

PLANILHA COMPROVAÇÃO DO ATENDIMENTO AS EXIGÊNCIAS MÍNIMAS DO EDITAL



Microcomputador BÁSICO com Monitor multimídia

Equipamento: ThinkCentre M75s Gen 2 AMD / Monitor Lenovo ThinkVision T24v-20 / Garantia 60 meses onsite

WWW.LIDERNOTEBOOKS.COM.BR

TERMO DE REFERÊNCIA	DOCUMENTO	PÁGINA
ATESTADOS E CERTIFICADOS ESPECÍFICOS AO OBJETO		
8.1. O equipamento ofertado deverá constar no Microsoft Windows Catalog. A comprovação da compatibilidade será efetuada pela apresentação do documento Hardware Compatibility Test Report emitido especificamente para o modelo no sistema operacional pré-instalado, em https://partido.microsoft.com/en-us/download/hardware/search/ . Caso a Microsoft ainda não tenha disponibilizado em seu site de consulta produtos com HCL para o Windows 11, será aceita a comprovação com o certificado para o Windows 10.	Anexo II - M75s_HCL Microsoft	
8.2. O equipamento e os monitores dos lotes 1 e 2 devem ser comprovadamente aderentes à portaria 170/2012 do INMETRO no que se refere a segurança, compatibilidade eletromagnética e eficiência energética para os usuários e instalações. Serão aceitas, para comprovação dos requisitos dessa portaria, as normas IEC 60950 e IEC 61000 ou Energy Star, independentemente da versão, além de outras que contemplem eficiência similar.	Anexo II - M75s_IEC60950 / M75s_IEC61000 / M75s_INMETRO 170-2012 / Energy Star Lenovo_...T24v-20...D2022870-2022-07-14 / eu-doc-124v-20-IEC61000-60950_rohs	
8.3. Baixo nível de ruído conforme ISO 9296, NBR 10152 ou equivalente.	Anexo II - M75s_ISO 9296 / Lenovo Acoustics M75s Iso 7779 / T24V_ISO 9296	Pág.05 / /
8.4. Todos os dispositivos de hardware (lotes 1 e 2), além de seus drivers deverão ser compatíveis com os sistemas operacionais Windows 10/11 e Linux Kernel 4.0 ou superior.	Anexo II - M75s_HCL Linux	
8.5. O modelo de equipamento deve estar em conformidade com o padrão RoHS (Restriction of Hazardous Substances), isto é, ser constituído com materiais que não agredem o meio ambiente, respeitando a INSTRUÇÃO NORMATIVA Nº 01, DE 19 DE JANEIRO DE 2010, art. 5º. A comprovação do disposto neste artigo poderá ser feita mediante apresentação de certificação emitida por instituição pública oficial ou instituição credenciada, ou por qualquer outro meio de prova que ateste que o bem fornecido cumpre com as exigências ambientais.	Anexo I - Declaração do Fabricante e Anexo II - M75s_IEC61000_ROHS / eu-doc-124v-20-IEC61000-60950_rohs	
8.6. Para os monitores e fontes dos lotes 1 e 2: Certificado Energy Star ou certificação emitida pelo INMETRO ou entidade acreditada pelo INMETRO em conformidade com a Portaria n.º 170, de 10 de abril de 2012, nos quesitos de eficiência energética, segurança e compatibilidade eletromagnética.	Anexo I - Declaração do Fabricante e Anexo II - M75s_INMETRO 170-2012 / M75s_ENERGY STAR / Anexo I - ThinkVision_T24v_20_Spec / Energy Star Lenovo_...T24v-20...D2022870-2022-07-14 / eu-doc-124v-20-IEC61000-60950_rohs	
8.7. Para as fontes dos lotes 1 e 2: O modelo de fonte fornecido deve estar cadastrado no site www.80plus.com na categoria Bronze ou superior, em nome do fabricante do equipamento.	Anexo I - Declaração do Fabricante / 80PLUSCertificationFonte	
8.8. Para os monitores dos lotes 1 e 2: Os monitores multimídia devem possuir compatibilidade e suporte para uso do Windows Hello.	Anexo I - Declaração do Fabricante / ThinkVision T24v-20_datasheet	
9 - ESPECIALIZAÇÃO DE PROFISSIONAL E ATESTADO DE CAPACIDADE:		
9.1. O licitante deverá apresentar declaração do FABRICANTE informando que ele encutará, dentro da fábrica, o procedimento de replicação da imagem do disco (lotes 1, 2 e 3) e suas devidas checagens e testes de qualidade pós clonagem.	Anexo I - Declaração do Fabricante	
10 - GARANTIA:		
10.1. Fica estipulada a garantia com cobertura total do equipamento de 60 (sessenta) meses do FABRICANTE, e 36 (trinta e seis) meses da bateria do notebook (lote 3), sendo prestada on site em Belo Horizonte.	Anexo I - Declaração do Fabricante	
10.2. A garantia será prestada pelo FABRICANTE ou sua rede de assistência técnica credenciada e deverá cobrir os micros, notebooks, servidores, monitores, teclado e mouse, nas mesmas condições.	Anexo I - Declaração do Fabricante	
10.3. A garantia deverá ser prestada, atendendo ao SLA proposto neste Termo de Referência, mesmo após findado a vigência contratual e todas as obrigações administrativas das partes. Caso ocorra descumprimento excessivo de prazos de solução, o fornecedor ou licitante vencedor assumirá a responsabilidade solidária junto a fábrica na resolução dos problemas.	Anexo I - Declaração do Fabricante / Proposta Comercial	
10.4. A garantia começará a contar a partir da data da emissão da nota fiscal do fornecedor (ou documento equivalente). A nota fiscal da fábrica não terá qualquer relação com a data de início da garantia dos equipamentos, salvo se ela for a licitante vencedora.		
10.5. Cabe ao fornecedor, após a emissão da nota fiscal, fazer a transferência de propriedade dos equipamentos, dos prazos de garantia acordados neste Termo de Referência junto ao fabricante e dos especificações exigidas (retenção do disco e SLAs). A garantia poderá ser verificada por consulta aberta no site do fabricante através do número de série e/ou etiqueta de serviço.	Anexo I - Declaração do Fabricante / Anexo II - Consulta garantia T24v 20 - Lenovo Support BR / Consulta garantia M75s gen 2 - Lenovo Support BR	
10.6. Fica acertado que, por cobertura total, entende-se a substituição ou reparação de qualquer peça e sistema operacional, já existente no equipamento quando da entrega pela Contratante, ainda que por desgaste, incluindo toda a mão de obra necessária à intervenção técnica, durante todo período especificado nesta cláusula, sem ônus para a Contratante.	Proposta Comercial	
10.7. Quando o licitante não for o próprio fabricante, a garantia do fabricante for menor que o estipulado na especificação 10.1 e o licitante fornecer uma "extensão de garantia", "prazo de garantia estendido" ou "modalidade de prestação de serviços para atendimento on-site e/ou tempos de reparo", o licitante deverá informar na proposta comercial o respectivo código junto ao fabricante dos serviços adicionais incluídos. Para comprovação, poderá ser apresentado pelos licitantes e/ou fabricantes declaração ou outro documento informando sobre os prazos de atendimento/reparo, ou, se couber, o Partnumber do serviço ofertado.	Anexo I - Declaração do Fabricante / Proposta Comercial	
10.8. Deverá ser disponibilizado pelo fabricante ou sua rede credenciada, Serviço de Atendimento ao Cliente (SAC) para abertura de chamado de assistência técnica, de segunda a sexta-feira, a partir de 08:00 até às 18:00 horas, podendo ser via atendimento telefônico, on line, acesso remoto, bem como por qualquer outro meio eficaz disponibilizado para abertura dos chamados de assistência técnica.	Anexo I - Declaração do Fabricante	
10.9. Durante a abertura do chamado, o fabricante ou sua rede de assistência técnica credenciada poderá realizar um pré-atendimento inicial/analtico, via SAC, a fim de solucionar o problema relatado.	Anexo I - Declaração do Fabricante / Proposta Comercial	
10.10. O prazo de atendimento será iniciado no próximo dia útil após a abertura do chamado.	Anexo I - Declaração do Fabricante / Proposta comercial	
10.11. O primeiro atendimento deverá ser executado no próximo dia útil da abertura do chamado e o reparo em até 48 horas.	Anexo I - Declaração do Fabricante / Proposta comercial	
10.12. Em caso da impossibilidade em solucionar o problema no prazo estipulado no item 10.10, o fabricante ou sua rede de assistência técnica credenciada compromete-se a substituir o equipamento defeituoso, até o término do reparo dele, por outro equivalente ou superior, de sua propriedade, a fim de proporcionar a operacionalização do equipamento e a continuidade da rotina de trabalho dos usuários. Não sendo possível o reparo, um equipamento novo, igual ou superior, deverá ser fornecido em garantia. Não serão aceitos em hipótese alguma e sob qualquer justificativa um equipamento de reuso para cobrir a garantia quando não houver reparo.	Proposta comercial	
10.13. O atendimento às chamadas técnicas durante o período de garantia será realizado em dias úteis, ou seja, de segunda a sexta-feira, a partir de 08:00 até às 18:00 horas.	Anexo I - Declaração do Fabricante / Proposta comercial	
10.14. O fabricante ou sua rede de assistência técnica credenciada deverá manter registros escritos dos referidos chamados constando o nome do técnico que prestou o atendimento e uma descrição resumida do problema.	Proposta Comercial	
10.15. O MPMG solicitará os registros de atendimento do item 10.9 sempre que julgar necessário a fim de avaliar e contabilizar os atendimentos executados.	Proposta Comercial	
10.16. Por motivo de Segurança da Informação, toda e qualquer Unidade de Armazenamento (disco rígido) substituída em garantia deverá permanecer em posse do MPMG (retenção do disco).	Anexo I - Declaração do Fabricante / Proposta comercial	
10.17. A abertura do gabinete poderá ser realizada pelos próprios técnicos do laboratório de TI do MPMG, sem necessidade de autorização prévia e sem perda da garantia.	Anexo I - Declaração do Fabricante / Proposta comercial	
10.18. Só serão aceitos peças e componentes novos e originais, salvo nos casos fundamentados por escrito e aceitos pela contratante.	Anexo I - Declaração do Fabricante / Proposta comercial	
10.19. O monitor deverá ter garantia contra pixels defeituosos, independentemente da quantidade de pixels identificados como defeituosos. Essa garantia contra pixels defeituosos pode ser prestada pelo fabricante ou pelo fornecedor.	Anexo I - Declaração do Fabricante / Proposta comercial	
10.20. Possuir recurso disponibilizado via web, site do próprio fabricante (informar url para comprovação), que permita verificar a garantia do equipamento através da inserção do seu número de série ou service TAG.	Anexo I - Declaração do Fabricante / Proposta comercial	
10.21. Os procedimentos de manutenção são de inteira responsabilidade da CONTRATADA. É vedado solicitar a CONTRATANTE procedimentos de manutenção, principalmente quando envolva riscos ao equipamento (como intervenções de hardware, atualização de firmware, etc.).	Proposta Comercial	
22.1.1. Processador		
22.1.1.1. O processador mínimo admitido nos equipamentos é o AMD Ryzen 5 PRO 5650G ou o Intel Core i5-10500.	Anexo I - ThinkCentre_M75s_Gen_2_Spec / Anexo I - AMD Ryzen 5 PRO 5650G_Spec	Pág.02
22.1.1.2. O processador oferecido deve possuir suporte a plataforma de gerenciamento com recursos embarcados para desempenho, segurança, gerenciabilidade e estabilidade. Ex: Intel vPro ou AMD Dash.	Anexo I - ThinkCentre_M75s_Gen_2_Spec / Declaração do Fabricante / Declaração do Fabricante AMD	Pág.07
22.1.1.3. Deverá possuir placa de vídeo integrada ao chip.	Anexo I - ThinkCentre_M75s_Gen_2_Spec / AMD Ryzen 5 PRO 5650G_Spec	Pág.02
22.1.1.4. Deve possuir 6 núcleos físicos e 12 threads.	Anexo I - ThinkCentre_M75s_Gen_2_Spec / AMD Ryzen 5 PRO 5650G_Spec	Pág.02
22.1.1.5. O processador deve operar dentro das especificações originais de seu fabricante e suportar tecnologia de virtualização.	Anexo I - Declaração do Fabricante / Declaração do Fabricante AMD	
22.1.1.6. Deverá pertencer a geração mais recente e disponível para o fabricante do equipamento com fábrica no Brasil.	Anexo I - Declaração do Fabricante / Declaração do Fabricante AMD	
22.1.1.6.1. A cada solicitação na Ata de Registro de Preços será exigido o envio do processador da última geração, respeitando o tipo de processador exigido no item 22.1.1.1 e os itens 22.1.1.4 e 22.1.1.6.		
22.1.1.7. É obrigatório informar o modelo do processador ofertado na proposta.	Anexo I - Declaração do Fabricante	
22.1.2. Placa-mãe		
22.1.2.1. Placa mãe da mesma marca do fabricante do equipamento, desenvolvida especificamente para o modelo ofertado. Não serão aceitas placas de livre comercialização no mercado ou regime de OEM;	Anexo I - Declaração do Fabricante	
22.1.2.2. Possuir 1 (um) slot PCI Express x16 3.0 ou superior.	Anexo I - ThinkCentre_M75s_Gen_2_Spec	Pág.05
22.1.2.3. O chipset deve ser da mesma marca do fabricante do processador, com suporte ao barramento de comunicação com o processador compartilhando da mesma velocidade;	Anexo I - ThinkCentre_M75s_Gen_2_Spec	Pág.03

22.1.2.4. Chip de segurança TPM dedicado (Trusted Platform Module) na versão 2.0 integrado para criptografia; não serão aceitas soluções via software ou baseadas em firmware.	Anexo I - ThinkCentre_M75s_Gen_2_Spec / TPM (Windows 10) + BitLocker Microsoft	Pág.06
22.1.2.4.1. Um chip TPM é um processador de criptografia seguro projetado para executar operações criptográficas. O chip inclui vários mecanismos de segurança física para torná-lo resistente a violações, e um software mal-intencionado não pode violar as funções de segurança do TPM. Tal mecanismo é exigência de funcionamento do Windows 11.	Anexo I - ThinkCentre_M75s_Gen_2_Spec / TPM (Windows 10) + BitLocker Microsoft	
22.1.3. BIOS		
22.1.3.1. A BIOS deve ser capaz de armazenar o número de série do equipamento além de disponibilizar campo editável que permita inserir identificação customizada podendo ser consultada por software de gerenciamento, como o número de patrimônio, por exemplo.	Anexo I - Declaração do Fabricante / Anexo II - BIOS ASSET TAG - PATRIMONIO BIOS	
22.1.3.2. BIOS com recursos de controle de permissão através de senhas, uma para inicializar o computador e outra para acesso e alterações das configurações do programa "setup" da BIOS;	Anexo I - Declaração do Fabricante / ThinkCentre_M75s_Gen_2_Spec / ThinkCentre_M75s_Gen_2_Manual_compressed	/ Pág. 07 / Pág.20
22.1.3.3. Deve possuir solução integrada a BIOS UEFI para diagnóstico do hardware além de identificar falhas de pelo menos os seguintes itens: processador, memória, unidades de armazenamento, interface gráfica e slots PCIe.	Anexo I - Declaração do Fabricante / Anexo II - LENOVO DIAGNOSTICS UEFI / LENOVO DIAGNOSTICS SOFTWARE	
22.1.3.3.1. A ferramenta deve possuir interface gráfica, sendo possível executar o diagnóstico de cada item individualmente, ou teste completo dos componentes em único comando (caso necessário detectar falhas em mais de um item).	Anexo I - Declaração do Fabricante / Anexo II - LENOVO DIAGNOSTICS UEFI / LENOVO DIAGNOSTICS SOFTWARE	
22.1.3.3.2. Os códigos de erro gerados pelas falhas encontradas devem ser suficientes para indicar os problemas do equipamento na abertura do chamado técnico em garantia junto ao fabricante. Não serão aceitos softwares externos para esta aplicação.	Anexo I - Declaração do Fabricante / Anexo II - LENOVO DIAGNOSTICS UEFI / LENOVO DIAGNOSTICS SOFTWARE	
22.1.3.4. Deve permitir atualização da BIOS em ambiente Windows x64.	Anexo I - Declaração do Fabricante / Anexo II - Lenovo System Update / Lenovo Vantage	
22.1.3.5. As atualizações da BIOS deverão ser disponibilizadas no site do fabricante do equipamento.	Anexo I - Declaração do Fabricante / Anexo II - Drivers Lenovo M75s Gen 2 czeanne - Lenovo Support BR	
22.1.3.6. BIOS desenvolvida pelo mesmo fabricante do equipamento ou via Copyright. O fabricante do computador deverá possuir livre direito de edição sobre a BIOS, garantindo assim adaptabilidade do conjunto adquirido;	Anexo I - Declaração do Fabricante	
22.1.3.7. A BIOS deverá ser desenvolvida de acordo com o padrão de segurança NIST 800-147 ou ISO/IEC 19678:2015 ou outra norma que se equivale a estas.	Anexo I - Declaração do Fabricante / Anexo II - BIOS NIST 800_88 / NIST800	
22.1.3.7.1. A solicitação desse padrão visa segurança. Ela impede atualizações ou alterações não permitidas na BIOS em razão de malware, vírus ou atualizações mal-intencionadas.	Anexo I - Declaração do Fabricante / Anexo II - BIOS NIST 800_88 / NIST800	
22.1.4. Memória		
22.1.4.1. Memória DDR4-2666 SDRAM ou superior.	Anexo I - ThinkCentre_M75s_Gen_2_Spec	Pág.03
22.1.4.2. 16 (dezesseis) GB instalados em um único módulo.	Anexo I - ThinkCentre_M75s_Gen_2_Spec / Declaração do Fabricante	
22.1.4.3. A placa mãe deve conter no mínimo 2 (dois) slots de memória, sendo um deles livre para possibilitar upgrade.	Anexo I - ThinkCentre_M75s_Gen_2_Spec / Declaração do Fabricante	
22.1.4.4. Expansível a no mínimo 64GB.	Anexo I - ThinkCentre_M75s_Gen_2_Spec	Pág.03
22.1.4.5. O módulo de memória deve ser homologado pelo fabricante e deve ser idêntico em marca/modelo para todos os computadores do lote.	Anexo I - Declaração do Fabricante	
22.1.5. Gabinete		
22.1.5.1. Gabinete tipo SFF (Small Form Factor).	Anexo I - ThinkCentre_M75s_Gen_2_Spec	Pág.05
22.1.5.2. Abertura tool-less para o gabinete. É permitido o uso de parafusos recartilhados apenas na tampa do gabinete.	Anexo I - ThinkCentre_M75s_Gen_2_Spec / Declaração do Fabricante	
22.1.5.3. O projeto tool-less deverá ser original do fabricante do equipamento, não sendo aceito nenhum tipo de adaptação.	Anexo I - ThinkCentre_M75s_Gen_2_Spec / Declaração do Fabricante	
22.1.5.4. Acabamento interno composto de superfícies não cortantes.	Declaração do Fabricante	
22.1.5.5. 1 baía interna de 3,5" ou 2,5".	Anexo I - ThinkCentre_M75s_Gen_2_Spec	Pág.05
22.1.5.6. 1 baía externa para DVD no padrão slim.	Anexo I - ThinkCentre_M75s_Gen_2_Spec	Pág.05
22.1.5.7. Conectores de entrada de microfone e de saída de fones de ouvido ou conector tipo COMBO.	Anexo I - ThinkCentre_M75s_Gen_2_Spec	Pág.06
22.1.5.8. Mínimo de 4 (quatro) portas USB frontais, sendo ao menos 2 (duas) 3.1, podendo ser tipo A ou C.	Anexo I - ThinkCentre_M75s_Gen_2_Spec	Pág.06
22.1.5.9. Mínimo de 4 (quatro) portas USB traseiras do tipo A, todas as portas deverão ser conectadas diretamente na placa mãe sem o uso de hubs e/ou adaptadores PCI.	Anexo I - ThinkCentre_M75s_Gen_2_Spec	Pág.06
22.1.5.10. 2 (duas) conexões de vídeo digitais nativas, sendo uma DisplayPort e outra HDMI, não sendo permitido o fornecimento de conversores ou adaptadores para essas interfaces.	Anexo I - ThinkCentre_M75s_Gen_2_Spec	Pág.06
22.1.5.12. Permitir a colocação de dispositivo antifurto do tipo Kensington (dispositivo de travamento).	Anexo I - ThinkCentre_M75s_Gen_2_Spec / Declaração do Fabricante	Pág. 06
22.1.5.13. Não existir quaisquer adaptações no gabinete destinadas a implementar os sistemas de abertura/fechamento rápido e de segurança.	Anexo I - Declaração do Fabricante	
22.1.5.14. Sistema de ventilação que permita o uso na posição horizontal com o monitor em cima do gabinete ou em posição vertical sem prejuízo da ventilação.	Anexo I - Declaração do Fabricante	
22.1.5.15. Possuir sensor de intrusão (chassi intrusion) que será captado via software de inventário.	Anexo I - ThinkCentre_M75s_Gen_2_Spec	Pág.06
22.1.5.16. O gabinete deve possuir Led de indicação de atividade do Disco Rígido e de indicação de micro ligado.	Anexo I - ThinkCentre_M75s_Gen_2_Manual	Págs 07 e 08
22.1.6. Fonte de alimentação		
22.1.6.1. Fonte de alimentação para corrente alternada com tensões de entrada de 100 a 240 VAC (+/-10%), 50-60Hz;	Anexo I - Declaração do Fabricante	
22.1.6.2. Seleção automática de tensão suficiente para suportar todos os dispositivos internos na configuração máxima admitida pelo equipamento (placa principal, interfaces, discos rígidos, memória RAM e demais periféricos) e que implemente PFC (Power Factor Correction) ativo com eficiência igual ou superior a 85% em 50% de carga máxima (PFC 60+) com no mínimo 180 (cento e oitenta) watts de potência.	Anexo I - Declaração do Fabricante / Anexo II - 80PLUSCertificationFonte	
22.1.7. Interface de vídeo		
22.1.7.1. Controladora de vídeo HD integrada sendo do mesmo fabricante do processador.	Anexo I - Declaração do Fabricante / Declaração do Fabricante AMD	
22.1.7.2. Suporte a DirectX 12 e OpenGL 4.5.	Anexo I - Declaração do Fabricante / Declaração do Fabricante AMD	
22.1.7.3. Deverá ser compatível com uso de 2 monitores de vídeo simultaneamente.	Anexo I - Declaração do Fabricante / ThinkCentre_M75s_Gen_2_Spec	/ Pág.03
22.1.8. Unidade de Armazenamento		
22.1.8.1. Um disco SSD (Solid State Drive), do tipo M.2 PCIe NVMe interno ao gabinete. Não será aceito solução híbrida.	Anexo I - Declaração do Fabricante / SSD 256GB	
22.1.8.2. Capacidade de armazenamento de 256 GB.	Anexo I - Declaração do Fabricante / SSD 256GB	
22.1.9. Unidade de Mídia Óptica		
22.1.9.1. Unidade leitora e gravadora de DVD interno.	Anexo I - Declaração do Fabricante / ThinkCentre_M75s_Gen_2_Spec	/ Pág. 04
22.1.9.2. Velocidade de operação fix mínima.	Anexo I - Declaração do Fabricante / ThinkCentre_M75s_Gen_2_Spec	/ Pág. 04
22.1.9.3. Configuração via software.	Anexo I - Declaração do Fabricante / ThinkCentre_M75s_Gen_2_Spec	/ Pág. 04
22.1.10. Interface de rede		
22.1.10.1. Placa de rede integrada padrão Gigabit Ethernet com leds indicativos da funcionalidade da rede.	Anexo I - Declaração do Fabricante / ThinkCentre_M75s_Gen_2_Spec	/ Pág. 05
22.1.10.2. Suporte a PXE e Wake-On-Lan.	Anexo I - Declaração do Fabricante / ThinkCentre_M75s_Gen_2_Spec	/ Pág. 05
22.1.11. Interface de som		
22.1.11.1. Possuir controladora integrada.	Anexo I - Declaração do Fabricante / ThinkCentre_M75s_Gen_2_Spec	
22.1.11.2. Conector para saída de áudio na parte traseira do gabinete.	Anexo I - Declaração do Fabricante / ThinkCentre_M75s_Gen_2_Spec	
22.1.11.3. Conectores de saída e microfone na parte frontal do gabinete, sendo aceito conectores do tipo combo.	Anexo I - Declaração do Fabricante / ThinkCentre_M75s_Gen_2_Spec	
22.1.11.4. Possuir alto falante interno ao gabinete de no mínimo 1 Watt RMS.	Anexo I - Declaração do Fabricante / ThinkCentre_M75s_Gen_2_Spec	
22.1.12. Teclado		
22.1.12.1. Teclado padrão brasileiro ABNT2 do tipo membrana.	Anexo I - Declaração do Fabricante / Teclado Lenovo	
22.1.12.2. Teclado resistente ao derramamento de líquidos, com teclas impressas a laser ou tecnologia equivalente, resistentes à abrasão e uso contínuo.	Anexo I - Declaração do Fabricante / Teclado Lenovo	
22.1.12.3. Mínimo de 1 posição para regulagem de altura/inclinação.	Anexo I - Declaração do Fabricante / Teclado Lenovo	
22.1.12.4. Conexão USB sem uso de adaptadores.	Anexo I - Declaração do Fabricante / Teclado Lenovo	
22.1.12.5. A garantia do teclado deverá ser prestada pelo fabricante nas mesmas condições do equipamento, inclusive quando por desgaste (abrasão) prematuro das teclas.	Anexo I - Declaração do Fabricante / Teclado Lenovo	
22.1.12.6. O teclado deverá ser do mesmo fabricante do computador.	Anexo I - Declaração do Fabricante / Teclado Lenovo	
22.1.13. Mouse		
22.1.13.1. Mouse óptico ambidestro de tamanho padrão. Não serão aceitos mini mouses.	Anexo I - Declaração do Fabricante / Mouse Lenovo	

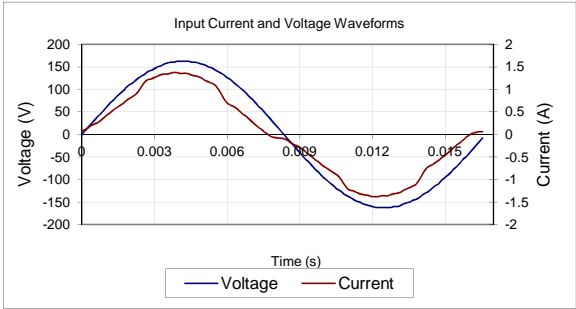
22.1.13.2. Conexão USB sem uso de adaptadores.	Anexo I - Declaração do Fabricante / Mouse Lenovo	
22.1.13.3. Resolução mínima de 800 dpi.	Anexo I - Declaração do Fabricante / Mouse Lenovo	
22.1.13.4. Deverá ser fornecido mouse pad de tamanho retangular (mínimo: 17 cm de altura e 21 cm de comprimento), feito de plástico e borracha aderente. O acessório deverá ser o mesmo para todos os equipamentos do lote. Deverão ser de cor escura. A exceção deste item é para os casos em que o fabricante forneça o item de sua própria marca.	Anexo I - Declaração do Fabricante / MousePad Lenovo	
22.1.13.5. A garantia do mouse deverá ser prestada pelo fabricante nas mesmas condições do equipamento.	Anexo I - Declaração do Fabricante / Mouse Lenovo	
22.1.13.6. O mouse deverá ser do mesmo fabricante do computador.	Anexo I - Declaração do Fabricante / Mouse Lenovo	
22.1.14. Sistema Operacional		
22.1.14.1. Acompanhar licença do sistema operacional Microsoft Windows 10 Professional, x64, versão em português do Brasil, pré-instalado, na modalidade OEM (Original Equipment Manufacturer).	Anexo I - Declaração do Fabricante / ThinkCentre M75s Gen 2 Spec	/ Pág. 03
22.1.14.1.1. As licenças do Windows 10 PRO devem possibilitar o upgrade para o Windows 11 PRO durante todo o período de garantia dos equipamentos.	Anexo I - Declaração do Fabricante / ThinkCentre M75s Gen 2 Spec	/ Pág. 03
22.1.15. Outros Requisitos		
22.1.15.1. Todos os equipamentos a serem entregues deverão ser idênticos, ou seja, todos os componentes externos e internos de mesmos modelos e marcas.	Anexo I - Declaração do Fabricante / Proposta Comercial	
22.1.15.2. Caso o componente não mais se encontre disponível no mercado, admitem-se substitutos com qualidade e características idênticas ou superiores, mediante nova homologação.	Anexo I - Declaração do Fabricante / Proposta Comercial	
22.1.15.3. Todos os cabos e conectores necessários ao funcionamento dos equipamentos deverão ser fornecidos com comprimento mínimo de 1,5m (um metro e cinquenta centímetros).	Anexo I - Declaração do Fabricante / Proposta Comercial	
22.1.15.4. Os cabos de conexão à rede elétrica (micro e monitor) deverão seguir o novo padrão brasileiro (NBR-14136).	Anexo I - Declaração do Fabricante / Proposta Comercial	
22.1.15.5. As unidades do equipamento deverão ser entregues devidamente acondicionadas em embalagens individuais adequadas, que utilizem preferencialmente materiais recicláveis, de forma a garantir a máxima proteção durante o transporte e a armazenagem.	Anexo I - Declaração do Fabricante / Proposta Comercial	
22.1.15.6. O equipamento (gabinete, monitor, teclado, mouse, dispositivos ópticos, dispositivo de E/S (entrada/saída) e demais componentes) obrigatoriamente deverá estar padronizado na cor preta, cinza, prata ou mesclado dessas.	Anexo I - Declaração do Fabricante / Proposta Comercial	
22.1.15.7. O equipamento deverá, comprovadamente, pertencer à linha corporativa do fabricante, não sendo aceitos equipamentos destinados ao uso doméstico.	Anexo I - Declaração do Fabricante	
22.1.15.8. Deverá fornecer Catálogo técnico oficial do produto que apresente as características técnicas em conformidade com as descritas no Edital. Caso os Catálogos Técnicos apresentados omitam alguma informação ou exigência técnica em relação aos descritivos do Edital e seus Anexos, deverá ser anexado aos mesmos a declaração do fabricante, completando estas informações, em português.		
22.1.15.9. Não serão aceitos produtos descontinuados por seus fabricantes.	Anexo I - Declaração do Fabricante	
22.1.15.10. O fabricante do equipamento deverá prover em seu site da internet todas as atualizações de BIOS e Drivers, bem como software do fabricante do equipamento que permita atualização de todos os componentes via console centralizada no Windows.	Anexo I - Declaração do Fabricante / Proposta Comercial / Anexo II - Lenovo Vantage / Lenovo System Update	
22.1.16. Monitor multimídia		
22.1.16.1. Tamanho mínimo de 23,8"	Anexo I - ThinkVision T24v 20 Spec	Pág.01
22.1.16.2. Resolução de tela de 1920x1080	Anexo I - ThinkVision T24v 20 Spec	Pág.01
22.1.16.3. Brilho mínimo de 250 cd/m ²	Anexo I - ThinkVision T24v 20 Spec	Pág.01
22.1.16.4. Relação de contraste estático de 1000:1	Anexo I - ThinkVision T24v 20 Spec	Pág.01
22.1.16.5. Tecnologia: IPS (In-Plane Switching).	Anexo I - ThinkVision T24v 20 Spec	Pág.01
22.1.16.6. Rotação/pivô de 90°.	Anexo I - ThinkVision T24v 20 Spec	Pág.01
22.1.16.7. Formato/taxa de proporção: 16:9.	Anexo I - ThinkVision T24v 20 Spec	Pág.01
22.1.16.8. Webcam integrada ao corpo do monitor com resolução mínima de 720P (HD), com sensor IR e 2 (dois) microfones digitais integrados.	Anexo I - ThinkVision T24v 20 Spec e ThinkVision T24v-20 datasheet	Pág.01
22.1.16.9. Alto falantes integrados ao monitor ou acoplados (soundbars), específicos da marca e do modelo.	Anexo I - ThinkVision T24v 20 Spec	Pág.01
22.1.16.10. Conectores de vídeo: mínimo 2 (duas) conexões de vídeo digitais, sendo uma DisplayPort e outra HDMI. Não será aceito a conexão DVI para atender à especificação nem adaptador para fornecer as interfaces.	Anexo I - ThinkVision T24v 20 Spec	Pág.01
22.1.16.11. Deverem ser fornecidos 2 (dois) cabos de vídeo (das portas digitais), compatíveis com o micro ofertado, sendo um HDMI e outro DisplayPort.	Anexo I - Declaração do Fabricante / Proposta Comercial	
22.1.16.12. O cabo de energia fornecido deve ser no padrão brasileiro (NBR-14136).	Anexo I - Declaração do Fabricante	
22.1.16.13. Fonte embutida no pedestal ou no corpo do monitor.	Anexo I - ThinkVision T24v 20 Spec	Pág.01
22.1.16.14. Cor predominante: preto, prata ou cinza.	Anexo I - ThinkVision T24v 20 Spec	Pág.01
22.1.16.15. O monitor deverá ser do mesmo fabricante do computador e seguir a mesma padronização do equipamento ou fornecido em regime de OEM - para tanto, OBRIGATORIA declaração do fabricante de monitores que comprove acordo entre o fabricante do computador e do monitor, garantindo assim a garantia e assistência técnica nas mesmas condições para ambos os componentes, conforme subitem garantia.	Anexo I - Declaração do Fabricante	

80 PLUS Verification and Testing Report

TYPICAL EFFICIENCY (50% Load):	87.04%
AVERAGE EFFICIENCY :	85.10%
80 PLUS COMPLIANT:	YES



Ecos ID #	4271
Manufacturer	Lenovo (United States), Inc.
Model Number	HK280-72PP
Serial Number	8SSP50A36177H1SZ52B0001
Year	2015
Type	CUSTOM
Test Date	3/18/15

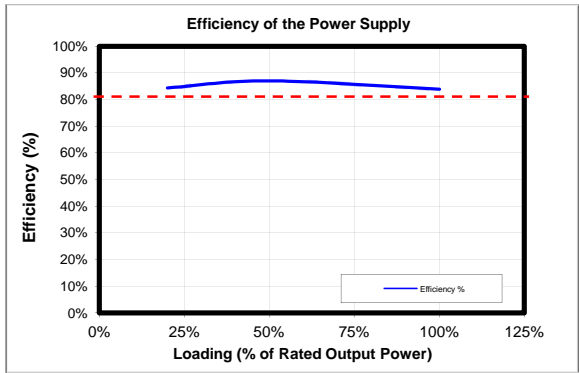
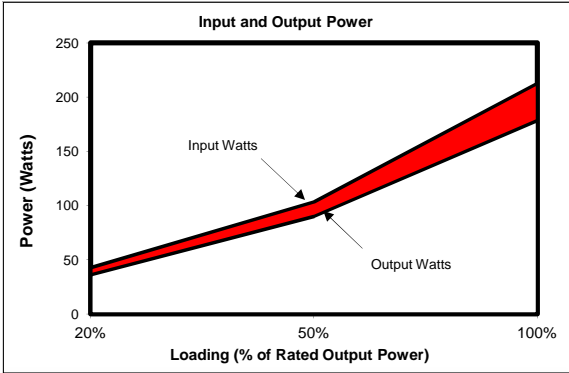


Input AC Current Waveform (ITHD = 14.57%, 50% Load)

Rated Specifications	Value	Units
Input Voltage	100-240	Volts
Input Current	3	Amps
Input Frequency	50/60	Hz
Rated Output Power	180	Watts

Note: All measurements were taken with input voltage at 115 V nominal at 60 Hz.

I _{RMS A}	PF	I _{THD} (%)	Load (%)	Input Watts	DC Terminal Voltage (V)/ DC Load Current (A)		Output Watts	Efficiency %
					12V (cumulative of 12V1, 12V2, etc.)	-12V		
0.23	0.87	13.85%	10%	23.00	12.01/1.49	12.69/0.02	18.10	78.69%
0.39	0.95	12.74%	20%	42.87	12/2.97	12.6/0.04	36.18	84.39%
0.92	0.98	14.57%	50%	103.47	11.95/7.43	12.51/0.1	90.06	87.04%
1.86	1.00	6.33%	100%	212.91	11.86/14.85	12.73/0.2	178.56	83.87%



These tests were conducted by a third party independent testing firm on behalf of the 80 PLUS Program. 80 PLUS is a certification program to promote highly-efficient power supplies (greater than 80% efficiency in the active mode) in technology applications. <http://www.80plus.org/>





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Lenovo HDMI to VGA Monitor Adapter

0B47069 7945

List Price (Tax excluded):

-

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FEATURE

TECH SPECS

Feature

Product Description

Trabalhe em trânsito. Conecte-se. O Adaptador de monitor HDMI para VGA de 20 cm Lenovo proporciona a melhor experiência de compatibilidade ao oferecer a interoperabilidade dos sistemas ThinkPad com projetores e monitores analógicos comerciais. O Adaptador permite conectar seu dispositivo a uma tela estendida ou trabalhar no modo espelhado com projetores VGA. A resolução máxima com suporte é de 1920 x 1080 a 60 Hz. O Adaptador de monitor HDMI para VGA Lenovo tem garantia de 3 anos. Para obter informações adicionais sobre opções, incluindo compatibilidade, acesse <http://www.lenovo.com/accessoriesguide> <http://www.lenovo.com/support/monitoraccessories>

Top Features

- A resolução máxima suportada é 1920 x 1080 a 60 Hz.
- o Adaptador de monitor HDMI para VGA Lenovo tem garantia de 3 anos

More Information

[Technical Support](#)

Tech Specs

Connectivity	HDMI
--------------	------

Compatibility

Operating System

OS Independent

Compatible Machines

Description	ID	Footnote
-------------	----	----------

-	82A4	
100e AMD G3-82J7 - 100e Gen 3	82J7	115. Support on-board ports only.
100e AMD G3-82J8 - 100e Gen 3	82J8	115. Support on-board ports only.
100e G3-82UY - 100e Gen 3	82UY	115. Support on-board ports only.
100e G3-82V0 - 100e Gen 3	82V0	115. Support on-board ports only.
100w AMD G3-82HY - 100w Gen 3	82HY	115. Support on-board ports only.
100w AMD G3-82J0 - 100w Gen 3	82J0	115. Support on-board ports only.
11e-20DA MT	20DA	
11e-20DB MT	20DB	
13w Yoga-82S1 - 13w Yoga	82S1	115. Support on-board ports only.
13w Yoga-82S2 - 13w Yoga	82S2	115. Support on-board ports only.
14 EDGE (Intel)-0199 Do Not Use	0199	
14 EDGE (Intel)-0578	0578	
14 EDGE (Intel)-MT 0579	0579	
14 EDGE (Intel)-MT 1141	1141	
14 EDGE (Intel)-MT 1167	1167	
14e Chrome G2-82M1 - 14e Chromebook Gen 2	82M1	115. Support on-board ports only.
14e Chrome G2-82M2 - 14e Chromebook Gen 2	82M2	115. Support on-board ports only.

14w G2-82N8 - 14w Gen 2	82N8	115. Support on-board ports only.
14w G2-82N9 - 14w Gen 2	82N9	115. Support on-board ports only.
15 EDGE Intel-MT 0301	0301	
15 EDGE Intel-MT 0302 Do Not Use	0302	
15 EDGE Intel-MT 0319	0319	
15 EDGE Intel-MT 1143	1143	
15 EDGE Intel-MT 1144	1144	
300e AMD 3rd Generation-82J9 - 300e Gen 3	82J9	115. Support on-board ports only.
300e AMD 3rd Generation-82JA - 300e Gen 3	82JA	115. Support on-board ports only.
300w AMD G3-82J1 - 300w Gen 3	82J1	115. Support on-board ports only.
300w AMD G3-82J2 - 300w Gen 3	82J2	115. Support on-board ports only.
500e G3-82JB - 500e Gen 3	82JB	115. Support on-board ports only.
500e G3-82JC - 500e Gen 3	82JC	115. Support on-board ports only.
500w G3-82J3 - 500w Gen 3	82J3	115. Support on-board ports only.
500w G3-82J4 - 500w Gen 3	82J4	115. Support on-board ports only.
A285-20MW MT	20MW	115. Support on-board ports only.
A285-20MX MT	20MX	115. Support on-board ports only.
A485-20MU MT	20MU	115. Support on-board ports only.

A485-20MV MT	20MV	115. Support on-board ports only.
B490-3772 MT	3772	
B590 HM77-MT 6274	6274	
B590 HM77-MT 8601	8601	
B590-MT 3761	3761	
C13 Yoga G1 Chromebook-20UX MT 2020	20UX	
C13 Yoga G1 Chromebook-20UY MT 2020	20UY	
C14 G1 Chromebook- 21C9 - C14 Gen 1 Chromebook	21C9	
C14 G1 Chromebook- 21CA - C14 Gen 1 Chromebook	21CA	
E135 Sub Series-3359 MT	3359	
E14 2nd Generation- 20TA MT 2020	20TA	115. Support on-board ports only.
E14 2nd Generation- 20TB MT 2020	20TB	115. Support on-board ports only.
E14 2nd Generation- ARE-20T6 MT 2020	20T6	115. Support on-board ports only.
E14 2nd Generation- ARE-20T7 MT 2020	20T7	115. Support on-board ports only.
E14 AMD 3rd Generation-20Y7 - E14 AMD Gen 3	20Y7	115. Support on-board ports only.
E14 AMD 3rd Generation-20YD - E14 AMD Gen 3	20YD	115. Support on-board ports only.

E14 AMD 3rd Generation-20YE - E14 AMD Gen 3	20YE	115. Support on-board ports only.
E14 AMD 3rd Generation-20YF - E14 AMD Gen 3	20YF	115. Support on-board ports only.
E14 AMD G4-21EB - E14 AMD Gen 4	21EB	115. Support on-board ports only.
E14 AMD G4-21EC - E14 AMD Gen 4	21EC	115. Support on-board ports only.
E14 G4-21E3 - E14 Gen 4	21E3	115. Support on-board ports only.
E14 G4-21E4 - E14 Gen 4	21E4	115. Support on-board ports only.
E14-IML-20RA MT	20RA	115. Support on-board ports only.
E14-IML-20RB MT	20RB	115. Support on-board ports only.
E15 2nd Generation- ARE-20T8 MT 2020	20T8	115. Support on-board ports only.
E15 2nd Generation- ARE-20T9 MT 2020	20T9	115. Support on-board ports only.
E15 AMD 3rd Generation-20YG - E15 AMD Gen 3	20YG	115. Support on-board ports only.
E15 AMD 3rd Generation-20YH - E15 AMD Gen 3	20YH	115. Support on-board ports only.
E15 AMD 3rd Generation-20YJ - E15 AMD Gen 3	20YJ	115. Support on-board ports only.
E15 AMD 3rd Generation-20YK - E15 AMD Gen 3	20YK	115. Support on-board ports only.
E15 AMD G4-21ED - E15 AMD Gen 4	21ED	115. Support on-board ports only.

E15 AMD G4-21EE - E15 AMD Gen 4	21EE	115. Support on-board ports only.
E15 G2-20TD MT 2020	20TD	115. Support on-board ports only.
E15 G2-20TE MT 2020	20TE	115. Support on-board ports only.
E15 G4-21E6 - E15 Gen 4	21E6	115. Support on-board ports only.
E15 G4-21E7 - E15 Gen 4	21E7	115. Support on-board ports only.
E15-IML-20RD MT	20RD	115. Support on-board ports only.
E15-IML-20RE MT	20RE	115. Support on-board ports only.
E1922s(New logo)-60G2	60G2	
E2054-19.5" Monitor- 60DF	60DF	
E330 Sub Series-3354 MT	3354	
E335 Sub Series-3355 MT	3355	
E41-45-82BF MT 2020	82BF	
E41-50-82HW MT 2020	82HW	
E41-55-82FJ MT 2020	82FJ	
E425 (AMD)-MT 1198	1198	
E430 Sub Series-3254 MT	3254	
E430 Sub Series-MT 6271	6271	
E430c Sub Series-3365 MT	3365	
E431 Sub Series-MT 6277	6277	
E431 Sub Series-MT 6886	6886	

E435 Sub Series-3256 MT	3256	
E435 Sub Series-3469 MT	3469	
E440 Sub Series-MT 20C5	20C5	
E445 Sub Series-MT 20B1	20B1	
E450 Sub Series-20DC	20DC	
E450 Sub Series-20DD	20DD	
E455 Sub Series-20DE	20DE	
E460-20ET MT	20ET	223 For Bay Trail model
E460-20EU MT	20EU	223 For Bay Trail model
E465-20EX MT	20EX	223 For Bay Trail model
E470-20H1 MT	20H1	223 For Bay Trail model
E470-20H2 MT	20H2	223 For Bay Trail model
E475-20H4 MT	20H4	223 For Bay Trail model
E480-20KN MT	20KN	115. Support on-board ports only.
E480-20KQ MT	20KQ	115. Support on-board ports only.
E480-3358 MT	3358	
E485-20KU MT	20KU	115. Support on-board ports only.
E490-20N8 MT	20N8	115. Support on-board ports only.
E490-20N9 MT	20N9	115. Support on-board ports only.
E490s-20NG MT	20NG	115. Support on-board ports only.
E495-20NE MT	20NE	115. Support on-board ports only.
E525 (AMD)-MT 1200	1200	
E530 Sub Series-3259 MT	3259	

E530 Sub Series-MT 6272	6272	
E530c Sub Series-3366 MT	3366	
E531 Sub Series-MT 6885	6885	
E531 Sub Series-MT 6887	6887	
E535 Sub Series-3260 MT	3260	
E540 Sub Series-MT 20C6	20C6	
E545 Sub Series-MT 20B2	20B2	
E550 Sub Series-20DF	20DF	
E550 Sub Series-20DG	20DG	
E550c Sub Series-20E0 MT	20E0	
E555 Sub Series-20DH	20DH	
E560-20EV MT	20EV	223 For Bay Trail model
E560-20EW MT	20EW	223 For Bay Trail model
E560p-20G5 MT	20G5	223 For Bay Trail model
E565-20EY MT	20EY	223 For Bay Trail model
E570-20H5 MT	20H5	223 For Bay Trail model
E570-20H6 MT	20H6	223 For Bay Trail model
E575-20H8 MT	20H8	223 For Bay Trail model
E580-20KS MT	20KS	115. Support on-board ports only.
E580-20KT MT	20KT	115. Support on-board ports only.
E585-20KV MT	20KV	115. Support on-board ports only.
E590-20NB MT	20NB	115. Support on-board ports only.

E590-20NC MT	20NC	115. Support on-board ports only.
E595-20NF MT	20NF	115. Support on-board ports only.
Edge 11 (AMD)-MT 2545	2545	
Edge 11 (Intel)-MT 0328	0328	
Edge 12"-MT 5038	5038	
Edge 120-MT 3043	3043	
Edge 125-MT 3035	3035	
Edge 2 13" (AMD)-MT 0221	0221	
Edge 2 13" (Intel)-MT 0217	0217	
Edge 2 13" (Intel)-MT 0250	0250	
Edge 320-MT 1298	1298	
Edge 325-MT 1297	1297	
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IdeaPad 3 15ALC6- 82MF - IdeaPad 3 15ALC6	82MF	
IdeaPad 3 15ARE05- MT 81W4	81W4	
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IdeaPad 5 14ARE05- MT 81YM	81YM	
IdeaPad 5 14IAL7- 82SD - IdeaPad 5 14IAL7	82SD	
IdeaPad 5 14IIL05-MT 81YH	81YH	
IdeaPad 5 14ITL05-MT 82FE	82FE	
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IdeaPad 5 15ALC05- 82LN - IdeaPad 5 15ALC05	82LN	
IdeaPad 5 15ARE05- MT 81YQ	81YQ	
IdeaPad 5 15IAL7-82SF - IdeaPad 5 15IAL7	82SF	
IdeaPad 5 15IIL05-MT 81YK	81YK	
IdeaPad 5 15ITL05-MT 82FG	82FG	

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IdeaPad 5 Pro 14ARH7-82SJ - IdeaPad 5 Pro 14ARH7	82SJ	
IdeaPad 5 Pro 14IAP7- 82SH - IdeaPad 5 Pro 14IAP7	82SH	
IdeaPad 5 Pro 14ITL6- 82L3 - IdeaPad 5 Pro 14ITL6	82L3	
IdeaPad 5 Pro 16ACH6-82L5 - IdeaPad 5 Pro 16ACH6	82L5	
IdeaPad 5 Pro 16ARH7-82SN - IdeaPad 5 Pro 16ARH7	82SN	
IdeaPad 5 Pro 16IAH7- 82SK - IdeaPad 5 Pro 16IAH7	82SK	
IdeaPad 5 Pro 16IHU6- 82L9 - IdeaPad 5 Pro 16IHU6	82L9	
IdeaPad Creator 5 16ACH6-82L6 - IdeaPad Creator 5 16ACH6	82L6	
IdeaPad Duet 3 10IGL5-MT 82AT	82AT	
IdeaPad Flex 3 11ADA05-MT 82G4	82G4	
IdeaPad Flex 3 11IGL05-MT 82B2	82B2	
IdeaPad Flex 3 CB 11IGL05-MT 82BB	82BB	

IdeaPad Flex 3 CB 11M735-MT 82HG	82HG	
IdeaPad Flex 3 Chrome 15IJL7-82T3 - IdeaPad Flex 3 Chrome 15IJL7	82T3	
IdeaPad Flex 5 14ALC7-82R9 - IdeaPad Flex 5 14ALC7	82R9	
IdeaPad Flex 5 14IAU7- 82R7 - IdeaPad Flex 5 14IAU7	82R7	
IdeaPad Flex 5 14IIL05- MT 81WS	81WS	
IdeaPad Flex 5 14IIL05- MT 81X1	81X1	
IdeaPad Flex 5 14ITL05-82HS - IdeaPad Flex 5 14ITL05	82HS	
IdeaPad Flex 5 14ITL05-82LT - IdeaPad Flex 5 14ITL05	82LT	
IdeaPad Flex 5 15IIL05- MT 81X3	81X3	
IdeaPad Flex 5 15ITL05-82HT - IdeaPad Flex 5 15ITL05	82HT	
IdeaPad Flex 5 16ALC7-82RA - IdeaPad Flex 5 16ALC7	82RA	
IdeaPad Flex 5 16IAU7- 82R8 - IdeaPad Flex 5 16IAU7	82R8	
IdeaPad Flex 5-14ARE- 05-MT 81X2	81X2	

IdeaPad Gaming 3 15ACH6-82K2 - IdeaPad Gaming 3 15ACH6	82K2	
IdeaPad Gaming 3 15ACH6-82MJ - IdeaPad Gaming 3 15ACH6	82MJ	
IdeaPad Gaming 3 15ARH05-MT 82EY	82EY	
IdeaPad Gaming 3 15ARH7-82SB - IdeaPad Gaming 3 15ARH7	82SB	
IdeaPad Gaming 3 15IAH7-82S9 - IdeaPad Gaming 3 15IAH7	82S9	
IdeaPad Gaming 3 15IHU6-82K1 - IdeaPad Gaming 3 15IHU6	82K1	
IdeaPad Gaming 3 15IHU6-82MG - IdeaPad Gaming 3 15IHU6	82MG	
IdeaPad Gaming 3 16ARH7-82SC - IdeaPad Gaming 3 16ARH7	82SC	
IdeaPad Gaming 3 16IAH7-82SA - IdeaPad Gaming 3 16IAH7	82SA	
IdeaPad L3 15IML05- MT 81Y3	81Y3	

IdeaPad L3 15ITL6-MT 82HL	82HL	
IdeaPad L340-15IRH Gaming-MT 81LK	81LK	
IdeaPad L340-15IRH Gaming-MT 81TR	81TR	
IdeaPad L340-17IRH Gaming-MT 81LL	81LL	
IdeaPad Slim 7 14ITL05-MT 82A6	82A6	
IdeaPad Slim 7 15IIL05- MT 82AD	82AD	
IdeaPad Slim 7 15IMH05-MT 82AE	82AE	
IdeaPad Slim 7 15ITL05-MT 82AF	82AF	
IdeaPad Slim 7 Pro 16ACH6-82QR - IdeaPad Slim 7 Pro 16ACH6	82QR	
K14 AMD G1-21CU - K14 Gen 1	21CU	115. Support on-board ports only.
K14 AMD G1-21CV - K14 Gen 1	21CV	115. Support on-board ports only.
K14 G1-21CS - K14 Gen 1	21CS	115. Support on-board ports only.
K14 G1-21CT - K14 Gen 1	21CT	115. Support on-board ports only.
L13 Clam 2nd Generation-20VH MT 2020	20VH	115. Support on-board ports only.
L13 Clam 2nd Generation-20VJ MT 2020	20VJ	115. Support on-board ports only.
L13 Clam AMD G2- 21AB - L13 Clam Gen 2	21AB	115. Support on-board ports only.

L13 Clam AMD G2- 21AC - L13 Clam Gen 2	21AC	115. Support on-board ports only.
L13 Clam AMD G3- 21B9 - L13 Clam Gen 3	21B9	115. Support on-board ports only.
L13 Clam AMD G3- 21BA - L13 Clam Gen 3	21BA	115. Support on-board ports only.
L13 Clam G3-21B3 - L13 Clam Gen 3	21B3	115. Support on-board ports only.
L13 Clam G3-21B4 - L13 Clam Gen 3	21B4	115. Support on-board ports only.
L13 Clam-20R3 MT	20R3	115. Support on-board ports only.
L13 Clam-20R4 MT	20R4	115. Support on-board ports only.
L13 Yoga 2nd Generation-20VK MT 2020	20VK	115. Support on-board ports only.
L13 Yoga 2nd Generation-20VL MT 2020	20VL	115. Support on-board ports only.
L13 Yoga AMD G2- 21AD - L13 Yoga Gen 2	21AD	115. Support on-board ports only.
L13 Yoga AMD G2- 21AE - L13 Yoga Gen 2	21AE	115. Support on-board ports only.
L13 Yoga AMD G3- 21BB - L13 Yoga Gen 3	21BB	115. Support on-board ports only.
L13 Yoga AMD G3- 21BC - L13 Yoga Gen 3	21BC	115. Support on-board ports only.
L13 Yoga G3-21B5 - L13 Yoga Gen 3	21B5	115. Support on-board ports only.
L13 Yoga G3-21B6 - L13 Yoga Gen 3	21B6	115. Support on-board ports only.
L13 Yoga-20R5 MT	20R5	115. Support on-board ports only.
L13 Yoga-20R6 MT	20R6	115. Support on-board ports only.
L14 AMD G1-20U5 MT 2020	20U5	115. Support on-board ports only.

L14 AMD G1-20U6 MT 2020	20U6	115. Support on-board ports only.
L14 AMD G2-20X5 - L14 Gen 2	20X5	115. Support on-board ports only.
L14 AMD G2-20X6 - L14 Gen 2	20X6	115. Support on-board ports only.
L14 AMD G3-21C5 - L14 Gen 3	21C5	115. Support on-board ports only.
L14 AMD G3-21C6 - L14 Gen 3	21C6	115. Support on-board ports only.
L14 G2-20X1 - L14 Gen 2	20X1	115. Support on-board ports only.
L14 G2-20X2 - L14 Gen 2	20X2	115. Support on-board ports only.
L14 G3-21C1 - L14 Gen 3	21C1	115. Support on-board ports only.
L14 G3-21C2 - L14 Gen 3	21C2	115. Support on-board ports only.
L15 AMD G1-20U7 MT 2020	20U7	115. Support on-board ports only.
L15 AMD G1-20U8 MT 2020	20U8	115. Support on-board ports only.
L15 AMD G2-20X7 - L15 Gen 2	20X7	115. Support on-board ports only.
L15 AMD G2-20X8 - L15 Gen 2	20X8	115. Support on-board ports only.
L15 AMD G3-21C7 - L15 Gen 3	21C7	115. Support on-board ports only.
L15 AMD G3-21C8 - L15 Gen 3	21C8	115. Support on-board ports only.
L15 G2-20X3 - L15 Gen 2	20X3	115. Support on-board ports only.
L15 G2-20X4 - L15 Gen 2	20X4	115. Support on-board ports only.
L15 G3-21C3 - L15 Gen 3	21C3	115. Support on-board ports only.

L15 G3-21C4 - L15 Gen 3	21C4	115. Support on-board ports only.
L22e-20-65DE	65DE	
L22e-30-66CB	66CB	
L22i-30-66CA	66CA	
L24e-20-65DF	65DF	
L27m-28-65E6	65E6	
L380-20M5 MT	20M5	115. Support on-board ports only.
L380-20M6 MT	20M6	115. Support on-board ports only.
L380-20M7 MT	20M7	115. Support on-board ports only.
L380-20M8 MT	20M8	115. Support on-board ports only.
L390-20NR MT	20NR	115. Support on-board ports only.
L390-20NS MT	20NS	115. Support on-board ports only.
L390-20NT MT	20NT	115. Support on-board ports only.
L390-20NU MT	20NU	115. Support on-board ports only.
L410-L410 4401 MT	4401	
L480-20LS MT	20LS	115. Support on-board ports only.
L480-20LT MT	20LT	115. Support on-board ports only.
L490-20Q5 MT	20Q5	115. Support on-board ports only.
L490-20Q6 MT	20Q6	115. Support on-board ports only.
L580-20LW MT	20LW	115. Support on-board ports only.
L580-20LX MT	20LX	115. Support on-board ports only.
L590-20Q7 MT	20Q7	115. Support on-board ports only.
L590-20Q8 MT	20Q8	115. Support on-board ports only.
LT1913p(New logo)-60FB	60FB	

LT1913p-60D2	60D2	
LT1953 Wide-1453	1453	
LT2024 (New logo)-60G5	60G5	
LT2323p-3794	3794	
Legion 5 15ACH6-82JW - Legion 5 15ACH6	82JW	
Legion 5 15ACH6-82QJ - Legion 5 15ACH6	82QJ	
Legion 5 15ACH6A-82NW - Legion 5 15ACH6A	82NW	
Legion 5 15ARH7-82RE - Legion 5 15ARH7	82RE	
Legion 5 15ARH7H-82RD - Legion 5 15ARH7H	82RD	
Legion 5 15IAH7-82RC - Legion 5 15IAH7	82RC	
Legion 5 15IAH7H-82RB - Legion 5 15IAH7H	82RB	
Legion 5 15IMH6-82NL - Legion 5 15IMH6	82NL	
Legion 5 15ITH6-82JK - Legion 5 15ITH6	82JK	
Legion 5 15ITH6H-82JH - Legion 5 15ITH6H	82JH	
Legion 5 15ITH6H-82MH - Legion 5 15ITH6H	82MH	

Legion 5 17ACH6- 82K0 - Legion 5 17ACH6	82K0	
Legion 5 17ACH6H- 82JY - Legion 5 17ACH6H	82JY	
Legion 5 17ITH6-82JN - Legion 5 17ITH6	82JN	
Legion 5 17ITH6H- 82JM - Legion 5 17ITH6H	82JM	
Legion 5 Pro 16ACH6- 82JS - Legion 5 Pro 16ACH6	82JS	
Legion 5 Pro 16ARH7- 82RY - Legion 5 Pro 16ARH7	82RY	
Legion 5 Pro 16ARH7H-82RG - Legion 5 Pro 16ARH7H	82RG	
Legion 5 Pro 16IAH7- 82S0 - Legion 5 Pro 16IAH7	82S0	
Legion 5 Pro 16IAH7H- 82RF - Legion 5 Pro 16IAH7H	82RF	
Legion 5 Pro 16ITH6- 82JF - Legion 5 Pro 16ITH6	82JF	
Legion 5 Pro 16ITH6H- 82JD - Legion 5 Pro 16ITH6H	82JD	
Legion 7 16ACHg6- 82N6 - Legion 7 16ACHg6	82N6	

Legion 7 16ARHA7- 82UH - Legion 7 16ARHA7	82UH	
Legion 7 16IAX7-82TD - Legion 7 16IAX7	82TD	
Legion 7 16ITHg6- 82K6 - Legion 7 16ITHg6	82K6	
Legion S7 16ARHA7- 82UG - Legion S7 16ARHA7	82UG	
Legion S7 16IAH7- 82TF - Legion S7 16IAH7	82TF	
Lenovo 100e Chromebook 2nd Gen MTK 2-82Q3 - Lenovo 100e Chrome 2nd Gen MTK 2	82Q3	115. Support on-board ports only.
Lenovo 100e-MT 81CY	81CY	
Lenovo Chromebook C330-MT 81HY	81HY	
Lenovo Chromebook C340-11-MT 81TA	81TA	
Lenovo Chromebook S330-MT 81JW	81JW	
Lenovo Chromebook S340-14-MT 81TB	81TB	
Lenovo D186 wide LCD Monitor-MT 2580	2580	
Lenovo Ducati 5-MT 82ES	82ES	
Lenovo IdeaPad L340- 15IWL-MT 81LG	81LG	
Lenovo IdeaPad L340- 17API-MT 81LY	81LY	

Lenovo IdeaPad L340- 17IWL-MT 81M0	81M0	
Lenovo IdeaPad S145- 14API-MT 81UV	81UV	
Lenovo IdeaPad S145- 14AST-MT 81ST	81ST	
Lenovo IdeaPad S145- 14IGM-MT 81MW	81MW	
Lenovo IdeaPad S145- 14IIL-MT 81W6	81W6	
Lenovo IdeaPad S145- 14IKB-MT 81VB	81VB	
Lenovo IdeaPad S145- 15API-MT 81UT	81UT	
Lenovo IdeaPad S145- 15API-MT 81V7	81V7	
Lenovo IdeaPad S145- 15AST-MT 81N3	81N3	
Lenovo IdeaPad S145- 15IGM-MT 81MX	81MX	
Lenovo IdeaPad S145- 15IGM-MT 81WT	81WT	
Lenovo IdeaPad S145- 15IIL-MT 81W8	81W8	
Lenovo IdeaPad S145- 15IIL-MT 82DJ	82DJ	
Lenovo IdeaPad S145- 15IKB-MT 81VD	81VD	
Lenovo IdeaPad S145- 15IKB-MT 81XM	81XM	
Lenovo IdeaPad S150- 11IGL-MT 81VT	81VT	
Lenovo IdeaPad S540- 13ARE-MT 82DL	82DL	

Lenovo IdeaPad S540- 14IWL Touch-MT 81QX	81QX	
Lenovo IdeaPad S540- 15IML-MT 81NG	81NG	
Lenovo IdeaPad S540- 15IWL GTX-MT 81SW	81SW	
Lenovo IdeaPad S540- 15IWL-MT 81NE	81NE	
Lenovo L1711p Wide LCD Monitor-MT 5047	5047	
Lenovo L193P LCD Monitor-MT 4431	4431	
Lenovo L1951P / LT1952p wide monitor- MT 2448	2448	
Lenovo L2250p/ L2251p / LT2252p wide-MT 2572	2572	
Lenovo Legion 5 15ARH05H-MT 82B1	82B1	
Lenovo Legion 5 17ARH05H-MT 82GN	82GN	
Lenovo Legion 5P 15ARH05H-MT 82GU	82GU	
Lenovo Legion 7 15IMH05-MT 81YT	81YT	
Lenovo Legion 7 15IMHg05-MT 81YU	81YU	
Lenovo Legion C7 15IMH05-MT 82EH	82EH	
Lenovo Legion Y540- 15IRH-MT 81RJ	81RJ	
Lenovo Legion Y540- 15IRH-MT 81SX	81SX	

Lenovo Legion Y540-15IRH-PG0-MT 81SY	81SY	
Lenovo Legion Y540-17IRH-MT 81Q4	81Q4	
Lenovo Legion Y540-17IRH-PG0-MT 81T3	81T3	
Lenovo Legion Y545-PG0-MT 81T2	81T2	
Lenovo Legion Y545-MT 81Q6	81Q6	
Lenovo Legion Y7000 2019 1050-MT 81V4	81V4	
Lenovo Legion Y7000 2019 PG0-MT 81T0	81T0	
Lenovo Legion Y7000 2019-MT 81NS	81NS	
Lenovo Legion Y730-17ICH-MT 81HG	81HG	
Lenovo Legion Y740-15ICHg-MT 81HE	81HE	
Lenovo Legion Y740-15IRH-MT 81UF	81UF	
Lenovo Legion Y740-15IRHg-MT 81UH	81UH	
Lenovo Legion Y740-17ICHg-MT 81HH	81HH	
Lenovo Legion Y740-17IRH-MT 81UG	81UG	
Lenovo Legion Y740-17IRHg-MT 81UJ	81UJ	
Lenovo N24-MT 81AF	81AF	
Lenovo S14 G3 IAP-82TW - Lenovo S14 G3 IAP	82TW	
Lenovo S200z-10HA	10HA	

Lenovo S200z-10K1	10K1	
Lenovo S200z-10K4	10K4	
Lenovo S200z-10K5	10K5	
Lenovo S400z-10HB	10HB	
Lenovo S400z-10K2	10K2	
Lenovo S405z-10HD	10HD	
Lenovo S500z-10HC	10HC	
Lenovo S500z-10K3	10K3	
Lenovo Slim 7 16IAH7-82VB - Lenovo Slim 7 16IAH7	82VB	
Lenovo Slim 7 Carbon 13IAP7-82V4 - Lenovo Slim 7 Carbon 13IAP7	82V4	
Lenovo Slim 7 ProX 14IAH7-82V1 - Lenovo Slim 7 ProX 14IAH7	82V1	
Lenovo Slim 9 14IAP7-82T1 - Lenovo Slim 9 14IAP7	82T1	
Lenovo Tablet 10-20L3 MT	20L3	
Lenovo Tablet 10-20L4 MT	20L4	
Lenovo ThinkBook 13s-IML-MT 20RR	20RR	
Lenovo ThinkBook 14-IIL-MT 20SL	20SL	
Lenovo ThinkBook 14-IML-MT 20RV	20RV	
Lenovo ThinkBook 14s Yoga ITL-MT 20WE	20WE	

Lenovo ThinkBook 14s- IML-MT 20RS	20RS	
Lenovo ThinkBook 15- IIL-MT 20SM	20SM	
Lenovo ThinkBook 15- IML-MT 20RW	20RW	
Lenovo ThinkBook 15p- IMH-MT 20V3	20V3	
Lenovo ThinkBook Plus-MT 20TG	20TG	
Lenovo V130-14IGM- MT 81HM	81HM	
Lenovo V130-15IGM- MT 81HL	81HL	
Lenovo V14 G1 IML- 82NA - Lenovo V14 G1 IML	82NA	
Lenovo V14 G2 ALC- 82KC - Lenovo V14- ALC	82KC	
Lenovo V14 G2 IJL- 82QX - Lenovo V14 G2 IJL	82QX	
Lenovo V14 G3 ABA(Brazil)-82UN - Lenovo V14 G3 ABA(Brazil)	82UN	
Lenovo V14 G3 ABA- 82TU - Lenovo V14 G3 ABA	82TU	
Lenovo V14 G3 IAP(Brazil)-82UL - Lenovo V14 G3 IAP(Brazil)	82UL	

Lenovo V14 G3 IAP- 82TS - Lenovo V14 G3 IAP	82TS	
Lenovo V14-ADA-MT 82C6	82C6	
Lenovo V14-ARE-MT 82DQ	82DQ	
Lenovo V14-IGL-MT 82C2	82C2	
Lenovo V14-IIL-MT 82C4	82C4	
Lenovo V14-IKB-MT 81YA	81YA	
Lenovo V140-15IWL- MT 81K6	81K6	
Lenovo V15 G1 IML(Brazil)-82NQ - Lenovo V15 G1 IML(Brazil)	82NQ	
Lenovo V15 G1 IML- 82NB - Lenovo V15 G1 IML	82NB	
Lenovo V15 G2 ALC- 82KD - Lenovo V15- ALC	82KD	
Lenovo V15 G2 IJL- 82QY - Lenovo V15 G2 IJL	82QY	
Lenovo V15 G3 ABA- 82TV - Lenovo V15 G3 ABA	82TV	
Lenovo V15 G3 IAP(Brazil)-82UM - Lenovo V15 G3 IAP(Brazil)	82UM	

Lenovo V15 G3 IAP- 82TT - Lenovo V15 G3 IAP	82TT	
Lenovo V15-ADA-MT 82C7	82C7	
Lenovo V15- IGL(Brazil)-82NN - Lenovo V15-IGL(Brazil)	82NN	
Lenovo V15-IGL-MT 82C3	82C3	
Lenovo V15-IIL-MT 82C5	82C5	
Lenovo V15-IKB-MT 81YD	81YD	
Lenovo V17 G2 ITL- 82NX - Lenovo V17 G2 ITL	82NX	
Lenovo V17 G3 IAP- 82U1 - Lenovo V17 G3 IAP	82U1	
Lenovo V17-IIL-MT 82GX	82GX	
Lenovo V30a-22IIL- 11LC	11LC	115. Support on-board ports only.
Lenovo V30a-22IIL- 11LD	11LD	115. Support on-board ports only.
Lenovo V30a-22IML- 11FV	11FV	115. Support on-board ports only.
Lenovo V30a-22IML- 11FW	11FW	115. Support on-board ports only.
Lenovo V30a-24IIL- 11LA	11LA	115. Support on-board ports only.
Lenovo V30a-24IIL- 11LB	11LB	115. Support on-board ports only.
Lenovo V30a-24IML- 11FT	11FT	115. Support on-board ports only.

Lenovo V30a-24IML-11FU	11FU	115. Support on-board ports only.
Lenovo V310z-10QG	10QG	115. Support on-board ports only.
Lenovo V310z-10QH	10QH	115. Support on-board ports only.
Lenovo V330-14ARR-MT 81B1	81B1	
Lenovo V330-20ICB AIO-10UK	10UK	115. Support on-board ports only.
Lenovo V330-20ICB AIO-10UL	10UL	115. Support on-board ports only.
Lenovo V340-17IWL-81RG MT	81RG	
Lenovo V35s-07ADA-11HE	11HE	115. Support on-board ports only.
Lenovo V35s-07ADA-11HF	11HF	115. Support on-board ports only.
Lenovo V35s-07ADA-11HQ	11HQ	115. Support on-board ports only.
Lenovo V35s-07ADA-11HR	11HR	115. Support on-board ports only.
Lenovo V410z-10QV	10QV	115. Support on-board ports only.
Lenovo V410z-10QW	10QW	115. Support on-board ports only.
Lenovo V410z-10R5	10R5	115. Support on-board ports only.
Lenovo V410z-10R6	10R6	115. Support on-board ports only.
Lenovo V50a-22IMB-11FN	11FN	115. Support on-board ports only.
Lenovo V50a-22IMB-11FQ	11FQ	115. Support on-board ports only.
Lenovo V50a-22IMB-11FR	11FR	115. Support on-board ports only.
Lenovo V50a-22IMB-11FS	11FS	115. Support on-board ports only.

Lenovo V50a-24IMB-11FJ	11FJ	115. Support on-board ports only.
Lenovo V50a-24IMB-11FK	11FK	115. Support on-board ports only.
Lenovo V50a-24IMB-11FL	11FL	115. Support on-board ports only.
Lenovo V50a-24IMB-11FM	11FM	115. Support on-board ports only.
Lenovo V50s-07IMB-11EE	11EE	115. Support on-board ports only.
Lenovo V50s-07IMB-11EF	11EF	115. Support on-board ports only.
Lenovo V50s-07IMB-11HA	11HA	115. Support on-board ports only.
Lenovo V50s-07IMB-11HB	11HB	115. Support on-board ports only.
Lenovo V50t Gen 2-13IOB-11QB - Lenovo V50t Gen 2-13IOB	11QB	115. Support on-board ports only.
Lenovo V50t Gen 2-13IOB-11QC - Lenovo V50t Gen 2-13IOB	11QC	115. Support on-board ports only.
Lenovo V50t Gen 2-13IOB-11QD - Lenovo V50t Gen 2-13IOB	11QD	115. Support on-board ports only.
Lenovo V50t Gen 2-13IOB-11QE - Lenovo V50t Gen 2-13IOB	11QE	115. Support on-board ports only.
Lenovo V50t-13IMB-11EC	11EC	115. Support on-board ports only.
Lenovo V50t-13IMB-11ED	11ED	115. Support on-board ports only.
Lenovo V50t-13IMB-11HC	11HC	115. Support on-board ports only.
Lenovo V50t-13IMB-11HD	11HD	115. Support on-board ports only.

Lenovo V510z-10NH	10NH	
Lenovo V510z-10NJ	10NJ	
Lenovo V510z-10NQ	10NQ	
Lenovo V530-15ICB Desktop-10TV	10TV	115. Support on-board ports only.
Lenovo V530-15ICB Desktop-10TW	10TW	115. Support on-board ports only.
Lenovo V530-15ICR Desktop-11BG	11BG	115. Support on-board ports only.
Lenovo V530-15ICR Desktop-11BH	11BH	115. Support on-board ports only.
Lenovo V530-22ICB AIO-10US	10US	115. Support on-board ports only.
Lenovo V530-22ICB AIO-10UT	10UT	115. Support on-board ports only.
Lenovo V530-22ICB AIO-10UU	10UU	115. Support on-board ports only.
Lenovo V530-22ICB AIO-10UV	10UV	115. Support on-board ports only.
Lenovo V530-24ICB AIO-10UW	10UW	115. Support on-board ports only.
Lenovo V530-24ICB AIO-10UX	10UX	115. Support on-board ports only.
Lenovo V530S-07ICB Desktop-10TX	10TX	115. Support on-board ports only.
Lenovo V530S-07ICB Desktop-10TY	10TY	115. Support on-board ports only.
Lenovo V530S-07ICR Desktop-11BL	11BL	115. Support on-board ports only.
Lenovo V530S-07ICR Desktop-11BM	11BM	115. Support on-board ports only.
Lenovo V55t Gen 2- 13ACN-11RM - Lenovo V55t Gen 2-13ACN	11RM	115. Support on-board ports only.

Lenovo V55t Gen 2- 13ACN-11RN - Lenovo V55t Gen 2-13ACN	11RN	115. Support on-board ports only.
Lenovo V55t Gen 2- 13ACN-11RQ - Lenovo V55t Gen 2-13ACN	11RQ	115. Support on-board ports only.
Lenovo V55t Gen 2- 13ACN-11RR - Lenovo V55t Gen 2-13ACN	11RR	115. Support on-board ports only.
Lenovo V55t Gen 2- 13ACN-11VS-Lenovo V55t Gen 2-13ACN	11VS	115. Support on-board ports only.
Lenovo V55t Gen 2- 13ACN-11VT-Lenovo V55t Gen 2-13ACN	11VT	115. Support on-board ports only.
Lenovo V55t Gen 2- 13ACN-11VU-Lenovo V55t Gen 2-13ACN	11VU	115. Support on-board ports only.
Lenovo V55t Gen 2- 13ACN-11VV-Lenovo V55t Gen 2-13ACN	11VV	115. Support on-board ports only.
Lenovo V55t-15API- 11CB	11CB	115. Support on-board ports only.
Lenovo V55t-15API- 11CC	11CC	115. Support on-board ports only.
Lenovo V55t-15ARE- 11KF	11KF	115. Support on-board ports only.
Lenovo V55t-15ARE- 11KG	11KG	115. Support on-board ports only.
Lenovo V55t-15ARE- 11KH	11KH	115. Support on-board ports only.
Lenovo V55t-15ARE- 11KJ	11KJ	115. Support on-board ports only.
Lenovo ideapad 330S- 14AST-MT 81F8	81F8	

Lenovo ideapad 330S- 15ARR-MT 81FB	81FB	
Lenovo ideapad 330S- 15AST-MT 81F9	81F9	
Lenovo ideapad 720S- 14IKB-MT 80XC	80XC	
Lenovo ideapad S530- 13IML-MT 81WU	81WU	
M490s-MT 6275	6275	
M490s-MT 6276	6276	
Mini Series (Intel)-MT 0627	0627	
Mini Series (Intel)-MT 0629	0629	
Mini Series-MT 0596	0596	
Mini Series-MT 0611	0611	
Mini Series-MT 0613	0613	
P1 2nd Generation- 20QT MT	20QT	115. Support on-board ports only.
P1 2nd Generation- 20QU MT	20QU	115. Support on-board ports only.
P1 G4-20Y3 - P1 Gen 4	20Y3	115. Support on-board ports only.
P1 G4-20Y4 - P1 Gen 4	20Y4	115. Support on-board ports only.
P1 G5-21DC - P1 Gen 5	21DC	115. Support on-board ports only.
P1 G5-21DD - P1 Gen 5	21DD	115. Support on-board ports only.
P1-20MD MT	20MD	115. Support on-board ports only.
P1-20ME MT	20ME	115. Support on-board ports only.
P14s 2nd Generation- 20VX MT 2021	20VX	115. Support on-board ports only.
P14s 2nd Generation- 20VY MT 2021	20VY	115. Support on-board ports only.

P14s AMD G1-20Y1 - P14s AMD Gen 1	20Y1	115. Support on-board ports only.
P14s AMD G1-20Y2 - P14s AMD Gen 1	20Y2	115. Support on-board ports only.
P14s AMD G2-21A0 - P14s AMD Gen 2	21A0	115. Support on-board ports only.
P14s AMD G2-21A1 - P14s AMD Gen 2	21A1	115. Support on-board ports only.
P14s G3-21AK MT 2022	21AK	115. Support on-board ports only.
P14s G3-21AL MT 2022	21AL	115. Support on-board ports only.
P15 G2-20YQ - P15 Gen 2	20YQ	115. Support on-board ports only.
P15 G2-20YR - P15 Gen 2	20YR	115. Support on-board ports only.
P15s 1st Generation- 20T4 MT 2020	20T4	115. Support on-board ports only.
P15s 1st Generation- 20T5 MT 2020	20T5	115. Support on-board ports only.
P15s 2nd Generation- 20W6 - P15s Gen 2	20W6	115. Support on-board ports only.
P15s 2nd Generation- 20W7 - P15s Gen 2	20W7	115. Support on-board ports only.
P15v AMD G3-21EM - P15v AMD Gen 3	21EM	115. Support on-board ports only.
P15v AMD G3-21EN - P15v AMD Gen 3	21EN	115. Support on-board ports only.
P15v G2-21A9 - P15v Gen 2	21A9	115. Support on-board ports only.
P15v G2-21AA - P15v Gen 2	21AA	115. Support on-board ports only.
P15v G3-21D8 - P15v Gen 3	21D8	115. Support on-board ports only.
P15v G3-21D9 - P15v Gen 3	21D9	115. Support on-board ports only.

P16 G1-21D6 - P16 Gen 1	21D6	115. Support on-board ports only.
P16 G1-21D7 - P16 Gen 1	21D7	115. Support on-board ports only.
P16s AMD G1-21CK - P16s AMD Gen 1	21CK	115. Support on-board ports only.
P16s AMD G1-21CL - P16s AMD Gen 1	21CL	115. Support on-board ports only.
P16s G1-21BT - P16s Gen 1	21BT	115. Support on-board ports only.
P16s G1-21BU - P16s Gen 1	21BU	115. Support on-board ports only.
P17 G2-20YU - P17 Gen 2	20YU	115. Support on-board ports only.
P17 G2-20YV - P17 Gen 2	20YV	115. Support on-board ports only.
P40 Yoga-20GQ MT	20GQ	223 For Bay Trail model
P40 Yoga-20GR MT	20GR	223 For Bay Trail model
P43s-20RH MT	20RH	115. Support on-board ports only.
P43s-20RJ MT	20RJ	115. Support on-board ports only.
P50-20EN MT	20EN	223 For Bay Trail model
P50-20EQ MT	20EQ	223 For Bay Trail model
P50s-20FK MT	20FK	223 For Bay Trail model
P50s-20FL MT	20FL	223 For Bay Trail model
P51-20HH MT	20HH	115. Support on-board ports only.
P51-20HJ MT	20HJ	115. Support on-board ports only.
P51s-20HB MT	20HB	115. Support on-board ports only.
P51s-20HC MT	20HC	115. Support on-board ports only.
P51s-20JY MT	20JY	115. Support on-board ports only.
P51s-20K0 MT	20K0	115. Support on-board ports only.

P52-20M9 MT	20M9	115. Support on-board ports only.
P52-20MA MT	20MA	115. Support on-board ports only.
P52s-20LB MT	20LB	115. Support on-board ports only.
P52s-20LC MT	20LC	115. Support on-board ports only.
P53-20QN MT	20QN	115. Support on-board ports only.
P53-20QQ MT	20QQ	115. Support on-board ports only.
P53s-20N6 MT	20N6	223 For Bay Trail model
P53s-20N7 MT	20N7	223 For Bay Trail model
P70-20ER MT	20ER	223 For Bay Trail model
P70-20ES MT	20ES	223 For Bay Trail model
P71-20HK MT	20HK	115. Support on-board ports only.
P71-20HL MT	20HL	115. Support on-board ports only.
P72-20MB MT	20MB	115. Support on-board ports only.
P72-20MC MT	20MC	115. Support on-board ports only.
P73-20QR MT	20QR	115. Support on-board ports only.
P73-20QS MT	20QS	115. Support on-board ports only.
Pro2820(New logo)-60FC	60FC	
S1 4th Gen-STORM-3.0 20LK MT	20LK	115. Support on-board ports only.
S3-20G0 MT	20G0	223 For Bay Trail model
S3-20G1 MT	20G1	223 For Bay Trail model
S3-S431-MT 20AX	20AX	
S3-S431-MT 20BA	20BA	
S3-S440-MT 20AY	20AY	
S3-S440-MT 20BB	20BB	

S5-20G4 MT	20G4	223 For Bay Trail model
S5-20JA MT	20JA	115. Support on-board ports only.
S5-S531-MT 20B0	20B0	
S5-S540-MT 20B3	20B3	
Sub Series X121e-MT 3048	3048	
Sub Series X121e-MT 3049	3049	
Sub Series X121e-MT 3053	3053	
Sub Series X121e-MT 3055	3055	
T14 2nd Generation- 20W0 MT 2021	20W0	115. Support on-board ports only.
T14 2nd Generation- 20W1 MT 2021	20W1	115. Support on-board ports only.
T14 2nd Generation- 20W2 MT 2021 HC	20W2	115. Support on-board ports only.
T14 2nd Generation- 20W3 MT 2021 HC	20W3	115. Support on-board ports only.
T14 AMD G1-20UD MT 2020	20UD	115. Support on-board ports only.
T14 AMD G1-20UE MT 2020	20UE	115. Support on-board ports only.
T14 AMD G2-20XK - T14 AMD Gen 2	20XK	115. Support on-board ports only.
T14 AMD G2-20XL - T14 AMD Gen 2	20XL	115. Support on-board ports only.
T14 AMD G3-21CF - T14 AMD Gen 3	21CF	115. Support on-board ports only.
T14 AMD G3-21CG - T14 AMD Gen 3	21CG	115. Support on-board ports only.
T14 G3-21AH - T14 Gen 3	21AH	115. Support on-board ports only.

T14 G3-21AJ - T14 Gen 3	21AJ	115. Support on-board ports only.
T14s 2nd Generation-20WM - T14s Gen 2	20WM	115. Support on-board ports only.
T14s 2nd Generation-20WN - T14s Gen 2	20WN	115. Support on-board ports only.
T14s AMD G1-20UH MT 2020	20UH	115. Support on-board ports only.
T14s AMD G1-20UJ MT 2020	20UJ	115. Support on-board ports only.
T14s AMD G2-20XF - T14s AMD Gen 2	20XF	115. Support on-board ports only.
T14s AMD G2-20XG - T14s AMD Gen 2	20XG	115. Support on-board ports only.
T14s AMD G3-21CQ - T14s AMD Gen 3	21CQ	115. Support on-board ports only.
T14s AMD G3-21CR - T14s AMD Gen 3	21CR	115. Support on-board ports only.
T14s G3-21BR - T14s Gen 3	21BR	115. Support on-board ports only.
T14s G3-21BS - T14s Gen 3	21BS	115. Support on-board ports only.
T15 2nd Generation-20W4 - T15 Gen 2	20W4	115. Support on-board ports only.
T15 2nd Generation-20W5 - T15 Gen 2	20W5	115. Support on-board ports only.
T15g G2-20YS - T15g Gen 2	20YS	115. Support on-board ports only.
T15g G2-20YT - T15g Gen 2	20YT	115. Support on-board ports only.
T15p G2-21A7 - T15p Gen 2	21A7	115. Support on-board ports only.
T15p G2-21A8 - T15p Gen 2	21A8	115. Support on-board ports only.
T15p G3-21DA - T15p Gen 3	21DA	115. Support on-board ports only.

T15p G3-21DB - T15p Gen 3	21DB	115. Support on-board ports only.
T16 AMD G1-21CH - T16 AMD Gen 1	21CH	115. Support on-board ports only.
T16 AMD G1-21CJ - T16 AMD Gen 1	21CJ	115. Support on-board ports only.
T16 G1-21BV - T16 Gen 1	21BV	115. Support on-board ports only.
T16 G1-21BW - T16 Gen 1	21BW	115. Support on-board ports only.
T1714(New logo)-60FD	60FD	
T1714-60D6	60D6	
T2014 (New logo)-60G3	60G3	
T2054p(New logo)-60G1	60G1	
T2054p-60D9	60D9	
T2224p(New logo)-60F4	60F4	
T2224p-60CA	60CA	
T2224z(New logo)-60F5	60F5	
T2224z-60CB	60CB	
T2254(New logo)-60F6	60F6	
T2254-60CD	60CD	
T2254-60DA	60DA	
T2254p(with DP cable)-60E1	60E1	
T2254p-60CC	60CC	
T2324p(New logo)-60GB	60GB	

T2324p-60C7	60C7	
T2424p(New logo)-60F7	60F7	
T2424p-60C8	60C8	
T2424z(New logo)-60F8	60F8	
T2424z-60D3	60D3	
T2454p(New logo)-60F9	60F9	
T2454p-60C9	60C9	
T24i-19-61D6	61D6	
T25d-10/P25d-10-61DB	61DB	
T430U Sub Series-6273 MT	6273	
T440s-20AQ MT	20AQ	
T460-20FM MT	20FM	223 For Bay Trail model
T460-20FN MT	20FN	223 For Bay Trail model
T460p-20FW MT	20FW	223 For Bay Trail model
T460p-20FX MT	20FX	223 For Bay Trail model
T460s-20F9 MT	20F9	223 For Bay Trail model
T460s-20FA MT	20FA	223 For Bay Trail model
T470-20HD MT	20HD	115. Support on-board ports only.
T470-20HE MT	20HE	115. Support on-board ports only.
T470-20JM MT	20JM	115. Support on-board ports only.
T470-20JN MT	20JN	115. Support on-board ports only.
T470p-20J6 MT	20J6	115. Support on-board ports only.
T470p-20J7 MT	20J7	115. Support on-board ports only.

T470s-20HF MT	20HF	115. Support on-board ports only.
T470s-20HG MT	20HG	115. Support on-board ports only.
T470s-20JS MT	20JS	115. Support on-board ports only.
T470s-20JT MT	20JT	115. Support on-board ports only.
T480-WINDU-2.0 20L5 MT	20L5	115. Support on-board ports only.
T480-WINDU-2.0 20L6 MT	20L6	115. Support on-board ports only.
T480s-KOLAR-1.0 20L7 MT	20L7	115. Support on-board ports only.
T480s-KOLAR-1.0 20L8 MT	20L8	115. Support on-board ports only.
T490-20N2 MT	20N2	115. Support on-board ports only.
T490-20N3 MT	20N3	115. Support on-board ports only.
T490-20Q9 MT	20Q9	115. Support on-board ports only.
T490-20QH MT	20QH	115. Support on-board ports only.
T490-20RX MT	20RX	115. Support on-board ports only.
T490-20RY MT	20RY	115. Support on-board ports only.
T490s-20NX MT	20NX	115. Support on-board ports only.
T490s-20NY MT	20NY	115. Support on-board ports only.
T495-20NJ MT	20NJ	115. Support on-board ports only.
T495-20NK MT	20NK	115. Support on-board ports only.
T495s-20QJ MT	20QJ	115. Support on-board ports only.
T495s-20QK MT	20QK	115. Support on-board ports only.
T560-20FH MT	20FH	223 For Bay Trail model
T560-20FJ MT	20FJ	223 For Bay Trail model
T570-20H9 MT	20H9	115. Support on-board ports only.

T570-20HA MT	20HA	115. Support on-board ports only.
T570-20JW MT	20JW	115. Support on-board ports only.
T570-20JX MT	20JX	115. Support on-board ports only.
T580-20L9 MT	20L9	115. Support on-board ports only.
T580-20LA MT	20LA	115. Support on-board ports only.
T590-20N4 MT	20N4	115. Support on-board ports only.
T590-20N5 MT	20N5	115. Support on-board ports only.
TP25-20K7 MT	20K7	115. Support on-board ports only.
Tablet 2-3679 MT	3679	
ThinkBook 13s 2nd Generation-ITL-MT 20V9	20V9	
ThinkBook 13s G2 ARE-MT code	20WC	
ThinkBook 13s G4 ARB-21AS - ThinkBook 13s G4 ARB	21AS	
ThinkBook 13s G4 IAP- 21AR - ThinkBook 13s G4 IAP	21AR	
ThinkBook 13x G2 IAP- 21AT - ThinkBook 13x G2 IAP	21AT	
ThinkBook 14 2nd Generation-ARE-MT 20VF	20VF	
ThinkBook 14 2nd Generation-ITL-MT 20VD	20VD	
ThinkBook 14 G4 ABA- 21DK - ThinkBook 14 G4 ABA	21DK	

ThinkBook 14 G4 IAP- 21DH - ThinkBook 14 G4 IAP	21DH	
ThinkBook 14 G4+ ARA-21D0 - ThinkBook 14 G4+ ARA	21D0	
ThinkBook 14 G4+ IAP- 21CX - ThinkBook 14 G4+ IAP	21CX	
ThinkBook 14p G2 ACH-20YN - ThinkBook 14p G2 ACH	20YN	
ThinkBook 14p G3 ARH-21EJ - ThinkBook 14p G3 ARH	21EJ	
ThinkBook 14s 2nd Generation-ITL-MT 20VA	20VA	
ThinkBook 14s Yoga G2 IAP-MT 21DM	21DM	
ThinkBook 15 2nd Generation-ARE-MT 20VG	20VG	
ThinkBook 15 2nd Generation-ITL-MT 20VE	20VE	
ThinkBook 15 G3 ITL- 21A5 - ThinkBook 15 G3 ITL	21A5	
ThinkBook 15 G4 ABA- 21DL - ThinkBook 15 G4 ABA	21DL	
ThinkBook 15 G4 IAP- 21DJ - ThinkBook 15 G4 IAP	21DJ	

ThinkBook 15p G2 ITH- 21B1 - ThinkBook 15p G2 ITH	21B1	
ThinkBook 16 G4+ ARA-21D1 - ThinkBook 16 G4+ ARA	21D1	
ThinkBook 16 G4+ IAP- 21CY - ThinkBook 16 G4+ IAP	21CY	
ThinkBook 16p G2 ACH-20YM - ThinkBook 16p G2 ACH	20YM	
ThinkBook 16p G3 ARH-21EK - ThinkBook 16p G3 ARH	21EK	
ThinkBook 16p NX ARH-21EV - ThinkBook 16p NX ARH	21EV	
ThinkBook 16p NX IAP- 21EU - ThinkBook 16p NX IAP	21EU	
ThinkBook Plus G3 IAP-21EL - ThinkBook Plus G3 IAP	21EL	
ThinkCentre E700- ThinkCentre E700IAB	11SB	115. Support on-board ports only.
ThinkCentre E76p- 11BR	11BR	115. Support on-board ports only.
ThinkCentre E76x- 11BA	11BA	115. Support on-board ports only.
ThinkCentre E96x- 11BB	11BB	115. Support on-board ports only.
ThinkCentre E97s- 12AY - ThinkCentre E97s	12AY	115. Support on-board ports only.

ThinkCentre E98-11QF - ThinkCentre E98	11QF	115. Support on-board ports only.
ThinkCentre Edge 91z- 1729	1729	
ThinkCentre Edge 91z- 1731	1731	
ThinkCentre Edge 91z- 1732	1732	
ThinkCentre Edge 91z- 1734	1734	
ThinkCentre Edge 91z- 1736	1736	
ThinkCentre Edge 91z- 1737	1737	
ThinkCentre Edge 91z- 7556	7556	
ThinkCentre Edge 91z- 7559	7559	
ThinkCentre Edge 93Z- 10B8	10B8	
ThinkCentre Edge 93Z- 10B9	10B9	
ThinkCentre Edge 93Z- 10BA	10BA	
ThinkCentre Edge 93Z- 10BH	10BH	
ThinkCentre Edge 93Z- 10BJ	10BJ	
ThinkCentre Edge 93Z- 10BK	10BK	
ThinkCentre M60e- 11LU	11LU	115. Support on-board ports only.
ThinkCentre M60e- 11LV	11LV	115. Support on-board ports only.
ThinkCentre M60e- 11LW	11LW	115. Support on-board ports only.

ThinkCentre M60e- 11LX	11LX	115. Support on-board ports only.
ThinkCentre M60e- 11LY	11LY	115. Support on-board ports only.
ThinkCentre M60e- 11M0	11M0	115. Support on-board ports only.
ThinkCentre M60e- 11M1	11M1	115. Support on-board ports only.
ThinkCentre M60e- 11M2	11M2	115. Support on-board ports only.
ThinkCentre M630e- 10YM	10YM	115. Support on-board ports only.
ThinkCentre M70a Gen 2-11K3 - ThinkCentre M70a Gen 2	11K3	115. Support on-board ports only.
ThinkCentre M70a Gen 2-11K4 - ThinkCentre M70a Gen 2	11K4	115. Support on-board ports only.
ThinkCentre M70a Gen 2-11K5 - ThinkCentre M70a Gen 2	11K5	115. Support on-board ports only.
ThinkCentre M70a Gen 2-11K6 - ThinkCentre M70a Gen 2	11K6	115. Support on-board ports only.
ThinkCentre M70q Gen 2-11MY - ThinkCentre M70q Gen 2	11MY	115. Support on-board ports only.
ThinkCentre M70q Gen 2-11N0 - ThinkCentre M70q Gen 2	11N0	115. Support on-board ports only.
ThinkCentre M70q Gen 2-11N3 - ThinkCentre M70q Gen 2	11N3	115. Support on-board ports only.
ThinkCentre M70q Gen 2-11N4 - ThinkCentre M70q Gen 2	11N4	115. Support on-board ports only.

ThinkCentre M70q Gen 3-11T3-ThinkCentre M70q Gen 3	11T3	115. Support on-board ports only.
ThinkCentre M70q Gen 3-11T4-ThinkCentre M70q Gen 3	11T4	115. Support on-board ports only.
ThinkCentre M70q Gen 3-11TY-ThinkCentre M70q Gen 3	11TY	115. Support on-board ports only.
ThinkCentre M70q Gen 3-11U0-ThinkCentre M70q Gen 3	11U0	115. Support on-board ports only.
ThinkCentre M70q Gen 3-11X2-ThinkCentre M70q Gen 3	11X2	115. Support on-board ports only.
ThinkCentre M70q Gen 3-11X6-ThinkCentre M70q Gen 3	11X6	115. Support on-board ports only.
ThinkCentre M70q- 11DT	11DT	115. Support on-board ports only.
ThinkCentre M70q- 11DU	11DU	115. Support on-board ports only.
ThinkCentre M70q- 11DV	11DV	115. Support on-board ports only.
ThinkCentre M70q- 11DW	11DW	115. Support on-board ports only.
ThinkCentre M70s Gen 2-11M5	11M5	115. Support on-board ports only.
ThinkCentre M70s Gen 2-11M6	11M6	115. Support on-board ports only.
ThinkCentre M70s Gen 2-11M9	11M9	115. Support on-board ports only.
ThinkCentre M70s Gen 2-11MA	11MA	115. Support on-board ports only.

ThinkCentre M70s Gen 3-11T7-ThinkCentre M70s Gen 3	11T7	115. Support on-board ports only.
ThinkCentre M70s Gen 3-11T8-ThinkCentre M70s Gen 3	11T8	115. Support on-board ports only.
ThinkCentre M70s Gen 3-11TB-ThinkCentre M70s Gen 3	11TB	115. Support on-board ports only.
ThinkCentre M70s Gen 3-11TC-ThinkCentre M70s Gen 3	11TC	115. Support on-board ports only.
ThinkCentre M70s Gen 3-11X8-ThinkCentre M70s Gen 3	11X8	115. Support on-board ports only.
ThinkCentre M70s Gen 3-11XG-ThinkCentre M70s Gen 3	11XG	115. Support on-board ports only.
ThinkCentre M70s- 11DB	11DB	115. Support on-board ports only.
ThinkCentre M70s- 11DC	11DC	115. Support on-board ports only.
ThinkCentre M70s- 11EW	11EW	115. Support on-board ports only.
ThinkCentre M70s- 11EX	11EX	115. Support on-board ports only.
ThinkCentre M70t Gen 2-11M3	11M3	115. Support on-board ports only.
ThinkCentre M70t Gen 2-11M4	11M4	115. Support on-board ports only.
ThinkCentre M70t Gen 2-11M7	11M7	115. Support on-board ports only.
ThinkCentre M70t Gen 2-11M8	11M8	115. Support on-board ports only.

ThinkCentre M70t Gen 3-11T5-ThinkCentre M70t Gen 3	11T5	115. Support on-board ports only.
ThinkCentre M70t Gen 3-11T6-ThinkCentre M70t Gen 3	11T6	115. Support on-board ports only.
ThinkCentre M70t Gen 3-11T9-ThinkCentre M70t Gen 3	11T9	115. Support on-board ports only.
ThinkCentre M70t Gen 3-11TA-ThinkCentre M70t Gen 3	11TA	115. Support on-board ports only.
ThinkCentre M70t Gen 3-11X3-ThinkCentre M70t Gen 3	11X3	115. Support on-board ports only.
ThinkCentre M70t Gen 3-11XE-ThinkCentre M70t Gen 3	11XE	115. Support on-board ports only.
ThinkCentre M70t- 11D9	11D9	115. Support on-board ports only.
ThinkCentre M70t- 11DA	11DA	115. Support on-board ports only.
ThinkCentre M70t- 11EU	11EU	115. Support on-board ports only.
ThinkCentre M70t- 11EV	11EV	115. Support on-board ports only.
ThinkCentre M715q- 10VG	10VG	115. Support on-board ports only.
ThinkCentre M715q- 10VH	10VH	115. Support on-board ports only.
ThinkCentre M715q- 10VJ	10VJ	115. Support on-board ports only.
ThinkCentre M715q- 10VK	10VK	115. Support on-board ports only.
ThinkCentre M720e- 11BD	11BD	115. Support on-board ports only.

ThinkCentre M720e- 11BE	11BE	115. Support on-board ports only.
ThinkCentre M720q- 10T7	10T7	115. Support on-board ports only.
ThinkCentre M720q- 10T8	10T8	115. Support on-board ports only.
ThinkCentre M720q- 10T9	10T9	115. Support on-board ports only.
ThinkCentre M720q- 10TA	10TA	115. Support on-board ports only.
ThinkCentre M720q- 10TC	10TC	115. Support on-board ports only.
ThinkCentre M75q Gen 2-11JJ	11JJ	115. Support on-board ports only.
ThinkCentre M75q Gen 2-11JK	11JK	115. Support on-board ports only.
ThinkCentre M75q Gen 2-11JL	11JL	115. Support on-board ports only.
ThinkCentre M75q Gen 2-11JM	11JM	115. Support on-board ports only.
ThinkCentre M75q Gen 2-11JN	11JN	115. Support on-board ports only.
ThinkCentre M75q Gen 2-11JQ	11JQ	115. Support on-board ports only.
ThinkCentre M75q Gen 2-11JR	11JR	115. Support on-board ports only.
ThinkCentre M75q Gen 2-11JS	11JS	115. Support on-board ports only.
ThinkCentre M75q-1- 11A4	11A4	115. Support on-board ports only.
ThinkCentre M75q-1- 11A5	11A5	115. Support on-board ports only.
ThinkCentre M75q-1- 11A6	11A6	115. Support on-board ports only.
ThinkCentre M75q-1- 11A7	11A7	115. Support on-board ports only.

ThinkCentre M75s Gen 2-11R7 - ThinkCentre M75s Gen 2	11R7	115. Support on-board ports only.
ThinkCentre M75s Gen 2-11R8 - ThinkCentre M75s Gen 2	11R8	115. Support on-board ports only.
ThinkCentre M75s Gen 2-11R9 - ThinkCentre M75s Gen 2	11R9	115. Support on-board ports only.
ThinkCentre M75s Gen 2-11RA - ThinkCentre M75s Gen 2	11RA	115. Support on-board ports only.
ThinkCentre M75s Gen 2-MT	11JA	115. Support on-board ports only.
	11JB	115. Support on-board ports only.
	11JC	115. Support on-board ports only.
	11JD	115. Support on-board ports only.
ThinkCentre M75t Gen 2-11KB	11KB	115. Support on-board ports only.
ThinkCentre M75t Gen 2-11KC	11KC	115. Support on-board ports only.
ThinkCentre M75t Gen 2-11KD	11KD	115. Support on-board ports only.
ThinkCentre M75t Gen 2-11KE	11KE	115. Support on-board ports only.
ThinkCentre M75t Gen 2-11RB - ThinkCentre M75t Gen 2	11RB	115. Support on-board ports only.
ThinkCentre M75t Gen 2-11RC - ThinkCentre M75t Gen 2	11RC	115. Support on-board ports only.
ThinkCentre M75t Gen 2-11RD - ThinkCentre M75t Gen 2	11RD	115. Support on-board ports only.

ThinkCentre M75t Gen 2-11RE - ThinkCentre M75t Gen 2	11RE	115. Support on-board ports only.
ThinkCentre M80q Gen 3-11U1-ThinkCentre M80q Gen 3	11U1	115. Support on-board ports only.
ThinkCentre M80q Gen 3-11U2-ThinkCentre M80q Gen 3	11U2	115. Support on-board ports only.
ThinkCentre M80q Gen 3-11U3-ThinkCentre M80q Gen 3	11U3	115. Support on-board ports only.
ThinkCentre M80q Gen 3-11U4-ThinkCentre M80q Gen 3	11U4	115. Support on-board ports only.
ThinkCentre M80q Gen 3-Machine Type	11XH	115. Support on-board ports only.
	11XJ	115. Support on-board ports only.
	11XK	115. Support on-board ports only.
	11XL	115. Support on-board ports only.
ThinkCentre M80q- 11DN	11DN	115. Support on-board ports only.
ThinkCentre M80q- 11DQ	11DQ	115. Support on-board ports only.
ThinkCentre M80q- 11DR	11DR	115. Support on-board ports only.
ThinkCentre M80q- 11DS	11DS	115. Support on-board ports only.
ThinkCentre M80s Gen 3-11TF-ThinkCentre M80s Gen 3	11TF	115. Support on-board ports only.
ThinkCentre M80s Gen 3-11TG-ThinkCentre M80s Gen 3	11TG	115. Support on-board ports only.

ThinkCentre M80s Gen 3-11TK-ThinkCentre M80s Gen 3	11TK	115. Support on-board ports only.
ThinkCentre M80s Gen 3-11TL-ThinkCentre M80s Gen 3	11TL	115. Support on-board ports only.
ThinkCentre M80s- 11CU	11CU	115. Support on-board ports only.
ThinkCentre M80s- 11CV	11CV	115. Support on-board ports only.
ThinkCentre M80s- 11EM	11EM	115. Support on-board ports only.
ThinkCentre M80s- 11EN	11EN	115. Support on-board ports only.
ThinkCentre M80t Gen 3-11TD-ThinkCentre M80t Gen 3	11TD	115. Support on-board ports only.
ThinkCentre M80t Gen 3-11TE-ThinkCentre M80t Gen 3	11TE	115. Support on-board ports only.
ThinkCentre M80t Gen 3-11TH-ThinkCentre M80t Gen 3	11TH	115. Support on-board ports only.
ThinkCentre M80t Gen 3-11TJ-ThinkCentre M80t Gen 3	11TJ	115. Support on-board ports only.
ThinkCentre M80t- 11CS	11CS	115. Support on-board ports only.
ThinkCentre M80t- 11CT	11CT	115. Support on-board ports only.
ThinkCentre M80t- 11EK	11EK	115. Support on-board ports only.
ThinkCentre M80t- 11EL	11EL	115. Support on-board ports only.

ThinkCentre M90a Gen 2-11JY - ThinkCentre M90a Gen 2	11JY	115. Support on-board ports only.
ThinkCentre M90a Gen 2-11K0 - ThinkCentre M90a Gen 2	11K0	115. Support on-board ports only.
ThinkCentre M90a Gen 2-11K1 - ThinkCentre M90a Gen 2	11K1	115. Support on-board ports only.
ThinkCentre M90a Gen 2-11K2 - ThinkCentre M90a Gen 2	11K2	115. Support on-board ports only.
ThinkCentre M90a Gen 2-11MN - ThinkCentre M90a Gen 2	11MN	115. Support on-board ports only.
ThinkCentre M90a Gen 3-11VF-ThinkCentre M90a Gen 3	11VF	115. Support on-board ports only.
ThinkCentre M90a Gen 3-11VG-ThinkCentre M90a Gen 3	11VG	115. Support on-board ports only.
ThinkCentre M90a Gen 3-11VH-ThinkCentre M90a Gen 3	11VH	115. Support on-board ports only.
ThinkCentre M90a Gen 3-11VJ-ThinkCentre M90a Gen 3	11VJ	115. Support on-board ports only.
ThinkCentre M90a Gen 3-Think Centre M90a Gen 3	12AH	115. Support on-board ports only.
	12AJ	115. Support on-board ports only.
	12AK	115. Support on-board ports only.
	12AL	115. Support on-board ports only.
ThinkCentre M90a Pro Gen3-11VA- ThinkCentre M90a Pro Gen3	11VA	115. Support on-board ports only.

ThinkCentre M90a Pro Gen3-11VB- ThinkCentre M90a Pro Gen3	11VB	115. Support on-board ports only.
ThinkCentre M90a Pro Gen3-11VC- ThinkCentre M90a Pro Gen3	11VC	115. Support on-board ports only.
ThinkCentre M90a Pro Gen3-11VD- ThinkCentre M90a Pro Gen3	11VD	115. Support on-board ports only.
ThinkCentre M90a Pro Gen3-11VE- ThinkCentre M90a Pro Gen3	11VE	115. Support on-board ports only.
ThinkCentre M90q Gen 2-11MQ - ThinkCentre M90q Gen 2	11MQ	115. Support on-board ports only.
ThinkCentre M90q Gen 2-11MR - ThinkCentre M90q Gen 2	11MR	115. Support on-board ports only.
ThinkCentre M90q Gen 2-11MU - ThinkCentre M90q Gen 2	11MU	115. Support on-board ports only.
ThinkCentre M90q Gen 2-11MV - Thinkcentre M90q Gen 2	11MV	115. Support on-board ports only.
ThinkCentre M90q Gen 3-11U5-ThinkCentre M90q Gen 3	11U5	115. Support on-board ports only.
ThinkCentre M90q Gen 3-11U6-ThinkCentre M90q Gen 3	11U6	115. Support on-board ports only.

ThinkCentre M90q Gen 3-11U7-ThinkCentre M90q Gen 3	11U7	115. Support on-board ports only.
ThinkCentre M90q Gen 3-11U8-ThinkCentre M90q Gen 3	11U8	115. Support on-board ports only.
ThinkCentre M90q- 11CR	11CR	115. Support on-board ports only.
ThinkCentre M90q- 11DG	11DG	115. Support on-board ports only.
ThinkCentre M90q- 11DH	11DH	115. Support on-board ports only.
ThinkCentre M90q- 11DJ	11DJ	115. Support on-board ports only.
ThinkCentre M90q- 11DK	11DK	115. Support on-board ports only.
ThinkCentre M90q- 11DL	11DL	115. Support on-board ports only.
ThinkCentre M90q- 11EY	11EY	115. Support on-board ports only.
ThinkCentre M90q- 11F0	11F0	115. Support on-board ports only.
ThinkCentre M90s Gen 3-11TS-ThinkCentre M90s Gen 3	11TS	115. Support on-board ports only.
ThinkCentre M90s Gen 3-11TT-ThinkCentre M90s Gen 3	11TT	115. Support on-board ports only.
ThinkCentre M90s Gen 3-11TW-ThinkCentre M90s Gen 3	11TW	115. Support on-board ports only.
ThinkCentre M90s Gen 3-11TX-ThinkCentre M90s Gen 3	11TX	115. Support on-board ports only.

ThinkCentre M90t Gen 3-11TM-ThinkCentre M90t Gen 3	11TM	115. Support on-board ports only.
ThinkCentre M90t Gen 3-11TN-ThinkCentre M90t Gen 3	11TN	115. Support on-board ports only.
ThinkCentre M90t Gen 3-11TU-ThinkCentre M90t Gen 3	11TU	115. Support on-board ports only.
ThinkCentre M90t Gen 3-11TV-ThinkCentre M90t Gen 3	11TV	115. Support on-board ports only.
ThinkCentre M91- 7074	7074	
ThinkCentre M91- 7077	7077	
ThinkCentre M91p- 7075	7075	
ThinkCentre M91p- 7078	7078	
ThinkCentre M920q- 10RR	10RR	115. Support on-board ports only.
ThinkCentre M920q- 10RS	10RS	115. Support on-board ports only.
ThinkCentre M920q- 10RT	10RT	115. Support on-board ports only.
ThinkCentre M920q- 10RU	10RU	115. Support on-board ports only.
ThinkCentre M920q- 10V8	10V8	115. Support on-board ports only.
ThinkCentre M920x- 10S0	10S0	115. Support on-board ports only.
ThinkCentre M920x- 10S1	10S1	115. Support on-board ports only.
ThinkCentre M920x- 10S2	10S2	115. Support on-board ports only.

ThinkCentre M920x- 10S3	10S3	115. Support on-board ports only.
ThinkCentre M93z- 10AD	10AD	
ThinkCentre M93z- 10AF	10AF	
ThinkCentre neo 30a 22 Gen 3-ThinkCentre neo 30a 22 Gen 3	12B1	115. Support on-board ports only.
ThinkCentre neo 30a 24 Gen 3-ThinkCentre neo 30a 24 Gen 3	12B0	115. Support on-board ports only.
ThinkCentre neo 50a 24 Gen 3-ThinkCentre neo 50a 24 Gen 3	12B6	115. Support on-board ports only.
	12B7	115. Support on-board ports only.
	12B8	115. Support on-board ports only.
	12B9	115. Support on-board ports only.
ThinkCentre neo 50s Gen 3-11SW - ThinkCentre neo 50s Gen 3	11SW	115. Support on-board ports only.
ThinkCentre neo 50s Gen 3-11SX - ThinkCentre neo 50s Gen 3	11SX	115. Support on-board ports only.
ThinkCentre neo 50s Gen 3-11SY - ThinkCentre neo 50s Gen 3	11SY	115. Support on-board ports only.
ThinkCentre neo 50s Gen 3-11T0 - ThinkCentre neo 50s Gen 3	11T0	115. Support on-board ports only.

ThinkCentre neo 50t Gen 3-11SC - ThinkCentre neo 50t Gen 3	11SC	115. Support on-board ports only.
ThinkCentre neo 50t Gen 3-11SD - ThinkCentre neo 50t Gen 3	11SD	115. Support on-board ports only.
ThinkCentre neo 50t Gen 3-11SE - ThinkCentre neo 50t Gen 3	11SE	115. Support on-board ports only.
ThinkCentre neo 50t Gen 3-11SF - ThinkCentre neo 50t Gen 3	11SF	115. Support on-board ports only.
ThinkCentre neo 70t Gen 3-11YT- ThinkCentre neo 70t Gen 3	11YT	115. Support on-board ports only.
ThinkCentre neo 70t Gen 3-11YU- ThinkCentre neo 70t Gen 3	11YU	115. Support on-board ports only.
ThinkEdge SE30-11NA - ThinkEdge SE30	11NA	115. Support on-board ports only.
ThinkEdge SE30-11NB - ThinkEdge SE30	11NB	115. Support on-board ports only.
ThinkEdge SE50-11RH - ThinkEdge SE50	11RH	115. Support on-board ports only.
ThinkEdge SE50-11RJ - ThinkEdge SE50	11RJ	115. Support on-board ports only.
ThinkEdge SE70-12A6 - ThinkEdge SE70	12A6	115. Support on-board ports only.
ThinkEdge SE70-12A7 - ThinkEdge SE70	12A7	115. Support on-board ports only.

ThinkEdge SE70-12A8 - ThinkEdge SE70	12A8	115. Support on-board ports only.
ThinkEdge SE70-12A9 - ThinkEdge SE70	12A9	115. Support on-board ports only.
ThinkEdge SE70-12AA - ThinkEdge SE70	12AA	115. Support on-board ports only.
ThinkEdge SE70-12AB - ThinkEdge SE70	12AB	115. Support on-board ports only.
ThinkEdge SE70-12AE - ThinkEdge SE70	12AE	115. Support on-board ports only.
ThinkEdge SE70-12AF - ThinkEdge SE70	12AF	115. Support on-board ports only.
ThinkEdge SE70-12AN - ThinkEdge SE70	12AN	115. Support on-board ports only.
ThinkEdge SE70-12AQ - ThinkEdge SE70	12AQ	115. Support on-board ports only.
ThinkEdge SE70-12AR - ThinkEdge SE70	12AR	115. Support on-board ports only.
ThinkEdge SE70-12AS - ThinkEdge SE70	12AS	115. Support on-board ports only.
ThinkEdge SE70-12AT - ThinkEdge SE70	12AT	115. Support on-board ports only.
ThinkEdge SE70-12AU - ThinkEdge SE70	12AU	115. Support on-board ports only.
ThinkPad 11e 1st Generation-20D9 MT	20D9	
ThinkPad 11e 1st Generation-20DU MT	20DU	
ThinkPad 11e 2nd Generation-20E5 MT	20E5	
ThinkPad 11e 2nd Generation-20E6 MT	20E6	
ThinkPad 11e 2nd Generation-20E7 MT	20E7	
ThinkPad 11e 2nd Generation-20E8 MT	20E8	

ThinkPad 11e 2nd Generation-20ED MT	20ED	
ThinkPad 11e 2nd Generation-20EE MT	20EE	
ThinkPad 11e 3rd Generation-20G8 MT	20G8	223 For Bay Trail model
ThinkPad 11e 3rd Generation-20G9 MT	20G9	223 For Bay Trail model
ThinkPad 11e 3rd Generation-20GA MT	20GA	223 For Bay Trail model
ThinkPad 11e 3rd Generation-20GB MT	20GB	223 For Bay Trail model
ThinkPad 11e 3rd Generation-20GC MT	20GC	223 For Bay Trail model
ThinkPad 11e 3rd Generation-20GD MT	20GD	223 For Bay Trail model
ThinkPad 11e 3rd Generation-20GE MT	20GE	223 For Bay Trail model
ThinkPad 11e 3rd Generation-20GF MT	20GF	223 For Bay Trail model
ThinkPad 11e 4th Generation-20HS MT	20HS	115. Support on-board ports only.
ThinkPad 11e 4th Generation-20HT MT	20HT	115. Support on-board ports only.
ThinkPad 11e 4th Generation-20HU MT	20HU	115. Support on-board ports only.
ThinkPad 11e 4th Generation-20HV MT	20HV	115. Support on-board ports only.
ThinkPad 11e 5th Generation-20LM MT	20LM	115. Support on-board ports only.
ThinkPad 11e 5th Generation-20LN MT	20LN	115. Support on-board ports only.
ThinkPad 11e 5th Generation-20LQ MT	20LQ	115. Support on-board ports only.
ThinkPad 11e 5th Generation-20LR MT	20LR	115. Support on-board ports only.

ThinkPad 13 1st Generation-20GJ MT	20GJ	
ThinkPad 13 1st Generation-20GK MT	20GK	
ThinkPad 13 2nd Generation-20J1 MT	20J1	
ThinkPad 13 2nd Generation-20J2 MT	20J2	
ThinkPad A475-20KL MT	20KL	115. Support on-board ports only.
ThinkPad A475-20KM MT	20KM	115. Support on-board ports only.
ThinkPad L14-20U1 MT 2020	20U1	115. Support on-board ports only.
ThinkPad L14-20U2 MT 2020	20U2	115. Support on-board ports only.
ThinkPad L15-20U3 MT 2020	20U3	115. Support on-board ports only.
ThinkPad L15-20U4 MT 2020	20U4	115. Support on-board ports only.
ThinkPad P1 3rd Generation-20TH MT 2020	20TH	115. Support on-board ports only.
ThinkPad P1 3rd Generation-20TJ MT 2020	20TJ	115. Support on-board ports only.
ThinkPad P14s-20S4 MT 2020	20S4	115. Support on-board ports only.
ThinkPad P14s-20S5 MT 2020	20S5	115. Support on-board ports only.
ThinkPad P15-20ST MT 2020	20ST	115. Support on-board ports only.
ThinkPad P15-20SU MT 2020	20SU	115. Support on-board ports only.
ThinkPad P15g-20UR MT 2020	20UR	115. Support on-board ports only.

ThinkPad P15g-20US MT 2020	20US	115. Support on-board ports only.
ThinkPad P15v-20TQ MT 2020	20TQ	115. Support on-board ports only.
ThinkPad P15v-20TR MT 2020	20TR	115. Support on-board ports only.
ThinkPad P17-20SN MT 2020	20SN	115. Support on-board ports only.
ThinkPad P17-20SQ MT 2020	20SQ	115. Support on-board ports only.
ThinkPad S5 Yoga 15- 20DQ MT	20DQ	
ThinkPad S5 Yoga 15- 20DR MT	20DR	
ThinkPad T14-20S0 MT 2020	20S0	115. Support on-board ports only.
ThinkPad T14-20S1 MT 2020	20S1	115. Support on-board ports only.
ThinkPad T14-20S2 MT 2020 HC	20S2	115. Support on-board ports only.
ThinkPad T14-20S3 MT 2020 HC	20S3	115. Support on-board ports only.
ThinkPad T14s-20T0 MT 2020	20T0	115. Support on-board ports only.
ThinkPad T14s-20T1 MT 2020	20T1	115. Support on-board ports only.
ThinkPad T15-20S6 MT 2020	20S6	115. Support on-board ports only.
ThinkPad T15-20S7 MT 2020	20S7	115. Support on-board ports only.
ThinkPad T15p-20TM MT 2020	20TM	115. Support on-board ports only.
ThinkPad T15p-20TN MT 2020	20TN	115. Support on-board ports only.
ThinkPad T410-2522	2522	

ThinkPad X201 Tablet-0053	0053	
ThinkPad X201 Tablet-0831	0831	
ThinkPad X201 Tablet-2985	2985	
ThinkPad X201 Tablet-3093	3093	
ThinkPad X201 Tablet-3113	3113	
ThinkPad X201 Tablet-3144	3144	
ThinkPad X201 Tablet-3239	3239	
ThinkPad X201s-5129	5129	
ThinkPad X201s-5143	5143	
ThinkPad X201s-5385	5385	
ThinkPad X201s-5397	5397	
ThinkPad X201s-5413	5413	
ThinkPad X201s-5442	5442	
ThinkPad X201s-5446	5446	
ThinkPad X270-2023	2023	
ThinkPad X270-2024	2024	
ThinkPad X270-20KC MT	20KC	115. Support on-board ports only.
ThinkPad X270-20KD MT	20KD	115. Support on-board ports only.
ThinkPad X270-3249	3249	
ThinkPad X270-3323	3323	
ThinkPad X270-3357	3357	

ThinkPad X270-3626	3626	
ThinkPad X270-3680	3680	
ThinkPad X270-3712	3712	
ThinkPad X270-4492	4492	
ThinkPad X270-7454	7454	
ThinkPad X270-7455	7455	
ThinkPad X270-7457	7457	
ThinkPad X270-7458	7458	
ThinkPad X270-7459	7459	
ThinkPad X300-2748	2748	
ThinkPad X300-2749	2749	
ThinkPad X300-6476	6476	
ThinkPad X300-6477	6477	
ThinkPad X300-6478	6478	
ThinkPad X300-X300 3 Year Onsite	4052	
ThinkPad X301-2774	2774	
ThinkPad X301-2776	2776	
ThinkPad X301-2777	2777	
ThinkPad X301-2778	2778	
ThinkPad X301-2779	2779	
ThinkPad X301-4057	4057	
ThinkPad X301-4182	4182	
ThinkPad X60 Tablet- 6363	6363	
ThinkPad X60 Tablet- 6364	6364	

ThinkPad X60 Tablet- 6365	6365	
ThinkPad X60 Tablet- 6366	6366	
ThinkPad X60-1706	1706	
ThinkPad X60-1707	1707	
ThinkPad X60-1708	1708	
ThinkPad X60-1709	1709	
ThinkPad X60S-1702	1702	
ThinkPad X60S-1703	1703	
ThinkPad X60S-1704	1704	
ThinkPad X60S-1705	1705	
ThinkPad X61 Tablet- 7667	7667	
ThinkPad X61 Tablet- 7762	7762	
ThinkPad X61 Tablet- 7763	7763	
ThinkPad X61 Tablet- 7764	7764	
ThinkPad X61 Tablet- 7767	7767	
ThinkPad X61 Tablet- 7768	7768	
ThinkPad X61 Tablet- 7769	7769	
ThinkPad X61-7673	7673	
ThinkPad X61-7674	7674	
ThinkPad X61-7675	7675	
ThinkPad X61-7676	7676	

ThinkPad X61-7678	7678	
ThinkPad X61-7679	7679	
ThinkPad X61s-7666	7666	
ThinkPad X61s-7670	7670	
ThinkPad X61s-7671	7671	
ThinkPad Yoga 260- 20FD MT	20FD	223 For Bay Trail model
ThinkPad Yoga 260- 20FE MT	20FE	223 For Bay Trail model
ThinkPad Yoga 260- 20GS MT	20GS	223 For Bay Trail model
ThinkPad Yoga 260- 20GT MT	20GT	223 For Bay Trail model
ThinkPad Yoga 370- 20JH MT	20JH	115. Support on-board ports only.
ThinkPad Yoga 370- 20JJ MT	20JJ	115. Support on-board ports only.
ThinkPad x100e-2876	2876	
ThinkPad x100e-MT 0022	0022	
ThinkPad x100e-MT 3506	3506	
ThinkPad x100e-MT 3507	3507	
ThinkPad x100e-MT 3508	3508	
ThinkSmart Core + Controller-MT	11LQ	
	11LR	
	11LS	
	11LT	

ThinkSmart Core C- 11S0	11S0	
ThinkSmart Core Full Room Kit-MT	11S2	
	11S3	
	11S4	
	11S5	
ThinkSmart Core L- 11RX	11RX	
ThinkSmart Core OEM- 11S6	11S6	
ThinkSmart Core P- 11RV	11RV	
ThinkSmart Hub-10V5	10V5	299. For HDMI1 (OUT) and HDMI2 (OUT) only
ThinkSmart Hub-10V6	10V6	299. For HDMI1 (OUT) and HDMI2 (OUT) only
ThinkStation P340- 30DK	30DK	
ThinkStation P340- 30DL	30DL	
ThinkStation P340- 30DN	30DN	
ThinkStation P350- 30E3	30E3	
ThinkStation P350- 30E4	30E4	
ThinkStation P350- 30E5	30E5	
ThinkStation P350- 30E6	30E6	
ThinkStation P360 Tiny-30F8	30F8	
ThinkStation P360 Tiny-30FA	30FA	

ThinkStation P360 Tiny-30FB	30FB	
ThinkStation P360 Tiny-30FC	30FC	
ThinkStation P360 Tiny-30FD	30FD	
ThinkStation P360 Tiny-30FF	30FF	
ThinkStation P360 Tower-30FM	30FM	
ThinkStation P360 Tower-30FN	30FN	
ThinkStation P360 Tower-30FQ	30FQ	
ThinkStation P360 Ultra-30G0	30G0	
ThinkStation P360 Ultra-30G1	30G1	
ThinkStation P360 Ultra-30G2	30G2	
ThinkStation P360 Ultra-30G3	30G3	
ThinkStation P360 Ultra-30G4	30G4	
ThinkVision X24-60CF	60CF	
Thinkbook 13s-IWL-MT 20R9	20R9	
Thinkbook 14s-IWL-MT 20RM	20RM	
Thinkcentre Edge 92z- 3396	3396	
Thinkcentre Edge 92z- 3397	3397	
Thinkcentre Edge 92z- 3398	3398	

Thinkcentre Edge 92z- 3399	3399	
Thinkcentre Edge 92z- 3414	3414	
Thinkcentre Edge 92z- 3415	3415	
Thinkcentre Edge 92z- 3416	3416	
Thinkcentre Edge 92z- 3417	3417	
Thinkcentre Edge 92z- 3418	3418	
Thinkcentre Edge 92z- 3419	3419	
Thinkcentre Edge 92z- 3423	3423	
Thinkcentre Edge 92z- 3426	3426	
Thinkpad X200 Tablet- 4184	4184	
Thinkpad X200 Tablet- 7448	7448	
Thinkpad X200 Tablet- 7449	7449	
Thinkpad X200 Tablet- 7453	7453	
Thinkpad X200 Tablet- X200 Tablet	2263	
	2266	
	7450	
Thinkpad X200s-2046	2046	
Thinkpad X200s-2047	2047	
Thinkpad X200s-7462	7462	
Thinkpad X200s-7465	7465	

Thinkpad X200s-7466	7466	
Thinkpad X200s-7469	7469	
Thinkpad X200s-7470	7470	
V155-15API-MT 81V5	81V5	
Valencia LS2023 Wide- 3778	3778	
Valencia LS2223 Wide- 3783	3783	
Wine French - Do Not Use-0196 - Do Not Use	0196	
Wine French - Do Not Use-0197 - Do Not Use	0197	
Wine French - Do Not Use-492 - Do Not Use	0492	
X1 Carbon 2nd Generation-20A7 MT	20A7	
X1 Carbon 2nd Generation-20A8 MT	20A8	
X1 Carbon 3rd Generation-20BS MT	20BS	
X1 Carbon 3rd Generation-20BT MT	20BT	
X1 Carbon 4th Generation-20FB MT	20FB	
X1 Carbon 4th Generation-20FC MT	20FC	
X1 Carbon 5th Generation-20HQ MT	20HQ	115. Support on-board ports only.
X1 Carbon 5th Generation-20HR MT	20HR	115. Support on-board ports only.
X1 Carbon 5th Generation-20K3 MT	20K3	115. Support on-board ports only.
X1 Carbon 5th Generation-20K4 MT	20K4	115. Support on-board ports only.

X1 Carbon 6th Generation-20KG MT	20KG	115. Support on-board ports only.
X1 Carbon 6th Generation-20KH MT	20KH	115. Support on-board ports only.
X1 Carbon 7th Generation-20QD MT	20QD	115. Support on-board ports only.
X1 Carbon 7th Generation-20QE MT	20QE	115. Support on-board ports only.
X1 Carbon 7th Generation-20R1 MT	20R1	115. Support on-board ports only.
X1 Carbon 7th Generation-20R2 MT	20R2	115. Support on-board ports only.
X1 Carbon 8th Generation-20U9 MT 2020	20U9	115. Support on-board ports only.
X1 Carbon 8th Generation-20UA MT 2020	20UA	115. Support on-board ports only.
X1 Carbon 9th Generation-20XW - X1 Carbon Gen 9	20XW	115. Support on-board ports only.
X1 Carbon 9th Generation-20XX - X1 Carbon Gen 9	20XX	115. Support on-board ports only.
X1 Carbon G10-21CB - X1 Carbon Gen 10	21CB	115. Support on-board ports only.
X1 Carbon G10-21CC - X1 Carbon Gen 10	21CC	115. Support on-board ports only.
X1 Extreme 1st Generation-20MF MT	20MF	115. Support on-board ports only.
X1 Extreme 1st Generation-20MG MT	20MG	115. Support on-board ports only.
X1 Extreme 2nd Generation-20QV MT	20QV	115. Support on-board ports only.
X1 Extreme 2nd Generation-20QW MT	20QW	115. Support on-board ports only.

X1 Extreme 3rd Generation-20TK MT 2020	20TK	115. Support on-board ports only.
X1 Extreme 3rd Generation-20TL MT 2020	20TL	115. Support on-board ports only.
X1 Extreme G4-20Y5 - X1 Extreme Gen 4	20Y5	115. Support on-board ports only.
X1 Extreme G4-20Y6 - X1 Extreme Gen 4	20Y6	115. Support on-board ports only.
X1 Extreme G5-21DE - X1 Extreme Gen 5	21DE	115. Support on-board ports only.
X1 Extreme G5-21DF - X1 Extreme Gen 5	21DF	115. Support on-board ports only.
X1 Series-1292 MT	1292	
X1 Series-1293 MT	1293	
X1 Series-1294 MT	1294	
X1 Series-1295 MT	1295	
X1 Series-1296 MT	1296	
X1 Yoga 1st Generation-20FQ MT	20FQ	
X1 Yoga 1st Generation-20FR MT	20FR	
X1 Yoga 2nd Generation-20JD MT	20JD	115. Support on-board ports only.
X1 Yoga 2nd Generation-20JE MT	20JE	115. Support on-board ports only.
X1 Yoga 2nd Generation-20JF MT	20JF	115. Support on-board ports only.
X1 Yoga 2nd Generation-20JG MT	20JG	115. Support on-board ports only.
X1 Yoga 3rd Generation-RAVEN-3.0 20LD MT	20LD	115. Support on-board ports only.

X1 Yoga 3rd Generation-RAVEN-3.0 20LE MT	20LE	115. Support on-board ports only.
X1 Yoga 3rd Generation-RAVEN-3.0 20LF MT	20LF	115. Support on-board ports only.
X1 Yoga 3rd Generation-RAVEN-3.0 20LG MT	20LG	115. Support on-board ports only.
X1 Yoga 4th Generation-20QF MT	20QF	115. Support on-board ports only.
X1 Yoga 4th Generation-20QG MT	20QG	115. Support on-board ports only.
X1 Yoga 4th Generation-20SA MT	20SA	115. Support on-board ports only.
X1 Yoga 4th Generation-20SB MT	20SB	115. Support on-board ports only.
X1 Yoga 5th Generation-20UB MT 2020	20UB	115. Support on-board ports only.
X1 Yoga 5th Generation-20UC MT 2020	20UC	115. Support on-board ports only.
X1 Yoga 6th Generation-20XY - X1 Yoga Gen 6	20XY	115. Support on-board ports only.
X1 Yoga 6th Generation-20Y0 - X1 Yoga Gen 6	20Y0	115. Support on-board ports only.
X1 Yoga G7-21CD - X1 Yoga Gen 7	21CD	115. Support on-board ports only.
X1 Yoga G7-21CE - X1 Yoga Gen 7	21CE	115. Support on-board ports only.
X121e-MT 3045	3045	
X121e-MT 3051	3051	

X13 AMD G1-20UF MT 2020	20UF	115. Support on-board ports only.
X13 AMD G1-20UG MT 2020	20UG	115. Support on-board ports only.
X13 AMD G2-20XH - X13 AMD Gen 2	20XH	115. Support on-board ports only.
X13 AMD G2-20XJ - X13 AMD Gen 2	20XJ	115. Support on-board ports only.
X13 AMD G3-21CM - X13 AMD Gen 3	21CM	115. Support on-board ports only.
X13 AMD G3-21CN - X13 AMD Gen 3	21CN	115. Support on-board ports only.
X13 G1-20T2 MT 2020	20T2	115. Support on-board ports only.
X13 G1-20T3 MT 2020	20T3	115. Support on-board ports only.
X13 G2-20WK - X13 Gen 2	20WK	115. Support on-board ports only.
X13 G2-20WL - X13 Gen 2	20WL	115. Support on-board ports only.
X13 G3-21BN - X13 Gen 3	21BN	115. Support on-board ports only.
X13 G3-21BQ - X13 Gen 3	21BQ	115. Support on-board ports only.
X13 Yoga 2nd Generation-20W8 MT 2021	20W8	115. Support on-board ports only.
X13 Yoga 2nd Generation-20W9 MT 2021	20W9	115. Support on-board ports only.
X13 Yoga G3-21AW - X13 Yoga Gen 3	21AW	115. Support on-board ports only.
X13 Yoga G3-21AX - X13 Yoga Gen 3	21AX	115. Support on-board ports only.
X13 Yoga-20SX MT 2020	20SX	115. Support on-board ports only.

X13 Yoga-20SY MT 2020	20SY	115. Support on-board ports only.
X130E-2339 MT	2339	
X130E-2340 MT	2340	
X131E-3367 MT	3367	
X131E-3369 MT	3369	
X131E-6283 MT	6283	
X131e-3368 MT	3368	
X140e-20BL MT	20BL	
X140e-20BM MT	20BM	
X1Series-1286 MT	1286	
X1Series-1291 MT	1291	
X220 Dasher-X220 4286 MT	4286	
X220 Dasher-X220 4287 MT	4287	
X220 Dasher-X220 4289 MT	4289	
X220 Dasher-X220 4290 MT	4290	
X220 Dasher-X220 4291 MT	4291	
X220 Dasher-X220 4292 MT	4292	
X220 Dasher-X220 4293 MT	4293	
X220 Tablet Comet- X220 Tablet 4294 MT	4294	
X220 Tablet Comet- X220 Tablet 4296 MT	4296	

X220 Tablet Comet- X220 Tablet 4297 MT	4297	
X220 Tablet Comet- X220 Tablet 4298 MT	4298	
X220 Tablet Comet- X220 Tablet 4299 MT	4299	
X220 Tablet Comet- X220 Tablet 4300 MT	4300	
X220 Tablet Comet- X220 Tablet 4301MT	4301	
X230 Sub-Series-2322 MT	2322	
X230 Sub-Series-2324 MT	2324	
X230 Sub-Series-2325 MT	2325	
X230 Sub-Series-2330 MT	2330	
X230 Sub-Series-2333 MT	2333	
X230 Sub-Series-3436 MT	3436	
X230 Sub-Series-3437 MT	3437	
X230 Sub-Series-3438 MT	3438	
X230 Sub-Series-3441 MT	3441	
X230 Sub-Series-3442 MT	3442	
X230-2306 MT	2306	
X230-2320 MT	2320	
X230-3434 MT	3434	
X230-3435 MT	3435	

X24(New logo)-60FA	60FA	
X260-20F5MT	20F5	
X260-20F6 MT	20F6	
X270-20HM MT	20HM	115. Support on-board ports only.
X270-20HN MT	20HN	115. Support on-board ports only.
X270-20K5 MT	20K5	115. Support on-board ports only.
X270-20K6 MT	20K6	115. Support on-board ports only.
X280-20KE MT	20KE	115. Support on-board ports only.
X280-20KF MT	20KF	115. Support on-board ports only.
X30E Series-2338 MT	2338	
X30E Series-MT 0622	0622	
X380 Yoga-STORM-3.0 20LH MT	20LH	115. Support on-board ports only.
X380 Yoga-STORM-3.0 20LJ MT	20LJ	115. Support on-board ports only.
X390 Yoga-20NN MT	20NN	115. Support on-board ports only.
X390 Yoga-20NQ MT	20NQ	115. Support on-board ports only.
X390-20Q0 MT	20Q0	115. Support on-board ports only.
X390-20Q1 MT	20Q1	115. Support on-board ports only.
X390-20SC MT	20SC	115. Support on-board ports only.
X390-20SD MT	20SD	115. Support on-board ports only.
X395-20NL MT	20NL	115. Support on-board ports only.
X395-20NM MT	20NM	115. Support on-board ports only.
Yoga 14-20FY MT	20FY	223 For Bay Trail model
Yoga 460-20EL MT	20EL	223 For Bay Trail model
Yoga 460-20EM MT	20EM	223 For Bay Trail model

Yoga 6 13ALC7-82UD - Yoga 6 13ALC7	82UD	
Yoga 7 14ARB7-82QF - Yoga 7 14ARB7	82QF	
Yoga 7 14IAL7-82QE - Yoga 7 14IAL7	82QE	
Yoga 7 14IAL7-82VD - Yoga 7 14IAL7	82VD	
Yoga 7 16IAH7-82UF - Yoga 7 16IAH7	82UF	
Yoga 7 16IAP7-82QG - Yoga 7 16IAP7	82QG	
Yoga Slim 7 14ARE05- MT 82A2	82A2	
Yoga Slim 7 14IIL05- MT 82A1	82A1	
Yoga Slim 7 14ITL05- MT 82A3	82A3	
Yoga Slim 7 15IIL05- MT 82AA	82AA	
Yoga Slim 7 15IMH05- MT 82AB	82AB	
Yoga Slim 7 15ITL05- MT 82AC	82AC	
Yoga Slim 7 Carbon 13IAP7-82U9 - Yoga Slim 7 Carbon 13IAP7	82U9	
Yoga Slim 7 Pro 16ACH6-82QQ - Yoga Slim 7 Pro 16ACH6	82QQ	
Yoga Slim 9 14IAP7- 82T0 - Yoga Slim 9 14IAP7	82T0	

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GENERAL

SPECIFICATIONS

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Search



GRAPHICS

CAPABILITIES

PRODUCT IDS

KEY FEATURES

AMD Ryzen™ 5 PRO 5650G

General Specifications

Platform:	Desktop
Product Family:	AMD Ryzen™ PRO Processors
Product Line:	AMD Ryzen™ 5 PRO 5000 Series Desktop Processors
Former Codename:	"Cezanne"
# of CPU Cores:	6
# of Threads:	12
Max. Boost Clock:	Up to 4.4GHz
Base Clock:	3.9GHz
L2 Cache:	3MB
L3 Cache:	16MB
Default TDP:	65W
Processor Technology for CPU Cores:	TSMC 7nm FinFET
Unlocked for Overclocking	No
i:	
CPU Socket:	AM4

**GENERAL
SPECIFICATIONS**

Max. Operating Temperature (Tjmax):	95°C
--	------

CONNECTIVITY

Launch Date:	6/1/2021
---------------------	----------

**GRAPHICS
CAPABILITIES**

*OS Support:	Windows 11 - 64-Bit Edition Windows 10 - 64-Bit Edition RHEL x86 64-Bit Ubuntu x86 64-Bit *Operating System (OS) support will vary by manufacturer.
---------------------	---

PRODUCT IDS**KEY FEATURES**

Connectivity

PCI Express® Version:	PCIe® 3.0
------------------------------	-----------

System Memory Type:	DDR4
----------------------------	------

Memory Channels:	2
-------------------------	---

System Memory Specification:	Up to 3200MHz
-------------------------------------	---------------

Graphics Capabilities

Integrated Graphics:	Yes
-----------------------------	-----

Graphics Model:	Radeon™ Graphics
------------------------	------------------

Graphics Core Count:	7
-----------------------------	---

Graphics Frequency:	1900 MHz
----------------------------	----------

Product IDs

Product ID Tray:	100-000000255
-------------------------	---------------

Key Features

Supported Technologies: AMD PRO technologies

GENERAL SPECIFICATIONS

CONNECTIVITY

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[Graphics Capabilities](#)
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[UK Tax Strategy \(https://www.amd.com/system/files/documents/amd-uk-tax-strategy.pdf\)](https://www.amd.com/system/files/documents/amd-uk-tax-strategy.pdf)
[Cookies Settings](#)

Setup Menu

- Main**
 - Devices**
 - Advanced**
 - Power**
 - Security**
 - Startup**
 - Exit**
-

- > **System Summary**
- > **System Time & Date**









Machine Type and Model	11JA
System Brand ID	ThinkCentre M75s Gen 2
System Serial Number	INVALID
Asset Tag	
System UUID	abcdefg-1234-1234-1234-abcdefghijklmn
Ethernet MAC Address	xx:xx:xx:xx:xx:xx
Embedded Controller Version	M3BCT
BIOS Revision Level	M3BKT
Boot Block Revision Level	0.04
BIOS Date (MM/DD/YYYY)	07/21/2018
Preinstalled OS License	Not Defined
OA3 License Key ID	NO DPK

Language

English

- F1** Help
- Esc** Exit
- Select Item
- Select Menu
- +/-** Change Values
- Enter** Select > Sub-Menu
- F9** Setup Defaults
- F10** Save and Exit

Setup Menu

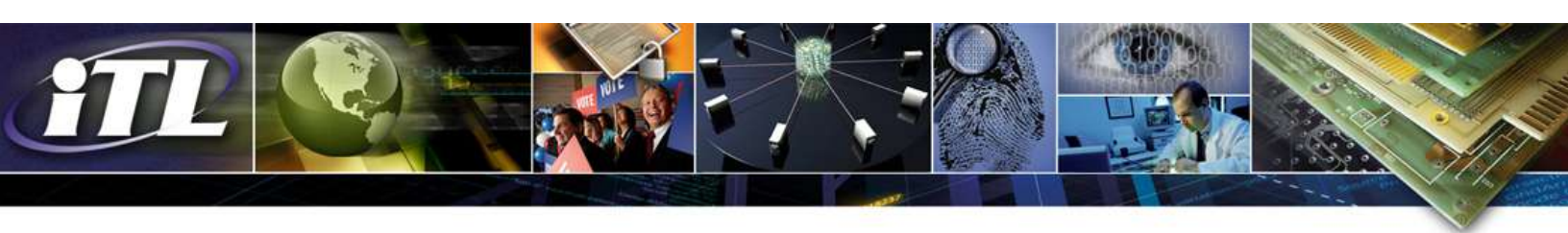
-  **Main**
 -  **Devices**
 -  **Advanced**
 -  **Power**
 -  **Security**
 -  **Startup**
 -  **Exit**
- 

- > **System Summary**
- > **System Time & Date**

Machine Type and Model	11JA
System Brand ID	ThinkCentre M75s Gen 2
System Serial Number	INVALID
Asset Tag	
System UUID	abcdefg-1234-1234-1234-abcdefghijklmn
Ethernet MAC Address	xx:xx:xx:xx:xx:xx
Embedded Controller Version	M3BCT
BIOS Revision Level	M3BKT
Boot Block Revision Level	0.04
BIOS Date (MM/DD/YYYY)	07/21/2018
Preinstalled OS License	Not Defined
OA3 License Key ID	NO DPK

Language

- F1** Help
- Esc** Exit
- ↑↓** Select Item
- ←→** Select Menu
- +/-** Change Values
- Enter** Select > Sub-Menu
- F9** Setup Defaults
- F10** Save and Exit



ITL BULLETIN FOR FEBRUARY 2015

NIST SPECIAL PUBLICATION 800-88 REVISION 1, *GUIDELINES FOR MEDIA SANITIZATION*

Andrew Regenscheid, Larry Feldman, and Greg Witte, Editors
Computer Security Division
Information Technology Laboratory
National Institute of Standards and Technology
U.S. Department of Commerce

Background

NIST has published an updated version of [Special Publication \(SP\) 800-88, *Guidelines for Media Sanitization*](#). SP 800-88 Revision 1 provides guidance to assist organizations and system owners in making practical sanitization decisions based on the categorization of confidentiality of their information. Media sanitization refers to a process that renders access to target data on the media infeasible for a given level of effort. Information disposition and sanitization decisions occur throughout the information system life cycle.

The publication states that the types of media used to create, capture, or transfer information used by the system should be determined during the requirements phase of the system. This analysis, balancing business needs and risk to confidentiality, will formalize the media that will be considered for the system to conform to Federal Information Processing Standards (FIPS) Publication 200, *Minimum Security Requirements for Federal Information and Information Systems*.

Media sanitization is one of the key elements in assuring confidentiality. In order for organizations to have appropriate controls of the information they are responsible for safeguarding, they must properly secure used media.

SP 800-88 Revision 1 recommends processes to guide media sanitization decision making regardless of the type of media in use. To effectively use this guide, organizations and individuals should focus on the information that may have been stored on the media, rather than focusing on the media itself. The document also includes guidelines and recommendations on methods for sanitizing different types of media, as described below.

Types of Sanitization

The publication describes three types of media sanitization – Clear, Purge, and Destroy - that can help ensure that data is not unintentionally released. These types are defined as follows:

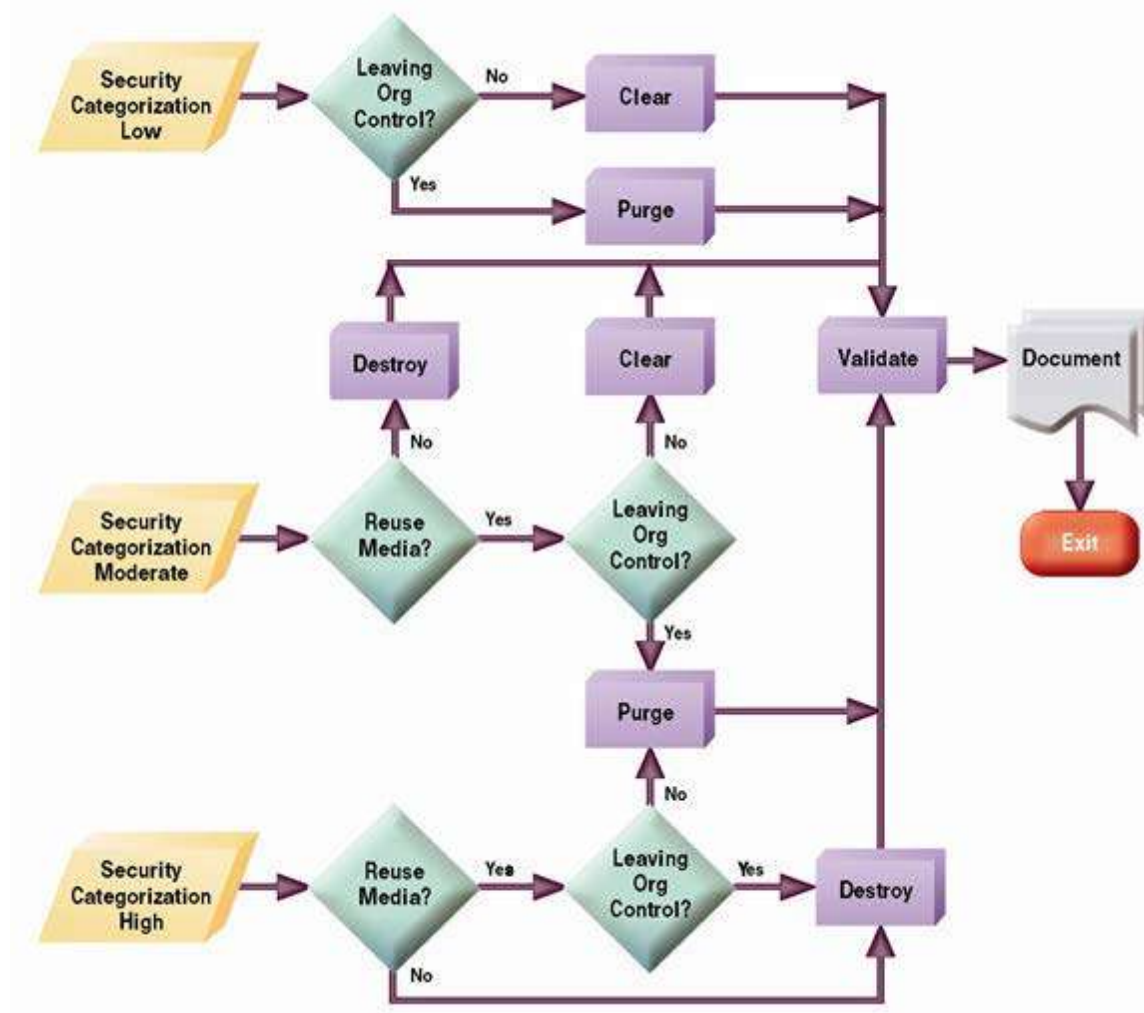
- **Clear** applies logical techniques to sanitize data in all user-addressable storage locations for protection against simple noninvasive data recovery techniques; it is typically applied through the standard Read and Write commands to the storage device, such as by rewriting with a new value or using a menu option to reset the device to the factory state (where rewriting is not supported).



- **Purge** applies physical or logical techniques that render target data recovery infeasible using state-of-the-art laboratory techniques.
- **Destroy** renders target data recovery (using state-of-the-art laboratory techniques) infeasible and results in the subsequent inability to use the media for storage of data.

Sanitization methods for specific media/device types are provided in Appendix A of the document.

Organizations using this guide should categorize the information to be protected, assess the nature of the medium on which it is recorded, assess the risk to confidentiality, and determine the future plans for the media. Then, the organization can choose the appropriate type(s) of sanitization. The **chart below** provides a decision process flow to assist organizations in making sanitization decisions that are commensurate with the security categorization of the confidentiality of information contained on their media. This decision process is based on the confidentiality of the information, not the type of media. Once organizations decide what type of sanitization is best for their individual case, then the media type will influence the technique used to achieve this sanitization goal.





Verification Methods

The publication recommends two types of sanitization verification. The first is to perform verification every time sanitization is applied. The second is a representative sampling verification, applied to a selected subset of the media. If possible, the sampling should be executed by personnel who were not part of the original sanitization action. The goal of sanitization verification is to ensure that the target data was effectively sanitized. SP 800-88 Revision 1 provides different methods of verification based on destructive techniques that have been used.

Trends in Data Storage Media

SP 800-88 Revision 1 provides analysis of trends in growing storage capacity and describes revolutionary and evolutionary changes in sanitization. The publication mentions that media technologies, such as flash memory-based storage devices including Solid State Drives (SSDs) and self-encrypting drives, have become prevalent. Degaussing and overwriting techniques - common methods for sanitizing magnetic media - are not applicable for flash memory devices. Evolutionary changes in magnetic media also have impacts on sanitization. New storage technologies, and even variations of magnetic storage, are dramatically different from legacy magnetic media. These clearly require sanitization research and a reinvestigation of sanitization procedures to ensure efficacy.

Trends in Sanitization

The publication summarizes some trends in sanitization. For storage devices containing *magnetic* media, a single overwrite pass with a fixed pattern, such as binary zeros, typically hinders recovery of data even if state-of-the-art laboratory techniques are applied to attempt to retrieve the data. One major drawback of relying solely upon the native Read and Write interface for performing the overwrite procedure is that areas that are not currently mapped to active areas (e.g., defect areas, over provisioned, unallocated space) may not be securely sanitized. These native methods also may not reliably overwrite all areas when wear-leveling techniques (commonly used with flash memory) are employed. Dedicated sanitization commands may support addressing these areas more effectively, but also require a level of assurance from the vendor.

Destructive techniques for some media types may become more difficult or impossible to apply in the future. Traditional techniques such as degaussing (for magnetic media) become more complicated as magnetic media evolves, because some emerging variations of magnetic recording technologies incorporate media with higher coercivity (magnetic force). As a result, existing degaussers may not have sufficient force to effectively degauss such media.

Cryptographic Erase (CE) is an emerging sanitization technique that can be used in some situations when data is encrypted as it is stored. With CE, media sanitization is performed by erasing the cryptographic keys that were used to encrypt the stored data, as opposed to sanitizing the storage locations on media containing the encrypted data itself. However, operational use of CE today presents some challenges. In some cases, it may be difficult to verify that CE has effectively sanitized media. SP 800-88 Revision 1 describes this challenge and possible approaches.



Conclusion

Both revolutionary and evolutionary changes make sanitization decisions more challenging, as the storage device may not clearly indicate what type of media is used for data storage. The burden falls on the user to accurately determine the media type and apply the appropriate sanitization procedure. SP 800-88 Revision 1 will assist organizations and system owners in making sanitization decisions. It does not, and cannot, specifically address all known types of media; however, the described sanitization decision process can be applied broadly.

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Disclaimer: Any mention of commercial products or reference to commercial organizations is for information only; it does not imply recommendation or endorsement by NIST nor does it imply that the products mentioned are necessarily the best available for the purpose.



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Cabo HDMI para HDMI

Lenovo

OB47070



4695

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FEATURE

TECH SPECS

Feature

Product Description

O cabo HDMI para HDMI Lenovo de 2 metros é um cabo HDMI macho para macho flexível, durável e confiável com uma banda larga de 340 MHz/10,2 Gbps. O cabo HDMI para HDMI Lenovo é um cabo de alta qualidade que proporciona conectividade nítida de vídeo/áudio e suporta altas resoluções de mais de 1080p+ a 120 Hz. É preparado para o futuro para superar as demandas futuras de padrões de vídeo/áudio de alta definição, como telas 4K x 2K e estéreo 3D. O cabo HDMI para HDMI Lenovo tem 3 anos de garantia.

Top Features

- Largura de banda alta de 340 MHz/10,2 Gbps
- Altas resoluções de mais de 1080 a 120 Hz
- suporte a 4K para 2 monitores
- suporte a estéreo 3D
- 3 ano de garantia

More Information

[Technical Support](#)

Tech Specs

Connectivity	Slim-tip
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Compatibility

Operating System

OS Independent

Compatible Machines

Description	ID	Footnote
-------------	----	----------

-	82A4	
100e AMD G3-82J7 - 100e Gen 3	82J7	115. Support on-board ports only.
100e AMD G3-82J8 - 100e Gen 3	82J8	115. Support on-board ports only.
100e G3-82UY - 100e Gen 3	82UY	115. Support on-board ports only.
100e G3-82V0 - 100e Gen 3	82V0	115. Support on-board ports only.
100w AMD G3-82HY - 100w Gen 3	82HY	115. Support on-board ports only.
100w AMD G3-82J0 - 100w Gen 3	82J0	115. Support on-board ports only.
11e-20DA MT	20DA	
11e-20DB MT	20DB	
13w Yoga-82S1 - 13w Yoga	82S1	115. Support on-board ports only.
13w Yoga-82S2 - 13w Yoga	82S2	115. Support on-board ports only.
14 EDGE (Intel)-0199 Do Not Use	0199	
14 EDGE (Intel)-0578	0578	
14 EDGE (Intel)-MT 0579	0579	
14 EDGE (Intel)-MT 1141	1141	
14 EDGE (Intel)-MT 1167	1167	
14e Chrome G2-82M1 - 14e Chromebook Gen 2	82M1	115. Support on-board ports only.
14e Chrome G2-82M2 - 14e Chromebook Gen 2	82M2	115. Support on-board ports only.

14w G2-82N8 - 14w Gen 2	82N8	115. Support on-board ports only.
14w G2-82N9 - 14w Gen 2	82N9	115. Support on-board ports only.
15 EDGE Intel-MT 0301	0301	
15 EDGE Intel-MT 0302 Do Not Use	0302	
15 EDGE Intel-MT 0319	0319	
15 EDGE Intel-MT 1143	1143	
15 EDGE Intel-MT 1144	1144	
19.5" LS2013W LCD Monitor-MT 60A8	60A8	
300e AMD 3rd Generation-82J9 - 300e Gen 3	82J9	115. Support on-board ports only.
300e AMD 3rd Generation-82JA - 300e Gen 3	82JA	115. Support on-board ports only.
300w AMD G3-82J1 - 300w Gen 3	82J1	115. Support on-board ports only.
300w AMD G3-82J2 - 300w Gen 3	82J2	115. Support on-board ports only.
500e G3-82JB - 500e Gen 3	82JB	115. Support on-board ports only.
500e G3-82JC - 500e Gen 3	82JC	115. Support on-board ports only.
500w G3-82J3 - 500w Gen 3	82J3	115. Support on-board ports only.
500w G3-82J4 - 500w Gen 3	82J4	115. Support on-board ports only.
A285-20MW MT	20MW	115. Support on-board ports only.

A285-20MX MT	20MX	115. Support on-board ports only.
A485-20MU MT	20MU	115. Support on-board ports only.
A485-20MV MT	20MV	115. Support on-board ports only.
B490-3772 MT	3772	
B590 HM77-MT 6274	6274	
B590 HM77-MT 8601	8601	
B590-MT 3761	3761	
C13 Yoga G1 Chromebook-20UX MT 2020	20UX	
C13 Yoga G1 Chromebook-20UY MT 2020	20UY	
C14 G1 Chromebook- 21C9 - C14 Gen 1 Chromebook	21C9	
C14 G1 Chromebook- 21CA - C14 Gen 1 Chromebook	21CA	
D24f-10-65EB	65EB	
E135 Sub Series-3359 MT	3359	
E14 2nd Generation- 20TA MT 2020	20TA	115. Support on-board ports only.
E14 2nd Generation- 20TB MT 2020	20TB	115. Support on-board ports only.
E14 2nd Generation- ARE-20T6 MT 2020	20T6	115. Support on-board ports only.
E14 2nd Generation- ARE-20T7 MT 2020	20T7	115. Support on-board ports only.
E14 AMD 3rd Generation-20Y7 - E14 AMD Gen 3	20Y7	115. Support on-board ports only.

E14 AMD 3rd Generation-20YD - E14 AMD Gen 3	20YD	115. Support on-board ports only.
E14 AMD 3rd Generation-20YE - E14 AMD Gen 3	20YE	115. Support on-board ports only.
E14 AMD 3rd Generation-20YF - E14 AMD Gen 3	20YF	115. Support on-board ports only.
E14 AMD G4-21EB - E14 AMD Gen 4	21EB	115. Support on-board ports only.
E14 AMD G4-21EC - E14 AMD Gen 4	21EC	115. Support on-board ports only.
E14 G4-21E3 - E14 Gen 4	21E3	115. Support on-board ports only.
E14 G4-21E4 - E14 Gen 4	21E4	115. Support on-board ports only.
E14-IML-20RA MT	20RA	115. Support on-board ports only.
E14-IML-20RB MT	20RB	115. Support on-board ports only.
E15 2nd Generation- ARE-20T8 MT 2020	20T8	115. Support on-board ports only.
E15 2nd Generation- ARE-20T9 MT 2020	20T9	115. Support on-board ports only.
E15 AMD 3rd Generation-20YG - E15 AMD Gen 3	20YG	115. Support on-board ports only.
E15 AMD 3rd Generation-20YH - E15 AMD Gen 3	20YH	115. Support on-board ports only.
E15 AMD 3rd Generation-20YJ - E15 AMD Gen 3	20YJ	115. Support on-board ports only.
E15 AMD 3rd Generation-20YK - E15 AMD Gen 3	20YK	115. Support on-board ports only.

E15 AMD G4-21ED - E15 AMD Gen 4	21ED	115. Support on-board ports only.
E15 AMD G4-21EE - E15 AMD Gen 4	21EE	115. Support on-board ports only.
E15 G2-20TD MT 2020	20TD	115. Support on-board ports only.
E15 G2-20TE MT 2020	20TE	115. Support on-board ports only.
E15 G4-21E6 - E15 Gen 4	21E6	115. Support on-board ports only.
E15 G4-21E7 - E15 Gen 4	21E7	115. Support on-board ports only.
E15-IML-20RD MT	20RD	115. Support on-board ports only.
E15-IML-20RE MT	20RE	115. Support on-board ports only.
E330 Sub Series-3354 MT	3354	
E335 Sub Series-3355 MT	3355	
E41-45-82BF MT 2020	82BF	
E41-50-82HW MT 2020	82HW	
E41-55-82FJ MT 2020	82FJ	
E425 (AMD)-MT 1198	1198	
E430 Sub Series-3254 MT	3254	
E430 Sub Series-MT 6271	6271	
E430c Sub Series-3365 MT	3365	
E431 Sub Series-MT 6277	6277	
E431 Sub Series-MT 6886	6886	
E435 Sub Series-3256 MT	3256	

E435 Sub Series-3469 MT	3469	
E440 Sub Series-MT 20C5	20C5	
E445 Sub Series-MT 20B1	20B1	
E450 Sub Series-20DC	20DC	
E450 Sub Series-20DD	20DD	
E455 Sub Series-20DE	20DE	
E460-20ET MT	20ET	223 For Bay Trail model
E460-20EU MT	20EU	223 For Bay Trail model
E465-20EX MT	20EX	223 For Bay Trail model
E470-20H1 MT	20H1	223 For Bay Trail model
E470-20H2 MT	20H2	223 For Bay Trail model
E475-20H4 MT	20H4	223 For Bay Trail model
E480-20KN MT	20KN	115. Support on-board ports only.
E480-20KQ MT	20KQ	115. Support on-board ports only.
E480-3358 MT	3358	
E485-20KU MT	20KU	115. Support on-board ports only.
E490-20N8 MT	20N8	115. Support on-board ports only.
E490-20N9 MT	20N9	115. Support on-board ports only.
E490s-20NG MT	20NG	115. Support on-board ports only.
E495-20NE MT	20NE	115. Support on-board ports only.
E525 (AMD)-MT 1200	1200	
E530 Sub Series-3259 MT	3259	
E530 Sub Series-MT 6272	6272	

E530c Sub Series-3366 MT	3366	
E531 Sub Series-MT 6885	6885	
E531 Sub Series-MT 6887	6887	
E535 Sub Series-3260 MT	3260	
E540 Sub Series-MT 20C6	20C6	
E545 Sub Series-MT 20B2	20B2	
E550 Sub Series-20DF	20DF	
E550 Sub Series-20DG	20DG	
E550c Sub Series-20E0 MT	20E0	
E555 Sub Series-20DH	20DH	
E560-20EV MT	20EV	223 For Bay Trail model
E560-20EW MT	20EW	223 For Bay Trail model
E560p-20G5 MT	20G5	223 For Bay Trail model
E565-20EY MT	20EY	223 For Bay Trail model
E570-20H5 MT	20H5	223 For Bay Trail model
E570-20H6 MT	20H6	223 For Bay Trail model
E575-20H8 MT	20H8	223 For Bay Trail model
E580-20KS MT	20KS	115. Support on-board ports only.
E580-20KT MT	20KT	115. Support on-board ports only.
E585-20KV MT	20KV	115. Support on-board ports only.
E590-20NB MT	20NB	115. Support on-board ports only.
E590-20NC MT	20NC	115. Support on-board ports only.

E595-20NF MT	20NF	115. Support on-board ports only.
Edge 11 (AMD)-MT 2545	2545	
Edge 11 (Intel)-MT 0328	0328	
Edge 12"-MT 5038	5038	
Edge 120-MT 3043	3043	
Edge 125-MT 3035	3035	
Edge 2 13" (AMD)-MT 0221	0221	
Edge 2 13" (Intel)-MT 0217	0217	
Edge 2 13" (Intel)-MT 0250	0250	
Edge 320-MT 1298	1298	
Edge 325-MT 1297	1297	
Hub 700-20MY MT	20MY	
Hub 700-20N0 MT	20N0	
IP Flex 3 Chrome 11IJL6-82N3 - IP Flex 3 Chrome 11IJL6	82N3	
IdeaPad 1 11ADA05- MT 82GV	82GV	
IdeaPad 1 14ADA05- MT 82GW	82GW	
IdeaPad 1 14ADA7- 82R0 - IdeaPad 1 14ADA7	82R0	
IdeaPad 1 14ALC7- 82R3 - IdeaPad 1 14ALC7	82R3	

IdeaPad 1 14IAU7- 82QC - IdeaPad 1 14IAU7	82QC	
IdeaPad 1 14IGL05-MT 81VU	81VU	
IdeaPad 1 14IGL7- 82V6 - IdeaPad 1 14IGL7	82V6	
IdeaPad 1 14IJL7-82LV - IdeaPad 1 14IJL7	82LV	
IdeaPad 1 15ADA7- 82R1 - IdeaPad 1 15ADA7	82R1	
IdeaPad 1 15ALC7- 82R4 - IdeaPad 1 15ALC7	82R4	
IdeaPad 1 15IAU7- 82QD - IdeaPad 1 15IAU7	82QD	
IdeaPad 1 15IAU7- 82VY - IdeaPad 1 15IAU7	82VY	
IdeaPad 1 15IGL7- 82V7 - IdeaPad 1 15IGL7	82V7	
IdeaPad 1 15IJL7-82LX - IdeaPad 1 15IJL7	82LX	
IdeaPad 3 14ABA7- 82RM - IdeaPad 3 14ABA7	82RM	
IdeaPad 3 14ADA05- MT 81W0	81W0	
IdeaPad 3 14ADA6- 82KQ - IdeaPad 3 14ADA6	82KQ	

IdeaPad 3 14ARE05- MT 81W3	81W3	
IdeaPad 3 14IAU7- 82RJ - IdeaPad 3 14IAU7	82RJ	
IdeaPad 3 14IGL05-MT 81WH	81WH	
IdeaPad 3 14IIL05-MT 81WD	81WD	
IdeaPad 3 14IKB05-MT 81X4	81X4	
IdeaPad 3 14IML05- MT 81WA	81WA	
IdeaPad 3 15ABA7- 82RN - IdeaPad 3 15ABA7	82RN	
IdeaPad 3 15ADA05- MT 81W1	81W1	
IdeaPad 3 15ADA6- 82KR - IdeaPad 3 15ADA6	82KR	
IdeaPad 3 15ALC6- 82KU - IdeaPad 3 15ALC6	82KU	
IdeaPad 3 15ALC6- 82MF - IdeaPad 3 15ALC6	82MF	
IdeaPad 3 15ARE05- MT 81W4	81W4	
IdeaPad 3 15IAU7- 82RK - IdeaPad 3 15IAU7	82RK	
IdeaPad 3 15IGL05-MT 81WQ	81WQ	
IdeaPad 3 15IGL05-MT 82BU	82BU	

IdeaPad 3 15IIL05-MT 81WE	81WE	
IdeaPad 3 15IKB05-MT 81X5	81X5	
IdeaPad 3 15IML05- MT 81WB	81WB	
IdeaPad 3 15IML05- MT 81WR	81WR	
IdeaPad 3 15IML05- MT 82BS	82BS	
IdeaPad 3 15ITL06- 82MD - IdeaPad 3 15ITL6	82MD	
IdeaPad 3 15ITL06-MT 82H8	82H8	
IdeaPad 3 17ABA7- 82RQ - IdeaPad 3 17ABA7	82RQ	
IdeaPad 3 17ADA05- MT 81W2	81W2	
IdeaPad 3 17ADA6- 82KS - IdeaPad 3 17ADA6	82KS	
IdeaPad 3 17ALC6- 82KV - IdeaPad 3 17ALC6	82KV	
IdeaPad 3 17ARE05- MT 81W5	81W5	
IdeaPad 3 17IAU7- 82RL - IdeaPad 3 17IAU7	82RL	
IdeaPad 3 17IIL05-MT 81WF	81WF	
IdeaPad 3 17IKB05-MT 81X6	81X6	

IdeaPad 3 17IML05- MT 81WC	81WC	
IdeaPad 3 CB 11IGL05- MT 82BA	82BA	
IdeaPad 3 CB 14IGL05- MT 82C1	82C1	
IdeaPad 3 Chrome 14APO6-MT 82MY	82MY	
IdeaPad 3 Chrome 15IJL6-82N4 - IdeaPad 3 Chrome 15IJL6	82N4	
IdeaPad 5 14ABA7- 82SE - IdeaPad 5 14ABA7	82SE	
IdeaPad 5 14ARE05- MT 81YM	81YM	
IdeaPad 5 14IAL7- 82SD - IdeaPad 5 14IAL7	82SD	
IdeaPad 5 14IIL05-MT 81YH	81YH	
IdeaPad 5 14ITL05-MT 82FE	82FE	
IdeaPad 5 15ABA7- 82SG - IdeaPad 5 15ABA7	82SG	
IdeaPad 5 15ALC05- 82LN - IdeaPad 5 15ALC05	82LN	
IdeaPad 5 15ARE05- MT 81YQ	81YQ	
IdeaPad 5 15IAL7-82SF - IdeaPad 5 15IAL7	82SF	
IdeaPad 5 15IIL05-MT 81YK	81YK	

IdeaPad 5 15ITL05-MT 82FG	82FG	
IdeaPad 5 Pro 14ACN6-82L7 - IdeaPad 5 Pro 14ACN6	82L7	
IdeaPad 5 Pro 14ARH7-82SJ - IdeaPad 5 Pro 14ARH7	82SJ	
IdeaPad 5 Pro 14IAP7- 82SH - IdeaPad 5 Pro 14IAP7	82SH	
IdeaPad 5 Pro 14ITL6- 82L3 - IdeaPad 5 Pro 14ITL6	82L3	
IdeaPad 5 Pro 16ACH6-82L5 - IdeaPad 5 Pro 16ACH6	82L5	
IdeaPad 5 Pro 16ARH7-82SN - IdeaPad 5 Pro 16ARH7	82SN	
IdeaPad 5 Pro 16IAH7- 82SK - IdeaPad 5 Pro 16IAH7	82SK	
IdeaPad 5 Pro 16IHU6- 82L9 - IdeaPad 5 Pro 16IHU6	82L9	
IdeaPad Creator 5 15IMH05-MT 82D4	82D4	
IdeaPad Creator 5 16ACH6-82L6 - IdeaPad Creator 5 16ACH6	82L6	
IdeaPad Duet 3 10IGL5-MT 82AT	82AT	
IdeaPad Flex 3 11ADA05-MT 82G4	82G4	

IdeaPad Flex 3 11IGL05-MT 82B2	82B2	
IdeaPad Flex 3 CB 11IGL05-MT 82BB	82BB	
IdeaPad Flex 3 CB 11M735-MT 82HG	82HG	
IdeaPad Flex 3 Chrome 15IJL7-82T3 - IdeaPad Flex 3 Chrome 15IJL7	82T3	
IdeaPad Flex 5 14ALC7-82R9 - IdeaPad Flex 5 14ALC7	82R9	
IdeaPad Flex 5 14IAU7- 82R7 - IdeaPad Flex 5 14IAU7	82R7	
IdeaPad Flex 5 14IIL05- MT 81WS	81WS	
IdeaPad Flex 5 14IIL05- MT 81X1	81X1	
IdeaPad Flex 5 14ITL05-82HS - IdeaPad Flex 5 14ITL05	82HS	
IdeaPad Flex 5 14ITL05-82LT - IdeaPad Flex 5 14ITL05	82LT	
IdeaPad Flex 5 15IIL05- MT 81X3	81X3	
IdeaPad Flex 5 15ITL05-82HT - IdeaPad Flex 5 15ITL05	82HT	
IdeaPad Flex 5 16ALC7-82RA - IdeaPad Flex 5 16ALC7	82RA	
IdeaPad Flex 5 16IAU7- 82R8 - IdeaPad Flex 5 16IAU7	82R8	

IdeaPad Flex 5 CB 13IML05-MT 82B8	82B8	
IdeaPad Flex 5-14ARE- 05-MT 81X2	81X2	
IdeaPad Gaming 3 15ACH6-82K2 - IdeaPad Gaming 3 15ACH6	82K2	
IdeaPad Gaming 3 15ACH6-82MJ - IdeaPad Gaming 3 15ACH6	82MJ	
IdeaPad Gaming 3 15ARH05-MT 82EY	82EY	
IdeaPad Gaming 3 15ARH7-82SB - IdeaPad Gaming 3 15ARH7	82SB	
IdeaPad Gaming 3 15IAH7-82S9 - IdeaPad Gaming 3 15IAH7	82S9	
IdeaPad Gaming 3 15IHU6-82K1 - IdeaPad Gaming 3 15IHU6	82K1	
IdeaPad Gaming 3 15IHU6-82MG - IdeaPad Gaming 3 15IHU6	82MG	
IdeaPad Gaming 3 15IMH05-MT 81Y4	81Y4	
IdeaPad Gaming 3 15IMH05-MT 82CG	82CG	

IdeaPad Gaming 3 16ARH7-82SC - IdeaPad Gaming 3 16ARH7	82SC	
IdeaPad Gaming 3 16IAH7-82SA - IdeaPad Gaming 3 16IAH7	82SA	
IdeaPad L3 15IML05- MT 81Y3	81Y3	
IdeaPad L3 15ITL6-MT 82HL	82HL	
IdeaPad L340-15IRH Gaming-MT 81LK	81LK	
IdeaPad L340-15IRH Gaming-MT 81TR	81TR	
IdeaPad L340-17IRH Gaming-MT 81LL	81LL	
IdeaPad Slim 7 14ARE05-MT 82A5	82A5	
IdeaPad Slim 7 14ITL05-MT 82A6	82A6	
IdeaPad Slim 7 15IIL05- MT 82AD	82AD	
IdeaPad Slim 7 15IMH05-MT 82AE	82AE	
IdeaPad Slim 7 15ITL05-MT 82AF	82AF	
IdeaPad Slim 7 Pro 16ACH6-82QR - IdeaPad Slim 7 Pro 16ACH6	82QR	
K14 G1-21CS - K14 Gen 1	21CS	115. Support on-board ports only.
K14 G1-21CT - K14 Gen 1	21CT	115. Support on-board ports only.

L13 Clam 2nd Generation-20VH MT 2020	20VH	115. Support on-board ports only.
L13 Clam 2nd Generation-20VJ MT 2020	20VJ	115. Support on-board ports only.
L13 Clam AMD G2- 21AB - L13 Clam Gen 2	21AB	115. Support on-board ports only.
L13 Clam AMD G2- 21AC - L13 Clam Gen 2	21AC	115. Support on-board ports only.
L13 Clam AMD G3- 21B9 - L13 Clam Gen 3	21B9	115. Support on-board ports only.
L13 Clam AMD G3- 21BA - L13 Clam Gen 3	21BA	115. Support on-board ports only.
L13 Clam G3-21B3 - L13 Clam Gen 3	21B3	115. Support on-board ports only.
L13 Clam G3-21B4 - L13 Clam Gen 3	21B4	115. Support on-board ports only.
L13 Clam-20R3 MT	20R3	115. Support on-board ports only.
L13 Clam-20R4 MT	20R4	115. Support on-board ports only.
L13 Yoga 2nd Generation-20VK MT 2020	20VK	115. Support on-board ports only.
L13 Yoga 2nd Generation-20VL MT 2020	20VL	115. Support on-board ports only.
L13 Yoga AMD G2- 21AD - L13 Yoga Gen 2	21AD	115. Support on-board ports only.
L13 Yoga AMD G2- 21AE - L13 Yoga Gen 2	21AE	115. Support on-board ports only.
L13 Yoga AMD G3- 21BB - L13 Yoga Gen 3	21BB	115. Support on-board ports only.
L13 Yoga AMD G3- 21BC - L13 Yoga Gen 3	21BC	115. Support on-board ports only.

L13 Yoga G3-21B5 - L13 Yoga Gen 3	21B5	115. Support on-board ports only.
L13 Yoga G3-21B6 - L13 Yoga Gen 3	21B6	115. Support on-board ports only.
L13 Yoga-20R5 MT	20R5	115. Support on-board ports only.
L13 Yoga-20R6 MT	20R6	115. Support on-board ports only.
L14 AMD G1-20U5 MT 2020	20U5	115. Support on-board ports only.
L14 AMD G1-20U6 MT 2020	20U6	115. Support on-board ports only.
L14 AMD G2-20X5 - L14 Gen 2	20X5	115. Support on-board ports only.
L14 AMD G2-20X6 - L14 Gen 2	20X6	115. Support on-board ports only.
L14 AMD G3-21C5 - L14 Gen 3	21C5	115. Support on-board ports only.
L14 AMD G3-21C6 - L14 Gen 3	21C6	115. Support on-board ports only.
L14 G2-20X1 - L14 Gen 2	20X1	115. Support on-board ports only.
L14 G2-20X2 - L14 Gen 2	20X2	115. Support on-board ports only.
L14 G3-21C1 - L14 Gen 3	21C1	115. Support on-board ports only.
L14 G3-21C2 - L14 Gen 3	21C2	115. Support on-board ports only.
L15 AMD G1-20U7 MT 2020	20U7	115. Support on-board ports only.
L15 AMD G1-20U8 MT 2020	20U8	115. Support on-board ports only.
L15 AMD G2-20X7 - L15 Gen 2	20X7	115. Support on-board ports only.
L15 AMD G2-20X8 - L15 Gen 2	20X8	115. Support on-board ports only.

L15 AMD G3-21C7 - L15 Gen 3	21C7	115. Support on-board ports only.
L15 AMD G3-21C8 - L15 Gen 3	21C8	115. Support on-board ports only.
L15 G2-20X3 - L15 Gen 2	20X3	115. Support on-board ports only.
L15 G2-20X4 - L15 Gen 2	20X4	115. Support on-board ports only.
L15 G3-21C3 - L15 Gen 3	21C3	115. Support on-board ports only.
L15 G3-21C4 - L15 Gen 3	21C4	115. Support on-board ports only.
L22e-20-65DE	65DE	
L22e-30-66CB	66CB	
L22i-30-66CA	66CA	
L24e-20-65DF	65DF	
L27m-28-65E6	65E6	
L380-20M5 MT	20M5	115. Support on-board ports only.
L380-20M6 MT	20M6	115. Support on-board ports only.
L380-20M7 MT	20M7	115. Support on-board ports only.
L380-20M8 MT	20M8	115. Support on-board ports only.
L390-20NR MT	20NR	115. Support on-board ports only.
L390-20NS MT	20NS	115. Support on-board ports only.
L390-20NT MT	20NT	115. Support on-board ports only.
L390-20NU MT	20NU	115. Support on-board ports only.
L410-L410 4401 MT	4401	
L480-20LS MT	20LS	115. Support on-board ports only.
L480-20LT MT	20LT	115. Support on-board ports only.

L490-20Q5 MT	20Q5	115. Support on-board ports only.
L490-20Q6 MT	20Q6	115. Support on-board ports only.
L580-20LW MT	20LW	115. Support on-board ports only.
L580-20LX MT	20LX	115. Support on-board ports only.
L590-20Q7 MT	20Q7	115. Support on-board ports only.
L590-20Q8 MT	20Q8	115. Support on-board ports only.
LT2013p Wide-60A0	60A0	
LT2223p Wide-60A1	60A1	
LT2223z Wide-60A2	60A2	
LT2934z Wide-60A5	60A5	
LT3053z Wide-60A4	60A4	
Legion 5 15ACH6- 82JW - Legion 5 15ACH6	82JW	
Legion 5 15ACH6- 82QJ - Legion 5 15ACH6	82QJ	
Legion 5 15ACH6A- 82NW - Legion 5 15ACH6A	82NW	
Legion 5 15ARH7-82RE - Legion 5 15ARH7	82RE	
Legion 5 15ARH7H- 82RD - Legion 5 15ARH7H	82RD	
Legion 5 15IAH7-82RC - Legion 5 15IAH7	82RC	
Legion 5 15IAH7H- 82RB - Legion 5 15IAH7H	82RB	

Legion 5 15IMH6-82NL - Legion 5 15IMH6	82NL	
Legion 5 15ITH6-82JK - Legion 5 15ITH6	82JK	
Legion 5 15ITH6H- 82JH - Legion 5 15ITH6H	82JH	
Legion 5 15ITH6H- 82MH - Legion 5 15ITH6H	82MH	
Legion 5 17ACH6- 82K0 - Legion 5 17ACH6	82K0	
Legion 5 17ACH6H- 82JY - Legion 5 17ACH6H	82JY	
Legion 5 17ITH6-82JN - Legion 5 17ITH6	82JN	
Legion 5 17ITH6H- 82JM - Legion 5 17ITH6H	82JM	
Legion 5 Pro 16ACH6- 82JS - Legion 5 Pro 16ACH6	82JS	
Legion 5 Pro 16ARH7- 82RY - Legion 5 Pro 16ARH7	82RY	
Legion 5 Pro 16ARH7H-82RG - Legion 5 Pro 16ARH7H	82RG	
Legion 5 Pro 16IAH7- 82S0 - Legion 5 Pro 16IAH7	82S0	
Legion 5 Pro 16IAH7H- 82RF - Legion 5 Pro 16IAH7H	82RF	

Legion 5 Pro 16ITH6- 82JF - Legion 5 Pro 16ITH6	82JF	
Legion 5 Pro 16ITH6H- 82JD - Legion 5 Pro 16ITH6H	82JD	
Legion 7 16ACHg6- 82N6 - Legion 7 16ACHg6	82N6	
Legion 7 16ARHA7- 82UH - Legion 7 16ARHA7	82UH	
Legion 7 16IAX7-82TD - Legion 7 16IAX7	82TD	
Legion 7 16ITHg6- 82K6 - Legion 7 16ITHg6	82K6	
Legion S7 16ARHA7- 82UG - Legion S7 16ARHA7	82UG	
Legion S7 16IAH7- 82TF - Legion S7 16IAH7	82TF	
Lenovo 100e 2nd Gen- 81M8 MT	81M8	115. Support on-board ports only.
Lenovo 100e 2nd Gen- 82GJ MT 2020	82GJ	115. Support on-board ports only.
Lenovo 100e 2nd Gen_BRL-82LR MT 2020	82LR	115. Support on-board ports only.
Lenovo 100e Chromebook 2nd Gen MTK 2-82Q3 - Lenovo 100e Chrome 2nd Gen MTK 2	82Q3	115. Support on-board ports only.
Lenovo 14w-81MQ MT	81MQ	115. Support on-board ports only.

Lenovo 300e 2nd Gen- 81M9 MT	81M9	115. Support on-board ports only.
Lenovo 300e 2nd Gen- 82GK MT 2020	82GK	115. Support on-board ports only.
Lenovo Ducati 5-MT 82ES	82ES	
Lenovo IdeaPad C340- 14API-MT 81N6	81N6	
Lenovo IdeaPad L340- 15API-MT 81LW	81LW	
Lenovo IdeaPad L340- 15IWL-MT 81LG	81LG	
Lenovo IdeaPad L340- 17API-MT 81LY	81LY	
Lenovo IdeaPad L340- 17IWL-MT 81M0	81M0	
Lenovo IdeaPad S145- 14API-MT 81UV	81UV	
Lenovo IdeaPad S145- 14AST-MT 81ST	81ST	
Lenovo IdeaPad S145- 14IGM-MT 81MW	81MW	
Lenovo IdeaPad S145- 14IIL-MT 81W6	81W6	
Lenovo IdeaPad S145- 14IKB-MT 81VB	81VB	
Lenovo IdeaPad S145- 15API-MT 81UT	81UT	
Lenovo IdeaPad S145- 15API-MT 81V7	81V7	
Lenovo IdeaPad S145- 15AST-MT 81N3	81N3	
Lenovo IdeaPad S145- 15IGM-MT 81MX	81MX	
Lenovo IdeaPad S145- 15IGM-MT 81WT	81WT	

Lenovo IdeaPad S145- 15IIL-MT 81W8	81W8	
Lenovo IdeaPad S145- 15IIL-MT 82DJ	82DJ	
Lenovo IdeaPad S145- 15IKB-MT 81VD	81VD	
Lenovo IdeaPad S145- 15IKB-MT 81XM	81XM	
Lenovo IdeaPad S150- 11IGL-MT 81VT	81VT	
Lenovo IdeaPad S340- 15API-MT 81NC	81NC	
Lenovo IdeaPad S540- 13API-MT 81XC	81XC	
Lenovo IdeaPad S540- 13ARE-MT 82DL	82DL	
Lenovo IdeaPad S540- 14API-MT 81NH	81NH	
Lenovo IdeaPad S540- 14IWL Touch-MT 81QX	81QX	
Lenovo IdeaPad S540- 15IML-MT 81NG	81NG	
Lenovo IdeaPad S540- 15IWL GTX-MT 81SW	81SW	
Lenovo IdeaPad S540- 15IWL-MT 81NE	81NE	
Lenovo Legion 5 15ARH05-MT 82B5	82B5	
Lenovo Legion 5 15ARH05H-MT 82B1	82B1	
Lenovo Legion 5 15IMH05-MT 82AU	82AU	
Lenovo Legion 5 15IMH05H-MT 81Y6	81Y6	

Lenovo Legion 5 15IMH05H-MT 82CF	82CF	
Lenovo Legion 5 17ARH05H-MT 82GN	82GN	
Lenovo Legion 5 17IMH05-MT 82B3	82B3	
Lenovo Legion 5 17IMH05H-MT 81Y8	81Y8	
Lenovo Legion 5P 15ARH05H-MT 82GU	82GU	
Lenovo Legion 5P 15IMH05-MT 82AY	82AY	
Lenovo Legion 5P 15IMH05H-MT 82AW	82AW	
Lenovo Legion 7 15IMH05-MT 81YT	81YT	
Lenovo Legion 7 15IMHg05-MT 81YU	81YU	
Lenovo Legion C7 15IMH05-MT 82EH	82EH	
Lenovo Legion Y540- 15IRH-MT 81RJ	81RJ	
Lenovo Legion Y540- 15IRH-MT 81SX	81SX	
Lenovo Legion Y540- 15IRH-PG0-MT 81SY	81SY	
Lenovo Legion Y540- 17IRH-MT 81Q4	81Q4	
Lenovo Legion Y540- 17IRH-PG0-MT 81T3	81T3	
Lenovo Legion Y545 PG0-MT 81T2	81T2	
Lenovo Legion Y545- MT 81Q6	81Q6	
Lenovo Legion Y7000 2019 1050-MT 81V4	81V4	

Lenovo Legion Y7000 2019 PG0-MT 81T0	81T0	
Lenovo Legion Y7000 2019-MT 81NS	81NS	
Lenovo Legion Y730- 17ICH-MT 81HG	81HG	
Lenovo Legion Y740- 15ICHg-MT 81HE	81HE	
Lenovo Legion Y740- 15IRH-MT 81UF	81UF	
Lenovo Legion Y740- 15IRHg-MT 81UH	81UH	
Lenovo Legion Y740- 17ICHg-MT 81HH	81HH	
Lenovo Legion Y740- 17IRH-MT 81UG	81UG	
Lenovo Legion Y740- 17IRHg-MT 81UJ	81UJ	
Lenovo S14 G3 IAP- 82TW - Lenovo S14 G3 IAP	82TW	
Lenovo S200z-10HA	10HA	
Lenovo S200z-10K1	10K1	
Lenovo S200z-10K4	10K4	
Lenovo S200z-10K5	10K5	
Lenovo S400z-10HB	10HB	
Lenovo S400z-10K2	10K2	
Lenovo S405z-10HD	10HD	
Lenovo S500z-10HC	10HC	
Lenovo S500z-10K3	10K3	

Lenovo Slim 7 16IAH7-82VB - Lenovo Slim 7 16IAH7	82VB	
Lenovo Slim 7 Carbon 13IAP7-82V4 - Lenovo Slim 7 Carbon 13IAP7	82V4	
Lenovo Slim 7 ProX 14IAH7-82V1 - Lenovo Slim 7 ProX 14IAH7	82V1	
Lenovo Slim 9 14IAP7-82T1 - Lenovo Slim 9 14IAP7	82T1	
Lenovo Tablet 10-20L3 MT	20L3	
Lenovo Tablet 10-20L4 MT	20L4	
Lenovo ThinkBook 13s-IML-MT 20RR	20RR	
Lenovo ThinkBook 14-IIL-MT 20SL	20SL	
Lenovo ThinkBook 14-IML-MT 20RV	20RV	
Lenovo ThinkBook 14s Yoga ITL-MT 20WE	20WE	
Lenovo ThinkBook 14s-IML-MT 20RS	20RS	
Lenovo ThinkBook 15-IIL-MT 20SM	20SM	
Lenovo ThinkBook 15-IML-MT 20RW	20RW	
Lenovo ThinkBook 15p-IMH-MT 20V3	20V3	
Lenovo ThinkBook Plus-MT 20TG	20TG	
Lenovo V130-14IGM-MT 81HM	81HM	

Lenovo V130-15IGM- MT 81HL	81HL	
Lenovo V130-20IGM AIO-10RX	10RX	
Lenovo V14 G1 IML- 82NA - Lenovo V14 G1 IML	82NA	
Lenovo V14 G2 ALC- 82KC - Lenovo V14- ALC	82KC	
Lenovo V14 G2 IJL- 82QX - Lenovo V14 G2 IJL	82QX	
Lenovo V14 G2 ITL(Brazil)-82NM - Lenovo V14-ITL Brazil	82NM	
Lenovo V14 G3 ABA(Brazil)-82UN - Lenovo V14 G3 ABA(Brazil)	82UN	
Lenovo V14 G3 ABA- 82TU - Lenovo V14 G3 ABA	82TU	
Lenovo V14 G3 IAP(Brazil)-82UL - Lenovo V14 G3 IAP(Brazil)	82UL	
Lenovo V14 G3 IAP- 82TS - Lenovo V14 G3 IAP	82TS	
Lenovo V14-ADA-MT 82C6	82C6	
Lenovo V14-ARE-MT 82DQ	82DQ	
Lenovo V14-IGL-MT 82C2	82C2	

Lenovo V14-IIL-MT 82C4	82C4	
Lenovo V14-IKB-MT 81YA	81YA	
Lenovo V14-ITL-82KA - Lenovo V14-ITL	82KA	
Lenovo V140-15IWL- MT 81K6	81K6	
Lenovo V15 G1 IML(Brazil)-82NQ - Lenovo V15 G1 IML(Brazil)	82NQ	
Lenovo V15 G1 IML- 82NB - Lenovo V15 G1 IML	82NB	
Lenovo V15 G2 ALC- 82KD - Lenovo V15- ALC	82KD	
Lenovo V15 G2 IJL- 82QY - Lenovo V15 G2 IJL	82QY	
Lenovo V15 G2 ITL(Brazil)-MT 82ME - V15-ITL(Brazil)	82ME	
Lenovo V15 G3 ABA- 82TV - Lenovo V15 G3 ABA	82TV	
Lenovo V15 G3 IAP(Brazil)-82UM - Lenovo V15 G3 IAP(Brazil)	82UM	
Lenovo V15 G3 IAP- 82TT - Lenovo V15 G3 IAP	82TT	
Lenovo V15-ADA-MT 82C7	82C7	

Lenovo V15- IGL(Brazil)-82NN - Lenovo V15-IGL(Brazil)	82NN	
Lenovo V15-IGL-MT 82C3	82C3	
Lenovo V15-IIL-MT 82C5	82C5	
Lenovo V15-IKB-MT 81YD	81YD	
Lenovo V15-ITL-82KB - Lenovo V15-ITL	82KB	
Lenovo V17 G2 ITL- 82NX - Lenovo V17 G2 ITL	82NX	
Lenovo V17 G3 IAP- 82U1 - Lenovo V17 G3 IAP	82U1	
Lenovo V17-IIL-MT 82GX	82GX	
Lenovo V30a-22IML- 11FV	11FV	115. Support on-board ports only.
Lenovo V30a-22IML- 11FW	11FW	115. Support on-board ports only.
Lenovo V30a-24IML- 11FT	11FT	115. Support on-board ports only.
Lenovo V30a-24IML- 11FU	11FU	115. Support on-board ports only.
Lenovo V310z-10QG	10QG	115. Support on-board ports only.
Lenovo V310z-10QH	10QH	115. Support on-board ports only.
Lenovo V330-14ARR- MT 81B1	81B1	
Lenovo V330-20ICB AIO-10UK	10UK	115. Support on-board ports only.
Lenovo V330-20ICB AIO-10UL	10UL	115. Support on-board ports only.

Lenovo V340-17IWL-81RG MT	81RG	
Lenovo V35s-07ADA-11HE	11HE	115. Support on-board ports only.
Lenovo V35s-07ADA-11HF	11HF	115. Support on-board ports only.
Lenovo V35s-07ADA-11HQ	11HQ	115. Support on-board ports only.
Lenovo V35s-07ADA-11HR	11HR	115. Support on-board ports only.
Lenovo V410z-10QV	10QV	115. Support on-board ports only.
Lenovo V410z-10QW	10QW	115. Support on-board ports only.
Lenovo V410z-10R5	10R5	115. Support on-board ports only.
Lenovo V410z-10R6	10R6	115. Support on-board ports only.
Lenovo V50a-22IMB-11FN	11FN	115. Support on-board ports only.
Lenovo V50a-22IMB-11FQ	11FQ	115. Support on-board ports only.
Lenovo V50a-22IMB-11FR	11FR	115. Support on-board ports only.
Lenovo V50a-22IMB-11FS	11FS	115. Support on-board ports only.
Lenovo V50a-24IMB-11FJ	11FJ	115. Support on-board ports only.
Lenovo V50a-24IMB-11FK	11FK	115. Support on-board ports only.
Lenovo V50a-24IMB-11FL	11FL	115. Support on-board ports only.
Lenovo V50a-24IMB-11FM	11FM	115. Support on-board ports only.
Lenovo V50s-07IMB-11EE	11EE	115. Support on-board ports only.
Lenovo V50s-07IMB-11EF	11EF	115. Support on-board ports only.

Lenovo V50s-07IMB-11HA	11HA	115. Support on-board ports only.
Lenovo V50s-07IMB-11HB	11HB	115. Support on-board ports only.
Lenovo V50t Gen 2-13IOB-11QB - Lenovo V50t Gen 2-13IOB	11QB	115. Support on-board ports only.
Lenovo V50t Gen 2-13IOB-11QC - Lenovo V50t Gen 2-13IOB	11QC	115. Support on-board ports only.
Lenovo V50t Gen 2-13IOB-11QD - Lenovo V50t Gen 2-13IOB	11QD	115. Support on-board ports only.
Lenovo V50t Gen 2-13IOB-11QE - Lenovo V50t Gen 2-13IOB	11QE	115. Support on-board ports only.
Lenovo V50t-13IMB-11EC	11EC	115. Support on-board ports only.
Lenovo V50t-13IMB-11ED	11ED	115. Support on-board ports only.
Lenovo V50t-13IMB-11HC	11HC	115. Support on-board ports only.
Lenovo V50t-13IMB-11HD	11HD	115. Support on-board ports only.
Lenovo V510z-10NH	10NH	
Lenovo V510z-10NJ	10NJ	
Lenovo V510z-10NQ	10NQ	
Lenovo V530-15ICB Desktop-10TV	10TV	115. Support on-board ports only.
Lenovo V530-15ICB Desktop-10TW	10TW	115. Support on-board ports only.
Lenovo V530-15ICR Desktop-11BG	11BG	115. Support on-board ports only.
Lenovo V530-15ICR Desktop-11BH	11BH	115. Support on-board ports only.

Lenovo V530-22ICB AIO-10US	10US	115. Support on-board ports only.
Lenovo V530-22ICB AIO-10UT	10UT	115. Support on-board ports only.
Lenovo V530-22ICB AIO-10UU	10UU	115. Support on-board ports only.
Lenovo V530-22ICB AIO-10UV	10UV	115. Support on-board ports only.
Lenovo V530-24ICB AIO-10UW	10UW	115. Support on-board ports only.
Lenovo V530-24ICB AIO-10UX	10UX	115. Support on-board ports only.
Lenovo V530S-07ICB Desktop-10TX	10TX	115. Support on-board ports only.
Lenovo V530S-07ICB Desktop-10TY	10TY	115. Support on-board ports only.
Lenovo V530S-07ICR Desktop-11BL	11BL	115. Support on-board ports only.
Lenovo V530S-07ICR Desktop-11BM	11BM	115. Support on-board ports only.
Lenovo V55t Gen 2- 13ACN-11RM - Lenovo V55t Gen 2-13ACN	11RM	115. Support on-board ports only.
Lenovo V55t Gen 2- 13ACN-11RN - Lenovo V55t Gen 2-13ACN	11RN	115. Support on-board ports only.
Lenovo V55t Gen 2- 13ACN-11RQ - Lenovo V55t Gen 2-13ACN	11RQ	115. Support on-board ports only.
Lenovo V55t Gen 2- 13ACN-11RR - Lenovo V55t Gen 2-13ACN	11RR	115. Support on-board ports only.
Lenovo V55t Gen 2- 13ACN-11VS-Lenovo V55t Gen 2-13ACN	11VS	115. Support on-board ports only.

Lenovo V55t Gen 2-13ACN-11VT-Lenovo V55t Gen 2-13ACN	11VT	115. Support on-board ports only.
Lenovo V55t Gen 2-13ACN-11VU-Lenovo V55t Gen 2-13ACN	11VU	115. Support on-board ports only.
Lenovo V55t Gen 2-13ACN-11VV-Lenovo V55t Gen 2-13ACN	11VV	115. Support on-board ports only.
Lenovo V55t-15API-11CB	11CB	115. Support on-board ports only.
Lenovo V55t-15API-11CC	11CC	115. Support on-board ports only.
Lenovo V55t-15ARE-11KF	11KF	115. Support on-board ports only.
Lenovo V55t-15ARE-11KG	11KG	115. Support on-board ports only.
Lenovo V55t-15ARE-11KH	11KH	115. Support on-board ports only.
Lenovo V55t-15ARE-11KJ	11KJ	115. Support on-board ports only.
Lenovo ideapad 330S-14AST-MT 81F8	81F8	
Lenovo ideapad 330S-15ARR-MT 81FB	81FB	
Lenovo ideapad 330S-15AST-MT 81F9	81F9	
Lenovo ideapad 720S-14IKB-MT 80XC	80XC	
Lenovo ideapad S530-13IML-MT 81WU	81WU	
M490s-MT 6275	6275	
M490s-MT 6276	6276	
Mini Series (Intel)-MT 0627	0627	

Mini Series (Intel)-MT 0629	0629	
Mini Series-MT 0596	0596	
Mini Series-MT 0611	0611	
Mini Series-MT 0613	0613	
P1 2nd Generation- 20QT MT	20QT	115. Support on-board ports only.
P1 2nd Generation- 20QU MT	20QU	115. Support on-board ports only.
P1 G4-20Y3 - P1 Gen 4	20Y3	115. Support on-board ports only.
P1 G4-20Y4 - P1 Gen 4	20Y4	115. Support on-board ports only.
P1 G5-21DC - P1 Gen 5	21DC	115. Support on-board ports only.
P1 G5-21DD - P1 Gen 5	21DD	115. Support on-board ports only.
P1-20MD MT	20MD	115. Support on-board ports only.
P1-20ME MT	20ME	115. Support on-board ports only.
P14s 2nd Generation- 20VX MT 2021	20VX	115. Support on-board ports only.
P14s 2nd Generation- 20VY MT 2021	20VY	115. Support on-board ports only.
P14s AMD G1-20Y1 - P14s AMD Gen 1	20Y1	115. Support on-board ports only.
P14s AMD G1-20Y2 - P14s AMD Gen 1	20Y2	115. Support on-board ports only.
P14s AMD G2-21A0 - P14s AMD Gen 2	21A0	115. Support on-board ports only.
P14s AMD G2-21A1 - P14s AMD Gen 2	21A1	115. Support on-board ports only.
P14s G3-21AK MT 2022	21AK	115. Support on-board ports only.
P14s G3-21AL MT 2022	21AL	115. Support on-board ports only.

P15 G2-20YQ - P15 Gen 2	20YQ	115. Support on-board ports only.
P15 G2-20YR - P15 Gen 2	20YR	115. Support on-board ports only.
P15s 1st Generation- 20T4 MT 2020	20T4	115. Support on-board ports only.
P15s 1st Generation- 20T5 MT 2020	20T5	115. Support on-board ports only.
P15s 2nd Generation- 20W6 - P15s Gen 2	20W6	115. Support on-board ports only.
P15s 2nd Generation- 20W7 - P15s Gen 2	20W7	115. Support on-board ports only.
P15v AMD G3-21EM - P15v AMD Gen 3	21EM	115. Support on-board ports only.
P15v AMD G3-21EN - P15v AMD Gen 3	21EN	115. Support on-board ports only.
P15v G2-21A9 - P15v Gen 2	21A9	115. Support on-board ports only.
P15v G2-21AA - P15v Gen 2	21AA	115. Support on-board ports only.
P15v G3-21D8 - P15v Gen 3	21D8	115. Support on-board ports only.
P15v G3-21D9 - P15v Gen 3	21D9	115. Support on-board ports only.
P16 G1-21D6 - P16 Gen 1	21D6	115. Support on-board ports only.
P16 G1-21D7 - P16 Gen 1	21D7	115. Support on-board ports only.
P16s AMD G1-21CK - P16s AMD Gen 1	21CK	115. Support on-board ports only.
P16s AMD G1-21CL - P16s AMD Gen 1	21CL	115. Support on-board ports only.
P16s G1-21BT - P16s Gen 1	21BT	115. Support on-board ports only.
P16s G1-21BU - P16s Gen 1	21BU	115. Support on-board ports only.

P17 G2-20YU - P17 Gen 2	20YU	115. Support on-board ports only.
P17 G2-20YV - P17 Gen 2	20YV	115. Support on-board ports only.
P40 Yoga-20GQ MT	20GQ	223 For Bay Trail model
P40 Yoga-20GR MT	20GR	223 For Bay Trail model
P43s-20RH MT	20RH	115. Support on-board ports only.
P43s-20RJ MT	20RJ	115. Support on-board ports only.
P44w-10-61D5	61D5	
P50-20EN MT	20EN	223 For Bay Trail model
P50-20EQ MT	20EQ	223 For Bay Trail model
P50s-20FK MT	20FK	223 For Bay Trail model
P50s-20FL MT	20FL	223 For Bay Trail model
P51-20HH MT	20HH	115. Support on-board ports only.
P51-20HJ MT	20HJ	115. Support on-board ports only.
P51s-20HB MT	20HB	115. Support on-board ports only.
P51s-20HC MT	20HC	115. Support on-board ports only.
P51s-20JY MT	20JY	115. Support on-board ports only.
P51s-20K0 MT	20K0	115. Support on-board ports only.
P52-20M9 MT	20M9	115. Support on-board ports only.
P52-20MA MT	20MA	115. Support on-board ports only.
P52s-20LB MT	20LB	115. Support on-board ports only.
P52s-20LC MT	20LC	115. Support on-board ports only.
P53-20QN MT	20QN	115. Support on-board ports only.
P53-20QQ MT	20QQ	115. Support on-board ports only.
P53s-20N6 MT	20N6	223 For Bay Trail model

P53s-20N7 MT	20N7	223 For Bay Trail model
P70-20ER MT	20ER	223 For Bay Trail model
P70-20ES MT	20ES	223 For Bay Trail model
P71-20HK MT	20HK	115. Support on-board ports only.
P71-20HL MT	20HL	115. Support on-board ports only.
P72-20MB MT	20MB	115. Support on-board ports only.
P72-20MC MT	20MC	115. Support on-board ports only.
P73-20QR MT	20QR	115. Support on-board ports only.
P73-20QS MT	20QS	115. Support on-board ports only.
Pro2820(New logo)-60FC	60FC	
S1 4th Gen-STORM-3.0 20LK MT	20LK	115. Support on-board ports only.
S3-20G0 MT	20G0	223 For Bay Trail model
S3-20G1 MT	20G1	223 For Bay Trail model
S3-S431-MT 20AX	20AX	
S3-S431-MT 20BA	20BA	
S3-S440-MT 20AY	20AY	
S3-S440-MT 20BB	20BB	
S5-20G4 MT	20G4	223 For Bay Trail model
S5-20JA MT	20JA	115. Support on-board ports only.
S5-S540-MT 20B3	20B3	
Sub Series X121e-MT 3048	3048	
Sub Series X121e-MT 3049	3049	
Sub Series X121e-MT 3053	3053	

Sub Series X121e-MT 3055	3055	
T14 2nd Generation- 20W0 MT 2021	20W0	115. Support on-board ports only.
T14 2nd Generation- 20W1 MT 2021	20W1	115. Support on-board ports only.
T14 2nd Generation- 20W2 MT 2021 HC	20W2	115. Support on-board ports only.
T14 2nd Generation- 20W3 MT 2021 HC	20W3	115. Support on-board ports only.
T14 AMD G1-20UD MT 2020	20UD	115. Support on-board ports only.
T14 AMD G1-20UE MT 2020	20UE	115. Support on-board ports only.
T14 AMD G2-20XK - T14 AMD Gen 2	20XK	115. Support on-board ports only.
T14 AMD G2-20XL - T14 AMD Gen 2	20XL	115. Support on-board ports only.
T14 AMD G3-21CF - T14 AMD Gen 3	21CF	115. Support on-board ports only.
T14 AMD G3-21CG - T14 AMD Gen 3	21CG	115. Support on-board ports only.
T14 G3-21AH - T14 Gen 3	21AH	115. Support on-board ports only.
T14 G3-21AJ - T14 Gen 3	21AJ	115. Support on-board ports only.
T14s 2nd Generation- 20WM - T14s Gen 2	20WM	115. Support on-board ports only.
T14s 2nd Generation- 20WN - T14s Gen 2	20WN	115. Support on-board ports only.
T14s AMD G1-20UH MT 2020	20UH	115. Support on-board ports only.
T14s AMD G1-20UJ MT 2020	20UJ	115. Support on-board ports only.
T14s AMD G2-20XF - T14s AMD Gen 2	20XF	115. Support on-board ports only.

T14s AMD G2-20XG - T14s AMD Gen 2	20XG	115. Support on-board ports only.
T14s AMD G3-21CQ - T14s AMD Gen 3	21CQ	115. Support on-board ports only.
T14s AMD G3-21CR - T14s AMD Gen 3	21CR	115. Support on-board ports only.
T14s G3-21BR - T14s Gen 3	21BR	115. Support on-board ports only.
T14s G3-21BS - T14s Gen 3	21BS	115. Support on-board ports only.
T15 2nd Generation- 20W4 - T15 Gen 2	20W4	115. Support on-board ports only.
T15 2nd Generation- 20W5 - T15 Gen 2	20W5	115. Support on-board ports only.
T15g G2-20YS - T15g Gen 2	20YS	115. Support on-board ports only.
T15g G2-20YT - T15g Gen 2	20YT	115. Support on-board ports only.
T15p G2-21A7 - T15p Gen 2	21A7	115. Support on-board ports only.
T15p G2-21A8 - T15p Gen 2	21A8	115. Support on-board ports only.
T15p G3-21DA - T15p Gen 3	21DA	115. Support on-board ports only.
T15p G3-21DB - T15p Gen 3	21DB	115. Support on-board ports only.
T16 AMD G1-21CH - T16 AMD Gen 1	21CH	115. Support on-board ports only.
T16 AMD G1-21CJ - T16 AMD Gen 1	21CJ	115. Support on-board ports only.
T16 G1-21BV - T16 Gen 1	21BV	115. Support on-board ports only.
T16 G1-21BW - T16 Gen 1	21BW	115. Support on-board ports only.
T2054p(New logo)-60G1	60G1	

T2054p-60D9	60D9	
T2224p(New logo)-60F4	60F4	
T2224p-60CA	60CA	
T2224z(New logo)-60F5	60F5	
T2224z-60CB	60CB	
T2254p(with DP cable)-60E1	60E1	
T2254p-60CC	60CC	
T22v-10-61BB	61BB	
T2324p(New logo)-60GB	60GB	
T2324p-60C7	60C7	
T2424p(New logo)-60F7	60F7	
T2424p-60C8	60C8	
T2424z(New logo)-60F8	60F8	
T2424z-60D3	60D3	
T2454p(New logo)-60F9	60F9	
T2454p-60C9	60C9	
T24i-19-61D6	61D6	
T24v-10-61BC	61BC	
T25d-10/P25d-10-61DB	61DB	
T25m-10/P25m-10-61DC	61DC	
T27p-10-61DA	61DA	

T430U Sub Series-6273 MT	6273	
T460-20FM MT	20FM	223 For Bay Trail model
T460-20FN MT	20FN	223 For Bay Trail model
T460p-20FW MT	20FW	223 For Bay Trail model
T460p-20FX MT	20FX	223 For Bay Trail model
T460s-20F9 MT	20F9	223 For Bay Trail model
T460s-20FA MT	20FA	223 For Bay Trail model
T470-20HD MT	20HD	115. Support on-board ports only.
T470-20HE MT	20HE	115. Support on-board ports only.
T470-20JM MT	20JM	115. Support on-board ports only.
T470-20JN MT	20JN	115. Support on-board ports only.
T470p-20J6 MT	20J6	115. Support on-board ports only.
T470p-20J7 MT	20J7	115. Support on-board ports only.
T470s-20HF MT	20HF	115. Support on-board ports only.
T470s-20HG MT	20HG	115. Support on-board ports only.
T470s-20JS MT	20JS	115. Support on-board ports only.
T470s-20JT MT	20JT	115. Support on-board ports only.
T480-WINDU-2.0 20L5 MT	20L5	115. Support on-board ports only.
T480-WINDU-2.0 20L6 MT	20L6	115. Support on-board ports only.
T480s-KOLAR-1.0 20L7 MT	20L7	115. Support on-board ports only.
T480s-KOLAR-1.0 20L8 MT	20L8	115. Support on-board ports only.
T490-20N2 MT	20N2	115. Support on-board ports only.
T490-20N3 MT	20N3	115. Support on-board ports only.

T490-20Q9 MT	20Q9	115. Support on-board ports only.
T490-20QH MT	20QH	115. Support on-board ports only.
T490-20RX MT	20RX	115. Support on-board ports only.
T490-20RY MT	20RY	115. Support on-board ports only.
T490s-20NX MT	20NX	115. Support on-board ports only.
T490s-20NY MT	20NY	115. Support on-board ports only.
T495-20NJ MT	20NJ	115. Support on-board ports only.
T495-20NK MT	20NK	115. Support on-board ports only.
T495s-20QJ MT	20QJ	115. Support on-board ports only.
T495s-20QK MT	20QK	115. Support on-board ports only.
T560-20FH MT	20FH	223 For Bay Trail model
T560-20FJ MT	20FJ	223 For Bay Trail model
T570-20H9 MT	20H9	115. Support on-board ports only.
T570-20HA MT	20HA	115. Support on-board ports only.
T570-20JW MT	20JW	115. Support on-board ports only.
T570-20JX MT	20JX	115. Support on-board ports only.
T580-20L9 MT	20L9	115. Support on-board ports only.
T580-20LA MT	20LA	115. Support on-board ports only.
T590-20N4 MT	20N4	115. Support on-board ports only.
T590-20N5 MT	20N5	115. Support on-board ports only.
TP25-20K7 MT	20K7	115. Support on-board ports only.
Tablet 2-3679 MT	3679	
ThinkBook 13s 2nd Generation-ITL-MT 20V9	20V9	

ThinkBook 13s G2 ARE-MT code	20WC	
ThinkBook 13s G4 ARB-21AS - ThinkBook 13s G4 ARB	21AS	
ThinkBook 13s G4 IAP- 21AR - ThinkBook 13s G4 IAP	21AR	
ThinkBook 13x G2 IAP- 21AT - ThinkBook 13x G2 IAP	21AT	
ThinkBook 14 2nd Generation-ARE-MT 20VF	20VF	
ThinkBook 14 2nd Generation-ITL-MT 20VD	20VD	
ThinkBook 14 G4 ABA- 21DK - ThinkBook 14 G4 ABA	21DK	
ThinkBook 14 G4 IAP- 21DH - ThinkBook 14 G4 IAP	21DH	
ThinkBook 14 G4+ ARA-21D0 - ThinkBook 14 G4+ ARA	21D0	
ThinkBook 14 G4+ IAP- 21CX - ThinkBook 14 G4+ IAP	21CX	
ThinkBook 14p G2 ACH-20YN - ThinkBook 14p G2 ACH	20YN	
ThinkBook 14p G3 ARH-21EJ - ThinkBook 14p G3 ARH	21EJ	

ThinkBook 14s 2nd Generation-ITL-MT 20VA	20VA	
ThinkBook 14s Yoga G2 IAP-MT 21DM	21DM	
ThinkBook 15 2nd Generation-ARE-MT 20VG	20VG	
ThinkBook 15 2nd Generation-ITL-MT 20VE	20VE	
ThinkBook 15 G3 ITL- 21A5 - ThinkBook 15 G3 ITL	21A5	
ThinkBook 15 G4 ABA- 21DL - ThinkBook 15 G4 ABA	21DL	
ThinkBook 15 G4 IAP- 21DJ - ThinkBook 15 G4 IAP	21DJ	
ThinkBook 15p G2 ITH- 21B1 - ThinkBook 15p G2 ITH	21B1	
ThinkBook 16 G4+ ARA-21D1 - ThinkBook 16 G4+ ARA	21D1	
ThinkBook 16 G4+ IAP- 21CY - ThinkBook 16 G4+ IAP	21CY	
ThinkBook 16p G3 ARH-21EK - ThinkBook 16p G3 ARH	21EK	
ThinkBook 16p NX ARH-21EV - ThinkBook 16p NX ARH	21EV	

ThinkBook 16p NX IAP- 21EU - ThinkBook 16p NX IAP	21EU	
ThinkBook Plus G3 IAP-21EL - ThinkBook Plus G3 IAP	21EL	
ThinkCentre E700- ThinkCentre E700IAB	11SB	115. Support on-board ports only.
ThinkCentre E76p- 11BR	11BR	115. Support on-board ports only.
ThinkCentre E76x- 11BA	11BA	115. Support on-board ports only.
ThinkCentre E96x- 11BB	11BB	115. Support on-board ports only.
ThinkCentre E97s- 12AY - ThinkCentre E97s	12AY	115. Support on-board ports only.
ThinkCentre E98-11QF - ThinkCentre E98	11QF	115. Support on-board ports only.
ThinkCentre Edge 91z- 1729	1729	
ThinkCentre Edge 91z- 1731	1731	
ThinkCentre Edge 91z- 1732	1732	
ThinkCentre Edge 91z- 1734	1734	
ThinkCentre Edge 91z- 1736	1736	
ThinkCentre Edge 91z- 1737	1737	
ThinkCentre Edge 91z- 7556	7556	
ThinkCentre Edge 91z- 7559	7559	

ThinkCentre Edge 93Z- 10B8	10B8	
ThinkCentre Edge 93Z- 10B9	10B9	
ThinkCentre Edge 93Z- 10BA	10BA	
ThinkCentre Edge 93Z- 10BH	10BH	
ThinkCentre Edge 93Z- 10BJ	10BJ	
ThinkCentre Edge 93Z- 10BK	10BK	
ThinkCentre M60e- 11LU	11LU	115. Support on-board ports only.
ThinkCentre M60e- 11LV	11LV	115. Support on-board ports only.
ThinkCentre M60e- 11LW	11LW	115. Support on-board ports only.
ThinkCentre M60e- 11LX	11LX	115. Support on-board ports only.
ThinkCentre M60e- 11LY	11LY	115. Support on-board ports only.
ThinkCentre M60e- 11M0	11M0	115. Support on-board ports only.
ThinkCentre M60e- 11M1	11M1	115. Support on-board ports only.
ThinkCentre M60e- 11M2	11M2	115. Support on-board ports only.
ThinkCentre M630e- 10YM	10YM	115. Support on-board ports only.
ThinkCentre M70a Gen 2-11K3 - ThinkCentre M70a Gen 2	11K3	115. Support on-board ports only.
ThinkCentre M70a Gen 2-11K4 - ThinkCentre M70a Gen 2	11K4	115. Support on-board ports only.

ThinkCentre M70a Gen 2-11K5 - ThinkCentre M70a Gen 2	11K5	115. Support on-board ports only.
ThinkCentre M70a Gen 2-11K6 - ThinkCentre M70a Gen 2	11K6	115. Support on-board ports only.
ThinkCentre M70q Gen 2-11MY - ThinkCentre M70q Gen 2	11MY	115. Support on-board ports only.
ThinkCentre M70q Gen 2-11N0 - ThinkCentre M70q Gen 2	11N0	115. Support on-board ports only.
ThinkCentre M70q Gen 2-11N3 - ThinkCentre M70q Gen 2	11N3	115. Support on-board ports only.
ThinkCentre M70q Gen 2-11N4 - ThinkCentre M70q Gen 2	11N4	115. Support on-board ports only.
ThinkCentre M70q Gen 3-11T3-ThinkCentre M70q Gen 3	11T3	115. Support on-board ports only.
ThinkCentre M70q Gen 3-11T4-ThinkCentre M70q Gen 3	11T4	115. Support on-board ports only.
ThinkCentre M70q Gen 3-11TY-ThinkCentre M70q Gen 3	11TY	115. Support on-board ports only.
ThinkCentre M70q Gen 3-11U0-ThinkCentre M70q Gen 3	11U0	115. Support on-board ports only.
ThinkCentre M70q Gen 3-11X2-ThinkCentre M70q Gen 3	11X2	115. Support on-board ports only.
ThinkCentre M70q Gen 3-11X6-ThinkCentre M70q Gen 3	11X6	115. Support on-board ports only.

ThinkCentre M70q- 11DT	11DT	115. Support on-board ports only.
ThinkCentre M70q- 11DU	11DU	115. Support on-board ports only.
ThinkCentre M70q- 11DV	11DV	115. Support on-board ports only.
ThinkCentre M70q- 11DW	11DW	115. Support on-board ports only.
ThinkCentre M70s Gen 2-11M5	11M5	115. Support on-board ports only.
ThinkCentre M70s Gen 2-11M6	11M6	115. Support on-board ports only.
ThinkCentre M70s Gen 2-11M9	11M9	115. Support on-board ports only.
ThinkCentre M70s Gen 2-11MA	11MA	115. Support on-board ports only.
ThinkCentre M70s Gen 3-11T7-ThinkCentre M70s Gen 3	11T7	115. Support on-board ports only.
ThinkCentre M70s Gen 3-11T8-ThinkCentre M70s Gen 3	11T8	115. Support on-board ports only.
ThinkCentre M70s Gen 3-11TB-ThinkCentre M70s Gen 3	11TB	115. Support on-board ports only.
ThinkCentre M70s Gen 3-11TC-ThinkCentre M70s Gen 3	11TC	115. Support on-board ports only.
ThinkCentre M70s Gen 3-11X8-ThinkCentre M70s Gen 3	11X8	115. Support on-board ports only.
ThinkCentre M70s Gen 3-11XG-ThinkCentre M70s Gen 3	11XG	115. Support on-board ports only.
ThinkCentre M70s- 11DB	11DB	115. Support on-board ports only.

ThinkCentre M70s- 11DC	11DC	115. Support on-board ports only.
ThinkCentre M70s- 11EW	11EW	115. Support on-board ports only.
ThinkCentre M70s- 11EX	11EX	115. Support on-board ports only.
ThinkCentre M70t Gen 2-11M3	11M3	115. Support on-board ports only.
ThinkCentre M70t Gen 2-11M4	11M4	115. Support on-board ports only.
ThinkCentre M70t Gen 2-11M7	11M7	115. Support on-board ports only.
ThinkCentre M70t Gen 2-11M8	11M8	115. Support on-board ports only.
ThinkCentre M70t Gen 3-11T5-ThinkCentre M70t Gen 3	11T5	115. Support on-board ports only.
ThinkCentre M70t Gen 3-11T6-ThinkCentre M70t Gen 3	11T6	115. Support on-board ports only.
ThinkCentre M70t Gen 3-11T9-ThinkCentre M70t Gen 3	11T9	115. Support on-board ports only.
ThinkCentre M70t Gen 3-11TA-ThinkCentre M70t Gen 3	11TA	115. Support on-board ports only.
ThinkCentre M70t Gen 3-11X3-ThinkCentre M70t Gen 3	11X3	115. Support on-board ports only.
ThinkCentre M70t Gen 3-11XE-ThinkCentre M70t Gen 3	11XE	115. Support on-board ports only.
ThinkCentre M70t- 11D9	11D9	115. Support on-board ports only.
ThinkCentre M70t- 11DA	11DA	115. Support on-board ports only.

ThinkCentre M70t- 11EU	11EU	115. Support on-board ports only.
ThinkCentre M70t- 11EV	11EV	115. Support on-board ports only.
ThinkCentre M715q- 10VG	10VG	115. Support on-board ports only.
ThinkCentre M715q- 10VH	10VH	115. Support on-board ports only.
ThinkCentre M715q- 10VJ	10VJ	115. Support on-board ports only.
ThinkCentre M715q- 10VK	10VK	115. Support on-board ports only.
ThinkCentre M720e- 11BD	11BD	115. Support on-board ports only.
ThinkCentre M720e- 11BE	11BE	115. Support on-board ports only.
ThinkCentre M720q- 10T7	10T7	115. Support on-board ports only.
ThinkCentre M720q- 10T8	10T8	115. Support on-board ports only.
ThinkCentre M720q- 10T9	10T9	115. Support on-board ports only.
ThinkCentre M720q- 10TA	10TA	115. Support on-board ports only.
ThinkCentre M720q- 10TC	10TC	115. Support on-board ports only.
ThinkCentre M75q Gen 2-11JJ	11JJ	115. Support on-board ports only.
ThinkCentre M75q Gen 2-11JK	11JK	115. Support on-board ports only.
ThinkCentre M75q Gen 2-11JL	11JL	115. Support on-board ports only.
ThinkCentre M75q Gen 2-11JM	11JM	115. Support on-board ports only.
ThinkCentre M75q Gen 2-11JN	11JN	115. Support on-board ports only.

ThinkCentre M75q Gen 2-11JQ	11JQ	115. Support on-board ports only.
ThinkCentre M75q Gen 2-11JR	11JR	115. Support on-board ports only.
ThinkCentre M75q Gen 2-11JS	11JS	115. Support on-board ports only.
ThinkCentre M75q-1- 11A4	11A4	115. Support on-board ports only.
ThinkCentre M75q-1- 11A5	11A5	115. Support on-board ports only.
ThinkCentre M75q-1- 11A6	11A6	115. Support on-board ports only.
ThinkCentre M75q-1- 11A7	11A7	115. Support on-board ports only.
ThinkCentre M75s Gen 2-11R7 - ThinkCentre M75s Gen 2	11R7	115. Support on-board ports only.
ThinkCentre M75s Gen 2-11R8 - ThinkCentre M75s Gen 2	11R8	115. Support on-board ports only.
ThinkCentre M75s Gen 2-11R9 - ThinkCentre M75s Gen 2	11R9	115. Support on-board ports only.
ThinkCentre M75s Gen 2-11RA - ThinkCentre M75s Gen 2	11RA	115. Support on-board ports only.
ThinkCentre M75s Gen 2-MT	11JA	115. Support on-board ports only.
	11JB	115. Support on-board ports only.
	11JC	115. Support on-board ports only.
	11JD	115. Support on-board ports only.
ThinkCentre M75t Gen 2-11KB	11KB	115. Support on-board ports only.
ThinkCentre M75t Gen 2-11KC	11KC	115. Support on-board ports only.

ThinkCentre M75t Gen 2-11KD	11KD	115. Support on-board ports only.
ThinkCentre M75t Gen 2-11KE	11KE	115. Support on-board ports only.
ThinkCentre M75t Gen 2-11RB - ThinkCentre M75t Gen 2	11RB	115. Support on-board ports only.
ThinkCentre M75t Gen 2-11RC - ThinkCentre M75t Gen 2	11RC	115. Support on-board ports only.
ThinkCentre M75t Gen 2-11RD - ThinkCentre M75t Gen 2	11RD	115. Support on-board ports only.
ThinkCentre M75t Gen 2-11RE - ThinkCentre M75t Gen 2	11RE	115. Support on-board ports only.
ThinkCentre M80q Gen 3-11U1-ThinkCentre M80q Gen 3	11U1	115. Support on-board ports only.
ThinkCentre M80q Gen 3-11U2-ThinkCentre M80q Gen 3	11U2	115. Support on-board ports only.
ThinkCentre M80q Gen 3-11U3-ThinkCentre M80q Gen 3	11U3	115. Support on-board ports only.
ThinkCentre M80q Gen 3-11U4-ThinkCentre M80q Gen 3	11U4	115. Support on-board ports only.
ThinkCentre M80q Gen 3-Machine Type	11XH	115. Support on-board ports only.
	11XJ	115. Support on-board ports only.
	11XK	115. Support on-board ports only.
	11XL	115. Support on-board ports only.
ThinkCentre M80q- 11DN	11DN	115. Support on-board ports only.

ThinkCentre M80q- 11DQ	11DQ	115. Support on-board ports only.
ThinkCentre M80q- 11DR	11DR	115. Support on-board ports only.
ThinkCentre M80q- 11DS	11DS	115. Support on-board ports only.
ThinkCentre M80s Gen 3-11TF-ThinkCentre M80s Gen 3	11TF	115. Support on-board ports only.
ThinkCentre M80s Gen 3-11TG-ThinkCentre M80s Gen 3	11TG	115. Support on-board ports only.
ThinkCentre M80s Gen 3-11TK-ThinkCentre M80s Gen 3	11TK	115. Support on-board ports only.
ThinkCentre M80s Gen 3-11TL-ThinkCentre M80s Gen 3	11TL	115. Support on-board ports only.
ThinkCentre M80s- 11CU	11CU	115. Support on-board ports only.
ThinkCentre M80s- 11CV	11CV	115. Support on-board ports only.
ThinkCentre M80s- 11EM	11EM	115. Support on-board ports only.
ThinkCentre M80s- 11EN	11EN	115. Support on-board ports only.
ThinkCentre M80t Gen 3-11TD-ThinkCentre M80t Gen 3	11TD	115. Support on-board ports only.
ThinkCentre M80t Gen 3-11TE-ThinkCentre M80t Gen 3	11TE	115. Support on-board ports only.
ThinkCentre M80t Gen 3-11TH-ThinkCentre M80t Gen 3	11TH	115. Support on-board ports only.

ThinkCentre M80t Gen 3-11TJ-ThinkCentre M80t Gen 3	11TJ	115. Support on-board ports only.
ThinkCentre M80t- 11CS	11CS	115. Support on-board ports only.
ThinkCentre M80t- 11CT	11CT	115. Support on-board ports only.
ThinkCentre M80t- 11EK	11EK	115. Support on-board ports only.
ThinkCentre M80t- 11EL	11EL	115. Support on-board ports only.
ThinkCentre M90a Gen 3-11VF-ThinkCentre M90a Gen 3	11VF	115. Support on-board ports only.
ThinkCentre M90a Gen 3-11VG-ThinkCentre M90a Gen 3	11VG	115. Support on-board ports only.
ThinkCentre M90a Gen 3-11VH-ThinkCentre M90a Gen 3	11VH	115. Support on-board ports only.
ThinkCentre M90a Gen 3-11VJ-ThinkCentre M90a Gen 3	11VJ	115. Support on-board ports only.
ThinkCentre M90a Gen 3-Think Centre M90a Gen 3	12AH	115. Support on-board ports only.
	12AJ	115. Support on-board ports only.
	12AK	115. Support on-board ports only.
	12AL	115. Support on-board ports only.
ThinkCentre M90a Pro Gen3-11VA- ThinkCentre M90a Pro Gen3	11VA	115. Support on-board ports only.

ThinkCentre M90a Pro Gen3-11VB- ThinkCentre M90a Pro Gen3	11VB	115. Support on-board ports only.
ThinkCentre M90a Pro Gen3-11VC- ThinkCentre M90a Pro Gen3	11VC	115. Support on-board ports only.
ThinkCentre M90a Pro Gen3-11VD- ThinkCentre M90a Pro Gen3	11VD	115. Support on-board ports only.
ThinkCentre M90a Pro Gen3-11VE- ThinkCentre M90a Pro Gen3	11VE	115. Support on-board ports only.
ThinkCentre M90q Gen 3-11U5-ThinkCentre M90q Gen 3	11U5	115. Support on-board ports only.
ThinkCentre M90q Gen 3-11U6-ThinkCentre M90q Gen 3	11U6	115. Support on-board ports only.
ThinkCentre M90q Gen 3-11U7-ThinkCentre M90q Gen 3	11U7	115. Support on-board ports only.
ThinkCentre M90q Gen 3-11U8-ThinkCentre M90q Gen 3	11U8	115. Support on-board ports only.
ThinkCentre M90q- 11CR	11CR	115. Support on-board ports only.
ThinkCentre M90q- 11DG	11DG	115. Support on-board ports only.
ThinkCentre M90q- 11DH	11DH	115. Support on-board ports only.
ThinkCentre M90q- 11DJ	11DJ	115. Support on-board ports only.

ThinkCentre M90q- 11DK	11DK	115. Support on-board ports only.
ThinkCentre M90q- 11DL	11DL	115. Support on-board ports only.
ThinkCentre M90q- 11EY	11EY	115. Support on-board ports only.
ThinkCentre M90q- 11FO	11FO	115. Support on-board ports only.
ThinkCentre M90s Gen 3-11TS-ThinkCentre M90s Gen 3	11TS	115. Support on-board ports only.
ThinkCentre M90s Gen 3-11TT-ThinkCentre M90s Gen 3	11TT	115. Support on-board ports only.
ThinkCentre M90s Gen 3-11TW-ThinkCentre M90s Gen 3	11TW	115. Support on-board ports only.
ThinkCentre M90s Gen 3-11TX-ThinkCentre M90s Gen 3	11TX	115. Support on-board ports only.
ThinkCentre M90t Gen 3-11TM-ThinkCentre M90t Gen 3	11TM	115. Support on-board ports only.
ThinkCentre M90t Gen 3-11TN-ThinkCentre M90t Gen 3	11TN	115. Support on-board ports only.
ThinkCentre M90t Gen 3-11TU-ThinkCentre M90t Gen 3	11TU	115. Support on-board ports only.
ThinkCentre M90t Gen 3-11TV-ThinkCentre M90t Gen 3	11TV	115. Support on-board ports only.
ThinkCentre M91- 7074	7074	
ThinkCentre M91- 7077	7077	

ThinkCentre M91p- 7075	7075	
ThinkCentre M91p- 7078	7078	
ThinkCentre M920q- 10RR	10RR	115. Support on-board ports only.
ThinkCentre M920q- 10RS	10RS	115. Support on-board ports only.
ThinkCentre M920q- 10RT	10RT	115. Support on-board ports only.
ThinkCentre M920q- 10RU	10RU	115. Support on-board ports only.
ThinkCentre M920q- 10V8	10V8	115. Support on-board ports only.
ThinkCentre M920x- 10S0	10S0	115. Support on-board ports only.
ThinkCentre M920x- 10S1	10S1	115. Support on-board ports only.
ThinkCentre M920x- 10S2	10S2	115. Support on-board ports only.
ThinkCentre M920x- 10S3	10S3	115. Support on-board ports only.
ThinkCentre neo 30a 22 Gen 3-ThinkCentre neo 30a 22 Gen 3	12B1	115. Support on-board ports only.
ThinkCentre neo 30a 24 Gen 3-ThinkCentre neo 30a 24 Gen 3	12B0	115. Support on-board ports only.
	12B6	115. Support on-board ports only.
ThinkCentre neo 50a 24 Gen 3-ThinkCentre	12B7	115. Support on-board ports only.
neo 50a 24 Gen 3	12B8	115. Support on-board ports only.
	12B9	115. Support on-board ports only.

ThinkCentre neo 50s Gen 3-11SW - ThinkCentre neo 50s Gen 3	11SW	115. Support on-board ports only.
ThinkCentre neo 50s Gen 3-11SX - ThinkCentre neo 50s Gen 3	11SX	115. Support on-board ports only.
ThinkCentre neo 50s Gen 3-11SY - ThinkCentre neo 50s Gen 3	11SY	115. Support on-board ports only.
ThinkCentre neo 50s Gen 3-11T0 - ThinkCentre neo 50s Gen 3	11T0	115. Support on-board ports only.
ThinkCentre neo 50t Gen 3-11SC - ThinkCentre neo 50t Gen 3	11SC	115. Support on-board ports only.
ThinkCentre neo 50t Gen 3-11SD - ThinkCentre neo 50t Gen 3	11SD	115. Support on-board ports only.
ThinkCentre neo 50t Gen 3-11SE - ThinkCentre neo 50t Gen 3	11SE	115. Support on-board ports only.
ThinkCentre neo 50t Gen 3-11SF - ThinkCentre neo 50t Gen 3	11SF	115. Support on-board ports only.
ThinkCentre neo 70t Gen 3-11YT- ThinkCentre neo 70t Gen 3	11YT	115. Support on-board ports only.

ThinkCentre neo 70t Gen 3-11YU- ThinkCentre neo 70t Gen 3	11YU	115. Support on-board ports only.
ThinkEdge SE30-11NA - ThinkEdge SE30	11NA	115. Support on-board ports only.
ThinkEdge SE30-11NB - ThinkEdge SE30	11NB	115. Support on-board ports only.
ThinkEdge SE50-11RH - ThinkEdge SE50	11RH	115. Support on-board ports only.
ThinkEdge SE50-11RJ - ThinkEdge SE50	11RJ	115. Support on-board ports only.
ThinkEdge SE70-12A6 - ThinkEdge SE70	12A6	115. Support on-board ports only.
ThinkEdge SE70-12A7 - ThinkEdge SE70	12A7	115. Support on-board ports only.
ThinkEdge SE70-12A8 - ThinkEdge SE70	12A8	115. Support on-board ports only.
ThinkEdge SE70-12A9 - ThinkEdge SE70	12A9	115. Support on-board ports only.
ThinkEdge SE70-12AA - ThinkEdge SE70	12AA	115. Support on-board ports only.
ThinkEdge SE70-12AB - ThinkEdge SE70	12AB	115. Support on-board ports only.
ThinkEdge SE70-12AE - ThinkEdge SE70	12AE	115. Support on-board ports only.
ThinkEdge SE70-12AF - ThinkEdge SE70	12AF	115. Support on-board ports only.
ThinkEdge SE70-12AN - ThinkEdge SE70	12AN	115. Support on-board ports only.
ThinkEdge SE70-12AQ - ThinkEdge SE70	12AQ	115. Support on-board ports only.
ThinkEdge SE70-12AR - ThinkEdge SE70	12AR	115. Support on-board ports only.
ThinkEdge SE70-12AS - ThinkEdge SE70	12AS	115. Support on-board ports only.

ThinkEdge SE70-12AT - ThinkEdge SE70	12AT	115. Support on-board ports only.
ThinkEdge SE70-12AU - ThinkEdge SE70	12AU	115. Support on-board ports only.
ThinkPad 11e 1st Generation-20D9 MT	20D9	
ThinkPad 11e 1st Generation-20DU MT	20DU	
ThinkPad 11e 2nd Generation-20E5 MT	20E5	
ThinkPad 11e 2nd Generation-20E6 MT	20E6	
ThinkPad 11e 2nd Generation-20E7 MT	20E7	
ThinkPad 11e 2nd Generation-20E8 MT	20E8	
ThinkPad 11e 2nd Generation-20ED MT	20ED	
ThinkPad 11e 2nd Generation-20EE MT	20EE	
ThinkPad 11e 3rd Generation-20G8 MT	20G8	223 For Bay Trail model
ThinkPad 11e 3rd Generation-20G9 MT	20G9	223 For Bay Trail model
ThinkPad 11e 3rd Generation-20GA MT	20GA	223 For Bay Trail model
ThinkPad 11e 3rd Generation-20GB MT	20GB	223 For Bay Trail model
ThinkPad 11e 3rd Generation-20GC MT	20GC	223 For Bay Trail model
ThinkPad 11e 3rd Generation-20GD MT	20GD	223 For Bay Trail model
ThinkPad 11e 3rd Generation-20GE MT	20GE	223 For Bay Trail model
ThinkPad 11e 3rd Generation-20GF MT	20GF	223 For Bay Trail model

ThinkPad 11e 4th Generation-20HS MT	20HS	115. Support on-board ports only.
ThinkPad 11e 4th Generation-20HT MT	20HT	115. Support on-board ports only.
ThinkPad 11e 4th Generation-20HU MT	20HU	115. Support on-board ports only.
ThinkPad 11e 4th Generation-20HV MT	20HV	115. Support on-board ports only.
ThinkPad 11e 5th Generation-20LM MT	20LM	115. Support on-board ports only.
ThinkPad 11e 5th Generation-20LN MT	20LN	115. Support on-board ports only.
ThinkPad 11e 5th Generation-20LQ MT	20LQ	115. Support on-board ports only.
ThinkPad 11e 5th Generation-20LR MT	20LR	115. Support on-board ports only.
ThinkPad 13 1st Generation-20GJ MT	20GJ	115. Support on-board ports only.
ThinkPad 13 1st Generation-20GK MT	20GK	115. Support on-board ports only.
ThinkPad 13 2nd Generation-20J1 MT	20J1	
ThinkPad 13 2nd Generation-20J2 MT	20J2	
ThinkPad A475-20KL MT	20KL	115. Support on-board ports only.
ThinkPad A475-20KM MT	20KM	115. Support on-board ports only.
ThinkPad L14-20U1 MT 2020	20U1	115. Support on-board ports only.
ThinkPad L14-20U2 MT 2020	20U2	115. Support on-board ports only.
ThinkPad L15-20U3 MT 2020	20U3	115. Support on-board ports only.
ThinkPad L15-20U4 MT 2020	20U4	115. Support on-board ports only.

ThinkPad P1 3rd Generation-20TH MT 2020	20TH	115. Support on-board ports only.
ThinkPad P1 3rd Generation-20TJ MT 2020	20TJ	115. Support on-board ports only.
ThinkPad P14s-20S4 MT 2020	20S4	115. Support on-board ports only.
ThinkPad P14s-20S5 MT 2020	20S5	115. Support on-board ports only.
ThinkPad P15-20ST MT 2020	20ST	115. Support on-board ports only.
ThinkPad P15-20SU MT 2020	20SU	115. Support on-board ports only.
ThinkPad P15g-20UR MT 2020	20UR	115. Support on-board ports only.
ThinkPad P15g-20US MT 2020	20US	115. Support on-board ports only.
ThinkPad P15v-20TQ MT 2020	20TQ	115. Support on-board ports only.
ThinkPad P15v-20TR MT 2020	20TR	115. Support on-board ports only.
ThinkPad P17-20SN MT 2020	20SN	115. Support on-board ports only.
ThinkPad P17-20SQ MT 2020	20SQ	115. Support on-board ports only.
ThinkPad S3 Yoga 14- 20DM MT	20DM	
ThinkPad S3 Yoga 14- 20DN MT	20DN	
ThinkPad S5 Yoga 15- 20DQ MT	20DQ	
ThinkPad S5 Yoga 15- 20DR MT	20DR	
ThinkPad T14-20S0 MT 2020	20S0	115. Support on-board ports only.

ThinkPad T14-20S1 MT 2020	20S1	115. Support on-board ports only.
ThinkPad T14-20S2 MT 2020 HC	20S2	115. Support on-board ports only.
ThinkPad T14-20S3 MT 2020 HC	20S3	115. Support on-board ports only.
ThinkPad T14s-20T0 MT 2020	20T0	115. Support on-board ports only.
ThinkPad T14s-20T1 MT 2020	20T1	115. Support on-board ports only.
ThinkPad T15-20S6 MT 2020	20S6	115. Support on-board ports only.
ThinkPad T15-20S7 MT 2020	20S7	115. Support on-board ports only.
ThinkPad T15p-20TM MT 2020	20TM	115. Support on-board ports only.
ThinkPad T15p-20TN MT 2020	20TN	115. Support on-board ports only.
ThinkPad T410-2522	2522	
ThinkPad X201 Tablet- 0053	0053	
ThinkPad X201 Tablet- 0831	0831	
ThinkPad X201 Tablet- 2985	2985	
ThinkPad X201 Tablet- 3093	3093	
ThinkPad X201 Tablet- 3113	3113	
ThinkPad X201 Tablet- 3144	3144	
ThinkPad X201 Tablet- 3239	3239	
ThinkPad X201s-5129	5129	
ThinkPad X201s-5143	5143	

ThinkPad X201s-5385	5385	
ThinkPad X201s-5397	5397	
ThinkPad X201s-5413	5413	
ThinkPad X201s-5442	5442	
ThinkPad X201s-5446	5446	
ThinkPad X270-2023	2023	
ThinkPad X270-2024	2024	
ThinkPad X270-20KC MT	20KC	115. Support on-board ports only.
ThinkPad X270-20KD MT	20KD	115. Support on-board ports only.
ThinkPad X270-3249	3249	
ThinkPad X270-3323	3323	
ThinkPad X270-3357	3357	
ThinkPad X270-3626	3626	
ThinkPad X270-3680	3680	
ThinkPad X270-3712	3712	
ThinkPad X270-4492	4492	
ThinkPad X270-7454	7454	
ThinkPad X270-7455	7455	
ThinkPad X270-7457	7457	
ThinkPad X270-7458	7458	
ThinkPad X270-7459	7459	
ThinkPad X300-2748	2748	
ThinkPad X300-2749	2749	
ThinkPad X300-6476	6476	

ThinkPad X300-6477	6477	
ThinkPad X300-6478	6478	
ThinkPad X300-X300 3 Year Onsite	4052	
ThinkPad X301-2774	2774	
ThinkPad X301-2776	2776	
ThinkPad X301-2777	2777	
ThinkPad X301-2778	2778	
ThinkPad X301-2779	2779	
ThinkPad X301-4057	4057	
ThinkPad X301-4182	4182	
ThinkPad X60 Tablet- 6363	6363	
ThinkPad X60 Tablet- 6364	6364	
ThinkPad X60 Tablet- 6365	6365	
ThinkPad X60 Tablet- 6366	6366	
ThinkPad X60-1706	1706	
ThinkPad X60-1707	1707	
ThinkPad X60-1708	1708	
ThinkPad X60-1709	1709	
ThinkPad X60S-1702	1702	
ThinkPad X60S-1703	1703	
ThinkPad X60S-1704	1704	
ThinkPad X60S-1705	1705	

ThinkPad X61 Tablet- 7667	7667	
ThinkPad X61 Tablet- 7762	7762	
ThinkPad X61 Tablet- 7763	7763	
ThinkPad X61 Tablet- 7764	7764	
ThinkPad X61 Tablet- 7767	7767	
ThinkPad X61 Tablet- 7768	7768	
ThinkPad X61 Tablet- 7769	7769	
ThinkPad X61-7673	7673	
ThinkPad X61-7674	7674	
ThinkPad X61-7675	7675	
ThinkPad X61-7676	7676	
ThinkPad X61-7678	7678	
ThinkPad X61-7679	7679	
ThinkPad X61s-7666	7666	
ThinkPad X61s-7670	7670	
ThinkPad X61s-7671	7671	
ThinkPad Yoga 260- 20FD MT	20FD	223 For Bay Trail model
ThinkPad Yoga 260- 20FE MT	20FE	223 For Bay Trail model
ThinkPad Yoga 260- 20GS MT	20GS	223 For Bay Trail model
ThinkPad Yoga 260- 20GT MT	20GT	223 For Bay Trail model

ThinkPad Yoga 370- 20JH MT	20JH	115. Support on-board ports only.
ThinkPad Yoga 370- 20JJ MT	20JJ	115. Support on-board ports only.
ThinkPad x100e-2876	2876	
ThinkPad x100e-MT 0022	0022	
ThinkPad x100e-MT 3506	3506	
ThinkPad x100e-MT 3507	3507	
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ThinkSmart Core C- 11S0	11S0	
ThinkSmart Core Full Room Kit-MT	11S2	
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	11S5	
ThinkSmart Core L- 11RX	11RX	
ThinkSmart Core OEM- 11S6	11S6	
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ThinkSmart Hub 60- 11H0	11H0	

ThinkSmart Hub 60-11H1	11H1	
ThinkSmart Hub-10V5	10V5	
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ThinkStation P340-30DK	30DK	
ThinkStation P340-30DL	30DL	
ThinkStation P340-30DN	30DN	
ThinkStation P350-30E3	30E3	
ThinkStation P350-30E4	30E4	
ThinkStation P350-30E5	30E5	
ThinkStation P350-30E6	30E6	
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ThinkStation P360 Tiny-30FB	30FB	
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ThinkStation P360 Ultra-30G4	30G4	
ThinkVision LT2223d- 60A9	60A9	
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Thinkbook 14s-IWL-MT 20RM	20RM	
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Thinkcentre Edge 92z- 3397	3397	
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Wine French - Do Not Use-0197 - Do Not Use	0197	

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X1 Carbon 2nd Generation-20A7 MT	20A7	
X1 Carbon 2nd Generation-20A8 MT	20A8	
X1 Carbon 3rd Generation-20BS MT	20BS	
X1 Carbon 3rd Generation-20BT MT	20BT	
X1 Carbon 4th Generation-20FB MT	20FB	
X1 Carbon 4th Generation-20FC MT	20FC	
X1 Carbon 5th Generation-20HQ MT	20HQ	115. Support on-board ports only.
X1 Carbon 5th Generation-20HR MT	20HR	115. Support on-board ports only.
X1 Carbon 5th Generation-20K3 MT	20K3	115. Support on-board ports only.
X1 Carbon 5th Generation-20K4 MT	20K4	115. Support on-board ports only.
X1 Carbon 6th Generation-20KG MT	20KG	115. Support on-board ports only.
X1 Carbon 6th Generation-20KH MT	20KH	115. Support on-board ports only.
X1 Carbon 7th Generation-20QD MT	20QD	115. Support on-board ports only.
X1 Carbon 7th Generation-20QE MT	20QE	115. Support on-board ports only.
X1 Carbon 7th Generation-20R1 MT	20R1	115. Support on-board ports only.
X1 Carbon 7th Generation-20R2 MT	20R2	115. Support on-board ports only.

X1 Carbon 8th Generation-20U9 MT 2020	20U9	115. Support on-board ports only.
X1 Carbon 8th Generation-20UA MT 2020	20UA	115. Support on-board ports only.
X1 Carbon 9th Generation-20XW - X1 Carbon Gen 9	20XW	115. Support on-board ports only.
X1 Carbon 9th Generation-20XX - X1 Carbon Gen 9	20XX	115. Support on-board ports only.
X1 Carbon G10-21CB - X1 Carbon Gen 10	21CB	115. Support on-board ports only.
X1 Carbon G10-21CC - X1 Carbon Gen 10	21CC	115. Support on-board ports only.
X1 Extreme 1st Generation-20MF MT	20MF	115. Support on-board ports only.
X1 Extreme 1st Generation-20MG MT	20MG	115. Support on-board ports only.
X1 Extreme 2nd Generation-20QV MT	20QV	115. Support on-board ports only.
X1 Extreme 2nd Generation-20QW MT	20QW	115. Support on-board ports only.
X1 Extreme 3rd Generation-20TK MT 2020	20TK	115. Support on-board ports only.
X1 Extreme 3rd Generation-20TL MT 2020	20TL	115. Support on-board ports only.
X1 Extreme G4-20Y5 - X1 Extreme Gen 4	20Y5	115. Support on-board ports only.
X1 Extreme G4-20Y6 - X1 Extreme Gen 4	20Y6	115. Support on-board ports only.
X1 Extreme G5-21DE - X1 Extreme Gen 5	21DE	115. Support on-board ports only.

X1 Extreme G5-21DF - X1 Extreme Gen 5	21DF	115. Support on-board ports only.
X1 Series-1292 MT	1292	
X1 Series-1293 MT	1293	
X1 Series-1294 MT	1294	
X1 Series-1295 MT	1295	
X1 Series-1296 MT	1296	
X1 Yoga 1st Generation-20FQ MT	20FQ	
X1 Yoga 1st Generation-20FR MT	20FR	
X1 Yoga 2nd Generation-20JD MT	20JD	115. Support on-board ports only.
X1 Yoga 2nd Generation-20JE MT	20JE	115. Support on-board ports only.
X1 Yoga 2nd Generation-20JF MT	20JF	115. Support on-board ports only.
X1 Yoga 2nd Generation-20JG MT	20JG	115. Support on-board ports only.
X1 Yoga 3rd Generation-RAVEN-3.0 20LD MT	20LD	115. Support on-board ports only.
X1 Yoga 3rd Generation-RAVEN-3.0 20LE MT	20LE	115. Support on-board ports only.
X1 Yoga 3rd Generation-RAVEN-3.0 20LF MT	20LF	115. Support on-board ports only.
X1 Yoga 3rd Generation-RAVEN-3.0 20LG MT	20LG	115. Support on-board ports only.
X1 Yoga 4th Generation-20QF MT	20QF	115. Support on-board ports only.

X1 Yoga 4th Generation-20QG MT	20QG	115. Support on-board ports only.
X1 Yoga 4th Generation-20SA MT	20SA	115. Support on-board ports only.
X1 Yoga 4th Generation-20SB MT	20SB	115. Support on-board ports only.
X1 Yoga 5th Generation-20UB MT 2020	20UB	115. Support on-board ports only.
X1 Yoga 5th Generation-20UC MT 2020	20UC	115. Support on-board ports only.
X1 Yoga 6th Generation-20XY - X1 Yoga Gen 6	20XY	115. Support on-board ports only.
X1 Yoga 6th Generation-20Y0 - X1 Yoga Gen 6	20Y0	115. Support on-board ports only.
X1 Yoga G7-21CD - X1 Yoga Gen 7	21CD	115. Support on-board ports only.
X1 Yoga G7-21CE - X1 Yoga Gen 7	21CE	115. Support on-board ports only.
X121e-MT 3045	3045	
X121e-MT 3051	3051	
X13 AMD G1-20UF MT 2020	20UF	115. Support on-board ports only.
X13 AMD G1-20UG MT 2020	20UG	115. Support on-board ports only.
X13 AMD G2-20XH - X13 AMD Gen 2	20XH	115. Support on-board ports only.
X13 AMD G2-20XJ - X13 AMD Gen 2	20XJ	115. Support on-board ports only.
X13 AMD G3-21CM - X13 AMD Gen 3	21CM	115. Support on-board ports only.

X13 AMD G3-21CN - X13 AMD Gen 3	21CN	115. Support on-board ports only.
X13 G1-20T2 MT 2020	20T2	115. Support on-board ports only.
X13 G1-20T3 MT 2020	20T3	115. Support on-board ports only.
X13 G2-20WK - X13 Gen 2	20WK	115. Support on-board ports only.
X13 G2-20WL - X13 Gen 2	20WL	115. Support on-board ports only.
X13 G3-21BN - X13 Gen 3	21BN	115. Support on-board ports only.
X13 G3-21BQ - X13 Gen 3	21BQ	115. Support on-board ports only.
X13 Yoga 2nd Generation-20W8 MT 2021	20W8	115. Support on-board ports only.
X13 Yoga 2nd Generation-20W9 MT 2021	20W9	115. Support on-board ports only.
X13 Yoga G3-21AW - X13 Yoga Gen 3	21AW	115. Support on-board ports only.
X13 Yoga G3-21AX - X13 Yoga Gen 3	21AX	115. Support on-board ports only.
X13 Yoga-20SX MT 2020	20SX	115. Support on-board ports only.
X13 Yoga-20SY MT 2020	20SY	115. Support on-board ports only.
X130E-2339 MT	2339	
X130E-2340 MT	2340	
X131E-3367 MT	3367	
X131E-3369 MT	3369	
X131E-6283 MT	6283	
X131e-3368 MT	3368	

X140e-20BL MT	20BL	
X140e-20BM MT	20BM	
X1Series-1286 MT	1286	
X1Series-1291 MT	1291	
X220 Dasher-X220 4286 MT	4286	
X220 Dasher-X220 4287 MT	4287	
X220 Dasher-X220 4289 MT	4289	
X220 Dasher-X220 4290 MT	4290	
X220 Dasher-X220 4291 MT	4291	
X220 Dasher-X220 4292 MT	4292	
X220 Dasher-X220 4293 MT	4293	
X220 Tablet Comet- X220 Tablet 4294 MT	4294	
X220 Tablet Comet- X220 Tablet 4296 MT	4296	
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X230 Sub-Series-2324 MT	2324	
X230 Sub-Series-2325 MT	2325	
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X230 Sub-Series-3442 MT	3442	
X230-2306 MT	2306	
X230-2320 MT	2320	
X230-3434 MT	3434	
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X260-20F5MT	20F5	
X260-20F6 MT	20F6	
X270-20HM MT	20HM	115. Support on-board ports only.
X270-20HN MT	20HN	115. Support on-board ports only.
X270-20K5 MT	20K5	115. Support on-board ports only.
X270-20K6 MT	20K6	115. Support on-board ports only.

X280-20KE MT	20KE	115. Support on-board ports only.
X280-20KF MT	20KF	115. Support on-board ports only.
X30E Series-2338 MT	2338	
X30E Series-MT 0622	0622	
X380 Yoga-STORM-3.0 20LH MT	20LH	115. Support on-board ports only.
X380 Yoga-STORM-3.0 20LJ MT	20LJ	115. Support on-board ports only.
X390 Yoga-20NN MT	20NN	115. Support on-board ports only.
X390 Yoga-20NQ MT	20NQ	115. Support on-board ports only.
X390-20Q0 MT	20Q0	115. Support on-board ports only.
X390-20Q1 MT	20Q1	115. Support on-board ports only.
X390-20SC MT	20SC	115. Support on-board ports only.
X390-20SD MT	20SD	115. Support on-board ports only.
X395-20NL MT	20NL	115. Support on-board ports only.
X395-20NM MT	20NM	115. Support on-board ports only.
Y25f-10-65D9	65D9	
Y44w-10 with SPK- 65EA	65EA	
Yoga 14-20FY MT	20FY	223 For Bay Trail model
Yoga 460-20EL MT	20EL	223 For Bay Trail model
Yoga 460-20EM MT	20EM	223 For Bay Trail model
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Yoga 7 14IAL7-82QE - Yoga 7 14IAL7	82QE	

Yoga 7 14IAL7-82VD - Yoga 7 14IAL7	82VD	
Yoga 7 16IAH7-82UF - Yoga 7 16IAH7	82UF	
Yoga 7 16IAP7-82QG - Yoga 7 16IAP7	82QG	
Yoga 9 15IMH5-MT 82DE	82DE	
Yoga Creator 7 15IMH05-MT 82DS	82DS	
Yoga Slim 7 14ARE05- MT 82A2	82A2	
Yoga Slim 7 14IIL05- MT 82A1	82A1	
Yoga Slim 7 14ITL05- MT 82A3	82A3	
Yoga Slim 7 15IIL05- MT 82AA	82AA	
Yoga Slim 7 15IMH05- MT 82AB	82AB	
Yoga Slim 7 15ITL05- MT 82AC	82AC	
Yoga Slim 7 Carbon 13IAP7-82U9 - Yoga Slim 7 Carbon 13IAP7	82U9	
Yoga Slim 7 Pro 16ACH6-82QQ - Yoga Slim 7 Pro 16ACH6	82QQ	
Yoga Slim 9 14IAP7- 82T0 - Yoga Slim 9 14IAP7	82T0	

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M75s Gen 2 (Type 11R7, 11R8, 11R9, 11RA) Desktop (ThinkCentre)

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Fale Conosco (</br/pt/contactus>)
Suporte para Armazenamento (<https://download.lenovo.com/lenovoemc/la/pt>)

Recursos


Fale Conosco (<https://shop.lenovo.com/br/pt/contato/>)
Onde Comprar (<https://shop.lenovo.com/br/pt/revendedores/>)
Blogs (https://news.lenovo.com/blog/?linkTrack=footer:Resources_Blogs)
Especificações do produto (PSREF) (<https://psref.lenovo.com/>)
Registro do produto (<https://support.lenovo.com/productregistration>)
Fóruns (<https://forums.lenovo.com/>)
Acessibilidade do Produto (https://www.lenovo.com/social_responsibility/us/en/accessibility_notebooks/)
Informação ambiental (https://www.lenovo.com/social_responsibility/br/pt/)

 Feedback

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/us/en/about#social-
responsibility](https://www.lenovo.com/us/en/about#social-responsibility))

Veja o nosso Relatório Global de
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([https://www3.lenovo.com
/us/en/social_responsibility
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/browsercompatibility](#))



São Paulo, 11 de Maio de 2021

Assunto: Especificação de produtos AMD

Referente: Características técnicas dos CPUs Ryzen 3 5300G, Ryzen 5 5600G, Ryzen 7 5700G, Ryzen 3 PRO 5350G, **Ryzen 5 PRO 5650G**, Ryzen 7 PRO 5750G

DECLARAÇÃO

A AMD South America Ltda, inscrita no CNPJ sob o nº01.248.915/0001-83, situada a Rua George Ohm 230, 22º andar, São Paulo (SP), CEP 04576-020, representante legal da empresa norte-americana Advanced Micro Devices, Inc que é fabricante de todos os processadores AMD Ryzen, vem por meio desta a quem possa interessar esclarecer os seguintes fatos sobre sua plataforma.

A AMD desenvolveu os processadores Ryzen para atender a demanda atual de desempenho e segurança. Essa plataforma é flexível para atender da melhor maneira possível todas as exigências de IOs e desempenho independentemente da plataforma, ou form factor, escolhido pelo cliente. Nossos processadores AMD Ryzen Série 5000G (zen3) tem suporte as seguintes instruções:

- MOVBE
- MMX
- **SSE (Streaming SIMD Extensions), SSE2, SSE3, SSE4a, SSE4.1, SSE4.2**
- POPCNT
- AVX
- AVX2
- AES
- PCLMUL
- FSGSBASE
- RDRND
- FMA3
- F16C
- BMI, BMI2
- RDSEED
- ADCX
- PREFETCHW
- CLFLUSHOPT
- XSAVE
- SHA1/SHA256
- UMIP
- CLZERO
- **ISA AMD64 / AMD 64-bit technology**
- **ISA X86 / x86 32-bits Instructions**
- EVP / Enhanced Virus Protection
- Turbo Core technology
- **AMD-V / AMD Extensão de Virtualização**
- SMEP / Secure Mode Execution Protection





Recursos de Gerenciamento de energia, com controles de frequência, voltagem e desempenho por parte da CPU são compatíveis com os seguintes recursos da AMD:

- AMD PurePower
- AMD Precision Boost

Controladora de memória e barramentos internos:

- Tipo de Memória: DDR4
- Frequências – DDR4 3200
- Vias PCIe – 16
- Versão PCIe – 3.0
- Frequência Fabric (Barramento Interno) 3200MHz ou 8GT/s

Como participantes do grupo DMTF, todos os processadores e Chipset AM4 suportam os seguintes recursos:

- DMTF DASH 1.0, 1.1 e 1.2

Os processadores AMD Ryzen listados acima tem as seguintes características técnicas no controlador de vídeo integrado.

- DirectX 12 API
- OpenGL 4.6
- OpenCL 2.0
- Shader Model: 6.4
- Vulkan 1.2
- Homologado com Windows Display Driver Model 2.7 (WDDM)
- Suporte até 4 Telas independentes.

Quantidade de telas suportadas na plataforma, resoluções máximas suportadas e quantidade de memória suportada podem ser customizadas por BIOS ou conexão utilizada, essas informações devem ser verificadas junto ao fabricante do computador.

Sem mais,

A handwritten signature in blue ink is written over a horizontal line. The signature is stylized and appears to read 'Alfredo Heiss'.

Alfredo Heiss
Especialista em Hardware / Arquiteto de Soluções AMD Brasil
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Brooklin, São Paulo, SP, Brasil. CEP 04576-020
Fone: (11) 3478-2150 / (11) 98946-2447
alfredo.heiss@amd.com





Lenovo Tecnologia (Brasil) Ltda
CNPJ/MF: 07.275.920/0001-61
Inscrição Estadual nº 387.119.123.110

São Paulo, 11 de Julho de 2022.

Á
MINISTÉRIO PÚBLICO DO ESTADO DE MINAS GERAIS/MPMG
EDITAL/PREGÃO: 142/2022

DECLARAÇÃO

Declaramos nos termos do Edital nº **142/2022**, que a empresa **LÍDER NOTEBOOKS COMÉRCIO E SERVIÇOS LTDA**, inscrita no CNPJ/MF sob o nº **12.477.490/0002-81**, sediada na **Av. Acesso Rodoviário, SN – QUADRA11 - MOD. 01 02 E 03 QUADRA12 - MOD. 01 PARTE GALPAO 05 06 07 08 E 09 SALA 33 TIMS – Serra / ES – Cep: 29.161.376**, é uma Revenda Autorizada, estando apto a comercializar os produtos de fabricação Lenovo.

Produtos:

Família	Part Number	Garantia/SLA
THINKCENTRE M75s Gen 2 AMD	11R7CTO1WW	Garantia 60 (sessenta) meses do Fabricante na modalidade onsite. Durante o prazo de garantia está incluso mão de obras e peças que possam ser substituídas. O atendimento será iniciado no próximo dia útil após a abertura do chamado (horário comercial). O reparo do equipamento será em até 48 horas. O atendimento às chamadas técnicas durante o período de garantia será realizado em dias úteis, ou seja, de segunda a sexta-feira, a partir de 08:00 até às 18:00 horas. Está incluso a retenção da Unidade de Armazenamento (disco rígido) permanecendo em posse do MPMG. A abertura do gabinete poderá ser realizada pelos próprios técnicos do laboratório de TI do MPMG, sem necessidade de autorização prévia e sem perda da garantia. A garantia poderá ser verificada por consulta aberta no site do fabricante através do número de série e/ou etiqueta de serviço. 5WS0T36190 / 5WS0G59101 / 5PS0K26186



<p>THINKCENTRE M80s Gen3 Intel</p>	<p>11TFCTO1WW</p>	<p>Garantia 60 (sessenta) meses do Fabricante na modalidade onsite. Durante o prazo de garantia está incluso mão de obras e peças que possam ser substituídas. O atendimento será iniciado no próximo dia útil após a abertura do chamado (horário comercial). O reparo do equipamento será em até 48 horas. O atendimento às chamadas técnicas durante o período de garantia será realizado em dias úteis, ou seja, de segunda a sexta-feira, a partir de 08:00 até às 18:00 horas. Está incluso a retenção da Unidade de Armazenamento (disco rígido) permanecendo em posse do MPMG. A abertura do gabinete poderá ser realizada pelos próprios técnicos do laboratório de TI do MPMG, sem necessidade de autorização prévia e sem perda da garantia. A garantia poderá ser verificada por consulta aberta no site do fabricante através do número de série e/ou etiqueta de serviço. 5WS0T36190 / 5WS0G59101 / 5PS0K26186</p>
<p>THINKVISION T24V-20</p>	<p>61FCMAR6US</p>	<p>Garantia 60 (sessenta) meses do Fabricante na modalidade onsite. Durante o prazo de garantia está incluso mão de obras e peças que possam ser substituídas. O atendimento será iniciado no próximo dia útil após a abertura do chamado (horário comercial). O reparo do equipamento será em até 48 horas. O atendimento às chamadas técnicas durante o período de garantia será realizado em dias úteis, ou seja, de segunda a sexta-feira, a partir de 08:00 até às 18:00 horas. O monitor tem garantia contra pixels defeituosos, independentemente da quantidade de pixels identificados como defeituosos. A garantia poderá ser verificada por consulta aberta no site do fabricante</p>



		através do número de série e/ou etiqueta de serviço. 5WS0G59093 / 5WS0T30708
LENOVO E14 Intel Gen 2	20TBCTO1WW	Garantia 60 (sessenta) meses do Fabricante na modalidade Onsite, exceto bateria na mesma modalidade porém por 36 (trinta e seis) meses. Durante o prazo de garantia está incluso mão de obras e peças que possam ser substituídas. O atendimento será iniciado no próximo dia útil após a abertura do chamado (horário comercial). O reparo do equipamento será em até 48 horas. O atendimento às chamadas técnicas durante o período de garantia será realizado em dias úteis, ou seja, de segunda a sexta-feira, a partir de 08:00 até às 18:00 horas. Está incluso a retenção da Unidade de Armazenamento (disco rígido) permanecendo em posse do MPMG. A abertura do gabinete poderá ser realizada pelos próprios técnicos do laboratório de TI do MPMG, sem necessidade de autorização prévia e sem perda da garantia. A garantia poderá ser verificada por consulta aberta no site do fabricante através do número de série e/ou etiqueta de serviço. 5WS0T36174 / 5WS0V26691 / 5PS0K27099 / 5WS0L01988

Declaramos que:

- Os produtos citados acima são novos, pertencem a linha corporativa, estão em linha de produção pelos próximos 90 dias, que não foram submetidos a uso, reforma e nem recondição, com exceção de testes de fábrica;
- Possui placa mãe fabricada pela Lenovo;
- Os equipamentos e acessórios possuem o mesmo padrão de cor e são de fabricação Lenovo;
- A impressão sobre as teclas é do tipo permanente, não apresenta desgaste por abrasão ou uso prolongado com garantia prestada pela fabricante por sua rede de assistência técnica credenciada;
- O Fabricante possui site na internet para download de drivers e dos softwares originais instalados em fábrica além de suporte técnico e verificação do status de garantia.



- O equipamento será todo integrado em fábrica.
- Mouse Lenovo mínimo 1000 dpi, óptico USB com 2 (dois) botões e botão de rolagem "Scroll".
- Todos equipamentos ofertados seguem com imagem customizada conforme matriz da contratante, possuem licença de uso Windows 10 Professional 64 pré-instalado mediante downgrade da versão Windows 11 Pro 64, português BR, licenciados na modalidade OEM em ambas versões 10 e 11.
- Será executado, dentro da fábrica, o procedimento de replicação da imagem do disco e suas devidas checagens e testes de qualidade pós clonagem.
- Todos os equipamentos a serem entregues serão idênticos, ou seja, todos os componentes externos e internos de mesmos modelos e marcas. Todos os cabos e conectores necessários ao funcionamento dos equipamentos serão fornecidos com comprimento mínimo de 1,5m (um metro e cinquenta centímetros). Os cabos de conexão à rede elétrica (micro e monitor) seguem o novo padrão brasileiro (NBR-14136).
- As unidades do equipamento serão entregues devidamente acondicionadas em embalagens individuais adequadas, utilizando preferencialmente materiais recicláveis, de forma a garantir a máxima proteção durante o transporte e a armazenagem. Os equipamentos (gabinete, monitor, teclado, mouse, dispositivos ópticos, dispositivo de E/S (entrada/saída) e demais componentes) estão padronizados na cor preta.
- **ThinkCentre M75s Gen2:**
- M75s são projetados e desenvolvidos pela Lenovo em compliance com ROHS. A família M7***** possui nomes de fábrica 11R7***** onde * pode ser qualquer caractere alfanumérico ou vazio.
- Processador AMD Ryzen 5 PRO 5650G, possui gerenciamento DASH (AMD Dash), opera dentro das especificações originais de seu fabricante e suporta tecnologia de virtualização. Pertence à geração mais recente e disponível para o fabricante do equipamento com fábrica no Brasil.
- A Placa Mãe Lenovo é fabricada para uso exclusivo em linha corporativa Lenovo e possui marca e modelo serigrafados em fábrica. Possui chip de segurança TPM dedicado (Trusted Platform Module) na versão 2.0 integrado para criptografia;
- BIOS desenvolvida pela Lenovo, capaz de armazenar o número de série do equipamento além de disponibilizar campo editável que permita inserir identificação customizada, podendo ser consultada por software de gerenciamento, como o número de patrimônio. Possui recursos de controle de permissão através de senhas, uma para inicializar o computador e outra para acesso e alterações das configurações do programa "setup" da BIOS. Possui solução integrada a BIOS UEFI para diagnóstico do hardware além de identificar falhas de pelo menos os seguintes itens: processador, memória, unidades de armazenamento, interface gráfica e slots PCIe. Possui interface gráfica, sendo possível executar o diagnóstico de cada item individualmente, ou teste completo dos componentes em único comando (caso necessário detectar falhas em mais de um item). Os códigos de erro gerados pelas falhas encontradas são suficientes para indicar os problemas do equipamento na abertura do chamado técnico em garantia junto ao fabricante. Permite atualização da BIOS em ambiente Windows x64 e as atualizações da BIOS estão disponibilizadas no site do fabricante do equipamento.
- BIOS desenvolvida de acordo com o padrão de segurança NIST 800-147 ou ISO/IEC 19678:2015.
- O equipamento será configurado com módulo de memória homologado pelo fabricante, sendo idêntico em marca/modelo para todos os computadores do lote.
- O equipamento irá instalado com módulo único de 16GB DDR4 3200MHz. A placa mãe contém no mínimo 2 (dois) slots de memória, sendo um deles livre para possibilitar upgrade.
- Gabinete tipo SFF (Small Form Factor), parafusos recartilhados apenas na tampa do gabinete, projeto tool-less original do fabricante do equipamento, para troca de componentes internos como: unidade de armazenamento, memória e placas PCIe. Acabamento interno composto de superfícies não cortantes. Permite a colocação de dispositivo antifurto do tipo kensington (dispositivo de travamento). Não existe quaisquer adaptações no gabinete destinadas a implementar os sistemas de abertura/fechamento rápido e de segurança. Sistema de ventilação permite o uso na posição horizontal com o monitor em cima do gabinete ou em posição vertical sem prejuízo da ventilação. Possui sensor de intrusão (chassi intrusion switch) que será captado via software de inventário. O

gabinete possui Led de indicação de atividade do Disco Rígido e de indicação de micro ligado. Possui controladora de áudio integrada; possui alto falante interno ao gabinete de no mínimo 1 Watt RMS;

- Fonte de alimentação Lenovo para corrente alternada com tensões de entrada de 100 a 240 VAC (+/-10%), 50-60Hz. Seleção automática de tensão suficiente para suportar todos os dispositivos internos na configuração máxima admitida pelo equipamento (placa principal, interfaces, discos rígidos, memória RAM e demais periféricos), implementa PFC (Power Factor Correction) ativo com eficiência igual ou superior a 85% em 50% de carga máxima (PFC 80+) com no mínimo 180 (cento e oitenta) watts de potência.
- O modelo de fonte fornecido está cadastrado no site www.80plus.com na categoria Bronze, em nome do fabricante do equipamento.
- Controladora de vídeo HD integrada sendo do mesmo fabricante do processador. Suporta a DirectX 12 e OpenGL 4.5, sendo compatível com uso de 2 monitores de vídeo simultaneamente.
- Disco SSD (Solid State Drive), do tipo M.2 PCIe NVMe interno ao gabinete, com capacidade de armazenamento de 256 GB.
- Unidade leitora e gravadora de DVD interno, velocidade de operação 6x mínima, configuração via software.
- Placa de rede integrada padrão Gigabit Ethernet com Leds indicativos da funcionalidade da rede. Suporte a PXE e Wake-On-Lan.
- Será fornecido junto com o equipamento, mouse pad de tamanho retangular (mínimo: 17 cm de altura e 21 cm de comprimento), feito de plástico e borracha aderente. Cor escura, sendo o mesmo para todos os equipamentos do lote.
- URL para Drivers, atualizações, Software, Diagnósticos, Catálogos, Manuais e Guia de Instalação:
- https://psref.lenovo.com/syspool/Sys/PDF/ThinkCentre/ThinkCentre_M75s_Gen_2/ThinkCentre_M75s_Gen_2_Spec.pdf
- <https://pcsupport.lenovo.com/us/en/downloads/ds012808-lenovo-system-update-for-windows-10-7-32-bit-64-bit-desktop-notebook-workstation>
- https://pcsupport.lenovo.com/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/?linkTrack=Homepage%3ABody_Search%20Products&searchType=3&keywordSearch=M75s%20Gen%20%20%28Type%2011R7,%2011R8,%2011R9,%2011RA%29%20Desktop%20%28ThinkCentre%29
- <http://support.lenovo.com/us/en/lenovodiagnosicsolutions>
- URL para acesso ao manual de serviço/manutenção do equipamento, contendo todas as orientações técnicas de como remover e recolocar peças externas e internas do equipamento:
- https://download.lenovo.com/pccbbs/thinkcentre_pdf/m75s_gen2_hmm.pdf
- **ThinkVision T24V-20:**
- LCD IPS Wide 23,8" são projetados e desenvolvidos pela Lenovo em compliance com ROHS. A família T2***** possui nomes de fabrica 61F***** onde * pode ser qualquer caractere alfanumérico ou vazio.
- O monitor multimídia T24v-20 possui compatibilidade e suporte para uso do Windows Hello.
- O monitor possui certificado Energy Star.
- Será fornecido 2 (dois) cabos de vídeo (das portas digitais), compatíveis com o micro ofertado, sendo um HDMI e outro DisplayPort.
- O cabo de energia fornecido será no padrão brasileiro (NBR-14136).
- URL para Drivers, atualizações, Software, Diagnósticos, Catálogos, Manuais e Guia de instalação:
- https://pcsupport.lenovo.com/br/pt/products/monitors-and-projectors/lcd-monitors/thinkvision-t24v-20?linkTrack=Homepage%3ABody_Search%20Products&searchType=3&keywordSearch=ThinkVision%20T24v-20



- **ThinkCentre M80s Gen3:**

- M80s são projetados e desenvolvidos pela Lenovo em compliance com ROHS. A família M8***** nomes de fábrica 11TF***** onde * pode ser qualquer caractere alfanumérico ou vazio.
- Processador Intel Core Core i9-12900 opera dentro das especificações originais de seu fabricante e suporta tecnologia de virtualização. Pertence à geração mais recente e disponível para o fabricante do equipamento com fábrica no Brasil.
- A Placa Mãe é fabricada para uso exclusivo em linha corporativa Lenovo e possui marca e modelo serigrafados em fábrica.
- BIOS desenvolvida pela Lenovo, capaz de armazenar o número de série do equipamento além de disponibilizar campo editável que permita inserir identificação customizada podendo ser consultada por software de gerenciamento, como o número de patrimônio. Possui recursos de controle de permissão através de senhas, uma para inicializar o computador e outra para acesso e alterações das configurações do programa "setup" da BIOS. Possui solução integrada a BIOS UEFI para diagnóstico do hardware além de identificar falhas de pelo menos os seguintes itens: processador, memória, unidades de armazenamento, interface gráfica e slots PCIe. Possui interface gráfica, sendo possível executar o diagnóstico de cada item individualmente, ou teste completo dos componentes em único comando (caso necessário detectar falhas em mais de um item). Os códigos de erro gerados pelas falhas encontradas são suficientes para indicar os problemas do equipamento na abertura do chamado técnico em garantia junto ao fabricante. Permite atualização da BIOS em ambiente Windows x64 e as atualizações da BIOS estão disponibilizadas no site do fabricante do equipamento.
- BIOS desenvolvida de acordo com o padrão de segurança NIST 800-147.
- O equipamento será configurado com módulo de memória homologado pelo fabricante, sendo idêntico em marca/modelo para todos os computadores do lote.
- O equipamento irá instalado com dois módulos de 32GB DDR4 3200MHz em dual Channel, totalizando 64GB. A placa mãe contém no mínimo 4 (quatro) slots de memória, sendo dois deles livres para possibilitar upgrade.
- Gabinete tipo SFF (Small Form Factor), parafusos recartilhados apenas na tampa do gabinete, projeto tool-less original do fabricante do equipamento, para troca de componentes internos como: unidade de armazenamento, memória e placas PCIe. Acabamento interno composto de superfícies não cortantes. Permite a colocação de dispositivo antifurto do tipo kensington (dispositivo de travamento). Não existe quaisquer adaptações no gabinete destinadas a implementar os sistemas de abertura/fechamento rápido e de segurança. Sistema de ventilação permite o uso na posição horizontal com o monitor em cima do gabinete ou em posição vertical sem prejuízo da ventilação.
- Fonte de alimentação para corrente alternada com tensões de entrada de 100 a 240 VAC (+/- 10%), 50-60Hz. Seleção automática de tensão suficiente para suportar todos os dispositivos internos na configuração máxima admitida pelo equipamento (placa principal, interfaces, discos rígidos, memória RAM e demais periféricos), implementa PFC (Power Factor Correction) ativo com eficiência igual ou superior a 92% em 50% de carga máxima (PFC 80+) com no mínimo 310 (trezentos e dez) watts de potência.
- O modelo de fonte fornecido está cadastrado no site www.80plus.com na categoria Platinum, em nome do fabricante do equipamento.
- Disco SSD (Solid State Drive), do tipo M.2 PCIe NVMe interno ao gabinete, com capacidade de armazenamento de 512 GB.
- Unidade leitora e gravadora de DVD interno, velocidade de operação 6x mínima, configuração via software.
- Placa de rede integrada padrão Gigabit Ethernet com Leds indicativos da funcionalidade da rede. Suporte a PXE e Wake-On-Lan.
- Será fornecido junto com o equipamento, mouse pad de tamanho retangular (mínimo: 17 cm de altura e 21 cm de comprimento), feito de plástico e borracha aderente. Cor escura, sendo o mesmo para todos os equipamentos do lote.



- O equipamento é aderente à portaria 170/2012 do INMETRO.
- O equipamento possui atestado a baixo nível de ruído conforme ISO 9296, NBR 10152.
- O equipamento é compatível com o sistema operacional Linux Kernel 4.0 ou superior.

- URL para Drivers, atualizações, Software, Diagnósticos, Catálogos, Manuais e Guia de Instalação:
- https://psref.lenovo.com/syspool/Sys/PDF/ThinkCentre/ThinkCentre_M80s_Gen_3/ThinkCentre_M80s_Gen_3_Spec.pdf
- https://pcsupport.lenovo.com/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m80s-gen-3/?linkTrack=Homepage%3ABody_Search%20Products&searchType=3&keywordSearch=M80s%20Gen%203%20Desktop%20%28ThinkCentre%29
- <https://pcsupport.lenovo.com/us/en/downloads/ds012808-lenovo-system-update-for-windows-10-7-32-bit-64-bit-desktop-notebook-workstation>
- <http://support.lenovo.com/us/en/lenovodiagnosicsolutions>

- URL para acesso ao manual de serviço/manutenção do equipamento, contendo todas as orientações técnicas de como remover e recolocar peças externas e internas do equipamento:
- https://download.lenovo.com/pccbbs/thinkcentre_pdf/m70s_gen3_m80s_gen3_m90s_gen3_hmm.pdf

- **Lenovo E14 Intel Gen 2:**
- A Placa Mãe Lenovo é fabricada para uso exclusivo em linha corporativa Lenovo e possui marca e modelo serigrafados em fábrica. Possui chip de segurança TPM dedicado (Trusted Platform Module) na versão 2.0 integrado para criptografia
- E14 Intel Gen 2 são projetados e desenvolvidos pela Lenovo em compliance com ROHS.
- O equipamento possui atestado a baixo nível de ruído conforme ISO 9296, NBR 10152.
- Processador Intel Cote I7-1165G7, desenhado especificamente para uso em notebooks, pertence à geração mais recente e disponível para o fabricante do equipamento com fábrica no Brasil.
- O equipamento irá instalado com um módulo de 32GB DDR4 3200MHz.
- BIOS desenvolvida pela Lenovo, capaz de armazenar o número de série do equipamento além de disponibilizar campo editável que permita inserir identificação customizada podendo ser consultada por software de gerenciamento, como o número de patrimônio. Possui recursos de controle de permissão através de senhas, uma para inicializar o computador e outra para acesso e alterações das configurações do programa "setup" da BIOS. Possui solução integrada a BIOS UEFI para diagnóstico do hardware além de identificar falhas de pelo menos os seguintes itens: processador, memória, unidades de armazenamento, interface gráfica e slots PCIe. Possui interface gráfica, sendo possível executar o diagnóstico de cada item individualmente, ou teste completo dos componentes em único comando (caso necessário detectar falhas em mais de um item). Os códigos de erro gerados pelas falhas encontradas são suficientes para indicar os problemas do equipamento na abertura do chamado técnico em garantia junto ao fabricante. Permite atualização da BIOS em ambiente Windows x64 e as atualizações da BIOS estão disponibilizadas no site do fabricante do equipamento.
- BIOS desenvolvida de acordo com o padrão de segurança NIST 800-147.
- Disco SSD (Solid State Drive), do tipo M.2 PCIe NVMe interno ao gabinete, com capacidade de armazenamento de 512 GB.
- Placa de Rede Gigabit Ethernet, possui conector padrão RJ-45, integrada ao gabinete.
- Possui tela de 14 (quatorze) polegadas, com tecnologia IPS, UWVA ou WVVA, antirreflexo; Resolução Full HD (FHD 1920 x 1080); Luminosidade de 250 nits; Taxa de contraste nativo mínimo de 500:1; Gama de cores de 45% NTSC; Processador gráfico (GPU) integrado ao processador na versão mais recente e com o melhor desempenho disponibilizado pelo fabricante; Controladora gráfica com suporte para uso de monitor estendido (auxiliar); Suporte a DirectX 12 e OpenGL 4.5;



- Interface de comunicação wireless implementa o padrão 802.11ax, dual band.
- Fonte de Alimentação, acompanhada de adaptador externo para corrente alternada, compatível com tensões de entrada de 100 a 240 V (50 a 60 Hz), com ajuste automático. Cabo de alimentação no novo padrão utilizado no Brasil, especificado pela NBR 14136.
- A bateria é interna, lacrada no gabinete do fabricante e inacessível pelo usuário.
- Teclado integrado ao gabinete, com o padrão ABNT-2 (português Brasil), resistente ao derramamento de líquidos, com teclas impressas a laser ou tecnologia equivalente, resistentes à abrasão e uso contínuo. Possui dispositivo apontador integrado tipo "touchpad" no gabinete, com dois botões integrados e uma área para a função "scroll" (botão de rolagem), através da função multi-touch.
- O notebook oferece leitor de digitais (fingerprint reader) para garantir maior segurança de acesso;
- Será fornecido mouse ótico USB de tamanho padrão, mouse pad e mochila de transporte específica para o modelo, com cor predominante preta. Os mouses e mochilas de transporte são do mesmo fabricante do notebook ofertado.
- Será fornecido junto com o equipamento, mouse pad de tamanho retangular (mínimo: 17 cm de altura e 21 cm de comprimento), feito de plástico e borracha aderente. Cor escura, sendo o mesmo para todos os equipamentos do lote.
- URL para Drivers, atualizações, Software, Diagnósticos, Catálogos, Manuais e Guia de Instalação:
- https://pcsupport.lenovo.com/br/pt/products/laptops-and-netbooks/thinkpad-edge-laptops/thinkpad-e14-gen-2-type-20t6-20t7/?linkTrack=Homepage%3ABody_Search%20Products&searchType=3&keyWordSearch=E14%20Gen%20%20%28type%20T6,%20T7%29%20Laptop%20%28ThinkPad%29
- <https://pcsupport.lenovo.com/us/en/downloads/ds012808-lenovo-system-update-for-windows-10-7-32-bit-64-bit-desktop-notebook-workstation>
- <http://support.lenovo.com/us/en/lenovodiagnosicsolutions>
- https://psref.lenovo.com/syspool/Sys/PDF/ThinkPad/ThinkPad_E14_Gen_2_Intel/ThinkPad_E14_Gen_2_Intel_Spec.pdf
- https://download.lenovo.com/pccbbs/mobiles_pdf/e14_gen2_e15_gen2_hmm_en.pdf

Informamos ainda que a Lenovo Tecnologia (Brasil) Limitada é responsável pelo atendimento "on site" em garantia dos equipamentos conforme o Termo de Garantia Padrão Lenovo.

A Lenovo dispõe de telefone gratuito 0800-773-6437 Premier Support para abertura de chamados técnicos em Língua Portuguesa e service desk. Declara ainda que os drivers, atualizações e suporte dos produtos Lenovo estão disponíveis para download no site: http://support.lenovo.com/pt_BR/.

Os serviços de assistência técnica aos produtos Lenovo acima relacionados serão prestados por:

Sede Técnica BELO HORIZONTE
Via Expressa de Contagem , 3115 Galpão 4 - Módulo D - Contagem - MG
Responsavel Técnico: GUSTAVO CAIXETA
Telefone: 31 99897 3254
Email: gcaixepx@br.ibm.com



A presente declaração foi emitida em atendimento ao **MINISTÉRIO PÚBLICO DO ESTADO DE MINAS GERAIS/MPMG - EDITAL/PREGÃO: 142/2022**

Atenciosamente,

LENOVO TECNOLOGIA (BRASIL) LIMITADA.
Valter Artea – Gerente de Vendas Sênior

LENOVO TECNOLOGIA (BRASIL) LIMITADA
Cristiano Ledo – Gerente de Vendas

Drivers e Software



PC Support (/br/pt) > desktops-and-all-in-ones > thinkcentre-m-series-desktops > M75s Gen 2 (Type 11R7, 11R8, 11R9, 11RA) Desktop (ThinkCentre) (/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne)



M75s Gen 2 (Type 11R7, 11R8, 11R9, 11RA) Desktop (ThinkCentre)

Insira o número de produto (https://support.lenovo.com/br/pt/solutions/HT510152)

Detecte o produto Alterar o produto

Página Inicial do Produto (/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne)

Drivers e Software (/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/downloads)

Solucionar problemas e diagnosticar (/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/diagnostics-troubleshooting)

Como fazer (/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/documentation)

Guias & Manuais (/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/document-userguide)

Drivers e Software

Search bar: Digite um nome de driver ou palavra-chave

Atualização manual (/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/downloads/driver-list)

Atualização Automática de Drivers (/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/downloads/automatic-driver-update)

Solicitar mídia de recuperação (/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/downloads/order-recovery-media)

Search bar: Digite um nome de driver ou palavra-chave

Filtros: Sistemas operacionais, Componentes, Severidade, Data de lançamento

Encontrados 26 resultados: Windows 10 (64-bit) x | Limpar todos os filtros

Que componente você está procurando?

Exibir resultados como: Título Lista

- BIOS (1 Downloads), Bluetooth e Modem (3 Downloads), Chipset (1 Downloads), Câmera e Leitor de Cartão (2 Downloads), Diagnóstico (2 Downloads), Network: LAN(Ethernet) (1 Downloads), Network: Wireless LAN (4 Downloads), RAID/SAS HBA Controllers, Backplanes, Storage Expanders/Switches, Bootable Storage (2 Downloads), Tecnologia ThinkVantage (1 Downloads), Tela e Gráficos (2 Downloads), Áudio (1 Downloads), Softwares e utilitários (4 Downloads), gerenciamento empresarial (2 Downloads)

Feedback


Fontes adicionais


Saiba mais sobre problemas relacionados ao driver.


Tópicos populares: Drivers, Atualização de drivers (https://support.lenovo.com/br/pt/solutions/HT504759)


Melhores Soluções


- 1. Selecione a linha de produtos para encontrar o número de série do modelo (/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/solutions/HT505229-FIND-MY-PRODUCT-OR-SERIAL-NUMBER)


 **Garantia e serviços**
 (/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/warranty)

 **Status de Reparo** (/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/repair)

 **Peças** (/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/parts)

 **Acessórios** (/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/accessory)

 **Fale Conosco** (/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/contactus)

 **Mais suporte** (/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/more)

Sobre a Lenovo

Nossa Empresa (https://www.lenovo.com/br/pt/lenovo/?linkTrack=footer>About%20Lenovo_Our%20Company)
 Notícias (https://www3.lenovo.com/br/pt/noticias?linkTrack=footer>About%20Lenovo_News)
 INVESTIDORES (https://static.lenovo.com/ww/lenovo/investor_relations.html?linkTrack=footer>About%20Lenovo_Investor%20Relations)
 Responsabilidade Social (https://www3.lenovo.com/us/en/social_responsibility/product/?linkTrack=footer>About%20Lenovo_Social%20Responsibility)
 Product Compliance (https://www.lenovo.com/us/en/lenovo/compliance?linkTrack=footer>About%20Lenovo_Product%20Compliance)
 Código aberto Lenovo (/br/pt/solutions/HT511330)
 Informações Legais (https://www.lenovo.com/br/pt/legal/?linkTrack=footer>About%20Lenovo_Legal%20Information)
 OPORTUNIDADES (<https://jobs.lenovo.com/>)

Loja

Notebooks e Ultrabooks (<https://shop.lenovo.com/br/pt/laptops/>)
 Tablets (<https://shop.lenovo.com/br/pt/tablets/>)
 Workstations (<https://www.lenovo.com/br/pt/desktops-y-all-in-one/c/DESKTOPS>)
 Servidores (<https://www.lenovo.com/us/en/data-center/servers/>)
 Acessórios e Atualizações (<https://shop.lenovo.com/br/pt/acessorios/?IPromoID=LEN130115>)
 Ofertas de laptop (<https://shop.lenovo.com/br/pt/ofertas/>)
 services and repairs (https://shop.lenovo.com/br/pt/servicos_e_garantia/?IPromoID=LEN930148)

Suporte

Drivers e Software (/br/pt/selectproduct?linkto=downloads&linkTrack=footer:Support_Downloads)
 Como fazer (/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/documentation?linkTrack=footer:Support_Manuals)
 Como fazer (/br/pt/selectproduct?linkto=documentation&linkTrack=footer:Support_Solutions)
 Pesquisa de garantia (/br/pt/warrantylookup?linkTrack=footer:Support_Warranty_Lookup)
 Fale Conosco (/br/pt/contactus)
 Suporte para Armazenamento (<https://download.lenovo.com/lenovoemc/la/pt>)

- Apesar de instalado, não foi possível encontrar o driver de áudio - ThinkCentre M720s, M720t (/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/solutions/HT510392-AUDIO-DEVICE-MISSING-OR-CANNOT-FIND-AUDIO-DEVICE-THINKCENTRE-M720S-M720T)
 - Popular Topics: Sound, Audio, Dolby (/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/solutions/HT504841-POPULAR-TOPICS-SOUND-AUDIO-DOLBY)
 - Lenovo System Update: atualização de drivers, BIOS e aplicativos (/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/solutions/HT003029-LENOVO-SYSTEM-UPDATE-UPDATE-DRIVERS-BIOS-AND-APPLICATIONS)
 - Como ligar ou desligar o WiFi sem fio - Windows 7, 8, 8.1 e 10 (/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/solutions/HT500407-HOW-TO-TURN-WIRELESS-WIFI-ONOFF-WINDOWS-7-8-81-10)
- ver tudo >

Recursos

Fale Conosco (<https://shop.lenovo.com/br/pt/contato/>)

Onde Comprar (<https://shop.lenovo.com/br/pt/revendedores/>)

Blogs (https://news.lenovo.com/blog/?linkTrack=footer:Resources_Blogs)

Especificações do produto (PSREF) (<https://psref.lenovo.com/>)

Registro do produto (<https://support.lenovo.com/productregistration>)

Fóruns (<https://forums.lenovo.com/>)


Acessibilidade do Produto (https://www.lenovo.com/social_responsibility/us/en/accessibility_notebooks/)

Informação ambiental (https://www.lenovo.com/social_responsibility/br/pt/)

 ([//www.facebook.com/lenovo](https://www.facebook.com/lenovo))  ([//twitter.com/lenovo](https://twitter.com/lenovo))

 ([//www.youtube.com/lenovovision](https://www.youtube.com/lenovovision))

 ([//pinterest.com/lenovous/](https://pinterest.com/lenovous/))

 Nosso compromisso
com o meio ambiente
([https://www.lenovo.com
/us/en/about#social-
responsibility](https://www.lenovo.com/us/en/about#social-responsibility))

Veja o nosso Relatório Global de
Sustentabilidade.

([https://www3.lenovo.com
/us/en/social_responsibility
/sustainability_reports/](https://www3.lenovo.com/us/en/social_responsibility/sustainability_reports/))

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/browsercompatibility](/solutions/browsercompatibility))



Lenovo - T24v-20 : D20238FT0

Specifications

ENERGY STAR Unique ID:	2354740
Brand Name:	Lenovo
Model Name:	T24v-20
Model Number:	D20238FT0
Product Type:	Monitor
Panel Type:	IPS LCD
Screen Size (inches):	23.8
Screen Area (square inches):	242.18
Native Resolution (pixels):	1080 x 1920
Maximum Luminance (candelas per square meter):	250.0
Total Native Resolution (megapixels):	2.1
Model Features:	None
Signal or Data Interfaces:	VGA,Display,HDMI,USB
Power Source:	Ac to dc internal power supply
Monitor Total Energy Consumption at 115 Volts (kWh/yr):	35.68
On Mode Power (watts):	11.36
Markets:	United States, Switzerland, Taiwan, Japan, Canada
Sleep Mode Power (watts):	0.15
Off Mode Power (watts):	0.09
Tiled Display System:	No
ENERGY STAR Certified:	Yes
ENERGY STAR Most Efficient:	No

Additional Model Information

UPC Codes



Lenovo (Singapore) Pte. Ltd.
151 Lorong Chuan,
#02-01, New Tech Park,
Singapore, 556741
(Tel - 65-6827-1000 & Fax- 65-6827-1100)

EU Declaration of Conformity

For the << T24v-20, D20238FT*>>

Machine Types: <<61FC-****-** >>

(the * in the model name can be 0 to 9, A to Z, a to z or blank for marketing use only)

We, Lenovo (Singapore) Pte Ltd., declare under sole responsibility that the above products, manufactured for:

Lenovo PC HK Limited.
23/F, Lincoln House, Taikoo Place 979 King's Road,
Quarry Bay, Hong Kong

- **Council Directive 2014/35/EU-relating to the making available on the market of electronic equipment designed for use within certain voltage limits.**
- **Council Directive 2014/30/EU relating to electromagnetic compatibility.**
- **Council Directive 2009/125/EC and EC 1275/2008 (Class B) establishing a framework for the setting of Ecodesign requirements for Energy-related products.**
- **Council Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment as amended by Directive 2015/863/EU.**

Conformity with these Directives has been assessed for this product by demonstrating compliance to the following harmonized standards and/or regulations:

AS/NZS CISPR32:2013 (class B)
AS/NZS CISPR32:2015 (class B),
EN 55032:2012+AC:2013 (class B),
EN 55032:2015+AC:2016 (class B),
EN 55024:2010+A1:2015,
IEC 61000-4-2:2008,
IEC 61000-4-3:2010, IEC 61000-4-4:2012, IEC 61000-4-5:2014+A1:2017, IEC 61000-4-6:2013,
IEC 61000-4-8:2009, IEC 61000-4-11:2004+A1:2017, EN 61000-3-2:2014, EN 61000-3-3:2013
EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013,
EN 62368-1:2014
IEC 62301:2011
EN 50564 : 2011
EC 642/2009, EC 1062/2010 Energy related Products (ErP)
EN 50581:2012

Signed:  Date: 1/19/2020
Joseph Chua (Executive Director)

Place of issue: Lenovo (Singapore) Pte. Ltd.

European Contact for regulatory topics only:
Lenovo (Slovakia), Landererova 12, 811 09 Bratislava, Slovakia
Tel: +421 2 6868 3018



Garantia



Proteção



Serviços de fábrica



Serviços gerenciados



Recuperação de Ativos e Descarte



Lenovo

LENOVO™ MANTENHA SEU DRIVE

QUANDO A SEGURANÇA DE DADOS É IMPORTANTE PARA VOCÊ

Mantenha seu drive sob sua custódia, melhorando a segurança e aliviando potencialmente os riscos de responsabilidade civil. O serviço Mantenha seu drive (Keep Your Drive-KYD) da Lenovo permite que você retenha o seu HD nos casos de troca por qualquer tipo de falha¹.

CONFORMIDADE REGULATÓRIA E PROTEÇÃO

Ajuda a sua organização a evitar as repercussões legais e monetárias associadas a uma violação na segurança de dados.

OS DADOS PERMANECEM SEGUROS

Elimina a necessidade de rastrear drives com falha em trânsito, dando à equipe de TI o tempo necessário para se concentrar em atividades de negócios de missão crítica.

- Disponível para produtos Lenovo™ ThinkPad®, ThinkCentre® e ThinkStation®.
- KYD deve ser comprado no momento da aquisição do sistema.
- A cobertura continua pela duração da garantia limitada de um sistema, mesmo que o disco rígido tenha sido substituído.
- O KYD abrange vários drives em um sistema e múltiplas falhas.
- As unidades de estado sólido (SSD) e os discos rígidos são cobertos pelo KYD. Alguns modelos também exigem uma atualização para serviço no local (on-site) quando o SSD é soldado à placa do sistema.

Lenovo Services

A Lenovo™ oferece um portfólio abrangente de serviços que suportam todo o ciclo de vida do seu PC. Para obter mais informações sobre o "KYD - Mantenha seu Drive" ou qualquer uma de nossas ofertas de serviços, ligue para um representante de vendas Lenovo™ ou visite: www.lenovo.com/services 0800-536-6861

1) De acordo com os termos da Garantia Limitada Lenovo, quando a Lenovo substitui uma peça com defeito, essa parte se torna propriedade da Lenovo. Todos os produtos e ofertas estão sujeitos a disponibilidade. A Lenovo se reserva o direito de alterar ofertas e especificações de produtos a qualquer momento, sem aviso prévio. A Lenovo faz todos os esforços para garantir a precisão de todas as informações, mas não é responsável por nenhum erro editorial, fotográfico ou tipográfico. Todas as imagens são apenas para fins ilustrativos. Para obter informações completas sobre produtos, serviços e garantia da Lenovo, visite www.lenovo.com. As seguintes são marcas comerciais ou marcas registradas da Lenovo: Lenovo, o logotipo da Lenovo, For those who do, ThinkPad. Outros nomes de empresas, produtos e serviços podem ser marcas registradas ou marcas de serviço de terceiros.

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Product Noise Declaration in Compliance with ISO 7779 and ISO 9296

ThinkCentre M75s Gen 2 Series

I .Configuration Information¹

Components	Typical Configuration1
FFs	SFF 8.2L
CPU	AMD Ryzen 7 5700G 3.8GHz/8C/16M 65W
Memory	16G DDR4 3200 UDIMM
HDD	3.5" 1TB 7200RPM SATA HDD
VGA	Onboard graphic
PSU	HK360-71PP 260w 85% psu
FSC Mode	BP mode

Components	Typical Configuration2
FFs	SFF 8.2L
CPU	AMD Ryzen 7 5700G 3.8GHz/8C/16M 65W
Memory	16G DDR4 3200 UDIMM
HDD	M.2 SSD_2280 512G NVMe
VGA	Onboard graphic
PSU	HK360-71PP 260w 85% psu
FSC Mode	BP mode



II.Machine Types

MT	11R7;11R8;11R9;11RA
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III.Acoustic Noise Emissions Declaration²

Typical config1_HDD			
Stress Mode	L _{WAd} (bels)	L _{PAm} (dBA)	
		Operator	Bystander
Idle	3.2	23	21
Disk Operating	3.6	25	24

Typical config2_M.2 SSD			
Stress Mode	L _{WAd} (bels)	L _{PAm} (dBA)	
		Operator	Bystander
Idle	2.5	17	16
Disk Operating	2.9	19	18

Test Photos		
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Legend:

- L_{WAd} -Declared (upper limit) A-weighted sound power levels for a random sample of machines, in bels.
- L_{pAm} -Measured A-weighted sound pressure levels for a random sample of machines, in dBA
- Operator -Mean value of A-weighted sound pressure levels at the operator position, for a random sample of machines, in dBA. The operator position is located 0.5m away from the front of unit.
- Bystander -Mean value of A-weighted SPLs averaged over four bystander positions, for a random sample of machines, in dBA. The bystander position is located 1.0m away from the edge of unit
- Idle -Indicates idle condition (system is powered on, but no disk activity).
- Disk Operating -Indicates HDD or M.2 SSD operating condition (disk drive is randomly seeking).

Notes:

1. All test are performed according to ISO 7779 and declared according to ISO 9296.
2. The declared acoustic noise value is based on a typically configured product. If optional items be added or removed, the acoustic noise value should be changed correspondingly.

Approved by: Sophia Liu

Signed by: Changyan1

Issued Date: 2021/5/12

IV.Appendix: CNAS 17025 certificate



**China National Accreditation Service for Conformity Assessment
LABORATORY ACCREDITATION CERTIFICATE
(Registration No. CNAS L2356)**

Lenovo (Beijing) Co., Ltd. Reliability Laboratory

No.6, Chuangye Road, Shangdi, Haidian District, Beijing, China

is accredited in accordance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories(CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence to undertake the service described in the schedule attached to this certificate.

The scope of accreditation is detailed in the attached schedule bearing the same registration number as above. The schedule form an integral part of this certificate.

Date of Issue: 2016-11-30

Date of Expiry: 2023-01-18

Date of Initial Accreditation: 2005-11-30

Signed on behalf of China National Accreditation Service for Conformity Assessment

China National Accreditation Service for Conformity Assessment(CNAS) is authorized by Certification and Accreditation Administration of the People's Republic of China (CNCA) to operate the national accreditation schemes for conformity assessment. CNAS is a signatory of the International Laboratory Accreditation Cooperation Mutual Recognition Arrangement (ILAC MRA) and the Asia Pacific Laboratory Accreditation Cooperation Mutual Recognition Arrangement (APLAC MRA). The validity of the certificate can be checked on CNAS website at <http://www.cnas.org.cn/english/findanaccreditedbody/index.shtml>

LENOVO DIAGNOSTICS V4.40.2 **USER GUIDE**

LSBD - Laboratório de Sistemas e Banco de Dados

LENOVO DIAGNOSTICS **USER GUIDE**

Title: Lenovo Diagnostics User Guide
Author: Júlio Oliveira
E-mail: julio.oliveira@lsbd.ufc.br
Date: August 05th, 2021
Platform: Windows

REVISION HISTORY

Revision	Author	Revision History	Date
1.0	Elsa Martins	Created according to Lenovo Diagnostics 4.29	Mar 15, 2019
1.1	Elsa Martins	Updated according to Lenovo Diagnostics 4.30	May 23, 2019
1.2	Helano Rocha	Updated according to Lenovo Diagnostics 4.31	Jul 30, 2019
1.3	Helano Rocha	Updated according to Lenovo Diagnostics 4.32	Oct 15, 2019
1.4	Helano Rocha	Updated according to Lenovo Diagnostics 4.33	Jan 17, 2020
1.5	Geisiane Almeida	Updated according to Lenovo Diagnostics 4.34	Feb 20, 2020
1.6	Júlio Oliveira	Updated according to Lenovo Diagnostics 4.35	Apr 29, 2020
1.7	Geisiane Almeida	Updated according to Lenovo Diagnostics 4.35.1	Jun 08, 2020
1.8	Geisiane Almeida	Updated according to Lenovo Diagnostics 4.36	Jun 29, 2020
1.9	Geisiane Almeida	Updated according to Lenovo Diagnostics 4.37	Oct 20, 2020
1.10	Geisiane Almeida	Updated according to Lenovo Diagnostics 4.38	Dec 14, 2020
1.11	Júlio Oliveira	Updated according to Lenovo Diagnostics 4.39	Mar 05, 2021
1.12	Júlio Oliveira	Updated according to Lenovo Diagnostics 4.40	Jun 24, 2021
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LENOVO DIAGNOSTICS V4.40.2 **USER GUIDE**

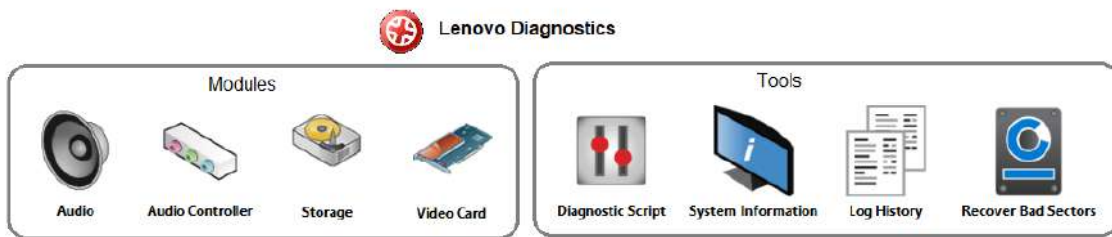
Note

Before using this information, be sure to read and understand the [Lenovo Privacy Statement](#).

1. LENOVO DIAGNOSTICS **OVERVIEW**

1.1 What is Lenovo Diagnostics?

Lenovo Diagnostics is a diagnostic tool that tests various devices in Lenovo computers providing feedback to the users about their machines health. Lenovo Diagnostics is composed by Modules that allows performing diagnostics for a group of devices and by Tools to create custom executions (diagnostic script), see detailed information about each device (system information) and consult the results for the tests performed in a machine (Log History).








1.2 Understanding the diagnostics

Each module contains one or more tests that may be performed under one or more devices resulting in a diagnostic. This structure is displayed in the image below:



When a diagnostic is finished, Lenovo Diagnostics displays the results for each performed test and create two results codes resuming the test execution.

The tests on Lenovo Diagnostics may have the following statuses:

	Passed	When the test algorithm is executed and no failure is found.
	Failed	When the test identifies the diagnosed device is defective.
	Warning	When the test indicates the diagnosed device may have some defect but the result is not conclusive.
	Canceled	When the test is canceled in the middle of test execution.
	Not Applicable	When the test is not applicable for the selected device.

The generated codes are:

Result Code	Contains information about the machine serial number, system platform and test execution status and date. This code is generated for each tested device.
Final Result Code	Contains information about the machine serial number, system platform and execution date. This code reports also the module where the tests were performed and the tests with failed status.


On the next section, you will learn how to use Lenovo Diagnostics to perform the diagnostics.

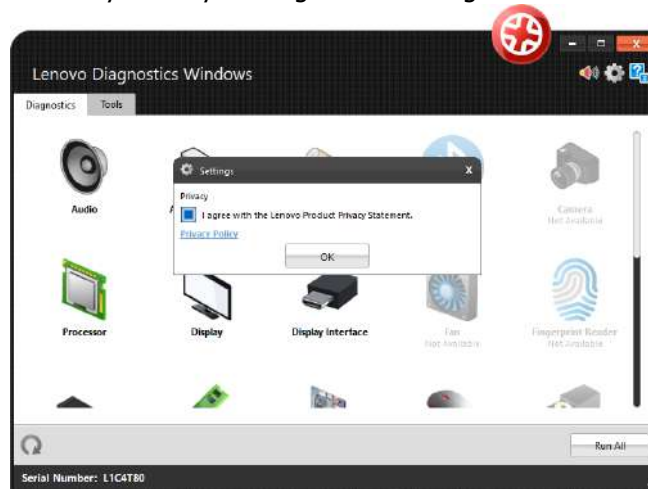
1.3 Data Collection

Lenovo Diagnostics tool perform collect anonymous data regarding tests execution for the purpose of improve hardware's diagnostics. You are able to enable or disable that function in accordance to your preferences.

By opening the Lenovo Diagnostics tool for the first time, the application will display a message asking if you agree or not with Lenovo Product Privacy Statement.



You also may change this option at any time by clicking at the Settings icon 




2. PERFORMING DIAGNOSTICS IN **LENOVO DIAGNOSTICS**


2.1 Lenovo Diagnostics Main screen

By opening the Lenovo Diagnostics, you will see the main screen with the tabs Diagnostics and Tools.

Diagnostics: here, you can see the modules provided by Lenovo Diagnostics and select one of them to perform tests. As you will using the application, the icons will be reordered according to the use. The modules with not supported devices are disabled, like the modules RAID, Sensors and Wireless on the image below. On this tab, you can also select the option "Run All" to perform the diagnostic for all available modules



Refresh button : you may update the modules after plug or unplug any device.

Sound Notice button : you may choose if you want to be advised regarding tests execution.

Tools: By selecting this option, you can access additional Lenovo Diagnostic’s features like Diagnostic Script, System Information, Log History screen, Recover Bad Sectors tool, eGather Report, Powercgl Reports and temperature.

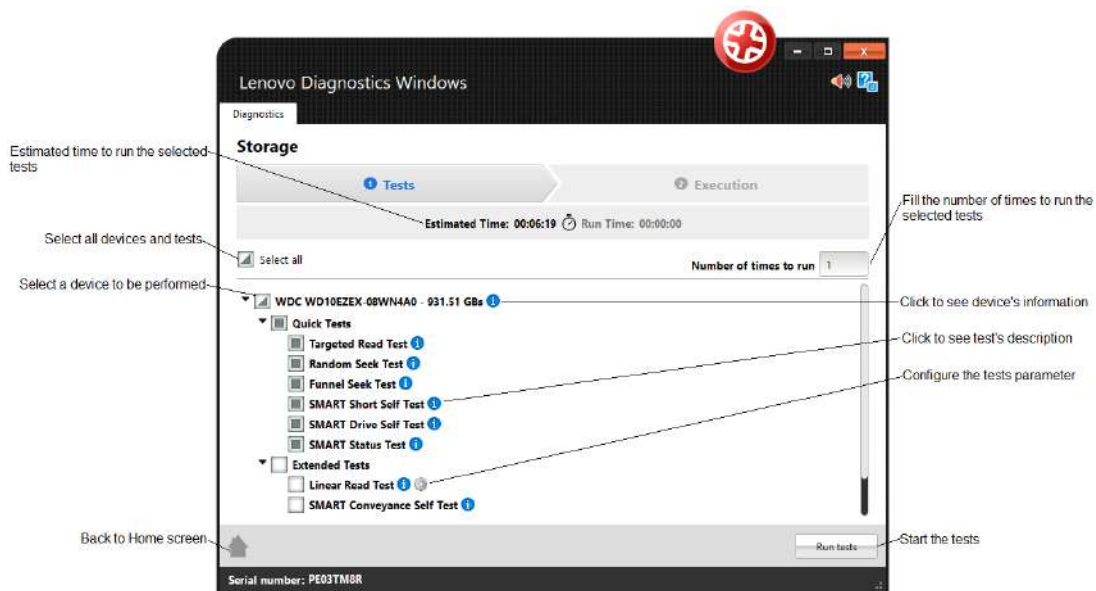


2.2 Run diagnostic for a module

The diagnostic for a module in Lenovo Diagnostics is based on the following steps:

2.2.1 Select Devices and Tests

By selecting a module in the Diagnostics tab, you will be directed to a screen where you can select which devices and tests will be performed. On this step, all devices and tests supported by the selected module are displayed and you may select one or more of them to perform the tests. It is also possible to select the number of times to run the set of tests in a range from 1 to 20 times.




By clicking to **See Device Information**, you can view detailed information about the device. The properties displayed depends on the selected module.



By clicking to **See test description**, you can view a brief description of the test and the estimated time to run the test, as the screen below.



If a test supports parameters customization, the icon  is displayed next to the test name. By clicking on this icon, a popup to set the values is displayed. See in in the image below the customization for the Linear Read Test from Storage module:



After the devices and test selection, you are able to run the diagnostic. The test execution is detailed in the next section.

2.2.2 Run Tests

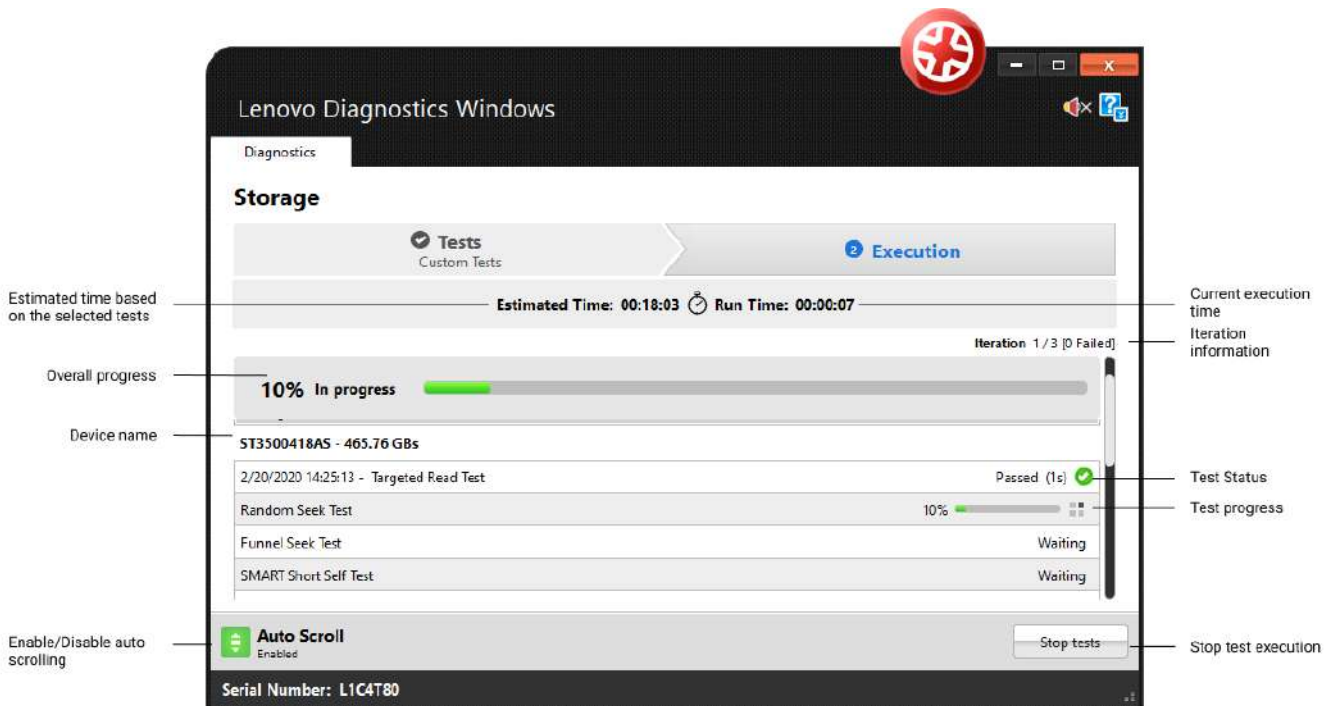
After configure the tests execution and clicking to **Run Test**, you will be directed to the Execution screen. This screen is displayed for both Recommended and Custom tests.

In the image below, you can see a screen of the test execution. See the popup advising you to refrain from using your computer unless requested by some tests. Follow this advisement is important because some tests may not be performed correctly if the needed machine resources are in use.



Once you have pressed OK, the tests execution begins. See in the image below that all devices selected in the previous steps are displayed with their respective tests. You can follow each test execution by tracking the individual test progress and see the test status of each one. In addition, you can see the overall test progress and time that reports the progress for all devices and tests selected.

If you have selected **Custom Tests** with more than one iteration, you will be able to see amount iterations that fail navigate around these iterations in order to see the executions already finished and the executions not started yet.



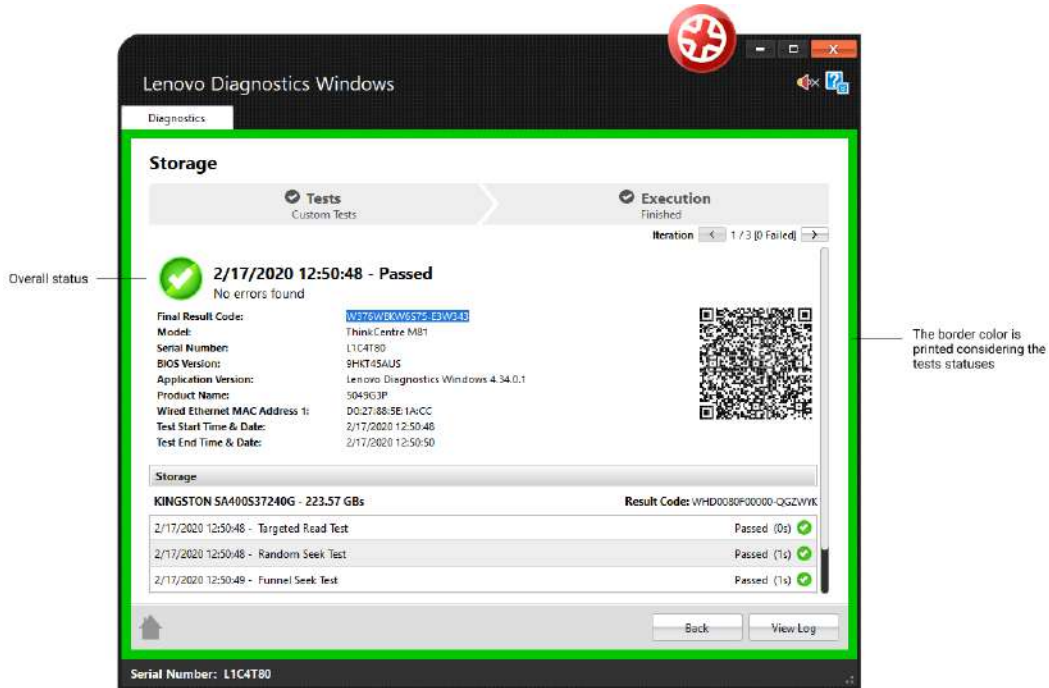
Some tests has specific guidelines that should be followed by the user to assure the correct execution. In this case, before to begin the execution of these tests, the application displays a popup with the test instructions. For instance, the Audio Playback test asks the user to make sure the output device is working correctly and advises a probably loud sound will played.



If you chose to continue by pressing the **OK** button, the execution continues normally. If you clicking on Cancel, the current test is canceled and the execution proceeds to the other tests not executed yet.

If you want abort the whole test execution, you can click on **Stop tests**. In this case, the current test and all tests waiting for execution are canceled, including those from the next iterations. At the same way, the overall status for the current iteration and for all next iterations are changed to Canceled.

After all tests to being finished, system displays the screen below where is possible to analyze the test results.



In this above image, you can see each test results, information about machine, final result code and test date. This section also display a QR Code that containing all those information.

2.3 See Execution Log

After a diagnostic execution, Lenovo Diagnostics generates a log with detailed information about the devices and their test results. This log is composed by the following sections:

General information: contains information about machine, test date and final result. This section also display a QR Code containing those information.



Device information: displays the technical details of each tested device and their respective result codes.

Storage		Result Code: WHDG1V000-GMZWYL
✔ ST3500418AS - 465.76 GBs		
UDI:	Seagate-ST3500418AS-S2A1NC01	
Manufacturer:	Seagate	
Model:	ST3500418AS	
Serial:	S2A1NC01	
Firmware:	CC68	
Size:	465.76 GBs	
Rotation Rate:	7200 RPM	
Cache:	16.00 MBs	
Temperature:	29 °C	
Physical Sector Size:	512	
Logical Sector Size:	512	
Logical Sectors:	91673168	
Supported Standards:	ATA5-ACS, ATA7-ATAPI, ATA6-ATAPI, ATA5-ATAPI, ATA4-ATAPI, ATA5-ACS, ATA7-ATAPI, ATA6-ATAPI, ATA5-ATAPI, ATA4-ATAPI	

Test Results: displays the results and execution time of each performed test.

11/9/2017 13:21:51 - SMART Status Test	Passed (0s) ✔
11/9/2017 13:21:51 - Targeted Read Test	Passed (1s) ✔
11/9/2017 13:21:52 - Random Seek Test	Passed (78s) ✔
11/9/2017 13:23:10 - Funnel Seek Test	Passed (59s) ✔
11/9/2017 13:24:09 - SMART Short Self Test	Passed (61s) ✔
11/9/2017 13:25:10 - SMART Drive Self Test	Passed (162s) ✔
11/9/2017 13:27:52 - SMART Health Test	Passed (0s) ✔
11/9/2017 13:27:52 - Messages: Disk's health: 100%	

3. LENOVO DIAGNOSTICS **MODULES AND TESTS**

This section provides information about all modules available in Lenovo Diagnostics and their respective tests. Here, you will understand the approach implemented by each test and how these tests should be performed for assure the correct diagnostic of your machine.

3.1 Audio

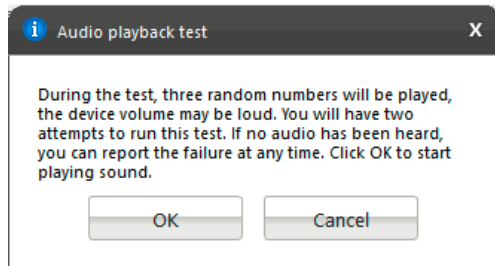


The Audio module is composed by the following tests:

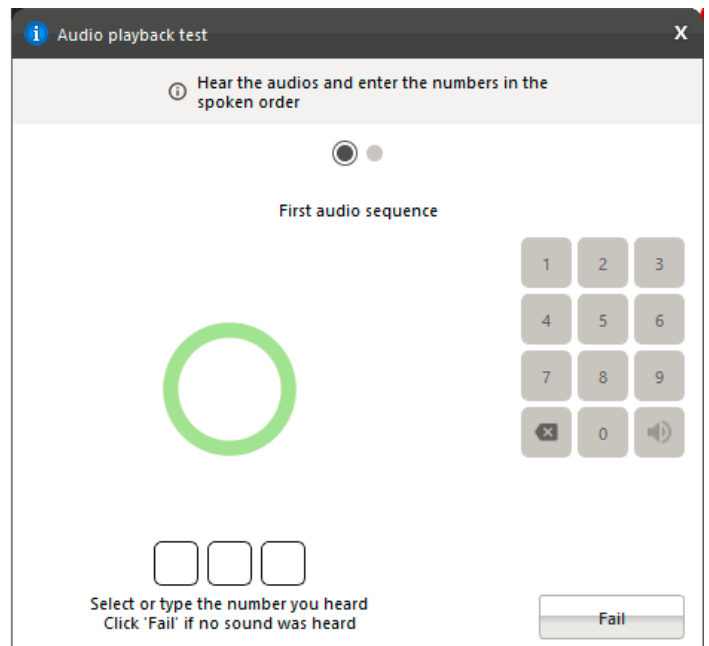
Test	Test type	Attendance
Audio Playback Test	Quick	Attended
Microphone Interactive Test	Quick	Attended

Audio Playback Test

The audio playback test tries to play random numbers through the audio hardware and asks the user in what order the numbers were played.



Advise the user that device volume may be loud during the execution.

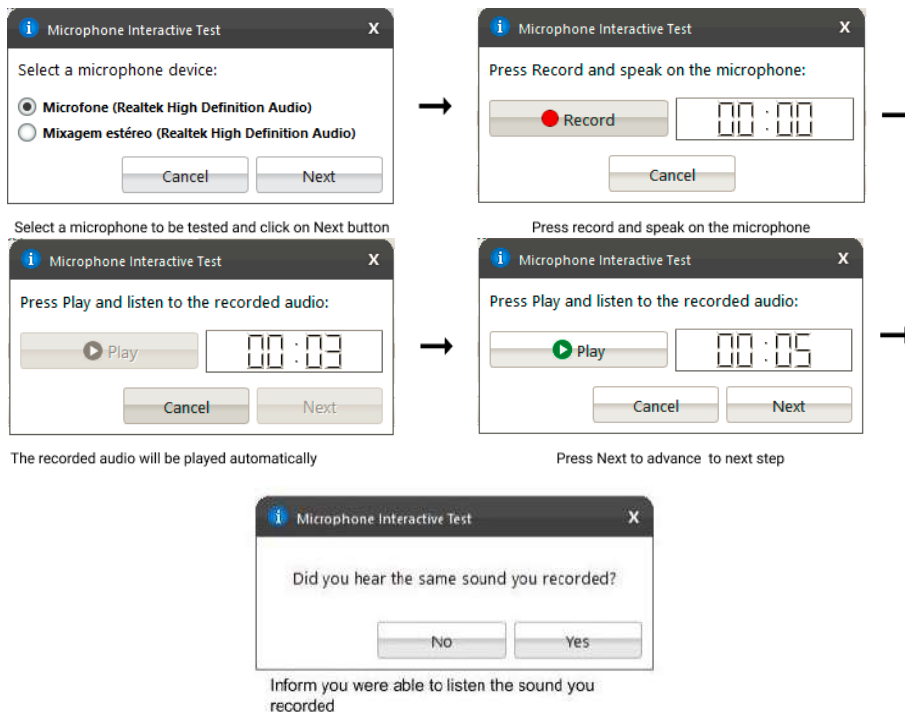


Play three random numbers and ask the user what order the numbers were played.

Microphone Interactive Test

This test helps to identify if the microphone is capable of capturing sound properly.

The microphone interactive test is performed according to the following workflow:



3.2 Audio Controller



The Audio Controller module is composed by the following tests:

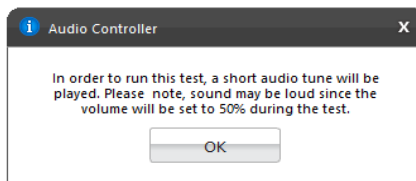
Test	Test type	Attendance
CORB Status Test	Quick	Unattended
Output Stream Test	Quick	Unattended
Input Stream Test	Quick	Unattended
Bidirectional Stream Test	Quick	Unattended

CORB Status Test

This test checks the status of the Command Outbound Ring Buffer (CORB) mechanism.

Output Stream Test

This test checks the status of the output streams. Before starting the test, Lenovo Diagnostics advises the user that a short audio tune will be played as displayed in the image below.



Input Stream Test

This test checks the status of the input streams.

Bidirectional Stream Test

This test checks the status of the bidirectional streams.

3.3 Battery



The Battery module is composed by the following tests:

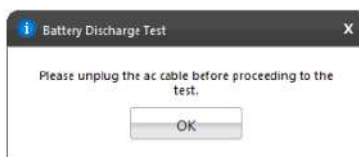
Test	Test type	Attendance
Battery Health Test	Quick	Unattended
Battery Discharge Test	Extended	Attended
Battery Charge Test	Extended	Attended
Battery Temperature Test	Quick	Unattended

Battery Health Test

Battery Health Test checks the device charge capacity and other important battery properties in order to evaluate device's health.

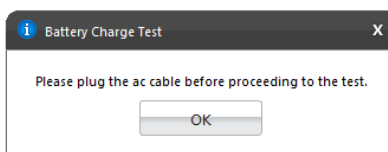
Battery Discharge Test

Battery Discharge Test checks the device charge capacity and other important battery properties in order to evaluate device's health. If there is an AC cable plugged you will must to unplug it before proceeding to the test as displayed below.



Battery Charge Test

The test checks if the battery charge increases while the AC cable is connected. If there is no AC cable plugged you should connect it before proceeding to the test.



Battery Temperature Test

Temperature test evaluates if the battery temperature is too high, which may prevent it from charging properly.

3.4 Camera



The Camera module is composed by the following tests:

Test	Test type	Attendance
Camera Capture Test	Quick	Attended

Camera Capture Test

Verifies if the camera device is working properly based on the user’s feedback for the captures images. This test is performed according to the following workflow:



3.5 Fan



The Fan module is composed by the following test:

Test	Test type	Attendance
Control Test	Quick	Unattended

Control Test

Check if the fan controller is able to work on higher speeds according to predefined levels (0-7) in the firmware.

3.6 Processor



The Processor module is composed by the following tests:

Test	Test type	Attendance
BT Instruction Test	Quick	Unattended
x87 Floating Point Test	Quick	Unattended
MMX Test	Quick	Unattended

3dnow! Test	Quick	Unattended
SSE Family Test	Quick	Unattended
AES Test	Quick	Unattended
Stress Test	Extended	Unattended

BT Instruction Test

The test checks the processor support for BT instruction.

x87 Floating Point Test

The test checks the processor support for x87 Floating Point instructions. If the processor does not support such feature, the test returns unsupported.

MMX Test

The test checks the processor support for MMX instructions. If the processor does not support such feature, the test returns unsupported.

3dnow! Test

The test checks the processor support for 3Dnow! Instructions. This test only runs in AMD processors. If the processor does not support such feature, the test returns unsupported

SSE Test

The test checks the processor support for SSE Family (SSE, SSE2, SSE3, SSSE3, SSE4.1, SSE4.2) instructions. If the processor does not support such feature, the test returns unsupported.

AES Test

The test checks the processor support for AES instructions. If the processor does not support such feature, the test returns unsupported.

Stress Test

The stress test performs a sequence of continuous check on all processor cores for 10 minutes. While running this test, the CPU temperature can increase considerably

3.7 Display

The Display module is composed by the following tests:

Test	Test type	Attendance
Red Purity test	Quick	Attended
Green Purity test	Quick	Attended
Blue Purity test	Quick	Attended
Black Purity test	Quick	Attended
White test	Quick	Attended
Color Transition Test	Quick	Attended

Monochromatic Mesh Test	Quick	Attended
Inverted Monochromatic Mesh Test	Quick	Attended
Sharpness Test	Quick	Attended
Resolution Fitting Test	Quick	Unattended
Display Interactive Test	Quick	Attended

Red Purity test

This test identifies any dead pixel or burn-in problem within the red channel.

Green Purity test

This test identifies any dead pixel or burn-in problem within the green channel.

Blue Purity test

This test identifies any dead pixel or burn-in problem within the blue channel.

Black Purity test

This test identifies any dead pixel or burn-in problem within the black channel.

White Purity test

This test identifies any dead pixel or burn-in problem within the white channel.

Color Transition Test

This test identifies any problem with the display's color distinction.

Monochromatic Mesh Test

This test identifies stuck pixels as they will be highlighted in contrast with the background.

Inverted Monochromatic Mesh Test

This test identifies stuck pixels as they will be highlighted in contrast with the background. In this test black and white pixels are inverted.

Sharpness Test

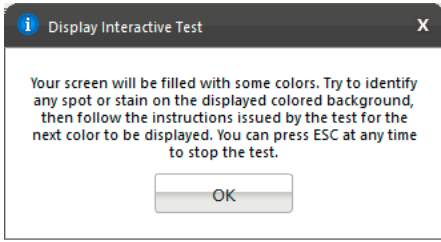
This test identifies sharpness problems.

Resolution Fitting Test

This test checks if the system can take full advantage of the display's native resolution.

Display Interactive Test

The Display Interactive Test is the combination of all purity tests. The purity tests aim to identify dead pixels or burn-in problems in the channels: red, green, blue, black and white.



Advise the user that her screen will be filled with some colors.

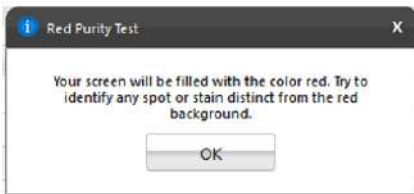


Fill the screen with a color.



Ask the user which number is being displayed.

All Purity tests from Display module are performed according to the following workflow:



Advise the user that her screen will be filled with the color



Fill the screen with the color



Ask the user if the color was properly displayed

3.8 Display Interface



The Display module is composed by the following tests:

Test	Test type	Attendance
EDID Checksum Test	Quick	Unattended
Display Communication Test	Quick	Unattended

EDID Checksum Test

This test checks the integrity of the Extended Display Identification Data (EDID) checksum provided by the monitor.

Display Communication Test

This test checks the communication with the monitor.

3.9 Keyboard



The Keyboard module is composed by the following tests:

Test	Test type	Attendance
PS2 Keyboard Test	Quick	Unattended
USB Keyboard Test	Quick	Unattended
Keycode Verification Test	Quick	Attended
Advanced Test	Quick	Attended

PS2 Keyboard Test

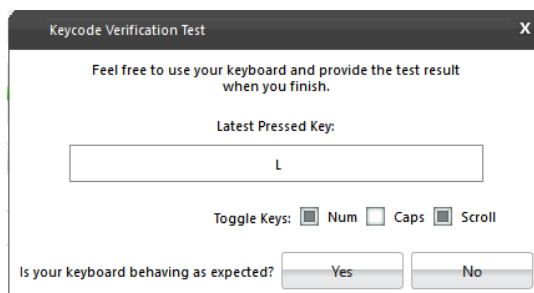
This test tries to identify any defective PS/2 keyboard detected on this machine.

USB Keyboard Test

This test tries to identify any defective USB keyboard detected on this machine.

Keycode Verification Test

Presents the latest pressed key to the user in a legible format and the current state of the toggle keys. If the user confirms the all keys that him have pressed was displayed, the test is finished as Passed. Otherwise the test is finished as Failed.



Advanced Test

Interactive test to verify the status of the keyboard keys. The test will marking the pressed keys until you test all keys. You are able to select the most appropriate keyboard layout.



3.10 Memory



The Memory module is composed by the following tests:

Test	Test type	Attendance
Quick Random Pattern Test	Quick	Unattended
Advanced Integrity Test	Extended	Unattended
Address Test	Extended	Unattended
Bit Low Test	Extended	Unattended
Bit High Test	Extended	Unattended
Walking Ones Left Test	Extended	Unattended
Walking Ones Right Test	Extended	Unattended
Modulo-20 Test	Extended	Unattended
Moving Inversions 8Bit Test	Extended	Unattended
Moving Inversions 32 Bit Test	Extended	Unattended
Random Pattern Test	Extended	Unattended
Random Number Sequence Test	Extended	Unattended
Block Move Test	Extended	Unattended
Nibble Move Test	Extended	Unattended

Quick Random Pattern Test

The test consists of filling the memory with a random generated pattern and then checking that the pattern was correctly written. When checking, it writes the pattern's binary complement and checks again. The test is repeated twice. By default, 15 random patterns are used, therefore, the test runs once for each of these patterns.

Advanced Integrity Test

The test is based on the March C- enhanced algorithm. This test consists of filling the accessible memory with a pattern, checking it, and writing its complement in an 8 bytes block size (64 bits) and then checking it again. This procedure is repeated twice, being the first one addressing the accessible memory from the highest position to the lowest and the second time by doing the inverse path. This test is intended to cover Stuck-At Faults and some Coupling Faults and Transition Faults.

Address Test

This test consists of writing each memory address its own address. After that, the algorithm reads the memory previously written and checks if they still store their own address. This test is intended to cover any addressing fault in the accessible memory range.

Bit Low Test

This test consists of filling the memory buffer with a pattern where all bits are 0 and then checking it. When checking for this pattern, it writes its binary complement, and finally checks if the complement was stored accordingly. Such process is repeated 4 times. This test is intended to identify the most serious Stuck-At Faults, some cases of Transition Faults and some cases of Read Random Faults.

Bit High Test

This test consists of filling the memory buffer with a pattern where all bits are 1 and then checking it. When checking for this pattern, it writes its binary complement, and finally checks if the complement was stored accordingly. Such process is repeated 4 times. This test is intended to identify the most serious Stuck-At Faults, some cases of Transition Faults and some cases of Read Random Faults.

Walking Ones Left Test

The Walking Ones Left Test consists of writing a pattern where only the rightmost bit is set (e.g. 00000001), then shift this pattern to the left (e.g. 00000010) until the end of the size of a byte, writing it again at the same memory address each time such pattern is shifted. Therefore, the test is intended to cover most of the Stuck-At Faults and some cases of Coupling Faults, and also testing the data bus by confirming that every bit can be written.

Walking Ones Right Test

The Walking Ones Right Test consists of writing a pattern where only the leftmost bit is set (e.g. 10000000), then shift this pattern to the right (e.g. 01000000) until the end of the size of a byte, writing it again at the same memory address each time such pattern is shifted. Therefore, such test is intended to cover most of the Stuck-At Faults and some cases of Coupling Faults, and also testing the data bus by confirming that every bit can be written.

Modulo-20 Test

The test consists of writing into an interval of 20 memory locations for each block with a pattern and filling all other locations with its complement 6 times. Unlike the other tests, the Modulo-20 test is not affected by buffering or caching, so it is able to detect most of the Stuck-At Faults, Coupling Faults, Transition Faults and Read Random Faults that are not detected by other testing approaches.

Moving Inversions 8Bit Test

The test consists of filling the memory with the 8 bit wide pattern: 10000000 and then checking that the pattern was correctly written. When checking, it writes the pattern's binary complement (01111111) and checks it again. The procedure described earlier is repeated 8 times, one for each pattern right shifted: 10000000, 01000000, 00100000, 00010000, 00001000, 00000100, 00000010, 00000001.

Moving Inversions 32 Bit Test

This test fills all the accessible memory with a shifting pattern, that is, a value which is binary left shifted as it is written out through the accessible memory of every memory block. Once the pattern reaches 0x80000000 (a value with the left most bit set to 1 only) then the pattern is reset to 0x00000001. After that, it checks the written values and writes their binary complements, starting from the first memory address to the last one. Finally, the algorithm checks the memory for the complements written in the previous step, being this checking starting from the last element down to the first one. Such process is repeated 2 times. This test presents a more thorough approach intended to cover most of the Stuck-At Faults and Transition Faults and some cases of Coupling Faults and Read Random Faults...

Random Pattern Test

The test consists of filling the memory with a random generated pattern and then checking that the pattern was correctly written. When checking, it writes the pattern's binary complement and checks it again. This process is repeated twice. By default, 50 random patterns are used, therefore the test runs once for each of these patterns...

Random Number Sequence Test

The test consists of filling the memory with one different random generated pattern for each memory address and then checking that the pattern was correctly written. In order to check it, the test must generate these numbers based on a seed that may be reset to reproduce the sequence. When checking, it writes the pattern's binary complement and it checks again. Such process is repeated several times. This test is intended to cover most of the Stuck-At Faults, Coupling Faults, and some cases of Transition Faults and Read Random Faults.

Block Move Test

The test consists of moving memory data around within memory blocks. It repeats the movements described above 80 times. Finally, the test checks every memory address to verify if it is consistent.

Nibble Move Test

This test consists of writing to a nibble (a nibble is a group of four bits) a pattern value in each memory address, then it validates every nibble individually. It repeats this process until all nibbles in every address are checked.

3.11 Motherboard

The Motherboard module is composed by the following tests:

Test	Test type	Attendance
Chipset Test	Quick	Unattended
PCI/PCI-e Test	Quick	Unattended
RTC Test	Quick	Unattended
USB Test	Quick	Unattended

Chipset Test

The test checks the status registers of the controllers that form the foundation of the motherboard chipset. These controllers are: EHCI, OHCI, xHCI and SATA.

PCI/PCI-e Test

The PCI/PCI-e Test checks the status registers of the PCI Express onboard devices for unexpected errors or power failure.

RTC Test

The test checks the following RTC (Real Time Clock) properties: accuracy and rollover. The test attempts to guarantee the correct operation of these properties.

USB Test

The test checks the status of USB devices. If any errors are indicated, the test fails.

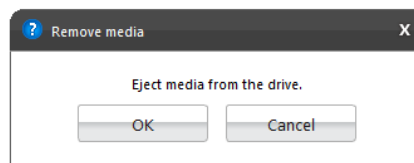
3.12 Optical Drive

The Optical Drive module is composed by the following tests:

Test	Test type	Attendance
Media-Less Optical Self-Test	Quick	Unattended
Linear Seek Test	Quick	Attended
Random Seek Test	Quick	Attended
Funnel Seek Test	Quick	Attended
Read and Compare Test	Quick	Attended
Write Test	Quick	Attended

Media-Less Optical Self-Test

Checks the optical drive's internal components. This test requires that no media is inserted into the drive. Therefore if any media was detected into the drive the application displays the following message:

**Linear Seek Test**

Checks the integrity of the optical drive's mechanism by continuously moving the drive's head all around the media. For execute this test the user must have a media containing at least the following amount of date written on it according to its type: CD (210 MB), DVD (1000 MB), Blu-Ray (4000 MB).

Random Seek Test

Checks the integrity of the optical drive's transmission mechanism by moving the drive's head through random positions on the media. For executing this test the user must have a media containing at least the following amount of date written on it according to its type: CD (210 MB), DVD (1000 MB), Blu-Ray (4000 MB).

Funnel Seek Test

Checks the integrity of the optical drive's mechanism by moving the drive's head in a funnel pattern. For executing this test the user must have a media containing at least the following amount of date written on it according to its type: CD (210 MB), DVD (1000 MB), Blu-Ray (4000 MB).

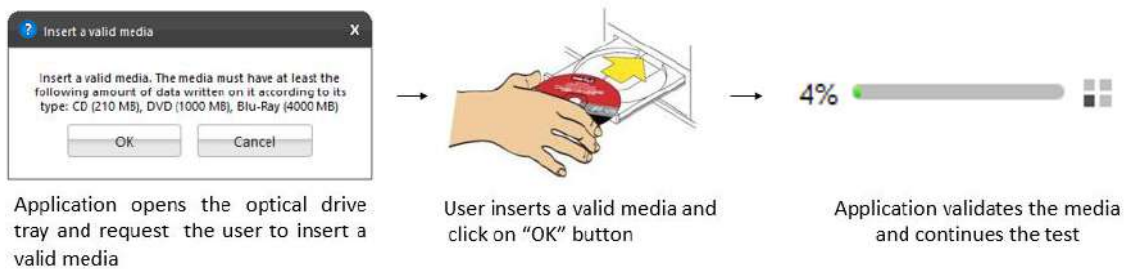
Read and Compare Test

Checks the drive’s ability to make correct read operations. Performs two linear read operations and compares the information obtained from the two reads. For executing this test the user must have a media containing at least the following amount of data written on it according to its type: CD (210 MB), DVD (1000 MB), Blu-Ray (4000 MB).

Write Test

Checks the capability of the drive to write correctly to an optical media. For executing this test you must have a blank media (CD-R, CD-RW, DVD-R, DVD-RW, BD-R, BD-RE).

Linear Seek Test, Random Seek Test, Funnel Seek Test, Read and Compare Test and Write Test are performed according the following workflow:



3.13 PCI Express



The PCI Express module is composed by the following tests:

Test	Test type	Attendance
Status Test	Quick	Attended

Status Test

Verifies that all of the PCI Express devices are recognized and communicating with the system.

3.14 Mouse Devices

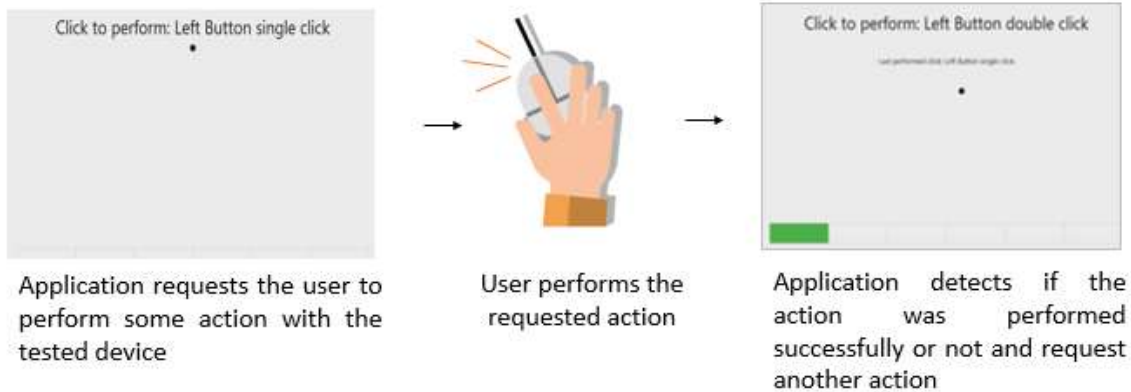


The Mouse Devices module is composed by the following tests:

Test	Test type	Attendance
Click Test	Quick	Attended
Precision Test	Quick	Attended
Press Precision Test	Quick	Attended

Click Test

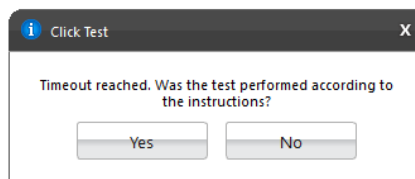
It does a check on the device's buttons, issuing the user to perform some actions regarding them. The Click Test execution is based on the workflow below.



The user must perform one by one, the actions issued by the test. Note that the actions requested depends on the numbers and types of buttons present in your pointing device.

The user has two attempts to execute each requested action. If the requested action was detected by the application, it is considered as passed. Otherwise the action is considered as "Failed". The Click Test is considered as "Passed" if all actions required are passed.

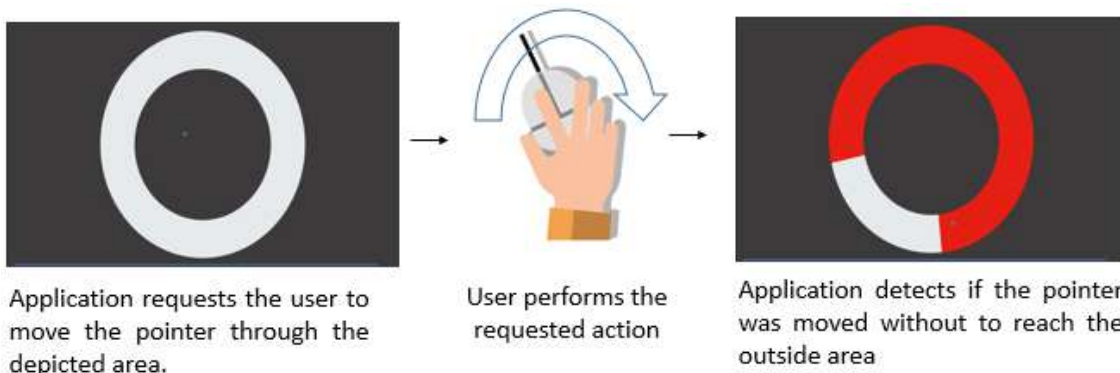
If the user does not perform any action for 30 seconds, the following popup is displayed:



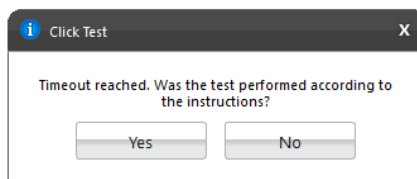
If the user select "Yes", reporting that the test was performed according to the instructions the test will fail. In this case, the application assumes that it was not possible to detect the device, indicating a bad working of it. If the user selects "No", the test is canceled because the actions required were not properly executed.

Precision Test and Press Precision Test

Tests the device movement precision. The Precision Test execution is based on the following workflow:



If the user gets to move the pointer through the entire depicted area without to reach the outside area the test is finished as passed. If the outside area was reached two times the test will fail. If the pointer is not moved for more than 30 seconds the test windows is going to be closed and the following message is displaying to the user:



If the user select "Yes", reporting the test was performed according to the instructions, the test will be finished as "failed". In this case, the application assumes that it was not possible to detect the device movement, indicating a bad working of the device. If the user selects "No", the test is canceled because the required actions were not properly executed.

Note: For executing Press Precision test, you must press any button from mouse and move the pointer.

3.15 RAID



The RAID module is composed by the following tests:

Test	Test type	Attendance
Battery Status Test	Quick	Unattended
Enclosure Status Test	Quick	Unattended
Logical Drive Status Test	Quick	Unattended
RAID Status Test	Quick	Unattended
RAID Controller Status Test	Quick	Unattended
Consistency Check	Extended	Attended

Battery Status Test

Checks the health of the controller's BBU (Battery Backup Unit)

Enclosure Status Test

Checks the status of the enclosures used by a RAID controller

Logical Drive Status Test

Checks the status of each logical drive in the RAID controller

RAID Status Test

Checks the status of each RAID volume in the RAID controller

RAID Controller Status Test

Checks the status of each RAID controller itself.

Consistency Check

Checks the consistency of each controller's logical drive. This test might take a few hours to run depending on how many logical and physical drives are present in the RAID controller.

3.16 Storage



The Storage module is composed by the following tests:

Test	Test type	Attendance
SMART Status Test	Quick	Unattended
Targeted Read Test	Quick	Unattended
Random Seek Test	Quick	Unattended
Funnel Seek Test	Quick	Unattended
SMART Short Self Test	Quick	Unattended
SMART Drive Self Test	Quick	Unattended
Default Self Test	Quick	Unattended
Device Read Test	Quick	Unattended
SMART Wearout Test	Quick	Unattended
NVME Controller Status Test	Quick	Unattended
NVME SMART Temperature Test	Quick	Unattended
NVME SMART Reliability Test	Quick	Unattended
NVME SMART Spare Space Test	Quick	Unattended
Extended Random Seek Test	Extended	Unattended
Extended Funnel Seek Test	Extended	Unattended
Extended Self Test	Extended	Unattended
Device Write Test	Extended	Unattended
Linear Read Test	Extended	Unattended
SMART Conveyance Test	Extended	Unattended
Full Disk Scan Test	Extended	Unattended

SMART Status Test

Checks the status reported by SMART to quickly identify whether a device is defective or not.

Targeted Read Test

Checks the sectors in the neighborhood of bad sectors reported in the SMART logs.

Random Seek Test

Checks the integrity of the servo mechanism of a device by checking sectors at several randomly chosen addresses.

Funnel Seek Test

Checks the integrity of the servo mechanism of a device by checking sectors following a "funnel" or "butterfly" pattern.

SMART Short Self Test

Checks electrical and mechanical component status as well as the reading ability of the device.

SMART Drive Self Test

Proprietary Lenovo Drive Self-Test (DST) that mixes sequential and random reads to the disk.

Default Self Test

Vendor specific test that runs a quick check.

Device Read Test

Tests if it is possible to correctly read sectors in different areas of the storage device.

SMART Wearout Test

SMART Wearout Test checks the wearout level of the attached SSD device by reading SMART attributes and informs whether the device is in good condition or has reached its wearout limit.

NVME Controller Status Test

This test detects if the device behaves as expected.

NVME SMART Temperature Test

This test detects if the current temperature for the device is in critical state.

NVME SMART Reliability Test

This test detects if the device is still reliable based on SMART metrics.

NVME SMART Spare Space Test

This test detects if the spare space in the device is critically low.

Extended Random Seek Test

Works similar to quick random test, but the number of checked sectors is larger and it does not stop when the first bad sector is found.

Extended Funnel Seek Test

Works similar to quick funnel test, but the number of checked sectors is larger and it does not stop when the first bad sector is found.

Extended Self-Test

Works similar to a quick short self-test, but checks more sectors.

Device Write Test

The Storage Device Write Test will verify if it is possible to write data on different areas of the device and then read the data correctly."

Linear Read Test

Checks the integrity of the storage device by reading its sectors following a linear pattern.

SMART Conveyance Test

Checks the device's integrity through the status returned by SMART Conveyance test.

Full Disk Scan Test

This test performs a full verification of the disk.

All devices and their supported tests are listed below:

TEST	DEVICE
SMART STATUS TEST	HDD SATA, SAS AND SSD SATA
TARGETED READ TEST	HDD SATA, SAS AND SSD SATA
RANDOM SEEK TEST	HDD SATA, SAS AND SSD SATA
FUNNEL SEEK TEST	HDD SATA, SAS AND SSD SATA
SMART SHORT SELF TEST	HDD SATA, SAS AND SSD SATA
SMART DRIVE SELF TEST	HDD SATA
DEFAULT SELF TEST	SAS
DEVICE READ TEST	SSD EMMC, SSD NVME AND OPTANE
SMART WEAROUT TEST	SSD SATA, SSD NVME AND OPTANE
NVME CONTROLLER STATUS TEST	SSD NVME AND OPTANE
NVME SMART TEMPERATURE TEST	SSD NVME AND OPTANE
NVME SMART RELIABILITY TEST	SSD NVME AND OPTANE
NVME SMART SPARE SPACE TEST	SSD NVME AND OPTANE
EXTENDED RANDOM SEEK TEST	SAS
EXTENDED FUNNEL SEEK TEST	SAS
EXTENDED SELF-TEST	SAS
DEVICE WRITE TEST	SSD EMMC, SSD NVME AND OPTANE
LINEAR READ TEST	HDD SATA, SAS, SSD SATA, SSD EMMC, SSD NVME AND OPTANE
SMART CONVEYANCE TEST	HDD SATA AND SSD SATA
FULL DISK SCAN TEST	HDD SATA, SAS, SSD SATA, SSD EMMC, SSD NVME AND OPTANE

3.17 Touchscreen

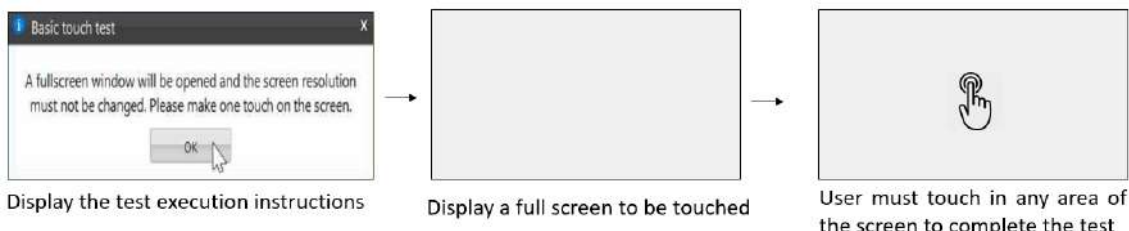


The Touchscreen module is composed by the following tests:

Test	Test type	Attendance
Basic Touch Test	Quick	Attended
Accuracy Test	Quick	Attended
Diagonal Test	Quick	Attended
Grid Test	Quick	Attended
Multi-touch Test	Quick	Attended

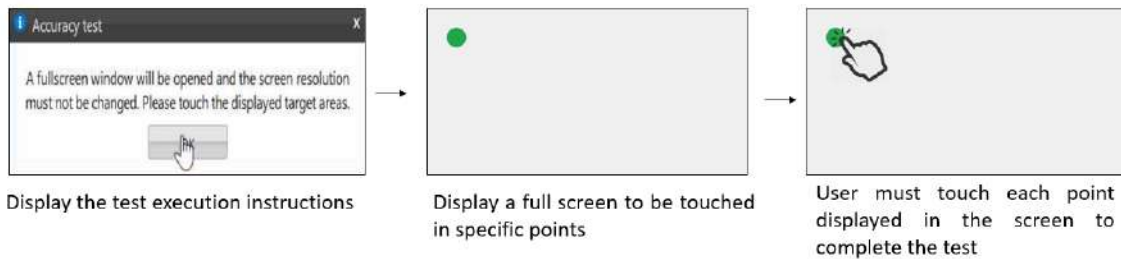
Basic Touch Test

The Basic touch test will verify if the system is receiving touch events. This test is based on the following workflow:



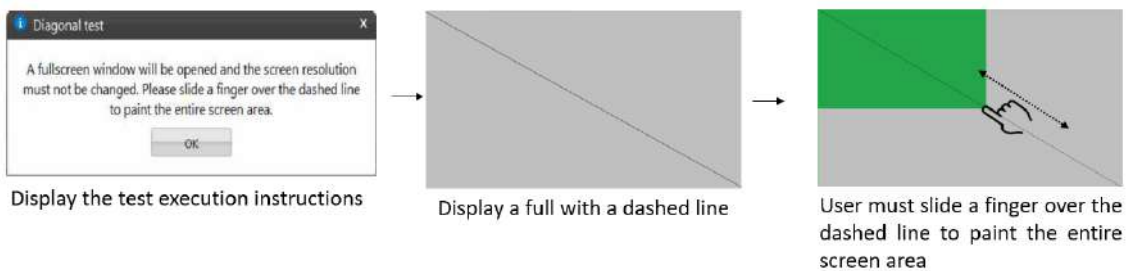
Accuracy test

The Accuracy test will verify if the touchpoints are accurate with the screen mapping. This test is based on the following workflow:



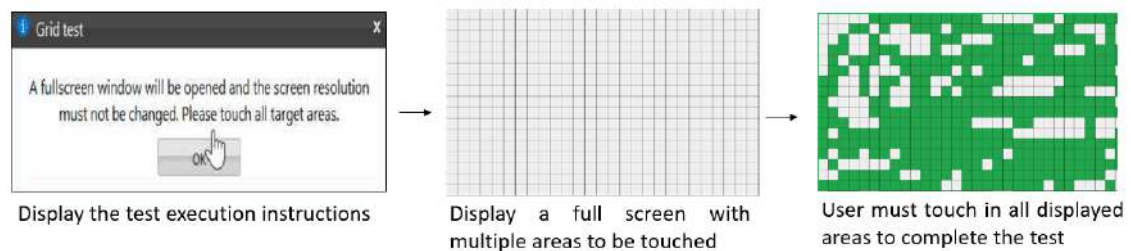
Diagonal Test

The Diagonal test will verify if rows and columns of the touchscreen are sensing through a diagonal gesture on the screen. This test is based on the following workflow:



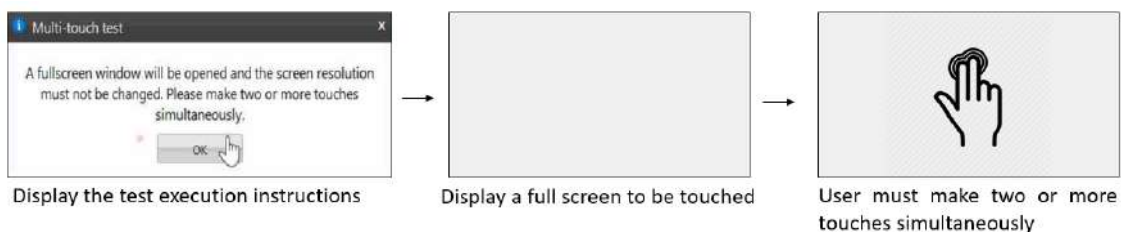
Grid test

The Grid test will verify if any areas of touchscreen are not able to receive touch events.



Multi-touch Test

The Multi-touch test will verify if the system is receiving multi-touch events.



3.18 Video Card



The Video Card module is composed by the following tests:

Test	Test type	Attendance
Video Memory Test	Quick	Unattended
CUDA Memory Fault Test	Quick	Unattended
CUDA Address Test	Quick	Unattended
CUDA Moving Inversion Test	Quick	Unattended
CUDA Block Move Test	Quick	Unattended
CUDA Random Number Sequence Test	Quick	Unattended
CUDA Modulo X Test	Quick	Unattended
Extended Video Memory Test	Extended	Unattended
Stress Test	Extended	Unattended
DirectCompute Standard Mathematical Operations Test	Quick	Unattended
DirectCompute Advanced Mathematical Operations Test	Quick	Unattended
CUDA Standard Mathematical Operations Test	Quick	Unattended
CUDA Advanced Mathematical Operations Test	Quick	Unattended
Wireframe Stress Test	Extended	Unattended
Texture Pipeline Test	Quick	Unattended

Video Memory Test

Verifies if some data patterns are consistently read from and written to video card memory.

CUDA Memory Fault Test

This test executes the March C- algorithm on memory GPU. This test detects Stuck-at-Faults (SAF), Address Faults (AF), Transition Faults (TF) and Coupling Faults (CF).

CUDA Address Test

This test loads each memory location with its own address and then checks for consistency, to detect addressing errors.

CUDA Moving Inversion Test

This test detects memory errors by writing a pattern and checking if each memory location holds this pattern.

CUDA Block Move Test

Blocks of memory are initialized with 8-bytes shifting patterns that are moved to different locations to detect memory errors.

CUDA Random Number Sequence Test

This test generate a random sequence and fills the GPU memory with it, then checks if these blocks still hold the same random pattern sequence.

CUDA Modulo X Test

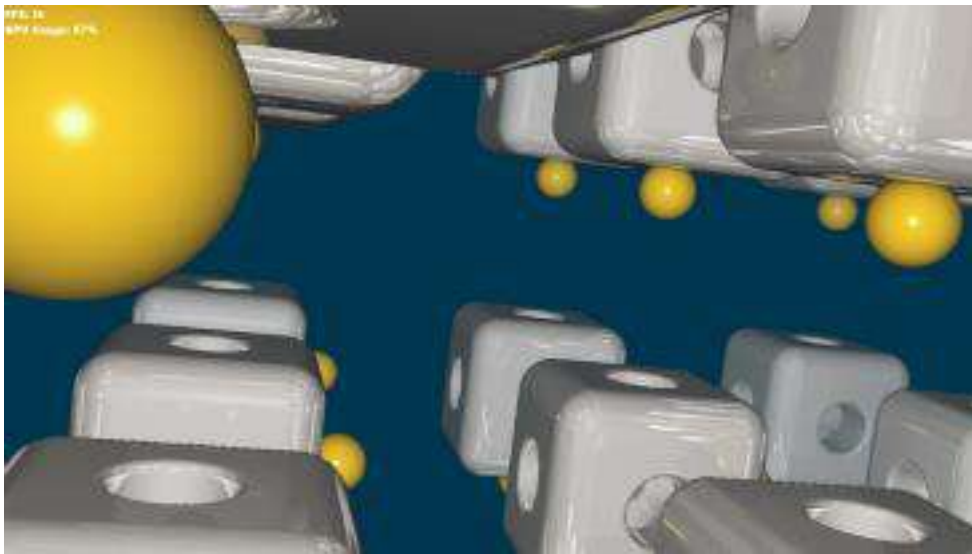
This test detects faults due to interaction of neighboring memory cells. A pattern is written for the addresses starting with an offset equals to zero and increasing by 20 until the end of the allocation. After, all the addresses not filled with pattern are filled with its complement. The pattern is checked for the addresses they supposed to be written and this process start another iteration adding the offset by 1. This process is repeated until all memory locations are tested.

Extended Video Memory Test

Similar to Video Memory Test, but performs an extended analysis with more data patterns

Stress Test

Executes heavy operations on the video card for the purpose of stressing the GPU and verifying that the results remain reliable under stress.



DirectCompute Standard Mathematical Operations Test

Performs several standard mathematical operations in order to test that the video board processing units are in good condition using DirectCompute.

DirectCompute Advanced Mathematical Operations Test

Performs several advanced mathematical operations in order to test that the video board processing units are in good condition using DirectCompute.

CUDA Standard Mathematical Operations Test

Performs several standard mathematical operations in order to test that the video board processing units are in good condition using CUDA.

CUDA Advanced Mathematical Operations Test

Performs several advanced mathematical operations in order to test that the video board processing units are in good condition using CUDA.

Wireframe Stress Test

Executes heavy wireframe operations on the video card for the purpose of stressing the GPU and verifying that the results remain reliable under stress.

Texture Pipeline Test

Sends texture patterns to be rendered by the graphics pipeline and checks for loss of data when comparing input and output

3.19 Wired Ethernet

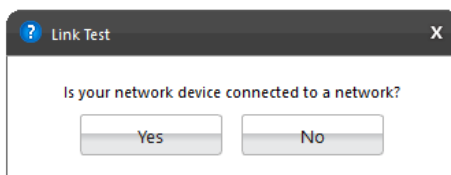


The Wired Ethernet module is composed by the following tests:

Test	Test type	Attendance
Link Test	Quick	Unattended
Internet Connection Test	Quick	Unattended

Link Test

The Link Test will verify if the Ethernet network device is faulty based on its operational status. The test starts by asking the user if the network device is connected to a network.



The test is performed according to the user answer. If the user selected "Yes", the test tries to establish a network link and if the user select "No" the tests verifies if the device has, indeed, no network link.

Internet Connection Test

Tests the internet connection by initiating a TCP connection with an external host, sending an HTTP request, and waiting for the host's reply. The test is canceled if the tested device has no wired connection using IPv4 to network.

3.20 Wireless



The Wired Ethernet module is composed by the following tests:

Test	Test type	Attendance
Radio Enabled Test	Quick	Unattended
Network Scan Test	Quick	Unattended
Signal Strength Test	Quick	Unattended

Radio Enabled Test

Verifies that the wireless is turned on.

Network Scan Test

Verifies that the wireless adapter can detect available networks. Make sure that there is a properly configured router or access point nearby before running this test.

Signal Strength Test

Verifies that the wireless adapter can detect available networks. Make sure that there is a properly configured router or access point nearby before running this test.

3.21 Sensors

The Sensors module is composed by the following tests:

Test	Test type	Attendance
Accelerometer Noise Test	Quick	Unattended
Gyrometer Noise Test	Quick	Unattended
Compass Noise Test	Quick	Unattended
Accelerometer Interactive Test	Quick	Attended
Gyrometer Interactive Test	Quick	Attended
GPS Communication Test	Quick	Unattended
GPS Lock Test	Extended	Unattended
GPS Interactive Test	Extended	Attended
Lid Closure Test	Quick	Attended

Accelerometer Noise Test

The Accelerometer Noise Test will verify the variation of the readings from the accelerometer over time and check if the noise detected is acceptable.

Gyrometer Noise Test

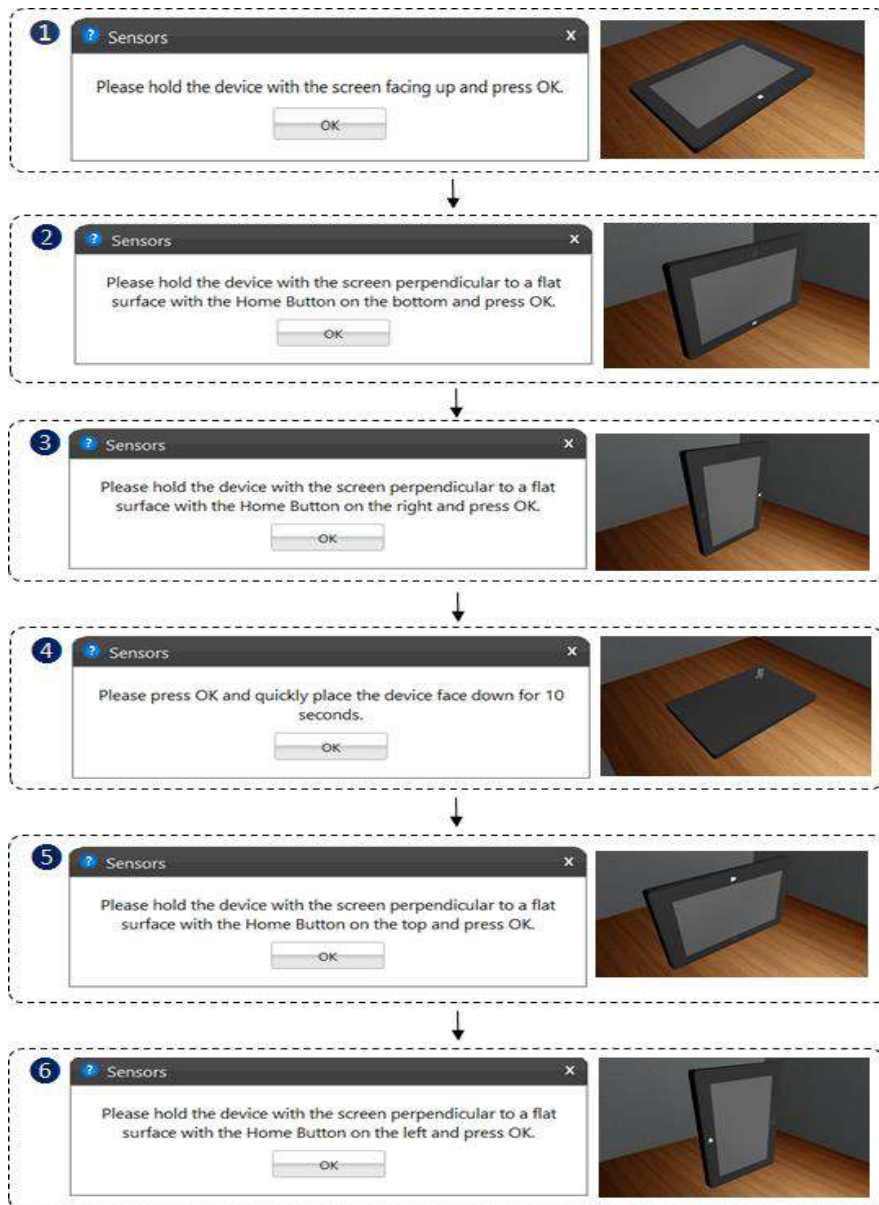
The Gyrometer Noise Test will verify the variation of the readings from the gyrometer over time and check if the noise detected is acceptable.

Compass Noise Test

The Compass Noise Test will verify the variation of the readings from the compass over time and check if the noise detected is acceptable.

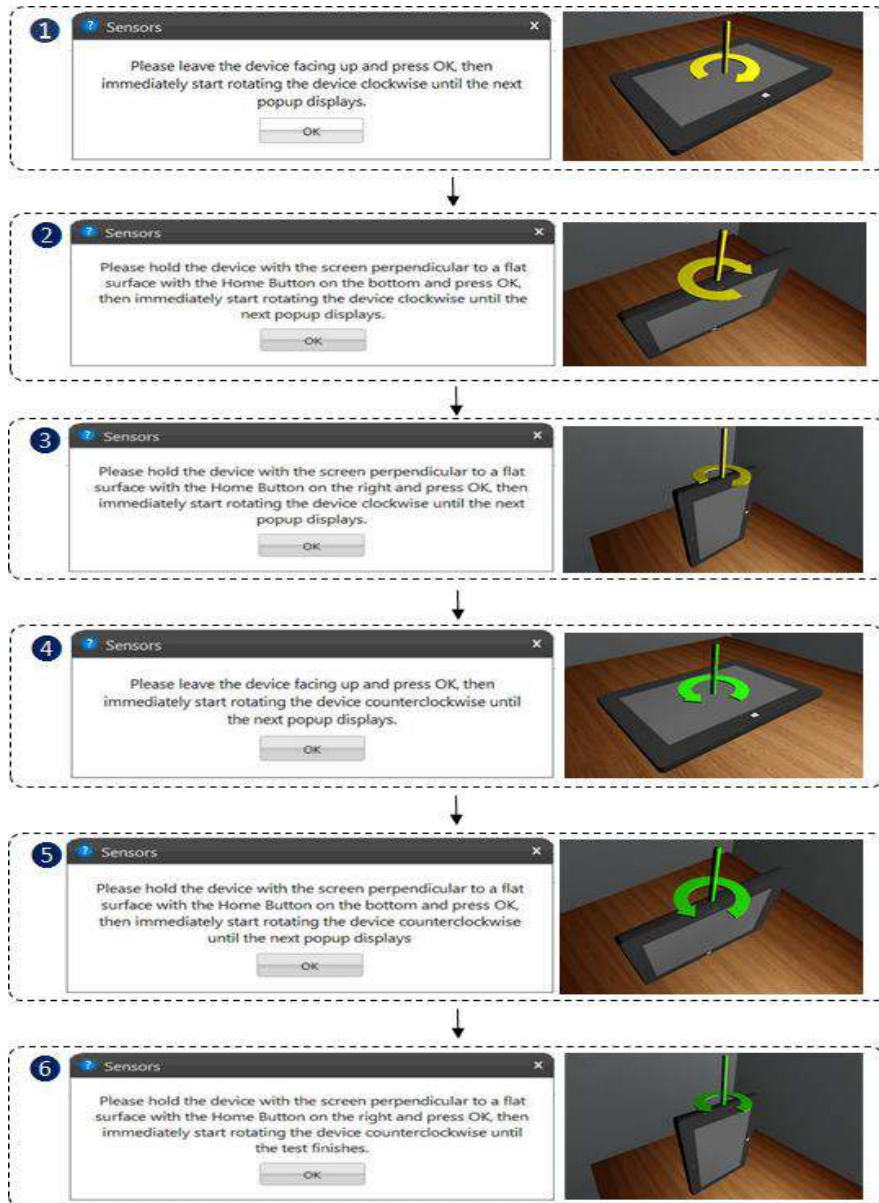
Accelerometer Interactive Test

The Accelerometer Interactive Test will check if the values returned by the accelerometer in different positions are correct.



Gyrometer Interactive Test

The Gyrometer Interactive Test will check if the values returned by the gyrometer in different positions are correct.



GPS Communication Test

This test communicates with the GPS device and attempts to retrieve data. If data collection is successful within a specified time interval, the test returns Success.

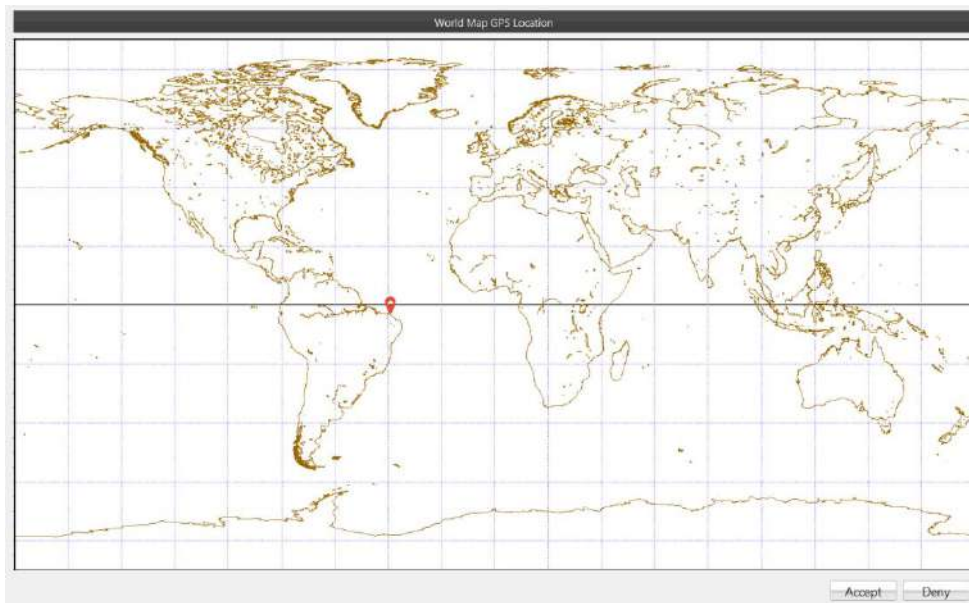
GPS Lock Test

This test verifies that the GPS is receiving signals of sufficient quality from enough satellites to calculate a location. If the GPS device does report a position fix within the specified time, the test returns Success.

GPS Interactive Test

This test communicates with the GPS sensor device and attempts to retrieve the current location coordinates. If the location coordinates collection is successful, a map is displayed of the current location.

The test will show a globe image indicating the current computer localization



Lid Closure Test

This test verifies if the lid sensor is capturing the events of closing and opening the lid. The test will fail if these events are not captured.

The test will ask to the user open and close the notebook lid.



3.22 Bluetooth



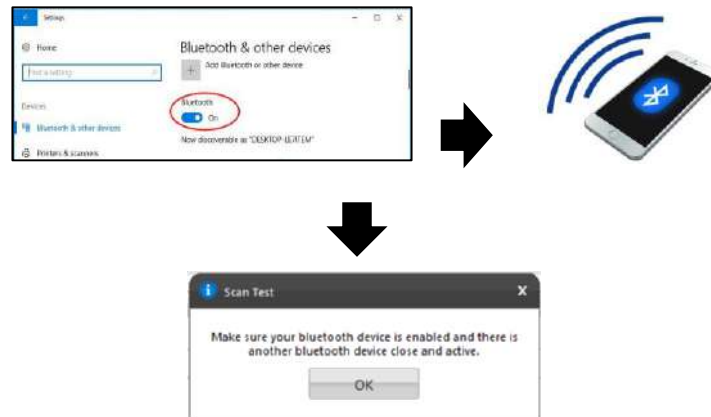
The Bluetooth module is composed by the following tests:

Test	Test type	Attendance
Scan Test	Quick	Attended

Scan Test

Scan for nearby active Bluetooth devices.

The test starts by asking you to make sure the Bluetooth device is enabled and there is another Bluetooth close and active.



3.23 Fingerprint



The Fingerprint module is composed by the following tests:

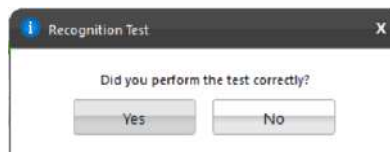
Test	Test type	Attendance
Recognition Test	Quick	Attended

Recognition Test

The test prompts the user to swipe or touch a finger on the fingerprint device. The test starts by asking you to swipe or touch in your device.



If the user does not perform any action for 30 seconds, the following popup is displayed:



If the user select "Yes", reporting that the test was performed according to the instructions, the test will fail. In this case, the application assumes that it was not possible to detect the device, indicating a bad working of it. If the user selects "No", the test is canceled because the actions required were not properly executed.

3.24 Touchpad Devices

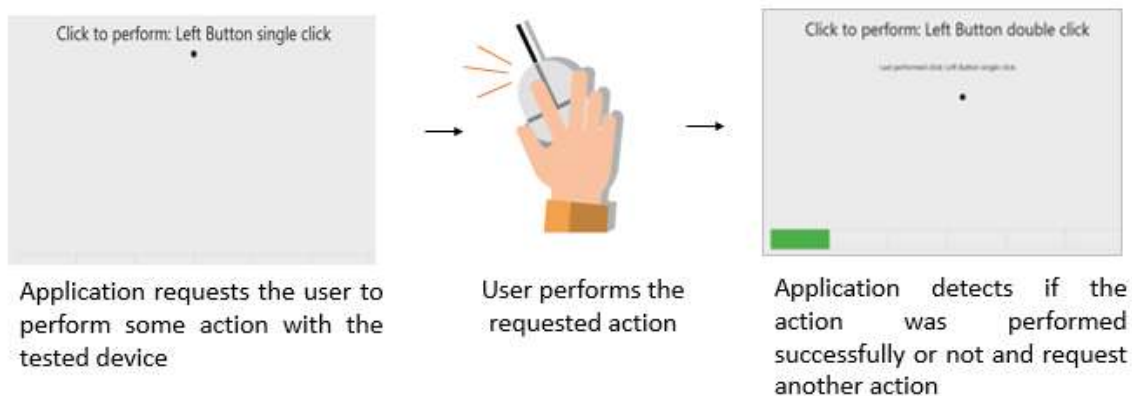


The Touchpad Devices module is composed by the following tests:

Test	Test type	Attendance
Click Test	Quick	Attended
Precision Test	Quick	Attended
Press Precision Test	Quick	Attended

Click Test

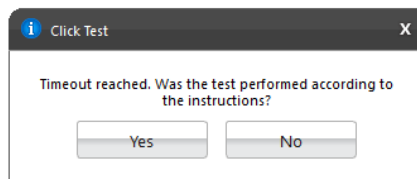
It does a check on the device's buttons, issuing the user to perform some actions regarding them. The Click Test execution is based on the workflow below.



The user must perform one by one, the actions issued by the test. Note that the actions requested depends on the numbers and types of buttons present in your touchpad device.

The user has two attempts to execute each requested action. If the requested action was detected by the application, it is considered as passed. Otherwise the action is considered as "Failed". The Click Test is considered as "Passed" if all actions required are passed.

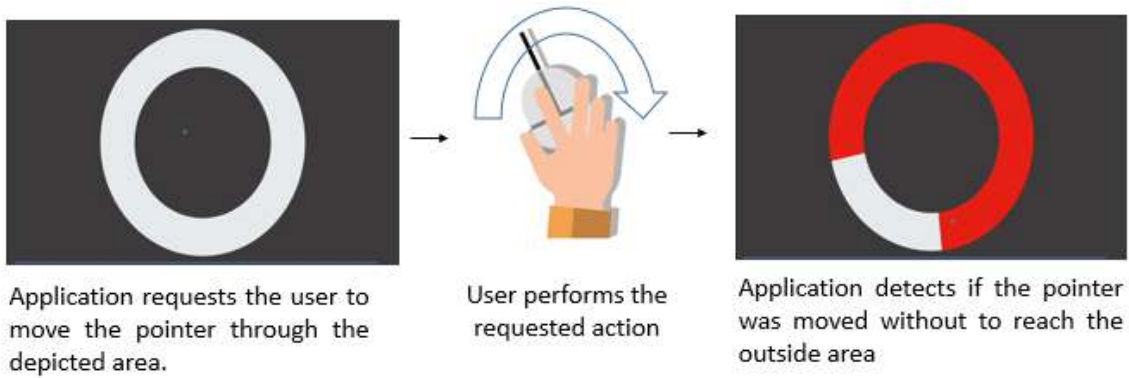
If the user does not perform any action for 30 seconds, the following popup is displayed:



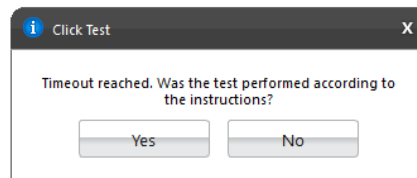
If the user select "Yes", reporting that the test was performed according to the instructions the test will fail. In this case, the application assumes that it was not possible to detect the device, indicating a bad working of it. If the user selects "No", the test is canceled because the actions required were not properly executed.

Precision Test and Press Precision Test

Tests the device movement precision. The Precision Test execution is based on the following workflow:



If the user gets to move the pointer through the entire depicted area without to reach the outside area the test is finished as passed. If the outside area was reached two times the test will fail. If the pointer is not moved for more than 30 seconds the test windows is going to be closed and the following message is displaying to the user:



If the user select "Yes", reporting the test was performed according to the instructions, the test will be finished as "failed". In this case, the application assumes that it was not possible to detect the device movement, indicating a bad working of the device. If the user selects "No", the test is canceled because the required actions were not properly executed.

Note: For executing Press Precision test, you must press any button from touchpad and move the pointer.

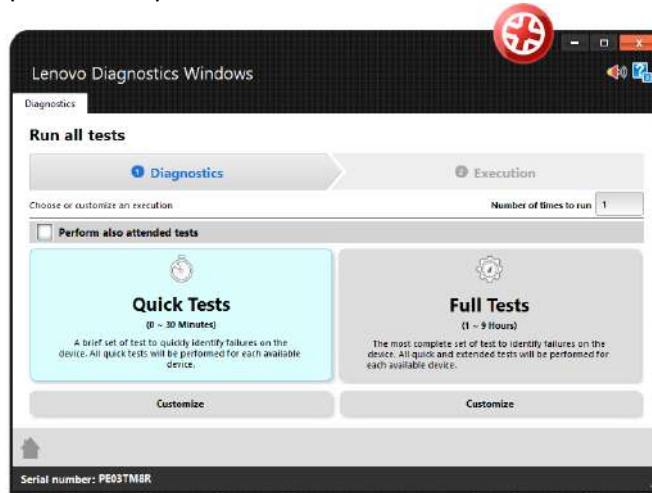
4. EXPLORING LENOVO **RUN ALL OPTION**

Run All option allow to perform all supported tests from all supported modules at the same execution. In this flow is not possible to select devices, thus all devices will be tested. It is possible to choose if the Attended tests should be performed or not.

When the checkbox is marked, the application will run Unattended + Attended tests from the test execution option selected.

4.1 Quick tests

Click on Quick tests button to perform all quick tests.



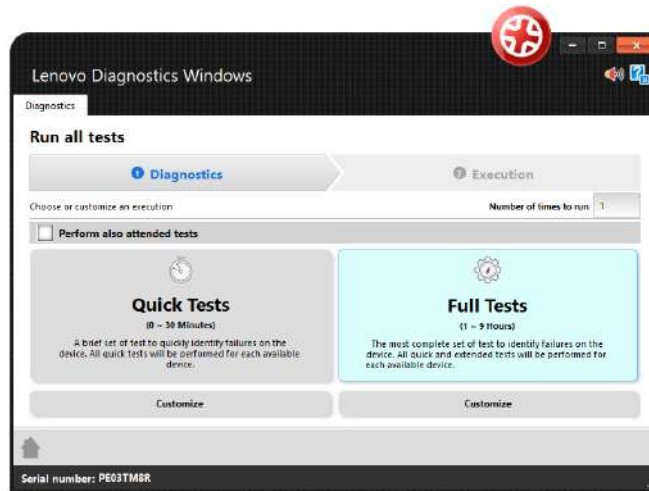
4.2 Quick tests (customized option)

Click to Customize to remove any module or test from the list of tests that will be performed.



4.3 Full tests

Click on Quick tests button to perform all tests quick and extended.



4.4 Full tests (customized option)

Click to Customize to remove any module or test from the list of tests that will be performed.



5. EXPLORING LENOVO **DIAGNOSTICS TOOLS**

This section provides information about:

Updated according to Lenovo Diagnostics 4.32



5. 1 Diagnostic Script


The Diagnostic Script is a tool that allows user to create a custom list of tests from any module. By selecting this tool, the following options are displayed:

- **Create:** allows to create a new diagnostic script.
- **Edit:** allows editing a diagnostic script saved previously.
- **Execute:** allows to perform the tests configures in a diagnostic script.



Warning: When the user executes a script, unsupported tests on the machine will receive the status – **NOT APPLICABLE**.

5.1.1 Create a diagnostic script

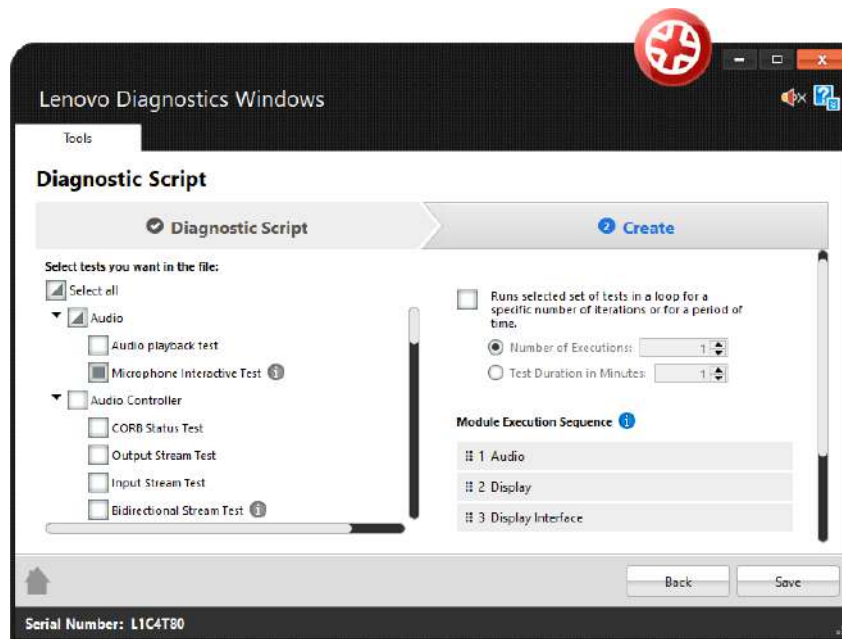
By selecting the option "Create" and clicking on the Next button, the screen below will be displayed. This screen allows selecting a set of tests to be performed from a list with all tests present in Lenovo Diagnostics. The tests not supported by the tested machine are marked with the icon .

It is also possible to configure the execution of this tests according one of the following parameters:

Number of executions: allows performing the tests according to a specific number of executions in a range from 1 to 999999999. In this case, the diagnostic will be finished when all iterations are completed.

Test duration in minutes: allows performing the tests according to a specific number of minutes in a range from 1 to 999999999. In this case, the diagnostic will be finished when this time is reached and all tests from the current iteration are finished. Notice that even if the time is reached the tests will be performed until the end in the current iteration.

Module Execution sequence: allows you to select the order in which the modules will be executed by dragging and dropping the modules in the list. The list will be filled according to the selected modules.

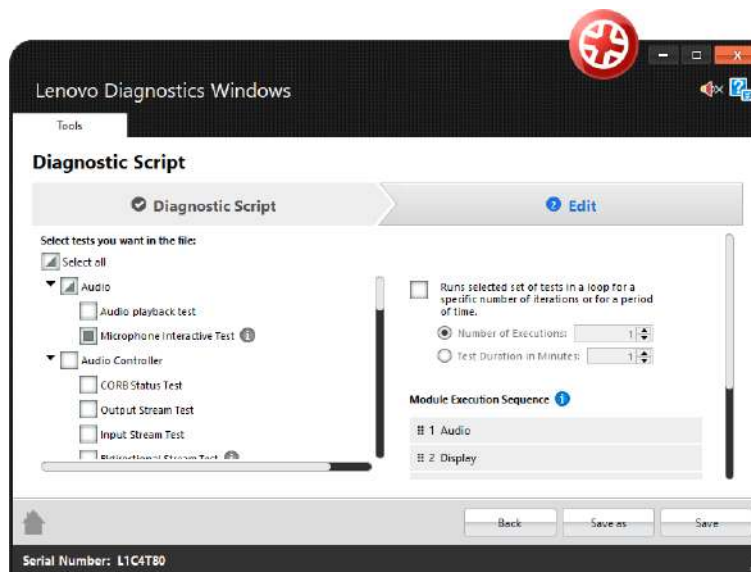


5.1.2 Edit a diagnostic script

By selecting the option "Edit", the Lenovo Diagnostics displays a field where is possible to select an existing diagnostic script to be edited.




By selecting this file and clicking on the Next button, a screen is displayed with the configuration from the selected diagnostic script. Here it is possible to modify this configuration by changing the list of tests, modify the number of executions or duration minutes and change the order of modules execution. By clicking on Save button all changes are saved in the current file and clicking on Save as it is possible to create a new file with the current configuration.



5.1.3 Execute a diagnostic script

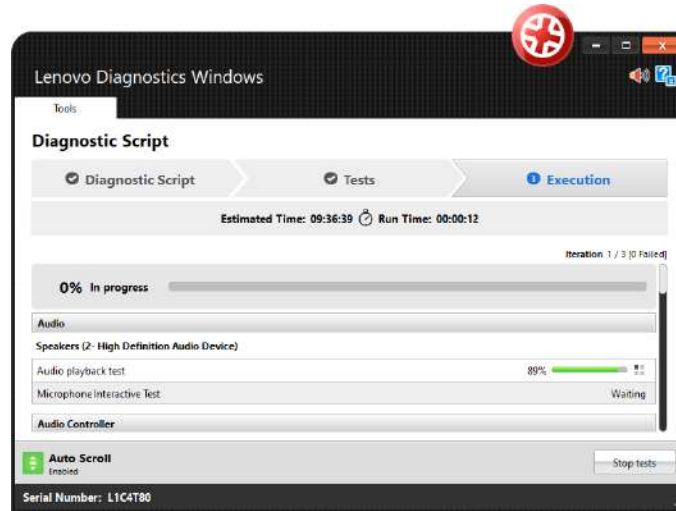
By selecting the option "Execute", the Lenovo Diagnostics displays a field where is possible to select an existing diagnostic script to be performed.



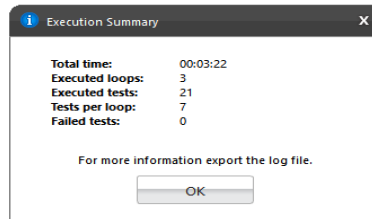
By selecting a valid diagnostic script file and clicking on the Next button, a screen is displayed with the configuration from the selected diagnostic script. All selected tests are listed selected and the not supported one are marked with the icon .



By clicking to Run Tests, the diagnostic script execution screen is displayed and all supported tests are performed. The not supported tests that do not have an associated device are filtered on this execution. It is possible to finish the execution anytime by clicking on Stop Test.

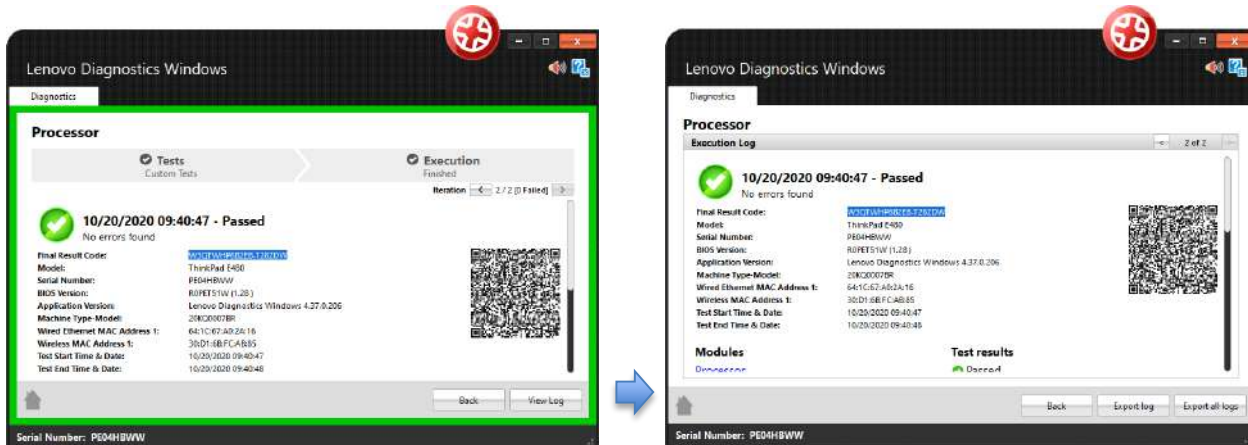


When the diagnostic is finished, the following popup is displayed with the execution summary.



The user can view the execution log by clicking View log.

It is also possible to export all executions log to a PDF file by clicking Export all log or export a specific iteration by clicking on Export log.



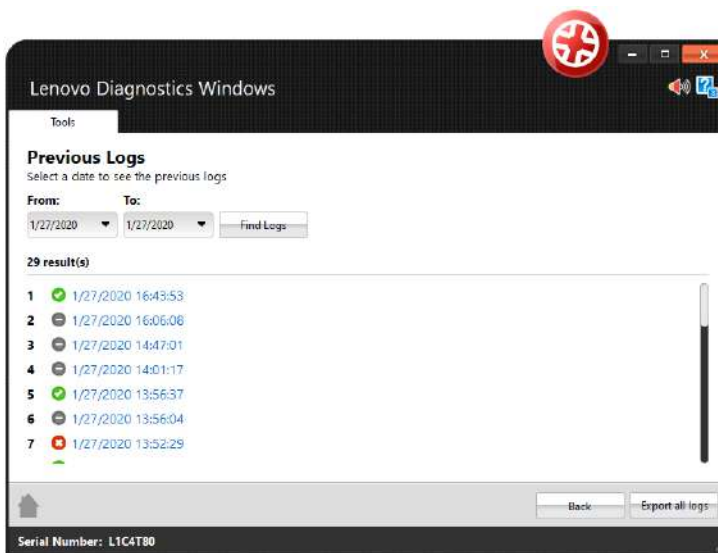
5.2 System Information

The system information tool allows the user to see general information about the system and the available module's devices. See in the screen below that is possible navigating between the modules and export the information by module or export all information at the same time.



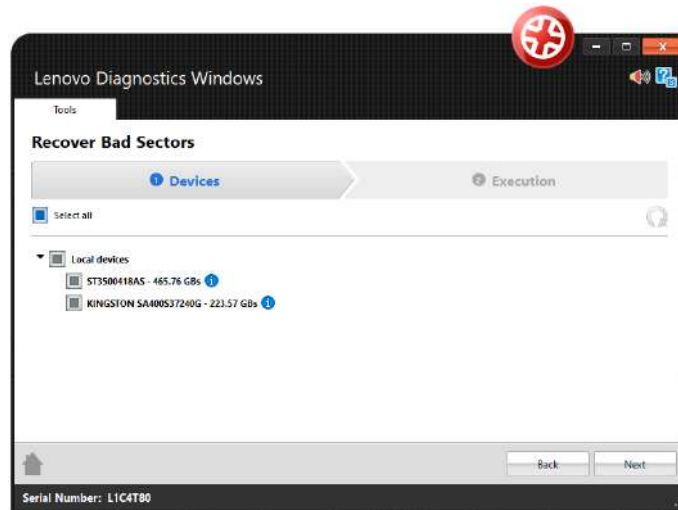
5.3 Log History

The Log History tool allows the user to see the logs of all executions performed in a machine. See in the image below it is possible to find logs by informing a period and export all logs.

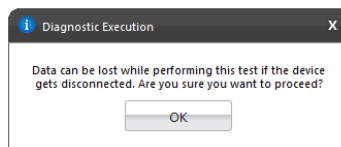


5.4 Recover Bad Sectors

The Recover Bad Sectors tool allows the user to scan HDD/SATA SSD devices for bad sectors and fix them whenever possible.

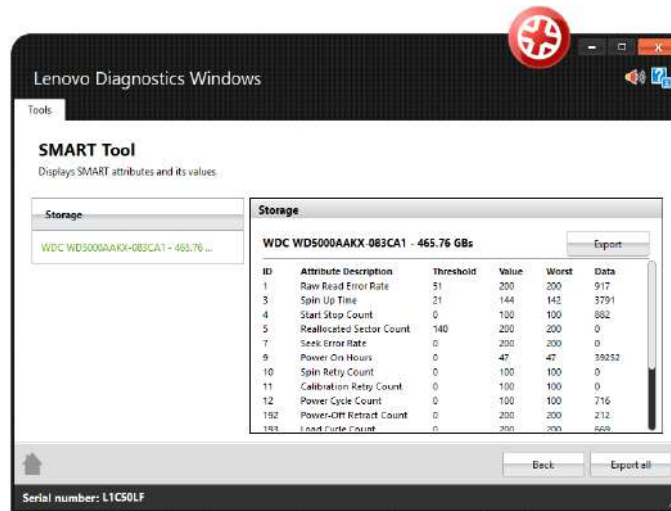


Be aware to perform a backup of your disk before performing this operation. The recovery operation can cause data loss and requires your confirmation.



5.5 SMART Tool

SMART tool provides a list of storage devices and shows, for each one, the SMART attributes and its information. You are able to export those information to a PDF or HTML file. It is possible to export information for each storage device separately or for all available devices in the same file.



5.6 eGather Report

This report provides system software and hardware information focused mainly on software and its drivers. You are able to export those information to a HTML or PDF file by clicking on **Export All** button or export each section separately by clicking on **Export** button.



5.7 Powercfg Reports

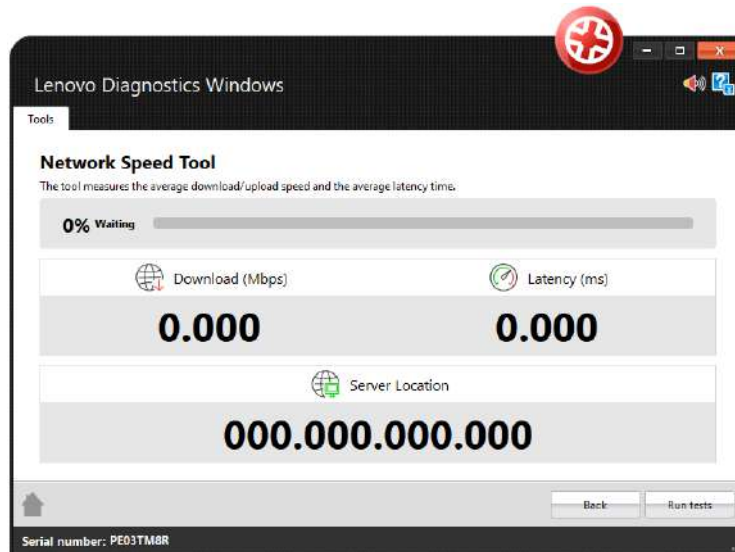
These reports provide information about the battery usage, energy efficiency, power-scheme settings and system power translations.

You are able to generate all reports by clicking on the **Generate all reports** button.



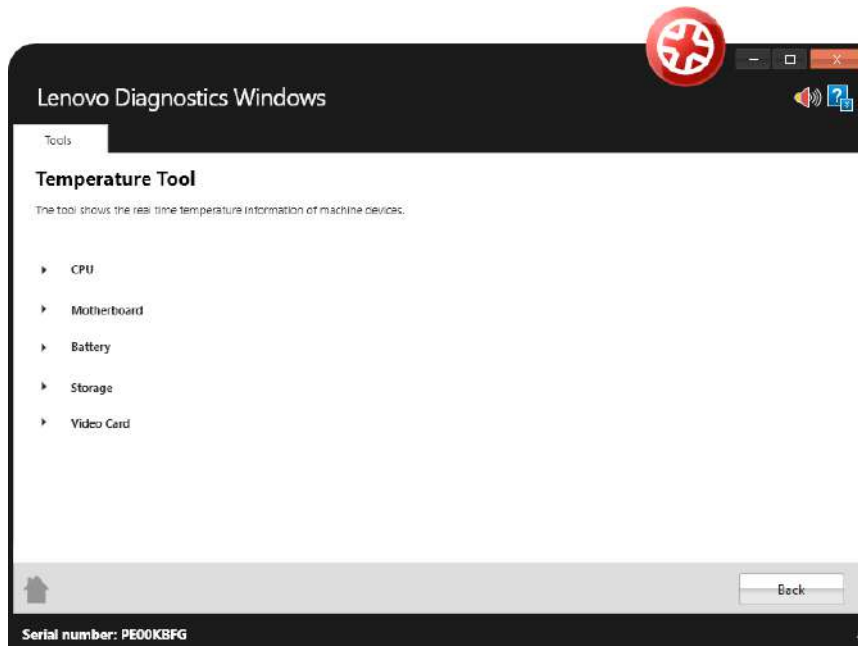
5.8 Network Speed Tool

The tool measures the average download/upload speed and the average latency time. You are able to perform the tests by clicking on the button Run Tests.



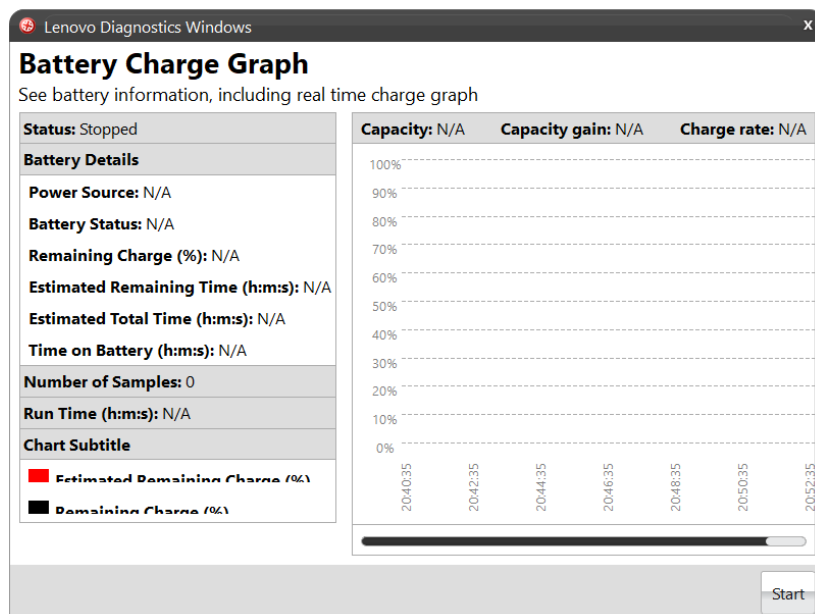
5.9 Temperature Tool

The tool shows the real time temperature information of machine devices.



5.10 Battery Charge Graph

See battery information, including real time charge graph



6. GLOSSARY

Extended Test: type of test that is performed in some hours.

Quick test: type of test that is performed in some minutes.

Unattended test: It is a test that does not depend on user actions to be executed. All steps are performed automatically by the application.

Attended test: It is a test that depends on some user action to be executed.

Module: a module contains a set of tests that can be performed for a type of devices. It is enabled in the application only if the tested machine has at least one device supported by the module.

Lenovo Diagnostics UEFI Embedded/Bootable v04.20.000

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Battery Diagnostic Type

Battery Quick Algorithm Selection

Battery Extended Algorithm Selection

Battery Quick Diagnostics Execution

Battery Extended Diagnostics Execution

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SMART Information Select Device
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NVMe SMART Information screen

Objective

This document describes what is necessary to run the **Lenovo Diagnostics UEFI Embedded/Bootable** tests.

Install and Run the UEFI diagnostics



Note

No installation is required for the **Lenovo Diagnostics UEFI Embedded**.

Download the Lenovo Diagnostics UEFI Bootable and Create a Bootable USB Flash Drive Using Windows GUI

1. **Save the UEFI Diagnostics image and Bootable Generator:**
 - a. Go to www.Lenovo.com/diags
 - b. Click on "Downloads"

- c. Under "Lenovo Diagnostics UEFI Bootable", click on "Create Bootable USB with UEFI Diagnostics"
 - d. Download UEFI Diagnostics zip file. Save the file. *(If your system has an Atom CPU, then click on "Lenovo UEFI Diagnostics – Bootable USB for Atom CPU based Tablet – ThinkPad 10" instead.)*
 - e. Download Bootable Generator Zip file.
- 2. Run the Bootable Generator application.**
- a. Insert a USB flash drive
 - b. Go to the folder where you saved the bootable generator and double click on it
 - c. Double click "BootableGenerator.exe"
 - d. Your flash drive name will appear under "Select a device". Click to select it. If you want to, you can type a new name for the device.
 - e. Click on "Search". Click on the image name that you saved in step 1, letter d.
 - f. Click on "Generate".
 - g. A message will appear, warning that all existing files on the flash drive will be erased if you continue. If you are OK with that, then press "Yes" to continue.

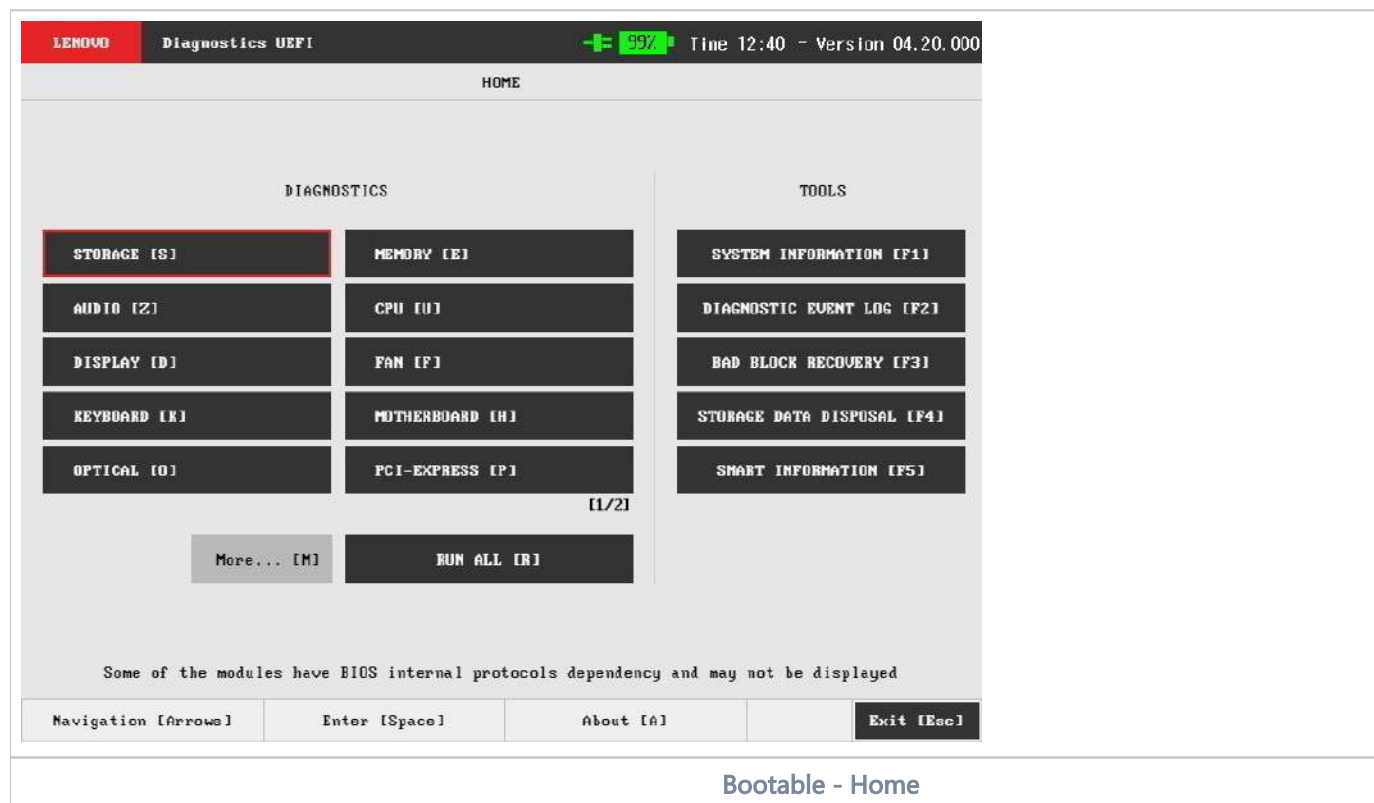
Run the UEFI Diagnostics

Run the Lenovo Diagnostics UEFI Bootable from a Bootable Flash Drive

1. Create the Bootable flash drive, as explained in sections 1 and 2.
2. If Secure Boot is enabled in BIOS, disable it.
3. Insert the flash drive.
4. Restart the machine, then immediately press F12.
5. On the boot menu, select your usb flash drive, and press Enter.
6. The UEFI diagnostics menu will display on your screen.

Home

The Home screen for Lenovo Diagnostics UEFI is shown in the next figure.



The Home screen is displayed right after the machine is booted from a USB flash drive containing the application. The Home screen provides options to run all available tests for devices installed in the machine, options to see detailed information about these devices, and option to exit the application. The Home screen is composed of:

- Application Header Bar
- Screen Title BarThe currently selected option is outlined in red. The user can change the selected option either by using mouse/touch (*f or systems that support mouse / touch navigation*)

- Two main sections (Diagnostics and Tools)
- Instruction Footer Bar

The Application Header Bar contains the name of the application, battery AC adapter indicator, battery capacity indicator, system's time and application's current version; the Screen Title Bar helps the user to be attentive of where s/he is throughout the application; and the Instruction Footer Bar contains additional instructions for using the screen, as well as the Exit button.

Additionally, the Home screen has two main sections: Diagnostics and Tools. The Diagnostics section provides options to run all installed tests; and the Tools section provides options of using extra tools.

The currently selected option is outlined in red. The user can change the selected option either by using mouse / touch (*for systems that support mouse / touch navigation*) or by using the arrow keys (←↓→) and to enter the selected option by pressing SPACE or ENTER.

Diagnostics options, sub-options and their descriptions are subsequently described:

- Run All: It allows the user to run all tests in one single execution. The Run all option has 4 modes:
 - Quick (Unattended): It executes the modules' quick diagnostics that are unattended (does not require human intervention).
 - Quick: It executes the all modules' quick diagnostics.
 - Full (unattended): It executes the modules' quick and extended diagnostics that are unattended.
 - Full: It executes all the modules' diagnostics.
- Audio: it selects and runs audio diagnostics.
- Battery:
 - Quick: It selects and runs battery quick diagnostics.
 - Extended: It selects and runs battery extended diagnostics.
- CPU
 - Quick: It selects and runs CPU quick diagnostics.
 - Extended: It selects and runs CPU extended diagnostics.
- Display: It selects and runs display diagnostics.
- Fan: It selects and runs fan diagnostics.
- Fingerprint: It selects and runs fingerprint diagnostics.
- Keyboard: It selects and runs keyboard diagnostics.
- Memory
 - Quick: It selects and runs memory quick diagnostics.
 - Extended: It selects and runs memory extended diagnostics.
- Motherboard: It selects and runs motherboard diagnostics.
- Mouse: It selects and runs mouse diagnostics.
- Optical: It selects and runs optical diagnostics.
- PCI Express: It selects and runs PCI express diagnostics.
- RAID: It selects and runs RAID diagnostics.
- Storage:
 - Quick: It selects and runs Storage quick diagnostics.
 - Extended: It selects and runs Storage extended diagnostics.
- Touch: it selects and runs Touch diagnostics.
- Wired Ethernet: selects and runs Wired Ethernet diagnostics if I have more than one device opens the device selection screen.



Battery AC indicator and Battery Capacity indicator may not be displayed for systems that does not support smart battery feature

Tools options are:

- System Information: On its main screen, it displays machine, BIOS and processor information, as well as a menu that it is possible to retrieve information from other devices modules.
- Hardware Diagnostic Events: It exhibits diagnostic events retrieved from the hardware.
- Bad Block Recovery: It allows to recover bad blocks on storage devices.
- Storage Data Disposal: Storage tool that erases all data from storage device.
- SMART Information: Tool used to obtain information related to the hardware condition, reported by the S.M.A.R.T. (Self-Monitoring, Analysis and Reporting Technology) monitoring system of HDDs, SSDs and NVMe, in order to prevent imminent hardware failures.



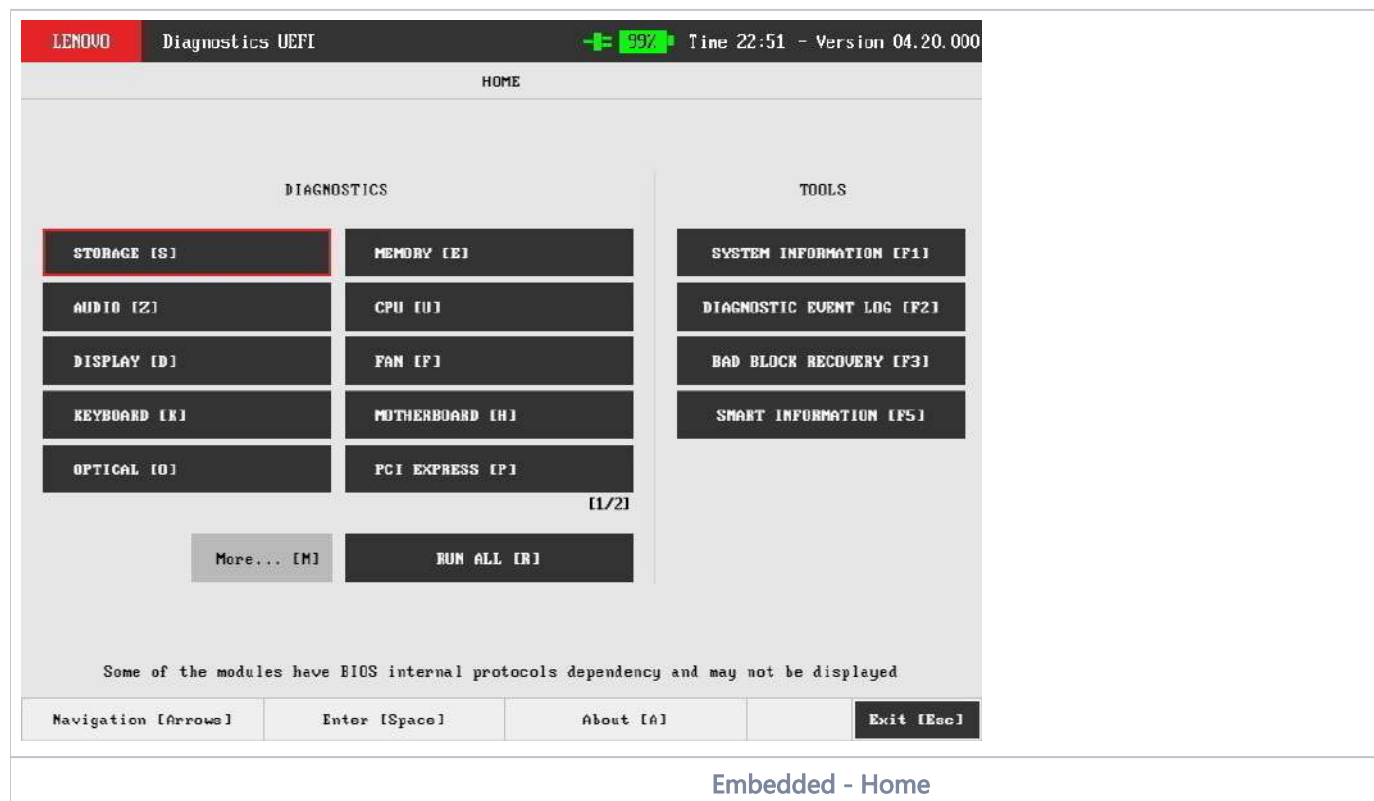
- Tests and tools rely on UEFI protocols availability, therefore some features might not be available on some systems.
- Attended tests require human intervention by interacting with mouse, keyboard, fingerprint or touch devices depending on selected test. To avoid issues with unresponsive devices, an automatic exit will be prompted after 15 seconds of no interaction .
- Text font may vary from system to system.

Run the Lenovo Diagnostics UEFI Embedded

1. Boot the system, then immediately press:
 - F10 for ThinkPad/ThinkBook/SMB system;
 - Access Novo menu for IdeaPad/SMB system;
2. On the displayed menu, select Lenovo UEFI Diagnostics.

Home

The Home screen for Lenovo Diagnostics UEFI is shown in the next figure.



The Home screen provides options to run all available tests for devices installed in the system, options to see detailed information about these devices, and option to exit the application. The Home screen is composed of:

- Application Header Bar
- Screen Title Bar
- Two main sections (Diagnostics and Tools)
- Instruction Footer Bar

The Application Header Bar contains the name of the application, system's time and application's current version; the Screen Title Bar helps the user to be attentive of where s/he is throughout the application; and the Instruction Footer Bar contains additional instructions for using the screen, as well as the Exit button.

Additionally, the Home screen has two main sections: Diagnostics and Tools. The Diagnostics section provides options to run all installed tests; and the Tools section provides options of using extra tools.

The currently selected option is outlined in red. The user can change the selected option by using the arrow keys (←↓↑→) and to enter the selected option by pressing SPACE or ENTER.

Diagnostics options, sub-options and their descriptions are subsequently described:

- Run All: It allows you to run all tests in one single execution. Depending on the running system, it's menu may vary:
 - Quick (Unattended): It executes the modules' quick diagnostics that are unattended (does not require human intervention).
 - Quick: It executes the all modules' quick diagnostics.
 - Full (unattended): It executes the modules' quick and extended diagnostics that are unattended.
 - Full: It executes all the modules' diagnostics.
- OR
- Quick: It executes the modules' quick diagnostics.
- Extended: It executes the modules' extended diagnostics.

- Restrict prior selection to unattended tests: It restricts the prior selection to execute only tests that do not require human intervention.
- Audio: It selects and runs diagnostics for audio devices.
- Battery:
 - Quick: It selects and runs battery quick diagnostics.
 - Extended: It selects and runs battery extended diagnostics.
- CPU
 - Quick: It selects and runs CPU quick diagnostics.
 - Extended: It selects and runs CPU extended diagnostics.
- Display: It selects and runs display diagnostics.
- Fan: It selects and runs fan diagnostics.
- Fingerprint: It selects and runs fingerprint diagnostics.
- Keyboard: It selects and runs keyboard diagnostics. (Module not available for all families except for **ThinkPads**)
- Memory
 - Quick: It selects and runs memory quick diagnostics.
 - Extended: It selects and runs memory extended diagnostics.
- Motherboard: It selects and runs motherboard diagnostics.
- Mouse: It selects and runs mouse diagnostics. (Module not available for all families except for **ThinkPads**)
- Optical: It selects and runs optical diagnostics.
- PCI Express: It selects and runs PCI express diagnostics.
- RAID: It selects and runs RAID diagnostics.
- Storage:
 - Quick: It selects and runs Storage quick diagnostics.
 - Extended: It selects and runs Storage extended diagnostics.
- Touch: It selects and runs Touch diagnostics.
- WiFi: It selects and runs WiFi diagnostics.

Tools options are:

- System Information: On its main screen, it displays machine, BIOS and processor information, as well as a menu that it is possible to retrieve information from other devices modules.
- Hardware Diagnostic Events: It exhibits diagnostic events retrieved from the hardware.
- Bad Block Recovery: It allows to recover bad blocks on storage devices.
- SMART Information: Tool used to obtain information related to the hardware condition, reported by the S.M.A.R.T. (Self-Monitoring, Analysis and Reporting Technology) monitoring system of HDDs, SSDs and NVMe, in order to prevent imminent hardware failures.



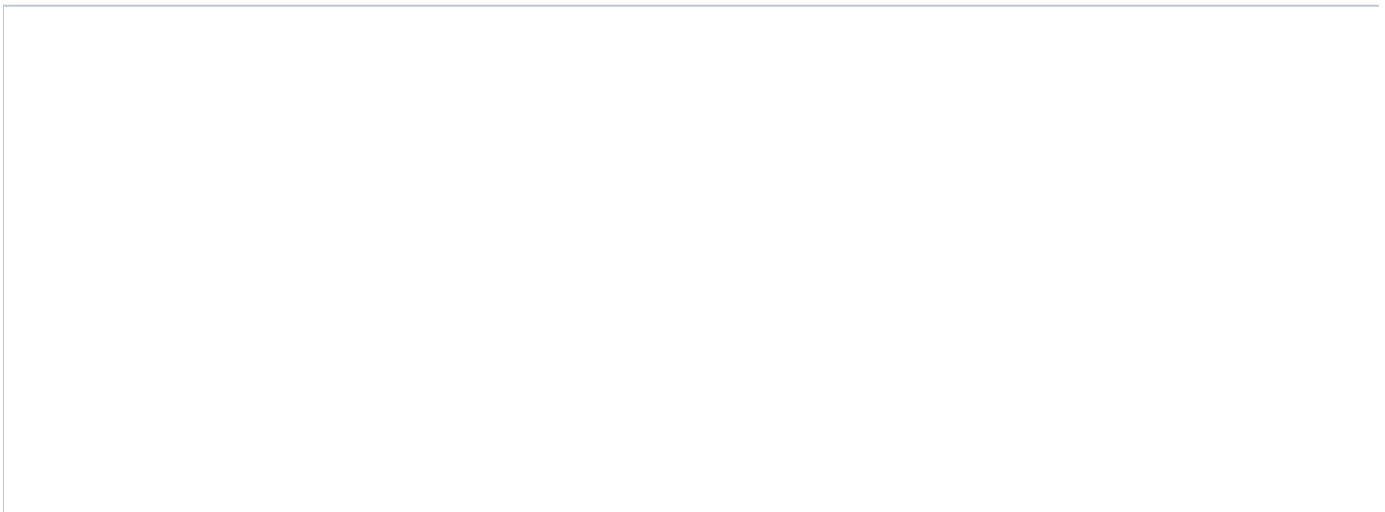
Tests and tools rely on UEFI protocols availability, therefore some features might not be available on some systems.

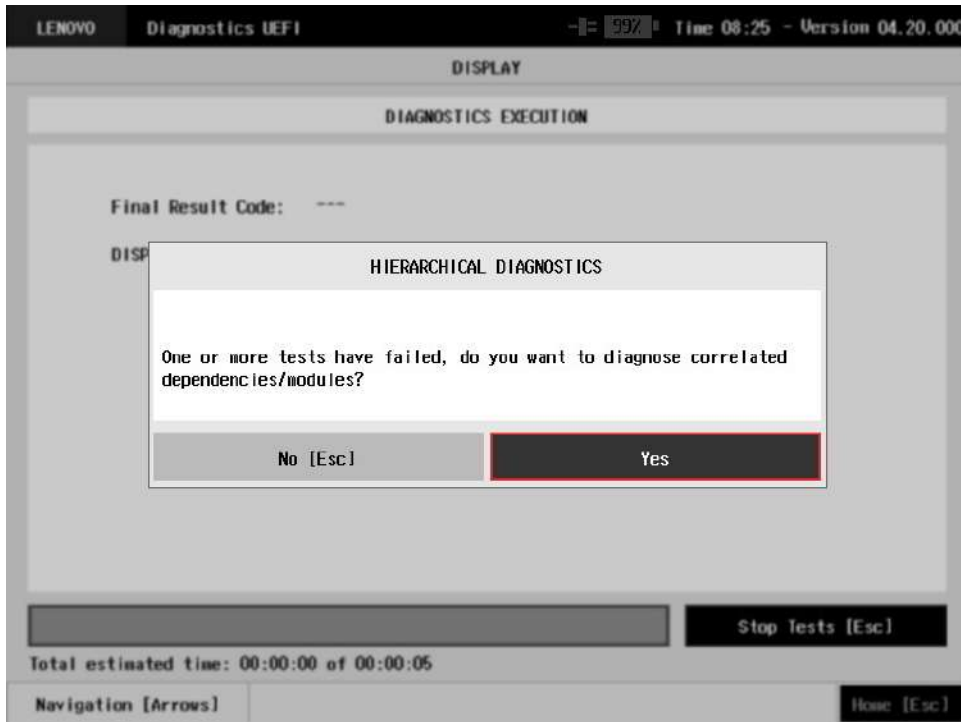
Hierarchical Diagnostics

The hierarchical diagnostics functionality is a feature which conducts hierarchic sorted tests, in the way that the more independent is a module, the more its tests take precedent in the tests hierarchy.

That allows the identification of modules' failures that precede a specific module being diagnosed, where its corresponding tests have firstly failed.

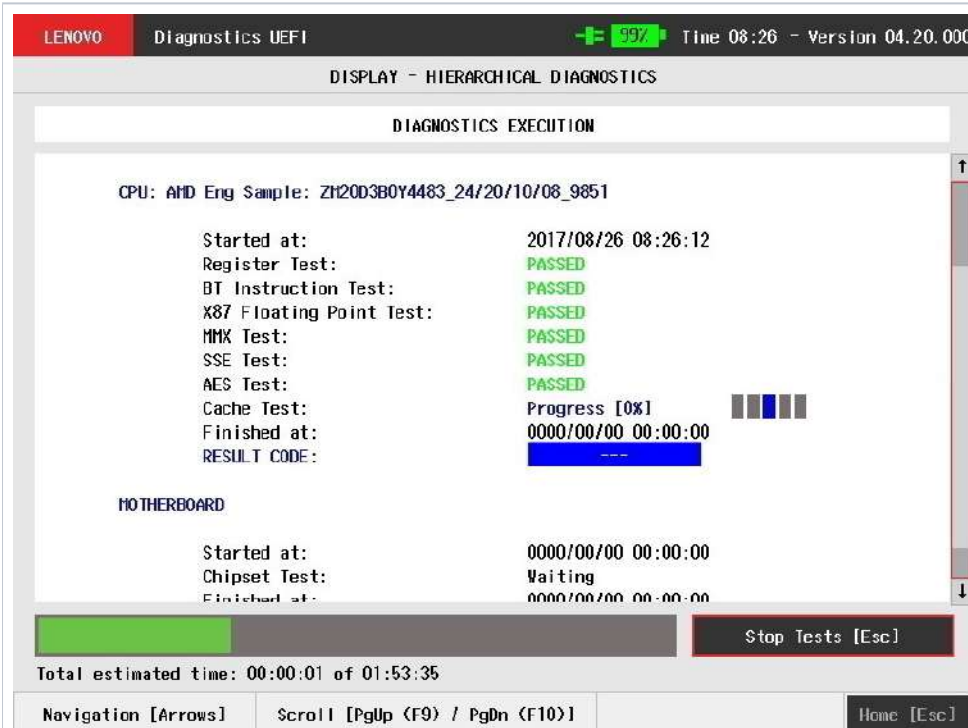
After testing a specific module, in the case of at least one failure has occurred, the following popup will be displayed.





Hierarchical Diagnostics Confirmation Popup

When choosing Yes, the application will test the correlated modules, as the following figure demonstrates it by using a Display test failure example.



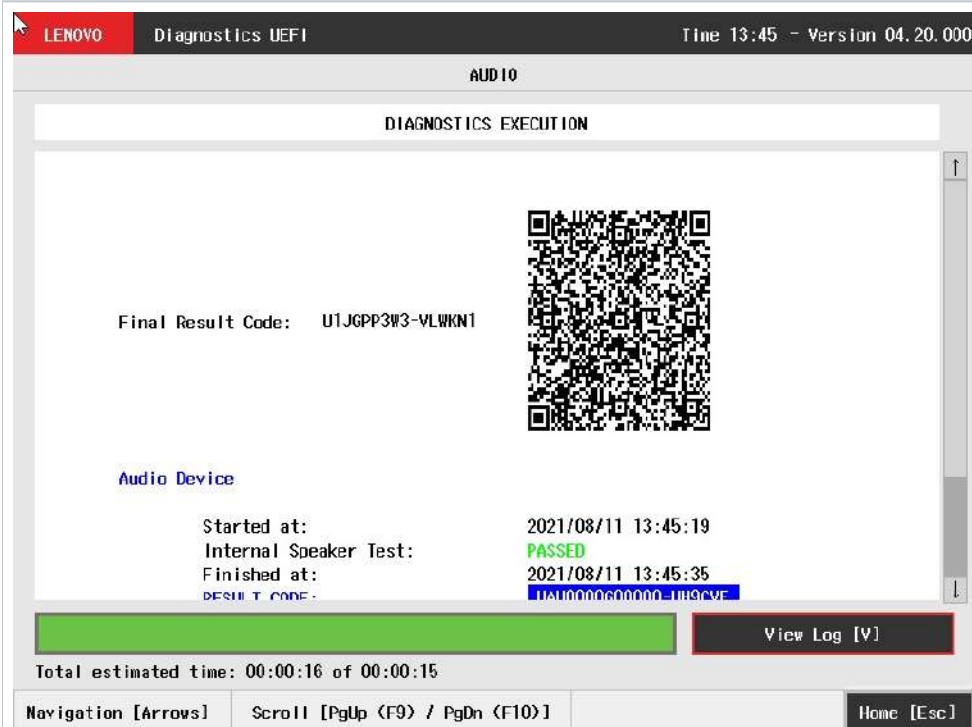
Hierarchical Diagnostics Execution

Audio

The system allows the user to access the Audio diagnostics from the Home screen, Diagnostics, Audio. After the user enters the Audio option, the Audio Diagnostics will automatically run Internal Speaker Test, where UEFI diagnostics will play a sound pattern through internal speaker and ask the user if the sound pattern was listened, as show in the next figure.



Internal Speaker Test



Audio Diagnostics Execution

The Audio Diagnostics Execution screen provides information about the audio diagnostics progress, as well as information about the results. This screen is composed of:

- Application Header Bar
- Screen Title Bar
- Screen Sub-title Bar
- Diagnostic Information Section
- Instruction Footer Bar

The Application Header Bar contains the name of the application, system's time and application's current version; the Screen Title and Screen Sub-title Bars help the user to be attentive of where s/he is throughout the application; and the Instruction Footer Bar contains additional instructions for using the screen.

The screen has one main section that provides information about the diagnostic, as well as a progress bar and a "View Log" button, both placed at the bottom of the section, where the former indicates the global execution progress and the latter allows to visualize tests details after finishing the diagnostic execution. That section contains the following diagnostics information:

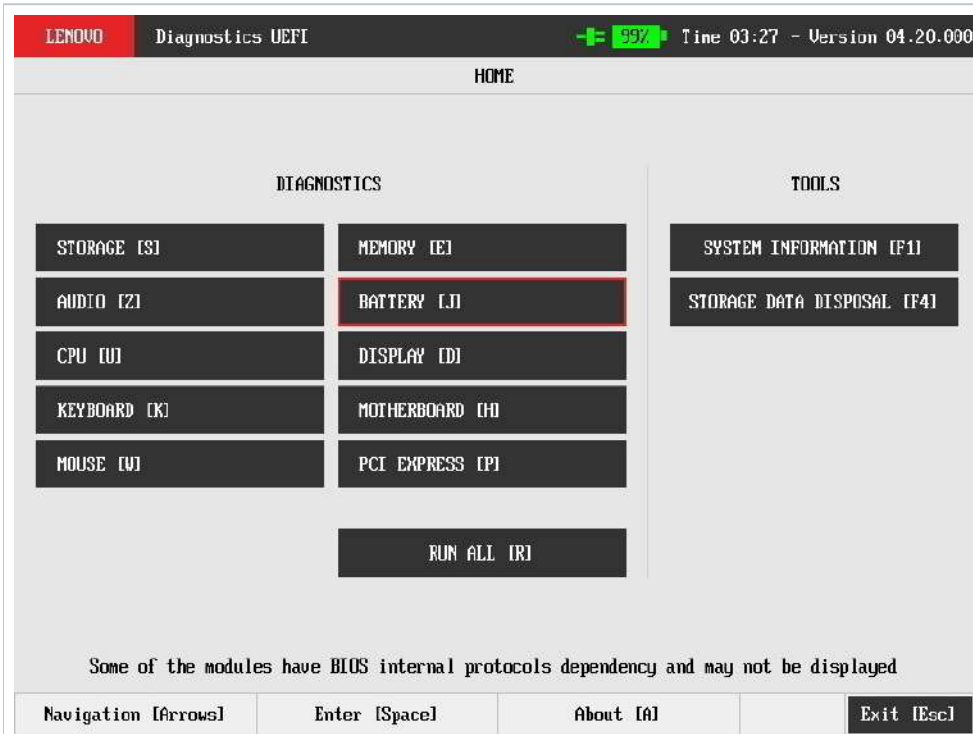
- Final Result Code (an encrypted code that informs which modules were tested).
- Date and time that diagnostic has started.
- Test (name of the test being currently run).
- Progress of the current test (current test's progress in percentage).
- Total estimated time of the current suite of diagnostic tests.
- A list with all the algorithms which compose device test and their respective status:
 - **Waiting**, indicating the test is waiting to be run.
 - **Progress** (plus the test execution percentage), indicating the test is being run.
 - **PASSED**, indicating the algorithm has found no problems at device.
 - **WARNING**, when applicable, indicating the algorithm has detected signs to the user be aware (for instance, of an imminent failure).
 - **CANCELED**, indicating the algorithm has been canceled by user.
- Date and time that the tests are finished (displayed after test is finished).
- Result Code for test.
- Elapsed time, that is a duration of test in hours, minutes and seconds (displayed after test is finished).

While the diagnostic is running, the user can stop it at any time by pressing the ESC key. If the user does that, the diagnostic is aborted and the status of the test that is being run is changed to **CANCELED**. After the diagnostic is finished or canceled, the user can go back to the Home screen (by pressing ESC again) or visualize the test log (by pressing the V key).

Battery

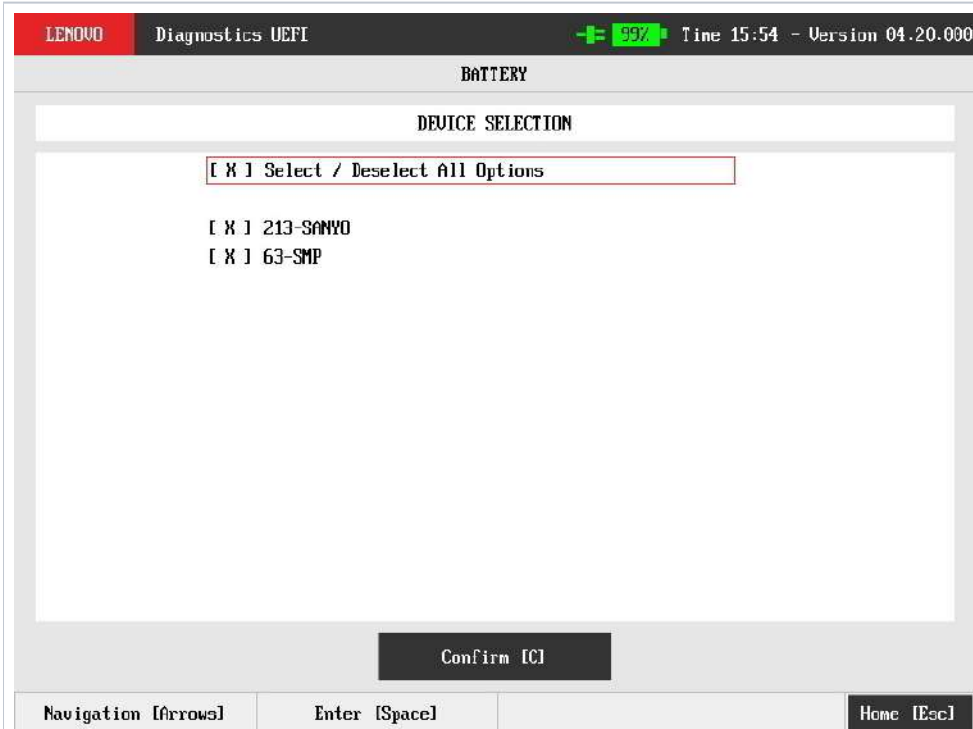
The battery module is available in only few models due to UEFI protocols availability.

The system allows the user to access the battery diagnostics from the Home screen, Diagnostics, Battery.




Home

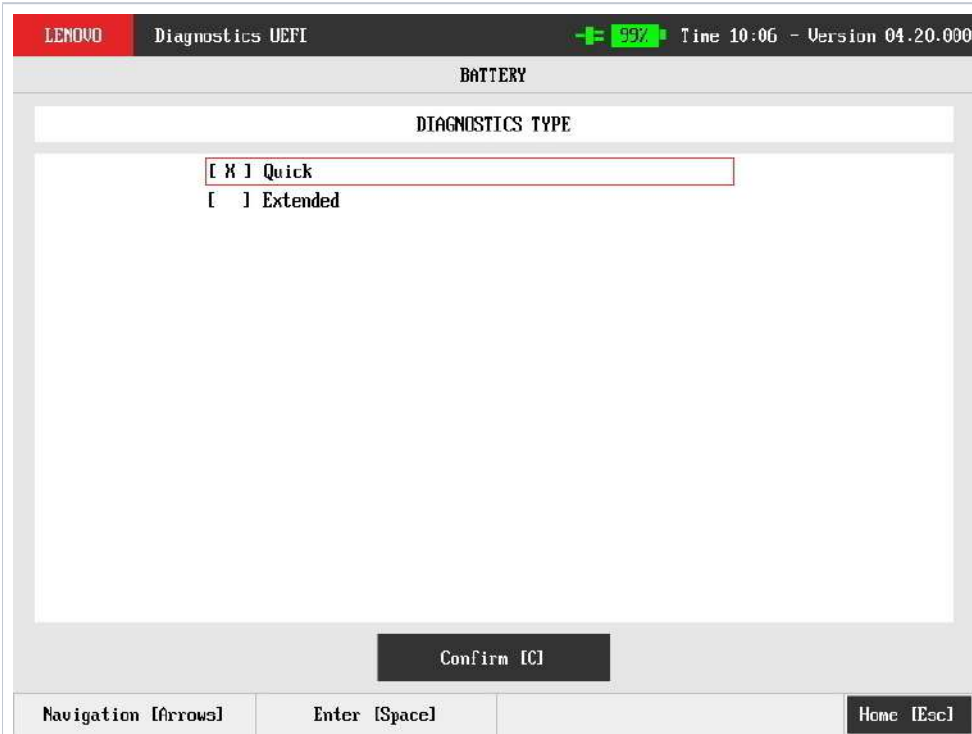
After the user enters the Battery option, the application will display the battery devices available in the system. If there is more than one battery device installed, the menu Device Selection is displayed, as shown in the next figure.



Battery Device Selection

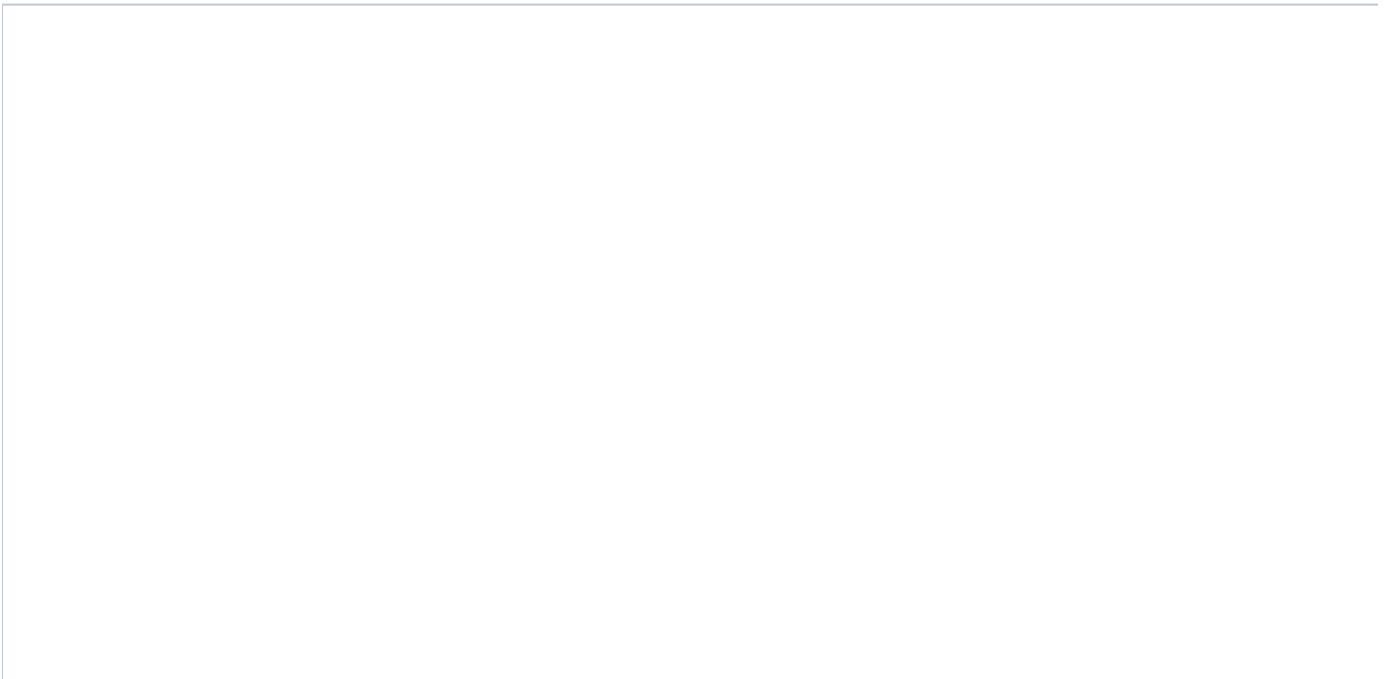
An item can be selected/deselected by pressing SPACE when it is highlighted. A desired item is selected when it shows "[X]" preceding it. In order to continue, the user has to press ENTER on the button Confirm. As a result, the system will show quick and extended diagnostic types, as illustrated in the next figure.

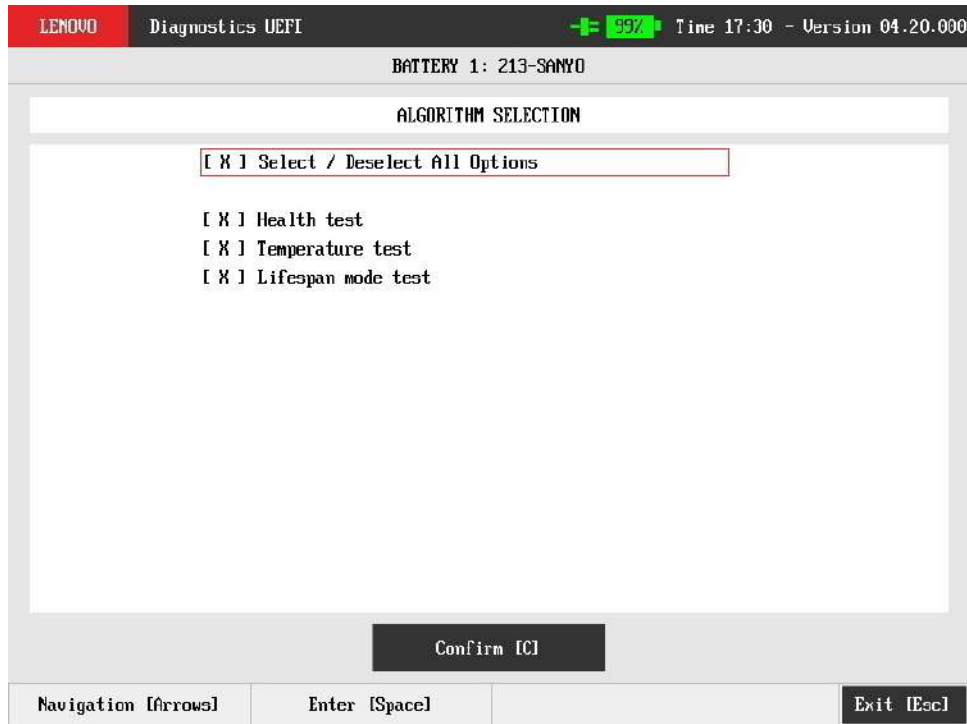
 If more than one battery is installed, Battery Extended diagnostic type won't be available due to UEFI detection limitation. The system will skip Diagnostic Type screen and present Quick Algorithm Selection screen



Battery Diagnostic Type

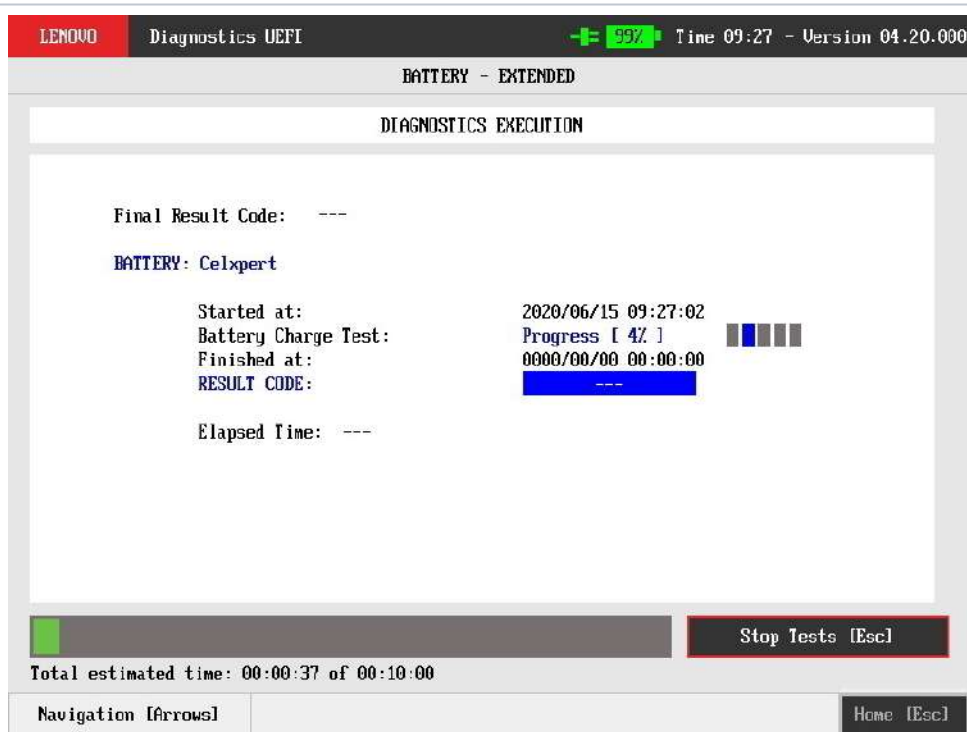
After the user selected an diagnostic type, all available tests will be displayed for execution. The available tests for quick diagnostics are illustrated in the next figure:





Battery Quick Algorithm Selection

The available tests for extended diagnostics are illustrated in the next figure:

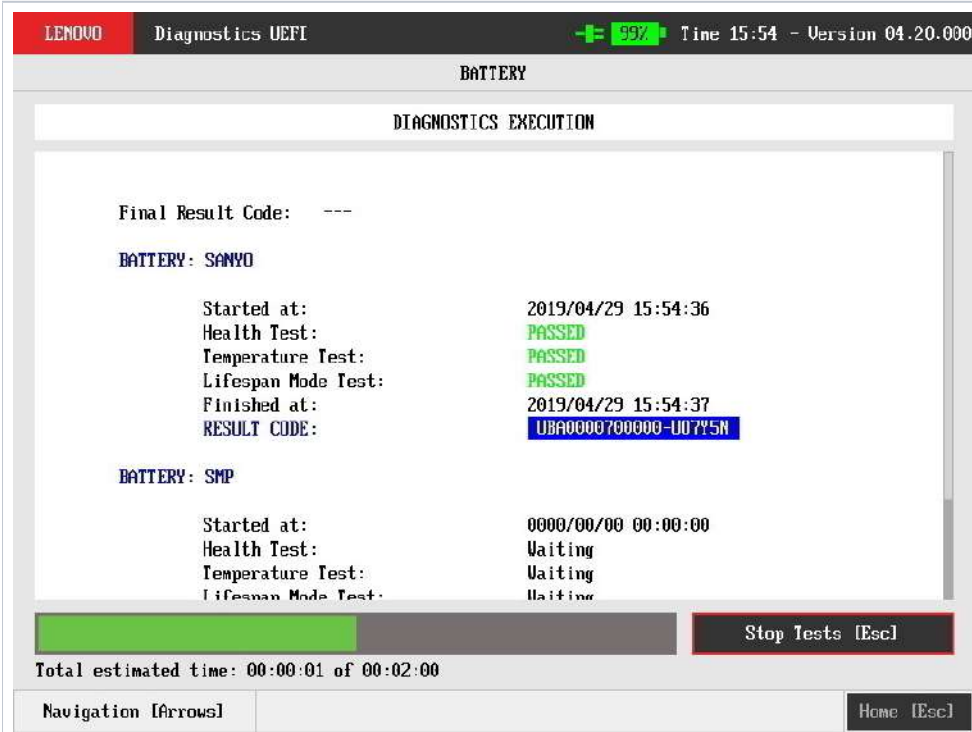


Battery Extended Algorithm Selection

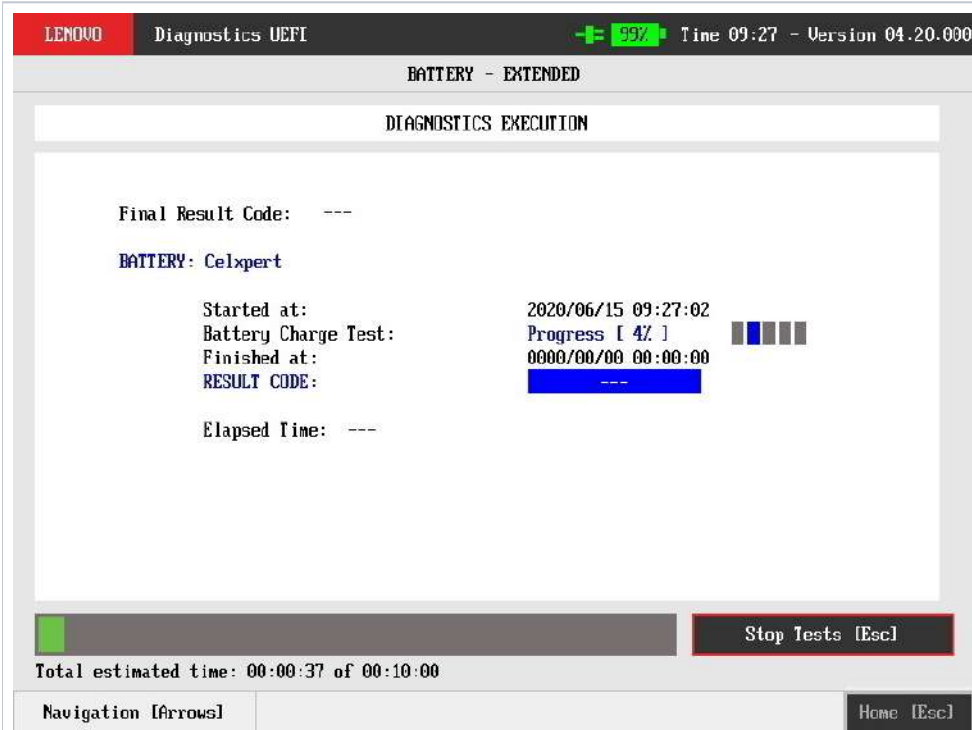
The user can deselect a select test by pressing the SPACE key when the test is highlighted. An empty space will appear between the brackets. To select a test again, the user can press the SPACE key again.

Initially, the "Select/Deselect All Options" is selected. If the user presses the SPACE or ENTER key on that option, then all test options will be deselected. If the user selects the "Select/Deselect All Options" again, all tests options will be selected again.

At least one test must be selected, so that the application can run the diagnostic. After the user chooses which tests must be performed, the user can use the "Confirm" button. Consequently, the system will run all tests, as illustrated in the figure below.



Battery Quick Diagnostics Execution



Battery Extended Diagnostics Execution

The Battery Diagnostics Execution screen provides information about the battery diagnostics progress, as well as information about the results. This screen is composed of:

- Application Header Bar
- Screen Title Bar
- Screen Sub-title Bar
- Diagnostic Information Section
- Instruction Footer Bar

The Application Header Bar contains the name of the application, system's time and application's current version; the Screen Title and Screen Sub-title Bars help the user to be attentive of where s/he is throughout the application; and the Instruction Footer Bar contains additional instructions for using the screen, as well as the Exit button.

The screen has one main section that provides information about the diagnostic, as well as a progress bar and a "View Log" button, both placed at the bottom of the section, where the former indicates the global execution progress and the latter allows to visualize tests details after finishing the diagnostic execution. That section contains the following diagnostics information:

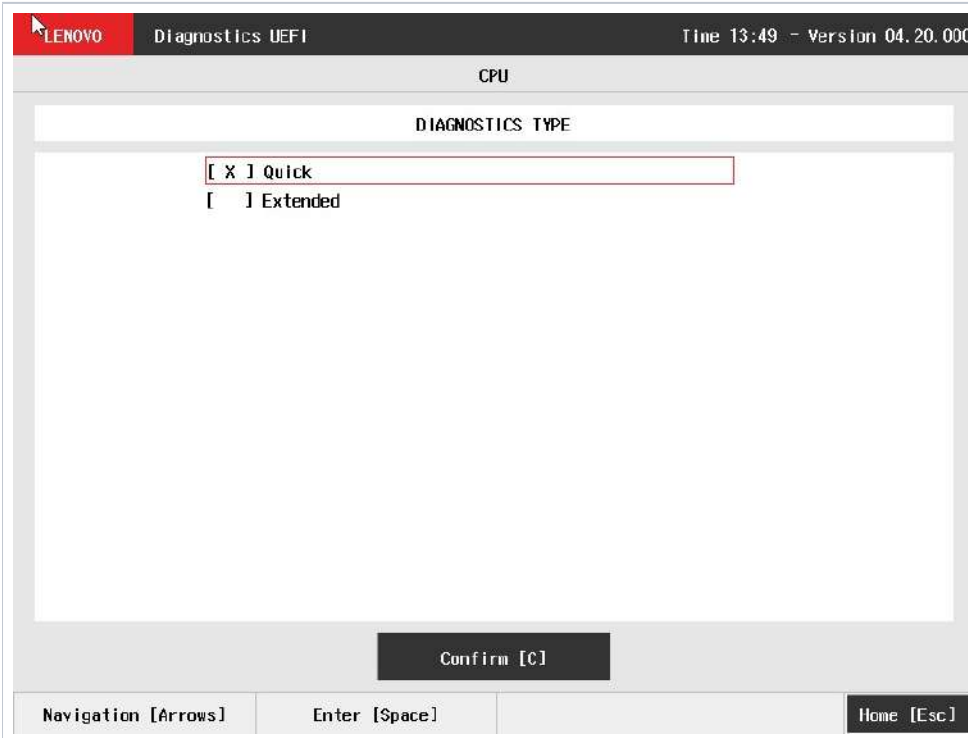
- Final Result Code (an encrypted code that informs which modules were tested).
- Date and time that diagnostic has started.
- Test (name of the test being currently run).
- Progress of the current test (current test's progress in percentage).
- Total estimated time of the current suite of diagnostic tests.
- A list with all the algorithms which compose device test and their respective status:
 - **Waiting**, indicating the test is waiting to be run.
 - **Progress** (plus the test execution percentage), indicating the test is being run.
 - **PASSED**, indicating the algorithm has found no problems at device.
 - **WARNING**, when applicable, indicating the algorithm has detected signs to the user be aware (for instance, of an imminent failure).
 - **FAILED**, indicating the algorithm has found one or more faults.
 - **CANCELED**, indicating the algorithm has been canceled by user.
- Date and time that the tests are finished (displayed after test is finished).
- Result Code for test.
- Elapsed time, that is a duration of test in hours, minutes and seconds (displayed after test is finished).

While the diagnostic is running, the user can stop it at any time by pressing the ESC key. If the user does that, the diagnostic is aborted and the status of the test that is being run is changed to **CANCELED**. After the diagnostic is finished or canceled, the user can go back to the Home screen (by pressing ESC again) or visualize the test log (by pressing the V key).

CPU

The system allows the user to access the CPU diagnostics from the Home screen, Diagnostics, CPU.

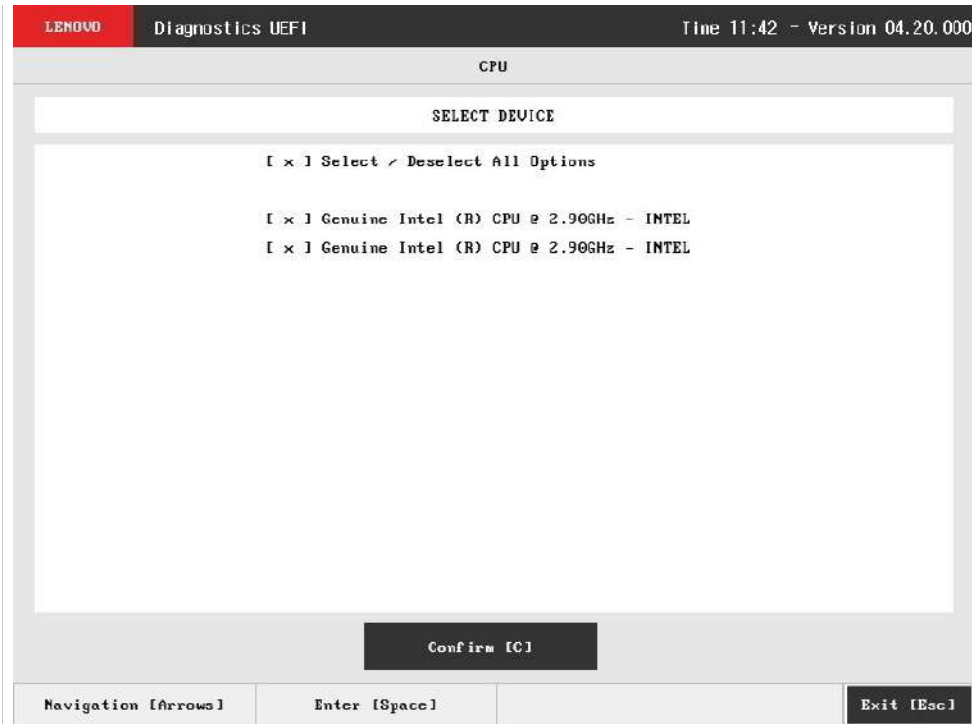
After the user enters the CPU option, the CPU diagnostics type's menu will be displayed, as the following image.



CPU Diagnostics Type

An item can be selected/deselected by pressing SPACE when it is highlighted. A desired item is selected when it shows "[X]" preceding it.

After the user enters the "Confirm" button, the application will display the CPU devices available in the system. If there is more than one CPU device installed, the menu Device Selection is displayed, as shown in the next figure.



CPU Device Selection

CPU Quick Diagnostics

The system allows the user to access the CPU quick diagnostics from the Home screen, Diagnostics, CPU.

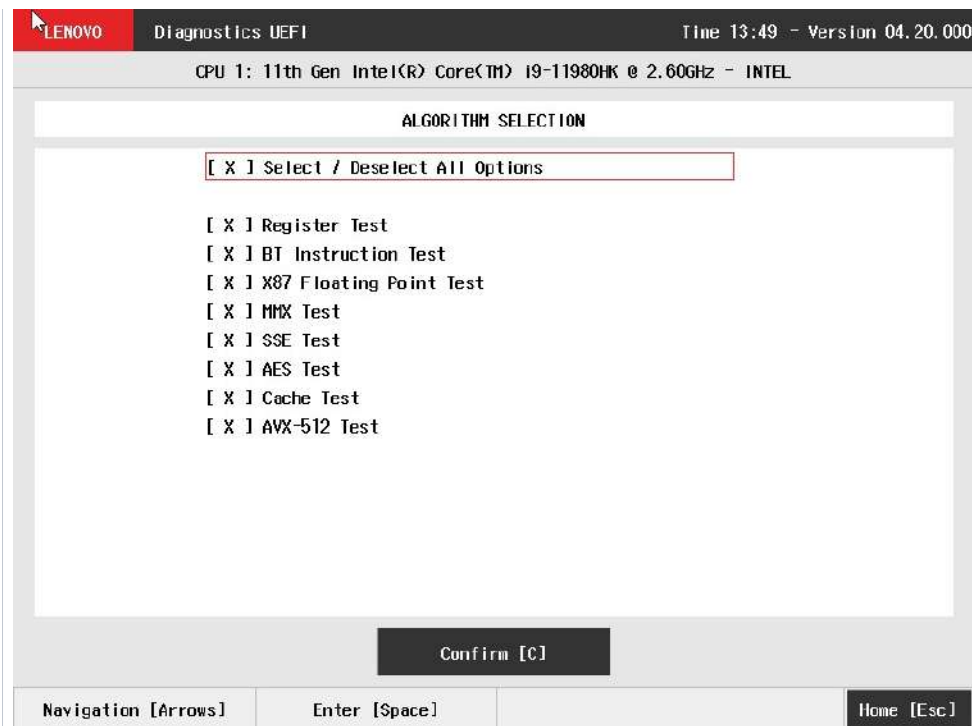
Quick diagnostics are test algorithms that take less than 10 minutes to execute each test.

An item can be selected/deselected by pressing SPACE when it is highlighted. A desired item is selected when it shows "[X]" preceding it. To access the CPU quick diagnostics, the user can use the UP/DOWN arrow key until "Quick" is focused and press SPACE key to select it.

In order to continue, the user has to press ENTER on the button Confirm. As a result, the system will show a list of tests, as illustrated in the next figure, and all the tests are initially selected to be tested.

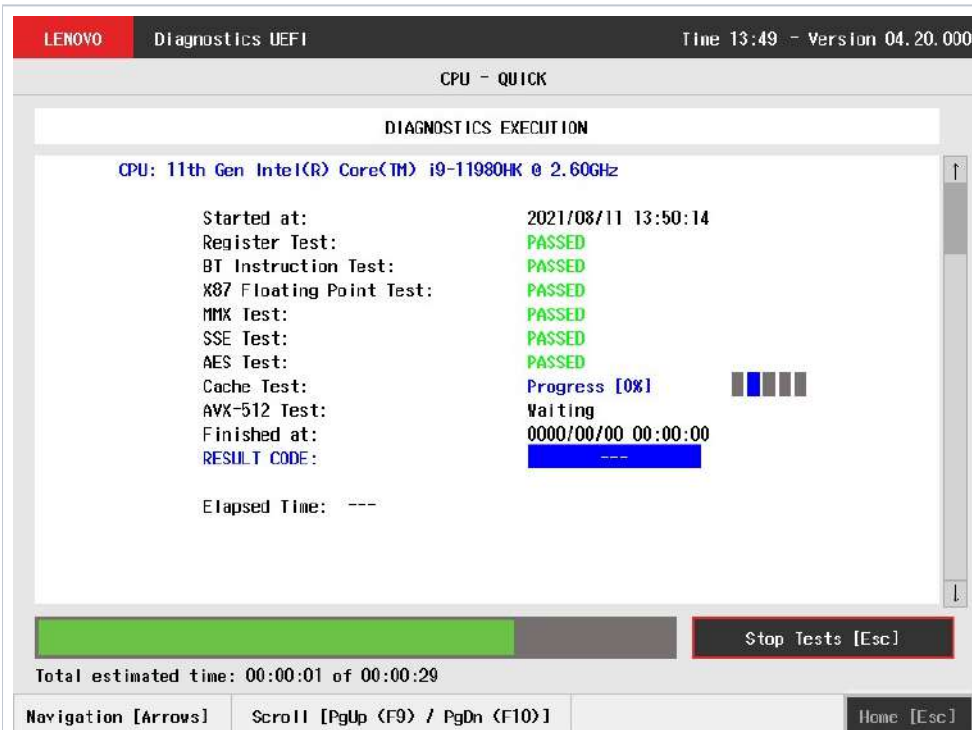
The user can deselect a selected test by pressing the SPACE key when the test is highlighted. An empty space will appear between the brackets. To select a test again, the user can press the SPACE key again.

Initially, the "Select/Deselect All Options" is selected. If the user presses the SPACE or ENTER key on that option, then all test options will be deselected. If the user selects the "Select/Deselect All Options" again, all tests options will be selected again.



CPU Algorithm Selection

At least one test must be selected, so that the application can run the diagnostic. After the user chooses which tests must be performed, the user can use the Confirm button. Consequently, the system will run all tests, as illustrated in the figure below.



CPU Quick Diagnostics Execution

The CPU Quick Diagnostics Execution screen provides information about the CPU diagnostics progress, as well as information about the results. This screen is composed of:

- Application Header Bar
- Screen Title Bar

- Screen Sub-title Bar
- Diagnostic Information Section
- Instruction Footer Bar

The Application Header Bar contains the name of the application, system's time and application's current version; the Screen Title and Screen Sub-title Bars help the user to be attentive of where s/he is throughout the application; and the Instruction Footer Bar contains additional instructions for using the screen, as well as the Exit button.

The screen has one main section that provides information about the diagnostic, as well as a progress bar and a View Log button, both placed at the bottom of the section, where the former indicates the global execution progress and the latter allows to visualize tests details after finishing the diagnostic execution. That section contains the following diagnostics information:

- Final Result Code (an encrypted code that informs which modules were tested).
- Date and time that diagnostic has started.
- Test (name of the test being currently run).
- Progress of the current test (current test's progress in percentage).
- Total estimated time of the current suite of diagnostic tests.
- A list with all the algorithms which compose device test and their respective status:
 - **Waiting**, indicating the test is waiting to be run.
 - **Progress** (plus the test execution percentage), indicating the test is being run.
 - **PASSED**, indicating the algorithm has found no problems at device.
 - **WARNING**, when applicable, indicating the algorithm has detected signs to the user be aware (for instance, of an imminent failure).
 - **FAILED**, indicating the algorithm has found one or more faults.
 - **CANCELED**, indicating the algorithm has been canceled by user.
 - **NOT APPLICABLE**, indicating the algorithm is not supported by device.
- Date and time that the tests are finished (displayed after test is finished).
- Result Code for test.
- Elapsed time, that is a duration of test in hours, minutes and seconds (displayed after test is finished).

While the diagnostic is running, the user can stop it at any time by pressing the ESC key. If the user does that, the diagnostic is aborted and the status of the test that is being run is changed to CANCELED. After the diagnostic is finished or canceled, the user can go back to the Home screen (by pressing ESC again) or visualize the test log (by pressing the V key).

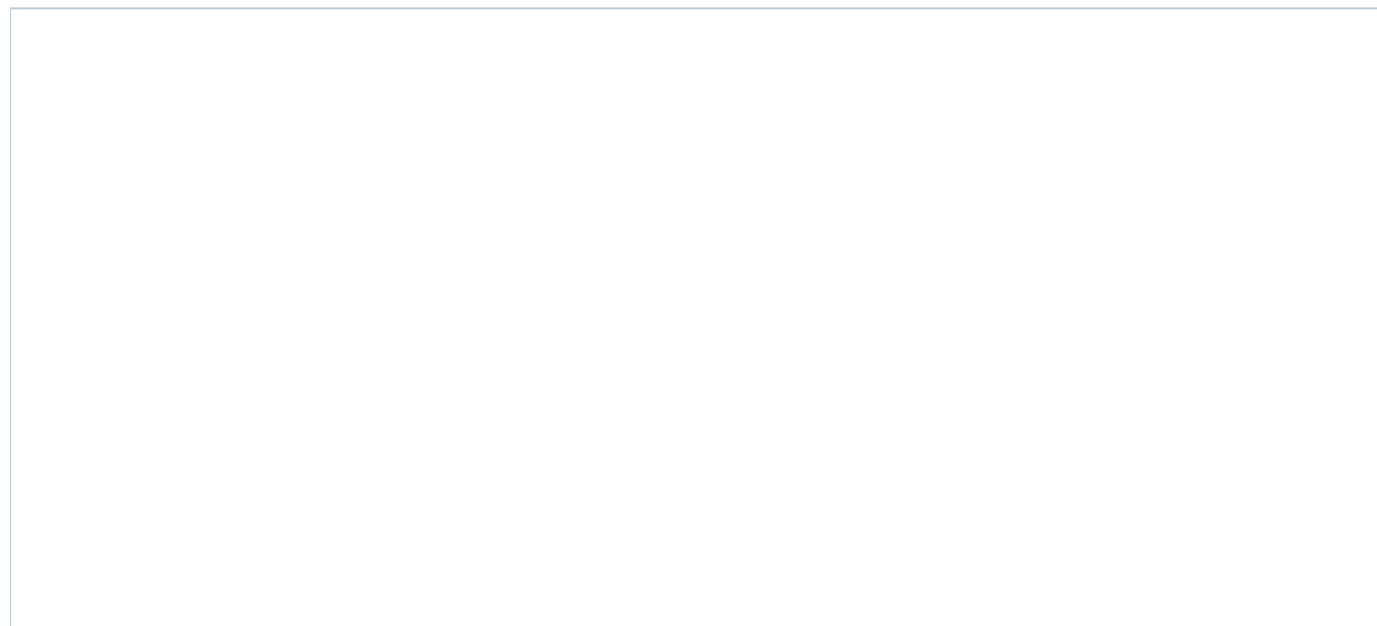
CPU Extended Diagnostics

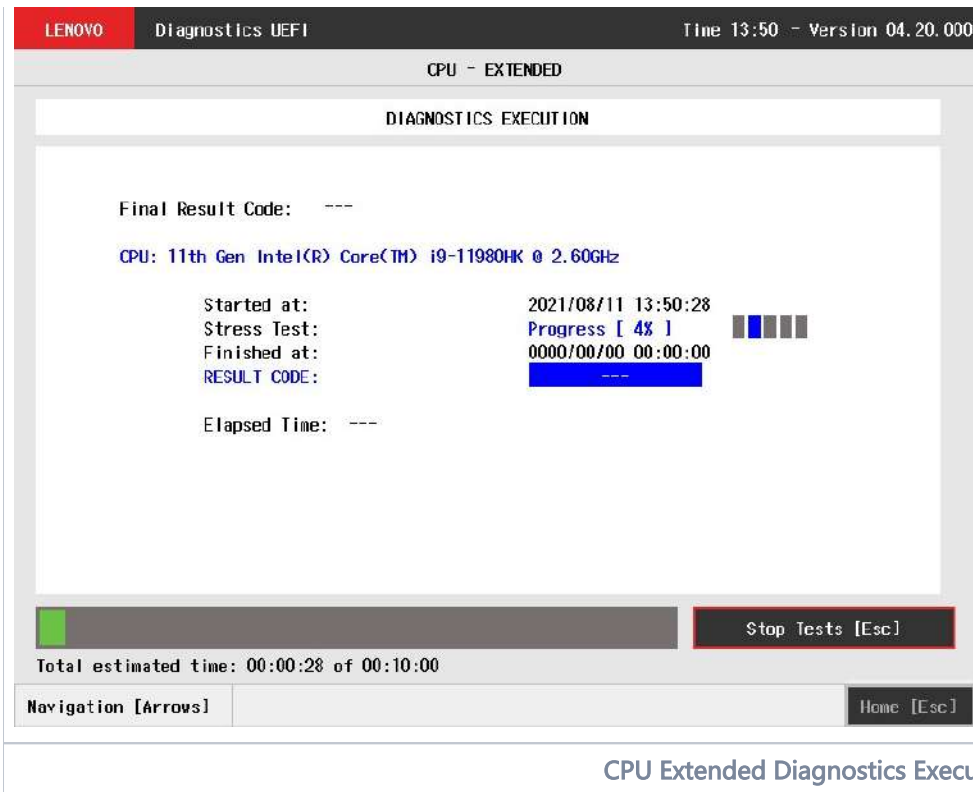
The system allows the user to access the CPU extended diagnostics from the Home screen, Diagnostics, CPU.

Extended Diagnostics may take more than 10 minutes to complete each test.

An item can be selected/deselected by pressing SPACE when it is highlighted. A desired item is selected when it shows "[X]" preceding it. To access the CPU extended diagnostics, the user can use the UP/DOWN arrow key until "Extended" is focused and press SPACE key to select it.

In order to continue, the user has to press ENTER on the button Confirm. When the user presses ENTER, the application will run the "Stress Test", and it will take about 10 minutes to complete.





CPU Extended Diagnostics Execution

The CPU Extended Diagnostics Execution screen provides information about the CPU diagnostics progress, as well as information about the results. This screen is composed of:

- Application Header Bar
- Screen Title Bar
- Screen Sub-title Bar
- Diagnostic Information Section
- Instruction Footer Bar

The Application Header Bar contains the name of the application, system's time and application's current version; the Screen Title and Screen Sub-title Bars help the user to be attentive of where s/he is throughout the application; and the Instruction Footer Bar contains additional instructions for using the screen, as well as the Exit button.

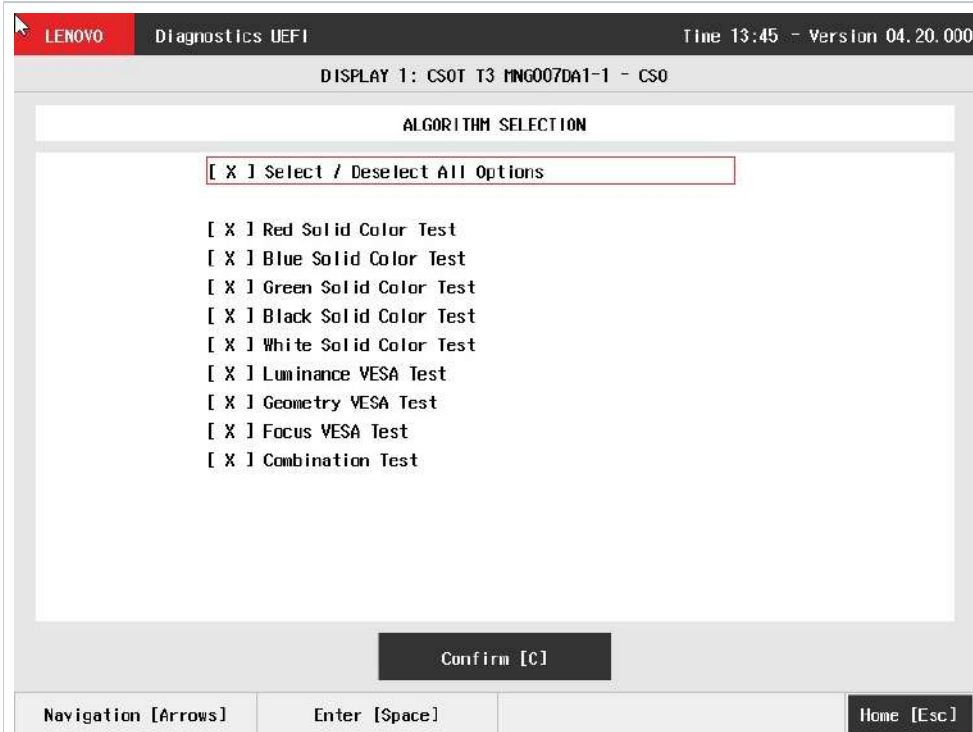
The screen has one main section that provides information about the diagnostic, as well as a progress bar and a View Log button, both placed at the bottom of the section, where the former indicates the global execution progress and the latter allows to visualize tests details after finishing the diagnostic execution. That section contains the following diagnostics information:

- Final Result Code (an encrypted code that informs which modules were tested).
- Date and time that diagnostic has started.
- Test (name of the test being currently run).
- Progress of the current test (current test's progress in percentage).
- Total estimated time of the current suite of diagnostic tests.
- A list with all the algorithms which compose device test and their respective status:
 - **Waiting**, indicating the test is waiting to be run.
 - **Progress** (plus the test execution percentage), indicating the test is being run.
 - **PASSED**, indicating the algorithm has found no problems at device.
 - **WARNING**, when applicable, indicating the algorithm has detected signs to the user be aware (for instance, of an imminent failure).
 - **FAILED**, indicating the algorithm has found one or more faults.
 - **CANCELED**, indicating the algorithm has been canceled by user.
 - **NOT APPLICABLE**, indicating the algorithm is not supported by device.
- Date and time that the tests are finished (displayed after test is finished).
- Result Code for test.
- Elapsed time, that is a duration of test in hours, minutes and seconds (displayed after test is finished).

While the diagnostic is running, the user can stop it at any time by pressing the ESC key. If the user does that, the diagnostic is aborted and the status of the test that is being run is changed to CANCELED. After the diagnostic is finished or canceled, the user can go back to the Home screen (by pressing ESC again) or visualize the test log (by pressing the V key).

Display

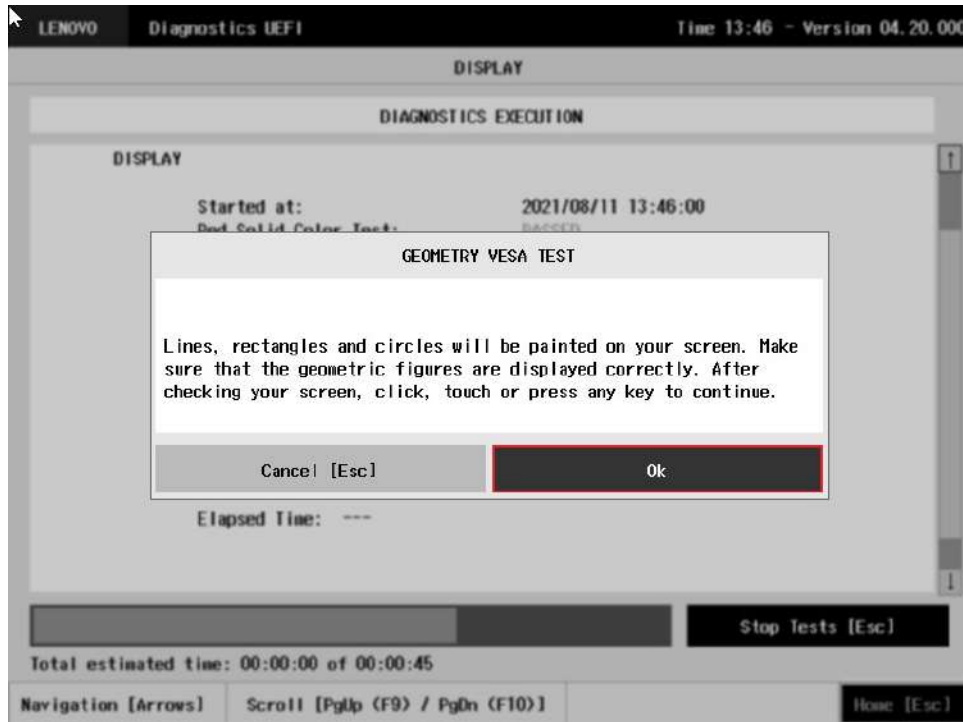
After the user enters the Display option, the application computes the number of algorithms that can be performed by the diagnostic. If the diagnostic has more than one algorithm, Algorithm Selection screen is displayed, as shown in the figure below.



Display Algorithm Selection

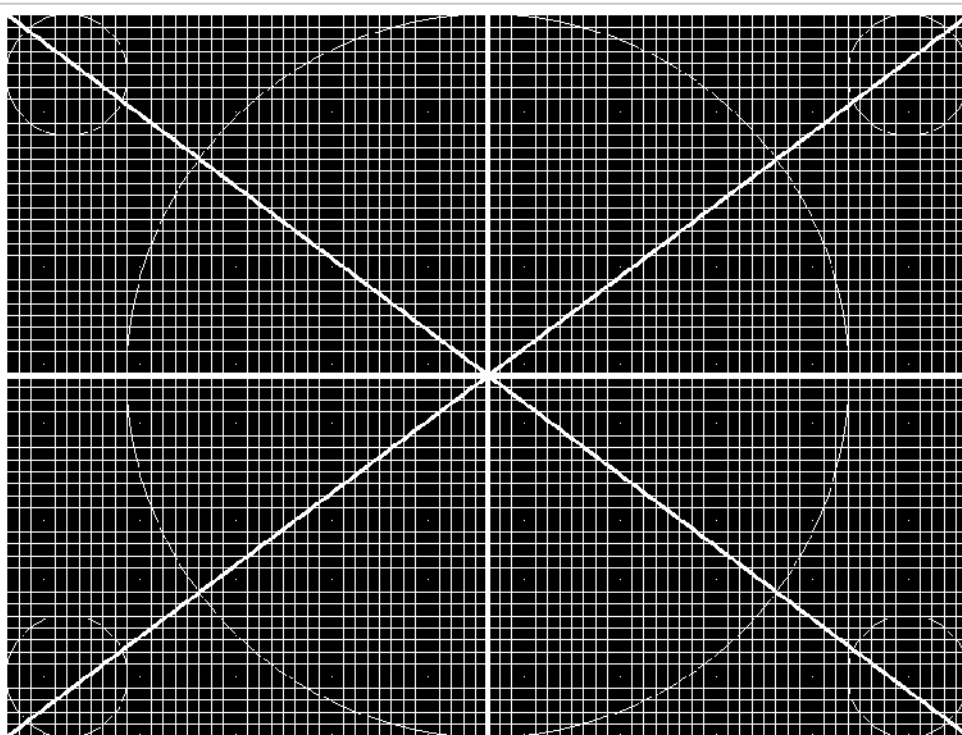
The Algorithm Selection screen allows the user to select which algorithms will be tested by the application. After the user chooses at least one test and chooses the Confirm button on the Algorithm Selection screen, the Display tests start.

Before an algorithm is run, a popup containing instructions about the algorithm is displayed, as shown in the following figure. The user can press the ENTER key to proceed with the algorithm execution or can press ESC to abort the test.



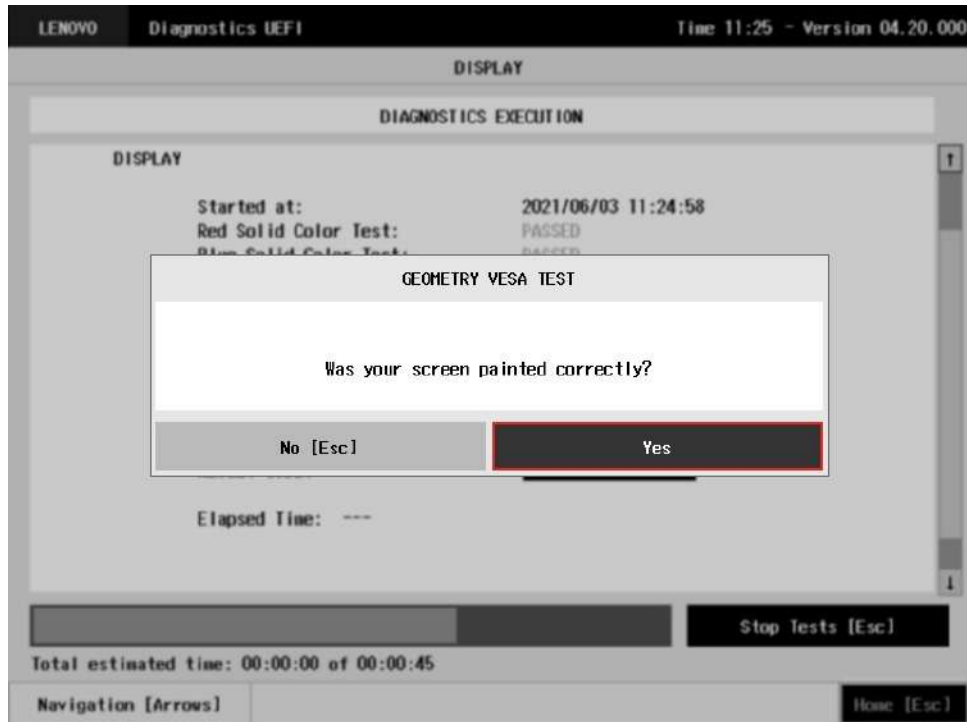
Display Test Instruction Popup

If the user chooses to proceed with the test's execution, an image pattern will be displayed on the screen, as shown in the following figure. After the user checks the screen, user can proceed with the test's execution by pressing any key, mouse click or touch action.



Geometry VESA Test

After that, a popup shows up, asking the user if the pattern was correctly painted on the display. If so, the user must press the ENTER key; if not, the user must press the ESC key. This popup can be seen in the next figure.

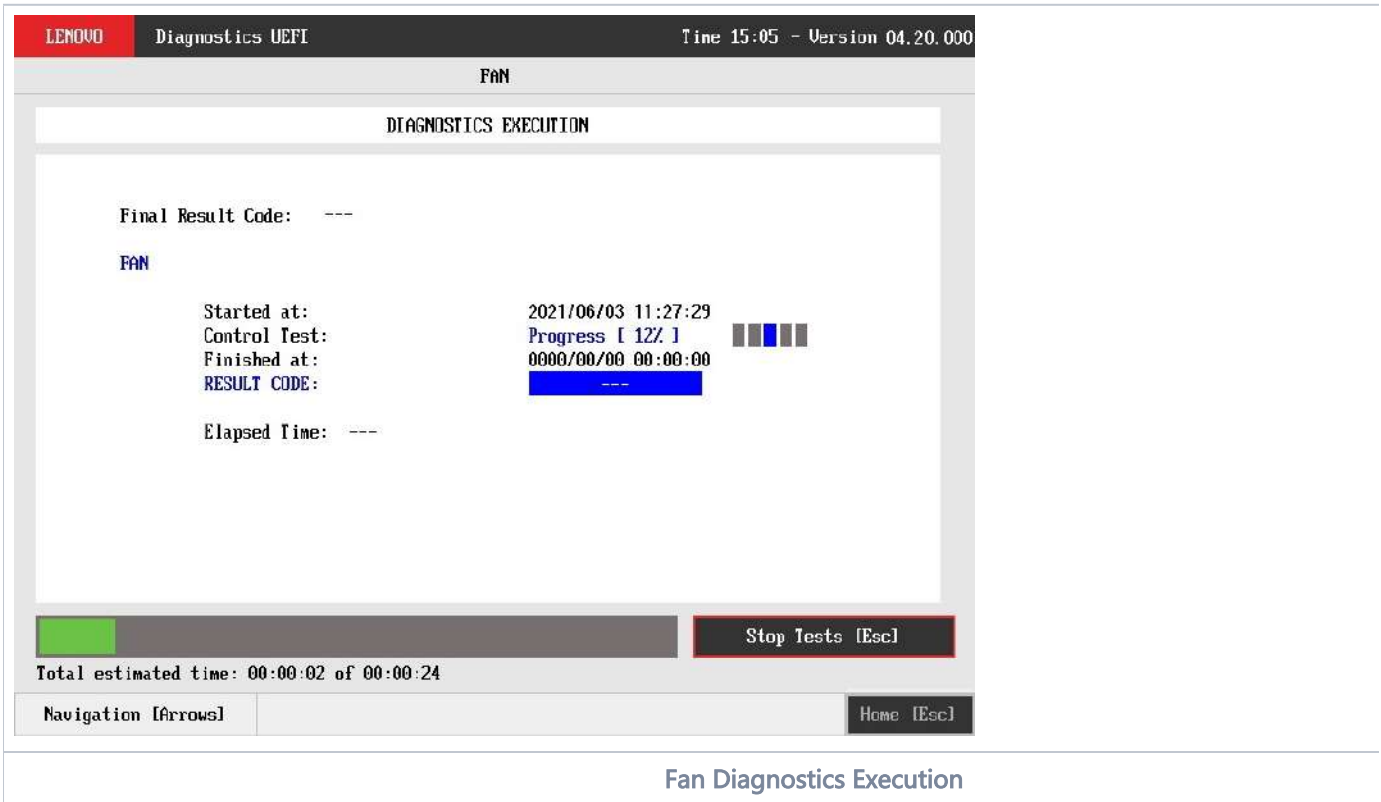


Display Test Result Inquiry Popup

This process is repeated for each selected algorithm. After the test is finished or canceled, the user can go back to the Home screen by pressing the ESC key again or to the Diagnostics Result Log screen by pressing the V key.

Fan

After the user enters the Fan option, the application verifies the number of algorithms that can be performed by the diagnostic. If the diagnostic has only one algorithm, it will be started, as shown in the next figure.



The Fan Diagnostics Execution screen provides information about the fan diagnostics progress, as well as information about the results. This screen is composed of:

- Application Header Bar
- Screen Title Bar
- Screen Sub-title Bar
- Diagnostic Information Section
- Instruction Footer Bar

The Application Header Bar contains the name of the application, system's time and application's current version; the Screen Title and Screen Sub-title Bars help the user to be attentive of where s/he is throughout the application; and the Instruction Footer Bar contains additional instructions for using the screen, as well as the Exit button.

The screen has one main section that provides information about the diagnostic, as well as a progress bar and a View Log button, both placed at the bottom of the section, where the former indicates the global execution progress and the latter allows to visualize tests details after finishing the diagnostic execution. That section contains the following diagnostics information:

- Final Result Code (an encrypted code that informs which modules were tested).
- Date and time that diagnostic has started.
- Test (name of the test being currently run).
- Progress of the current test (current test's progress in percentage).
- Total estimated time of the current suite of diagnostic tests.
- A list with all the algorithms which compose device test and their respective status:
 - **Waiting**, indicating the test is waiting to be run.
 - **Progress** (plus the test execution percentage), indicating the test is being run.
 - **PASSED**, indicating the algorithm has found no problems at device.
 - **WARNING**, when applicable, indicating the algorithm has detected signs to the user be aware (for instance, of an imminent failure).
 - **FAILED**, indicating the algorithm has found one or more faults.
 - **CANCELED**, indicating the algorithm has been canceled by user.
 - **NOT APPLICABLE**, indicating the algorithm is not supported by device.

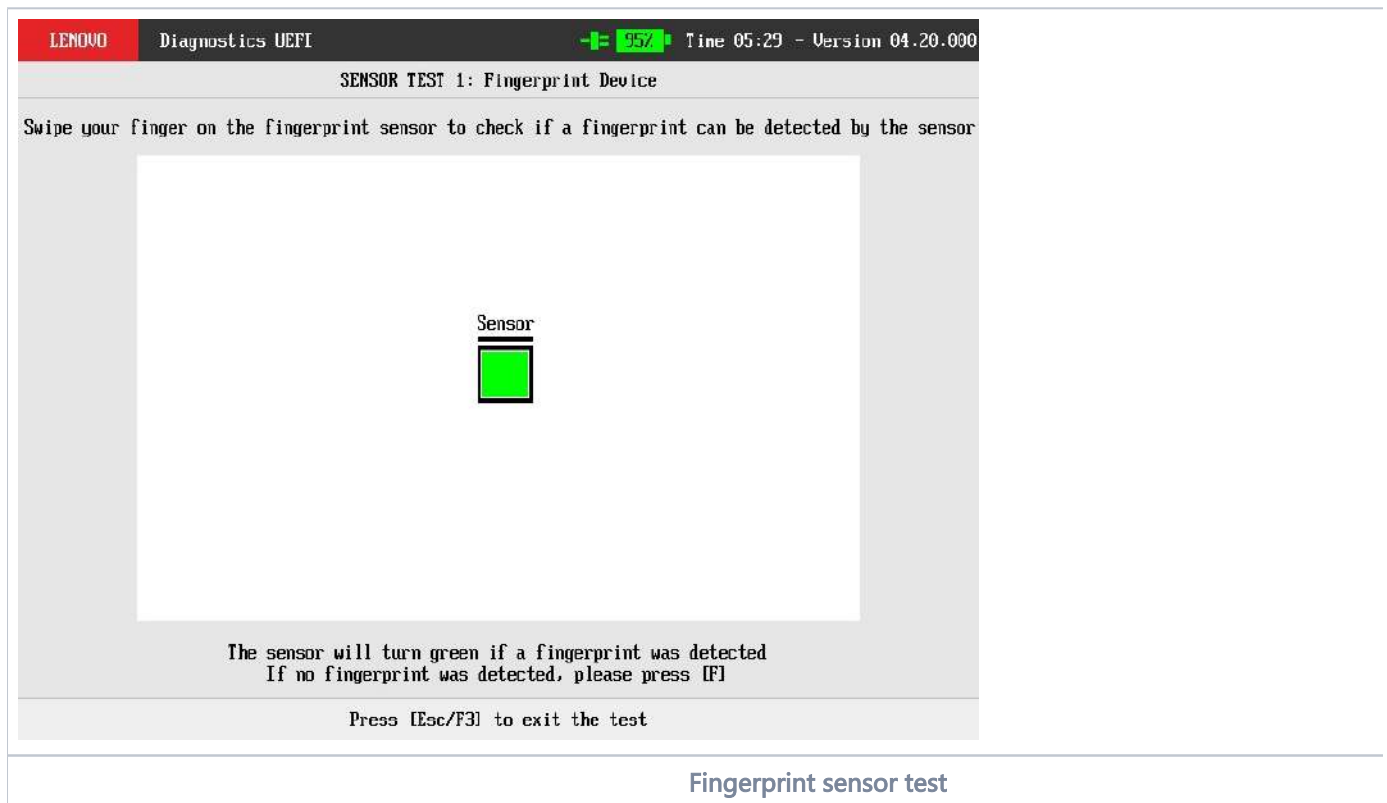
- Date and time that the tests are finished (displayed after test is finished).
- Result Code for test.
- Elapsed time, that is a duration of test in hours, minutes and seconds (displayed after test is finished).

While the diagnostic is running, the user can stop it at any time by pressing the ESC key. If the user does that, the diagnostic is aborted and the status of the test that is being run is changed to CANCELED. After the diagnostic is finished or canceled, the user can go back to the Home screen (by pressing ESC again) or visualize the test log (by pressing the V key).

The dual fan support was added on **v04.06.000** version.

Fingerprint

After the user enters the Fingerprint option, the application will execute the sensor test that waits for the user to swipe or touch a finger on the fingerprint sensor, if it is detected, the test return **SUCCESS**, the square representing the sensor will turn green.

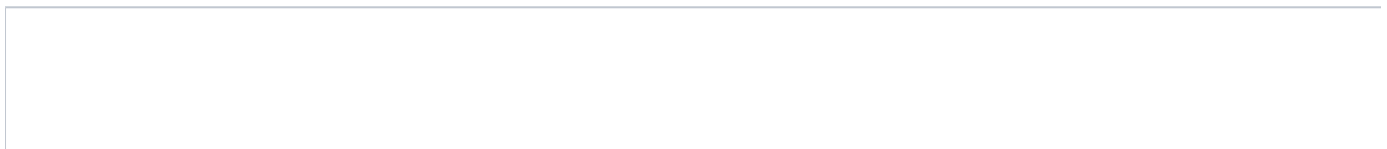


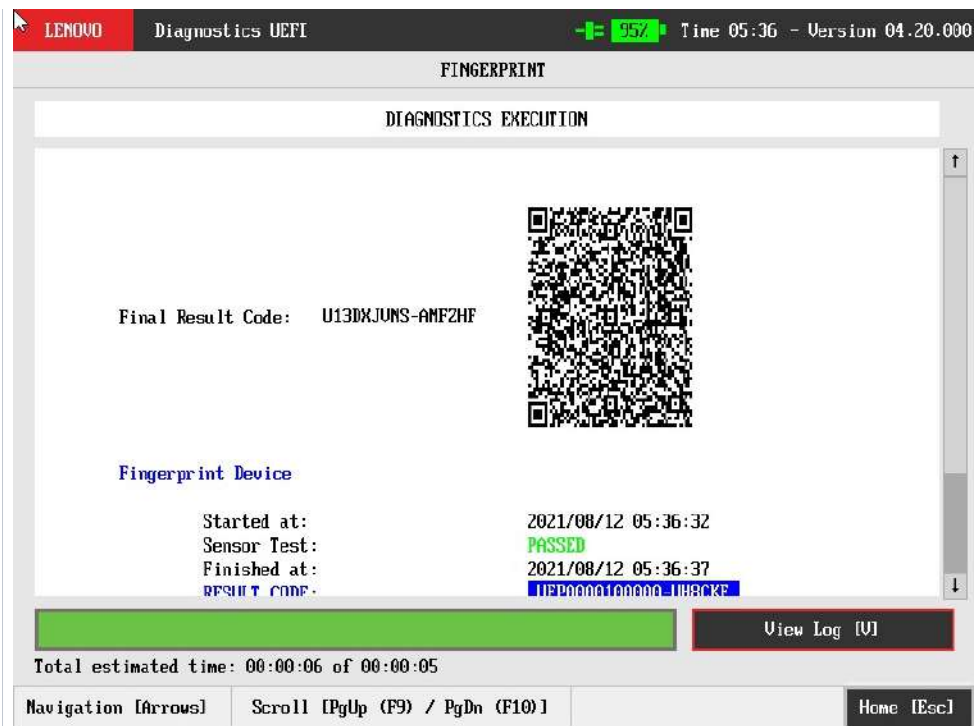
- **Sensor Test:**
 - **Description:** "Sensor Test" is a sensor test that checks if its possible to read data from sensor within user interaction
 - **Results:** **PASSED**; **FAILED**; CANCELED; NOT APPLICABLE.

In the Sensor test, it is an attended test that will ask the user to swipe a finger on the sensor to check if a fingerprint was detected.

- If the sensor detected successfully, the test is finished and finished execution screen is displayed
 - The test result will be **PASSED**
- If the sensor does not detect any fingerprint, the user can finish the test pressing **[F]**
 - The test result will be **FAILED**
- If the user press **[Esc]**, the test will be **CANCELED**
- If the test can not be executed the test result will be **NOT APPLICABLE**.

After the sensor test execution, the screen below is displayed with the test results:





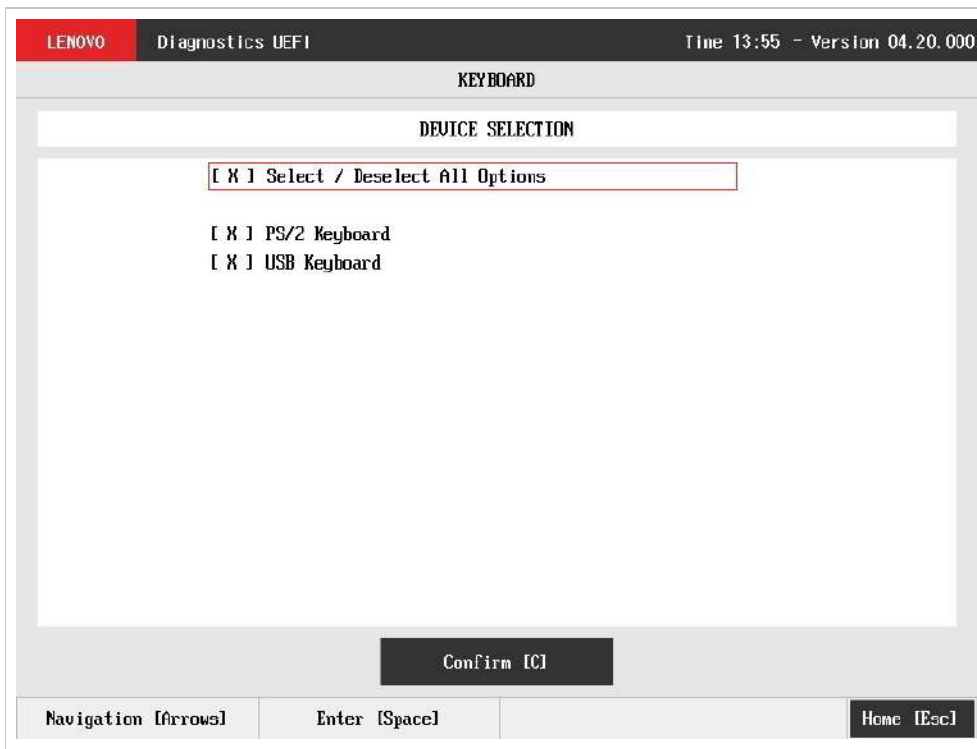
Fingerprint sensor test result screen

Note

Fingerprint Sensor test will automatically exit after 15 seconds of no user interaction, cancelling the test.

Keyboard

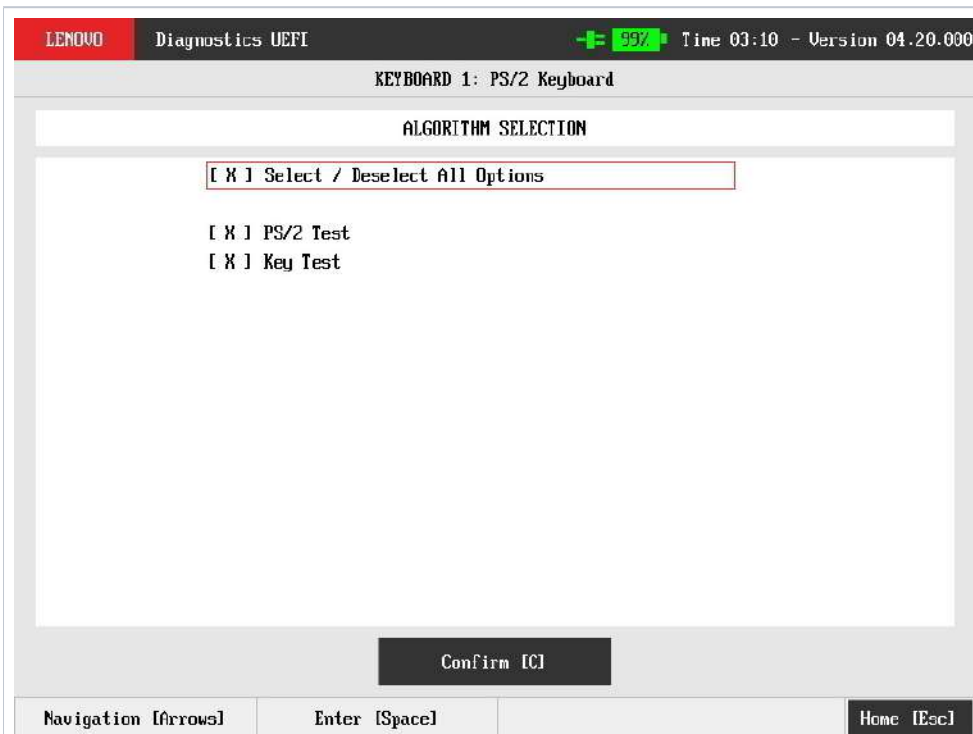
The user can choose between PS/2 or USB keyboard as is shown in the figure below.



Keyboard type selection

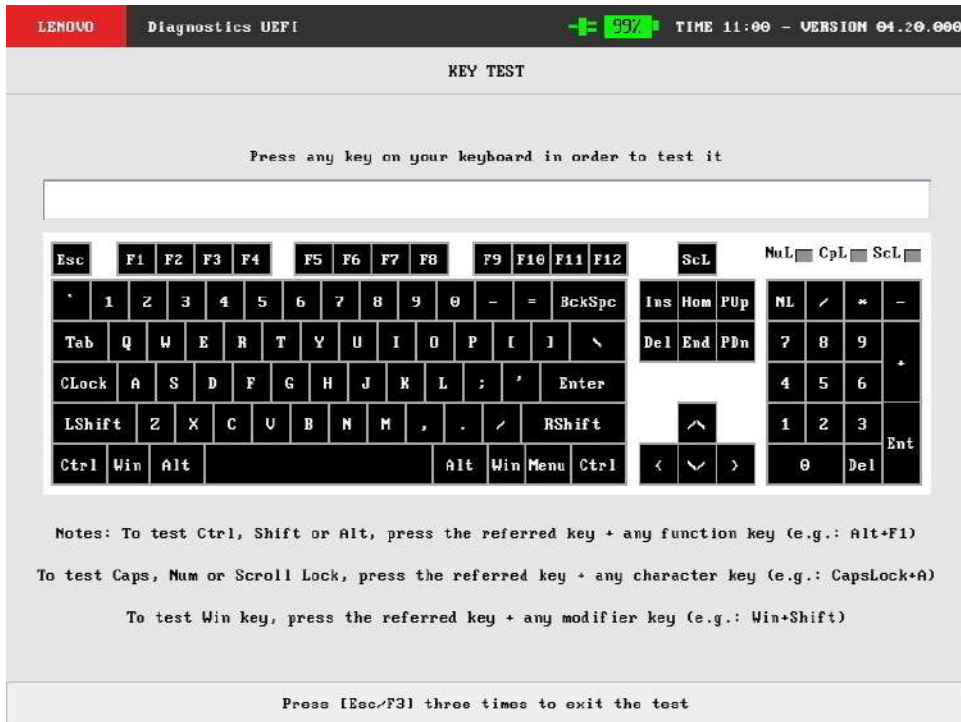
After the selection of the desired keyboard, the user can select the tests for the selected keyboard type:

- **PS/2 Test:**
 - **Description:** "PS/2 Test" is a keyboard test that checks the access to PS/2 type keyboards.
 - **Results:** PASSED; FAILED; CANCELED; NOT APPLICABLE.
- **USB Test:**
 - **Description:** "USB Test" is a keyboard test that checks the access to USB type keyboards.
 - **Results:** PASSED; FAILED; WARNING¹; CANCELED; NOT APPLICABLE.
 - ¹: This test presents similar behavior to USB keyboard Test from Lenovo Diagnostics Windows, consequently, the **WARNING** test result is given when some information is not retrieved.
 - **Warning Message** (when some information is not retrieved): *WARNING Manufacturer or Machine Type-Model (MTM) was not possible to be retrieved*
- **Key Test:**
 - **Description:** "Key Test" is an attended keyboard test that the user can check whether the keys and existing LEDs are properly working for PS/2 Keyboards or USB Keyboards.
 - **Results:** PASSED; FAILED; CANCELED.

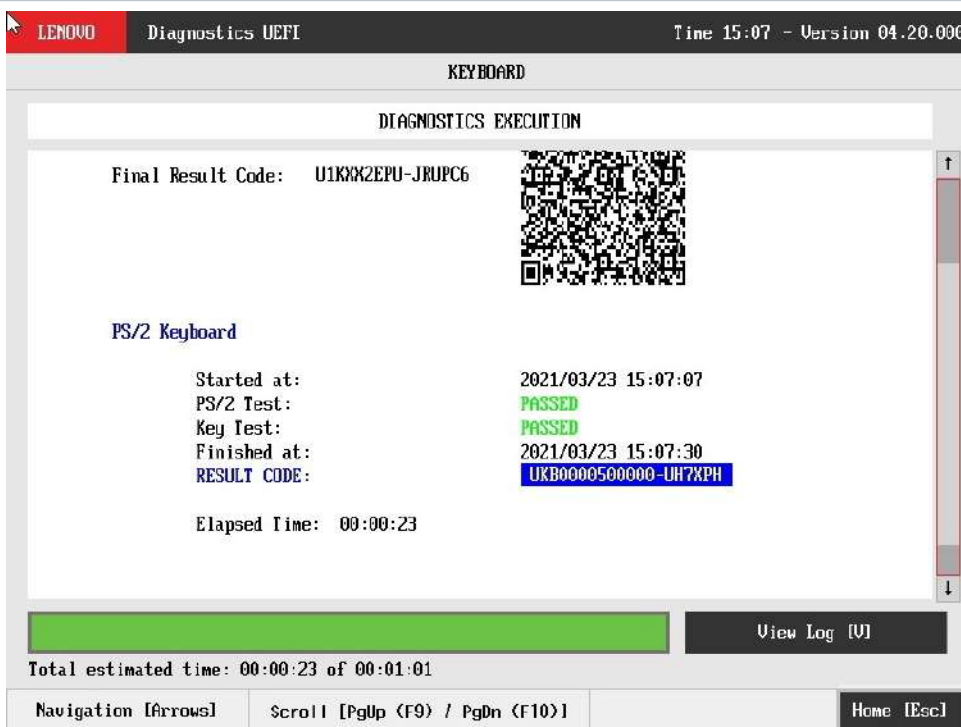


Keyboard Test selection

At least one test must be selected, so that the application can run the diagnostic. After the user chooses which tests must be performed, the user can use the Confirm button. Consequently, the system will run all selected tests, as illustrated in the figures below.



Keyboard Key Test execution



Keyboard Diagnostics execution

Note

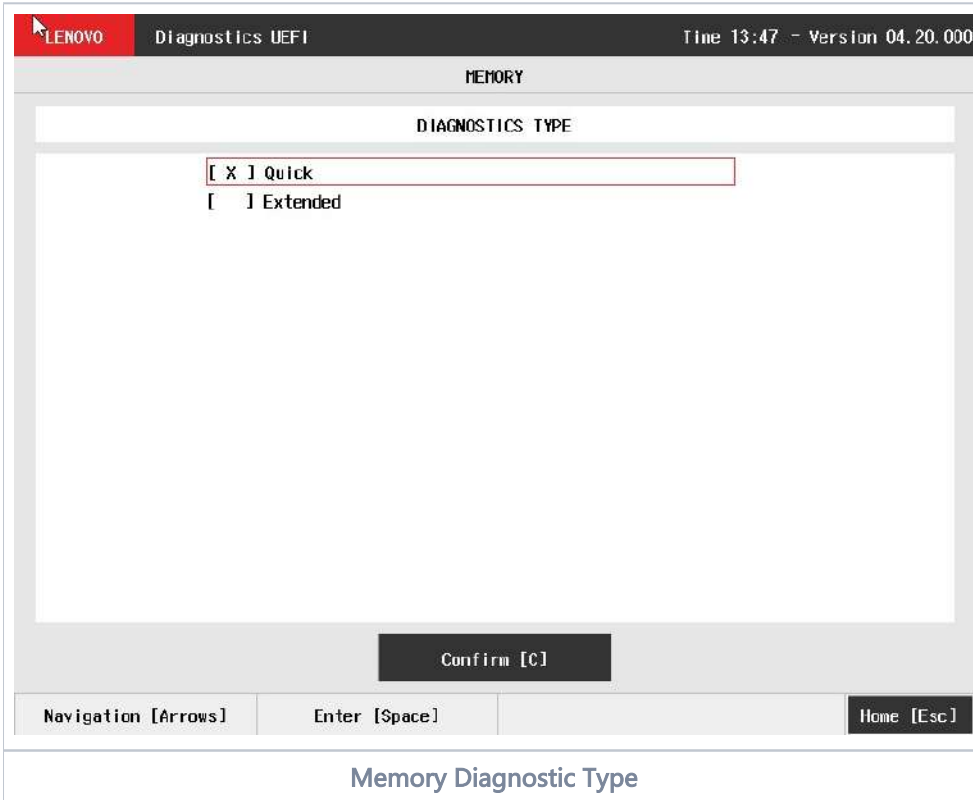
Keyboard attended test will automatically exit after 15 seconds of no user interaction.

Test Keyboard displayed layout may differ from physical device depending on system model

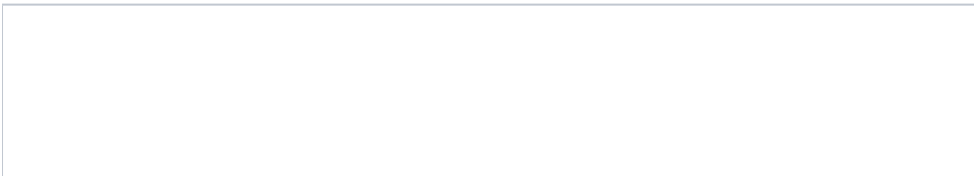
Memory

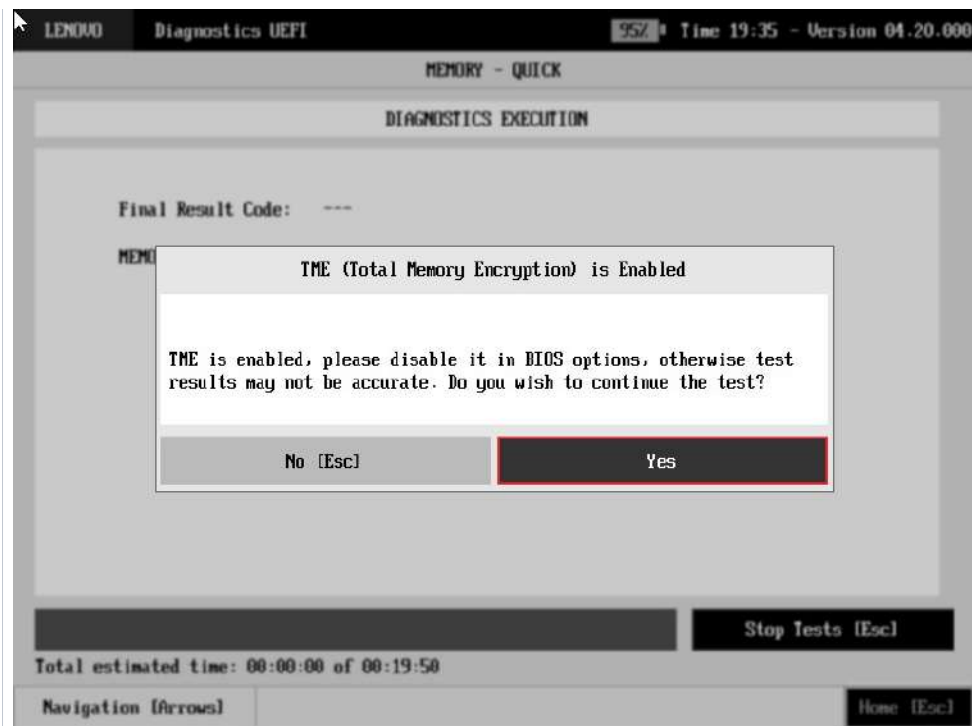
The system allows the user to access the Memory diagnostics from the Home screen, Diagnostics, Memory.

After the user enters the Memory option, the memory diagnostics type's menu will be displayed and user can choose between quick and extended diagnostics.



Intel's Tiger Lake processor platform has a feature called TME (Total Memory Encryption) that enables the encryption of the whole physical memory of a system. This feature can usually be enabled via BIOS menu in compatible systems. The encryption of memory can cause the memory diagnostics to present inaccurate results. If the application detects that TME is enabled it will display this popup:

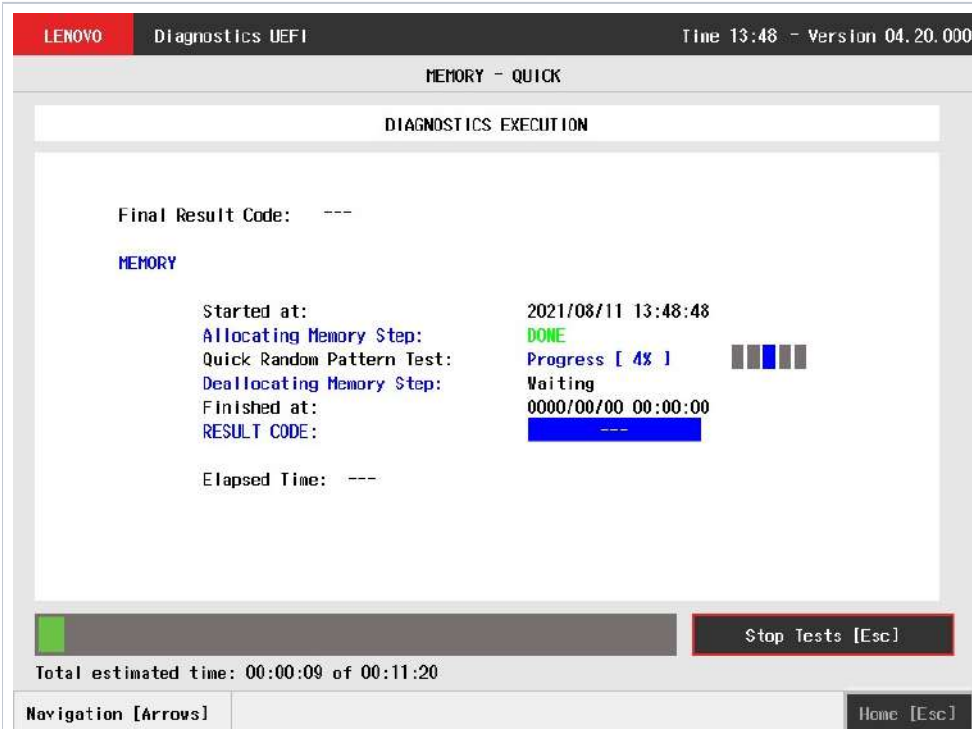




Memory Diagnostic TME popup

Memory Quick Diagnostics

The Memory Quick Diagnostics Execution screen is shown in the figure below.



Memory Quick Diagnostics Execution

The system allows the user to access the memory quick diagnostics from the Home screen, Diagnostics, Memory.

The Memory Quick Diagnostics Execution screen provides information about the memory diagnostics progress, as well as information about the results. This screen is composed of:

- Application Header Bar
- Screen Title Bar
- Screen Sub-title Bar
- Diagnostic Information Section
- Instruction Footer Bar

The Application Header Bar contains the name of the application, system's time and application's current version; the Screen Title and Screen Sub-title Bars help the user to be attentive of where s/he is throughout the application; and the Instruction Footer Bar contains additional instructions for using the screen, as well as the Exit button.

The screen has one main section that provides information about the diagnostic, as well as a progress bar and a View Log button, both placed at the bottom of the section, where the former indicates the global execution progress and the latter allows to visualize tests details after finishing the diagnostic execution. That section contains the following diagnostics information:

- Final Result Code (an encrypted code that informs which modules were tested).
- QR Code (QR code shown on the right side of Final Result Code and that contain the information below, concatenated with semicolon):
 - Final Result Code;
 - Serial Number;
 - Test Date (YYYYMMDD format)
 - Machine Model
 - BIOS Version
 - UEFI Diags version
 - Machine Type-Model (MTM)
 - Wired MAC Address (if not available, hide this information)
 - Wireless MAC Address (if not available, hide this information)
- Date and time that diagnostic has started.
- Test (name of the test being currently run).
- Progress of the current test (current test's progress in percentage).
- Total estimated time of the current suite of diagnostic tests.
- A list with all the algorithms which compose device test and their respective status:
 - **Waiting**, indicating the test is waiting to be run.
 - **Progress** (plus the test execution percentage), indicating the test is being run.
 - **PASSED**, indicating the algorithm has found no problems at device.
 - **WARNING**, when applicable, indicating the algorithm has detected signs to the user be aware (for instance, of an imminent failure).
 - **FAILED**, indicating the algorithm has found one or more faults.
 - **CANCELED**, indicating the algorithm has been canceled by user.
 - **NOT APPLICABLE**, indicating the algorithm is not supported by device.
- Date and time that the tests are finished (displayed after test is finished).
- Result Code for test.
- Elapsed time, that is a duration of test in hours, minutes and seconds (displayed after test is finished).

While the diagnostic is running, the user can stop it at any time by pressing the ESC key. If the user does that, the diagnostic is aborted and the status of the test that is being run is changed to **CANCELED**. After the diagnostic is finished or canceled, the user can go back to the Home screen (by pressing ESC again) or visualize the test log (by pressing the V key).

Memory Extended Diagnostics

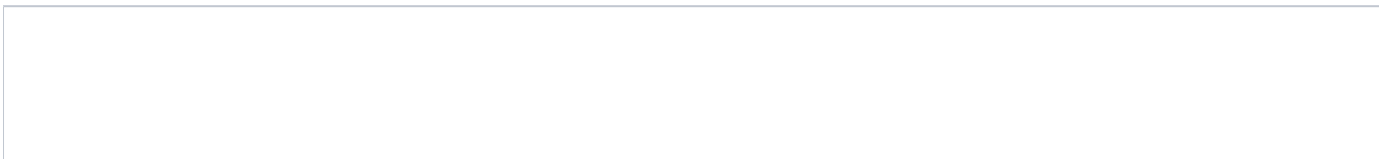
The system allows the user to access the memory extended diagnostics from the Home screen, Diagnostics, Memory.

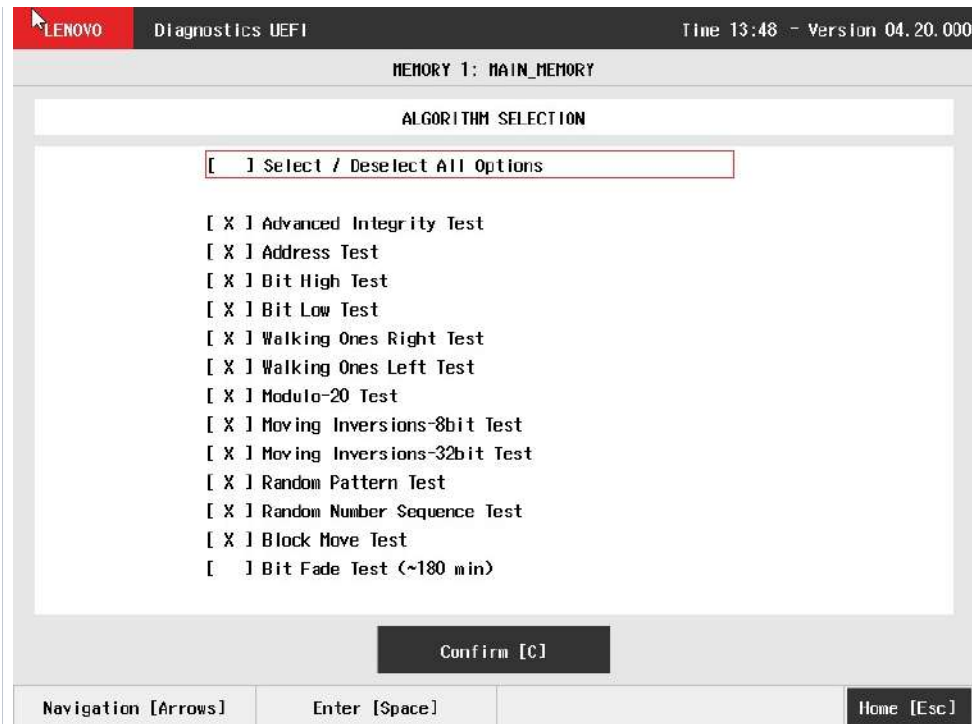
An item can be selected/deselected by pressing SPACE when it is highlighted. A desired item is selected when it shows "[X]" preceding it. To access the memory extended diagnostics, the user can use the UP/DOWN arrow key until "Extended" is focused and press SPACE key to select it.

In order to continue, the user has to press ENTER on the button Confirm. As a result, the system will show a list of tests, as illustrated in the next figure, and all the tests are initially selected to be tested.

The user can deselect a selected test by pressing the SPACE key when the test is highlighted. An empty space will appear between the brackets. To select a test again, the user can press the SPACE key again.

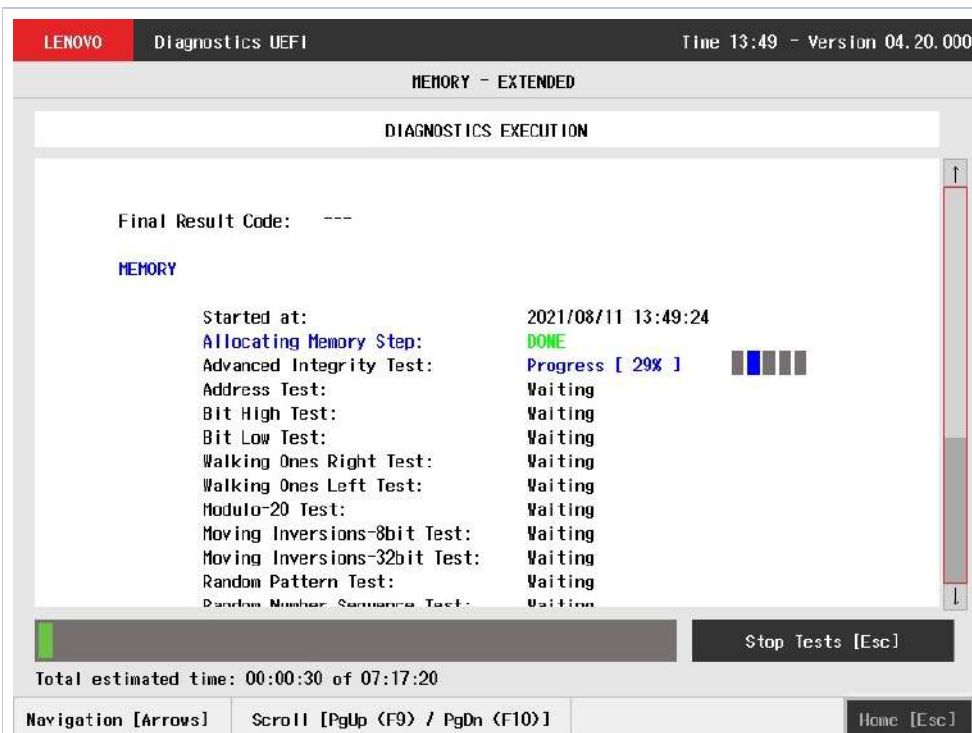
Initially, the "Select/Deselect All Options" is selected. If the user presses the SPACE or ENTER key on that option, then all test options will be deselected. If the user selects the "Select/Deselect All Options" again, all tests options will be selected again.





Memory Extended Algorithm Selection

At least one test must be selected, so that the application can run the diagnostic. After the user chooses which tests must be performed, the user can use the Confirm button. Consequently, the system will run all tests, as illustrated in the figure below.



Memory Extended Diagnostics Execution

The Memory Extended Diagnostics Execution screen provides information about the memory diagnostics progress, as well as information about the results. This screen is composed of:


- Application Header Bar
- Screen Title Bar
- Screen Sub-title Bar
- Diagnostic Information Section
- Instruction Footer Bar

The Application Header Bar contains the name of the application, system's time and application's current version; the Screen Title and Screen Sub-title Bars help the user to be attentive of where s/he is throughout the application; and the Instruction Footer Bar contains additional instructions for using the screen, as well as the Exit button.

The screen has one main section that provides information about the diagnostic, as well as a progress bar and a View Log button, both placed at the bottom of the section, where the former indicates the global execution progress and the latter allows to visualize tests details after finishing the diagnostic execution. That section contains the following diagnostics information:

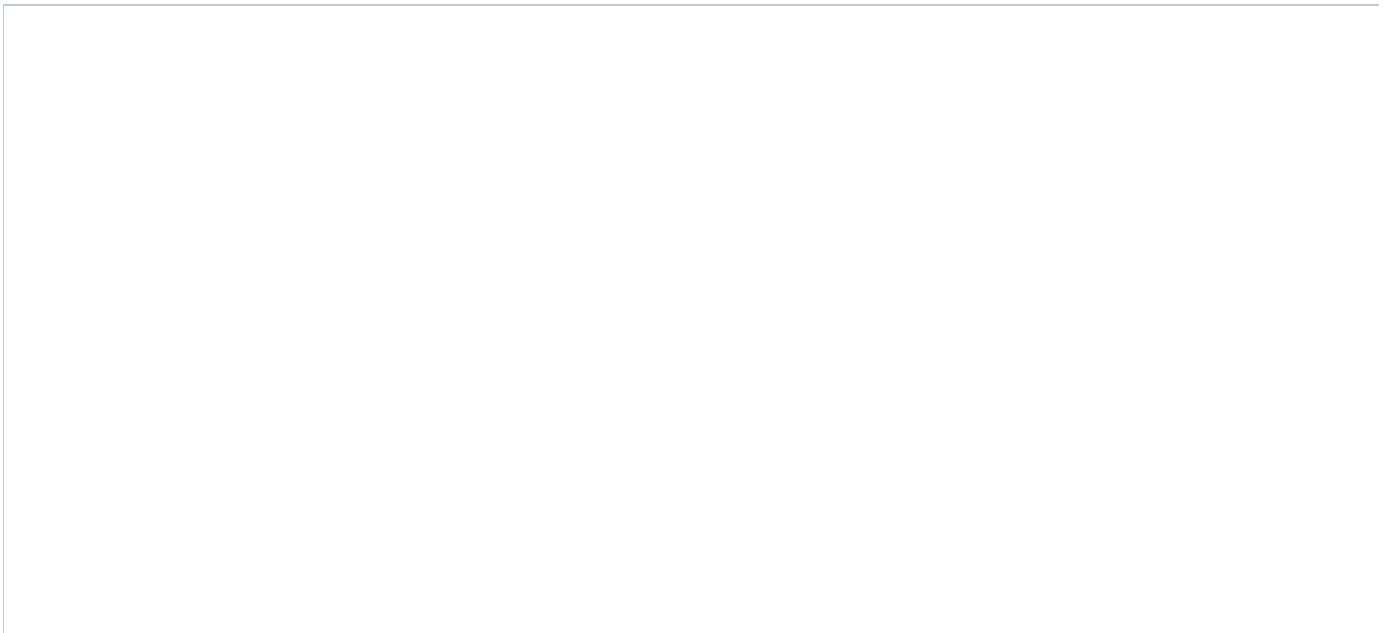
- Final Result Code (an encrypted code that informs which modules were tested).
- Date and time that diagnostic has started.
- Test (name of the test being currently run).
- Progress of the current test (current test's progress in percentage).
- Total estimated time of the current suite of diagnostic tests.
- A list with all the algorithms which compose device test and their respective status:
 - **Waiting**, indicating the test is waiting to be run.
 - **Progress** (plus the test execution percentage), indicating the test is being run.
 - **PASSED**, indicating the algorithm has found no problems at device.
 - **WARNING**, when applicable, indicating the algorithm has detected signs to the user be aware (for instance, of an imminent failure).
 - **FAILED**, indicating the algorithm has found one or more faults.
 - **CANCELED**, indicating the algorithm has been canceled by user.
 - **NOT APPLICABLE**, indicating the algorithm is not supported by device.
- Date and time that the tests are finished (displayed after test is finished).
- Result Code for test.
- Elapsed time, that is a duration of test in hours, minutes and seconds (displayed after test is finished).

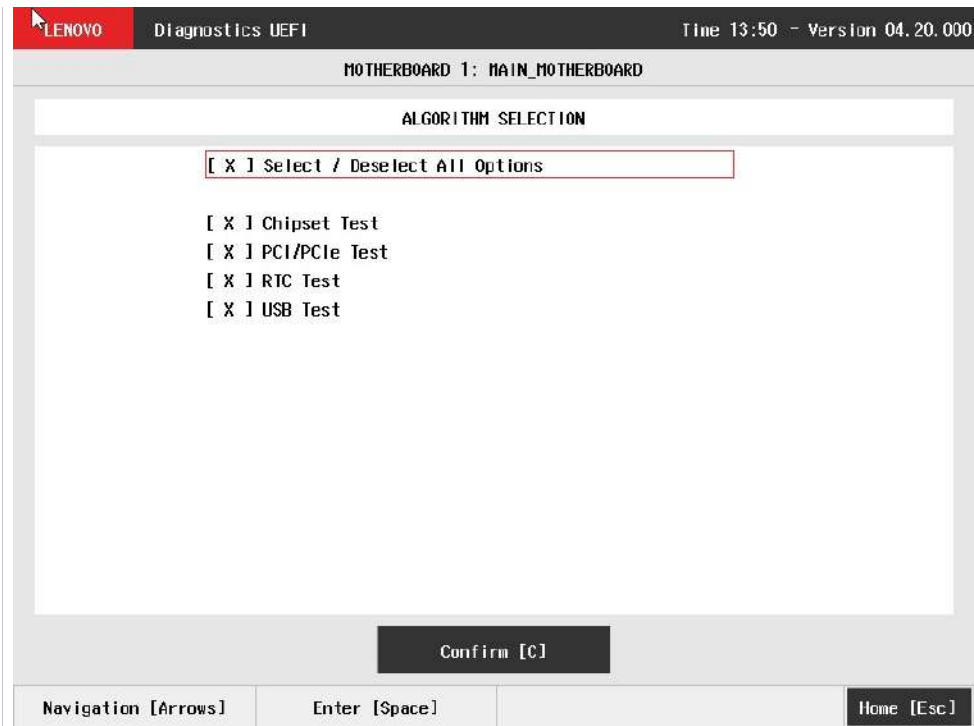
While the diagnostic is running, the user can stop it at any time by pressing the ESC key. If the user does that, the diagnostic is aborted and the status of the test that is being run is changed to CANCELED. After the diagnostic is finished or canceled, the user can go back to the Home screen (by pressing ESC again) or visualize the test log (by pressing the V key).

 For memory diagnostics there is an additional step to allocate and deallocate memory, where the deallocate step cannot be canceled as the test cannot keep memory allocated.

Motherboard

After the user enters the Motherboard option, the application computes the number of algorithms that can be performed by the diagnostic. If the diagnostic has more than one algorithm, Algorithm Selection screen is displayed, as shown in the next figure.





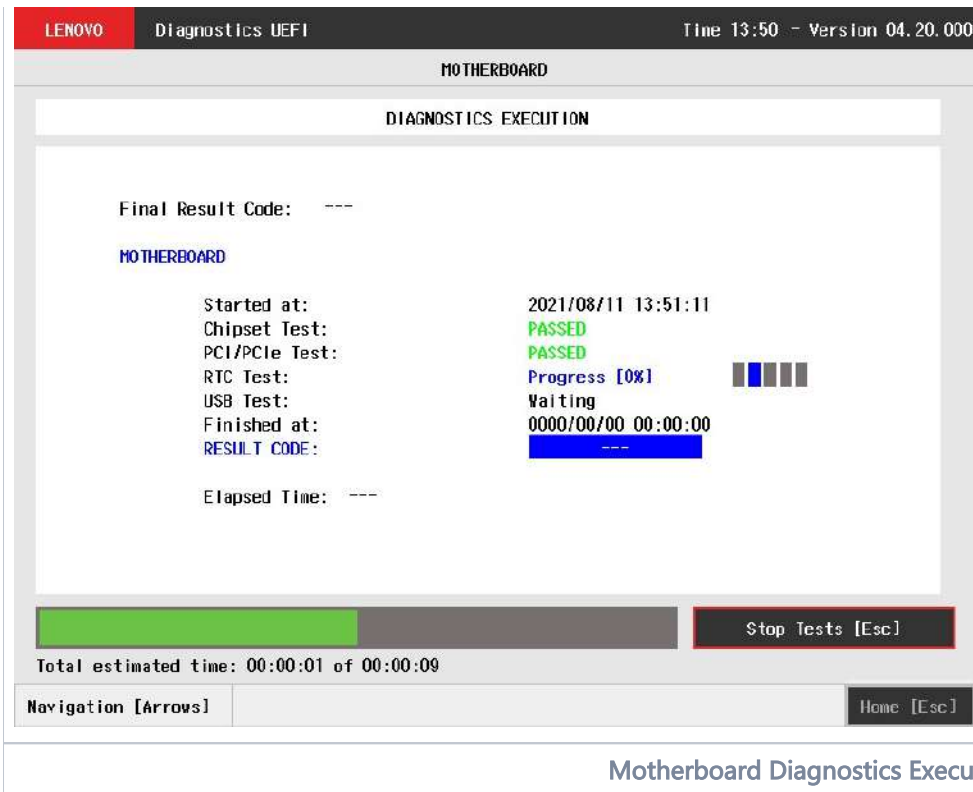
Motherboard Algorithm Selection

The system allows the user to access the motherboard diagnostics from the Home screen, Diagnostics, Motherboard.

The user can deselect a selected test by pressing the SPACE key when the test is highlighted. An empty space will appear between the brackets. To select a test again, the user can press the SPACE key again.

Initially, the "Select/Deselect All Options" is selected. If the user presses the SPACE or ENTER key on that option, then all test options will be deselected. If the user selects the "Select/Deselect All Options" again, all tests options will be selected again.

At least one test must be selected, so that the application can run the diagnostic. After the user chooses which tests must be performed, the user can use the Confirm button. Consequently, the system will run all tests, as illustrated in the figure below.



Motherboard Diagnostics Execution

The Motherboard Diagnostics Execution screen provides information about the motherboard diagnostics progress, as well as information about the results. This screen is composed of:

- Application Header Bar
- Screen Title Bar
- Screen Sub-title Bar
- Diagnostic Information Section
- Instruction Footer Bar

The Application Header Bar contains the name of the application, system's time and application's current version; the Screen Title and Screen Sub-title Bars help the user to be attentive of where s/he is throughout the application; and the Instruction Footer Bar contains additional instructions for using the screen, as well as the Exit button.

The screen has one main section that provides information about the diagnostic, as well as a progress bar and a View Log button, both placed at the bottom of the section, where the former indicates the global execution progress and the latter allows to visualize tests details after finishing the diagnostic execution. That section contains the following diagnostics information:

- Final Result Code (an encrypted code that informs which modules were tested).
- Date and time that diagnostic has started.
- Test (name of the test being currently run).
- Progress of the current test (current test's progress in percentage).
- Total estimated time of the current suite of diagnostic tests.
- A list with all the algorithms which compose device test and their respective status:
 - **Waiting**, indicating the test is waiting to be run.
 - **Progress** (plus the test execution percentage), indicating the test is being run.
 - **PASSED**, indicating the algorithm has found no problems at device.
 - **WARNING**, when applicable, indicating the algorithm has detected signs to the user be aware (for instance, of an imminent failure).
 - **FAILED**, indicating the algorithm has found one or more faults.
 - **CANCELED**, indicating the algorithm has been canceled by user.
 - **NOT APPLICABLE**, indicating the algorithm is not supported by device.
- Date and time that the tests are finished (displayed after test is finished).
- Result Code for test.
- Elapsed time, that is a duration of test in hours, minutes and seconds (displayed after test is finished).

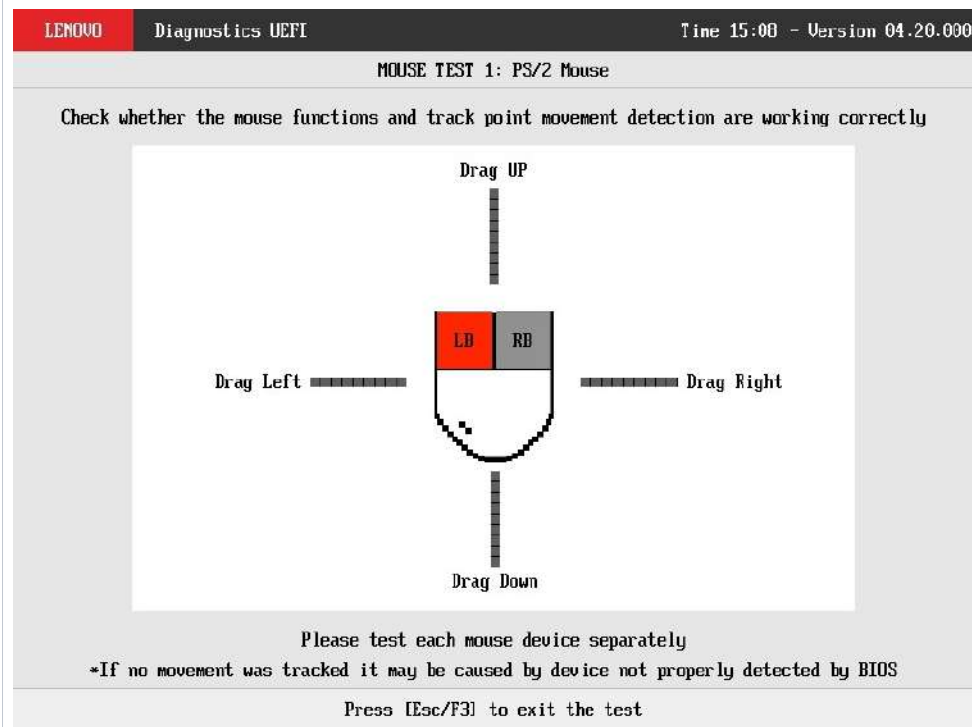
While the diagnostic is running, the user can stop it at any time by pressing the ESC key. If the user does that, the diagnostic is aborted and the status of the test that is being run is changed to CANCELED. After the diagnostic is finished or canceled, the user can go back to the Home screen (by pressing ESC again) or visualize the test log (by pressing the V key).

Mouse

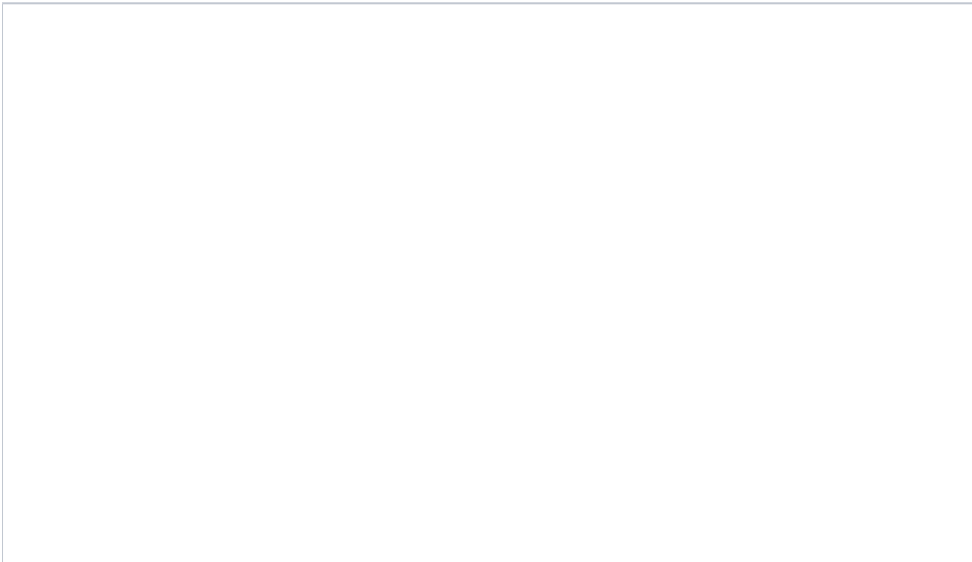
List of tests that can be performed:

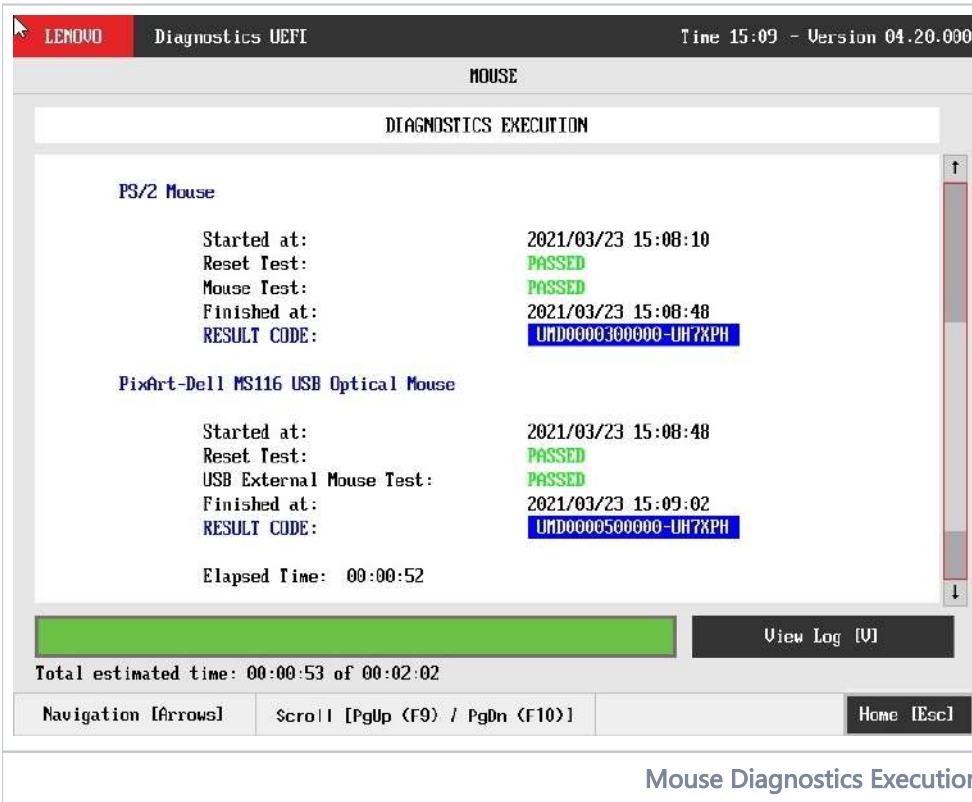
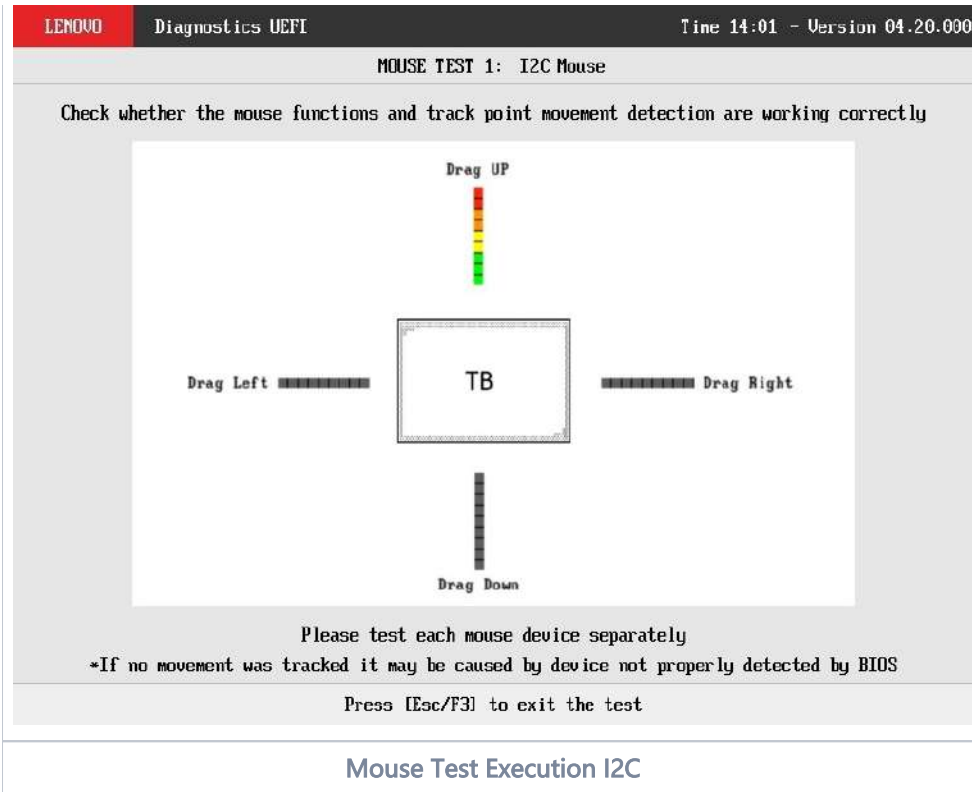
- **Reset Test:**
 - **Description:** "Reset Test" is a mouse test that resets the connection for both PS/2 and USB External type mice.
 - **Results:** PASSED; FAILED; CANCELED; NOT APPLICABLE.
- **Mouse Test:**
 - **Description:** "Mouse Test" is a mouse test that checks the access and move detection to PS/2 type mice.
 - **Results:** PASSED; FAILED; CANCELED; NOT APPLICABLE.
- **USB External Mouse Test:**
 - **Description:** "USB External Mouse Test" is a mouse test that checks the access and move detection to USB type mouse.
 - **Results:** PASSED; FAILED; CANCELED; NOT APPLICABLE.

After the selection of the desired mouse type, the test begins as the screen below:



Mouse Test Execution PS/2





The Mouse Diagnostics Execution screen provides information about the memory diagnostics progress, as well as information about the results. This screen is composed of:

- Application Header Bar
- Screen Title Bar

- Screen Sub-title Bar
- Diagnostic Information Section
- Instruction Footer Bar

The Application Header Bar contains the name of the application, system's time and application's current version; the Screen Title and Screen Sub-title Bars help the user to be attentive of where s/he is throughout the application; and the Instruction Footer Bar contains additional instructions for using the screen, as well as the Exit button.

After the test finishes, a confirmation screen pop up to check if the test worked fine. After the confirmation, a screen with one main section that provides information about the diagnostic, as well as a progress bar and a View Log button, both placed at the bottom of the section, where the former indicates the global execution progress and the latter allows to visualize tests details after finishing the diagnostic execution. That section contains the following diagnostics information:

- Final Result Code (an encrypted code that informs which modules were tested).
- Date and time that diagnostic has started.
- Test (name of the test being currently run).
- A list with all the algorithms which compose device test and their respective status:
 - **PASSED**, indicating the algorithm has found no problems at device.
 - **FAILED**, indicating the user could interact with mouse device, but algorithm has found one or more faults.
 - **CANCELED**, indicating the algorithm has been canceled by user.
 - **NOT APPLICABLE**, indicating the algorithm is not supported by device.
- Date and time that the tests are finished (displayed after test is finished).
- Result Code for test.
- Elapsed time, that is a duration of test in hours, minutes and seconds (displayed after test is finished).

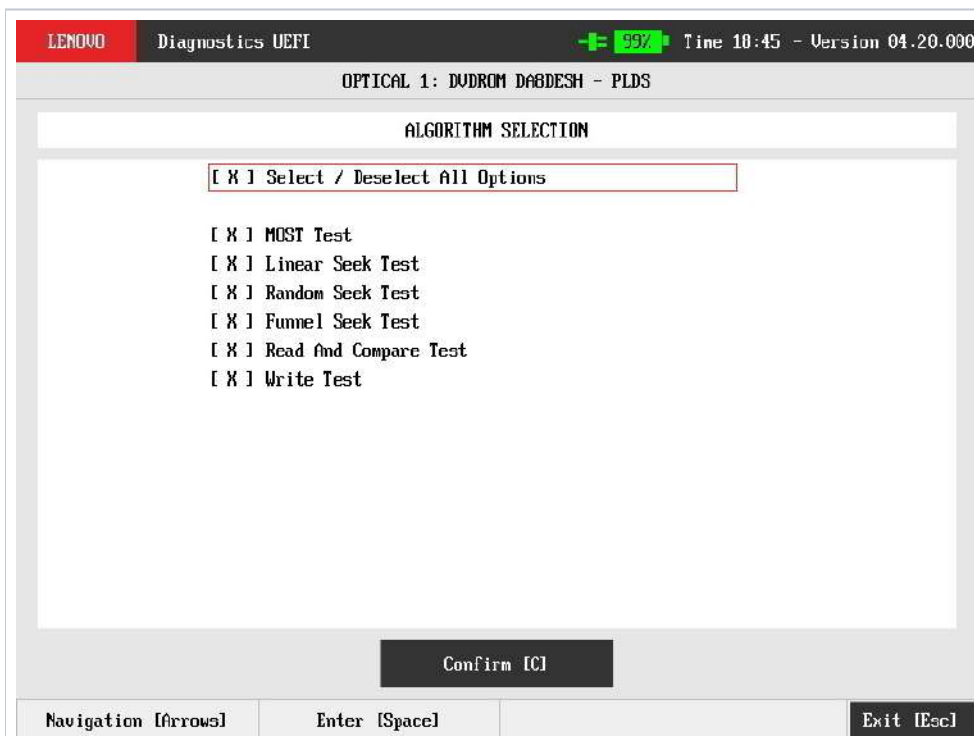
While the diagnostic is running, the user can stop it at any time by pressing the ESC key. If the user does that, the diagnostic is aborted and the status of the test that is being run is changed to CANCELED. After the diagnostic is finished or canceled, the user can go back to the Home screen (by pressing ESC again) or visualize the test log (by pressing the V key).

Note

Mouse attended tests will automatically exit after 15 seconds of no user interaction.

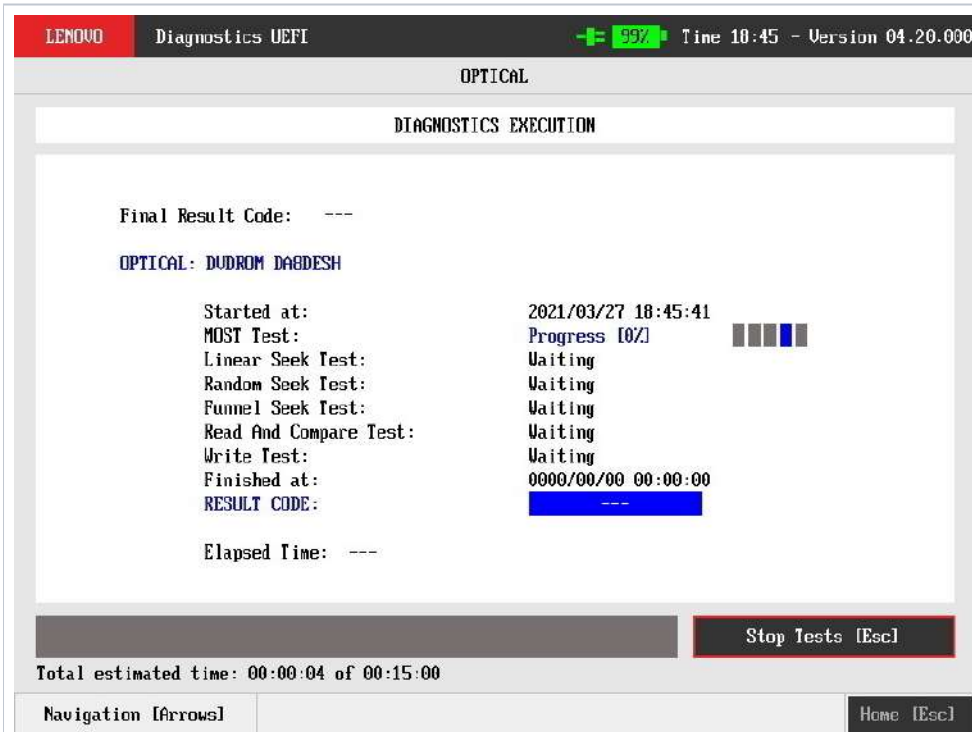
Optical

The system allows the user to access the optical diagnostics from the Home screen, Diagnostics, Optical. After the user accesses the Optical option, the application displays the number of algorithms that can be performed. If the diagnostic has more than one algorithm, Algorithm Selection screen is displayed, as shown in the figure below.



Optical Algorithm Selection

At least one test must be selected, so that the application can run the diagnostic. After the user chooses which tests must be performed, the user can use the Confirm button. Consequently, the system will run all tests, as illustrated in the next figure.



Optical Device Diagnostics Execution

The Optical Diagnostics Execution screen provides information about the optical diagnostics progress, as well as information about the results. This screen is composed of:

- Application Header Bar
- Screen Title Bar
- Screen Sub-title Bar
- Diagnostic Information Section
- Instruction Footer Bar

The Application Header Bar contains the name of the application, system's time and application's current version; the Screen Title and Screen Sub-title Bars help the user to be attentive of where s/he is throughout the application; and the Instruction Footer Bar contains additional instructions for using the screen, as well as the Exit button.

The screen has one main section that provides information about the diagnostic, as well as a progress bar and a View Log button, both placed at the bottom of the section, where the former indicates the global execution progress and the latter allows to visualize tests details after finishing the diagnostic execution. That section contains the following diagnostics information:

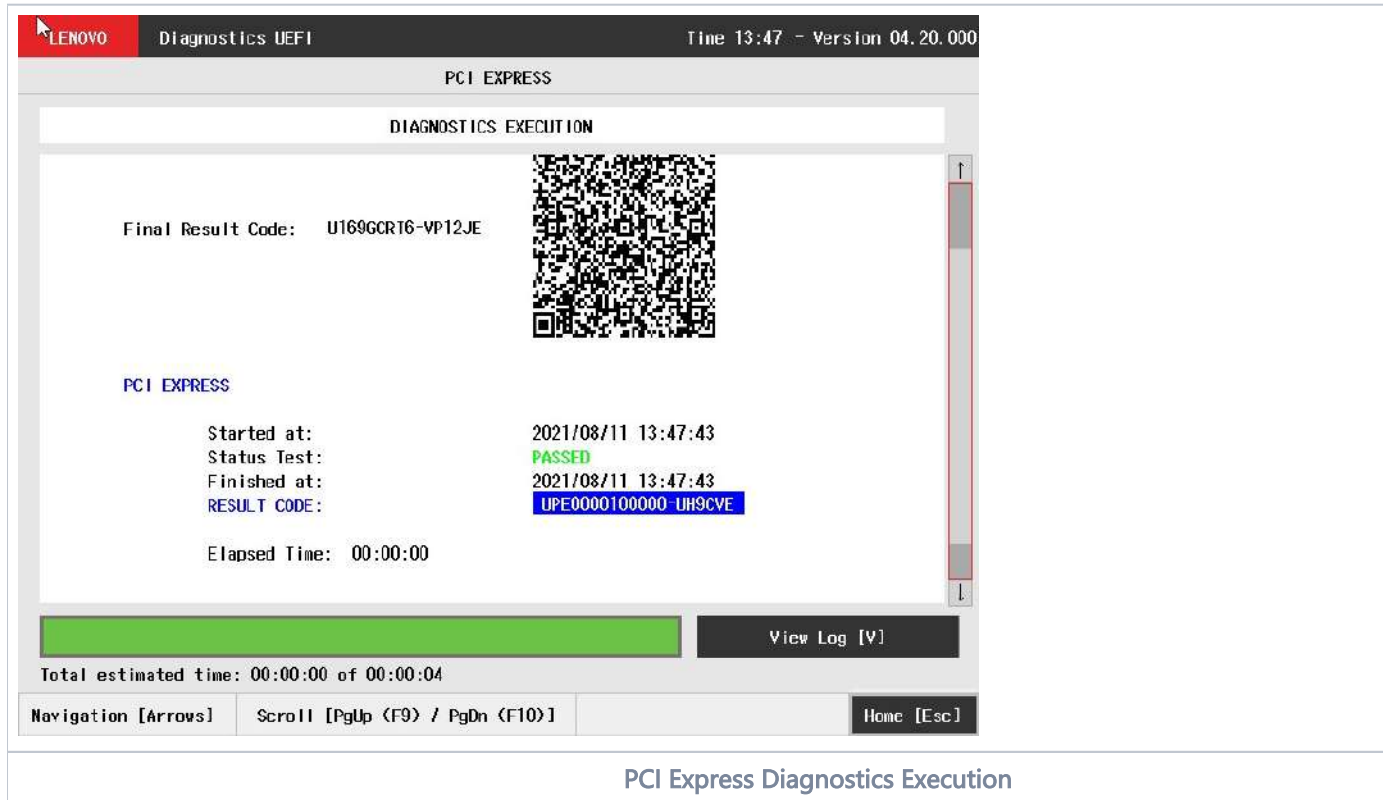
- Final Result Code (an encrypted code that informs which modules were tested).
- Date and time that diagnostic has started.
- Test (name of the test being currently run).
- Progress of the current test (current test's progress in percentage).
- A list with all the algorithms which compose device test and their respective status, whereas an algorithm can have seven status:
 - **Waiting**, indicating the test is waiting to be run.
 - **Progress** (plus the test execution percentage), indicating the test is being run.
 - **PASSED**, indicating the algorithm has found no problems at device.
 - **WARNING**, when applicable, indicating the algorithm has detected signs to the user be aware (for instance, of an imminent failure).
 - **FAILED**, indicating the algorithm has found one or more faults.
 - **CANCELED**, indicating the algorithm has been canceled by user.
 - **NOT APPLICABLE**, indicating the algorithm is not supported by device.

- Date and time that the tests are finished (displayed after test is finished).
- Result Code for test.
- Elapsed time, that is a duration of test in hours, minutes and seconds (displayed after test is finished).

While the diagnostic is running, the user can stop it at any time by pressing the ESC key. If the user does that, the diagnostic is aborted and the status of the test that is being run is changed to CANCELED. After the diagnostic is finished or canceled, the user can go back to the Home screen (by pressing ESC again) or visualize the test log (by pressing the V key).

PCI Express

After the user enters the PCI Express option, the application computes the number of algorithms that can be performed by the diagnostic. If the diagnostic has only one algorithm, it will be started, as shown in the next figure.



The PCI Express Diagnostics Execution screen provides information about the PCI Express diagnostics progress, as well as information about the results. This screen is composed of:

- Application Header Bar
- Screen Title Bar
- Screen Sub-title Bar
- Diagnostic Information Section
- Instruction Footer Bar

The Application Header Bar contains the name of the application, system's time and application's current version; the Screen Title and Screen Sub-title Bars help the user to be attentive of where s/he is throughout the application; and the Instruction Footer Bar contains additional instructions for using the screen, as well as the Exit button.

The screen has one main section that provides information about the diagnostic, as well as a progress bar and a View Log button, both placed at the bottom of the section, where the former indicates the global execution progress and the latter allows to visualize tests details after finishing the diagnostic execution. That section contains the following diagnostics information:

- Final Result Code (an encrypted code that informs which modules were tested).
- Date and time that diagnostic has started.
- Test (name of the test being currently run).
- Progress of the current test (current test's progress in percentage).
- Total estimated time of the current suite of diagnostic tests.
- A list with all the algorithms which compose device test and their respective status:
 - **Waiting**, indicating the test is waiting to be run.
 - **Progress** (plus the test execution percentage), indicating the test is being run.
 - **PASSED**, indicating the algorithm has found no problems at device.

- **WARNING**, when applicable, indicating the algorithm has detected signs to the user be aware (for instance, of an imminent failure).
- **FAILED**, indicating the algorithm has found one or more faults.
- **CANCELED**, indicating the algorithm has been canceled by user.
- **NOT APPLICABLE**, indicating the algorithm is not supported by device.
- Date and time that the tests are finished (displayed after test is finished).
- Result Code for test.
- Elapsed time, that is a duration of test in hours, minutes and seconds (displayed after test is finished).

While the diagnostic is running, the user can stop it at any time by pressing the ESC key. If the user does that, the diagnostic is aborted and the status of the test that is being run is changed to CANCELED. After the diagnostic is finished or canceled, the user can go back to the Home screen (by pressing ESC again) or visualize the test log (by pressing the V key).

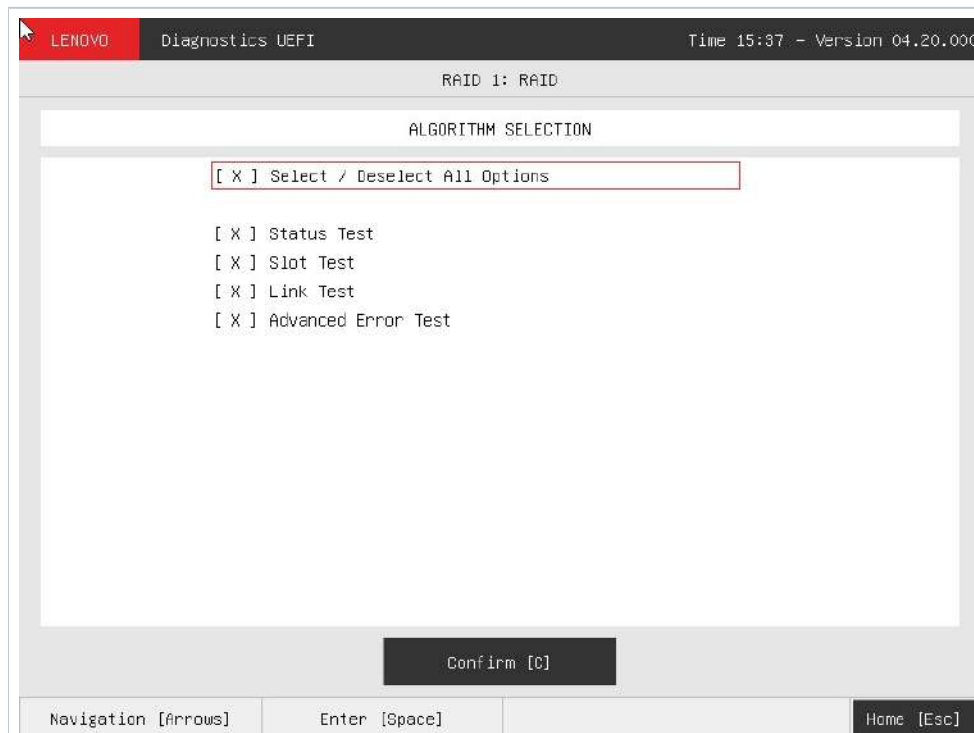
RAID

The system allows the user to access the RAID diagnostics from the Home screen, Diagnostics, RAID.

An item can be selected/deselected by pressing SPACE when it is highlighted. A desired item is selected when it shows "[X]" preceding it. In order to continue, the user has to press ENTER on the button Confirm. As a result, the system will show a list of tests, as illustrated in the next figure, and all the tests are initially selected to be tested.

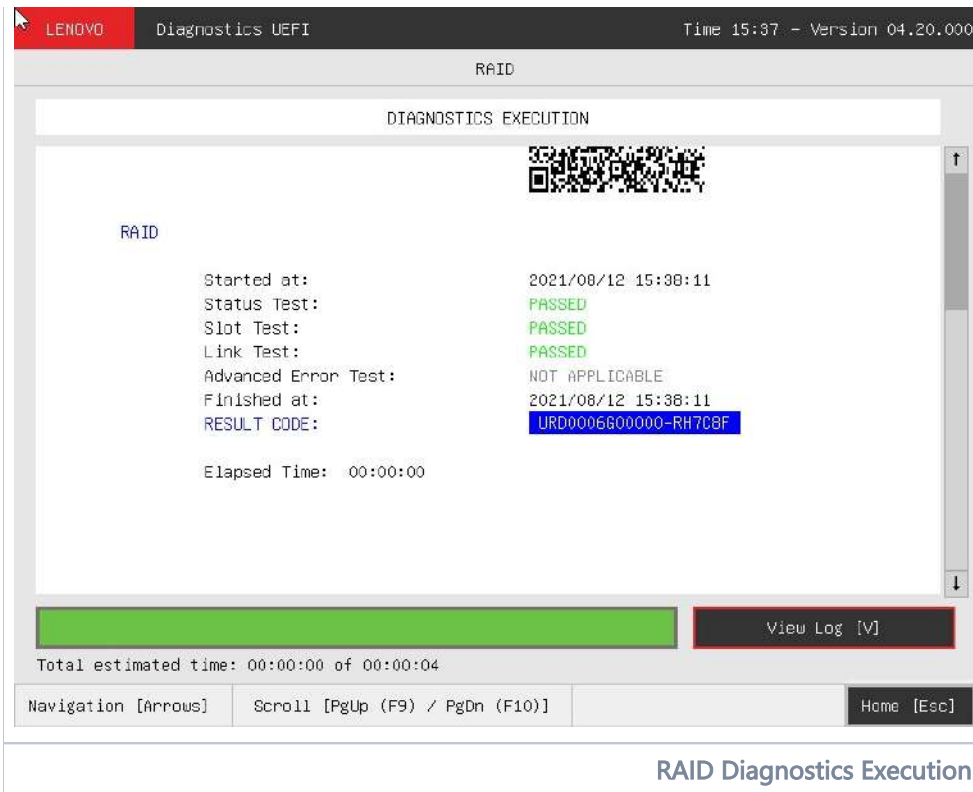
The user can deselect a selected test by pressing the SPACE key when the test is highlighted. An empty space will appear between the brackets. To select a test again, the user can press the SPACE key again.

Initially, the "Select/Deselect All Options" is selected. If the user presses the SPACE or ENTER key on that option, then all test options will be deselected. If the user selects the "Select/Deselect All Options" again, all tests options will be selected again.



RAID Algorithm Selection

At least one test must be selected so that the application can run the diagnostic. After the user chooses which tests will be performed, the user can press Confirm by pressing the ENTER key. Consequently, the system will run the tests, as illustrated in the following figure.



RAID Diagnostics Execution

The RAID Diagnostics Execution screen provides information about the RAID diagnostics progress, as well as information about the results. This screen is composed of:

- Application Header Bar
- Screen Title Bar
- Screen Sub-title Bar
- Diagnostic Information Section
- Instruction Footer Bar

The Application Header Bar contains the name of the application, system's time and application's current version; the Screen Title and Screen Sub-title Bars help the user to be attentive of where s/he is throughout the application; and the Instruction Footer Bar contains additional instructions for using the screen, as well as the Exit button.

The screen has one main section that provides information about the diagnostic, as well as a progress bar and a View Log button, both placed at the bottom of the section, where the former indicates the global execution progress and the latter allows to visualize tests details after finishing the diagnostic execution. That section contains the following diagnostics information:

- Final Result Code (an encrypted code that informs which modules were tested).
- Date and time that diagnostic has started.
- Test (name of the test being currently run).
- Progress of the current test (current test's progress in percentage).
- Total estimated time of the current suite of diagnostic tests.
- A list with all the algorithms which compose device test and their respective status:
 - **Waiting**, indicating the test is waiting to be run.
 - **Progress** (plus the test execution percentage), indicating the test is being run.
 - **PASSED**, indicating the algorithm has found no problems at device.
 - **WARNING**, when applicable, indicating the algorithm has detected signs to the user be aware (for instance, of an imminent failure).
 - **FAILED**, indicating the algorithm has found one or more faults.
 - **CANCELED**, indicating the algorithm has been canceled by user.
 - **NOT APPLICABLE**, indicating the algorithm is not supported by device.
- Date and time that the tests are finished (displayed after test is finished).
- Result Code for test.
- Elapsed time, that is a duration of test in hours, minutes and seconds (displayed after test is finished).

While the diagnostic is running, the user can stop it at any time by pressing the ESC key. If the user does that, the diagnostic is aborted and the status of the test that is being run is changed to CANCELED. After the diagnostic is finished or canceled, the user can go back to the Home screen (by pressing ESC again) or visualize the test log (by pressing the V key).

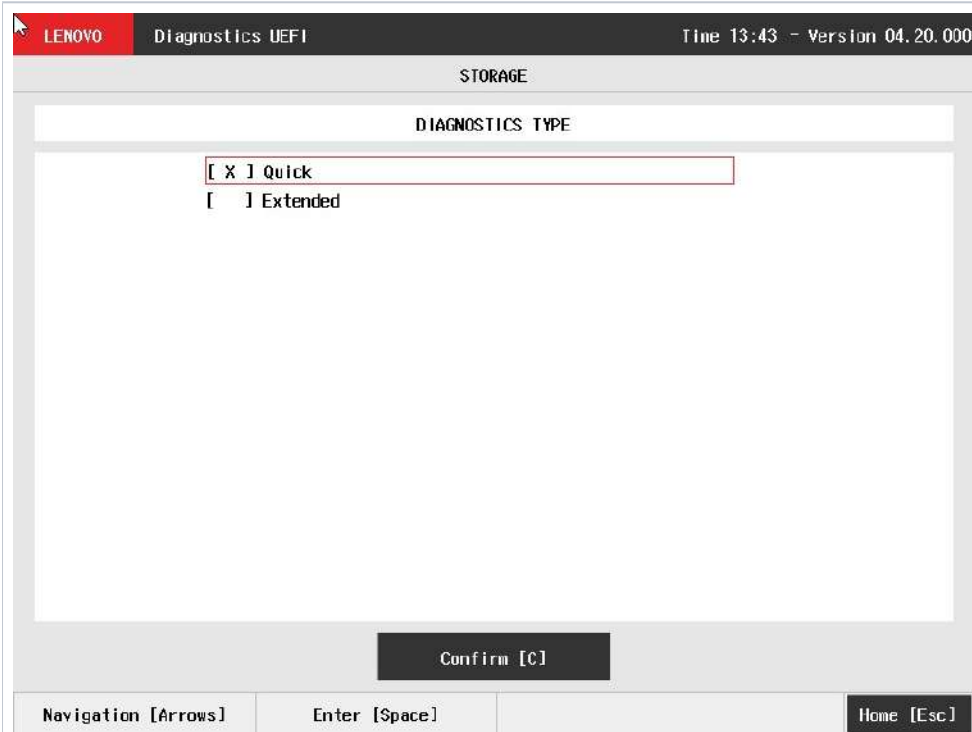
Storage



Storage devices connected as RAID will not be detected by UEFI diagnostics application, therefore they can not be tested.

The system allows the user to access the storage extended diagnostics from the Home screen, Diagnostics, Storage.

After the user enters the Storage option, the storage diagnostics type's menu will be displayed, as the following image.



Storage Diagnostics Type

An item can be selected/deselected by pressing SPACE when it is highlighted. A desired item is selected when it shows "[X]" preceding it.

After the user enters the Confirm button, the application will display the number of storage devices available in the system. If there is more than one storage device installed, the menu Device Selection is displayed, as shown in the next figure.



Storage Device Selection

This screen also allows seeing devices details. To access this feature, the user has to press the I key when the desired device is focused, leading to the exhibition of a popup with the device information, as shown in the subsequent figure. (The 8s code will only be shown when supported.)



Storage Information Popup

Storage Quick Diagnostics

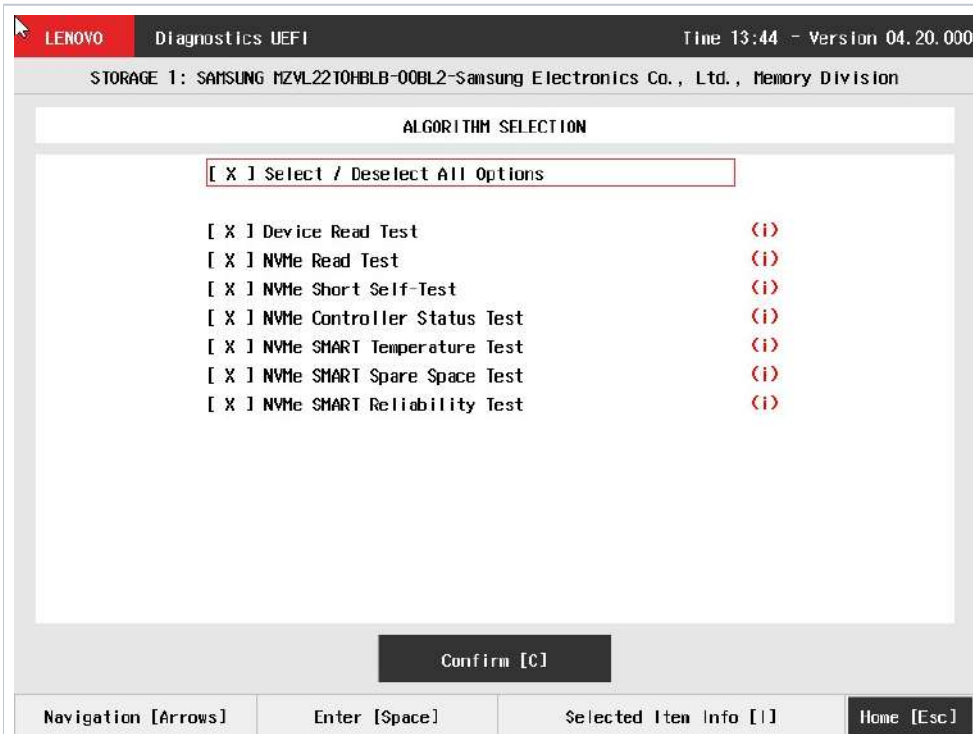
The system allows the user to access the storage quick diagnostics from the Home screen, Diagnostics, Storage.

An item can be selected/deselected by pressing SPACE when it is highlighted. A desired item is selected when it shows "[X]" preceding it. To access the storage quick diagnostics, the user can use the UP/DOWN arrow key until "Quick" is focused and press SPACE key to select it.

In order to continue, the user has to press ENTER on the button Confirm. As a result, the system will show a list of tests, as illustrated in the next figure, and all the tests are initially selected to be tested.

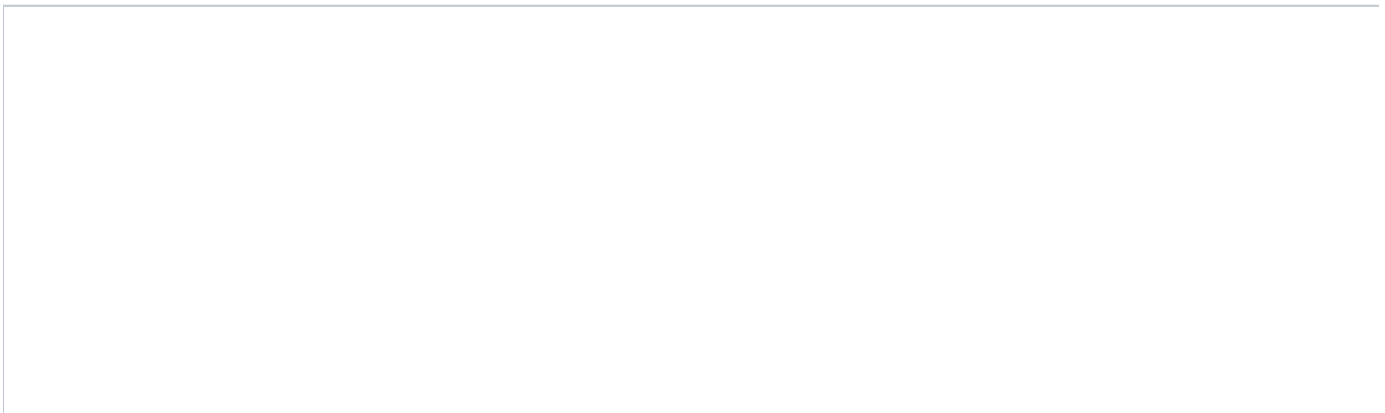
The user can deselect a selected test by pressing the SPACE key when the test is highlighted. An empty space will appear between the brackets. To select a test again, the user can press the SPACE key again.

Initially, the "Select/Deselect All Options" is selected. If the user presses the SPACE or ENTER key on that option, then all test options will be deselected. If the user selects the "Select/Deselect All Options" again, all tests options will be selected again.



Storage Quick Algorithm Selection for NVMe devices

At least one test must be selected, so that the application can run the diagnostic. After the user chooses which tests must be tested, the user can use the Confirm button. It will start the diagnostic, as demonstrated in the next figure.



LENOVO Diagnostics UEFI Time 13:44 - Version 04.20.000

STORAGE - QUICK

DIAGNOSTICS EXECUTION

Final Result Code: ---

STORAGE: SAMSUNG MZVL22TOHBLB-00BL2
 Serial Number: S64RNEOR200162
 8S Code: 8SSSSOZ46560G1KA12D0052

Started at: 2021/08/11 13:44:37

Device Read Test: Progress [55%]

NVMe Read Test: Waiting

NVMe Short Self-Test: Waiting

NVMe Controller Status Test: Waiting

NVMe SMART Temperature Test: Waiting

NVMe SMART Spare Space Test: Waiting

NVMe SMART Reliability Test: Waiting

Finished at: 0000/00/00 00:00:00

RESULT CODE: ---

Stop Tests [Esc]

Total estimated time: 00:00:04 of 00:00:54

Navigation [Arrows] Scroll [PgUp (F9) / PgDn (F10)] Home [Esc]

Storage Quick Diagnostics Execution

The tests availability relies on UEFI protocols in order to be available for the selected device.

The Storage Quick Diagnostics Execution screen provides information about the storage diagnostics progress, as well as information about the results. This screen is composed of:

- Application Header Bar
- Screen Title Bar
- Screen Sub-title Bar
- Diagnostic Information Section
- Instruction Footer Bar

The Application Header Bar contains the name of the application, system's time and application's current version; the Screen Title and Screen Sub-title Bars help the user to be attentive of where s/he is throughout the application; and the Instruction Footer Bar contains additional instructions for using the screen, as well as the Exit button.

The screen has one main section that provides information about the diagnostic, as well as a progress bar and a View Log button, both placed at the bottom of the section, where the former indicates the global execution progress and the latter allows to visualize tests details after finishing the diagnostic execution. That section contains the following diagnostics information:

- Final Result Code (an encrypted code that informs which modules were tested).
- Date and time that diagnostic has started.
- Test (name of the test being currently run).
- Progress of the current test (current test's progress in percentage).
- Total estimated time of the current suite of diagnostic tests.
- A list with all the algorithms which compose device test and their respective status:
 - **Waiting**, indicating the test is waiting to be run.
 - **Progress** (plus the test execution percentage), indicating the test is being run.
 - **PASSED**, indicating the algorithm has found no problems at device.
 - **WARNING**, when applicable, indicating the algorithm has detected signs to the user be aware (for instance, of an imminent failure).
 - **FAILED**, indicating the algorithm has found one or more faults.
 - **CANCELED**, indicating the algorithm has been canceled by user.
 - **NOT APPLICABLE**, indicating the algorithm is not supported by device.
- Date and time that the tests are finished (displayed after test is finished).
- Result Code for test.

- Elapsed time, that is a duration of test in hours, minutes and seconds (displayed after test is finished).

While the diagnostic is running, the user can stop it at any time by pressing the ESC key. If the user does that, the diagnostic is aborted and the status of the test that is being run is changed to CANCELED. After the diagnostic is finished or canceled, the user can go back to the Home screen (by pressing ESC again) or visualize the test log (by pressing the V key).

Storage Extended Diagnostics

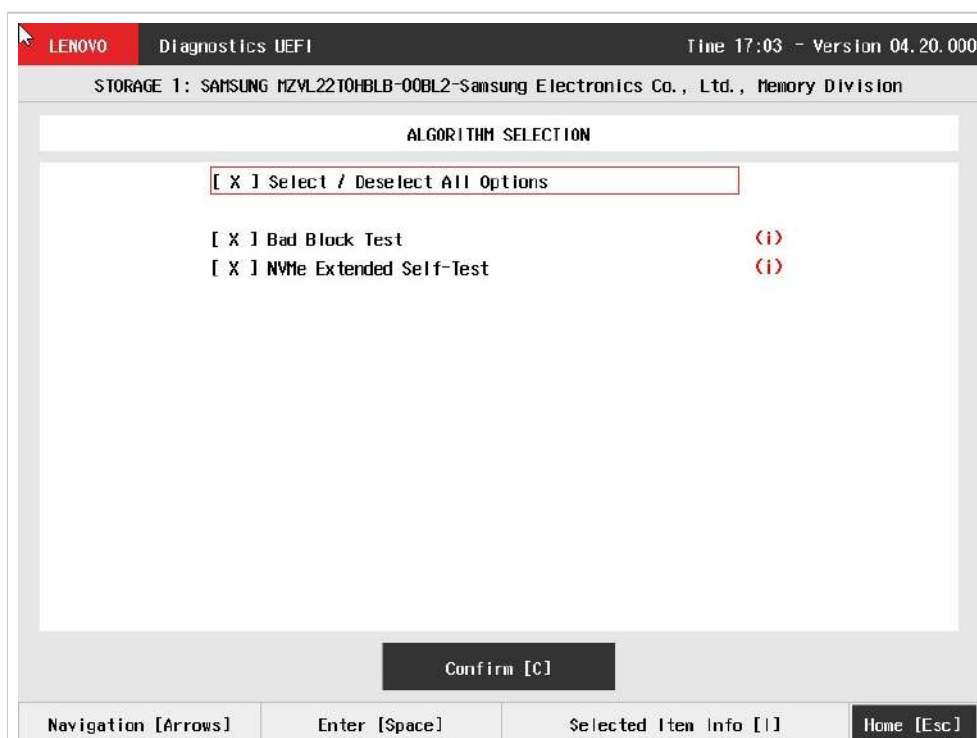
The system allows the user to access the storage extended diagnostics from the Home screen, Diagnostics, Storage.

An item can be selected/deselected by pressing SPACE when it is highlighted. A desired item is selected when it shows "[X]" preceding it. To access the storage extended diagnostics, the user can use the UP/DOWN arrow key until "Extended" is focused and press SPACE key to select it.

In order to continue, the user has to press ENTER on the button Confirm. As a result, the system will show a list of tests, as illustrated in the next figure, and all the tests are initially selected to be tested.

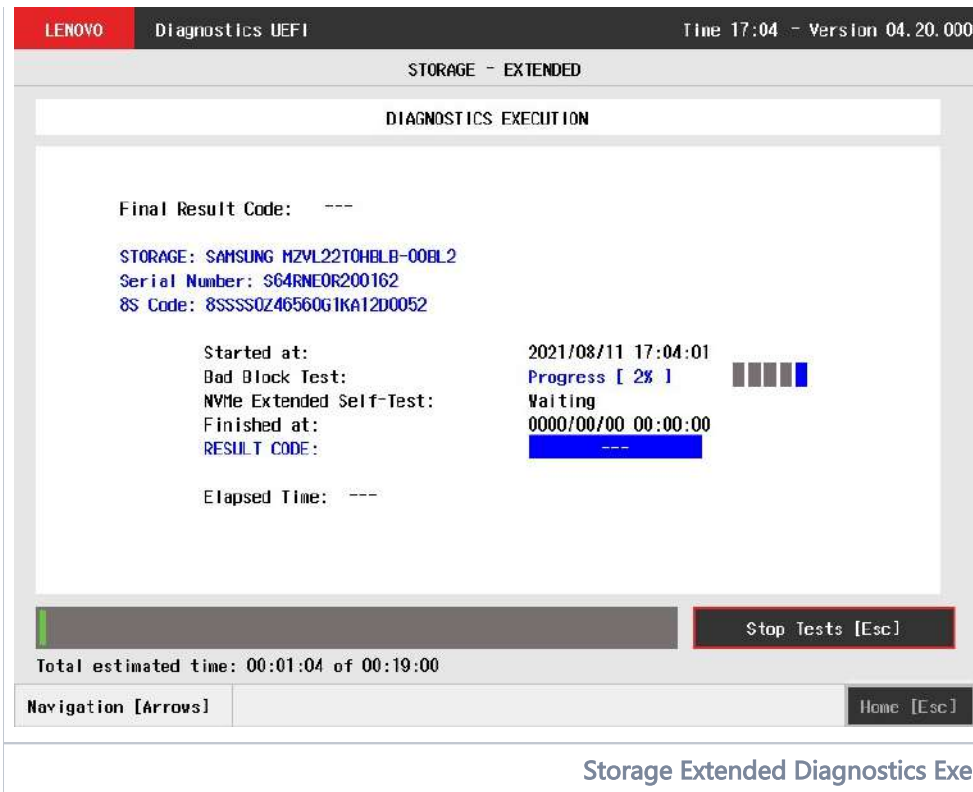
The user can deselect a selected test by pressing the SPACE key when the test is highlighted. An empty space will appear between the brackets. To select a test again, the user can press the SPACE key again.

Initially, the "Select/Deselect All Options" is selected. If the user presses the SPACE or ENTER key on that option, then all test options will be deselected. If the user selects the "Select/Deselect All Options" again, all tests options will be selected again.



Storage Extended Algorithm Selection

At least one test must be selected, so that the application can run the diagnostic. After the user chooses which tests must be tested, the user can use the Confirm button. It will start the diagnostic, as demonstrated in the next figure.



Storage Extended Diagnostics Execution

The Storage Extended Diagnostics Execution screen provides information about the storage diagnostics progress, as well as information about the results. This screen is composed of:

- Application Header Bar
- Screen Title Bar
- Screen Sub-title Bar
- Diagnostic Information Section
- Instruction Footer Bar

The Application Header Bar contains the name of the application, system's time and application's current version; the Screen Title and Screen Sub-title Bars help the user to be attentive of where s/he is throughout the application; and the Instruction Footer Bar contains additional instructions for using the screen, as well as the Exit button.

The screen has one main section that provides information about the diagnostic, as well as a progress bar and a View Log button, both placed at the bottom of the section, where the former indicates the global execution progress and the latter allows to visualize tests details after finishing the diagnostic execution. That section contains the following diagnostics information:

- Final Result Code (an encrypted code that informs which modules were tested).
- Date and time that diagnostic has started.
- Test (name of the test being currently run).
- Progress of the current test (current test's progress in percentage).
- Total estimated time of the current suite of diagnostic tests.
- A list with all the algorithms which compose device test and their respective status:
 - **Waiting**, indicating the test is waiting to be run.
 - **Progress** (plus the test execution percentage), indicating the test is being run.
 - **PASSED**, indicating the algorithm has found no problems at device.
 - **WARNING**, when applicable, indicating the algorithm has detected signs to the user be aware (for instance, of an imminent failure).
 - **FAILED**, indicating the algorithm has found one or more faults.
 - **CANCELED**, indicating the algorithm has been canceled by user.
 - **NOT APPLICABLE**, indicating the algorithm is not supported by device.
- Date and time that the tests are finished (displayed after test is finished).
- Result Code for test.
- Elapsed time, that is a duration of test in hours, minutes and seconds (displayed after test is finished).

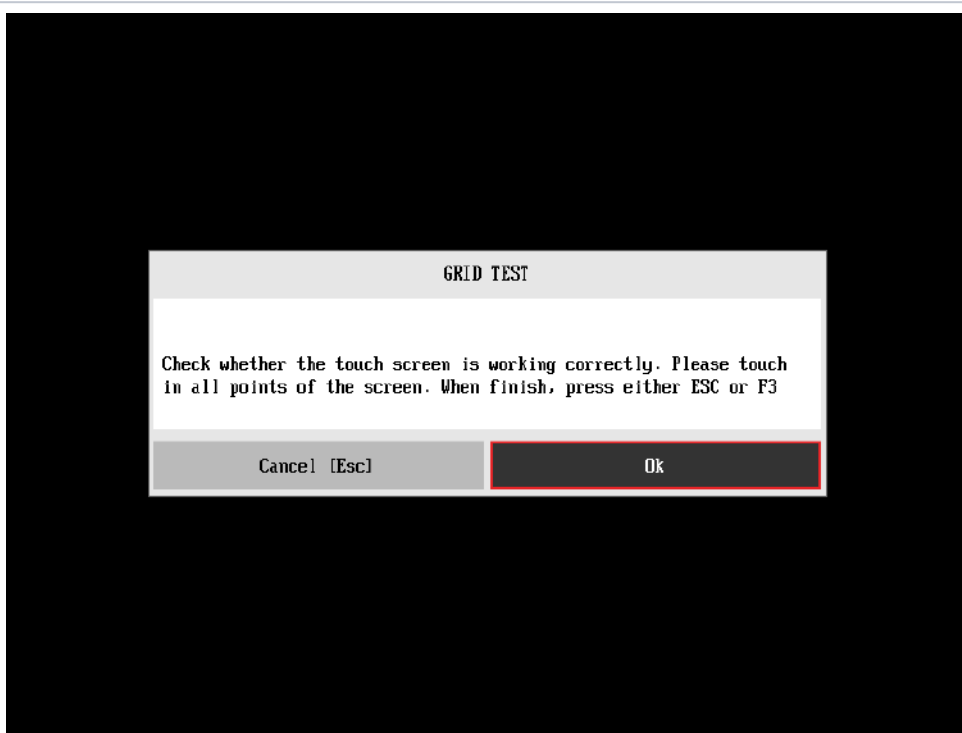
While the diagnostic is running, the user can stop it at any time by pressing the ESC key. If the user does that, the diagnostic is aborted and the status of the test that is being run is changed to CANCELED. After the diagnostic is finished or canceled, the user can go back to the Home screen (by pressing ESC again) or visualize the test log (by pressing the V key).

Touch

The system allows the user to access the touch diagnostics from the Home screen, Diagnostics, Touch. After the user accesses the Touch option, the application displays the number of algorithms that can be performed. If the diagnostic has more than one algorithm, Algorithm Selection screen is displayed:

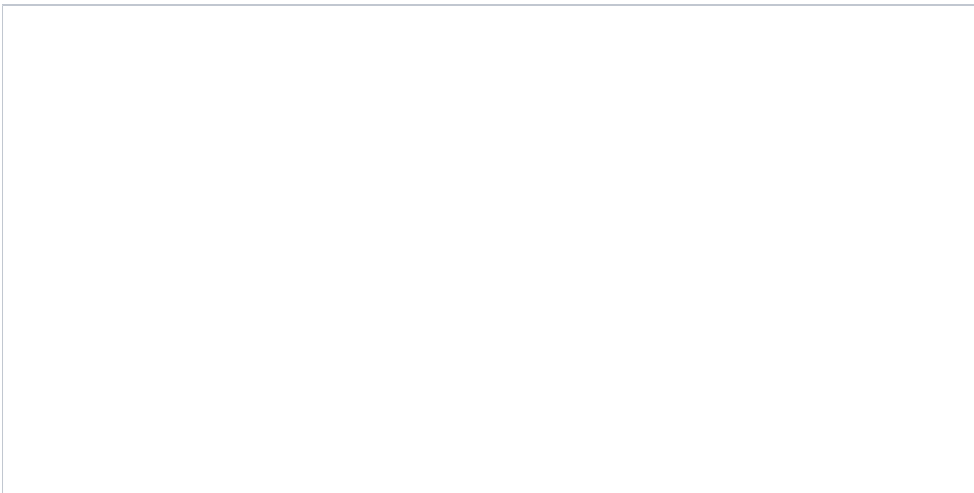
- **Reset Test:**
 - **Description:** "Reset Test" is a touch device test that resets the connection with touch device.
 - **Results:** PASSED; FAILED; CANCELED; NOT APPLICABLE.
- **Grid Test:**
 - **Description:** "Grid Test" is a touch device test that tracks all touch events on touch device.
 - **Results:** PASSED; FAILED; CANCELED; NOT APPLICABLE

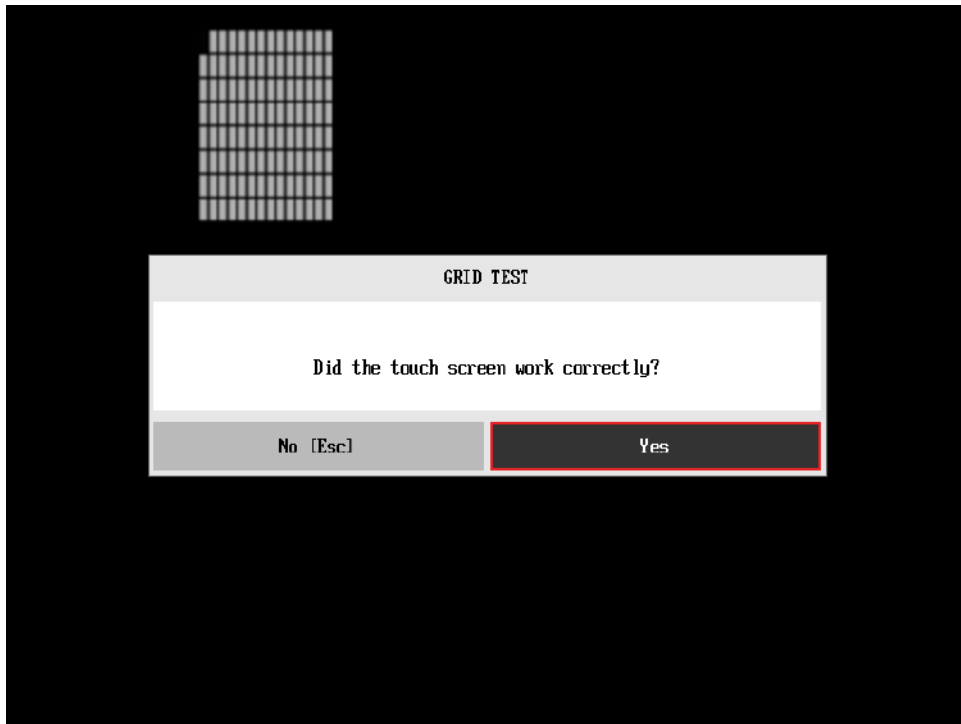
On Grid test, a popup is show asking the user to touch the screen in all points to test if it is working correctly.



Touch Grid Test start pop-up

After the test finishes, a confirmation screen pop up to check if the test worked fine.

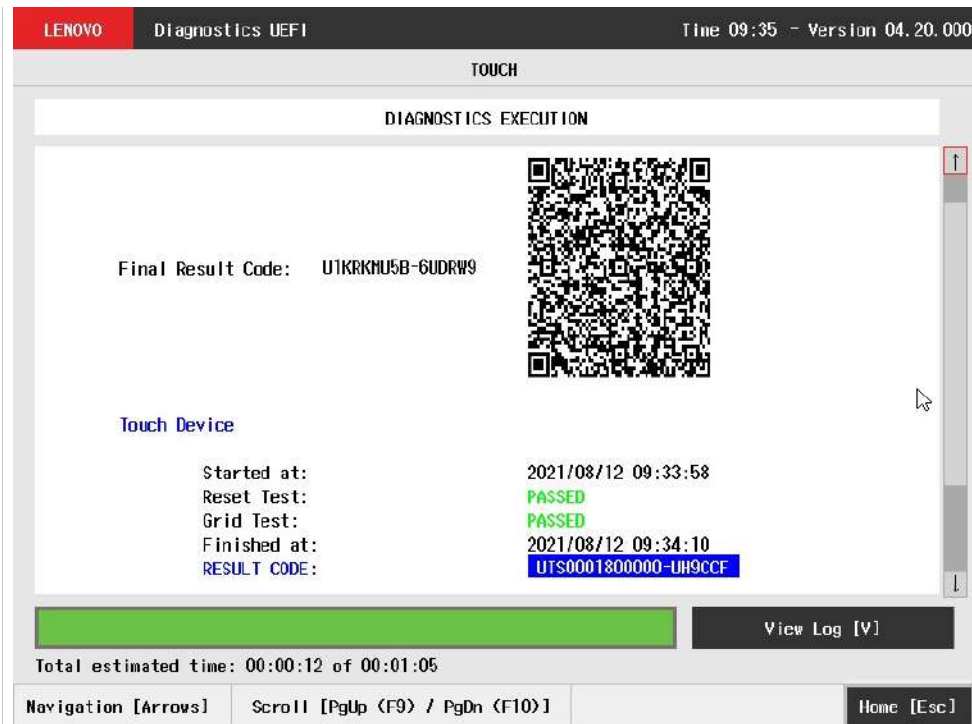




Touch Grid Test end pop-up

After the confirmation, a screen with one main section that provides information about the diagnostic, as well as a progress bar and a View Log button, both placed at the bottom of the section, where the former indicates the global execution progress and the latter allows to visualize tests details after finishing the diagnostic execution. That section contains the following diagnostics information:

- Final Result Code (an encrypted code that informs which modules were tested).
- Date and time that diagnostic has started.
- Test (name of the test being currently run).
- A list with all the algorithms which compose device test and their respective status:
 - **PASSED**, indicating the algorithm has found no problems at device.
 - **FAILED**, indicating the algorithm has found one or more faults.
 - **CANCELED**, indicating the algorithm has been canceled by user.
 - **NOT APPLICABLE**, indicating the algorithm is not supported by device.
- Date and time that the tests are finished (displayed after test is finished).
- Result Code for test.
- Elapsed time, that is a duration of test in hours, minutes and seconds (displayed after test is finished).



Touch Diagnostic Execution Result

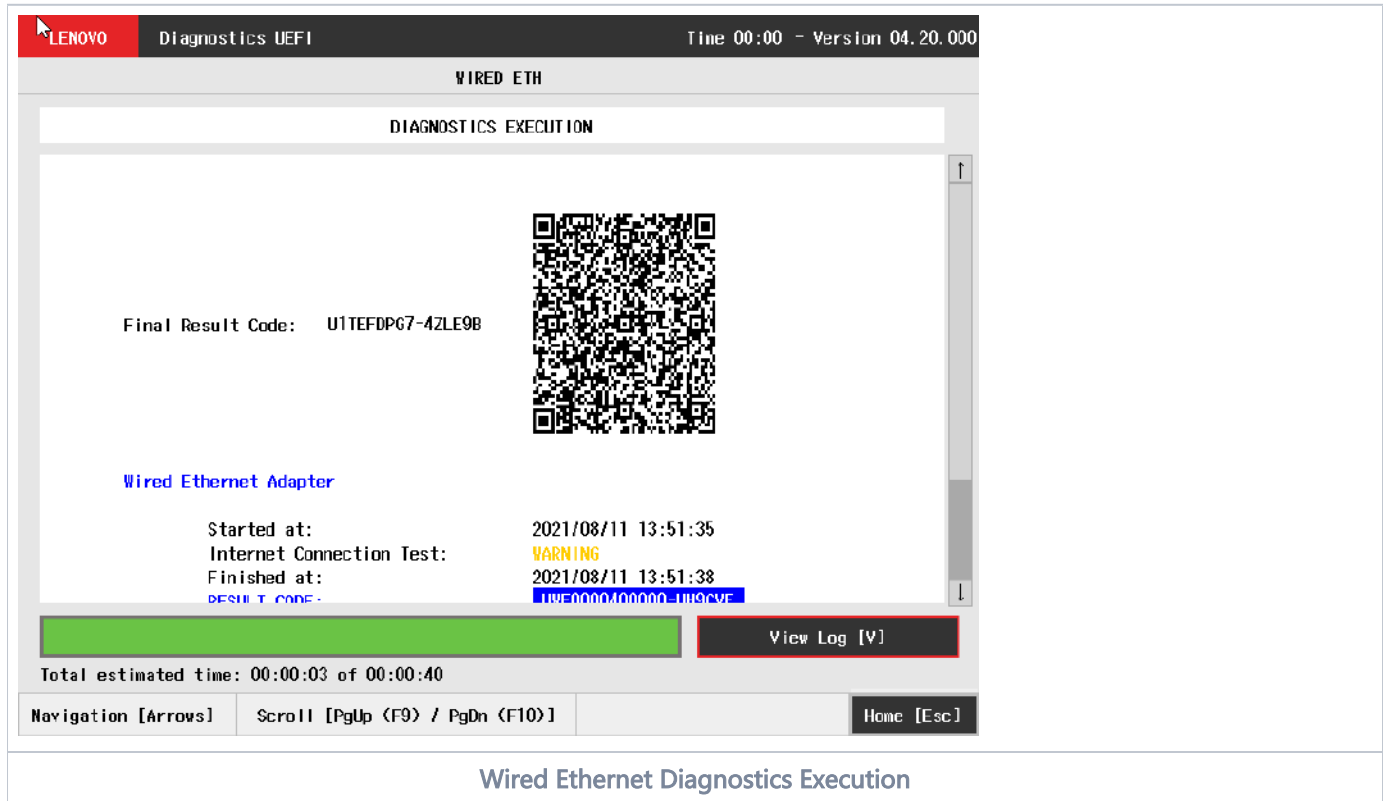
While the diagnostic is running, the user can stop it at any time by pressing the ESC key. If the user does that, the diagnostic is aborted and the status of the test that is being run is changed to CANCELED. After the diagnostic is finished or canceled, the user can go back to the Home screen (by pressing ESC again) or visualize the test log (by pressing the V key).

Note

Touch grid test will automatically exit after 15 seconds of no user interaction.

Wired Ethernet

After the user enters the Wired Ethernet option(Only available in Bootable version), the application Internet Connection Test to check if the Ethernet device has a connection and it is sending and receiving packets.. If the diagnostic has only one device, it will be started, as shown in the next figure.



The Wired Ethernet screen provides information about the Wired Ethernet diagnostics progress, as well as information about the results. This screen is composed of:

- Application Header Bar
- Screen Title Bar
- Screen Sub-title Bar
- Diagnostic Information Section
- Instruction Footer Bar

The Application Header Bar contains the name of the application, system's time and application's current version; the Screen Title and Screen Sub-title Bars help the user to be attentive of where s/he is throughout the application; and the Instruction Footer Bar contains additional instructions for using the screen, as well as the Exit button.

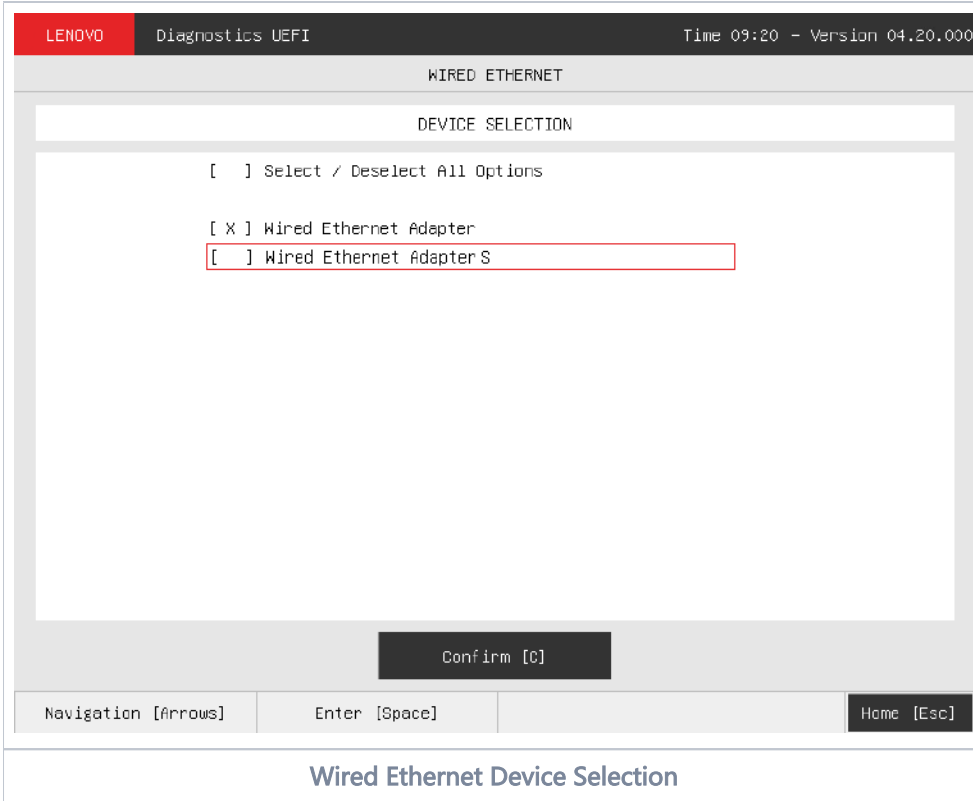
The screen has one main section that provides information about the diagnostic, as well as a progress bar and a View Log button, both placed at the bottom of the section, where the former indicates the global execution progress and the latter allows to visualize tests details after finishing the diagnostic execution. That section contains the following diagnostics information:

- Final Result Code (an encrypted code that informs which modules were tested).
- Date and time that diagnostic has started.
- Test (name of the test being currently run).
- Progress of the current test (current test's progress in percentage).
- Total estimated time of the current suite of diagnostic tests.
- A list with all the algorithms which compose device test and their respective status:
 - **Waiting**, indicating the test is waiting to be run.
 - **Progress** (plus the test execution percentage), indicating the test is being run.
 - **PASSED**, indicating the algorithm has found no problems at device.
 - **WARNING**, when applicable, indicating the algorithm has detected signs to the user be aware (for instance, of an imminent failure).
 - **CANCELED**, indicating the algorithm has been canceled by user.
 - **NOT APPLICABLE**, indicating the algorithm is not supported by device.
- Date and time that the tests are finished (displayed after test is finished).
- Result Code for test.
- Elapsed time, that is a duration of test in hours, minutes and seconds (displayed after test is finished).

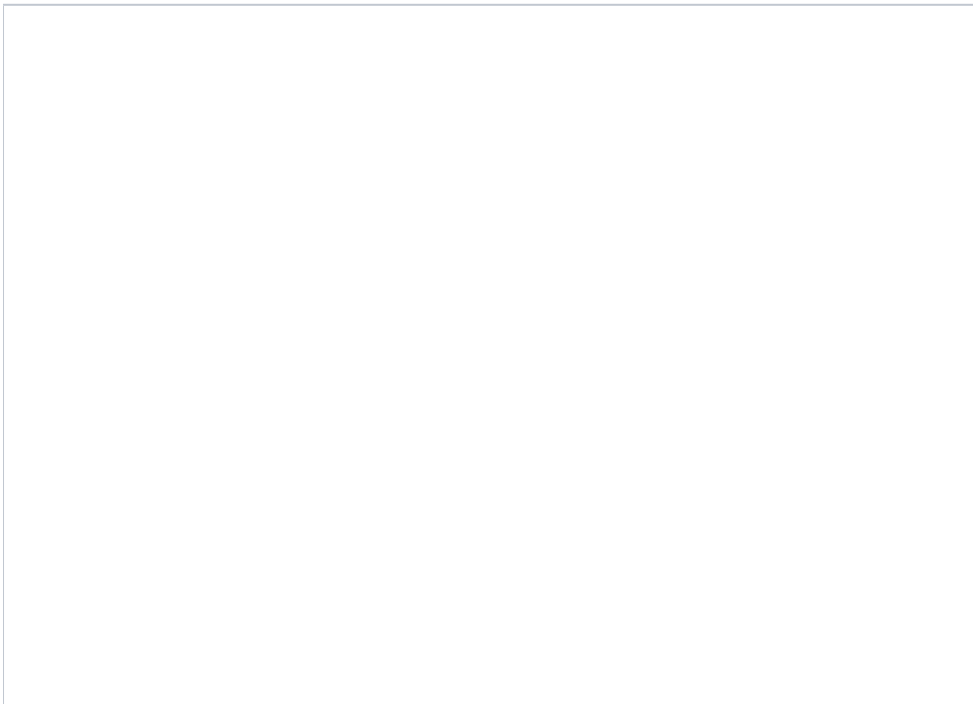
While the diagnostic is running, the user can stop it at any time by pressing the ESC key. If the user does that, the diagnostic is aborted and the status of the test that is being run is changed to CANCELED. After the diagnostic is finished or canceled, the user can go back to the Home screen (by pressing ESC again) or visualize the test log (by pressing the V key).

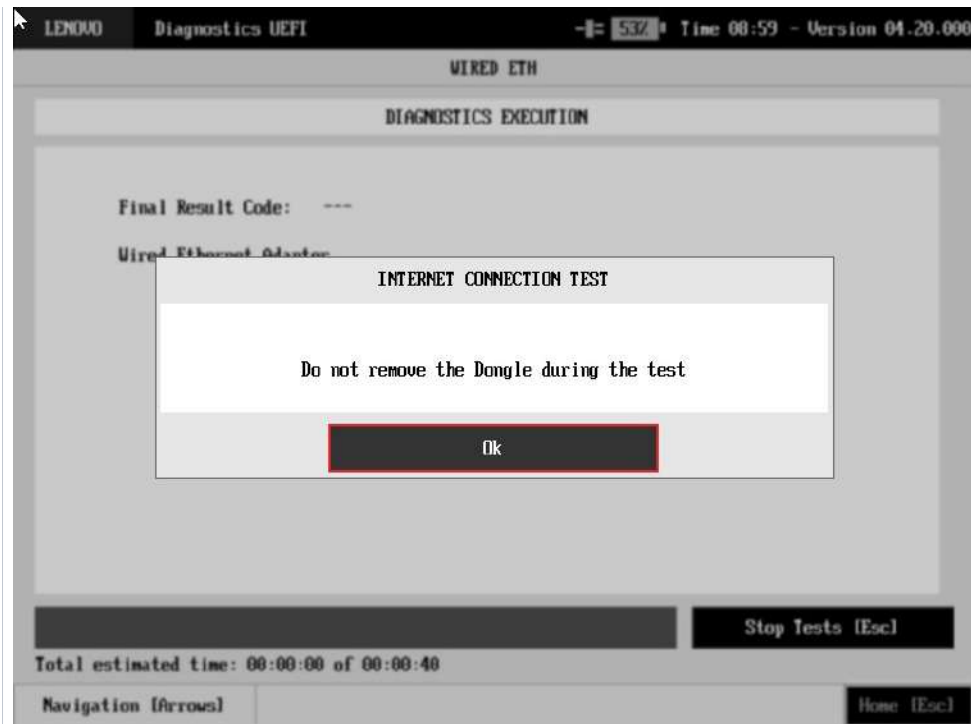
Note

If there is more than one device in the system, the screen below will be displayed



In case the test is executed using an Ethernet dongle (or adapter) the following pop-up message will be shown:





Wired Ethernet Internet Connection Test Dongle Warning

WiFi

i WiFi Diagnostic is available on embedded version only and depend on WiFi UEFI Drivers availability.

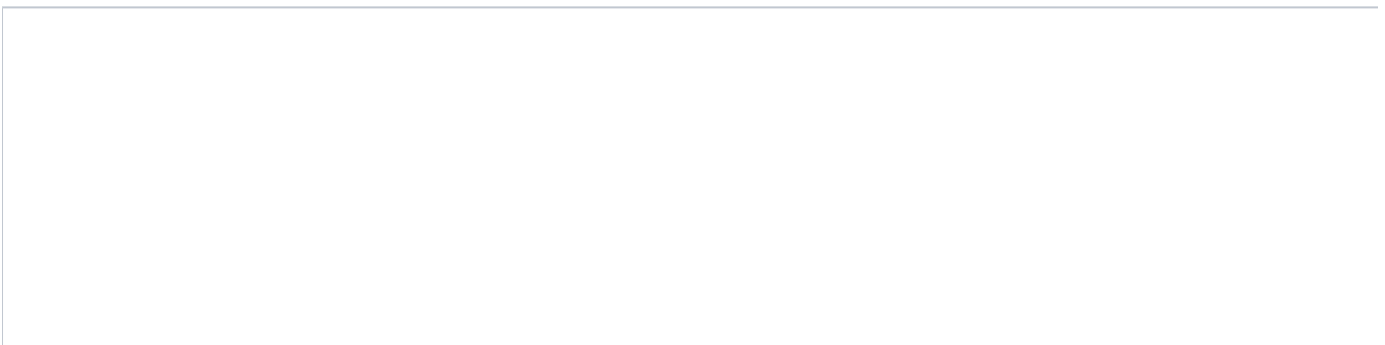
The system allows the user to access the WiFi diagnostics from the Home screen, Diagnostics, WiFi. After the user accesses the WiFi option, the application will display the available WiFi tests:

- **Scan Test:**
 - **Description:** "Scan Test" scans for nearby WiFi Networks.
 - **Results:** PASSED; WARNING FAILED; CANCELED; NOT APPLICABLE.

Scan test, an unattended test that will search for available WiFi networks

- If one or more networks are found:
 - The rest result will be **PASSED**
- If the sensor does not detect any WiFi network
 - The test result will be **WARNING**
- If any error occurs when accessing the device and scanning for networks
 - The test result will be **FAILED**
- If the user press **[Esc]**, the test will be **CANCELED**
- If the test can not be executed the test result will be **NOT APPLICABLE**.

After the test is executed, the application will display the execution result screen as in the image below:




LENOVO Diagnostics UEFI 99% Time 22:51 - Version 04.20.000

WIFI

DIAGNOSTICS EXECUTION

Final Result Code: U1JHLH4X-X6K3U3



Wifi Adapter

Started at: 2021/06/12 09:47:13
Scan Test: PASSED
Finished at: 2021/06/12 09:47:17
RESULT CODE: UWF0000100000-U0BASF

Elapsed Time: 00:00:04

View Log [V]

Total estimated time: 00:00:04 of 00:00:05

Navigation [Arrows] Scroll [PgUp (F9) / PgDn (F10)] Home [Esc]

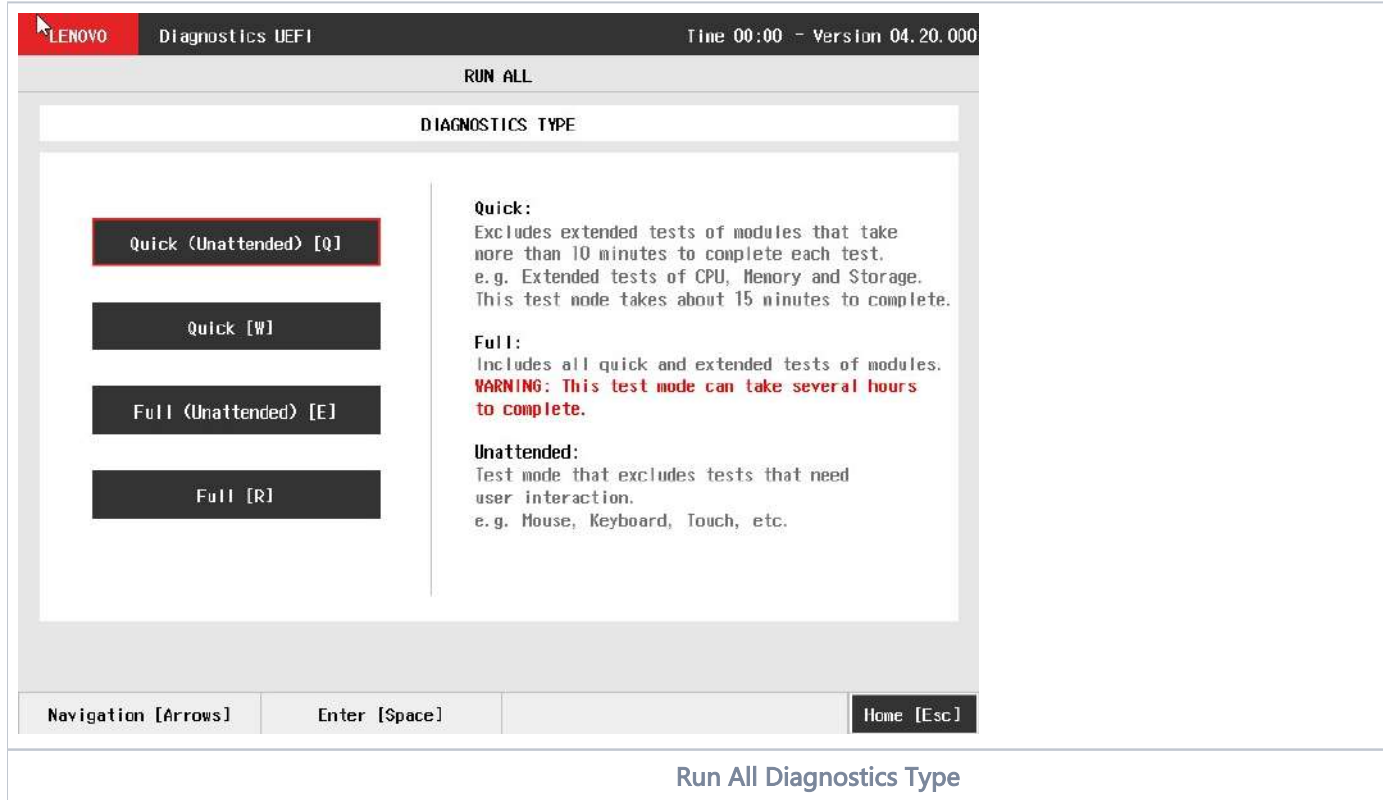
WiFi Diagnostic Execution Result

In the result log, the found WiFi networks are listed.

Run All

The system allows the user to access the run all diagnostics from the Home screen, Diagnostics, Run All.

An item can be selected/deselected by pressing SPACE when it is highlighted. To access a diagnostics type, the user can use the UP/DOWN arrow key until the desired item is focused and press SPACE key to select it, as illustrated in the figure below.



After the user selects one option of the run all modes, the application will display the entire set of modules of the UEFI Diagnostic application as follows:

- If a module is unavailable, the module will display as **Not Found**.

Quick (Unattended) [Q]:

- If a module has only attended tests, it will be displayed as **Not Selected**
- If a module has only extended tests, it will be displayed as **Not Selected**
- Attended tests will be displayed as **Not Selected** and won't be executed
- Extended tests will be displayed as **Not Selected** and won't be executed

Quick [W]:

- If a module has only extended tests, it will be displayed as **Not Selected**
- Extended tests will be displayed as **Not Selected** and won't be executed

Full (Unattended) [E]:

- If a module has only attended tests, it will be displayed as **Not Selected**
- Attended tests will be displayed as **Not Selected** and won't be executed

Full [R]:

- All tests will be selected.

LENOVO Diagnostics UEFI Time 13:52 - Version 04.20.000

Diagnostic	Status	Progress	Summary
			CPU: 11th Gen Intel(R) Core(TM) i9-11980HK @ 2.60GHz
AUDIO	NOT SELECTED	>	Started at: 2021/08/11 13:52:27
DISPLAY	NOT SELECTED	>	Register Test: PASSED
FINGERPRINT	N/A	>	BT Instruction Test: PASSED
KEYBOARD	N/A	>	X87 Floating Point Test: PASSED
MOUSE	N/A	>	MMX Test: PASSED
OPTICAL	N/A	>	SSE Test: PASSED
TOUCH	N/A	>	AES Test: PASSED
BATTERY	N/A	>	Cache Test: Progress [16%]
CPU	IN PROGRESS	77%	AVX-512 Test: Waiting
FAN	N/A	>	Finished at: 0000/00/00 00:00:00
MEMORY	PENDING	0%	RESULT CODE: ---
MOTHERBOARD	PENDING	0%	
PCI EXPRESS	PENDING	0%	

Total estimated time: 00:00:02 of 00:15:47 FINAL RESULT CODE
 Passed: 00 Failed: 00 N/A: 09 Canceled/Not Selected: 03
 Navigation [Arrows] Stop Tests [Esc]

Run All Diagnostics Execution

The Run All Diagnostics Execution screen provides information about the diagnostics progress of all modules, as well as information about the results. This screen is composed of:

- Application Header Bar
- Screen Title Bar
- Screen Sub-title Bar
- Diagnostics Modules list
- Diagnostic Information Section
- Instruction Footer Bar

The Application Header Bar contains the name of the application, system's time and application's current version; the Screen Title and Screen Sub-title Bars help the user to be attentive of where s/he is throughout the application; and the Instruction Footer Bar contains additional instructions for using the screen, as well as the Exit button.

All diagnostic modules will be displayed on Diagnostic Modules List. The ones that are not selected or not applicable for the target system will be grayed with N/A status. Use upper or bottom arrows to scroll modules list.

The screen has one main section that provides information about the diagnostic, as well as a progress bar and a View Log button, both placed at the bottom of the section, where the former indicates the global execution progress and the latter allows to visualize tests details after finishing the diagnostic execution. That section contains the following diagnostics information:

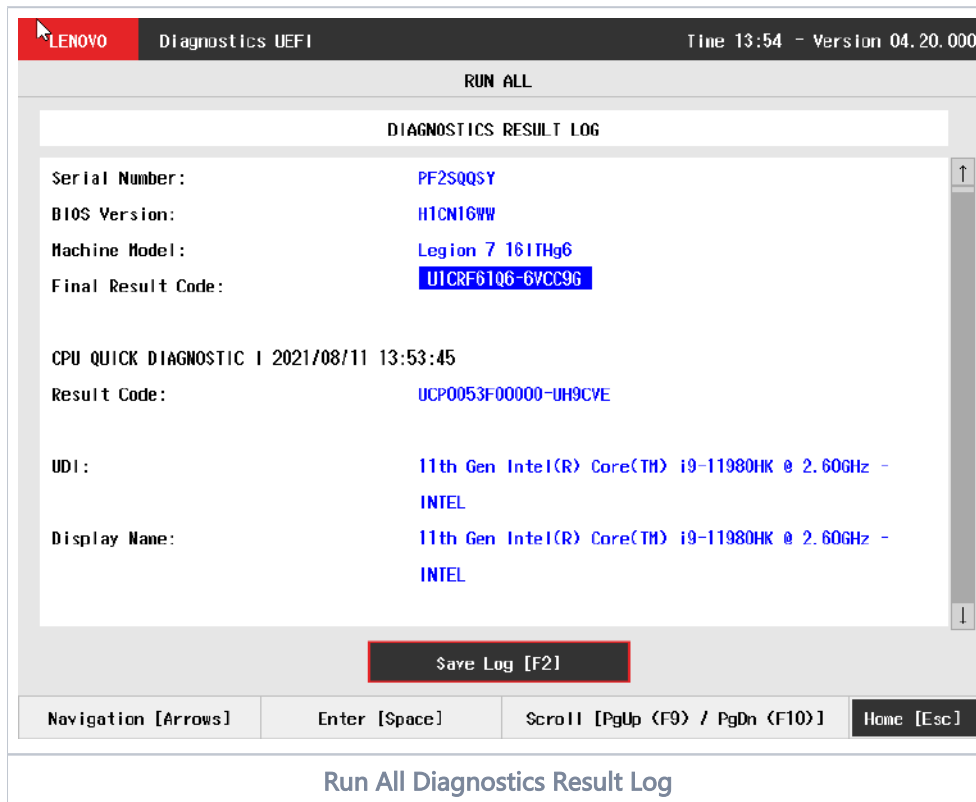
- Final Result Code (an encrypted code that informs which modules were tested).
- Date and time that diagnostic has started.
- Test (name of the test being currently run).
- Progress of the current test (current test's progress in percentage).
- Total estimated time of the current suite of diagnostic tests.
- A list with all the algorithms which compose device test and their respective status:
 - **Waiting**, indicating the test is waiting to be run.
 - **Progress** (plus the test execution percentage), indicating the test is being run.
 - **PASSED**, indicating the algorithm has found no problems at device.
 - **WARNING**, when applicable, indicating the algorithm has detected signs to the user be aware (for instance, of an imminent failure).
 - **FAILED**, indicating the algorithm has found one or more faults.
 - **CANCELED**, indicating the algorithm has been canceled by user.
 - **NOT APPLICABLE**, indicating the algorithm is not supported by device.
- Date and time that the tests are finished (displayed after test is finished).
- Result Code for test.
- Elapsed time, that is a duration of test in hours, minutes and seconds (displayed after test is finished).

While the diagnostic is running, the user can stop it at any time by pressing the ESC key. If the user does that, the diagnostic is aborted and the status of the test that is being run is changed to CANCELED. After the diagnostic is finished or canceled, the user can go back to the Home screen (by pressing ESC again) or visualize the test log (by pressing the V key).

A total sum of **Passed** (**Warning** tests are also counted as passed as it does not indicate a hardware failure, it just indicates a point of attention), **Failed**, **N/A** (Not Applicable) and **Canceled / Not Selected** tests are displayed in the Footer Bar.

Diagnostics Result Log

After a test or a recover operation is finished, the user can see the Diagnostics Result Log screen by pressing the V key. That screen is shown in the following figure.



The Diagnostics Result Log screen is composed of:

- Application Header Bar
- Screen Title Bar
- Screen Sub-title Bar
- Diagnostic Log Section
- Save Log Button
- Instruction Footer Bar

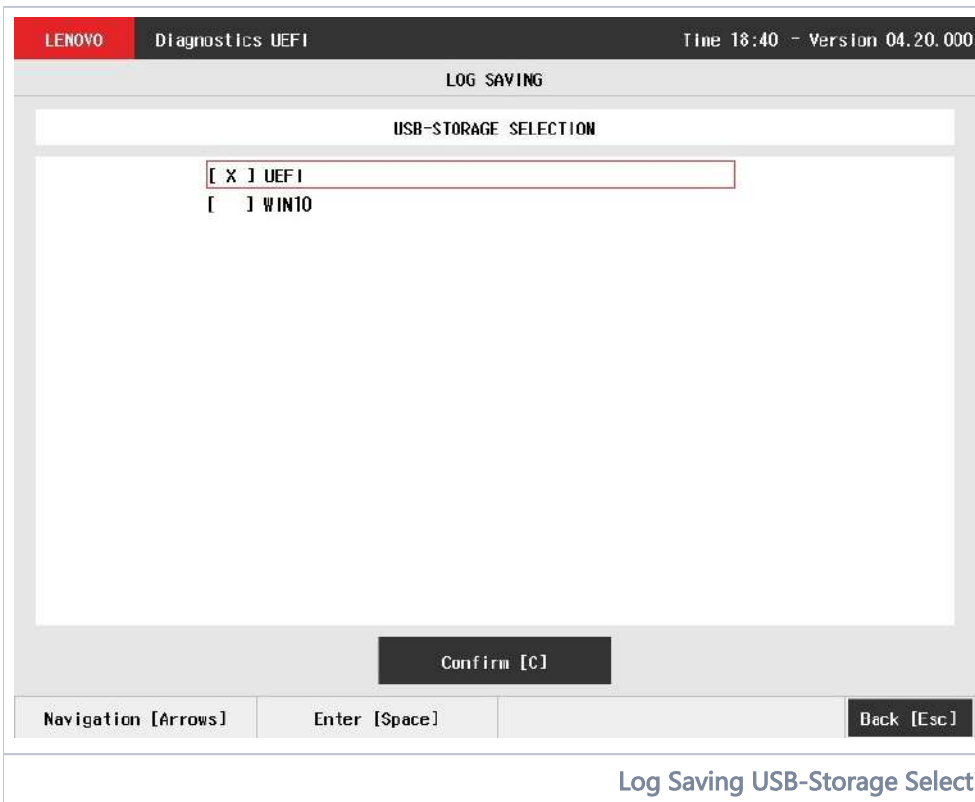
The Application Header Bar contains the name of the application, system's time and application's current version; the Screen Title and Screen Sub-title Bars help the user to be attentive of where s/he is throughout the application; and the Instruction Footer Bar contains additional instructions for using the screen, as well as the Exit button.

Additionally, the screen has one main section that shows the diagnostic log, and a Save Log button that allows the user to store the log into an USB-Storage.

If the log content has many rows, user can scroll by pressing the Page Up and Page Down to move the displayed region up and down, respectively. The user can also go back to the Home screen by pressing the ESC key and save the log by pressing the F2 key.

Log Saving

If the user chooses to save the log by pressing the Save Log button on the Diagnostics Result Log screen, the Log Saving screen is displayed, as shown in the figure below.



Log Saving USB-Storage Selection

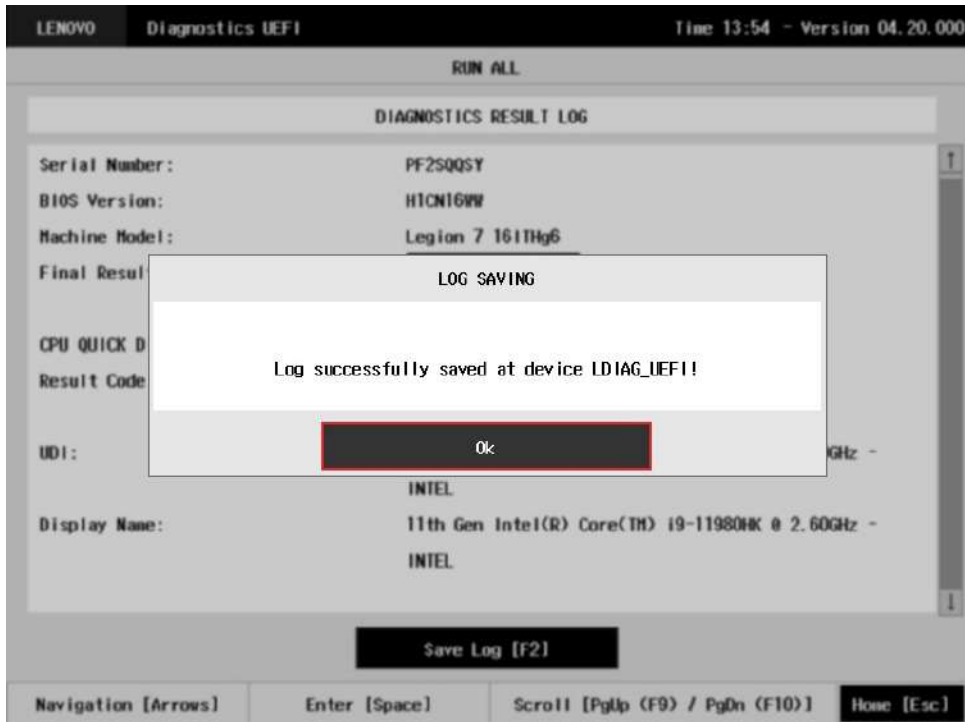
The Log Saving screen is composed of:

- Application Header Bar
- Screen Title Bar
- Screen Sub-title Bar
- USB-Storage Selection List
- Confirm Button
- Instruction Footer Bar

The Application Header Bar contains the name of the application, system's time and application's current version; the Screen Title and Screen Sub-title Bars help the user to be attentive of where s/he is throughout the application; and the Instruction Footer Bar contains additional instructions for using the screen, as well as the Exit button.

In addition, user can choose a device from the USB-Storage Selection List to save the log in. After the user chooses a device, s/he can press Confirm. The application will attempt to save the log into the selected device.

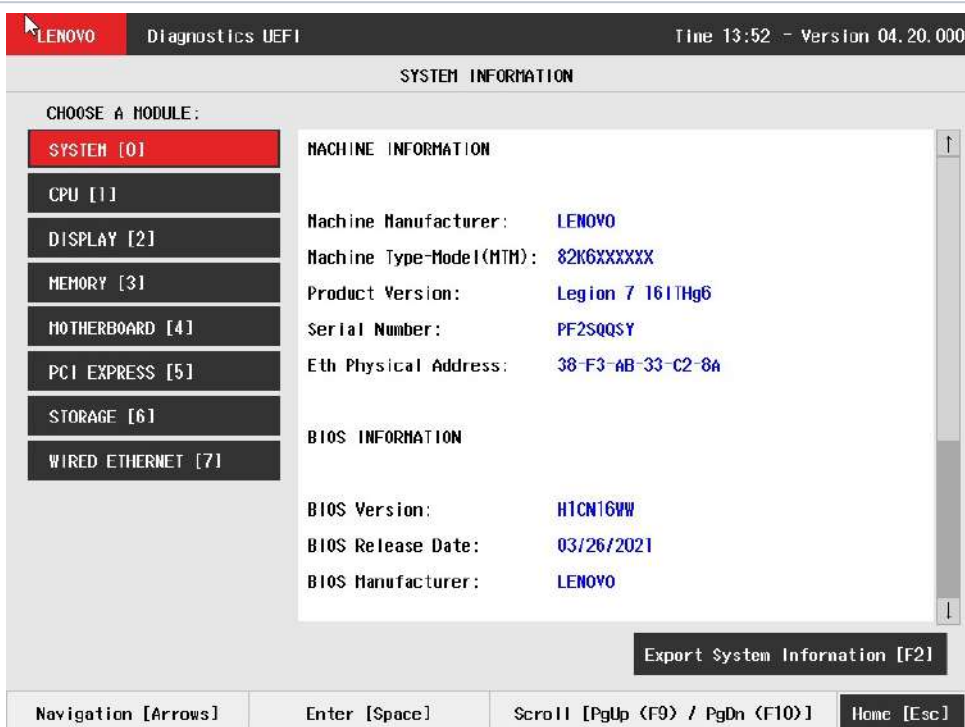
If the saving operation is successful, a window will be displayed to inform the user that the operation was successful (as shown in the next figure). If the operation does not work, a window will be displayed to inform the user that the operation was not successful. In both cases, the user must press ENTER, and the Diagnostics Result Log screen will be displayed again.



Log Saving Information Popup

System Information

The System Information screen with the System tab selected is shown in the following figure.



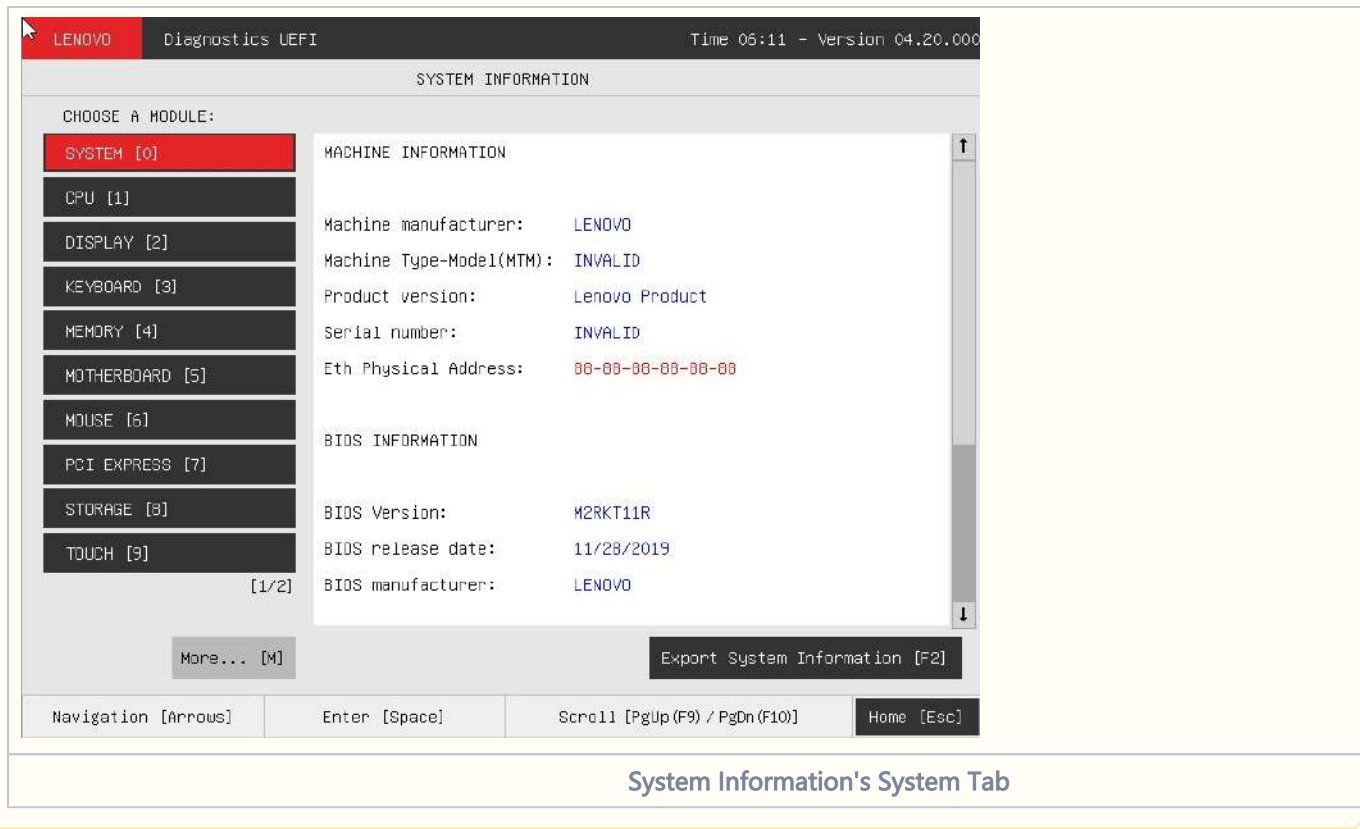
System Information's System Tab

The value of field "Eth Physical Address" can be highlighted in red when it is considered invalid. Will be considered invalid the MAC addresses that have all the same characters or be present in the MAC address list below.

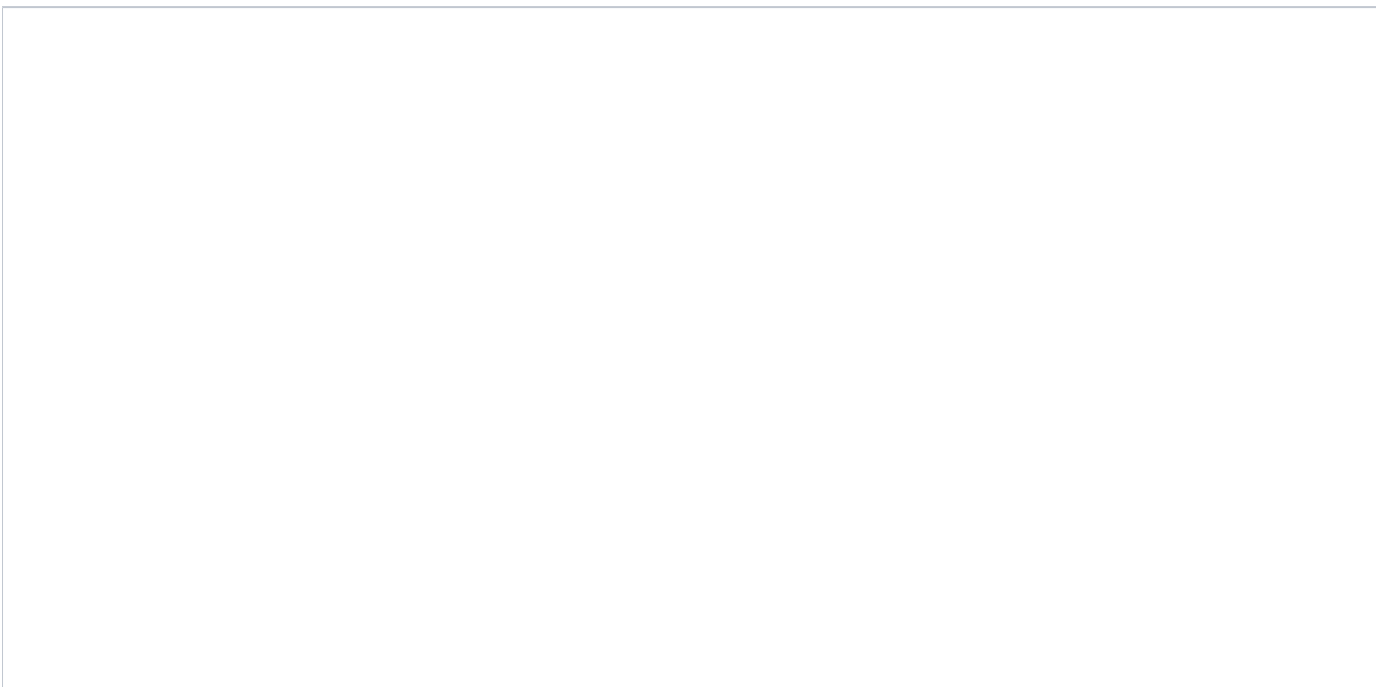
Invalid MAC address list:

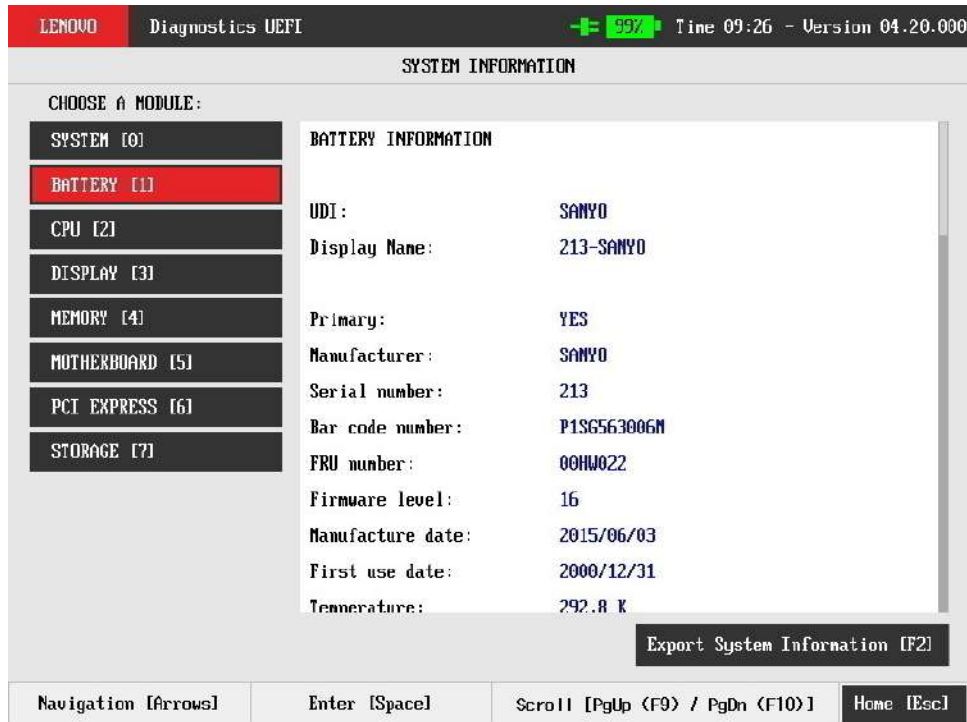
- "88-88-88-88-87-88"
- "88-88-88-88-88-87"

Example in the figure below:



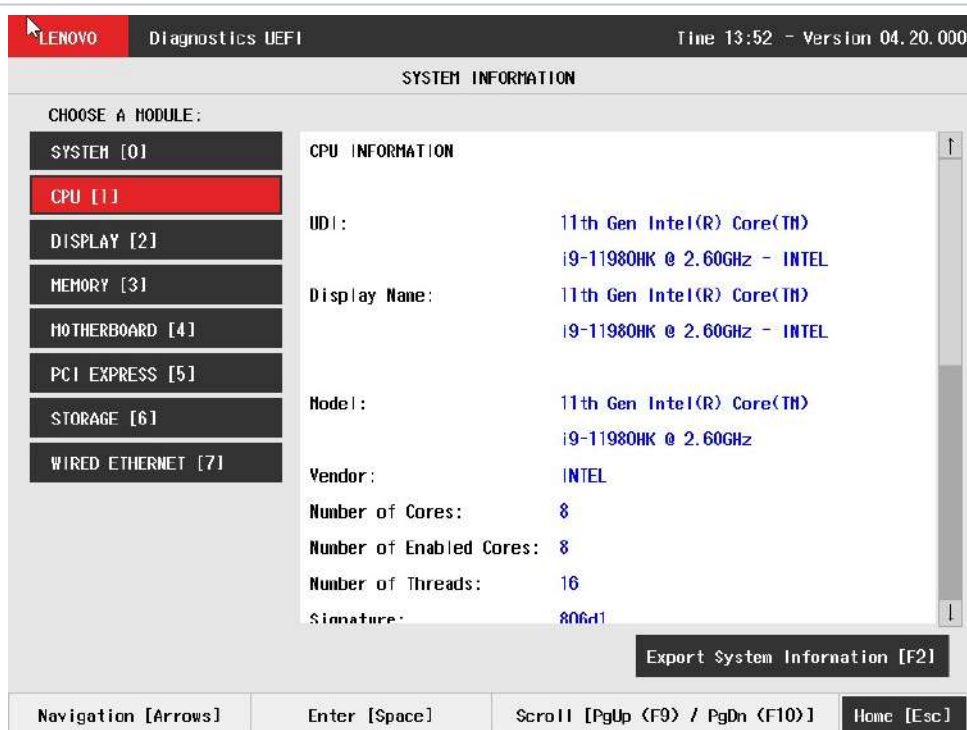
The System Information screen with the Battery tab selected is shown in the following figure.





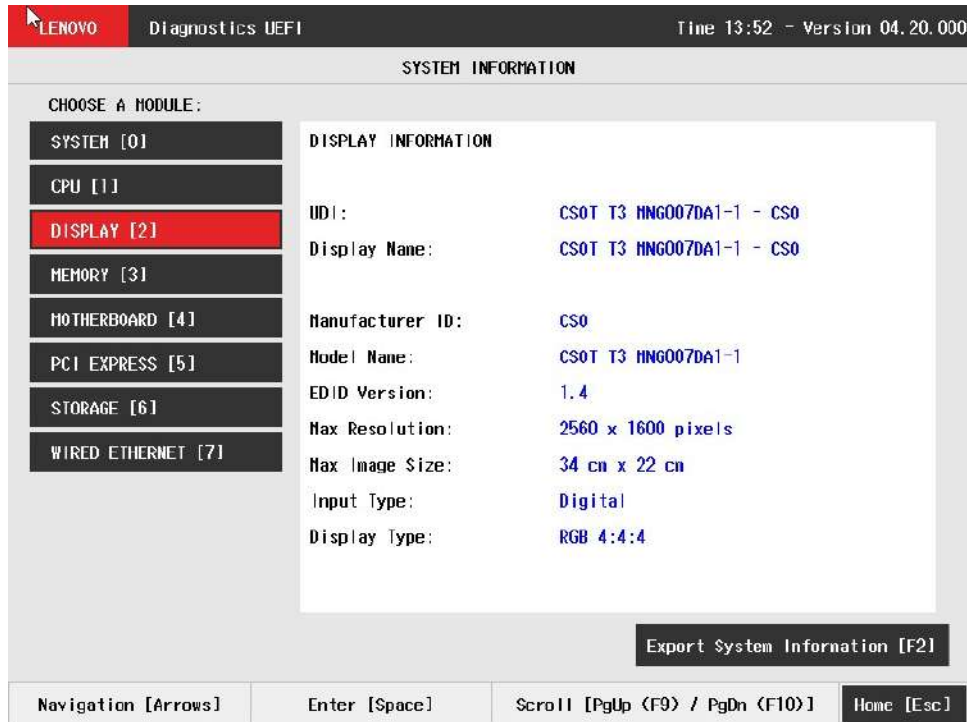
System Information's Battery Tab

The System Information screen with the CPU tab selected is shown in the following figure.



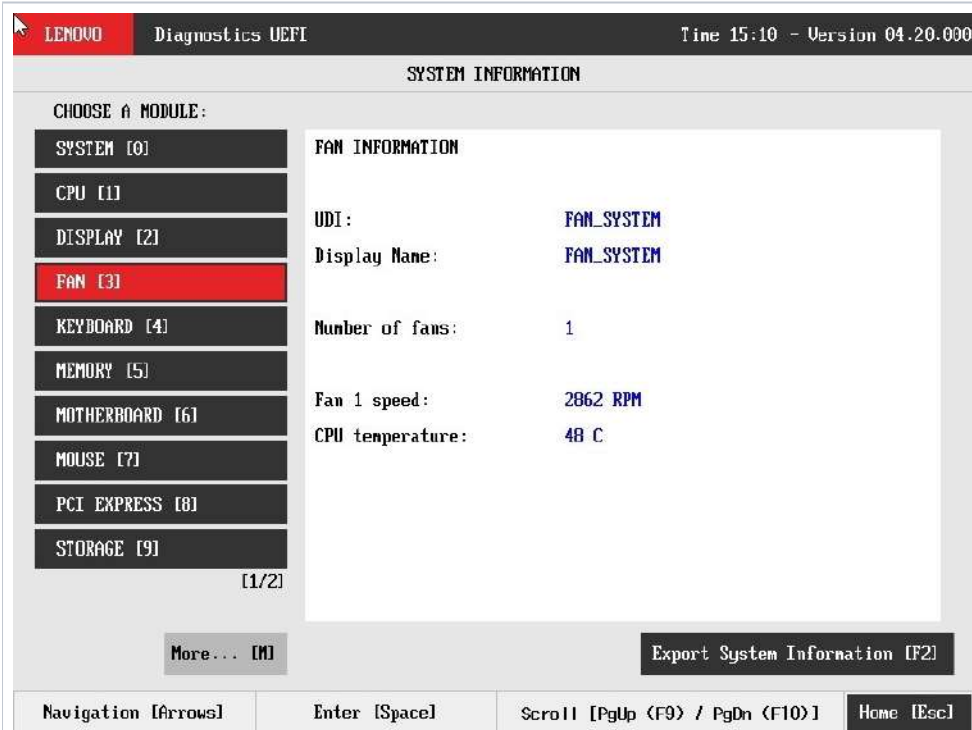
System Information's CPU Tab

The System Information screen with the Display tab selected is shown in the following figure.



System Information's Display Tab

The System Information screen with the Fan tab selected is shown in the following figure.



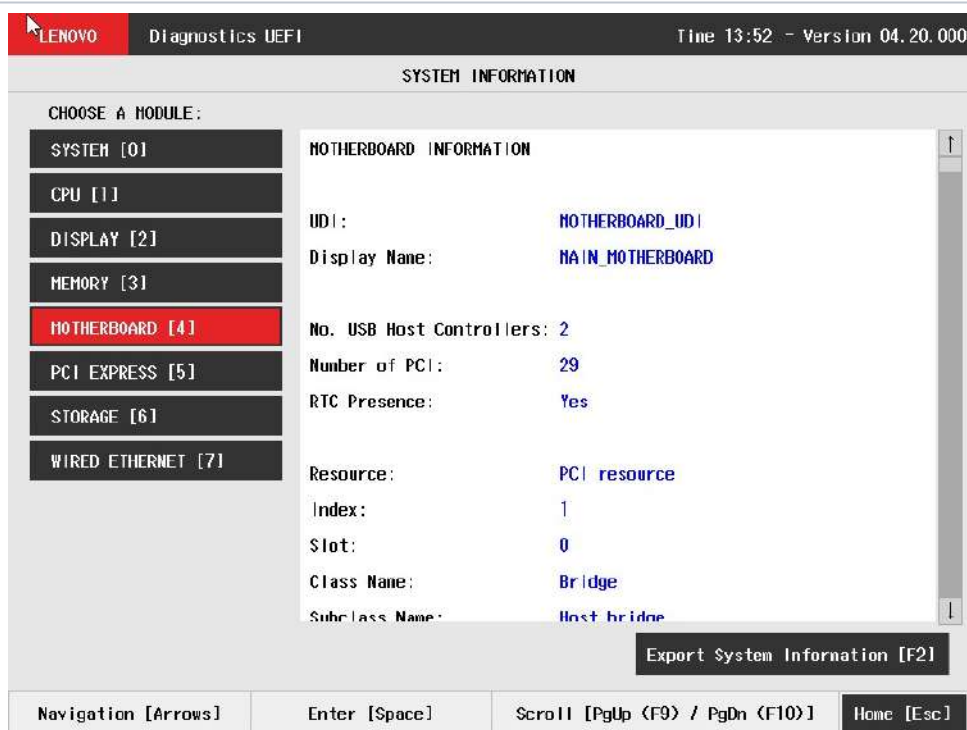
System Information's Fan Tab

The System Information screen with the Memory tab selected is shown in the following figure.



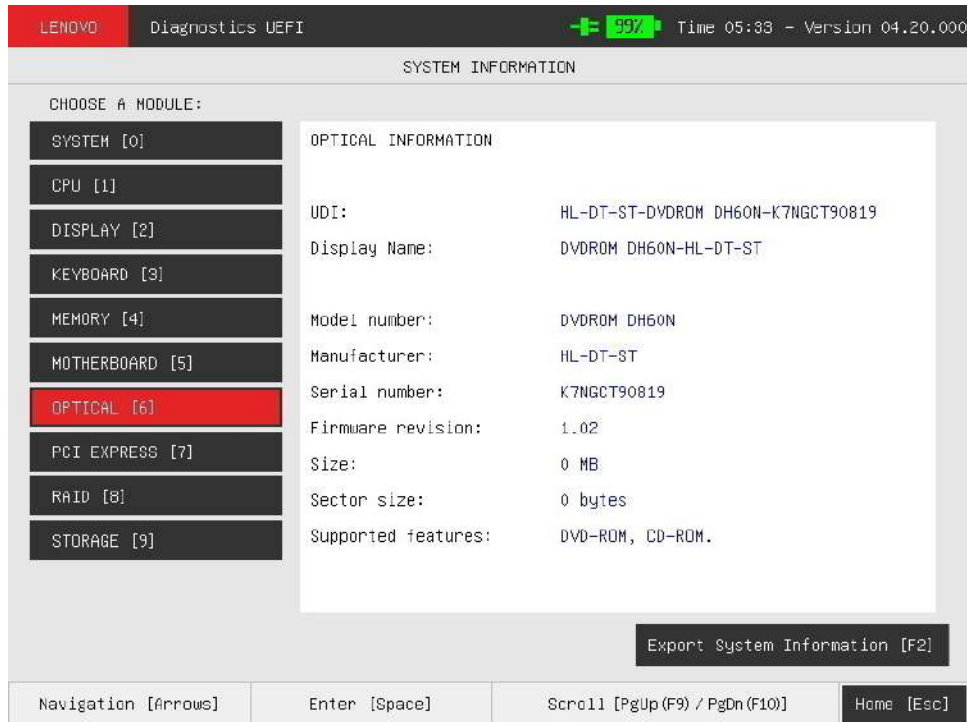
System Information's Memory Tab

The System Information screen with the Motherboard tab selected is shown in the following figure.



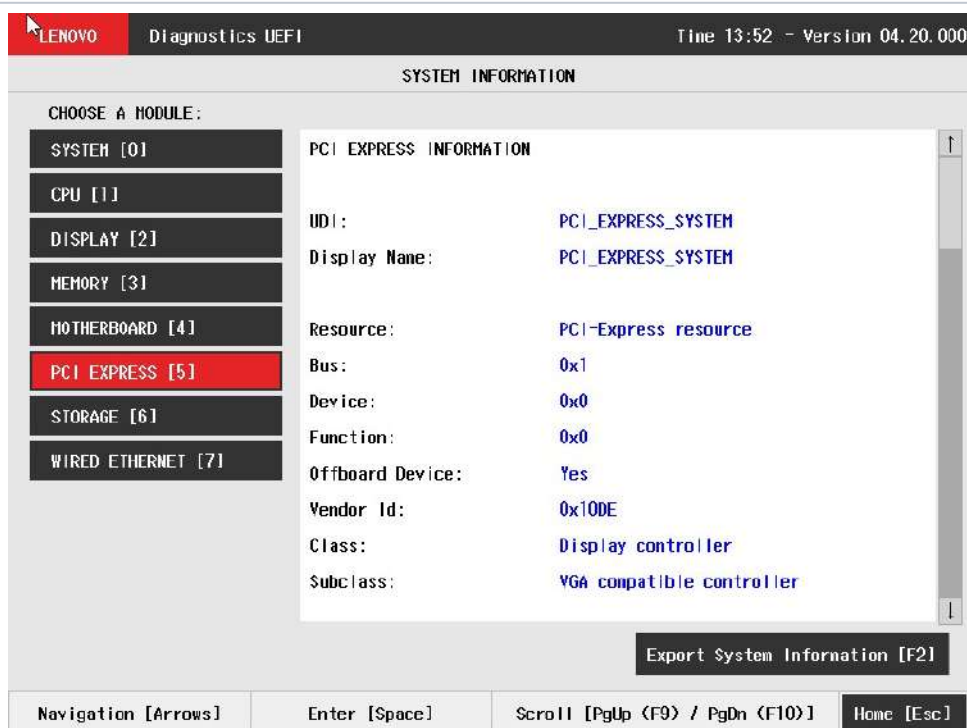
System Information's Motherboard Tab

The System Information screen with the Optical tab selected is shown in the following figure.



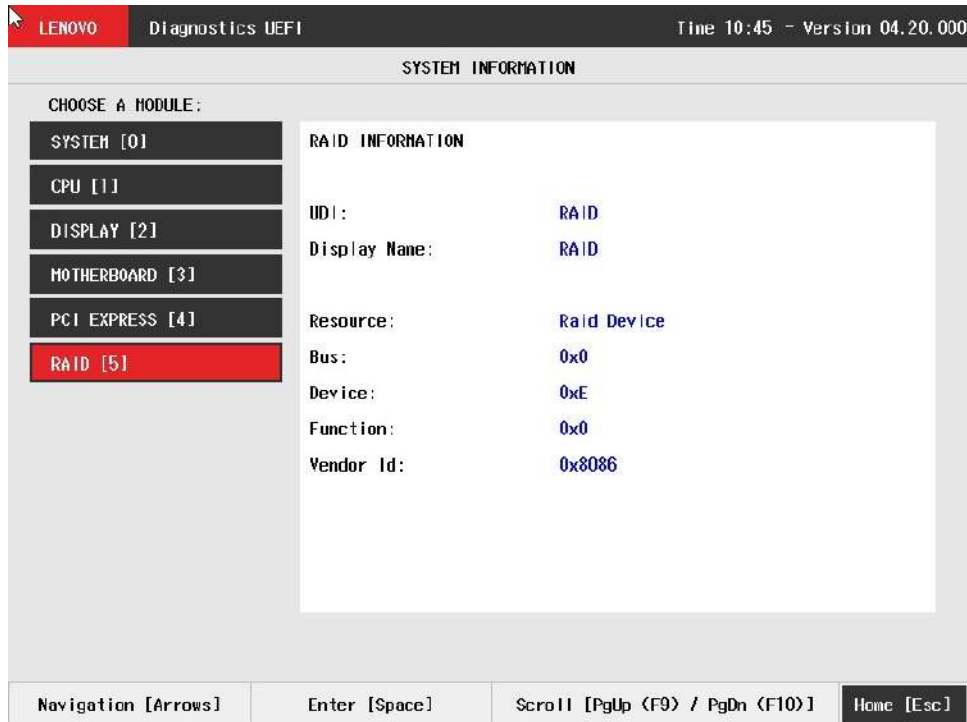
System Information's Optical Tab

The System Information screen with the PCI Express tab selected is shown in the following figure.



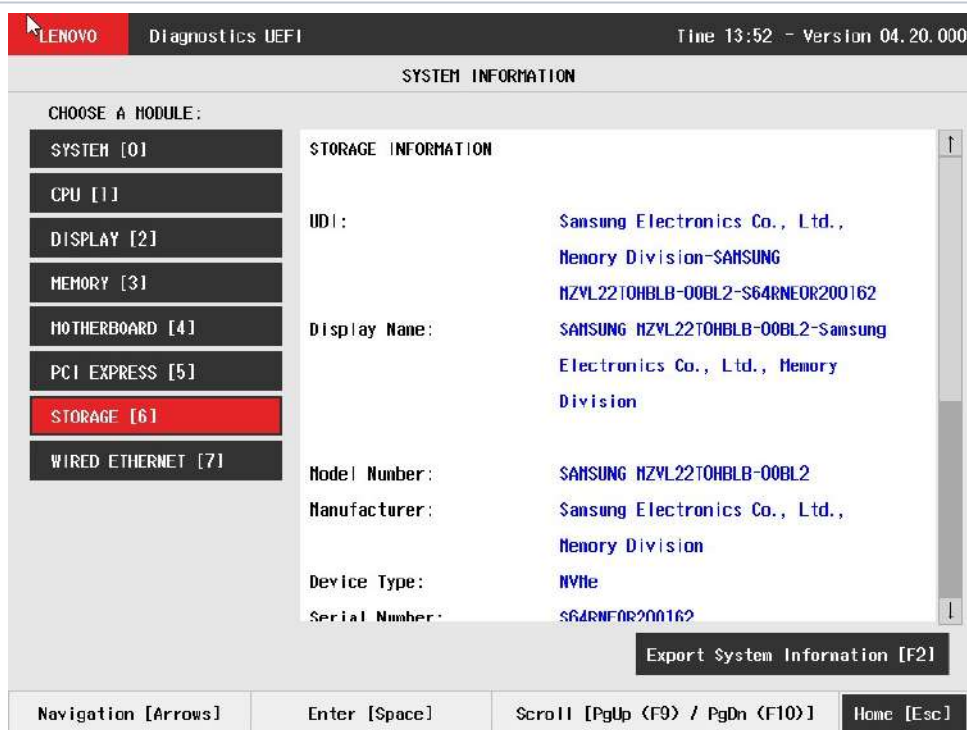
System Information's PCI Express Tab

The System Information screen with the RAID tab selected is shown in the following figure.



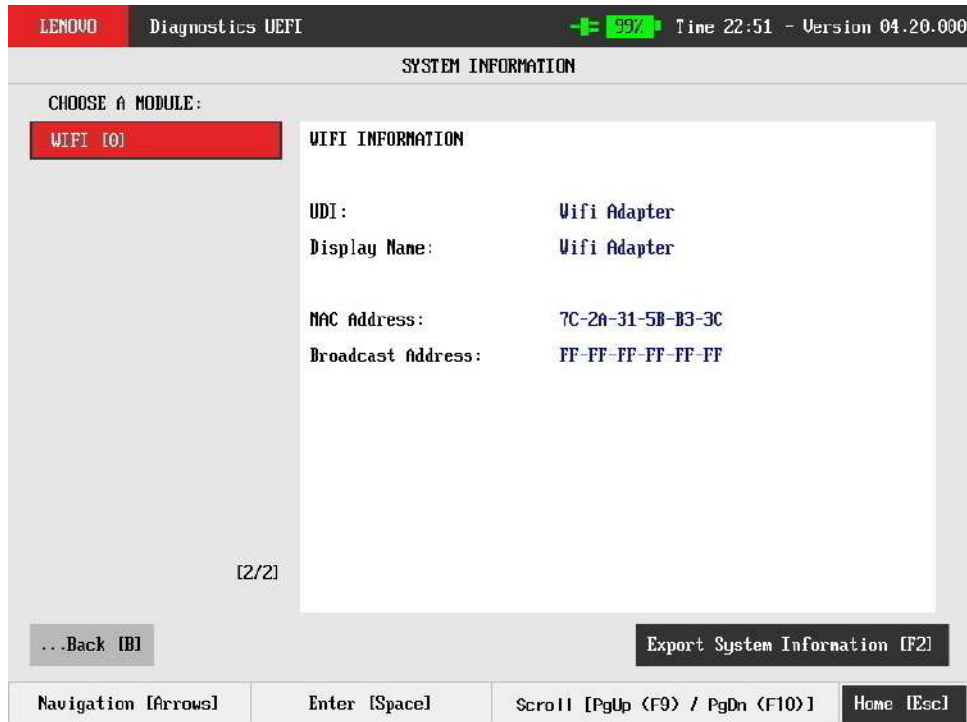
System Information's RAID Tab

The System Information screen with the Storage tab selected is shown in the following figure.



System Information's Storage Tab

The System Information screen with the WiFi tab selected is shown in the following figure.



System Information's WiFi Tab

Will be considered invalid the WIFI MAC addresses that have all the same characters or be present in the MAC address list below.

Invalid MAC address list:

- "88-88-88-88-87-88"
- "88-88-88-88-88-87"

Example in the figure below:



WiFi Log

The System Information screen with the Wired Ethernet tab selected is shown in the following figure.



System Information's Wired Ethernet Tab

The System Information screen is displayed after the user enters the option System Information on the Home screen. The System Information screen provides detailed information about the machine, the memory devices, and the storage devices. This screen is composed of:

- Application Header Bar
- Screen Title Bar
- Modules Tabs Bar;
- Content Tab;
- Export System Information Button;
- Instruction Footer Bar

The Application Header Bar contains the name of the application, system's time and application's current version; the Screen Title Bar helps the user to be attentive of where s/he is throughout the application; and the Instruction Footer Bar contains additional instructions for using the screen, as well as the Exit button.

Modules Tabs Bar contains the modules options to load information and displays the tab currently selected (the name of current tab has a red background to differentiate it from the other tabs), while the Content Tab is the region that exhibits information corresponding to the selected tab.

Export System Information Button can be accessed between the Content Tab and the Instruction Footer Bar, where it is possible to export all the modules' information at once to an USB-Storage device.

The user can change the current tab either by using mouse/touch device (*Bootable version only*) or by using the up (↑) and down (↓) keys to navigate among the options and by pressing ENTER to access the option. The Content Tab region will display information about the device on the selected tab. The user can also scroll information content using the Page Up and Page Down keys if the number of content rows is greater than the number of rows on the screen.

For the **System tab**, the following information is displayed on the Content Tab:

- Machine Manufacturer;
- Machine Type-Model (MTM);
- Product Version;
- Serial Number;
- BIOS Version;
- BIOS Release Date;
- BIOS Manufacturer;

- Processor Manufacturer;
- Processor Version.

For the **Battery tab**, the following information is displayed on the Content Tab:

- Primary;
- Manufacturer;
- Serial Number;
- Bar Code Number;
- FRU Number;
- Firmware Level;
- Manufacture Date;
- First Use Date;
- Temperature;
- Device Chemistry;
- Cycle Count;
- Charging Status;
- Remaining Charge;
- Capacity Mode;
- Full Charge Capacity;
- Remaining Capacity;
- Design Capacity;
- Current;
- Voltage;
- Design Voltage;
- Warranty Period;
- Warranty Cycles;
- OptionalMFGFunction2.

For the **CPU tab**, the following information is displayed on the Content Tab:

- UDI;
- Display Name;
- Model;
- Vendor;
- Number of Cores;
- Number of Enabled Cores;
- Number of Threads;
- Signature;
- Max Speed;
- Current Speed;
- Features;
- Cache L1;
- Cache L2;
- Cache L3.

For the **Display tab**, the following information is displayed on the Content Tab:

- UDI;
- Display Name;
- Manufacturer ID (a three-letter code identifying the manufacturer);
- Model Name;
- EDID Version;
- Max Resolution (in pixels);
- Max Image Size (in cm);
- Input Type (Analog or Digital);
- Display Type.

For the **Fan tab**, the following information is displayed in the Content Tab:

- UDI;
- Display Name;
- CPU Fan Speed;
- CPU Temperature.

For the **Fingerprint tab**, the following information is displayed in the Content Tab:

- UDI;
- Display Name;
- Serial Number;
- Manufacturer;
- Product Name:

For the **Keyboard tab**, the following information is displayed in the Content Tab:

- UDI;
- Display Name;
- Device Type;
- Serial Number (when applicable);
- Manufacturer (when applicable);
- Product Name (when applicable);

For the **Memory tab**, the following information is displayed on the Content Tab:

- UDI;
- Display Name;
- Total Physical Memory (total of physical memory of machine in MB) and, for each memory device installed on machine:
 - Origin (Identification of memory device);
 - Type (DDR2, DDR3, EEPROM and so on);
 - Manufacturer;
 - Maximum Speed (in MT/s);
 - Current Speed (in MT/s);
 - Size (in MB);
 - Part Number;
 - Serial Number.

For the **Motherboard tab**, the following information is displayed on the Content Tab:

- UDI;
- Display Name;
- No. of USB Host Controllers;
- Number of PCI;
- RTC Presence;
- 8S Code (when applicable);
- Thunderbolt FW Version (when applicable);

- Resource:
- Index
- Slot
- Class name:
- Subclass name:

- Resource:
- PCI Index:
- PCI Slot
- Class name:
- Subclass name:
- PCI Bus:
- PCI Device
- PCI Func
- Vendor ID:
- Product ID:

- Resource:
- Index:
- USB Version:
- Class name:
- Subclass name:
- Vendor ID:
- Product ID:
- Vendor:
- Product:

For the **Mouse tab**, the following information is displayed on the Content Tab:

- UDI;
- Display Name;
- Device Type;
- Resolution X;

- Resolution Y;
- Has Left Button;
- Has Right Button;
- Serial Number (when applicable);
- Manufacturer (when applicable);
- Product Name (when applicable);

For the **Optical tab**, the following information is displayed on the Content Tab:

- UDI;
- Display Name;
- Model Number;
- Manufacturer;
- Serial Number;
- Firmware Revision;
- Size;
- Sector Size;
- Supported Features.

For the **PCI Express tab**, the following information is displayed on the Content Tab:

- UDI;
- Display Name;
- Resource;
- Bus (current item bus hexadecimal id);
- Device (current item device hexadecimal id);
- Function (current item function hexadecimal id);
- Offboard Device (in case it's an external PCI Express off board connected);
- Vendor ID (current item vendor hexadecimal id);
- Class (current item class name);
- Subclass (current item subclass name).
- Bus (current item bus hexadecimal id);
- Device (current item device hexadecimal id);
- Function (current item function hexadecimal id);

For the **RAID tab**, the following information is displayed on the Content Tab:

- UDI;
- Display Name;
- Resource;
- Bus (current item bus hexadecimal id);
- Device (current item device hexadecimal id);
- Function (current item function hexadecimal id);
- Vendor ID (current item vendor hexadecimal id).

For the **Storage tab**, the following information is displayed on the Content Tab:

When the device is eMMC:

- UDI;
- Display Name;
- Model Number;
- Manufacturer;
- Device Type;
- Serial Number;
- Firmware Revision;
- Size;
- Rotation Rate;
- Physical Block Size;
- Logical Block Size;
- No. of Logical Blocks;

When the device is NVMe:

- UDI;
- Display Name;
- Model Number;
- Manufacturer;
- Device Type;
- Serial Number;
- 8S Code; (when applicable)
- Firmware Revision;
- Size;

- Rotation Rate;
- Temperature;
- Physical Block Size;
- Logical Block Size;
- No. of Logical Blocks;
- VMD Active; (when applicable)

When the device is SSD:

- UDI;
- Display Name;
- Model Number;
- Manufacturer;
- Device Type;
- Serial Number;
- Firmware Revision;
- Size;
- Rotation Rate;
- Temperature;
- Physical Block Size;
- Logical Block Size;
- No. of Logical Blocks;
- Supported Standards:
 - ATA/ATAPI 4;
 - ATA/ATAPI 5;
 - ATA/ATAPI 6;
 - ATA/ATAPI 7;
 - ATA8_ACS;
- Standard version;

When the device is SATA HDD:

- RAID; (If RAID is configured, the application will show the device physical location for each device, as well as the RAID physical location where each storage is connected.)
- UDI;
- Display Name;
- Model Number;
- Manufacturer;
- Device Type;
- Serial Number;
- Firmware Revision;
- Size;
- Rotation Rate;
- Temperature;
- Physical Block Size;
- Logical Block Size;
- No. of Logical Blocks;
- Supported Standards:
 - ATA/ATAPI 4;
 - ATA/ATAPI 5;
 - ATA/ATAPI 6;
 - ATA/ATAPI 7;
 - ATA8_ACS;
- Standard version;
- 8S Number; (when applicable)

For the **Touch tab**, the following information is displayed on the Content Tab:

- UDI;
- Display Name;
- Absolute Min X;
- Absolute Min Y;
- Absolute Min Z;
- Absolute Max X;
- Absolute Max Y;
- Absolute Max Z;
- Supports Alternative Button;
- Supports Pressure as Z;
- Serial Number (when applicable);
- Manufacturer (when applicable);
- Product Name (when applicable);

For the **WiFi tab**, the following information is displayed on the Content Tab:

- UDI;
- Display Name;
- MAC Address;
- Broadcast Address;

For the **Wired Ethernet tab**, the following information is displayed on the Content Tab:

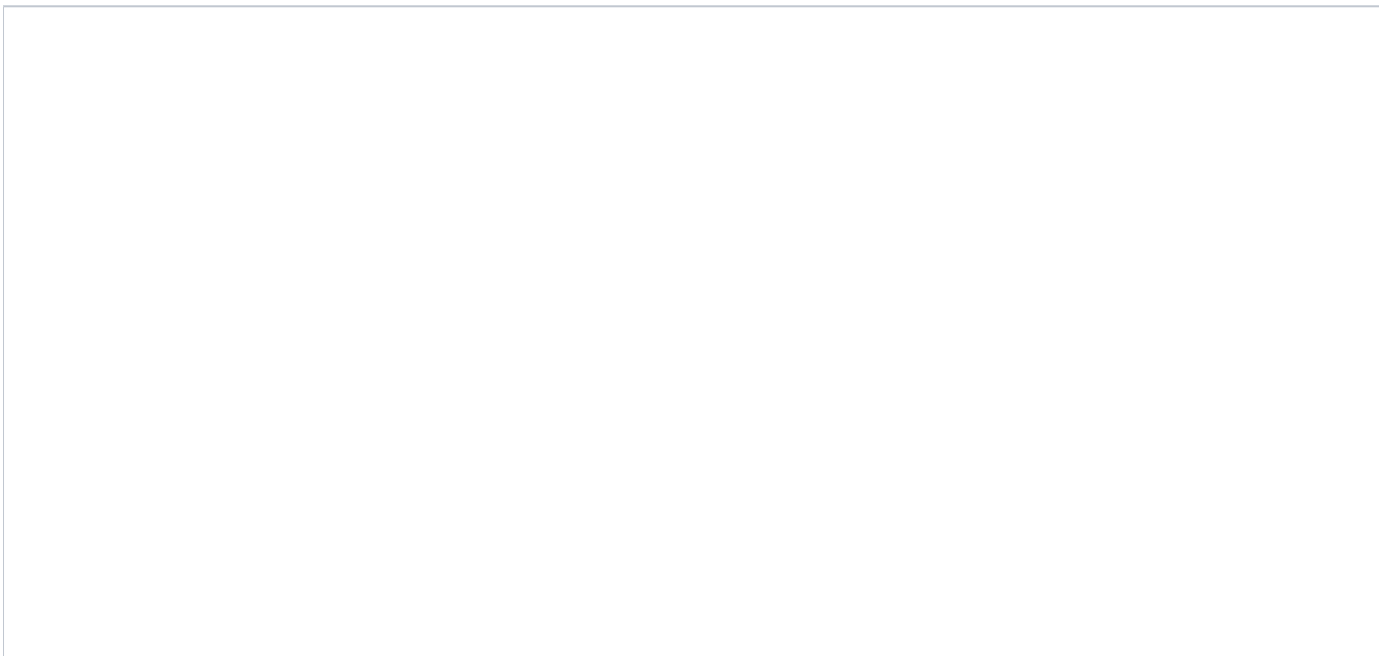
- UDI;
- Display Name;
- MAC Address;
- Media State;
- Policy;
- IPv4;
- Subnet Mask
- Default Gateway;
- DNS Server 1;

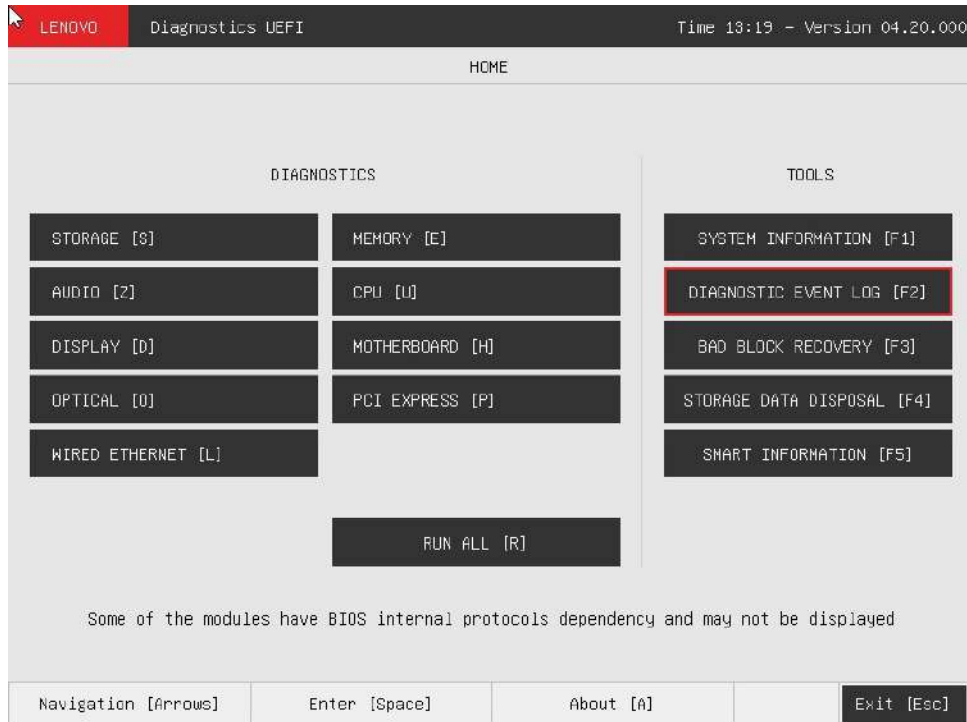
To exit the System Information screen and go back to the Home screen, the user must press the ESC key.

Hardware Diagnostic Events (for ThinkStation)

Hardware Diagnostic Events are exhibited by accessing the Home screen, Tools, Diagnostic Event Log.

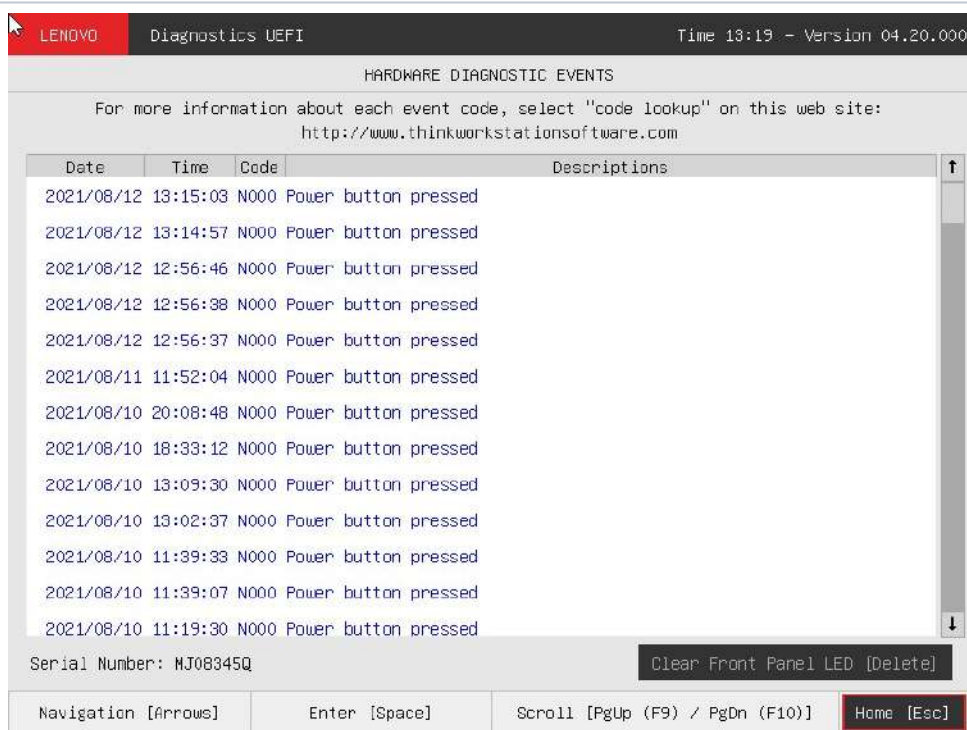
Nevertheless, this tool is currently limited to only ThinkStation products, specifically to P520C, P520, P720 and P920.





Home

When entering the tool, the events are loaded and displayed, as demonstrated in the next image.



Hardware Diagnostic Events

The application may be unable to retrieve the requested information. When that occurs, users can use the "Clear Front Panel LED" button to be able again to retrieve hardware diagnostic events.

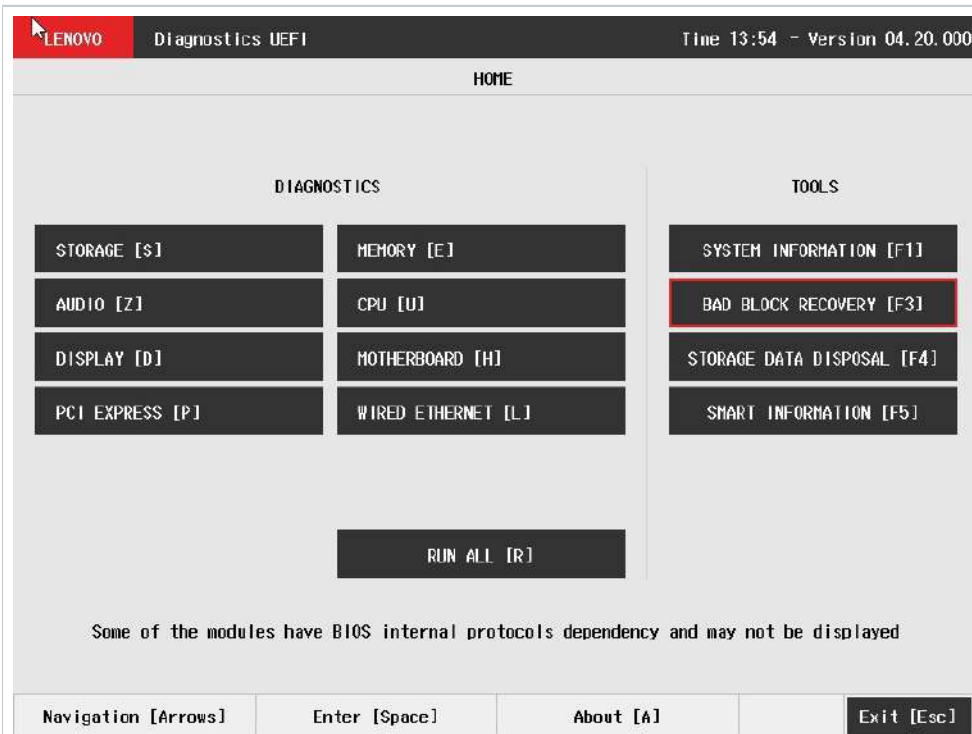
Bad Block Recovery

The Bad Block Recovery is a tool available for HDD and SSD/NVMe devices, that recovers bad blocks in a storage device.

The system allows the user to access that tool by accessing the Home screen, Tools, Bad Block Recovery.

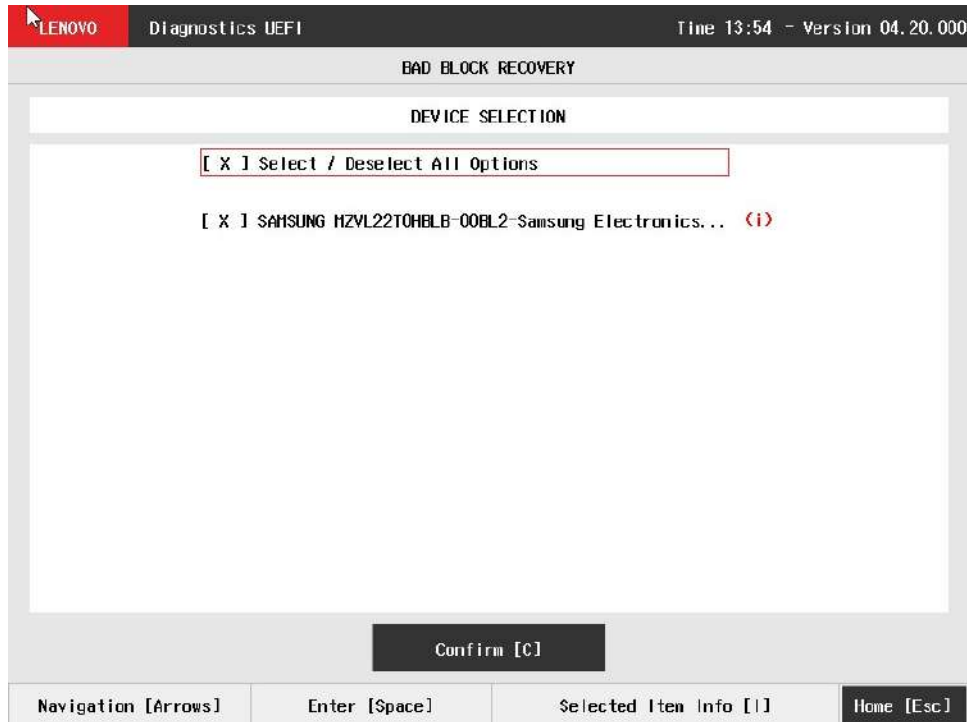


Bad Block Recovery tool relies on UEFI protocols availability in order to be available for the system.



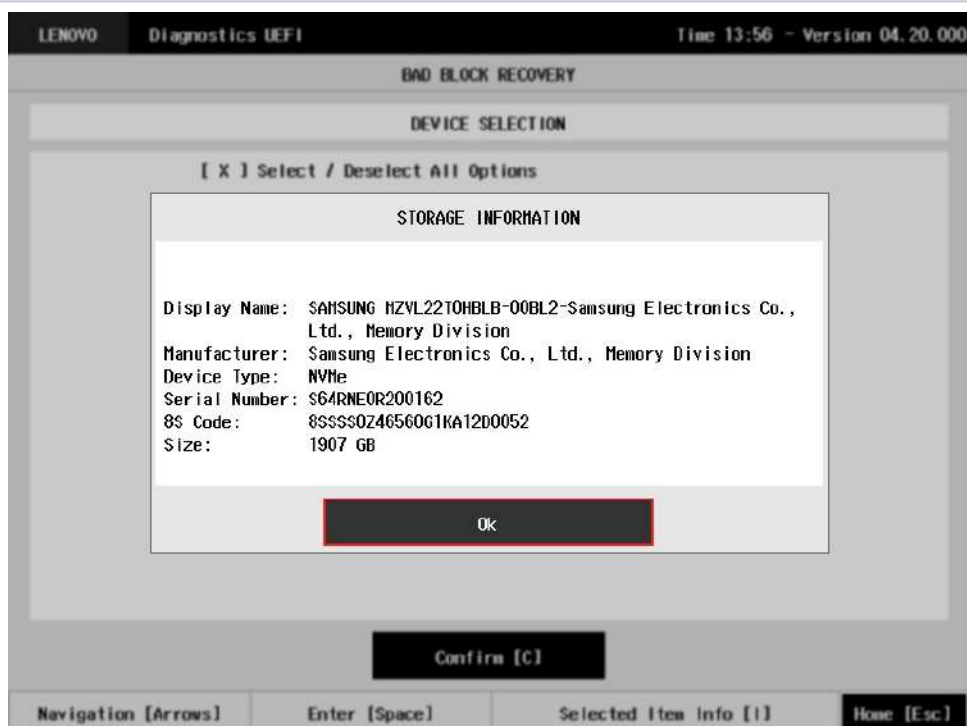
Home Bad Block Recovery

After the user enters the Bad Block Recovery option, the application will display the storage devices available in the system. The menu Device Selection is displayed, as shown in the next figure.



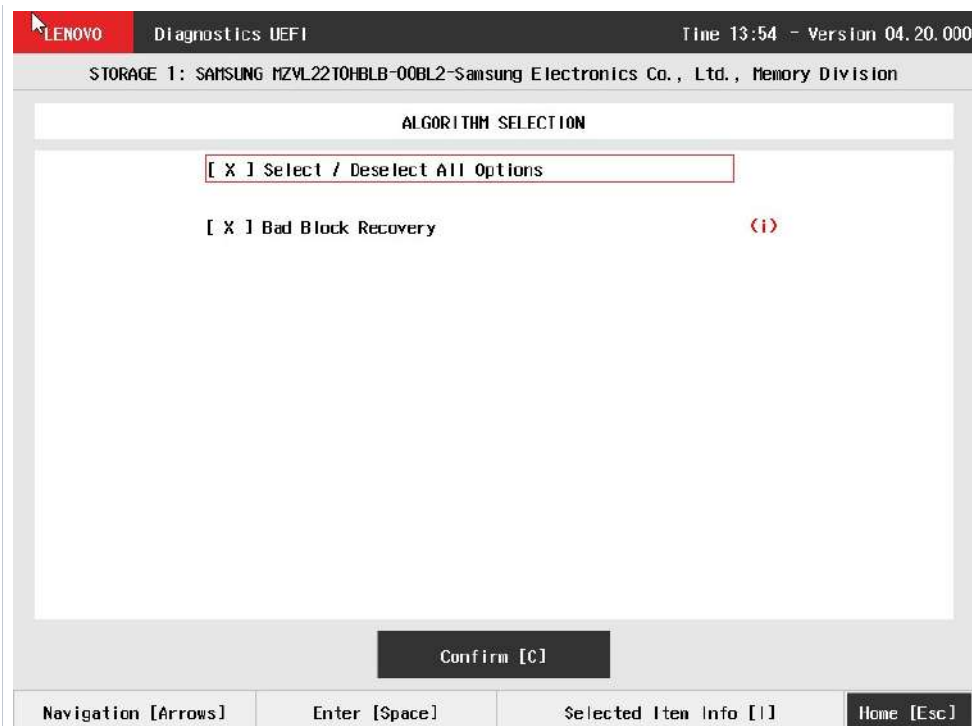
Bad Block Recovery Device Selection

This screen also allows seeing devices details. To access this feature, the user has to press the I key when the desired device is focused, leading to the exhibition of a popup with the device information, as shown in the subsequent figure.



Bad Block Recovery Device Information

An item can be selected/deselected by pressing SPACE when it is highlighted. A desired item is selected when it shows "[X]" preceding it. In order to continue, the user has to press ENTER on the button Confirm. As a result, the system will show the Bad Block Recovery item, as illustrated in the next figure, where the item is selected to be executed.



Bad Block Recovery Algorithm Selection

That screen also allows seeing the algorithm details. To access this feature, the user has to press the I key when the Bad Block Recovery item is focused, leading to the exhibition of a popup with the algorithm information, as shown in the subsequent figure.



Bad Block Recovery Information Popup

 Note

Once the Bad Block Recovery might perform write operations on a device, it may cause data loss. Consequently, the user must backup his or her data before running that operation.

In order to confirm the tool's execution, the user can use the Confirm button. Consequently, the system will run the tool, as illustrated in the figure below.



Bad Block Recovery Tool Execution

The Bad Block Recovery Tool Execution screen provides information about the Bad Block Recovery tool progress, as well as its result when it has finished. This screen is composed of:

- Application Header Bar
- Screen Title Bar
- Screen Sub-title Bar
- Tool Information Section
- Instruction Footer Bar

The Application Header Bar contains the name of the application, system's time and application's current version; the Screen Title and Screen Sub-title Bars help the user to be attentive of where s/he is throughout the application; and the Instruction Footer Bar contains additional instructions for using the screen, as well as the Exit button.

The screen has one main section that provides information about the tool, as well as a progress bar and a View Log button, both placed at the bottom of the section, where the former indicates the global execution progress and the latter allows to visualize the algorithm execution details after finishing the tool execution. That section contains the following information:

- Final Result Code (an encrypted code that informs the algorithm's execution).
- Date and time that the operation has started.
- Bad Block Recovery (name of the algorithm being currently run).
- Progress of operation (algorithm's progress in percentage).
- The tool's algorithm can have these status:
 - **Progress** (plus the tool execution percentage), indicating the tool is being run.
 - **PASSED**, indicating the algorithm has found no problems at device.
 - **FAILED**, indicating the algorithm has found one or more faults.
 - **CANCELED**, indicating the algorithm has been canceled by user.
- Date and time that the operation is finished (displayed after it is finished).
- Result Code for the tool's algorithm.
- Elapsed time, that is a duration of the tool's algorithm in hours, minutes and seconds (displayed after it is finished).

While the tool is running, the user can stop it at any time by pressing the ESC key. If the user does that, the operation is aborted and its status is changed to CANCELED. After the operation is finished or canceled, the user can go back to the Home screen (by pressing ESC again) or visualize the tool log (by pressing the V key).

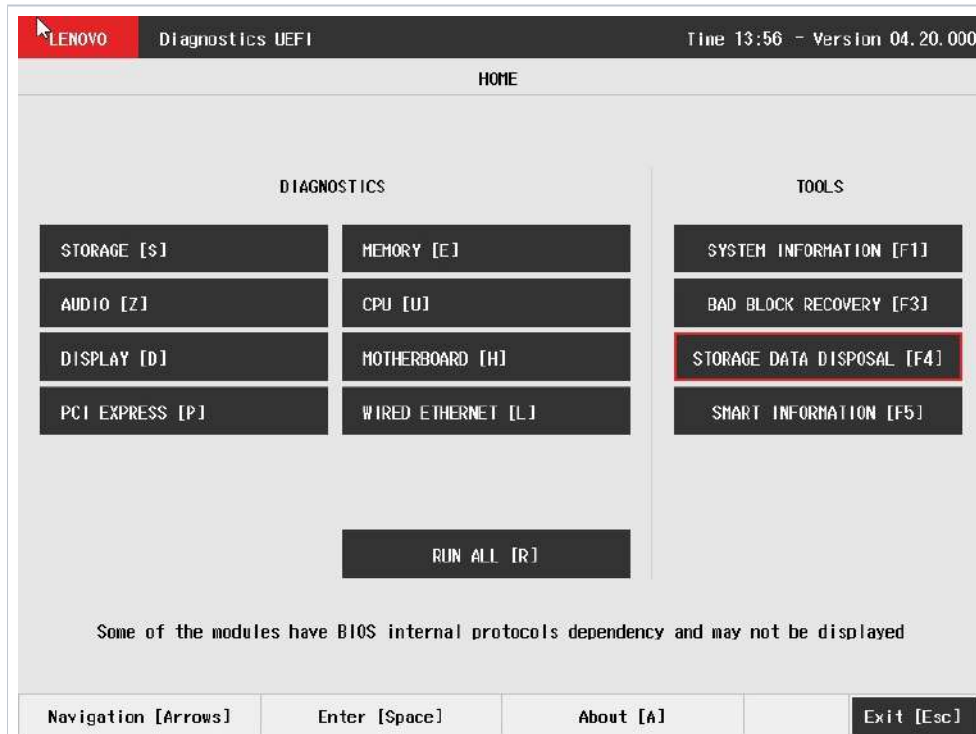
Storage Data Disposal

Data Disposal Tool is a storage tool that erases all data from storage device.

i Storage Data Disposal tool is available in Bootable version only and relies on UEFI protocols availability

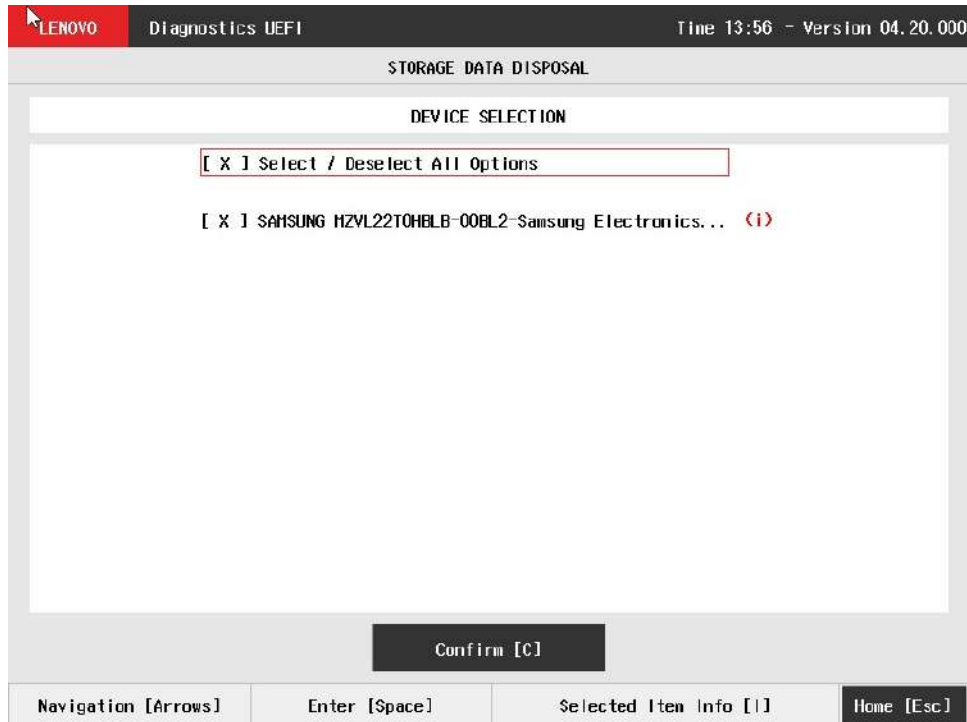
! The data erasing process may take a long time to complete. Before running it, you should perform a complete backup as the data will not be restorable from the disk

The system allows the user to access this tool by accessing the Home screen, Tools, Storage Data Disposal



Storage Data Disposal Tool

After the user enters the Storage Data Disposal option, the application will display the storage devices available in the system. The menu Device Selection is displayed, as shown in the next figure.



Storage Data Disposal Device Selection

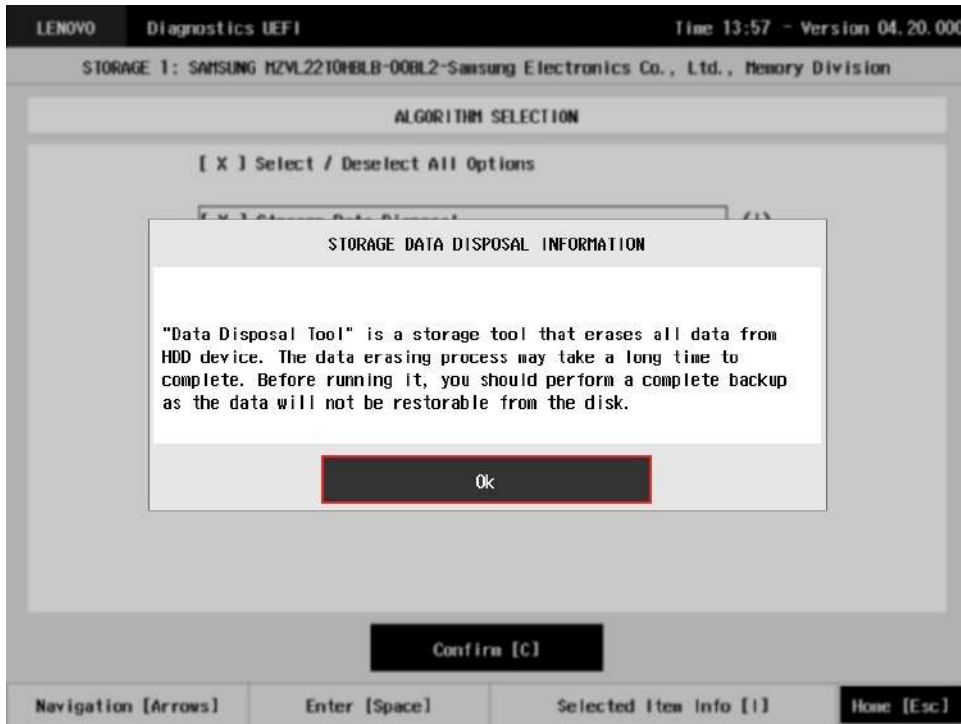
An item can be selected/deselected by pressing SPACE when it is highlighted. A desired item is selected when it shows "X" preceding it. In order to continue, the user has to press ENTER on the button Confirm. As a result, the system will show the Storage Data Disposal item, as illustrated in the next figure, where the item is selected to be executed.



Storage Data Disposal Algorithm Selection

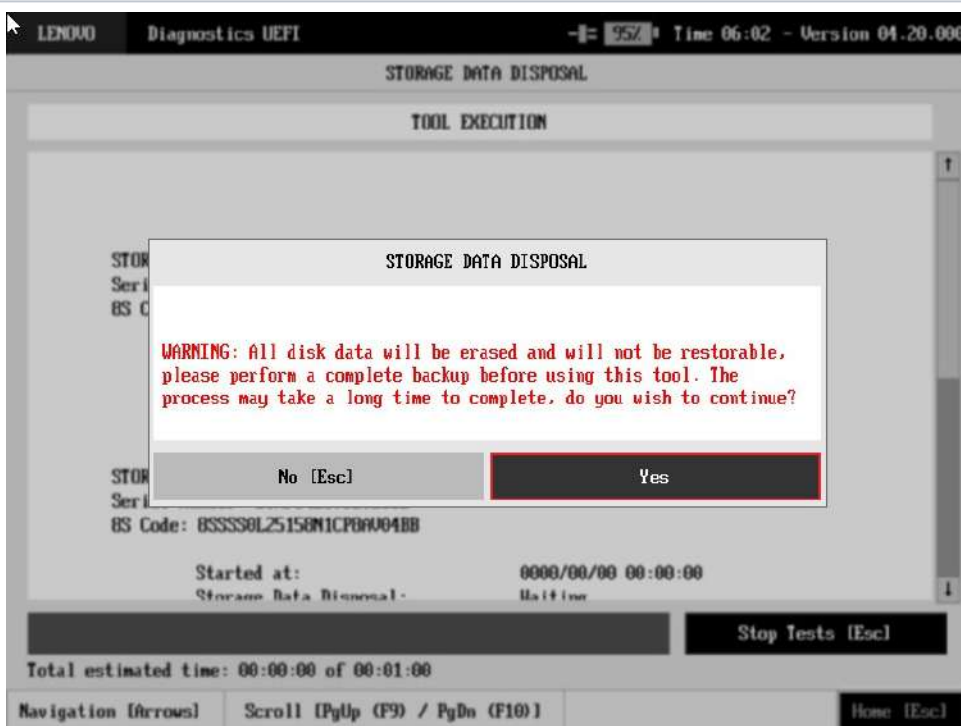
That screen also allows seeing the algorithm details. To access this feature, the user has to press the I key when the Storage Data Disposal item is focused, leading to the exhibition of a popup with the algorithm information, as shown in the subsequent figure.





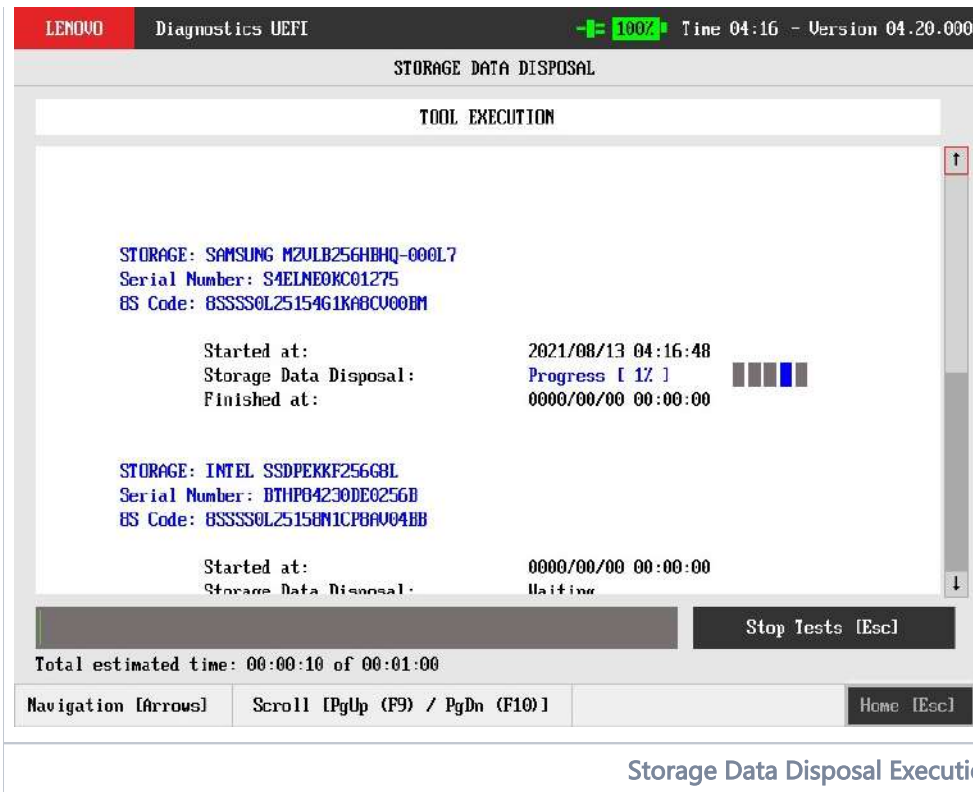
Storage Data Disposal Information

In order to confirm the tool's execution, the user can use the Confirm button. Consequently, the system will display a warning message about the data disposal process, as illustrated in the figure below.



Storage Data Disposal Warning Message

After reading the warning message, the user can confirm the tool's execution. Consequently, the system will start the data disposal process, as displayed in the figure below.



Storage Data Disposal Execution

The Storage Data Disposal Tool Execution screen provides information about the data disposal progress, as well as its result when it has finished. This screen is composed of:

- Application Header Bar
- Screen Title Bar
- Screen Sub-title Bar
- Tool Information Section
- Instruction Footer Bar

The Application Header Bar contains the name of the application, system's time and application's current version; the Screen Title and Screen Sub-title Bars help the user to be attentive of where s/he is throughout the application; and the Instruction Footer Bar contains additional instructions for using the screen, as well as the Exit button.

The screen has one main section that provides information about the tool, as well as a progress bar and a View Log button, both placed at the bottom of the section, where the former indicates the global execution progress and the latter allows to visualize the algorithm execution details after finishing the tool execution. That section contains the following information:

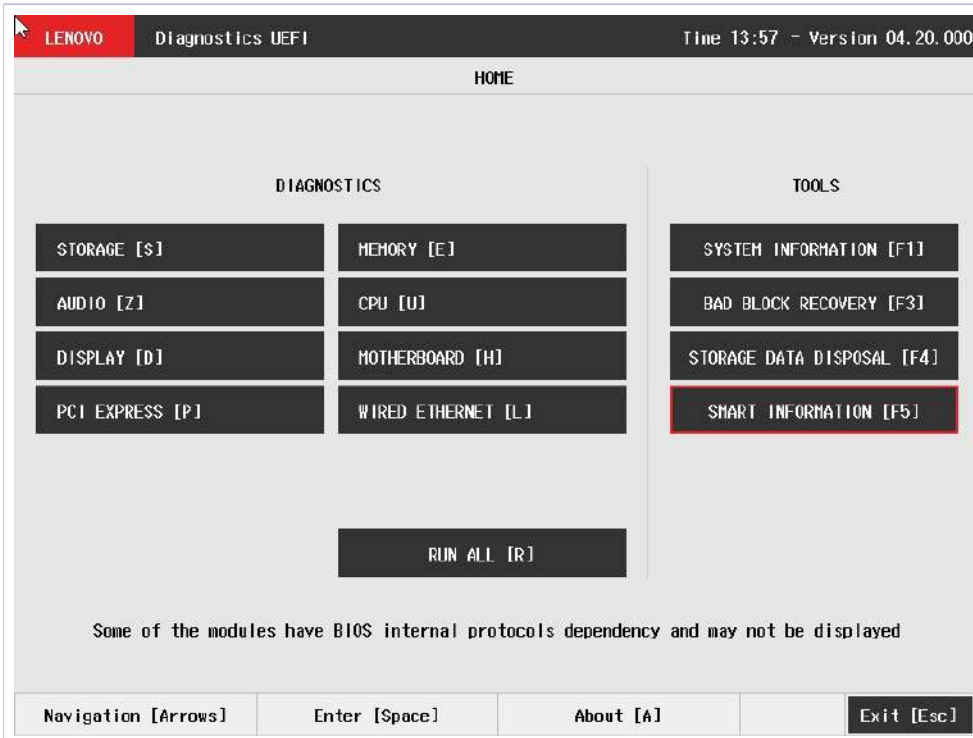
- Final Result Code (an encrypted code that informs the algorithm's execution).
- Date and time that the operation has started.
- Storage Data Disposal (name of the algorithm being currently run).
- Progress of operation (algorithm's progress in percentage).
- The tool's algorithm can have these status:
 - **Progress** (plus the tool execution percentage), indicating the tool is being run.
 - **SUCCESS**, indicating the algorithm has found no problems at device.
 - **FAILED**, indicating the algorithm has found one or more faults.
 - **CANCELED**, indicating the algorithm has been canceled by user.
 - **NOT APPLICABLE**, indicating the algorithm is not supported by device.
- Date and time that the operation is finished (displayed after it is finished).
- Result Code for the tool's algorithm.
- Elapsed time, that is a duration of the tool's algorithm in hours, minutes and seconds (displayed after it is finished).

While the tool is running, the user can stop it at any time by pressing the ESC key. If the user does that, the operation is aborted and its status is changed to CANCELED. After the operation is finished or canceled, the user can go back to the Home screen (by pressing ESC again) or visualize the tool log (by pressing the V key).

SMART Information

SMART Information is a tool used to obtain information related to the hardware condition, reported by the S.M.A.R.T. (Self-Monitoring, Analysis and Reporting Technology) monitoring system of HDDs, SSDs and NVMe devices, in order to prevent imminent hardware failures.

The system allows the user to access this tool by accessing the Home screen, Tools, SMART Information Tool, as displayed in the figure below.



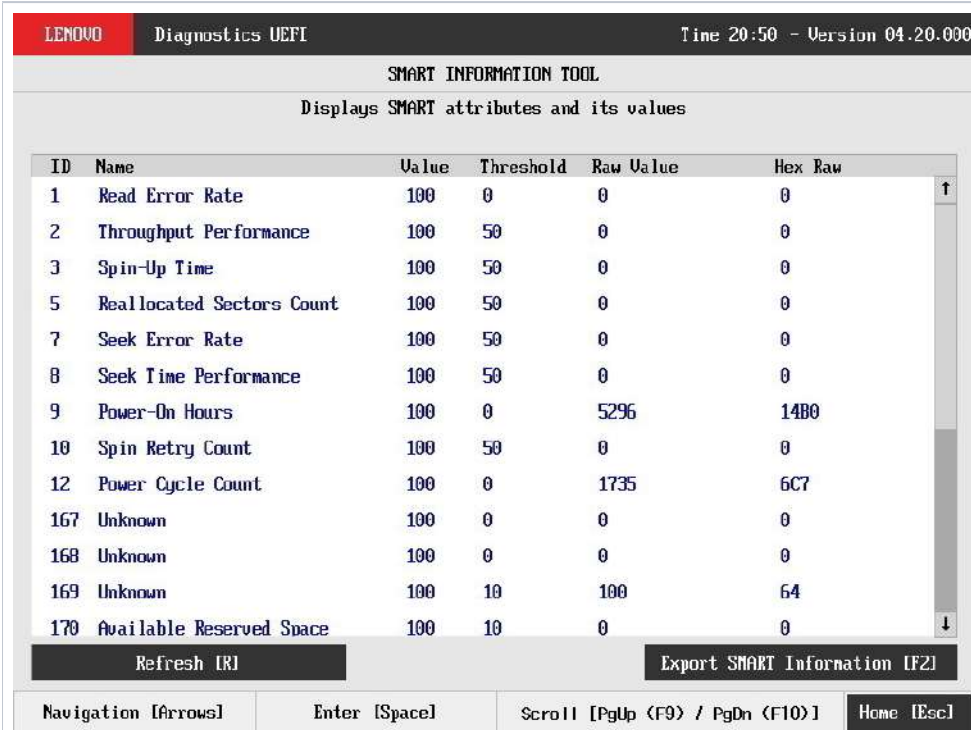
SMART Information home

After the user enters the SMART Information option, the application will display the storage devices available in the system. The menu Device Selection is displayed, as shown in the next figure.



SMART Information Select Device

An item can be selected/deselected by pressing SPACE when it is highlighted. A desired item is selected when it shows "[X]" preceding it. In order to continue, the user has to press ENTER on the button Confirm. As a result, the system will show the SMART Information, as illustrated in the next figure.



LENOVO Diagnostics UEFI Time 20:50 - Version 04.20.000

SMART INFORMATION TOOL
Displays SMART attributes and its values

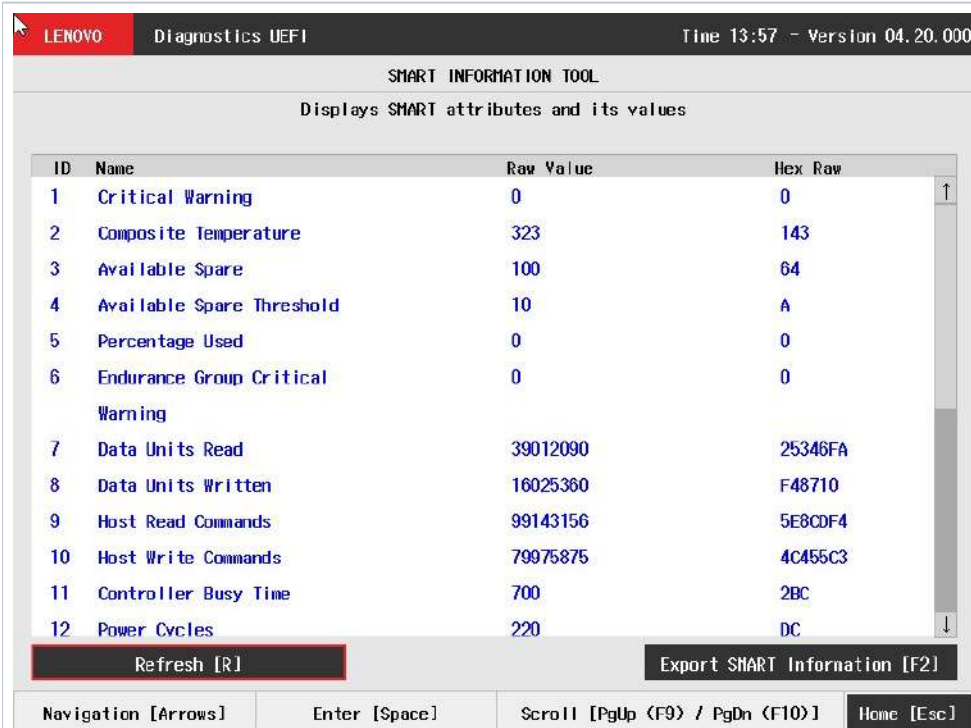
ID	Name	Value	Threshold	Raw Value	Hex Raw
1	Read Error Rate	100	0	0	0
2	Throughput Performance	100	50	0	0
3	Spin-Up Time	100	50	0	0
5	Reallocated Sectors Count	100	50	0	0
7	Seek Error Rate	100	50	0	0
8	Seek Time Performance	100	50	0	0
9	Power-On Hours	100	0	5296	14B0
10	Spin Retry Count	100	50	0	0
12	Power Cycle Count	100	0	1735	6C7
167	Unknown	100	0	0	0
168	Unknown	100	0	0	0
169	Unknown	100	10	100	64
170	Available Reserved Space	100	10	0	0

Refresh [R] Export SMART Information [F2]

Navigation [Arrows] Enter [Space] Scroll [PgUp (F9) / PgDn (F10)] Home [Esc]

SMART Information screen

Value and Threshold columns are not displayed for NVMe devices as they don't provide these values, as illustrated in next figure:



LENOVO Diagnostics UEFI Time 13:57 - Version 04.20.000

SMART INFORMATION TOOL
Displays SMART attributes and its values

ID	Name	Raw Value	Hex Raw
1	Critical Warning	0	0
2	Composite Temperature	323	143
3	Available Spare	100	64
4	Available Spare Threshold	10	A
5	Percentage Used	0	0
6	Endurance Group Critical Warning	0	0
7	Data Units Read	39012090	25346FA
8	Data Units Written	16025360	F48710
9	Host Read Commands	99143156	5E8CDF4
10	Host Write Commands	79975875	4C455C3
11	Controller Busy Time	700	2BC
12	Power Cycles	220	DC

Refresh [R] Export SMART Information [F2]

Navigation [Arrows] Enter [Space] Scroll [PgUp (F9) / PgDn (F10)] Home [Esc]

NVMe SMART Information screen

Exit Application

To exit the application, the user must select the option "Exit" on the Home screen and press the ENTER key. Then, the interface will be closed and the machine will be reset.

Resources by Platform

Module / Tool	x86	ARM
Audio	✓	✗
Battery	✓	✗
CPU	✓	✓
Display	✓	✗
Fan	✓	✗
Fingerprint	✓	✗
Keyboard	✓	✗
Memory	✓	✓
Motherboard	✓	✓
Mouse	✓	✗
Optical	✓	✗
PCI Express	✓	✓
RAID	✓	✗
Storage	✓	✓
Touch	✓	✗
Wired Ethernet	✓	✓
WiFi	✓	✗
Run All	✓	✓
System Information	✓	✓
Hierarchical Diagnostics	✓	✗
Hardware Diagnostic Events	✓	✗
Bad Block Recovery	✓	✓
Storage Data Disposal	✓	✓
SMART Information	✓	✗

About

Lenovo Diagnostics for UEFI

04.20.000

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QR Code generator 1.3.1

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<https://www.nayuki.io/page/qr-code-generator-library>

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Suporte (/gb/pt)

Base de Conhecimento & Guias

Lenovo System Update: atualização de drivers, BIOS e aplicativos

Lenovo System Update economiza tempo e esforço ajudando a automatizar o processo de localização e instalação dos drivers, BIOS e outros aplicativos mais recentes. Ter os downloads e drivers mais recentes ajuda a otimizar o desempenho do seu sistema Lenovo .



Notas:

- Para administradores de TI, o Guia de implantação de solução de Lenovo System Update está disponível em: ThinkVantage Technologies IT Administrator Tools (/solutions/HT037099)
- Lenovo System Update é apenas para sistemas que funcionam no Windows. Android usuários do Android podem se referir a:
 - Matriz de atualização do Android (/solutions/HT501098)

Onde baixar

Para Windows 10 e 7

Clique no botão para fazer o download:

[Download tool now](#)[\(/downloads/DS012808\)](/downloads/DS012808)

Observação: o Microsoft .NET Framework versão 4.0 (<http://www.microsoft.com/en-US/download/details.aspx?id=17718>) ou superior é necessário para que a System Update funcione corretamente.

Como executar a Lenovo System Update

Nota: Execute o Windows Update antes de usar o Lenovo System Update . Ao usar o Lenovo System Update , algumas das atualizações dependem de determinados componentes do Windows. Para obter mais informações sobre o Windows Update, vá para:

- Windows Update: Perguntas frequentes (<https://support.lenovo.com/us/en/solutions/HT501271>)
- Execute o Windows Update antes de usar o Lenovo System Update para recuperar Lenovo System Update de sistema e software para o seu computador - ThinkCentre , ThinkPad e ThinkStation (</solutions/HT102010>)

Importante

- Lenovo System Update é usado para atualizar / instalar drivers, BIOS e aplicativos da Lenovo .
- Lenovo System Update deve ser usado para atualizar seu sistema após uma nova configuração ou nova imagem.
- É recomendável não instalar BIOS atualizações do BIOS junto com outras atualizações.
- Lenovo System Update pode precisar ser executada várias vezes para garantir que todas as atualizações foram baixadas e instaladas com êxito.
- Lenovo System Update é compatível com os seguintes sistemas:
 - ThinkPad
 - ThinkCentre
 - ThinkStation

Artigos relacionados

- Conheça nosso canal no YouTube (<https://www.youtube.com/channel/UCAIvKsUHOASlzduN8Tuv3jA>)
- Conheça a assistente virtual da Lenovo no Whatsapp e Messenger (<https://www.lenovo.com/br/pt>)
- Noções básicas sobre drivers, BIOS , UEFI e firmware (</solutions/HT103672>)

- Drivers: perguntas frequentes (FAQ) (/solutions/HT001609)
- Como encontrar o número de série (<https://support.lenovo.com/br/pt/solutions/ht510152>)
- Como atualizar o BIOS (/solutions/HT500008)
- Como navegar e fazer download do software ou drivers da Lenovo no site de suporte (/solutions/HT117260)
- Lenovo Service Bridge: Detecta automaticamente o tipo de sistema e o número de série para uma experiência de suporte Lenovo aprimorada (/solutions/HT104055)
- Tópicos populares: dicas para PCs (/solutions/HT503909)
- Centro de Suporte do Windows (<https://support.lenovo.com/windows-support>)
- Tópicos mais populares (<https://support.lenovo.com/br/pt/solutions/ht503909>)

Id do Alias:TVSU-UPDATE
ID do documento:HT003029
Data de publicação original:07/23/2017
Data da última modificação:10/26/2020

🔊 Esta informação foi útil?

Sua opinião ajuda a melhorar este site.

Sim

Não

Ajuda



Obtenha ajuda na página inicial do produto

Encontre mais soluções, ferramentas e informações úteis em nossa página inicial do produto.



Fale Conosco


Economize tempo iniciando sua solicitação de suporte online

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 ([//www.youtube.com/lenovovision](https://www.youtube.com/lenovovision))

 ([//pinterest.com/lenovous/](https://pinterest.com/lenovous/))

 Nosso compromisso com o meio ambiente
(<https://www.lenovo.com/us/en/about#social-responsibility>)

Veja o nosso Relatório Global de Sustentabilidade. (https://www3.lenovo.com/us/en/social_responsibility/sustainability_reports/)

Sobre a Lenovo

Nossa Empresa (https://www.lenovo.com/br/pt/lenovo/?linkTrack=footer>About%20Lenovo_Our%20Company)

Notícias (https://www3.lenovo.com/br/pt/noticias?linkTrack=footer>About%20Lenovo_News)

INVESTIDORES (https://static.lenovo.com/ww/lenovo/investor_relations.html?linkTrack=footer>About%20Lenovo_Investor%20Relations)

Responsabilidade Social (https://www3.lenovo.com/us/en/social_responsibility/product/?linkTrack=footer>About%20Lenovo_Social%20Responsibility)

Product Compliance (https://www.lenovo.com/us/en/lenovo/compliance?linkTrack=footer>About%20Lenovo_Product%20Compliance)

Código aberto Lenovo ([/gb/pt/solutions/HT511330](https://gb/pt/solutions/HT511330))

Informações Legais (https://www.lenovo.com/br/pt/legal/?linkTrack=footer>About%20Lenovo_Legal%20Information)

OPORTUNIDADES (<https://lenovocareers.com/por/index.html>)

Loja

Notebooks e Ultrabooks (<https://shop.lenovo.com/br/pt/laptops/>)

Tablets (<https://shop.lenovo.com/br/pt/tablets/>)

Workstations (<https://www.lenovo.com/br/pt/desktops-y-all-in-one/c/DESKTOPS>)

Servidores (https://www.lenovo.com/us/en/data-center/servers/c/servers?menu-id=explore_servers)

Acessórios e Atualizações (<https://shop.lenovo.com/br/pt/acessorios/?IPromotID=LEN130115>)

Ofertas de laptop (<https://shop.lenovo.com/br/pt/ofertas/>)

services and repairs (https://shop.lenovo.com/br/pt/servicos_e_garantia/?IPromotID=LEN930148)

Suporte

Drivers e Software ([/gb/pt/products/downloads?linkTrack=footer:Support_Downloads](https://gb/pt/products/downloads?linkTrack=footer:Support_Downloads))

Documentação ([/gb/pt/products/documentation?linkTrack=footer:Support_Manuals](https://gb/pt/products/documentation?linkTrack=footer:Support_Manuals))

Como fazer & soluções ([/gb/pt/products/solutions?linkTrack=footer:Support_Solutions](https://gb/pt/products/solutions?linkTrack=footer:Support_Solutions))

Pesquisa de garantia ([/gb/pt/warrantylookup?linkTrack=footer:Support_Warranty_Lookup](https://gb/pt/warrantylookup?linkTrack=footer:Support_Warranty_Lookup))

Fale Conosco ([/gb/pt/contactus](https://gb/pt/contactus))

Suporte para Armazenamento (<https://download.lenovo.com/lenovoemc/la/pt>)

Recursos

Fale Conosco (<https://shop.lenovo.com/br/pt/contato/>)

Onde Comprar (<https://shop.lenovo.com/br/pt/revendedores/>)

Blogs (https://news.lenovo.com/blog/?linkTrack=footer:Resources_Blogs)

Especificações do produto (PSREF) (<https://psref.lenovo.com/>)

Fóruns (<https://forums.lenovo.com/>)

Acessibilidade do Produto (https://www.lenovo.com/social_responsibility/us/en/accessibility_notebooks/)

Informação ambiental (https://www.lenovo.com/social_responsibility/br/pt/)

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INSTRUMENTO PARTICULAR DE MANDATO

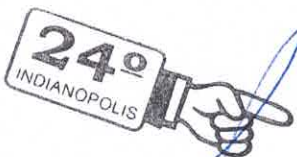
OUTORGANTE: LENOVO TECNOLOGIA (BRASIL) LIMITADA, com sede no município de Indaiatuba, neste Estado, na Estrada Municipal José Costa de Mesquita, 200, galpão 6 a 10, Chácara Alvorada, CEP 13.337-200, inscrita no CNPJ/MF de nº 07.275.920/0001-61 e na Junta Comercial do Estado de São Paulo - JUCESP sob o NIRE 35.219.820.251 e sua filial com sede no município de São Paulo, neste Estado, na Rua Werner Von Siemens, 111, prédio 11, torre A, andares 3 e 4, CEP 05.069-900, inscrita no CNPJ/MF nº 07.275.920/0007-57, neste ato, representada nos termos seu Contrato Social, por **RICARDO HORÁCIO BLOJ**, cidadão brasileiro, casado, engenheiro eletrônico, portador da cédula de identidade RG nº 75.421-19 - SSP/SP e inscrito no CPF/MF sob o nº 088.503.398-10 e **LISSANDRA SHIRAMIZU**, brasileira, casada, diretora de operações estratégicas, portadora da cédula de identidade RG nº 20.509.341-3-SSP/SP, inscrita no CPF/MF sob nº 164.983.868-94,, ambos com endereço comercial nesta Capital, na Rua Werner Von Siemens, nº 111, 4º andar, São Paulo/SP.

OUTORGADOS: CRISTIANO LEDO BARBOSA CRUZ, brasileiro, casado, representante comercial, portador da cédula de identidade RG n. 3151669 SSP/GO, inscrito no CPF/MF sob n. 818.524.601-72, **IVAN FELIZ DA NOBREGA**, brasileiro, casado, representante comercial, portador da cédula de identidade RG nº 25.060.683-5, inscrito no CPF/MF sob nº 289.709.148-70, **MARCO CÉSAR RIBAS VOLACO**, brasileiro, casado, gerente de contas, portador da cédula de identidade RG nº 2.933.372 expedido por SSP/DFI, inscrito no CPF/MF sob nº 465.156.829-72 e **VALTER ANTONIO SGROI ARTEA**, brasileiro, casado, gerente de vendas, portador da cédula de Identidade RG nº 27.837.009-3 – SSP-SP, inscrito no CPF/MF sob o nº 282.061.248-29, todos com endereço comercial na Rua Werner Von Siemens, 111, Torre A, 4º andar, Lapa de Baixo, CEP 05069-900.

PODERES: A **OUTORGANTE** nomeia e constitui seus bastantes procuradores os **OUTORGADOS**, aos quais confere amplos poderes para, em conjunto de dois, representarem a **OUTORGANTE** apenas para a emissão de declarações a respeito dos produtos e serviços oferecidos pela **OUTORGANTE** para fins de participação em pregões, certames públicos, concorrências públicas e privadas e demais finalidade a que as declarações possam servir. A assinatura dos **OUTORGADOS** deve ser realizada, preferencialmente, por **VALTER ANTONIO SGROI ARTEA** em conjunto com um dos outros **OUTORGADOS**. O presente instrumento de procuração não permite aos **OUTORGADOS** a assunção de quaisquer obrigações em nome da **OUTORGANTE**, nem admite substabelecimentos.

Prazo de validade: 30 de abril de 2023

São Paulo, 20 de junho de 2022



RICARDO HORÁCIO BLOJ

LENOVO TECNOLOGIA (BRASIL) LIMITADA.



LISSANDRA SHIRAMIZU

21º SUBDISTRITO - INDIANÓPOLIS
CAPITAL/SP RICARDO ALEXANDRE DE ALCANTARA - INTERINO

Selo(s): 2 Ato:AA - 0822669
Reconheço, por Semelhança, as firmas de: (1) RICARDO HORACIO BLOJ e (1) LISSANDRA SHIRAMIZU, com valor econômico, conforme padrão depositado nesta Serventia.
São Paulo, 23 de Junho de 2022.
Em testemunho da verdade.

ORCPN 24º - INDIANÓPOLIS (Valor Unit. R\$ 11,40; Qtd: 2; Total R\$ 22,80)
Feito por: MARCELO

AVS 1100 - US EUCALÍPTOS - 679 - CAPITAL/SP

24º SUBDISTRITO - REGISTRO CIVIL
"INDIANÓPOLIS"
Marcelo Aparecido da Silva
ESCREVENTE AUTORIZADO

115030
FIRMA
VALOR ECONÔMICO 22,80

C21049AA0822669



Suporte (/ng/pt)

Base de Conhecimento & Guias

Usar o Lenovo Vantage facilita a sua vida

Descrição

Seu PC Lenovo possui características únicas que você não encontrará em nenhum outro computador, e o Lenovo Vantage (<https://www.lenovo.com/br/pt/lenovo-vantage>) torna mais fácil para que você obtenha o máximo do seu dispositivo. Tudo dentro do Lenovo Vantage é feito sob medida para você encontrar informações úteis e recomendações com base no seu dispositivo e a maneira como o utiliza. Saiba mais sobre o app nesse vídeo (<https://www.youtube.com/watch?v=JlMFsd1Ufll>). Com uma interface fácil de usar, você poderá:

- Personalizar suas configurações
- Melhorar a segurança do WiFi,
- Atualizar drivers (<https://support.lenovo.com/br/pt/solutions/tvsu-update>)
- Executar o diagnóstico do dispositivo
- Identificar o número de série (<https://support.lenovo.com/br/pt/solutions/ht510152>) do sistema e o número de produto
- Solicitação de suporte e muito mais.
- Configurar câmera (<https://support.lenovo.com/by/pt/solutions/ht118432>) e microfone de forma rápida

**Nota:**

- Lenovo Vantage foi criado especificamente para PCs com o Windows 10. Link para baixá-lo de graça: (<https://www.microsoft.com/pt-br/p/lenovo-companion/9wzdncrfj4mv?activetab=pivot:overviewtab>)

Marcas aplicáveis

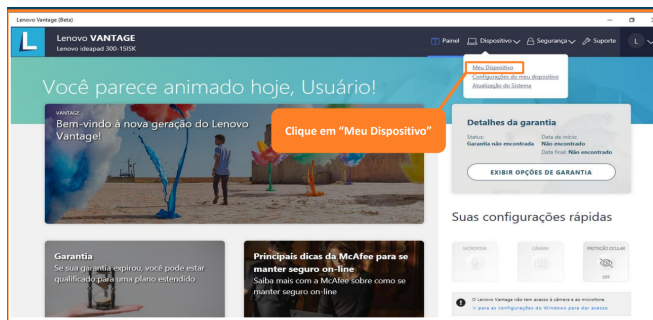
Desktops, Notebooks, Tablets, Workstations

Sistema Operacional

- Windows 10

Solução

Lenovo Vantage (substituto do Lenovo Companion) é um app que mantém o seu dispositivo funcionando corretamente e o ajuda a fazer ainda mais com o seu dispositivo.



Principais características:

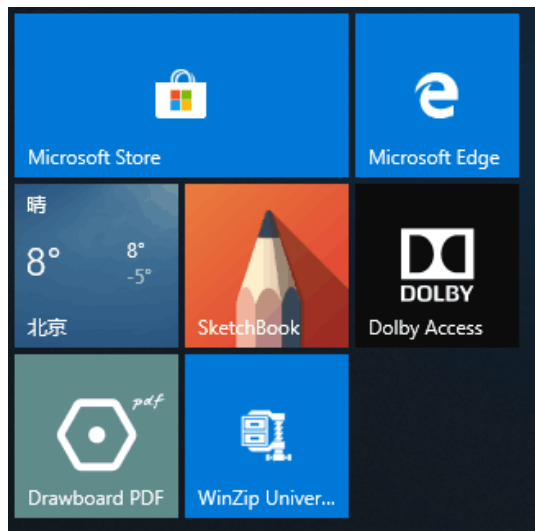
- Ajuste o seu PC Lenovo com configurações personalizadas:
 - Energia: Ajuda a gerenciar e prolongar a vida útil da bateria do notebook
 - Áudio, Visual: Configurações da câmera, controle de brilho, configurações de microfone, configurações Dolby
 - Configurações inteligentes: Ajusta automaticamente o seu áudio e exibição com base em aplicativos que estão sendo usados.
 - Entrada: Touchpad, tecla de função (Fn), teclado luminoso, as configurações do mouse/caneta/toque
 - Realiza diagnóstico e os corrige

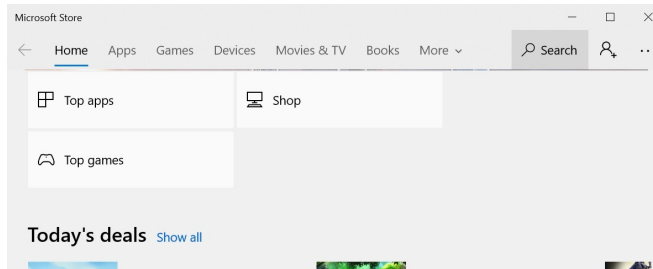
- Acesso para o Lenovo Migration Assistant - um aplicativo gratuito que transfere perfeitamente arquivos e configurações de um PC para outro
- Protege o seu PC e atualiza os drivers e softwares de sistemas importantes
- Avaliação da integridade do sistema e execução do diagnóstico no seu dispositivo
- Acesso ao guia do usuário do seu sistema e obtenção de suporte
- Descubra outras coisas divertidas e aplicativos úteis
- Veja os acessórios compatíveis com seu dispositivo
- Explore ofertas exclusivas em serviços e produtos da Lenovo
- Identifique o status da garantia
 - Data de início e data de término
 - Links para as opções de garantia e upgrades
- Obter dicas úteis e manter-se atualizado sobre as últimas notícias de tecnologia, com artigos da Lenovo

Como baixar o Lenovo Vantage

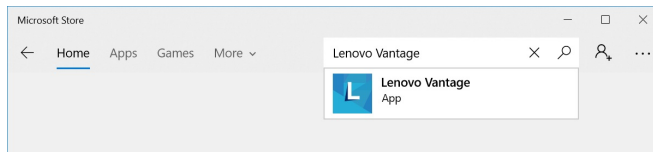
Consulte abaixo os passos para baixar e instalar o Lenovo Vantage.

1. Encontre a Microsoft Store no menu Iniciar

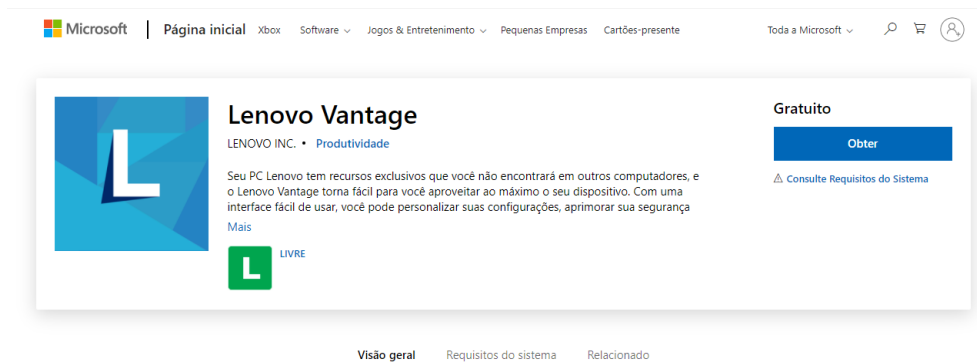




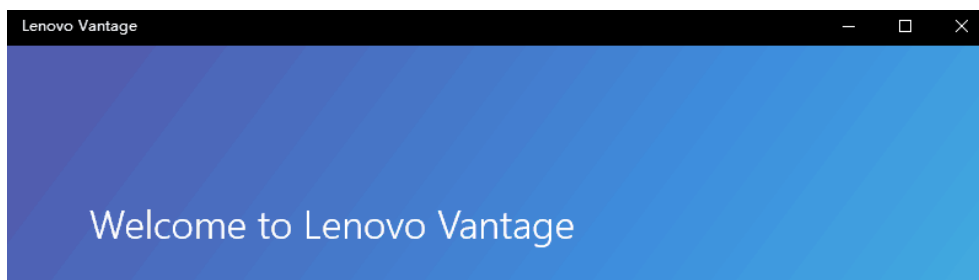
2. Digite Lenovo Vantage na barra de buscas da loja Microsoft



3. Clique no ícone Lenovo Vantage para acessar a página do aplicativo. Em seguida, clique em Obter e iniciar para baixar o Lenovo Vantage.



4. Depois de baixar o Lenovo Vantage, execute o arquivo. Em seguida, verifique Aceitar a Política de Privacidade da Lenovo para ir para a próxima etapa.



Help Us Make Your Lenovo Experience Better:

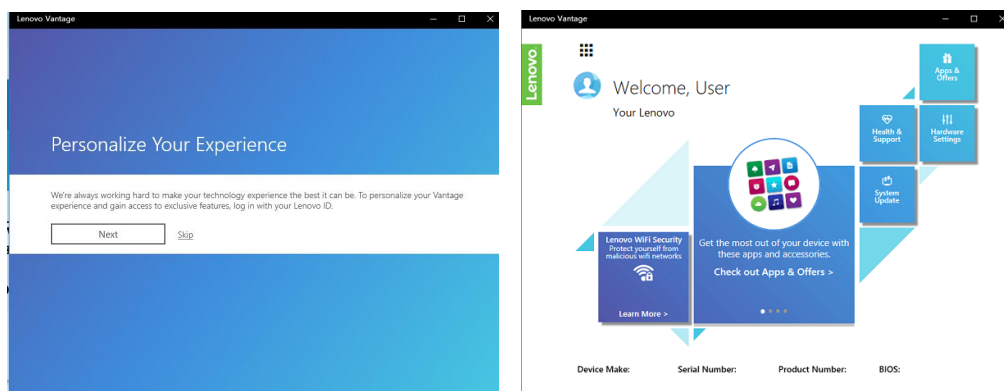
To help us make Vantage more useful and enjoyable, we need to collect some information on how you use our app. Selecting the checkbox below indicates that you agree to our license and privacy policy. No personal or identifying information is ever collected and we never share the data we collect with other parties.

Accept [Lenovo's Privacy Policy](#) and allow the collection of anonymous usage statistics.

Next



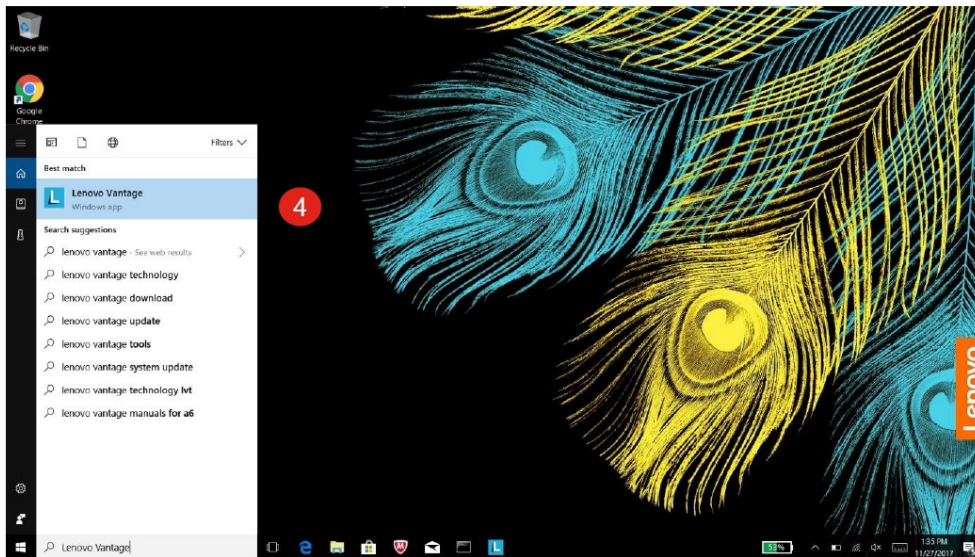
5. Se você possui o Lenovo ID, pode entrar com ele. Se você não tiver, você pode pular esta etapa para acessar diretamente o Lenovo Vantage, e registrar mais tarde se quiser.



Como encontrar o Lenovo Vantage no computador

Use um dos procedimentos a seguir para encontrar Lenovo Vantage no seu dispositivo:

1. Abra o menu Iniciar: Listado na lista de aplicativos instalados.
2. *Tiles* (quadrinhos) do Windows
3. Barra de tarefas
4. Barra de pesquisa do Windows



Caso o Lenovo Vantage (<https://www.lenovo.com/br/pt/lenovo-vantage>) não esteja instalado no seu dispositivo, você deve baixá-lo gratuitamente na Microsoft Store. (<https://www.microsoft.com/pt-br/p/lenovo-companion/9wzdncrfj4mv?activetab=pivot:overviewtab>)

Artigos relacionados

- Conheça as vantagens do Lenovo Vantage (<https://www.lenovo.com/br/pt/lenovo-vantage>)
- Encontrar número de série (<https://support.lenovo.com/br/pt/solutions/HT505229>)
- Centro de reparos Lenovo (<https://support.lenovo.com/br/pt/solutions/ht104448>)
- Conheça o atendimento virtual Lenovo Brasil no Whatsapp e Messenger (<https://www.lenovo.com/br/pt/suporte>)
- Conheça o canal Lenovo Suporte no YouTube (<https://www.youtube.com/channel/UCAIvKsUHOASlZduN8Tuv3jA/videos>)
- Tópicos populares para PC's (</solutions/HT503909>)
- Atualização de drivers (<https://support.lenovo.com/br/pt/solutions/ht504759>)
- Suporte técnico (<https://pcsupport.lenovo.com/br/pt/>)
- Lenovo ID: Acesse tudo da Lenovo, através de todos os nossos sites com um nome de usuário e senha (</solutions/HT103471>)
- Verifique sua garantia (<https://support.lenovo.com/br/pt/warrantylookup>)
- Saiba mais sobre a garantia de PCs Lenovo (<https://pcsupport.lenovo.com/br/pt/warrantylookup>)
- Encontre os principais tópicos pro seu computador (<https://support.lenovo.com/br/pt/solutions/HT503909>)
- (video) O que acontece no seu computador uma vez que o envia para reparo? (<https://www.youtube.com/watch?v=8IEK27CxJBE>)

ID do documento:HT505081
Data de publicação original:02/11/2018
Data da última modificação:01/18/2021

Esta informação foi útil?

Sua opinião ajuda a melhorar este site.

Sim

Não

Ajuda



Obtenha ajuda na página inicial do produto

Encontre mais soluções, ferramentas e informações úteis em nossa página inicial do produto.



Fale Conosco


Economize tempo iniciando sua solicitação de suporte online

Fique em contato

 ([//www.facebook.com/lenovo](https://www.facebook.com/lenovo))  ([//twitter.com/lenovo](https://twitter.com/lenovo))

 ([//www.youtube.com/lenovovision](https://www.youtube.com/lenovovision))

 ([//pinterest.com/lenovous/](https://pinterest.com/lenovous/))

 Nosso compromisso com o meio ambiente
(<https://www.lenovo.com/us/en/about#social-responsibility>)

Veja o nosso Relatório Global de Sustentabilidade. (https://www3.lenovo.com/us/en/social_responsibility/sustainability_reports/)

Sobre a Lenovo

Nossa Empresa (https://www.lenovo.com/br/pt/lenovo/?linkTrack=footer>About%20Lenovo_Our%20Company)

Notícias (https://www3.lenovo.com/br/pt/noticias?linkTrack=footer>About%20Lenovo_News)

INVESTIDORES (https://static.lenovo.com/ww/lenovo/investor_relations.html?linkTrack=footer>About%20Lenovo_Investor%20Relations)

Responsabilidade Social (https://www3.lenovo.com/us/en/social_responsibility/product/?linkTrack=footer>About%20Lenovo_Social%20Responsibility)

Product Compliance (https://www.lenovo.com/us/en/lenovo/compliance?linkTrack=footer>About%20Lenovo_Product%20Compliance)

Código aberto Lenovo ([/ng/pt/solutions/HT511330](https://ng/pt/solutions/HT511330))

Informações Legais (https://www.lenovo.com/br/pt/legal/?linkTrack=footer>About%20Lenovo_Legal%20Information)

OPORTUNIDADES (<https://lenovocareers.com/por/index.html>)

Loja

Notebooks e Ultrabooks (<https://shop.lenovo.com/br/pt/laptops/>)

Tablets (<https://shop.lenovo.com/br/pt/tablets/>)

Workstations (<https://www.lenovo.com/br/pt/desktops-y-all-in-one/c/DESKTOPS>)

Servidores (https://www.lenovo.com/us/en/data-center/servers/c/servers?menu-id=explore_servers)

Acessórios e Atualizações (<https://shop.lenovo.com/br/pt/aceessorios/?IPromotID=LEN130115>)

Ofertas de laptop (<https://shop.lenovo.com/br/pt/ofertas/>)

services and repairs (https://shop.lenovo.com/br/pt/servicos_e_garantia/?IPromotID=LEN930148)

Suporte

Drivers e Software ([/ng/pt/products/downloads?linkTrack=footer:Support_Downloads](https://ng/pt/products/downloads?linkTrack=footer:Support_Downloads))

Documentação ([/ng/pt/products/documentation?linkTrack=footer:Support_Manuals](https://ng/pt/products/documentation?linkTrack=footer:Support_Manuals))

Como fazer & soluções ([/ng/pt/products/solutions?linkTrack=footer:Support_Solutions](https://ng/pt/products/solutions?linkTrack=footer:Support_Solutions))

[Pesquisa de garantia \(/ng/pt/warrantylookup?linkTrack=footer:Support_Warranty_Lookup\)](#)

[Fale Conosco \(/ng/pt/contactus\)](#)

[Suporte para Armazenamento \(https://download.lenovo.com/lenovoemc/la/pt\)](https://download.lenovo.com/lenovoemc/la/pt)

Recursos

[Fale Conosco \(https://shop.lenovo.com/br/pt/contato/\)](https://shop.lenovo.com/br/pt/contato/)

[Onde Comprar \(https://shop.lenovo.com/br/pt/revendedores/\)](https://shop.lenovo.com/br/pt/revendedores/)

[Blogs \(https://news.lenovo.com/blog/?linkTrack=footer:Resources_Blogs\)](https://news.lenovo.com/blog/?linkTrack=footer:Resources_Blogs)

[Especificações do produto \(PSREF\) \(https://psref.lenovo.com/\)](https://psref.lenovo.com/)

[Fóruns \(https://forums.lenovo.com/\)](https://forums.lenovo.com/)

[Acessibilidade do Produto \(https://www.lenovo.com/social_responsibility/us/en/accessibility_notebooks/\)](https://www.lenovo.com/social_responsibility/us/en/accessibility_notebooks/)

[Informação ambiental \(https://www.lenovo.com/social_responsibility/br/pt/\)](https://www.lenovo.com/social_responsibility/br/pt/)

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CERTIFICATE

Certificate Number: 141968.00
With One Page Addendum

The Environmental Management System and implementation of:

Lenovo Group, LTD

With Operational Center at:
8001 Development Drive
Morrisville, NC 27560
United States

meets the requirements of the standard:

ISO 14001:2015

Scope of Certification:

Design, development, manufacturing, distribution, fulfillment, and repair of computer products and devices, data center products, mobile devices, smart devices and accessories.

Certificate Expires:	July 16, 2022
Certificate Reissued:	August 19, 2021
Certificate Issued:	July 17, 2019
Certified Since:	July 17, 2013



Dr. Cem O. Onus
Managing Director, Business Assurance
DEKRA Certification, Inc.
1120 Welsh Road, Suite 210
North Wales, PA 19454 USA
(215) 997-4519
www.dekra.us/audits



CERTIFICATE ADDENDUM

Certificate Number: 141968.00

Addendum Page One of One

The Environmental Management System and implementation of:

Lenovo Group, LTD

meets the requirements of the standard:

ISO 14001:2015

Site Address	Scope Per Site:
Central Function: 8001 Development Drive; Morrisville, NC 27560 USA	Responsibility of the company's overall EMS through the management of documentation/changes, management review, corrective actions, internal audit, planning/evaluation and compliance to applicable requirements.
8001 Development Drive; Morrisville, NC 27560 USA	Design and development of data center products.
19/1A, & 2A Edayar, Cuddalore Main Road, Edayar Palayam Village – Pondicherry, India	Manufacturing of computer products and devices.
Plant #1: Boulevard Escobedo No 316, Apodaca Technology Park, Apodaca, Nuevo Leon C.P. 66600 Plant #2: Boulevard Escobedo No 318, Apodaca Technology Park, Apodaca, Nuevo Leon C.P. 66627	Manufacturing of computer products and devices and data center products.
Estrada Municipal José Costa de Mesquita, 200 – Chácara Alvorada – Indaiatuba/SP, Brazil	Manufacturing of computer products and devices and data center products.
6540 Franz Warner Parkway; Whitsett, NC 27377 USA	Manufacturing, distribution, fulfillment, and repair of computer products and devices, data center products, mobile devices, smart devices, and accessories.
Am Zehnthof 77, 45307 Essen, Germany	Design and development of computer products and devices.
Minatomirai Center Building; 2F 3-6-1; Minatomirai, Nishi-Ku; Yokohama, Japan	Design and development of computer products and devices.
Motorola Mobility LLC: 222 W Merchandise Mart Plaza, Chicago, IL 60654 USA	Design and development of wireless communication equipment and accessories for the global market place.
K-Sped krt. 28, Ullo, 2225 Hungary	Manufacturing of computer products and devices and data center products.

Certificate Expires: July 16, 2022
Certificate Reissued: August 19, 2021
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Dr. Cem O. Onus
Managing Director, Business Assurance
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1120 Welsh Road, Suite 210
North Wales, PA 19454 USA
(215) 997-4519

www.dekra.us/audits





管理体系认证证书

证书编号: 01119E30081R6L(F1-2)

OTD 编号: 1.2.156.1.2.01119E30081R6L(F1-2)

兹 证 明

联想(北京)有限公司

(社会信用代码: 9111010870000458B)

(北京市海淀区上地西路6号2幢2层201-H2-6, 100085)

环境管理体系符合标准:

GB/T 24001-2016/ISO 14001:2015 《环境管理体系 要求及使用指南》

本证书覆盖下述范围:

联想(北京)有限公司环境管理体系范围内

与微型计算机、便携式计算机、移动用户终端、显示器、打印机、
PC 周边设备系列产品、多媒体数码产品、智能终端设备的设计、开发、生产和服务
移动通信系统设备(基站)、核心网设备的设计、开发、生产(外包)和服务, 投影仪、
消费类电子产品(限资质许可)的组装加工相关的环境管理体系活动

(本证书有效性依据发证机构的定期监督获得保持, 证书有效性信息请登录 www.cc.cesi.cn 进行查询)

(本证书信息可在国家认证认可监督管理委员会官方网站 www.cnca.gov.cn 上查询)

注: 认证注册范围不包括未获得有效的国家规定的行政许可, 资质许可的产品服务范围

发证日期: 2019年11月16日

换证日期: 2021年12月22日

有效期至: 2022年11月15日



北京赛西认证有限责任公司



中国认可
国际互认
管理体系
MANAGEMENT SYSTEM
CNAS C011-M



地址: 北京市东城区安定门东大街1号

客服电话: 400-071-9000

网址: www.cc.cesi.cn



CERTIFICATE OF MANAGEMENT SYSTEM CERTIFICATION

Certificate No: 01119E30081R6L(F1-2)

OID No: 1.2.156.1.2.01119E30081R6L(F1-2)

This is to certify that the Environmental Management System of

LENOVO (BEIJING) LIMITED

(Certificate of Social Credit Code : 9111010870000458B)

(No. 2 Building, 201-H2-6, No. 6 Shangdi West Road, Haidian District, Beijing, China, 100085)

**has complied with the requirements of
GB/T 24001-2016/ISO 14001:2015**

Environmental management systems-Requirements with Guidance for use

This certificate is valid for the following scope:

**THE ENVIRONMENTAL MANAGEMENT SYSTEM ACTIVITIES RELATING TO
DESIGN, DEVELOPMENT, MANUFACTURING AND SERVICE OF COMPUTER
PRODUCTS AND DEVICES, MOBILE TERMINAL DEVICES, MONITORS, PRINTERS
PC OPTIONS, MULTIMEDIA DIGITAL PRODUCTS AND SMART DEVICES. THE
DESIGN, DEVELOPMENT, MANUFACTURING (OUTSOURCING) AND SERVICE OF
MOBILE COMMUNICATION SYSTEM EQUIPMENTS (BASE STATION) AND CORE
NETWORK EQUIPMENTS. THE MANUFACTURING OF PROJECTORS AND
CONSUMER ELECTRONIC PRODUCTS (LICENSED PRODUCTS ONLY)**

THE VALIDITY OF THIS CERTIFICATE DEPENDS ON THE CONSEQUENCE OF
THE ANNUALLY SURVEILLANCE EXECUTED BY THE CERTIFICATION BODY
PLEASE ACCESS www.cc.cesi.cn OR www.cnca.gov.cn FOR CHECKING VALIDITY OF THE CERTIFICATE

Note: The scope of product services without the related administrative permits and qualifications is
not included in the scope of certification registration.

General Manager

CESI Certification Co., Ltd.

Issue Date:2019-11-16

Exchange Date:2021-12-22

Valid Until:2022-11-15



中国认可
国际互认
管理体系
MANAGEMENT SYSTEM
CNAS C011-M



Add: No.1Andingmen Dongdajie Dongchengqu,Beijing,China

Tel: 400-071-9000

[Http://www.cc.cesi.cn](http://www.cc.cesi.cn)

发证日期: 2019年11月16日
 Issue Date: 2019-11-16
 换证日期: 2021年12月22日
 Exchange Date: 2021-12-22
 有效期至: 2022年11月15日
 Valid Until: 2022-11-15



环境认证证书附件 1

ENVIRONMENTAL MANAGEMENT SYSTEMS CERTIFICATE APPENDIX

证书编号: 01119E30081R6L(F1-2)
 Certificate No: 01119E30081R6L(F1-2)
 OID 编号: 1.2.156.1.2.01119E30081R6L(F1-2)
 OID No: 1.2.156.1.2.01119E30081R6L(F1-2)

地域	名称	地址	产品	过程
北京 BEI JING	联想(北京)有限公司 LENOVO (BEIJING) LIMITED	北京市海淀区西北旺东路10号院1, 2号楼 BUILDING 1&2, No.10 COURTYARD XIBEIWANG EAST ROAD, HAIDIAN DISTRICT, BEIJING, CHINA	微型计算机、便携式计算机、移动 用户终端、显示器、打印机、PC 周边设备系列产品、多媒体数码产 品、智能终端设备 COMPUTER PRODUCTS AND DEVICES, MOBILE TERMINAL DEVICES, MONITORS, PRINTERS, PC OPTIONS, MULTIMEDIA DIGITAL PRODUCTS, SMART DEVICES	研发、运营管理 DESIGN, DEVELOPMENT AND OPERATION MANAGEMENT
		北京市海淀区上地信息产业基地创业路8号2 号楼 NO.2 BUILDING, NO.8 CHUANGYE ROAD, SHANGDI INFORMATION INDUSTRY BASE, HAIDIAN DISTRICT, BEIJING, CHINA		服务 CUSTOMER SERVICE
上海 SHANG HAI	联想(上海)信息技 术有限公司 LENOVO (SHANGHAI) INFORMATION TECHNOLOGY LTD.	上海市浦东新区松涛路696号 NO. 696 SONGTAO ROAD, PUDONG NEW DISTRICT, SHANGHAI, CHINA	便携式计算机、智能终端设备 COMPUTER PRODUCTS AND DEVICES, SMART DEVICES	研发 DESIGN AND DEVELOPMENT
惠阳 HUI YANG	惠阳联想电子工业 有限公司 LENOVO (HUIYANG) ELECTRONIC INDUSTRIAL CO., LTD.	广东省惠州市惠阳经济开发区联想科技园 LENOVO SCIENCE & TECHNOLOGY PARK, HUIYANG ECONOMIC DEVELOPMENT ZONE, HUIZHOU, GUANGDONG, CHINA	微型计算机、打印机、PC周边设 备系列产品、多媒体数码产品、投 影仪、消费类电子(限资质许可类) COMPUTER PRODUCTS AND DEVICES, PRINTERS, PC OPTIONS AND MULTIMEDIA DIGITAL PRODUCTS, CONSUMER ELECTRONIC PRODUCTS(QUALIFICATION LICENSE ONLY)	生产 MANUFACTURING
成都 CHENG DU	成都联想电子科技有 限公司 CHENGDU LENOVO ELECTRONIC TECHNOLOGY LTD.	四川省成都市高新区西区天健路88号 B1,B2 生产厂房和办公楼 NO. B1, B2 AND OFFICE BUILDING, NO.88 TIANJIAN ROAD WEST GAOXIN DISTRICT CHENGDU, SICHUAN, CHINA	投影仪 PROJECTORS	生产 MANUFACTURING



发证日期: 2019 年 11 月 16 日
 Issue Date: 2019-11-16
 换证日期: 2021 年 12 月 22 日
 Exchange Date: 2021-12-22
 有效期至: 2022 年 11 月 15 日
 Valid Until: 2022-11-15



环境认证证书附件 2

ENVIRONMENTAL MANAGEMENT SYSTEMS CERTIFICATE APPENDIX

证书编号: 01119E30081R6L(F1-2)
 Certificate No: 01119E30081R6L(F1-2)
 OID 编号: 1.2.156.1.2. 01119E30081R6L(F1-2)
 OID No: 1.2.156.1.2. 01119E30081R6L(F1-2)

深圳 SHEN ZHEN	联想信息产品(深圳)有限公司 LENOVO INFORMATION PRODUCTS (SHENZHEN) CO., LTD.	广东省深圳市南山区高新技术产业园区南一道 16 号联想研发大厦 4-11 层 4-11F LENOVO R&D CENTRE, NO. 16 NANYI ROAD, HI-TECH INDUSTRIAL PARK, NANSHAN DISTRICT, SHENZHEN, GUANGDONG, CHINA	PC 周边设备系列产品、显示器 PC OPTIONS AND MONITORS	研发 DESIGN AND DEVELOPMENT
		广东省深圳市福田区福田保税区桃花路 30 号 NO.30 TAO HUA ROAD, FUTIAN FREE TRADE ZONE, FUTIAN DISTRICT SHENZHEN, GUANGDONG, CHINA	微型计算机、便携式计算机 COMPUTER PRODUCTS AND DEVICES	生产 MANUFACTURING
厦门 XIA MEN	摩托罗拉移动通信技术有限公司 MOTOROLA MOBILE COMMUNICATION TECHNOLOGY LTD.	福建省厦门市火炬高新区荟智空间新丰路 178 号 B 区 2 层 2F, AREA B, NO.178 XINFENG ROAD, HUIZHI SPACE, TORCH HIGH-TECH ZONE, XIAMEN, FUJIAN, CHINA	移动用户终端 MOBILE TERMINAL DEVICES	研发、服务 DESIGN, DEVELOPMENT AND CUSTOMER SERVICE
武汉 WU HAN	摩托罗拉(武汉)移动通信技术有限公司 MOTOROLA (WUHAN) MOBILITY TECHNOLOGIES COMMUNICATION CO., LTD.	湖北省武汉市东湖新技术开发区高新四路 19 号 NO. 19 GAOXIN 4TH ROAD, EAST LAKE HIGH-TECH ZONE, WUHAN, CHINA	便携式计算机、移动用户终端、智能终端设备 COMPUTER PRODUCTS AND DEVICES, MOBILE TERMINAL DEVICES AND SMART DEVICES	生产 MANUFACTURING
重庆 CHONG QING	联想未来通信科技(重庆)有限公司 LENOVO FUTURE COMMUNICATIONS TECHNOLOGY (CHONGQING) CO., LTD.	重庆市渝北区互联网产业园二期 7 号楼 11-19 层 11-19F, BUILDING 7, INTERNET INDUSTRIAL PARK PHASE II, YUBEI DISTRICT, CHONGQING, CHINA	移动通信系统设备(基站)、核心网络设备 MOBILE COMMUNICATION SYSTEM EQUIPMENTS (BASE STATION) AND CORE NETWORK EQUIPMENTS	研发、生产(外包)和服务 DESIGN, DEVELOPMENT, MANUFACTURING (OUTSOURCING) AND CUSTOMER SERVICE





管理体系认证证书

证书编号: 01119E30094R1L(F1)

OTD 编号: 1.2.156.1.2.01119E30094R1L(F1)

兹证明

联想（北京）信息技术有限公司

(社会信用代码: 91110108397173806M)

(北京市海淀区上地西路6号2幢2层201-H2-2, 100085)

环境管理体系符合标准:

GB/T 24001-2016/ISO 14001:2015 《环境管理体系 要求及使用指南》

本证书覆盖下述范围:

位于北京市海淀区西北旺东路10号院1, 2号楼

上海市浦东新区松涛路696号

台湾台北市南港区三重路66号4, 5, 8楼、深圳市福田区福田保税区桃花路30号的
联想(北京)信息技术有限公司范围内的与数据中心系列产品的设计、开发、生产、销售
(自有产品)和服务; 数据中心系列产品的系统软件及应用软件的设计、开发和服务
相关的环境管理体系活动, 详见环境认证证书附件

(本证书有效性依据发证机构的定期监督获得保持, 证书有效性信息请登录 www.cc.cesi.cn 进行查询)

(本证书信息可在国家认证认可监督管理委员会官方网站 www.cnca.gov.cn 上查询)

注: 认证注册范围不包括未获得有效的国家规定的相关行政许可, 资质许可的产品服务范围

发证日期: 2019年12月5日

换证日期: 2021年12月13日

有效期至: 2022年12月4日



北京赛西认证有限责任公司



中国认可
国际互认
管理体系
MANAGEMENT SYSTEM
CNAS C011-M



地址: 北京市东城区安定门东大街1号

客服电话: 400-071-9000

网址: www.cc.cesi.cn



CERTIFICATE OF MANAGEMENT SYSTEM CERTIFICATION

Certificate No: 01119E30094R1L(F1)
OID No: 1.2.156.1.2.01119E30094R1L(F1)

This is to certify that the Environmental Management System of
LENOVO (BEIJING) INFORMATION TECHNOLOGY LTD.
(Certificate of Social Credit Code : 91110108397173806M)
(No. 2 Building 201-H2-2, No. 6 Shangdi West Road, Haidian District, Beijing, China, 100085)

has complied with the requirements of
GB/T 24001-2016/ISO 14001:2015
Environmental management systems-Requirements with Guidance for use
This certificate is valid for the following scope:

THE ENVIRONMENTAL MANAGEMENT SYSTEM ACTIVITIES RELATING TO THE DESIGN, DEVELOPMENT, MANUFACTURING, SALES AND SERVICE OF DATA CENTER PRODUCTS, THE DESIGN, DEVELOPMENT AND SERVICE OF SYSTEM AND APPLICATION SOFTWARES OF DATA CENTER PRODUCTS THESE ENVIRONMENTAL MANAGEMENT SYSTEM APPLIED TO THE FOLLOWING AREAS:

- 1. BUILDING 1&2, No.10 COURTYARD XIBEIWANG EAST ROAD HAI DIAN DISTRICT, BEIJING, CHINA**
- 2. NO. 696 SONGTAO ROAD, PUDONG NEW DISTRICT, SHANGHAI, CHINA**
- 3. 4F, 5F, 8F, No. 66, SAN CHONG ROAD, NAN GANG DISTRICT, TAIPEI CITY, TAIWAN**
- 4. No.30 TAO HUA ROAD, FUTIAN FREE TRADE ZONE, FUTIAN DISTRICT SHENZHEN, GUANGDONG, CHINA**

THE VALIDITY OF THIS CERTIFICATE DEPENDS ON THE CONSEQUENCE OF THE ANNUALLY SURVEILLANCE EXECUTED BY THE CERTIFICATION BODY
PLEASE ACCESS www.cc.cesi.cn OR www.cnca.gov.cn FOR CHECKING VALIDITY OF THE CERTIFICATE

Note: The scope of product services without the related administrative permits and qualifications is not included in the scope of certification registration.

General Manager

CESI Certification Co., Ltd.

Issue Date:2019-12-05
Exchange Date:2021-12-13
Valid Until:2022-12-04



中国认可
国际互认
管理体系
MANAGEMENT SYSTEM
CNAS C011-M



Add: No.1Andingmen Dongdajie Dongchengqu,Beijing,China Tel: 400-071-9000

[Http://www.cc.cesi.cn](http://www.cc.cesi.cn)

发证日期: 2019年12月5日
 Issue Date: 2019-12-05
 换证日期: 2021年12月13日
 Exchange Date: 2021-12-13
 有效期至: 2022年12月4日
 Valid Until: 2022-12-04



环境认证证书附件

ENVIRONMENTAL MANAGEMENT SYSTEMS CERTIFICATE APPENDIX

证书编号: 01119E30094R1L(F1)
 Certificate No: 01119E30094R1L(F1)
 OID 编号: 1.2.156.1.2.01119E30094R1L(F1)
 OID No: 1.2.156.1.2.01119E30094R1L(F1)

地域	名称	地址	产品	过程
北京 BEI JING	联想(北京)信息技术有限公司 LENOVO (BEIJING) INFORMATION TECHNOLOGY LTD.	北京市海淀区西北旺东路 10 号院 1, 2 号楼 BUILDING 1&2, No.10 COURTYARD XIBEIWANG EAST ROAD, HAIDIAN DISTRICT, BEIJING, CHINA	数据中心系列产品 (服务器、网络设备等) DATA CENTER PRODUCTS (SERVER, NETWORKING)	研发、销售以及服务等运营管理 DESIGN, DEVELOPMENT, SALES, CUSTOMER SERVICE AND OTER OPERATION MANAGEMENT
上海 SHANG HAI	联想(上海)计算机科技有限公司 LENOVO (SHANG HAI) COMPUTER TECHNOLOGY CO., LTD.	上海市浦东新区松涛路 696 号 NO. 696 SONGTAO ROAD, PUDONG NEW DISTRICT, SHANGHAI, CHINA	数据中心系列产品的系统软件及应用软件 DATA CENTER PRODUCTS SYSTEM AND APPLICATION SOFTWARE	研发 DESIGN AND DEVELOPMENT
台北 TAIPEI	台湾联想环球科技股份有限公司 LENOVO GLOBAL TECHNOLOGY (TAIWAN) LTD.	台湾台北市南港区三重路 66 号 4,5,8 楼 4F, 5F, 8F, No. 66 SAN CHONG ROAD, NAN GANG DISTRICT, TAIPEI CITY, TAIWAN	数据中心系列产品 (服务器、存储等) DATA CENTER PRODUCTS (SERVER, STORAGE)	研发 DESIGN AND DEVELOPMENT
深圳 SHEN ZHEN	联想系统集成(深圳)有限公司 LENOVO SYSTEMS TECHNOLOGY COMPANY LIMITED	广东省深圳市福田区福田保税区桃花路 30 号 No.30 TAO HUA ROAD, FUTIAN FREE TRADE ZONE, FUTIAN DISTRICT SHENZHEN, GUANGDONG, CHINA	数据中心系列产品 (服务器、存储、网络设备等) DATA CENTER PRODUCTS (SERVER, STORAGE, NETWORKING)	生产 MANUFACTURING





中质协质量保证中心
环境管理体系认证证书

注册号：00622E30072R1L

兹证明

联宝（合肥）电子科技有限公司

统一社会信用代码：91340100586142822H

注册地址：中国·安徽省·合肥市经济技术开发区云谷路 3188-1 号（综合保税区内）

审核地址：中国·安徽省·合肥市经济技术开发区云谷路 3188-1 号（综合保税区内）

环境管理体系符合

GB/T 24001-2016/ ISO 14001:2015

认证范围

便携式计算机、微型计算机（台式机）
及其主板，SSD 主板、服务器主板及其整机的设计开发、制造和售后服务。

该组织常设分场所信息：“无”

本证书有效期：2022 年 01 月 19 日至 2025 年 01 月 21 日

再认证审核时间：2022 年 01 月 10 日至 2022 年 01 月 13 日

证书有效期内每年监督审核合格后方为有效，证书有效性查询请登陆 www.qac.com.cn;

本证书信息可在国家认证认可监督管理委员会官方网站 www.cnca.gov.cn 上查询



代表签字：

颁证日期：2022 年 01 月 19 日



请扫描二维码核实证书有效性及监督审核执行情况
第一次监督审核应在 2023 年 01 月 18 日前执行
第二次监督审核应在 2024 年 01 月 18 日前执行



中国认可
国际互认
管理体系
MANAGEMENT SYSTEM
CNAS C006-M

北京市海淀区三虎桥百胜村 6 号. 100048.



Quality Assurance Centre of China Association for Quality

CERTIFICATE OF ENVIRONMENTAL MANAGEMENT SYSTEM

Certificate No. 00622E30072R1L

This is to certify that the Environmental Management System of

LCFC (HeFei) Electronics Technology Co., Ltd.

Unified social credit code: 91340100586142822H

Registered Address: No.3188 Yungu Road (Comprehensive Bonded Zone), Hefei Economic&Technological Development Area,Anhui

Audit Address: No.3188 Yungu Road (Comprehensive Bonded Zone), Hefei Economic&Technological Development Area,Anhui

is in conformity with

GB/T 24001-2016/ ISO 14001:2015

The Environmental Management System applies in the following area:

Design, manufacture and after-sales service of notebook computers, microcomputers (desktop) and their motherboards, SSD motherboards, servers and their motherboards.

Standing Branch Information: "None"

Term of validity of this certificate from: 19th.Jan.2022 to 21st.Jan.2025

Recertification time:10th.Jan.2022 to 13th.Jan.2022

Certificate Validity Information can be inquired on (www.qac.com.cn) and (www.cnca.gov.cn)

Quality Assurance Centre

of China Association

for Quality

(QAC)

Representative:

Yao Qin

General Manager

Issue Date: 19th.Jan.2022



中国认可
国际互认
管理体系
MANAGEMENT SYSTEM
CNAS C006-M

BUREAU VERITAS
Certification



Certification

Awarded to

NEC Personal Computers, Ltd.

Bureau Veritas Japan Co., Ltd. certify that the management system of the above organization has been audited and found to be in accordance with the requirements of the management system standards detailed below.

— STANDARDS —

ISO14001:2015, JIS Q 14001:2015

— SCOPE OF SUPPLY —

- DESIGN, DEVELOPMENT AND MANUFACTURING OF PERSONAL COMPUTERS
- SERVICE OF PERSONAL COMPUTERS AND PERIPHERALS (FAILURE DIAGNOSIS AND REPAIR)
- REUSE OF USED PERSONAL COMPUTERS(BUYBACK, RECYCLING)

— SITE NAME, SCOPE OF SITE and LOCATTON OF SITE —

YONEZAWA PLANT : DESIGN, DEVELOPMENT AND MANUFACTURING OF PERSONAL COMPUTERS.
REUSE OF USED PERSONAL COMPUTERS(BUYBACK, RECYCLING).

6-80, SHIMOHANAZAWA 2-CHOME, YONEZAWA-SHI, YAMAGATA, 141-0032, JAPAN

GUNMA PLANT : SERVICE OF PERSONAL COMPUTERS AND PERIPHERALS (FAILURE DIAGNOSIS AND REPAIR).

32 NISHIJAJIMA-CHO, OHTA-SHI, GUNMA, 373-0823, JAPAN

Original Approval Date: **22 DECEMBER 2011**

Certification Cycle Start Date: **22 DECEMBER 2020**

Subject to the continued satisfactory operation of the organization's management system, this certificate is valid until: **21 DECEMBER 2023**

To check this certificate validity please call (+81 45 651 4784)

Further clarifications regarding the scope of this certificate and the applicability of the management system requirements may be obtained by consulting the organization

Version: **2.0**

Approval Date: **20 MAY 2021**

Certificate Number: **4556059**

Bureau Veritas Japan Co., Ltd.
Certification Division
Certification Representative
Kazuhiko KAGEI



MS
CM042



Japan Audit and Certification Organization
for Environment and Quality



051



MS
CM021

Fujitsu Client Computing Limited

Head Office, R&D Center

Shinkawasaki Mitsui Bldg. (West Tower), 1-1-2 Kashimada, Saiwai-ku, Kawasaki, Kanagawa, Japan

CERTIFICATE

Certificate No.: EC19J0015

ISO 14001:2015 · JIS Q 14001:2015

Commercial development of Personal Computer and Tablet

Our organization certifies the organizations described in attached Appendix to be complied with the requirement of indicated above management system.

Registration Date :25/Dec/2019
Recertification Date:
Issue Date :27/Jan/2021
Certificate Expiry :24/Dec/2022

**Japan Audit and Certification Organization
for Environment and Quality**

2-2-19 Akasaka, Minato-ku, Tokyo, Japan

President
& CEO

To be used in conjunction with attached Appendix



APPENDIX

1/1

Fujitsu Client Computing Limited Head Office, R&D Center

Head Office

Human Resources and General Affairs Division, Quality Assurance Division,
1st Development Center, 2nd Development Center,
Consumer Division, Procurement Division

Shinkawasaki Mitsui Bldg. (West Tower),

1-1-2 Kashimada, Saiwai-ku, Kawasaki, Kanagawa, Japan

【Commercial development of Personal Computer and Tablet】

R&D Center

Okidensen Bldg.,

2-12-8 Odanaka, Nakahara-ku, Kawasaki, Kanagawa, Japan

【Commercial development of Personal Computer and Tablet】

Certificate No. :EC19J0015
Registration Date :25/Dec/2019
Recertification Date:
Issue Date :27/Jan/2021
Certificate Expiry :24/Dec/2022

**Japan Audit and Certification Organization
for Environment and Quality**

2-2-19 Akasaka, Minato-ku, Tokyo, Japan

President
& CEO

Drivers e Software



PC Support (/br/pt) > desktops-and-all-in-ones > thinkcentre-m-series-desktops > M75s Gen 2 (Type 11R7, 11R8, 11R9, 11RA) Desktop (ThinkCentre) (/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne)



M75s Gen 2 (Type 11R7, 11R8, 11R9, 11RA) Desktop (ThinkCentre)

Insira o número de produto (HT510152)

Detecte o produto Alterar o produto

Página Inicial do Produto
</br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne>

↓ Drivers e Software

Digite um nome de driver ou palavra-chave



[Atualização manual \(/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/downloads/driver-list\)](/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/downloads/driver-list)

[Atualização Automática de Drivers \(/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/downloads/automatic-driver-update\)](/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/downloads/automatic-driver-update)

[Solicitar mídia de recuperação \(/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/downloads/order-recovery-media\)](/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/downloads/order-recovery-media)

Suporte do programa Recovery Media Systems

Sistemas Windows 11 Pro que foram rebaixados para o Windows 10 Pro (programa de downgrade) - (obter mídia de recuperação do Windows 11 ou Windows 10)

Sistemas Windows 10 Pro que foram rebaixados para o Windows 7 Pro (programa de downgrade) - (obtenha a mídia de recuperação do Windows10)

Sistemas Windows 8.1 Pro com downgrade para o Windows 7 Pro (programa Downgrade) - (obtenha a mídia de recuperação do Windows8.1)

Feedback



↓ Drivers e Software
(/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/downloads)

🔧 Solucionar problemas e diagnosticar
(/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/diagnostics-troubleshooting)

📖 Como fazer
(/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/documentation)

📖 Guias & Manuais
(/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/document-userguide)

🛡️ Garantia e serviços
(/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/warranty)

Sistemas Windows 10 THINK e almofada de idéia selecionada e sistemas de desktop (obtenha a mídia de recuperação do Windows 10 e o Download digital apenas)

(Programa sem downgrade)

Selecione a máquina originalmente com Ubuntu / Fedora (<https://pcsupport.lenovo.com/us/en/solutions/HT512169>)



1. Determinar a elegibilidade





2. Escolha o país e o idioma do sistema operacional





3. Enviar ordem de mídia de recuperação


CLIQUE PARA CONTINUAR (/LENOVORECOVERY?LINKTRACK=BODY:BOX:RECOVERYMEDIA)

 **Status de Reparo**
(/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/repair)

 **Peças**
(/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/parts)

 **Acessórios**
(/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/accessory)

 **Fale Conosco**
(/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/contactus)

 **Mais suporte**
(/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/more)

selecione a região do país

Português ▼

Sobre a Lenovo

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Código aberto Lenovo (/br/pt/solutions/HT511330)

Informações Legais (https://www.lenovo.com/br/pt/legal/?linkTrack=footer:About_Lenovo_Legal_Information)

OPORTUNIDADES (<https://jobs.lenovo.com/>)

Loja

Notebooks e Ultrabooks (<https://shop.lenovo.com/br/pt/laptops/>)

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Workstations (<https://www.lenovo.com/br/pt/desktops-y-all-in-one/c/DESKTOPS>)

Servidores (<https://www.lenovo.com/us/en/data-center/servers/>)

Acessórios e Atualizações (<https://shop.lenovo.com/br/pt/acesorios/?IPromoID=LEN130115>)

Ofertas de laptop (<https://shop.lenovo.com/br/pt/ofertas/>)

services and repairs (https://shop.lenovo.com/br/pt/servicos_e_garantia/?IPromoID=LEN930148)

Suporte

Drivers e Software (/br/pt/selectproduct?linkto=downloads&linkTrack=footer:Support_Downloads)

Como fazer (/br/pt/products/desktops-and-all-in-ones/thinkcentre-m-series-desktops/thinkcentre-m75s-gen-2-cezanne/documentation?linkTrack=footer:Support_Manuals)

Como fazer (/br/pt/selectproduct?linkto=documentation&linkTrack=footer:Support_Solutions)

Pesquisa de garantia (/br/pt/warrantylookup?linkTrack=footer:Support_Warranty_Lookup)

Fale Conosco (/br/pt/contactus)

Suporte para Armazenamento (<https://download.lenovo.com/lenovoemc/la/pt>)

Recursos

Fale Conosco (<https://shop.lenovo.com/br/pt/contato/>)

Onde Comprar (<https://shop.lenovo.com/br/pt/revendedores/>)

Blogs (https://news.lenovo.com/blog/?linkTrack=footer:Resources_Blogs)

Especificações do produto (PSREF) (<https://psref.lenovo.com/>)

Registro do produto (<https://support.lenovo.com/productregistration>)

Fóruns (<https://forums.lenovo.com/>)

Acessibilidade do Produto (https://www.lenovo.com/social_responsibility/us/en/accessibility_notebooks/)

Informação ambiental (https://www.lenovo.com/social_responsibility/br/pt/)

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(<https://www.lenovo.com/us/en/about#social-responsibility>)

Veja o nosso Relatório Global de
Sustentabilidade.

(https://www3.lenovo.com/us/en/social_responsibility/sustainability_reports/)

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Lenovo - ThinkCentre M75s Gen 2 : 11JA

Specifications

ENERGY STAR Unique ID:	2364528
Brand Name:	Lenovo
Model Name:	ThinkCentre M75s Gen 2
Model Number:	11JA
Type:	Desktop
Notebooks, Desktops, Integrated Computers, Slate/Tablets, Two-in-one Notebooks, and Portable All-in-ones Category for TEC (Typical Energy Consumption) Criteria:	Desktop D1,Desktop D2,Desktop I1 or Integrated Desktop 1,Desktop I2 or Integrated Desktop 2
Category I1: Processor Brand:	AMD
Category I1: Processor Name:	Athlon
Category I1: Operating System Name:	Windows 10
Category I1: Base Processor Speed Per Core (GHz):	3.4
Category I1: System Memory (GB):	128
Category I1: Default Low-power Mode:	Sleep Mode
Category I1: Long Idle Power Used for Sleep Mode:	No
Category I1: Off Mode (watts):	0.6
Category I1: Sleep Mode (watts):	2.3
Category I1: Long Idle (watts):	17.4
Category I1: Short Idle (watts):	18.4
Category I1: Base TEC Allowance (kWh):	26
Category I1: Functional Adder Allowances (kWh):	57.9
Category I1: TEC of Model (kWh):	73.4
Category I2: Processor Brand:	AMD
Category I2: Processor Name:	Ryzen 7
Category I2: Operating System Name:	Windows 10
Category I2: Physical CPU Cores (count):	8
Category I2: Base Processor Speed Per Core (GHz):	3.6
Category I2: System Memory (GB):	128
Category I2: Default Low-power Mode:	Sleep Mode

Category I2: Long Idle Power Used for Sleep Mode:	No
Category I2: Off Mode (watts):	0.7
Category I2: Sleep Mode (watts):	2.3
Category I2: Long Idle (watts):	14.8
Category I2: Short Idle (watts):	15.5
Category I2: Base TEC Allowance (kWh):	46
Category I2: Functional Adder Allowances (kWh):	60.3
Category I2: TEC of Model (kWh):	63.8
Category D1: Processor Brand:	AMD
Category D1: Processor Name:	Athlon
Category D1: Operating System Name:	Windows 10
Category D1: Physical CPU Cores (count):	2
Category D1: Base Processor Speed Per Core (GHz):	3.4
Category D1: System Memory (GB):	128
Category D1: Default Low-power Mode:	Sleep Mode
Category D1: Long Idle Power Used for Sleep Mode:	No
Category D1: Off Mode (watts):	0.6
Category D1: Sleep Mode (watts):	2.2
Category D1: Long Idle (watts):	24.4
Category D1: Short Idle (watts):	25.2
Category D1: Base TEC Allowance (kWh):	35
Category D1: Functional Adder Allowances (kWh):	85.6
Category D1: TEC of Model (kWh):	96.8
Category D2: Processor Brand:	AMD
Category D2: Processor Name:	Ryzen 7
Category D2: Operating System Name:	Windows 10
Category D2: Physical CPU Cores (count):	6
Category D2: Base Processor Speed Per Core (GHz):	3.6
Category D2: System Memory (GB):	128
Category D2: Default Low-power Mode:	Sleep Mode
Category D2: Long Idle Power Used for Sleep Mode:	No
Category D2: Off Mode (watts):	0.7
Category D2: Sleep Mode (watts):	2.3
Category D2: Long Idle (watts):	22.6
Category D2: Short Idle (watts):	24.0
Category D2: Base TEC Allowance (kWh):	45
Category D2: Functional Adder Allowances (kWh):	86.8

Category D2: TEC of Model (kWh):	93.0
Sleep Mode Default Time Upon Shipment (min.):	25
Display Sleep Mode Default Time Upon Shipment (min.):	10
WOL (Wake on LAN) From Sleep:	Shipped Enabled Under All Conditions
Will the Speed of Any Active 1 GB/s or Higher Ethernet Network Links be Reduced to Less Than 1 GB/s When Transitioning to Sleep or Off Mode?:	Yes
WLAN Capability:	Yes
Ethernet Capability:	Yes
Bluetooth Capability:	Yes
Touch Screen:	No
Date Available On Market:	2020-09-30
Date Certified:	2020-08-13
Markets:	United States, Switzerland, Taiwan, Japan, Canada
Category I1: Physical CPU Cores (count):	2
ENERGY STAR Certified:	Yes

Additional Model Information

ThinkCentre M75s Gen 2,11JB,; ThinkCentre M75s Gen 2,11R7,; ThinkCentre M75s Gen 2,11R8,; ThinkCentre M75s Gen 2,11W1,; ThinkCentre M75s Gen 2,11W2,

UPC Codes	
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Captured On:
07/05/2022

Lenovo ThinCentre M75s Gen2

Desktop system certified with Ubuntu

Release

- **Ubuntu 20.04 LTS 64 Bit**

Pre-installed in some regions with a custom Ubuntu image that takes advantage of the system’s hardware features and may include additional software. Standard images of Ubuntu may not work well, or at all.

Kernel

This system was tested with 20.04 LTS, running the 5.13.0-1012-oem kernel.

BIOS

LENOVO: M46KT1EA (UEFI)

Hardware

Network Realtek Semiconductor Co., Ltd. RTL8111/8168/8411 PCI Express Gigabit Ethernet Controller pci (10ec:8168 17aa:32e1)

Processor AMD AMD Ryzen 7 5700G with Radeon Graphics

Video Advanced Micro Devices, Inc. [AMD/ATI] Lexa PRO [Radeon 540/540X/550/550X / RX 540X/550/550X] pci (1002:699f 1642:2065)

Advanced Micro Devices, Inc. [AMD/ATI] Cezanne pci (1002:1638 17aa:32e1)

Wireless Mediatek Inc. MT7921 802.11ax PCI Express Wireless Network Adapter pci (14c3:7961 17aa:e0bc)

[Hardware details ›](#)



Microsoft

Hardware certification report **Approved**

Private product ID: **14194390558462113**

Shared product ID: **400646242**

Submission ID: **1152921505693740823**

Submission date: **8/4/2021**

Completion date: **8/4/2021**

Company: **Lenovo**

Product name: **ThinkCentre M75t Gen 2 Cazzane W11**

Category: **System**

Product type: **Desktop**

Qualification level: **Certified for Microsoft Windows Hardware Compatibility Program – Client family version 21H2, x64**

Marketing name: **ThinkCentre M75t Gen 2 11KB**
ThinkCentre M75t Gen 2 11KC
ThinkCentre M75t Gen 2 11KD
ThinkCentre M75t Gen 2 11KE
ThinkCentre M75t Gen 2 11RB
ThinkCentre M75t Gen 2 11RC
ThinkCentre M75t Gen 2 11RD
ThinkCentre M75t Gen 2 11RE
ThinkCentre M75t Gen 2 11W5
ThinkCentre M75t Gen 2 11W6
ThinkCentre M75t Gen 2 11W7
ThinkCentre M75t Gen 2 11W8
ThinkCentre M75s Gen 2 11JA
ThinkCentre M75s Gen 2 11JB
ThinkCentre M75s Gen 2 11JC
ThinkCentre M75s Gen 2 11JD
ThinkCentre M75s Gen 2 11R7
ThinkCentre M75s Gen 2 11R8
ThinkCentre M75s Gen 2 11R9
ThinkCentre M75s Gen 2 11RA
ThinkCentre M75s Gen 2 11W1
ThinkCentre M75s Gen 2 11W2
ThinkCentre M75s Gen 2 11W3
ThinkCentre M75s Gen 2 11W4

Lenovo (Singapore) Pte. Ltd.
151 Lorong Chuan,
#02-01, New Tech Park,
Singapore, 556741
(Tel - 65-6827-1000 & Fax- 65-6827-1100)



EU Declaration of Conformity

For the **ThinkCentre M75s Gen 2** Personal Computer

Machine Type: 11R7***, 11R8*****, 11R9*****, 11RA*******

(Where * maybe 0~9, a-z, A~Z, any alphanumeric character, symbol or blank)

We, Lenovo (Singapore) Pte Ltd, declare under sole responsibility that the above products,
manufactured for:

Lenovo PC HK Limited.
23/F, Lincoln House, Taikoo Place 979 King's Road,
Quarry Bay, Hong Kong


to which this declaration relates, is in conformity with the requirements of the following EU Directives:

- **Directive 2014/53/EU on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment.**
- **Directive 2009/125/EC establishing a framework for the setting of Ecodesign requirements for Energy-related products.**
- **Council Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment as amended by Directive 2015/863/EU.**

The conformity assessment procedure referred to in Article 17.4a of Directive 2014/53/EU has been followed and performed with the involvement of a Notified Body, in accordance with Article 3.2:

Notified Body Name/number : DEKRA Testing and Certification,S.A.U./1909
Issued the EU-type examination certificate: 56476RNB.063A1

The Technical Documentation (TD), relevant to the product described above and which support this DoC is available from the EU contact address on this DoC.

Signed:  _____ Date: 17th June 2021
Joseph Chua (Executive Director)
Place of issue: Lenovo (Singapore) Pte Ltd.

European Contact for regulatory topics only:
Lenovo (Slovakia), Landererova 12, 811 09 Bratislava, Slovakia
Tel: +421 2 6868 3018

Lenovo (Singapore) Pte. Ltd.
 151 Lorong Chuan,
 #02-01, New Tech Park,
 Singapore, 556741
 (Tel - 65-6827-1000 & Fax- 65-6827-1100)



Standards References

The following harmonized standards and normative documents are those to which the product's conformance is declared, and by specific reference to the essential requirements of the referenced Directives:

RE Directive

Article 3.1a (Safety & Health)	EN 62368-1	2014+A11:2017	✓
	EN IEC 62311	: 2020	✓

Article 3.1b (EMC)	EN 55032	: 2015+A11:2020	✓
	EN IEC 61000-3-2	: 2019	✓
	EN 61000-3-3	: 2013+A1:2019	✓
	EN 55035	: 2017+A11:2020	✓
	EN 301 489-1	V2.2.3 2019-11	✓
	EN 301 489-3	V2.1.1 2019-03	✓
	EN 301 489-17	V3.2.4 2020-09	✓

		Wireless module inside			
		WLAN with Bluetooth 1	WLAN with Bluetooth 2		
Article 3.2 (Radio Spectrum)	EN 300 328	V2.2.2	2019-07	✓	✓
	EN 301 893	V2.1.1	2017-05	✓	✓
	EN 300 440	V2.2.1	2018-07	✓	

RoHS Directive	EN 50581:2012	EN IEC 63000:2018	✓
ErP Directive	EC 617/2013 ErP – Class B	EN 50564:2011	✓


Wireless modules

Wireless module inside	MODEL
WLAN with Bluetooth 1	RTL8852AE
	9260NGW
WLAN with Bluetooth 2	RTL8822CE

European Contact for regulatory topics only:
 Lenovo (Slovakia), Landererova 12, 811 09 Bratislava, Slovakia
 Tel: +421 2 6868 3018

CERTIFICADO DE CONFORMIDADE

CERTIFICATE OF CONFORMITY

Certificado No. / Certificate No.	UL-BR 22.1054
Data de Emissão / Date of issue	08 de Abril de 2022 / April 08, 2022
Página / Page	1/22
Certificado de conformidade válido somente acompanhado das páginas de 1 até 22 Certificate of conformity valid with pages from 1 to 22	
Fornecedor / Supplier 100592254	LENOVO TECNOLOGIA (BRASIL) LTDA Estrada Municipal Jose Costa de Mesquita, 200 Módulos 5 a 10, Chacara Alvorada, Indaiatuba – SP - CEP 13337-200, Brazil CNPJ: 07.275.920/0001-61
Produto Certificado / Certified Product	Computador pessoal / Personal computer
Família de Produto / Product's Family	Thinkcentre M720s, Lenovo V530s-07icb, M920q Tiny ThinkCentre, M720q Tiny ThinkCentre, M920s SFF Thinkcentre, ThinkCentre M715q, Lenovo V530s-07ICR, ThinkCentre M75q-1, ThinkCentre M70s, ThinkCentre M80s, ThinkCentre M70q, ThinkCentre M80q, ThinkCentre M75s-1, V50s-07IMB, ThinkCentre M75s Gen 2 , ThinkCentre M75q Gen 2, ThinkCentre M90q Gen 2
Modelo - Tipo / Model - Type	10ST****, 10SU****, 10SV****, 10TR****, 10U6****, 10TX****, 10TY****, 10XV****, 10XW****, 10RRXXXX, 10RSXXXX, 10RTXXXX, 10RUXXXX, 10SYXXXX, 10T1XXXX, 10T2XXXX, 10UHXXXX, 10V8XXXX, 10T7XXXX, 10T8XXXX, 10T9XXXX, 10TAXXXX, 10TCXXXX, 10U8XXXX, 10U9XXXX, 10UAXXXX, 10SJXXXX, 10SKXXXX, 10SLXXXX, 10TNXXXX, 10U2XXXX, 10U3XXXX, 11BL****, 11BM****, 11BN****, 11BQ****, 10M2****, 10M3****, 10M4****, 10M5****, 10RA****, 10RB****, 10RC****, 10RD****, 10VG****, 10VH****, 10VJ****, 10VK****, 10VL****, 10VM****, 10VN****, 10VQ****, 11A4****, 11A5****, 11A6****, 11A7****, 11DB****, 11DC****, 11EW****, 11EY****, 11CU****, 11CV****, 11EM****, 11EN****, 11DT****, 11DU****, 11DV****, 11DW****, 11FA****, 11FB****, 11FC****, 11FD****, 11E7****, 11E8****, 11E9****, 11H4****, 11H5****, 11H6****, 11DN****, 11DR****, 11DQ****, 11DS****, 11F6****, 11F7****, 11F8****, 11F9****, 11EG****, 11EH****, 11H7****, 11H8****, 11A9****, 11AA****, 11AV****, 11AW****, 11EE****, 11EF****, 11HA****, 11HB****, 11JA****, 11JB****, 11JC****, 11JD****, 11JJ****, 11JK****, 11JL****, 11JM****, 11JN****, 11JQ****, 11JR****, 11JS****, 11JT****, 11JU****, 11MQ****, 11MR****, 11MS****, 11MT****, 11MU****, 11MV****, 11MW****, 11MX****, 11R7****, 11R8****, 11R9****, 11RA**** (Onde * pode ser qualquer caractere alfanumérico ou vazio)
Marca Comercial / Trademark	LENOVO
Lote ou No. de Série / Lot or Serial Number	N/A
Normas Aplicáveis / Applicable standards	IEC 60950-1:2005 + A1:2009 + A2:2013; CISPR 22: 2012; CISPR 32: 2016; CISPR 24: 2015; IEC 61000-3-2:2014, IEC 61000-3-3:2013, IEC 61000-4-2: 2008; IEC 61000-4-3:2010; IEC 61000-4-4: 2012; IEC 61000-4-5: 2014; IEC 61000-4-6: 2013; IEC 61000-4-8: 2009; IEC 61000-4-11:2004
Programa de Certificação ou Portaria / Certification Program or Decree	PORTARIA NO. 170/2012 / DECREE NO. 170/2012 PORTARIA NO. 407/2015 / DECREE NO. 407/2015 PORTARIA NO. 48/2017 / DECREE NO. 48/2017
Relatório de Avaliação e Ensaios / Assessment and Test Report #	BR2334, Vol. 1, Sec. Sec. 45, 46, 50, 55, 58, 59, 60, 62, 75, 76, 78, 82, 86, 87, 88, 90, 91, 93, 94, 99
Concessão Para / Concession for	Ostentar o Selo de Identificação da Conformidade do Sistema Brasileiro de Avaliação da Conformidade (SBAC) sobre o(s) produto(s) relacionado(s) neste certificado. Bearing the Conformity Identification Seal of the Brazilian System of Evaluation of Conformity (SBAC) on the product covered by this certificate.
Revisão / Revision date	-----
Validade / Expire date	07 de Abril de 2025 / April 07, 2025
 Pedro Mottola Program Owner	UL do Brasil Certificações, organismo acreditado pela Coordenação Geral de Acreditação do INMETRO – CGCRE, segundo o registro Nº OCP-0029 confirma que o produto está em conformidade com a(s) Norma(s) e programas ou Portarias acima descritas. UL do Brasil Certificações, Certification Body accredited by Coordenação Geral de Acreditação do INMETRO - CGCRE according to the register Nr OCP-0029 confirms that the product is in compliance with the standards and certification Programs or Decrees above mentioned.

Organismo de Certificação /
Certification Body

UL do Brasil Certificações

Av. Engenheiro Luís Carlos Berrini, 105 – 24º Andar
São Paulo – SP – Brasil - 04571-010
T: 55.11.3049.8300 / W: brazil.ul.com

84-IC-F0033 rev 12.0

CERTIFICADO DE CONFORMIDADE

CERTIFICATE OF CONFORMITY

Certificado No. / Certificate No. UL-BR 22.1054

Data de Emissão / Date of issue 08 de Abril de 2022 / April 08, 2022

Página / Page 2/22

Certificado de conformidade válido somente acompanhado das páginas de 1 até 22
Certificate of conformity valid with pages from 1 to 22

Solicitante / Applicant **LENOVO TECNOLOGIA (BRASIL) LTDA**
(100592254) Estrada Municipal Jose Costa de Mesquita, 200
Módulos 5 a 10, Chacara Alvorada, Indaiatuba – SP - CEP 13337-200, Brazil
CNPJ - 07.275.920/0001-61

Fábrica / Factory **LENOVO TECNOLOGIA (BRASIL) LTDA**
(100592254) Estrada Municipal Jose Costa de Mesquita, 200
Módulos 5 a 10, Chacara Alvorada, Indaiatuba – SP - CEP 13337-200, Brazil
CNPJ - 07.275.920/0001-61

MARCAÇÃO / MARKING: Marca do fabricante, modelo e características elétricas.

CARACTERÍSTICAS NOMINAIS / RATINGS:

100-240 Vac, 3 A, 50/60 Hz, Class I
100-240 Vac, 4 A, 50/60 Hz
3.25A, 4.5A or 6,75 A, 20 Vdc, Class III

LISTA DE ACESSÓRIOS / LIST OF ACCESSORIES: N/A

MODELO DE CERTIFICAÇÃO / CERTIFICATION MODEL: 5

VERSÃO DO PROJETO DO PRODUTO / PRODUCT DESIGN VERSION: N/A

LISTA DE COMPONENTES CRÍTICOS / LIST OF CRITICAL COMPONENTS:

Componente/ Component	Fabricante/ Manufacturer	Tipo/Modelo Type/Model	Características técnicas/ Technical data	Norma/ Standard	Marca de conformidade/ Mark(s) of conformity
1. Label	Interchangeable	Interchangeable	Min 55 degree C, suitable for the surface applied.	UL969	UL
Cord set	Interchangeable	Interchangeable	----	NBR 14136, NBR NM 60884-1	INMETRO
2. Metal Chassis	-	-	Consists of 4 pieces, secured together by physical fit, wedged, overall 361.7 mm X 88.0 mm X 338.0 mm, min 0.6mm thick for top and bottom, min 0.8mm thick for sides,. Overall 179mmx178.7mmx34.5mm, Min.0.6 mm thickness	-	-
Metal Chassis	Interchangeable	Interchangeable	min. 0.6 mm thickness	-	Test with equipment
Metal enclosure	Interchangeable	Interchangeable	Overall 257mm x 89mm x 340mm, min 0.6 mm thickness	IEC/EN 60950-1	Test with equipment
Plastic Front Panel and battery box plastic enclosure	LG CHEM LTD	HI121	HB, min. 1.5 mm thickness. Min. 95°C	UL94, IEC/EN 60950-1	UL & tested in Appliance
3. Plastic Front Panel	Interchangeable	Interchangeable	HB or better, min. 1.5 mm thickness. Min. 95°C	UL94, UL746C	UL
Plastic Front Panel	STYROLUTION GROUP GMBH	GP-22	HB, min. 0.8 mm thickness	Applicable parts of IEC/EN 60950-1	UL E108538 & tested in appliance
Plastic Front Panel	CHI MEI CORPORATION	PA-757(+)	HB, 80°C, min. 1.5mm thickness	UL746C, UL94	UL E56070
Plastic Front Panel (Alternative)	COVESTRO DEUTSCHLANDAG [PC RESINS]	2865 + (z), 2867 + (z)	V-2, 115°C, min. 1.5mm thickness.	UL 746C, UL 94	UL E41613a

**Organismo de Certificação /
Certification Body**

UL do Brasil Certificações

Av. Engenheiro Luís Carlos Berrini, 105 – 24º Andar
São Paulo – SP – Brasil - 04571-010
T: 55.11.3049.8300 / W: brazil.ul.com

81-IC-F0033 rev 12.0

CERTIFICADO DE CONFORMIDADE

CERTIFICATE OF CONFORMITY

Certificado No. / Certificate No. **UL-BR 22.1054**

Data de Emissão / Date of issue **08 de Abril de 2022 / April 08, 2022**

Página / Page **3/22**

Certificado de conformidade válido somente acompanhado das páginas de 1 até 22

Certificate of conformity valid with pages from 1 to 22

Componente/ Component	Fabricante/ Manufacturer	Tipo/Modelo Type/Model	Características técnicas/ Technical data	Norma/ Standard	Marca de conformidade/ Mark(s) of conformity
Plastic Front Panel (Alternative)	SABIC INNOVATIVE PLASTICS B V	C6600(GG)(X) (VS)	V-2, 60°C, min. 1.0mm thickness.	UL 746C, UL 94	UL E45329
Plastic Front Panel (Alternative)	DONGGUAN HINGLONG PLASTIC TECHNOLOGY CO LTD	HL-ABSPCR35/ 65/85	HB, 60°C, min. 1.6mm thickness.	UL 746C, UL 94	UL E345434
Plastic Front Panel (Alternative)	Interchangeable	Interchangeable	HB or better, min. 1.5 mm thickness.	UL 746C, UL 94	UL certified
Plastic Front Panel (Dust Cover) (Optional)	Interchangeable	Interchangeable	HB or better, min. 0.80 mm thickness.	UL 746C, UL 94	UL certified
Plastic Stand (Optional)	Interchangeable	Interchangeable	HB or better, min. 0.80 mm thickness.	UL 746C, UL 94	UL certified
Plastic Front Panel and battery box plastic Enclosure (Alternative)	Interchangeable	Interchangeable	HB or better, min. 1.5 mm thickness. Min. 95°C	UL94:2013	UL approved
4. PWB	Interchangeable	Interchangeable	Min V-1, min 105 degree C	UL796	UL
5. Built-in Power Supply	FSP Group Inc.	FSP180- 20TGBAA	I/P: 100-240Vac, 3.0A, 50/60Hz; O/P: +12V/15.0A, -12V/0.2 A, 180W	UL 60950-1, IEC/EN 60950-1	TUV CB Cert. No. JPTUV- 062658
5a. Built-in Power Supply (alternate)	Shenzhen Huntkey Electric Co., Ltd.	HK280-72PP, HK280-72PP xy (x=A-Z or blank, y=0-9 or blank)	I/P: 100-240Vac, 3.0A, 50/60Hz; O/P: +12V/15A, -12V/0.2 A, max. 180W; +12V: max. 180W; -12V: max. 2.4W.	UL 60950-1, IEC/EN 60950-1	TUV CB Cert. No. SG-OF- 12495
5b. Built-in Power Supply (alternate)	FSP Group Inc.	FSP210- 20TGBAA FSP180- 20TGBAB FSP210- 20TGBAB	I/P: 100-240Vac, 3.0A, 50/60Hz; O/P: +12V/17.5A, -12V/0.2 A, 210W Altitude: up to 5000m	UL 60950-1, IEC/EN 60950-1	TUV CB Cert. No. JPTUV - 062658 No.: JPTUV 067200 M1
5c. Built-in Power Supply (alternate)	Acbel Polytech Inc.	PCE025	I/P: 100- 240Vac, 3.0A, 50/60Hz; O/P: +12V/17.5A, -12V/0.2 A; Total power 210W max.	UL 60950-1, IEC/EN 60950-1	TUV CB Cert. No. JPTUV- 062130
5d. Built-in Power Supply (alternate)	Shenzhen Huntkey Electric Co., Ltd.	HK310-71PP, HK310-71PP xy (x=A-Z or blank, y=0-9 or blank)	I/P: 100-240Vac, 3.0A, 50/60Hz; O/P: +12V/17.5A, -12V/0.2 A; Max 210W; +12V: max. 210W; - 12V: Max. 2.4W	UL 60950-1, IEC/EN 60950-1	TUV CB Cert. No. SG-OF- 12494
5e. Built-in Power Supply (alternate)	Lite-On Technology Corporation	PA-2221-3XX (X can be any character or blank)	I/P: 100-240Vac, 3A, 50/60Hz; O/P: +12V/17.5A, -12V/0.2 A, continuous total DC output power 210W max.	UL 60950-1, IEC/EN 60950-1	TUV CB Cert. No. JPTUV - 062750
Built-in Power Supply	Lite-On Technology Corporation	PA-1650-72	Input: AC 100-240V;50-60Hz;1.8A; Class I Output: DC 20V;3.25A	IEC/EN 60950-1	CB Cert. No.: JPTUV-044694 GS Cert. No.: S 50233068 0001
Built-in Power Supply	Lite-On Technology Corporation	PA-1900-72	Input: AC 100-240V;50-60Hz;1.5A; Class I Output: DC 20V;4.5A	IEC/EN 60950-1	TUV CB Cert. No. JPTUV- 044681 GS Cert. No.: S 50232721 0001

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Built-in Power Supply	DELTA ELECTRONICS INC	ADP-90XD B ADP-65FD B	Input: AC 100-240V;50-60Hz;1.5A; Class I Output: DC 20V;4.5A Input: AC 100-240V, 1.5A, 50- 60Hz; Output: DC 20V, 3.25A; Altitude: up to 5000m	IEC/EN 60950-1	UL CB Cert. No.DK-27369-A1- UL GS Cert. DK-39157- UL.No.:S1 50234916 UL E131881
6. DC Fan (For CPU)	DELTA ELECTRONICS INC	AFB0812SH- 9N07	12Vdc, 0.51A, 64.5CFM	UL507, IEC60950-1	VDE
DC Fan (For CPU)	SUNONWEALT H ELECTRIC MACHINE INDUSTRY CO LTD	EF90151BXC01C- S9A	DC 12V, 0.771A, 19.0CFM	UL 507, IEC/EM 60950-1	UL E77551 TUV R 50275749
6a. DC Fan (For CPU) (alternate)	Foxconn Technology Co., Ltd.	PVA080G12Q -P01-AD	12Vdc, 0.65A, 66.09CFM	UL507, IEC60950-1	TUV
6b. DC Fan (For CPU) (alternate)	ASIA VITAL COMPONENTS CO LTD	DS08025T12 UP199DS08025R12 UP227 DS08025R12UP241 DS08025R12UP242	12Vdc, 0.7A, 64.44CFM	UL507, IEC60950-1	TUV UL E158191 & tested in appliance
6c. DC Fan (For CPU) (alternate)	SHENZHEN DONGWEIFENG ELECTRONIC TECHNOLOGY CO LTD	EF(X)-08E12(Y)(Z), where (X) may be S, H, B, C or F, (Y) may be W, (Z) may be blank, may be – WWWW, W can be 0 to 9 or A to Z EFH 08E12WGP01	12Vdc, 0.7A, 64.9CFM	UL507, IEC60950-1	TUV
6d. DC Fan (For CPU) (alternate)	Interchangeable	Interchangeable	12Vdc, 0.7A max., 64.44CFM min. 12Vdc, max 1.0A, min. 18CFM 12Vdc, 0.7A, 64.4CFM	UL507, IEC60950-1 UL 507:1999& IEC 60950-1: 2005+A1:2009 EN 60950 1:2006+A11:2009+ A1:2010+A12:2011	TUV UL, S & other EU certification Marks
DC Fan (For CPU) (Alternative)	ASIA VITAL COMPONENTS CO LTD	BAZA0814B2U P001	12Vdc, 1.0A, 18CFM	UL 507 IEC/EN 60950-1	UL E231557 & tested in appliance
7. DC Fan (For System)	Foxconn Technology Co., Ltd.	PVA080G12Q -(X)YY-YY, Where (X) may be F, R or X, X may be from 0 to 9, from A to Z or blank; Y may be from 0 to 9, from A to Z or blank	12Vdc, 0.65A, 65CFM	UL507, IEC60950-1	TUV
7a. DC Fan (For System) (alternate)	DELTA ELECTRONICS INC	AFB0812SHAA38	12Vdc, 0.6A, 64CFM	UL507, IEC60950-1	TUV
7b. DC Fan (For System) (alternate)	Interchangeable	Interchangeable	12Vdc, 0.65A max., 64CFMmin. 12V dc, 0.60A, 64.5CFM	UL507, IEC60950-1	TUV UL, EU Certification Approved

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8. DC Fan (For HDD) (Optional)	Asia Vital Components Co., Ltd.	DS04010R12 (W)(V), where (Z) may be A, B, C, G, S, T, R or P, (W) may be S, U, H, M or L, (V) may be XXXX, where X maybe A through Z, 0 through 9, "-" or blank.	12Vdc, 0.14A, 7.59 CFM	UL507, IEC60950-1	TUV UL E158191 & tested in appliance
8a. DC Fan (For HDD) (Optional) (alternate)	Interchangeable	Interchangeable	12Vdc, 0.14A max., 7.59 CFM min.	UL507, IEC60950-1	TUV UL, EU Certification Approved
DC Fan (For CPU)	DELTA ELECTRONICS INC	BFB0712HBA9 H	12Vdc, 1.0A, 18.5CFM	UL 507 IEC/EN 60950-1	UL E132003 & tested in appliance
DC Fan (For CPU)	AVC	Z8UA0D4001-1 (DS08025R12U P227)	DC 12V, 0.7A, 64.4CFM	UL507	UL E158191
DC Fan (For System Rear) (optional)	AVC	DS08025R12UP241 -1	DC 12V, 0.45A/0.7A max., 64.4CFM min.	UL507	UL E158191
DC Fan (For System Front) (optional)	AVC	DS08025R12UP242 -1	DC 12V, 0.7A max., 64.4CFM min.	UL507	UL E158191
9. Lithium Battery Protection Circuit (for Motherboard, P/N: IQ1X0MS)	-	-	Reverse current protection accomplished by Diode (D2) and 1 kohm resistor (R195).	-	-
10. Optical Device Drive (Optional)	Samsung Electronics Co., Ltd.	TS-H353C	Class 1(I), 5V/12 V dc, 1.5 A or 1.6 A/1.5A or 1.6 A	UL60950-1	UL
Optical Device Drive (Optional)	Philips & Lite- On Digital Solutions Corp	DS-8A8SH	Class 1 laser, 5/12 V dc, 3.0A/1.5 A.	IEC/EN 60825-1& IEC 60950-1	TUV CB Cert. No. JPTUV- 052989
10a. Optical Device Drive (Optional) (alternate)	Interchangeable	Interchangeable	Class 1(I), 5/12 V dc, 3.0/3.0 A max.	UL60950-1; IEC/EN 60950-1	TUV, VDE, Nemko S, CB, UL& other EU certificationmarks
Optical Device Drive (Optional)	Hitachi-LG Data Storage inc.,	CH20N	BD Combo, Class 1 laser, 5/12 V dc, 1.5/1.5 A.	IEC/EN 60825-1	Intertek S Certificate: 911330
Optical Device Drive (Optional)	Sony Optiarc Inc.	DDU1681Sxxx (x can be any alphanumeric or blank or hyhen)	Class 1 laser, DC 5/12 V, 1.5/1.5 A	IEC/EN 608251:2014& IEC 60950-1	CB Certificate: JPTUV 026113
Optical Device Drive (Optional) (Alternative)	Interchangeable	Interchangeable	Class 1 laser, DC 5/12 V, 3.0/3.0 A max. Class III	UL60950-1, IEC/EN 60950-1, IEC/EN 60825-1	UL,S & other EU certification marks
11. Hard Disk (Optional)	Seagate Technology Inc.	ST1000DM003	12 V/5 V dc, 1.5A max	UL60950-1	UL
Hard Disk Drive (Optional)	Western Digital Technologie Inc	WD5000AAKX	5 V/12 V dc, 1.0A/0.95 A max.	Applicable parts of IEC/EN 60950-1	UL E101559 & tested in appliance
Hard Disk (Optional)	Seagate Technology, Incorporated	ST3 series	5 V/12 V dc, 0.72 A/0.52 A max. DC 5 V/12 V, 1.5 A/ 1.5 A max.	UL 60950- 1& IEC/EN 60950-1	UL E106814 & tested in appliance

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Hard Disk (Optional)	Seagate Technology, Incorporated	ST500DM002	12 V/5 V dc, 1.5A max	UL60950-1	--
Hard Disk (Optional)	Seagate Technology, Incorporated	ST3500413AS	12 V/5 V dc, 1.5A max	UL60950-1	--
11a. Hard Disk(Optional) (alternate)	Interchangeable	Interchangeable	5 V/12 V dc, 3.0 A/3.0 A max.	UL60950-1; IEC/EN 60950-1 IEC 60950-1: 2005+A1:2009 EN 60950-1: 2006+A11:2009+A1 :2010+A12:2011	TUV, VDE, Nemko S & other EU certification marks
12. Lithium Battery for RTC	Sony Energy Devices Corp. VIC-DAWN ENTERPRISE CO LTD	CR2032	3 VDC, maximum abnormal charging current 10 mA (Lithium Type) 3.0V/220mAh max continue discharge current: 4mA	UL1642	UL MH20550 & tested in appliance
Lithium Battery for RTC (Alternative)	PANASONIC CORPORATION, PANASONIC CORPORATION OF NORTH AMERICA	CR2032	3V/225mAh max continue discharge current: 0.2mA	Applicable parts of IEC/EN 60950-1	UL MH12210 & tested in appliance
Lithium Battery for RTC (Alternative)	VIC-DAWN ENTERPRISE CO LTD	CR2032	DC 3 V, Max. abnormal charging current 10 mA	UL 1642 IEC/EN 60950- 1	UL MH20550 & tested with equipment
Lithium Battery for RTC (Alternative)	Shun Wo New Power Battery Technology Ltd.	CR2032	DC 3 V, Max. abnormal charging current 10 mA	UL 1642	--
Lithium Battery for RTC (Alternative)	Hitachi Maxell Ltd	CR2032	DC 3 V, Max. abnormal charging current 10 mA	UL 1642	--
Lithium Battery for RTC (Alternative)	Toshiba Home Appliances Corp	CR2032	DC 3 V, Max. abnormal charging current 10 mA	UL 1642	--
Lithium Battery for RTC (Alternative)	Wuhan Lixing (Torch) Power Source Co Ltd	CR2032	DC 3 V, Max. abnormal charging current 10 mA	UL 1642	--
Lithium Battery for RTC (Alternative)	Jihh Hong Technology Co Ltd	CR2032	DC 3 V, Max. abnormal charging current 10 mA	UL 1642	--
12a. Lithium Battery for RTC (alternate)	Interchangeable	Interchangeable	3 V dc, maximum abnormal charging current 10 mA (Lithium Type)	UL1642	UL
13. Poly Switch (F3,F4,F6,F7,F8, F12)	BOURNS ELECTRONICS (TAIWAN) LTD	MF-USMF110 MF-NSMF200 MF-MSMF260 MF-PSML260	PTC, rated 6Vdc, holding current: 1.1 A, trip current: 2.2A 6Vdc, holding current: 2.6A, trip current: 5.2A PTC, rated 6V dc, holding current: 2.6 A, trip current: 5.0 A	UL1434	UL UL E174545 & tested in appliance
13a. Poly Switch (F3,F4,F6,F7,F8, F12) (alternate)	TYCO ELECTRONICS CORP	microSMD110 F-2	PTC, rated 6V dc, holding current: 1.1 A, trip current: 2.2 A	UL1434	UL E74889 & tested in appliance
Poly Switch (F1,SF2,SF8)	TYCO ELECTRONICS CORP	nanoSMDC110 F	PTC, 6V dc, 1.1A, tripping current:2.2A	UL 1434& IEC/EN 60950-1	UL E74889 & tested in appliance

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13b. Poly Switch (F3,F4,F6,F7,F8, F12) (alternate)	POLYTRONICS TECHNOLOGY CORP	SMD1210P11 0TFT SMD1812P260T SPR-P260T SMD1206P110TFT	PTC, rated 8V dc, holding current: 1.1 A, trip current: 2.2 A 8Vdc, holding current: 2.6A, trip current: 5A PTC, rated 6Vdc, holding current: 2.6A, trip current: 5.2A DC 6V, holding current: 1.1A, trip current: 2.2A	UL1434	UL E201431 & tested in appliance
14. Poly Switch (F1, F2, F5, SF2,SF8, SF3,SF5)	BOURNS ELECTRONICS (TAIWAN) LTD	MF-NSML300 MF-NSMF110 MF-NSMF110-2	PTC, 6 V dc, holding current: 3 A, tripping current: 6A PTC, 6V dc, 1.1A, tripping current:1.8A DC 6V, holding current: 1.1A, trip current: 2.2A	UL1434& IEC/EN 60950-1	UL E174545 & tested in appliance
Poly Switch F1,F2,F3 (Alternative)	LITTELFUSE	1206L110THYR	DC 8V, holding current: 1.1A, trip current: 2.2A	UL1434	UL E183209
14a. Poly Switch (F1,F5, F7,SF2,SF8) (alternate)	LITTLEFUSE INC.	1206L300SL WR 1206L110 1812L260TH 0805L260ULTHYR 1206L200, 1206L200PR	PTC, 6 V dc, holding current: 3 A, tripping current: 6 A PTC, 6V dc, 1.1A, tripping current:2.2A 8VDC, holding current 2.6A, trip current 5A	UL1434& IEC/EN 60950-1	UL E183209 & tested in appliance
Poly Switch (F4, F5, F8) (alternate)	LITTELFUSE INC	1210L110THYR	PTC, rated 8V dc, holding current: 1.1 A, trip current: 2.2 A	UL1434	UL
Poly Switch F7 (Alternative)	LITTELFUSE	MF-MSMF260-2	DC 6V, holding current: 2.6A, trip current: 5.2A	UL1434	UL E174545
Poly Switch (U36 U37 U69 U71 for USB) (Alternative)	ANPEC	APL3518ABITRG	DC 5.5V, Holding Current : 2A, trip - Current: 3.6A	UL Subject 2367	UL E328191
15. IC Switch (U36, U37,U51, U52,U57, U59, U69, U71, U88)	UPI SEMICONDUCTOR CORP	UP7549TMA5 -25	2.7 to 5.5Vdc, Cont. current: 2A; 6 Vdc, holding current: 2A trip current: 3.1-5A	UL1434	UL E316940 & tested in appliance
15a. IC Switch (U51, U52, U57, U59) (alternate)	NIKO SEMICONDUCTOR CO LTD	GS7612S5MN GS7612S5MNR	2.0-5.5Vdc, Cont. current: 2A; Prot. current: 5A 5.5 Vdc, holding current : 3.2A, trip current: 5.0A	UL2367	UL E360303 & tested in appliance
IC Switch (U3 on optional USB type C module)	Global Mixedmode Technology Inc	G517AL	2.7-5.5Vdc, Cont. Current: 0.1A-2.15A; Prot. current: 0.2A-2.75A	IEC/EN 60950-1	TUV CB Cert. No. JPTUV-071444
16.Heat sink (above CPU)	-	-	Consist of Aluminum part, overall	-	-
17. Heat sink (above South Bridge chipset)	-	-	Consist of Aluminum part, overall	-	-
18. Insulating tubing/Sleeving	Interchangeable	Interchangeable	FEP, PTFE, PVC, TFE, neoprene, polyimide or marked VW-1 or FT-1; 105 degree C, 300 V.	UL224	UL
19. Wiring, Internal secondary ELV/SELV Circuits	Interchangeable	Interchangeable	FEP, PTFE, PVC, TFE, neoprene, polyimide or marked VW-1 or FT-1; min 30 V, 60 or 80 degree C.	UL758	UL
20. Interconnecting Cable (Optional)	Interchangeable	Interchangeable	60 degree C min., 60 V min., 3.05 m long max, VW-1 or FT-1	UL758	UL
21. Internal Plastic Part Materials	Interchangeable	Interchangeable	V-2 min.	UL94, UL746C	UL
22. Connectors And Receptacles (Secondary ELV/SELV circuits)	Interchangeable	Interchangeable	Copper alloy pins housed in bodies of plastic rated V-2 min.	UL94, UL746C	UL

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22a. Connectors And Receptacles (Secondary ELV/SELV circuits) (alternate)	Interchangeable	Interchangeable	plastic rated V-2 min.	UL498,UL1977	UL
23. Power Supply Cord	Interchangeable	Interchangeable	----	NBR 14136, NBR NM 60884-1	INMETRO
Power Supply Cord (Optional)	Interchangeable	Interchangeable	Type SVT or SPT-2, minimum 18 AWG, min 250 V, 6 A. One end with NEMA 5-15P. Other end in appliance coupler	UL62+ UL498, UL817,IEC607 99	--
24. Graphics card	Shenzhen Bitland Information Technology Co., Ltd.	BD3E56 BD3F09 BD3G10 (P/N: GT 730) BD3E32(Marketing Name: GTX 750Ti) BD3F86 (P/N: GT 730)	DC 12V, 5.5Amax; and DC 3.3V, 3A max; Class III DC 12V; 3.3V; Class III DC 3.3V,3A; 12V,5.5A max(optional); Class III	UL 60950-1, IEC/EN 60950-1	TUV CB Cert. No. JPTUV-059969 and JPTUV-063517-M1 JPTUV-076247
24a. Graphics card (Alternate)	Micro-Star Int'l Co., Ltd.	V313 V338 (P/N: GT 730)	DC 3.3V; 12V(optional); Class III	UL 60950-1, IEC/EN 60950-1	TUV CB Cert. No. JPTUV-059127 TUV CB Cert. No.JPTUV-068607
24b. Graphics card (Alternate)	Interchangeable	Interchangeable	DC 3.3V; 12V(optional); Class III DC 12V, 5.5A max. or DC 3.3V, 3A max., Class III, 41W	UL 60950-1, IEC/EN 60950-1	TUV, VDE, Nemko UL, EU Certification Approved
24c. Graphics Card	NVIDIA CORP	P2012 (P/N: K420)	PCI-E interface, DVI and DISPLAY output ports.	-	-
Graphics Card	NVIDIA CORP	Quadro420	DC 12V, 5.5A max. or DC 3.3V, 3A max., Class III, 41W	IEC/EN 60950-1	Tested in appliance
24c-1. PWB	Interchangeable	Interchangeable	V-1 or better, min. 105 degree C	UL796	UL
24c-2. DC Fan	Interchangeable	Interchangeable	min. 3.03 CFM	UL507, IEC60335, , IEC60950-1	UL, TUV
24c-3. IC switch (U506) for DISPLAY	ANPEC ELECTRONICS CORP	APL3516AKITRG	Rated 2.9 to 3.7 V dc, holding current: 0.9A, tripping current:1.7A	UL2367	UL
25. Plastic Base	Interchangeable	Interchangeable	min. HB	UL94, UL746C	UL
USB Power Switch SF3,SF5) (Alternate)	POLYTRONICS TECHNOLOGY CORP	SMD1206P300 SLR(\$)	PTC, 6 V dc, 3A, tripping current:6A	UL 2367& IEC/EN 60950-1	UL E201431 & tested in appliance
USB Power Switch SU1,SU34)	Nuvoton Technology Corp	NCT3955Y	Input Voltage Range, V dc 4.5 V - 5.5 V Continuous Output Rating, A per output 2.5 A Protective Current Rating, A +3.5 A	IEC/EN 60950-1	TUV CB Cert SG-OF-12624
USB Power Switch (SU1,SU34) (Alternate)	PERICOM TECHNOLOGY (SHANGHAI)CO LTD	PI5USB2546ZH E	Input Voltage: 4.5 - 5.5 Vdc; Continuous Rating: 30 mA to 2.5 A Current Limit:100 mA to 3.18 A	IEC/EN 60950-1	UL CB Cert. No.US-24707-UL
USB power switch (SU69)	TEXAS INSTRUMENTS INC	TPS2546	Rated: DC 4.5-5.5V, holding current: 2.5A, trip current: 3.1A	UL 1434 & IEC/EN 60950-1	UL E169910 & tested with equipment
	Interchangeable	Interchangeable			

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PCB for motherboard	GOLDEN ELITE TECHNOLOGY (SHEN ZHEN) LTD	GE-1	V-0, min. 1.5mm, 130 °C	UL796 & IEC/EN 60950-1	UL E307069 & tested in appliance
PCB for motherboard (Alternative)	Interchangeable	Interchangeable	V-1 or better, min. 1.5mm, min. 105 °C	UL796 :2010	UL approved
PCB for battery box	TRUSTECH ELECTRONICS (SHENZHEN) CO LTD	CL-2	V-0, min. 1.5mm, 130 °C	UL796, IEC/EN 60950-1	UL E241819 & tested in appliance
PCB for battery box (Alternative)	Interchangeable	Interchangeable	V-1 or better, min. 1.5mm, min. 130 °C/ 105° C	UL796:2010	UL approved
PCB	CHUAN YICOMPUTER (SHENZHEN) CO LTD	CM-4	V-0, min. 1.5mm, 130 °C	Applicable parts of IEC/EN 60950-1	UL E162264 & tested in appliance
PCB	HANNSTAR BOARD CORP	MV-4	V-0, min. 1.5mm, max. 130°C	UL 94, UL 796	UL E89382
PCB (Alternative)	PALWONN ELECTRONICS (SHENZHEN) CO LTD	M3	V-0, min. 1.5mm, 130 °C	Applicable parts of IEC/EN 60950-1	UL E230435 & tested in appliance
PCB (Alternative)	HANNSTAR BOARD CORP	MV-1	V-0, min. 1.5mm, 130 °C	UL 796	UL E89382
Li-ion Battery Pack (Optional)	SONY TAIWAN LTD	45N1040	10.8 Vdc, 2.9 Ah / 32 Wh	IEC/EN 60950-1	UL CB report.No. E236872- A131-CB-2
Rubber	Interchangeable	Interchangeable	Min V-1, Min 1.0mm thick, filled in the metal enclosure bottom openings as part of fire enclosure.	UL94, UL746C	UL

Seção 75:

Componente/ Component	Fabricante/ Manufacturer	Tipo/Modelo Type/Model	Características técnicas/ Technical data	Norma/ Standard	Marca de conformidade/ Mark(s) of conformity
01. Cord set (Optional)	Interchangeable	Interchangeable	---	NBR 14136, NBR NM 60884-1	INMETRO
02. Interconnecting Cable (optional)	Interchangeable	Interchangeable	Max. 3.05m long, rated VW-1 or FT-1 or better.	UL758, UL1675, UL444	UL, --
02a. Interconnecting Cable (optional) - alternate	Interchangeable	Interchangeable	Maximum 3.05m long, type CMP, CMR, CMG, CM.	UL444	--, UL
02b. Interconnecting Cable (optional) - alternate	Interchangeable	Interchangeable	With RJ-45 type connector.	UL1863	--, UL
03. Label	Interchangeable	Interchangeable	Min. 60 degree C, suitable for the surface supplied.	UL969	UL, --
03a. Label - alternate	Interchangeable	Interchangeable	Molded as part of enclosure, Hot stamping, laser etching or silk screened.	--	--, --
04. Wiring, Internal (Secondary SELV circuits)	Interchangeable	Interchangeable	FEP, PTFE, PVC, TFE, neoprene, polyimide or marked VW-1 or FT-1; 80 degree C, Min. 30Vdc.	UL758	UL, --
05. Connectors and Receptacles (Secondary ELV/SELV circuits)	Interchangeable	Interchangeable	Metal/ Copper alloy pins housed in bodies of plastic rated Min. V-2.	UL94	UL, --
05a. Connectors and Receptacles (Secondary ELV/SELV circuits) - alternate	Interchangeable	Interchangeable	--	UL1977, UL498	UL, --

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05b. Connectors and Receptacles (Secondary ELV/SELV circuits) - alternate	Interchangeable	Interchangeable	Flammability level is ignored, when small parts (Max. 4g or Max. 1750mm ³) are mounted on V-1 class material.	--	--, --
05c. Connectors and Receptacles (Secondary ELV/SELV circuits) - alternate	Interchangeable	Interchangeable	Flammability level is ignored, when small parts (Max. 4g or Max. 1750mm ³) are separated from electrical parts (other than insulated wires and cables) by at least 13mm of air or by a solid barrier of V-1 class material.	--	--, --
06. Internal Plastic Parts Materials	Interchangeable	Interchangeable	Min. V-2, or Min. HF-2.	UL94	UL, --
06a. Internal Plastic Parts Materials (optional) - alternate	Interchangeable	Interchangeable	Min. HB or HBF, when foamed plastic parts are separated from electrical parts (other than insulated wires and cables) by at least 13mm of air or by a solid barrier of V-1 class material.	UL94	UL, --
06b. Internal Plastic Parts Materials (optional) - alternate	Interchangeable	Interchangeable	The combination, when one or more layers of thin insulating material used on the surface application, comply with V-2 class material within the fire enclosure.	--	--, --
06c. Internal Plastic Parts Materials (optional) - alternate	Interchangeable	Interchangeable	Flammability level is ignored, when small parts (Max. 4g or Max. 1750mm ³) are mounted on V-1 class material.	--	--, --
06d. Internal Plastic Parts Materials (optional) - alternate	Interchangeable	Interchangeable	Flammability level is ignored, when small parts (Max. 4g or Max. 1750mm ³) are separated from electrical parts (other than insulated wires and cables) by at least 13mm of air or by a solid barrier of V-1 class material.	--	--, --
07. Insulating Tubing/ Sleeveing	Interchangeable	Interchangeable	FEP, PTFE, PVC, TFE, neoprene, polyimide or marked VW-1 or FT-1.	UL224	UL, --
08. Printed Wiring Board (PWB)	Interchangeable	Interchangeable	Min. V-1, Min. 105 degree C.	UL796	UL, --
09. Enclosure	--	--	Metal, Min. 0.6mm thick. See enclosure 4-01 for detail.	--	--, --
09-01. Enclosure (Front Bezel & Rear side)	Interchangeable	Interchangeable	HB or better.	UL94	UL, --
10. Foot Rubber (filled in metal enclosure)	Interchangeable	Interchangeable	V-1 or better, min. 1.0mm thickness, filled in the metal enclosure bottom openings as part of fire enclosure.	UL94, UL746C	UL, --
11. Power supply (for unit with rating 3.25A)	DELTA ELECTRONICS INC	ADP-65FD B	Input: 100-240Vac, 1.5A, 50-60Hz; Output: 20Vdc, 3.25A; 40 degree C, LPS, Altitude of operation Up to 5000m.	UL60950-1, IEC60950-1	UL (E131881), CB by UL (DK-39157-UL)
11a. Power supply (for unit with rating 3.25A) - alternate	LITE-ON TECHNOLOGY CORP	PA-1650-72	AC Input: 100-240Vac, 50-60Hz, 1.8A; DC Output: 20Vdc/ 3.25A; 40 degree C, LPS, Altitude of operation Up to 5000m.	UL60950-1, IEC60950-1	UL (E132068), CB by TUV RH (JPTUV-057469)
11b. Power supply (for unit with rating 3.25A) - alternate	CHICONY POWER TECHNOLOGY CO LTD	A17-065N2A	Input: 1.8A 100-240V~ 50-60Hz; Output: 3.25A, 20V; 40 degree C, LPS, Altitude of operation Up to 5000m.	UL60950-1, IEC60950-1	UL (E143709), CB by Nemko (NO99354)
11c. Power supply (for unit with rating 3.25A) - alternate	Interchangeable	Interchangeable	Output: 20Vdc, min. 3.25A; 35 degree C min., Altitude of operation Up to 5000m.	UL60950-1, IEC60950-1	UL, CB
11d. Power supply (for unit with rating 3.25A or 4.5A) - alternate	DELTA ELECTRONICS INC	ADP-90XD B	Input: AC 100-240V, 1.5A, 50-60Hz; Output: 20Vdc/4.5A; 40 degree C, Altitude of operation Up to 5000m.	UL60950-1, IEC60950-1	UL (E131881), CB by UL (DK-39163-UL)
11e. Power supply (for unit with rating 3.25A or 4.5A) - alternate	LITE-ON TECHNOLOGY CORP	PA-1900-72	I/P: 100-240Vac, 50-60Hz, 1.5A O/P: 20Vdc, 4.5A; 40 degree C, Altitude of operation Up to 5000m.	UL60950-1, IEC60950-1	UL (E132068), CB by TUV RH (JPTUV-044681-M2)

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11f. Power supply (for unit with rating 3.25A or 4.5A) - alternate	Interchangeable	Interchangeable	Output: 20Vdc, min. 4.5A; 35 degree C min., Altitude of operation Up to 5000m.	UL60950-1, IEC60950-1	UL, CB
11g. Power supply - alternate	DELTA ELECTRONICS INC	ADL135NDC3A	Input: 100-240V~, 1.5A, 50-60Hz; Output: 20Vdc, 6.75A; 40 degree C, LPS, Altitude of operation Up to 5000m.	UL60950-1, IEC62368-1	UL (E131881), CB by UL (DK-63818-UL)
11h. Power supply - alternate	LITE-ON TECHNOLOGY CORP	ADL135NLC3A	Input: 100-240Vac, 50-60Hz, 2.5A; Output: 20Vdc, 6.75A; 40 degree C, Altitude of operation Up to 5000m.	UL60950-1, IEC60950-1	UL (E132068), CB by TUV RH (JPTUV-062043)
11i. Power supply - alternate	Interchangeable	Interchangeable	Output: 20Vdc, min. 6.75A; 35 degree C min., Altitude of operation Up to 5000m.	UL60950-1, IEC60950-1	UL, CB
12. Hard Disk (optional)	SEAGATE TECHNOLOGY L L C	ST3	12Vdc, 1.5A maximum, 5Vdc, 1.5A maximum.	UL60950-1, IEC60950-1	UL (E106814), --
12a. Hard Disk (optional) - alternate	Interchangeable	Interchangeable	5/12 V dc, 3.0/3.0A max.	UL60950-1, IEC60950-1	UL, --
13. Optical Disk Drive (optional)	LG ELECTRONICS INC	GUAx#, GUCx#, GUEx# DUCx#, DUEx#	DC 5V, 1.5A, Class III, CLASS 1 LASER PRODUCT.	UL60950-1	UL (E119002), --
13a. Optical Device Drive (optional) - alternate	Interchangeable	Interchangeable	Class 1 laser, 5/12Vdc, 3.0/3.0A max. Class III.	UL60950-1	UL, --
14. CPU Fan	FOXCONN TECHNOLOGY CO LTD	PVB070E12H-P01	12V, 0.95A, 17.5CFM.	UL507	UL (E231557), --
14-01. Heat sink for CPU fan	--	--	Consist of Aluminum part, overall see enclosure 4-04 for details.	--	--, --
14a. CPU Fan - alternate	ASIA VITAL COMPONENTS CO LTD	BAZA0817R2UP003	12V, 0.80A, 20.3CFM.	UL507	UL (E158191), --
14a-01. Heat sink for CPU fan	--	--	Consist of Aluminum part, overall see enclosure 4-02 for details.	--	--, --
14b. CPU Fan - alternate	DELTA ELECTRONICS INC	BUC0812VD-02	12V, 1.60A, 20.25CFM.	UL507, IEC60950-1	UL (E132003), TUV RH
14b-01. Heat sink for CPU fan	--	--	Consist of Aluminum part, overall see enclosure 4-03 for details.	--	--, --
14c. CPU Fan - alternate	Interchangeable	Interchangeable	Max. 12Vdc, 1.60A max., min. 17.5CFM.	UL507	UL, --
15. Mother Board	Interchangeable	IQ3X0IL	--	--	--, --
15-01. RTC Battery	PANASONIC CORPORATION, PANASONIC CORPORATION OF NORTH AMERICA	CR2032*	3Vdc, maximum abnormal charging current 10mA, user replaceable against charging current by multiple components PD203 and PR224 rated 1Kohm.	UL1642	UL (MH12210), --
15-01a. RTC Battery - alternate	VIC-DAWN ENTERPRISE CO LTD	CR2032	3Vdc, maximum abnormal charging current 10mA, user replaceable against charging current by multiple components PD203 and PR224 rated 1Kohm.	UL1642	UL (MH20550), --
15-02. Polyswitch (F2, F10)	BOURNS ELECTRONICS (TAIWAN) LTD	MF-USMF110	6Vdc, I _h =1.1A, I _t =2.2A, CA=1 (max. 110), 2, 3, 4. T _{moa} =85 degree, C2.	UL1434, UL60730-1	UL (E174545), --
15-02a. Polyswitch (F2, F10) - alternate	LITTELFUSE INC	MICROSMD110F-2	6Vdc, I _h =1.1A, I _t =2.2A, CA=1 (max. 125), 2, 3, 4. T _{moa} =85 degree, C1.	UL1434, UL60730-1	UL (E74889), --
15-03. USB Polyswitch (U27, U28, U29, U30)	UPI SEMICONDUCTOR CORP	Series uP7549, following by P, Q, R, S, T or U, then following by S8, SA8, M5, MA5, MC5, RA8 or RU8, then following by 25	2.7 to 5.5VDC, Cont.current:2.0A, Prot.current:5.0A, Temp range:-30 degree C to 70 degree C, TNC:1.	UL2367	UL (E316940), --
15-03a. USB Polyswitch (U27, U28, U29, U30) - alternate	POLYTRONICS TECHNOLOGY CORP	AX87, followed by 13, 23, followed by S, B, U8, may be followed by A	2.5 to 5.5VDC, Cont.current:2.0A, Prot.current:3.8A, Temp range:-30 degree C to 70 degree C.	UL2367	UL (E353665), --

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15-04. USB Polyswitch (U59)	TEXAS INSTRUMENTS INC	SN1702001, may be followed by additional suffixes.	Range: 4.5V-5.5V, Cont.current:2.5A, Prot.current:3.1A, Temp Range:-40 to 85 degree C, TNC 1.	UL2367	UL (E169910), --
15-04a. USB Polyswitch (U59) - alternate	ANPEC ELECTRONICSCORP	APL3524QBI-TRG	Range: 4.5V-5.5V, Cont.current:0.15-2.5A, Prot.current:0.275-3.17A, Temp Range:-30 to 70 degree C, TNC 1.	UL2367	UL (E328191), --
15-04b. USB Polyswitch (U59) - alternate	PERICOM SEMICONDUCTOR CORP	PI5USB2546HZHDE	Range: 4.5V-5.5V, Cont.current:0.03-2.5A, Prot.current:0.1-3.18A, Temp Range:-30 to 70 degree C, TNC 1.	UL2367	UL (E340734), --
15-05. USB Polyswitch (U45)	LITTELFUSE INC	AX8714, followed by FL, FH, followed by BTA, BA, SA, or U8A	Range: 2.9V-5.5V, Cont.current:3A, Prot.current:4.2A, Temp Range:-30 to 70 degree C.	UL2367	UL (E353665), --

Seção 76:

Componente/ Component	Fabricante/ Manufacturer	Tipo/Modelo Type/Model	Características técnicas/ Technical data	Norma/ Standard	Marca de conformidade/ Mark(s) of conformity
01. Power Supply Cord (optional)	Interchangeable	Interchangeable	Detachable, Min. 1.5m, Max. 4.5m long, 16 AWG Min. Type SVT or SJT or SPT-2 or NISPT-2 flexible cord, rated Min. 125V, if one end terminated in NEMA 5-15P; rated Min. 250V, if one end terminated in NEMA 6-15P, the other end in an appliance coupler.	UL817, UL62, UL498	UL, --
02. Interconnecting Cable (optional)	Interchangeable	Interchangeable	Max. 3.05m long, rated VW-1 or FT-1 or better.	UL758, UL1675, UL444	UL, --
02a. Interconnecting Cable (optional) - alternate	Interchangeable	Interchangeable	Maximum 3.05m long, type CMP, CMR, CMG, CM.	UL444	--, UL
02b. Interconnecting Cable (optional) - alternate	Interchangeable	Interchangeable	With RJ-45 type connector.	UL1863	--, UL
03. Label	Interchangeable	Interchangeable	Min. 60 degree C, suitable for the surface supplied.	UL969	UL, --
03a. Label - alternate	Interchangeable	Interchangeable	Molded as part of enclosure, Hot stamping, laser etching or silk screened.	--	--, --
04. Wiring, Internal (Secondary SELV circuits)	Interchangeable	Interchangeable	FEP, PTFE, PVC, TFE, neoprene, polyimide or marked VW-1 or FT-1; 80 degree C, Min. 30Vdc.	UL758	UL, --
05. Connectors and Receptacles (Secondary ELV/SELV circuits)	Interchangeable	Interchangeable	Metal/ Coper alloy pins housed in bodies of plastic rated Min. V-2.	UL94	UL, --
05a. Connectors and Receptacles (Secondary ELV/SELV circuits) - alternate	Interchangeable	Interchangeable	--	UL1977, UL498	UL, --
05b. Connectors and Receptacles (Secondary ELV/SELV circuits) - alternate	Interchangeable	Interchangeable	Flammability level is ignored, when small parts (Max. 4g or Max. 1750mm ³) are mounted on V-1 class material.	--	--, --
05c. Connectors and Receptacles (Secondary ELV/SELV circuits) - alternate	Interchangeable	Interchangeable	Flammability level is ignored, when small parts (Max. 4g or Max. 1750mm ³) are separated from electrical parts (other than insulated wires and cables) by at least 13mm of air or by a solid barrier of V-1 class material.	--	--, --

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06. Internal Plastic Parts Materials	Interchangeable	Interchangeable	Min. V-2, or Min. HF-2.	UL94	UL, --
06a. Internal Plastic Parts Materials (optional) - alternate	Interchangeable	Interchangeable	Min. HB or HBF, when foamed plastic parts are separated from electrical parts (other than insulated wires and cables) by at least 13mm of air or by a solid barrier of V-1 class material.	UL94	UL, --
06b. Internal Plastic Parts Materials (optional) - alternate	Interchangeable	Interchangeable	The combination, when one or more layers of thin insulating material used on the surface application, comply with V-2 class material within the fire enclosure.	--	--, --
06c. Internal Plastic Parts Materials (optional) - alternate	Interchangeable	Interchangeable	Flammability level is ignored, when small parts (Max. 4g or Max. 1750mm ³) are mounted on V-1 class material.	--	--, --
06d. Internal Plastic Parts Materials (optional) - alternate	Interchangeable	Interchangeable	Flammability level is ignored, when small parts (Max. 4g or Max. 1750mm ³) are separated from electrical parts (other than insulated wires and cables) by at least 13mm of air or by a solid barrier of V-1 class material.	--	--, --
07. Insulating Tubing/ Sleeveing	Interchangeable	Interchangeable	FEP, PTFE, PVC, TFE, neoprene, polyimide or marked VW-1 or FT-1.	UL224	UL, --
08. Printed Wiring Board (PWB)	Interchangeable	Interchangeable	Min. V-1, Min. 105 degree C.	UL796	UL, --
09. Enclosure	--	--	Metal, Min. 0.6mm thick. See enclosure 4-01 for detail.	--	--, --
09-01. Enclosure (Front Bezel & Rear side)	Interchangeable	Interchangeable	HB or better.	UL94	UL, --
10. Foot Rubber (filled in metal enclosure)	Interchangeable	Interchangeable	V-1 or better, min. 1.0mm thickness, filled in the metal enclosure bottom openings as part of fire enclosure.	UL94, UL746C	UL, --
11. Power supply (for unit with rating 3.25A)	DELTA ELECTRONICS INC	ADP-65FD B	Input: 100-240Vac, 1.5A, 50-60Hz; Output: 20Vdc, 3.25A; 40 degree C, LPS, Altitude of operation Up to 5000m.	UL60950-1, IEC60950-1	UL (E131881), CB by UL (DK-39157-UL)
11a. Power supply (for unit with rating 3.25A) - alternate	LITE-ON TECHNOLOGY CORP	PA-1650-72	AC Input: 100-240Vac, 50-60Hz, 1.8A; DC Output: 20Vdc/ 3.25A; 40 degree C, LPS, Altitude of operation Up to 5000m.	UL60950-1, IEC60950-1	UL (E132068), CB by TUV RH (JPTUV-057469)
11b. Power supply (for unit with rating 3.25A) - alternate	CHICONY POWER TECHNOLOGY CO LTD	A17-065N2A	Input: 1.8A 100-240V~ 50-60Hz; Output: 3.25A, 20V; 40 degree C, LPS, Altitude of operation Up to 5000m.	UL60950-1, IEC60950-1	UL (E143709), CB by Nemko (NO99354)
11c. Power supply (for unit with rating 3.25A) - alternate	Interchangeable	Interchangeable	Output: 20Vdc, min. 3.25A; 35 degree C min., Altitude of operation Up to 5000m.	UL60950-1, IEC60950-1	UL, CB
11d. Power supply (for unit with rating 3.25A or 4.5A) - alternate	DELTA ELECTRONICS INC	ADP-90XD B	Input: AC 100-240V, 1.5A, 50-60Hz; Output: 20Vdc/4.5A; 40 degree C, Altitude of operation Up to 5000m.	UL60950-1, IEC60950-1	UL (E131881), CB by UL (DK-39163-UL)
11e. Power supply (for unit with rating 3.25A or 4.5A) - alternate	LITE-ON TECHNOLOGY CORP	PA-1900-72	I/P: 100-240Vac, 50-60Hz, 1.5A O/P: 20Vdc, 4.5A; 40 degree C, Altitude of operation Up to 5000m.	UL60950-1, IEC60950-1	UL (E132068), CB by TUV RH (JPTUV-044681-M2)
11f. Power supply (for unit with rating 3.25A or 4.5A) - alternate	Interchangeable	Interchangeable	Output: 20Vdc, min. 4.5A; 35 degree C min., Altitude of operation Up to 5000m.	UL60950-1, IEC60950-1	UL, CB
11g. Power supply - alternate	DELTA ELECTRONICS INC	ADL135NDC3A	Input: 100-240V~, 1.5A, 50-60Hz; Output: 20Vdc, 6.75A; 40 degree C, LPS, Altitude of operation Up to 5000m.	UL60950-1, IEC62368-1	UL (E131881), CB by UL (DK-63818-UL)
11h. Power supply - alternate	LITE-ON TECHNOLOGY CORP	ADL135NLC3A	Input: 100-240Vac, 50-60Hz, 2.5A; Output: 20Vdc, 6.75A; 40 degree C, Altitude of operation Up to 5000m.	UL60950-1, IEC60950-1	UL (E132068), CB by TUV RH (JPTUV-062043)
11i. Power supply - alternate	Interchangeable	Interchangeable	Output: 20Vdc, min. 6.75A; 35 degree C min., Altitude of operation Up to 5000m.	UL60950-1, IEC60950-1	UL, CB

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12. Hard Disk (optional)	SEAGATE TECHNOLOGY L L C	ST3	12Vdc, 1.5A maximum, 5Vdc, 1.5A maximum.	UL60950-1, IEC60950-1	UL (E106814), --
12a. Hard Disk (optional) - alternate	Interchangeable	Interchangeable	5/12 V dc, 3.0/3.0A max.	UL60950-1, IEC60950-1	UL, --
13. Optical Disk Drive (optional)	LG ELECTRONICS INC	GUAx#, GUCx#, GUEx# DUCx#, DUEx#	DC 5V, 1.5A, Class III, CLASS 1 LASER PRODUCT.	UL60950-1	UL (E119002), --
13a. Optical Device Drive (optional) - alternate	Interchangeable	Interchangeable	Class 1 laser, 5/12Vdc, 3.0/3.0A max. Class III.	UL60950-1	UL, --
14. CPU Fan	FOXCONN TECHNOLOGY CO LTD	PVB070E12H-P01	12V, 0.95A, 17.5CFM.	UL507	UL (E231557), --
14-01. Heat sink for CPU fan	--	--	Consist of Aluminum part, overall see enclosure 4-04 for details.	--	--, --
14a. CPU Fan - alternate	ASIA VITAL COMPONENTS CO LTD	BAZA0817R2UP003	12V, 0.80A, 20.3CFM.	UL507	UL (E158191), --
14a-01. Heat sink for CPU fan	--	--	Consist of Aluminum part, overall see enclosure 4-02 for details.	--	--, --
14b. CPU Fan - alternate	DELTA ELECTRONICS INC	BUC0812VD-02	12V, 1.60A, 20.25CFM.	UL507, IEC60950-1	UL (E132003), TUV RH
14b-01. Heat sink for CPU fan	--	--	Consist of Aluminum part, overall see enclosure 4-03 for details.	--	--, --
14c. CPU Fan - alternate	Interchangeable	Interchangeable	Max. 12Vdc, 1.60A max., min. 17.5CFM.	UL507	UL, --
15. Mother Board	Interchangeable	Interchangeable	--	--	--, --
15-01. RTC Battery	PANASONIC CORPORATION, PANASONIC CORPORATION OF NORTH AMERICA	CR2032*	3Vdc, maximum abnormal charging current 10mA, user replaceable against charging current by multiple components PD203 and PR224 rated 1Kohm.	UL1642	UL (MH12210), --
15-01a. RTC Battery - alternate	VIC-DAWN ENTERPRISE CO LTD	CR2032	3Vdc, maximum abnormal charging current 10mA, user replaceable against charging current by multiple components PD203 and PR224 rated 1Kohm.	UL1642	UL (MH20550), --
15-02. Polyswitch (F2, F10)	BOURNS ELECTRONICS (TAIWAN) LTD	MF-USMF110	6Vdc, lh=1.1A, It=2.2A, CA=1 (max. 110), 2, 3, 4. Tmoa=85 degree, C2.	UL1434, UL60730-1	UL (E174545), --
15-02a. Polyswitch (F2, F10) - alternate	LITTELFUSE INC	MICROSMD110F-2	6Vdc, lh=1.1A, It=2.2A, CA=1 (max. 125), 2, 3, 4. Tmoa=85 degree, C1.	UL1434, UL60730-1	UL (E74889), --
15-03. USB Polyswitch (U27, U28, U29, U30)	UPI SEMICONDUCTOR CORP	Series uP7549, following by P, Q, R, S, T or U, then following by S8, SA8, M5, MA5, MC5, RA8 or RU8, then following by 25	2.7 to 5.5VDC, Cont.current:2.0A, Prot.current:5.0A, Temp range:-30 degree C to 70 degree C, TNC:1.	UL2367	UL (E316940), --
15-03a. USB Polyswitch (U27, U28, U29, U30) - alternate	POLYTRONICS TECHNOLOGY CORP	AX87, followed by 13, 23, followed by S, B, U8, may be followed by A	2.5 to 5.5VDC, Cont.current:2.0A, Prot.current:3.8A, Temp range:-30 degree C to 70 degree C.	UL2367	UL (E353665), --
15-04. USB Polyswitch (U59)	TEXAS INSTRUMENTS INC	SN1702001, may be followed by additional suffixes.	Range: 4.5V-5.5V, Cont.current:2.5A, Prot.current:3.1A, Temp Range:-40 to 85 degree C, TNC 1.	UL2367	UL (E169910), --
15-04a. USB Polyswitch (U59) - alternate	ANPEC ELECTRONICS CORP	APL3524QBI-TRG	Range: 4.5V-5.5V, Cont.current:0.15-2.5A, Prot.current:0.275-3.17A, Temp Range:-30 to 70 degree C, TNC 1.	UL2367	UL (E328191), --
15-04b. USB Polyswitch (U59) - alternate	PERICOM SEMICONDUCTOR CORP	PI5USB2546HZHDE	Range: 4.5V-5.5V, Cont.current:0.03-2.5A, Prot.current:0.1-3.18A, Temp Range:-30 to 70 degree C, TNC 1.	UL2367	UL (E340734), --

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15-05. USB Polyswitch (U45)	LITTELFUSE INC	AX8714, followed by FL, FH, followed by BTA, BA, SA, or U8A	Range: 2.9V-5.5V, Cont.current:3A, Prot.current:4.2A, Temp Range:-30 to 70 degree C.	UL2367	UL (E353665), --

Seção 78:

Componente/ Component	Fabricante/ Manufacturer	Tipo/Modelo Type/Model	Características técnicas/ Technical data	Norma/ Standard	Marca de conformidade/ Mark(s) of conformity
Cord set (Optional)	Interchangeable	Interchangeable	---	NBR 14136, NBR NM 60884-1	INMETRO
Metal enclosure	Interchangeable	Interchangeable	Overall 89mm x 257mm x 340mm, min. 0.6mm thickness	IEC/EN 60950-1, UL 60950-1	Test with equipment
Plastic Front Panel	KINGFA SCI & TECH CO LTD	GAR-011	HB, min 0.80mm thick.	UL94, UL746C	UL E171666
Plastic Front Panel (Alternative)	BASF SE	GP-22	HB, min 0.80mm thick.	UL94, UL746C	UL E41871
Plastic Front Panel (Alternative)	KINGFA SCI & TECH CO LTD	FLEXBOND-10(n), KFLEX-2(n) (n:two digits to denote 1-50% Mineral Filler Content)	HB, min 0.80mm thick.	UL94, UL746C	UL E171666
Plastic Front Panel (Alternative)	KINGFA SCI & TECH CO LTD	JH960 6(M), JH960 6(M) (ccc) (##), JH960-6(M) (ccc) (##) (M: three digits to represent customer reference number; ccc: any combinations of any letters excluding a letter "X" and/or any numerals for their special application may or may not follow; ##:ten digits maximum by a combination of letters and/or numbers as color code.)	HB, min 0.80mm thick.	UL94, UL746C	UL E171666
Plastic Front Panel (Alternative)	Interchangeable	Interchangeable	HB or better, min. 0.8 mm thickness.	UL 94, UL 764C	UL approved
Plastic Front Panel (Dust Cover) (Optional)	KINGFA SCI & TECH CO LTD	GAR-011	HB, min 0.80mm thick.	UL94, UL746C	UL E171666
Plastic Front Panel (Dust Cover) (Optional) (Alternative)	BASF SE	GP-22	HB, min 0.80mm thick.	UL94, UL746C	UL E41871
Plastic Front Panel (Dust Cover) (Optional) (Alternative)	KINGFA SCI & TECH CO LTD	FLEXBOND-10(n), KFLEX-2(n) (n:two digits to denote 1-50% Mineral Filler Content)	HB, min 0.80mm thick.	UL94, UL746C	UL E171666

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Plastic Front Panel (Dust Cover) (Optional) (Alternative)	KINGFA SCI & TECH CO LTD	JH960 6(M), JH960 6(M) (ccc) (##), JH960-6(M) (ccc) (##) (M: three digits to represent customer reference number; ccc: any combinations of any lettersexcluding a letter "X" and/or any numerals for their special application may or may not follow; ##:ten digits maximum by a combination of letters and/or numbers as color code.)	V-0, min 0.80mm thick.	UL94, UL746C	UL E171666
Plastic Front Panel (Dust Cover) (Optional) (Alternative)	Interchangeable	Interchangeable	HB or better, min. 0.8 mm thickness.	UL 94, UL 764C	UL approved
PCB	CHUAN YI COMPUTER (SHENZHEN)CO LTD	CM-4	V-0, 130 °C	UL796, UL94, UL764A	UL E162264
PCB (Alternative)	PALWONN ELECTRONICS (SHENZHEN)CO LTD	M3	V-0, 130 °C	UL796, UL94, UL764A	UL E230435
PCB (Alternative)	Interchangeable	Interchangeable	V-1 or better, min.105 °C	UL796, UL94, UL764A	UL approved
PCB for PCI USB Card	CHUAN YI COMPUTER (SHENZHEN)CO LTD	CM-4	V-0, 130 °C	UL796, UL94, UL764A	UL E162264
PCB for PCI USB Card (Alternative)	PALWONN ELECTRONICS (SHENZHEN)CO LTD	M3	V-0, 130 °C	UL796, UL94, UL764A	UL E230435
PCB for PCI USB Card (Alternative)	Interchangeable	Interchangeable	V-1 or better, min.105 °C	UL796, UL94, UL764A	UL approved
Built-in Power Supply	FSP Group Inc.	FSP180-20TGBAB	Input: AC100-240V, 50/60Hz, 3A Output: DC+12V/15A; -12V/0.2A, 180W; Altitude: up to 5000m	IEC/EN 60950-1, UL 60950-1, CAN/CSA-C22.2 No. 60950-1, CAN/CSA-C22.2 No. 60950-22	CB Cert. No.: JPTUV-067200-M1, UL E190414, cUL E190414
Built-in Power Supply (Alternative)	Shenzhen Huntkey Electric Co., Ltd.	HK280-72PP, HK280-72PP xy (x=A-Z or blank, y=0-9 or blank)	Input: AC100-240V, 50/60Hz, 3.0A Output: DC+12V/15A; DC -12V/0.2A; Max.180W; +12V:Max.180W; -12V:Max.2.4W; Altitude: up to 5000m	IEC/EN 60950-1, UL 60950-1, CAN/CSA-C22.2 No. 60950-1, CAN/CSA-C22.2 No. 60950-22	CB Cert. No.: SG-OF-12495, UL E181356, cUL E181356
Built-in Power Supply (Alternative)	Lite-On Technology Corporation	PA-2181-2XX (where X=0-9, A-Z, or – or blank, for marketing purpose only no safety impact)	Input: AC100-240V, 50/60Hz, 4A, class I Output: DC+12V, 15A max., DC-12V, 0.2A max.; Total Power: 180W max.; Altitude: up to 5000m	IEC/EN 60950-1, UL 60950-1, CAN/CSA-C22.2 No. 60950-1, CAN/CSA-C22.2 No. 60950-22	CB Cert. No.: DK-61888-UL, UL E132068, cUL E132068

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Built-in Power Supply (Alternative)	Acbel Polytech Inc.	PCG010	Input: AC100-240V, 50/60Hz, 3.0A; Output: DC+12V, 17.5A, DC-12V, 0.2A, 210W; Altitude: up to 5000m	IEC/EN 60950-1, UL 60950-1, CAN/CSA-C22.2 No. 60950-1, CAN/CSA-C22.2 No. 60950-22	CB Cert. No.: JPTUV-078492, UL E131875, cUL E131875
Built-in Power Supply (Alternative)	FSP Group Inc.	FSP210-20TGBAB	Input: AC100-240V, 50/60Hz, 3A Output: DC+12V/17.5A, -12V/0.2A, 210W; Altitude: up to 5000m	IEC/EN 60950-1, UL 60950-1, CAN/CSA-C22.2 No. 60950-1, CAN/CSA-C22.2 No. 60950-22	CB Cert. No.: JPTUV-067200-M1, UL E151113, cUL E151113
Built-in Power Supply (Alternative)	Shenzhen Huntkey Electric Co., Ltd.	HK310-71PP, HK310-71PP xy ("x" = A to Z or blank, "y" = 0 to 9 or blank, for marketing Purpose only)	Input: AC100-240V, 50/60Hz, 3.0A Output: +12V1/17.5A; -12V/0.2A; Max.210W; +12V:Max.210W; -12V:Max.2.4W; Altitude: up to 5000m	IEC/EN 60950-1, UL 60950-1, CAN/CSA-C22.2 No. 60950-1, CAN/CSA-C22.2 No. 60950-22	CB Cert. No.: SG-OF-12495, UL E181356, cUL E181356
Built-in Power Supply (Alternative)	Lite-On Technology Corporation	PA-2221-3XX (X can be any character or blank)	Input: AC100-240V, 50/60Hz, 3.0A; Output: DC+12V, 17.5A; DC-12V, 0.2A; Altitude: up to 5000m	IEC/EN 60950-1, UL 60950-1, CAN/CSA-C22.2 No. 60950-1, CAN/CSA-C22.2 No. 60950-22	CB Cert. No.: JPTUV-062750, UL E132068, cUL E132068
Built-in Power Supply (Alternative)	Acbel Polytech Inc.	PCE025	Input: AC 100-240V, 3.0A,50/60 Hz; Output: DC +12V/17.5A, -12.0V/0.2A; Altitude: up to 5000m	IEC/EN 60950-1, UL 60950-1, CAN/CSA-C22.2 No. 60950-1, CAN/CSA-C22.2 No. 60950-22	CB Cert. No.: JPTUV-062130-M1, UL E131875, cUL E131875
Built-in Power Supply (Alternative)	Acbel Polytech Inc.	PCH015	I/P: 100-240Vac, 4.0A, 50/60Hz; O/P: +12V1/18.0A, +12V2/18.0A, -12V/0.2 A; total 260W max Altitude: up to 5000m	IEC/EN 60950-1, UL 60950-1, CAN/CSA-C22.2 No. 60950-1, CAN/CSA-C22.2 No. 60950-22	CB Cert. No.: JPTUV-082436-M1, UL E131875, cUL E131875
DC Fan (For CPU)	DELTA ELECTRONICS INC	BUC1012VJ-00DHA	DC 12V, 1.0A, 20.98CFM	UL 507, CSA-C22.2 No. 113	UL E132003, cUL E132003
DC Fan (For CPU) (Alternative)	ASIA VITAL COMPONENTS CO LTD	BAZC0925R2UP006	DC 12V, 0.9A, 24.39CFM	UL 507, CSA-C22.2 No. 113	UL E158191, cUL E158191
DC Fan (For CPU) (Alternative)	Interchangeable	Interchangeable	DC 12V, 1.0A max., 20.98CFM min.	UL 507, CSA-C22.2 No. 113	UL and CSA approved
Optical Device Drive (Optional)	Hitachi-LG Data Storage inc.	CH20N	Class 1 laser, DC 5/12 V, 1.5/1.5 A.	IEC/EN 60825-1	ntertek S Certificate: 911330
Optical Device Drive (Optional) (Alternative)	Interchangeable	Interchangeable	Class 1(I), 5V/12Vdc, 3.0A/3.0A max.	IEC/EN 60825-1	TUV, VDE, Nemko approved
Hard Disk Drive (Optional)	SEAGATE TECHNOLOGY L L C	ST2000DM001	5 V/12 Vdc, 1.5A max	UL 60950-1, CAN/CSA C22.2 No. 60950-1	UL E106814, cUL E106814
Hard Disk Drive (Optional) (Alternative)	Interchangeable	Interchangeable	5 V/12 Vdc, 3.0A/3.0 A max.	UL 60950-1, CAN/CSA C22.2 No. 60950-1, IEC/EN 60950-1	UL and CSA approved , TUV, VDE, Nemko approved

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Solid State Drive (Optional)	Samsung Electronics Co., Ltd.	MZ-W***** (* is 0-9, A-Z or blank or slash or dash. 1st * means Line-up 2nd* means SSD controller 3rd, 4th, 5th * means SSD capacity 6th * means customized design 7th-10th * means customer list reference)	DC 12V, 1.85A or 2.5A	IEC/EN 60950-1, UL 60950-1, CAN/CSA C22.2 No. 60950-1	UL CB Cert. No.: DK-57680-UL, UL E149091, cUL E149091
Solid State Drive (Optional) (Alternative)	Interchangeable	Interchangeable	DC 12V, 2.5A max.	UL 60950-1, CAN/CSA C22.2 No. 60950-1	UL and CSA approved
Lithium Battery for RTC	VIC-DAWN ENTERPRISE CO LTD	CR2032	3 Vdc, maximum abnormal charging current 10 mA (Lithium Type)	UL 1642	UL MH20550
Lithium Battery for RTC (Alternative)	PANASONIC CORPORATION, PANASONIC CORPORATION OF NORTH AMERICA	CR2032	3 Vdc, maximum abnormal charging current 10 mA (Lithium Type)	UL 1642	UL MH12210
Lithium Battery for RTC (Alternative)	MAXELL, LTD	CR2032	3 Vdc, maximum abnormal charging current 10 mA (Lithium Type)	UL 1642	UL MH12568
Poly Switch (F1, F2, F3)	BOURNS ELECTRONICS (TAIWAN) LTD	MF-USMF110	PTC, rated 6Vdc, holding current: 1.1 A, trip current: 2.2 A	UL 1434, CSA-C22.2 No. 72	UL E174545, cUL E174545
Poly Switch (F1, F2, F3) (Alternative)	TYCO ELECTRONICS CORP	microSMD110, microSMD110(11)F	PTC, rated 6V dc, holding current: 1.1 A, trip current: 2.2A	UL 1434, CSA-C22.2 No. 72	UL E74889, cUL E74889
Poly Switch (F1, F2, F3) (Alternative)	POLYTRONICS TECHNOLOGY CORP	SMD1210P110TFT	PTC, rated 8Vdc, holding current: 1.1 A, trip current: 2.2 A	UL 1434, CSA-C22.2 No. 72	UL E201431, cUL E201431
Poly Switch (F1, F2, F3) (Alternative)	LITTELFUSE INC	1210L110THYR, 1210L110TH	PTC, rated 8Vdc, holding current: 1.1 A, trip current: 2.2A	UL 1434, CSA-C22.2 No. 72	UL E183209, cUL E183209
IC Switch (U10, U23, U30, U33, U57, U59 U71, U74)	UPI SEMICONDUCTOR CORP	UP7549TMA5-25	2.7 to 5.5Vdc, Cont. current: 2.0A; Prot. current: 5.0A	UL 2367	UL E316940
IC Switch (U10, U23, U30, U33, U57, U59 U71, U74) (Alternative)	NIKO SEMICONDUCTOR CO LTD	GS7612S5MN, GS7632S5MN, GS7632S5MNR	2.0-5.5Vdc, Cont. current: 2.0A; Prot. current: 5.0A	UL 2367	UL E360303
IC Switch (U10, U23, U30, U33, U57, U59 U71, U74) (Alternative)	TEXAS INSTRUMENTS INC	TPS2001DDBVR, TPS2001	4.5-5.5Vdc, Cont. current: 2.0A; Prot. current: 3.6A	UL 2367	UL E169910
Heat Sink (above CPU)	--	--	Consist of Aluminum part	--	--
Graphics Card (Optional)	Shenzhen Bitland Information Technology Co., Ltd.	BD3G10 (P/N: GT 730)	DC 12V, 5.5A max; and DC 3.3V, 3A max; Class III	IEC/EN 60950-1, UL 60950-1, CAN/CSA-C22.2 No. 60950-1	TUVR CB Cert. No.:JPTUV-076247, UL E356357, cUL E356357
Graphics Card (Optional) (Alternative)	Interchangeable	Interchangeable	DC 3.3V, DC12V (optional); Class III	UL 60950-1, CAN/CSA-C22.2 No. 60950-1	UL and CSA approved
Power Distribution Switch F5 for VGA&COM1 port (CN4)	Bourns Inc.	MF-NSMF110	Input: 6 Vdc, hold current: 1.10 A	-	TUV, UL

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Power Distribution Switch F6 for DP port (J20)	Bourns Inc.	MF-NSMF110	Input: 6 Vdc, hold current: 1.10 A	-	TUV, UL
Power Distribution Switch F8 for HDMI port (J18)	Bourns Inc.	MF-NSMF110	Input: 6 Vdc, hold current: 1.10 A	-	TUV, UL
Power Distribution switch U52 for USB 3.0 port (P152)	Texas Instruments Inc.	TPS2061C	Input Voltage: 4.5 to 5.5 Vdc Output Continuous Rating: 1.0A Output Current Limit: 1,9 A	-	TUV, UL
Motherboard	Interchangeable	Interchangeable	-	-	-
Graphics card	Shenzhen Bitland Information Technology Co Ltd	BD3I69	DC 3.3 A, 12 V, Class III	-	TUV, UL

Seção 86

Plastic Front Panel	NINGBO LG YONGXING CHEMICAL CO LTD	HI-121H	HB, 60°C, min. 1.5mm thickness.	UL746C, UL94, CSA-C22.2 No. 0.17	UL E203955, cUL E203955
Dust Cover, Stand (Optional) (Alternative)	DONGGUAN HINGLONG PLASTIC TECHNOLOGY CO LTD	HL-ABS-PCR35/65/85, HL-HIPS-PCR35/65/85, HL-ABS-PCR65	HB, 60°C, min. 1.6mm thickness.	UL 746C, UL 94, CSA-C22.2 No. 0.17	UL E345434, cUL E345434
Poly Switch (SF1, SF2) (Alternative)	POLYTRONICS TECHNOLOGY CORP	SMD1206P200T FT	Rated: 6.0V dc, holding current: 2.0A, trip current: 3.5A	IEC/EN 60738-1, UL 1434, CSA-C22.2 No.72	TUV R 50099121, UL E201431, cUL E201431

Seção 86

Plastic Front Panel	SABIC INNOVATIVE PLASTICS US LLC	925A	HB or better, min. 1.0 mm thickness.	UL 94, UL 764C	UL E121562
Plastic Front Panel (Alternative)	KINGFA SCI & TECH CO LTD	HP-126	HB or better, min. 1.0 mm thickness.	UL 94, UL 764C	UL E171666
Built-in Power Supply (Alternative)	Acbel Polytech Inc.	PCJ010	Input: AC100-240V, 50/60Hz, 3.0A Output: DC+12V/15A; DC -12V/0.2A; Max.180W; +12V:Max.180W; -12V:Max.2.4W Altitude: up to 5000m	IEC/EN 60950-1, UL 62368-1, CAN/CSA-C22.2 No. 62368-1	CB Cert. No.: JPTUV-101485, UL E131875, cUL E131875
Built-in Power Supply (Alternative)	FSP GROUP INC.	FSP180-20TLA	Input: AC100-240V, 50/60Hz, 3A, class I Output: DC+12V, 15A max., DC-12V, 0.2A max.; Total Power: 180W max.; Altitude: up to 5000m	IEC/EN 60950-1, UL 62368-1, CAN/CSA-C22.2 No. 62368-1	CB Cert. No.: DK-88801-UL, UL E190414, cUL E190414
Built-in Power Supply (Alternative)	SHENZHEN HUNTKEY ELECTRIC CO LTD	HK360-71PP xy (x=A-Z or blank, y=0-9 or blank, for different market)	Input: AC100-240V, 50/60Hz, 5A, class I Output: DC+12V, 21.5A, DC-12V, 0.2A; Total Power: 260W max.; -12V:Max.2.4W Altitude: up to 5000m	IEC/EN 60950-1, UL 62368-1, CAN/CSA-C22.2 No. 62368-1	CB Cert. No.: DK-89030-UL, UL E181356, cUL E181356
Built-in Power Supply (Alternative)	Acbel Polytech Inc.	PCK012	Input: AC100-240V, 50/60Hz, 4A, class I Output: DC+12V, 21.5A, DC-12V, 0.2A; Total Power: 260W; +12V:Max .260W; -12V:Max.2.4W Altitude: up to 5000m	IEC/EN 60950-1, UL 62368-1, CAN/CSA-C22.2 No. 62368-1	CB Cert. No.: JPTUV-101667, UL E131875, cUL E131875
Built-in Power Supply (Alternative)	Acbel Polytech Inc.	PCK014	Input: AC100-240V, 50/60Hz, 5A, class I Output: DC+12V1, 30A, DC+12V2, 18A, DC-12V, 0.2A; Total Power: 380W	IEC/EN 60950-1, UL 62368-1, CAN/CSA-C22.2 No.	CB Cert. No.:JPTUV-101675,

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			max.;+12V:Max. 380W. -12V:Max.2.4W Altitude: up to 5000m	62368-1	UL E131875, cUL E131875
Built-in Power Supply (Alternative)	Acbel Polytech Inc.	PCJ007	Input: AC100-240V, 50/60Hz, 4A, class I Output: DC+12V1, 18A, DC+12V2, 18A, DC+12V2, 18A, DC-12V, 0.2A ; Total Power: 310W max.; -12V:Max.2.4W Altitude: up to 5000m	IEC/EN 60950-1, UL 62368-1, CAN/CSA-C22.2 No. 62368-1	CB Cert. No.: JPTUV-092384, UL E131875, cUL E131875
DC Fan (For System Rear) (Optional)	SHENZHEN DONGWEIFENG ELECTRONIC TECHNOLOGY CO LTD	EFH-08E12W-GP01	DC 12V, 0.7A, 64.9CFM	UL 507, CSA-C22.2 No. 113	UL E305197, cUL E305197

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Alt.	FSP Group Inc.	FSP260-20TLA	Input: AC 100- 240V, 3.0A, 50/60Hz Output: DC +12V, 21.5A; -12V,0.2A.	IEC/EN 60950-1	CB Cert. No. DK-88801-UL
Alt.	Shenzhen Huntkey Electric Co., Ltd.	HK280-73PP xy ("x" =A to Z or blank, "y" = 0 to 9 or blank, for marketing purpose only)	Input: AC 100- 240V, 3.0A, 50/60Hz Output: DC +12V, 15A; -12V,0.2A.	IEC/EN 60950-1	CB Cert. No. DK-89075-UL
Optical Device Drive (Optional)	Philips & Lite-On Digital Solutions Corp	DA8AESH	Class 1 laser, 5/12 V dc, 3.0A/1.5 A.	IEC/EN 60825-1& IEC 60950-1 UL 60950-1	TUV CB Cert. No. JPTUV-052989

Adapter (Optional)	Delta Electronics Inc	ADP-65ME B	Input: 100-240V~, 50-60Hz, 1.5A; Output: 20Vdc, 3.25A Altitude: 5000m	IEC/EN 60950-1 UL 60950-1 CAN/CSA-C22.2 No. 60950-1	TUV CB Cert. No.: JPTUV-101691 UL E131881 cUL E131881
Adapter (Optional) (Alternative)	Lite-On Technology Corporation	PA-1650-74XX (X can be any character or blank)	Input: 100-240V~, 50-60Hz, 1.5A; Output: 20Vdc, 3.25A Altitude: 5000m	IEC/EN 60950-1 UL 60950-1 CAN/CSA-C22.2 No. 60950-1	TUV CB Cert. No.: JPTUV-101957 UL E132068 cUL E132068
Adapter (Optional) (Alternative)	Interchangeable	Interchangeable	Input: 100-240V~, 50-60Hz, 1.5A; Output: 20Vdc, 3.25A Altitude: 5000m	IEC/EN 60950-1 UL 60950-1, CSA-C22.2 No. 60950, or IEC/EN 62368-1 UL 62368-1, CAN/CSA-C22.2 No. 62368-1	UL, CSA, TUV certified
Adapter (Optional) (Alternative)	DELTA ELECTRONICS INC	ADP-90ME B	Input: 100-240V~, 50-60Hz, 1.5A; Output: 20Vdc, 4.5A Altitude: 5000m	IEC/EN 60950-1 UL 60950-1 CAN/CSA-C22.2 No. 60950-1	TUV CB Cert. No.: JPTUV-101791 UL E131881 cUL E131881
Adapter (Optional) (Alternative)	Lite-On Technology Corporation	PA-1900-74XX (X can be A-Z,0-9, or hyphen or	Input: 100-240V~, 50-60Hz, 1.5A; Output: 20Vdc,	IEC/EN 60950-1 UL 60950-1 CAN/CSA-C22.2	TUV CB Cert. No.: JPTUV-102060

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		blank)	4.5A Altitude: 5000m	No. 60950-1	UL E132068 cUL E132068
Adapter (Optional) (Alternative)	CHICONY POWER TECHNOLOGY CO LTD	A19-090P3A	Input: 100-240V~, 50-60Hz, 1.5A; Output: 20Vdc, 4.5A Altitude: 5000m	IEC/EN 60950-1 UL 60950-1 CAN/CSA-C22.2 No. 60950-1	TUV CB Cert. No.: JPTUV- 101835 UL E143709 cUL E143709
Adapter (Optional) (Alternative)	Interchangeable	Interchangeable	Input: 100-240V~, 50-60Hz, 1.5A; Output: 20Vdc, 4.5A Altitude: 5000m	IEC/EN 60950-1 UL 60950-1, CSA- C22.2 No. 60950, or IEC/EN 62368-1 UL 62368-1, CAN/CSA-C22.2 No. 62368-1	UL, CSA, TUV certified
Adapter (Optional) (Alternative)	DELTA ELECTRONICS INC	ADL170SDC3A	Input: 100-240V~, 50-60Hz, 2.5A Output: 20Vdc, 8.5A Altitude: 5000m	IEC/EN 60950-1, IEC/EN 62368-1, UL 60950-1 CAN/CSA-C22.2 No. 60950-1	TUV CB Cert. No.: JPTUV- 095706, JPTUV- 095864, UL(E131881) cUL(E131881)
Adapter (Optional) (Alternative)	DELTA ELECTRONICS INC	ADP-170CB B	Input: 100-240V~, 50-60Hz, 2.5A Output: 20Vdc, 8.5A Altitude: 5000m	IEC/EN 60950-1 UL 60950-1 CAN/CSA-C22.2 No. 60950-1	UL CB Cert. No.: DK- 87663-UL UL(E131881) cUL(E131881)
Adapter (Optional) (Alternative)	LITE-ON TECHNOLOGY CORP	ADL170SLC3A	Input: 100-240V~, 50-60Hz, 2.5A Output: 20Vdc, 8.5A Altitude: 5000m	IEC/EN 60950-1, IEC/EN 62368-1, UL 60950-1 CAN/CSA-C22.2 No. 60950-1	UL CB Cert. No.: DK 81072-A1- UL, DK-81011-UL UL(E132068) cUL(E132068)
Adapter (Optional) (Alternative)	Chicony Power Technology Co., Ltd.	ADL170SCC3A	Input: 100-240V~, 50-60Hz, 2.5A Output: 20Vdc, 8.5A Altitude: 5000m	IEC/EN 60950-1, IEC/EN 62368-1, UL 60950-1 CAN/CSA-C22.2 No. 60950-1	TUV CB Cert. No.: JPTUV- 095168, JPTUV- 095261 UL(E143709) cUL(E143709)
Adapter (Optional) (Alternative)	Interchangeable	Interchangeable	Input: 100-240V~, 50-60Hz, 2.5A Output: 20Vdc, 8.5A Altitude: 5000m	IEC/EN 60950-1 UL 60950-1, CSA-C22.2 No. 60950, or IEC/EN 62368-1 UL 62368-1, CAN/CSA-C22.2 No. 62368-1	UL, CSA, TUV certified

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Adapter (Optional) (Alternative)	Lite-On Technology Corporatio	ADL230NLC3* (* can be any character or blank)	Input: 100-240V~, 50-60 Hz, 3.5A; Output: 20Vdc, 11.5A Altitude: 5000m	IEC/EN 60950-1, IEC/EN 62368-1, UL 60950-1, CAN/CSA-C22.2 No. 60950-1	TUV CB Cert. No.: (JPTUV-079376-M1), UL CB Cert. No.: (DK-65243-UL) UL(E132068) cUL(E132068)
Adapter (Optional) (Alternative)	CHICONY POWER TECHNOLOGY CO LTD	A18-230P1A	A18-230P1A Input: 100-240V~, 50-60 Hz, 3.5A; Output: 20Vdc, 11.5A Altitude: 5000m	IEC/EN 60950-1, UL 60950-1, CAN/CSA-C22.2 No. 60950-1	TUV CB Cert. No.: (JPTUV-090385) UL(E132068) cUL(E132068)
Plastic Front Panel (Alternative)	COVESTRO DEUTSCHLAND AG [PC RESINS]	2407 + (z)(f1); 2407 DC (k); RW2407 + (z)(f1)	HB, 60°C, min. 1.0mm thickness.	UL 746C, UL 94	UL E41613
PCB (Alternative)	VICTORY GIANT TECHNOLOGY (HUIZHOU) CO LTD	SH	V-0, 130°C	UL 796	UL E248779
PCB (Alternative)	HANNSTAR BOARD CORP	MV-4, MV-6	V-0, 130°C	UL 796	UL E89382
PCB (Alternative)	Interchangeable	Interchangeable	V-1 or better, min. 130°C	UL 796	UL certified
DC Fan (For CPU) (Alternative)	ASIA VITAL COMPONENTS CO LTD	BAZB0817R2UP 006	12Vdc, 1.1A, 19.17CFM.	IEC/EN 60950-1, UL 507, CSA-C22.2 No. 113	TUV B 15 02 25730 895, UL E158191, cUL E158191
DC Fan (For CPU) (Alternative)	DELTA ELECTRONICS INC	BUB0812HD-01FSG	12Vdc, max. 1.5A, 20.3CFM	UL 507, IEC/EN 60950-1	UL E132003 TUV R 50387001
Optical Device Drive (Optional)	Hitachi-LG Data Storage inc.,	GUAX**, GUC**, GUE**, DUC**, DUE** (the first symbol * can be any number 0-9, the second symbol * can be any alphanumeric character, denoting non safety related differences)	Class 1 laser, 5Vdc, 1.5A	IEC/EN 60950-1, IEC/EN 60825-1, UL 60950-1, CSA-C22.2 No. 60950, Code of Federal Regulations (CFR), Title 21, Part 1040	Intertek CB Cert. No.:SE-85321M1, UL E119002, cUL E119002, FDA Registration No.: 1830330-001

DOCUMENTOS / DOCUMENTS:

Título / Title	Número / Number	Revisão / Revision	Data / Date
Relatório de ensaio emitido por / Test report issued by UL-CCIC Company Limited	OFF-4786852502-A-1	0	2015-09-15
Relatório de ensaio emitido por / Test report issued by QuieTek Corporation - Suzhou Testing Laboratory	1570347R-IT-CE-P01V01	0	2015-08-19
Relatório de ensaio emitido por / Test report issued by QuieTek Corporation - Suzhou Testing Laboratory	1570347R-ITUSP01V02	0	2015-08-19
Relatório de ensaio emitido por / Test report issued by Underwriters Laboratories Taiwan Co., Ltd.	4787133880	0	2015-08-20

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Relatório de ensaio emitido por / Test report issued by QuieTek Corporation - Suzhou Testing Laboratory	1570347R-ITUSP01V02	0	2015-08-24
Relatório de ensaio emitido por / Test report issued by Underwriters Laboratories Taiwan Co., Ltd.	4787062985	0	2015-08-25
Relatório de ensaio emitido por / Test report issued by TÜV Rheinland (China) Ltd.	16804576 001	0	2015-10-21
Relatório de ensaio emitido por / Test report issued by QuieTek Corporation - Suzhou Testing Laboratory	1570341R-IT-CE-P01V01	0	2015-10-30
Relatório de ensaio emitido por / Test report issued by QuieTek Corporation - Suzhou Testing Laboratory	1570341R-ITUSP01V02	0	2015--10-30
Relatório de ensaio emitido por / Test report issued by Underwriters Laboratories Taiwan Co., Ltd.	4787141290	0	2015-10-20
Relatório de ensaio emitido por / Test report issued by UL-CCIC Company Limited	OFF-4787141342-A-1	0	2015-12-28
Relatório de ensaio emitido por / Test report issued by EMTEK (Shenzhen) Co., Ltd.	ES151012034E	0	2016-02-01
Relatório de ensaio emitido por / Test report issued by EMTEK (Shenzhen) Co., Ltd.	ES151012034E-2	0	2016-08-11
Relatório de ensaio emitido por / Test report issued by International Standards Laboratory	ISL-16LE042FB	0	2016-01-22
Relatório de ensaio emitido por / Test report issued by Underwriters Laboratories Taiwan Co., Ltd.	4787307591	0	2016-02-01
Relatório de ensaio emitido por / Test report issued by TÜV Rheinland Japan Ltd.	JPTUV-076934	0	2016-12-01
Relatório de ensaio emitido por / Test report issued by EMTEK (Shenzhen) Co., Ltd.	ES160830026E	0	2016-11-25
Relatório de ensaio emitido por / Test report issued by Dekra Testing and Certification Co. Ltd.	16C2005E-ITUSP01V02	0	2017-01-11
Relatório de ensaio emitido por / Test report issued by TÜV Rheinland Japan Ltd.	JPTUV-076935	0	2016-11-29
Relatório de ensaio emitido por / Test report issued by QuieTek Corporation - Suzhou EMC Laboratory	1692061E-MME-CE-P01V01	0	2016-11-23
Relatório de ensaio emitido por / Test report issued by TÜV Rheinland (China) Ltd	50063530 002	0	2017-09-27
Relatório de ensaio emitido por / Test report issued by Intertek Testing Services Limited, Shanghai	180701932SHA-003	0	2018-08-02
Relatório de ensaio emitido por / Test report issued by EMTEK (Shenzhen) Co., Ltd.	ES171031992E	0	2018-04-04
Relatório de ensaio emitido por / Test report issued by EMTEK (Shenzhen) Co., Ltd.	ES171031998E	0	2018-04-04
Relatório de ensaio emitido por / Test report issued by UL-CCIC Company Limited	E307995-A422-CB-1	0	2018-04-11
Relatório de ensaio emitido por / Test report issued by Intertek Testing Services Limited, Shanghai	180701932SHA-004	0	2018-08-01
Relatório de ensaio emitido por / Test report issued by UL (Demko)	ACSCBIT18014	0	2018-04-17
Relatório de ensaio emitido por / Test report issued by EMTEK (Shenzhen) Co., LTD.	ES180327004E	0	2018-04-11
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Relatório de ensaio emitido por Nome do Laboratório / Test report issued by Laboratory Name UL-CCIC Company Limited	E307995-A421-CB-1	0	2018-04-13
Relatório de ensaio emitido por Nome do Laboratório / Test report issued by Laboratory Name DEKRA Testing & Certification (Suzhou) Co., Ltd.	1832081E-MME-CE-P01V01	0	2018-04-18
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Relatório de ensaio emitido por / Test report issued by IBEC	R190726	0	2019-04-01
Relatório de ensaio emitido por / Test report issued by IBEC	R190727	0	2019-04-08
Relatório de ensaio emitido por / Test report issued by FIT	V19-020-SERV-02	0	2019-03-22
Relatório de ensaio emitido por Nome do Laboratório / Test report issued by Laboratory Name Intertek Testing Services Limited, Shanghai	190601416SHA-001	0	2019-06-26
Relatório de ensaio emitido por / Test report issued by EMTEK (Shenzhen) Co., Ltd.	ES180223004E	0	2018-03-07
Relatório de ensaio emitido por / Test report issued by EMTEK (Shenzhen) Co., Ltd.	ES180223006E	0	2018-03-08
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Relatório de ensaio emitido por / Test report issued by Audix Technology (Shenzhen) CO., Ltd.	ACSCBIT18014-01	0	2019-07-09
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Relatório de ensaio emitido por / Test report issued by EMTEK (Shenzhen) Co., Ltd.	ES190429964E	0	2019-05-20

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Relatório de ensaio emitido por / Test report issued by IBEC	R194730	0	2020-04-16
Relatório de ensaio emitido por / Test report issued by FIT	V19-151-SERV-01	0	2020-03-24
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Relatório de ensaio emitido por / Test report issued by EMTEK (Shenzhen) Co., Ltd.	ES191106013E	0	2019-11-18
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Relatório de ensaio emitido por / Test report issued by EMTEK (Shenzhen) Co., Ltd.	ES191106009E	0	2019-11-18
Relatório de ensaio emitido por / Test report issued by FIT	S20-078-SERV-02	0	2020-09-01
Relatório de ensaio emitido por / Test report issued by Laboratory Name TÜV Rheinland (China) Ltd.	50235116 001	0	2019-04-23
Relatório de ensaio emitido por / Test report issued by EMTEK (Shenzhen) Co., Ltd.	ES190422977E	0	2019-05-11
Relatório de ensaio emitido por / Test report issued by Laboratory Name Intertek Testing Services Limited, Shanghai	200501942SHA-001	0	2020-06-04
Relatório de ensaio emitido por / Test report issued by Laboratory Name Intertek Testing Services Limited, Shanghai	200700259SHA-001	0	2020-07-17
Relatório de ensaio emitido por / Test report issued by Laboratory Name UL-CCIC Company Limited	E307995-A6041-CB-1	0	2020-01-06
Relatório de ensaio emitido por / Test report issued by Dekra	2050156R-IT-JP-P01V01	0	2020-06-02
Relatório de ensaio emitido por / Test report issued by Dekra	2050156R-MME-CE-P01V01	0	2020-05-29
Relatório de ensaio emitido por / Test report issued by Dekra	2050156R-RF-CE-P01V01	0	2020-06-02
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Relatório de ensaio emitido por / Test report issued by Intertek Testing Services Limited, Shanghai	200500269SHA-001	0	2020-07-20
Relatório de ensaio emitido por / Test report issued by EMTEK (Shenzhen) Co., Ltd.	ES200427033E	0	2020-05-20
Relatório de ensaio emitido por / Test report issued by Intertek Testing Services Limited, Shanghai	200401737SHA-001	0	2020-05-25
Relatório de ensaio emitido por / Test report issued by Instituto de Pesquisas Eldorado	LET-ENE-RE 2395-8971-01-C - 01.00 (Pt)	0	2021-06-30
Relatório de ensaio emitido por / Test report issued by IBEC	IBEC210328	0	2021-07-30
Relatório de ensaio emitido por / Test report issued by IBEC	IBEC210329	0	2021-08-06
Relatório de ensaio emitido por / Test report issued by EMTEK (Shenzhen) Co., LTD.	ES200928008E	0	2021-01-07
Relatório de ensaio emitido por / Test report issued by TÜV Rheinland (China) Ltd.	CN2011VA 001	0	2020-12-08
Relatório de ensaio emitido por / Test report issued by TÜV Rheinland (China) Ltd.	CN206NJZ 001	0	2020-12-16
Relatório de ensaio emitido por / Test report issued by Intertek Testing Services Limited, Shanghai	200201344SHA-001	0	2021-03-16
Relatório de ensaio emitido por / Test report issued by TÜV Rheinland	60376965 003	0	2021-03-01

OBSERVAÇÕES / OBSERVATIONS:

Organismo de Certificação /
Certification Body

UL do Brasil Certificações

Av. Engenheiro Luís Carlos Berrini, 105 – 24º Andar
São Paulo – SP – Brasil - 04571-010
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41-IC-F0033 rev 12.0

CERTIFICADO DE CONFORMIDADE

CERTIFICATE OF CONFORMITY

Certificado No. / Certificate No.	UL-BR 22.1054
Data de Emissão / Date of issue	08 de Abril de 2022 / April 08, 2022
Página / Page	25/22

Certificado de conformidade válido somente acompanhado das páginas de 1 até 22
Certificate of conformity valid with pages from 1 to 22

- 1. A validade deste Certificado está condicionada à realização das avaliações de manutenção e tratamento de possíveis não conformidades de acordo com as orientações da UL do Brasil Certificações e previstas nos procedimentos específicos. Para verificação da condição atualizada de regularidade deste Certificado de Conformidade deve ser consultado o banco de dados de produtos e serviços certificados do Inmetro.**

The validation of this certificate depends on the surveillance inspections performing and Non conformity treatments, according to UL do Brasil Certificações procedures. To verify the updated condition of regularity of this Conformity Certificate shall be consulted the certified products and services Inmetro database.

- 2. Este certificado aplica-se aos equipamentos (produtos) idênticos ao protótipo avaliado e certificado, manufaturados na(s) unidade (s) fabril (is) mencionada (S) acima.**

This certificate applies to the products that are identical to the prototype investigated, certified and manufactured at the production site mentioned in this certificate.

- 3. Qualquer alteração no produto, incluindo a marcação, invalidará o presente certificado, salvo se o solicitante informar por escrito à UL do Brasil Certificações sobre esta modificação, a qual procederá à avaliação e decidirá quanto à continuidade da validade do certificado.**

Any non-authorized changes performed in the product, including marking, will invalidate this certificate. UL do Brasil Certificações must be notified about any desired change. This notification will be analyzed by UL do Brasil Certificações that will decide about certificate force.

Histórico de Revisões / Revisions Description:

08 de Abril de 2022 / April 08, 2022	Emissão inicial com recertificação do certificado ULBR 19.0551 / Initial Issue with renewal of certificate UL-BR 19.0551
	A última revisão substitui e cancela as anteriores <i>The last review replaces and cancels the previous ones</i>

**Organismo de Certificação /
Certification Body**

UL do Brasil Certificações

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41-IC-F0033 rev 12.0


THE ECO DECLARATION



ECMA/TC38-TG3/2015/026
(Rev. 1 – 15 April 2017)

Annex B2 - Product environmental attributes Desktop/All-in-One Computers

The declaration may be published only when all rows and/or fields marked with * are filled-in (n.a. for not applicable).
Additional information regarding each item may be found under P15.


Brand *	Lenovo	
Company name *	Lenovo	
Contact information * e-mail address	Lenovo Global Environmental Affairs Alvin L Carter alcarter@lenovo.com	
Internet site *	http://www.lenovo.com/social_responsibility/us/en/environment.html	
Additional information	The latest version of this document can be found at: http://www.lenovo.com/ecodeclaration	

The company declares (based on product specification or test results based obtained from sample testing), that the product conforms to the statements given in this declaration.	
Type of product *	Desktop
Commercial name *	ThinkCentre M75s Gen 2
Model number *	11JA,11JB,11JC,11JD,11R7,11R8,11R9,11RA
Issue date *	2021.5.13
Intended market *	<input checked="" type="checkbox"/> Global <input type="checkbox"/> Europe <input type="checkbox"/> Asia, Pacific & Japan <input type="checkbox"/> Americas <input type="checkbox"/> Other
Additional information	ES/TCO/EPEAT


This is an uncontrolled copy when in printed form. Please refer to the contact information for the latest version.

About Annex B2

Annex B2 reflects Product environmental attributes relevant for Computers and Computer Monitors. The following items from the ECMA-370 Main body are not shown in the template:
P4.1 – P4.3 Consumable materials
P9.1 TEC and Print speed
P10.2 - P10.3 Chemical emissions from printing products
P11.1 - P11.3 Consumable materials for printing products.

Model number *	11JA,11JB,11JC,11JD,11R7,11R8,11R9,11RA	Logo			
Issue date *	2021.5.13				
Product environmental attributes - Legal requirements					
Item		Requirement met			
		Yes	No	n.a.	
P1	Hazardous substances and preparations				
P1.1*	Products do comply with current European RoHS Directive. (See legal reference and NOTE B1)	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
P1.2*	Products do not contain Asbestos (see legal reference). Comment: Legal reference has no maximum concentration value.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
P1.3*	Products do not contain Ozone Depleting Substances: Chlorofluorocarbons (CFC), hydrobromofluorocarbons (HBFC), hydrochlorofluorocarbons (HCFC), Halons, carbontetrachloride, 1,1,1-trichloroethane, methyl bromide (see legal reference). Comment: Legal reference has no maximum concentration values.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
P1.4*	Products do not contain more than; 0,005% polychlorinated biphenyl (PCB), 0,005% polychlorinated terphenyl (PCT) in preparations (see legal reference).	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
P1.5*	Products do not contain more than 0,1% short chain chloroparaffins (SCCP) with 10-13 carbon atoms in the chain containing at least 48% per mass of chlorine in the SCCP (see legal reference).	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
P1.6*	Parts with direct and prolonged skin contact do not release nickel in concentrations above 0,5 µg/cm ² /week (see legal reference). Comment: Max limit in legal reference when tested according to EN1811:2011-5.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
P1.7*	REACH Article 33 information about substances in articles is available at (add URL or mail contact): https://www.lenovo.com/us/en/Lenovo-REACH-SVHC-Disclosure	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
P2	Batteries				
P2.1*	If the product contains a battery or an accumulator, the battery/accumulator is labeled with the disposal symbol. Information on proper disposal is provided in user manual. (See legal reference)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
P2.2*	Batteries or accumulators do not contain more than 0,0005% of mercury or 0,002% of cadmium. (See legal reference)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
P2.3*	Batteries and accumulators are readily removable. (See legal reference)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
P3	Conformity verification & Eco design (ErP)				
P3.1*	The product is CE-marked to show conformance with applicable legal requirements (see legal reference). The Declaration of Conformity can be requested at: https://www.lenovo.com/us/en/compliance/eu-doc	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
P3.2*	The product complies with the Eco design requirements for energy-related products, (see legal reference). Required information is; <input checked="" type="checkbox"/> given in item P15 or added to this document, <input checked="" type="checkbox"/> available at: https://www.lenovo.com/us/en/compliance/eco-declaration	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
P5	Product packaging				
P5.1*	Packaging and packaging components do not contain more than 0,01% lead, mercury, cadmium and hexavalent chromium by weight of these together.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
P5.2*	The packaging materials are marked with abbreviations and numbers indicating the nature of the material(s) used (see legal reference).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
P5.3*	The product packaging material is free from ozone depleting substances as specified in the Montreal Protocol (see legal reference). Comment: Legal reference has no maximum concentration values.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
P6	Treatment information				
P6.1*	Information for recyclers/treatment facilities is available (see legal reference).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

NOTE B1 Restriction applies to the homogeneous material, unless other specified and expressed in weight %. Stating "Yes" means that the product is compliant with the mandatory requirements.

Model number *	11JA,11JB,11JC,11JD,11R7,11R8,11R9,11RA	Logo				
Issue date *	2021.5.13					
Product environmental attributes - Market requirements (See General NOTE GN below)						
- Environmental conscious design						
				Requirement met		
Item	* = mandatory to fill in. Additional information regarding each item may be found under P14.			Yes	No	n.a.
P7 Design, Disassembly, recycling						
P7.1*	Parts that have to be treated separately are easily separable			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P7.2*	Plastic materials in covers/housing have no surface coating.			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P7.3*	Plastic parts > 100 g consist of one material or of easily separable materials.			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P7.4*	Plastic parts > 25 g have material codes according to ISO 11469 referring ISO 1043-4.			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P7.5	Plastic parts are free from metal inlays or have inlays that can be removed with commonly available tools.			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P7.6*	Labels are easily separable. (This requirement does not apply to safety/regulatory labels).			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Product lifetime						
P7.7*	Upgrading can be done e.g. with processor, memory, cards or drives			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P7.8*	Upgrading can be done using commonly available tools			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P7.9	Spare parts are available after end of production for: 5 years					<input type="checkbox"/>
P7.10	Service is available after end of production for: 5 years					<input type="checkbox"/>
Material and substance requirements						
P7.11*	Product cover/housing material type (e.g. plastics, metal, aluminum): Material type: ABS Material type: SGCC Material type:					
P7.12	Insulation materials of external electrical cables are PVC free.			<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
P7.13	Insulation materials of internal electrical cables are PVC free.			<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
P7.14	External plastic casing/cover parts > 25 g contain no more than 0,1% weight (1000 ppm) bromine and 0,1% weight (1000 ppm) chlorine attributable to brominated flame retardants, chlorinated flame retardants, and polyvinyl chloride or 0,3% weight (3000 ppm) bromine and 0,3% weight (3000 ppm) chlorine in parts containing more than 25% post-consumer recycled content.			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P7.15	Printed circuit boards, PCBs (without components) are low halogen: all <input checked="" type="checkbox"/> PCBs > 25 g <input type="checkbox"/> are low halogen as defined in IEC 61249-2-21. (See 1NOTE B2)			<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
P7.16	Flame retarded plastic parts > 25 g in covers / housings are marked according ISO 1043-4: Marking:			<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
P7.17	Alt. 1: Chemical specifications of flame retardants in printed circuit boards > 25 g (without components): <input type="checkbox"/> TBBPA (additive), <input checked="" type="checkbox"/> TBBPA (reactive) (See NOTE B3), <input type="checkbox"/> Other: , CAS #: Alt. 2: Chemical specifications of flame retardants in printed circuit boards (without components) > 25 g according ISO 1043-4:			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P7.18	Alt. 1: Flame retarded plastic parts > 25 g contain the following flame retardant substances/preparations in concentrations above 0,1%: 1. Chemical name: , CAS #: (See NOTE B4) 2. Chemical name: , CAS #: " 3. Chemical name: , CAS #: " Alt. 2: Chemical specifications of flame retardants in plastic parts > 25 g according ISO 1043-4:			<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
P7.19	In plastic parts > 25 g, flame retardant substances/preparations above 0,1% are used which have been assigned the following Risk phrases; and Hazard statements: The source(s) for these classifications is/are found at (add URL(s)): , (See note B5)			<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
P7.20*	Postconsumer recycled plastic material content is used in the product (See Note B6): If YES; at least one of the two alternatives below shall be answered; a) Of total plastic parts' weight > 25 g, the postconsumer recycled plastic material content (calculated as a percentage of total plastic by weight) is 31.4% . or b) The weight of recycled material is 120.4 g .			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>


GENERAL NOTE Standard references should direct to the latest version of a standard. If an older version of a standard is used, section P15 shall be used for explanation.

NOTE B2 IEC 61249-2-21 defines maximum limits of 900 ppm for each of the substances chlorine and bromine and a maximum limit of 1500ppm of these substances combined. The standard does not address fluorine, iodine and astatine which are included in the group of halogens.

NOTE B3 and B4 A Guidance document on Chemical substances is available; see <http://www.ecma-international.org/publications/standards/Ecma-370.htm>

NOTE B5 If a certain substance has been assigned a certain risk phrases / hazard statement in the referenced source, this does not necessarily mean the substance has been tested for all of the hazards referred to by a certain customer.

NOTE B6 Applies to a product containing plastic parts whose combined weight exceeds 100 g with the exception of printed circuit boards, cables, connectors and electronic components and bio-based plastic material.

Model number *	11JA,11JB,11JC,11JD,11R7,11R8,11R9,11RA	Logo	
Issue date *	2021.5.13		

Product environmental attributes - Market requirements (continued)		Requirement met		
Item		Yes	No	n.a.

Material and substance requirements (continued)

P7.21*	Biobased plastic material content is used in the product (See NOTE B7): If YES; at least one of the two alternatives below shall be answered; a) Of total plastic parts' weight > 25 g, the biobased plastic material content (calculated as a percentage of total plastic by weight) is %. or b) The weight of the biobased plastic material is g.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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P7.22*	Light sources are free from mercury, i.e. less than 0,1 mg/lamp. If mercury is used specify: Number of lamps: and maximum mercury content per lamp: mg	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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P8 Batteries

P8.1*	Battery chemical composition: <i>Lithium Manganese Dioxide</i>	<input type="checkbox"/>
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P9 Energy consumption (See NOTE B8)

P9.1 For the product the following power levels or energy consumptions are reported:


Energy mode *	Power level at 100 V AC W	Power level at 115 V AC W	Power level at 230 V AC W	Reference/Standard for energy modes and test method *	<input type="checkbox"/>
Peak (On-max)				Full load	
Category I1					
Short Idle State - WOL Enabled	17.4 W	18.4 W	18.2 W	Use for ENERGY STAR V8 registration (P_{idle})	
Long Idle State - WOL Enabled	17.0 W	17.4 W	16.9 W	Use for ENERGY STAR V8 registration (P_{idle})	
Sleep (S3) - WOL Enabled	2.3 W	2.3 W	2.3 W	Use for ENERGY STAR V8 registration (P_{sleep})	
Off (S5) - WOL Enabled	0.6 W	0.6 W	0.6 W	Use for ENERGY STAR V8 registration (P_{off})	
Off (S5) - WOL Disabled	W	W	0.62 W	Use for ErP lot3	
Category I2					
Short Idle State - WOL Enabled	15.5 W	15.5 W	16.1 W	Use for ENERGY STAR V8 registration (P_{idle})	
Long Idle State - WOL Enabled	13.7 W	14.8 W	15.6 W	Use for ENERGY STAR V8 registration (P_{idle})	
Sleep (S3) - WOL Enabled	2.3 W	2.3 W	2.3 W	Use for ENERGY STAR V8 registration (P_{sleep})	
Off (S5) - WOL Enabled	0.7 W	0.7 W	0.7 W	Use for ENERGY STAR V8 registration (P_{off})	
Off (S5) - WOL Disabled	W	W	0.66 W	Use for ErP lot3	
Category D1					
Short Idle State - WOL Enabled	26.6 W	25.6 W	26.3 W	Use for ENERGY STAR V8 registration (P_{idle})	
Long Idle State - WOL Enabled	25.5 W	25.3 W	25.2 W	Use for ENERGY STAR V8 registration (P_{idle})	
Sleep (S3) - WOL Enabled	2.2 W	2.2 W	2.2 W	Use for ENERGY STAR V8 registration (P_{sleep})	
Off (S5) - WOL Enabled	0.6 W	0.6 W	0.6 W	Use for ENERGY STAR V8 registration (P_{off})	
Off (S5) - WOL Disabled	W	W	0.63 W	Use for ErP lot3	

NOTE B7 The following is to be excluded from the calculation of percentage: printed circuit boards, labels, cables, connectors and electronic components and postconsumer recycled plastic

NOTE B8 A Guidance document on Energy Efficiency is available;
see <http://www.ecma-international.org/publications/standards/Ecma-370.htm>

NOTE B9 A Guidance document on Acoustic Noise is available;
see <http://www.ecma-international.org/publications/standards/Ecma-370.htm>

Category D2				
Short Idle State - WOL Enabled	24.1 W	24.0 W	23.6 W	Use for ENERGY STAR V8 registration(P_{idle})
Long Idle State - WOL Enabled	23.7 W	21.8 W	21.5 W	Use for ENERGY STAR V8 registration(P_{idle})
Sleep (S3) - WOL Enabled	2.4 W	2.4 W	2.4 W	Use for ENERGY STAR V8 registration(P_{sleep})
Off (S5) - WOL Enabled	0.7 W	0.7 W	0.7 W	Use for ENERGY STAR V8 registration(P_{off})
Off (S5) - WOL Disabled	W	W	0.76 W	Use for ErP lot3
EPS No-load (External power supply / charger plugged in the wall outlet but disconnected from the product.)	W	W	W	<input checked="" type="checkbox"/>
PTEC * Typical Energy Consumption	W	W	W	<input checked="" type="checkbox"/>
ETEC * Annual Energy Consumption	I1:70.3 kWh/year I2:63.0 kWh/year D1:101.9 kWh/year D2:94.4 kWh/year	I1:73.4 kWh/year I2:63.8 kWh/year D1:99.0 kWh/year D2:92.3 kWh/year	I1:72.4 kWh/year I2:66.2 kWh/year D1:100.7 kWh/year D2:91.2 kWh/year	$E_{TEC} = (8760/1000) \times (P_{off} \times 0.45 + P_{sleep} \times 0.05 + P_{long_idle} \times 0.15 + P_{short_idle} \times 0.35)$ <i>P_{off}: Off Mode(S5) - WOL Enabled; P_{sleep}: Sleep Mode(S3) - WOL Enabled; P_{idle}: Idle State - WOL Enabled</i>
External Power Supply Efficiency Level (International Efficiency Marking Protocol) * :				<input checked="" type="checkbox"/>
Display resolution * : megapixels				<input checked="" type="checkbox"/>
Default time to enter energy save mode: 25 minutes				<input type="checkbox"/>
P9.2* Information about the energy save function is provided with the product.				<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
P9.3 Energy efficiency class (monitors only): NA				<input checked="" type="checkbox"/>
P10 Emissions				
Noise emission – Declared according to ISO 9296 (See NOTE B9)				
P10.1	Mode	Mode description	Statistical upper limit A-weighted sound power level, $L_{WA,C}$ (B)	
	Idle	* HDD:Idle	* 3.1	<input type="checkbox"/>
	Operation	* HDD: Operating	* 4.0	<input type="checkbox"/>
	Other mode	Declared A-weighted sound pressure level (dB) L_{pAm}	23 (operator position desktop – idle)	
	Other mode	Declared A-weighted sound pressure level (dB) L_{pAm}	25 (operator position desktop – operating)	
Measured according to: <input checked="" type="checkbox"/> ISO 7779 <input type="checkbox"/> ECMA-74 <input type="checkbox"/> Other (only if not covered by ECMA-74)				

Model number *	11JA,11JB,11JC,11JD,11R7,11R8,11R9,11RA	Logo	
Issue date *	2021.5.13		

Product environmental attributes - Market requirements (continued) **Requirement met**

Item	Yes	No	n.a.					
Electromagnetic emissions								
P10.4	Computer display meets the requirement for low frequency electromagnetic fields of the following voluntary program(s): <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> n.a.							
P12 Ergonomics for computing products								
P12.1*	The display meets the ergonomic requirements of ISO 9241-307 for visual display technologies. <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> n.a.							
P12.2*	The physical input device meets the requirements of ISO 9995 and ISO 9241-410. <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> n.a.							
P13 Packaging and documentation								
P13.1*	Product packaging material type(s): <i>Plastic - LDPE (low density polyethylene)</i> weight (kg): 0.051 Product packaging material type(s): <i>Plastic - LDPE (low density polyethylene)</i> weight (kg): 0.265 Product packaging material type(s): <i>Paper - Corrugated Double wall</i> weight (kg): 0.98 Product packaging material type(s): <i>Paper - Corrugated single wall</i> weight (kg): 0.047							
P13.2*	Product plastic primary packaging is free from PVC. <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> n.a.							
P13.3*	For product primary corrugated fiberboard packaging, specify the contained percentage of minimum post-consumer recovered fiber content: 90 % <input type="checkbox"/> n.a.							
P13.4*	Specify media for user and product documentation (tick box): <input checked="" type="checkbox"/> Electronic, <input checked="" type="checkbox"/> Paper, <input type="checkbox"/> Other <input type="checkbox"/> n.a.							
P13.5	(Please only complete this item if paper documentation used) User and product documentation on paper media is chlorine-free: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If Yes, please specify: Totally chlorine-free <input checked="" type="checkbox"/> Elemental chlorine-free <input type="checkbox"/> Processed chlorine-free <input type="checkbox"/>							
P14 Voluntary programs								
P14.1	The product meets the requirements of the following voluntary program(s): ENERGY STAR® Criteria version: 8.0 Date: 2021.1.15 Product category: Desktop Eco-label: EPEAT Criteria version: 1680.1-2018 Date: 2021.6.30 Product category: Desktop Eco-label: TCO Criteria version: 8.0 Date: 2020.9.16 Product category: Desktop							
P15 Additional information (See NOTE B10)								
P9	Energy consumption of specific configuration may vary; description of the tested product configuration:							
Test item	Category	CPU	Memory	HDD	SSD	Graphics	power supply	Sleep mode
ES	I1 I2 D1 D2	AMD	128GB	2TB 3.5"HDD 1TB 2.5"HDD	2TB	DIS&UMA	180W 300W	Sleep
NOTE: Supplier makes no representations, guarantees, assurances or warranties whether express or implied, regarding the information contained in this document. All information provided by supplier in this document is provided based on supplier's knowledge available at the time of completion, and supplier shall have no obligation to update such information. The information provided here is approximate and provided for informational purposes only. See a Lenovo Account Representative for more information.								
P9	See Energy Star Qualified Notebooks & Tablet Computers for the latest information: http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=CO							

NOTE B10 Additional lines may be inserted to declare further items, by positioning the cursor at the far right of the row and hitting the <Enter> key.

Legal references Europe Annex B2

Reference	Declaration item
Directive 2011/65/EU (RoHS Directive) * * Specific exemptions apply for certain products and applications.	P1.1
Regulation (EC) 1907/2006(REACH, Annex XVII)	P1.2, P1.4, P1.6, P1.7
Regulation (EC) 2037/2000, 2038/2000, 2039/2000 (Marketing and use of Ozone layer depleting substances)	P1.3, P5.3
Norwegian regulation relating to restrictions on the use of certain dangerous chemicals 20.12.2002	P1.5
Directive 2013/56/EC (Battery and accumulators Directive) * * These provisions shall not apply where, for safety, performance, medical or data integrity reasons, continuity of power supply is necessary and requires a permanent connection between the appliance and the battery or accumulator.	P2.1, P2.2, P2,3, P8.1
Directive 2006/95/EC (Low Voltage Directive)	P3.1
Directive 2004/108/EC (EMC Directive)	P3.1
Directive 1999/5/EC (R&TTE Directive)	P3.1
Regulation (EC) 801/2013 amending Regulation (EC) No 1275/2008 with regard to ecodesign requirements for standby, off mode electric power consumption of electrical and electronic household and office equipment, and amending Regulation (EC) No 642/2009 with regard to ecodesign requirements for televisions	P3.1, P3.2
Regulation (EC) No 1272/2008 (CLP Regulation)	P7.19
Directive 2004/12/EC (Packaging Directive)	P5.1
Decision 97/129/EC (Secondary packaging legislation)	P5.2
Directive 2012/19/EU (WEEE directive)	P6.1

Lenovo ErP Lot3 Information Sheet


- PC / Notebook -

As required by COMMISSION REGULATION (EU) No 617/2013 of 26 June 2013 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for computers and computer servers (ErP Lot3).

Products scope of this sheet:

Desktop computer, integrated desktop computer, and notebook computer

This document is only valid in connection with the IT Eco Declaration of the specific Product.

Commercial name	ThinkCentre M75s Gen 2	Logo 
Model Number	11JA,11JB,11JC,11JD,11R7,11R8,11R9,11RA	
Issue Date	2021.5.13	
Additional information	ES/TCO/EPEAT	

P7.1.1 Product environmental attributes					
(d) year of manufacture:					
				2021	
(e) Etec value (kWh) per ErP Lot 3 Category and capability adjustments applied when all discrete graphics cards (dGfx) are disabled and if the system is tested with switchable graphics mode with UMA driving the display.					
(f) Etec value (kWh) per ErP Lot 3 Category and capability adjustments applied when all discrete graphics cards (dGfx) are enable					
		Category A	Category B	Category C	Category D
		(according to ErP Lot 3)	(according to ErP Lot 3)	(according to ErP Lot 3)	(according to ErP Lot 3)
capability adjustments applied during testing	Memory over base [GB]		126		124
	Additional internal storage	(Yes / No)	Yes (Yes / No)	(Yes / No)	Yes (Yes / No)
	Discrete television tuner	(Yes / No)	No (Yes / No)	(Yes / No)	No (Yes / No)
	Discrete Audio Card	(Yes / No)	No (Yes / No)	(Yes / No)	No (Yes / No)
	Discrete graphics Card(s) [number / #]	(Yes / No) #:	Yes #: 1 (Yes / No)	(Yes / No) #:	Yes #: 1 (Yes / No)
	Category of discrete graphics Card(s)		G5		G5
Test results	Etec Value (kWh) - dGfx disabled all discrete graphics cards (dGfx) are disabled / UMA is active for switchable graphics/ product has no graphics cards (dGfx)		67.75		59.05
	Etec Value (kWh) - dGfx enabled all discrete graphics cards (dGfx) are enabled		96.29		98.54
(g) Idle state power demand (Watts);					
				26.33 26.77	
(h) Sleep mode power demand (Watts);					
				2.21 2.52	
(i) Sleep mode with WOL enabled power demand (Watts) (where enabled);					
				2.26 2.46	
(j) Off mode power demand (Watts);					
				0.63 0.76	
(k) Off mode with WOL enabled power demand (Watts) (where enabled);					
				0.63 0.76	
(l) Internal power supply efficiency at 10 %, 20 %, 50 % and 100 % of rated output power (if applicable): Minimum Efficiency of all Power Supplies: 10% 82.88% 20% 86.2% 50% 86.98% 100% 84.26% Average 85.82%					
(m) External power supply efficiency (if applicable)*: Average active efficiency: <small>*internal note: show values for all available external power supplies</small>					
(o) Minimum number of loading cycles that the batteries can withstand (applies only to notebook computers):					
(p-1) Measurement methodology used to determine information mentioned in points (l) – internal PSU efficiency: 80 plus program					

(p-2)	Measurement methodology used to determine information mentioned in points (m) – external PSU efficiency: NA	
(p-3)	Measurement methodology used to determine information mentioned in points (o) – loading cycles batteries: NA	
(p-4)	Measurement methodology used to determine information mentioned in maximum, idle, sleep, off mode power as defined in Point P9.1 in the Product IT Eco Declaration: refer to IEC62623:2013-Desktop and notebook computers-Measurement of energy consumption	
(q)	Sequence of steps for achieving a stable condition with respect to power demand: Based on user manual/Power on->Wait 5 minutes->Stable condition	
(r)	Description of how sleep and/or off mode was selected or programmed: Based on user manual-Set power button behaviors Set power button behaviors You can define what the power button does according to your preference. For example, by pressing the power button, you can turn off the computer or put the computer to sleep or hibernation mode. To change what the power button does: <ol style="list-style-type: none"> 1. Go to Control Panel and view by large icons or small icons. 2. Click Power Options → Choose what the power buttons do. 3. Change the settings as you prefer. 	
(s)	Sequence of events required to reach the mode where the equipment automatically changes to sleep and/or off mode: Based on user manual/Control Panel->Power Options-> Change Settings-> Restore default settings for this plan	
(t)	Duration of idle state condition before the computer automatically reaches sleep mode, or another condition which does not exceed the applicable power demand requirements for sleep mode (in minutes): 25	
(u)	Length of time after a period of user inactivity in which the computer automatically reaches a power mode that has a lower power demand requirement than sleep mode (in minutes): NA	
(v)	Length of time before the display sleep mode is set to activate after user inactivity (in minutes): 10	
(w)	Information on the energy-saving potential of power management functionality: NA	
(x)	User information on how to enable the power management functionality: Based on user manual-Set the power plan Set the power plan For ENERGY STAR® compliant computers, the following power plan takes effect when your computers have been idle for a specified duration: <i>Table 1. Default power plan (when plugged into ac power)</i> <table border="1"> <tr> <td> <ul style="list-style-type: none"> • Turn off the display: After 10 minutes • Put the computer to sleep: After 25 minutes </td> </tr> </table> To awaken the computer from Sleep mode, press any key on your keyboard. To reset the power plan to achieve the best balance between performance and power saving: <ol style="list-style-type: none"> 1. Go to Control Panel and view by large icons or small icons. 2. Click Power Options, and then choose or customize a power plan of your preference. 	<ul style="list-style-type: none"> • Turn off the display: After 10 minutes • Put the computer to sleep: After 25 minutes
<ul style="list-style-type: none"> • Turn off the display: After 10 minutes • Put the computer to sleep: After 25 minutes 		

(z) Test parameters for measurements: — test voltage in V and frequency in Hz, — total harmonic distortion of the electricity supply system, — information and documentation on the instrumentation, set-up and circuits used for electrical testing:

Test voltage in V and frequency in Hz: 230V/50Hz
Total harmonic distortion of the electricity supply system: $\leq 2\%$

Instrument Name	Range Used or *****	Make and Model**
AC Power Source	1~300VAC;1~550Hz; 1000VA	NF; EC1000S
Power Meter	1~500V;0~20A	YOKOGAWA; WT310
Digital Watch	Full Range	CASIO; HS-70W
Ambient Monitor	-10~60°C; 0~100&RH	Testo; 622
Anemometer	0~20m/s	Testo; 425

Additional Notebook Battery Information:

	Battery[ies] not user replaceable The battery[ies] in this product cannot be easily replaced by users themselves. ¹⁾	Battery[ies] user replaceable	n/a
Internal/built-in Battery	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
External/detachable Battery	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Bios Backup Battery	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Additional information

1)

The battery[ies] in this product cannot be easily replaced by users themselves.
 Аккумуляторната[ите] батерия[и] в този продукт не може да се замени[ят] лесно от самите потребители.
 Las baterías de este producto no pueden ser sustituidas fácilmente por los propios usuarios.
 Výměnu baterie/baterií v tomto výrobku by neměli provádět sami uživatelé.
 Brugeren kan ikke uden videre udskifte batteriet/batterierne i dette produkt.
 Der Akku/die Akkus dieses Produkts kann/können nicht ohne weiteres vom Benutzer selbst ausgetauscht werden.
 Kasutajad ei saa selle toote akut/akusid ise hõlpsasti asendada.
 Η μπαταρία[ς] στο προϊόν αυτό δεν μπορούν να αντικατασταθούν εύκολα από τους ίδιους τους χρήστες
 La/les batterie(s) présente(s) dans ce produit ne peuvent être facilement remplacée(s) par les utilisateurs eux-mêmes.
 Korisnik ne može lako zamijeniti Bateriju sam u ovom proizvodu.
 La batteria/le batterie in questo prodotto non può/possono essere facilmente sostituita/e dall'utente.
 Lietotāji paši nevar nomainīt šā ražojuma akumulatoru(-us).
 Šio gaminių baterijos [baterijų] pats vartotojas negali lengvai pakeisti.
 A termék akkumulátorát/akkumulátorait a felhasználó nem tudja egyedül egyszerűen kicserélni.
 Il-batterija/batteriji f'dan il-prodott ma tistax/jistghux tiġi/jiġu sostitwita/i mill-utenti stess.
 Batteriet [ene] i dette produktet kan ikke lett erstattes av brukerne selv.
 De batterij(en) in dit product is (zijn) door de gebruiker niet gemakkelijk vervangbaar.
 Użytkownik nie może sam w łatwy sposób wymienić baterii w tym produkcie.
 A ou as baterias deste produto não podem ser facilmente substituídas pelos próprios utilizadores.
 Bateria (bateriile) din acest produs nu poate (pot) fi ușor înlocuită (înlocuite) de utilizatorii înșiși.
 Batériu(-ie) v tomto výrobku nemôže vymieňať používateľ.
 Baterij/baterije v tem izdelku uporabniki sami ne morejo zlahka zamenjati.
 Tämän tuotteen akku [akut] ei[vät] ole helposti käyttäjän vaihdettavissa.
 Det är inte enkelt för kunden att själv byta ut batteriet/batterierna.
 Bu üründe ki batarya(lar) kullanıcılar tarafından kolaylıkla değiştirilemez.

[Back](#)

Memória UDIMM 3.200 DDR4 16 GB Lenovo

4X71D07930 213

Image
Coming Soon

List Price (Tax excluded):

-

[Compare](#)[Add to List](#)

FEATURE

TECH SPECS

Feature

Product Description

A memória UDIMM Lenovo de 16 GB DDR4 3.200 MHz permite uma transferência elevada de dados de E/S e menos consumo de energia. Com essa memória DDR4, você obterá melhor desempenho sem prejudicar as necessidades de energia.

Top Features

- Memória UDIMM de 16 GB DDR4 3.200 MHz
- Totalmente compatível com produtos ThinkCentre especificados. Design que proporciona alta disponibilidade, escalabilidade e o máximo de flexibilidade e preço/desempenho

Tech Specs

JAN	4580550403873
EAN	0195890233987
UPC	195890233987
Warranty Type	CRU
Warranty Period	36 meses
Minimum Relative Humidity (%)	10
Minimum Operating Temperature	0°

[TOP](#)

Maximum Relative Humidity (%)	90
Maximum Operating Temperature	95°
Packed Weight	0,035 kg
Packed Dimensions (L x D x H)	157 mm x 57 mm x 15 mm
Package Type	Caixa Marrom
Shipment Group	1 memória 1 pôster
Product Weight	20 g
Height	3,9 mm
Depth	31,25 mm
Length	133,35 mm
Color	Verde
Agency Approvals	CE
Special/Added Features	Não ECC
Reset to Factory Mode	Remover a energia
Transfer Speed	3200MHz
Available Capacity	16 GB
Connectivity	UDIMM
Supported OS	SO independente
Brand	Lenovo

TOP

Compatibility

Operating System

OS Independent

Compatible Machines

Description	ID	Footnote
Lenovo V50t Gen 2- 13IOB-11QB - Lenovo V50t Gen 2-13IOB	11QB	
Lenovo V50t Gen 2- 13IOB-11QC - Lenovo V50t Gen 2-13IOB	11QC	
Lenovo V50t Gen 2- 13IOB-11QD - Lenovo V50t Gen 2-13IOB	11QD	
Lenovo V50t Gen 2- 13IOB-11QE - Lenovo V50t Gen 2-13IOB	11QE	
Lenovo V55t Gen 2- 13ACN-11RM - Lenovo V55t Gen 2-13ACN	11RM	
Lenovo V55t Gen 2- 13ACN-11RN - Lenovo V55t Gen 2-13ACN	11RN	
Lenovo V55t Gen 2- 13ACN-11RQ - Lenovo V55t Gen 2-13ACN	11RQ	
Lenovo V55t Gen 2- 13ACN-11RR - Lenovo V55t Gen 2-13ACN	11RR	
Lenovo V55t Gen 2- 13ACN-11VS-Lenovo V55t Gen 2-13ACN	11VS	
Lenovo V55t Gen 2- 13ACN-11VT-Lenovo V55t Gen 2-13ACN	11VT	

TOP

Lenovo V55t Gen 2- 13ACN-11VU-Lenovo V55t Gen 2-13ACN	11VU	
Lenovo V55t Gen 2- 13ACN-11VV-Lenovo V55t Gen 2-13ACN	11VV	
ThinkCentre E97s- 12AY - ThinkCentre E97s	12AY	
ThinkCentre M70s Gen 3-11T7-ThinkCentre M70s Gen 3	11T7	
ThinkCentre M70s Gen 3-11T8-ThinkCentre M70s Gen 3	11T8	
ThinkCentre M70s Gen 3-11TB-ThinkCentre M70s Gen 3	11TB	
ThinkCentre M70s Gen 3-11TC-ThinkCentre M70s Gen 3	11TC	
ThinkCentre M70s Gen 3-11X8-ThinkCentre M70s Gen 3	11X8	
ThinkCentre M70s Gen 3-11XG-ThinkCentre M70s Gen 3	11XG	
ThinkCentre M70t Gen 2-11M3	11M3	
ThinkCentre M70t Gen 2-11M4	11M4	
ThinkCentre M70t Gen 2-11M7	11M7	
ThinkCentre M70t Gen 2-11M8	11M8	

TOP

ThinkCentre M70t Gen 3-11T5-ThinkCentre M70t Gen 3	11T5	
ThinkCentre M70t Gen 3-11T6-ThinkCentre M70t Gen 3	11T6	
ThinkCentre M70t Gen 3-11T9-ThinkCentre M70t Gen 3	11T9	
ThinkCentre M70t Gen 3-11TA-ThinkCentre M70t Gen 3	11TA	
ThinkCentre M70t Gen 3-11X3-ThinkCentre M70t Gen 3	11X3	
ThinkCentre M70t Gen 3-11XE-ThinkCentre M70t Gen 3	11XE	
ThinkCentre M75s Gen 2-11R7 - ThinkCentre M75s Gen 2	11R7	
ThinkCentre M75s Gen 2-11R8 - ThinkCentre M75s Gen 2	11R8	
ThinkCentre M75s Gen 2-11R9 - ThinkCentre M75s Gen 2	11R9	
ThinkCentre M75s Gen 2-11RA - ThinkCentre M75s Gen 2	11RA	
ThinkCentre M75t Gen 2-11RB - ThinkCentre M75t Gen 2	11RB	
ThinkCentre M75t Gen 2-11RC - ThinkCentre M75t Gen 2	11RC	

TOP

ThinkCentre M75t Gen 2-11RD - ThinkCentre M75t Gen 2	11RD	
ThinkCentre M75t Gen 2-11RE - ThinkCentre M75t Gen 2	11RE	
ThinkCentre M90s Gen 2-11L2 - ThinkCentre M90s Gen 2	11L2	
ThinkCentre M90s Gen 2-11L3 - ThinkCentre M90s Gen 2	11L3	
ThinkCentre M90s Gen 2-11L6 - ThinkCentre M90s Gen 2	11L6	
ThinkCentre M90s Gen 2-11L7 - ThinkCentre M90s Gen 2	11L7	
ThinkCentre M90t Gen 2-11L0 - ThinkCentre M90t Gen 2	11L0	
ThinkCentre M90t Gen 2-11L1 - ThinkCentre M90t Gen 2	11L1	
ThinkCentre M90t Gen 2-11L4 - ThinkCentre M90t Gen 2	11L4	
ThinkCentre M90t Gen 2-11L5 - ThinkCentre M90t Gen 2	11L5	
ThinkCentre neo 50s Gen 3-11SW - ThinkCentre neo 50s Gen 3	11SW	

TOP

ThinkCentre neo 50s Gen 3-11SX - ThinkCentre neo 50s Gen 3	11SX	
ThinkCentre neo 50s Gen 3-11SY - ThinkCentre neo 50s Gen 3	11SY	
ThinkCentre neo 50s Gen 3-11T0 - ThinkCentre neo 50s Gen 3	11T0	
ThinkStation P348- 30EQ	30EQ	
ThinkStation P348- 30ER	30ER	
ThinkStation P350- 30E3	30E3	
ThinkStation P350- 30E4	30E4	
ThinkStation P350- 30E5	30E5	
ThinkStation P350- 30E6	30E6	

+ Mouse Lenovo

PN: MOUSE00



- ↳ Interface USB
- ↳ Resolução de 1000 DPI
- ↳ Óptico (sem esfera)
- ↳ Compatível com toda linha Lenovo
- ↳ Ambidestro
- ↳ Botão Scroll para rolagem

MOUSE Lenovo USB - Overview



Foto meramente illustrativa

Overview

Experience the performance of high-definition tracking, full programmability and the superior comfort of the new Lenovo Mouse. **Optical technology delivers extraordinary accuracy and more responsiveness than traditional mice**, resulting in smoother tracking on virtually any surface. A tilting scrollwheel allows the user to scroll through documents and webpages both horizontally and vertically. Designed for both right- and left-handed use, the Lenovo Mouse offers the ultimate in all-day comfort, precision and performance.

- **1000 dpi resolution**
- Fully programmable tilting scrollwheel and buttons
- Ambidextrous design for both right- and left-handed users
- Full-speed USB connection
- Full-featured Lenovo Mouse software suite
- Exclusive soft-to-the-touch metallic black finish

Tech Specs

Ship Group **Enhanced Optical** USB Mouse

Agency Approvals & Certifications EN 60825-1, EN 60950, BSMI, C-ick, CISPR-22 Class B, RoHS, CUL, TUV, VCCI, FCC Class B - Part 15, IEC 60825-1, IEC-60950-1 (CB Certificate and CB Test Report), MIC (Korea), EN 55022, EN 55024

Maximum Operating Humidity	80
Maximum Operating Humidity Units	%
Minimum Operating Humidity	8
Minimum Operating Humidity Units	%
Maximum Operating Temperature	40
Maximum Operating Temperature Units	C
Minimum Operating Temperature	0
Minimum Operating Temperature Units	C
Depth Metric	115
Depth	115mm
Depth Metric Units	mm
Depth (US)	4.5in
Height Metric	36
Height	36mm
Height Metric Units	mm
Height (US)	1.43in
Max Operating Humidity + Units	80%



Min Operating Humidity + Units	8%
Max Operating Temperature + Units	40C
Min Operating Temperature + Units	0C
Weight US	0.2
Weight US Units	lbs
Weight Metric	0.095
Weight Metric Units	Kg
Width Metric	61
Width	61mm
Width Metric Units	mm
Width (US)	2.4in
Warranty Type	Customer Replaceable Unit





Mouse Pad Preto Lenovo 17,5cm x 25,5cm Nacional

A LENOVO CONTA COM UM VARIADO PORTFÓLIO DE ACESSÓRIOS, INCLUINDO BATERIAS, MEMÓRIAS, HDS, DOCKSTATIONS, AC ADAPTERS ENTRE OUTROS.

PARA CONHECER MELHOR NOSSOS ACESSÓRIOS E COMPATIBILIDADES ACESSE: [LENOVOQUICKPICK.COM/BRA](https://lenovoquickpick.com/bra)



**National Institute of
Standards and Technology**

U.S. Department of Commerce

Special Publication 800-147

BIOS Protection Guidelines

**Recommendations of the National Institute
of Standards and Technology**

David Cooper

William Polk

Andrew Regenscheid

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Murugiah Souppaya

C O M P U T E R S E C U R I T Y

Computer Security Division
Information Technology Laboratory
National Institute of Standards and Technology
Gaithersburg, MD 20899-8930

April 2011



U.S. Department of Commerce

Gary Locke, Secretary

National Institute of Standards and Technology

Dr. Patrick D. Gallagher, Director

Reports on Computer Systems Technology

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Natl. Inst. Stand. Technol. Spec. Publ. 800-147, 27 pages (April 2011)

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In addition, the authors would also like to thank Gustavo Duarte, who created an earlier diagram of the boot-up process that was used as the basis for Figures 1 and 2 in this document.

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Executive Summary

Modern computers rely on fundamental system firmware, commonly known as the system Basic Input/Output System (BIOS), to facilitate the hardware initialization process and transition control to the operating system. The BIOS is typically developed by both original equipment manufacturers (OEMs) and independent BIOS vendors, and is distributed to end-users by motherboard or computer manufacturers. Manufacturers frequently update system firmware to fix bugs, patch vulnerabilities, and support new hardware. This document provides security guidelines for preventing the unauthorized modification of BIOS firmware on PC client systems.

Unauthorized modification of BIOS firmware by malicious software constitutes a significant threat because of the BIOS's unique and privileged position within the PC architecture. A malicious BIOS modification could be part of a sophisticated, targeted attack on an organization—either a permanent denial of service (if the BIOS is corrupted) or a persistent malware presence (if the BIOS is implanted with malware). The move from conventional BIOS implementations to implementations based on the Unified Extensible Firmware Interface (UEFI) may make it easier for malware to target the BIOS in a widespread fashion, as these BIOS implementations are based on a common specification.

This document focuses on current and future x86 and x64 desktop and laptop systems, although the controls and procedures could potentially apply to any system design. Likewise, although the guide is oriented toward enterprise-class platforms, the necessary technologies are expected to migrate to consumer-grade systems over time. The security guidelines do not attempt to prevent installation of unauthentic BIOSs through the supply chain, by physical replacement of the BIOS chip, or through secure local update procedures.

Security guidelines are specified for four system BIOS features:

- The authenticated BIOS update mechanism, where digital signatures prevent the installation of BIOS update images that are not authentic.
- An optional secure local update mechanism, where physical presence authorizes installation of BIOS update images.
- Integrity protection features, to prevent unintended or malicious modification of the BIOS outside the authenticated BIOS update process.
- Non-bypassability features, to ensure that there are no mechanisms that allow the system processor or any other system component to bypass the authenticated update mechanism.

Additionally, management best practices which complement the security guidelines are presented. Five distinct phases are addressed:

- The Provisioning Phase, which establishes configuration baselines identifying the approved BIOS version and configuration settings.
- The Platform Deployment Phase, which establishes or verifies the configuration baseline using a secure local update mechanism.
- The Operations and Maintenance Phase, where systems are monitored for unexpected changes and planned BIOS updates are executed using the authenticated BIOS update mechanism.
- The Recovery Phase, which supports authorized rollback to an earlier BIOS version and recovery from a corrupted BIOS.
- The Disposition Phase, where the BIOS and configuration data are restored to their original settings to prevent against accidental information leakage.

Future revisions to this publication will also address the security of critical system firmware that interact with the BIOS.

1. Introduction

1.1 Authority

The National Institute of Standards and Technology (NIST) developed this document in furtherance of its statutory responsibilities under the Federal Information Security Management Act (FISMA) of 2002, Public Law 107-347.

NIST is responsible for developing standards and guidelines, including minimum requirements, for providing adequate information security for all agency operations and assets; but such standards and guidelines shall not apply to national security systems. This guideline is consistent with the requirements of the Office of Management and Budget (OMB) Circular A-130, Section 8b(3), “Securing Agency Information Systems,” as analyzed in A-130, Appendix IV: Analysis of Key Sections. Supplemental information is provided in A-130, Appendix III.

This guideline has been prepared for use by Federal agencies. It may be used by nongovernmental organizations on a voluntary basis and is not subject to copyright, though attribution is desired.

Nothing in this document should be taken to contradict standards and guidelines made mandatory and binding on Federal agencies by the Secretary of Commerce under statutory authority, nor should these guidelines be interpreted as altering or superseding the existing authorities of the Secretary of Commerce, Director of the OMB, or any other Federal official.

1.2 Purpose and Scope

This document provides guidelines for preventing the unauthorized modification of *Basic Input/Output System (BIOS)* firmware on PC client systems. Unauthorized modification of BIOS firmware by malicious software constitutes a significant threat because of the BIOS’s unique and privileged position within the PC architecture. A malicious BIOS modification could be part of a sophisticated, targeted attack on an organization—either a permanent denial of service (if the BIOS is corrupted) or a persistent malware presence (if the BIOS is implanted with malware).

As used in this publication, the term BIOS refers to conventional BIOS, *Extensible Firmware Interface (EFI)* BIOS, and *Unified Extensible Firmware Interface (UEFI)* BIOS. This document applies to system BIOS firmware (e.g., conventional BIOS or UEFI BIOS) stored in the system flash memory of computer systems, including portions that may be formatted as Option ROMs. However, it does not apply to Option ROMs, UEFI drivers, and firmware stored elsewhere in a computer system.

Section 3.1 of this guide provides platform vendors with recommendations and guidelines for a secure BIOS update process. Additionally, Section 3.2 provides recommendations for managing the BIOS in an operational environment. Future revisions to this publication will also address the security of critical system firmware that interact with the BIOS.

While this document focuses on current and future x86 and x64 client platforms, the controls and procedures are independent of any particular system design. Likewise, although the guide is oriented toward enterprise-class platforms, the necessary technologies are expected to migrate to consumer-grade systems over time. Future efforts may look at boot firmware security for enterprise server platforms.

1.3 Audience

The intended audience for this document includes BIOS and platform vendors, and information system security professionals who are responsible for managing the endpoint platforms' security, secure boot processes, and hardware security modules. The material may also be of use when developing enterprise-wide procurement strategies and deployment.

The material in this document is technically oriented, and it is assumed that readers have at least a basic understanding of system and network security. The document provides background information to help such readers understand the topics that are discussed. Readers are encouraged to take advantage of other resources (including those listed in this document) for more detailed information.

1.4 Document Structure

The remainder of this document is organized into the following major sections:

- Section 2 presents an overview of the BIOS and its role in the boot process, and identifies potential attacks against the BIOS in an operational environment.
- Section 3 examines how selected threats to the BIOS can be mitigated. Section 3.1 describes security controls for BIOS implementations that are required or recommended to mitigate these threats. Section 3.2 defines processes that leverage these controls to implement a secure BIOS update process within an enterprise as part of the platform management life cycle.

The document also contains appendices with supporting material:

- Appendix A contains a summary of the security guidelines for system BIOS implementations.
- Appendix B defines terms used in this document.
- Appendix C contains a list of acronyms and abbreviations used in this document.
- Appendix D contains a list of references used in the development of this document.

2. Background

Modern computers such as desktop and laptop computers contain program code that facilitates the hardware initialization process. The code is stored in non-volatile memory and is commonly referred to as boot firmware. The primary firmware used to initialize the system is called the *Basic Input/Output System (BIOS)* or the *system BIOS*. This section provides background information on the system BIOS and its role in the boot process using the conventional BIOS and Unified Extensible Firmware Interface (UEFI) BIOS as examples. It identifies the primary methods used for updating the system BIOS, and security issues and threats to the system BIOS.

2.1 System BIOS

The system BIOS is the first piece of software executed on the main central processing unit (CPU) when a computer is powered on. While the system BIOS was originally responsible for providing operating systems access to hardware, its primary role on modern machines is to initialize and test hardware components and load the operating system. In addition, the BIOS loads and initializes important system management functions, such as power and thermal management. The system BIOS may also load CPU microcode patches during the boot process.

There are several different types of BIOS firmware. Some computers use a 16-bit conventional BIOS, while many newer systems use boot firmware based on the UEFI specifications [UEFI]. In this document we refer to all types of boot firmware as BIOS firmware, the system BIOS, or simply BIOS. When necessary, we differentiate conventional BIOS firmware from UEFI firmware by calling them the conventional BIOS and UEFI BIOS, respectively.

System BIOS is typically developed by both original equipment manufacturers (OEMs) and independent BIOS vendors, and is distributed to end users with computer hardware. Manufacturers frequently update system firmware to fix bugs, patch vulnerabilities, and support new hardware. The system BIOS is typically stored on electrically erasable programmable read-only memory (EEPROM) or other forms of flash memory, and is modifiable by end users. Typically, system BIOS firmware is updated using a utility or tool that has special knowledge of the non-volatile storage components in which the BIOS is stored.

A given computer system can have BIOS in several different locations. In addition to the motherboard, BIOS can be found on hard drive controllers, video cards, network cards and other add-in cards. This additional firmware generally takes the form of *Option ROMs* (containing conventional BIOS and/or UEFI drivers). These are loaded and executed by the system firmware during the boot process. Other system devices, such as hard drives and optical drives, may have their own microcontrollers and other types of firmware.

As noted in Section 1.2, the guidelines in this document apply BIOS firmware stored in the system flash. This includes Option ROMs and UEFI drivers that are stored with the system BIOS firmware and are updated by the same mechanism. It does not apply to Option ROMs, UEFI drivers, and firmware stored elsewhere in a computer system.

2.2 Role of System BIOS in the Boot Process

The primary function of the system BIOS is to initialize important hardware components and to load the operating system. This process is known as *booting*. The boot process of the system BIOS typically executes in the following stages:

1. **Execute Core Root of Trust:** The system BIOS may include a small core block of firmware that executes first and is capable of verifying the integrity of other firmware components. This has traditionally been called the *BIOS Boot Block*. For trusted computing applications, it may also contain the Core Root of Trust for Measurement (CRTM).
2. **Initialize and Test Low-Level Hardware:** Very early in the boot process the system BIOS initializes and tests key pieces of hardware on the computer system, including the motherboard, chipset, memory and CPU.
3. **Load and Execute Additional Firmware Modules:** The system BIOS executes additional pieces of firmware that either extend the capabilities of the system BIOS or initialize other hardware components necessary for booting the system. These additional modules may be stored within the same flash memory as the system BIOS or they may be stored in the hardware devices they initialize (e.g., video card, local area network card).
4. **Select Boot Device:** After system hardware has been configured, the system BIOS searches for a boot device (e.g., hard drive, optical drive, USB drive) and executes the boot loader stored on that device.
5. **Load Operating System:** While the system BIOS is still in control of the computer, the boot loader begins to load and initialize the operating system kernel. Once the kernel is functional, primary control of the computer system transfers from the system BIOS to the operating system.

In addition, the system BIOS loads system management interrupt (SMI) handlers (also known as System Management Mode (SMM) code) and initializes Advanced Configuration and Power Interface (ACPI) tables and code. These provide important system management functions for the running computer system, such as power and thermal management.

This section describes the boot process in conventional BIOS-based systems and the boot process in UEFI-based systems. While conventional BIOS is used in many desktop and laptop computers deployed today, the industry has begun transitioning to UEFI BIOS.

2.2.1 Conventional BIOS Boot Process

Figure 1 shows a typical boot process for x86-compatible systems running a conventional BIOS. The conventional BIOS often executes in 16-bit real mode, although some more recent implementations execute in protected mode. Some conventional BIOS-based firmware has a small block of BIOS firmware— known as the BIOS boot block— that is logically separate from the rest of the BIOS. On these computer systems, the boot block is the first firmware executed during the boot process. The boot block is responsible for checking the integrity of the remaining BIOS code, and may provide mechanisms for recovery if the main system BIOS firmware is corrupted. On most trusted computing architectures, the BIOS boot block serves as the computer system’s CRTM because this firmware is implicitly trusted to bootstrap the process of building a measurement chain for subsequent attestation of other firmware and software that is executed on the machine [TCG05].

The boot block executes the part of the conventional BIOS that initializes most hardware components—the *Power-on-Self-Test* (POST) code. During POST, key low-level hardware on the computer system is initialized, including the chipset, CPU, and memory. The system BIOS initializes the video card, which may load and execute its own BIOS to initialize graphics processors and memory.

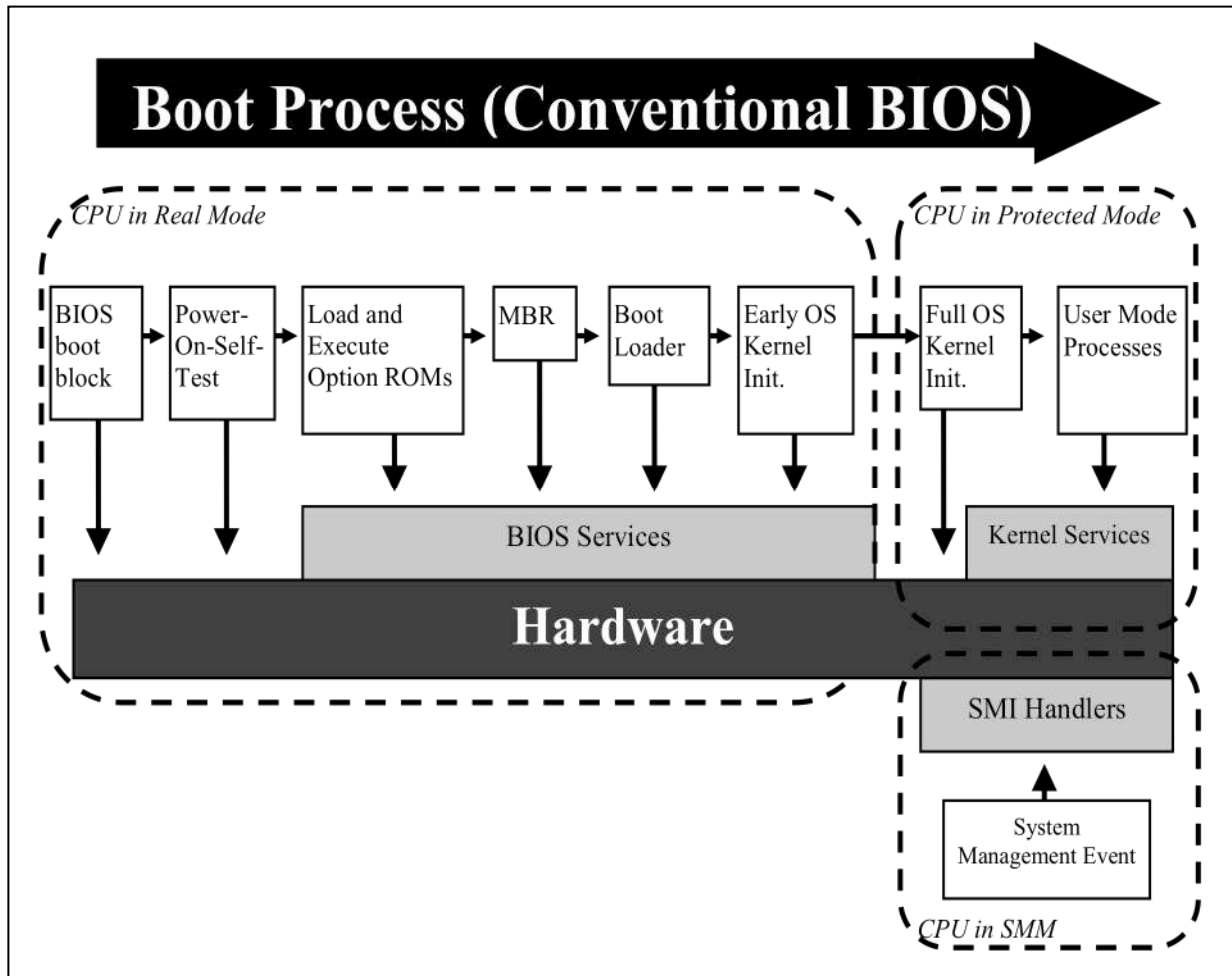


Figure 1: Conventional BIOS Boot Process¹

Next, the system BIOS searches for other peripherals and microcontrollers, and executes any Option ROMs on these components necessary to initialize them. Option ROMs execute very early in the boot process and can add a variety of features to the boot process. For example, the Option ROM on a network adapter could load the Preboot Execution Environment (PXE), which allows a computer to boot over the network.

Next, the system BIOS scans the computer system for storage devices that have been identified as boot devices. In a typical case, the BIOS attempts to boot from the first boot device it finds that has a valid master boot record (MBR). The MBR points to a boot loader stored on the hard drive, which in turn starts the process of loading the operating system.

During the boot process the system BIOS loads SMI handlers and initializes ACPI tables and code. SMI handlers run in a special high-privilege mode on the CPU known as System Management Mode, a 32-bit mode that is capable of bypassing many of the hardware security mechanisms of protected mode, such as memory segmentation and page protections.

¹ This figure is based on information and a diagram found at [Duarte08].

2.2.2 UEFI Boot Process

At a high level, the UEFI boot process, shown in Figure 2, follows a similar flow to the conventional BIOS boot process. One difference is that UEFI code runs in 32- or 64-bit protected mode on the CPU, not in 16-bit real mode as is often the case with conventional BIOS. Most UEFI-based platforms start with a small core block of code that has the primary responsibility of authenticating subsequent code executed on the computer system. This is very similar to the role of the boot block in conventional BIOS. This part of the boot process is known as the Security (SEC) phase, and it serves as the core root of trust in the computer system.

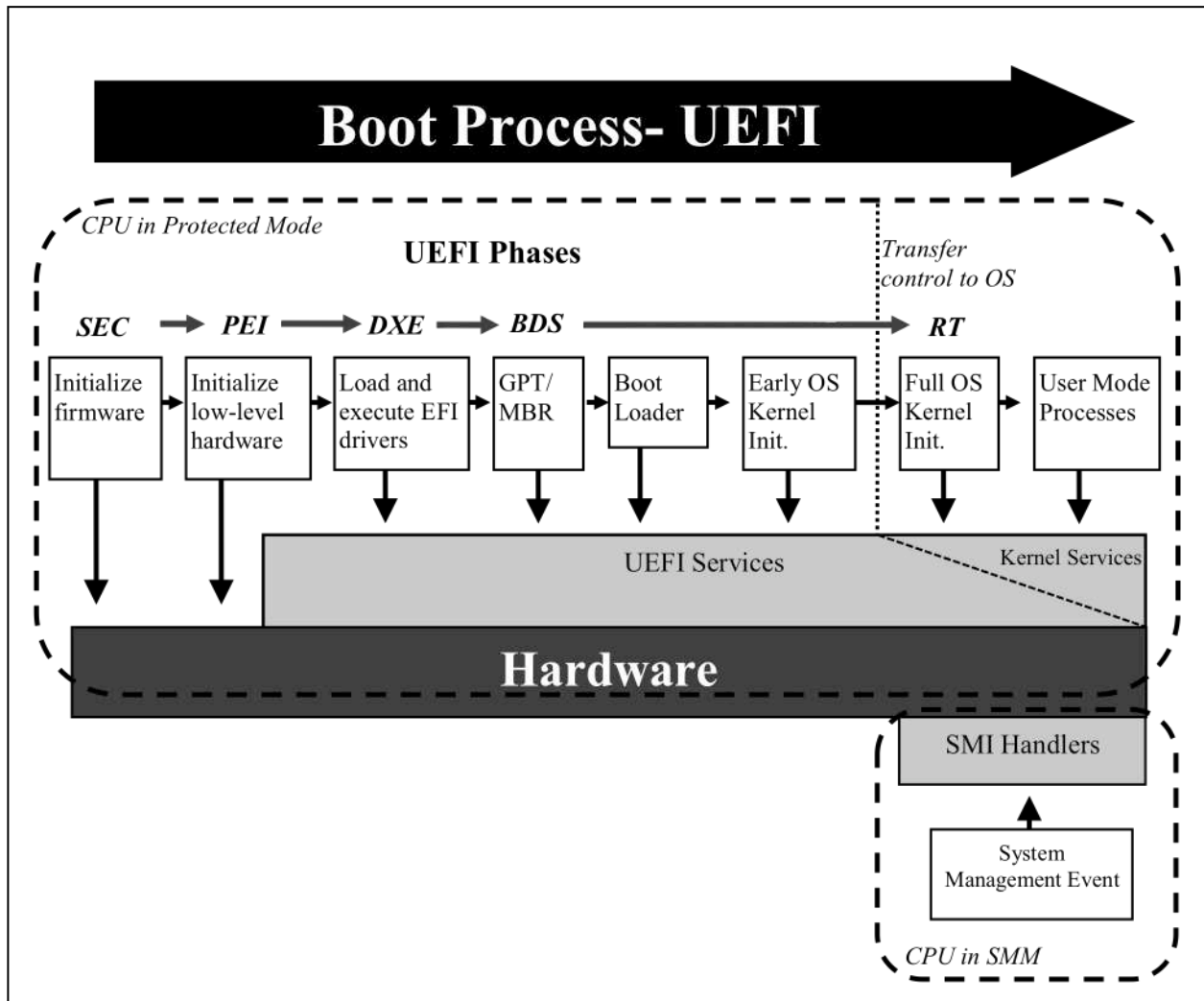


Figure 2: UEFI BIOS Boot Process

The next phase of the UEFI boot process is the Pre-EFI Initialization (PEI) Phase. The PEI phase is intended to initialize key system components, such as the processor, chipset and motherboard. In some cases, the code in the Security Phase and the PEI Phase comprise the core root of trust in a UEFI system.

The purpose of the PEI Phase is to prepare the system for the Driver Execution Environment (DXE) phase. The DXE phase is where most system initialization is performed. The firmware executed in this phase is responsible for searching for and executing drivers that provide device support during the boot

process, or provide additional features. During this phase the UEFI BIOS may execute conventional option ROMs, which have a similar purpose.

The PEI and DXE phases of the UEFI boot process lay the foundation to load an operating system. The final tasks necessary to load an operating system are performed in the Boot Device Selection (BDS) phase. This phase initializes console devices for simple input/output operations on the system. These console devices include local text or graphical interfaces, as well as remote interfaces, such as Telnet or remote displays over HTTP. The BDS phase also loads any additional drivers necessary to manage console or boot devices. Finally, the firmware loads the boot loader from the first MBR or GUID Partition Table (GPT) formatted boot device, and loads the operating system.

During the boot process the UEFI BIOS loads SMI handlers and initializes ACPI tables and code.

The Run Time phase of the UEFI boot process begins when the operating system is ready to take control from the UEFI BIOS. UEFI runtime services are available to the operating system during this phase.

2.3 Updating the System BIOS

A system and its supporting management software and firmware may provide several authorized mechanisms for legitimately updating the system BIOS. These include:

1. **User-Initiated Updates:** System and motherboard manufacturers typically supply end users with utilities capable of updating the system BIOS. Historically, end users booted from external media to perform these updates, but today most manufacturers provide utilities that can update the system BIOS from the user's normal operating system. Depending on the security mechanisms implemented on the system, these utilities might directly update the system BIOS or they may schedule an update for the next system reboot.
2. **Managed Updates:** A given computer system may have hardware and software-based agents that allow a system administrator to remotely update the system BIOS without direct involvement from the user.
3. **Rollback:** System BIOS implementations that authenticate updates before applying them may also check version numbers during the update process. In these cases, the system BIOS may have a special update process for rolling back the installed firmware to an earlier version. For instance, the rollback process might require the physical presence of the user. This mechanism guards against attackers flashing old firmware with known vulnerabilities.
4. **Manual Recovery:** To recover from a corrupt or malfunctioning system BIOS, many computer systems provide mechanisms to allow a user with physical presence during the boot process to replace the current system BIOS with a known good version and configuration.
5. **Automatic Recovery:** Some computer systems are able to detect when the system BIOS has been corrupted and recover from a backup firmware image stored in a separate storage location from the primary system BIOS (e.g., a second flash memory chip, a hidden partition on a hard drive).

2.4 Importance of BIOS Integrity

As the first code that is executed by the main CPU, the system BIOS is a critical security component of a computer system. While the system BIOS, possibly with the use of a Trusted Platform Module (TPM), can verify the integrity of firmware and software executed later in the boot process, typically all or part of the system BIOS is implicitly trusted.

The system BIOS is a potentially attractive target for attack. Malicious code running at the BIOS level could have a great deal of control over a computer system. It could be used to compromise any components that are loaded later in the boot process, including the SMM code, boot loader, hypervisor,

and operating system. The BIOS is stored on non-volatile memory that persists between power cycles. Malware written into a BIOS could be used to re-infect machines even after new operating systems have been installed or hard drives replaced. Because the system BIOS runs early in the boot process with very high privileges on the machine, malware running at the BIOS level may be very difficult to detect. Because the BIOS loads first, there is no opportunity for anti-malware products to authoritatively scan the BIOS.

BIOS exploits would likely be highly system-specific—directed at a specific version of a system BIOS or certain hardware components (e.g., a particular motherboard chipset). In contrast, most malware targets software executing at or above the operating system kernel, where it is easier to develop and can attack larger classes of machines. BIOS-level malware may be more likely employed in targeted attacks on high-value computer systems. The move to UEFI-based BIOS may make it easier for malware to target the BIOS in a widespread fashion, as these BIOS implementations are based on a common specification.

For the reasons outlined above, there are few known instances of BIOS-level malware. At this time, the only publicly known malware targeting the system BIOS that has infected a significant number of computers is the CIH virus, also known as the Chernobyl virus [Sym02], first discovered in 1998. One element of the payload of this virus attempted to overwrite the BIOS on systems using a specific chipset that was widely deployed at the time. This malware relied on several vulnerabilities that are not present in modern machines.

Security researchers have demonstrated other potential attacks on conventional BIOS and EFI/UEFI firmware. Proof-of-concept attacks have been demonstrated that allow for the insertion of malicious code into conventional BIOS implementations that permit unsigned updates [SaOr09]. Other researchers have discovered a buffer-overflow vulnerability in the EFI BIOS on a modern platform. Although this EFI BIOS write-protects firmware early in the boot process and only flashes signed updates to firmware, the buffer overflow allowed the researchers to bypass the secure update process by executing an unsigned portion of the firmware update package before write protections were applied [WoTe09].

Vulnerabilities such as these could allow attackers to create stealthy malware that operate with very high privileges on a system. The system BIOS loads SMI handlers before passing control of the computer to the operating system. Malicious code written into a BIOS could modify the SMI handlers to create malware that would run in SMM [EmSp08]. This would give the malware unrestricted access to physical memory and peripherals connected to the host machine, and it would be very difficult for software running on the operating system to detect.

2.5 Threats to the System BIOS

The preceding section established the importance of maintaining the integrity of the system BIOS. This section describes some of the various ways that the integrity of the system BIOS can be attacked, and identifies the attacks considered within scope for the security controls and processes specified in Section 3.

The first threat to the integrity of the system BIOS comes while the system moves through the supply chain. Supply chain security techniques are out of scope for the security controls specified in this document. Some of the procedures specified in Section 3.2 can, however, be used to identify and remedy systems that have an unapproved system BIOS.

Assuming that the system arrives with the manufacturer's intended system BIOS installed, there are a number of threats to the integrity of the system BIOS during the system's lifetime:

- One of the most difficult threats to prevent is a user-initiated installation of a malicious system BIOS. User-initiated BIOS update utilities are often the primary method for updating the system BIOS. The guidelines included in this document will not prevent users from installing unapproved BIOS images if they have physical access to the computer system. As with supply chain threats, security processes may be able to detect and remediate the unapproved system BIOS, such as initiating a recovery process to restore to an approved BIOS.
- Malware could leverage weak BIOS security controls or exploit vulnerabilities in the system BIOS itself to reflash or modify the system BIOS. General-purpose malicious software is unlikely to include this functionality, but a targeted attack on an organization could be directed towards an organization's standard system BIOS. The malicious BIOS can be delivered to the system either over a network, or using media. The guidelines presented in this document are designed to prevent these kinds of attack.
- Network-based system management tools could also be used to launch an organization-wide attack on system BIOSs. For example, consider an organization-maintained update server for the organization's deployed system BIOS; a compromised server could push a malicious system BIOS to computer systems across the organization. This is a high-impact attack, but requires either an insider or compromise of an organization's update process. The guidelines presented in this document are designed to prevent this kind of attack.
- Any of the preceding mechanisms could be used to rollback to an authentic but vulnerable system BIOS. This is a particularly insidious attack, since the "bad" BIOS is authentic (i.e., shipped by the manufacturer). The security controls specified in the following section are primarily focused on verifying the source and integrity of the system BIOS. This document includes recommended controls for rollback protection.

The controls described in the following section are primarily focused on preventing unauthorized modification of the system BIOS by potentially malicious software running on computer systems. Installation of an unapproved system BIOS in the supply chain, by individuals with physical access, or through rollback to an authenticated but vulnerable system BIOS, are not addressed by the controls in Section 3.1, but can be addressed using processes specified in Section 3.2.

3. Threat Mitigation

BIOS is a critical component of a secure system. As the first code executed during the boot process, the system BIOS is implicitly trusted by hardware and software components in a system. The previous section described the system BIOS's role in the boot process, the system BIOS's appeal to attackers, and the potential threats resulting in the unauthorized modification of the BIOS. This section presents security guidelines for BIOS implementations and recommended practices for managing BIOSs in an enterprise environment. Section 3.1 provides guidelines for a secure BIOS update process. It is intended for platform vendors designing, implementing, or selecting a system BIOS implementation. While products may not be immediately available, organizations can use these guidelines as input to their procurement processes and begin developing plans to make use of these security features when they are available. Organizations can use the recommended BIOS management practices in Section 3.2 when developing these plans. The recommendations are intended to prevent unauthorized modification of the BIOS.

3.1 Security Guidelines for System BIOS Implementations

This subsection provides guidelines intended to maintain the integrity of the BIOS after it has been provisioned by securing the mechanisms used for updating the BIOS. In particular, this subsection defines guidelines for system BIOS implementations for a secure BIOS update mechanism. A secure BIOS update mechanism includes:

1. a process for verifying the authenticity and integrity of BIOS updates; and
2. a mechanism for ensuring that the BIOS is protected from modification outside of the secure update process.

Authentication verifies that a BIOS update image was generated by an authentic source and is unaltered. All updates to the system BIOS shall either go through an authenticated BIOS update mechanism as described in Section 3.1.1 or use an optional secure local update mechanism compliant with the guidelines in Section 3.1.2.

These guidelines for a secure BIOS update mechanism do not mitigate all risks associated with the system BIOS. Some threats to unauthorized modification of the system BIOS remain. For example, these guidelines do not prevent individuals with physical access to systems from modifying the system BIOS. Nor do they guarantee the absence of vulnerabilities in the system BIOS implementations. The guidelines on the system BIOS should be used in conjunction with organizations' existing security policies and procedures.

3.1.1 BIOS Update Authentication

The authenticated BIOS update mechanism employs digital signatures to ensure the authenticity of the BIOS update image. To update the BIOS using the authenticated BIOS update mechanism, there shall be a Root of Trust for Update (RTU) that contains a signature verification algorithm and a key store that includes the public key needed to verify the signature on the BIOS update image. The key store and the signature verification algorithm shall be stored in a protected fashion on the computer system and shall be modifiable only using an authenticated update mechanism or a secure local update mechanism as outlined in Section 3.1.2.

The key store in the RTU shall include a public key used to verify the signature on a BIOS update image or include a hash [FIPS 180-3] of the public key if a copy of the public key is provided with the BIOS update image. In the latter case, the update mechanism shall hash the public key provided with the BIOS

update image and ensure that it matches a hash which appears in the key store before using the provided public key to verify the signature on the BIOS update image.

BIOS images shall be signed in conformance with NIST SP 800-89, *Recommendation for Obtaining Assurances for Digital Signature Applications* [SP800-89], using an approved digital signature algorithm as specified in NIST FIPS 186-3, *Digital Signature Standard* [FIPS186-3], that provides at least 112 bits of security strength, in accordance with NIST SP 800-131A, *Transitions: Recommendation for Transitioning the Use of Cryptographic Algorithms and Key Lengths* [SP800-131A].

The update mechanism shall ensure that the BIOS update image has been digitally signed and that the digital signature can be verified using a key in the RTU before updating the BIOS. Recovery mechanisms shall also use the authenticated update mechanism unless the recovery process meets the guidelines for a secure local update. The authenticated update mechanism should prevent the unauthorized rollback of the BIOS to an earlier authentic version that has a known security weakness. This limitation of the rollback mechanism may be accomplished, for example, by verifying that the version number of the BIOS image is larger than the currently installed BIOS image's version number.

Some organizations may wish to assert greater control over BIOS updates in high-security environments. The authenticated update mechanism may be designed to permit organizational control over the update process, where updates to the BIOS or rollbacks of the BIOS to an earlier version are permitted only if the update or rollback has been authorized by the organization. For example, specific BIOS images could be authorized by an organization by countersigning them with an organization-controlled key, which would be verified during the update process.

3.1.2 Secure Local Update

BIOS implementations may optionally include a secure local update mechanism that updates the system BIOS without using the authenticated update mechanism. The secure local update mechanism, if it is implemented, should be used only to load the first BIOS image or to recover from a corruption of a system BIOS that cannot be fixed using the authenticated update mechanism described in Section 3.1.1. A secure local update mechanism shall ensure the authenticity and integrity of the BIOS update image by requiring physical presence. Further protections may be implemented in the secure local update mechanism by requiring the entry of an administrator password or the unlocking of a physical lock (e.g., a motherboard jumper) before permitting the system BIOS to be updated.

3.1.3 Integrity Protection

To prevent unintended or malicious modification of the system BIOS outside the authenticated BIOS update process, the RTU and the system BIOS (excluding configuration data used by the system BIOS that is stored in non-volatile memory) shall be protected from unintended or malicious modification with a mechanism that cannot be overridden outside of an authenticated BIOS update. The protection mechanism shall itself be protected from unauthorized modification.

The authenticated BIOS update mechanism shall be protected from unintended or malicious modification by a mechanism that is at least as strong as that protecting the RTU and the system BIOS.

The protection mechanism shall protect relevant regions of the system flash memory containing the system BIOS prior to executing firmware or software that can be modified without using an authenticated update mechanism or a secure local update mechanism. Protections should be enforced by hardware mechanisms that are not alterable except by an authorized mechanism.

3.1.4 Non-Bypassability

The authenticated BIOS update mechanism shall be the exclusive mechanism for modifying the system BIOS absent physical intervention through the secure local update mechanism. The design of the system and accompanying system components and firmware shall ensure that there are no mechanisms that allow the system processor or any other system component to bypass the authenticated update mechanism, except for the secure local update mechanism. Any such mechanisms capable of bypassing the authenticated update mechanism could create a vulnerability allowing malicious software to modify the system BIOS or overwrite the system flash with a BIOS image from an illegitimate source.

A modern platform includes design features that give system components direct access to the system BIOS for performance improvements, such as shadowing the BIOS in RAM or for system management mode operations. System components may have read access to BIOS flash memory, but they shall not be able to directly modify the system BIOS except through the authenticated update mechanism or by an authorized mechanism requiring physical intervention. For example, bus mastering that bypasses the main processor (e.g., Direct Memory Access to the system flash) shall not be capable of directly modifying the firmware. Also, microcontrollers on the system shall not be capable of directly modifying the firmware, unless the hardware and firmware components of the microcontroller are protected with equivalent mechanisms at the RTU. These non-bypassability guidelines do not apply to configuration data used by the system BIOS that is stored in non-volatile memory.

3.2 Recommended Practices for BIOS Management

This section introduces considerations for managing system BIOS in an enterprise operational environment leveraging the existing policy, process, and operations practices. It focuses on key activities revolving around provisioning, deploying, managing, and decommissioning the system BIOS as part of its overall platform life cycle. Activities performed in a recovery phase are also specified to handle exceptional conditions.

Provisioning Phase: It is crucial that the organization institute a mechanism for identifying, inventorying, and tracking the different computer systems across the enterprise throughout their life cycle. Identifying and monitoring the BIOS image characteristics such as manufacturer name, version, or time stamp allows the organization to perform update, rollback, and recovery. The organization should maintain a “golden master image” for each approved system BIOS, including superseded versions, in secure offline storage.

If the platform has a configurable Root of Trust for Update (RTU), the organization needs to maintain a copy of the key store and signature verification algorithm. If the RTU is integrated into the system BIOS then this guideline is satisfied by maintaining the golden BIOS image. If the RTU is not integrated into the system BIOS, the security afforded the RTU should be at least as strong as that for the golden BIOS image.

Most organizations will rely upon the manufacturer as the source for the authenticated BIOS. In this case, the organization does not maintain any private keys, and the RTU contains only public keys provided by the manufacturer. Where the organization prefers to participate actively in the BIOS authentication process by countersigning some or all approved system BIOS updates, the RTU may contain one or more public keys associated with the organization. In this case, the organization must securely maintain the corresponding private key so that the next BIOS update can be signed. Private keys should be maintained under multi-party control to protect against insider attacks. For organizational keys, the corresponding public keys must also be maintained securely (to ensure authentication of origin).

In addition, a common configuration baseline for each platform must be created to conform to the organization's policy. The baseline should ensure that the integrity protection and non-bypassability features are enabled (if they are configurable), and organization policies for password policy and device boot order are enforced. Finally, the BIOS image information and associated baseline of settings for each platform should be documented in the configuration management plan.²

Platform Deployment Phase: The secure local update process should be used to provision the approved BIOS for that platform from the golden master image, the corresponding RTU should be installed, and BIOS-related configuration parameters established before computer systems are deployed. This will help the organization maintain a consistent, known starting posture. The organization should periodically perform assessments to confirm that the organization's BIOS policies, processes, and procedures are being followed properly.

Specifically, the procedures must ensure that the appropriate system BIOS is installed, the RTU contains all required keys and no unauthorized keys, and the integrity protection and non-bypassability features are enabled if they are configurable.

Operation and Maintenance Phase: This phase includes the operations and maintenance activities that are important for maintaining BIOS security and reliability in the operational environment. System BIOS updates should be performed using a change management process and the new approved version should be documented in the configuration plan, noting the previous BIOS image has been superseded.

The BIOS image and configuration baseline should be continuously monitored. If an unapproved deviation from this baseline is detected, the event should be investigated, documented, and remediated as part of incident response activities. The incident response plan should document the process and set of authorized tools that can be used to capture the evidence to help determine the root cause.³ The secure local update mechanism should be used to recover from a BIOS image compromise.

When a new BIOS image is required to extend system capabilities, improve system reliability, or remediate software vulnerabilities, BIOS updates should be performed using the authenticated update process. Where the organization participates actively in the update process, the multi-party control process must be executed to retrieve the private key from secure storage and generate the digital signature. The BIOS installation package should also be signed, and the digital signature should be verified before execution. Once the update has executed successfully, the configuration baseline should be validated to confirm that the computer system is still in compliance with the organization's defined policy.

Recovery Phase: In some circumstances, a BIOS update will be required that cannot be accomplished using the authenticated update process. For example, a corrupted system BIOS or RTU may be unable to execute or invoke the authentication procedures. In this case, the appropriate system BIOS and/or RTU may be able to be installed using the secure local update process. In other cases, a BIOS update may have unintended consequences, forcing the organization to roll back to an earlier version. Extra steps may be required for an authenticated update to authorize rollback (if versioning or timestamps are compared during the standard authentication process), or the secure local update process may be required to reestablish a secure baseline. As with the Operations and Maintenance phase, it is essential to validate

² See Draft NIST SP 800-128, *Guide for Security Configuration Management of Information Systems* [SP800-128] for guidelines on developing a configuration management plan.

³ For additional information on establishing incident response capabilities and handling incidents efficiently and effectively, see NIST SP 800-61rev1 *Computer Security Incident Handling Guide* [SP800-61].

the configuration of the BIOS against the organization's defined policy after BIOS rollback or reinstallation.

Disposition Phase: Before the computer system is disposed and leaves the organization, the organization should remove or destroy any sensitive data from the system BIOS. The configuration baseline should be reset to the manufacturer's default profile; in particular, sensitive settings such as passwords should be deleted from the system and keys should also be removed from the key store. If the system BIOS includes any organization-specific customizations then a vendor-provided BIOS image should be installed. This phase of the platform life cycle reduces chances for accidental data leakage.

Appendix A Summary of Guidelines for System BIOS Implementations

This appendix contains a summary of the secure BIOS update guidelines for system BIOS implementations found in Section 3.1. These guidelines are intended for platform vendors designing, implementing, or selecting a system BIOS implementation. Readers should consult the relevant sections in the main body of this document for additional informative text that further describes the intent and context of the guidelines.

1. Approved BIOS Update Mechanisms

- 1-A** All updates to the system BIOS shall use either an authenticated BIOS update mechanism as described in Section 3.1.1 or an optional secure local update mechanism compliant with the guidelines in Section 3.1.2.

2. BIOS Update Authentication

- 2-A** There shall be a Root of Trust for Update (RTU) that contains a signature verification algorithm and a key store that includes the public key needed to verify the signature on the BIOS update image.
- 2-B** The key store and the signature verification algorithm shall be stored in a protected fashion on the computer system and shall be modifiable only using an authenticated update mechanism or a secure local update mechanism as outlined in Section 3.1.2.
- 2-C** The key store in the RTU shall include the public key for verifying the signature on a BIOS update image or include the hash [FIPS 180-3] of the public key for verifying the signature on a BIOS update image that includes the public key. In the latter case, the update mechanism shall ensure that the hash of the public key provided with the BIOS update image appears in the key store before using the provided public key to verify the signature on the BIOS update image.
- 2-D** BIOS images shall be signed in conformance with NIST SP 800-89, *Recommendation for Obtaining Assurances for Digital Signature Applications* [SP800-89], using an approved digital signature algorithm as specified in NIST FIPS 186-3, *Digital Signature Standard* [FIPS186-3], that provides at least 112 bits of security strength, in accordance with NIST SP 800-131A, *Transitions: Recommendation for Transitioning the Use of Cryptographic Algorithms and Key Lengths* [SP800-131A].
- 2-E** The authenticated update mechanism shall ensure that the BIOS update image has been digitally signed and that the digital signature can be verified using one of the keys in the key store in the RTU before updating the BIOS.

3. Secure Local Update (Optional)

BIOS implementations may optionally include a secure local update mechanism, where physical presence authorizes installation of BIOS update images without necessarily using the authenticate update mechanism.

- 3-A** A secure local update mechanism shall ensure the authenticity and integrity of the BIOS update image by requiring physical presence.

4. Integrity Protection

- 4-A** The RTU and the BIOS (excluding configuration data used by the BIOS that is stored in non-volatile memory) shall be protected from unintended or malicious modification using a mechanism that cannot be overridden outside of an authenticated BIOS update.
- 4-B** The protection mechanism shall be protected from unauthorized modification.
- 4-C** The authenticated BIOS update mechanism shall be protected from unintended or malicious modification by a mechanism that is at least as strong as that protecting the RTU and the system BIOS.
- 4-D** The protection mechanism shall protect relevant regions of the system flash memory containing the system BIOS prior to executing firmware or software that can be modified without using an authenticated update mechanism or a secure local update mechanism.
- 4-E** Protections should be enforced by hardware mechanisms that are not alterable except by an authorized mechanism.

5. Non-Bypassability

These non-bypassability guidelines do not apply to configuration data used by the system BIOS that is stored in non-volatile memory.

- 5-A** The authenticated BIOS update mechanism shall be the exclusive mechanism for modifying the system BIOS absent physical intervention through the secure local update mechanism.
- 5-B** The design of the system and accompanying system components and firmware shall ensure that there are no mechanisms that allow the system processor or any other system component to bypass the authenticated update mechanism, except for the secure local update mechanism.
- 5-C** While system components may have read access to BIOS flash memory, they shall not be able to directly modify the system BIOS except through the authenticated update mechanism or by an authorized mechanism requiring physical intervention.
 - 5-C.i** Bus mastering that bypasses the main processor (e.g., Direct Memory Access to the system flash) shall not be capable of directly modifying the firmware.

Microcontrollers on the system shall not be capable of directly modifying the firmware, unless the hardware and firmware components of the microcontroller are protected with equivalent mechanisms at the RTU.

Appendix B Glossary

Selected terms used in the publication are defined below.

Basic Input/Output System (BIOS): In this publication, refers collectively to boot firmware based on the conventional BIOS, Extensible Firmware Interface (EFI), and the Unified Extensible Firmware Interface (UEFI).

Conventional BIOS: Legacy boot firmware used in many x86-compatible computer systems. Also known as the legacy BIOS.

Core Root of Trust for Measurement (CRTM): The first piece of BIOS code that executes on the main processor during the boot process. On a system with a Trusted Platform Module the CRTM is implicitly trusted to bootstrap the process of building a measurement chain for subsequent attestation of other firmware and software that is executed on the computer system.

Extensible Firmware Interface (EFI): A specification for the interface between the operating system and the platform firmware. Version 1.10 of the EFI specifications was the final version of the EFI specifications, and subsequent revisions made by the Unified EFI Forum are part of the UEFI specifications.

Firmware: Software that is included in read-only memory (ROM).

Option ROM: Firmware that is called by the system BIOS. Option ROMs include BIOS firmware on add-on cards (e.g., video card, hard drive controller, network card) as well as modules which extend the capabilities of the system BIOS.

Protected Mode: An operational mode found in x86-compatible processors with hardware support for memory protection, virtual memory, and multitasking.

Real Mode: A legacy high-privilege operating mode in x86-compatible processors.

System Management Mode (SMM): A high-privilege operating mode found in x86-compatible processors used for low-level system management functions. System Management Mode is only entered after the system generates a System Management Interrupt and only executes code from a segregated block of memory.

System Flash Memory: The non-volatile storage location of system BIOS, typically in electronically erasable programmable read-only memory (EEPROM) flash memory on the motherboard. While system flash memory is a technology-specific term, guidelines in this document referring to the system flash memory are intended to apply to any non-volatile storage medium containing the system BIOS.

Trusted Platform Module (TPM): A tamper-resistant integrated circuit built into some computer motherboards that can perform cryptographic operations (including key generation) and protect small amounts of sensitive information, such as passwords and cryptographic keys.

Unified Extensible Firmware Interface (UEFI): A possible replacement for the conventional BIOS that is becoming widely deployed in new x86-based computer systems. The UEFI specifications were preceded by the EFI specifications.

Appendix C Acronyms and Abbreviations

This appendix contains a list of selected acronyms and abbreviations used in the guide.

ACPI	Advanced Configuration and Power Interface
BDS	Boot Device Selection
BIOS	Basic Input/Output System
CPU	Central Processing Unit
CRTM	Core Root of Trust for Measurement
DXE	Driver Execution Environment
EEPROM	Electrically Erasable Programmable Read-Only Memory
EFI	Extensible Firmware Interface
FIPS	Federal Information Processing Standard
FISMA	Federal Information Security Management Act
GPT	GUID Partition Table
GUID	Globally Unique Identifier
HTTP	Hypertext Transfer Protocol
IT	Information Technology
ITL	Information Technology Laboratory
MBR	Master Boot Record
NIST	National Institute of Standards and Technology
OEM	Original Equipment Manufacturer
OMB	Office of Management and Budget
OS	Operating System
PEI	Pre-EFI Initialization
POST	Power-on self-test
PXE	Preboot Execution Environment
ROM	Read-only Memory
RT	Runtime
RTU	Root of Trust for Update
SMI	System Management Interrupt
SMM	System Management Mode
SP	Special Publication
TPM	Trusted Platform Module
UEFI	Unified Extensible Firmware Interface

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CPU Benchmarks

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AMD Ryzen 5 PRO 5650G

Price and performance details for the AMD Ryzen 5 PRO 5650G can be found below. This is made using thousands of [PerformanceTest](#) benchmark results and is updated daily.

- The first graph shows the relative performance of the CPU compared to the 10 other common (single) CPUs in terms of PassMark CPU Mark.
- The 2nd graph shows the value for money, in terms of the CPUMark per dollar.
- The pricing history data shows the price for a single Processor. For multiple Processors, multiply the price shown by the number of CPUs.

CPUS	AMD Ryzen 5 PRO 5650G	Average CPU Mark														
<ul style="list-style-type: none"> High End <ul style="list-style-type: none"> High Mid Range Low Mid Range Low End Best Value (On Market) <ul style="list-style-type: none"> Best Value XY Scatter Best Value (All time) New Desktop <ul style="list-style-type: none"> New Laptop Single Thread <ul style="list-style-type: none"> Systems with Multiple CPUs Overclocked Power Performance CPU Mark by Socket Type Cross-Platform CPU Performance CPU Mega List <ul style="list-style-type: none"> Search Model Compare ⁰ Common <ul style="list-style-type: none"> Most Benchmarked AMD vs Intel Market Share 	<p>Description: with Radeon Graphics</p> <table border="1"> <tr> <td>Class: Desktop</td> <td>Socket: AM4</td> </tr> <tr> <td>Clockspeed: 3.9 GHZ</td> <td>Turbo Speed: 4.4 GHZ</td> </tr> <tr> <td>Cores: 6</td> <td>Typical TDP: 65 W</td> </tr> <tr> <td>Threads: 12</td> <td></td> </tr> </table> <p>Other names: AMD Ryzen 5 PRO 5650G with Radeon Graphics</p> <p>CPU First Seen on Charts: Q2 2021</p> <p>CPUMark/\$Price: NA</p> <p>Overall Rank: 290</p> <p>Last Price Change: NA</p>	Class: Desktop	Socket: AM4	Clockspeed: 3.9 GHZ	Turbo Speed: 4.4 GHZ	Cores: 6	Typical TDP: 65 W	Threads: 12		<p>Average CPU Mark</p> <p> 20425</p> <p>Single Thread Rating: 3217 Samples: 44* *Margin for error: Low</p> <p>+ COMPARE</p>						
Class: Desktop	Socket: AM4															
Clockspeed: 3.9 GHZ	Turbo Speed: 4.4 GHZ															
Cores: 6	Typical TDP: 65 W															
Threads: 12																
	<p>CPU Test Suite Average Results for AMD Ryzen 5 PRO 5650G</p> <table border="1"> <tr> <td>Integer Math</td> <td>72,209 MOps/Sec</td> </tr> <tr> <td>Floating Point Math</td> <td>39,196 MOps/Sec</td> </tr> <tr> <td>Find Prime Numbers</td> <td>61 Million Primes/Sec</td> </tr> <tr> <td>Random String Sorting</td> <td>26 Thousand Strings/Sec</td> </tr> <tr> <td>Data Encryption</td> <td>15,853 MBytes/Sec</td> </tr> <tr> <td>Data Compression</td> <td>247.7 MBytes/Sec</td> </tr> <tr> <td>Physics</td> <td>910 Frames/Sec</td> </tr> </table>	Integer Math	72,209 MOps/Sec	Floating Point Math	39,196 MOps/Sec	Find Prime Numbers	61 Million Primes/Sec	Random String Sorting	26 Thousand Strings/Sec	Data Encryption	15,853 MBytes/Sec	Data Compression	247.7 MBytes/Sec	Physics	910 Frames/Sec	
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Data Compression	247.7 MBytes/Sec															
Physics	910 Frames/Sec															

Produtos e modelos habilitados à fruição dos benefícios fiscais da Lei de Informática

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Endereço:	Estrada Municipal José Costa de Mesquita, nº 200, Módulos 05 a 10 Sapezal Indaiatuba / SP - 13337200
Contato:	Ricardo Horácio Bloj rbloj@lenovo.com (11)33365112 https://www3.lenovo.com/br/pt/
Produto:	Microcomputador portátil, de peso inferior a 3,5 kg, com teclado alfanumérico de no mínimo 70 teclas, e com uma tela de área superior a 140 cm ² e inferior a 560 cm ²
Processo MCT/Data:	01200.002363/2012-38 de 16/07/2012
CNPJ da Incentivada:	07275920000161
Portaria MCT/MDIC/MF:	786, de 01/11/2012 DOU 05/11/2012 ()
Modelos:	(21-11-12: T430) (21-11-12: X230) (06-02-13: S400) (06-02-13: S400U) (20-03-13: Z400) (20-03-13: Z400 TOUCH) (09-04-13: B490) (09-04-13: T430U) (25-04-13: G485) (02-07-13: G400S) (02-07-13: G400S TOUCH) (02-07-13: S400 TOUCH)(20-09-13: YOGA11S) (17-10-13: E431) (17-10-13: L1125) (17-10-13: L1145) (17-10-13: HELIX) (06-12-13: FLEX14) (16-12-13: T440P) (18-12-13: T440) (30-12-13: L1325) (03-02-14: G405) (03-02-14: X240) (13-05-14: L40-30) (23-05-14: L440) (23-05-14: L40-70) (25-06-14: YOGA 2) (25-06-14: G40-70) (25-06-14: YOGA 2 13) (03-07-14: Z40-70) (10-07-14: T440S) (30-12-14: NOTEBOOK B4030) (30-12-14: NOTEBOOK B4070) (30-12-14: NOTEBOOK F4030) (25-03-15: NOTEBOOK THINKPAD X250) (25-03-15: NOTEBOOK THINKPAD T450) (25-03-15: NOTEBOOK G40-80 SWG) (25-03-15: NOTEBOOK G40-80 UMA) (15-04-15: NOTEBOOK T450S) (15-04-15: NOTEBOOK THINKPAD L450) (06-07-15: NOTEBOOK IDEAPAD 100-14IBY) (06-07-15: NOTEBOOK YOGA 500-14IBD) (29-10-15: NOTEBOOK B40-80) (27-11-15: NOTEBOOK LENOVO B40-70/WINDOWS 8.1 PRO) (27-11-15: NOTEBOOK LENOVO B40-70/WINDOWS EM) (23-12-15: NOTEBOOK THINKPAD T450S/WINDOWS 8.1) (23-12-15: NOTEBOOK THINKPAD T450S/WINDOWS 8.1 PRO) (23-12-15: NOTEBOOK THINKPAD T450S/WINDOWS 8.1 PRO DG) (23-12-15: NOTEBOOK THINKPAD T450S/WINDOWS 10 PRO) (23-12-15: NOTEBOOK THINKPAD T450S/WINDOWS 10 PRO DG) (23-12-15: NOTEBOOK LENOVO B40-70/FREEDOS) (23-12-15: NOTEBOOK THINKPAD L450/WINDOWS 8.1) (23-12-15: NOTEBOOK THINKPAD L450/WINDOWS 8.1 PRO) (23-12-15: NOTEBOOK THINKPAD L450/WINDOWS 8.1 PRO DG) (23-12-15: NOTEBOOK THINKPAD L450/WINDOWS 10 PRO) (23-12-15: NOTEBOOK THINKPAD L450/WINDOWS 10 PRO DG) (14-01-16: NOTEBOOK LENOVO G40-80/WINDOWS 10 HOME EM) (14-01-16: NOTEBOOK LENOVO G40-80/WINDOWS 10 HOME HIGH END EM) (14-01-16: NOTEBOOK LENOVO G40-80/WINDOWS 8.1) (11-04-16: NOTEBOOK THINKPAD T460S/WINDOWS 8.1) (11-04-16: NOTEBOOK THINKPAD T460S/WINDOWS 8.1 PRO) (11-04-16: NOTEBOOK THINKPAD T460S/WINDOWS 8.1 PRO DG) (11-04-16: NOTEBOOK THINKPAD T460S/WINDOWS 10 PRO) (11-04-16: NOTEBOOK THINKPAD T460S/WINDOWS 10 PRO DG) (25-04-16: NOTEBOOK IDEAPAD 310-14ISK/WINDOWS 10 HOME EM) (25-04-16: NOTEBOOK IDEAPAD 310-14ISK/WINDOWS 10 HOME HIGH END EM) (13-05-16: NOTEBOOK YOGA 510-14ISK /WINDOWS 10 HOME EM) (13-05-16: NOTEBOOK YOGA 510-14ISK /WINDOWS 10 HOME HIGH END EM) (13-05-16: NOTEBOOK THINKPAD T460/WINDOWS 8.1) (13-05-16: NOTEBOOK THINKPAD T460/WINDOWS 8.1 PRO) (13-05-16: NOTEBOOK THINKPAD T460/WINDOWS 8.1 PRO DG) (13-05-16: NOTEBOOK THINKPAD T460/WINDOWS 10 PRO) (13-05-16: NOTEBOOK THINKPAD T460/WINDOWS 10 PRO DG) (13-06-16: NOTEBOOK THINKPAD L460/WINDOWS 8.1) (13-06-16: NOTEBOOK THINKPAD L460/WINDOWS 8.1 PRO) (13-06-16: NOTEBOOK THINKPAD L460/WINDOWS 8.1 PRO DG) (13-06-16: NOTEBOOK THINKPAD L460/WINDOWS 10 PRO) (13-06-16: NOTEBOOK THINKPAD L460/WINDOWS 10 PRO DG) (24-06-16: NOTEBOOK LENOVO V310/WINDOWS 10 SL) (24-06-16: NOTEBOOK LENOVO V310/WINDOWS 10 PRO) (24-06-16: NOTEBOOK LENOVO V310/WINDOWS 10 PRO DG) (01-07-16: NOTEBOOK IDEAPAD 110-14IBR / WINDOWS 10 HOME EM) (01-07-16: NOTEBOOK IDEAPAD 110-14IBR / LINUX) (28-07-16: NOTEBOOK IDEAPAD 310-14ISK/LINUX)(24-08-16: NOTEBOOK LENOVO B110/WINDOWS 10) (24-08-16: NOTEBOOK LENOVO B110/WINDOWS 10 PRO) (24-08-16: NOTEBOOK LENOVO B110/WINDOWS 10 PRO DG) (27-10-16: NOTEBOOK LENOVO B110/WINDOWS 10) (27-10-16: NOTEBOOK LENOVO B110/WINDOWS 10 PRO) (27-10-16: NOTEBOOK LENOVO B110/WINDOWS 10 PRO DG) (27-10-16: NOTEBOOK LENOVO B110/LINUX) (07-12-16: THINKPAD T460 I5 6300U/4GB DDR3L/HD500GB/WINDOWS 10 PRO 64) (07-12-16: THINKPAD T460 I5 6300U/8GB DDR3L/SSD256GB/WINDOWS 10 PRO 64) (07-12-16: THINKPAD T460 I7 6600U/16GB DDR3L(02X8GB)/SSD 256GB/WINDOWS 10 PRO 64) (15-12-16: NOTEBOOK THINKPAD E470/WINDOWS 10 PRO) (15-12-16: NOTEBOOK THINKPAD E470/WINDOWS 10 PRO DG) (03-03-17: NOTEBOOK THINKPAD X270/WINDOWS 10 PRO) (03-03-17: NOTEBOOK THINKPAD X270/WINDOWS 10 PRO DG) (19-04-17: NOTEBOOK THINKPAD T470/WINDOWS 10 PRO) (27-04-17: NOTEBOOK THINKPAD T470/SEM SISTEMA OPERACIONAL) (27-04-17: NOTEBOOK THINKPAD T470/WINDOWS 10) (27-04-17: NOTEBOOK THINKPAD T470/WINDOWS 10 PRO DG) (13-06-17: NOTEBOOK IDEAPAD YOGA 520-14IKB/WINDOWS 10 HOME) (13-06-17: NOTEBOOK IDEAPAD YOGA 520-14IKB/LINUX) (13-06-17: NOTEBOOK IDEAPAD YOGA 520-14IKB/SEM SISTEMA OPERACIONAL) (13-06-17: NOTEBOOK IDEAPAD 320-14IKB/WINDOWS 10 HOME) (13-06-17: NOTEBOOK IDEAPAD 320-14IKB/LINUX) (13-06-17: NOTEBOOK IDEAPAD 320-14IKB/SEM SISTEMA OPERACIONAL) (30-

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14IIL05 / LINUX) (26-06-20: NOTEBOOK LENOVO IDEADPAD FLEX 5 14IIL05 / WINDOWS 10 HOME) (26-06-20: NOTEBOOK LENOVO IDEADPAD FLEX 5 14IIL05 / WINDOWS 10 PRO) (26-06-20: NOTEBOOK LENOVO IDEADPAD FLEX 5 14IIL05 / SEM SISTEMA OPERACIONAL) (21-07-20: NOTEBOOK THINKPAD T14 / LINUX) (21-07-20: NOTEBOOK THINKPAD T14 / WINDOWS 10 HOME) (21-07-20: NOTEBOOK THINKPAD T14 / WINDOWS 10 PRO) (21-07-20: NOTEBOOK THINKPAD T14 / SEM SISTEMA OPERACIONAL) (21-07-20: NOTEBOOK THINKPAD T14 AMD / LINUX) (21-07-20: NOTEBOOK THINKPAD T14 AMD / WINDOWS 10 HOME) (21-07-20: NOTEBOOK THINKPAD T14 AMD / WINDOWS 10 PRO) (21-07-20: NOTEBOOK THINKPAD T14 AMD / SEM SISTEMA OPERACIONAL) (20-08-20: NOTEBOOK THINKPAD E14/WINDOWS 10 PROFESSIONAL) (20-08-20: NOTEBOOK THINKPAD E14/WINDOWS 10 HOME) (20-08-20: NOTEBOOK THINKPAD E14/LINUX) (20-08-20: NOTEBOOK THINKPAD E14/SEM SISTEMA OPERACIONAL) (25-08-20: NOTEBOOK THINKPAD L13/WINDOWS 10 PRO) (25-08-20: NOTEBOOK THINKPAD L13/WINDOWS 10 HOME) (25-08-20: NOTEBOOK THINKPAD L13/LINUX) (25-08-20: NOTEBOOK THINKPAD L13/SEM SISTEMA OPERACIONAL) (31-08-20: NOTEBOOK THINKPAD E14 AMD / LINUX) (31-08-20: NOTEBOOK THINKPAD E14 AMD / WINDOWS 10 HOME) (31-08-20: NOTEBOOK THINKPAD E14 AMD / WINDOWS 10 PRO) (31-08-20: NOTEBOOK THINKPAD E14 AMD / SEM SISTEMA OPERACIONAL) (12-02-21: NOTEBOOK LENOVO IDEAPAD 3-15IML / LINUX) (12-02-21: NOTEBOOK LENOVO IDEAPAD 3-15IML / WINDOWS 10 HOME) (12-02-21: NOTEBOOK LENOVO IDEAPAD 3-15IML / SEM SISTEMA OPERACIONAL) (12-02-21: NOTEBOOK LENOVO IDEAPAD 3-15IGL / LINUX) (12-02-21: NOTEBOOK LENOVO IDEAPAD 3-15IGL / WINDOWS 10 HOME) (12-02-21: NOTEBOOK LENOVO IDEAPAD 3-15IGL / SEM SISTEMA OPERACIONAL) (10-03-21: NOTEBOOK THINKPAD E14 GEN 2 INTEL / LINUX) (10-03-21: NOTEBOOK THINKPAD E14 GEN 2 INTEL / WINDOWS 10 HOME) (10-03-21: NOTEBOOK THINKPAD E14 GEN 2 INTEL / WINDOWS 10 PRO) (10-03-21: NOTEBOOK THINKPAD E14 GEN 2 INTEL / SEM SISTEMA OPERACIONAL) (16-04-21: NOTEBOOK LENOVO YOGA 7-14ITL / LINUX) (16-04-21: NOTEBOOK LENOVO YOGA 7-14ITL / WINDOWS 10 HOME) (16-04-21: NOTEBOOK LENOVO YOGA 7-14ITL / WINDOWS 10 PRO) (16-04-21: NOTEBOOK LENOVO YOGA 7-14ITL / SEM SISTEMA OPERACIONAL) (16-04-21: NOTEBOOK LENOVO THINKPAD L14 AMD / LINUX) (16-04-21: NOTEBOOK LENOVO THINKPAD L14 AMD / WINDOWS 10 HOME) (16-04-21: NOTEBOOK LENOVO THINKPAD L14 AMD / SEM SISTEMA OPERACIONAL) (16-04-21: NOTEBOOK LENOVO THINKPAD L14 AMD / WINDOWS 10 PRO) (16-04-21: NOTEBOOK LENOVO IDEAPAD FLEX 5-14ITL / LINUX) (16-04-21: NOTEBOOK LENOVO IDEAPAD FLEX 5-14ITL / WINDOWS 10 HOME) (16-04-21: NOTEBOOK LENOVO IDEAPAD FLEX 5-14ITL / SEM SISTEMA OPERACIONAL) (16-04-21: NOTEBOOK LENOVO IDEAPAD FLEX 5-14ITL / WINDOWS 10 PRO) (12-05-21: NOTEBOOK LENOVO V14 GEN 2 ITL / LINUX) (12-05-21: NOTEBOOK LENOVO V14 GEN 2 ITL / WINDOWS 10 HOME) (12-05-21: NOTEBOOK LENOVO V14 GEN 2 ITL / SEM SISTEMA OPERACIONAL) (12-05-21: NOTEBOOK LENOVO V14 GEN 2 ITL / WINDOWS 10 PRO) (30-07-21: NOTEBOOK THINKPAD E14 GEN 3 AMD / LINUX) (30-07-21: NOTEBOOK THINKPAD E14 GEN 3 AMD / WINDOWS 10 HOME) (30-07-21: NOTEBOOK THINKPAD E14 GEN 3 AMD / WINDOWS 10 PRO) (30-07-21: NOTEBOOK THINKPAD E14 GEN 3 AMD / SEM SISTEMA OPERACIONAL) (30-07-21: NOTEBOOK THINKPAD T14 GEN 2 / LINUX) (30-07-21: NOTEBOOK THINKPAD T14 GEN 2 / WINDOWS 10 HOME?) (30-07-21: NOTEBOOK THINKPAD T14 GEN 2 / SEM SISTEMA OPERACIONAL) (30-07-21: NOTEBOOK THINKPAD T14 GEN 2 / WINDOWS 10 PRO) (08-11-21: NOTEBOOK LENOVO FLEX 5 14ITL05/WINDOWS 11) (08-11-21: NOTEBOOK LENOVO FLEX 5 14ITL05/WINDOWS 11 HOME) (08-11-21: NOTEBOOK LENOVO FLEX 5 14ITL05/WINDOWS 11 PRO) (08-11-21: NOTEBOOK LENOVO YOGA 7 14ITL5BR / WINDOWS 11) (08-11-21: NOTEBOOK LENOVO YOGA 7 14ITL5BR / WINDOWS 11 HOME) (08-11-21: NOTEBOOK LENOVO YOGA 7 14ITL5BR / WINDOWS 11 PRO) (09-11-21: NOTEBOOK LENOVO IDEAPAD 3-15IML05/ WINDOWS 11) (09-11-21: NOTEBOOK LENOVO IDEAPAD 3-15IML05/ WINDOWS 11 PRO) (09-11-21: NOTEBOOK LENOVO IDEAPAD 3-15IML05/ WINDOWS 11 HOME) (09-11-21: NOTEBOOK LENOVO IDEAPAD 3-15IGL05 / WINDOWS 11) (09-11-21: NOTEBOOK LENOVO IDEAPAD 3-15IGL05 / WINDOWS 11 HOME) (09-11-21: NOTEBOOK LENOVO IDEAPAD 3-15IGL05 / WINDOWS 11 PRO) (09-11-21: NOTEBOOK LENOVO IDEAPAD 3-15IGL05 / WINDOWS 11 PRO) (17-11-21: NOTEBOOK LENOVO V14 GEN2 ITL/ WINDOWS 11) (17-11-21: NOTEBOOK LENOVO V14 GEN2 ITL/ WINDOWS 11 HOME) (17-11-21: NOTEBOOK LENOVO V14 GEN2 ITL/ WINDOWS 11 PRO) (01-04-22: NB TP L14 G2/WINDOWS 10 PRO 64) (01-04-22: NB TP L14 G2/ WINDOWS 11 PRO 64) (01-04-22: NB TP L14 G2/SEM SISTEMA OPERACIONAL) (29-04-22: NB LN K14 AMD G1/WINDOWS 11 PRO 64) (29-04-22: NB LN K14 AMD G1/WINDOWS 11) (29-04-22: NB LN K14 AMD

	G1/LINUX) (29-04-22: NB LN K14 AMD G1/SEM SISTEMA OPERACIONAL) (01-06-22: NOTEBOOK LENOVO IDEAPAD FLEX 5 14IAU7/WINDOWS 11) (01-06-22: NOTEBOOK LENOVO IDEAPAD FLEX 5 14IAU7/SEM SISTEMA OPERACIONAL) (01-06-22: NOTEBOOK LENOVO IDEAPAD FLEX 5 14IAU7/LINUX)
Produto:	Microcomputador portátil, de peso inferior a 3,5 kg, com teclado alfanumérico de no mínimo 70 teclas, e com uma tela de área superior ou igual a 560 cm ²
Processo MCT/Data:	01200.002363/2012-38 de 16/07/2012
CNPJ da Incentivada:	07275920000161
Portaria MCT/MDIC/MF:	786, de 01/11/2012 DOU 05/11/2012 ()
Modelos:	(15-10-14: G50) (15-10-14: G50-45) (06-07-15: NOTEBOOK IDEAPAD 100-15IBY) (06-07-15: NOTEBOOK G50-80) (23-12-15: NOTEBOOK IDEAPAD 300-15ISK/WINDOWS 10 HOME EM) (23-12-15: NOTEBOOK IDEAPAD 100-14IBY/WINDOWS 10 HOME EM) (23-12-15: NOTEBOOK IDEAPAD 100-14IBY/LINUX) (23-12-15: NOTEBOOK IDEAPAD 100-15IBY/WINDOWS 10 HOME EM) (23-12-15: NOTEBOOK IDEAPAD 100-15IBY/LINUX) (23-12-15: NOTEBOOK IDEAPAD 300-15ISK/WINDOWS 10 HOME HIGH END EM) (15-01-16: NOTEBOOK LENOVO G50-80/WINDOWS 10 HOME EM) (15-01-16: NOTEBOOK LENOVO G50-80/WINDOWS 10 HOME HIGH END EM) (25-04-16: NOTEBOOK IDEAPAD 310-15ISK/WINDOWS 10 HOME EM) (25-04-16: NOTEBOOK IDEAPAD 310-15ISK/WINDOWS 10 HOME HIGH END EM) (01-07-16: NOTEBOOK IDEAPAD 110-15IBR / WINDOWS 10 HOME EM) (01-07-16: NOTEBOOK IDEAPAD 110-15IBR / LINUX) (16-06-17: NOTEBOOK IDEAPAD 320-15IKB/WINDOWS 10 HOME) (16-06-17: NOTEBOOK IDEAPAD 320-15IKB/LINUX) (16-06-17: NOTEBOOK IDEAPAD 320-15IKB/SEM SISTEMA OPERACIONAL) (04-07-17: NOTEBOOK IDEAPAD 320-15IAP/WINDOWS 10 HOME) (04-07-17: NOTEBOOK IDEAPAD 320-15IAP/LINUX) (04-07-17: NOTEBOOK IDEAPAD 320-15IAP/SEM SISTEMA OPERACIONAL) (02-08-17: NOTEBOOK IDEAPAD B320-15IAP/WINDOWS 10 HOME) (02-08-17: NOTEBOOK IDEAPAD B320-15IAP/SEM SISTEMA OPERACIONAL) (23-08-17: NOTEBOOK LEGION Y720-15IKB/WINDOWS 10 HOME) (26-04-18: NOTEBOOK IDEAPAD 330-15IKB/WINDOWS 10 HOME) (26-04-18: NOTEBOOK IDEAPAD 330-15IKB/LINUX) (06-06-18: NOTEBOOK IDEAPAD 330-15IGM/WINDOWS 10 HOME) (06-06-18: NOTEBOOK IDEAPAD 330-15IGM/LINUX) (18-06-18: NOTEBOOK IDEAPAD 330S-15IKB/WINDOWS 10 HOME) (31-07-18: NOTEBOOK LEGION Y530-15ICH/WINDOWS 10 HOME) (30-08-18: NOTEBOOK IDEAPAD B330-15IGM/WINDOWS 10 HOME) (30-08-18: NOTEBOOK IDEAPAD B330S-15IKBR/WINDOWS 10 PRO) (30-08-18: NOTEBOOK IDEAPAD B330-15IKBR/WINDOWS 10 PRO) (30-08-18: NOTEBOOK IDEAPAD B330-15IKBR/WINDOWS 10 HOME) (30-08-18: NOTEBOOK IDEAPAD B330-15IKBR/SEM SISTEMA OPERACIONAL) (12-11-18: NOTEBOOK IDEAPAD 330S-15ARR / WINDOWS 10 HOME) (05-06-19: NOTEBOOK S145-15IWL/WINDOWS 10 HOME) (05-06-19: NOTEBOOK S145-15IWL/SEM SISTEMA OPERACIONAL) (05-06-19: NOTEBOOK S145-15IWL/LINUX) (02-08-19: NOTEBOOK Y540-15IRH/WINDOWS 10 HOME) (02-08-19: NOTEBOOK Y540-15IRH/SEM SISTEMA OPERACIONAL) (02-08-19: NOTEBOOK Y540-15IRH/LINUX) (06-08-19: NOTEBOOK L340-15IRH/WINDOWS 10 HOME) (06-08-19: NOTEBOOK L340-15IRH/SEM SISTEMA OPERACIONAL) (06-08-19: NOTEBOOK L340-15IRH/LINUX) (07-08-19: NOTEBOOK BS145-15IWL/WINDOWS 10 HOME) (07-08-19: NOTEBOOK BS145-15IWL/WINDOWS 10 PRO) (07-08-19: NOTEBOOK BS145-15IWL/SEM SISTEMA OPERACIONAL) (07-08-19: NOTEBOOK BS145-15IWL/LINUX) (13-08-19: NOTEBOOK S145-15API/WINDOWS 10 HOME) (13-08-19: NOTEBOOK S145-15API/SEM SISTEMA OPERACIONAL) (13-08-19: NOTEBOOK S145-15API/LINUX) (16-08-19: NOTEBOOK S145-15IGM/WINDOWS 10 HOME) (16-08-19: NOTEBOOK S145-15IGM/SEM SISTEMA OPERACIONAL) (16-08-19: NOTEBOOK S145-15IGM/LINUX) (18-09-19: NOTEBOOK BS145-15IGM/WINDOWS 10 HOME) (18-09-19: NOTEBOOK BS145-15IGM/WINDOWS 10 PRO) (18-09-19: NOTEBOOK BS145-15IGM/SEM SISTEMA OPERACIONAL) (18-09-19: NOTEBOOK BS145-15IGM/LINUX) (08-11-19: NOTEBOOK S145-15IKB/WINDOWS 10 HOME) (08-11-19: NOTEBOOK S145-15IKB/SEM SISTEMA OPERACIONAL) (08-11-19: NOTEBOOK IDEAPAD B330-15IKB/WINDOWS 10 HOME) (08-11-19: NOTEBOOK IDEAPAD B330-15IKB/WINDOWS 10 PRO) (08-11-19: NOTEBOOK IDEAPAD B330-15IKB/SEM SISTEMA OPERACIONAL) (08-11-19: NOTEBOOK THINKPAD E14/WINDOWS 10 PROFESSIONAL) (08-11-19: NOTEBOOK THINKPAD E14/WINDOWS 10 HOME) (08-11-19: NOTEBOOK THINKPAD E14/LINUX) (08-11-19: NOTEBOOK THINKPAD E14/SEM SISTEMA OPERACIONAL) (11-02-20: NOTEBOOK THINKPAD L13/WINDOWS 10 PRO) (11-02-20: NOTEBOOK THINKPAD L13/WINDOWS 10 HOME) (11-02-20: NOTEBOOK THINKPAD L13/LINUX) (11-02-20: NOTEBOOK THINKPAD L13/SEM SISTEMA OPERACIONAL) (11-02-20: NOTEBOOK IDEAPAD S145-15IIL / WINDOWS 10 HOME) (11-02-20: NOTEBOOK IDEAPAD S145-15IIL / WINDOWS 10 LINUX) (11-02-20: NOTEBOOK IDEAPAD S145-15IIL / SEM SISTEMA OPERACIONAL) (11-02-20: NOTEBOOK IDEAPAD S145-15IIL / WINDOWS 10 HOME) (11-02-20: NOTEBOOK IDEAPAD S145-15IIL / LINUX) (11-02-20: NOTEBOOK IDEAPAD S145-15IIL / SEM SISTEMA OPERACIONAL) (25-06-20: NOTEBOOK LENOVO LEGION 5 15IMH05 / LINUX) (25-06-20: NOTEBOOK LENOVO LEGION 5 15IMH05 / WINDOWS 10 HOME) (25-06-20: NOTEBOOK LENOVO LEGION 5 15IMH05 / SEM SISTEMA OPERACIONAL) (26-06-20: NOTEBOOK LENOVO IDEADPAD GAMING 3 15IMH05 / LINUX) (26-06-20: NOTEBOOK LENOVO IDEADPAD GAMING 3 15IMH05 / WINDOWS 10 HOME) (26-06-20: NOTEBOOK LENOVO IDEADPAD GAMING 3 15IMH05 / WINDOWS 10 PRO) (26-06-20: NOTEBOOK LENOVO IDEADPAD GAMING 3 15IMH05 / SEM SISTEMA OPERACIONAL) (20-08-20: NOTEBOOK LENOVO BS145-15IIL / WINDOWS 10 HOME) (20-08-20: NOTEBOOK LENOVO BS145-15IIL / WINDOWS 10 PRO) (20-08-20: NOTEBOOK LENOVO BS145-15IIL / LINUX) (20-08-20: NOTEBOOK LENOVO BS145-15IIL / SEM SISTEMA OPERACIONAL) (16-04-21: NOTEBOOK LENOVO V15 GEN 2 ITL / LINUX) (16-04-21: NOTEBOOK LENOVO V15 GEN 2 ITL / WINDOWS 10 HOME) (16-04-21: NOTEBOOK LENOVO V15 GEN 2 ITL / SEM SISTEMA OPERACIONAL) (16-04-21: NOTEBOOK LENOVO V15 GEN 2 ITL / WINDOWS 10 PRO) (26-05-21: NOTEBOOK LENOVO V15 GEN 1 IML / LINUX) (26-05-21: NOTEBOOK LENOVO V15 GEN 1 IML / WINDOWS 10 HOME) (26-05-21: NOTEBOOK LENOVO V15 GEN 1 IML / SEM SISTEMA OPERACIONAL) (26-05-21: NOTEBOOK LENOVO V15 GEN 1 IML / WINDOWS 10 PRO) (27-05-21: NOTEBOOK LENOVO IDEAPAD 3-15ALC6 / LINUX) (27-05-21: NOTEBOOK LENOVO IDEAPAD 3-15ALC6 / WINDOWS 10 HOME) (27-05-21: NOTEBOOK LENOVO IDEAPAD 3-15ALC6 / SEM SISTEMA OPERACIONAL) (27-05-21: NOTEBOOK LENOVO IDEAPAD 3-15ALC6 / WINDOWS 10 PRO)

	(07-06-21: NOTEBOOK LENOVO V15 GEN 1 IGL / LINUX) (07-06-21: NOTEBOOK LENOVO V15 GEN 1 IGL / WINDOWS 10 HOME) (07-06-21: NOTEBOOK LENOVO V15 GEN 1 IGL / SEM SISTEMA OPERACIONAL) (07-06-21: NOTEBOOK LENOVO V15 GEN 1 IGL / WINDOWS 10 PRO) (15-06-21: NOTEBOOK LENOVO IDEAPAD 3-15ITL06 / LINUX) (15-06-21: NOTEBOOK LENOVO IDEAPAD 3-15ITL06 / WINDOWS 10 HOME) (15-06-21: NOTEBOOK LENOVO IDEAPAD 3-15ITL06 / SEM SISTEMA OPERACIONAL) (15-06-21: NOTEBOOK LENOVO IDEAPAD 3-15ITL06 / WINDOWS 10 PRO) (16-06-21: NOTEBOOK LENOVO GAMING 3-15IHU06 / LINUX) (16-06-21: NOTEBOOK LENOVO GAMING 3-15IHU06 / WINDOWS 10 HOME) (16-06-21: NOTEBOOK LENOVO GAMING 3-15IHU06 / SEM SISTEMA OPERACIONAL) (16-06-21: NOTEBOOK LENOVO GAMING 3-15IHU06 / WINDOWS 10 PRO) (30-07-21: NOTEBOOK LENOVO LEGION5-15ITH06 / LINUX) (30-07-21: NOTEBOOK LENOVO LEGION5-15ITH06 / WINDOWS 10 HOME) (30-07-21: NOTEBOOK LENOVO LEGION5-15ITH06 / SEM SISTEMA OPERACIONAL) (30-07-21: NOTEBOOK LENOVO LEGION5-15ITH06 / WINDOWS 10 PRO) (03-09-21: NOTEBOOK IDEAPAD GAMING 3-15ACH06 / LINUX) (03-09-21: NOTEBOOK IDEAPAD GAMING 3-15ACH06 / WINDOWS 10 HOME) (03-09-21: NOTEBOOK IDEAPAD GAMING 3-15ACH06 / WINDOWS 10 PRO) (03-09-21: NOTEBOOK IDEAPAD GAMING 3-15ACH06 / SEM SISTEMA OPERACIONAL) (03-09-21: NOTEBOOK IDEAPAD GAMING 3-15ACH06 / WINDOWS 11) (15-09-21: NOTEBOOK LENOVO LEGION 5-15ACH06 / LINUX) (15-09-21: NOTEBOOK LENOVO LEGION 5-15ACH06 / WINDOWS 10 HOME) (15-09-21: NOTEBOOK LENOVO LEGION 5-15ACH06 / WINDOWS 10 PRO) (15-09-21: NOTEBOOK LENOVO LEGION 5-15ACH06 / SEM SISTEMA OPERACIONAL) (15-09-21: NOTEBOOK LENOVO LEGION 5-15ACH06 / WINDOWS 11) (20-09-21: NOTEBOOK LENOVO LEGION 5-15ITH / LINUX) (20-09-21: NOTEBOOK LENOVO LEGION 5-15ITH / SEM SISTEMA OPERACIONAL) (20-09-21: NOTEBOOK LENOVO LEGION 5-15ITH / WINDOWS 10 HOME) (20-09-21: NOTEBOOK LENOVO LEGION 5-15ITH / WINDOWS 10 PRO) (20-09-21: NOTEBOOK LENOVO LEGION 5-15ITH / WINDOWS 11) (30-09-21: NOTEBOOK LENOVO LEGION 5-15ITH / WINDOWS 11 PRO DG) (30-09-21: NOTEBOOK LENOVO LEGION 5-15ITH / WINDOWS 11 HOME) (05-10-21: NOTEBOOK IDEAPAD GAMING 3-15ACH06 / WINDOWS 11 PRO DG) (05-10-21: NOTEBOOK IDEAPAD GAMING 3-15ACH06 / WINDOWS 11 PRO) (05-10-21: NOTEBOOK IDEAPAD GAMING 3-15ACH06 / WINDOWS 11 HOME) (07-10-21: NOTEBOOK LENOVO LEGION 5-15ACH06/ WINDOWS 11 PRO DG) (07-10-21: NOTEBOOK LENOVO LEGION 5-15ACH06 / WINDOWS 11 HOME) (22-10-21: NOTEBOOK LENOVO GAMING 3-15IHU06 / WINDOWS 11) (22-10-21: NOTEBOOK LENOVO GAMING 3-15IHU06 / WINDOWS 11 PRO) (22-10-21: NOTEBOOK LENOVO GAMING 3-15IHU06 / WINDOWS 11 PRO DG) (22-10-21: NOTEBOOK LENOVO GAMING 3-15IHU06 / WINDOWS 11 HOME) (08-11-21: NOTEBOOK LENOVO V15 IML/ WINDOWS 11) (08-11-21: NOTEBOOK LENOVO V15 IML/ WINDOWS 11 HOME) (08-11-21: NOTEBOOK LENOVO V15 IML/ WINDOWS 11 PRO) (09-11-21: NOTEBOOK LENOVO IDEAPAD 3 15ALC6/WINDOWS 11) (09-11-21: NOTEBOOK LENOVO IDEAPAD 3 15ALC6/WINDOWS 11 HOME) (09-11-21: NOTEBOOK LENOVO IDEAPAD 3 15ALC6/WINDOWS 11 PRO) (09-11-21: NOTEBOOK LENOVO IDEAPAD 3 15ALC6/WINDOWS 11 PRO DG) (17-11-21: NOTEBOOK LENOVO V15 GEN2 ITL/ WINDOWS 11) (17-11-21: NOTEBOOK LENOVO V15 GEN2 ITL/ WINDOWS 11 PRO) (16-02-22: NOTEBOOK LENOVO IDEAPAD 3 15ITL6/WINDOWS 10 HOME) (16-02-22: NOTEBOOK LENOVO IDEAPAD 3 15ITL6/WINDOWS 11) (16-02-22: NOTEBOOK LENOVO IDEAPAD 3 15ITL6/WINDOWS 11) (01-06-22: NOTEBOOK LENOVO GAMING 3 15IAH7/WINDOWS 11) (01-06-22: NOTEBOOK LENOVO GAMING 3 15IAH7/SEM SISTEMA OPERACIONAL) (01-06-22: NOTEBOOK LENOVO GAMING 3 15IAH7/LINUX) (02-06-22: NOTEBOOK LENOVO LEGION 5 15IAH7H/WINDOWS 11) (02-06-22: NOTEBOOK LENOVO LEGION 5 15IAH7H/SEM SISTEMA OPERACIONAL) (02-06-22: NOTEBOOK LENOVO LEGION 5 15IAH7H /LINUX)
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Produto:	Microcomputador portátil, sem teclado, com tela sensível ao toque ("touch screen") - "Tablet PC"
Processo MCT/Data:	01200.001527/2013-91 de 16/04/2013
CNPJ da Incentivada:	07275920000161
Portaria MCT/MDIC/MF:	957, de 20/09/2013 DOU 24/09/2013 ()
Modelos:	

Produto:	Monitor de vídeo policromático, com tela de cristal líquido ("LCD")
Processo MCT/Data:	01200.000493/2015-89 de 11/02/2015
CNPJ da Incentivada:	07275920000161
Portaria MCT/MDIC/MF:	749, de 01/09/2015 DOU 02/09/2015 ()
Modelos:	

Produto:	Unidade de processamento digital de grande capacidade, baseada em microprocessador
Processo MCT/Data:	01200.000491/2015-90 de 11/02/2015
CNPJ da Incentivada:	07275920000161
Portaria MCT/MDIC/MF:	750, de 01/09/2015 DOU 02/09/2015 ()
Modelos:	(01-10-15: SERVIDOR X3850 X6)(07-11-16: SERVIDOR HX5510) (11-11-16: SERVIDOR HX3310) (05-04-17: SERVIDOR HX2310-E) (05-04-17: SERVIDOR HX7510) (20-04-17: SERVIDOR HX1310) (11-10-17: THINKSYSTEM SR850) (11-10-17: THINKSYSTEM SR950) (07-07-20: SERVIDOR THINKAGILE HX7821) (22-12-20: SERVIDOR THINKSYSTEM SR850 V2) (29-09-21: SERVIDOR THINKSYSTEM SR670 V2) (21-01-22: SERVIDOR THINKSYSTEM SR630 V2) (28-01-22: SERVIDOR THINKSYSTEM SR650 V2) (28-01-22: SERVIDOR THINKSYSTEM SN550 V2) (02-02-22: SERVIDOR THINKAGILE VX2330) (02-02-22: SERVIDOR THINKAGILE VX3330) (02-02-22: SERVIDOR THINKAGILE VX3730-N) (02-02-22: SERVIDOR THINKAGILE VX3331) (10-02-22: SERVIDOR THINKAGILE HX1331) (10-02-22: SERVIDOR THINKAGILE HX1330) (10-02-22: SERVIDOR THINKAGILE HX2330) (10-02-22: SERVIDOR THINKAGILE VX2375) (10-02-22: SERVIDOR THINKAGILE VX3375) (10-02-22: SERVIDOR THINKAGILE VX7375-N) (10-02-22: SERVIDOR THINKAGILE VX3376) (11-02-22: SERVIDOR THINKAGILE HX2331) (11-02-22: SERVIDOR THINKAGILE HX3330) (11-02-22: SERVIDOR THINKAGILE HX3331) (11-02-22: SERVIDOR THINKAGILE HX5530) (11-02-22: SERVIDOR THINKAGILE HX5530) (11-02-22: SERVIDOR THINKAGILE HX5531) (11-02-22: SERVIDOR THINKAGILE HX7530) (15-02-22: SERVIDOR THINKAGILE VX7531) (15-02-22: SERVIDOR THINKAGILE VX5530) (15-02-22: SERVIDOR THINKAGILE VX5575) (15-02-22: SERVIDOR THINKAGILE HX7531) (15-02-22: SERVIDOR THINKAGILE VX7530) (15-02-22: SERVIDOR THINKAGILE VX3575-G) (15-02-22: SERVIDOR THINKAGILE VX5575) (15-02-22: SERVIDOR THINKAGILE HX7531) (15-02-22: SERVIDOR THINKAGILE VX7530) (15-02-22: SERVIDOR THINKAGILE VX3575-G) (15-02-22: SERVIDOR THINKAGILE VX7576) (19-04-22: SERVIDOR THINKAGILE MX3330-H) (19-04-22: SERVIDOR THINKAGILE MX3331-H) (19-04-22: SERVIDOR THINKAGILE MX3331-H) (19-04-22: SERVIDOR THINKAGILE MX3330-F) (19-04-22: SERVIDOR THINKAGILE MX3331-F) (28-04-22: SERVIDOR THINKAGILE MX3531-H) (28-04-22: SERVIDOR THINKAGILE MX3530-F) (28-04-22: SERVIDOR THINKAGILE MX3531-F) (29-04-22: OBSERVAR MODELO ANTERIOR MX3520-H) (10-05-22: SERVIDOR THINKSYSTEM ST650 V2) (02-06-22: SERVIDOR THINKAGILE VX7330-N)
Produto:	Unidade de processamento digital, de média capacidade, baseada em microprocessadores
Processo MCT/Data:	01200.003239/2013-71 de 26/07/2013
CNPJ da Incentivada:	07275920000161
Portaria MCT/MDIC/MF:	792, de 05/08/2014 DOU 06/08/2014 ()
Modelos:	(28-01-15: X240 M4) (05-02-15: X3550 M5) (19-02-15: X3850 X6) (01-04-15: NX360-M4) (17-07-15: SERVIDOR X480 X6) (17-07-15: SERVIDOR X880 X6) (19-10-15: SERVIDOR NX360 M4) (19-10-15: SERVIDOR NX360 M5) (22-10-15: SERVIDOR X3550 M5) (22-10-15: SERVIDOR X240 M4) (22-10-15: SERVIDOR X3850 X6) (07-11-16: SERVIDOR HX5510) (11-11-16: SERVIDOR HX3310) (05-04-17: SERVIDOR HX2310-E) (05-04-17: SERVIDOR HX7510) (19-04-17: SERVIDOR HX1310) (02-10-17: THINKSYSTEM SR650) (11-10-17: THINKSYSTEM SR850) (11-10-17: THINKSYSTEM SR950) (15-12-17: THINKSYSTEM SD530) (10-05-18: THINKAGILE HX3320) (18-06-18: THINKAGILE HX5520) (18-06-18: THINKAGILE HX7520) (05-07-18: THINKAGILE HX1520-R) (19-09-18: SERVIDOR THINKAGILE HX1521-R) (19-09-18: SERVIDOR THINKAGILE HX3321) (19-09-18: SERVIDOR THINKAGILE HX5521) (19-09-18: SERVIDOR THINKAGILE HX7521) (22-01-19: SERVIDOR THINKAGILE HX5520-C) (07-08-19: SERVIDOR THINKAGILE MX CERTIFIED NODE) (03-09-19: SERVIDOR THINKAGILE MX CERTIFIED NODE) (29-10-19: SERVIDOR THINKAGILE VX7520)(29-11-19: SERVIDOR THINKAGILE VX3320) (03-12-19: SERVIDOR THINKAGILE VX5520) (03-12-19: SERVIDOR THINKAGILE VX3720) (05-12-19: SERVIDOR THINKAGILE VX3520-G) (04-03-20: SERVIDOR THINKAGILE VX 1U CERTIFIED NODE) (04-03-20: SERVIDOR THINKAGILE VX 2U CERTIFIED NODE) (07-07-20: SERVIDOR THINKAGILE HX7821) (22-12-20: SERVIDOR THINKSYSTEM SR850 V2) (07-07-21: SERVIDOR THINKSYSTEM SN550 V2) (07-07-21: SERVIDOR THINKSYSTEM SR650 V2) (16-09-21: SERVIDOR THINKSYSTEM SR630 V2) (17-09-21: SERVIDOR THINKSYSTEM SR665) (27-09-21: SERVIDOR THINKSYSTEM SR670 V2) (27-09-21: SERVIDOR THINKSYSTEM SR645) (02-02-22: SERVIDOR THINKAGILE VX2330) (02-02-22: SERVIDOR THINKAGILE VX3330) (02-02-22: SERVIDOR THINKAGILE VX3730-N) (02-02-22: SERVIDOR THINKAGILE VX3331) (10-02-22: SERVIDOR THINKAGILE HX1331) (10-02-22: SERVIDOR THINKAGILE HX1330) (10-02-22: SERVIDOR THINKAGILE HX2330) (10-02-22: SERVIDOR THINKAGILE VX2375) (10-02-22: SERVIDOR THINKAGILE VX3375) (10-02-22: SERVIDOR THINKAGILE VX7375-N) (10-02-22: SERVIDOR THINKAGILE VX3376) (11-02-22: SERVIDOR THINKAGILE HX2331) (11-02-22: SERVIDOR THINKAGILE HX3330) (11-02-22: SERVIDOR THINKAGILE HX3331) (11-02-22: SERVIDOR THINKAGILE HX5530) (11-02-22: SERVIDOR THINKAGILE HX5531) (11-02-22: SERVIDOR THINKAGILE HX7530) (15-02-22: SERVIDOR THINKAGILE VX7531) (15-02-22: SERVIDOR THINKAGILE VX5530) (15-02-22: SERVIDOR THINKAGILE VX7575) (15-02-22: SERVIDOR THINKAGILE VX3530-G) (15-02-22: SERVIDOR THINKAGILE VX5575) (15-02-22: SERVIDOR THINKAGILE HX7531) (15-02-22: SERVIDOR THINKAGILE VX7530) (15-02-22: SERVIDOR THINKAGILE VX3575-G) (15-02-22: SERVIDOR THINKAGILE VX7576) (19-04-22: SERVIDOR THINKAGILE MX3330-H) (19-04-22: SERVIDOR THINKAGILE MX3330-F) (19-04-22: SERVIDOR THINKAGILE MX3331-F) (28-04-22: SERVIDOR THINKAGILE MX3531-H) (28-04-22: SERVIDOR THINKAGILE MX3530-F) (28-04-22: SERVIDOR THINKAGILE MX3531-F) (29-04-22: SERVIDOR THINKAGILE MX3530-H) (10-05-22: SERVIDOR THINKSYSTEM ST650 V2) (02-06-22: SERVIDOR THINKAGILE VX7330-N)

Produto:	Unidade de processamento digital, de muito grande capacidade, baseada em microprocessador
Processo MCT/Data:	01200.000724/2015-54 de 03/03/2015
CNPJ da Incentivada:	07275920000161
Portaria MCT/MDIC/MF:	563, de 17/07/2015 DOU 20/07/2015 ()
Modelos:	(17-08-15: SERVIDOR X880 X6) (20-08-15: SERVIDOR X480 X6) (01-10-15: SERVIDOR X3950 X6)(07-11-16: SERVIDOR HX5510) (11-11-16: SERVIDOR HX3310) (05-04-17: SERVIDOR HX2310-E) (05-04-17: SERVIDOR HX7510) (20-04-17: SERVIDOR HX1310) (11-10-17: THINKSYSTEM SR950) (30-09-21: SERVIDOR THINKSYSTEM SR670 V2) (21-01-22: SERVIDOR THINKSYSTEM SR630 V2) (28-01-22: SERVIDOR THINKSYSTEM SR650 V2) (28-01-22: SERVIDOR THINKSYSTEM SN550 V2) (02-02-22: SERVIDOR THINKAGILE VX2330) (02-02-22: SERVIDOR THINKAGILE VX3330) (02-02-22: SERVIDOR THINKAGILE VX3730-N) (02-02-22: SERVIDOR THINKAGILE VX3331) (10-02-22: SERVIDOR THINKAGILE HX1331) (10-02-22: SERVIDOR THINKAGILE HX1330) (10-02-22: SERVIDOR THINKAGILE HX2330) (10-02-22: SERVIDOR THINKAGILE VX2375) (10-02-22: SERVIDOR THINKAGILE VX3375) (10-02-22: SERVIDOR THINKAGILE VX7375-N) (10-02-22: SERVIDOR THINKAGILE VX3376) (11-02-22: SERVIDOR THINKAGILE HX2331) (11-02-22: SERVIDOR THINKAGILE HX3330) (11-02-22: SERVIDOR THINKAGILE HX3331) (11-02-22: SERVIDOR THINKAGILE HX5530) (11-02-22: SERVIDOR THINKAGILE HX5531) (11-02-22: SERVIDOR THINKAGILE HX7530) (15-02-22: SERVIDOR THINKAGILE VX7531) (15-02-22: SERVIDOR THINKAGILE VX5530) (15-02-22: SERVIDOR THINKAGILE VX7575) (15-02-22: SERVIDOR THINKAGILE VX3530-G) (15-02-22: SERVIDOR THINKAGILE VX5575) (15-02-22: SERVIDOR THINKAGILE HX7531) (15-02-22: SERVIDOR THINKAGILE VX7530) (15-02-22: SERVIDOR THINKAGILE VX3575-G) (15-02-22: SERVIDOR THINKAGILE VX7576) (19-04-22: SERVIDOR THINKAGILE MX3330-H) (19-04-22: SERVIDOR THINKAGILE MX3331-H) (19-04-22: SERVIDOR THINKAGILE MX3330-F) (19-04-22: SERVIDOR THINKAGILE MX3331-F) (28-04-22: SERVIDOR THINKAGILE MX3531-H) (28-04-22: SERVIDOR THINKAGILE MX3530-F) (28-04-22: SERVIDOR THINKAGILE MX3531-F) (29-04-22: SERVIDOR THINKAGILE MX3530-H) (10-05-22: SERVIDOR THINKSYSTEM ST650 V2) (02-06-22: SERVIDOR THINKAGILE VX7330-N)

Produto:	Unidade de processamento digital, de pequena capacidade, baseada em microprocessadores - Port 844
Processo MCT/Data:	01200.000030/2013-55 de 08/01/2013
CNPJ da Incentivada:	07275920000161
Portaria MCT/MDIC/MF:	844, de 05/09/2013 DOU 06/09/2013 ()

Modelos:	<p>(16-12-13: E32) (16-12-13: TS430) (17-12-13: D30) (17-12-13: S30) (22-01-14: TS140)(14-03-14: RD540) (14-03-14: RD640) (16-03-14: 8471.50.10) (16-03-14: TD340) (07-11-14: (21-11-12: EDGE72) (21-11-12: EDGE92) (21-11-12: M92) (21-11-12: M92P) (21-11-12: LENOVO62) (20-03-13: H520G) (26-08-13: M93) (26-08-13: M93P) (23-09-13: M83) (13-11-13: E73)(28-05-14: H50-30G) (05-06-14: LENOVO63) (07-11-14: P300)) (11-12-14: (21-11-12: EDGE72) (21-11-12: EDGE92) (21-11-12: M92) (21-11-12: M92P) (21-11-12: LENOVO62) (20-03-13: H520G) (26-08-13: M93) (26-08-13: M93P) (23-09-13: M83) (13-11-13: E73)(28-05-14: H50-30G) (05-06-14: LENOVO63) (11-12-14: X3550 M5)) (11-12-14: (21-11-12: EDGE72) (21-11-12: EDGE92) (21-11-12: M92) (21-11-12: M92P) (21-11-12: LENOVO62) (20-03-13: H520G) (26-08-13: M93) (26-08-13: M93P) (23-09-13: M83) (13-11-13: E73)(28-05-14: H50-30G) (05-06-14: LENOVO63) (11-12-14: X3650 M5)) (24-12-14: (21-11-12: EDGE72) (21-11-12: EDGE92) (21-11-12: M92) (21-11-12: M92P) (21-11-12: LENOVO62) (20-03-13: H520G) (26-08-13: M93) (26-08-13: M93P) (23-09-13: M83) (13-11-13: E73)(28-05-14: H50-30G) (05-06-14: LENOVO63) (24-12-14: NX360 M4)) (07-01-15: (21-11-12: EDGE72) (21-11-12: EDGE92) (21-11-12: M92) (21-11-12: M92P) (21-11-12: LENOVO62) (20-03-13: H520G) (26-08-13: M93) (26-08-13: M93P) (23-09-13: M83) (13-11-13: E73)(28-05-14: H50-30G) (05-06-14: LENOVO63) (07-01-15: X240-M4)) (25-09-17: THINKSYSTEM SN550) (02-10-17: THINKSYSTEM SR630) (02-10-17: THINKSYSTEM SR650) (15-12-17: THINKSYSTEM SD530) (15-12-17: THINKSYSTEM SR530) (21-12-17: THINKSYSTEM SR550) (21-12-17: THINKSYSTEM ST550) (19-09-18: SERVIDOR THINKAGILE HX1521-R) (19-09-18: SERVIDOR THINKAGILE HX3321) (19-09-18: SERVIDOR THINKAGILE HX5521) (19-09-18: SERVIDOR THINKAGILE HX7521) (19-09-18: SERVIDOR THINKAGILE HX1321) (07-12-18: SERVIDOR THINKSYSTEM ST50) (03-09-19: SERVIDOR THINKAGILE MX CERTIFIED NODE) (28-10-19: SERVIDOR THINKAGILE HX1320) (25-06-20: DESKTOP TC M70S/WINDOWS 10 PRO) (07-07-21: SERVIDOR THINKSYSTEM SN550 V2) (07-07-21: SERVIDOR THINKSYSTEM SR650 V2) (07-07-21: SERVIDOR THINKSYSTEM SR630 V2) (17-09-21: SERVIDOR THINKSYSTEM SR645) (17-09-21: SERVIDOR THINKSYSTEM SR665) (02-02-22: SERVIDOR THINKAGILE VX2330) (02-02-22: SERVIDOR THINKAGILE VX3330) (02-02-22: SERVIDOR THINKAGILE VX3730-N) (02-02-22: SERVIDOR THINKAGILE VX3331) (10-02-22: SERVIDOR THINKAGILE HX1331) (10-02-22: SERVIDOR THINKAGILE HX1330) (10-02-22: SERVIDOR THINKAGILE HX2330) (10-02-22: SERVIDOR THINKAGILE VX2375) (10-02-22: SERVIDOR THINKAGILE VX3375) (10-02-22: SERVIDOR THINKAGILE VX7375-N) (10-02-22: SERVIDOR THINKAGILE VX3376) (11-02-22: SERVIDOR THINKAGILE HX2331) (11-02-22: SERVIDOR THINKAGILE HX3330) (11-02-22: SERVIDOR THINKAGILE HX3331) (11-02-22: SERVIDOR THINKAGILE HX5530) (11-02-22: SERVIDOR THINKAGILE HX5531) (11-02-22: SERVIDOR THINKAGILE HX7530) (15-02-22: SERVIDOR THINKAGILE VX7531) (15-02-22: SERVIDOR THINKAGILE VX5530) (15-02-22: SERVIDOR THINKAGILE VX7575) (15-02-22: SERVIDOR THINKAGILE VX3530-G) (15-02-22: SERVIDOR THINKAGILE VX5575) (15-02-22: SERVIDOR THINKAGILE HX7531) (15-02-22: SERVIDOR THINKAGILE VX7530) (15-02-22: SERVIDOR THINKAGILE VX3575-G) (15-02-22: SERVIDOR THINKAGILE VX7576) (04-04-22: SERVIDOR THINKSYSTEM ST50 V2) (19-04-22: SERVIDOR THINKAGILE MX3330-H) (19-04-22: SERVIDOR THINKAGILE MX3331-H) (19-04-22: SERVIDOR THINKAGILE MX3330-F) (19-04-22: SERVIDOR THINKAGILE MX3331-F) (28-04-22: SERVIDOR THINKAGILE MX3531-H) (28-04-22: SERVIDOR THINKAGILE MX3530-F) (28-04-22: SERVIDOR THINKAGILE MX3531-F) (29-04-22: SERVIDOR THINKAGILE MX3530-H) (10-05-22: SERVIDOR THINKSYSTEM ST650 V2) (02-06-22: SERVIDOR THINKAGILE VX7330-N)</p>
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Produto:	Unidade de processamento digital, de pequena capacidade, baseada em microprocessador - Port 786
Processo MCT/Data:	01200.002363/2012-38 de 16/07/2012
CNPJ da Incentivada:	07275920000161
Portaria MCT/MDIC/MF:	786, de 01/11/2012 DOU 05/11/2012 ()
Modelos:	<p>(21-11-12: EDGE72);(21-11-12: EDGE92) (21-11-12: M92) (21-11-12: M92P) (21-11-12: LENOVO62) (20-03-13: H520G)(26-08-13: M93) (26-08-13: M93P) (23-09-13: M83)(13-11-13: E73)(28-05-14: H50-30G) (05-06-14: LENOVO63) (16-04-15: TD350) (16-04-15: RD350) (24-04-15: RD450) (25-05-15: P500) (25-05-15: X250 M5) (19-06-15: SERVIDOR X240 M5) (19-06-15: SERVIDOR P500) (14-09-15: SERVIDOR P300) (14-09-15: SERVIDOR RD450) (15-09-15: SERVIDOR RD350) (19-10-15: SERVIDOR TS140) (19-10-15: SERVIDOR NX360) (19-10-15: SERVIDOR NX360 M4) (19-10-15: SERVIDOR NX360 M5) (22-10-15: SERVIDOR X3550 M5) (22-10-15: SERVIDOR TD350) (22-10-15: SERVIDOR X240 M4) (23-12-15: DESKTOP THINKCENTRE M900 SFF/WINDOWS 8.1 PRO) (29-01-16: DESKTOP THINKCENTRE H50-30G/WINDOWS 7 PRO) (29-01-16: DESKTOP THINKCENTRE H50-30G/SEM SISTEMA OPERACIONAL) (29-01-16: DESKTOP THINKCENTRE H50-30G/WINDOWS 8) (29-01-16: DESKTOP THINKCENTRE H50-30G/WINDOWS 8 PRO) (29-01-16: DESKTOP THINKCENTRE H50-30G/WINDOWS 8 PRO DG) (29-01-16: DESKTOP THINKCENTRE H50-30G/WINDOWS 8.1) (29-01-16: DESKTOP THINKCENTRE H50-30G/WINDOWS 8.1 PRO) (29-01-16: DESKTOP THINKCENTRE H50-30G/WINDOWS 8.1 PRO DG) (29-01-16: DESKTOP THINKCENTRE H50-30G/WINDOWS 10 PRO) (29-01-16: DESKTOP THINKCENTRE H50-30G/WINDOWS 10 PRO DG) (10-02-16: DESKTOP THINKCENTRE M900 TINY/SEM SISTEMA OPERACIONAL) (10-02-16: DESKTOP THINKCENTRE M900 TINY/WINDOWS 8) (10-02-16: DESKTOP THINKCENTRE M900 TINY/WINDOWS 8 PRO) (10-02-16: DESKTOP THINKCENTRE M900 TINY/WINDOWS 8 PRO DG) (10-02-16: DESKTOP THINKCENTRE M900 TINY/WINDOWS 8.1) (10-02-16: DESKTOP THINKCENTRE M900 TINY/WINDOWS 8.1 PRO) (10-02-16: DESKTOP THINKCENTRE M900 TINY/WINDOWS 8.1 PRO DG) (10-02-16: DESKTOP THINKCENTRE M900 TINY/WINDOWS 10 PRO) (10-02-16: DESKTOP THINKCENTRE M900 TINY/WINDOWS 10 PRO DG) (18-02-16: SERVIDOR THINKSERVER TS150) (29-02-16: DESKTOP THINKCENTRE M900 SFF/SEM SISTEMA OPERACIONAL) (29-02-16: DESKTOP THINKCENTRE M900 SFF/WINDOWS 8) (29-02-16: DESKTOP THINKCENTRE M900 SFF/WINDOWS 8 PRO) (29-02-16: DESKTOP THINKCENTRE M900 SFF/WINDOWS 8 PRO DG) (29-02-16: DESKTOP THINKCENTRE M900 SFF/WINDOWS 8.1) (29-02-16: DESKTOP THINKCENTRE M900 SFF/WINDOWS 8.1 PRO DG) (29-02-16: DESKTOP THINKCENTRE M900 SFF/WINDOWS 10 PRO) (29-02-16: DESKTOP THINKCENTRE M900 SFF/WINDOWS 10 PRO DG) (01-04-16: DESKTOP THINKCENTRE E73 SFF/WINDOWS 10 HOME) (01-04-16: DESKTOP THINKCENTRE M900 TINY/WINDOWS 8.1 EM) (01-04-16: DESKTOP THINKCENTRE M900 TINY/WINDOWS 10 HOME) (13-05-16: DESKTOP THINKCENTRE M700/WINDOWS 8.1) (13-05-16: DESKTOP THINKCENTRE M700/WINDOWS 8.1 PRO) (13-05-16: DESKTOP THINKCENTRE M700/WINDOWS 8.1 PRO</p>

DG) (13-05-16: DESKTOP THINKCENTRE M700/WINDOWS 10 PRO) (13-05-16: DESKTOP THINKCENTRE M700/WINDOWS 10 PRO DG) (06-07-16: DESKTOP LENOVO S510 SFF/SEM SISTEMA OPERACIONAL) (06-07-16: DESKTOP LENOVO S510 SFF/WINDOWS 10 PRO) (06-07-16: DESKTOP LENOVO S510 SFF/WINDOWS 10 PRO DG) (06-07-16: DESKTOP LENOVO S510 SFF/LINUX)(24-08-16: DESKTOP LENOVO S510 TW/WINDOWS 10 PRO) (24-08-16: DESKTOP LENOVO S510 TW/WINDOWS 10 PRO DG) (07-12-16: M900 TINY I5 6400T/8GB DDR4/HD 500GB/WINDOWS 10 PRO 64) (07-12-16: M900 SFF I5 6500/4GB DDR4/HD 500GB/DVDRW/WINDOWS 10 PRO 64) (05-06-17: DESKTOP THINKCENTRE M910S SFF/WINDOWS 10 HOME) (05-06-17: DESKTOP THINKCENTRE M910S SFF/WINDOWS 10 PRO) (05-06-17: DESKTOP THINKCENTRE M910S SFF/WINDOWS 10 PRO DG) (05-06-17: DESKTOP THINKCENTRE M910S SFF/LINUX) (05-06-17: DESKTOP THINKCENTRE M910S SFF/SEM SISTEMA OPERACIONAL) (05-06-17: DESKTOP THINKCENTRE M710S SFF/WINDOWS 10 HOME) (05-06-17: DESKTOP THINKCENTRE M710S SFF/WINDOWS 10 PRO) (05-06-17: DESKTOP THINKCENTRE M710S SFF/WINDOWS 10 PRO DG) (05-06-17: DESKTOP THINKCENTRE M710S SFF/LINUX) (05-06-17: DESKTOP THINKCENTRE M710S SFF/SEM SISTEMA OPERACIONAL) (05-06-17: DESKTOP THINKCENTRE M910Q TINY/WINDOWS 10 HOME) (05-06-17: DESKTOP THINKCENTRE M910Q TINY/WINDOWS 10 PRO) (05-06-17: DESKTOP THINKCENTRE M910Q TINY/WINDOWS 10 PRO DG) (05-06-17: DESKTOP THINKCENTRE M910Q TINY/LINUX) (05-06-17: DESKTOP THINKCENTRE M910Q TINY/SEM SISTEMA OPERACIONAL) (05-06-17: DESKTOP LENOVO V520S SFF/WINDOWS 10 HOME) (05-06-17: DESKTOP LENOVO V520S SFF/WINDOWS 10 PRO) (05-06-17: DESKTOP LENOVO V520S SFF/WINDOWS 10 PRO DG) (05-06-17: DESKTOP LENOVO V520S SFF/LINUX) (05-06-17: DESKTOP LENOVO V520S SFF/SEM SISTEMA OPERACIONAL) (11-10-17: DESKTOP THINKCENTRE M710Q TINY/WINDOWS 10 HOME) (11-10-17: DESKTOP THINKCENTRE M710Q TINY/WINDOWS 10 PRO) (11-10-17: DESKTOP THINKCENTRE M710Q TINY/WINDOWS 10 PRO DG) (11-10-17: DESKTOP THINKCENTRE M710Q TINY/LINUX) (11-10-17: DESKTOP THINKCENTRE M710Q TINY/SEM SISTEMA OPERACIONAL) (28-09-18: DESKTOP LENOVO V530S SFF/WINDOWS 10 PRO) (28-09-18: DESKTOP LENOVO V530S SFF/WINDOWS 10 HOME) (28-09-18: DESKTOP LENOVO V530S SFF/LINUX) (28-09-18: DESKTOP LENOVO V530S SFF/SEM SISTEMA OPERACIONAL) (05-10-18: DESKTOP THINKCENTRE M720Q TINY/WINDOWS 10 HOME) (05-10-18: DESKTOP THINKCENTRE M720Q TINY/LINUX) (05-10-18: DESKTOP THINKCENTRE M920S SFF/WINDOWS 10 PRO) (05-10-18: DESKTOP THINKCENTRE M920S SFF/WINDOWS 10 HOME) (05-10-18: DESKTOP THINKCENTRE M920S SFF/SEM SISTEMA OPERACIONAL) (05-10-18: DESKTOP THINKCENTRE M920Q TINY/WINDOWS 10 PRO) (05-10-18: DESKTOP THINKCENTRE M920Q TINY/LINUX) (05-10-18: DESKTOP THINKCENTRE M920Q TINY/SEM SISTEMA OPERACIONAL) (05-10-18: DESKTOP THINKCENTRE M920Q TINY/WINDOWS 10 HOME) (11-10-18: DESKTOP THINKCENTRE M720S SFF/WINDOWS 10 PRO) (11-10-18: DESKTOP THINKCENTRE M720S SFF/WINDOWS 10 HOME) (11-10-18: DESKTOP THINKCENTRE M720S SFF/LINUX) (11-10-18: DESKTOP THINKCENTRE M720S SFF/SEM SISTEMA OPERACIONAL) (02-05-19: DESKTOP THINKCENTRE M720Q TINY) (01-07-19: DESKTOP THINKCENTRE M715Q TINY/WINDOWS 10 HOME) (01-07-19: DESKTOP THINKCENTRE M715Q TINY/LINUX) (01-07-19: DESKTOP THINKCENTRE M715Q TINY/SEM SISTEMA OPERACIONAL) (01-07-19: DESKTOP THINKCENTRE M715Q TINY/WINDOWS 10 PRO) (28-10-19: DESKTOP THINKSTATION P330 TWR/WINDOWS 10 PRO) (28-10-19: DESKTOP THINKSTATION P330 TWR/SEM SISTEMA OPERACIONAL) (28-10-19: DESKTOP THINKSTATION P330 TWR/LINUX) (20-01-20: DESKTOP THINKCENTRE M75Q TINY/WINDOWS 10 PRO) (20-01-20: DESKTOP THINKCENTRE M75Q TINY/SEM SISTEMA OPERACIONAL) (20-01-20: DESKTOP THINKCENTRE M75Q TINY/LINUX) (25-06-20: DESKTOP TC M80S/WINDOWS 10 PRO) (25-06-20: DESKTOP TC M80S/WINDOWS 10 HOME) (25-06-20: DESKTOP TC M80S/LINUX) (25-06-20: DESKTOP TC M80S/SEM SISTEMA OPERACIONAL) (25-06-20: DESKTOP TC M70S/WINDOWS 10 PRO) (25-06-20: DESKTOP TC M70S/WINDOWS 10 HOME) (25-06-20: DESKTOP TC M70S/LINUX) (25-06-20: DESKTOP TC M70S/SEM SISTEMA OPERACIONAL) (25-06-20: DESKTOP TC M80S/WINDOWS 10 PRO) (25-06-20: DESKTOP TC M80S/WINDOWS 10 HOME) (25-06-20: DESKTOP TC M80S/LINUX) (25-06-20: DESKTOP TC M80S/SEM SISTEMA OPERACIONAL) (26-06-20: DESKTOP TC M80Q/WINDOWS 10 PRO) (26-06-20: DESKTOP TC M80Q/WINDOWS 10 HOME) (26-06-20: DESKTOP TC M80Q/LINUX) (26-06-20: DESKTOP TC M80Q/SEM SISTEMA OPERACIONAL) (21-07-20: DESKTOP TC M70Q/WINDOWS 10 PRO) (21-07-20: DESKTOP TC M70Q/WINDOWS 10 HOME) (21-07-20: DESKTOP TC M70Q/LINUX) (21-07-20: DESKTOP TC M70Q/SEM SISTEMA OPERACIONAL) (08-09-20: WORKSTATION TS P340/WINDOWS 10 PRO WS) (08-09-20: WORKSTATION TS P340/WINDOWS 10 PRO) (08-09-20: WORKSTATION TS P340/LINUX) (08-09-20: WORKSTATION TS P340/SEM SISTEMA OPERACIONAL) (08-09-20: DESKTOP TC M75S-1/WINDOWS 10 PRO) (08-09-20: DESKTOP TC M75S-1 /SEM SISTEMA OPERACIONAL) (22-10-20: DESKTOP LN V50S-07IMB/WINDOWS 10 PRO) (22-10-20: DESKTOP LN V50S-07IMB/WINDOWS 10 HOME) (22-10-20: DESKTOP LN V50S-07IMB/LINUX) (22-10-20: DESKTOP LN V50S-07IMB/SEM SISTEMA OPERACIONAL) (18-11-20: DESKTOP TC M75Q GEN 2/WINDOWS 10 PRO) (18-11-20: DESKTOP TC M75Q GEN 2/WINDOWS 10 HOME) (18-11-20: DESKTOP TC M75Q GEN 2/LINUX) (18-11-20: DESKTOP TC M75Q GEN 2/SEM SISTEMA OPERACIONAL) (14-01-21: DESKTOP TC M75S GEN 2/WINDOWS 10 PRO) (14-01-21: DESKTOP TC M75S GEN 2/WINDOWS 10 HOME) (14-01-21: DESKTOP TC M75S GEN 2/LINUX) (14-01-21: DESKTOP TC M75S GEN 2/SEM SISTEMA OPERACIONAL) (16-06-21: DESKTOP TC M90Q GEN 2/WINDOWS 10 PRO) (16-06-21: DESKTOP TC M90Q GEN 2/WINDOWS 10 HOME) (16-06-21: DESKTOP TC M90Q GEN 2/LINUX) (16-06-21: DESKTOP TC M90Q GEN 2/SEM SISTEMA OPERACIONAL) (11-08-21: DESKTOP TC M75S GEN 2/WINDOWS 10 PRO) (11-08-21: DESKTOP TC M75S GEN 2/WINDOWS 10 HOME) (11-08-21: DESKTOP TC M75S GEN 2/LINUX) (11-08-21: DESKTOP TC M75S GEN 2/SEM SISTEMA OPERACIONAL) (16-09-21: DESKTOP TC M75S GEN 2/WINDOWS 11) (16-09-21: DESKTOP TC M75S GEN 2/WINDOWS 11 PRO) (16-09-21: DESKTOP TC M75S GEN 2/WINDOWS 11 PRO DG) (16-09-21: DESKTOP TC M75S GEN 2/WINDOWS 11 HOME) (07-10-21: DESKTOP TC M75Q GEN 2/WINDOWS 10 PRO) (07-10-21: DESKTOP TC M75Q GEN 2/WINDOWS 10 HOME) (07-10-21: DESKTOP TC M75Q GEN 2/LINUX) (07-10-21: DESKTOP TC M75Q GEN 2/SEM SISTEMA OPERACIONAL) (07-10-21: DESKTOP TC M75Q GEN 2/WINDOWS 11 PRO) (07-10-21: DESKTOP TC M75Q GEN 2/WINDOWS 11 PRO DG) (07-10-21: DESKTOP TC M75Q GEN 2/WINDOWS 11 HOME) (07-10-21: WORKSTATION TS P348 /SEM SISTEMA OPERACIONAL) (07-10-21: WORKSTATION TS P348 /LINUX) (07-10-21: WORKSTATION TS P348 /WINDOWS 10 HOME) (07-10-21: WORKSTATION TS P348 /WINDOWS 10 PRO)

	(07-10-21: WORKSTATION TS P348 /WINDOWS 11 HOME) (07-10-21: WORKSTATION TS P348 /WINDOWS 11 PRO DG) (07-10-21: WORKSTATION TS P348 /WINDOWS 11 PRO) (25-11-21: DESKTOP TC M70S/WINDOWS 11 PRO 64) (25-11-21: DESKTOP TC M70S/WINDOWS 11 HOME 64) (25-11-21: DESKTOP TC M70S/WINDOWS 11 PRO 64) (25-11-21: DESKTOP TC M70S/WINDOWS 11 HOME 64) (25-11-21: DESKTOP TC M70Q/WINDOWS 11 PRO 64) (25-11-21: DESKTOP TC M80Q/WINDOWS 11 PRO 64) (25-11-21: DESKTOP TC M80S/WINDOWS 11 PRO 64) (25-11-21: DESKTOP TC M75Q GEN 2/WINDOWS 11 PRO 64) (16-02-22: DESKTOP LENOVO TC NEO 50S GEN 3 / WINDOWS 11 PRO) (16-02-22: DESKTOP LENOVO TC NEO 50S GEN 3 / WINDOWS 11 HOME) (16-02-22: DESKTOP LENOVO TC NEO 50S GEN 3 / LINUX) (16-02-22: DESKTOP LENOVO TC NEO 50S GEN 3 / SEM SISTEMA OPERACIONAL) (20-04-22: DESKTOP TC M70Q GEN 3/WINDOWS 11 PRO) (20-04-22: DESKTOP TC M70Q GEN 3/WINDOWS 11 HOME) (20-04-22: DESKTOP TC M70Q GEN 3/LINUX) (20-04-22: DESKTOP TC M70Q GEN 3/SEM SISTEMA OPERACIONAL) (29-04-22: DESKTOP TC M80Q GEN 3/WINDOWS 11 PRO) (29-04-22: DESKTOP TC M80Q GEN 3/WINDOWS 11 HOME) (29-04-22: DESKTOP TC M80Q GEN 3/LINUX) (29-04-22: DESKTOP TC M80Q GEN 3/SEM SISTEMA OPERACIONAL) (01-06-22: WORKSTATION TS P340/WINDOWS 11 PRO) (01-06-22: WORKSTATION TS P340/WINDOWS 11 PRO WS) (29-06-22: WORKSTATION TS P360 TOWER/WINDOWS 11 PRO) (29-06-22: WORKSTATION TS P360 TOWER/WINDOWS 11 HOME) (29-06-22: WORKSTATION TS P360 TOWER/SEM SISTEMA OPERACIONAL) (29-06-22: WORKSTATION TS P360 TOWER/LINUX)
--	--

Produto:	Unidade de processamento digital, de pequena capacidade, baseada em microprocessador com unidade de saída por vídeo incorporada
Processo MCT/Data:	01200.002363/2012-38 de 16/07/2012
CNPJ da Incentivada:	07275920000161
Portaria MCT/MDIC/MF:	786, de 01/11/2012 DOU 05/11/2012 ()
Modelos:	(21-11-12: EDGE72Z)(20-09-13: B550) (17-12-13: E73Z) (25-03-15: COMPUTADOR ALL-IN-ONE C50-30) (11-11-16: ALL IN ONE LENOVO A510/WINDOWS 10) (11-11-16: AIO LENOVO A510/WINDOWS 10) (11-01-18: AIO LENOVO A510/WINDOWS 10 PRO) (11-01-18: AIO LENOVO A510/WINDOWS 10 HOME) (29-03-19: ALL IN ONE IDEACENTRE A340/WINDOWS 10 HOME) (29-03-19: ALL IN ONE IDEACENTRE A340/WINDOWS 10 PRO) (29-03-19: ALL IN ONE IDEACENTRE A340/LINUX) (29-03-19: ALL IN ONE IDEACENTRE A340/SEM SISTEMA OPERACIONAL) (20-12-19: DESKTOP LENOVO V530S SFF/WINDOWS 10 PRO) (20-12-19: DESKTOP LENOVO V530S SFF/WINDOWS 10 HOME) (20-12-19: DESKTOP LENOVO V530S SFF/SEM SISTEMA OPERACIONAL) (20-12-19: DESKTOP LENOVO V530S SFF/LINUX)

Produto:	Unidade digital de armazenamento de dados em meio magnético ("Intelligent Storage System")
Processo MCT/Data:	01200.000030/2013-55 de 08/01/2013
CNPJ da Incentivada:	07275920000161
Portaria MCT/MDIC/MF:	844, de 05/09/2013 DOU 06/09/2013 ()
Modelos:	(09-09-19: STORAGE DE CONTROLLER DE2000H 2U24 SFF)

Voltar

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MZVLB256HBHQ-000L2/L7
MZVLB512HBJQ-000L2/L7
MZVLB1T0HBLR-000L2/L7
MZVLB2T0HALB-000L2/L7

M.2 NVMe PCIe SSD specification

(PM981a)

datasheet *For Lenovo*

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Revision History

<u>Revision No.</u>	<u>History</u>	<u>Draft Date</u>	<u>Remark</u>	<u>Created by</u>	<u>Review by</u>
0.5	1. Initial issue	Sep.11, 2018	Preliminary	K.M Song	K.M Song
0.6	1. Modifies Product Number of 1TB.	Nov.06, 2018	Preliminary	S.J Oh	S.J Oh
1.0	1. Deleted 2TB capacity. 2. Changed Random Read performance from TLC to SLC.	Nov.16, 2018	Final	S.J Oh	S.J Oh
1.1	1. Added 2TB capacity (Preliminary)	Jan. 29, 2019	Final	S.J Oh	S.J Oh
1.2	1. Power/Performance value addition 2. Dynamic Thermal Throttling addition [Table 6] newly 3. Changed the Power Specification word from L1.2 to Sleep	Feb. 8, 2019	Final	N.R Kim	N.R Kim

PM981a Series

PART NUMBER	Capacity ¹⁾	LBA ²⁾
MZVLB256HBHQ-000L2/L7	256GB	500,118,192
MZVLB512HBQ-000L2/L7	512GB	1,000,215,216
MZVLB1T0HBLR-000L2/L7	1TB	2,000,409,264
MZVLB2T0HALB-000L2/L7	2TB	4,000,797,360

FEATURES	Reliability Specifications
<ul style="list-style-type: none"> PCIe Gen3 8Gb/s Interface, up to 4 Lanes Compliant with PCI Express Base Specification Rev. 3.0 Compliant with PCI Express M.2 Specification Rev. 1.1 Compliant with NVMe Express specification Rev. 1.3 Power Saving Modes: <ul style="list-style-type: none"> - Supporting APST - Supporting L1.2 Mode Support Admin & NVM Command Set RoHS Compliant Hardware based AES-XTS 256-bit Encryption Engine for SED TCG OPAL (v2.0) Compliant for SED 	<p>UBER < 1 sector per 10¹⁵ bits read</p> <p>MTBF 1.5 Million Hours</p>
	Environmental Specifications
	<p>Temperature</p> <p>Operating⁴⁾ 0°C to 70°C</p> <p>Non-operating -40°C to 85°C</p> <p>Humidity (non-condensing)</p> <p>Non-operating 5 ~ 95%</p> <p>Linear Shock (0.5ms duration with 1/2 sine wave)</p> <p>Non-operating 1,500 Gpeak</p> <p>Vibration</p> <p>Non-operating (20 ~ 2,000 Hz, Sinusoidal) 20 Gpeak</p>

Drive Configuration	POWER SPECIFICATIONS
Capacity 256/512GB/1/2TB	Supply Voltage / Tolerance 3.3V ± 5%
From Factor M.2	Voltage Ripple/Noise (max.) 100mV p-p
Interface PCI Express Gen3 x4	Active ⁵⁾ (Typ, RMS)
Bytes per Sector 512Byte	- Read 5.1W
	- Write 5.6W

Performance Specifications ³⁾	PHYSICAL DIMENSION
Data Transfer Rate (128KB)	Width 22.00 ± 0.15 mm
Sequential Read	Length 80.00 ± 0.15 mm
(256GB) Up to 3,500 MB/s	Height
(512GB) Up to 3,500 MB/s	- Single Side Max. 2.38 mm
(1TB) Up to 3,500 MB/s	Weight Max. 9.0g
(2TB) Up to 3,500 MB/s	
Sequential Write	
(256GB) Up to 2,200 MB/s	
(512GB) Up to 2,900 MB/s	
(1TB) Up to 3,000 MB/s	
(2TB) Up to 3,000 MB/s	

Data I/O Speed (4KB)		<i>Specifications are subject to change without notice.</i>
Random Read	(256GB) Up to 240K IOPS	1) 1MB = 1,000,000 Bytes, 1GB = 1,000,000,000 Bytes, Unformatted Capacity. User accessible capacity may vary depending on operating environment and formatting.
	(512GB) Up to 460K IOPS	2) 1 Sector = 512Bytes, Max. LBA represents the total user addressable sectors in LBA mode and calculated by IDEMA rule
	(1TB) Up to 580K IOPS	3) Actual performance may vary depending on use conditions and environment. Performance measurements based on TurboWrite technology.
	(2TB) Up to 600K IOPS	4) Measured by SMART Temperature. Proper airflow recommended.
Random Write	(256GB) Up to 480K IOPS	5) Active power is measured on sequential write and read.
	(512GB) Up to 500K IOPS	6) Idle Power is measured on Idle status with L1.2+APST/ASPM on.
	(1TB) Up to 500K IOPS	7) Actual measurements result may vary depending on use conditions and environment.
	(2TB) Up to 500K IOPS	8) Sleep means PS4 (Lowest Power State)

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

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1.0 INTRODUCTION

1.1 General Description

This document describes the specification of PM981a SSD which uses PCIe interface.

The PM981a is fully consist of semiconductor device and using NAND Flash Memory which has a high reliability and a high technology in a small form factor for using a SSD and supporting Peripheral Component Interconnect Express (PCIe) 3.0 interface standard up to 4 lanes shows much faster performance than previous SATA SSDs.

The PM981a provides 256GB, 512GB, 1TB and 2TB capacities. It's sequential performance is up to 3,500MB/s for read operation and 3,000MB/s for write operation by 4 lanes. It's random performance is up to 600k IOPS for read and 500k IOPS for write operation by 4 lanes. It could also provide rugged features with an extreme environment with a high MTBF.

1.2 Product List

[Table 1] Product Line-up

Type	Capacity	Part Number
M.2	256GB	MZVLB256HBHQ-000L2/L7
	512GB	MZVLB512HBQ-000L2/L7
	1TB	MZVLB1T0HBLR-000L2/L7
	2TB	MZVLB2T0HALB-000L2/L7

1.3 Ordering Information

M Z X X X X X X X X X X - X X X X X
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

1. Memory (M)

2. Module Classification
 Z: SSD

3. Form Factor
 V: PCIeM.2 (22*80, PCIe x4)

4. Line-Up
 L: Client/SV (VNAND 3bit MLC)

5. SSD CTRL
 B: Phoenix

6~8. SSD Density
 256: 256GB
 512: 512GB
 1T0: 1TB
 2T0: 2TB

9. NAND PKG + NAND Voltage
 H: BGA (LF,HF)

10. Flash Generation
 B: 3rd Generation
 A: 2nd Generation

11~12. NAND Density
 HQ: 1T QDP 4CE
 JQ: 2T ODP 4CE
 LR: 4T HDP 4CE
 LB: 8T HDP 4CE

13. "-"

14. Default
 "0"

15. HW revision
 0: No revision

16. Packaging type
 0: Bulk

17~18. Customer
 L2: Lenovo LBG
 L7: Lenovo SED

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2.0 PRODUCT SPECIFICATION

2.1 Capacity

[Table 2] User Addressable Sectors

Capacity ¹⁾	Max LBA ²⁾
256GB	500,118,192
512GB	1,000,215,216
1TB	2,000,409,264
2TB	4,000,797,360

NOTE:

1) Gigabyte (GB) = 1,000,000,000 Bytes, 1 Sector = 512Bytes

2) Max. LBA shown in Table 1 represents the total user addressable sectors in LBA mode and calculated by IDEMA rule.

2.2 Performance¹⁾

[Table 3] Drive Performance

Gen3

Parameter	Unit	Queue Depth	256GB	512GB	1TB	2TB
Sequential Read ²⁾ (Up to)	MB/s	QD = 32	3,500	3,500	3,500	3,500
Sequential Write ²⁾ (Up to)	MB/s	QD = 32	2,200 / 400 ⁴⁾	2,900 / 800 ⁴⁾	3,000 / 1,600 ⁴⁾	3,000 / 1,540 ⁴⁾
Random Read ³⁾ (Up to)	IOPS	QD = 1	16K / 11K ⁴⁾	18K / 12K ⁴⁾	18K / 12K ⁴⁾	18K / 12K ⁴⁾
	IOPS	QD = 32	240K / 135K ⁴⁾	460K / 270K ⁴⁾	580K / 400K ⁴⁾	600K / 380K ⁴⁾
Random Write ³⁾ (Up to)	IOPS	QD = 1	54K / 50K ⁴⁾	55K / 53K ⁴⁾	56K / 55K ⁴⁾	56K / 55K ⁴⁾
	IOPS	QD = 32	480K / 100K ⁴⁾	500K / 200K ⁴⁾	500K / 400K ⁴⁾	500K / 400K ⁴⁾

NOTE:

1) Performance measured using CDM 5.0.2 on Windows 10 64bit. Actual performance may vary depending on use conditions and environment.

2) Sequential performance measured using 128KB data size. (QD=32 by Thread=1)

3) Random performance measured using 4KB data size. (QD=32 by Thread 4, QD=1 by Thread 1)

4) Performance without TurboWrite technology

2.3 Power

[Table 4] Maximum Ratings

Parameter	Specifications	
Supply Voltage	Allowable voltage	3.3V ± 5%
	Allowable noise/ripple	100mV p-p or less

[Table 5] Power Consumption for M.2 (3.3V Supply)

Parameter	Specifications		
Power Consumption ⁴⁾	Active ¹⁾ (Typical, RMS)	Read	5.1W
		Write	5.6W
	Idle ²⁾ (Typical)		30mW
	Sleep ³⁾⁴⁾⁵⁾ (Typical)		5mW

NOTE:

1) Active power is measured on sequential write and read.

2) Idle Power is measured on Idle status with L1.2+APST/ASPM on.

3) If Sleep time logging option is enabled, Sleep Power could be 5mW.

4) Actual measurements result may vary depending on use conditions and environment.

5) Sleep means PS4 (Lowest Power State)

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

[Table 6] Dynamic Thermal Throttling for PM981a

Model	PM981a		
Dynamic Thermal Throttling	Level	SMART (=NAND Tc)	Power State
Stepping DTT	T0	~82°C	Full performance (PS0)
	T1	82°C	Light Throttling (PS1)
	T2	83°C	Heavy Throttling (PS2)
Thermal Protection	T3	85°C	1%

NOTE:
 This drive has an automatic thermal control, which utilizes an on-board thermal sensor to monitor the NAND flash temperature, to protect from overheating. The performance is reduced by the temperature threshold level shown in Table 6. The device returns to full performance when the temperature is lower than T0.

2.4 Reliability

This chapter provides the information for the reliability features of the SSD.

2.4.1 MTBF

MTBF is Mean Time Between Failure, and is the predicted elapsed time between inherent failures of a system during operation. As same word, AFR (annual failure ratio) is 0.4%. MTBF can be calculated as the arithmetic average time between failures of a system.

[Table 7] MTBF Specifications

Capacity	MTBF
256GB	1,500,000 Hours
512GB	
1TB	
2TB	

2.4.2 UBER

UBER is Uncorrectable Bit Error Rate.

[Table 8] UBER Specifications

Parameter	Specification
UBER	< 1 sector per 10 ¹⁵ bits read

2.5 Environmental Specification

[Table 9] Temperature, Humidity, Shock, Vibration

Parameter	Mode	Specification
Temperature	Operating ¹⁾	0°C to 70°C
	Non-operating	-40°C to 85°C
Humidity ²⁾	Non-operating	5% to 95%
Shock ³⁾	Non-operating	1500G
Vibration ⁴⁾	Non-operating	20G

NOTE:
 1) Temperature is measured by SMART Temperature. Proper airflow recommended over 70°C
 2) Humidity is measured in non-condensing
 3) Test condition for shock: 0.5ms duration with half sine wave
 4) Test condition for vibration: 10Hz to 2000Hz

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

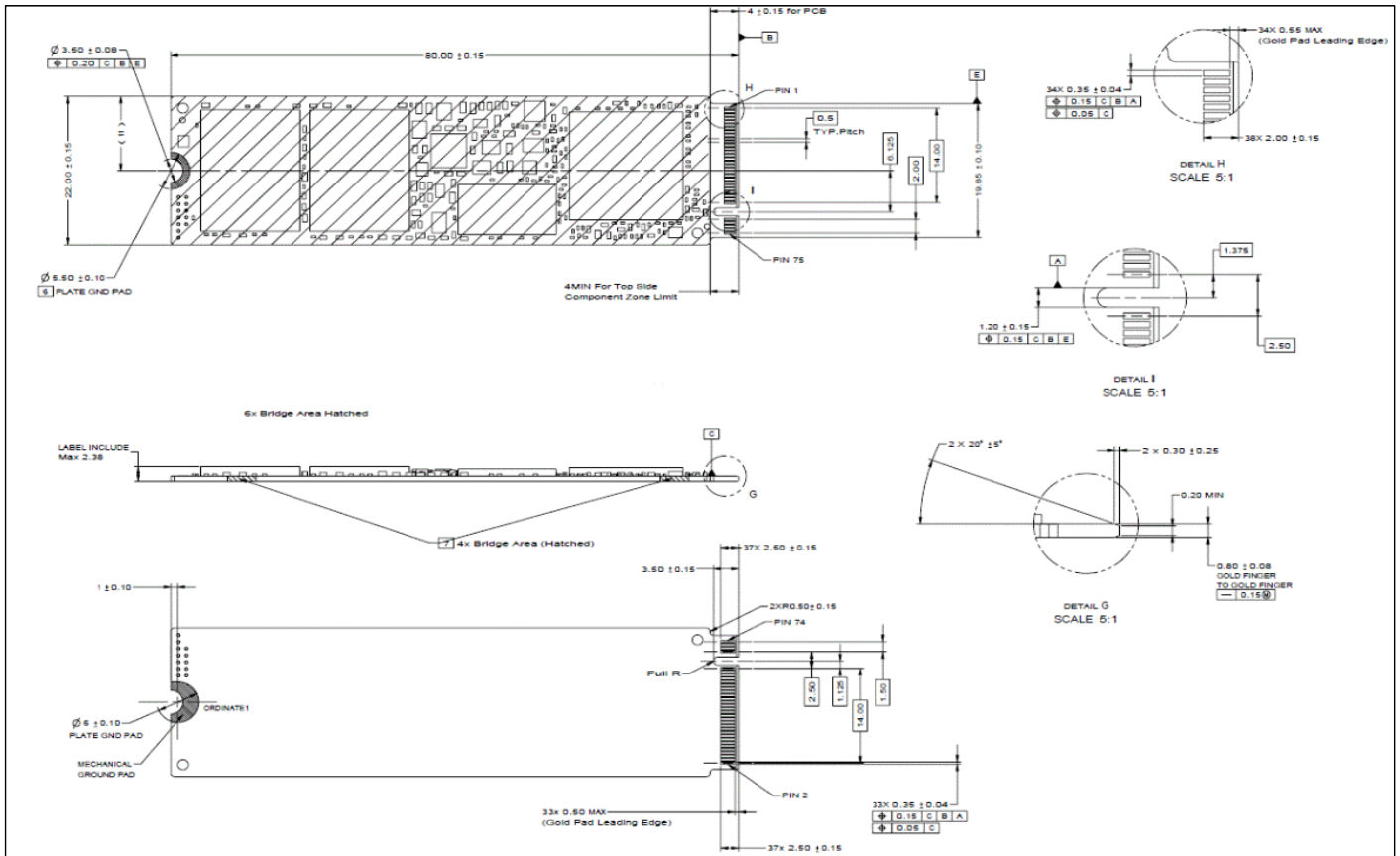
3.0 MECHANICAL SPECIFICATION

3.1 Physical dimensions and Weight

[Table 10] Physical dimensions and Weight

Parameter		Value
Width		22.00 ± 0.15 mm
Length		80.00 ± 0.15 mm
Thickness		Max. 2.38 mm
Weight	256/512GB/1/2TB	Max 9.0g

3.2 Form Factor

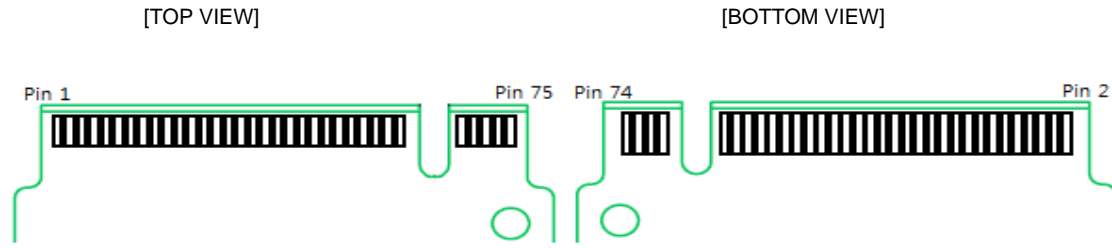


[Figure 1] M.2 Package

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

4.0 INTERFACE SPECIFICATION

4.1 Connector Dimension and Pin Location



[Figure 2] M.2 Signal and Power pins

4.2 Pin Assignments and Definition

[Table 11] Signal Assignments

Pin#	Assignment	Description	Pin#	Assignment	Description
1	GND	Return current path	2	3.3V	3.3V source
3	GND	Return current path	4	3.3V	3.3V source
5	PETn3	PCIe TX	6	N/C	N/C
7	PETp3	PCIe TX	8	PLP_INIT#	PLP Control Signal
9	GND	Return current path	10	LED1#	Device Active Signal (Refer to [Table 11])
11	PERn3	PCIe Rx	12	3.3V	3.3V source
13	PERp3	PCIe Rx	14	3.3V	3.3V source
15	GND	Return current path	16	3.3V	3.3V source
17	PETn2	PCIe TX	18	3.3V	3.3V source
19	PETp2	PCIe TX	20	N/C	N/C
21	GND	Return current path	22	N/C	N/C
23	PERn2	PCIe Rx	24	N/C	N/C
25	PERp2	PCIe Rx	26	N/C	N/C
27	GND	Return current path	28	N/C	N/C
29	PETn1	PCIe TX	30	PLP_FBCK#	N/C
31	PETp1	PCIe TX	32	N/C	N/C
33	GND	Return current path	34	N/C	N/C
35	PERn1	PCIe Rx	36	N/C	N/C
37	PERp1	PCIe Rx	38	N/C	N/C
39	GND	Return current path	40	SMB_CLK (I/O) ²	DNU (Do Not Use)
41	PETn0	PCIe TX	42	SMB_DATA (I/O) ²	DNU (Do Not Use)
43	PETp0	PCIe TX	44	ALERT# (O) ¹	DNU (Do Not Use)
45	GND	Return current path	46	N/C	N/C
47	PERn0	PCIe Rx	48	N/C	N/C
49	PERp0	PCIe Rx	50	PERST#	PCIe Reset
51	GND	Return current path	52	CLKREQ#	PCIe Device Clock Request
53	REFCLKN	PCIe Reference Clock	54	PEWake#	N/C
55	REFCLKP	PCIe Reference Clock	56	Reserved for MFG_-Data	DNU (Do Not Use)
57	GND	Return current path	58	Reserved for MFG_-CLOCK	DNU (Do Not Use)
67	N/C	N/C	68	SUSCLK	DNU (Do Not Use)
69	PEDET	N/C	70	3.3V	3.3V source
71	GND	Return current path	72	3.3V	3.3V source
73	GND	Return current path	74	3.3V	3.3V source
75	GND	Return current path			

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

NOTE:

- 1) Not support: open drain with pull-up on platform (1.8V), active low.
- 2) Not support: open drain with pull-up on platform (1.8V).

[Table 12] Simple Indicator Protocol for SSD LED States (Optional)

ASPM ¹⁾		LED Status
Active State (Host send CMD to SSD)		Blinking
Idle	Low Power standby	OFF
State	Deep Sleep Power savings	OFF

NOTE:

- 1) ASPM (Active State Power Management)

5.0 PCI and NVM Express registers

5.1 PCI Express Registers

5.1.1 PCI Register Summary

[Table 13] PCI Register Summary

Start Address	End Address	Name	Type
00h	3Fh	PCI Header	PCI Configuration Header Space
40h	47h	PCI Power Management Capability	PCI Capability
50h	67h	MSI Capability	PCI Capability
70h	A3h	PCI Express Capability	PCI Capability
B0h	BBh	MSI-X Capability	PCI Capability
100h	12Bh	Advanced Error Reporting Capability	PCI Extended Capability
148h	153h	Device Serial Number Capability	PCI Extended Capability
158h	167h	Power Budgeting Capability	PCI Extended Capability
168h	17Bh	Secondary PCI Express Capability	PCI Extended Capability
188h	18Fh	Latency Tolerance Reporting Capability	PCI Extended Capability
190h	19Fh	L1 Sub-states Capability	PCI Extended Capability

5.1.2 PCI Configuration Header Space Registers Detail

5.1.2.1 PCI Configuration Header Space Registers

[Table 14] PCI Header Space Summary

Start Address	End Address	Symbol	Description
00h	03h	IDTF	Identifiers
04h	05h	CMD	Command Register
06h	07h	STS	Status Register
08h	08h	REVID	Revision ID
09h	0Bh	CC	Class Codes
0Ch	0Ch	CLS	Cache Line Size
0Dh	0Dh	MLT	Master Latency Timer
0Eh	0Eh	HTYPE	Header Type
0Fh	0Fh	BIST	Built in Self Test
10h	13h	MLBAR (BAR0)	Memory Register Base Address (lower 32-bit)
14h	17h	MUBAR (BAR1)	Memory Register Base Address (upper 32-bit)
18h	1Bh	IDBAR (BAR2)	Reserved
1Ch	1Fh	BAR3	Reserved
20h	23h	BAR4	Reserved
24h	27h	BAR5	Reserved
28h	2Bh	CCPTR	CardBus CIS Pointer
2Ch	2Fh	SS	Subsystem Identifiers
30h	33h	EXPROM	Expansion ROM Base Address
34h	34h	CAP	Capabilities Pointer
35h	3Bh	R	Reserved
3Ch	3Dh	INTR	Interrupt Information
3Eh	3Eh	MGNT	Minimum Grant
3Fh	3Fh	MLAT	Maximum Latency

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

[Table 15] Identifier Register

Bits	Type	Default Value	Description
31:16	RO	A808h	Device ID
0:15	RO	144Dh	Vendor ID

[Table 16] Command Register

Bits	Type	Default Value	Description
15:11	RO	0h	Reserved
10	RW	0	Interrupt Disable
9	RO	0	Fast Back-to-Back Enable (N/A)
8	RW	0	SERR# Enable
7	RO	0	IDSEL Stepping/Wait Cycle Control (N/A)
6	RW	0	Parity Error Response Enable
5	RO	0	VGA Palette Snooping Enable (N/A)
4	RO	0	Memory Write and Invalidate Enable (N/A)
3	RO	0	Special Cycle Enable (N/A)
2	RW	0	Bus Master Enable
1	RW	0	Memory Space Enable
0	RW	0	I/O Space Enable

[Table 17] Status Register

Bits	Type	Default Value	Description
15	RW1C	0	Detected Parity Error
14	RW1C	0	Signaled System Error
13	RW1C	0	Received Master Abort
12	RW1C	0	Received Target Abort
11	RW1C	0	Signaled Target Abort (N/A)
10:9	RO	0h	DEVSEL Timing (N/A)
8	RW1C	0	Master Data Parity Error Detected
7	RO	0	Fast Back-to-Back Transaction Capable (N/A)
6	RO	0	Reserved
5	RO	0	66MHz Capable (N/A)
4	RO	1	Capabilities List
3	RO	0	Interrupt Status
2:1	RO	0h	Reserved
0	RO	0	Reserved

[Table 18] Revision ID Register

Bits	Type	Default Value	Description
7:0	RO	00h	Controller Hardware Revision ID

[Table 19] Class Code Register

Bits	Type	Default Value	Description
23:16	RO	01h	Base Class Code
15:8	RO	08h	Sub Class Code
7:0	RO	02h	Programming Interface

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

[Table 20] Cache Line Size Register

Bits	Type	Default Value	Description
7:0	RW	0h	Cache Line Size (N/A)

[Table 21] Master Latency Timer Register

Bits	Type	Default Value	Description
7:0	RO	0h	Master Latency Timer (N/A)

[Table 22] Header Type Register

Bits	Type	Default Value	Description
7	RO	0	Multi-Function Device (N/A)
6:0	RO	0h	Reserved

[Table 23] Built In Self Test Register

Bits	Type	Default Value	Description
7:0	RO	0h	Built In Self Test (N/A)

[Table 24] Memory Register Base Address Lower 32-bits (BAR0) Register

Bits	Type	Default Value	Description
31:14	RW	0h	Base Address
13:4	RO	0h	Reserved
3	RO	0	Pre-Fetchable
2:1	RO	2h	Address Type (64-bit)
0	RO	0	Memory Space Indicator (MEMSI)

[Table 25] Memory Register Base Address Upper 32-bits (BAR1)

Bits	Type	Default Value	Description
31:0	RO	0h	Base Address

[Table 26] Index/Data Pair Register Base Address (BAR2) Register

Bits	Type	Default Value	Description
31:0	RO	0h	N/A

[Table 27] BAR3 Register

Bits	Type	Default Value	Description
31:0	RO	0h	N/A

[Table 28] Vendor Specific BAR4 Register

Bits	Type	Default Value	Description
31:0	RO	0h	N/A

[Table 29] Vendor Specific BAR5 Register

Bits	Type	Default Value	Description
31:0	RO	0h	N/A

[Table 30] Cardbus CIS Pointer Register

Bits	Type	Default Value	Description
31:0	RO	0h	N/A

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

[Table 31] Subsystem Identifier Register

Bits	Type	Default Value	Description
31:16	RO	A801h	Subsystem ID
15:0	RO	144Dh	Subsystem Vendor ID

[Table 32] Expansion ROM Register

Bits	Type	Default Value	Description
31:17	RW	0h	Expansion ROM Base Address
16:1	RO	0h	Reserved
0	RW	0	Expansion ROM Enable/Disable

[Table 33] Capabilities Pointer Register

Bits	Type	Default Value	Description
7:0	RO	40h	Capability Pointer

[Table 34] Interrupt Information Register

Bits	Type	Default Value	Description
15:8	RO	01h	Interrupt Pin
7:0	RW	FFh	Interrupt Line

[Table 35] Minimum Grant Register

Bits	Type	Default Value	Description
7:0	RO	0h	Minimum Grant

[Table 36] Maximum Latency Register

Bits	Type	Default Value	Description
7:0	RO	0h	Maximum Latency

5.1.3 PCI Capability Registers Detail

5.1.3.1 PCI Power Management Capability

[Table 37] PCI Power Management Capability Summary

Start Address	End Address	Symbol	Description
40h	40h	PCIPM_ID	PCI Power Management Capability ID
41h	41h	NEXTCAP	Next Capability Pointer
42h	43h	PCIPM_CAP	PCI Power Management Capabilities
44h	45h	PCIPM_CS	PCI Power Management Control and Status
46h	46h	PCIPM_CSR_BSE	PMCSR_BSE Bridge Extensions
47h	47h	PCIEPM_DATA	Data

[Table 38] PCI Power Management Capability ID Register

Bits	Type	Default Value	Description
15:8	RO	50h	Next Capability
7:0	RO	1h	Capability ID

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

[Table 39] PCI Power Management Capability Register

Bits	Type	Default Value	Description
15:11	RO	0h	PME Support (N/A)
10	RO	0	D2 Support (N/A)
9	RO	0	D1 Support (N/A)
8:6	RO	0h	AUX Current (N/A)
5	RO	0	Device Specific Initialization (N/A)
4	RsvdP	0	Reserved
3	RO	0	PME Clock (N/A)
2:0	RO	3h	Version (Support for PCI Bus Power Management Interface Spec R1.2)

[Table 40] PCI Power Management Control and Status Register

Bits	Type	Default Value	Description
31:24	RsvdP	0h	Data register (N/A)
23	RO	0	Bus Power/Clock Enable (N/A)
22	RO	0	B2, B3 support (N/A)
21:16	RsvdP	0h	Reserved
15	RO	0	PME_Status (N/A)
14:13	RO	0h	Data Scale (N/A)
12:9	RO	0h	Data Select (N/A)
8	RWS	0	PME enable (N/A)
7:4	RsvdP	0h	Reserved
3	RO	1	No Soft Reset
2	RsvdP	0	Reserved
1:0	RW	0h	Power State

5.1.3.2 Message Signaled Interrupt (MSI) Capability

[Table 41] Message Signaled Interrupt Capability Summary

Start Address	End Address	Symbol	Description
50h	51h	MSI_ID	Message Signaled Interrupt Capability ID
52h	53h	MSI_MC	Message Signaled Interrupt Message Control
54h	57h	MSI_MA	Message Signaled Interrupt Message Address
58h	5Bh	MSI_MUA	Message Signaled Interrupt Upper Address
5Ch	5Dh	MSI_MDATA	Message Signaled Interrupt Message Data
60h	63h	MSI_MMASK	Message Signaled Interrupt Mask Bits
64h	67h	MSI_MPEND	Message Signaled Interrupt Pending Bits

[Table 42] Message Signaled Interrupt Capability ID Register

Bits	Type	Default Value	Description
15:8	RO	70h	Next Capability
7:0	RO	05h	Capability ID

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

[Table 43] Message Signaled Interrupt Control Register

Bits	Type	Default Value	Description
15:9	RsvdP	0h	Reserved
8	RO	0	Per Vector Masking Capable (N/A)
7	RO	1h	64-bit Address Capable
6:4	RW	0h	Multiple Message Enable
3:1	RO	5h	Multiple Message Capable
0	RW	0	MSI Enable

[Table 44] Message Signaled Interrupt Address Register

Bits	Type	Default Value	Description
31:2	RW	0h	Address
1:0	RO	0h	Reserved

[Table 45] Message Signaled Interrupt Upper Address Register

Bits	Type	Default Value	Description
31:0	RW	0h	Upper Address

[Table 46] Message Signaled Interrupt Message Data Register

Bits	Type	Default Value	Description
31:16	RsvdP	0h	Reserved
0:15	RW	0h	Data

[Table 47] Message Signaled Interrupt Mask Bits Register

Bits	Type	Default Value	Description
31:0	RW	0h	Mask Bits (N/A)

[Table 48] Message Signaled Interrupt Pending Bits Register

Bits	Type	Default Value	Description
31:0	RO	0h	Pending Bits

5.1.3.3 PCI Express Capability

[Table 49] PCI Express Capability Summary

Start Address	End Address	Symbol	Description
70h	71h	PCIE_ID	PCI Express Capability ID
72h	73h	PCIE_CAP	PCI Express Capabilities
74h	77h	PCIE_DCAP	PCI Express Device Capabilities
78h	79h	PCIE_DC	PCI Express Device Control
7Ah	7Bh	PCIE_DS	PCI Express Device Status
7Ch	7Fh	PCIE_LCAP	PCI Express Link Capabilities
80h	81h	PCIE_LC	PCI Express Link Control
82h	83h	PCIE_LS	PCI Express Link Status
94h	97h	PCIE_DCAP2	PCI Express Device Capabilities 2
98h	99h	PCIE_DC2	PCI Express Device Control 2
9Ah	9Bh	PCIE_DS2	PCI Express Device Status 2
9Ch	9Fh	PCIE_LCAP2	PCI Express Link Capabilities 2
A0h	A1h	PCIE_LC2	PCI Express Link Control 2
A2h	A3h	PCIE_LS2	PCI Express Link Status 2

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

[Table 50] PCI Express Capability ID Register

Bits	Type	Default Value	Description
15:8	RO	B0h	Next Pointer
7:0	RO	10h	Capability ID

[Table 51] PCI Express Capabilities Register

Bits	Type	Default Value	Description
15:14	RsvdP	0h	Reserved
13:9	RO	0h	Interrupt Message Number
8	HwInit	0	Slot Implementation (N/A)
7:4	RO	0h	Device/Port Type
3:0	RO	2h	Capability Version

[Table 52] PCI Express Device Capabilities Register

Bits	Type	Default Value	Description
31:29	RsvdP	0h	Reserved
28	RO	1	Function Level Reset Capability
27:26	RO	0h	Captured Slot Power Limit Scale
25:18	RO	0h	Captured Slot Power Limit Value
17:16	RsvdP	0h	Reserved
15	RO	1	Role-based Error Reporting
14:12	RO	0h	Reserved
11:9	RO	7h	Endpoint L1 Acceptable Latency
8:6	RO	7h	Endpoint L0 Acceptable Latency
5	RO	0	Extended Tag Field Supported
4:3	RO	0h	Phantom Functions Supported
2:0	RO	1h	Max Payload Size Supported

[Table 53] PCI Express Device Control Register

Bits	Type	Default Value	Description
15	RW	0	Initiate Function Level Reset
14:12	RW	2h	Max Read Request Size
11	RW	1	Enable No Snoop
10	RWS	0	Aux Power PM Enable (N/A)
9	RW	0	Phantom Functions Enable (N/A)
8	RW	0	Extended Tag Enable
7:5	RW	0h	Max Payload Size
4	RW	1	Enable Relaxed Ordering
3	RW	0	Unsupported Request Reporting Enable
2	RW	0	Fatal Error Reporting Enable
1	RW	0	Non-Fatal Error Reporting Enable
0	RW	0	Correctable Error Reporting Enable

[Table 54] PCI Express Device Status Register

Bits	Type	Default Value	Description
15:6	RsvdZ	0h	Reserved
5	RO	0	Transactions Pending
4	RO	0	Aux Power Detected

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

3	RW1C	0	Unsupported Request Detected
2	RW1C	0	Fatal Error Detected
1	RW1C	0	Non-Fatal Error Detected
0	RW1C	0	Correctable Error Detected

[Table 55] PCI Express Link Capabilities Register

Bits	Type	Default Value	Description
31:24	Hwlnit	0h (Port 0)	Port Number
23	RsvdP	0	Reserved
22	Hwlnit	1	ASPM Optionality Compliance
21	RO	0	Link Bandwidth Notification Capability (N/A)
20	RO	0	Data Link Layer Link Active Reporting Capable (N/A)
19	RO	0	Surprise Down Error Reporting Capable (N/A)
18	RO	1	Clock Power Management
17:15	RO	6h	L1 Exit Latency
14:12	RO	7h	L0s Exit Latency
11:10	RO	2h	Active State Power Management Support
9:4	RO	4h (x4 link)	Maximum Link Width
3:0	RO	3h	Max Link Speeds

[Table 56] PCI Express Link Control Register

Bits	Type	Default Value	Description
15:14	RW/RsvdP	0h	Reserved
13:12	RsvdP	0h	Reserved
11	RsvdP	0	Link Autonomous Bandwidth Interrupt Enable (N/A)
10	RsvdP	0	Link Bandwidth Management Interrupt Enable (N/A)
9	RW	0	Hardware Autonomous Width Disable
8	RW	0	Enable Clock Power Management
7	RW	0	Extended Sync
6	RW	0	Common Clock Configuration
5	RsvdP	0	Retrain Link (N/A)
4	RsvdP	0	Link Disable (N/A)
3	RW	0	Read Completion Boundary (N/A)
2	RsvdP	0	Reserved
1:0	RW	0h	Active State Power Management Control

[Table 57] PCI Express Link Status Register

Bits	Type	Default Value	Description
15	RW1C	0h	Link Autonomous Bandwidth Status (N/A)
14	RW1C	0	Link Bandwidth Management Status (N/A)
13	RO	0	Data Link Layer Link Active
12	Hwlnit	1	Slot Clock Configuration
11	RO	0	Link Training (N/A)
10	RO	0	Reserved
9:4	RO	1h	Negotiated Link Width
3:0	RO	1h	Current Link Speed

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

[Table 58] PCI Express Device Capabilities 2 Register

Bits	Type	Default Value	Description
31	HwInit	0	Reserved
30:24	RsvdP	0h	Reserved
23:22	HwInit	0h	Max End-End TLP Prefixes (N/A)
21	HwInit	0	End-End TLP Prefix Supported (N/A)
20	RO	0	Extended Format Field Supported (N/A)
19:18	HwInit	0h	OBFF Supported (N/A)
17:16	RsvdP	0h	Reserved
15:14	HwInit	0h	LN System CLS (N/A)
13:12	RO	0h	TPH Completer Supported (N/A)
11	RO	1	Latency Tolerance Reporting Supported
10	HwInit	0	No RO-enabled PR-PR Passing (N/A)
9	RO	0	128-bit CAS Completer Supported (N/A)
8	RO	0	64-bit Atomic Op Completer Supported (N/A)
7	RO	0	32-bit Atomic Op Completer Supported (N/A)
6	RO	0	Atomic Op Routing Supported (N/A)
5	RO	0	ARI Forwarding Supported (N/A)
4	RO	1	Completion Timeout Disable Supported
3:0	HwInit	Fh	Completion Timeout Ranges Supported

[Table 59] PCI Express Device Control 2 Register

Bits	Type	Default Value	Description
15	RsvdP	0	End-to-end TLP Prefix Blocking (N/A)
14:13	RW/RsvdP	0h	OBFF Enable (N/A)
12:11	RsvdP	0h	Reserved
10	RW	0	Latency Tolerance Reporting Mechanism Enable
9	RW	0	IDO Completion Enable (N/A)
8	RW	0	IDO Request Enable (N/A)
7	RW	0	AtomicOp Egress Blocking (N/A)
6	RW	0	AtomicOp Requester Enable (N/A)
5	RW	0	ARI Forwarding Enable (N/A)
4	RW	0	Completion Timeout Disable
3:0	RW	0h	Completion Timeout Value

[Table 60] PCI Express Device Status 2 Register

Bits	Type	Default Value	Description
15:0	RsvdZ	0h	Reserved

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

[Table 61] PCI Express Link Capabilities 2 Register

Bits	Type	Default Value	Description
31	RO	0	Reserved
30:24	RsvdP	0h	Reserved
23	HWinit	0	Reserved
22:16	HWinit	0h	Lower SKP OS Reception Supported Speed Vector (N/A)
15:9	HWinit	0h	Lower SKP OS Generation Supported Speed Vector (N/A)
8	RO	0	Cross-Link Supported (N/A)
7:1	RO	7h	Supported Speeds Vector
0	RsvdP	0	Reserved

[Table 62] PCI Express Link Control 2 Register

Bits	Type	Default Value	Description
15:12	RWS/RsvdP	0h	Compliance De-emphasis
11	RWS/RsvdP	0	Compliance SOS
10	RWS/RsvdP	0	Enter Modified Compliance
9:7	RWS/RsvdP	0h	Transmit Margin
6	Hwinit	0	Selectable De-Emphasis (N/A)
5	RWS/RsvdP	0	Hardware Autonomous Speed Disable
4	RWS/RsvdP	0	Enter Compliance
3:0	RWS/RsvdP	3h	Target Link Speed

[Table 63] PCI Express Link Status 2 Register

Bits	Type	Default Value	Description
15:6	RsvdP	0h	Reserved
5	RW1CS	0	Link Equalization Request 8.0GT/s
4	ROS	0	Equalization 8.0GT/s Phase 3 Successful
3	ROS	0	Equalization 8.0GT/s Phase 2 Successful
2	ROS	0	Equalization 8.0GT/s Phase 1 Successful
1	ROS	0	Equalization 8.0GT/s Complete
0	RO	1	Current De-Emphasis

5.1.3.4 MSI-X Capability

[Table 64] MSI-X Capability Summary

Start Address	End Address	Symbol	Description
B0h	B1h	MSIX_ID	MSI-X Capability ID
B2h	B3h	MSIX_CAP	MSI-X Message Control
B4h	B7h	MSIX_TBL	MSI-X Table Offset and Table BIR
B8h	BBh	MSIX_PBA	MSI-X PBA Offset and PBA BIR

[Table 65] MSI-X Identifier Register

Bits	Type	Default Value	Description
15:8	RO	00h	Next Capability
7:0	RO	11h	Capability ID

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

[Table 66] MSI-X Control Register

Bits	Type	Default Value	Description
15	RW	0	MSI-X Enable
14	RW	0	Function Mask
13:11	RsvdP	0h	Reserved
10:0	RO	20h	Table Size

[Table 67] MSI-X Table Offset Register

Bits	Type	Default Value	Description
31:3	RO	600h	Table Offset
2:0	RO	0h	Table BIR

[Table 68] MSI-X Pending Bit Array Offset Register

Bits	Type	Default Value	Description
31:3	RO	400h	Pending Bit Array Offset
2:0	RO	0h	Pending Bit Array BIR

5.1.4 PCI Extended Capability Details

5.1.4.1 Advanced Error Reporting Registers

[Table 69] Advanced Error Reporting Capability Summary

Start Address	End Address	Symbol	Description
100h	103h	AER_ID	AER Capability ID
104h	107h	AER_UCES	AER Uncorrectable Error Status
108h	10Bh	AER_UCEM	AER Uncorrectable Error Mask
10Ch	10Fh	AER_UCESEV	AER Uncorrectable Error Severity
110h	113h	AER_CES	AER Correctable Error Status
114h	117h	AER_CEM	AER Correctable Error Mask
118h	11Bh	AER_CC	AER Advanced Error Capabilities and Control
11Ch	12Bh	AER_HL	AER Header Log

[Table 70] AER Capability ID Register

Bits	Type	Default Value	Description
31:20	RO	148h	Next Pointer (Points to Secondary PCI Express Extended Capability Header Offset)
19:16	RO	2h	Capability Version
15:0	RO	1h	Capability ID

[Table 71] AER Uncorrectable Error Status Register

Bits	Type	Default Value	Description
31:27	RsvdZ	0h	Reserved
26	RW1CS	0	Poisoned TLP Egress Blocked Status (N/A)
25	RW1CS	0	TLP Prefix Blocked Error Status (N/A)
24	RW1CS	0	Atomic Op Egress Blocked Status (N/A)
23	RW1CS	0	MC Blocked TLP Status (N/A)
22	RW1CS	0	Uncorrectable Internal Error Status
21	RW1CS	0	ACS Violation Status (N/A)

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

20	RW1CS	0	Unsupported Request Error Status
19	RW1CS	0	ECRC Error Status
18	RW1CS	0	Malformed TLP Status
17	RW1CS	0	Receiver Overflow Status
16	RW1CS	0	Unexpected Completion Status
15	RW1CS	0	Completer Abort Status
14	RW1CS	0	Completion Timeout Status
13	RW1CS	0	Flow Control Protocol Error Status
12	RW1CS	0	Poisoned TLP Status
11:6	RsvdZ	0h	Reserved
5	RW1CS	0	Surprise Down Error Status (N/A)
4	RW1CS	0	Data Link Protocol Error Status
3:1	RsvdZ	0h	Reserved
0	Undefined	0	Undefined

[Table 72] AER Uncorrectable Error Mask Register

Bits	Type	Default Value	Description
31:26	RsvdZ	0h	Reserved
25	RWS	0	TLP Prefix Blocked Error Mask (N/A)
24	RWS	0	Atomic Op Egress Blocked Mask (N/A)
23	RWS	0	MC Blocked TLP Mask (N/A)
22	RWS	1	Uncorrectable Internal Error Mask
21	RWS	0	ACS Violation Mask (N/A)
20	RWS	0	Unsupported Request Error Mask
19	RWS	0	ECRC Error Mask
18	RWS	0	Malformed TLP Mask
17	RWS	0	Receiver Overflow Mask
16	RWS	0	Unexpected Completion Mask
15	RWS	0	Completer Abort Mask
14	RWS	0	Completion Timeout Mask
13	RWS	0	Flow Control Protocol Error Mask
12	RWS	0	Poisoned TLP Mask
11:6	RsvdZ	0h	Reserved
5	RWS	0	Surprise Down Error Mask (N/A)
4	RWS	0	Data Link Protocol Error Mask
3:1	RsvdZ	0h	Reserved
0	Undefined	0	Undefined

[Table 73] AER Uncorrectable Error Severity Register

Bits	Type	Default Value	Description
31:27	RsvdP	0h	Reserved
26	RWS	0	Poisoned TLP Egress Blocked Severity (N/A)
25	RWS	0	TLP Prefix Blocked Error Severity (N/A)
24	RWS	0	Atomic Op Egress Blocked Severity (N/A)
23	RWS	0	MC Blocked TLP Severity (N/A)
22	RWS	1	Uncorrectable Internal Error Severity
21	RWS	0	ACS Violation Severity (N/A)
20	RWS	0	Unsupported Request Error Severity

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION
 IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR
 HEADQUARTERS OF SAMSUNG ELECTRONICS.

19	RWS	0	ECRC Error Severity
18	RWS	1	Malformed TLP Severity
17	RWS	1	Receiver Overflow Severity
16	RWS	0	Unexpected Completion Severity
15	RWS	0	Completer Abort Severity
14	RWS	0	Completion Timeout Severity
13	RWS	1	Flow Control Protocol Error Severity
12	RWS	0	Poisoned TLP Severity
11:6	RsvdP	0h	Reserved
5	RWS	1	Surprise Down Error Severity (N/A)
4	RWS	1	Data Link Protocol Error Severity
3:1	RsvdP	0h	Reserved
0	Undefined	0	Undefined

[Table 74] AER Correctable Error Status Register

Bits	Type	Default Value	Description
31:16	RsvdZ	0h	Reserved
15	RW1CS	0	Header Log Overflow Status
14	RW1CS	0	Corrected Internal Error Status
13	RW1CS	0	Advisory Non-Fatal Error Status
12	RW1CS	0	Replay Timer Timeout Status
11:9	RsvdZ	0h	Reserved
8	RW1CS	0	Replay Number Rollover Status
7	RW1CS	0	Bad DLLP Status
6	RW1CS	0	Bad TLP Status
5:1	RsvdZ	0h	Reserved
0	RW1CS	0	Received Error Status

[Table 75] AER Correctable Error Mask Register

Bits	Type	Default Value	Description
31:16	RsvdP	0h	Reserved
15	RWS	1	Header Log Overflow Mask
14	RWS	1	Corrected Internal Error Mask
13	RWS	1	Advisory Non-Fatal Error Mask
12	RWS	0	Replay Timer Timeout Mask
11:9	RsvdP	0h	Reserved
8	RWS	0	Replay Number Rollover Mask
7	RWS	0	Bad DLLP Mask
6	RWS	0	Bad TLP Mask
5:1	RsvdP	0h	Reserved
0	RWS	0	Received Error Mask

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

[Table 76] AER Capabilities and Control Register

Bits	Type	Default Value	Description
31:11	RsvdP	0h	Reserved
10	RWS	0	Multiple Header Recording Enable
9	RO	1	Multiple Header Recording Capable
8	RWS	0	ECRC Check Enable
7	RO	1	ECRC Check Capable
6	RWS	0	ECRC Generation Enable
5	RO	1	ECRC Generation Capable
4:0	ROS	0h	First Error Pointer

[Table 77] AER Header Log Register

Bits	Type	Default Value	Description
127:120	ROS	0h	Header Byte 0
119:112	ROS	0h	Header Byte 1
111:104	ROS	0h	Header Byte 2
103:96	ROS	0h	Header Byte 3
95:88	ROS	0h	Header Byte 4
87:80	ROS	0h	Header Byte 5
79:72	ROS	0h	Header Byte 6
71:64	ROS	0h	Header Byte 7
63:56	ROS	0h	Header Byte 8
55:48	ROS	0h	Header Byte 9
47:40	ROS	0h	Header Byte 10
39:32	ROS	0h	Header Byte 11
31:24	ROS	0h	Header Byte 12
23:16	ROS	0h	Header Byte 13
15:8	ROS	0h	Header Byte 14
7:0	ROS	0h	Header Byte 15

5.1.4.2 Device Serial Number Capability

[Table 78] Device Serial Number Capability Summary

Start Address	End Address	Symbol	Description
148h	14Bh	DSN_ID	Device Serial Number Capability ID
14Ch	14Fh	DSN_LR	Serial Number Register (Lower DW)
150h	153h	DSN_UR	Serial Number Register (Upper DW)

[Table 79] Device Serial Number Capability Register Header

Bits	Type	Default Value	Description
31:20	RO	158h	Next Capability Offset
19:16	Hwlnit	1h	Capability Version
15:0	Hwlnit	3h	PCI Express Extended Capability ID

[Table 80] Serial Number Register Header (Lower DW)

Bits	Type	Default Value	Description
31:0	RO	0h	Serial Number register (Lower DW)

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

[Table 81] Serial Number Register Header (Upper DW)

Bits	Type	Default Value	Description
31:0	RO	0h	Serial Number register (Upper DW)

5.1.4.3 Power Budgeting Capability

[Table 82] Power Budgeting Capability Summary

Start Address	End Address	Symbol	Description
158h	15Bh	PB_ID	Power Budgeting Extended Capability ID
15Ch	15Fh	PB_SR	Data Select Register
160h	163h	PB_DR	Data Register
164h	167h	PB_BCR	Power Budget Capability Register

[Table 83] Power Budgeting Capability Header

Bits	Type	Default Value	Description
31:20	RO	168h	Next Capability Offset
19:16	RO	1h	Capability Version
15:00	RO	4h	PCI Express Extended Capability ID

[Table 84] Data Select Register

Bits	Type	Default Value	Description
31:8	RsvdP	0h	Reserved
7:0	RW	0h	Data Select

[Table 85] Data Register

Bits	Type	Default Value	Description
31:21	RsvdP	0h	Reserved
20:18	RO	0h	Power Rail
17:15	RO	0h	Type
14:13	RO	0h	PM State
12:10	RO	0h	PM Sub State
9:8	RO	0h	Data Scale
7:0	RO	0h	Base Power

[Table 86] Power Budget Capability Register

Bits	Type	Default Value	Description
7:1	RsvdP	0h	Reserved
0	Hwlnit	1h	System Allocated

5.1.4.4 Secondary PCI Express Capability

[Table 87] Secondary PCI Express Capability Summary

Start Address	End Address	Symbol	Description
168h	16Bh	SPE_ID	Secondary PCI Express Capability
16Ch	16Fh	PCIE_LC3	PCI Express Link Control 3
170h	173h	PCIE_LE	PCI Express Lane Error Status
174h	175h	PCIE_L0EC	PCI Express Lane 0 Equalization Control
176h	177h	PCIE_L1EC	PCI Express Lane 1 Equalization Control
178h	179h	PCIE_L2EC	PCI Express Lane 2 Equalization Control
17Ah	17Bh	PCIE_L3EC	PCI Express Lane 3 Equalization Control

[Table 88] Secondary PCI Express Capability ID Register

Bits	Type	Default Value	Description
31:20	RO	188h	Next Pointer
19:16	RO	1h	Capability Version
15:0	RO	19h	Capability ID (Secondary PCI Express Extended capability)

[Table 89] PCI Express Link Control 3 Register

Bits	Type	Default Value	Description
31:16	RsvdP	0h	Reserved
15:9	RW	0h	Enable Lower SKP OS Generation Vector (N/A)
8:2	RsvdP	0h	Reserved
1	RW	0	Link Equalization Request Interrupt Enable (N/A)
0	RW	0	Perform Equalization (N/A)

[Table 90] PCI Express Lane Error Status Register

Bits	Type	Default Value	Description
31:4	Rsvdp	0h	Reserved
3:0	RW1CS	0h	Lane Error Status Bits

[Table 91] Lane 0 Equalization Control Register

Bits	Type	Default Value	Description
15	RsvdP	0	Reserved
14:12	Hwlnit/RO	7h	Upstream Port 8.0T/s Receiver Preset Hint
11:8	Hwlnit/RO	Fh	Upstream Port 8.0T/s Transmitter Preset
7	RsvdP	0	Reserved
6:4	Hwlnit/RsvdP	0h	Downstream Port 8.0T/s Receiver Preset Hint (N/A)
3:0	Hwlnit/RsvdP	0h	Downstream Port 8.0T/s Transmitter Preset (N/A)

[Table 92] Lane 1 Equalization Control Register

Bits	Type	Default Value	Description
15	RsvdP	0	Reserved
14:12	Hwlnit/RO	7h	Upstream Port 8.0T/s Receiver Preset Hint
11:8	Hwlnit/RO	Fh	Upstream Port 8.0T/s Transmitter Preset
7	RsvdP	0	Reserved
6:4	Hwlnit/RsvdP	0h	Downstream Port 8.0T/s Receiver Preset Hint (N/A)
3:0	Hwlnit/RsvdP	0h	Downstream Port 8.0T/s Transmitter Preset (N/A)

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

[Table 93] Lane 2 Equalization Control Register

Bits	Type	Default Value	Description
15	RsvdP	0	Reserved
14:12	Hwlnit/RO	7h	Upstream Port 8.0T/s Receiver Preset Hint
11:8	Hwlnit/RO	Fh	Upstream Port 8.0T/s Transmitter Preset
7	RsvdP	0	Reserved
6:4	Hwlnit/RsvdP	0h	Downstream Port 8.0T/s Receiver Preset Hint (N/A)
3:0	Hwlnit/RsvdP	0h	Downstream Port 8.0T/s Transmitter Preset (N/A)

[Table 94] Lane 3 Equalization Control Register

Bits	Type	Default Value	Description
15	RsvdP	0	Reserved
14:12	Hwlnit/RO	7h	Upstream Port 8.0T/s Receiver Preset Hint
11:8	Hwlnit/RO	Fh	Upstream Port 8.0T/s Transmitter Preset
7	RsvdP	0	Reserved
6:4	Hwlnit/RsvdP	0h	Downstream Port 8.0T/s Receiver Preset Hint (N/A)
3:0	Hwlnit/RsvdP	0h	Downstream Port 8.0T/s Transmitter Preset (N/A)

5.1.4.5 Latency Tolerance Reporting Capability Registers

[Table 95] Latency Tolerance Reporting Capability Summary

Start Address	End Address	Symbol	Description
188h	18Bh	LTR_ID	Latency Tolerance Reporting (LTR) Capability ID
18Ch	18Dh	LTR_SLR	LTR Max Snoop Latency Register
18Eh	18Fh	LTR_NSLR	LTR Max No-Snoop Latency Register

[Table 96] LTR Extended Capability Header

Bits	Type	Default Value	Description
31:20	RO	190h	Next Capability Offset
19:16	RO	1h	Capability Version
15:0	RO	18h	PCI Express Extended Capability ID

[Table 97] LTR Max Snoop latency Register

Bits	Type	Default Value	Description
15:13	RsvdP	0h	Reserved
12:10	RW	0h	Max Snoop latency Scale
9:0	RW	0h	Max Snoop latency Value

[Table 98] LTR Max No Snoop latency Register

Bits	Type	Default Value	Description
15:13	RsvdP	0h	Reserved
12:10	RW	0h	Max No Snoop Latency Scale
9:0	RW	0h	Max No Snoop Latency Value

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

5.1.4.6 L1 Substates Extended Capability

[Table 99] L1 Substate Capability Summary

Start Address	End Address	Symbol	Description
190h	193h	L1S_CID	L1 Substate Capability ID
194h	197h	L1S_CR	L1 Substate Capability Register
198h	19Bh	L1S_C1R	L1 Substate Control 1 Register
19Ch	19Fh	L1S_C2R	L1 Substate Control 2 Register

[Table 100] L1 Substates Extended Capability Header

Bits	Type	Default Value	Description
31:20	RO	0	Next Capability Offset
19:16	RO	1h	Capability Version
15:0	RO	1Eh	PCI Express Extended Capability ID

[Table 101] L1 Substate Capability Register

Bits	Type	Default Value	Description
31:24	RsvdP	0h	Reserved
23:19	Hwlnit	5h	Port Power on value
18	RsvdP	0	Reserved
17:16	Hwlnit	0h	Port T_Power_on scale
15:8	Hwlnit	Ah	Port Common_mode_restore_time
7:5	RsvdP	0h	Reserved
4	Hwlnit	1	L1 PM Substates Supported
3	Hwlnit	1	ASPM PM L1.1 Supported
2	Hwlnit	1	ASPM PM L1.2 Supported
1	Hwlnit	1	PCI PM L1.1 Supported
0	Hwlnit	1	PCI PM L1.2 Supported

[Table 102] L1 Substate Control 1 Register

Bits	Type	Default Value	Description
31:29	RW	0h	LTR L1.2 Threshold Scale
28:26	RsvdP	0h	Reserved
25:16	RW	0h	LTR L1.2 Threshold value
15:8	RsvdP	0h	Common_mode_restore_time (N/A)
7:4	RsvdP	0h	Reserved
3	RW	0	ASPM PM L1.1 Enable
2	RW	0	ASPM PM L1.2 Enable
1	RW	0	PCI PM L1.1 Enable
0	RW	0	PCI PM L1.2 Enable

[Table 103] L1 Substate Control 2 Register

Bits	Type	Default Value	Description
31:8	RsvdP	0h	Reserved
7:3	RW	5h	T_POWER_ON Value
2	RsvdP	0	Reserved
1:0	RW	0h	T_POWER_ON Scale

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

5.2 NVM Express Registers

5.2.1 Register Summary

[Table 104] Register Summary

Start Address	End Address	Name	Type
00h	07h	CAP	Controller Capabilities
08h	0Bh	VS	Version
0Ch	0Fh	INTMS	Interrupt Mask Set
10h	13h	INTMC	Interrupt Mask Clear
14h	17h	CC	Controller Configuration
18h	1Bh	Reserved	Reserved
1Ch	1Fh	CSTS	Controller Status
20h	23h	NSSR	NVM Subsystem Reset
24h	27h	AQA	Admin Queue Attributes
28h	2Fh	ASQ	Admin Submission Queue Base Address
30h	37h	ACQ	Admin Completion Queue Base Address
38h	3Bh	CMBLOC	Controller Memory Buffer Location (Optional)
3Ch	3Fh	CMBSZ	Controller Memory Buffer Size (Optional)
40h	EFFh	Reserved	Reserved
F00h	FFFh	Reserved	Command Set Specific
1000h	1003h	SQ0TCBL	Submission Queue 0 Tail Doorbell (Admin)
1000h + (1 * (4 << CAP.DSTRD))	1003h + (1 * (4 << CAP.DSTRD))	CQ0HDBL	Completion Queue 0 Head Doorbell (Admin)
...			
1000h + (2y * (4 << CAP.DSTRD))	1003h + (2y * (4 << CAP.DSTRD))	SQyTDVL	Submission Queue y Tail Doorbell
1000h + ((2y + 1) * (4 << CAP.DSTRD))	1003h + ((2y + 1) * (4 << CAP.DSTRD))	CQyHDBL	Completion Queue y Head Doorbell

5.2.2 Controller Registers

[Table 105] Controller Capabilities

Bits	Type	Name	Default Value	Description
63:56	RO		0h	Reserved
55:52	RO	MPSMAX	0h	Memory Page Size Maximum (Maximum is 4KB)
51:48	RO	MPSMIN	0	Memory Page Size Minimum (Minimum is 4KB)
47:45	RO		0	Reserved
44:37	RO	CSS	1h	Command Sets Supported
				1h: NVM command set
36	RO	NSSRS	1h	NVM Subsystem Reset Supported
35:32	RO	DSTRD	0	Doorbell Stride
				0: Stride of 4 bytes
31:24	RO	TO	3Ch	Timeout
				3Ch: 30 seconds
23:19	RO		0	Reserved
18:17	RO	AMS	1	Arbitration Mechanism Supported
				(Weighted Round Robin with Urgent supported)
16	RO	CQR	1	Contiguous Queues Required
15:00	RO	MQES	3FFFh	Maximum Queue Entries Supported
				(16384 entries supported)

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

[Table 106] Version

Bits	Type	Name	Default Value	Description
31:16	RO	MJR	1h	Major Version Number
15:08	RO	MNR	3h	Minor Version Number
7:00	RO	Reserved	0	Reserved

NOTE:
 Note: The PM981a supports NVMe Express version 1.3

[Table 107] Interrupt Mask Set

Bits	Type	Name	Default Value	Description
31:00	RW1S	IVMS	0	Interrupt Vector Mask Set

[Table 108] Interrupt Mask Clear

Bits	Type	Name	Default Value	Description
31:00	RW1C	IVMC	0	Interrupt Vector Mask Clear

[Table 109] Controller Configuration

Bits	Type	Name	Default Value	Description
31:24	RO	-	0	Reserved
23:20	RW	IOCQES	0	I/O Completion Queue Entry Size (Configured as a power of 2) (Should be set to 4 for a 16 byte entry size)
19:16	RW	IOSQES	0	I/O Submission Queue Entry Size (Configured as a power of 2) (Should be set to 6 for a 64 byte entry size)
15:14	RW	SHN	0	Shutdown Notification 0h: No notification 1h: Normal shutdown notification 2h: Abrupt shutdown notification 3h: Reserved CSTS.SHST indicates shutdown status.
13:11	RW	AMS	0	Arbitration Mechanism Selected 0h: Round Robin No other values supported.
10:7	RW	MPS	0	Memory Page Size MPS is $2^{(12+MPS)}$ Shall be within CAP.MPSMAX and CAP.MPSMIN ranges.
6:4	RW	CSS	0	Command Set Selected 0h: NVMe Command Set No other values supported
3:1	RO	-	0	Reserved
0	RW	EN	0	Enable When set to 1, controller shall process commands. When cleared to 0, controller shall not process commands. This field is subject to CSTS.RDY and CAP.TO restrictions.

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

[Table 110] Controller Status

Bits	Type	Name	Default Value	Description
31:6	RO	-	0	Reserved
5	RW	PP	0	Processing Paused
4	RW1C	NSSRO	0	NVM Subsystem Reset Occurred
3:2	RO	SHST	0	Shutdown Status 0h: Normal operation, no shutdown requested 1h: Shutdown processing occurring 2h: Shutdown processing complete 3h: Reserved
1	RO	CFS	0	Controller Fatal Status
0	RO	RDY	0	1h: Controller ready to process commands 0h: Controller shall not process commands.

[Table 111] NVM Subsystem Reset

Bits	Type	Name	Default Value	Description
31:0	RW	NSSRC	0	NVM Subsystem Reset Control

[Table 112] Admin Queue Attributes

Bits	Type	Name	Default Value	Description
31:28	RO	-	0	Reserved
27:16	RW	ACQS	0	Admin Completion Queue Size Max: 4096 (Value of 4095h - 0's based value)
15:12	RO	-	0	Reserved
11:0	RW	ASQS	0	Admin Submission Queue Size Max: 4096 (Value of 4095h - 0's based value)

[Table 113] Admin Submission Queue Base Address

Bits	Type	Name	Default Value	Description
63:12	RW	ASQB	0	Admin Submission Queue Base Address
11:0	RO	-	0	Reserved

[Table 114] Admin Completion Queue Base Address

Bits	Type	Name	Default Value	Description
63:12	RW	ACQB	0	Admin Completion Queue Base Address
11:0	RO	-	0	Reserved

[Table 115] Controller Memory Buffer Location

Bits	Type	Name	Default Value	Description
31:12	RO	OFST	0	Offset
11:3	RO	-	0	Reserved
2:0	RO	BIR	0	Base Indicator Register

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

[Table 116] Controller Memory Buffer Size

Bits	Type	Name	Default Value	Description
31:12	RO	SZ	0	Size
11:8	RO	SZU	0	Size Units
7:5	RO		0	Reserved
4	RO	WDS	0	Write Data Support
3	RO	RDS	0	Read Data Support
2	RO	LISTS	0	PRP SGL List Support
1	RO	CQS	0	Completion Queue Support
0	RO	SQS	0	Submission Queue Support

[Table 117] Submission Queue Tail y Doorbell

Bits	Type	Name	Default Value	Description
31:16	RO		0	Reserved
15:0	RW	SQT	0	Submission Queue Tail

[Table 118] Completion Queue Head y Doorbell

Bits	Type	Name	Default Value	Description
31:16	RO		0	Reserved
15:0	RW	CQH	0	Completion Queue Head

6.0 Supported Command Set

The Admin command sets and NVM I/O command sets of Samsung SSD PM981a are defined in compliant with NVM Express specification revision 1.3

6.1 Admin Command Set

The Admin command set is the commands that are submitted to the Admin Submission Queues. The detailed specifications are described in NVM Express specification document.

[Table 119] Opcode for Admin Commands

Opcode (Hex)	Command Name
00h	Delete I/O Submission Queue
01h	Create I/O Submission Queue
02h	Get Log Page
04h	Delete I/O Completion Queue
05h	Create I/O Completion Queue
06h	Identify
08h	Abort
09h	Set Feature
0Ah	Get Feature
0Ch	Asynchronous Event Request
10h	Firmware Activate
11h	Firmware Image Download
14h	Device Self-test
80h	Format NVM
81h	Security Send
82h	Security Receive
84h	Sanitize
C0h – FFh	Vendor Specific

6.1.1 Identify Command

The Identify Command returns the data described below.

[Table 120] Identify Controller Data Structure

Bytes	O/M	Default Value	Description
1:0	M	144Dh	PCI Vendor ID
3:2	M	144Dh	PCI Subsystem Vendor ID
23:4	M	S###N#####	Serial Number(ASCII), # :Variables
63:24	M	256GB: SAMSUNG MZVLB256HBHQ-000L2 / L7 512GB: SAMSUNG MZVLB512HBQ-000L2 / L7 1024GB: SAMSUNG MZVLB1T0HBLR-000L2 / L7 2048GB: SAMSUNG MZVLB2T0HALB-000L2 / L7	Model Number (ASCII)
71:64	M	####EX##	Firmware Revision, #:Variables
72	M	2h	Recommended Arbitration Burst
75:73	M	002538h	IEEE OUI
76	O	0	Controller Multi-Path I/O and Namespace Sharing Capabilities Bit 2: 1h - Controller is associated with an SR-IOV Virtual Function 0h - Controller is associated with a PCI Function. Bit 1: 1h - Device has Two or More controller 0h - Device has One Controller Bit 0: 1h - Device has Two or More physical PCI Express ports 0h - Device has One PCI Express port
77	M	9h	Maximum Data Transfer Size 0h: No restrictions on transfer size
79:78	M	4h	Controller ID (CNTLID)
83:80	M	00010300h	Version
87:84	M	0x30D40	RTD3 Resume Latency (RTD3R)
91:88	M	007A1200h	RTD3 Entry Latency
95:92	M	0h	Optional Asynchronous Events Supported
255:96		0h	Reserved
257:256	M	17h	Optional Admin Command Support Bits 15:5 - Reserved Bit 4: 1h - Device Self-Test Bit 3: 0h - Namespace Management Attachment Not Supported Bit 2: 1h - Firmware Activate/Download Supported Bit 1: 1h Format NVM Supported Bit 0: 1h Security Send and Security Receive Supported
258	M	7h	Abort Command Limit (Maximum number of concurrently outstanding Abort commands) (0's based value)
259	M	3h	Asynchronous Event Request Limit (Maximum number of concurrently outstanding Asynchronous Event Request commands) (0's based value)
260	M	13h	Firmware Updates Bits 7:5 - Reserved Bit 4 - 1h Support firmware activation without a reset Bits 3:1 - Number of firmware slots Bit 0 - 0h, "1" indicates Slot 1 is read only

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

261	M	3h	Log Page Attributes Bits 7:2 – Reserved Bit 1 : 1h - Support the command effects log page Bit 0: 0h SMART data is global for all namespaces
262	M	3Fh	Error Log Page Entries (Number of Error Information log entries stored by controller) (0's based value)
263	M	4h	Number of Power States Support (0's based value)
264	M	1h	Admin Vendor Specific Command Configuration Bits 7:1 – reserved Bit 0 – Indicates Admin Vendor Specific Commands use the format defined in NVMe Express 1.0c Figure 8.
265	O	1h	Autonomous Power State Transition Attributes (APSTA)
267:266	M	0x162	Warning Composite Temperature Threshold
269:268	M	0x163	Critical Composite Temperature Threshold
271:270	O	0h	Maximum Time for Firmware Activation
275:272	O	0h	Host Memory Buffer Preferred Size
279:276	O	0h	Host Memory Buffer Minimum Size
295:280	O	2048GB: 1DCEEA56000h	Total NVM Capacity
		1024GB: EE77A56000h	
		512GB: 773C256000h	
		256GB: 3B9E656000h	
311:296	O	0h	Unallocated NVM Capacity
315:312	O	0h	Replay Protected Memory Block Support
317:316	O	23h	Extended Device Self-Test Time
318	O	0h	Device Self-Test Options
319	L0	0x0	Firmware Update Granularity (FWUG):
321:320	L0	0x0	Keep Alive Support (KAS):
323:322	O	0x1	Host Controlled Thermal Management Attributes (HCTMA):
325:324	O	0x160	Minimum Thermal Management Temperature (MNTMT):
327:326	O	0x162	Maximum Thermal Management Temperature (MXTMT):
331:328	O	0x03	Sanitize Capabilities (SANICAP):
		0x0	Bits 31:3
		0x0	Bit 2 the Overwrite sanitize operation supported
		0x1	Bit 1 the Block Erase sanitize operation supported
		Non-SED:0x0 SED: 0x1	Bit 0 the Crypto Erase sanitize operation supported
511:332		0x0	Reserved NVM Command Set Attributes
512	M	66h	Submission Queue Entry Size Bits 7:4 – 6h Max SQES (64 bytes) Bits 3:0 – 6h Required SQES (64 bytes)
513	M	44h	Completion Queue Entry Size Bits 7:4 – 4h Max CQES (16 bytes) Bits 3:0 – 4h Required CQES (16 bytes)
515:514		0	Reserved
519:516	M	1h	Number of Namespaces

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

521:520	M	5Fh	Optional NVM Command Support Bits 15:6 – Reserved Bit 5 – 1h Reservations Supported 0h Not support Reservations Bit 4 – 1h Save field in Set Feature & Select field in Get Feature Supported 0h Not support Save field in Set Feature & Select field in Get Feature Bit 3 – 1h Write Zeros Supported 0h Not support Write Zeros Bit 2 – 1h Dataset Management Supported 0h Not support Dataset Management Bit 1 – 1h Write Uncorrectable Supported 0h Not support Write Uncorrectable Bit 0 – 1h Compare Supported 0h Not support Compare
523:522	M	0h	Fused Operation Support Bits 15:1 – Reserved Bit 0 – 0h Compare/Write Fused Operation Not Supported
524	M	0h for Non-SED 4h for SED	Format NVM Attributes Bits 7:3 – Reserved Bit 2 – 1h Cryptographic Erase is supported 0h Cryptographic Erase is not supported Bit 1 – 0h Cryptographic erase and user data erase Per Namespace Bit 0 – 0h Format Per Namespace
525	M	1h	Volatile Write Cache Bits 7:1 - Reserved Bit 0 -1h Volatile write cache is present 0h No Volatile Write Cache present
527:526	M	3FFh	Atomic Write Unit Normal (0's based value)
529:528	M	0h	Atomic Write Unit Power Fail (0's based value)
530	M	1h	NVM Vendor Specific Command Configuration Bits 7:1 – reserved Bit 0 – Indicates NVM Vendor Specific Commands use the format defined in NVMe Express
531	M	0h	Reserved
533:532	O	0h	ACWU
534:533	M	0h	Reserved
539:536	O	0h	No SGL support
703:540	-	0h	Reserved
I/O Command Set Attributes			
2047:704	-	0h	Reserved
Power State Descriptors			
2079:2048	M	refer to 'Identify Power State Descriptor Data Structure'	Power State 0 Descriptor
2111:2080	O	refer to 'Identify Power State Descriptor Data Structure'	Power State1 Descriptor
2143:2112	O	refer to 'Identify Power State Descriptor Data Structure'	Power State 2 Descriptor
2175:2144	O	refer to 'Identify Power State Descriptor Data Structure'	Power State 3 Descriptor

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

2207:2176	O	refer to 'Identify Power State Descriptor Data Structure'	Power State 4 Descriptor
...	-	0h	(N/A)
3071:3040	O	0h	Power State 31 Descriptor (N/A)
Vendor Specific			
3278:3072	-	Samsung Specific	Samsung Reserved
3279	O	5h for Non-SED 7h for SED	Security Feature Set Bit 2 – 1h TCG Supported Bit 1 – 1h SED Supported Bit 0 – 1h ATA Security Supported
4095:3280	-	0h	Samsung Reserved

[Table 121] Identify Power State Descriptor Data Structure

Bytes	Description	Power State 0 Descriptor	Power State 1 Descriptor	Power State 2 Descriptor	Power State 3 Descriptor	Power State 4 Descriptor
255:184	Reserved					
183:182	Active Power Scale(APS)	0h	0h	0h	0h	0h
181:179	Reserved					
178:176	Active Power Workload(APW)	0h	0h	0h	0h	0h
175:160	Active Power(ACTP)	0h	0h	0h	0h	0h
159:152	Reserved					
151:150	Idle Power Scale(IPS)	0h	0h	0h	0h	0h
149:144	Reserved					
143:128	Idle Power(IDLP)	0h	0h	0h	0h	0h
127:125	Reserved					
124:120	Relative Write Latency	0h	1h	2h	3h	4h
119:117	Reserved					
116:112	Relative Write Throughput	0h	1h	2h	3h	4h
111:109	Reserved					
108:104	Relative Read Latency	0h	1h	2h	3h	4h
103:101	Reserved					
100:96	Relative Read Throughput	0h	1h	2h	3h	4h
95:64	Exit Latency	0h	0h	0h	4B0h	1F40h
63:32	Entry Latency	0h	0h	0h	D2h	7D0h
31:26	Reserved					
25	Non-Operational State	0h	0h	0h	1h	1h
24	Max Power Scale	0h	0h	0h	1h	1h
23:16	Reserved					
15:00	Maximum Power	320h	276h	15Eh	2F8h	32h

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

[Table 122] Identify Namespace Data Structure

Bytes	O/M	Default Value		Description
7:0	M	2048GB	EE7752B0h	Namespace Size
		1024GB	773BD2B0h	
		512GB	3B9E12B0h	
		256GB	1DCF32B0h	
15:8	M	2048GB	EE7752B0h	Namespace Capacity
		1024GB	773BD2B0h	
		512GB	3B9E12B0h	
		256GB	1DCF32B0h	
23:16	M	2048GB	0	Namespace Utilization
		1024GB	0	
		512GB	0	
		256GB	0	
24	M	0h		Namespace Features Bits 7:1 Reserved Bit 0: 0h Thin provisioning not supported
25	M	0h		Number of LBA Formats
26	M	0h		Formatted LBA Size Bits 7:5 – Reserved Bit 4: Metadata interleaved or separate (based on LBA format) Bit 3:0 – Indicates LBA format
27	M	0h		Metadata Capabilities Bits 7:2 – Reserved Bit 1 – Supports Metadata as separate buffer Bit 0 – Supports Metadata as extended LBA
28	M	0h		End-to-end Data Protection Capabilities Bits 7:5 – Reserved Bit 4 – Supports protection information as last 8 bytes of Metadata Bit 3 – Supports protection information as first 8 bytes of metadata Bit 2 – Supports Type 3 protection information Bit 1 – Supports Type 2 protection information Bit 0 – Supports Type 1 protection information
29	M	0h		End-to-End Data Protection Type Settings Bits 7:4 – Reserved Bit 3 – 1: Protection information transferred as first 8 bytes of metadata Bit 3 – 0: Protection information transferred as last 8 bytes of metadata Bit 2:0 – 000b: Protection information disabled Bit 2:0 – 1h: Protection type 1 enabled Bit 2:0 – 2h: Protection type 2 enabled Bit 2:0 – 3h: Protection type 3 enabled
30	O	0h		Namespace Multi-path I/O and Namespace sharing Capabilities (NMIC) Bits 7:1 - Reserved Bit 0 - 1 : Accessible by two or more controllers Bit 0 - 0 : Private namespace

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31	O	0h	<p>Reservation Capabilities (RESCAP)</p> <p>Bits 7 - Reserved</p> <p>Bits 6 - 1 : Namespace supports the Exclusive Access (All Registrants reservation type)</p> <p>Bit 5 - 1 : Namespace supports the Write Exclusive (All Registrants reservation type)</p> <p>Bit 4 - 1 : Namespace supports the Exclusive Access (Registrants only reservation type)</p> <p>Bit 3 - 1 : Namespace supports the Write Exclusive (Registrants only reservation type)</p> <p>Bit 2 - 1 : Namespace supports the Exclusive Access Reservation type</p> <p>Bit 1 - 1 : Namespace supports the Write Exclusive Reservation type</p> <p>Bit 0 - 1 : Namespace supports the Persist Through Power Loss capability</p>	
32	O	80h	Bit 7 - 1:Format Progress Indicator	
33		-	Reserved	
35:34	O	0h	Namespace Atomic Write Unit Normal	
37:36	O	0h	Namespace Atomic Write Unit Power Fail	
39:38	O	0h	Namespzcce Atomic Compare & Write Unit	
41:40	O	0h	Namespace Atomic Boundary Size Normal	
43:42	O	0h	Namespace Atomic Boundary Offset	
45:44	O	0h	Namespace Atomic Boundary Size Power Fail	
47:46		-	Reserved	
63:48	O	2048GB	1DCEEA56000h	NVM Capacity
		1024GB	EE77A56000h	
		512GB	773C256000h	
		256GB	3B9E656000h	
103:64		-	Reserved	
119:104	O	0h	<p>Namespace Globally Unique Identifier (NGUID)</p> <p>#:Variables</p> <p>*NGUID specifies data in a big endian format.</p>	
127:120	O	002538#####h	<p>IEEE Extended Unique Identifier(EUI64)</p> <p>#:Variables</p> <p>*EUI64 specifies data in a big endian format.</p>	
131:128	M	refer to 'LBA Format 0 Data Structure'	LBA Format 0 Support	
135:132	O	0h	LBA Format 1 Support	
139:136	O	0h	LBA Format 2 Support	
143:140	O	0h	LBA Format 3 Support	
147:144	O	0h	LBA Format 4 Support (N/A)	
...				
191:188	O	0h	LBA Format 15 Support (N/A)	
383:192	-	0h	Reserved	
Vendor Specific				
4095:384	-	0h	Samsung Reserved	

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

[Table 123] LBA Format 0 Data Structure

Bits	Name	Default Value	Description
31:26	-	0	Reserved
25:24	RP	0	Relative Performance
23:16	LBADS	9h	LBA Data Size
15:00	MS	0	Meta data Size

6.2 NVM Express I/O Command Set

[Table 124] Opcode for NVM Express I/O Commands

Opcode (Hex)	Command Name
00h	Flush
01h	Write
02h	Read
04h	Write Uncorrectable
05h	Compare
08h	Write Zeroes
09h	Dataset Management

NOTE:

1) Deallocate feature in Dataset Management command is only supported in the Samsung SSD PM981a.

6.3 SMART/Health Information

[Table 125] SMART/Health Information Log

Bytes	Default Value	Attribute Description
0	0	Critical Warning Bit 7:5 – Reserved Bit 4 – 1h: the volatile memory backup device has failed. (only valid if the controller has a volatile memory backup solution) Bit 3 – 1h: the media has been placed in read only mode Bit 2 – 1h: the NVM subsystem reliability has been degraded due to significant media related errors or any internal error that degrades NVM subsystem reliability Bit 1 – 1h: a temperature is above an over temperature threshold or below an under temperature threshold Bit 0 – 1h: the available spare space has fallen below the threshold
2:1	current temp.	Temperature
3	100	Available Spare
4	10	Available Spare Threshold
5	0	Percentage Used
31:6	-	Reserved
47:32	0	Data Units Read
63:48	0	Data Units Written
79:64	0	Host Read Commands
95:80	0	Host Write Commands
111:96	0	Controller Busy Time
127:112	0	Power Cycles
143:128	0	Power On Hours
159:144	0	Unsafe Shutdowns
175:160	0	Media and Data Integrity Errors
191:176	0	Number of Error Information Log Entries
195:192	0	Warning Composite Temperature Time
199:196	0	Critical Composite Temperature Time
201:200	current temp.	Temperature Sensor 1
203:202	current temp.	Temperature Sensor 2
205:204	0	Temperature Sensor 3
207:206	0	Temperature Sensor 4
209:208	0	Temperature Sensor 5
211:210	0	Temperature Sensor 6
213:212	0	Temperature Sensor 7
215:213	0	Temperature Sensor 8
511:216	-	Reserved

7.0 PRODUCT COMPLIANCE

7.1 Product regulatory compliance and Certifications

[Table 126] Certifications and Declarations

Category	Certifications	Region or Country	Standard
EMC	CE	E.U. (Europe)	EN55032:2012/AC:2013, Class B EN55024:2010 EN55035:2017
	FCC	U.S.	CFR 47 Part 15 subpart B, Class B
	IC	CANADA	ICES-003, Issue 6
	RCM	Australia & New Zealand	AS/NZS CISPR 32:2015, Class B
	Morocco	Morocco	NM EN 55022 NM EN 55024
	KC	Korea	KN 32, KN 35
	VCCI	Japan	VCCI-CISPR 32:2016, Class B
	BSMI	Taiwan	CNS 13438
Safety	c-UL-us	America(U.S., CANADA)	UL/CSA 60950-1
	CE	E.U. (Europe)	EN 60950-1:2006
	TUV-GS	-	EN 60950-1:2006
	CB	E.U. (Europe)	IEC 60950-1:2005 (2 nd Edition)
RoHS	CE	E.U. (Europe)	EN50581:2012
	BSMI	Taiwan	CNS 15663

The three existing compliance marks (C-Tick, A-Tick and RCM) are consolidated into a single compliance mark - the RCM.

For more details are available at the following internet address:

www.samsung.com/semiconductor



MANUFACTURER'S DECLARATION FOR CE CERTIFICATION

Hereby, Samsung Electronics declares that the product above is in compliance with Directive 2014/30/EU, 2011/65/EU, 2014/35/EU.

EU Compliance Contact information
Samsung Service PO Box 12987, Dublin, Ireland



FEDERAL COMMUNICATION COMMISSION (FCC)

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

Unique Identifier : Check the label on the product
Responsible Party : Samsung Electronics America QA Lab
19 Chapin Rd. Building D Pine Brook NJ 07058
Tel : 1-973-808-6362, Fax : 1-973-808-6361

Innovation, Science and Economic Development Canada ICES-003 Compliance Label

CAN ICES-3 (B)/NMB-3(B)

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

Taiwan RoHS (Restriction of Hazardous Substances Directive)

設備名稱：固態硬碟， 型號（型式）：請參考外箱標籤						
單元Unit	限用物質及其化學符號					
	鉛 Lead (Pb)	汞 Mercury (Hg)	鎘 Cadmium (Cd)	六價鉻 Hexavalent chromium (Cr ⁶⁺)	多溴聯苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
電子零組件	○	○	○	○	○	○
電路板	○	○	○	○	○	○
錫膏	○	○	○	○	○	○
主動及被動零組件	-	○	○	○	○	○
次要零組件	○	○	○	○	○	○
備考1. “○” 係指該項限用物質之百分比含量未超出百分比含量基準值。						
備考2. “-” 係指該項限用物質為排除項目。						



Waste Electrical and Electronic Equipment

This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service, or the shop where you purchased the product.

8.0 References

[Table 127] Standards References

Item	Website
PCI Express Base Specification Revision 3.0	http://www.pcisig.com/specifications/pciexpress/base3/
PCI Express M.2 Specification Revision 1.1	http://pcisig.com/specifications
NVM Express Specification Rev. 1.3	http://www.nvmexpress.org/
Solid-State Drive Requirements and Endurance Test Method (JESD218A)	http://www.jedec.org/standards-documents/docs/jesd218a
Solid-State Drive Requirements and Endurance Test Method (JESD219A)	http://www.jedec.org/standards-documents/docs/jesd219a


THE ECO DECLARATION



ECMA/TC38-TG3/2015/026
(Rev. 1 – 15 April 2015)

Annex B2- Product environmental attributes Computer Monitors


The declaration may be published only when all rows and/or fields marked with * are filled-in (n.a. for not applicable). Additional information regarding each item may be found under P15.

Brand *	Lenovo	
Company name *	Lenovo	
Contact information * e-mail address	Lenovo Global Environmental Affairs Alvin L Carter alcarter@lenovo.com	
Internet site *	http://www3.lenovo.com/us/en/social_responsibility/environment	
Additional information		

The company declares (based on product specification or test results based obtained from sample testing), that the product conforms to the statements given in this declaration.	
Type of product *	Display
Commercial name *	ThinkVision T24V-10
Model number *	61BC
Issue date *	2017/09/27
Intended market *	<input checked="" type="checkbox"/> Global <input type="checkbox"/> Europe <input type="checkbox"/> Asia, Pacific & Japan <input type="checkbox"/> Americas <input type="checkbox"/> Other
Additional information	


This is an uncontrolled copy when in printed form. Please refer to the contact information for the latest version.

<p>About Annex B2</p> <p>Annex B2 reflects Product environmental attributes relevant for Computers and Computer Monitors. The following items from the ECMA-370 Main body are not shown in the template:</p> <p>P4.1 – P4.3 Consumable materials P9.1 TEC and Print speed P10.2 - P10.3 Chemical emissions from printing products P11.1 - P11.3 Consumable materials for printing products.</p>
--

Model number *	<i>Error! Reference source not found.61BC</i>	Logo	
Issue date *	2017/09/27		

Product environmental attributes - Legal requirements		Requirement met		
Item		Yes	No	n.a.
P1 Hazardous substances and preparations				
P1.1*	Products do comply with current European RoHS Directive. (See legal reference and NOTE B1)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
P1.2*	Products do not contain Asbestos (see legal reference). Comment: Legal reference has no maximum concentration value.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
P1.3*	Products do not contain Ozone Depleting Substances: Chlorofluorocarbons (CFC), hydrobromofluorocarbons (HBFC), hydrochlorofluorocarbons (HCFC), Halons, carbontetrachloride, 1,1,1-trichloroethane, methyl bromide (see legal reference). Comment: Legal reference has no maximum concentration values.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
P1.4*	Products do not contain more than; 0,005% polychlorinated biphenyl (PCB), 0,005% polychlorinated terphenyl (PCT) in preparations (see legal reference).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
P1.5*	Products do not contain more than 0,1% short chain chloroparaffins (SCCP) with 10-13 carbon atoms in the chain containing at least 48% per mass of chlorine in the SCCP (see legal reference).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
P1.6*	Parts with direct and prolonged skin contact do not release nickel in concentrations above 0,5µg/cm ² /week (see legal reference). Comment: Max limit in legal reference when tested according to EN1811:2011-5.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P1.7*	REACH Article 33 information about substances in articles is available at (add URL or mail contact): http://www3.lenovo.com/us/en/social_responsibility/environment	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P2 Batteries				
P2.1*	If the product contains a battery or an accumulator, the battery/accumulator is labeled with the disposal symbol. Information on proper disposal is provided in user manual. (See legal reference)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
P2.2*	Batteries or accumulators do not contain more than 0,0005% of mercury or 0,002% of cadmium. (See legal reference)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
P2.3*	Batteries and accumulators are readily removable. (See legal reference)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
P3 Conformity verification & Eco design (ErP)				
P3.1*	The product is CE-marked to show conformance with applicable legal requirements (see legal reference). The Declaration of Conformity can be requested at (add link or e-mail address): http://www3.lenovo.com/us/en/social_responsibility/EU_DoC_monitors	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P3.2*	The product complies with the Eco design requirements for energy-related products, (see legal reference). Required information is; <input type="checkbox"/> given in item P15 or added to this document, <input checked="" type="checkbox"/> available at (add URL): http://www3.lenovo.com/us/en/social_responsibility/datasheets_monitors/	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P5 Product packaging				
P5.1*	Packaging and packaging components do not contain more than 0,01% lead, mercury, cadmium and hexavalent chromium by weight of these together.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
P5.2*	The packaging materials are marked with abbreviations and numbers indicating the nature of the material(s) used (see legal reference).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P5.3*	The product packaging material is free from ozone depleting substances as specified in the Montreal Protocol (see legal reference). Comment: Legal reference has no maximum concentration values.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P6 Treatment information				
P6.1*	Information for recyclers/treatment facilities is available (see legal reference).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>


NOTE B1 Restriction applies to the homogeneous material, unless other specified and expressed in weight %. Stating "Yes" means that the product is compliant with the mandatory requirements.

Model number *	Error! Reference source not found.61BC	Logo	
Issue date *	2017/09/27		

Product environmental attributes - Market requirements (See General NOTE GN below)		Requirement met		
- Environmental conscious design		Yes	No	n.a.
Item	*=mandatory to fill in. Additional information regarding each item may be found under P14.			
P7 Design				
Disassembly, recycling				
P7.1*	Parts that have to be treated separately are easily separable	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P7.2*	Plastic materials in covers/housing have no surface coating.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P7.3*	Plastic parts > 100 g consist of one material or of easily separable materials.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P7.4*	Plastic parts > 25 g have material codes according to ISO 11469 referring ISO 1043-4.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P7.5	Plastic parts are free from metal inlays or have inlays that can be removed with commonly available tools.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P7.6*	Labels are easily separable. (This requirement does not apply to safety/regulatory labels).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Product lifetime				
P7.7*	Upgrading can be done e.g. with processor, memory, cards or drives	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
P7.8*	Upgrading can be done using commonly available tools	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
P7.9	Spare parts are available after end of production for: 5 years			<input type="checkbox"/>
P7.10	Service is available after end of production for: 5 years			<input type="checkbox"/>
Material and substance requirements				
P7.11*	Product cover/housing material type(e.g. plastics, metal, aluminum): Material type: ABS Material type: STEEL Material type:			
P7.12	Insulation materials of external electrical cables are PVC free.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
P7.13	Insulation materials of internal electrical cables are PVC free.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
P7.14	External plastic casing/cover parts > 25 g contain no more than 0,1% weight (1000 ppm) bromine and 0,1% weight (1000 ppm) chlorine attributable to brominated flame retardants, chlorinated flame retardants, and polyvinyl chloride or 0,3% weight (3000 ppm) bromine and 0,3% weight (3000 ppm) chlorine in parts containing more than 25% post-consumer recycled content.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P7.15	Printed circuit boards, PCBs (without components) are low halogen: all <input type="checkbox"/> PCBs > 25 g <input type="checkbox"/> are low halogen as defined in IEC61249-2-21. (See NOTE B2)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
P7.16	Flame retarded plastic parts > 25 g in covers / housings are marked according ISO 1043-4: Marking: no flame retardant	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
P7.17	Alt. 1:Chemical specifications of flame retardants in printed circuit boards > 25 g (without components): <input type="checkbox"/> TBBPA (additive), <input type="checkbox"/> TBBPA (reactive) (See NOTE B3), <input checked="" type="checkbox"/> Other: brominated epoxy resin , CAS #: 68928-70-1 Alt. 2:Chemical specifications of flame retardants in printed circuit boards (without components)> 25 g according ISO 1043-4: FR16	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P7.18	Alt. 1: Flame retarded plastic parts > 25 g contain the following flame retardant substances/preparations in concentrations above 0,1%: 1. Chemical name: , CAS #: (See NOTE B4) 2. Chemical name: , CAS #: " 3. Chemical name: , CAS #: " Alt. 2:Chemical specifications of flame retardants in plastic parts > 25 g according ISO 1043-4:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
P7.19	In plastic parts > 25 g, flame retardant substances/preparations above 0,1% are used which have been assigned the following Risk phrases; and Hazard statements: The source(s) for these classifications is/are found at (add URL(s)): , (See note B5)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
P7.20*	Postconsumer recycled plastic material content is used in the product (See Note B6): If YES; at least one of the two alternatives below shall be answered; a) Of total plastic parts' weight > 25 g, the postconsumer recycled plastic material content (calculated as a percentage of total plastic by weight) is 45.78% . or b) The weight of recycled material is 950.5g .	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

GENERAL NOTE Standard references should direct to the latest version of a standard. If an older version of a standard is used, section P15 shall be used for explanation.


NOTE B6 Applies to a product containing plastic parts whose combined weight exceeds 100 g with the exception of printed circuit boards, cables, connectors and electronic components and bio-based plastic material.

Model number *	61BC			Logo		
Issue date *	2017/09/27					
Product environmental attributes - Market requirements (continued)					Requirement met	
Item				Yes	No	n.a.
Material and substance requirements (continued)						
P7.21*	Biobased plastic material content is used in the product (See NOTEB7): If YES; at least one of the two alternatives below shall be answered; a) Of total plastic parts' weight > 25 g, the biobased plastic material content (calculated as a percentage of total plastic by weight) is %. or b) The weight of the biobased plastic material is g.			<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
P7.22*	Light sources are free from mercury, i.e. less than 0,1 mg/lamp. If mercury is used specify: Number of lamps: 0 and maximum mercury content per lamp: 0 mg			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P8 Batteries						
P8.1*	Battery chemical composition:					<input checked="" type="checkbox"/>
P9 Energy consumption (See NOTEB8)						
P9.1 For the product the following power levels or energy consumptions are reported:						
Energy mode *	Power level at 100 V AC	Power level at 115V AC	Power level at 230 V AC	Reference/Standard for energy modes and test method *		
ENERGY STAR® On Mode*(System Idle)	12.70W @ 50Hz 13.09W @ 60Hz	13.14W	13.68 W	ENERGY STAR® Program Requirements for Computer Monitors: Ver. 7.0		
ENERGY STAR® Low Power Sleep Mode*	0.43W @ 50Hz 0.44W @ 60Hz	0.44 W	0.46 W	ENERGY STAR® Program Requirements for Computer Monitors: Ver. 7.0		
ENERGY STAR® Off / Apparent Off Mode*	0.26W @ 50Hz 0.26W @ 60Hz	0.25 W	0.29 W	ENERGY STAR® Program Requirements for Computer Monitors: Ver. 7.0		
PTEC *	41.39W @ 50Hz 42.64W @ 60Hz	42.79W	44.56W	$E_{TEC} = 8.76 \times (P_{on} \times 0.35 + P_{sleep} \times 0.65)$ <input type="checkbox"/>		
ETEC *	54.12Wh/year	54.12Wh/year	54.12Wh/year	<input type="checkbox"/>		
External Power Supply Efficiency Level (International Efficiency Marking Protocol) * :				<input type="checkbox"/>		
Display resolution* : 2.1megapixels				ENERGY STAR® Program Requirements for Computer Monitors: Ver. 7.0		
Default time to enter energy save mode: 20 minutes				ENERGY STAR® Program Requirements for Computer Monitors: Ver. 7.0		
P9.2*	Information about the energy save function is provided with the product.			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P9.3*	The product meets the energy requirements of the following voluntary program/s: ENERGY STAR® version: 7.0 Product category: Display.			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P10 Emissions						
Noise emission – Declared according to ISO 9296 (See NOTE B9)						
P10.1	Mode	Mode description	Statistical upper limit A-weighted sound power level, $L_{WA,c}(B)$			
	Idle	N/A	N/A <input checked="" type="checkbox"/>			
	Operation	N/A	N/A <input checked="" type="checkbox"/>			
	Other mode	N/A	N/A			
	Other mode	N/A	N/A			
Measured according to: <input checked="" type="checkbox"/> ISO 7779 <input type="checkbox"/> ECMA-74 <input type="checkbox"/> Other (only if not covered by ECMA-74)						

NOTE B7 The following is to be excluded from the calculation of percentage: printed circuit boards, labels, cables, connectors and electronic components and postconsumer recycled plastic

NOTE B8A Guidance document on Energy Efficiency is available;
see <http://www.ecma-international.org/publications/standards/Ecma-370.htm>

NOTE B9A Guidance document on Acoustic Noise is available;
see <http://www.ecma-international.org/publications/standards/Ecma-370.htm>

Model number *	61BC	Logo	
Issue date *	2017/09/27		

Product environmental attributes - Market requirements (continued)		Requirement met		
Item		Yes	No	n.a.
Electromagnetic emissions				
P10.4	Computer display meets the requirement for low frequency electromagnetic fields of the following voluntary program(s): TCO7.0, TUV GS, Energy Star7.0, MPRII, JEITA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P12 Ergonomics for computing products				
P12.1*	The display meets the ergonomic requirements of ISO 9241-307 for visual display technologies.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P12.2*	The physical input device meets the requirements of ISO 9995 and ISO 9241-410.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
P13 Packaging and documentation				
P13.1*	Product packaging material type(s): Carton weight (kg): 0.968 Product packaging material type(s): Cushion weight (kg): 0.386 Product packaging material type(s): EPE Bag weight (kg): 0.03			
P13.2*	Product plastic primary packaging is free from PVC.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P13.3*	For product primary corrugated fiberboard packaging, specify the contained percentage of minimum post-consumer recovered fiber content: 80 %			<input type="checkbox"/>
P13.4*	Specify media for user and product documentation (tick box): <input checked="" type="checkbox"/> Electronic, <input type="checkbox"/> Paper, <input type="checkbox"/> Other			<input type="checkbox"/>
P13.5	(Please only complete this item if paper documentation used) User and product documentation on paper media is chlorine-free: If Yes, please specify: Totally chlorine-free Elemental chlorine-free Processed chlorine-free	<input type="checkbox"/>	<input type="checkbox"/>	
P14 Voluntary programs				
P14.1	The product meets the requirements of the following voluntary program(s): ENERGY STAR® Criteria version: 7.0 Date: 2017/7/31 Product category: Monitor Eco-label: TCO Criteria version: 7.0 Date: 2017/9/8 Product category: Displays Eco-label: TCO edge Criteria version: 2.0 Date: 2017/9/8 Product category: Displays			
P15 Additional information (See NOTE B10)				
P9	Energy consumption of specific configuration may vary; description of the tested product configuration: NOTE: Supplier makes no representations, guarantees, assurances or warranties whether express or implied, regarding the information contained in this document. All information provided by supplier in this document is provided based on supplier's knowledge available at the time of completion, and supplier shall have no obligation to update such information. The information provided here is approximate and provided for informational purposes only. See a Lenovo Account Representative for more information.			
P9	See Energy Star Qualified Monitors & Displays for the latest information: https://www.energystar.gov/products/office_equipment/displays			

NOTE B10 Additional lines may be inserted to declare further items, by positioning the cursor at the far right of the row and hitting the <Enter> key.

Legal references Europe Annex B2

Reference	Declaration item
Directive 2011/65/EU (RoHS Directive)* *Specific exemptions apply for certain products and applications.	P1.1
Regulation (EC) 1907/2006(REACH, Annex XVII)	P1.2, P1.4, P1.6, P1.7
Regulation (EC) 2037/2000, 2038/2000, 2039/2000 (Marketing and use of Ozone layer depleting substances)	P1.3, P5.3
Norwegian regulation relating to restrictions on the use of certain dangerous chemicals 20.12.2002	P1.5
Directive 2013/56/EC (Battery and accumulators Directive)* *These provisions shall not apply where, for safety, performance, medical or data integrity reasons, continuity of power supply is necessary and requires a permanent connection between the appliance and the battery or accumulator.	P2.1, P2.2, P2.3, P8.1
Directive 2006/95/EC (Low Voltage Directive)	P3.1
Directive 2004/108/EC (EMC Directive)	P3.1
Directive 1999/5/EC (R&TTE Directive)	P3.1
Regulation (EC)801/2013 amending Regulation (EC) No 1275/2008 with regard to ecodesign requirements for standby, off mode electric power consumption of electrical and electronic household and office equipment, and amending Regulation (EC) No 642/2009 with regard to ecodesign requirements for televisions	P3.1, P3.2
Regulation (EC) No 1272/2008 (CLP Regulation)	P7.19
Directive 2004/12/EC (Packaging Directive)	P5.1
Decision 97/129/EC (Secondary packaging legislation)	P5.2
Directive 2012/19/EU (WEEE directive)	P6.1

+ Teclado Lenovo

PN: TECLA00



↘ Interface USB

↘ Padrão ABNT II

↘ Numlock Independente

↘ Compatível com toda linha Lenovo

↘ Ajuste de Inclinação

Teclado Lenovo Pro USB – Overview



Features and specifications

- Quiet 107-key full-size layout (includes three Windows keys)
- Detachable rubberized palm/wrist rest for additional comfort
- Three levels of keyboard tilt
- Common Windows shortcuts are highlighted on key skirts helps improve productivity
- USB-attach
- Keyboard USB cable length: 2.0 m (6.56 feet)
- Spill-resistant
- Choice of multiple [keyboard languages](#)

Physical specifications

- Lenovo Preferred Pro USB Keyboard
 - Approximate weight: 1.41 kg (3.1 lb)
 - Approximate height: 34 mm (1.3 in)
 - Approximate depth: 185 mm (7.3 in)
 - Approximate width: 453 mm (17.8 in)
 - Approximate USB cable length: 2.00 m (6.56 ft)
- Lenovo Preferred Pro USB Keyboard packaged in a shipping carton:
 - Approximate weight: 1.63 kg (3.6 lb)
 - Approximate height: 63 mm (2.5 in)
 - Approximate depth: 233 mm (9.2 in)
 - Approximate width: 495 mm (19.5 in)

Warranty

3 year Limited – customer carry-in exchange

- Announce date: June 2005 (Worldwide)
- Available date: June 2005 (Worldwide)

Hardware compatibility

Desktop or notebook systems with available 1.1 , 2.0, 3.0 or 3.1 USB Port.

For the latest updates on the compatible systems, please refer to the [Accessories Compatibility Guide](#).

Software requirements

Operating systems that supports a standard USB keyboard.

Packaging

- Lenovo Preferred Pro USB Keyboard (unique version for each language: [Preferred Pro Keyboard Languages](#))
- Palm/wrist rest
- User's Guide

Agency approvals

CFCC Part 15 (Class B), UL 1950-1 (E164844), CSA C22.2 #0950-M89 (LR94275), Canada ICES-003 Class B; Canada NMB-003, Class B), CE (IEC 950, IEC 801-2, Level 3), RoHS, CE (IEC 950, IEC 801-2, Level 3), VCCI, C-Tick, BSMI, MIC

Additional product information

- [Service parts](#) - Parts listing for your product
- [Personal Systems Reference \(PSREF\)](#) - Comprehensive information on the features and technical specifications of Lenovo products.

[← RETURN TO SEARCH](#)

ThinkCentre M75s Gen 2

Product Summary:

Product Type:	Desktop
Registered In:	United States
Manufacturer:	Lenovo
EPEAT Tier:	Silver
Registration Date:	2020-12-04
Product Status:	Active
Manufacturer Part Number(s):	11JA, 11JB, 11R7, 11R8, 11W1

All unique product identifiers existing for this product may not be listed here. If the unique product identifier you are looking for is not listed, please contact EPEAT at EPEAT@GEC.org.

EPEAT Tier Score Detail

For a product to be listed on the EPEAT Registry, it must, at a minimum, meet the applicable “required” criteria. [Click here](#) to see a list of the required criteria for this product category.

This product has met the necessary [required criteria](#).

Along with required criteria, products can also meet optional criteria and score optional points. It is not required for a product to achieve any optional points.

Products that meet all required criteria and achieve **less than 50%** of the optional points are rated at **EPEAT Bronze**

Products that meet all required criteria and achieve **50 - 74%** of the optional points are rated at **EPEAT Silver**

Products that meet all required criteria and achieve **75 - 100%** of the optional points are rated at **EPEAT Gold**

The optional criteria for this product category and optional points achieved by this product are listed below.

Optional Criteria	Scores
4.1 Substance Management	11 / 16
4.2 Materials Selection	2 / 3
4.4 Product longevity/life-cycle extension	2 / 2
4.5 Energy Conservation	0 / 4
4.7 Packaging	1 / 2
4.8 Life cycle assessment and carbon footprint	6 / 6
4.9 Corporate Environmental Performance	9 / 9
4.10 Corporate social responsibility	2 / 6
TOTAL OPTIONAL CRITERIA SCORE:	33 / 48

Please note that it is not required for a product to achieve any optional points.

Some optional criteria may not be applicable to a product. Optional criteria that are not applicable (N/A) to the product are not included in the Total Optional Criteria Score, and are not reflected above.

For any questions, comments, or feedback regarding the EPEAT Registry, please [contact us](#).

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Guia do Usuário do M75s Gen 2

ThinkCentre



Leia isto primeiro

Antes de utilizar esta documentação e o produto suportado por ela, certifique-se de ler e entender o seguinte:

- Apêndice A "Informações importantes sobre segurança" na página 49
- *Guia de Segurança e Garantia*
- *Guia de Instalação*

Terceira edição (Maio 2022)

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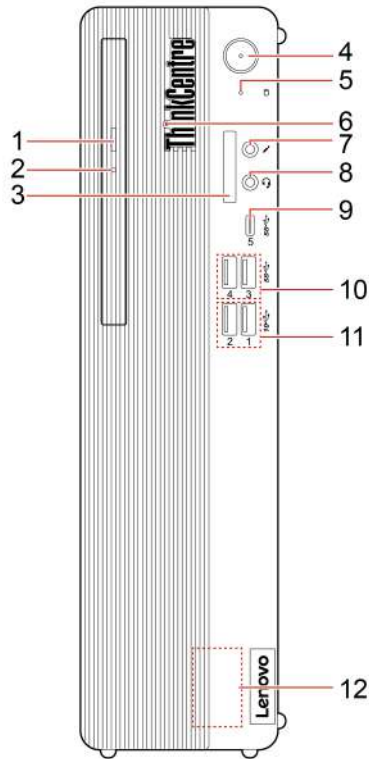
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Sobre esta documentação

- As ilustrações nesta documentação poderão ser diferentes do seu produto.
- Dependendo do modelo, alguns acessórios, recursos e programas de software opcionais podem não estar disponíveis em seu computador.
- Dependendo da versão dos sistemas operacionais e dos programas, algumas instruções de interface do usuário podem não ser aplicáveis ao seu computador.
- O conteúdo da documentação está sujeito a mudanças sem aviso prévio. A Lenovo aprimora constantemente a documentação de seu computador, inclusive este *Guia do Usuário*. Para obter a documentação mais recente, acesse:
<https://pcsupport.lenovo.com>
- A Microsoft® faz alterações periódicas nos recursos do sistema operacional Windows® por meio do Windows Update. Como resultado, algumas informações nesta documentação podem ficar desatualizadas. Consulte os recursos da Microsoft para obter as informações mais recentes.

Capítulo 1. Conhecer seu computador

Vista frontal



1. Botão de ejeção da unidade óptica*

Ejete a bandeja da unidade óptica.

2. Indicador de atividade da unidade óptica*

Esse indicador acende quando a unidade óptica está em uso.


3. Slot para cartões SD*

Cartões suportados:

- Cartão Secure Digital (SD)
- Cartão Secure Digital eXtended-Capacity (SDXC) UHS-1
- Cartão Secure Digital High-Capacity (SDHC) UHS-1

Nota: Seu computador não oferece suporte ao recurso de proteção de conteúdo para mídia gravável (CPRM) para o cartão SD.

Consulte "Usar um cartão de mídia (em modelos selecionados)" na página 10.

	Pressione para ligar o computador.
	Para desligar o computador, abra o menu Iniciar , clique em  Energia e, em seguida, selecione Desligar .
4. Botão liga/desliga	<p>O indicador no botão liga/desliga mostra o status do sistema do computador:</p> <ul style="list-style-type: none"> • Aceso: o computador está ligado. • Desligado: o computador está desligado ou no modo de hibernação. • Piscando: o computador está no modo de suspensão.
5. Indicador de atividade da unidade de armazenamento	Esse indicador acende quando a unidade de armazenamento está em uso.
6. LED ThinkCentre®	Esse indicador fica aceso quando o computador está ligado.
7. Conector de microfone	Conecte um microfone.
8. Conector do fone de ouvido	Conecte um headset ou fones de ouvido ao computador.
9. Conector USB-C™ (3.2 Gen 1)	<ul style="list-style-type: none"> • Carregue os dispositivos compatíveis com USB-C com a voltagem de saída e a corrente de 5 V e 3 A. • Transfira dados em velocidade USB 3.2, até 5 Gbps. • Conecte a acessórios USB-C para ajudar a expandir a funcionalidade do computador. Para comprar acessórios USB-C, acesse https://www.lenovo.com/accessories.
10. Conectores USB 3.2 Gen 1	Conecte dispositivos compatíveis com USB, como teclado USB, mouse USB, unidade de armazenamento USB ou impressora USB.
11. Conectores USB 3.2 Gen 2	Permite que você aproveite uma maior taxa de transferência de dados ao conectar dispositivos compatíveis com USB, como um teclado, um mouse, um dispositivo de armazenamento ou uma impressora.
12. Alto-falante interno*	Permite que você aproveite som de alta qualidade.

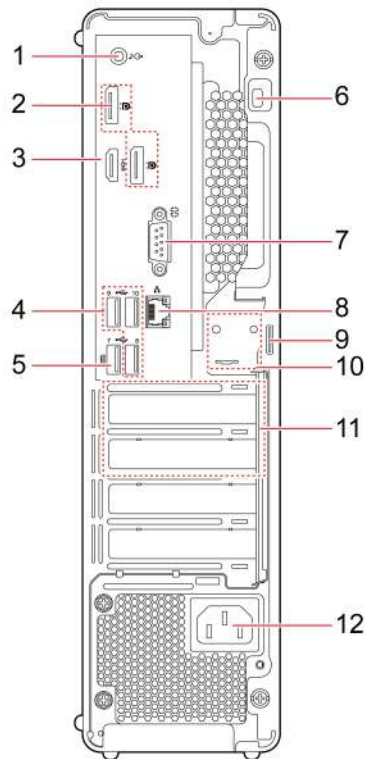
* em modelos selecionados

Declaração de taxa de transferência USB

Dependendo de vários fatores, como a capacidade de processamento do host e dos dispositivos periféricos, atributos de arquivo e outros fatores relacionados com a configuração do sistema e ambientes operacionais, a taxa de transferência real usando os vários conectores USB neste dispositivo irá variar e será mais lenta do que a taxa de dados listada abaixo para cada dispositivo correspondente.

Dispositivo USB	Taxa de dados (Gbit/s)
3.2 Gen 1	5
3.2 Gen 2	10
3.2 Gen 2 × 2	20
Thunderbolt 3	40
Thunderbolt 4	40

Vista traseira



1. Conector de saída de áudio	Envie sinais de áudio do computador para dispositivos externos como alto-falantes estéreos à bateria, fones de ouvido ou teclados multimídia. Para conectar um sistema estéreo ou outro dispositivo de gravação externo, conecte um cabo entre o conector de entrada de áudio do dispositivo e o conector de saída de áudio do computador. Nota: Se o seu computador tiver um conector de saída de linha de áudio e um conector de headset ou fone de ouvido, sempre utilize o conector de headset ou de fone de ouvido para fones de ouvido ou um headset. O conector de fones de ouvido não oferece suporte aos microfones do headset.
2. Conectores de saída DisplayPort®	Envie sinais de áudio e vídeo do computador a outro dispositivo de áudio ou vídeo, como um monitor de alto desempenho.
3. Conector de saída HDMI™	Envie sinais de áudio e vídeo do computador a outro dispositivo de áudio ou vídeo, como um monitor de alto desempenho.
4. Conectores USB 2.0	Conecte dispositivos compatíveis com USB, como teclado USB, mouse USB, unidade de armazenamento USB ou impressora USB.
5. Conector USB 2.0	Conecte dispositivos compatíveis com USB, como teclado USB, mouse USB, unidade de armazenamento USB ou impressora USB. Nota: Este conector oferece suporte ao recurso de ativação inteligente. Para obter mais informações, consulte "Ativar ou desativar o recurso de ativação inteligente" na página 21.
6. Slot para trava de segurança	Prenda o computador em uma bancada, mesa ou outros objetos com uma trava de cabo estilo Kensington.
7. Conector serial	Conecte um modem externo, uma impressora serial ou outros dispositivos que utilizam um conector serial.

8. Conector Ethernet	Conecte a uma rede local (LAN). Quando o indicador verde está aceso, o computador está conectado a uma LAN. Quando o indicador amarelo pisca, dados estão sendo transmitidos.
9. Trava de cadeado	Trave a tampa do computador com um cadeado.
10. Slots para trava E	Trave a tampa do computador com uma trava E.
11. Área da placa PCI-Express	Instale as placas PCI-Express nesta área para melhorar o desempenho de operação do computador. Dependendo do modelo de computador, os conectores nesta área podem variar.
12. Conector do cabo de alimentação	Conecte o cabo de alimentação ao computador para o fornecimento de energia.

Recursos e especificações

Dimensões	<ul style="list-style-type: none">• Largura: 92,5 mm (3,6 pol.)• Altura: 339,5 mm (13,4 pol.)• Profundidade: 297,7 mm (11,7 pol.)
Peso (sem a embalagem)	Configuração máxima conforme fornecido: 5,3 kg (11,7 lb)
Configuração de hardware	Digite Gerenciador de Dispositivos na caixa de pesquisa do Windows e pressione Enter. Digite a senha de administrador ou forneça a confirmação se solicitada.
Fonte de alimentação	<ul style="list-style-type: none">• Fonte de alimentação de 180 watts com detecção automática de voltagem• Fonte de alimentação de 260 watts com detecção automática de voltagem• Fonte de alimentação de 310 watts com detecção automática de voltagem
Entrada elétrica	<ul style="list-style-type: none">• Tensão de entrada: 100 VCA a 240 VCA• Frequência de entrada: 50/60 Hz
Memória	<ul style="list-style-type: none">• Até quatro UDIMMs DDR4 (Duble Data Rate 4 Unbuffered Dual Inline Memory Modules)• A capacidade máxima de memória: 128 GB
Dispositivo de armazenamento	<ul style="list-style-type: none">• Unidade de disco rígido de 2,5 polegadas*• Unidade de disco rígido de 3,5 polegadas*• Unidade de estado sólido M.2* <p>Para exibir a capacidade da unidade de armazenamento do computador, digite Gerenciamento de disco na caixa de pesquisa do Windows e pressione Enter.</p> <p>Nota: A capacidade da unidade de armazenamento indicada pelo sistema é inferior à capacidade nominal.</p>
Recursos de vídeo	<ul style="list-style-type: none">• A placa gráfica integrada é compatível com:<ul style="list-style-type: none">– Conectores de saída DisplayPort– Conector de saída HDMI• A placa gráfica separada opcional fornece experiência e capacidades aprimoradas de vídeo.
Recursos de áudio	<p>A placa de áudio integrada é compatível com:</p> <ul style="list-style-type: none">• Conector de saída de áudio• Conector do fone de ouvido• Alto-falante interno*• Conector de microfone

Expansão

- Leitor de cartões*
 - Slots de memória
 - Slot para unidade de estado sólido M.2
 - Unidade óptica*
 - Slots para placas PCI Express
 - Compartimento da unidade de armazenamento
-

Recursos de rede

- Bluetooth*
 - LAN Ethernet
 - LAN wireless*
-

* em modelos selecionados

Capítulo 2. Bem-vindo ao seu computador

Conectar-se a redes

Seu computador ajuda você a se conectar ao mundo através de uma rede com ou sem fio.

Conectar-se à Ethernet com fio

Conecte o computador a uma rede local por meio do conector Ethernet do computador com um cabo Ethernet.

Conectar a redes Wi-Fi (em modelos selecionados)

Se seu computador tiver um módulo de LAN wireless, você poderá conectar o computador a redes Wi-Fi®. O módulo de LAN wireless em seu computador pode oferecer suporte a diferentes padrões. Em alguns países ou regiões, a utilização do 802.11ax pode ser desativada de acordo com as regulamentações locais.

1. Clique no ícone de rede na área de notificação do Windows. Uma lista das redes wireless disponíveis é exibida.
2. Selecione uma rede disponível para conexão. Forneça as informações necessárias, se for o caso.

Use o aplicativo Vantage

O aplicativo Vantage pré-instalado é uma solução centralizada personalizada para ajudá-lo a manter o computador com atualizações e correções automatizadas, definir configurações de hardware e obter suporte personalizado.

Para acessar o aplicativo Vantage, digite Vantage na caixa de pesquisa do Windows.

Principais recursos

O aplicativo Vantage permite:

- Saber mais facilmente o status do dispositivo e personalizar as configurações do dispositivo.
- Fazer download e instalar as atualizações de UEFI BIOS, firmware e driver para manter o computador atualizado.
- Monitorar a integridade do computador e proteger o computador contra ameaças externas.
- Verificar seu hardware do computador e diagnosticar problemas de hardware.
- Pesquisar o status de garantia (on-line).
- Acessar o *Guia do Usuário* e artigos úteis.

Notas:

- Os recursos disponíveis variam de acordo com o modelo do computador.
- O aplicativo Vantage faz atualizações periódicas dos recursos para continuar a aprimorar sua experiência com seu computador. A descrição dos recursos pode ser diferente daquelas em sua interface de usuário real.

Usar multimídia

Use seu computador para negócios ou entretenimento com os dispositivos (como uma câmera, um monitor ou alto-falantes).

Usar o áudio

Para aprimorar a experiência de áudio, conecte alto-falantes, fones de ouvido ou um headset ao conector de áudio.

Ajustar o volume

1. Clique no ícone de volume na área de notificação do Windows da barra de tarefas.
2. Siga as instruções na tela para ajustar o volume. Clique no ícone de alto-falante para colocar o áudio no mudo.

Alterar as configurações de som

1. Digite Painel de Controle na caixa de pesquisa do Windows e pressione Enter. Exibição por categoria.
2. Clique em **Hardware e Sons → Som**.
3. Altere as configurações conforme suas preferências.

Conectar um monitor externo

Conecte um projetor ou um monitor ao computador para fazer apresentações ou expandir seu espaço de trabalho.

Conectar um monitor sem fio

Certifique-se de que o computador e o monitor sem fio tenham suporte para Miracast®.

Pressione a tecla do logotipo do Windows + K e, em seguida, selecione um monitor sem fio para conectar.

Alterar configurações de vídeo

1. Clique com o botão direito do mouse em uma área vazia da área de trabalho e selecione configurações de vídeo.
2. Selecione o monitor que deseja configurar e altere as configurações de vídeo de sua preferência.

Capítulo 3. Explorar seu computador

Gerenciar a energia

Use as informações desta seção para obter o melhor equilíbrio entre desempenho e eficiência de energia.

Definir o comportamento do botão liga/desliga

Você pode definir o que o botão liga/desliga faz de acordo com sua preferência. Por exemplo, ao pressionar o botão de energia, você poderá desligar o computador ou colocá-lo no modo de suspensão ou hibernação.

Para alterar a função do botão liga/desliga:

1. Clique com o botão direito do mouse no ícone de status da bateria e selecione **Opções de Energia** → **Alterar o funcionamento dos botões de energia**.
2. Altere as configurações conforme suas preferências.

Definir o plano de energia

Para computadores compatíveis com ENERGY STAR®, o seguinte plano de energia entrará em vigor quando seus computadores permanecerem ociosos por um período especificado:

Plano de energia padrão (quando conectados a uma fonte de alimentação CA)

- Desligar o monitor: Após 10 minutos
- Colocar o computador no modo de hibernação: Após 25 minutos

Para despertar o computador do modo de suspensão, pressione qualquer tecla no teclado.

Para redefinir o plano de energia:

1. Clique com o botão direito no ícone de status da bateria e selecione **Opções de energia**.
2. Escolha ou personalize um plano de energia de sua preferência.

Transferir dados

Compartilhe com rapidez seus arquivos usando a tecnologia Bluetooth interna entre dispositivos com os mesmos recursos. Você também pode instalar um disco ou cartão de mídia para transferir dados.

Conectar-se a um dispositivo habilitado para Bluetooth (em modelos selecionados)

Você pode conectar todos os tipos de dispositivos habilitados para Bluetooth ao seu computador, como teclados, mouses, smartphones ou alto-falantes. Coloque o dispositivo que você está tentando conectar a menos de 10 metros (33 pés) do computador.

1. Digite Bluetooth na caixa de pesquisa do Windows e pressione Enter.
2. Ligue o Bluetooth se ele estiver desligado.
3. Selecione um dispositivo Bluetooth e siga as instruções na tela.

Seu dispositivo Bluetooth e o computador se conectarão automaticamente na próxima vez se os dois dispositivos estiverem no alcance um do outro com o Bluetooth ativado. Você pode usar Bluetooth para transferência de dados ou controle remoto e comunicação.

Usar a unidade óptica (em modelos selecionados)

Caso seu computador possua uma unidade óptica, leia as seguintes informações.

Saber o tipo da unidade óptica

1. Digite Gerenciador de Dispositivos na caixa de pesquisa do Windows e pressione Enter. Digite a senha de administrador ou forneça a confirmação se solicitada.
2. Selecione uma unidade óptica e siga as instruções na tela.

Instalar ou remover um disco

1. Com o computador ligado, pressione o botão Ejetar na unidade óptica. A bandeja desliza para fora da unidade.
2. Insira um disco na bandeja ou remova um disco da bandeja e, em seguida, empurre a bandeja para a unidade.

Nota: Se a bandeja não deslizar para fora da unidade ao pressionar o botão Ejetar, desligue o computador. Em seguida, insira um clipe de papel no orifício de ejeção de emergência adjacente ao botão Ejetar. Use a ejeção de emergência apenas em uma emergência.

Gravar um disco

1. Insira um disco gravável na unidade óptica com suporte para gravação.
2. Execute uma das seguintes opções:
 - Digite Reprodução Automática na caixa de pesquisa do Windows e pressione Enter. Ative **Usar a Reprodução Automática para todas as mídias e dispositivos**.
 - Abra o Windows Media Player.
 - Clique duas vezes no arquivo ISO.
3. Siga as instruções na tela.

Usar um cartão de mídia (em modelos selecionados)

Caso seu computador possua um slot para cartões SD, leia as seguintes informações.

Instalar um cartão de mídia

1. Localize o slot para cartões SD.
2. Certifique-se de que os contatos metálicos no cartão estejam voltados para os contatos do slot para cartões SD. Insira o cartão firmemente no slot para cartões SD até encaixá-lo no lugar.

Remover um cartão de mídia

Atenção: Antes de remover o cartão:

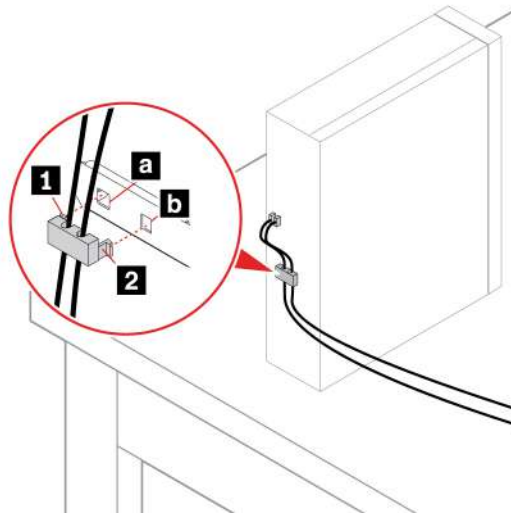
1. Clique no ícone triangular na área de notificação do Windows para mostrar os ícones ocultos. Clique com o botão direito do mouse no ícone que solicita para remover o hardware com segurança e ejetar a mídia.
2. Selecione o item correspondente para ejetar o cartão do sistema operacional Windows.
3. Pressione o cartão e remova-o do computador. Guarde o cartão com segurança para uso futuro.

Usar um clipe de cabos inteligente (em modelos selecionados)

Nota: Você pode comprar um clipe de cabo inteligente na Lenovo.

Bloqueie dispositivos (como o teclado e mouse) para seu computador com um clipe de cabos inteligente.

1. Insira o clipe **1** no slot da trava de segurança **a**.
2. Puxe os cabos que deseja travar pelos dentes do clipe de cabos inteligente.
3. Pressione o clip **2** no slot da trava de cabo **b** até encaixá-lo na posição final.



Comprar acessórios

A Lenovo possui uma variedade de acessórios de hardware e upgrades para ajudá-lo a ampliar os recursos de seu computador. As opções incluem módulos de memória, dispositivos de armazenamento, cartões de rede, adaptadores de rede, teclados, mouses e muito mais.

Para comprar na Lenovo, acesse <https://www.lenovo.com/accessories>.

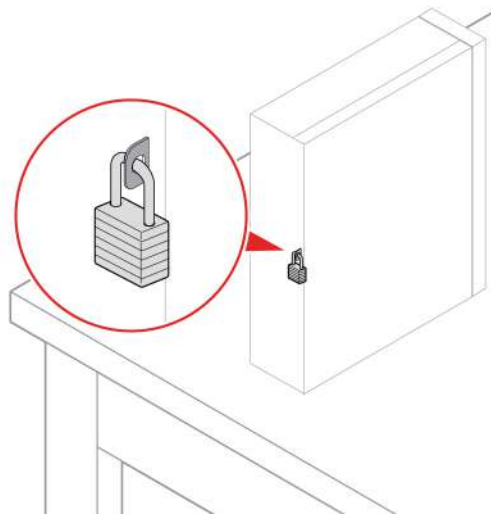
Capítulo 4. Proteger o computador e informações

Bloquear o computador

Nota: Você é responsável por avaliar, escolher e implementar o dispositivo de travamento e os recursos de segurança apropriados. A Lenovo não faz comentários, avaliações ou garantias sobre o funcionamento, qualidade ou desempenho de qualquer dispositivo de trava ou recurso de segurança. Você pode comprar travas para computador da Lenovo.

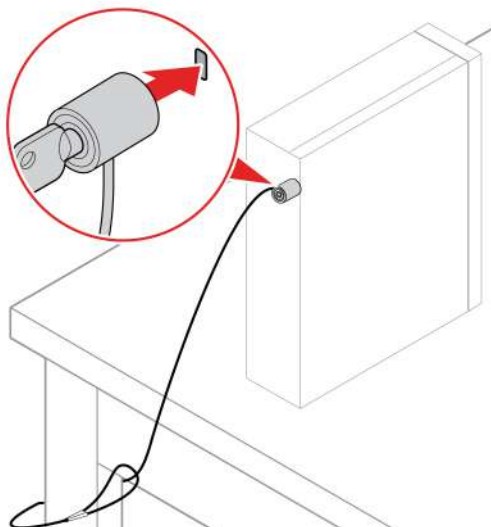
Cadeado

O travamento da tampa do computador com um cadeado impede o acesso não autorizado ao interior do computador.



Trava de cabo estilo Kensington

Prenda o computador em uma bancada, mesa ou outros objetos com uma trava de cabo estilo Kensington.



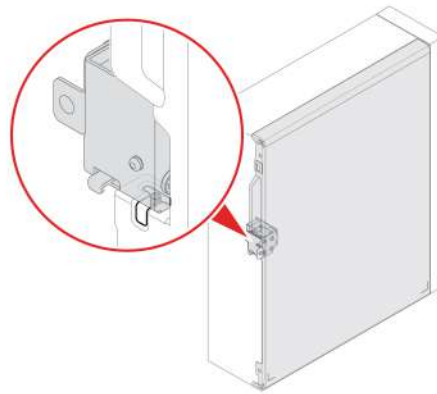
Trava E (em modelos selecionados)

Seu computador pode ter uma solução de trava de segurança instalada para proteger o computador contra violação não autorizada dos componentes internos. Usando a trava E, você poderá travar ou destravar mecanicamente a tampa do computador.

Para ativar ou desativar a trava E:

1. Reinicie o computador. Quando a tela de logotipo for exibida, pressione a tecla F1 ou Fn+F1.
2. Selecione **Security** → **Electronic Lock** para ativar ou desativar a trava E.
3. Pressione F10 ou Fn+F10 para salvar as alterações e sair.

Nota: As alterações não entram em vigor até que a configuração seja salva e o sistema seja reiniciado.



Fazer login em seu computador com segurança

Esta seção fornece maneiras seguras de fazer login em seu computador.

Usar senhas

Tipos de senha

Você pode definir as seguintes senhas no BIOS (Basic Input/Output System) da UEFI (Unified Extensible Firmware Interface) para impedir o acesso não autorizado ao seu computador. No entanto, não será solicitado que você insira nenhuma senha do UEFI BIOS quando o computador sair do modo de suspensão.

- Senha de inicialização

Quando uma senha de inicialização for definida, você deverá fornecer uma senha válida sempre que o computador for ligado. O computador não poderá ser usado até que a senha válida seja fornecida.

- Senha de supervisor

A configuração de uma senha de supervisor impede que usuários não autorizados alterem as configurações. Se você for responsável por manter as configurações de vários computadores, talvez deseje definir uma senha de supervisor.

Quando uma senha de supervisor for definida, você deverá fornecer uma senha válida sempre que tentar acessar o menu BIOS.

Se ambas as senhas de inicialização e supervisor estiverem definidas, você poderá fornecer qualquer uma delas. No entanto, você deverá usar sua senha de supervisor para alterar quaisquer configurações.

- Senha de disco rígido

Definir uma senha de disco rígido impede o acesso não autorizado aos dados na unidade de armazenamento. Quando uma senha de disco rígido for definida, você deverá fornecer uma senha válida sempre que tentar acessar a unidade de armazenamento.

Nota: Após definir uma senha de disco rígido, seus dados na unidade de armazenamento permanecerão protegidos mesmo se unidade de armazenamento for removida de um computador e instalada em outro.

- Senha de gerenciamento do sistema (em modelos selecionados)

Você pode ativar a senha de gerenciamento de sistema para ter a mesma autoridade que a senha de supervisor para controlar recursos relacionadas à segurança. Para personalizar a autoridade da senha de gerenciamento de sistema por meio do menu do UEFI BIOS:

1. Reinicie o computador. Quando a tela de logotipo for exibida, pressione a tecla F1 ou Fn+F1.
2. Selecione **Security** → **System Management Password Access Control**.
3. Siga as instruções na tela.

Se você definiu a senha de supervisor e a senha de gerenciamento de sistema, a senha de supervisor substitui a senha de gerenciamento de sistema.

Definir, alterar e remover uma senha

Antes de iniciar, imprima estas instruções.

1. Reinicie o computador. Quando a tela de logotipo for exibida, pressione a tecla F1 ou Fn+F1.
2. Selecione **Security**.
3. Dependendo do tipo de senha, selecione **Set Supervisor Password**, **Set Power-On Password**, **Set System Management Password** ou **Hard Disk Password** e pressione Enter.
4. Siga as instruções na tela para configurar, alterar ou remover uma senha.
5. Pressione F10 ou Fn+F10 para salvar as alterações e sair.

Registre suas senhas e armazene-as em um local seguro. Se você esqueceu as senhas, entre em contato com um provedor de serviços autorizado pela Lenovo para a remoção das senhas.

Nota: Se a senha de disco rígido for esquecida, a Lenovo não poderá removê-la nem recuperar os dados da unidade de armazenamento.

Usar as soluções de segurança de software

Esta seção fornece soluções de software para proteger o computador e as informações.

Usar firewalls do Windows

Um firewall poderá ser um hardware, um software ou uma combinação de ambos, dependendo do nível de segurança necessário. Os firewalls operam com base em um conjunto de regras para determinar quais conexões de entrada e saída são autorizadas. Se o computador vier com um programa de firewall pré-instalado, ele ajudará a protegê-lo contra ameaças à segurança, acesso não autorizado, invasões e ataques da Internet. Ele também protegerá sua privacidade. Para obter mais informações sobre como usar o programa de firewall, consulte o sistema de ajuda desse programa.

Para usar firewalls do Windows:

1. Digite Painel de Controle na caixa de pesquisa do Windows e pressione Enter. Exibição por ícones grandes ou ícones pequenos.
2. Clique em **Firewall do Windows Defender** e siga as instruções na tela.

Usar o software Computrace Agent integrado ao firmware (em modelos selecionados)

O software Computrace Agent é uma solução de recuperação de roubos de computadores e de gerenciamento de ativos de TI. O software detecta se foram efetuadas alterações no computador, como alterações de hardware, de software ou no seu local de chamada. Talvez você precise comprar uma assinatura para ativar o software Computrace Agent.

Usar as soluções de segurança do BIOS

Esta seção fornece soluções de BIOS para proteger o computador e as informações.

Apagar os dados da unidade de armazenamento

É recomendável que você apaga todos os dados da unidade de armazenamento antes de reciclagem do computador ou uma unidade de armazenamento.

Para apagar todos os dados da unidade de armazenamento:

1. Defina uma senha de disco rígido para a unidade de armazenamento que será reciclar. Consulte "Usar senhas" na página 14.
2. Reinicie o computador. Quando a tela de logotipo for exibida, pressione a tecla F1 ou Fn+F1.
3. Selecione **Security** → **Hard Disk Password** → **Security Erase HDD Data** e pressione Enter.
4. Selecione a unidade de armazenamento será reciclar e pressione Enter.
5. Uma mensagem é exibida solicitando a você para confirmar a operação. Selecione **Yes** e pressione Enter. O processo de apagamento será iniciado.

Nota: Durante o processo de apagar, o teclado e o botão liga / desliga estiverem desativados.

6. Após a conclusão do processo apagar, uma mensagem é exibida solicitando que você reinicie o sistema. Selecione **Continue**.

Nota: Dependendo da capacidade de unidade de armazenamento, o processo de apagar levará meia hora três horas.

7. Após a conclusão do processo de redefinição, ocorrerá uma das seguintes opções:
 - Se os dados na unidade de armazenamento do sistema estão apagados, você será solicitado nenhum sistema operacional está disponível.
 - Se os dados na unidade de armazenamento do sistema não estão apagados, o computador é reiniciado automaticamente.

Usar o sensor de presença da tampa

A chave de presença da tampa impede que o computador faça login no sistema operacional quando a tampa do computador não está instalada ou fechada corretamente.

Para ativar o conector do sensor de presença da tampa na placa-mãe:

1. Reinicie o computador. Quando a tela de logotipo for exibida, pressione a tecla F1 ou Fn+F1.
2. Selecione **Security** → **Cover Tamper Detected** e pressione Enter.
3. Selecione **Enabled** e pressione Enter.
4. Pressione F10 ou Fn+F10 para salvar as alterações e sair.

Ao ligar o computador, se o sensor de presença de tampa estiver ativado e a tampa do computador não estiver instalada ou fechada corretamente, uma mensagem de erro será exibida. Para ignorar a mensagem de erro e efetuar login no sistema operacional:

1. Instale ou feche a tampa do computador corretamente.
2. Entre no menu do BIOS, salve e saia.

Usar Smart USB Protection

A função Smart USB Protection é uma função de segurança que ajuda a impedir que os dados sejam copiados do computador para dispositivos de armazenamento USB conectados ao computador. Você pode ajustar a função Smart USB Protection para uma dos seguintes modos:

- **Disabled** (configuração padrão): você pode usar os dispositivos de armazenamento USB sem limitação.
- **Read Only**: não é possível copiar dados do computador para dispositivos de armazenamento USB. No entanto, você pode acessar ou modificar dados em dispositivos de armazenamento USB.
- **No Access**: não é possível acessar os dispositivos de armazenamento USB do computador.

Para configurar a função Smart USB Protection:

1. Reinicie o computador. Quando a tela de logotipo for exibida, pressione a tecla F1 ou Fn+F1.
2. Selecione **Security → Smart USB Protection** e pressione Enter.
3. Selecione a configuração desejada e pressione Enter.
4. Pressione F10 ou Fn+F10 para salvar as alterações e sair.

Capítulo 5. UEFI BIOS

Este capítulo fornece informações sobre como configurar e atualizar o UEFI BIOS e limpar o CMOS.

O que é UEFI BIOS

Nota: As configurações do sistema operacional podem substituir quaisquer configurações semelhantes no UEFI BIOS.

O UEFI BIOS é o primeiro programa que é executado quando o computador é ligado. O UEFI BIOS inicializa os componentes de hardware e carrega o sistema operacional e outros programas. Seu computador vem com um programa de instalação com o qual você pode alterar as configurações do UEFI BIOS.

Entrar no menu do BIOS

Reinicie o computador. Quando a tela de logotipo for exibida, pressione F1 ou Fn+F1 para entrar no menu do BIOS.

Nota: Se senhas BIOS tiverem sido definidas, digite as senhas corretas quando solicitado. Você também pode selecionar **No** ou pressionar Esc para ignorar o prompt de senha e entrar no menu do BIOS. No entanto, não é possível alterar as configurações do sistema que são protegidas por senhas.

Navegar na interface do BIOS

Atenção: As configurações padrão já estão otimizadas para você em **negrito**. A alteração incorreta das configurações pode provocar resultados inesperados.

Dependendo do teclado, você pode navegar na interface do BIOS pressionando as seguintes teclas ou combinações de Fn e as seguintes teclas:

Teclas	Descrição
F1 ou Fn+F1	Exibe a tela Ajuda geral.
Esc ou Fn+Esc	Sai do submenu e retorna ao menu pai.
↑ ↓ ou Fn+↑ ↓	Localiza um item.
← → ou Fn+← →	Seleciona uma guia.
+/- ou Fn+ +/-	Altere para um valor maior ou menor.
Enter	Entra na guia ou no submenu selecionado.
F9 ou Fn+F9	Restaura as configurações padrão.
F10 ou Fn+F10	Salva as alterações de configuração e sai do sistema.

Alterar o idioma de exibição do UEFI BIOS

O UEFI BIOS oferece suporte a três ou quatro idiomas de exibição: inglês, francês, chinês simplificado e russo (em modelos selecionados).

Para alterar o idioma de exibição do UEFI BIOS:

1. Selecione **Main** → **Language** e pressione Enter.
2. Defina o idioma conforme o desejado.

Alterar o modo de exibição do UEFI BIOS

Você pode usar o UEFI BIOS no modo gráfico ou modo de texto de acordo com suas necessidades.

Para alterar o modo de exibição do UEFI BIOS:

1. Reinicie o computador. Quando a tela de logotipo for exibida, pressione a tecla F1 ou Fn+F1.
2. Selecione **Main** → **Setup Mode Select** e pressione Enter.
3. Defina o modo de exibição conforme o desejado.

Definir a data e a hora do sistema

1. Reinicie o computador. Quando a tela de logotipo for exibida, pressione a tecla F1 ou Fn+F1.
2. Selecione **Main** → **System Time & Date** e pressione Enter.
3. Defina a data e a hora do sistema conforme o desejado.
4. Pressione F10 ou Fn+F10 para salvar as alterações e sair.

Alterar a sequência de inicialização

Se o computador não for inicializado por um dispositivo conforme esperado, você poderá optar por alterar a sequência de dispositivos de inicialização de modo permanente ou selecionar um dispositivo de inicialização temporário.

Alterar permanentemente a sequência de dispositivos de inicialização

1. Dependendo do tipo de dispositivo de armazenamento, execute uma das seguintes opções:
 - Se o dispositivo de armazenamento for interno é, vá para a etapa 2.
 - Se o dispositivo de armazenamento for um disco, certifique-se de que o computador esteja ligado ou ligue o computador. Em seguida, insira o disco na unidade óptica.
 - Se o dispositivo de armazenamento for um dispositivo externo que não seja um disco, conecte o dispositivo de armazenamento ao computador.
2. Reinicie o computador. Quando a tela de logotipo for exibida, pressione a tecla F1 ou Fn+F1.
3. Selecione **Startup** e siga as instruções na tela para alterar a sequência de inicialização.
4. Pressione F10 ou Fn+F10 para salvar as alterações e sair.

Selecionar um dispositivo de inicialização temporário

Nota: Nem todos os discos e unidades de armazenamento são inicializáveis.

1. Dependendo do tipo de dispositivo de armazenamento, execute uma das seguintes opções:
 - Se o dispositivo de armazenamento for interno é, vá para a etapa 2.
 - Se o dispositivo de armazenamento for um disco, certifique-se de que o computador esteja ligado ou ligue o computador. Em seguida, insira o disco na unidade óptica.
 - Se o dispositivo de armazenamento for um dispositivo externo que não seja um disco, conecte o dispositivo de armazenamento ao computador.
2. Reinicie o computador. Quando a tela de logotipo for exibida, pressione a tecla F12 ou Fn+F12.
3. Selecione o dispositivo de armazenamento desejado e pressione Enter.

Se desejar alterar permanentemente a sequência de dispositivos de inicialização, selecione **Enter Setup** no Startup Device Menu e pressione Enter para acessar o menu do BIOS.

Ativar ou desativar o recurso de detecção de alteração de configuração

Se você ativar a detecção de alterações de configuração, quando o POST detectar as alterações de configuração de alguns dispositivos de hardware (como unidades de armazenamento ou módulos de memória), uma mensagem de erro será exibida ao ligar o computador.

Para ativar ou desativar o recurso de detecção de alteração de configuração:

1. Reinicie o computador. Quando a tela de logotipo for exibida, pressione a tecla F1 ou Fn+F1.
2. Selecione **Security** → **Configuration Change Detection** e pressione Enter.
3. Ative ou desative o recurso como quiser.
4. Pressione F10 ou Fn+F10 para salvar as alterações e sair.

Para ignorar a mensagem de erro e efetuar login no sistema operacional, pressione F2 ou Fn+F2. Para limpar a mensagem de erro, entre no menu do BIOS, salve e saia.

Ativar ou desativar o recurso de ativação automática

O item Automatic Power On no UEFI BIOS fornece várias opções para fazer com que seu computador inicie automaticamente.

Para ativar ou desativar o recurso de ativação automática:

1. Reinicie o computador. Quando a tela de logotipo for exibida, pressione a tecla F1 ou Fn+F1.
2. Selecione **Power** → **Automatic Power On** e pressione Enter.
3. Selecione o recurso desejado e pressione Enter.
4. Ative ou desative o recurso como quiser.
5. Pressione F10 ou Fn+F10 para salvar as alterações e sair.

Ativar ou desativar o recurso de ativação inteligente

Verifique se o teclado está conectado a um conector USB com suporte ao recurso de ativação inteligente. Com o recurso de ativação inteligente, é possível iniciar ou despertar o computador do modo de hibernação pressionando Alt+P.

Para ativar ou desativar o recurso de ativação inteligente:

1. Reinicie o computador. Quando a tela de logotipo for exibida, pressione a tecla F1 ou Fn+F1.
2. Selecione **Power** → **Smart Power On** e pressione Enter.
3. Ative ou desative o recurso como quiser.
4. Pressione F10 ou Fn+F10 para salvar as alterações e sair.

Ativar ou desativar o modo de compatibilidade ErP LPS

Os computadores Lenovo atendem aos requisitos de design ecológico da regulamentação ErP Lot 3. Para obter mais informações, acesse:

<https://www.lenovo.com/us/en/compliance/eco-declaration>

Você pode ativar o modo de compatibilidade com a diretiva ErP LPS para reduzir o consumo de eletricidade quando o computador está desligado ou no modo de suspensão.

Para ativar ou desativar o modo de compatibilidade ErP LPS:

1. Reinicie o computador. Quando a tela de logotipo for exibida, pressione a tecla F1 ou Fn+F1.
2. Selecione **Power → Enhanced Power Saving Mode** e pressione Enter.
3. Dependendo das opções **Enabled** ou **Disabled**, que você selecionar, faça o seguinte:
 - Se você selecionar **Enabled**, pressione Enter. Em seguida, selecione **Power → Automatic Power On** e pressione Enter. Verifique se o recurso Wake on LAN será desativado automaticamente. Caso não seja, desative-o.
 - Se você selecionar **Disabled**, pressione Enter. Em seguida, vá para a próxima etapa.
4. Pressione F10 ou Fn+F10 para salvar as alterações e sair.

Quando o modo de compatibilidade ErP LPS está habilitado, você pode despertar o computador ao fazer o seguinte:

- Pressione o botão liga/desliga.
- Ative o recurso Wake Up on Alarm para fazer o computador despertar em um horário definido.

Para satisfazer o requisito de modo desligado de conformidade com ErP, você precisa desabilitar a função Início Rápido.

1. Vá para **Painel de Controle** e visualize usando ícones grandes ou ícones pequenos.
2. Clique em **Opções de Energia → Escolher a função dos botões de energia → Alterar configurações não disponíveis no momento**.
3. Desmarque a opção **Ligar inicialização rápida (recomendado)** na lista **Configurações de desligamento**.

Alterar o modo de desempenho do ITS

Você pode ajustar o desempenho acústico e térmico do seu computador alterando o modo de desempenho do ITS. Há três opções disponíveis:

- **Best Performance** (configuração padrão): o computador funciona no melhor desempenho do sistema com nível acústico normal.
- **Best Experience**: o computador funciona na melhor experiência com ruído equilibrado e melhor desempenho.
- **Full Speed**: todos os ventiladores do computador funcionam em velocidade máxima.

Para alterar o modo de desempenho do ITS:

1. Reinicie o computador. Quando a tela de logotipo for exibida, pressione a tecla F1 ou Fn+F1.
2. Selecione **Power → Intelligent Cooling** e pressione Enter.
3. Selecione **Performance Mode** e pressione Enter.
4. Defina o modo de desempenho conforme o desejado.
5. Pressione F10 ou Fn+F10 para salvar as alterações e sair.

Alterar as configurações do BIOS antes de instalar um novo sistema operacional

As configurações do BIOS variam de acordo com o sistema operacional. Altere as configurações do BIOS antes de instalar um novo sistema operacional.

Constantemente, a Microsoft faz atualizações do sistema operacional Windows. Antes de instalar uma versão específica do Windows, verifique a lista de compatibilidade para a versão do Windows. Para obter detalhes, acesse:

<https://support.lenovo.com/us/en/solutions/windows-support>

Para alterar as configurações de BIOS:

1. Reinicie o computador. Quando a tela de logotipo for exibida, pressione a tecla F1 ou Fn+F1.
2. Na interface principal, selecione **Security** → **Secure Boot** e pressione Enter.
3. Dependendo do sistema operacional a ser instalado, execute um dos seguintes procedimentos:
 - Para instalar um sistema operacional Windows que oferece suporte à inicialização segura, selecione **Enabled** para **Secure Boot**.
 - Para instalar um sistema operacional que não oferece suporte à inicialização segura, como alguns sistemas operacionais Linux, selecione **Disabled** para **Secure Boot**.
4. Pressione F10 ou Fn+F10 para salvar as alterações e sair.

Atualizar o UEFI BIOS

Quando um novo programa, driver de dispositivo ou componente de hardware é instalado, talvez você precise atualizar o UEFI BIOS. Você pode atualizar o BIOS no sistema operacional ou de um disco flash de atualização (com suporte apenas em modelos selecionados).

Baixe e instale o pacote de atualização do UEFI BIOS mais recente por um dos seguintes métodos:

- No aplicativo Vantage:

Abra o aplicativo Vantage para verificar os pacotes de atualização disponíveis. Se o pacote de atualização do UEFI BIOS mais recente estiver disponível, siga as instruções na tela para fazer download e instalar o pacote.
- No Web site de suporte da Lenovo:
 1. Acesse <https://pcsupport.lenovo.com>.
 2. Faça o download do driver de atualização do BIOS para a versão do sistema operacional ou para a versão da imagem ISO (utilizada para criar um disco flash de atualização). Em seguida, faça o download das instruções de instalação para o driver de atualização flash do BIOS que foi baixado.
 3. Imprima o arquivo de instruções de instalação e siga as instruções para atualizar o BIOS.

Recuperar de uma falha de atualização do BIOS

1. Remova todas as mídias das unidades e desligue todos os dispositivos conectados.
2. Insira o disco de atualização de BIOS na unidade óptica e, depois, desligue o computador.
3. Desconecte todos os cabos de alimentação das tomadas elétricas. Depois, remova quaisquer peças que impeçam o acesso ao jumper de Limpeza de CMOS/Recuperação.
4. Mova o jumper da posição padrão para a posição de manutenção.
5. Reconecte os cabos de alimentação do computador e do monitor às tomadas elétricas.
6. Ligue o computador e o monitor. Quando o computador emitir um bipe, o processo de recuperação começará.
7. Após a conclusão do processo de recuperação, o computador será desligado automaticamente.

Nota: Dependendo do modelo de computador, o processo de recuperação levará dois a três minutos.

8. Desconecte todos os cabos de alimentação das tomadas elétricas.
9. Mova o jumper de volta para a posição padrão.

10. Reinstale todas as peças que foram removidas. Depois, reconecte os cabos de alimentação do computador e do monitor às tomadas elétricas.
11. Ligue o computador e o monitor. Quando a tela de logotipo for exibida, pressione a tecla F1 ou Fn+F1.
12. Para evitar a perda de dados, certifique-se de que as configurações de BIOS sejam restauradas para um ponto anterior.

Limpeza de CMOS

1. Remova todas as mídias das unidades e desligue todos os dispositivos conectados e o computador.
2. Desconecte todos os cabos de alimentação das tomadas elétricas. Depois, remova quaisquer peças que impeçam o acesso ao jumper de Limpeza de CMOS/Recuperação.
3. Mova o jumper da posição padrão para a posição de manutenção.
4. Reconecte os cabos de alimentação do computador e do monitor às tomadas elétricas.
5. Ligue o computador e o monitor. Quando o computador emitir um bipe, aguarde aproximadamente 10 segundos.
6. Desligue o computador, mantendo pressionado o botão de energia por, aproximadamente, quatro segundos.
7. Desconecte todos os cabos de alimentação das tomadas elétricas.
8. Mova o jumper de volta para a posição padrão.
9. Reinstale todas as peças que foram removidas. Depois, reconecte os cabos de alimentação do computador e do monitor às tomadas elétricas.
10. Ligue o computador e o monitor. Quando a tela de logotipo for exibida, pressione a tecla F1 ou Fn+F1.
11. Para evitar a perda de dados, certifique-se de que as configurações de BIOS sejam restauradas para um ponto anterior.

Capítulo 6. Diagnóstico

Use soluções de diagnóstico para testar componentes de hardware e relatar configurações controladas pelo sistema operacional que interferem na operação correta de seu computador.

Ferramentas de diagnóstico Lenovo

Para obter informações sobre as ferramentas de diagnóstico da Lenovo, acesse:

<https://pcsupport.lenovo.com/lenovodiagnosicsolutions>

Capítulo 7. Substituição de CRUs

O que são CRUs

Unidades Substituíveis pelo Cliente (CRUs) são peças que podem ser atualizadas ou substituídas pelo cliente. Os computadores Lenovo contêm os seguintes tipos de CRUs:

- **CRUs de autoatendimento:** consulte as peças que podem ser instaladas ou substituídas facilmente pelo próprio cliente ou pelos técnicos de serviço treinados a um custo adicional.
- **CRUs de serviço opcional:** consulte as peças que podem ser instaladas ou substituídas pelos clientes com um nível de habilidade maior. Os técnicos de serviço treinados também podem oferecer serviços para instalar ou substituir peças de acordo com o tipo de garantia designado para a máquina do cliente.

Se você pretende instalar a CRU, a Lenovo enviará a CRU para você. As informações sobre CRU e as instruções de substituição são fornecidas com o produto e estão disponíveis para pedidos na Lenovo a qualquer momento. A peça defeituosa que é substituída pela CRU talvez precise ser devolvida. Quando a devolução for necessária: (1) instruções de devolução, uma etiqueta de remessa de devolução pré-paga e um contêiner serão incluídos na CRU de substituição e (2) você poderá ser cobrado pela CRU de substituição se a Lenovo não receber a CRU defeituosa em até trinta (30) dias do recebimento da CRU de substituição por você. Para obter todos os detalhes, consulte a documentação da Garantia Limitada Lenovo em:

https://www.lenovo.com/warranty/llw_02

Consulte a seguinte lista de CRUs para o seu computador.

CRUs de Autoatendimento

- Tampa do computador
- Painel frontal
- Dissipador de calor (para a unidade de estado sólido M.2)*
- Teclado*
- Unidade de estado sólido M.2*
- Suporte da unidade de estado sólido M.2*
- Módulo de memória
- Mouse*
- Unidade óptica*
- Suporte da unidade óptica*
- Placa PCI-Express*
- Cabo de alimentação
- Unidade de disco rígido principal*
- Suporte da unidade de disco rígido principal*
- Unidade de disco rígido secundária*
- Suporte da unidade de disco rígido secundária*
- Clipe de cabos inteligente*
- Conversor de armazenamento*
- Base vertical*

CRUs de Serviço Opcional

- Bateria de célula do tipo moeda
- Trava E*
- Conjunto da fonte de alimentação

* em modelos selecionados

Substituir uma CRU

Para substituir uma CRU, siga o procedimento de substituição.

Base vertical

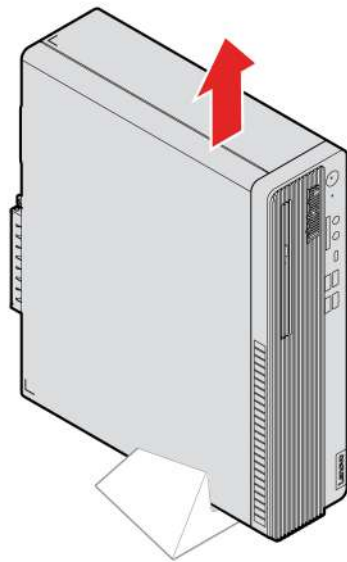
Pré-requisito

Antes de começar, leia Apêndice A "Informações importantes sobre segurança" na página 49 e imprima estas instruções.

Para acessar, faça o seguinte:

1. Remova todas as mídias das unidades e desligue todos os dispositivos conectados e o computador.
2. Desconecte todos os cabos de alimentação das tomadas elétricas e também todos os cabos do computador.

Etapas de remoção



Tampa do computador

Pré-requisito

Antes de começar, leia Apêndice A "Informações importantes sobre segurança" na página 49 e imprima estas instruções.

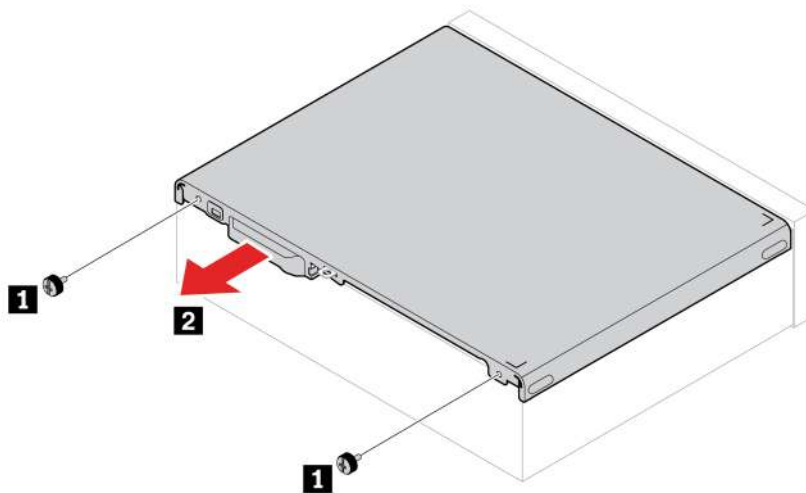


Antes de abrir a tampa do computador, desligue o computador e aguarde vários minutos até que ele esfrie.

Para acessar, faça o seguinte:

1. Remova todas as mídias das unidades e desligue todos os dispositivos conectados e o computador.
2. Desconecte todos os cabos de alimentação das tomadas elétricas e também todos os cabos do computador.
3. Solte qualquer dispositivo de trava que prenda a tampa do computador.
4. Remova a base vertical. Consulte "Base vertical" na página 28.
5. Recline o computador de modo que a tampa dele fique para cima.

Etapas de remoção



Nota: Se houver um dispositivo de travamento disponível, use-o para travar o computador.

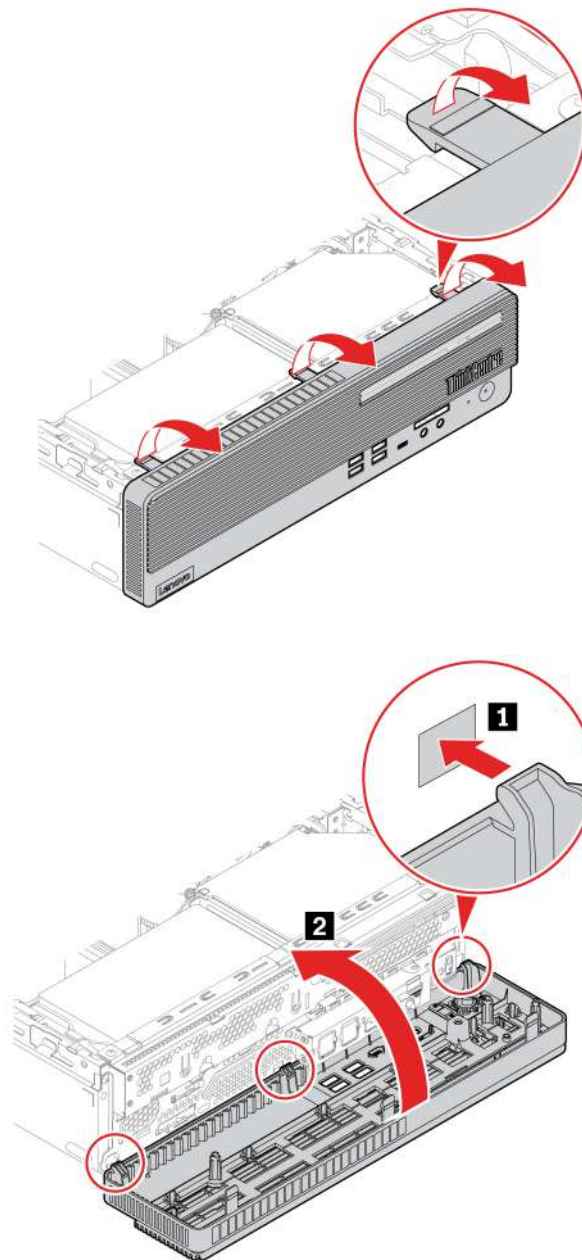
Painel frontal

Pré-requisito

Antes de começar, leia Apêndice A "Informações importantes sobre segurança" na página 49 e imprima estas instruções.

Para acessar, remova a tampa do computador. Consulte "Tampa do computador" na página 28.

Procedimento de substituição



Unidade óptica

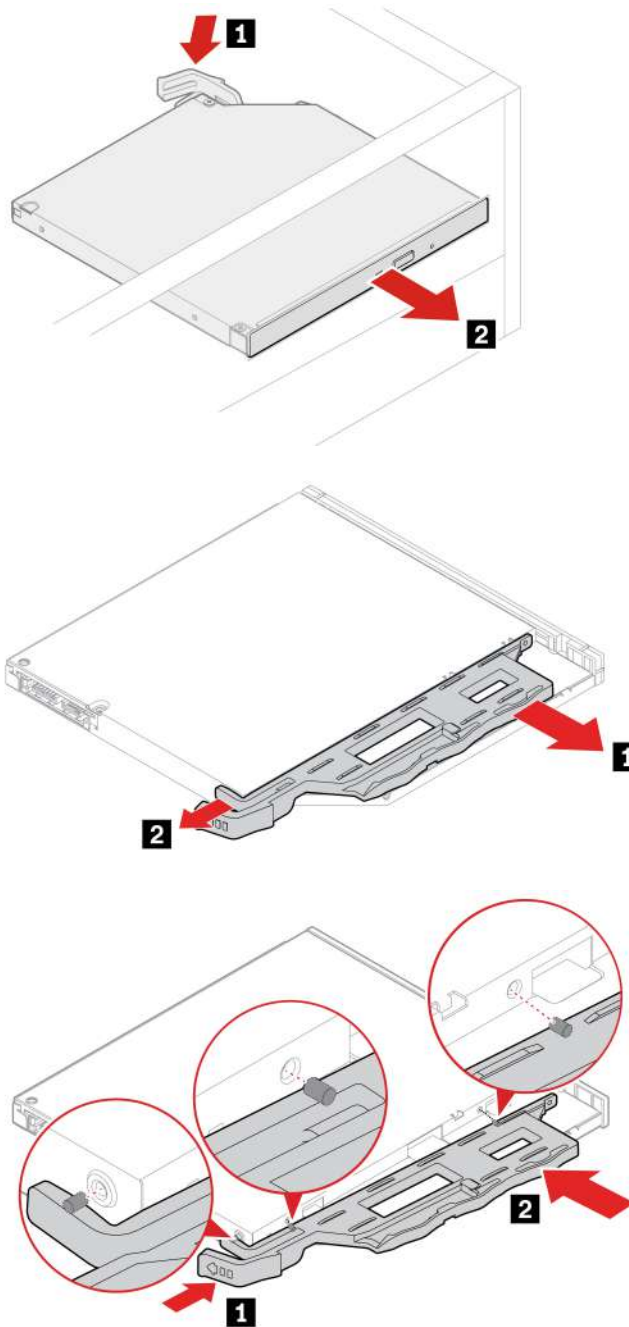
Pré-requisito

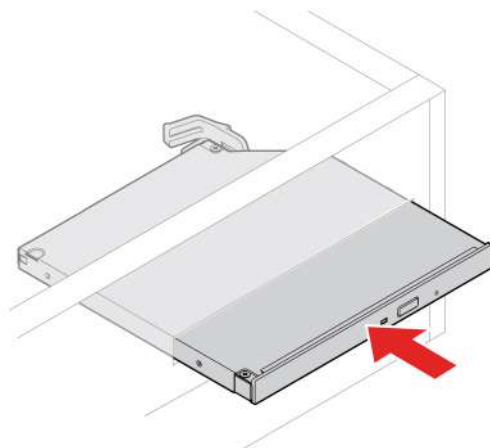
Antes de começar, leia Apêndice A "Informações importantes sobre segurança" na página 49 e imprima estas instruções.

Para acessar, faça o seguinte:

1. Remova a tampa do computador. Consulte "Tampa do computador" na página 28.
2. Desconecte o cabo de sinal e de alimentação da unidade óptica.

Procedimento de substituição





Conjunto do compartimento de unidade

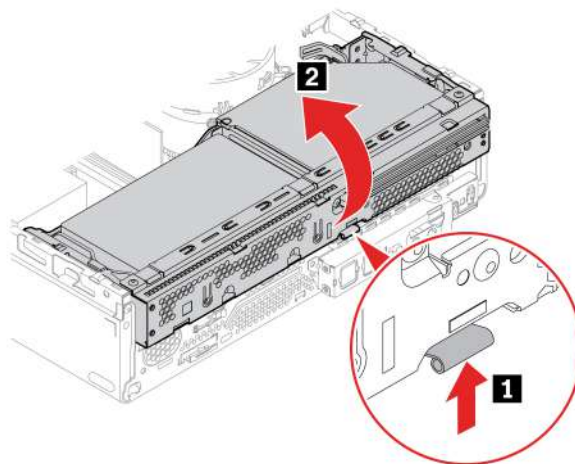
Pré-requisito

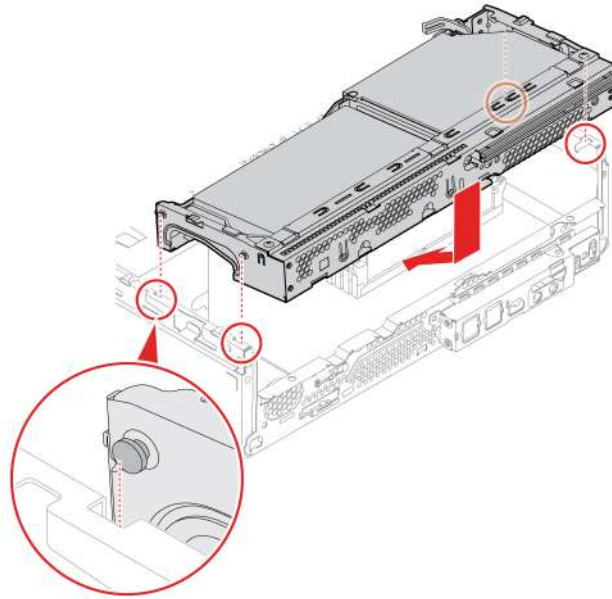
Antes de começar, leia Apêndice A "Informações importantes sobre segurança" na página 49 e imprima estas instruções.

Para acessar, remova as seguintes peças na ordem:

- "Tampa do computador" na página 28
- "Painel frontal" na página 29

Procedimento de substituição





Unidade de disco rígido

Pré-requisito

Antes de começar, leia Apêndice A "Informações importantes sobre segurança" na página 49 e imprima estas instruções.

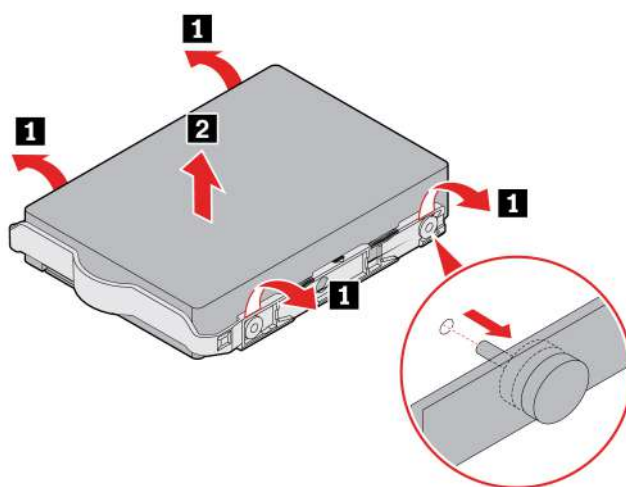
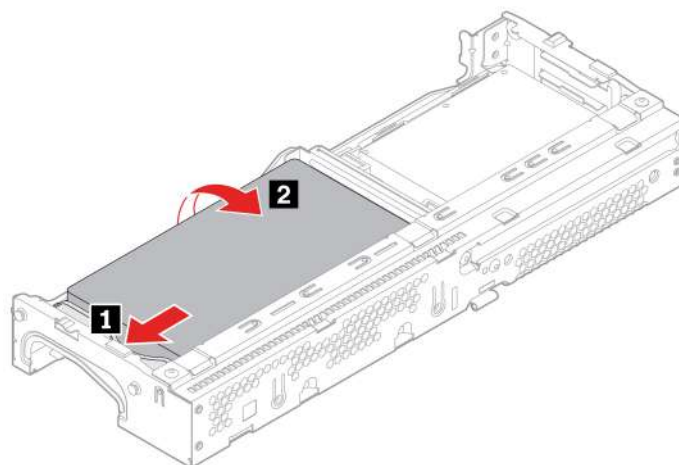
Atenção: A unidade de armazenamento interna é sensível. O manuseio incorreto pode causar danos e perda permanente de dados. Ao manusear a unidade de armazenamento interna, tome as seguintes diretrizes:

- Substitua a unidade de armazenamento interna apenas para a atualização ou reparo. A unidade de armazenamento interna não foi projetada para alterações ou substituição frequente.
- Antes de substituir a unidade de armazenamento interna, faça uma cópia de backup de todos os dados que você deseja manter.
- Não toque na borda de contato da unidade interna de armazenamento. Caso contrário, a unidade de armazenamento interna poderá ser danificada.
- Não aplique pressão à unidade de armazenamento interna.
- Não submeta a unidade de armazenamento interna a choques físicos ou vibrações. Coloque a unidade de armazenamento interna sobre algum material macio, como um tecido, que absorva qualquer choque físico.

Etapas de remoção da unidade de disco rígido principal de 3,5 polegadas

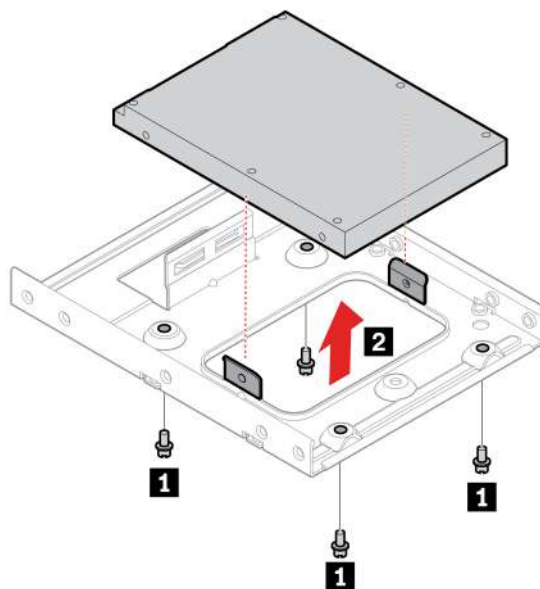
Para acessar, faça o seguinte:

1. Remova as seguintes peças na ordem, se houver:
 - "Tampa do computador" na página 28
 - "Painel frontal" na página 29
 - "Conjunto do compartimento de unidade" na página 32
2. Na parte inferior do conjunto do compartimento de unidade, desconecte o cabo de sinal e o de alimentação da unidade de disco rígido principal de 3,5 polegadas.



Etapas de remoção da unidade de disco rígido principal de 2,5 polegadas

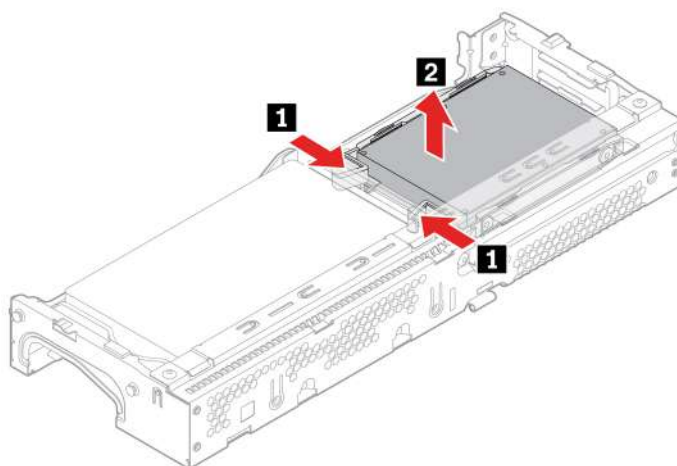
Remova o conversor de armazenamento com a unidade de armazenamento primária de 2,5 polegadas. Consulte "Unidade de disco rígido principal de 3,5 polegadas" na página 33.

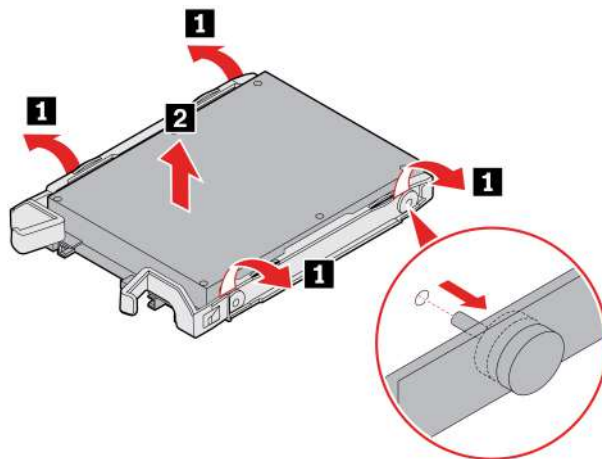


Etapas de remoção da unidade de disco rígido secundária de 2,5 polegadas

Para acessar, faça o seguinte:

1. Remova as seguintes peças na ordem, se houver:
 - "Tampa do computador" na página 28
 - "Painel frontal" na página 29
 - "Unidade óptica" na página 30
 - "Conjunto do compartimento de unidade" na página 32
2. Na parte inferior do conjunto do compartimento de unidade, desconecte o cabo de sinal e o de alimentação da unidade de disco rígido secundária de 2,5 polegadas.





Dissipador de calor e unidade de estado sólido M.2

Pré-requisito

Antes de começar, leia Apêndice A "Informações importantes sobre segurança" na página 49 e imprima estas instruções.



O dissipador de calor pode estar muito quente. Antes de abrir a tampa do computador, desligue o computador e aguarde vários minutos até que ele esfrie.

Atenção: A unidade de armazenamento interna é sensível. O manuseio incorreto pode causar danos e perda permanente de dados. Ao manusear a unidade de armazenamento interna, tome as seguintes diretrizes:

- Substitua a unidade de armazenamento interna apenas para a atualização ou reparo. A unidade de armazenamento interna não foi projetada para alterações ou substituição frequente.
- Antes de substituir a unidade de armazenamento interna, faça uma cópia de backup de todos os dados que você deseja manter.
- Não toque na borda de contato da unidade interna de armazenamento. Caso contrário, a unidade de armazenamento interna poderá ser danificada.
- Não aplique pressão à unidade de armazenamento interna.
- Não submeta a unidade de armazenamento interna a choques físicos ou vibrações. Coloque a unidade de armazenamento interna sobre algum material macio, como um tecido, que absorva qualquer choque físico.

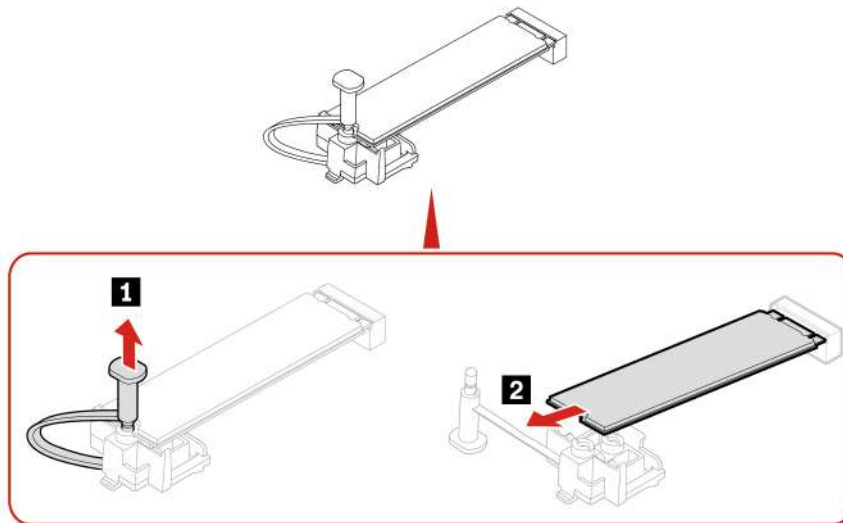
Para acessar, remova as seguintes peças na ordem, se houver:

- "Tampa do computador" na página 28
- "Painel frontal" na página 29
- "Conjunto do compartimento de unidade" na página 32

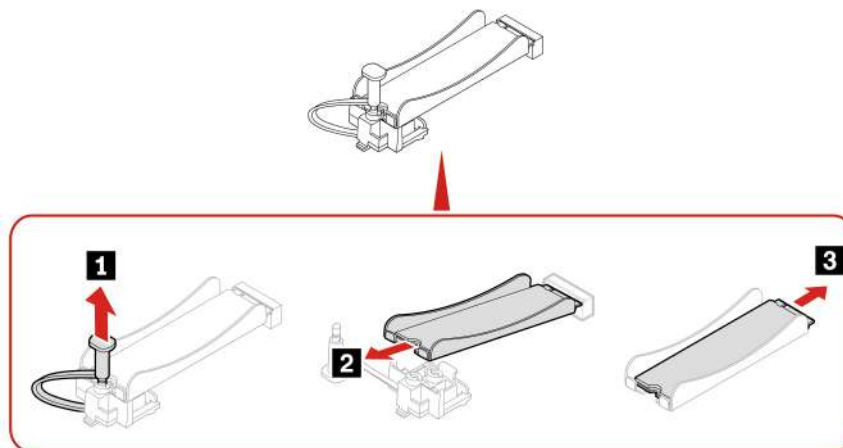
Etapas de remoção

Substitua a unidade de estado sólido M.2 e o dissipador de calor de acordo com o modelo do computador:

- Para computadores sem o dissipador de calor para a unidade de estado sólido M.2, faça o seguinte:

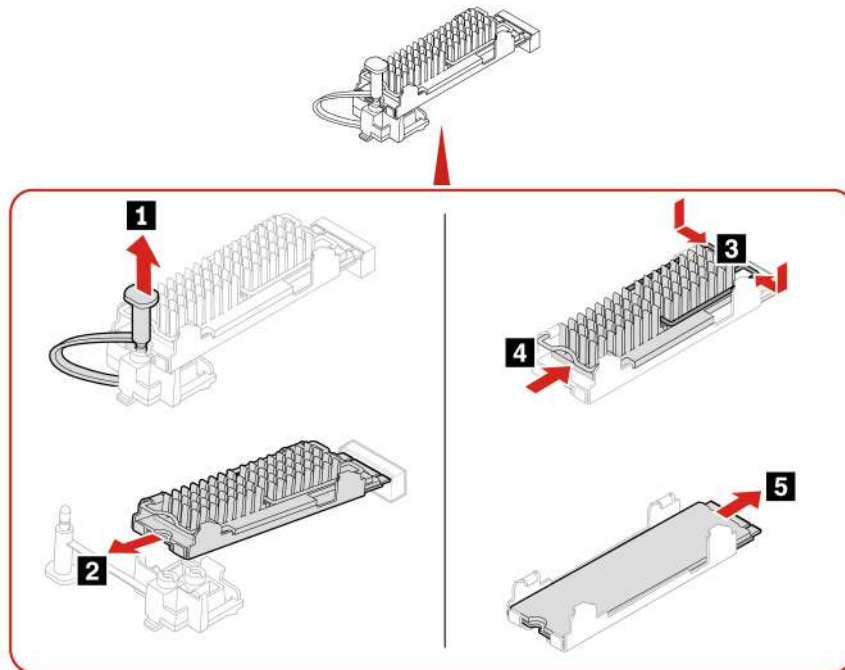


- Para computadores com o dissipador de calor para a unidade de estado sólido M.2, execute uma das seguintes ações de acordo com o modelo do computador:
 - Tipo 1



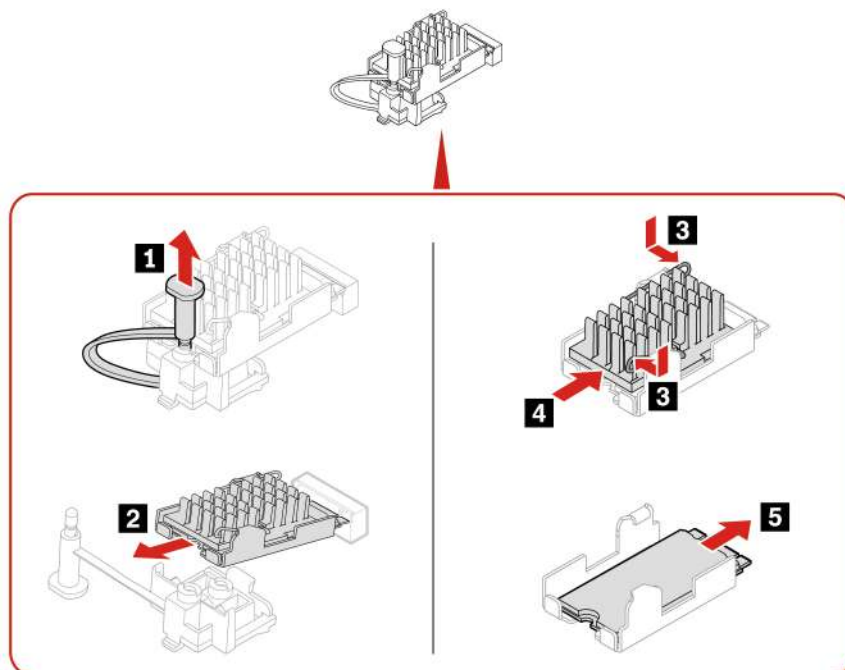
Nota: Remova o filme que cobre a interface térmica (se houver) ao instalar a unidade de estado sólido M.2 e o dissipador de calor.

- Tipo 2



Nota: Remova o filme que cobre a interface térmica (se houver) ao instalar a unidade de estado sólido M.2 e o dissipador de calor.

– Tipo 3



Nota: Remova o filme que cobre a interface térmica (se houver) ao instalar a unidade de estado sólido M.2 e o dissipador de calor.

Suporte da unidade de estado sólido M.2

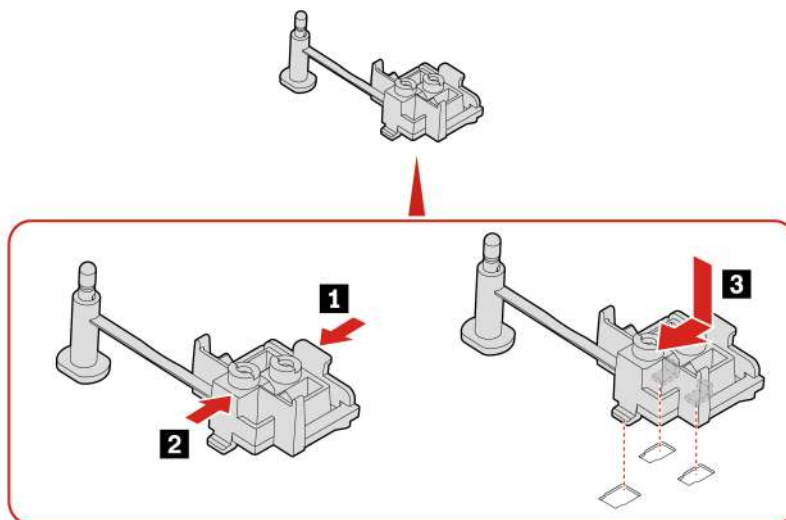
Pré-requisito

Antes de começar, leia Apêndice A "Informações importantes sobre segurança" na página 49 e imprima estas instruções.

Para acessar, remova as seguintes peças na ordem, se houver:

- "Tampa do computador" na página 28
- "Painel frontal" na página 29
- "Conjunto do compartimento de unidade" na página 32
- "Dissipador de calor e unidade de estado sólido M.2" na página 36

Procedimento de substituição

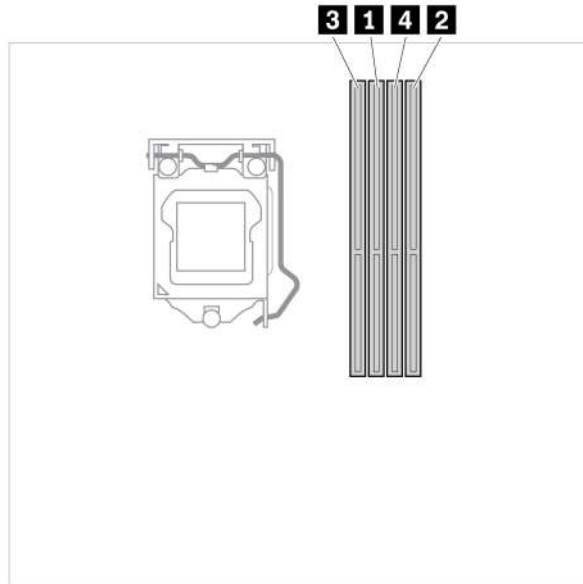


Módulo de memória

Pré-requisito

Antes de começar, leia Apêndice A "Informações importantes sobre segurança" na página 49 e imprima estas instruções.

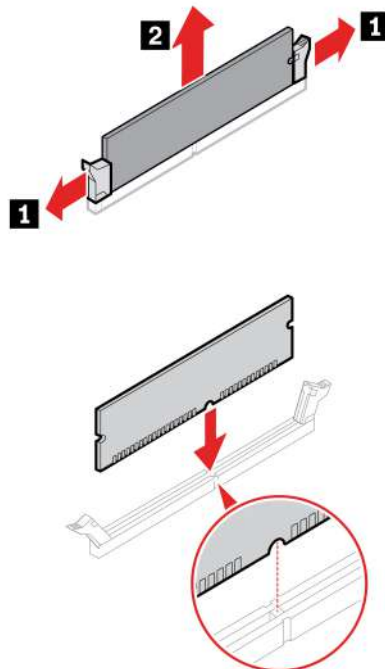
Certifique-se de acompanhar a ordem de instalação de módulos de memória mostrada na ilustração a seguir.



Para acessar, remova as seguintes peças na ordem, se houver:

- "Tampa do computador" na página 28
- "Painel frontal" na página 29
- "Conjunto do compartimento de unidade" na página 32

Procedimento de substituição



Nota: Durante a instalação, alinhe o módulo de memória com o slot e pressione para baixo nas duas extremidades até que as travas estejam totalmente encaixadas com um clique.

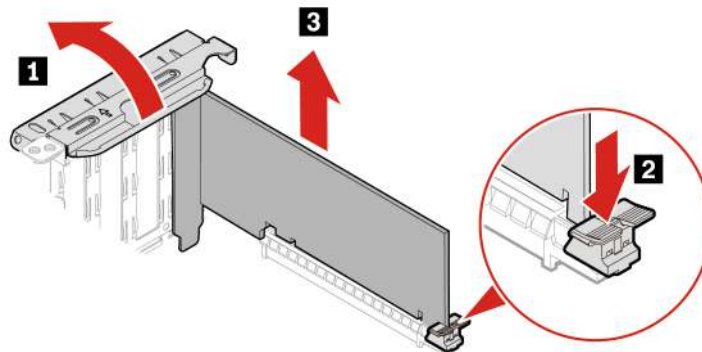
Placa PCI-Express

Pré-requisito

Antes de começar, leia Apêndice A "Informações importantes sobre segurança" na página 49 e imprima estas instruções.

Para acessar, remova a tampa do computador. Consulte "Tampa do computador" na página 28.

Etapas de remoção



Nota: Remova todos os cabos do conector PCI-Express que impedem a instalação das placas PCI-Express.

Bateria de célula do tipo moeda

Pré-requisito

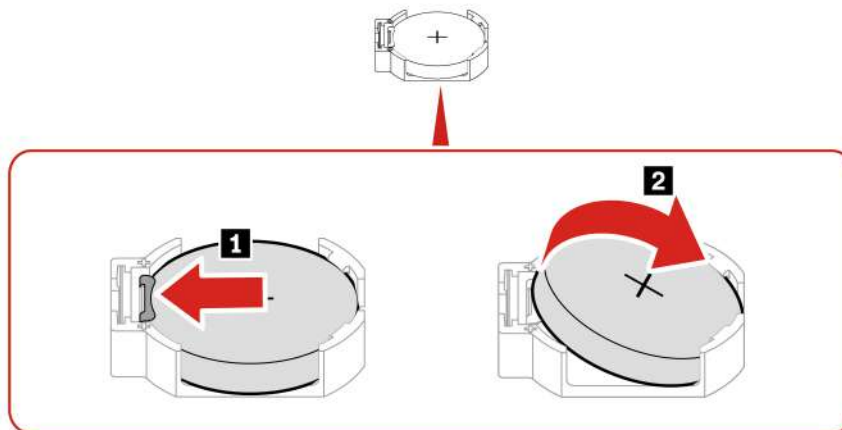
Antes de começar, leia Apêndice A "Informações importantes sobre segurança" na página 49 e imprima estas instruções.

Seu computador possui um tipo especial de memória que mantém a data, a hora e as definições para recursos integrados, como atribuições de conector paralelo (configurações). A bateria de célula do tipo moeda mantém estas informações ativas quando o computador está desligado.

A bateria de célula do tipo moeda normalmente não requer troca ou manutenção durante sua vida útil; entretanto, nenhuma bateria dura para sempre. Se a bateria de célula do tipo moeda falhar, as informações de data e hora serão perdidas. Uma mensagem de erro aparecerá quando você ligar o computador.

Para acessar, remova a tampa do computador. Consulte "Tampa do computador" na página 28.

Etapas de remoção



Notas:

- Redefina a data e a hora do sistema no menu do UEFI BIOS.
- Para descartar a bateria de célula do tipo moeda, consulte o "Aviso sobre baterias de células de lítio do tipo moeda" no *Guia de Segurança e Garantia*.

Conjunto da fonte de alimentação

Pré-requisito

Antes de começar, leia Apêndice A "Informações importantes sobre segurança" na página 49 e imprima estas instruções.

Embora não existam peças móveis no computador após a desconexão do cabo de alimentação, os avisos a seguir são necessários para a sua segurança.



Mantenha os dedos e outras partes do corpo longe de peças móveis perigosas. Se você sofrer algum dano, procure cuidados médicos imediatamente. Nunca remova a tampa de uma fonte de alimentação ou qualquer peça que possua a etiqueta a seguir anexada.



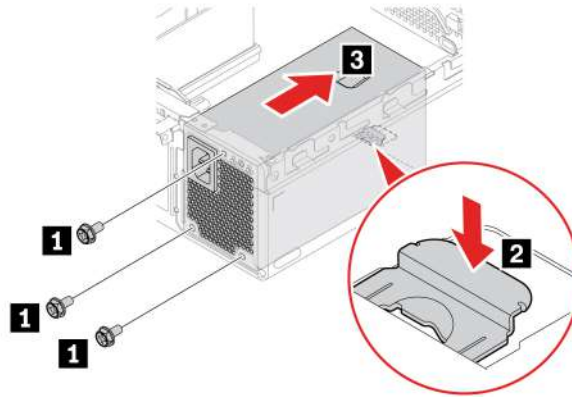
Quaisquer componentes que tenham esta etiqueta anexada possuem interiormente voltagem, corrente e níveis de energia perigosos. Não existem peças no interior desses componentes que possam ser consertadas. Se o Cliente suspeitar de algum problema com uma dessas peças, deve entrar em contato com um técnico de serviço.

Para acessar, faça o seguinte:

1. Remova as seguintes peças na ordem, se houver:
 - "Tampa do computador" na página 28
 - "Painel frontal" na página 29

- "Conjunto do compartimento de unidade" na página 32
2. Desconecte os cabos do conjunto da fonte de alimentação da placa-mãe.

Etapas de remoção



Trava E

Pré-requisito

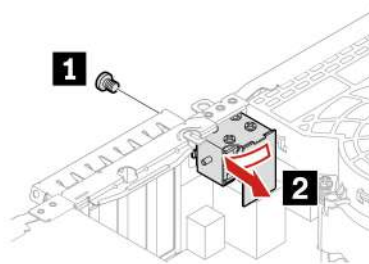
Antes de começar, leia Apêndice A "Informações importantes sobre segurança" na página 49 e imprima estas instruções.

Para acessar, faça o seguinte:

1. Remova as seguintes peças na ordem, se houver:
 - "Tampa do computador" na página 28
 - "Placa PCI-Express" na página 41
2. Desconecte o cabo da trava E da placa-mãe.

Nota: Para remover os parafusos, você precisa de uma ferramenta especial (chave estrela T15).

Etapas de remoção



Capítulo 8. Ajuda e suporte

Recursos de autoajuda

Use os seguintes recursos de autoajuda para saber mais sobre o computador e solucionar problemas.

Recursos	Como acessar?
Solução de problemas e perguntas frequentes	<ul style="list-style-type: none">• https://www.lenovo.com/tips• https://forums.lenovo.com
Informações sobre acessibilidade	https://www.lenovo.com/accessibility
Redefinir ou restaurar Windows	<ul style="list-style-type: none">• Use as opções de recuperação da Lenovo.<ol style="list-style-type: none">1. Acesse https://support.lenovo.com/HowToCreateLenovoRecovery.2. Siga as instruções na tela.• Use as opções de recuperação do Windows.<ol style="list-style-type: none">1. Acesse https://pcsupport.lenovo.com.2. Detecte seu computador ou selecione manualmente seu modelo de computador.3. Navegue até o menu de solução de problemas para diagnosticar o sistema operacional e obter instruções de recuperação.
Use o aplicativo Vantage para: <ul style="list-style-type: none">• Definir as configurações de dispositivo.• Baixar e instalar atualizações de UEFI BIOS, drivers e firmware.• Proteger seu computador contra ameaças externas.• Diagnosticar problemas de hardware.• Verificar o status de garantia do computador.• Acessar o <i>Guia do Usuário</i> e artigos úteis.	Digite Vantage na caixa de pesquisa do Windows.
Nota: Os recursos disponíveis variam de acordo com o modelo do computador.	
Documentação do produto: <ul style="list-style-type: none">• <i>Guia de Segurança e Garantia</i>• <i>Avisos genéricos sobre segurança e conformidade</i>• <i>Guia de Instalação</i>• Este <i>Guia do Usuário</i>• <i>Aviso Regulatório</i>	Acesse https://pcsupport.lenovo.com . Em seguida, siga as instruções na tela para filtrar a documentação desejada.

Recursos	Como acessar?
<p>Web site de suporte da Lenovo com as informações de suporte mais recentes do seguinte:</p> <ul style="list-style-type: none"> • Drivers e software • Soluções de diagnóstico • Garantia de produtos e serviços • Detalhes de produtos e peças • Base de dados de conhecimento e perguntas frequentes 	<p>https://pcsupport.lenovo.com</p>
<p>Informações de ajuda do Windows</p>	<ul style="list-style-type: none"> • Digite Obter ajuda ou Dicas na caixa de pesquisa do Windows e pressione Enter. • Use o Windows Search ou a assistente pessoal Cortana®. • Site de suporte da Microsoft: https://support.microsoft.com

Entrar em contato com a Lenovo

Se você tentar corrigir o problema sozinho e ainda precisar de ajuda, ligue para o Centro de Suporte ao Cliente Lenovo.

Antes de entrar em contato com a Lenovo

Prepare o seguinte antes de entrar em contato com a Lenovo:

1. Registre os sintomas e os detalhes do problema:
 - Qual é o problema? Ele é contínuo ou intermitente?
 - Alguma mensagem ou código de erro?
 - Qual sistema operacional você está utilizando? Qual versão?
 - Quais aplicativos de software estavam sendo executados no momento do problema?
 - O problema pode ser reproduzido? Se sim, como?
2. Registre as informações do sistema:
 - Nome do produto
 - Tipo e número de série da máquina

A ilustração a seguir mostra onde encontrar o tipo e o número de série do computador.



Centro de Suporte ao Cliente Lenovo

Durante o período de garantia, você pode ligar para o Centro de Suporte ao Cliente Lenovo para obter ajuda.

Números de telefone

Para obter uma lista dos números de telefone de Suporte Lenovo no seu país ou região, acesse:

<https://pcsupport.lenovo.com/supportphonenumber>

Nota: Os números de telefone estão sujeitos a alterações sem aviso prévio. Se o número de seu país ou região não for informado, entre em contato com seu revendedor ou representante de marketing Lenovo.

Serviços disponíveis durante o período de garantia

- Determinação de problemas - Uma equipe técnica treinada está disponível para ajudá-lo a determinar se há um problema de hardware e decidir a ação necessária para corrigir o problema.
- Conserto de hardware Lenovo - Se for determinado que o problema foi causado por hardware da Lenovo dentro da garantia, uma equipe técnica treinada estará disponível para fornecer o nível adequado de serviço.
- Gerenciamento de alterações de engenharia – Eventualmente, podem ocorrer alterações após a venda de um produto. A Lenovo ou seu revendedor, se autorizado pela Lenovo, realizará Alterações Técnicas (ECs) selecionadas disponíveis que se aplicam ao seu hardware.

Serviços não abordados

- Substituição ou o uso de peças não fabricadas para ou pela Lenovo ou peças sem garantias
- Identificação de origens de problema com o software
- Configuração do UEFI BIOS como parte de uma instalação ou atualização
- Alterações, modificações ou atualização dos drivers de dispositivo
- Instalação e manutenção de sistemas operacionais de rede (NOS)
- Instalação e manutenção de programas

Para obter os termos e condições da Garantia Limitada Lenovo aplicável ao seu produto de hardware Lenovo, consulte o *Guia de Segurança e Garantia* que acompanha o seu computador.

Adquirir serviços adicionais

Durante e após o período de garantia, é possível adquirir serviços adicionais da Lenovo em:
<https://pcsupport.lenovo.com/warrantyupgrade>

A disponibilidade e o nome dos serviços podem variar de acordo com o país ou a região.

Apêndice A. Informações importantes sobre segurança

Avisos de segurança

Essas informações podem ajudá-lo a utilizar com segurança seu computador. Siga e guarde todas as informações fornecidas com seu computador. As informações contidas neste documento não alteram os termos de seu contrato de compra ou a Garantia Limitada. Para obter mais informações, acesse:

- https://www.lenovo.com/warranty/llw_02
- <https://pcsupport.lenovo.com/warrantylookup>

A segurança do cliente é um fator importante. Nossos produtos são desenvolvidos para servir com segurança e eficiência. No entanto, computadores pessoais são dispositivos eletrônicos. Cabos de energia, adaptadores de energia e outros recursos podem criar riscos potenciais de segurança, podendo resultar em danos físicos ou à propriedade, especialmente se mal utilizados. Para reduzir esses riscos, siga as instruções fornecidas com seu produto, observe todos os avisos sobre o produto, nas instruções de operação, e leia atentamente as informações incluídas neste documento. Seguindo cuidadosamente as informações contidas neste documento e fornecidas com o produto, o Cliente poderá proteger-se contra riscos e criar um ambiente de trabalho do computador mais seguro. Se o computador for usado de algum modo não especificado pelo fabricante, a proteção fornecida pelo computador poderá ser prejudicada.

Nota: Essas informações incluem referências a adaptadores de energia e baterias. Além disso, alguns produtos (como alto-falantes e monitores) são fornecidos com adaptadores de energia externos. Se o Cliente possui tal produto, essas informações se aplicarão ao seu produto. Além disso, os produtos de computador contêm uma bateria interna do tamanho de uma moeda que fornece energia ao relógio do sistema mesmo quando o computador está desconectado, portanto as informações sobre segurança da bateria aplicam-se a todos os produtos de computadores.

Condições que requerem ação imediata

Os produtos podem ser danificados em decorrência de uso impróprio ou negligência. Alguns danos no produto podem ser tão graves que o produto não deve ser utilizado até que seja inspecionado e, se necessário, consertado por um técnico autorizado.

Assim como com qualquer dispositivo eletrônico, tenha muito cuidado ao ligar o produto.

Raramente, o Cliente poderá notar um odor ou ver fumaça ou faíscas saindo de seu produto. Você também poderá ouvir sons do tipo estouro, rachadura ou assobio. Essas condições podem simplesmente significar que um componente eletrônico interno falhou de uma maneira segura e controlada. Por outro lado, podem indicar um problema de segurança potencial. Não corra riscos nem tente diagnosticar a situação você mesmo. Entre em contato com o Centro de Suporte ao Cliente para obter orientação adicional. Para obter uma lista de números de telefone do Serviço e Suporte, consulte o seguinte Web site:

<https://pcsupport.lenovo.com/supportphonest>

Inspeção com frequência o computador e seus componentes para ver se há danos, desgastes ou sinais de perigo. Em caso de alguma dúvida a respeito da condição de um componente, não utilize o produto. Entre em contato com o Centro de Suporte ao Cliente ou com o fabricante do produto para obter instruções sobre como inspecionar o produto e consertá-lo, se necessário.

No improvável evento de observar qualquer umas das condições a seguir ou caso tenha alguma dúvida relacionada à segurança do seu produto, o Cliente deve interromper a utilização do produto e desconectá-lo da fonte de alimentação e das linhas de telecomunicações até que o Cliente possa entrar em contato com o Centro de Suporte ao Cliente para obter mais instruções.

- Cabos de energia, plugues, adaptadores de energia, cabos de extensão, protetor contra oscilações de tensão ou fontes de alimentação que estejam quebrados, rachados ou danificados.
- Sinais de superaquecimento, fumaça, faíscas ou fogo.
- Danos a uma bateria (como rachaduras, afundamentos ou dobras), descarregamento ou acúmulo de substâncias estranhas na bateria.
- Um som de rachadura, assobio ou estouro ou odor forte que esteja saindo do produto.
- Sinais de derramamento de líquido ou queda de objeto sobre o computador, o cabo de energia ou o adaptador de energia.
- O computador, o cabo de energia ou o adaptador de energia expostos à água.
- O produto foi derrubado ou danificado de alguma forma.
- O produto não opera normalmente quando o Cliente segue as instruções de operação.

Nota: Se o Cliente observar essas condições com um produto (como um cabo de extensão) que não seja fabricado pela ou para a Lenovo, deve parar de usar esse produto até conseguir entrar em contato com o fabricante para obter instruções adicionais, ou até obter uma substituição adequada.

Serviços e upgrades

Não deve-se tentar fazer manutenção em um produto, a menos que haja uma instrução para fazê-lo, dada pelo Centro de Suporte ao Cliente ou pela documentação. Utilize somente um Provedor de Serviços aprovado para reparar seu produto em particular.

Nota: Algumas peças do computador podem ser atualizadas ou substituídas pelo cliente. Normalmente, os upgrades são denominados opcionais. As peças de substituição aprovadas para a instalação pelo cliente são denominadas Unidades Substituíveis pelo Cliente ou CRUs. A Lenovo fornece uma documentação com instruções sobre quando é apropriado que os clientes instalem opcionais ou substituam CRUs. É necessário seguir exatamente todas as instruções ao instalar ou substituir peças. O estado Desligado de um indicador de energia não significa necessariamente que os níveis de voltagem dentro de um produto sejam zero. Antes de remover as tampas de um produto equipado com um cabo de alimentação, sempre verifique se a alimentação está desligada e se o produto está desconectado de qualquer fonte de alimentação. Em caso de dúvidas ou preocupações, entre em contato com o Centro de Suporte ao Cliente.

Embora não existam peças móveis no computador após a desconexão do cabo de alimentação, os avisos a seguir são necessários para a sua segurança.



Peças móveis:

Mantenha os dedos e outras partes do corpo longe de peças móveis perigosas. Se você sofrer algum dano, procure cuidados médicos imediatamente.



Superfície quente:

Evite contato com componentes quentes dentro do computador. Durante a operação, alguns componentes ficam quentes o suficiente para queimar a pele. Antes de abrir a tampa do computador, desligue o computador, desconecte a energia e aguarde 10 minutos até que os componentes esfriem.



Após a substituição de uma CRU, reinstale todas as tampas de proteção, incluindo a tampa do computador, antes de conectar a energia e operar o computador. Essa ação é importante para ajudar a evitar choque elétrico inesperado e para ajudá-lo a garantir a retenção de incêndio inesperado que pode acontecer em condições extremamente raras.



Arestas cortantes:

Ao substituir CRUs, tenha cuidado com bordas afiadas ou cantos que podem causar dano. Se você sofrer algum dano, procure cuidados médicos imediatamente.

Adaptadores e cabos de energia



PERIGO

Utilize apenas os cabos e os adaptadores de energia fornecidos pelo fabricante do produto.

Os cabos de alimentação devem ter aprovação de segurança. Na Alemanha, eles devem ser do tipo H03VV-F, 3G, 0,75 mm² ou superiores. Para outros países, os tipos apropriados devem ser utilizados de acordo.

Jamais enrole um cabo de energia em torno de um adaptador de energia ou outro objeto. Isso pode desgastar o cabo, fazendo com que ele se desencape, rache ou dobre. Isso pode representar um risco de segurança.

Passe os cabos de energia por lugares em que eles não sejam pisados, não causem tropeços nem sejam pressionados por objetos.

Mantenha os adaptadores de energia e cabos de alimentação longe dos líquidos. Por exemplo, não deixe o cabo ou o adaptador de energia próximo a pias, banheiras, banheiros ou em pisos que sejam limpos com limpadores líquidos. Líquidos podem causar curto-circuito, especialmente se o cabo ou adaptador de energia sofreu fadiga com o uso impróprio. Líquidos também podem causar corrosão gradual nos terminais do cabo de alimentação e/ou nos terminais do conector do adaptador de energia, que podem eventualmente resultar em superaquecimento.

Certifique-se de que todos os conectores de cabos de alimentação estejam firmemente encaixados nos receptáculos.

Não utilize adaptadores de energia que demonstrem corrosão nos pinos de entrada de corrente alternada ou sinais de superaquecimento (como plástico deformado) na entrada de corrente alternada ou em qualquer lugar no adaptador de energia.

Não utilize cabos de energia nos quais os contatos elétricos nas duas extremidades apresentem sinais de corrosão ou superaquecimento ou onde o cabo de energia parece ter sido danificado de alguma forma.

Para prevenir um possível superaquecimento, não cubra o adaptador de energia com roupas ou outros objetos quando ele estiver conectado em uma tomada elétrica.

Aviso sobre Cabo de Energia

Nota: O cabo de alimentação e o adaptador fornecidos com o item devem ser usados somente com este produto. Não os utilize com outros produtos.

Para sua segurança, a Lenovo fornece um cabo de energia com um plugue para conexão aterrada, para ser utilizado com este produto. Para evitar choques elétricos, sempre utilize o cabo de alimentação e o plugue em uma tomada devidamente aterrada.

Os cabos de alimentação fornecidos pela Lenovo nos Estados Unidos e no Canadá são relacionados pelo UL (Underwriter's Laboratories) e certificados pela CSA (Canadian Standards Association).

Para unidades destinadas à operação em 115 volts: utilize um cabo aprovado pelo UL e com certificação CSA, consistindo em um cabo de três condutores, no mínimo 18 AWG, Tipo SVT ou SJT, com máximo de

4,5 metros de comprimento e plugue com lâminas em paralelo e aterramento, classificado para 10 ampères, 125 volts.

Para unidades destinadas à operação em 230 volts (nos Estados Unidos): utilize um cabo aprovado pelo UL e com certificação CSA, consistindo em um cabo de três condutores de, no mínimo, 18 AWG, Tipo SVT ou SJT, com o máximo de 4,5 metros de comprimento e um plugue de conexão de aterramento, com uma lâmina tandem, classificado para 10 ampères, 250 volts.

Para unidades destinadas à operação em 230 volts (fora dos EUA): use um cabo com plugue com pino de aterramento. O cabo deve possuir aprovação de segurança adequada para o país em que o equipamento será instalado.

Os cabos de alimentação fornecidos pela Lenovo para um país ou região específica geralmente estão disponíveis apenas naquele país ou região.

Para unidades que serão operadas na Alemanha: os cabos de alimentação devem ter aprovação de segurança. Na Alemanha, devem ser H05VV-F, 3G, com 0,75 mm² ou superiores. Em outros países, os tipos apropriados devem ser utilizados adequadamente.

Para unidades destinadas à operação na Dinamarca: use um cabo com plugue com pino de aterramento. O cabo deve possuir aprovação de segurança adequada para o país em que o equipamento será instalado.

Para unidades destinadas à operação na Noruega, na Suécia e na Finlândia: use um cabo com plugue de dois pinos. O cabo deve possuir aprovação de segurança adequada para o país em que o equipamento será instalado.

Se você pretende usar seu PC em outro país ou região fora da localização do pedido, compre um cabo de alimentação Lenovo adicional para o país ou a região em que o PC será usado. Para obter detalhes, consulte o guia do cabo de alimentação em nosso site, <https://pcsupport.lenovo.com>. Alguns países e regiões oferecem suporte para várias tensões. Por isso, certifique-se de pedir o cabo de alimentação apropriado para a tensão em questão.

Cabos de extensão e dispositivos relacionados

Assegure-se de que os cabos de extensão, os protetores contra oscilações de tensão, fontes de alimentação ininterruptas e cabos de energia utilizados estejam classificados para suportar os requisitos elétricos do produto. Jamais sobrecarregue esses dispositivos. Se forem utilizados cabos de energia, a carga não deverá exceder a taxa de entrada do cabo. Consulte um electricista para obter informações adicionais se tiver dúvidas sobre cargas elétricas, requisitos de alimentação e taxas de entrada.

Plugues e tomadas



PERIGO

Se um receptáculo (tomada de energia) que o Cliente pretende utilizar com seu equipamento no computador parecer danificado ou corroído, a tomada não deve ser utilizada até que ela seja substituída por um eletricista qualificado.

Não envergue ou modifique o plugue. Se o plugue estiver danificado, entre em contato com o fabricante para obter uma substituição.

Não compartilhe a tomada com outros aparelhos elétricos domésticos ou comerciais que consumam grandes quantidades de eletricidade; caso contrário, a voltagem instável pode danificar seu computador, seus dados ou dispositivos conectados.

Alguns produtos são equipados com um plugue de três pinos. Esse plugue serve apenas em uma tomada aterrada. Esse é um recurso de segurança. Não desmonte esse recurso tentando inseri-lo em uma tomada não aterrada. Caso o Cliente não consiga inserir o plugue na tomada, deve entrar em contato com um eletricista para obter um adaptador de tomada aprovado ou substituir a tomada por uma que possua esse recurso de segurança. Nunca se deve sobrecarregar uma tomada. A carga geral do sistema não deve exceder 80 por cento da taxa do circuito de ramificação. Deve-se consultar um eletricista para obter informações adicionais caso o Cliente tenha dúvidas sobre cargas elétricas e taxas do circuito de ramificação.

Certifique-se de que a tomada de energia utilizada esteja cabeada adequadamente, tenha fácil acesso e esteja localizada próxima ao equipamento. Não estique totalmente os cabos de energia para não forçá-los.

Certifique-se de que a tomada de energia forneça a voltagem e a corrente corretas para o produto que estiver sendo instalado.

Conecte e desconecte o equipamento da tomada cuidadosamente.

Declarações da fonte de alimentação

Nunca remova a tampa de uma fonte de alimentação ou qualquer peça que possua a etiqueta a seguir anexada.



Quaisquer componentes que tenham esta etiqueta anexada possuem interiormente voltagem, corrente e níveis de energia perigosos. Não existem peças no interior desses componentes que possam ser consertadas. Se o Cliente suspeitar de algum problema com uma dessas peças, deve entrar em contato com um técnico de serviço.

Dispositivos externos

CUIDADO:

Não conecte ou desconecte quaisquer cabos de dispositivo externo que não sejam cabos USB e 1394 enquanto o computador estiver ligado; caso contrário, o computador poderá ser danificado. Para

evitar possíveis danos aos dispositivos conectados, deve-se aguardar pelo menos cinco segundos após o encerramento do computador para desconectar dispositivos externos.

Aviso sobre baterias de células de lítio do tipo moeda



Perigo de explosão se a bateria for substituída incorretamente.

Se a bateria de célula do tipo moeda não for CRU, não tente substituir a bateria de célula do tipo moeda recarregável. A substituição da bateria deve ser feita por uma assistência técnica ou profissional autorizado Lenovo.

As assistências técnicas ou profissionais autorizados Lenovo reciclam as baterias Lenovo de acordo com as leis e regulamentações locais.



Ao substituir a bateria de célula do tipo moeda de lítio, utilize apenas o mesmo tipo ou um tipo equivalente recomendado pelo fabricante. A bateria contém lítio e pode explodir se não for utilizada, manuseada ou descartada corretamente. Engolir a bateria de célula do tipo moeda de lítio causará choque ou queimaduras internas graves em apenas duas horas e pode até resultar em morte.

Mantenha as baterias longe de crianças. Se a bateria de célula do tipo moeda de lítio for engolida ou colocada dentro de qualquer parte do corpo, procure cuidados médicos imediatamente.

Não:

- Jogue ou coloque na água
- Aqueça a mais de 100 °C (212 °F)
- Conserte nem desmonte
- Deixe em um ambiente com pressão de ar extremamente baixa
- Deixe em um ambiente de temperatura extremamente alta
- Esmagar, perfurar, cortar ou incinerar

Descarte a bateria conforme requerido pelas orientações ou regulamentações locais.

A declaração a seguir se aplica aos usuários do estado da Califórnia, EUA.

Informações de Perclorato da Califórnia:

Produtos que contêm baterias de células de lítio do tipo moeda com dióxido de manganês podem conter perclorato.

Material com perclorato - manuseio especial pode ser necessário, consulte <https://www.dtsc.ca.gov/hazardouswaste/perchlorate/>.

Aquecimento e ventilação do produto



Computadores, adaptadores de energia e muitos acessórios podem gerar aquecimento quando ligados e quando baterias estão sendo carregadas. Siga sempre estas precauções práticas:

- Não deixe seu computador, seu adaptador de energia ou acessórios em contato com o seu colo ou qualquer parte de seu corpo por um período estendido quando os produtos estiverem funcionando ou quando a bateria estiver sendo carregada. O seu computador, adaptador de energia e muitos acessórios produzem aquecimento durante operação normal. O contato prolongado com o corpo pode causar desconforto ou potencialmente uma queimadura.
- Não carregue a bateria nem opere seu computador, adaptador de energia ou acessórios próximo a materiais inflamáveis ou em ambientes explosivos.
- Slots de ventilação, ventiladores e dissipadores de calor são fornecidos com o produto para segurança, conforto e operação confiável. Esses recursos podem ser bloqueados inadvertidamente colocando-se o produto em uma cama, sofá, carpete ou outra superfície flexível. Nunca bloqueie, cubra ou desative estes recursos.

Pelo menos uma vez a cada três meses faça uma inspeção em seu computador para ver se há poeira acumulada. Antes de inspecionar o computador, desligue a energia e desconecte seu cabo de energia da tomada; então, remova a poeira das aberturas e perfurações no painel. Caso o Cliente observe poeira acumulada na parte externa, deve examinar e remover a poeira de dentro do computador, incluindo as aletas de entrada do dissipador de calor, os orifícios da fonte de alimentação e os ventiladores. Sempre desligue e desconecte o computador antes de abrir a tampa. Se possível, evite operar o computador a uma distância aproximada de 60 cm de áreas de tráfego intenso. Se tiver que operar seu computador em uma área de tráfego intenso ou próximo a ela, inspecione e, se necessário, limpe seu computador com mais frequência.

Para sua segurança e para manter um ótimo desempenho do computador, sempre siga estas precauções básicas com seu computador desktop:

- Mantenha a tampa do computador fechada sempre que o computador estiver conectado.
- Inspecione regularmente a parte externa do computador em busca de acúmulo de poeira.
- Remova a poeira das saídas de ar e quaisquer perfurações no painel. Poderão ser necessárias limpezas mais frequentes em computadores localizados em áreas empoeiradas e de tráfego intenso.
- Não restrinja ou bloqueie qualquer abertura de ventilação.
- Não guarde ou opere o computador dentro de móveis, pois isso pode aumentar o risco de superaquecimento.
- As temperaturas do fluxo de ar no computador não devem exceder 35 °C (95 °F).
- Não instale dispositivos de filtragem de ar. Eles podem interferir no resfriamento adequado.

Informações sobre segurança da corrente elétrica



A corrente elétrica proveniente de cabos de alimentação, de telefone e de comunicação é perigosa.

Para evitar um risco de choque elétrico:

- Não utilize seu computador durante uma tempestade com raios.
- Não conecte nem desconecte nenhum cabo ou execute instalação, manutenção ou reconfiguração deste produto durante uma tempestade com raios.
- Conecte todos os cabos de energia a tomadas corretamente instaladas e aterradas.
- Conecte em tomadas corretamente instaladas qualquer equipamento que será conectado a esse produto.
- Sempre que possível, utilize uma das mãos somente para conectar ou desconectar cabos de sinal.
- Nunca ligue nenhum equipamento quando houver evidência de fogo, água ou danos estruturais.
- Desconecte os cabos de alimentação conectados, e todos os cabos antes de abrir as tampas do dispositivo, a menos que instruído de forma diferente nos procedimentos de instalação e configuração.
- Não use seu computador até todas as peças internas serem fixadas no lugar. Nunca use o computador quando peças internas e circuitos estiverem expostos.



Conecte e desconecte os cabos conforme descrito nos procedimentos a seguir ao instalar, mover ou abrir tampas nesse produto ou nos dispositivos conectados.

Para Conectar:

1. **DESLIGUE** tudo.
2. Primeiro, conecte todos os cabos nos dispositivos.
3. Conecte os cabos de sinal nos conectores.
4. Conecte os cabos de alimentação às tomadas.
5. **LIGUE** os dispositivos.

Para desconectar:

1. **DESLIGUE** tudo.
2. Primeiro, remova os cabos de alimentação das tomadas.
3. Remova os cabos de sinal dos conectores.
4. Remova todos os cabos dos dispositivos.

O cabo de alimentação deve ser desconectado da tomada de parede ou do receptáculo antes de instalar todos os demais cabos elétricos conectados ao computador.

O cabo de alimentação poderá ser reconectado à tomada de parede ou ao receptáculo somente depois que todos os outros cabos elétricos tiverem sido conectados ao computador.



PERIGO

Durante tempestades elétricas, não execute qualquer substituição e não conecte ou desconecte o cabo da tomada telefônica na parede.

Informações sobre segurança do laser

CUIDADO:

Quando produtos a laser (como CD-ROMs, unidades de DVD, dispositivos de fibra óptica ou transmissores) estão instalados, observe o seguinte:

- Não remova as tampas. A remoção das tampas do produto a laser pode resultar em exposição prejudicial à radiação de laser. Não há peças que permitam manutenção no interior do dispositivo.
- A utilização de controles ou ajustes ou a execução de procedimentos diferentes daqueles especificados aqui pode resultar em exposição perigosa à radiação.



PERIGO

Alguns produtos a laser contêm um diodo de laser de Classe 3B integrado. Observe o seguinte: Radiação do laser quando a unidade estiver aberta. Não olhe diretamente para o feixe a olho nu ou com instrumentos ópticos e evite exposição direta ao feixe de laser.

Aviso sobre telas de LCD



PERIGO

Para evitar risco de choque elétrico:

- Não remova as tampas.
- Não utilize este produto, a menos que a base esteja conectada.
- Não conecte e nem desconecte este produto durante uma tempestade com raios.
- O cabo de alimentação deve ser conectado a uma tomada elétrica com a fiação e o aterramento corretos.
- Qualquer equipamento ao qual este produto será conectado também deve estar conectado a tomadas elétricas com a fiação e o aterramento corretos.
- Para isolar o monitor da fonte de alimentação, é necessário remover o plugue da tomada elétrica. A tomada elétrica deve estar facilmente acessível.

Manuseio:

- Se seu monitor pesar mais de 18 kg, é recomendável que seja movido ou levantado por duas pessoas.

Descarte do produto (monitores TFT):

- A lâmpada fluorescente na tela de cristal líquido contém mercúrio; descarte de acordo com as leis locais, estaduais ou federais.

Advertências da bateria:

- Haverá risco de explosão se a bateria for substituída por outra de tipo incorreto.

- Descarte as pilhas usadas de acordo com as instruções.

Usar fones de ouvido, headphones ou headset

- Se o seu computador possui um conector de fone de ouvido e um conector de saída de áudio, use sempre o conector de fone de ouvido ao ligar fones de ouvido ou um headset. No entanto, o conector de fone de ouvido não oferece suporte ao microfone do headset.
- Se o seu computador possui um conector de headset e um conector de saída de áudio, use sempre o conector de headset ao ligar fones de ouvido ou um headset.



A pressão sonora excessiva dos fones de ouvido pode causar perda de audição. Ajustar o equalizador para o máximo aumenta a voltagem de saída dos fones de ouvido e headphones e, portanto, o nível de pressão sonora. Assim, proteja sua audição ao ajustar o equalizador para um nível apropriado.

O uso excessivo de fones de ouvido em volumes elevados por longos períodos de tempo poderá ser perigoso se as saídas dos headphones ou fones de ouvido não estiverem em conformidade com as especificações EN 50332-2. O conector de saída do fone de ouvido do seu computador está em conformidade com a especificação EN 50332-2 Subcláusula 7. Essa especificação limita a voltagem máxima de saída RMS real de faixa ampla do computador a 150 mV. Para se proteger contra a perda de audição, certifique-se de que seus headphones ou fones de ouvido também estejam em conformidade com a especificação EN 50332-2 (Limites da Cláusula 7) ou uma voltagem característica de faixa ampla de 75 mV. O uso de headphones incompatíveis com a especificação EN 50332-2 pode ser perigoso devido a níveis excessivos de pressão sonora.

Se seu computador Lenovo veio acompanhado por fones de ouvido na embalagem, na forma de um conjunto, a combinação dos fones de ouvido com o computador já está em conformidade com as especificações EN 50332-1. Se headphones ou fones de ouvido diferentes forem usados, certifique-se de que eles sejam compatíveis com a especificação EN 50332-1 (Cláusula 6.5, Valores de limitação). O uso de headphones incompatíveis com a especificação EN 50332-1 pode ser perigoso devido aos níveis excessivos de pressão sonora.

Aviso sobre risco de engasgos



PERIGO DE ENGASGO – O produto contém peças pequenas.

Mantenha-o longe de crianças menores de três anos.

Aviso sobre embalagens plásticas



PERIGO

Sacos plásticos podem ser perigosos. Mantenha sacos plásticos fora do alcance de bebês e crianças para evitar o perigo de sufocamento.

Aviso sobre peças de vidro

CUIDADO:

Algumas partes do produto podem ser feitas de vidro. Esse vidro pode quebrar se o produto cair em uma superfície dura ou sofrer um impacto considerável. Se o vidro quebrar, não toque-o nem tente removê-lo. Interrompa o uso do produto até que o vidro seja substituído por profissionais de manutenção treinados.

Avisos de posicionamento do computador

O posicionamento incorreto do computador pode causar danos às crianças.

- Coloque o computador em um móvel baixo resistente ou em um móvel que foi fixado.
- Não coloque o computador na borda de móveis.
- Mantenha os cabos do computador fora do alcance de crianças.
- Alguns itens, como brinquedos, podem atrair crianças. Mantenha esses itens longe do computador.

Supervisione crianças em salas onde as instruções de segurança acima não podem ser completamente implementadas.

Declaração de risco de energia



Desconecte todos os cabos de alimentação das tomadas elétricas antes de remover a tampa do computador ou qualquer peça que tenha a etiqueta acima afixada.

NÃO desmonte os componentes com a etiqueta acima afixada. Não existem peças no interior desses componentes que possam ser consertadas.

O produto foi projetado para uso seguro. No entanto, quaisquer componentes que tenham esta etiqueta anexada possuem interiormente voltagem, corrente e níveis de energia perigosos. Desmontar esses componentes pode causar incêndio ou mesmo resultar em morte. Se o Cliente suspeitar de algum problema com uma dessas peças, deve entrar em contato com um técnico de serviço.

CUIDADO:



Luz forte. Possíveis danos à pele ou aos olhos. Desconecte a alimentação antes de efetuar a manutenção.

CUIDADO:



Luz infravermelha. Possíveis danos à pele ou aos olhos. Desconecte a alimentação antes de efetuar a manutenção.

Conforto visual

A propriedade do vídeo em conjunto com as notas a seguir resulta em redução da fadiga dos olhos e em maior conforto.

Para obter dicas de como minimizar a fadiga visual, vá para <https://www.lenovo.com/us/en/safecomp/> para visitar "Minimização da fadiga visual".

Aviso sobre prevenção de riscos de quedas - Dicas

O computador poderá causar danos às crianças se não estiver em um local apropriado. Siga as dicas abaixo para proteger as crianças contra danos causados pela queda do computador:

- Coloque os computadores ou monitores em um móvel resistente com uma base baixa ou um móvel que tenha sido fixado. Afaste os computadores ou monitores da borda dos móveis o máximo possível.
- Mantenha controles remotos, brinquedos e outros itens que poderiam atrair crianças afastados dos computadores ou monitores.
- Mantenha os cabos do computador ou monitor fora do alcance das crianças.
- Supervisione as crianças em cômodos onde essas dicas de segurança não foram seguidas.

CUIDADO:

Algumas partes do produto podem ser feitas de vidro. Esse vidro pode quebrar se o produto cair em uma superfície dura ou sofrer um impacto considerável. Se o vidro quebrar, não toque nele nem tente removê-lo. Interrompa o uso do produto até que o vidro seja substituído por profissionais de manutenção treinados.

Prevenção contra eletricidade estática

A eletricidade estática, embora inofensiva ao Cliente, pode danificar seriamente os componentes e opcionais do computador. A manipulação inadequada de peças sensíveis à estática pode danificar a peça. Ao desembalar um opcional ou a CRU, não abra a embalagem de proteção antiestática que contém a peça até que as instruções indiquem que você deve instalá-la.

Ao manipular opcionais ou CRUs, ou desempenhar qualquer trabalho dentro do computador, tome as seguintes precauções para evitar danos por eletricidade estática:

- Limite o seu movimento. O movimento pode fazer com que a eletricidade estática seja estabelecida ao seu redor.
- Sempre manipule os componentes com cuidado. Manipule adaptadores, módulos de memória e outras placas de circuito pelas extremidades. Nunca toque nos circuitos expostos.
- Evite que outras pessoas toquem os componentes.
- Ao instalar um opcional ou uma CRU sensível à estática, encoste a embalagem antiestática que contém a peça em uma tampa metálica do slot de expansão ou em outra superfície metálica não pintada do computador por, pelo menos, dois segundos. Isso reduz a eletricidade estática na embalagem e em seu corpo.
- Quando possível, remova a peça sensível à estática da embalagem de proteção contra estática e instale-a sem colocá-la em qualquer superfície. Quando isto não for possível, coloque a embalagem de proteção contra estática em uma superfície uniforme e nivelada e coloque a peça sobre ela.
- Não coloque a peça sobre a tampa do computador ou em outra superfície metálica.

Ambiente operacional

Altitude máxima (sem pressurização)

- Operacional: De 0 m (0 pé) a 3.048 m (10.000 pés)
- Armazenamento: De 0 m (0 pé) a 12.192 m (40.000 pés)

Temperatura

- Operacional: De 5 °C (41 °F) a 35 °C (95 °F)
- Armazenamento:
 - Para computadores desktop comuns: De -40 °C (-40 °F) a 60 °C (140 °F)
 - Para computadores desktop all-in-one: De -20 °C (-4 °F) a 60 °C (140 °F)

Umidade relativa

- Operacional: 20% a 80% (sem condensação)
- Armazenamento: 10% a 90% (sem condensação)

Limpeza e manutenção

Com o cuidado e a manutenção adequados, o seu computador funcionará de forma confiável. Os tópicos a seguir fornecem informações para ajudá-lo a manter o computador funcionando com o melhor desempenho.

Dicas básicas de manutenção

Estas são algumas considerações básicas sobre como manter o funcionamento adequado do seu computador:

- Mantenha-o em um ambiente limpo e seco. Certifique-se de que o computador esteja sobre uma superfície plana e estável.
- Não cubra nenhuma das exaustões de ar. Essas exaustões de ar permitem um fluxo de ar que protege o computador contra superaquecimento.
- Mantenha equipamentos elétricos tais como ventilador elétrico, rádio, alto-falantes de alta potência, ar-condicionado e forno de micro-ondas longe do computador, pois os fortes campos magnéticos gerados por esses equipamentos podem danificar o monitor e os dados na unidade de armazenamento.
- Mantenha alimentos e bebidas longe de todas as peças do computador. Partículas de alimentos e líquidos derramados podem grudar no teclado e no mouse e inutilizá-los.
- Não molhe os interruptores nem outros controles. A umidade pode danificar essas peças e expor o equipamento a um risco elétrico.
- Sempre desconecte o cabo de alimentação ao segurar o plugue em vez do cabo.
- Mantenha o software do computador, os drivers de dispositivos e o sistema operacional atualizados.
- Esvazie a lixeira regularmente.
- Limpe regularmente as pastas Caixa de Entrada, Itens Enviados e Itens Excluídos do seu aplicativo de e-mail.
- Limpe arquivos e libere espaço na unidade de armazenamento e espaço de memória ocasionalmente para prevenir problemas de desempenho.
- Mantenha um livro de registro. As entradas podem incluir alterações importantes de hardware ou software, atualizações de drivers de dispositivos, problemas intermitentes e o que você fez para resolvê-los, além de problemas que você possa ter enfrentado. A causa do problema pode ser uma alteração no

hardware, uma alteração no software ou todas as outras ações que possam ter ocorrido. Um livro de registros pode ajudar você ou um técnico da Lenovo a determinar a causa do problema.

- Faça backup regularmente de seus dados na unidade de armazenamento. Você poderá restaurar a unidade de armazenamento a partir de um backup.
- Criar uma mídia de resgate o quanto antes. Você pode utilizar a mídia de resgate para restaurar o sistema operacional, mesmo se o Windows não for inicializado.
- Obtenha os patches de atualização do sistema operacional, programas de software e drivers de dispositivo mais recentes.

Dicas de manutenção sobre movimentação do computador

Antes de mover o computador, tome as seguintes precauções:

1. Faça backup dos dados na unidade de armazenamento.
2. Remova todas as mídias das unidades e desligue todos os dispositivos conectados e o computador. Em seguida, desconecte todos os cabos de alimentação das tomadas elétricas e também todos os cabos conectados ao computador.
3. Se você tiver guardado as caixas e os materiais de embalagem originais, utilize-os para embalar as unidades. Se estiver usando caixas diferentes, proteja as unidades para evitar dano.

Ao levar o computador para outro país ou região, você deverá considerar os padrões elétricos locais. Se o estilo da tomada elétrica local for diferente do atual, entre em contato com o Centro de Suporte ao Cliente Lenovo para comprar um adaptador de tomada elétrica ou um novo cabo de alimentação.

Limpar o computador

CUIDADO:

Remova todas as mídias das unidades e desligue todos os dispositivos conectados e o computador. Em seguida, desconecte todos os cabos de alimentação das tomadas elétricas e também todos os cabos conectados ao computador.

É uma boa prática limpar o computador periodicamente para proteger as superfícies e garantir uma operação sem problemas.

Limpar a superfície do computador: limpe-a com um pano de algodão umedecido em água e sabão neutro. Evite aplicar líquidos diretamente à superfície.

Limpar o teclado: limpe uma tecla de cada vez com um pano de algodão umedecido em água e sabão neutro. Se você limpar várias teclas de uma vez, o pano poderá prender em uma tecla vizinha e danificá-la. Evite borrifar o limpador diretamente sobre o teclado. Para remover farelos ou poeira da parte inferior das teclas, você pode utilizar um soprador com escova ou o ar frio de um secador de cabelos.

Limpar a tela do computador: riscos, óleo, pó, produtos químicos e luz ultravioleta podem afetar o desempenho da tela do computador. Use um pano seco de algodão para limpar a tela com cuidado. Se você vir uma marca semelhante a um arranhão na tela, pode ser uma mancha. Limpe ou espere a mancha suavemente com um pano seco e macio. Se a mancha permanecer, umedeça um pano de algodão com água ou com um limpador de vidro, mas não aplique líquidos diretamente à tela do computador. Verifique se a tela do computador está seca antes de fechá-la.

Apêndice B. Informações sobre acessibilidade e ergonomia

Este capítulo fornece informações sobre acessibilidade e ergonomia.

Informações sobre acessibilidade

A Lenovo tem o compromisso de fornecer maior acesso às informações e tecnologias aos usuários com limitações auditivas, visuais e de mobilidade. Você também pode obter as informações mais atualizadas sobre acessibilidade em <https://www.lenovo.com/accessibility>.

Se você precisar de suporte adicional com os recursos de acessibilidade, vá para <https://pcsupport.lenovo.com/supportphonenumber> para encontrar os números de telefone de suporte em seu país ou região.

Informações sobre ergonomia

Práticas de ergonomia adequadas são importantes para que você obtenha o máximo de seu computador pessoal e evite desconforto. Organize sua área de trabalho e o equipamento utilizado para atender às suas necessidades e ao tipo de trabalho que você faz. Além disso, tenha hábitos de trabalho saudáveis a fim de obter o desempenho e o conforto máximos ao usar o computador.

Trabalhar no escritório virtual pode requerer uma adaptação às alterações frequentes em seu ambiente. Adaptar-se às fontes de iluminação do ambiente, sentar da forma adequada e o posicionamento correto do hardware do computador podem melhorar seu desempenho e ajudar a obter maior conforto.

Este exemplo mostra uma pessoa em uma configuração convencional. Mesmo quando não estiver nessa posição, você pode seguir muitas das dicas. Desenvolva bons hábitos que eles também o ajudarão.



Postura geral: faça pequenas modificações em sua postura de trabalho para impedir o desconforto causado por longos períodos de trabalho na mesma posição. Paradas curtas e frequentes também ajudarão a evitar qualquer desconforto associado à postura de trabalho.

Visor: posicione a tela de modo a manter uma distância de visualização confortável de 510 a 760 mm (20 a 30 pol.). Evite brilho ou reflexos no vídeo provenientes da iluminação do teto ou de fontes de luz exteriores. Mantenha a tela de exibição limpa e configure o nível do brilho de forma que seja possível ver a tela com nitidez. Pressione as teclas de controle de brilho para ajustar o brilho do monitor.

Posição da cabeça: mantenha a cabeça e o pescoço em uma posição confortável e neutra (vertical ou ereta).

Cadeira: utilize uma cadeira que forneça um bom apoio para as costas e ajuste de altura do assento. Use os ajustes da cadeira para adaptá-la à sua postura confortável.

Posição do braço e da mão: se disponível, utilize cadeiras com descanso para o braço ou uma área em sua superfície de trabalho para fornecer apoio para o peso dos seus braços. Mantenha os antebraços, pulsos e mãos em uma posição neutra e relaxada (horizontal). Digite com um toque leve sem golpear as teclas.

Posição da perna: mantenha suas coxas paralelas ao chão e seus pés retos no chão ou em um descanso para os pés.

Apêndice C. Informações complementares sobre o sistema operacional Ubuntu

Em países ou regiões limitadas, a Lenovo oferece aos clientes uma opção para solicitar computadores com o sistema operacional Ubuntu® pré-instalado.

Se o sistema operacional Ubuntu estiver disponível em seu computador, leia as informações a seguir antes de utilizar o computador. Ignore informações relacionadas aos programas baseados no Windows, utilitários e aplicativos pré-instalados da Lenovo nesta documentação.

Acessar a Garantia Limitada Lenovo

Este produto está coberto pelos termos da Garantia Limitada Lenovo (LLW), versão L505-0010-02 08/2011. A LLW está disponível em vários idiomas no Web site a seguir. Leia a Garantia Limitada da Lenovo em: https://www.lenovo.com/warranty/llw_02

A LLW também está pré-instalada no computador. Para acessar a LLW, vá até o diretório:

```
/opt/Lenovo
```

Se você não conseguir exibir a LLW no Web site nem no seu computador, entre em contato com o escritório ou revendedor Lenovo local para obter uma versão impressa gratuita da LLW.

Acessar o sistema de ajuda do Ubuntu

O sistema de ajuda do Ubuntu fornece informações sobre como usar o sistema operacional Ubuntu. Para acessar o sistema de ajuda da tela inicial, mova o ponteiro para a barra de inicialização e clique no ícone **Ajuda**. Se você não conseguir localizar o ícone **Ajuda** na barra de inicialização, clique no ícone **Pesquisar** no canto inferior esquerdo e digite Ajuda para pesquisar.

Para aprender mais sobre o sistema operacional Ubuntu, acesse: <https://www.ubuntu.com>

Obter informações de suporte

Se precisar de ajuda, serviços, assistência técnica ou mais informações sobre o sistema operacional Ubuntu ou outros aplicativos, entre em contato com o provedor do sistema operacional Ubuntu ou o provedor do aplicativo. Se precisar de assistência e suporte de componentes de hardware fornecidos com seu computador, entre em contato com a Lenovo. Para obter mais informações sobre como entrar em contato com a Lenovo, consulte o *Guia do Usuário* e *Guia de Segurança e Garantia*.

Para acessar o mais recente *Guia do Usuário* e *Guia de Segurança e Garantia*, acesse: <https://pcsupport.lenovo.com>

Apêndice D. Informações sobre conformidade e certificação TCO

Este capítulo fornece informações regulatórias, ambientais e sobre ENERGY STAR de produtos Lenovo.

Declarações de conformidade de frequência de rádio

Modelos de computador equipados com comunicações wireless estão em conformidade com os padrões de frequência de rádio e segurança de qualquer país ou região no qual foram aprovados para utilização wireless.

Além deste documento, certifique-se de ler o *Aviso Regulatório* para seu país ou região antes de usar os dispositivos sem fio do seu computador.

Localizar avisos regulatórios sobre wireless

Para obter mais informações sobre os avisos regulatórios de wireless, consulte o *Aviso Regulatório* em: <https://pcsupport.lenovo.com>

União Europeia (UE)/Reino Unido (UK) – Conformidade de Equipamentos de Rádio



Contato na UE: Lenovo (Slovakia), Landererova 12, 811 09 Bratislava, Slovakia



Contato no Reino Unido: Lenovo, Redwood, Crockford Lane, Basingstoke, RG24 8WQ, Reino Unido.

Este produto está em conformidade com todos os requisitos e normas essenciais que se aplicam à Diretiva de Equipamentos de Rádio do Conselho da UE 2014/53/EU sobre a aproximação das leis dos Estados Membros, bem como as Regulamentações de Equipamentos de Rádio do Reino Unido SI 2017 No. 1206, relativas a equipamentos de rádio.

O texto completo da declaração de conformidade de sistemas da UE está disponível em: <https://www.lenovo.com/us/en/compliance/eu-doc>

O texto completo da declaração de conformidade de sistemas do Reino Unido está disponível em: <https://www.lenovo.com/us/en/compliance/uk-doc>

A Lenovo não pode assumir responsabilidade por qualquer falha para preencher os requisitos de proteção resultantes de uma modificação não recomendada do produto, incluindo a instalação de cartões de opção de outros fabricantes. Este produto foi testado e atende aos limites estabelecidos para equipamentos de Classe B de acordo com os padrões de conformidade europeus e do Reino Unido. Os limites para equipamentos de Classe B foram derivados para ambientes residenciais típicos fornecerem proteção razoável contra interferências com dispositivos de comunicação licenciados.

Brasil

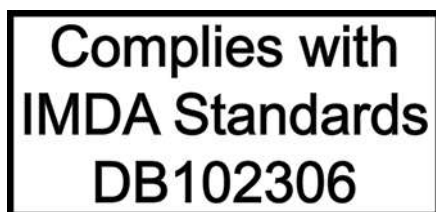
Este equipamento não tem direito à proteção contra interferência prejudicial e não pode causar interferência em sistemas devidamente autorizados.

This equipment is not protected against harmful interference and may not cause interference with duly authorized systems.

México

Advertencia: En Mexico la operación de este equipo está sujeta a las siguientes dos condiciones: (1) es posible que este equipo o dispositivo no cause interferencia perjudicial y (2) este equipo o dispositivo debe aceptar cualquier interferencia, incluyendo la que pueda causar su operación no deseada.

Singapura



Coreia

무선설비 전파 혼신 (사용주파수 2400 ~ 2483.5 , 5725 ~ 5825 무선제품해당)

해당 무선설비가 전파혼신 가능성이 있으므로 인명안전과 관련된 서비스는 할 수 없음

SAR 정보

본 장치는 전파 노출에 대한 가이드라인을 충족합니다.

본 장치는 무선 송수신기입니다. 본 장치는 국제 가이드라인으로 권장되는 전파 노출에 대한 제한을 초과하지 않도록 설계되었습니다. 장치 액세서리 및 최신 부품을 사용할 경우 SAR 값이 달라질 수 있습니다. SAR 값은 국가 보고 및 테스트 요구 사항과 네트워크 대역에 따라 다를 수 있습니다. 본 장치는 사람의 신체에서 20mm 이상의 거리에서 사용할 수 있습니다.

Informações ambientais sobre países e regiões

Esta seção fornece informações ambientais, de reciclagem e RoHS sobre produtos Lenovo.

Informações sobre reciclagem e meio ambiente

A Lenovo estimula os proprietários de equipamentos de TI (Tecnologia da Informação) a reciclar com responsabilidade o equipamento quando não for mais necessário. A Lenovo oferece uma variedade de programas e serviços para auxiliar proprietários de equipamentos na reciclagem de seus produtos de TI.

Para obter informações sobre reciclagem de produtos Lenovo, vá para:

<https://www.lenovo.com/us/en/compliance/recycling>

As informações ambientais mais recentes sobre nossos produtos estão disponíveis em:

<https://www.lenovo.com/us/en/compliance/eco-declaration>

Informações importantes sobre reciclagem da bateria e WEEE

Informações sobre retomada e reciclagem para WEEE e baterias/acumuladores na União Europeia e no Reino Unido



A marca de lixeira riscada aplica-se somente a países com regulamentações da WEEE e de resíduos de baterias, incluindo a União Europeia (UE) e o Reino Unido (UK).

Os aparelhos e baterias/acumuladores são rotulados de acordo com as regulamentações locais relativas aos resíduos dos equipamentos elétricos e eletrônicos (WEEE) e resíduos de baterias e acumuladores. Essas regulamentações determinam a estrutura para o retorno e a reciclagem de aparelhos e baterias/acumuladores usados, conforme aplicáveis em cada geografia. Esta etiqueta é aplicada a vários produtos para indicar que o produto não deve ser jogado fora, mas sim enviado para os sistemas de coleta estabelecidos para recuperação de produtos no final da vida útil.

O rótulo na bateria também pode incluir um símbolo químico do metal presente na bateria (Pb para chumbo, Hg para mercúrio e Cd para cádmio).

Os usuários de equipamentos elétricos e eletrônicos (EEE) e de baterias/acumuladores com a marca de lixeira riscada não devem descartar tais produtos na forma de lixo comum sem classificação, mas utilizar a estrutura de coleta disponível para devolver, reciclar e recuperar WEEE e resíduos de baterias/acumuladores com o objetivo de minimizar os possíveis efeitos de EEE e baterias sobre o ambiente e a saúde humana causados pela presença de substâncias perigosas.

Os equipamentos elétricos e eletrônicos (EEE) da Lenovo podem conter peças e componentes que, no fim de sua vida útil, podem se qualificar como lixos perigosos.

O descarte de equipamentos elétricos e eletrônicos (WEEE) pode ser fornecido gratuitamente no ponto de venda ou em qualquer distribuidor venda equipamentos elétricos e eletrônicos de mesma natureza e com função de EEE ou WEEE.

Antes de colocar equipamentos elétricos e eletrônicos (EEE) no fluxo de coleta de resíduos ou nas instalações de coleta de resíduos, o usuário final do equipamento que contém baterias e/ou acumuladores deve remover essas baterias e acumuladores para coleta separada.

Descarte baterias de lítio e baterias de produtos Lenovo:

Pode haver uma bateria de lítio de célula tipo moeda instalada em seu produto Lenovo. Você pode encontrar detalhes sobre a bateria na documentação do produto. Se for necessário substituir a bateria, entre em contato com o ponto de venda ou com a Lenovo. Se você precisar descartar uma bateria de lítio, isole-a com uma fita de vinil, entre em contato com o ponto de venda ou com um operador de descarte de resíduos e siga as instruções fornecidas.

Seu dispositivo Lenovo pode conter uma bateria de íons de lítio ou de hidreto de metal níquel. Você pode encontrar detalhes sobre a bateria na documentação do produto. Se você precisar descartar uma bateria, isole-a com fita de vinil, entre em contato com o departamento de vendas ou de atendimento da Lenovo, com o ponto de venda ou com um operador de descarte de resíduos e siga as instruções fornecidas. Você também pode consultar as instruções fornecidas no Guia do Usuário do seu produto.

Para coleta e tratamento adequados, acesse:

<https://www.lenovo.com/environment>

Para obter informações adicionais sobre WEEE, acesse:

<https://www.lenovo.com/recycling>

Informações sobre WEEE para a Hungria

A Lenovo, como produtora, é responsável pelo custo incorrido em relação ao cumprimento de suas obrigações nos termos da Lei nº 197/2014 (VIII.1.), subseções (1) a (5) da seção 12, da Hungria.

Declarações de reciclagem para o Japão

Collect and recycle a disused Lenovo computer or monitor

If you are a company employee and need to dispose of a Lenovo computer or monitor that is the property of the company, you must do so in accordance with the Law for Promotion of Effective Utilization of Resources. Computers and monitors are categorized as industrial waste and should be properly disposed of by an industrial waste disposal contractor certified by a local government. In accordance with the Law for Promotion of Effective Utilization of Resources, Lenovo Japan provides, through its PC Collecting and Recycling Services, for the collecting, reuse, and recycling of disused computers and monitors. For details, visit the Lenovo Web site at:

https://www.lenovo.com/us/en/social_responsibility/sustainability/ptb_japan

Pursuant to the Law for Promotion of Effective Utilization of Resources, the collecting and recycling of home-used computers and monitors by the manufacturer was begun on October 1, 2003. This service is provided free of charge for home-used computers sold after October 1, 2003. For details, go to:

https://www.lenovo.com/us/en/social_responsibility/sustainability/ptb_japan

Dispose of Lenovo computer components

Some Lenovo computer products sold in Japan may have components that contain heavy metals or other environmental sensitive substances. To properly dispose of disused components, such as a printed circuit board or drive, use the methods described above for collecting and recycling a disused computer or monitor.

Dispose of disused lithium batteries from Lenovo computers

A button-shaped lithium battery is installed inside your Lenovo computer to provide power to the computer clock while the computer is off or disconnected from the main power source. If you need to replace it with a new one, contact your place of purchase or contact Lenovo for service. If you need to dispose of a disused lithium battery, insulate it with vinyl tape, contact your place of purchase or an industrial-waste-disposal operator, and follow their instructions.

Disposal of a lithium battery must comply with local ordinances and regulations.

Informações sobre reciclagem para o Brasil

Declarações de Reciclagem no Brasil

Descarte de um Produto Lenovo Fora de Uso

Equipamentos elétricos e eletrônicos não devem ser descartados em lixo comum, mas enviados à pontos de coleta, autorizados pelo fabricante do produto para que sejam encaminhados e processados por empresas especializadas no manuseio de resíduos industriais, devidamente certificadas pelos órgãos ambientais, de acordo com a legislação local.

A Lenovo possui um canal específico para auxiliá-lo no descarte desses produtos. Caso você possua um produto Lenovo em situação de descarte, ligue para o nosso SAC ou encaminhe um e-mail para: reciclar@lenovo.com, informando o modelo, número de série e cidade, a fim de enviarmos as instruções para o correto descarte do seu produto Lenovo.

Informações sobre reciclagem para a China continental

《废弃电器电子产品回收处理管理条例》提示性说明

联想鼓励拥有联想品牌产品的用户当不再需要此类产品时，遵守国家废弃电器电子产品回收处理相关法律法规，将其交给当地具有国家认可的回收处理资质的厂商进行回收处理。更多回收服务信息，请点击进入<http://support.lenovo.com.cn/activity/551.htm>

Informações sobre reciclagem da bateria para Taiwan



廢電池請回收

Diretiva de restrição de substâncias perigosas (RoHS) de países e regiões

As informações ambientais mais recentes sobre produtos Lenovo estão disponíveis em:

<https://www.lenovo.com/us/en/compliance/eco-declaration>

RoHS da União Europeia (UE)/Reino Unido (UK)

Este produto da Lenovo, com as peças inclusas (cabos e outros), atende às exigências da Diretiva 2011/65/EU da UE (conforme corrigido pela Diretiva 2015/863/EU) e UK SI 2012 No. 3032 quanto à restrição do uso de certas substâncias perigosas em equipamentos elétricos e eletrônicos ("RoHS recast" ou "RoHS 2").

Para obter mais informações sobre a conformidade mundial da Lenovo quanto aos requisitos RoHS, acesse: <https://www.lenovo.com/rohs-communication>

WEEE/RoHS da Turquia

Turkish WEEE/RoHS

Türkiye AEEE yönetmeliğine Uygunluk Beyanı

Bu Lenovo ürünü, T.C. Çevre ve Şehircilik Bakanlığı'nın "Atık Elektrikli ve Elektronik Eşyaların Kontrolü Yönetmeliğine (AEEE)" uygundur.

AEEE yönetmeligne Uygundur.

RoHS da Ucrânia

Цим підтверджуємо, що продукція Леново відповідає вимогам нормативних актів України, які обмежують вміст небезпечних речовин

RoHS da Índia

RoHS compliant as per E-Waste (Management) Rules.

RoHS da China continental

产品中有害物质的名称及含量

部件名称	有害物质					
	铅(Pb)	汞(Hg)	镉(Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板组件*	X	O	O	O	O	O
硬盘	X	O	O	O	O	O
光驱	X	O	O	O	O	O
内存	X	O	O	O	O	O
电脑I/O 附件	X	O	O	O	O	O
电源	X	O	O	O	O	O
键盘	X	O	O	O	O	O
鼠标	X	O	O	O	O	O
机箱/附件	X	O	O	O	O	O
液晶面板	X	O	O	O	O	O
电池	X	O	O	O	O	O

本表格依据 SJ/T 11364 的规定编制。
O：表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。
X：表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。
注：表中标记“X”的部件，皆因全球技术发展水平限制而无法实现有害物质的替代。
印刷电路板组件*：包括印刷电路板及其零部件、电容和连接器。
根据型号的不同，可能不会含有以上的所有部件，请以实际购买机型为准。



在中华人民共和国境内销售的电子信息产品必须标识此标志，标志内的数字代表在正常使用状态下的产品的环保使用期限。

中国大陆 RoHS 合格评定制度标识

依照《电器电子产品有害物质限制使用合格评定制度实施安排》，《绿色产品标识使用管理办法》以及市场监管总局关于明确电器电子产品有害物质限制使用合格评定制度“供方符合性标志”的公告中对于合格评定标识的相关要求，联想公司针对纳入《电器电子产品有害物质限制使用达标管理目录》内的产品，使用自我声明的合格评定方式，并使用如下合格评定标识：



RoHS de Taiwan

臺灣 RoHS - 個人電腦

單元	限用物質及其化學符號					
	鉛 (Pb)	汞 (Hg)	鎘 (Cd)	六價鉻 (Cr ⁺⁶)	多溴聯苯 (PBB)	多溴二苯醚 (PBDE)
印刷電路板組件	—	○	○	○	○	○
硬碟	—	○	○	○	○	○
光碟機(選配件)	—	○	○	○	○	○
記憶體	—	○	○	○	○	○
電源供應器	—	○	○	○	○	○
鍵盤(選配件)	—	○	○	○	○	○
滑鼠(選配件)	—	○	○	○	○	○
機殼	—	○	○	○	○	○
配件(電源線)	—	○	○	○	○	○
散熱模組	—	○	○	○	○	○

備考1. “超出0.1 wt %”及“超出0.01 wt %”係指限用物質之百分比含量超出百分比含量基準值。

備考2. “○”係指該項限用物質之百分比含量未超出百分比含量基準值。

備考3. “—”係指該項限用物質為排除項目。

臺灣 RoHS - 一體機

單元	限用物質及其化學符號					
	鉛 (Pb)	汞 (Hg)	鎘 (Cd)	六價鉻 (Cr ⁺⁶)	多溴聯苯 (PBB)	多溴二苯醚 (PBDE)
印刷電路板組件	—	○	○	○	○	○
硬碟	—	○	○	○	○	○
光碟機(選配件)	—	○	○	○	○	○
記憶體	—	○	○	○	○	○
電腦I/O配件	—	○	○	○	○	○
電源供應器	—	○	○	○	○	○
鍵盤(選配件)	—	○	○	○	○	○
滑鼠(選配件)	—	○	○	○	○	○
機殼	—	○	○	○	○	○
螢幕	—	○	○	○	○	○
配件(電源線)	—	○	○	○	○	○
散熱模組	—	○	○	○	○	○

備考1. “超出0.1 wt %”及“超出0.01 wt %”係指限用物質之百分比含量超出百分比含量基準值。

備考2. “○”係指該項限用物質之百分比含量未超出百分比含量基準值。

備考3. “—”係指該項限用物質為排除項目。

Avisos sobre emissão eletromagnética

Declaração de conformidade do fornecedor da Federal Communications Commission (FCC)

Notas:

- The statements below regarding FCC are only valid for products that are shipping to the United States.
- Refer to the product label information to identify the specific model name and number of your product.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an authorized dealer or service representative for help.

Lenovo is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Responsible Party:
Lenovo (United States) Incorporated
7001 Development Drive
Morrisville, NC 27560
Email: FCC@lenovo.com



Declaração de conformidade da Industry Canada

CAN ICES-003(B) / NMB-003(B)

Conformidade com a União Europeia/Reino Unido (UK)

União Europeia (UE)/Reino Unido (UK) – Conformidade de Compatibilidade Eletromagnética

Este produto está em conformidade com os requisitos de proteção da Diretiva do Conselho da UE 2014/30/EU sobre a aproximação das leis dos Estados Membros, bem como o SI 2016 No. 1091 do Reino Unido com alterações, relativas aos limites de compatibilidade eletromagnética para equipamentos Classe B. Esses requisitos da Classe B têm a finalidade de oferecer proteção adequada aos serviços de transmissão em ambientes residenciais.

Diretiva EU ErP (EcoDesign) (2009/125/EC) – adaptadores de energia externos (Regulamentação (EU) 2019/1782), Ecodesign para Regulamentações de produtos com energia 2010 – UK SI 2010 No. 2617 (PSU de ext.), SI 2020 No. 485 (standby de rede), SI 2014 No. 1290, conforme correção

Os produtos Lenovo estão em conformidade com a Diretiva da EcoDesign (ErP) da UE e da EcoDesign do Reino Unido para Regulamentações de produtos com energia. Consulte o seguinte para obter detalhes. Para a UE, consulte a declaração do sistema <https://www.lenovo.com/us/en/compliance/eu-doc> e para o Reino Unido, consulte a declaração do sistema <https://www.lenovo.com/us/en/compliance/uk-doc>.

Declaração de conformidade Classe B da Alemanha

Hinweis zur Einhaltung der Klasse B zur elektromagnetischen Verträglichkeit

Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie zur elektromagnetischen Verträglichkeit Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der Klasse B der Norm gemäß Richtlinie.

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der Lenovo empfohlene Kabel angeschlossen werden. Lenovo übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der Lenovo verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der Lenovo gesteckt/eingebaut werden.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Betriebsmitteln, EMVG vom 20. Juli 2007 (früher Gesetz über die elektromagnetische Verträglichkeit von Geräten), bzw. der EU Richtlinie 2014/30/EU, der EU Richtlinie 2014/53/EU Artikel 3.1b), für Geräte der Klasse B.

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen. Verantwortlich für die Konformitätserklärung nach Paragraf 5 des EMVG ist die Lenovo (Deutschland) GmbH, Meitnerstr. 9, D-70563 Stuttgart.

Declaração de conformidade Classe B VCCI do Japão

この装置は、クラスB機器です。この装置は、住宅環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。

取扱説明書に従って正しい取り扱いをして下さい。

VCCI-B

Declaração de conformidade do Japão para produtos conectados à alimentação elétrica com corrente nominal igual ou inferior a 20 A por fase

日本の定格電流が 20A/相 以下の機器に対する高調波電流規制
高調波電流規格 JIS C 61000-3-2 適合品

Aviso para o Japão sobre o cabo de alimentação CA

The ac power cord shipped with your product can be used only for this specific product. Do not use the ac power cord for other devices.

本製品およびオプションに電源コード・セットが付属する場合は、それぞれ専用のもになっていますので他の電気機器には使用しないでください。

Outras informações sobre conformidade e certificação TCO de países e regiões

Esta seção fornece outras informações sobre conformidade de produtos Lenovo.

Informações relacionadas a certificação

Nome do produto: ThinkCentre M75s Gen 2

Tipos de máquina: 11JA, 11JB, 11JC, 11JD, 11R7, 11R8, 11R9, 11RA, 11W1, 11W2, 11W3 e 11W4

As informações sobre conformidade mais recentes estão disponíveis em:

<https://www.lenovo.com/us/en/compliance>

Certificação TCO

Os modelos selecionados são certificados pelo TCO e carregam o logotipo de certificação TCO.

Nota: A certificação TCO é uma certificação de sustentabilidade internacional de terceiros para produtos de TI. Para obter detalhes, acesse <https://www.lenovo.com/us/en/compliance/tco>.

Aviso de classificação de exportação

Este produto está sujeito às EARs (Export Administration Regulations) dos Estados Unidos e possui um ECCN (Export Classification Control Number) de 5A992.c. Ele pode ser reexportado, exceto para qualquer um dos países sob embargo na lista de países EAR E1.

Informações de serviço de produtos Lenovo para Taiwan

委製商/進口商名稱: 荷蘭商聯想股份有限公司台灣分公司

進口商地址: 台北市中山區樂群三路128號16樓

進口商電話: 0800-000-702 (代表號)

Declaração de precaução de visualização de Taiwan

警語: 使用過度恐傷害視力

注意事項:

- 使用30分鐘請休息10分鐘。
- 未滿2歲幼兒不看螢幕, 2歲以上每天看螢幕不要超過1小時。

Declaração de Conformidade do Teclado e do Mouse para Taiwan

本產品隨貨附已取得經濟部標準檢驗局認可之PS/2或USB的鍵盤與滑鼠一組

Marca de conformidade da Eurásia



Aviso de áudio para o Brasil

Ouvir sons com mais de 85 decibéis por longos períodos pode provocar danos ao sistema auditivo.

Informações sobre o modelo ENERGY STAR



ENERGY STAR é um programa conjunto da Agência de Proteção Ambiental dos Estados Unidos e do Departamento de Energia dos Estados Unidos cujo objetivo é economizar dinheiro e proteger o ambiente por meio de produtos e práticas de energia eficazes.

A Lenovo tem o orgulho de oferecer produtos com a designação de certificação ENERGY STAR. Os computadores Lenovo com a marca ENERGY STAR foram projetados e testados para atender aos requisitos do programa ENERGY STAR para computadores conforme determinado pela Agência de Proteção Ambiental dos Estados Unidos. No caso de um computador certificado, uma marca ENERGY STAR pode ser afixada ao produto ou à embalagem do produto ou exibido eletronicamente na tela E-Label ou na interface de configurações de energia.

Ao usar produtos em conformidade com ENERGY STAR e aproveitar os recursos de gerenciamento de energia de seu computador, você reduz o consumo de eletricidade. O consumo reduzido de energia elétrica contribui para uma possível economia financeira, um ambiente mais limpo e para a redução de emissão de gases de efeito estufa. Para obter mais informações sobre ENERGY STAR, acesse <https://www.energystar.gov>.

A Lenovo o incentiva a transformar o uso eficiente de energia em parte integrante de suas operações do dia a dia. Para ajudá-lo nessa tarefa, a Lenovo predefiniu um plano de energia padrão. Para alterar o plano de energia, consulte "Definir o plano de energia" na página 9.

Apêndice E. Avisos e marcas registradas

Avisos

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*Lenovo (United States), Inc.
8001 Development Drive
Morrisville, NC 27560
U.S.A.
Attention: Lenovo Director of Licensing*

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A interface e a função do software, bem como a configuração do hardware descritas nos manuais incluídos com seu computador podem não corresponder exatamente à configuração real do computador adquirido. Para saber a configuração do produto, consulte o contrato relacionado (se houver) ou a lista de remessa do produto ou consulte o distribuidor para a venda do produto. A Lenovo pode usar ou distribuir as informações fornecidas da forma que julgar apropriada sem incorrer em qualquer obrigação para com o Cliente.

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Para obter as informações mais recentes, esclarecer dúvidas ou fazer comentários, entre em contato ou visite o site da Lenovo:

<https://pcsupport.lenovo.com>

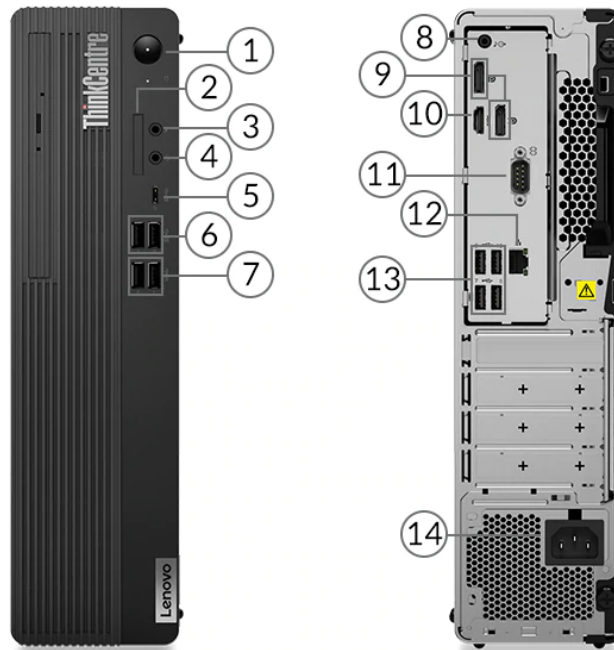
Marcas registradas

LENOVO, o logotipo da LENOVO, THINKCENTRE e o logotipo do THINKCENTRE são marcas registradas da Lenovo. Microsoft, Windows e Cortana são marcas registradas do grupo de empresas Microsoft.

DisplayPort é marca comercial da Video Electronics Standards Association. Os termos HDMI e HDMI High-Definition Multimedia Interface são marcas comerciais ou registradas da HDMI Licensing LLC nos Estados Unidos e em outros países. Wi-Fi e Miracast são marcas registradas da Wi-Fi Alliance. USB-C é uma marca registrada do USB Implementers Forum. Todas as outras marcas registradas são propriedades de seus respectivos proprietários.

Lenovo

OVERVIEW



1. Power button	8. Line-out (3.5mm)
2. Card reader	9. 2x DisplayPort
3. Microphone (3.5mm)	10. HDMI
4. Headphone / microphone combo jack (3.5mm)	11. Serial
5. USB-C 3.2 Gen 1	12. Ethernet (RJ-45)
6. 2x USB 3.2 Gen 1	13. 4x USB 2.0
7. 2x USB 3.2 Gen 2	14. Power connector

Notes:

- More ports are available through the optional expansion cards (not shown on the sample product above)

PERFORMANCE

Processor

Processor Family

AMD Athlon™ or **AMD Ryzen™ 3 / 5 / 7 / 9** Processor

Processor**

Processor Name	Cores	Threads	Base Frequency	Max Frequency	Cache	Memory Support	Processor Graphics
AMD Athlon Silver 3050GE	2	4	3.4GHz	3.4GHz	1MB L2 / 4MB L3	DDR4-2666	AMD Radeon™ Graphics
AMD Athlon Gold PRO 3150G	4	4	3.5GHz	3.9GHz	2MB L2 / 4MB L3	DDR4-2933	AMD Radeon Graphics
AMD Ryzen 3 3200G	4	4	3.6GHz	4.0GHz	2MB L2 / 4MB L3	DDR4-2933	AMD Radeon Vega 8 Graphics
AMD Ryzen 3 4300G	4	8	3.8GHz	4.0GHz	2MB L2 / 4MB L3	DDR4-3200	AMD Radeon Graphics
AMD Ryzen 3 5300G	4	8	4.0GHz	4.2GHz	2MB L2 / 8MB L3	DDR4-3200	AMD Radeon Graphics
AMD Ryzen 3 PRO 4350G	4	8	3.8GHz	4.0GHz	2MB L2 / 4MB L3	DDR4-3200	AMD Radeon Graphics
AMD Ryzen 3 PRO 5350G	4	8	4.0GHz	4.2GHz	2MB L2 / 8MB L3	DDR4-3200	AMD Radeon Graphics
AMD Ryzen 5 4600G	6	12	3.7GHz	4.2GHz	3MB L2 / 8MB L3	DDR4-3200	AMD Radeon Graphics
AMD Ryzen 5 5600G	6	12	3.9GHz	4.4GHz	3MB L2 / 16MB L3	DDR4-3200	AMD Radeon Graphics
AMD Ryzen 5 PRO 3350G	4	8	3.6GHz	4.0GHz	2MB L2 / 4MB L3	DDR4-2933	AMD Radeon Vega 11 Graphics
AMD Ryzen 5 PRO 3400G	4	8	3.7GHz	4.2GHz	2MB L2 / 4MB L3	DDR4-2933	AMD Radeon Vega 11 Graphics
AMD Ryzen 5 PRO 3600	6	12	3.6GHz	4.2GHz	3MB L2 / 32MB L3	DDR4-3200	-
AMD Ryzen 5 PRO 4650G	6	12	3.7GHz	4.2GHz	3MB L2 / 8MB L3	DDR4-3200	AMD Radeon Graphics
AMD Ryzen 5 PRO 5650G	6	12	3.9GHz	4.4GHz	3MB L2 / 16MB L3	DDR4-3200	AMD Radeon Graphics
AMD Ryzen 7 4700G	8	16	3.6GHz	4.4GHz	4MB L2 / 8MB L3	DDR4-3200	AMD Radeon Graphics
AMD Ryzen 7 5700G	8	16	3.8GHz	4.6GHz	4MB L2 / 16MB L3	DDR4-3200	AMD Radeon Graphics
AMD Ryzen 7 PRO 3700	8	16	3.6GHz	4.4GHz	4MB L2 / 32MB L3	DDR4-3200	-
AMD Ryzen 7 PRO 4750G	8	16	3.6GHz	4.4GHz	4MB L2 / 8MB L3	DDR4-3200	AMD Radeon Graphics
AMD Ryzen 7 PRO 5750G	8	16	3.8GHz	4.6GHz	4MB L2 / 16MB L3	DDR4 3200	AMD Radeon Graphics
AMD Ryzen 9 PRO 3900	12	24	3.1GHz	4.3GHz	6MB L2 / 64MB L3	DDR4-3200	-

Operating System

Operating System**

- Windows® 11 Pro 64

ThinkCentre M75s Gen 2

- Windows 11 Home 64
- Windows 11 DG Windows 10 Pro 64
- **Windows 10 Pro 64**
- Windows 10 Home 64
- Windows 10 IoT Enterprise
- Ubuntu Linux
- No operating system

Graphics

Graphics**^{[1][2]}

Graphics	Type	Memory	Connector	Max Resolution	Key Features
AMD Radeon Graphics	Integrated	Shared	2x DisplayPort™ 1.4, 1x HDMI® 1.4	4096x2160@60Hz(DP), 4096x2160@24Hz(HDMI)	DirectX® 12
AMD Radeon Vega 8 Graphics	Integrated	Shared	2x DisplayPort 1.4, 1x HDMI 1.4	4096x2160@60Hz(DP), 4096x2160@24Hz(HDMI)	DirectX 12
AMD Radeon Vega 11 Graphics	Integrated	Shared	2x DisplayPort 1.4, 1x HDMI 1.4	4096x2160@60Hz(DP), 4096x2160@24Hz(HDMI)	DirectX 12
AMD Radeon 520	Discrete	2GB GDDR5	2x DP 1.2	4096x2160@60Hz(DP)	DirectX 12
AMD Radeon RX 550X	Discrete	4GB GDDR5	1x HDMI 2.0, 1x DP 1.4	4096x2160@60Hz(HDMI), 3840x2160@60Hz(DP)	DirectX 12

Notes:

1. The information of integrated graphics are not applicable for the models without integrated graphics (for the details, please refer to processor section)
2. AMD Radeon 520 is not available for MT 11R7 / 11R8 / 11R9 / 11RA

Monitor Support

Monitor Support

Supports up to 3 independent displays via onboard ports (HDMI and 2x DisplayPort), more displays support via discrete graphics

Chipset

Chipset

AMD PRO 565 chipset

Memory^[1]

Max Memory^{[1][2]}

Up to 128GB DDR4-3200

Memory Slots

Four DDR4 DIMM slots, dual-channel capable

Memory Type**^[3]

- DDR4-1866
- DDR4-2133
- DDR4-2400
- DDR4-2666
- **DDR4-3200**

Notes:

1. Recommend to choose the models with more than 4GB for better performance and experience
2. The max memory is based on the test results with current Lenovo® memory offerings. The system may support more memory as the technology develops.
3. Installed memory is actually 3200MHz, but may run at 1866MHz, 2133MHz, 2400MHz or 2666MHz depending on the memory support capability of processor

Storage

Storage Support^[1]

ThinkCentre M75s Gen 2

Up to three drives, 1x 2.5"/3.5" HDD + 1x 2.5" HDD + 1x M.2 SSD

- 2.5" HDD up to 1TB each
- 3.5" HDD up to 2TB
- M.2 SSD up to 2TB

Storage Type**

Disk Type	Interface	RPM	Security
2.5" SATA HDD	SATA 6Gb/s	7.2K	-
3.5" SATA HDD	SATA 6Gb/s	7.2K	-
M.2 2242 SSD	PCIe® NVMe®, PCIe 3.0 x2	-	-
M.2 2242 SSD	PCIe NVMe, PCIe 3.0 x4	-	-
M.2 2280 SSD	PCIe NVMe, PCIe 3.0 x4	-	Opal

RAID

RAID 0/1 support for HDDs (RAID preset only available via special bid model)

Notes:

1. The storage capacity supported is based on the test results with current Lenovo storage offerings. The system may support larger storage as the technology develops.

Removable Storage

Optical**

- DVD-ROM, SATA 1.5Gb/s, slim (9.0mm)
- DVD burner (DVD±RW), SATA 1.5Gb/s, slim (9.0mm)
- None

Card Reader

- 3-in-1 card reader (SD, SDHC, SDXC)
- No card reader

Multi-Media

Audio Chip

High Definition (HD) Audio, Realtek® ALC623-CG codec

Speakers

- Single speaker, 1W x1
- No speakers

Power Supply

Power Supply**

Power	Type	Efficiency	Key Features
180W	Fixed	85%	-
260W	Fixed	85%	100-240V, 50-60Hz
310W	Fixed	92%	100-240V, 50-60Hz

DESIGN

Input Device

Keyboard**

- Lenovo Calliope Keyboard (USB connector), black
- Lenovo Calliope Wireless Keyboard (2.4GHz via USB receiver), black
- Lenovo Traditional Keyboard (USB connector), black
- No keyboard

Mouse**

- Lenovo Calliope Mouse (USB connector), black
- Lenovo Calliope Wireless Mouse (2.4GHz via USB receiver), black

- Lenovo Fingerprint Mouse (USB connector), Windows Hello support, black
- No mouse

Mechanical

Form Factor

SFF (8.2L)

Dimensions (WxDxH)

93 x 298 x 340 mm (3.6 x 11.7 x 13.4 inches)

Weight

Around 5.3 kg (11.7 lbs)

Case Color

Black

Bays

- 1x 2.5" disk bay (bay comes with disk)
- 1x 3.5" disk bay
- 1x slim ODD bay

Expansion Slots

- One PCIe 3.0 x1, low-profile (length < 155mm, height < 68mm)
- One PCIe 3.0 x16, low-profile (length < 155mm, height < 68mm)
- Two dummy slots, only brackets for optional port extension
- Two M.2 slots (one for WLAN, one for SSD)

EOU

EOU design for chassis open, M.2 SSD, HDD, ODD, memory, and PCIe extension card

Stand

- Vertical stand
- No stand

Others

- (Optional) Dust filter
- Supports Smart Power On

CONNECTIVITY

Network^[1]

Onboard Ethernet**

- Gigabit Ethernet, Realtek RTL8111EPV, 1x RJ-45, supports Wake-on-LAN
- Gigabit Ethernet, Realtek RTL8111HN, 1x RJ-45, supports Wake-on-LAN

Optional Ethernet**^[2]

- Gigabit Ethernet, Bitland BN8E88, 1x RJ-45, PCIe x1
- Gigabit Ethernet, Bitland RTL8111FP, 1x RJ-45, PCIe x1
- No optional Ethernet

WLAN + Bluetooth®**^[3]

- Mediatek Wi-Fi® 6 MT7921, 802.11ax 2x2 Wi-Fi + Bluetooth 5.2, M.2 Card
- Realtek RTL8822CE, 802.11ac Dual Band 2x2 Wi-Fi + Bluetooth 5.0, M.2 card
- Realtek Wi-Fi 6 RTL8852AE, 802.11ax Dual Band 2x2 Wi-Fi + Bluetooth 5.2, M.2 card
- Intel® Wireless-AC 9260, 802.11ac Dual Band 2x2 Wi-Fi + Bluetooth 5.0, M.2 card
- Intel Wi-Fi 6 AX200, 802.11ax 2x2 Wi-Fi + Bluetooth 5.1, M.2 card
- No WLAN and Bluetooth

Notes:

1. This system does not support Power Over Ethernet (PoE). If the system is used in a PoE environment, then a Network Isolator is required to prevent possible damage to the system, PoE equipment, or both.
2. RTL8111FP is not available for AP countries
3. Bluetooth 5.2 is hardware ready but may run at a lower version due to OS limitation

Ports^[1]

Front Ports

ThinkCentre M75s Gen 2

- 2x USB 3.2 Gen 1
- 2x USB 3.2 Gen 2
- 1x USB-C® 3.2 Gen 1
- 1x headphone / microphone combo jack (3.5mm)
- 1x microphone (3.5mm)

Optional Front Ports

- 1x card reader
- None

Rear Ports^[2]

- 4x USB 2.0
- 1x HDMI
- 2x DisplayPort
- 1x serial (9-pin)
- 1x Ethernet (RJ-45)
- 1x line-out (3.5mm)

Optional Rear Ports^{***}

- 2x USB 3.2 Gen 1 (via 2-port USB expansion card, PCIe x1)
- 2x USB-C 3.2 Gen 2 (via 2-port USB-C expansion card, PCIe x4)
- 1x serial
- 1x parallel
- None

Notes:

1. The transfer speed of following ports will vary and, depending on many factors, such as the processing speed of the host device, file attributes and other factors related to system configuration and your operating environment, will be slower than theoretical speed.
USB 2.0: 480 Mbit/s;
USB 3.2 Gen 1 (SuperSpeed USB 5Gbps, formerly USB 3.0 / USB 3.1 Gen 1): 5 Gbit/s;
USB 3.2 Gen 2 (SuperSpeed USB 10Gbps, formerly USB 3.1 Gen 2): 10 Gbit/s;
USB 3.2 Gen 2x2 (SuperSpeed USB 20Gbps): 20 Gbit/s;
Thunderbolt™ 3/4: 40 Gbit/s
2. For video ports on discrete graphics, please see graphics section

Monitor Cable

Monitor Cable^{***}

- DP to dual DP dongle
- DP to DVI-D dongle
- DP to HDMI 1.4 dongle
- DP to VGA cable (1.5M)
- DP to VGA dongle
- HDMI to HDMI cable (1.5m)
- HDMI to VGA dongle
- No monitor cable

SECURITY & PRIVACY

Security

Security Chip

Discrete TPM 2.0, TCG certified

Physical Locks

- (Optional) E-lock
- (Optional) Smart Cable Clip
- Kensington® Security Slot, 3 x 7 mm
- Padlock Loop

Chassis Intrusion Switch

- Chassis intrusion switch
- No chassis intrusion switch

Fingerprint Reader

- Touch style fingerprint reader on mouse
- No fingerprint reader

BIOS Security

- Administrator password
- Power-on password
- Hard disk password
- Boot sequence control
- Boot without keyboard and mouse
- Smart USB protection (allows keyboard / mouse only, blocks all storage devices)
- Individual USB port disablement

MANAGEABILITY

System Management

System Management^[1]

- DASH 1.2
- Non-DASH

Notes:

1. DASH 1.2 is an optional feature for the selected MTs, MT 11W1 / 11W2 / 11W3 / 11W4 do not support DASH.

SERVICE

Warranty

Base Warranty^{**[1]}

- 1-year depot service
- 1-year limited onsite service
- 3-year limited onsite service
- No base warranty

Notes:

1. More information of warranty policy, please access <https://pcsupport.lenovo.com/warranty>

ENVIRONMENTAL

Operating Environment

Temperature

- Operating: 5°C (41°F) to 35°C (95°F)
- Storage: -40°C (-40°F) to 60°C (140°F)

Humidity

- Operating: 20% to 80%
- Storage: 10% to 90%

Altitude

- Operating: 0 m (0 ft) to 3048 m (10,000 ft)
- Storage: 0 m (0 ft) to 12192 m (40,000 ft)

CERTIFICATIONS

Green Certifications

Green Certifications^[1]

- (Optional) EPEAT™ Gold
- (Optional) EPEAT Silver
- (Optional) ENERGY STAR® 8.0
- ErP Lot 3
- TCO Certified 8.0
- RoHS compliant

Notes:

1. ENERGY STAR 8.0 and EPEAT are only available for selected MTs

Other Certifications

Other Certifications

- (Optional) TÜV Rheinland® Low Noise
- (Optional) TÜV Rheinland Ultra Low Noise

Mil-Spec Test

MIL-STD-810H military test passed (Low Pressure [Altitude], High Temperature, Low Temperature, Temperature Shock, Humidity, Sand and Dust, Vibration, Shock, Fungus, Solar Radiation)

- Feature with ** means that only one offering listed under the feature is configured on selected models.
- Feature with *** means that one or more offerings listed under the feature could be configured on selected models.
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- The specifications on this page may not be available in all regions, and may be changed or updated without notice.



AMD



AMD



AMD



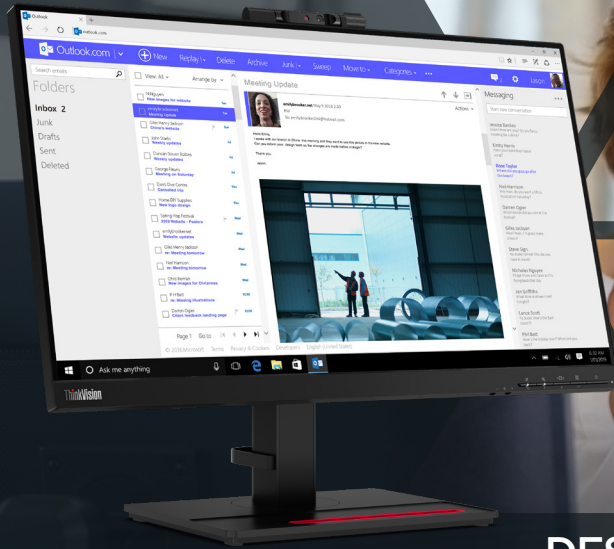
AMD



AMD



AMD



THINKVISION T24v

SMART PERFORMANCE.
EFFECTIVE COLLABORATION.

Lenovo

DESIGNED FOR MODERN WORKSPACES

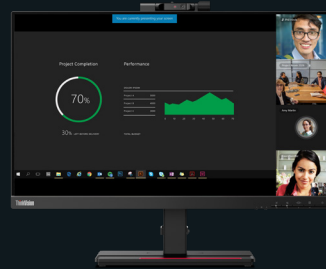
Built to empower the next-generation workforce, the ThinkVision T24v-20 redefines workplace collaboration with its smart, innovative features. This 23.8-inch monitor has an IR camera, which along with Windows Hello and enterprise-grade security, ensures instant and secure login. The camera is equipped with a physical shutter that works as added protection to user privacy. Dual microphones with noise cancellation function and speakers offer an enhanced VoIP meeting experience. Create a strong first impression with every presentation on its Full-HD, 3-sided NearEdgeless display that delivers brilliant clarity and outstanding visuals. Its ergonomic features offer comfort and convenience for you to work efficiently. Designated as one of the Most Efficient ENERGY STAR certified products in 2020, it reduces your carbon footprint while lowering power consumption. Lenovo exclusive ThinkColour software¹ lets you effortlessly adjust advanced display settings using the mouse, enhancing efficiency and user experience.

FEATURES OF THINKVISION T24v-20



Smarter and Personalized Security

Safety, security, and speed are the need of the hour and the IR camera, in conjunction with Windows Hello facial recognition, gives you exactly that. No need to remember passwords, or save credentials—just log in using your face. Additionally, the ThinkShutter allows you to cover your camera and the auto-alarm feature notifies you if the camera or microphone is in use, offering uncompromised privacy.



Effective Collaboration

Virtual meetings will now be a breeze. The T24v's superior screen format, picture quality, and user functionality ensure that your video calls have top-notch clarity, crystal clear sound, and uninterrupted connectivity—thanks to the 2MP Full-HD camera, dual array microphones, and stereo speakers. A viewing angle of 178° makes it easy to collaborate as multiple users can view on-screen content from anywhere in the room.



Intuitive User Experience

Make your meetings more comfortable and productive. An angle-adjustable camera and an ergonomic stand allow you to adjust the monitor to match your working style. Smart face-tracking technology automatically adjusts your face in the center of the screen, optimizing the display for a perfect VoIP meeting. With an ergonomic design and dedicated control keys, the T24v makes for a smart choice for any business.

ThinkVision T24v-20

DISPLAY

Panel Size
23.8-inch

Screen Dimensions
527.04 mm x 296.46 mm

Panel Type
3-side NearEdgeless
In-Plane Switching

Backlight
WLED

Aspect Ratio
16:9

Resolution
1920 x 1080

Pixel Pitch
0.2745 x 0.2745 mm

Dot/Pixel Per Inch (DPI/PPI)
93

Viewing Angle (H x V @ CR 10:1)
178° / 178°

Response Time
4ms (Extreme Mode)
6ms (Normal Mode)

Refresh Rate
60 Hz

Brightness (typical)
250 cd/m²

Brightness (peak)
250 cd/m²

Contrast Ratio (typical)
1000:1

Dynamic Contrast Ratio (typical)
3M:1

Color Gamut
72% NTSC (CIE 1931)

Color Support (typical)
16.7 Million

Anti-glare
Yes

CONNECTIVITY

Video Signal
1 x HDMI 1.4
1 x DP 1.2
1 x VGA

Audio Signal
1 x Audio Combo (3.5 mm; in/out)

USB Hub
Yes

USB Upstream
1 X USB 3.2 Gen1

USB Downstream
2 x USB 3.2 Gen1 (1 x BC1.2)

MULTI-MEDIA

Integrated Webcam
Yes (1080p, IRRGB camera)

Integrated Microphone
Yes

Integrated Speakers
Yes (2 x 3W)

SPECIAL FEATURES

Software
Lenovo ThinkColour (Lenovo Display Control Center)¹

POWER

Power Consumption (Typ./Max)
13W / 44W

Power Consumption Sleep/Off Mode
< 0.5W

Power Consumption Switch-off Mode
< 0.3W

ENERGY STAR Power Consumption (P_{on}/E_{TEC})
11.36W / 35.68kWh

Power Supply
Internal

Voltage Required
AC 100 to 240 V (50-60 Hz)

MECHANICAL

Tilt Angle (front/back)
-5° / 35°

Swivel Angle (left/right)
+45° / -45°

Lift (max range)
150 mm

Pivot
-90° / 90°

VESA Mount Capability
Yes (100 x 100 mm)

ThinkCentre M Series Tiny support
Yes (sold separately)

Kensington Lock Slot
Yes

Cable Management
Yes

Bezel Color
Raven Black

Bezel Width (side)
1.8 mm

Bezel Width (top/bottom)
1.8 / 22.0 mm

DIMENSION

Size Packed (D x H x W, mm/inch)
418.0 x 187.0 x 644.0 mm
16.46 x 7.36 x 25.35 inches

Size Unpacked w/ Stand (D x H x W, mm/inch) (lowest position)
205.0 x 434.0 x 539.8 mm
8.07 x 17.0 x 21.2 inches

Size Unpacked w/ Stand (D x H x W, mm/inch) (highest position)
205.0 x 584.0 x 539.8 mm
8.07 x 23.0 x 21.2 inches

Size Unpacked w/o Stand (head only) (D x H x W, mm/inch)
48.35 x 344.3 x 539.8 mm
1.9 x 13.55 x 21.25 inches

Min. Distance from Table to Panel (lowest pixel at bottom of screen, mm)
114.1 mm

Max. Distance from Table to Panel (highest pixel at top of screen, mm)
560.56 mm

Weight Packed (kg/lbs.)
7.86kg / 17.33 lbs.

Weight Unpacked (kg/lbs.)
7.86kg / 17.33 lbs.

Weight (monitor head only) (kg/lbs.)
3.48kg / 7.67 lbs.

Full Container Load (40' STD / 20' STD)
1012/440 units

WHAT'S IN THE BOX

Monitor with stand
1 x Power cable (1.8 m)
1 x DP cable (1.8 m)
1 x USB Type-A to Type-B cable (1.8 m)
Quick setup guide

CERTIFICATION

ENERGY STAR Rating
8.0

CCC
Yes

TCO
8.0

TCO Edge
2.0

EPEAT
Gold

RoHS (EU 2002/95/EC)
Yes

Windows Certification
Windows 7, Windows 10

China Energy Efficiency Standard
Tier 1

TÜV Rheinland Eye Comfort
Yes



¹This software can only be used with Windows 10

Depending on many factors such as the processing capability of peripheral devices, file attributes, and other factors related to system configuration and operating environments, the actual transfer rate using the various USB connectors on this device will vary and is typically slower than the data rates as defined by the respective USB specifications: - 5 Gbit/s for USB 3.1 Gen1; 10 Gbit/s for USB 3.1 Gen2 & 20 Gbit/s for USB 3.2. Enhanced Sign-in Security is not supported.

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Specifications may vary depending upon region.

Visão geral da tecnologia Trusted Platform Module

28/11/2018 • 5 minutos para ler •  

Neste artigo

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[Aplicações práticas](#)

[Funcionalidade nova e alterada](#)

[Atestado de integridade de dispositivo](#)

[Versões com suporte para atestado de integridade do dispositivo](#)

[Tópicos relacionados](#)

Aplica-se a

- Windows 10
- Windows Server 2016
- Windows Server 2019

Este tópico para o profissional de TI descreve o TPM (Trusted Platform Module) e como o Windows o usa para controle de acesso e autenticação.

Descrição do recurso

A tecnologia TPM foi desenvolvida para fornecer funções relacionadas à segurança com base em hardware. Um chip TPM é um processador de criptografia seguro projetado para desempenhar as operações de criptografia. O chip inclui vários mecanismos de segurança física para torná-lo resistente a adulterações nas funções de segurança do TPM por software mal-intencionado. Algumas das principais vantagens do uso da tecnologia TPM são a possibilidade de:

- Gerar, armazenar e limitar o uso de chaves de criptografia.
- Usar a tecnologia TPM para autenticação de dispositivo de plataforma com a chave RSA de autogravação exclusiva do TPM.

- Ajudar a garantir a integridade da plataforma, executando e armazenando medidas de segurança.

As funções mais comuns do TPM são para medições de integridade do sistema e uso e criação de chaves. Durante o processo de inicialização de um sistema, o código de inicialização que é carregado (incluindo firmware e componentes do sistema operacional) pode ser medido e gravado no TPM. As medidas de integridade podem ser usadas como prova de como um sistema foi iniciado e como garantia de que uma chave baseada no TPM só foi usada com o software correto para inicializar o sistema.

As chaves baseadas no TPM podem ser configuradas de várias maneiras. Uma opção é tornar uma chave baseada no TPM indisponível fora do TPM. Isso é bom para reduzir ataques de phishing porque impede que a chave seja copiada e usada sem o TPM. As chaves baseadas no TPM também podem ser configuradas para exigir um valor de autorização de uso. Se ocorrerem muitas tentativas de autorização incorretas, o TPM ativará sua lógica de ataque de dicionário e evitará novas tentativas de valor de autorização.

Versões diferentes do TPM estão definidas nas especificações pelo TCG (Trusted Computing Group). Para obter mais informações, consulte o [site do TCG](#).

Inicialização automática do TPM com o Windows 10

Desde o Windows 10, o sistema operacional é inicializado automaticamente e assume propriedade do TPM. Isso significa que, na maioria dos casos, recomendamos que você evite configurar o TPM por meio do console de gerenciamento do TPM, **TPM.msc**. Há algumas exceções, principalmente relacionadas à redefinição ou à realização de uma instalação limpa em um computador. Para obter mais informações, consulte [Limpar todas as chaves do TPM](#). Não estamos [mais desenvolvendo ativamente o console de gerenciamento do TPM a partir do](#) windows Server 2019 e do Windows 10, versão 1809.

Em determinados cenários corporativos específicos limitados ao Windows 10, versões 1507 e 1511, a Política de Grupo pode ser usada para fazer backup do valor de autorização do proprietário do TPM no Active Directory. Como o estado do TPM é preservado em todas as instalações de sistema operacional, essas informações do TPM são armazenadas em um local separado dos objetos do computador no Active Directory.

Aplicações práticas

É possível instalar ou criar certificados em computadores usando o TPM. Depois que um computador é configurado, a chave privada RSA para obter um certificado é vinculada ao

TPM e não pode ser exportada. O TPM também pode ser usado como um substituto para cartões inteligentes, o que reduz os custos associados à criação e distribuição de cartões inteligentes.

O provisionamento automatizado no TPM reduz o custo de implantação do TPM em uma empresa. As novas APIs para gerenciamento do TPM podem determinar se as ações de provisionamento do TPM exigem a presença física de um técnico de serviço para aprovar solicitações de alteração de estado do TPM durante o processo de inicialização.

O software antimalware pode usar as medições de inicialização do estado inicial do sistema operacional para comprovar a integridade de um computador no qual o Windows 10 ou o Windows Server 2016 esteja em execução. Essas medições incluem a inicialização do Hyper-V para testar se os datacenters usando a virtualização não estão executando hipervisores não confiáveis. Com o Desbloqueio pela rede do BitLocker, os administradores de TI podem enviar por push uma atualização sem a preocupação de que um computador está esperando a entrada do PIN.

O TPM tem diversas configurações de Política de Grupo que podem ser úteis em determinados cenários corporativos. Para obter mais informações, consulte [Configurações da Política de Grupo do TPM](#).

Funcionalidade nova e alterada

Para obter mais sobre as funcionalidades nova e alterada para Trusted Platform Module no Windows 10, consulte [Novidades no Trusted Platform Module?](#).

Atestado de integridade de dispositivo

O atestado de integridade de dispositivo permite que as empresas tenham confiança nos componentes de hardware e software de um dispositivo gerenciado. Com o atestado de integridade de dispositivo, você pode configurar um servidor MDM para consultar um serviço de atestado de integridade que permitirá ou negará o acesso de um dispositivo gerenciado a um recurso seguro.

Algumas coisas que você pode verificar no dispositivo são:

- A Prevenção de Execução de Dados é compatível e está habilitada?
- A Criptografia de Unidade de Disco BitLocker é compatível e está habilitada?
- A Inicialização Segura é compatível e está habilitada?

ⓘ Observação

O Windows 10, o Windows Server 2016 e o Windows Server 2019 dão suporte ao atestado de integridade do dispositivo com TPM 2,0. O suporte para o TPM 1,2 foi adicionado a partir da versão 1607 do Windows (RS1). TPM 2,0 requer firmware UEFI. Um computador com BIOS herdado e TPM 2,0 não funcionará conforme o esperado.

Versões com suporte para atestado de integridade do dispositivo

Versão do TPM	Windows 10	Windows Server 2016	Windows Server 2019
TPM 1.2	> = ver 1607	> = ver 1607	Sim
TPM 2.0	Sim	Sim	Sim

Tópicos relacionados

- [Trusted Platform Module](#) (lista de tópicos)
- [Detalhes sobre o padrão TPM](#) (tem links para recursos usando TPM)
- [Portal de serviços base do TPM](#)
- [API de serviços base TPM](#)
- [Cmdlets do TPM no Windows PowerShell](#)
- [Preparar sua organização para o BitLocker: planejamento e políticas - configurações do TPM](#)
- [Provisionamento de dispositivo do Azure: atestado de identidade com TPM](#)
- [Provisionamento de dispositivo do Azure: uma linha do tempo de fabricação para dispositivos TPM](#)
- [Windows 10: Habilitando o vTPM \(TPM virtual\)](#)
- [Como fazer multi-inicialização com o BitLocker, TPM e um sistema operacional que não seja Windows](#)

Esta página é útil?

Sim Não

