Lenovo Diagnostics UEFI Embedded/Bootable v04.20.000

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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.

Bootable - Home

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 NVMes , 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.

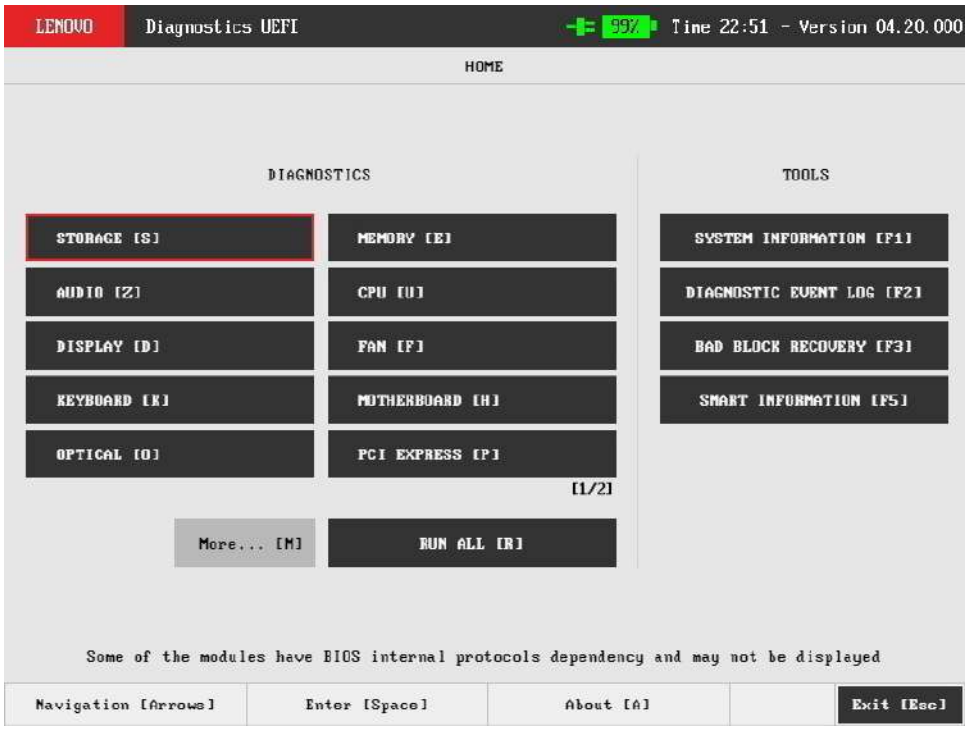
Run the Lenovo Diagnostics UEFI Embedded

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.



Embedded - Home

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 NVMes , in order to prevent imminent hardware failures.

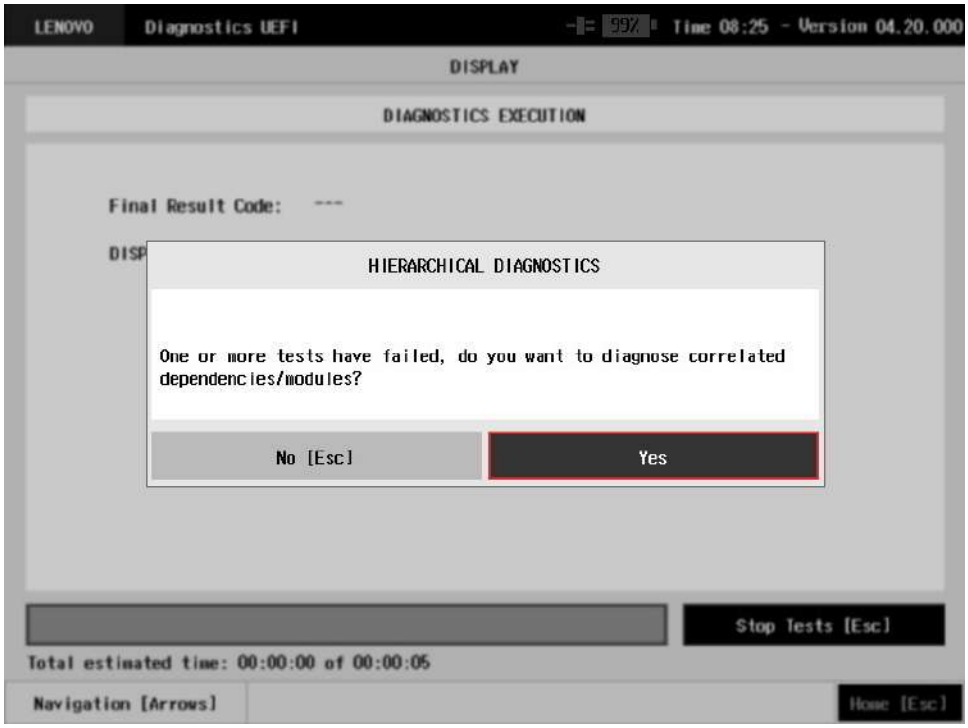
> ⚠ Tests and tools rely on UEFI protocols availability, therefore some features might not be available on some systems.

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.

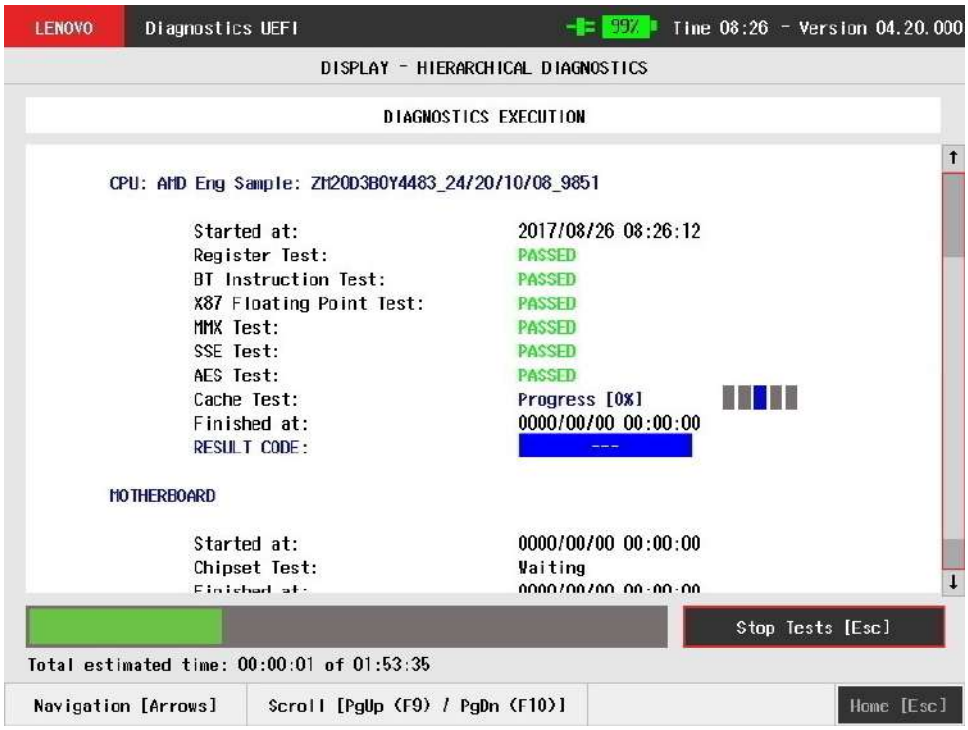
That allows the identification of modules' failures that precede a specific module being diagnosed, where its corresponding tests have firstly failed.

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

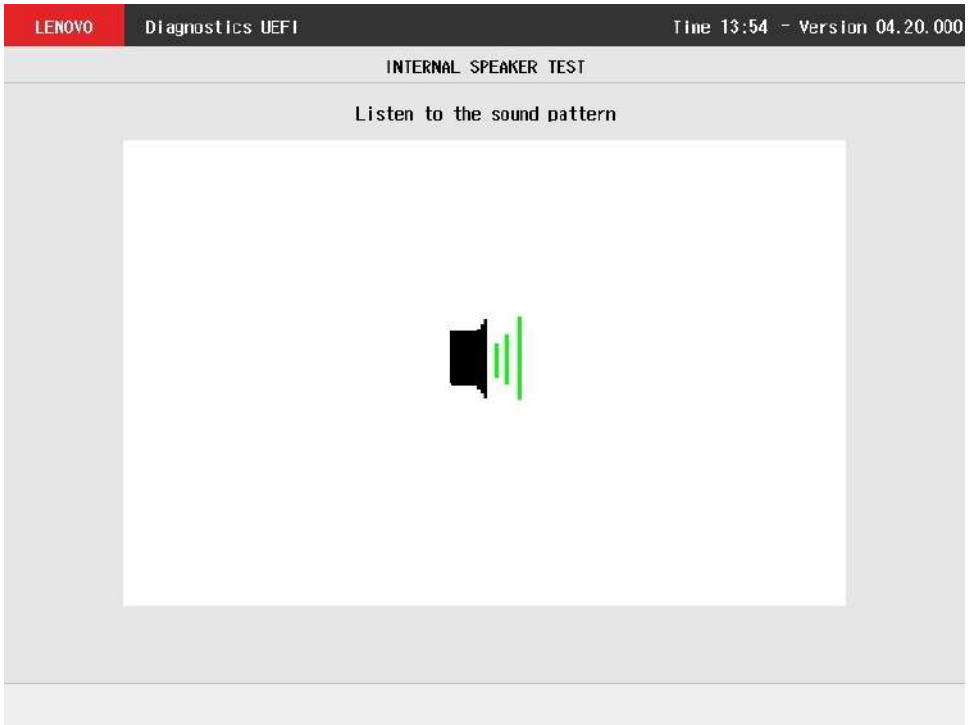
When choosing Yes, the application will test the correlated modules, as the following figure demonstrates it by using a Display test failure example.



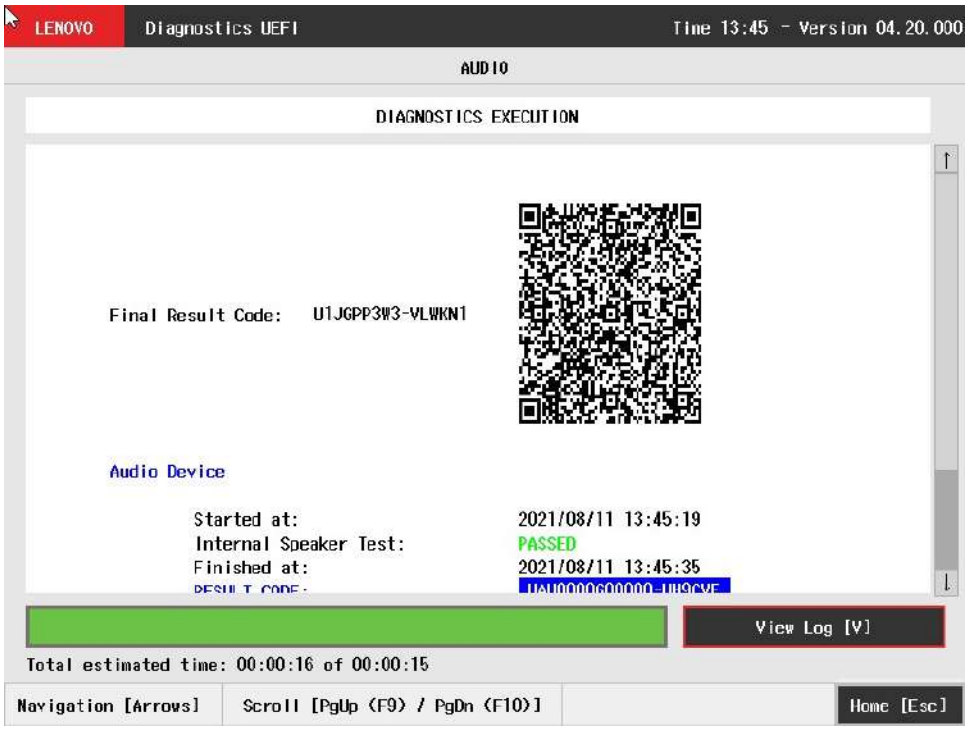
Hierarchical Diagnostics Execution

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:

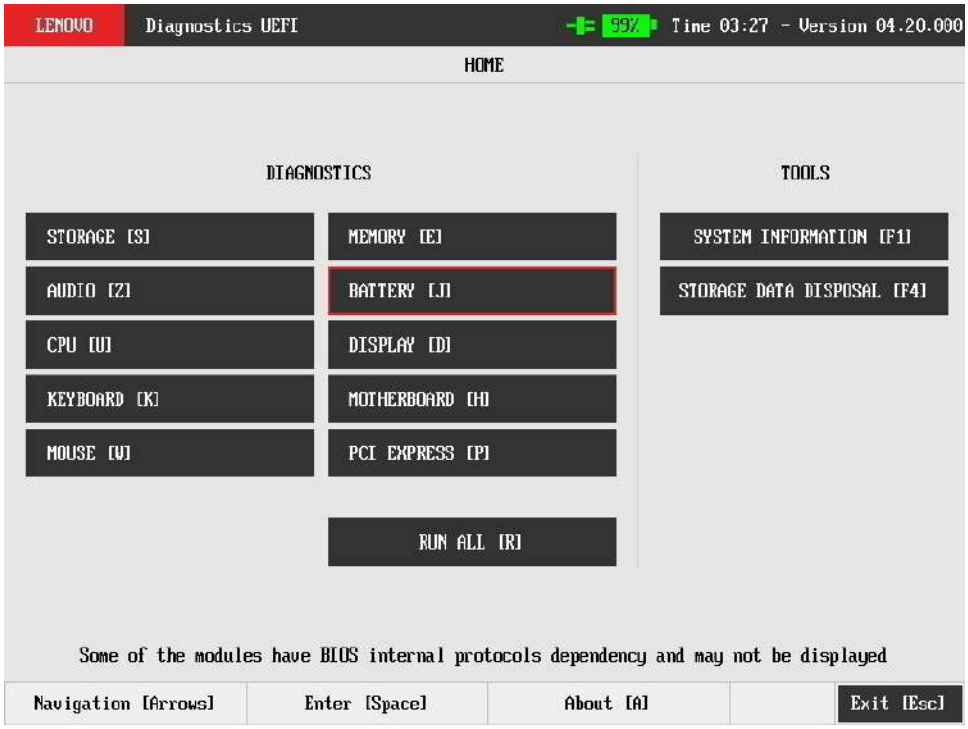
- Final Result Code (an encrypted code that informs which modules were tested).
- Date and time that diagnostic has started.
- Test (name of the test being currently run).
- Progress of the current test (current test's progress in percentage).
- Total estimated time of the current suite of diagnostic 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

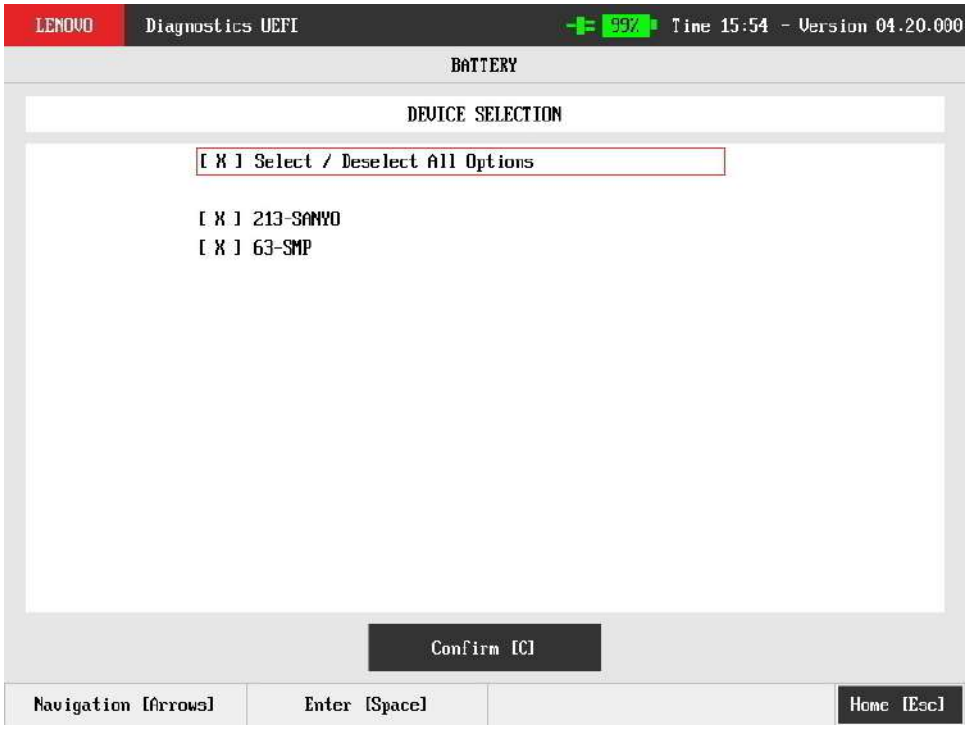
The battery module is available in only few models due to UEFI protocols availability.

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



Home

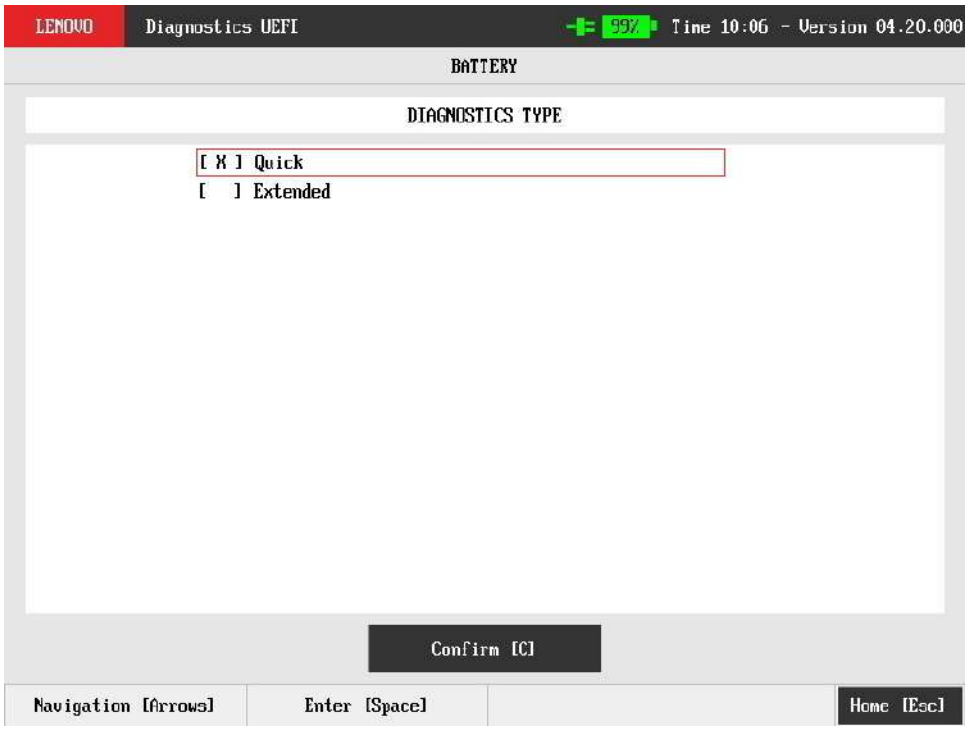
After the user enters the Battery option, the application will display the battery devices available in the system. If there is more than one battery device installed, the menu Device Selection is displayed, as shown in the next figure.



Battery Device Selection

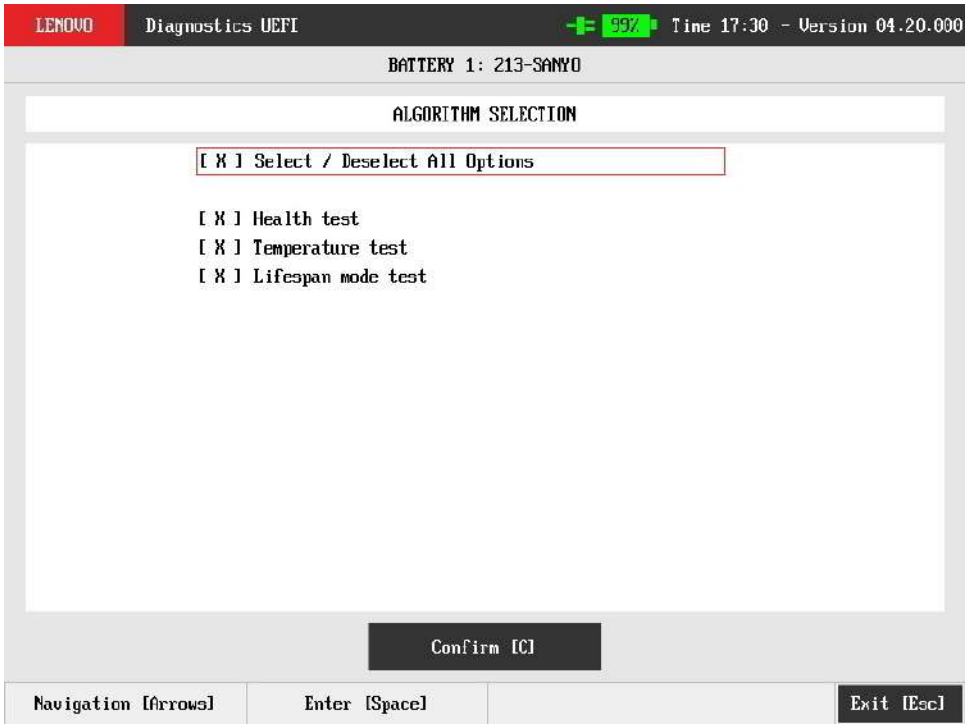
An item can be selected/deselected by pressing SPACE when it is highlighted. A desired item is selected when it shows "[X]" preceding it. In order to continue, the user has to press ENTER on the button Confirm. As a result, the system will show quick and extended diagnostic types, as illustrated in the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



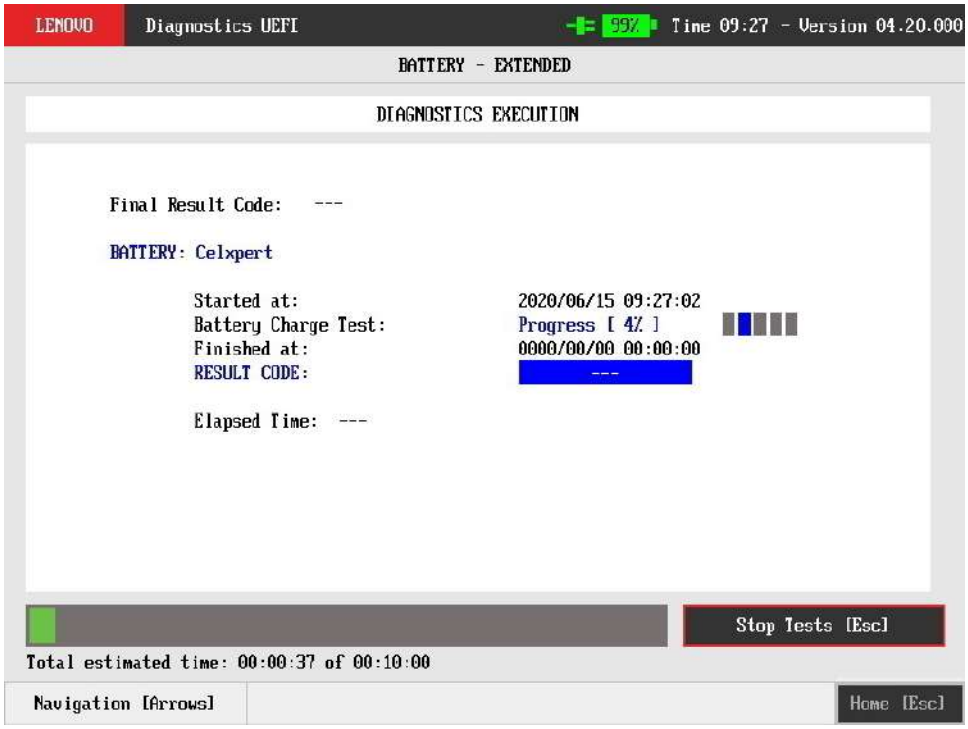
Battery Diagnostic Type

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:

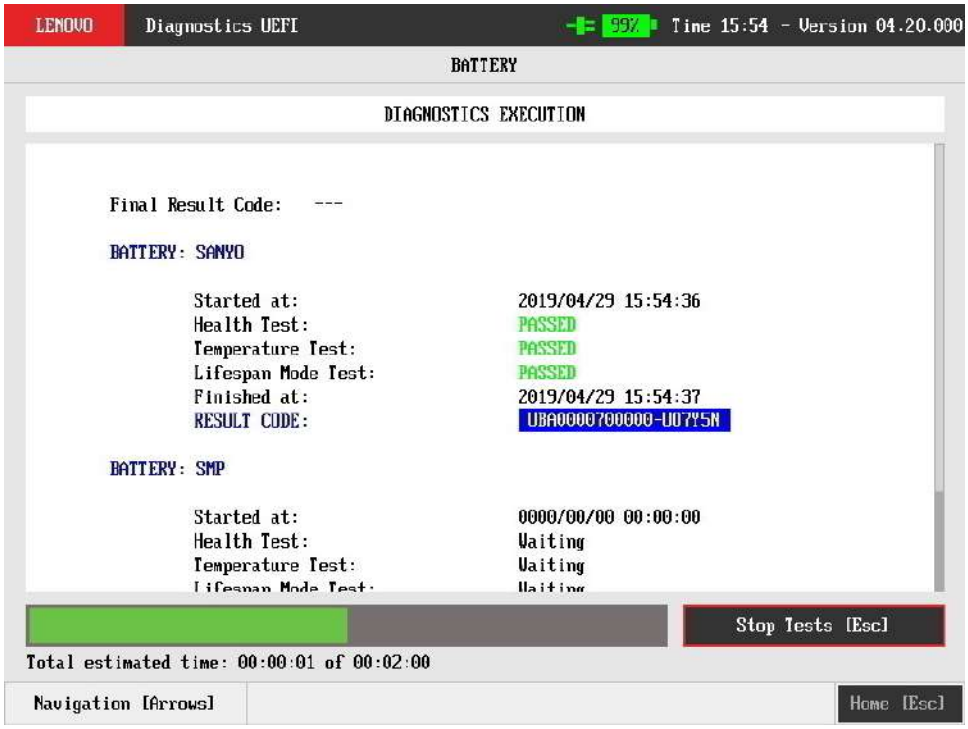


Battery Extended Algorithm Selection

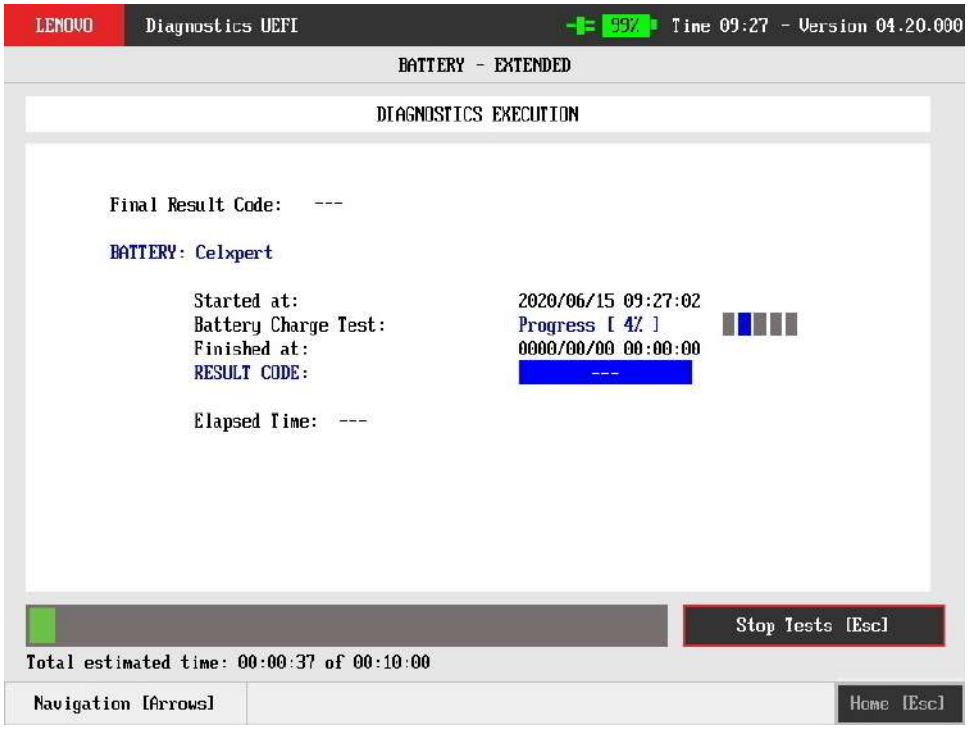
The user can deselect a select test by pressing the SPACE key when the test is highlighted. An empty space will appear between the brackets. To select a test again, the user can press the SPACE key again.

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:

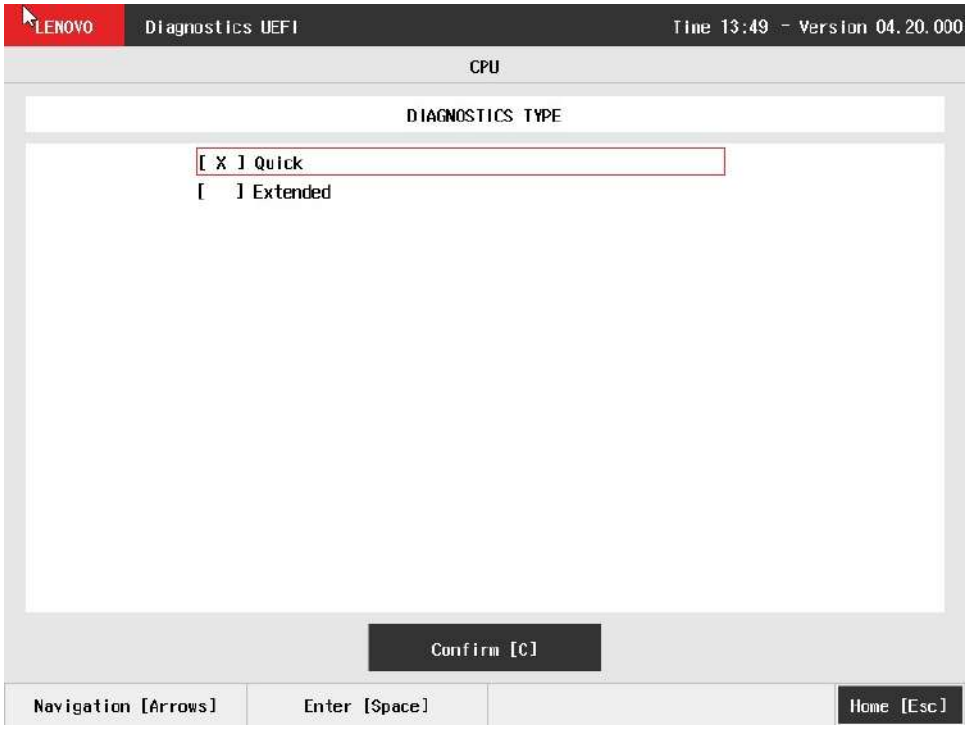
- Final Result Code (an encrypted code that informs which modules were tested).
- Date and time that diagnostic has started.
- Test (name of the test being currently run).
- Progress of the current test (current test's progress in percentage).
- Total estimated time of the current suite of diagnostic 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.

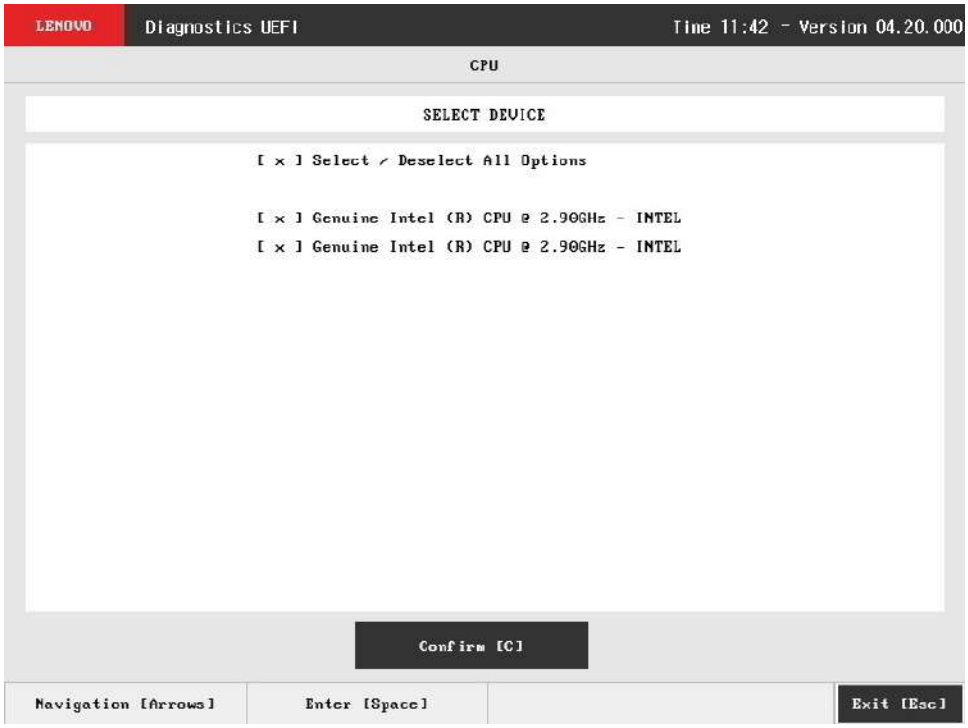
After the user enters the CPU option, the CPU diagnostics type's menu will be displayed, as the following image.



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.

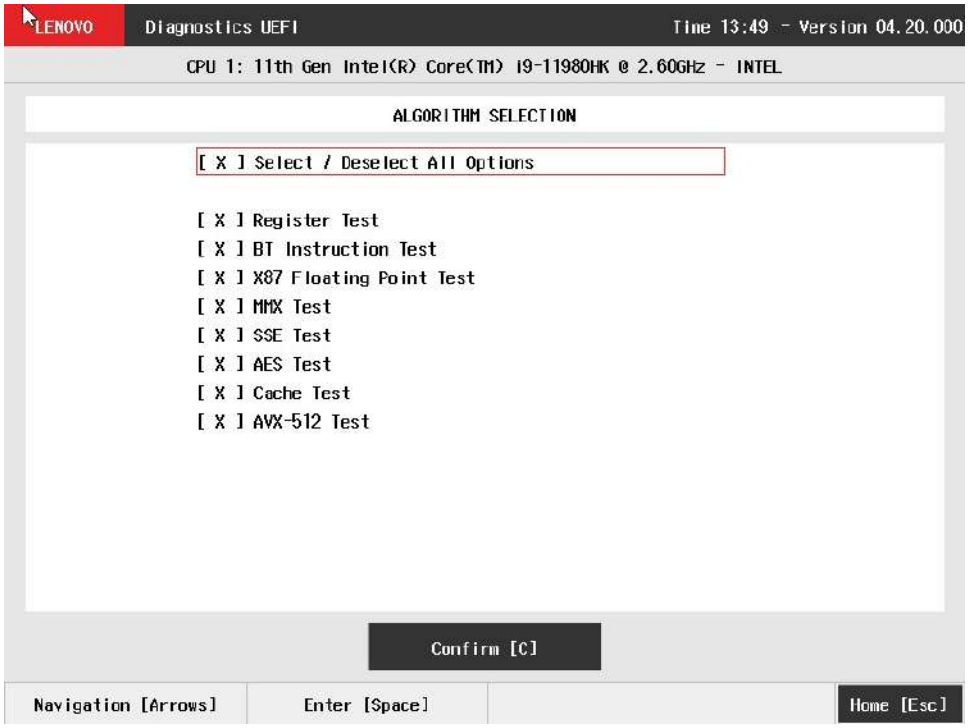
Quick diagnostics are test algorithms that take less than 10 minutes to execute each test.

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.

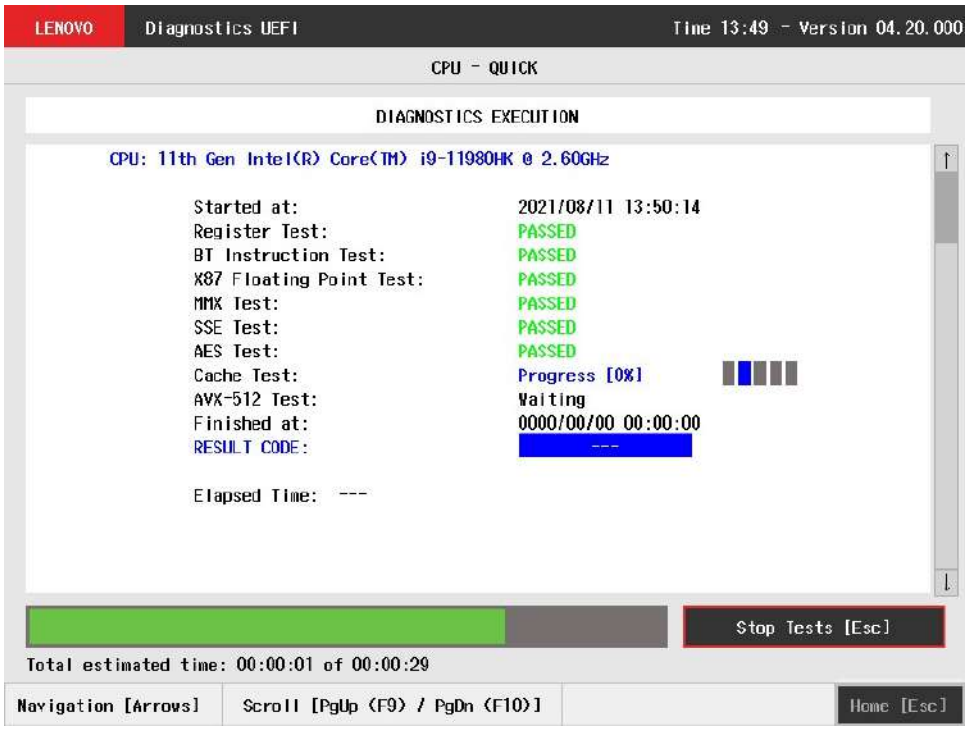
The user can deselect a selected test by pressing the SPACE key when the test is highlighted. An empty space will appear between the brackets. To select a test again, the user can press the SPACE key again.

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).

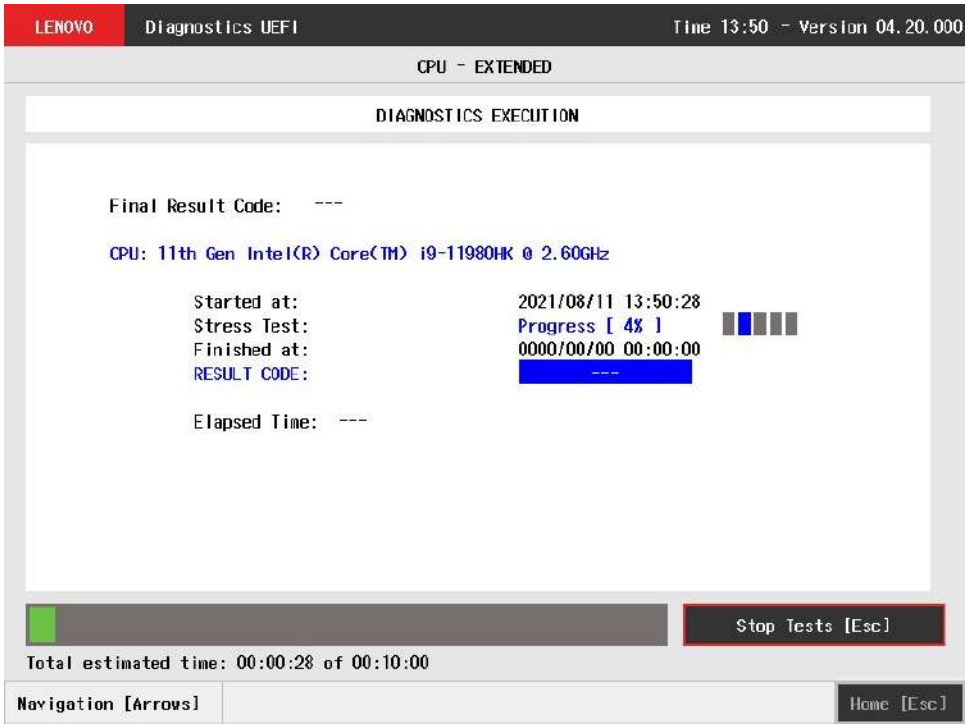
CPU Extended Diagnostics

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.

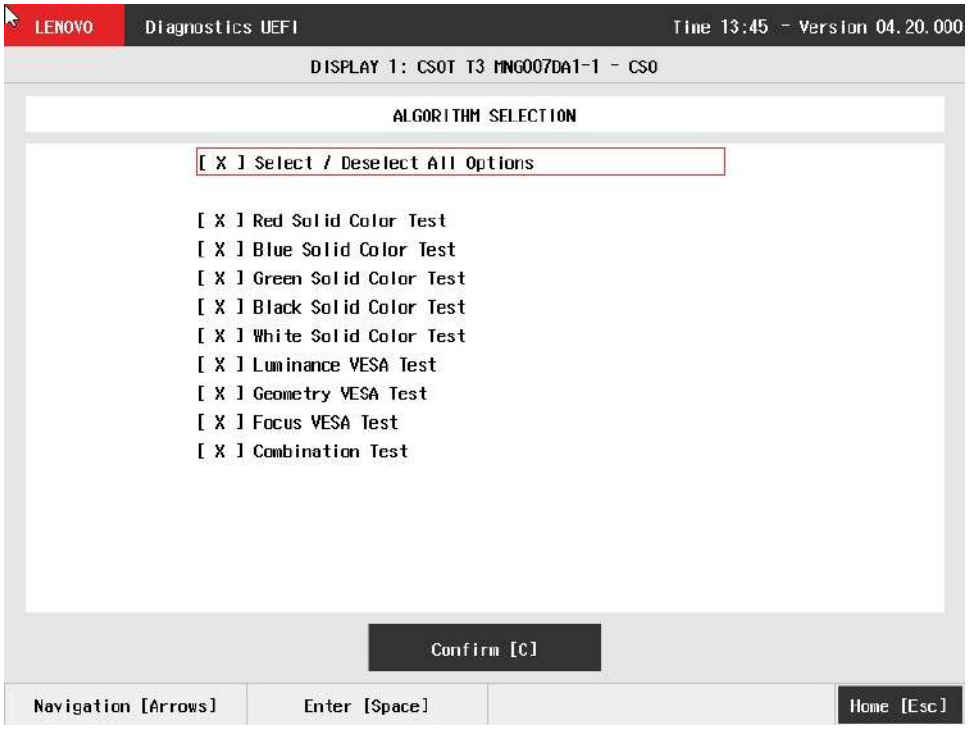
The screen has one main section that provides information about the diagnostic, as well as a progress bar and a View Log button, both placed at the bottom of the section, where the former indicates the global execution progress and the latter allows to visualize tests details after finishing the diagnostic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

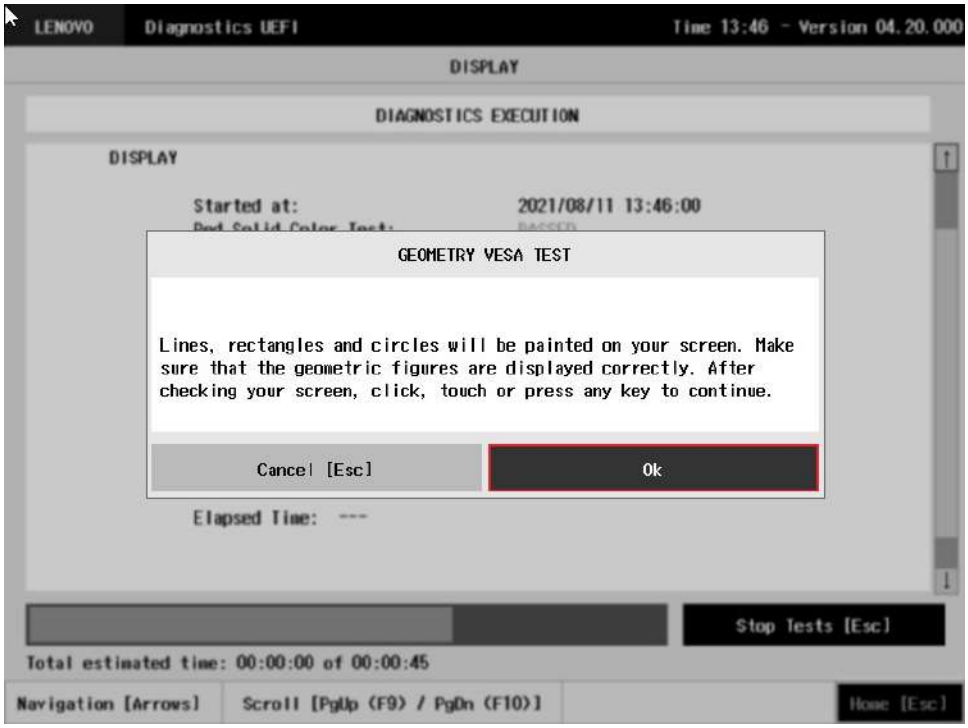
After the user enters the Display option, the application computes the number of algorithms that can be performed by the diagnostic. If the diagnostic has more than one algorithm, Algorithm Selection screen is displayed, as shown in the figure below.



Display Algorithm Selection

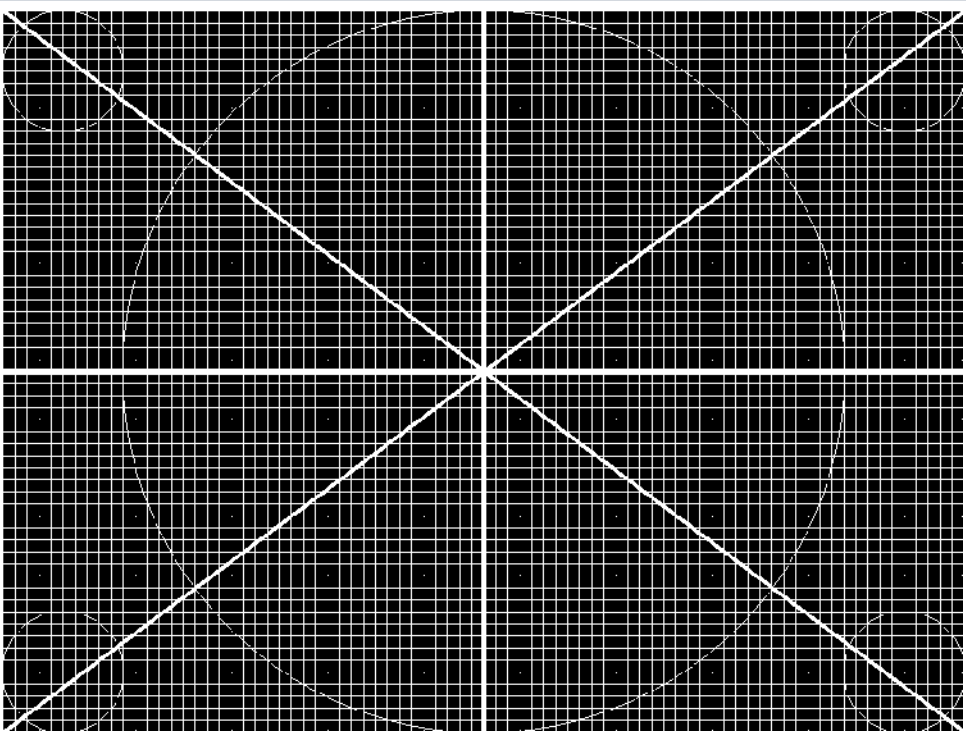
The Algorithm Selection screen allows the user to select which algorithms will be tested by the application. After the user chooses at least one test and chooses the Confirm button on the Algorithm Selection screen, the Display tests start.

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.



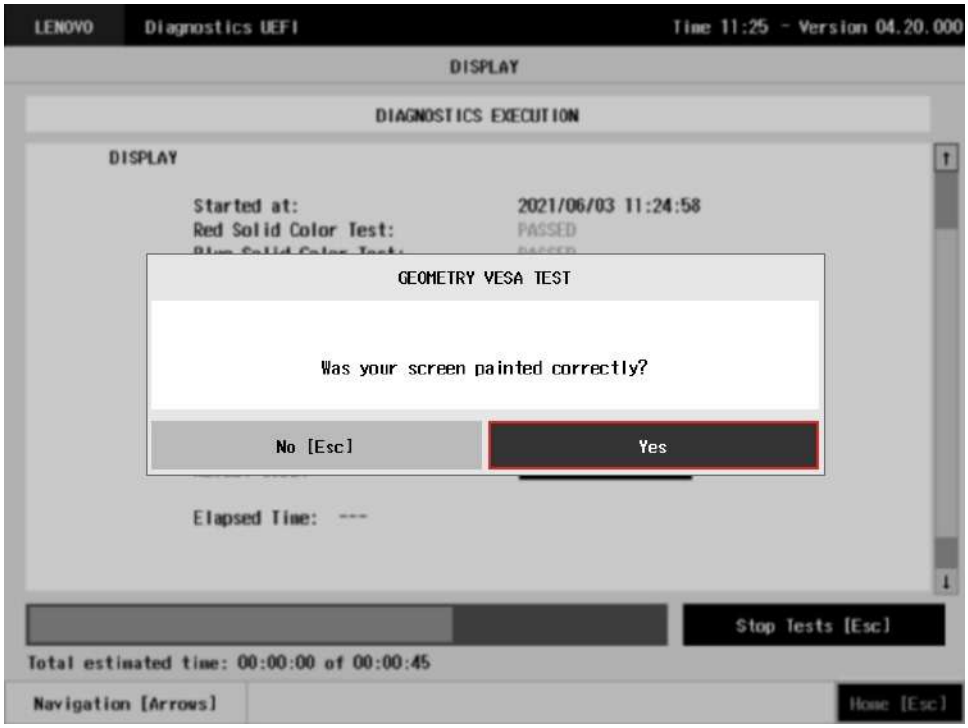
Display Test Instruction Popup

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.

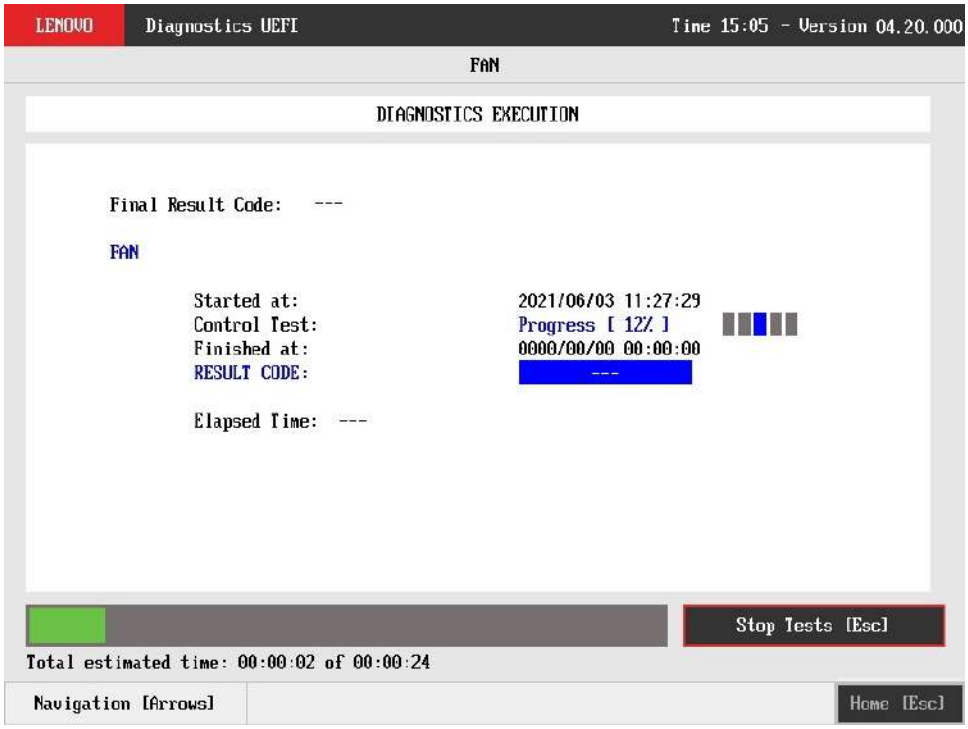


Display Test Result Inquiry Popup

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.



Fan Diagnostics Execution

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.

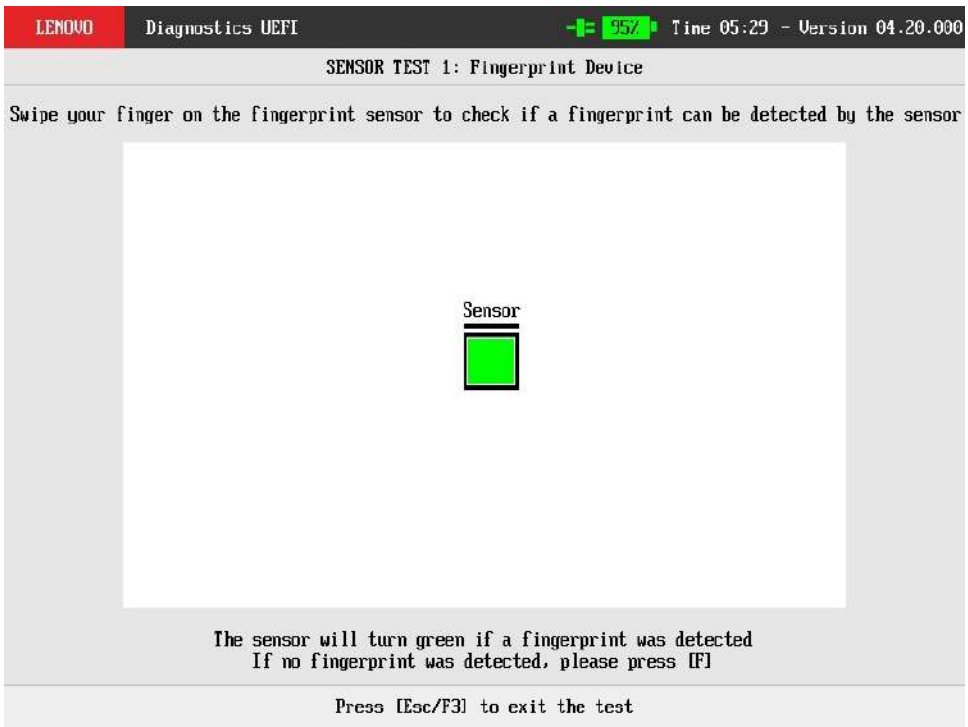
- Date and time that the tests are finished (displayed after test is finished).
- Result Code for test.
- Elapsed time, that is a duration of test in hours, minutes and seconds (displayed after test is finished).

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.



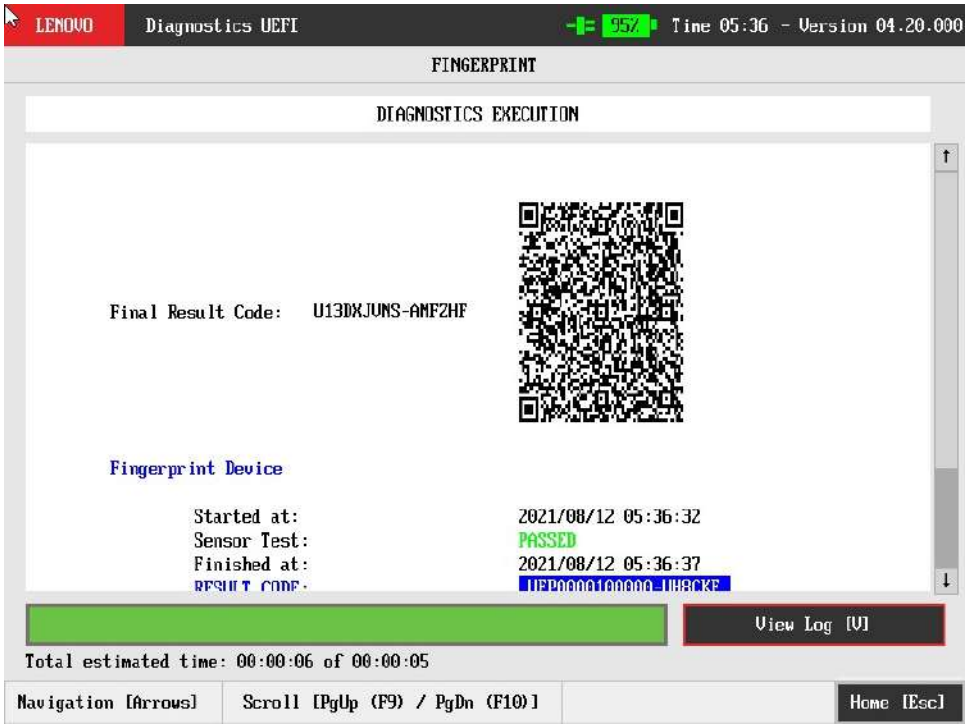
Fingerprint sensor test

- **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 rest 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:

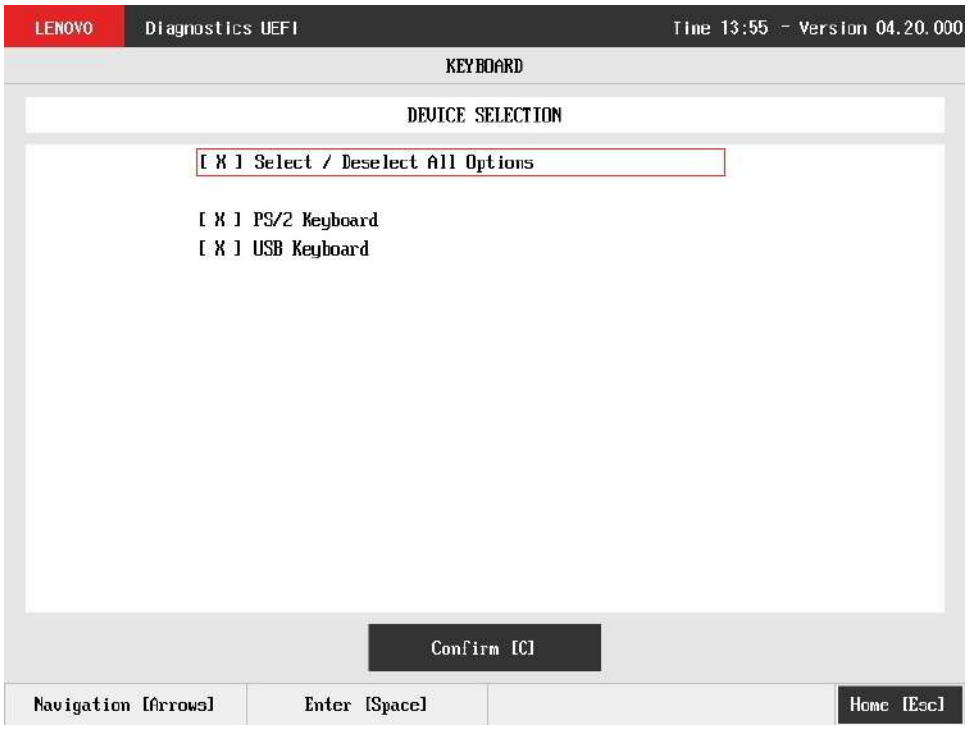


Fingerprint sensor test result screen

> **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.

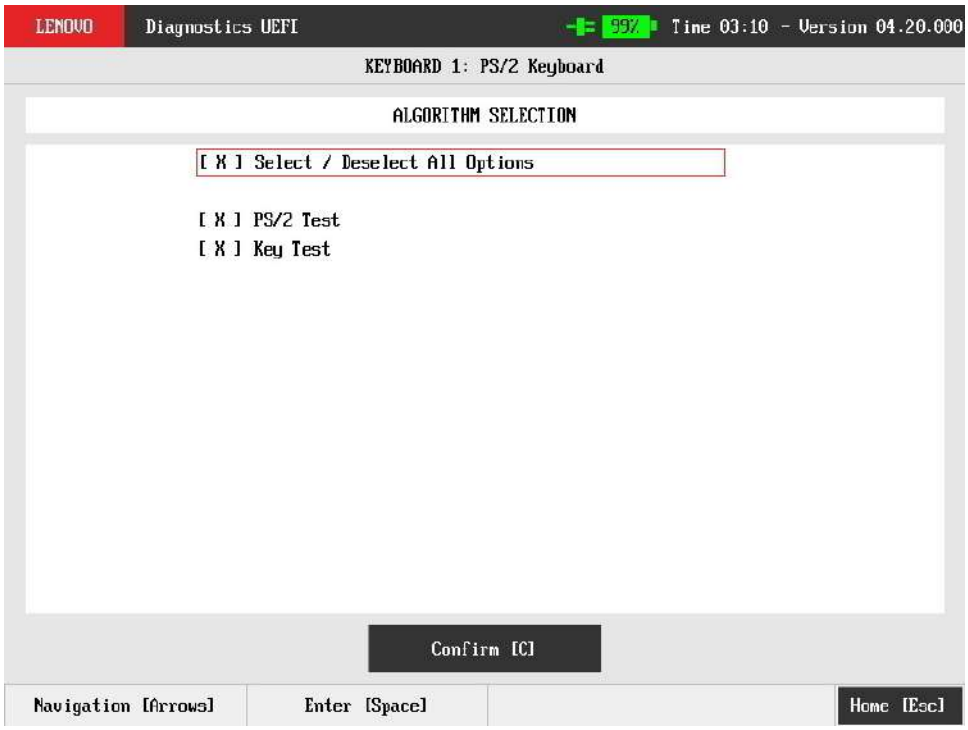


Keyboard type selection

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

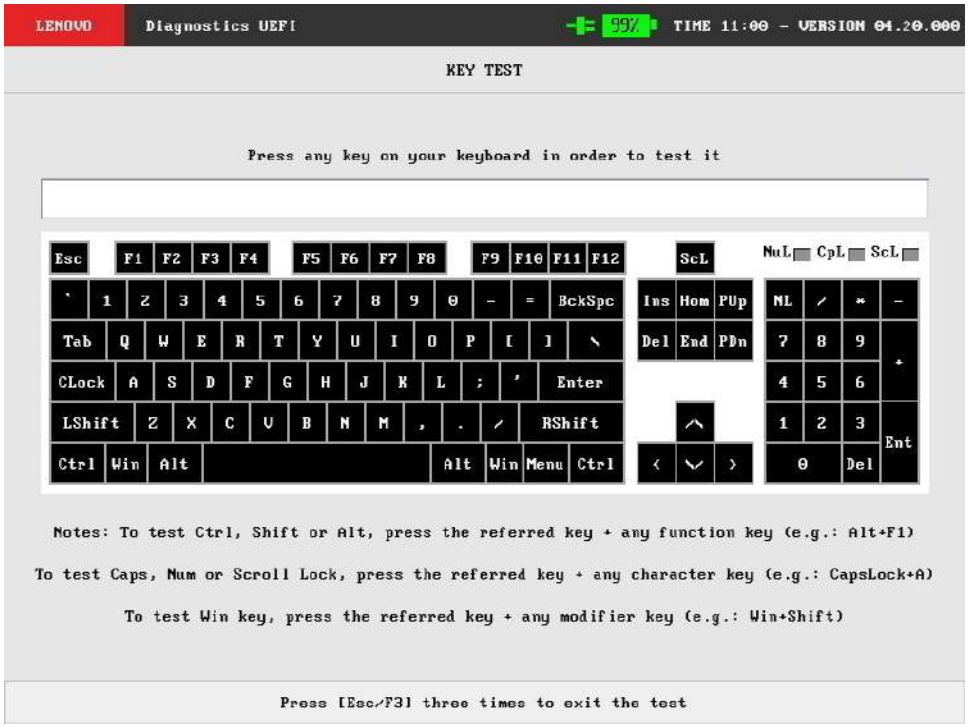
- **PS/2 Test:'**
  - **Description:** *"PS/2 Test" is a keyboard test that checks the access to PS/2 type keyboards.*
  - **Results:** PASSED; FAILED; CANCELED; NOT APPLICABLE.
- **USB Test:**
  - **Description:** *"USB Test" is a keyboard test that checks the access to USB type keyboards.*
  - **Results:** PASSED; FAILED; WARNING[1]; 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.

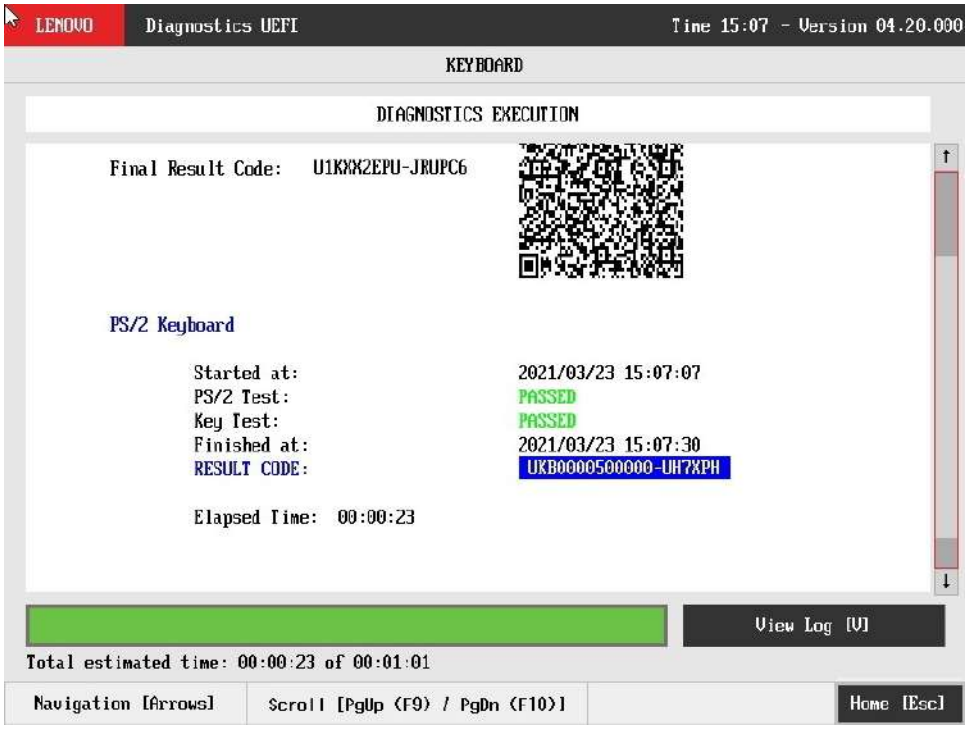


Keyboard Test selection

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

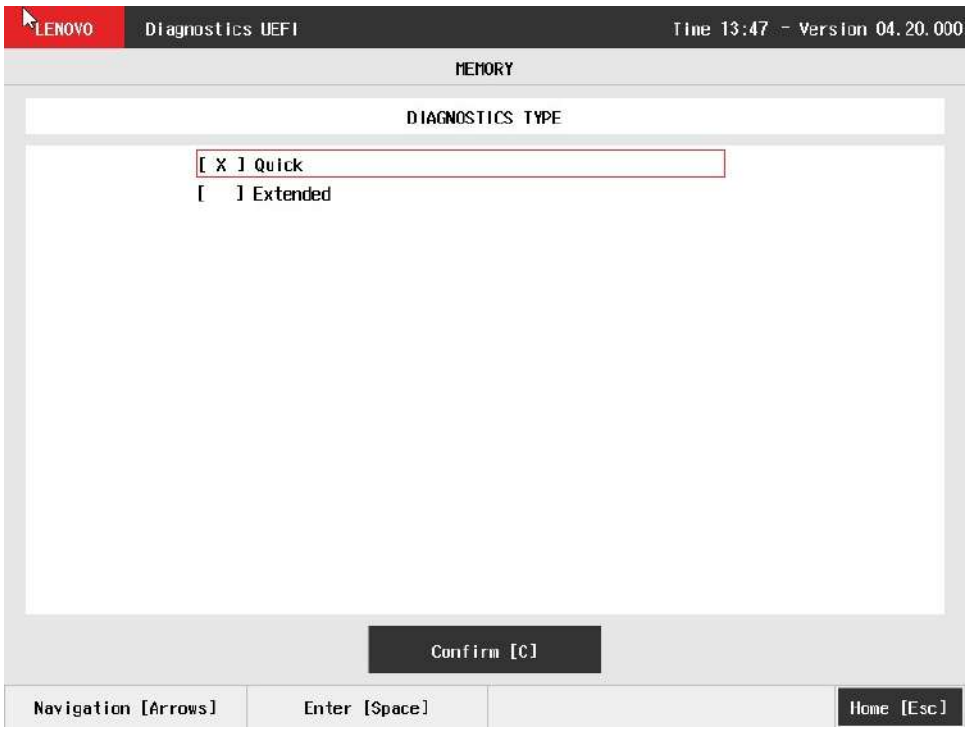
Keyboard attended test will automatically exit after 15 seconds of no user interaction.

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

Memory

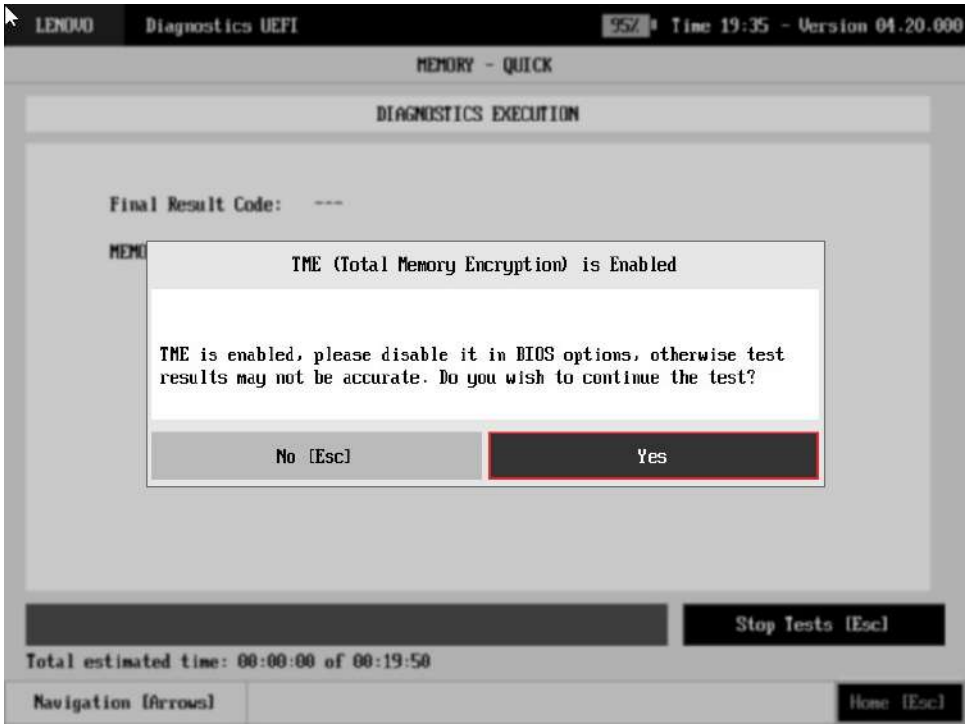
The system allows the user to access the Memory diagnostics from the Home screen, Diagnostics, Memory.

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.



Memory Diagnostic Type

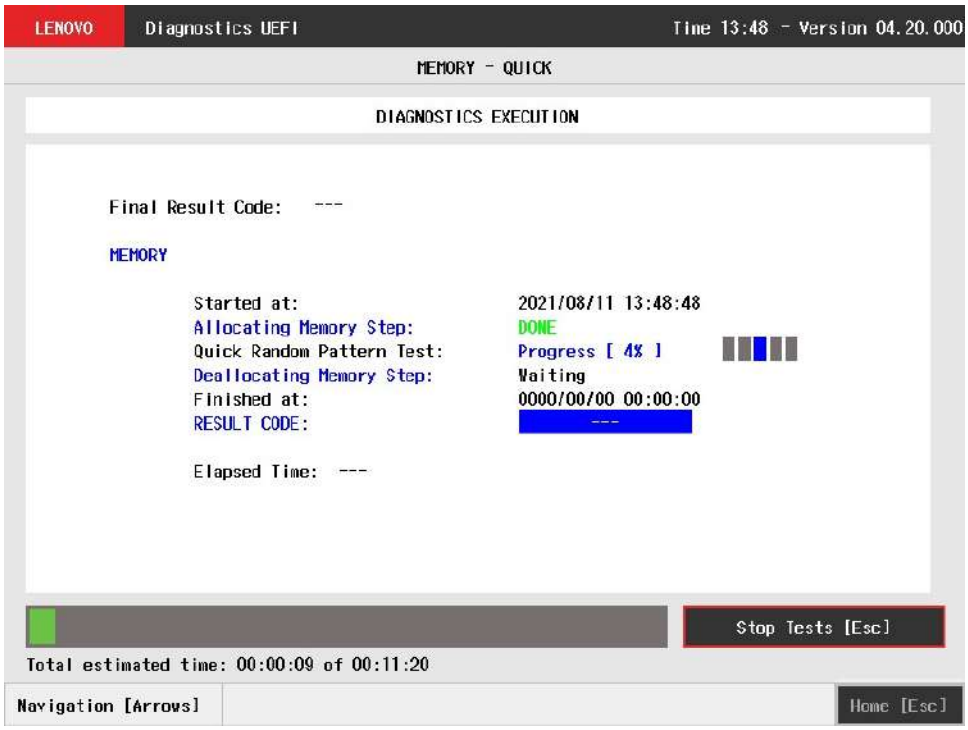
Intel's Tiger Lake processor platform has a feature called TME (Total Memory Encryption) that enables the encryption of the whole physical memory of a system. This feature can usually be enabled via BIOS menu in compatible systems. The encryption of memory can cause the memory diagnostics to present 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

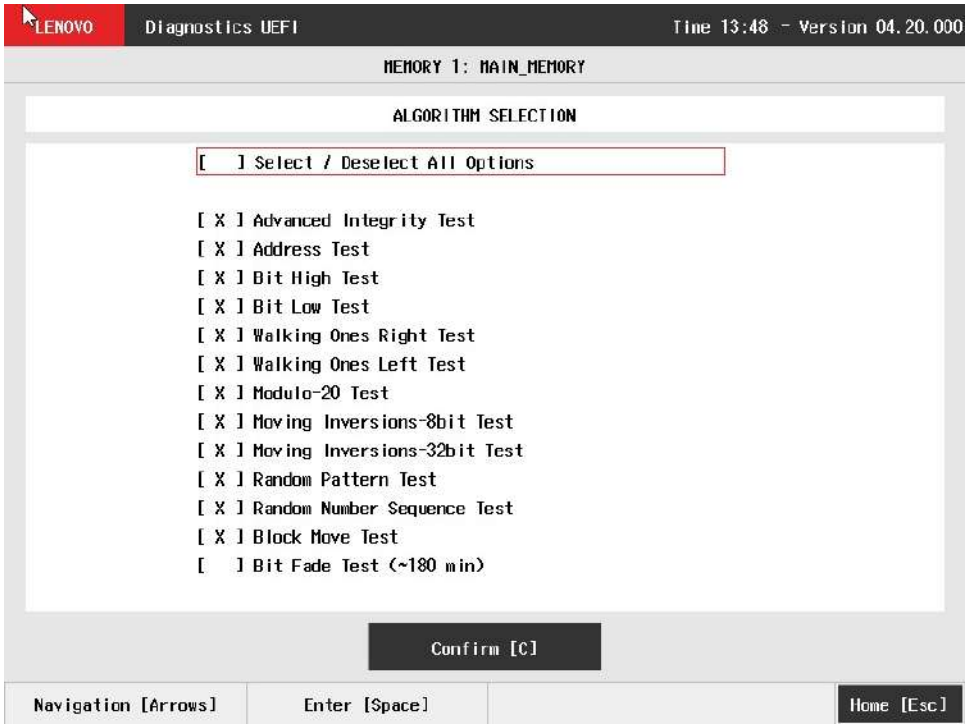
The system allows the user to access the memory extended diagnostics from the Home screen, Diagnostics, Memory.

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.

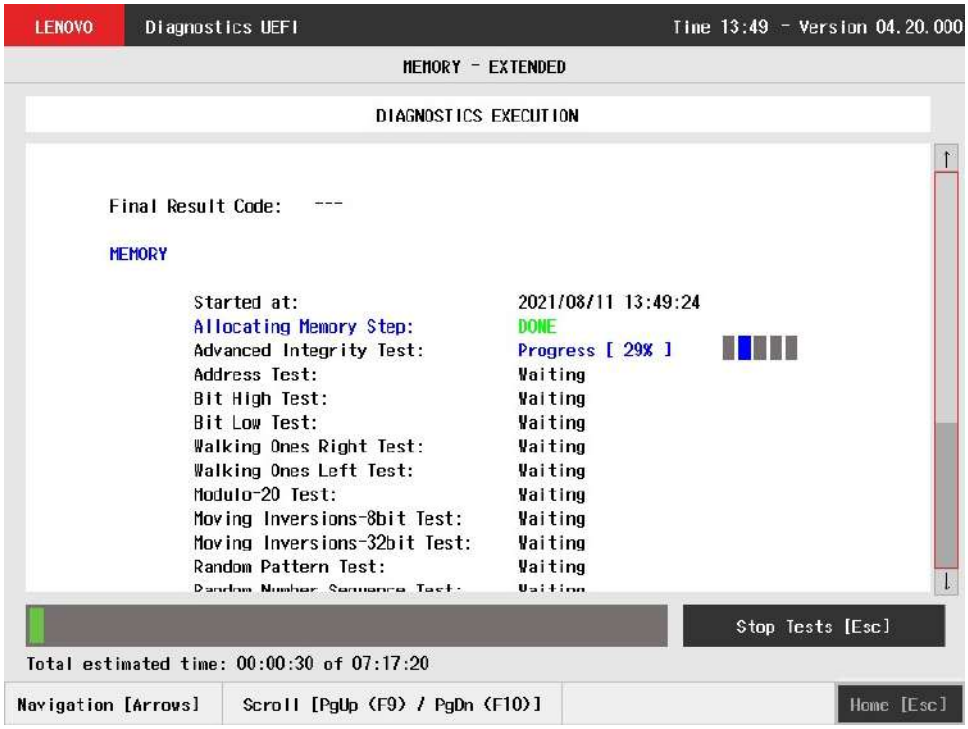
The user can deselect a selected test by pressing the SPACE key when the test is highlighted. An empty space will appear between the brackets. To select a test again, the user can press the SPACE key again.

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:

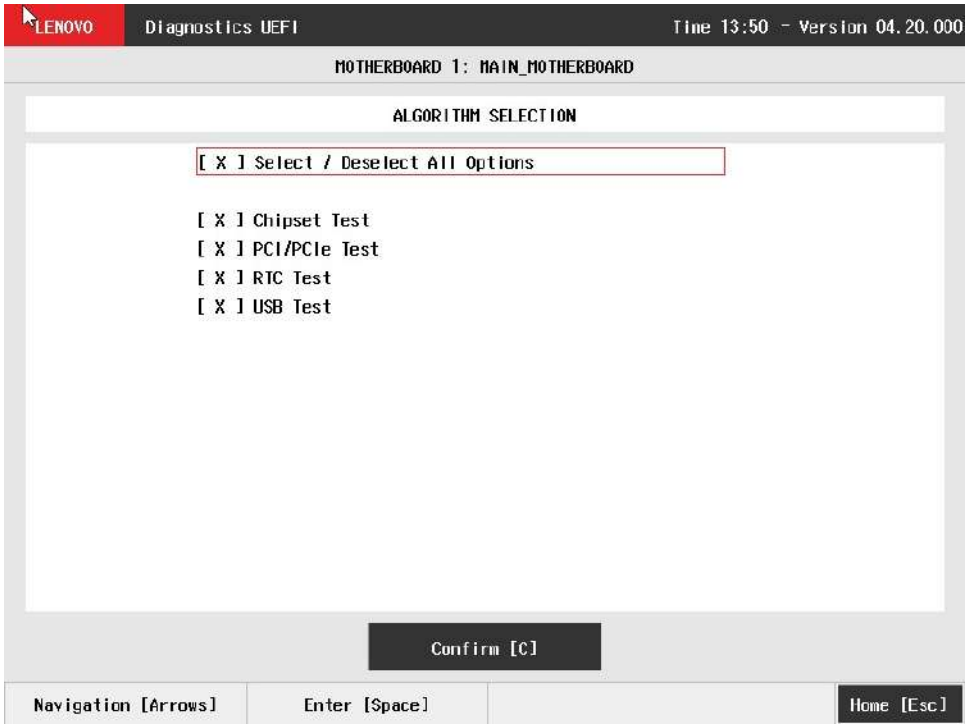
- Final Result Code (an encrypted code that informs which modules were tested).
- Date and time that diagnostic has started.
- Test (name of the test being currently run).
- Progress of the current test (current test's progress in percentage).
- Total estimated time of the current suite of diagnostic 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.



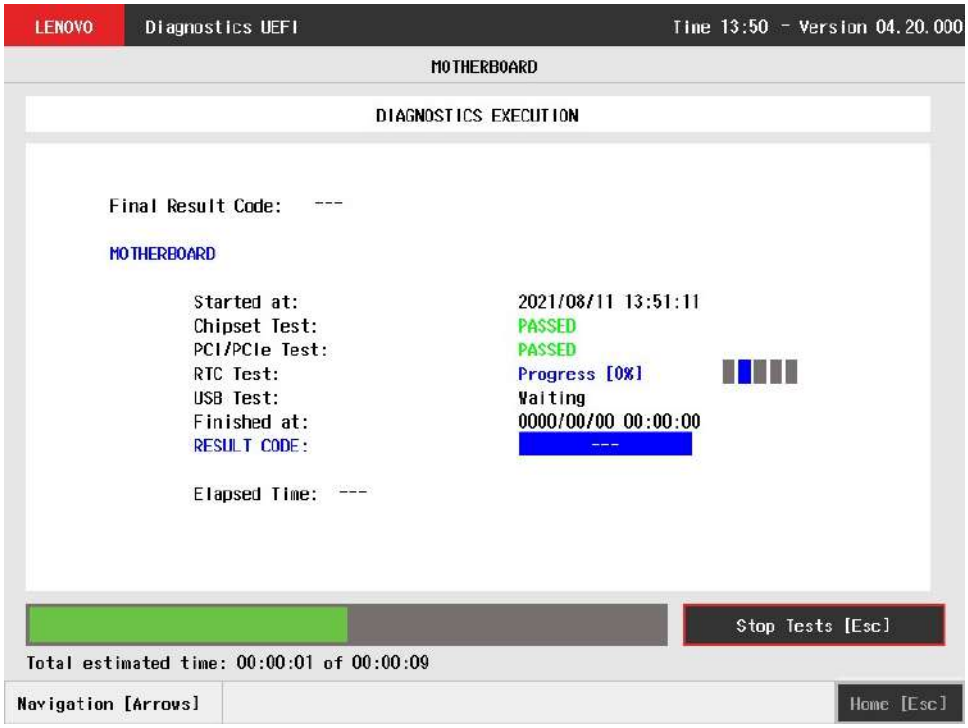
Motherboard Algorithm Selection

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).

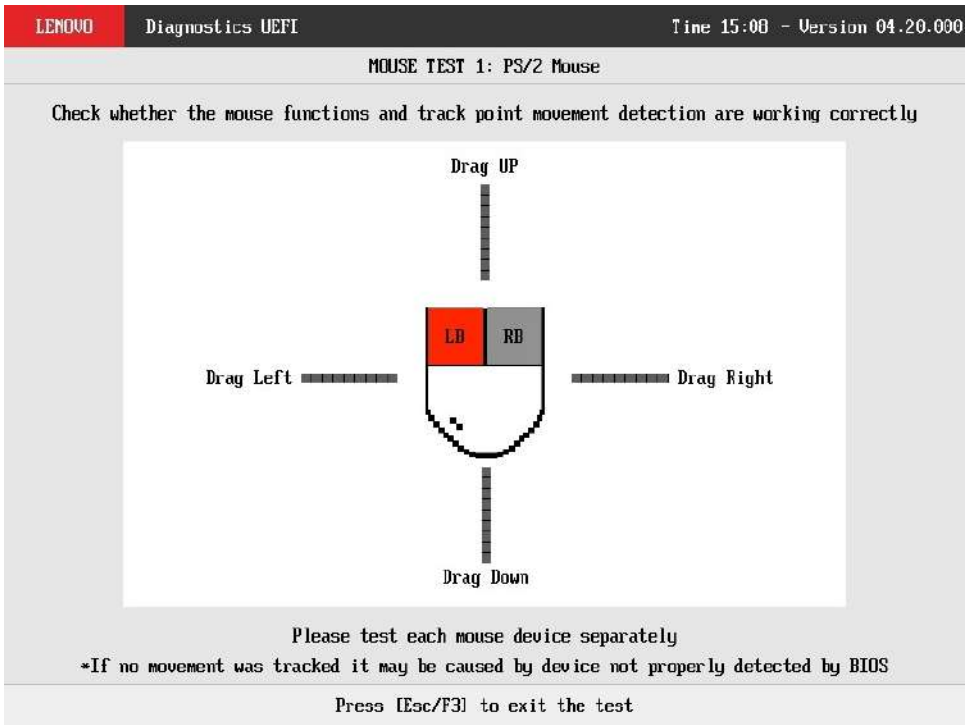
While the diagnostic is running, the user can stop it at any time by pressing the ESC key. If the user does that, the diagnostic is aborted and the status of the test that is being run is changed to CANCELED. After the diagnostic is finished or canceled, the user can go back to the Home screen (by pressing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

Mouse

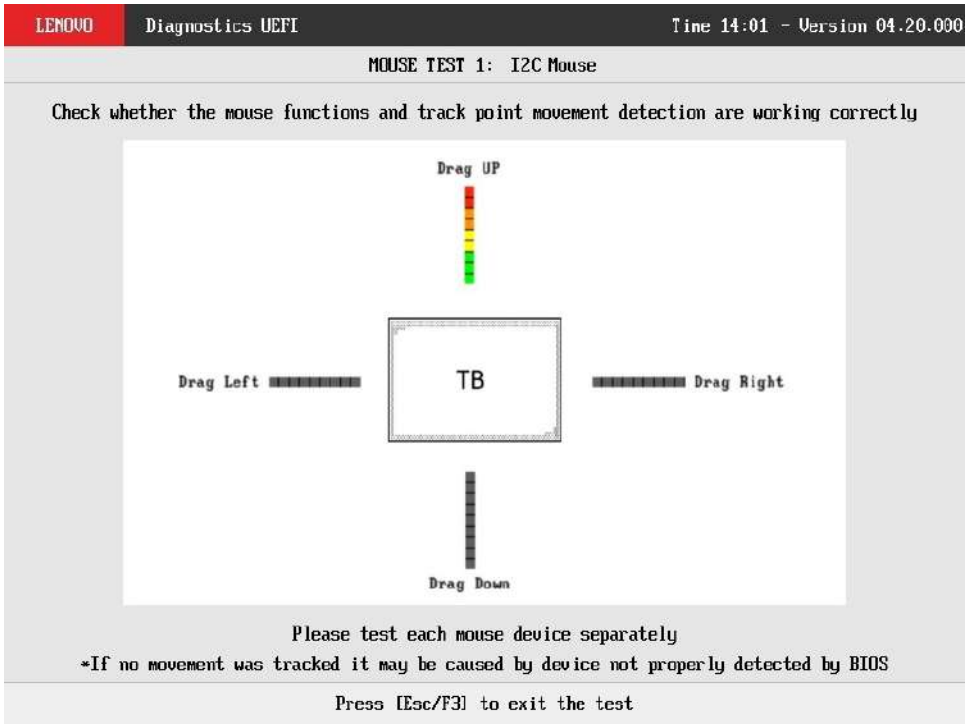
List of tests that can be performed:

- **Reset Test:**
  - **Description:** *"Reset Test" is a mouse test that resets the connection for both PS/2 and USB External type mouses.*
  - **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 mouses.*
  - **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.

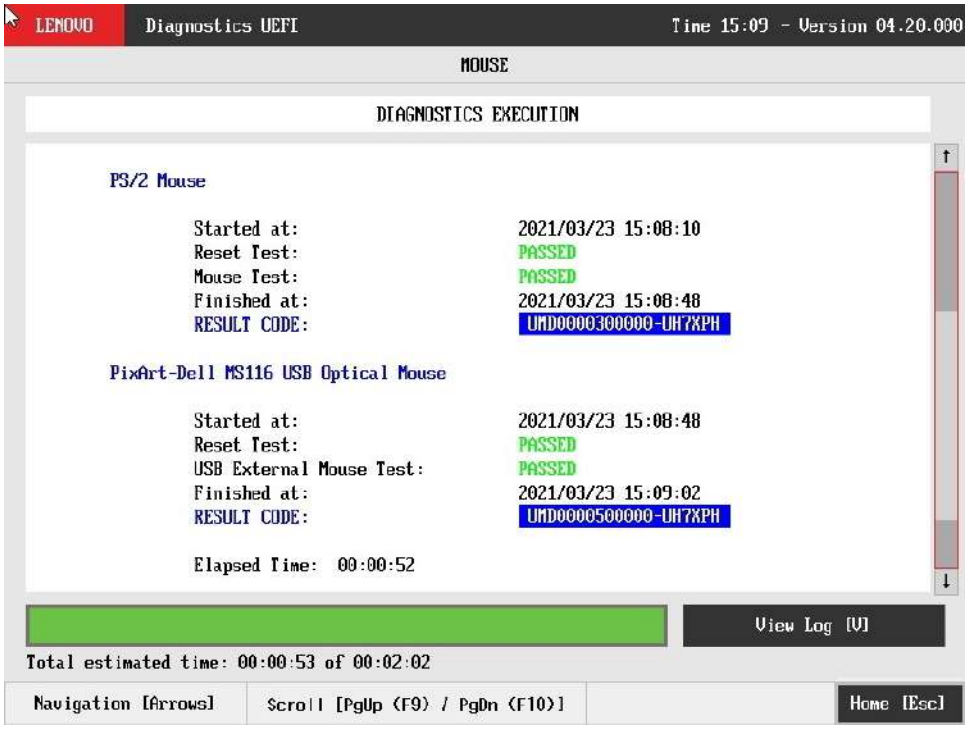
After the selection of the desired mouse type, the test begins as the screen below:



Mouse Test Execution PS/2



Mouse Test Execution I2C



Mouse Diagnostics Execution

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:

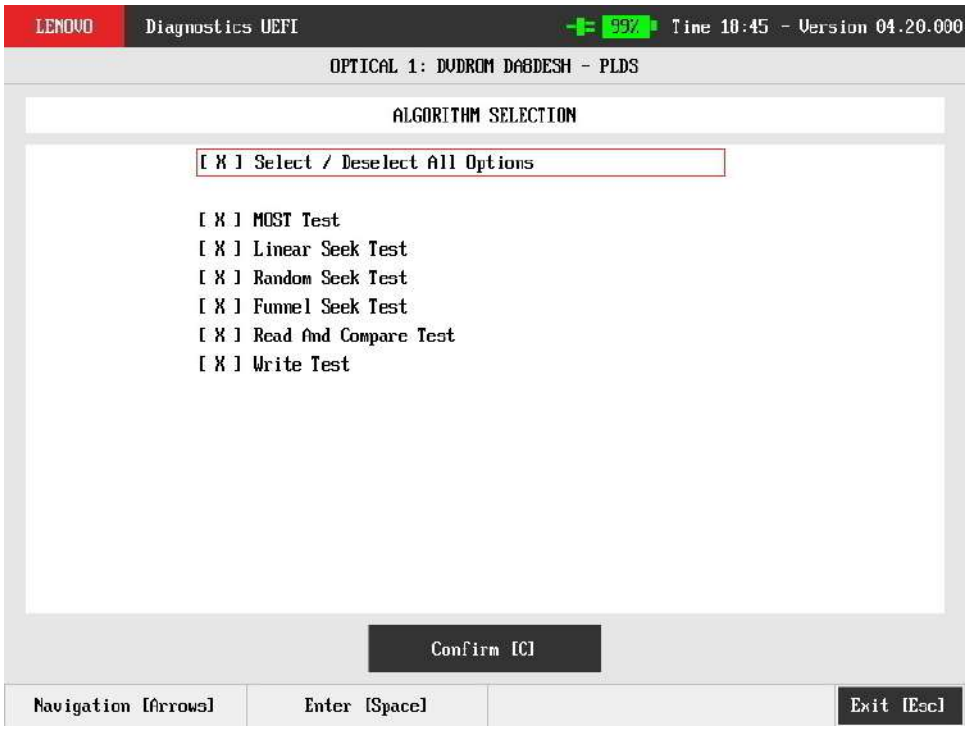
- Final Result Code (an encrypted code that informs which modules were tested).
- Date and time that diagnostic has started.
- Test (name of the test being currently run).
- A list with all the algorithms which compose device test and their respective status:
    - PASSED, indicating the algorithm has 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.

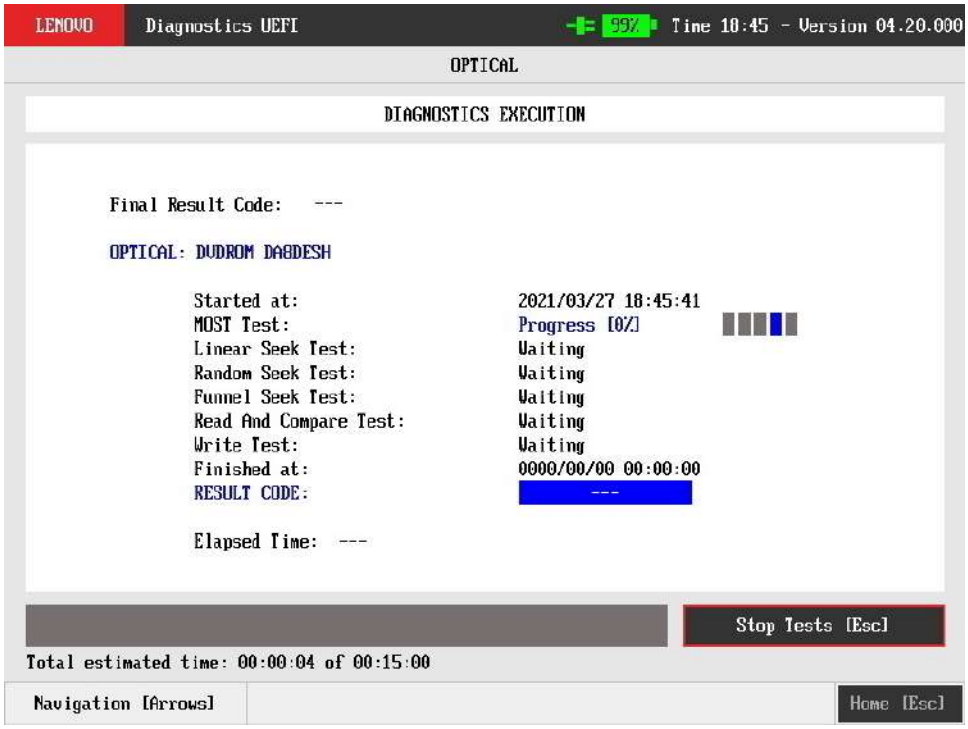
Optical

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:

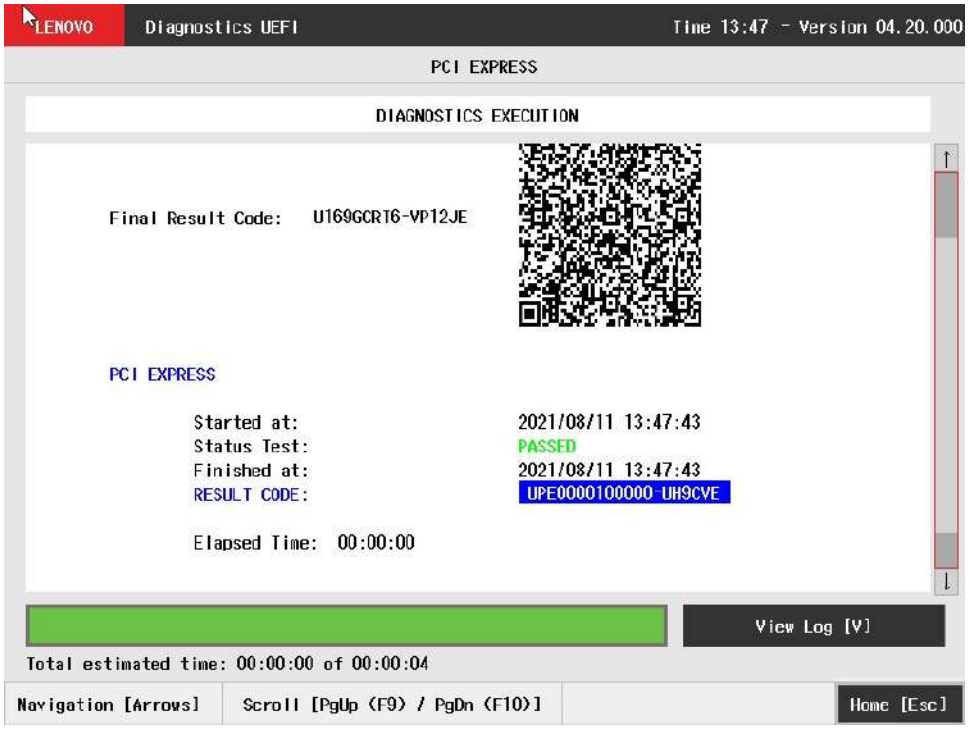
- Final Result Code (an encrypted code that informs which modules were tested).
- Date and time that diagnostic has started.
- Test (name of the test being currently run).
- Progress of the current test (current test's progress in percentage).
- A list with all the algorithms which compose device test 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.



PCI Express Diagnostics Execution

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).

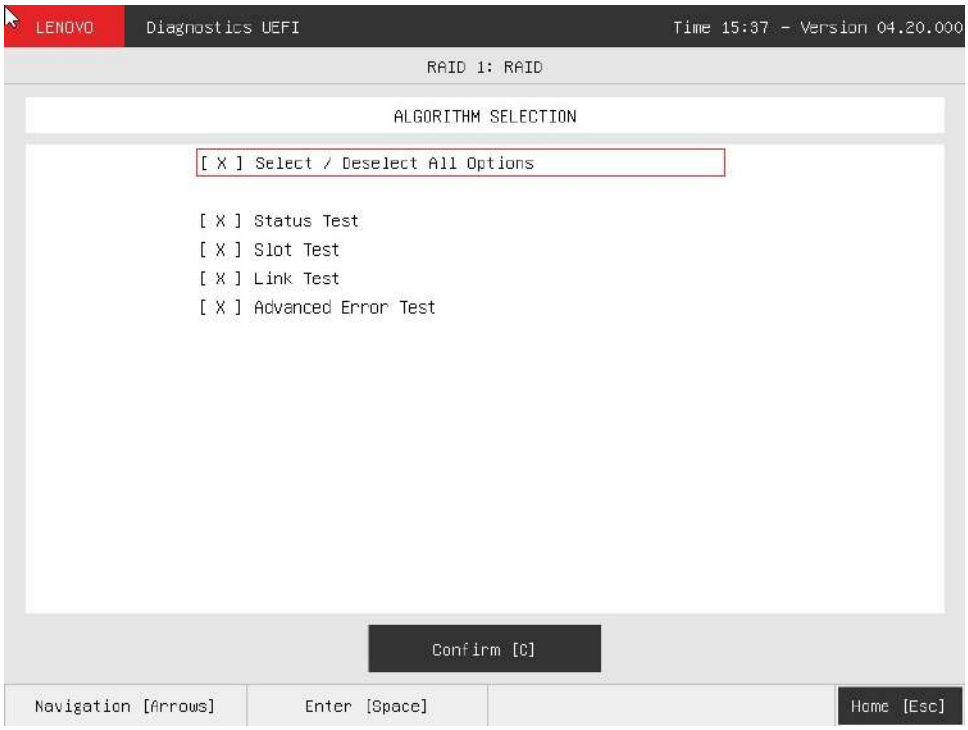
RAID

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.

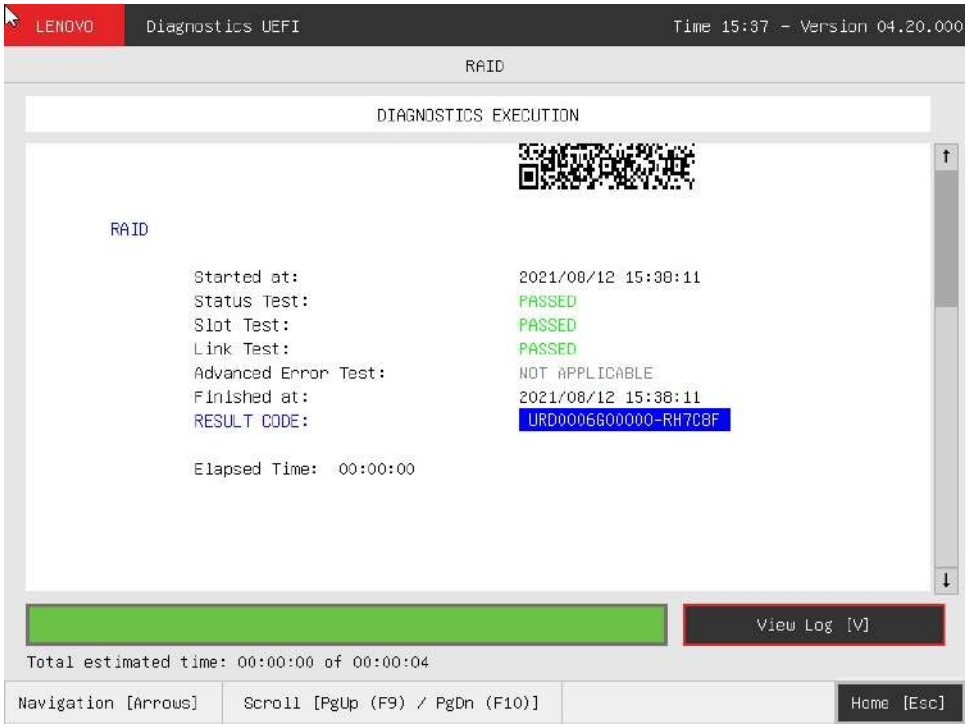
The user can deselect a selected test by pressing the SPACE key when the test is highlighted. An empty space will appear between the brackets. To select a test again, the user can press the SPACE key again.

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).

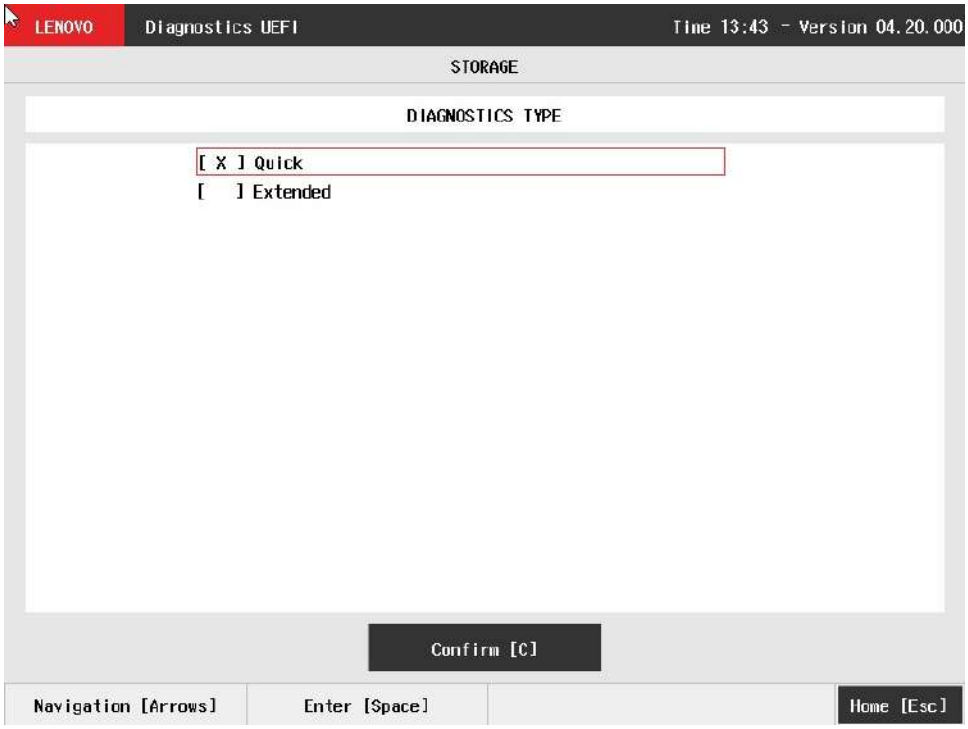
While the diagnostic is running, the user can stop it at any time by pressing the ESC key. If the user does that, the diagnostic is aborted and the status of the test that is being run is changed to CANCELED. After the diagnostic is finished or canceled, the user can go back to the Home screen (by pressing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

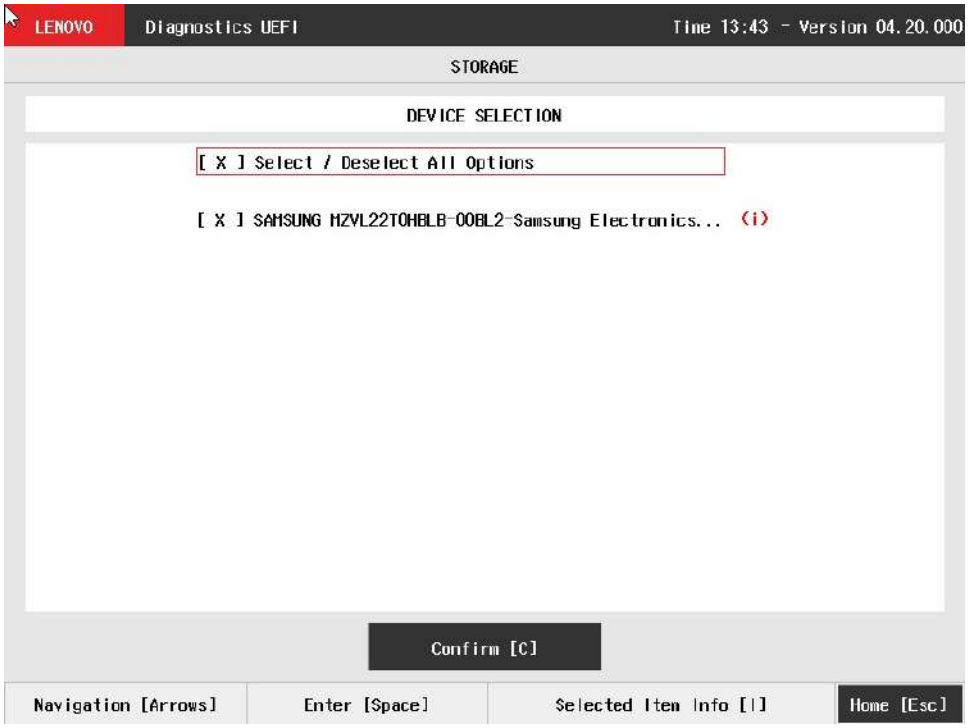
After the user enters the Storage option, the storage diagnostics type's menu will be displayed, as the following image.



Storage Diagnostics Type

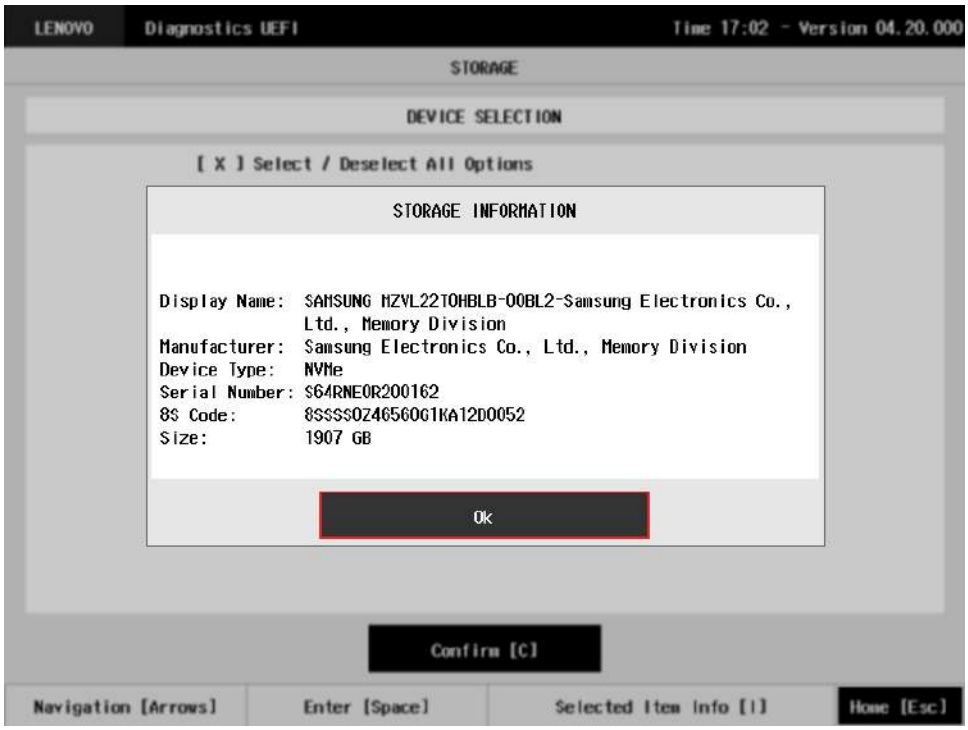
An item can be selected/deselected by pressing SPACE when it is highlighted. A desired item is selected when it shows "[X]" preceding it.

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

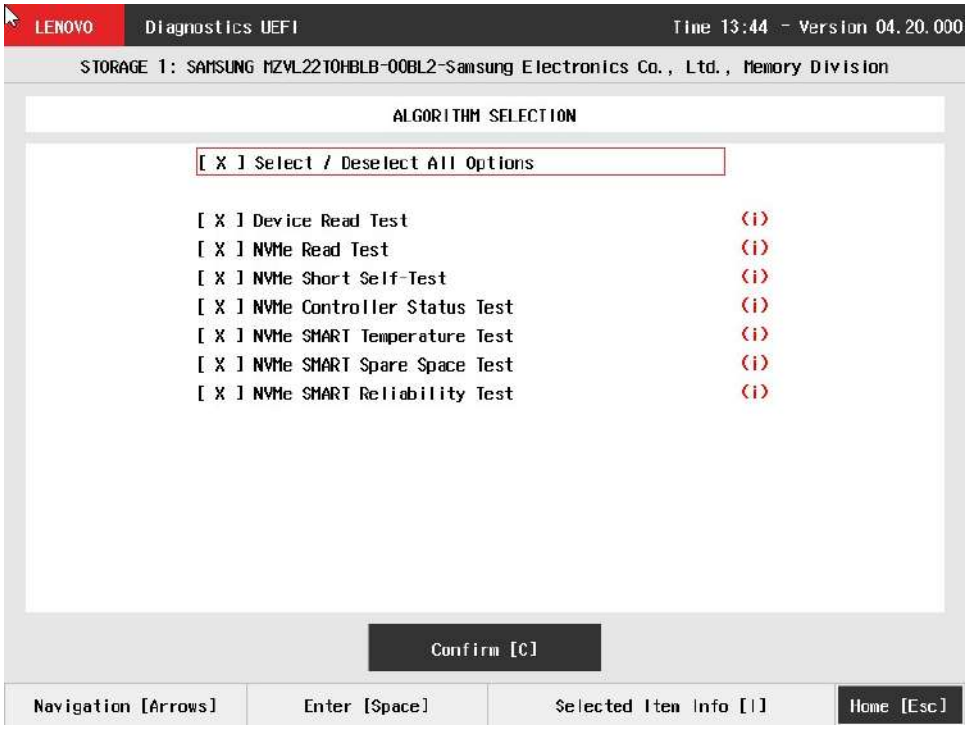
The system allows the user to access the storage quick diagnostics from the Home screen, Diagnostics, Storage.

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.

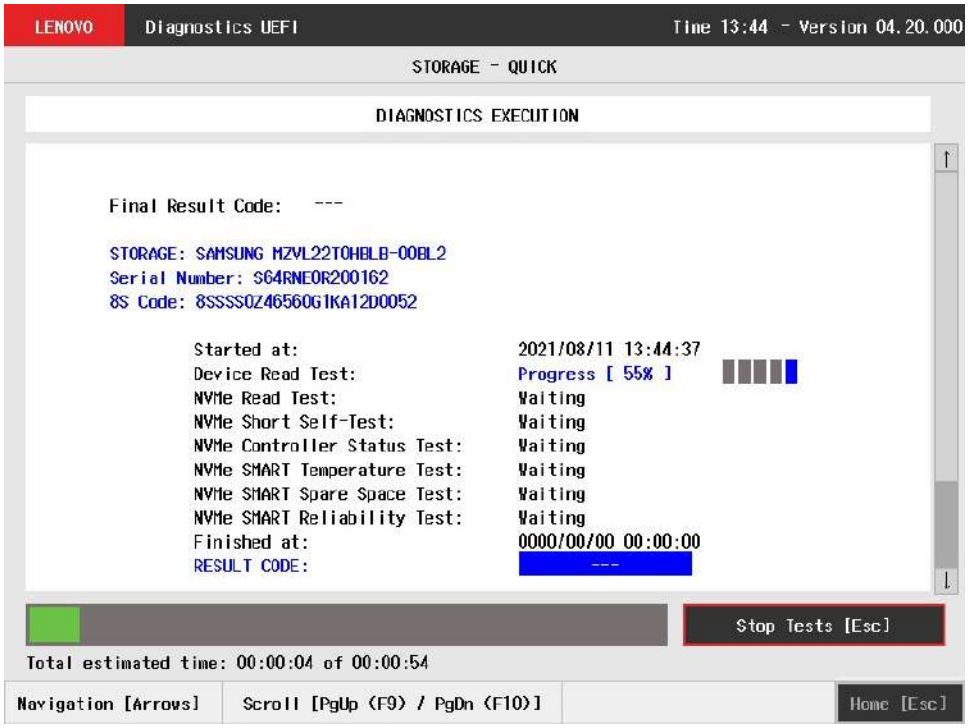
The user can deselect a selected test by pressing the SPACE key when the test is highlighted. An empty space will appear between the brackets. To select a test again, the user can press the SPACE key again.

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.



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

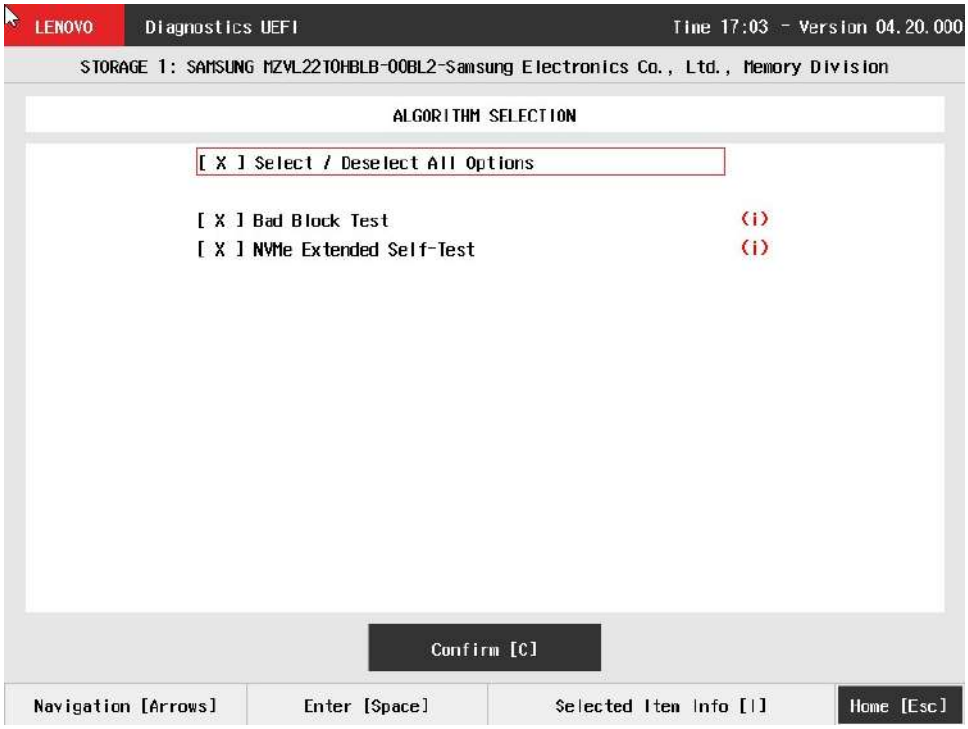
The system allows the user to access the storage extended diagnostics from the Home screen, Diagnostics, Storage.

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).

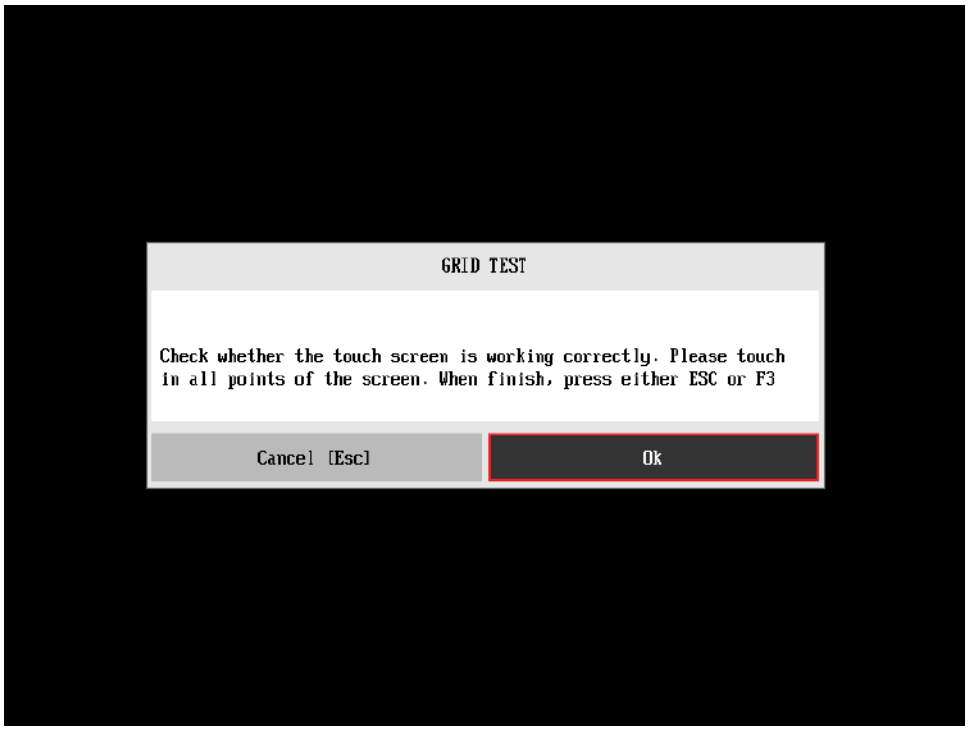
While the diagnostic is running, the user can stop it at any time by pressing the ESC key. If the user does that, the diagnostic is aborted and the status of the test that is being run is changed to CANCELED. After the diagnostic is finished or canceled, the user can go back to the Home screen (by pressing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

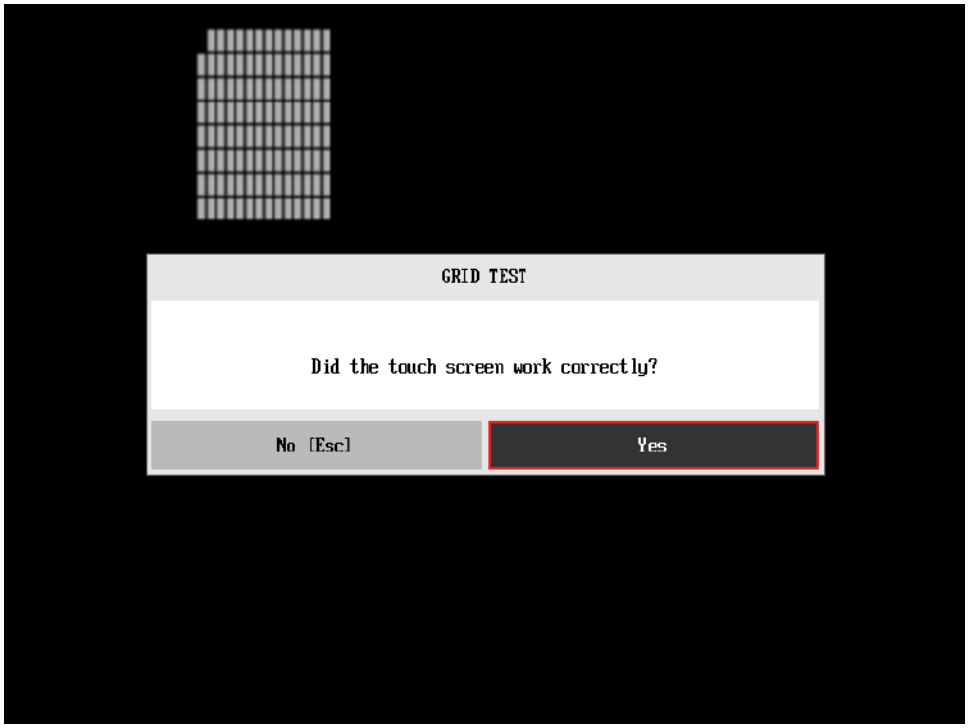
- **Reset Test:**
  - **Description:** *"Reset Test" is a touch device test that resets the connection with touch device.*
  - **Results:** PASSED; FAILED; CANCELED; NOT APPLICABLE.
- **Grid Test:**
  - **Description:** *"Grid Test" is a touch device test that tracks all touch events on touch device.*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

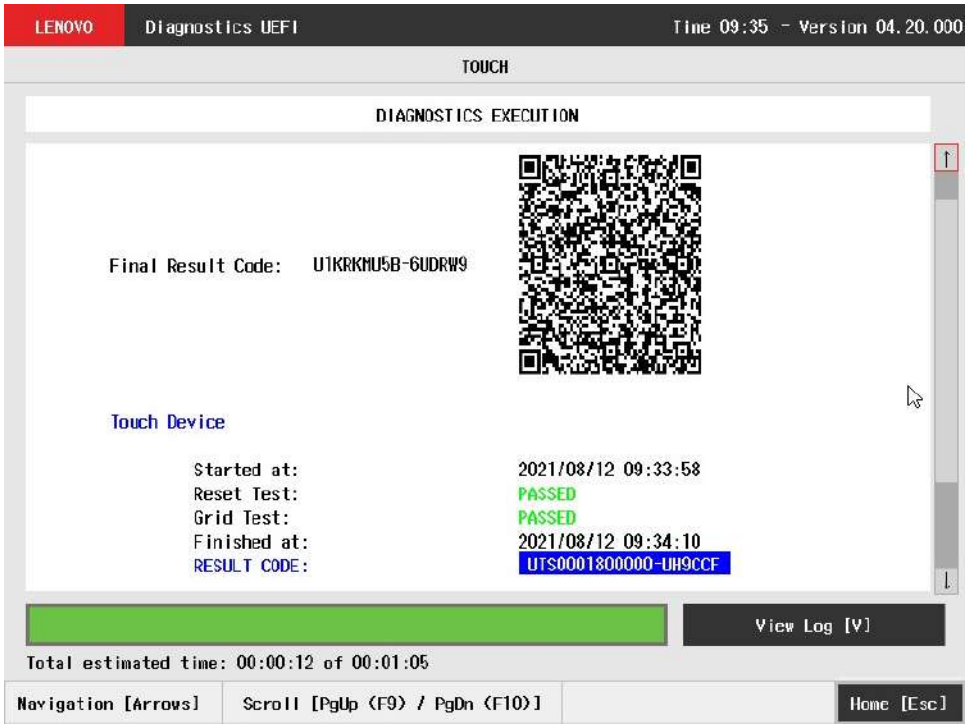
After the test finishes, a confirmation screen pop up to check if the test worked fine.



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

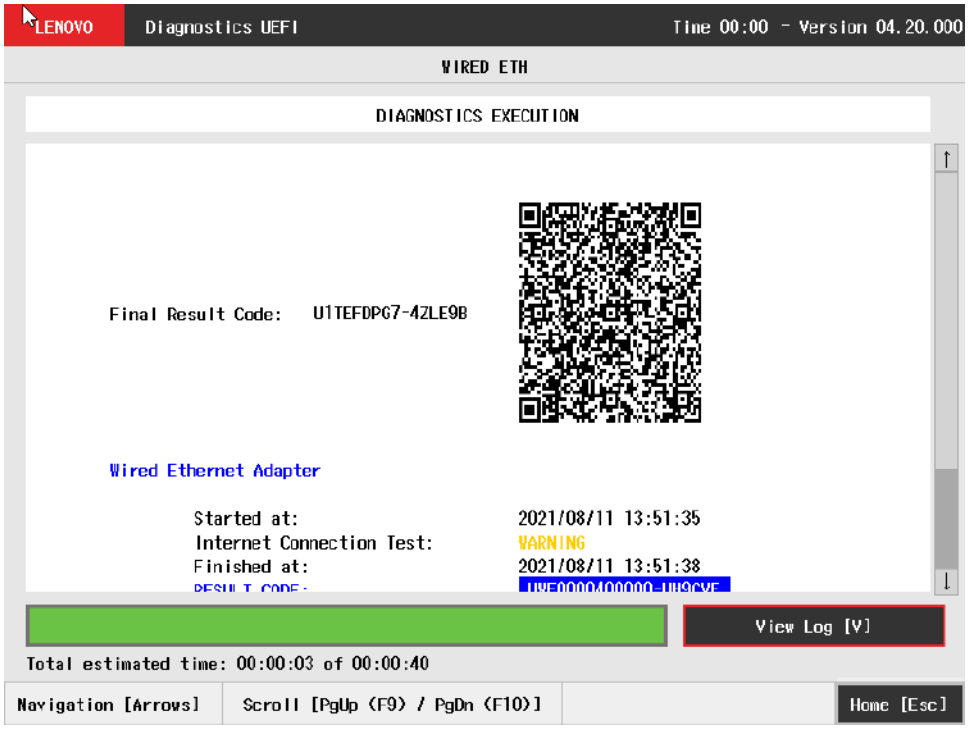
While the diagnostic is running, the user can stop it at any time by pressing the ESC key. If the user does that, the diagnostic is aborted and the status of the test that is being run is changed to CANCELED. After the diagnostic is finished or canceled, the user can go back to the Home screen (by pressing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



Wired Ethernet Diagnostics Execution

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:

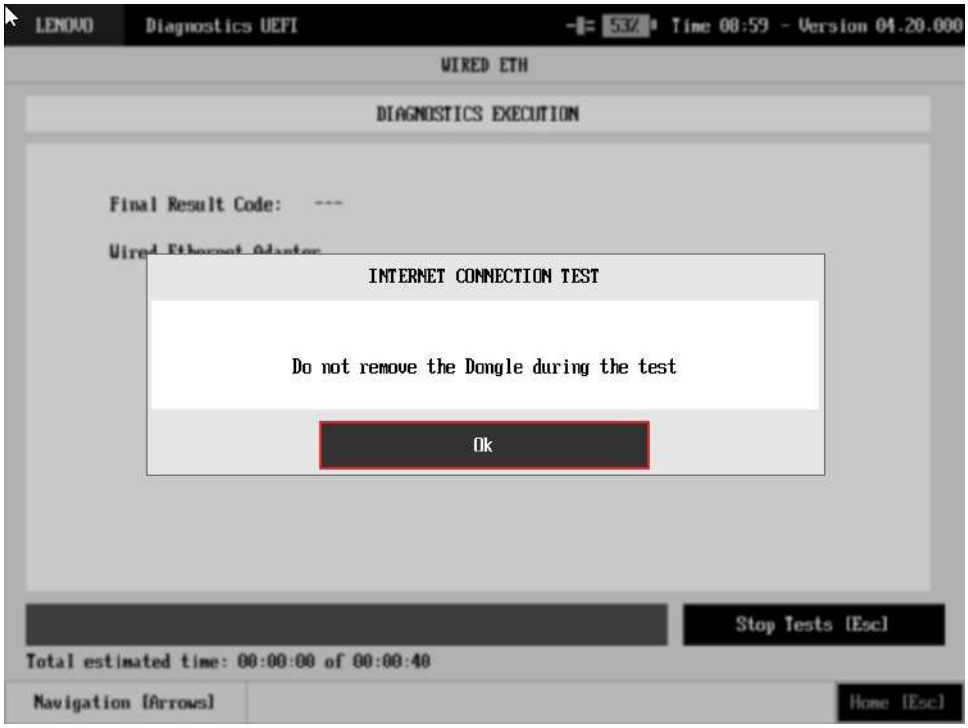
- Final Result Code (an encrypted code that informs which modules were tested).
- Date and time that diagnostic has started.
- Test (name of the test being currently run).
- Progress of the current test (current test's progress in percentage).
- Total estimated time of the current suite of diagnostic 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

Wired Ethernet Device Selection

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

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

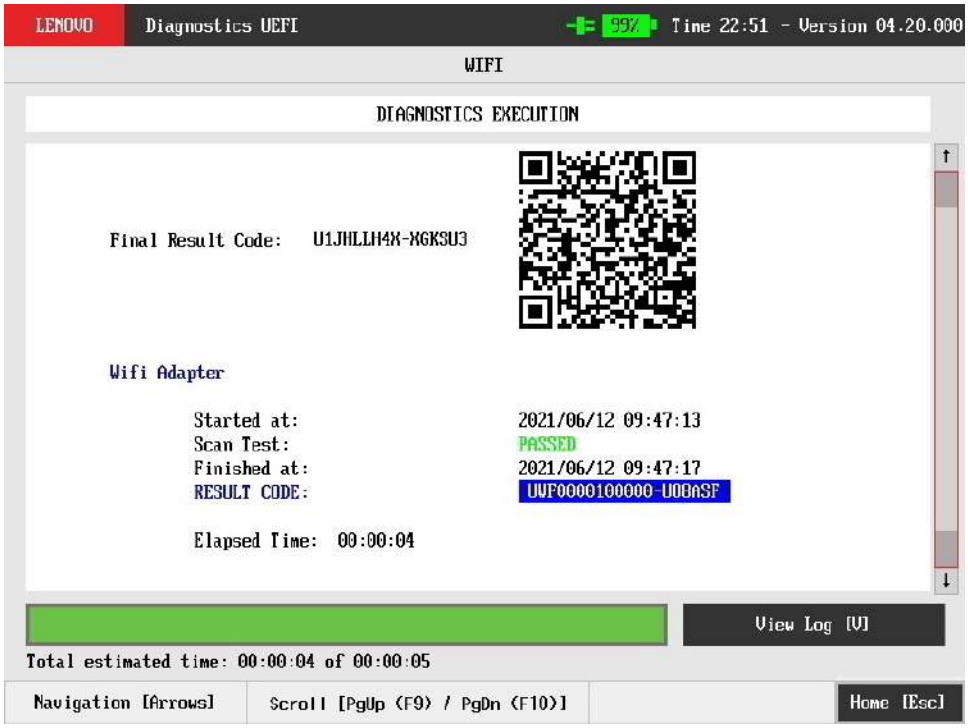
The system allows the user to access the WiFi diagnostics from the Home screen, Diagnostics, WiFi. After the user accesses the WiFi option, the application will display the available WiFi tests:

- **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:



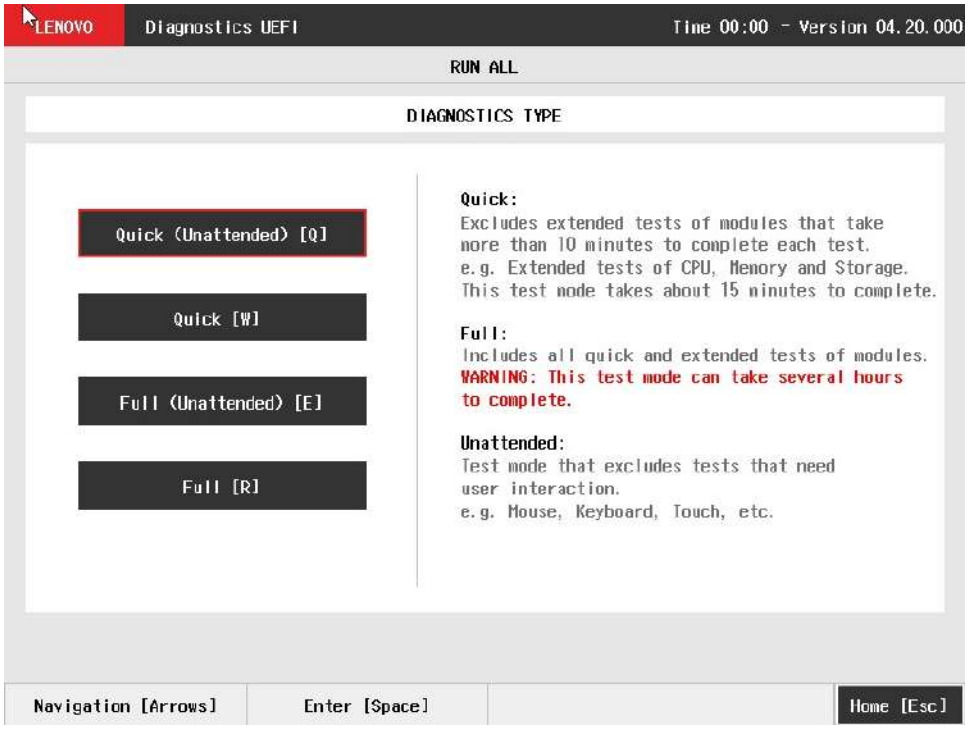
WiFI Diagnostic Execution Result

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.



Run All Diagnostics Type

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]:

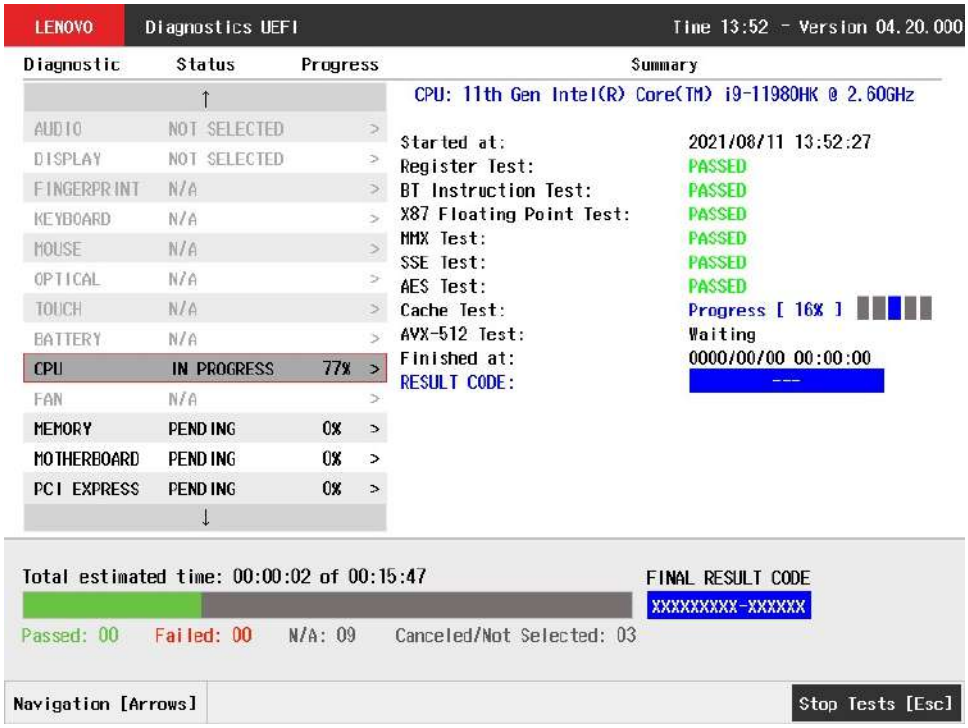
- If a module has only extended tests, it will be displayed as **Not Selected**
- Extended tests will be displayed as **Not Selected** and won't be executed

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.



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:

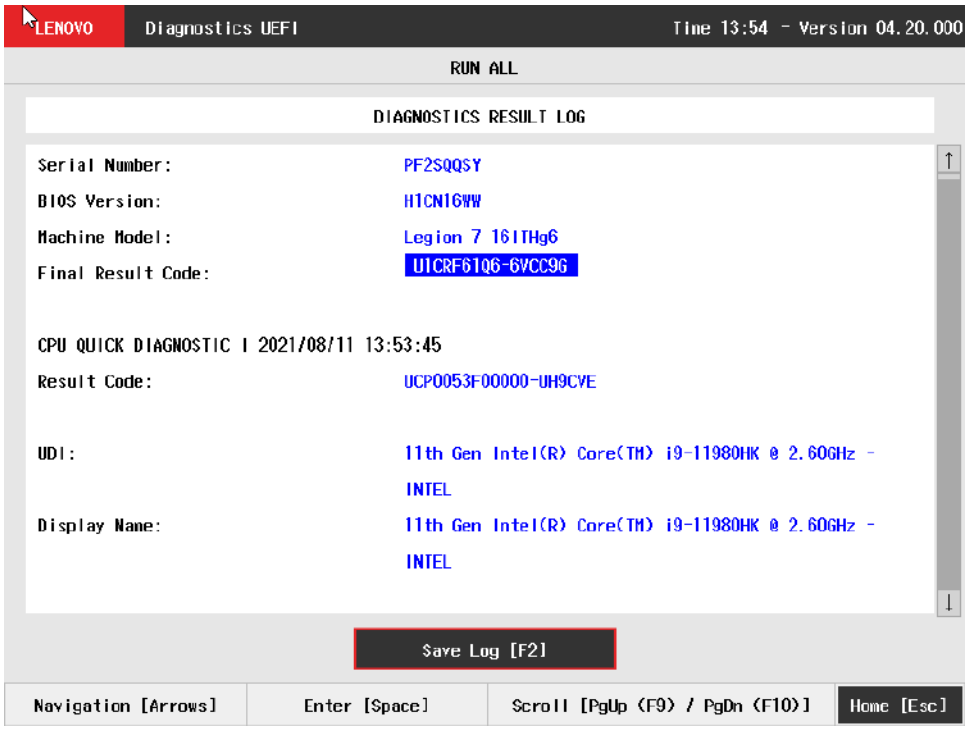
- Final Result Code (an encrypted code that informs which modules were tested).
- Date and time that diagnostic has started.
- Test (name of the test being currently run).
- Progress of the current test (current test's progress in percentage).
- Total estimated time of the current suite of diagnostic 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 indicates 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.



Run All Diagnostics Result Log

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

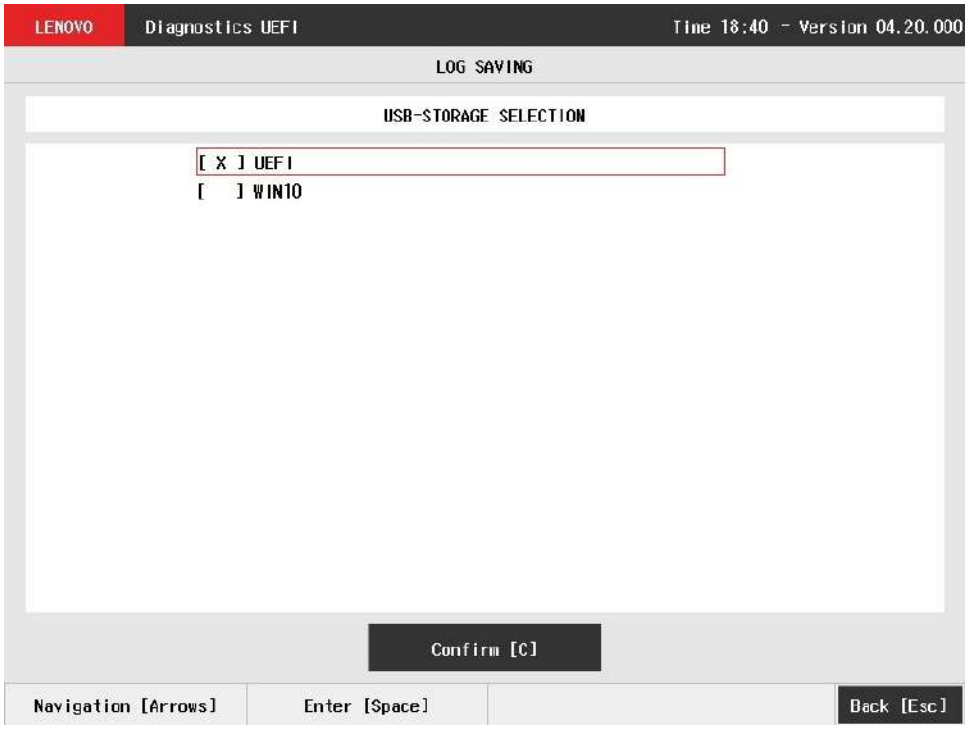
The Application Header Bar contains the name of the application, system's time and application's current version; the Screen Title and Screen Sub-title Bars help the user to be attentive of where s/he is throughout the application; and the Instruction Footer Bar contains additional instructions for using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

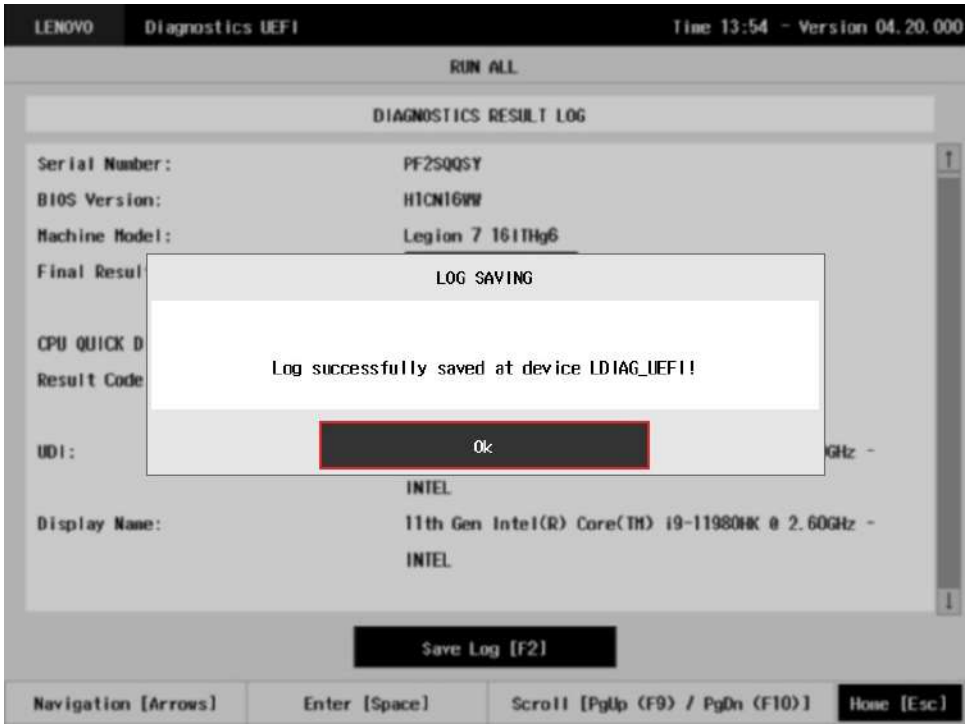
The Log Saving screen is composed of:

- 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.

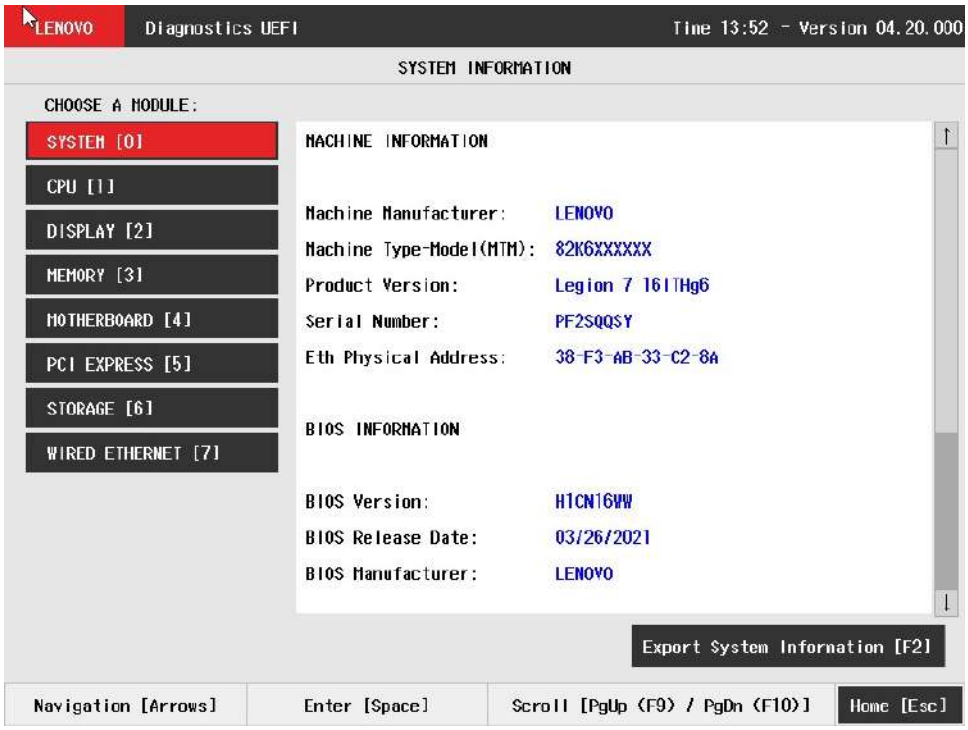
If the saving operation is successful, a window will be displayed to inform the user that the operation was successful (as shown in the next figure). If the operation does not work, a window will be displayed to inform the user that the operation was not successful. In both cases, the user must press 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.



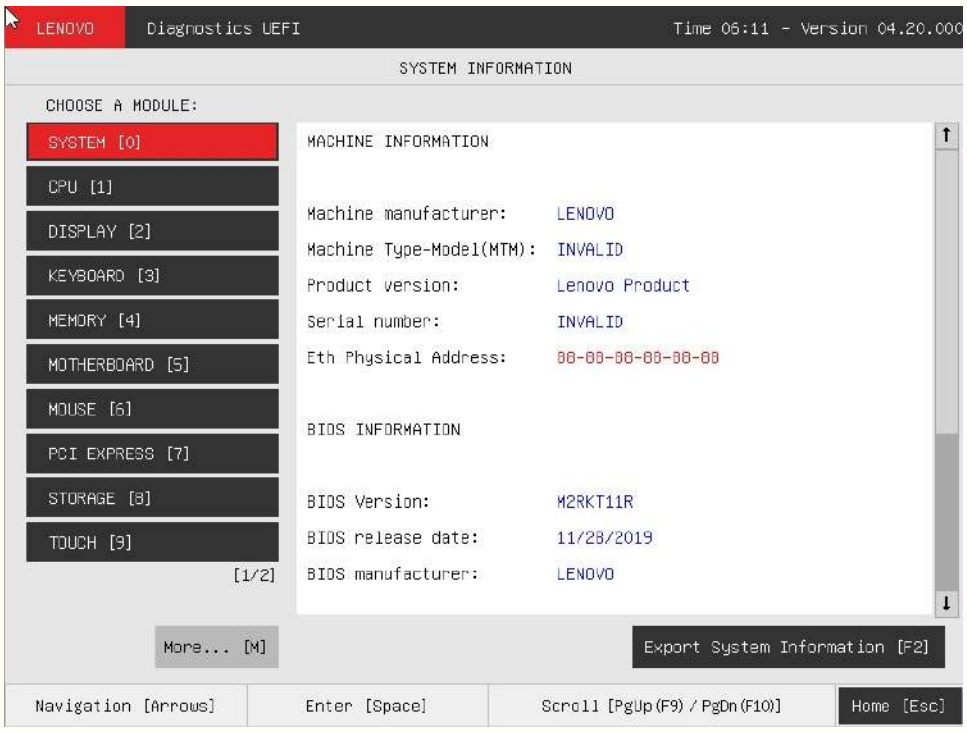
System Information's System Tab

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:

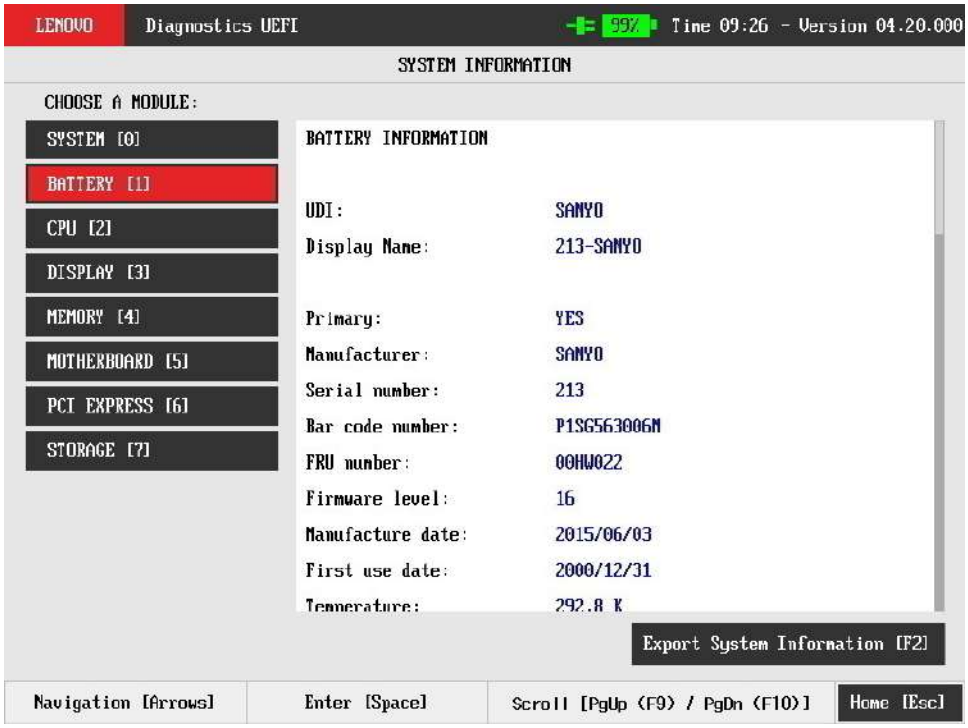
- "88-88-88-88-87-88"
- "88-88-88-88-88-87"

Example in the figure below:



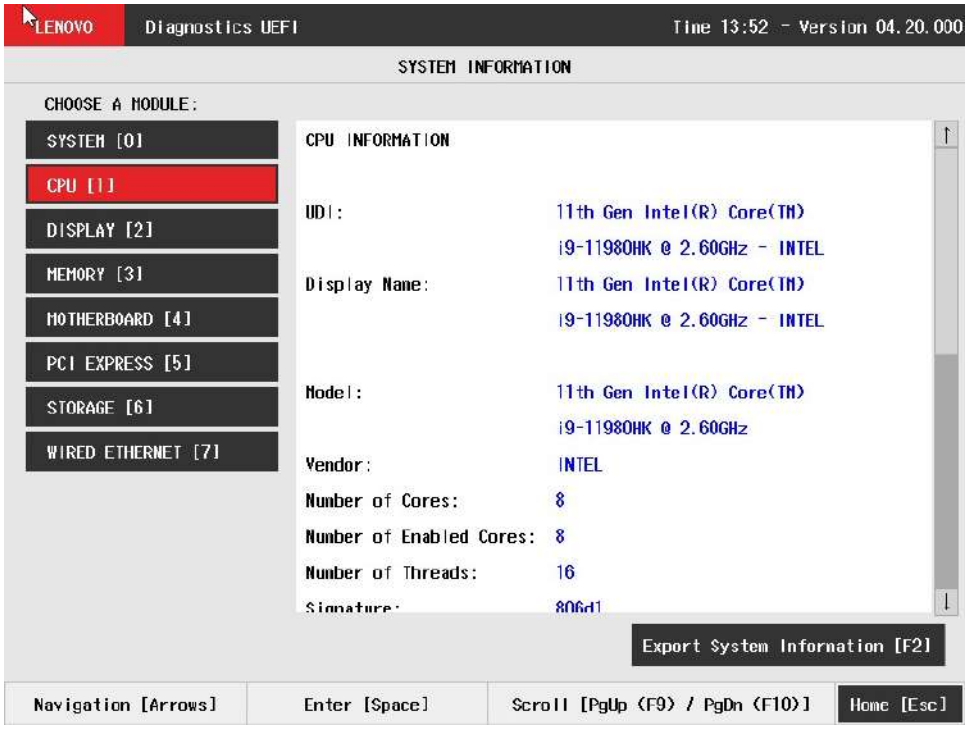
System Information's System Tab

The System Information screen with the Battery tab selected is shown in the following figure.



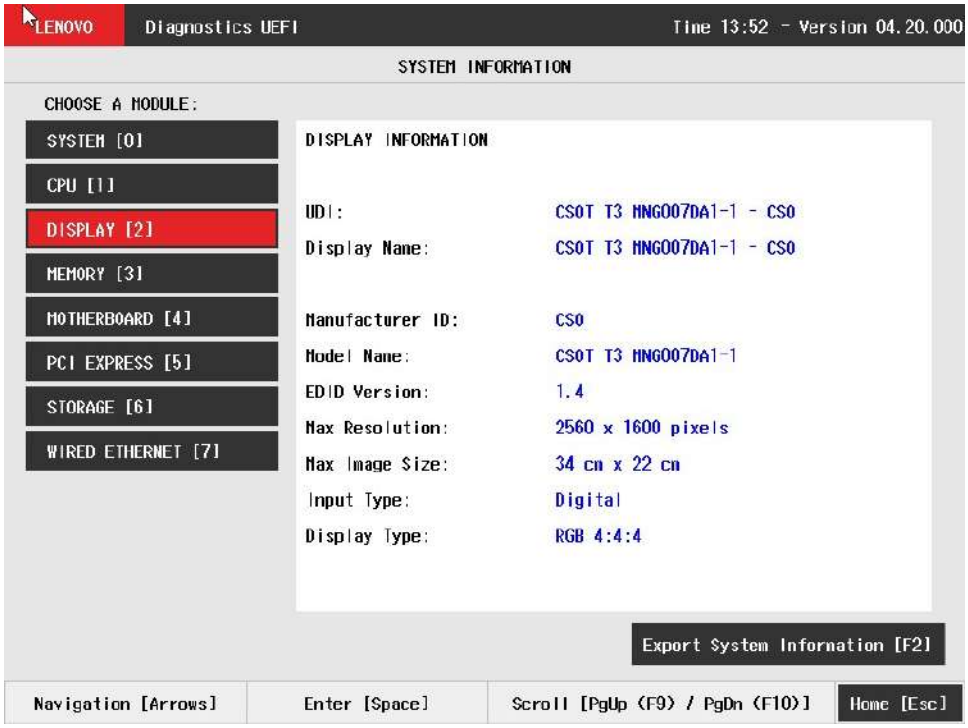
System Information's Battery Tab

The System Information screen with the CPU tab selected is shown in the following figure.



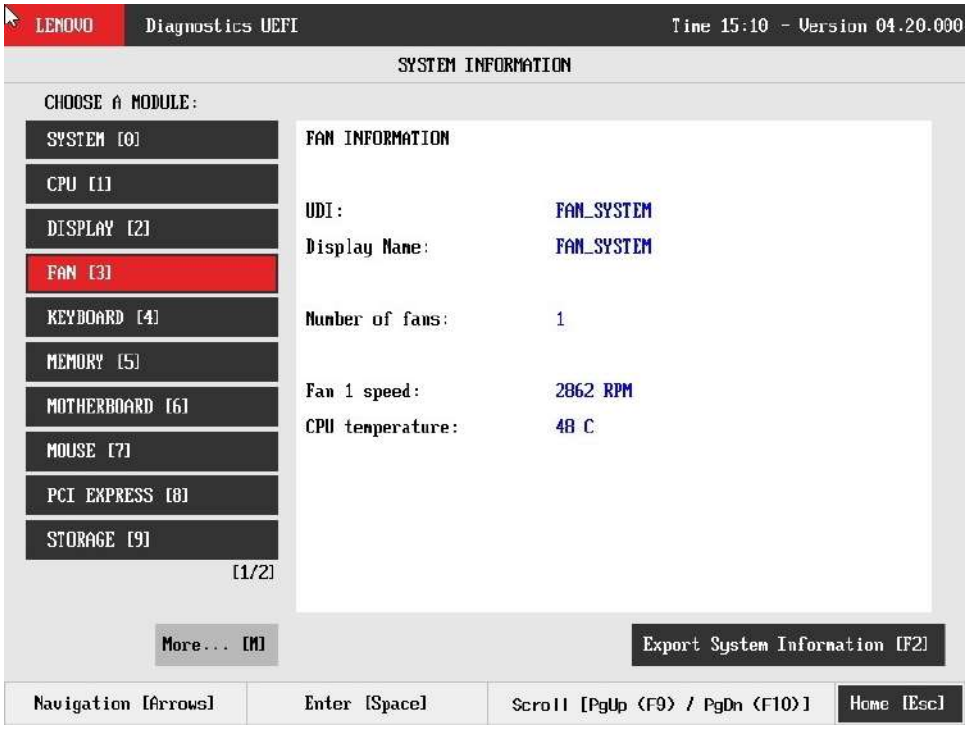
System Information's CPU Tab

The System Information screen with the Display tab selected is shown in the following figure.



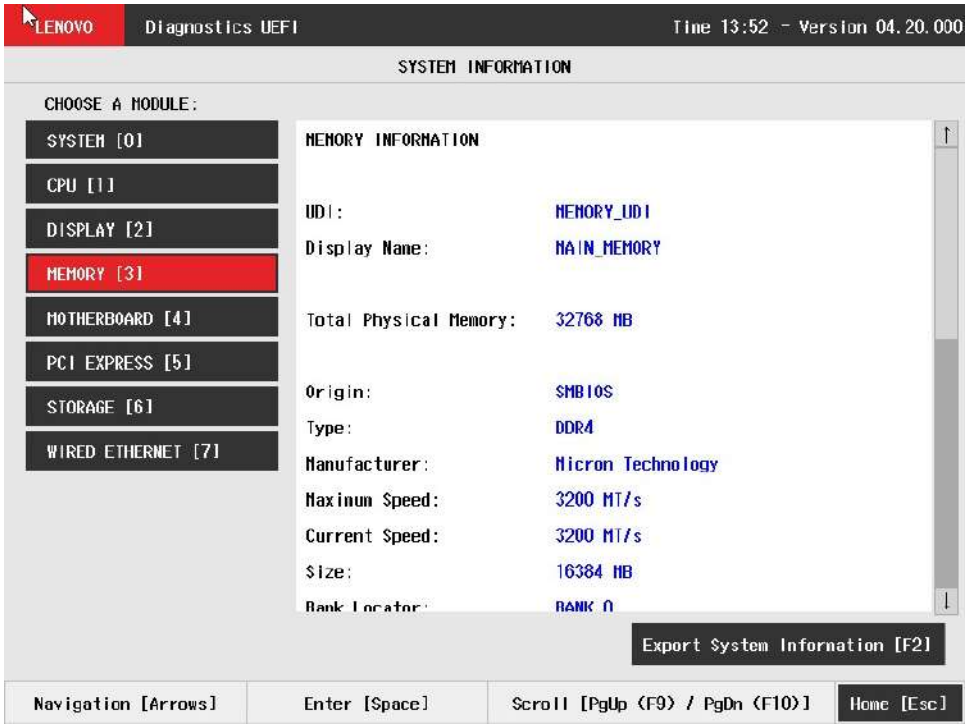
System Information's Display Tab

The System Information screen with the Fan tab selected is shown in the following figure.



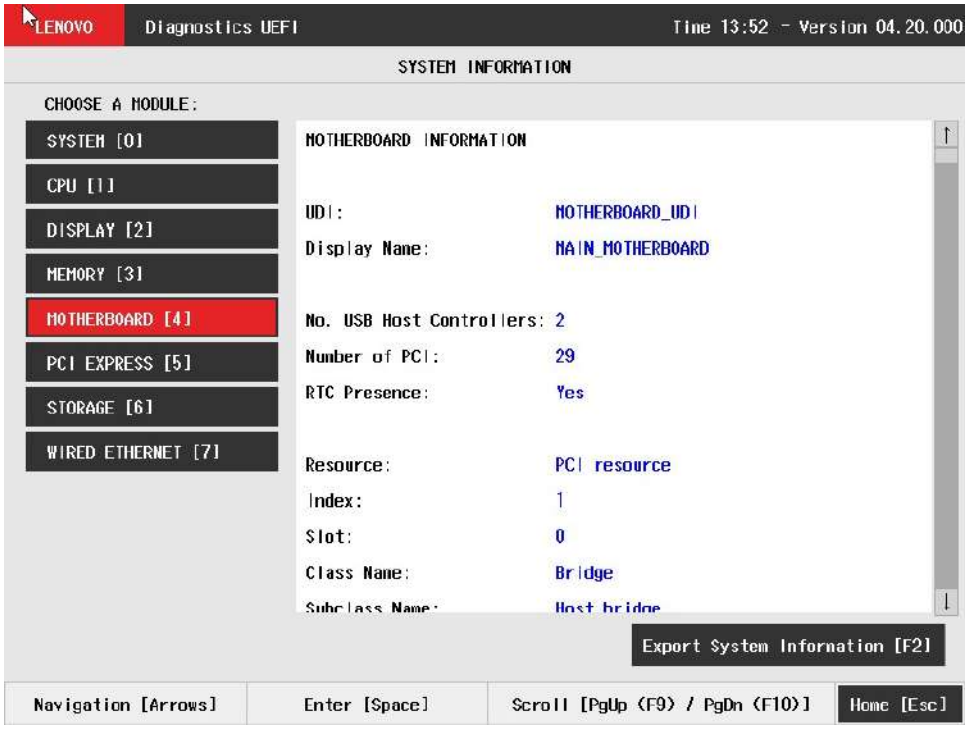
System Information's Fan Tab

The System Information screen with the Memory tab selected is shown in the following figure.



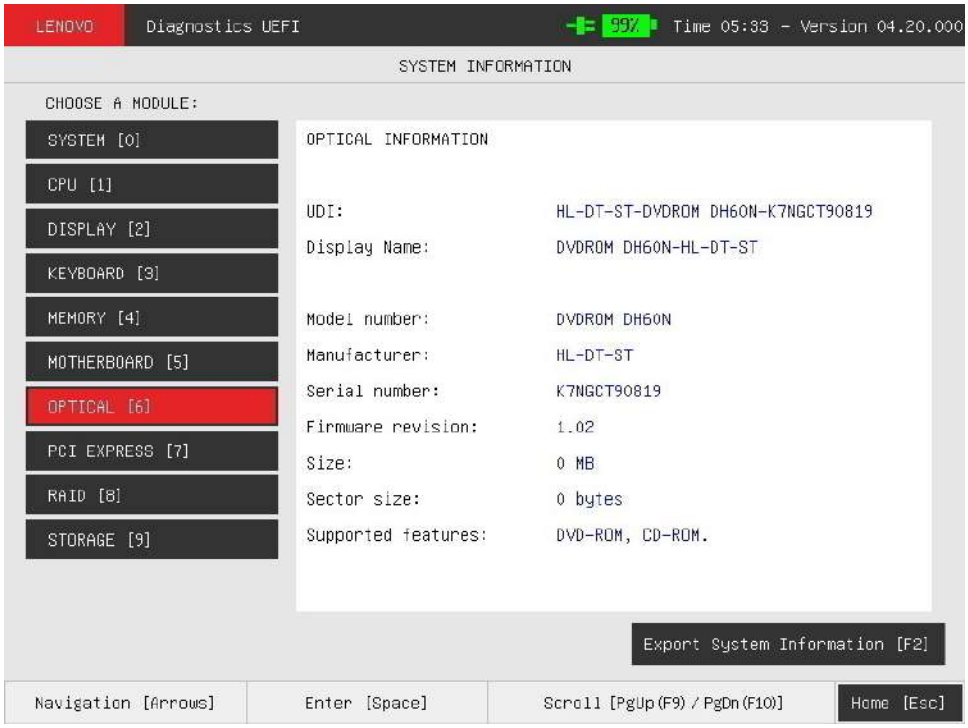
System Information's Memory Tab

The System Information screen with the Motherboard tab selected is shown in the following figure.



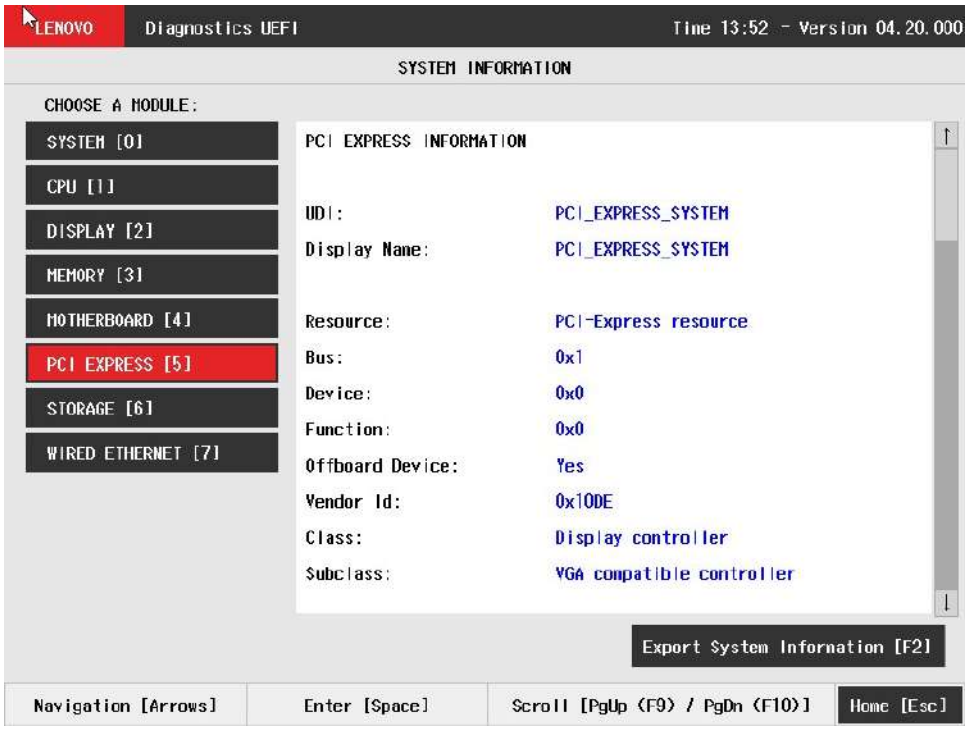
System Information's Motherboard Tab

The System Information screen with the Optical tab selected is shown in the following figure.



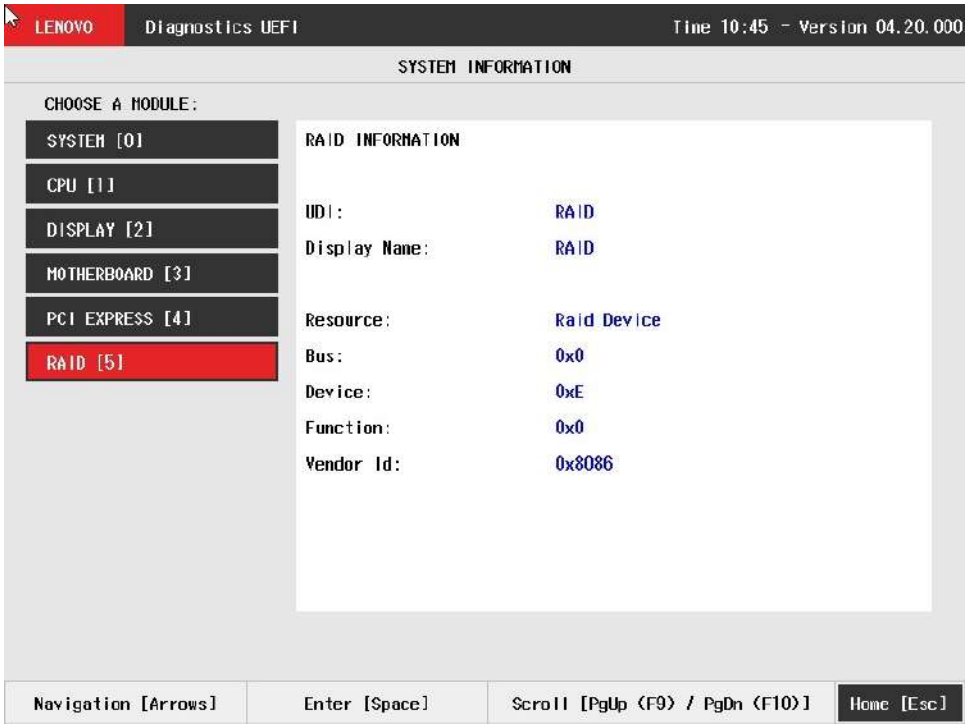
System Information's Optical Tab

The System Information screen with the PCI Express tab selected is shown in the following figure.



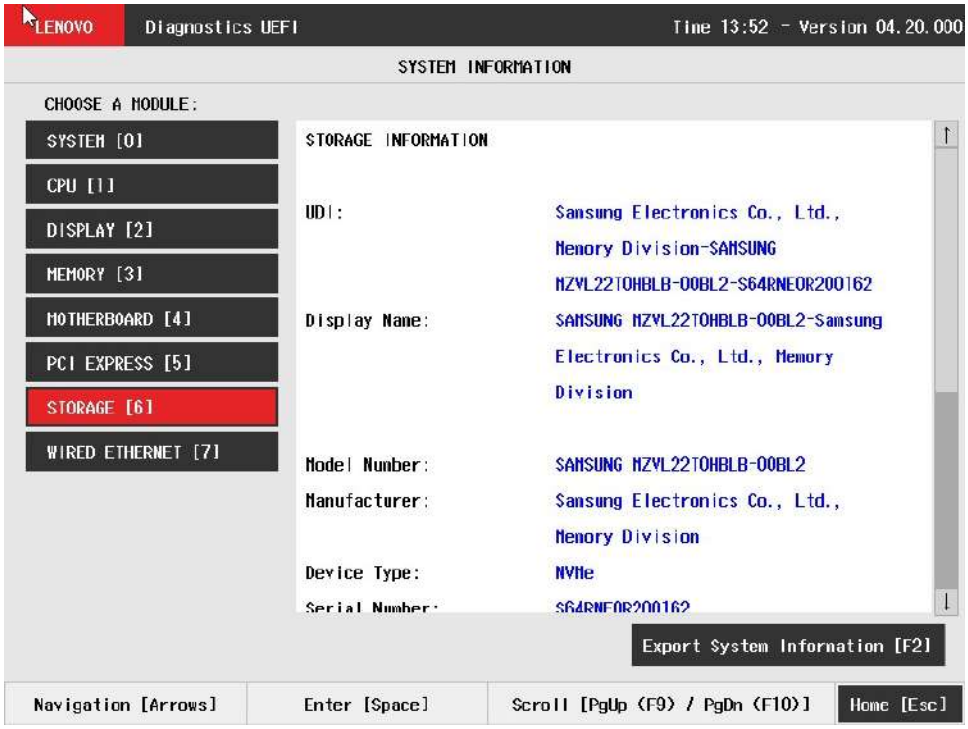
System Information's PCI Express Tab

The System Information screen with the RAID tab selected is shown in the following figure.



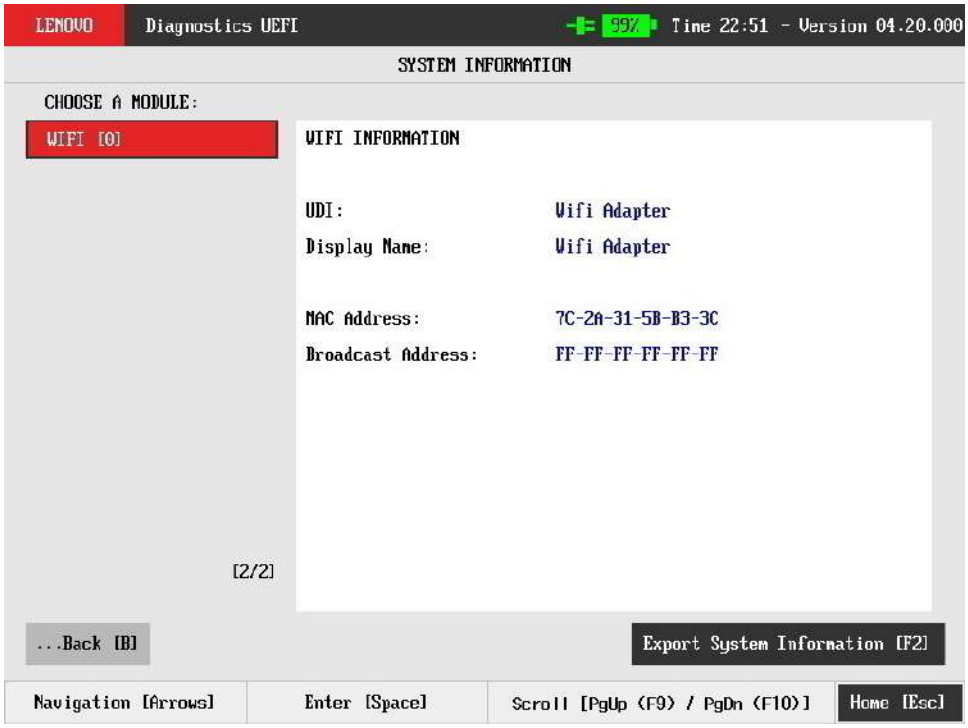
System Information's RAID Tab

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.



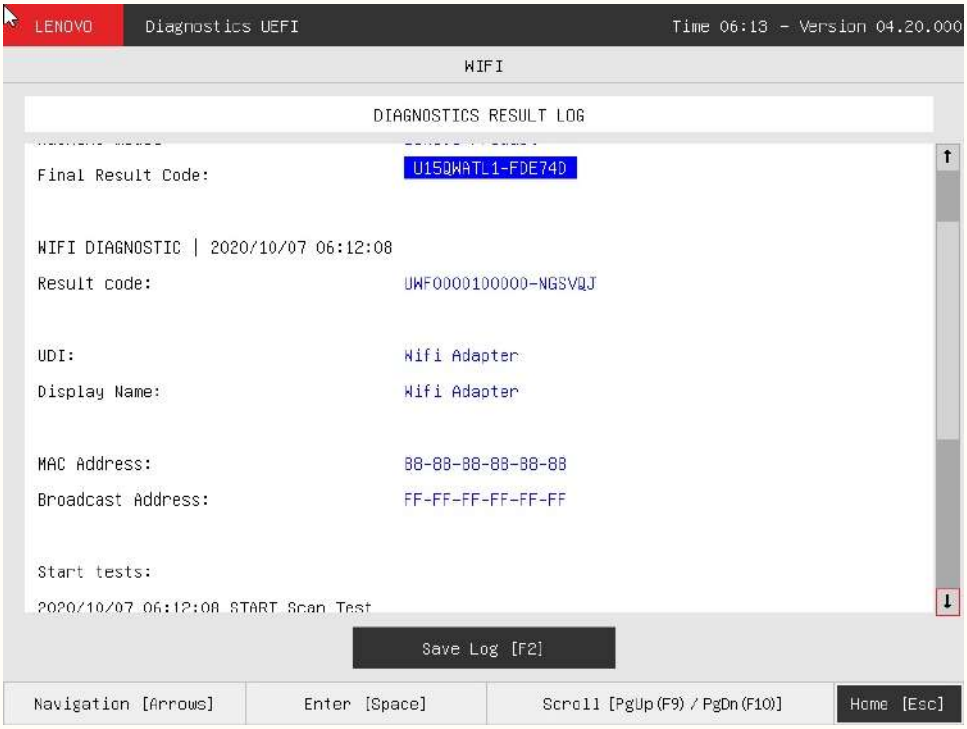
System Information's WiFi Tab

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:

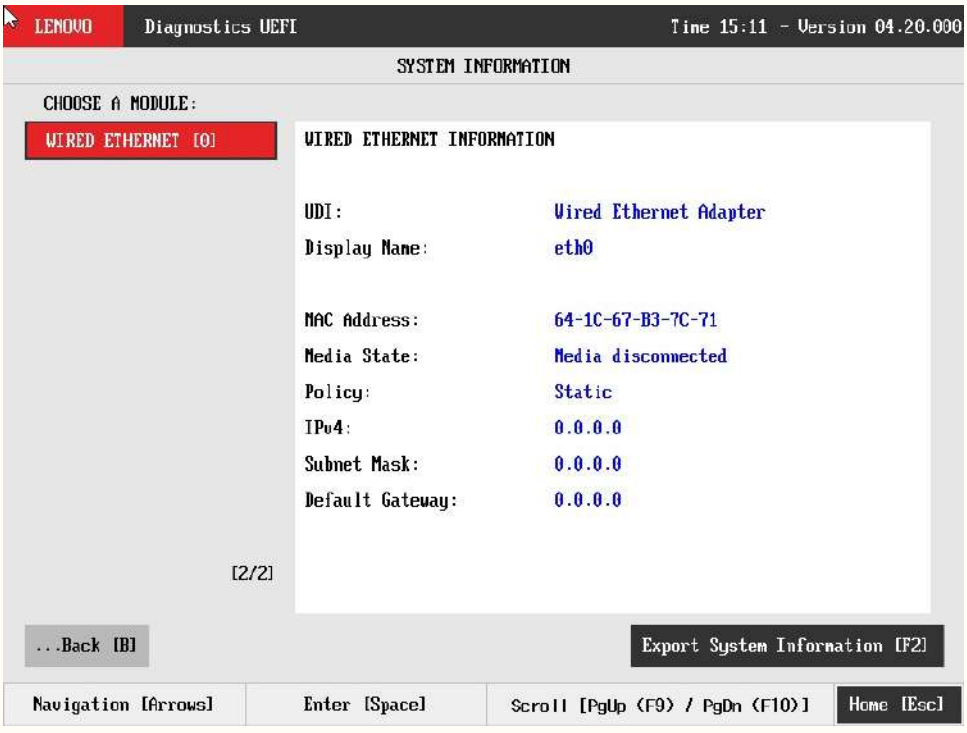
- "88-88-88-88-87-88"
- "88-88-88-88-88-87"

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:

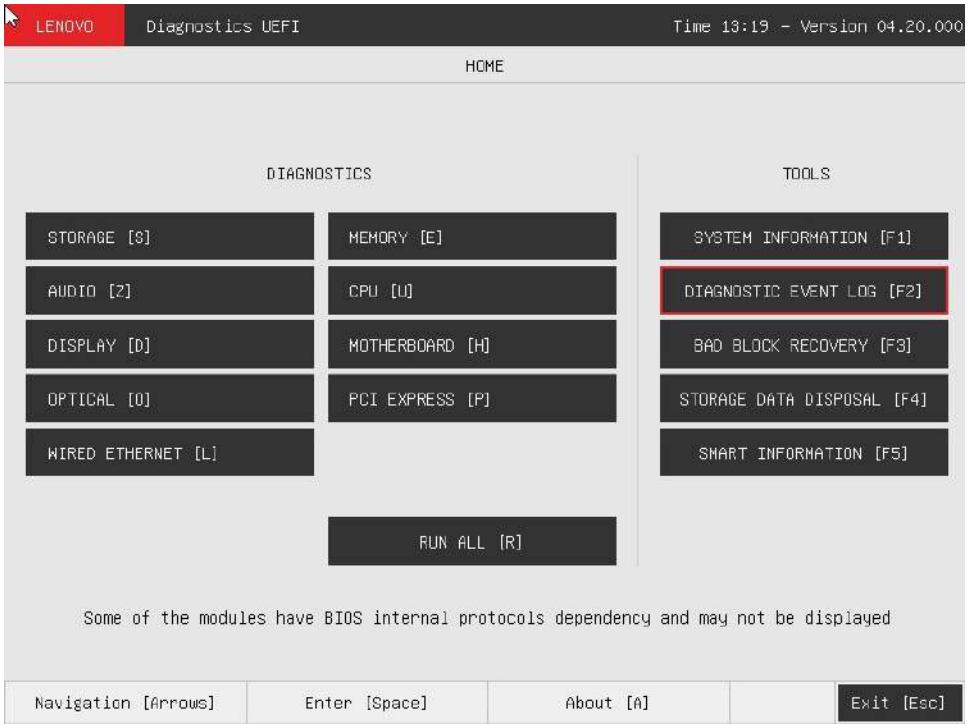
- UDI;
- Display Name;
- MAC Address:
- Media State;
- Policy;
- IPv4;
- Subnet Mask
- Default Gateway;
- DNS Server 1;

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)

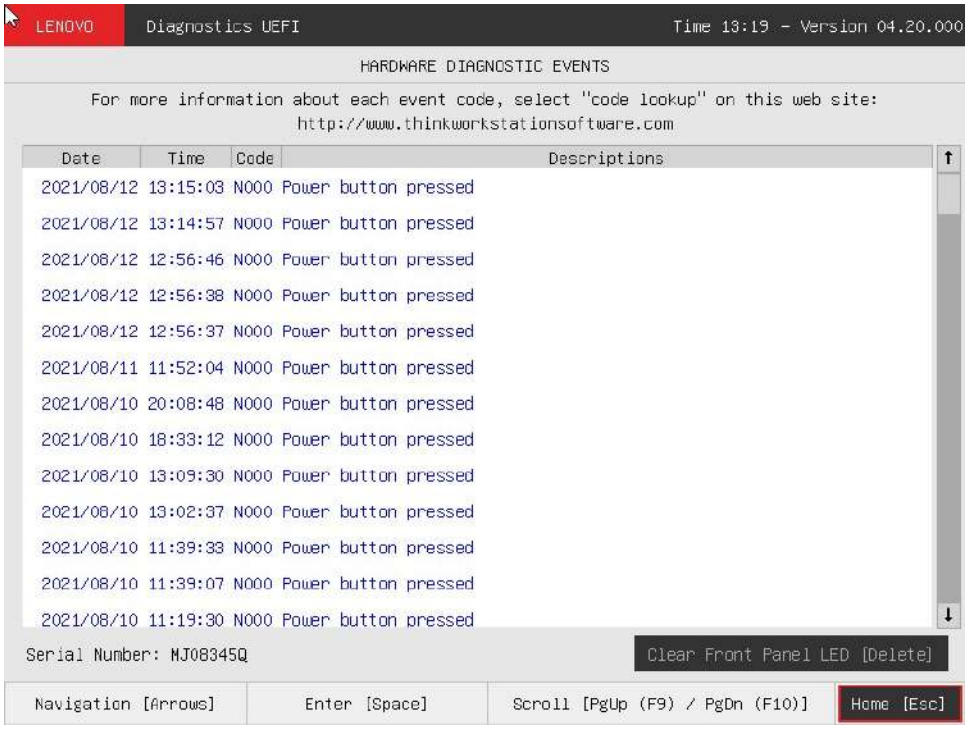
Hardware Diagnostic Events are exhibited by accessing the Home screen, Tools, Diagnostic Event Log.

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

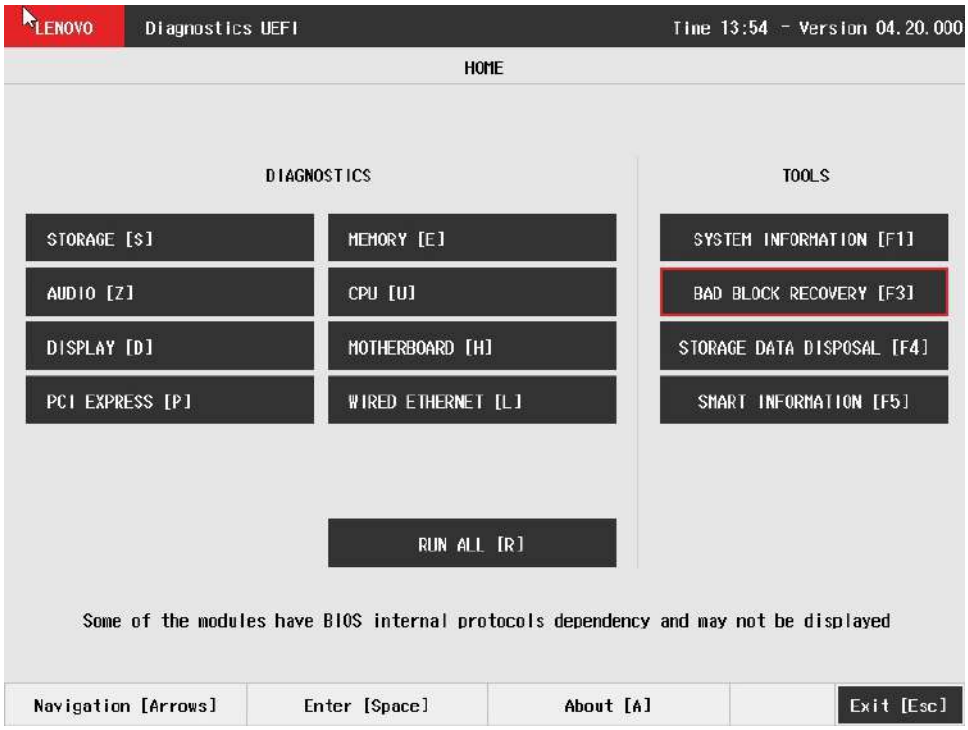
The application may be unable to retrieve the requested information. When that occurs, users can use the "Clear Front Panel LED" button to be able again to retrieve hardware diagnostic events.

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.

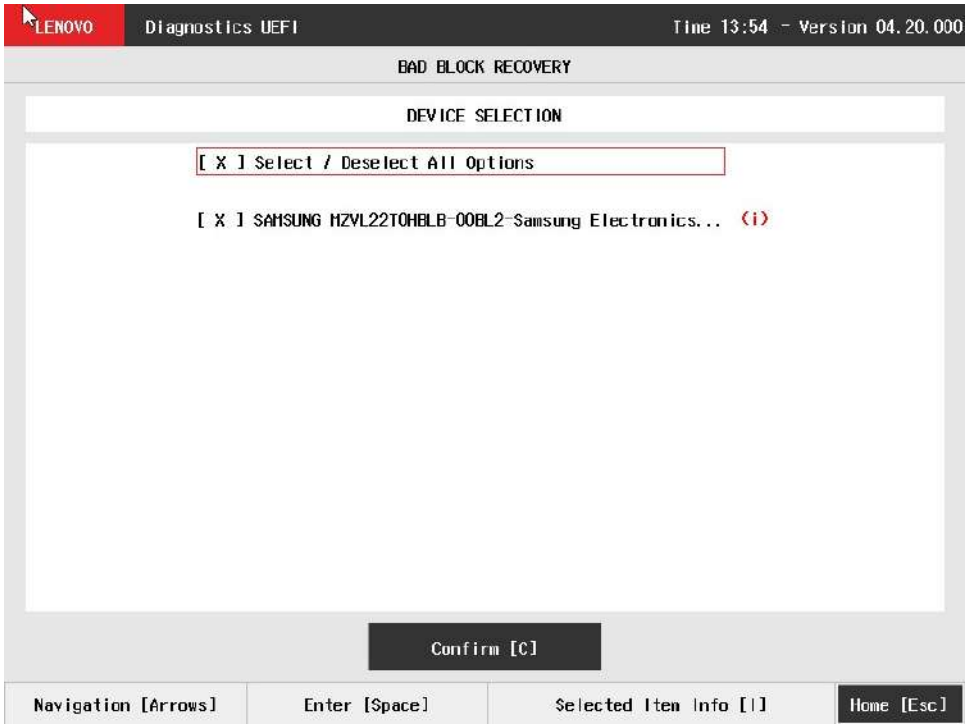
The system allows the user to access that tool by accessing the Home screen, Tools, Bad Block Recovery.

> ⚠ 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

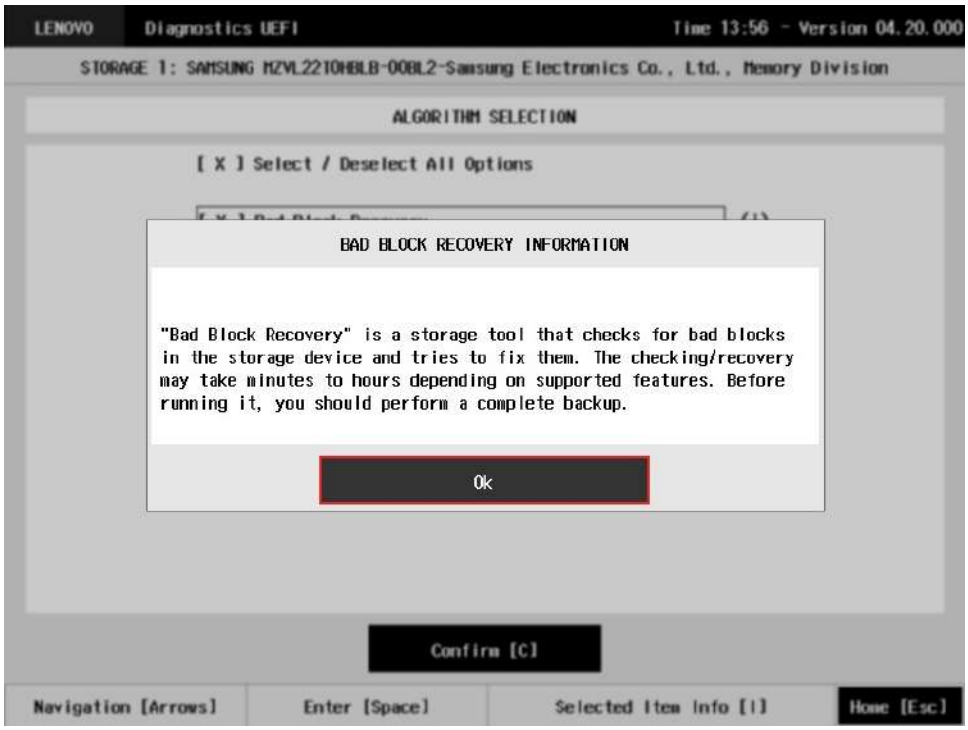
This screen also allows seeing devices details. To access this feature, the user has to press the I key when the desired device is focused, leading to the exhibition of a popup with the device information, as shown in the subsequent figure.

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).

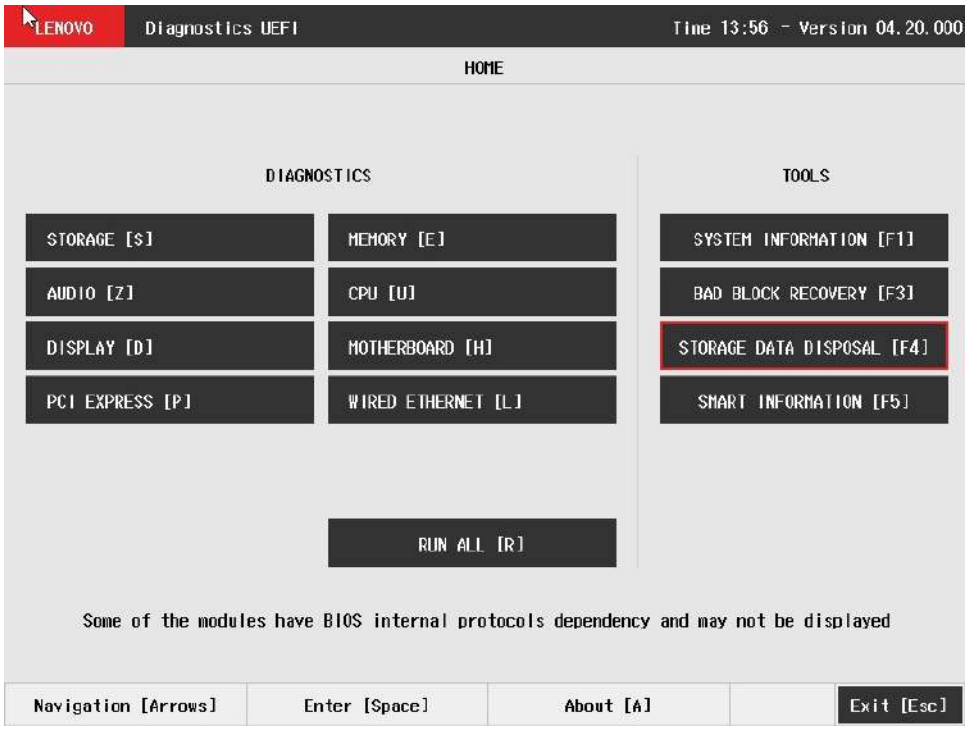
Storage Data Disposal

Data Disposal Tool is a storage tool that erases all data from storage device.

> Storage Data Disposal tool is available in Bootable version only and relies on UEFI protocols availability

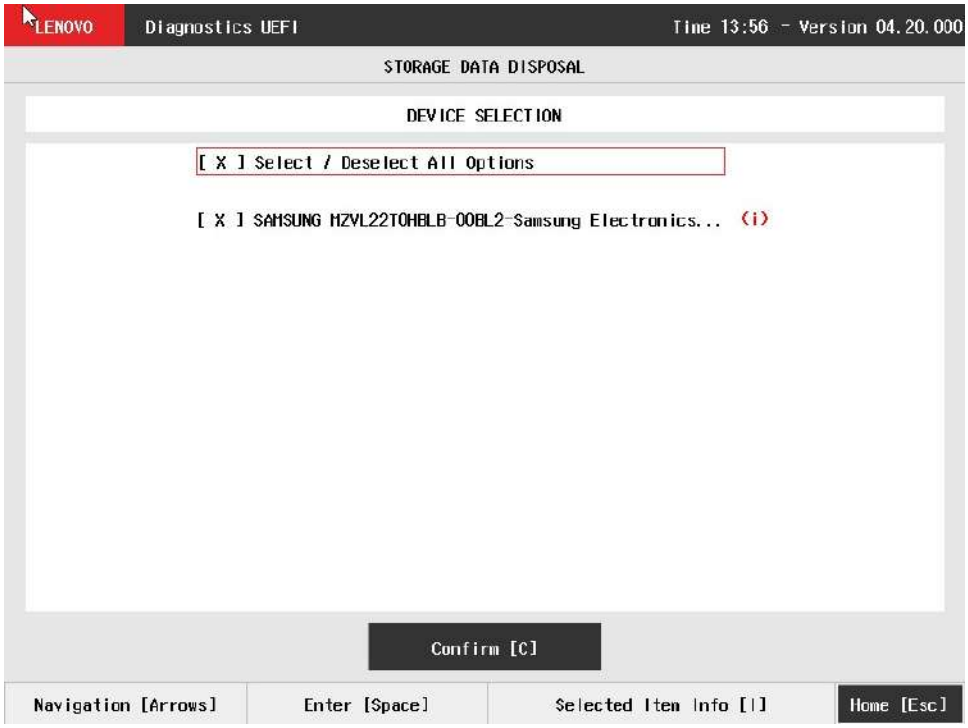
> The data erasing process may take a long time to complete. Before running it, you should perform a complete backup as the data will not be restorable from the disk

The system allows the user to access this tool by accessing the Home screen, Tools, Storage Data Disposal



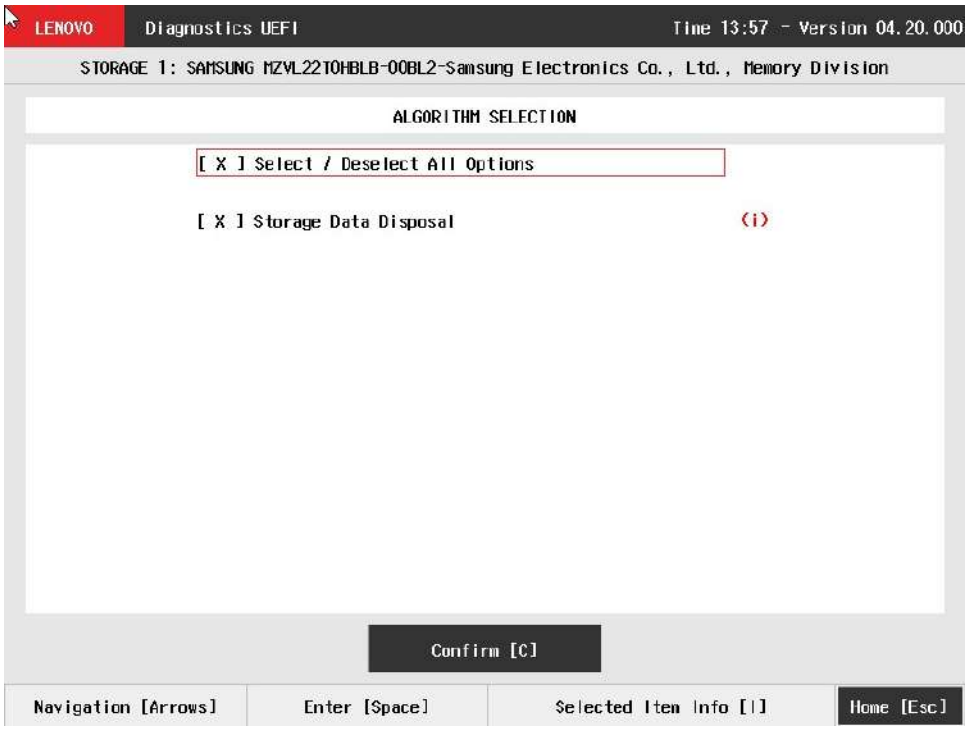
Storage Data Disposal Tool

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.



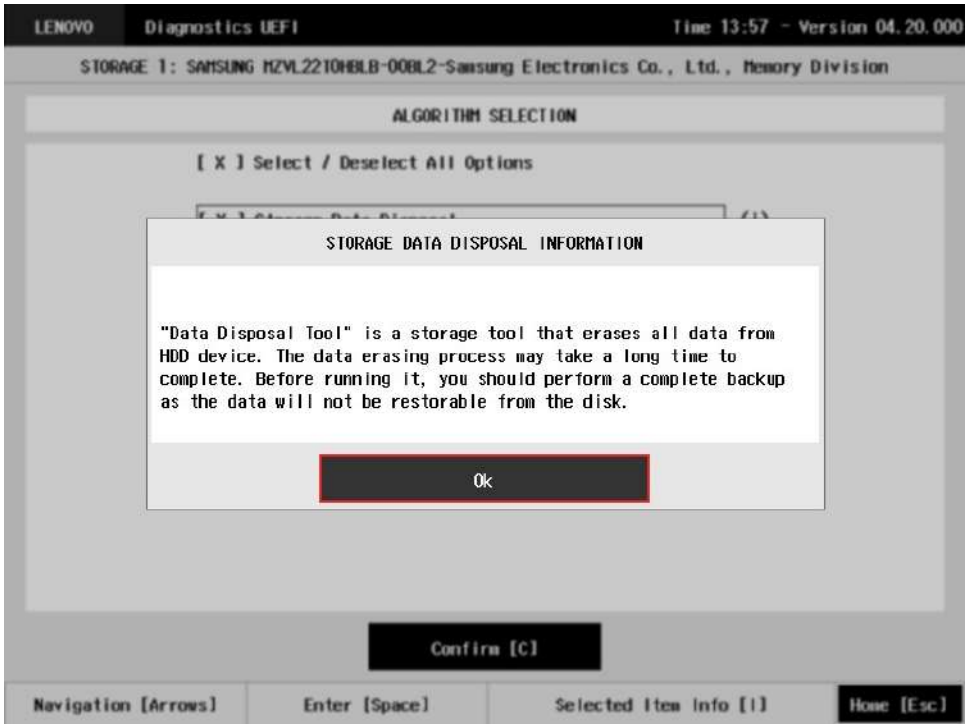
Storage Data Disposal Device Selection

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.



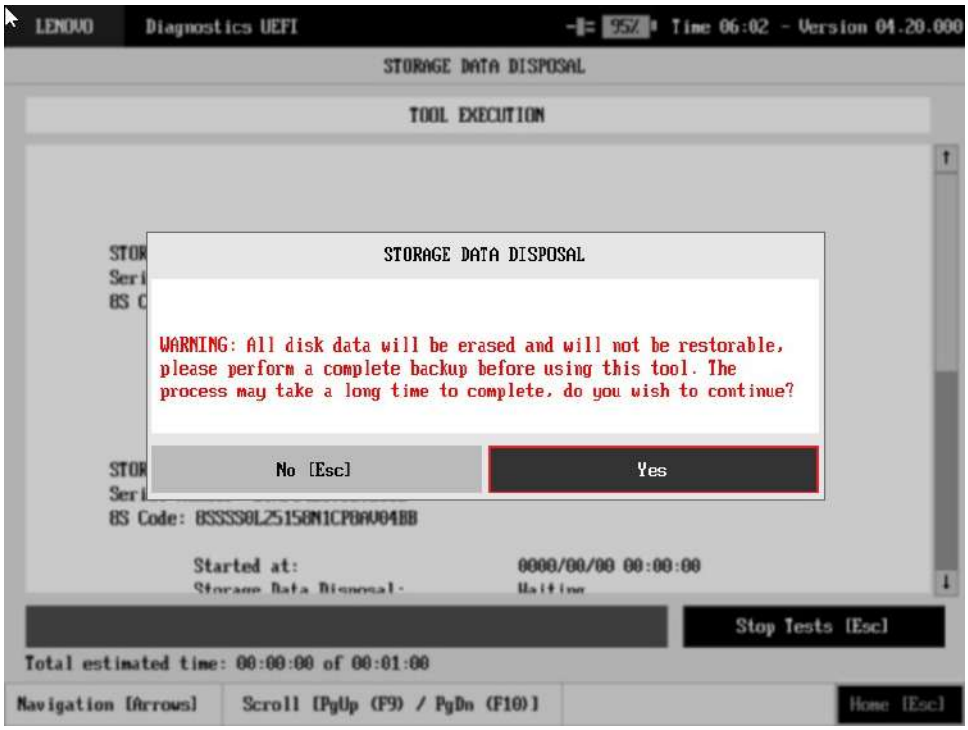
Storage Data Disposal Algorithm Selection

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.



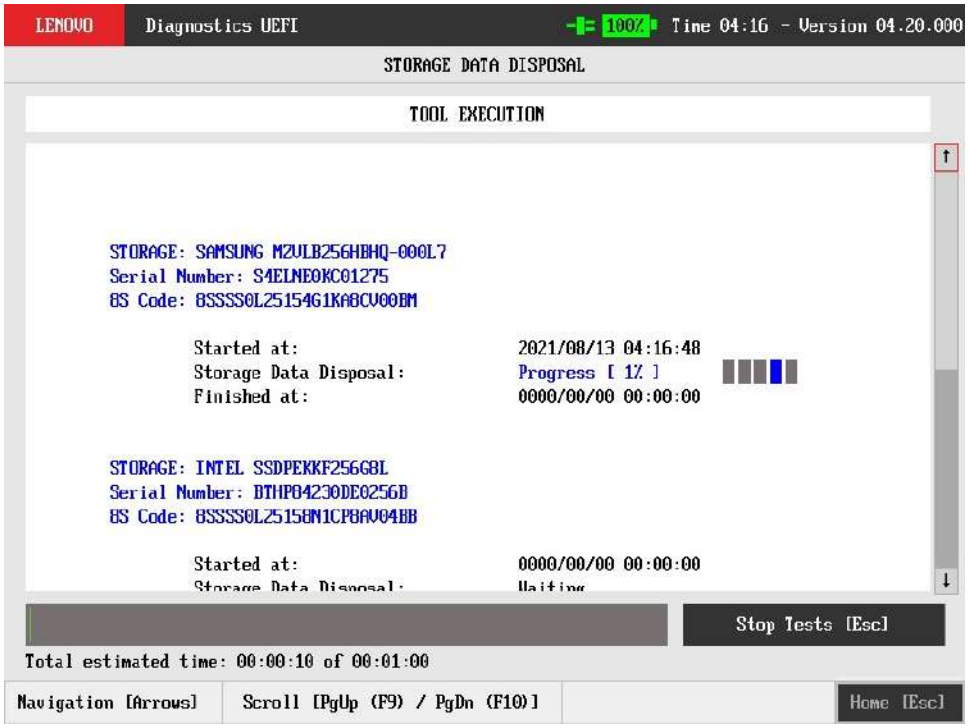
Storage Data Disposal Information

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:

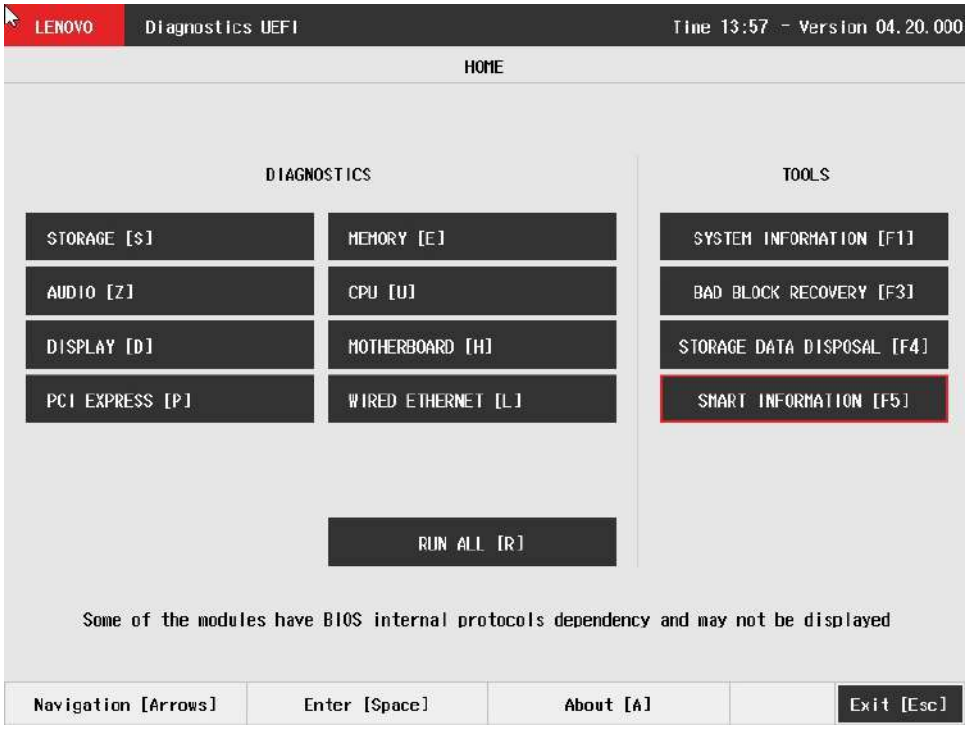
- Final Result Code (an encrypted code that informs the algorithm's execution).
- Date and time that the operation has started.
- Storage Data Disposal (name of the algorithm being currently run).
- Progress of operation (algorithm's progress in percentage).
- The tool's algorithm can have these status:
    - **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.

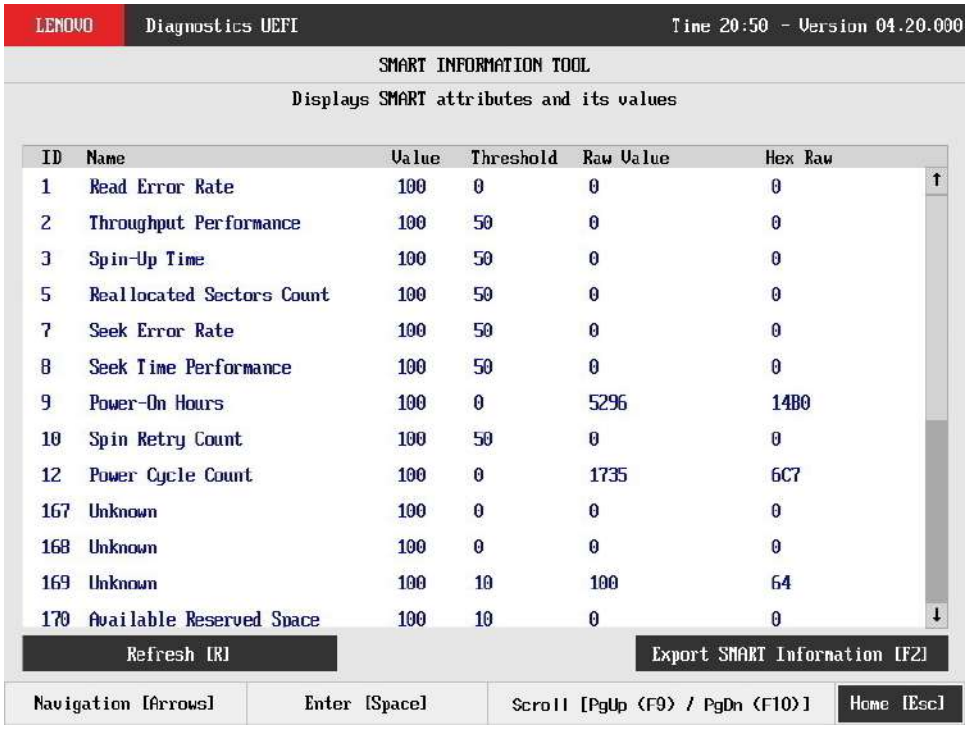


SMART Information home

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

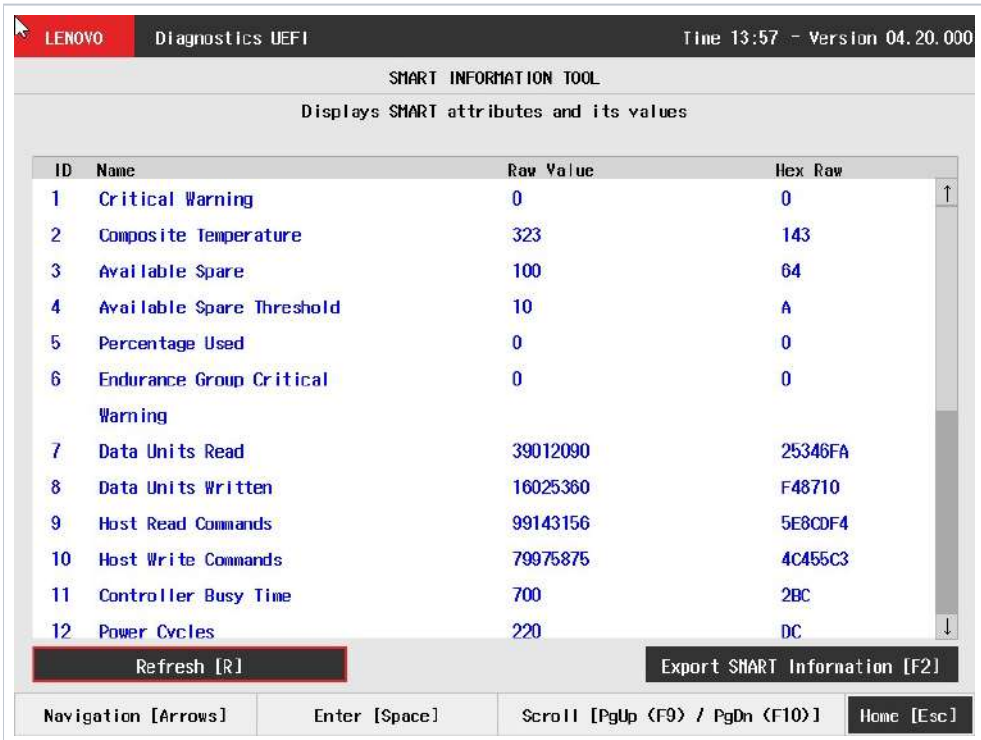
An item can be selected/deselected by pressing SPACE when it is highlighted. A desired item is selected when it shows "[X]" preceding it. In order to continue, the user has to press ENTER on the button Confirm. As a result, the system will show the SMART Information, as illustrated in the next figure.



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

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:



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

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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