Lenovo Diagnostics UEFI Embedded/Bootable v04.08.000

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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:**
   1. Go to www.Lenovo.com/diags
   2. Click on "Downloads"
   3. Under "Lenovo Diagnostics UEFI Bootable", click on "Create Bootable USB with UEFI Diagnostics"
   4. 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*.)
   5. Download Bootable Generator Zip file
2. **Run the Bootable Generator application.**
   1. Insert a USB flash drive
   2. Go to the folder where you saved the bootable generator and double click on it
   3. Double click "BootableGenerator.exe"
   4. 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.
   5. Click on "Search". Click on the image name that you saved in step 1, letter d.
   6. Click on "Generate".
   7. 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.
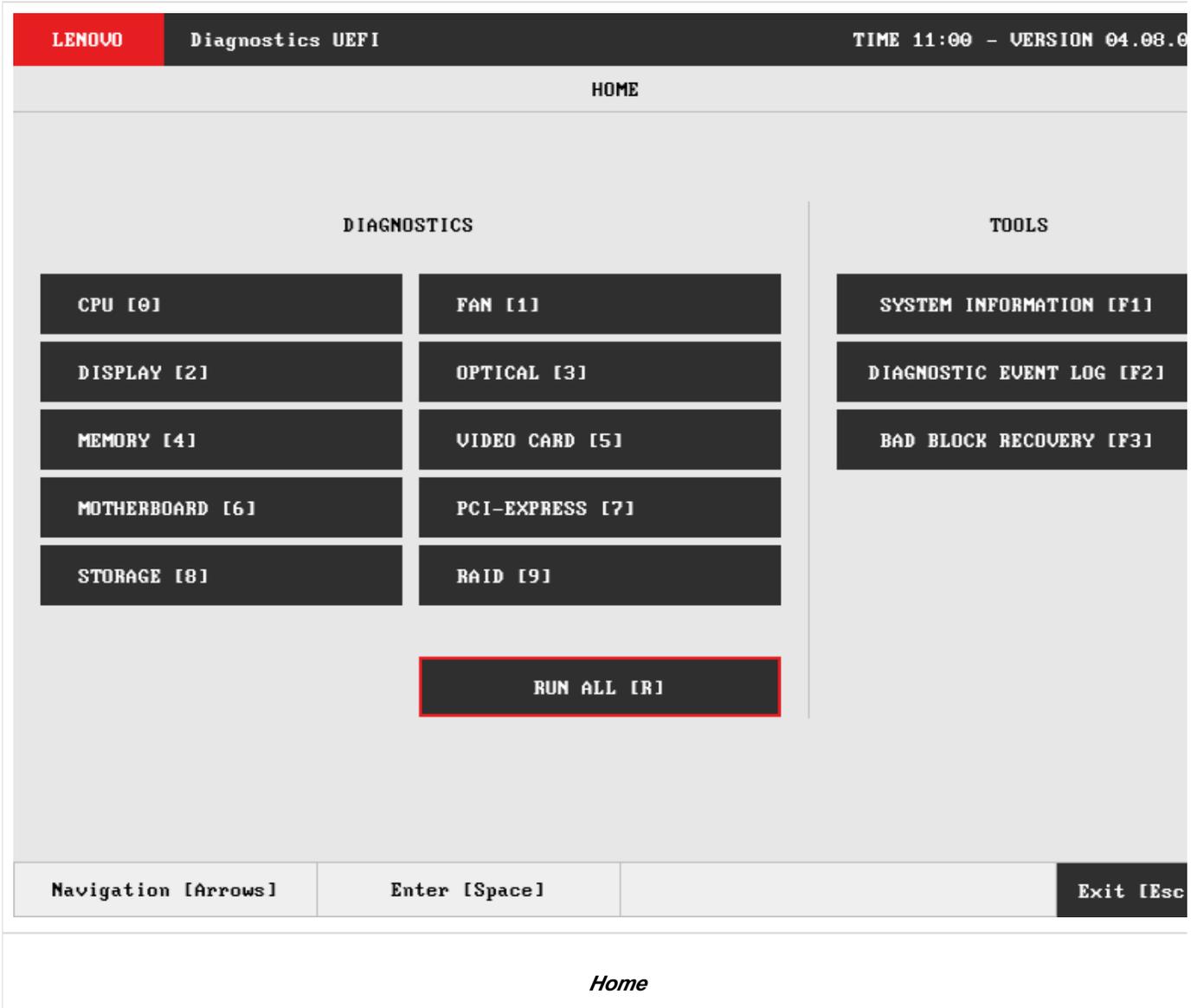
Home

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 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.
    - 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.

- Battery: It selects and runs battery 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.
- 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: It selects and runs storage 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.
- Bad Block Recovery: It allows to recover bad blocks on storage devices.
- Hardware Diagnostic Events: It exhibits diagnostic events retrieved from the hardware.

Run the Lenovo Diagnostics UEFI Embedded
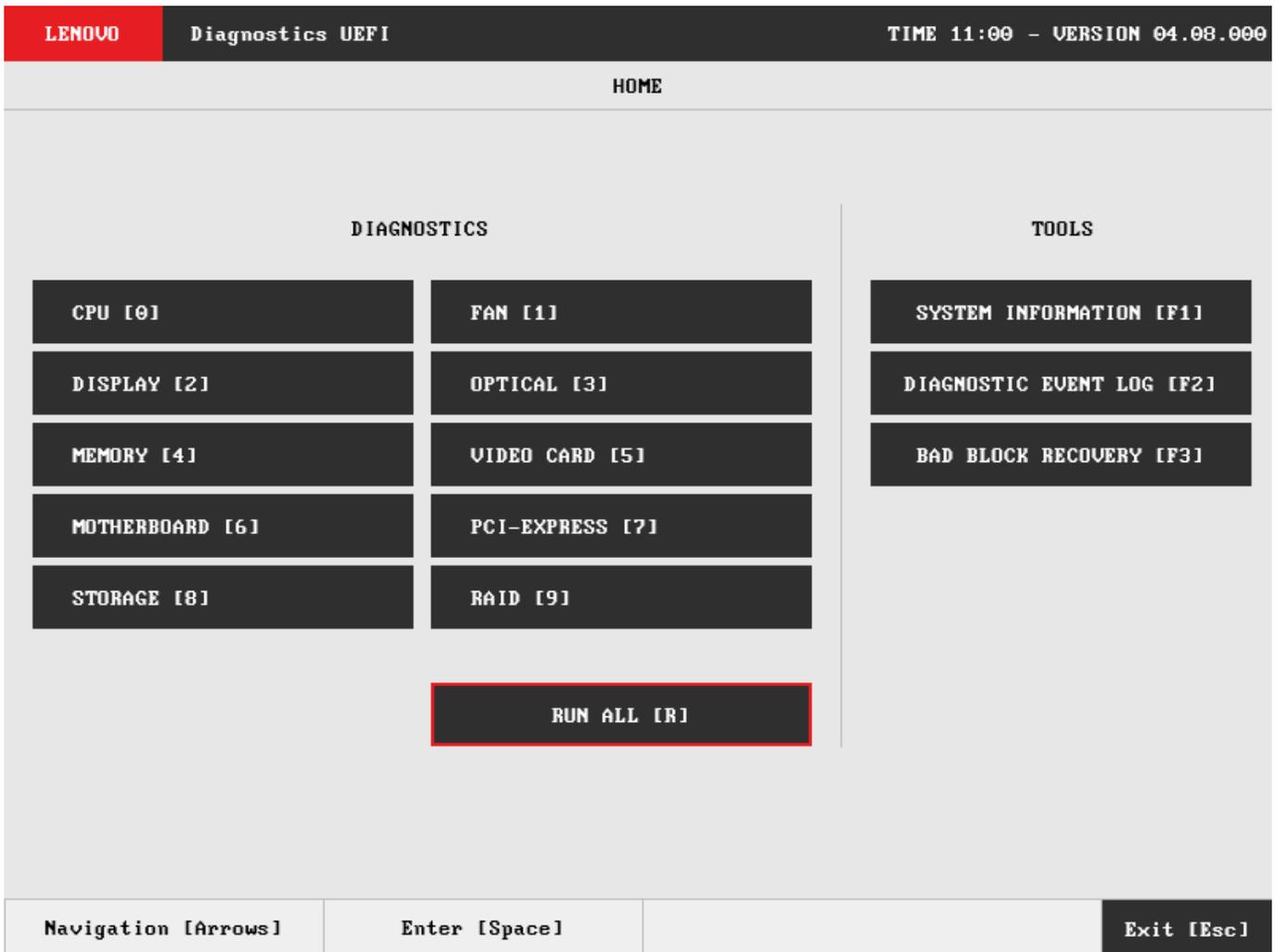
1. Boot the system, then immediately press:

   • F10 for Think systems
   • F11 for Idea systems

2. The UEFI diagnostics menu will be displayed on your screen.

Home

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

HOME

DIAGNOSTICS

CPU [0]	FAN [1]
DISPLAY [2]	OPTICAL [3]
MEMORY [4]	VIDEO CARD [5]
MOTHERBOARD [6]	PCI-EXPRESS [7]
STORAGE [8]	RAID [9]

RUN ALL [R]

TOOLS

SYSTEM INFORMATION [F1]

DIAGNOSTIC EVENT LOG [F2]

BAD BLOCK RECOVERY [F3]

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 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.
    - 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.
- CPU
    - Quick: It selects and runs CPU quick diagnostics.
    - Extended: It selects and runs CPU extended 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.

- Storage: It selects and runs storage 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.
- Bad Block Recovery: It allows to recover bad blocks on storage devices.

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.
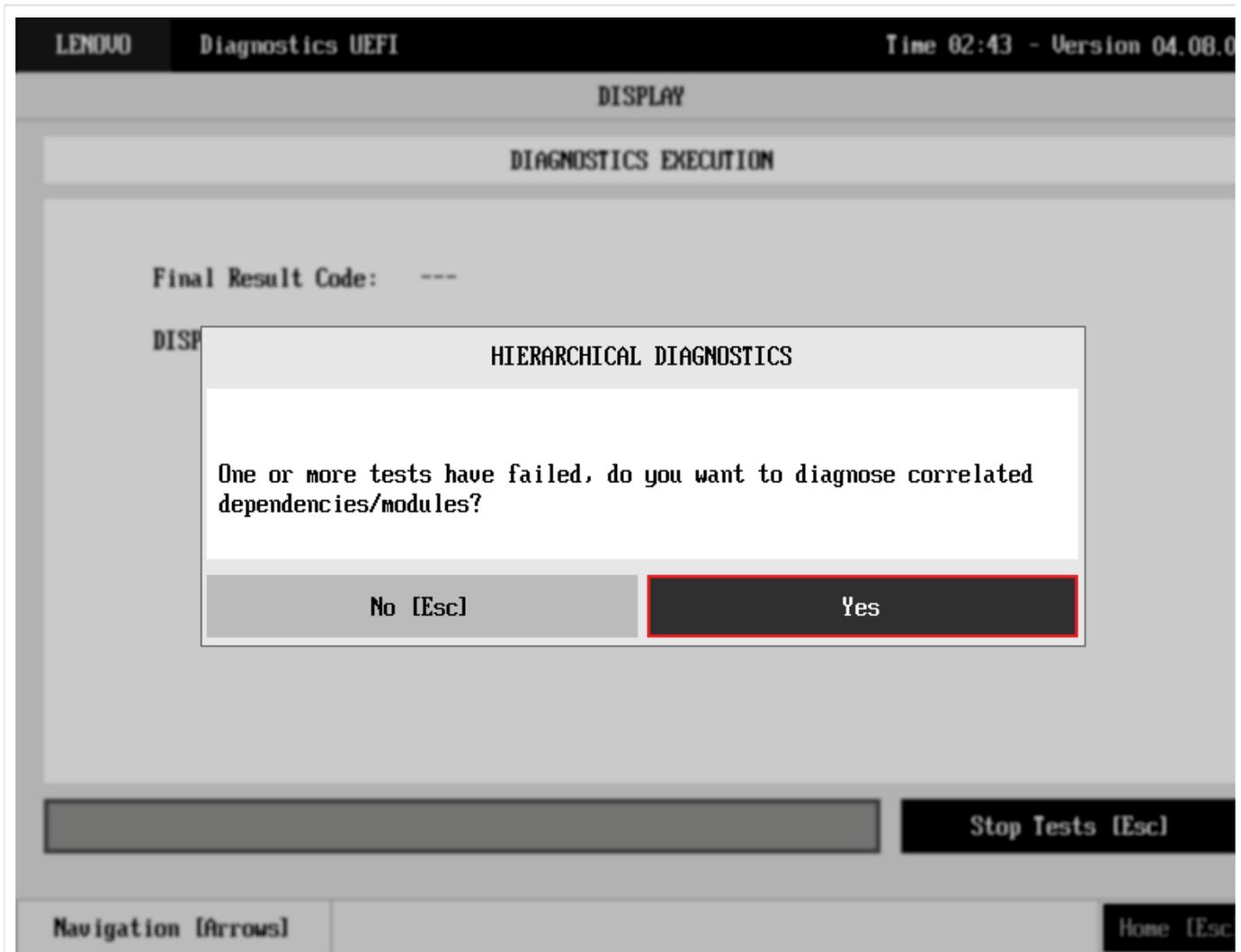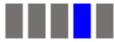

Hierarchical Diagnostics Confirmation Popup

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

DISPLAY - HIERARCHICAL DIAGNOSTICS

DIAGNOSTICS EXECUTION

CPU: Intel(R) Core(TM) i3-7100U CPU @ 2.40GHz

Started at:	2018/12/11 02:44:37
Register Test:	PASSED
BT Instruction Test:	PASSED
X87 Floating Point Test:	PASSED
MMX Test:	PASSED
SSE Test:	PASSED
AES Test:	PASSED
Cache Test:	Progress [54%]
Finished at:	0000/00/00 00:00:00
RESULT CODE:	---

MOTHERBOARD

Started at:	0000/00/00 00:00:00
Chipset Test:	Waiting
Finished at:	0000/00/00 00:00:00

Stop Tests [Esc]

Navigation [Arrows]   Home [Esc]

Hierarchical Diagnostics Execution

Battery

The battery module only works on Thorpe 64 bit system.

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

HOME

DIAGNOSTICS   TOOLS

| BATTERY [0] | CPU [1] | | SYSTEM INFORMATION [F1] |

| DISPLAY [2] | FAN [3] | | BAD BLOCK RECOVERY [F3] |

MEMORY [4]   MOTHERBOARD [5]

MOUSE [6]   OPTICAL [7]

PCI EXPRESS [8]   STORAGE [9]

RUN ALL [R]

| Navigation [Arrows] | Enter [Space] | | Exit [Esc |

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

[X] Select / Deselect All Options

[X] 213-SANYO
[X] 63-SMP

Confirm [C]

| Navigation [Arrows] | Enter [Space] | | Exit [Esc] |

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 a list of tests, as illustrated in the next figure, where all the tests are initially selected to be tested.

BATTERY 1: 213-SANYO

ALGORITHM SELECTION

[X] Select / Deselect All Options

[X] Health test
[X] Temperature test
[X] Lifespan mode test

Confirm [C]

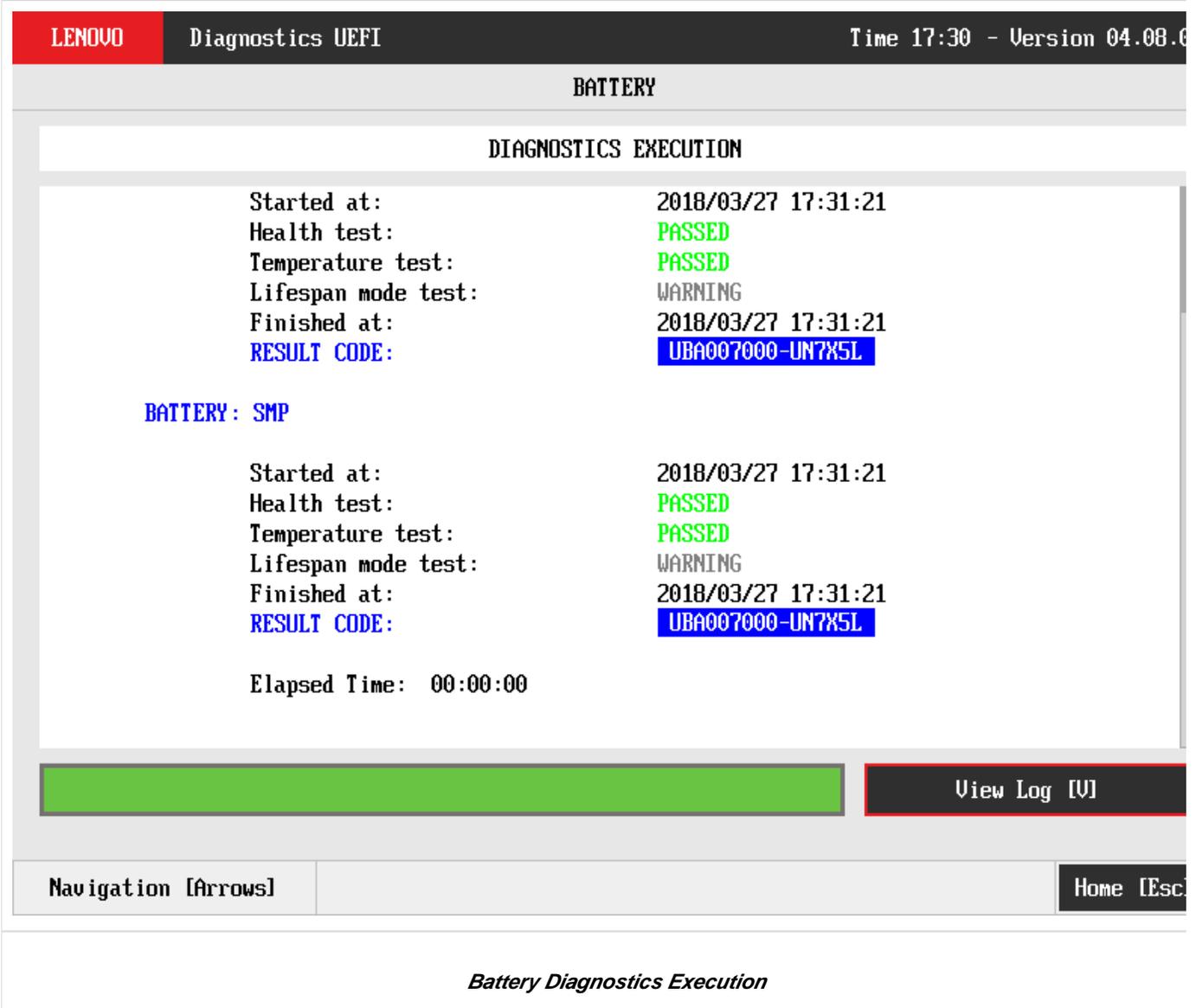Navigation [Arrows]   Enter [Space]   Exit [Esc]

Battery Algorithm Selection

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.

Battery 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).
- 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).

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.
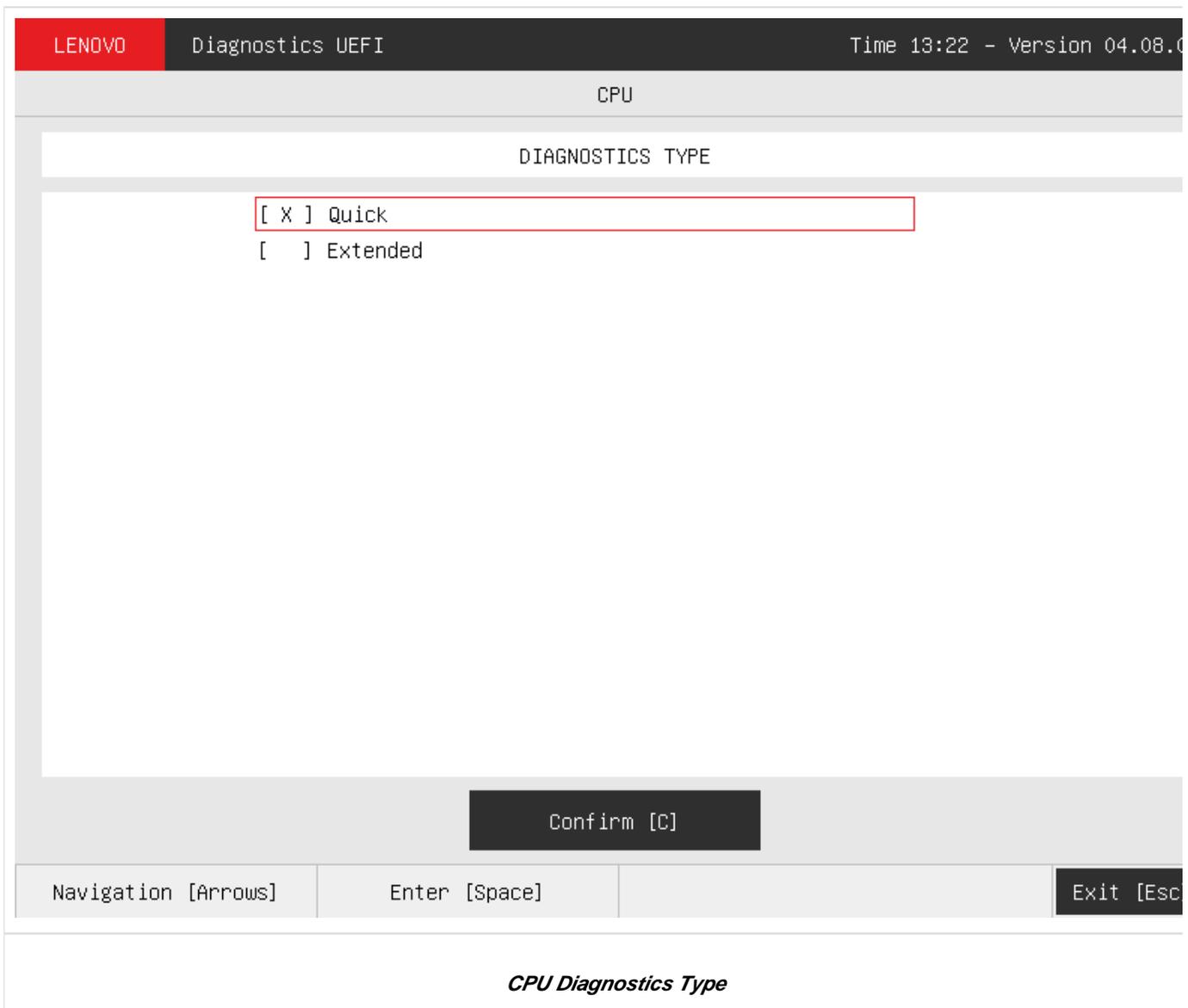
CPU Diagnostics Type

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

SELECT DEVICE

[x] Select / Deselect All Options

[x] Genuine Intel (R) CPU @ 2.90GHz - INTEL
[x] Genuine Intel (R) CPU @ 2.90GHz - INTEL

Confirm [C]

Navigation [Arrows]   Enter [Space]   Exit [Esc

CPU Device Selection

CPU Quick Diagnostics

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

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 1: Genuine Intel(R) CPU 0000 @ 2.70GHz - INTEL

ALGORITHM SELECTION

[X] Select / Deselect All Options

[X] Register Test
[X] BT Instruction Test
[X] X87 Floating Point Test
[X] MMX Test
[X] SSE Test
[X] AES Test
[X] Cache Test

Confirm [C]

Navigation [Arrows]   Enter [Space]   Exit [Esc

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).
- 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).

CPU Extended Diagnostics

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

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.

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).
- 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).

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 1: NT140FHM-N41 - BOE

ALGORITHM SELECTION

[X] Select / Deselect All Options

[X] Red Solid Color Test
[X] Blue Solid Color Test
[X] Green Solid Color Test
[X] Black Solid Color Test
[X] White Solid Color Test
[X] Luminance VESA Test
[X] Geometry VESA Test
[X] Focus VESA Test
[X] Combination Test

Confirm [C]

Navigation [Arrows]   Enter [Space]   Home [Esc

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

DIAGNOSTICS EXECUTION

Final Result Code: ---

DISPLAY

GEOMETRY VESA TEST

Lines, rectangles and circles will be painted on your screen. Make sure that the geometric figures are displayed correctly. After checking your screen, press Enter key to continue.

CANCEL [ESC]	Ok

Stop Tests [Esc]

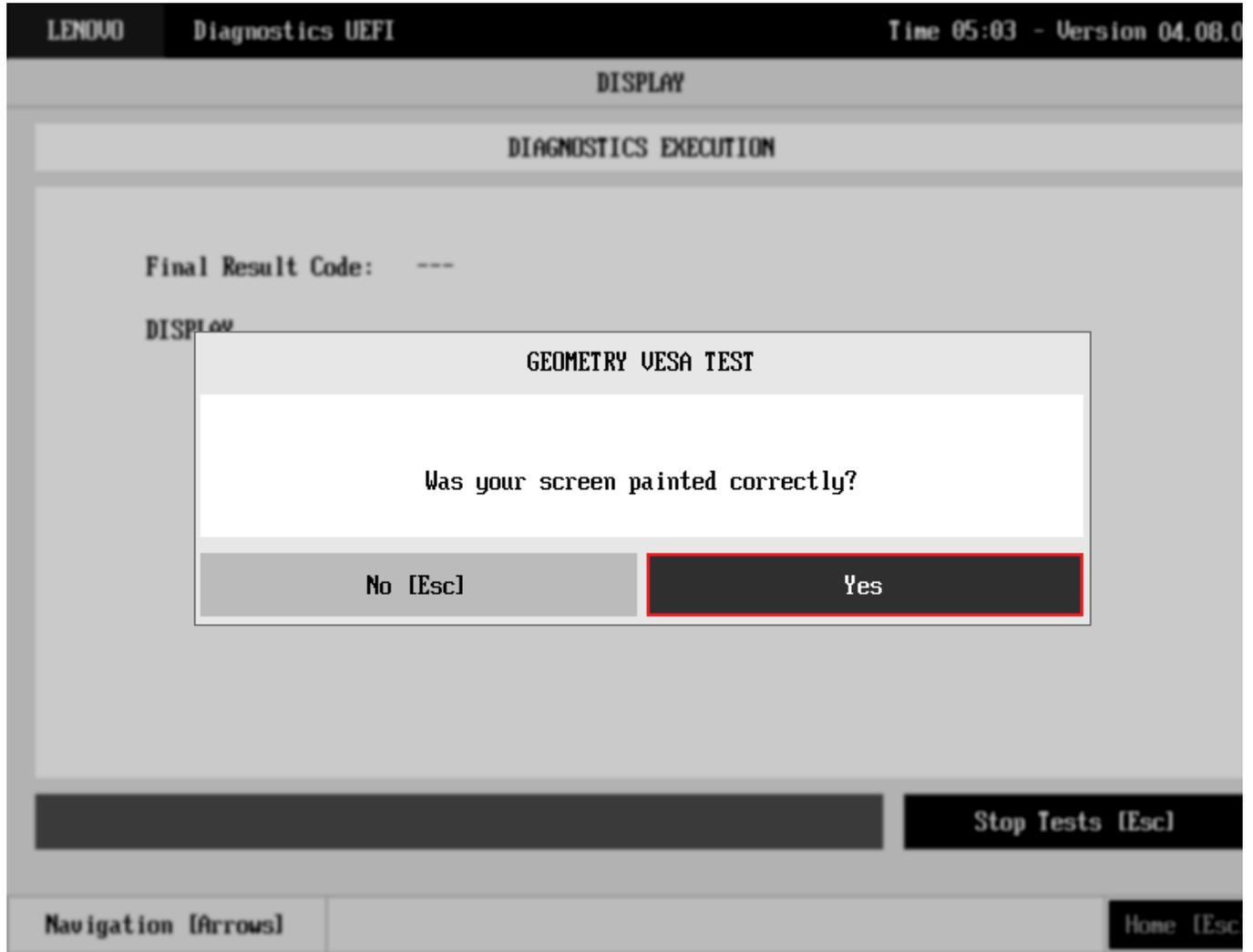Navigation [Arrows]   Home [Esc

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, any key can be pressed to proceed with the test's execution.
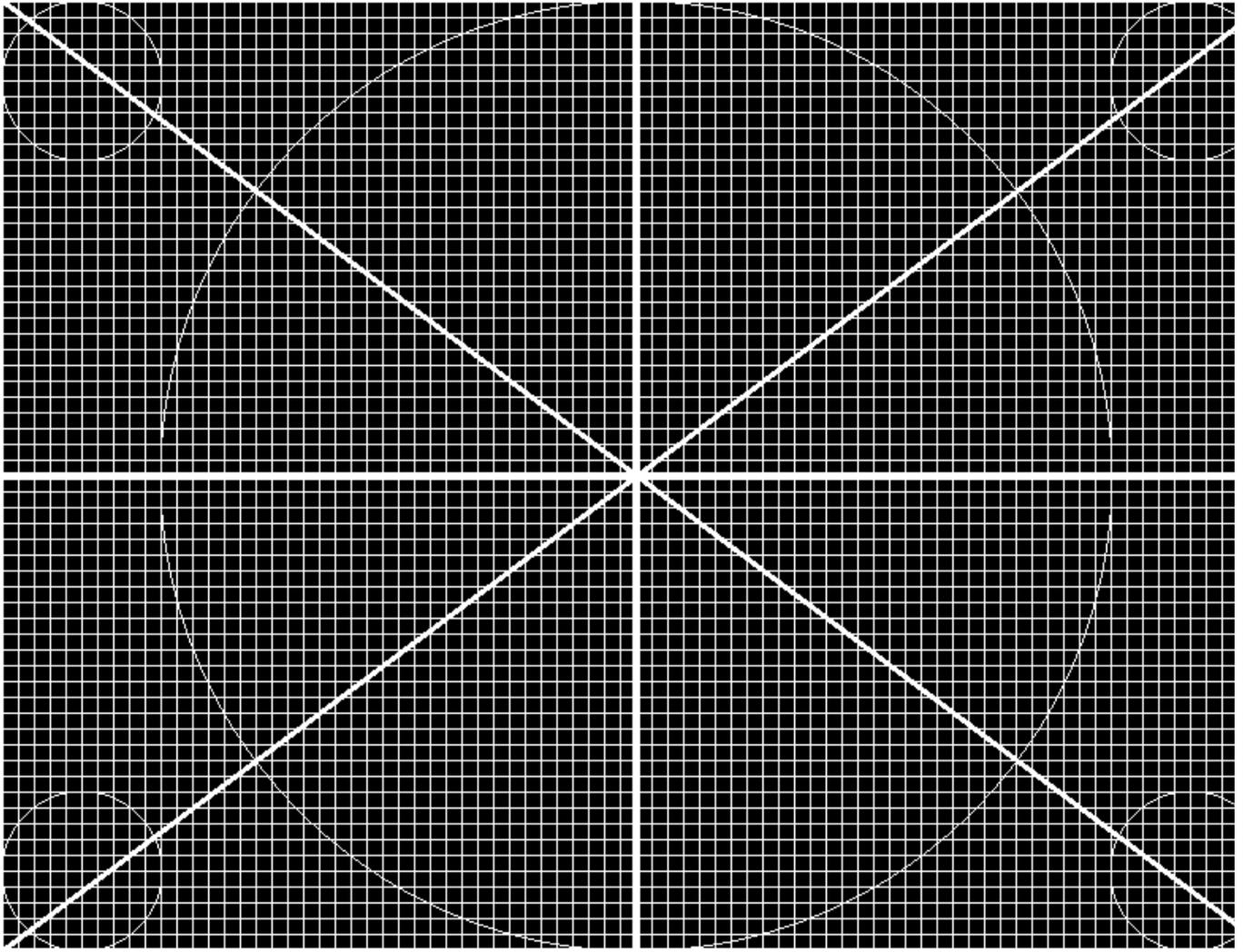
Display Pattern Test Exhibition

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.

LENOVO   Diagnostics UEFI   Time 05:03 - Version 04.08.0

DISPLAY

DIAGNOSTICS EXECUTION

Final Result Code: ---

DISPLAY

GEOMETRY VESA TEST

Was your screen painted correctly?

No [Esc]   Yes

Stop Tests [Esc]

Navigation [Arrows]   Home [Esc

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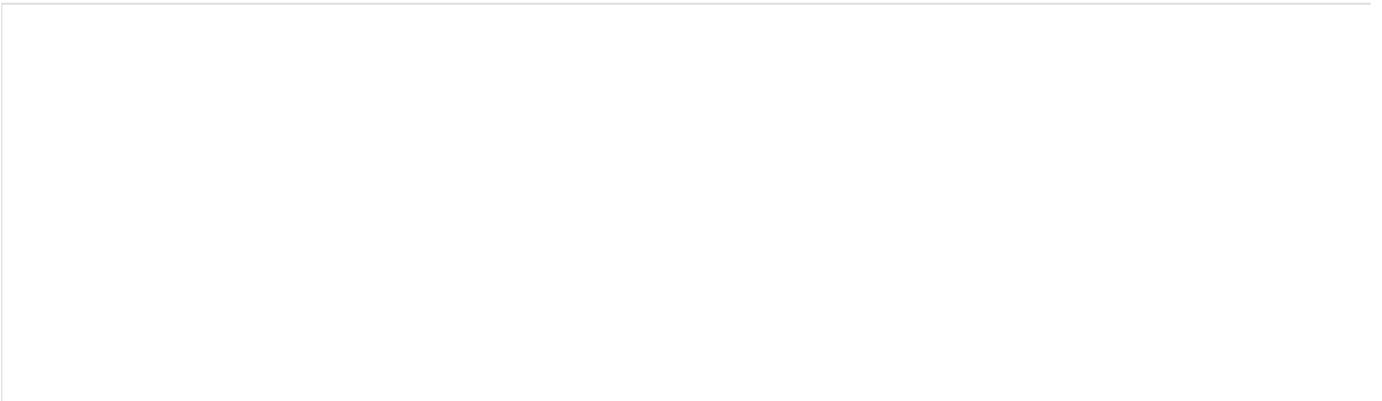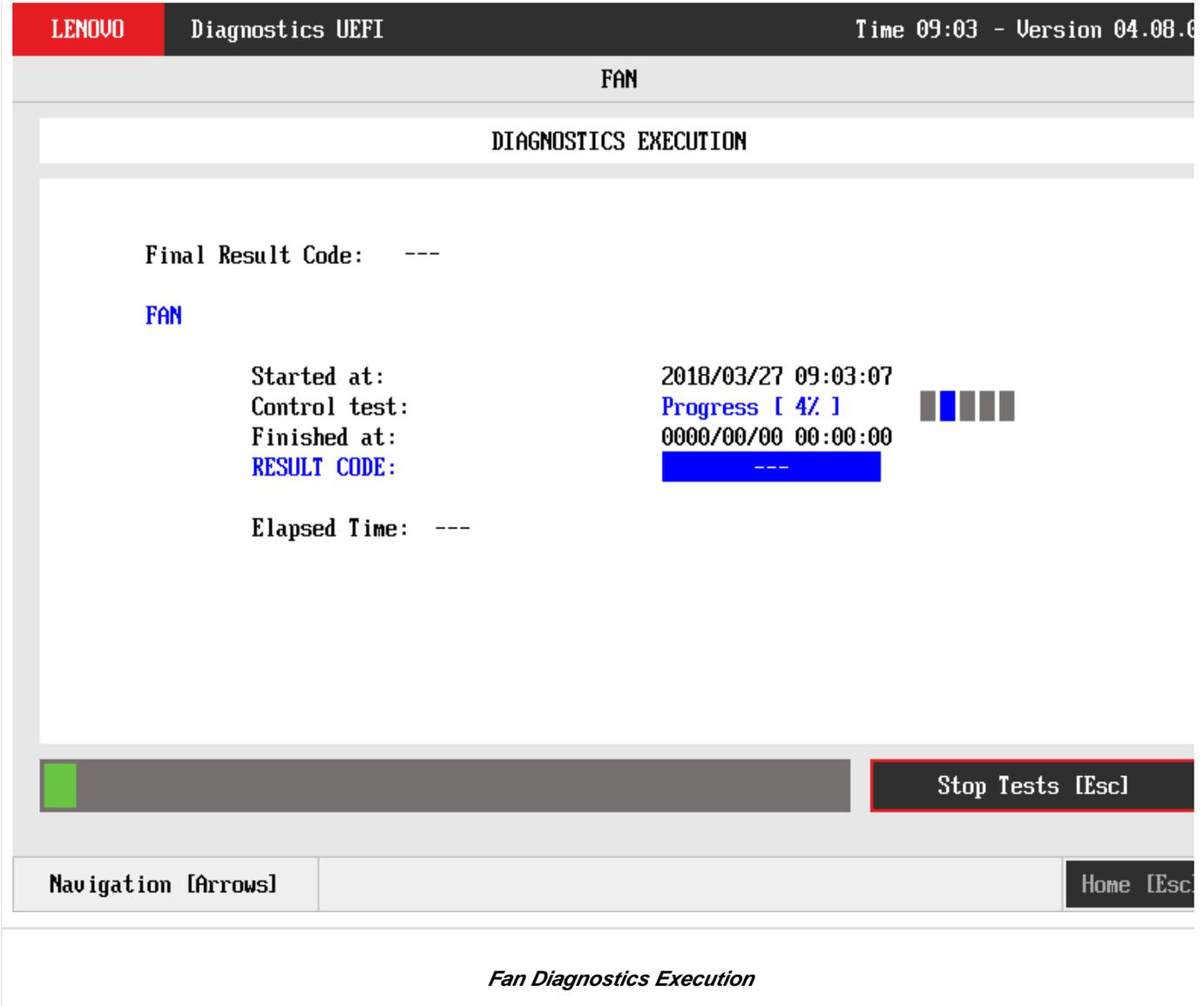
The Fan Diagnostics Execution screen provides information about the fan diagnostics progress, as well as information about the results. This screen is composed of:

- 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).
- 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).

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

Keyboard

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

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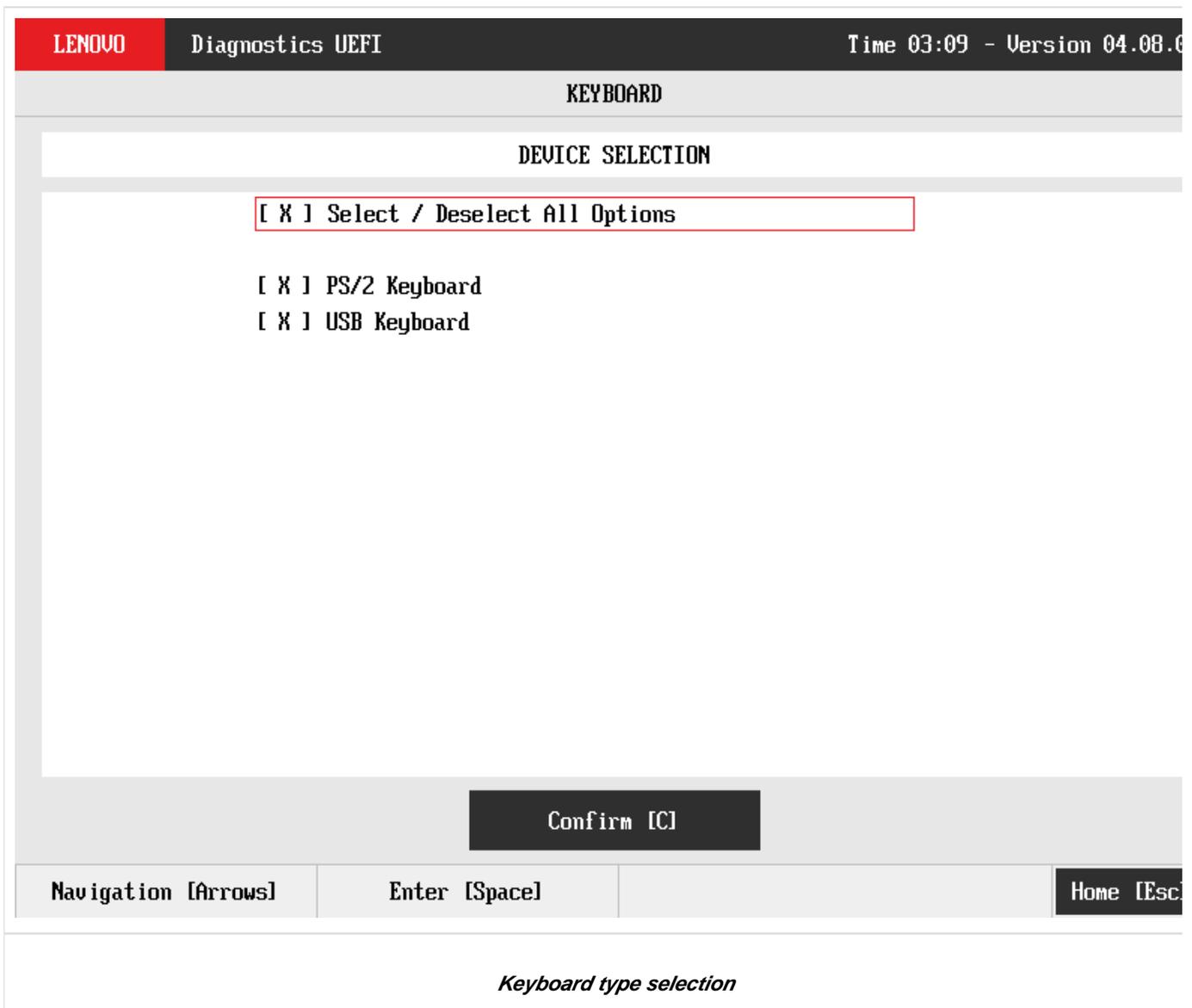
After the selection of the desired keyboard, the user can select the tests for the selected keyboard type:

- **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 <u>USB keyboard Test</u> from <u>Lenovo Diagnostics Windows</u>, consequently, the **WARNING** test result is given when some information is not retrieved.
  - **Warning Message** (when some information is not retrieved): *WARNING Manufacturer or Product Name 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.
  - **Results: PASSED; FAILED; CANCELED.**
- **USB Key Test:**
  - **Description:** *"USB Key Test"* is an attended keyboard test that the user can check whether the keys and existing LEDs are properly working for USB Keyboards.
  - **Results: PASSED; FAILED; CANCELED.**

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KEYBOARD 1: PS/2 Keyboard

ALGORITHM SELECTION

[X] Select / Deselect All Options

[X] PS/2 Test
[X] Key Test

Confirm [C]

Navigation [Arrows]	Enter [Space]		Home [Esc

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 tests, as illustrated in the figure below.

KEYBOARD

DIAGNOSTICS RESULT LOG

Serial number: PF0FLMCH

BIOS Version: N1MET10W (0.10)

Machine model: ThinkPad X1 Carbon 5th

Final Result Code: U1SLU5KHA-CV15P5

KEYBOARD DIAGNOSTIC | 2018/12/11 03:10:48

Result code: UKB001000-UN7XQE

UDI: Keyboard

Display Name: PS/2 Keyboard

Device Type: PS/2 Keyboard

Save Log [F2]

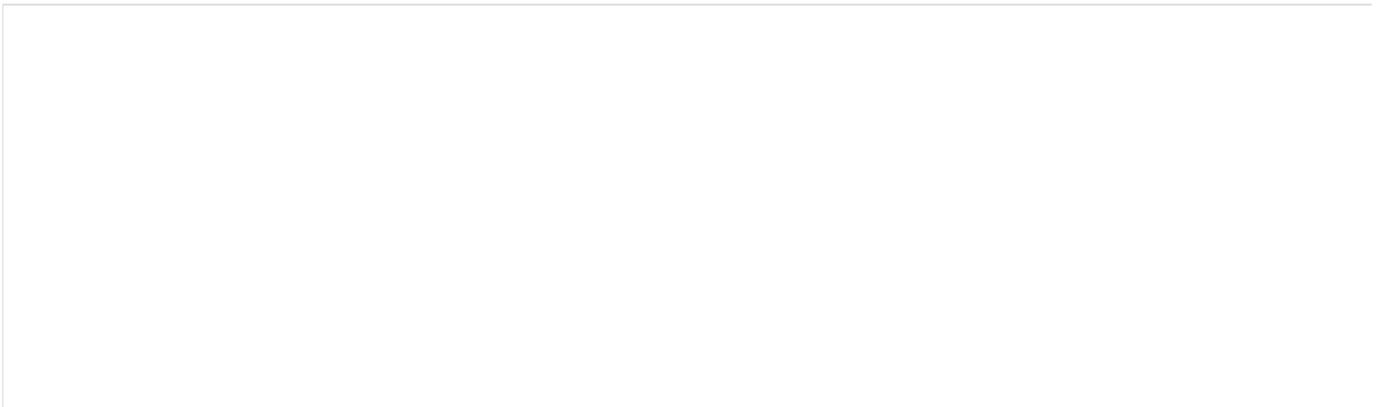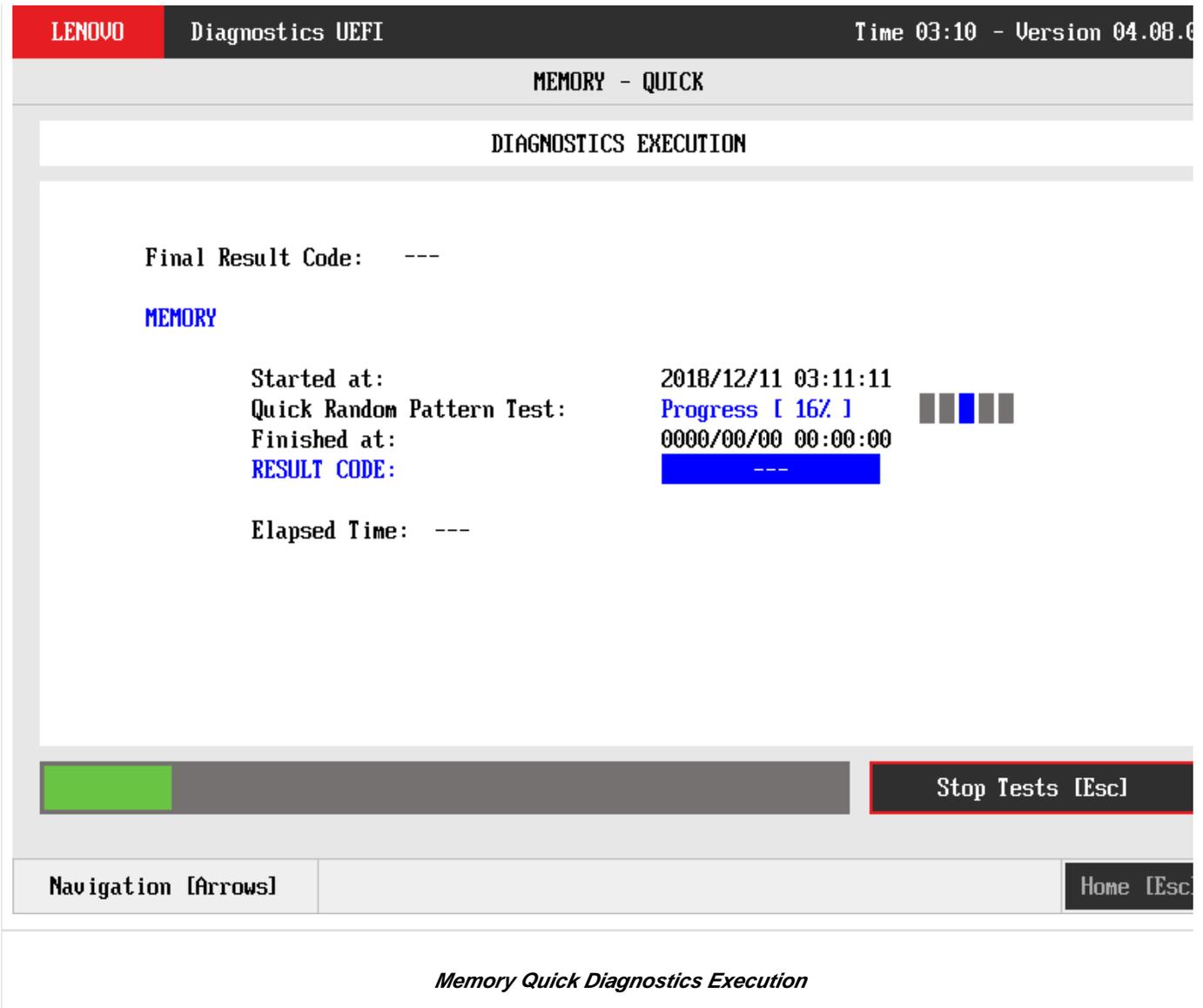| Navigation [Arrows] | Enter [Space] | Scroll [Page Up/Down] | Home [Esc] |

USB Keyboard diagnostic execution

Memory

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)
- 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).

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 1: MAIN_MEMORY

ALGORITHM SELECTION

[X] Select / Deselect All Options

[X] Advanced Integrity Test
[X] Address Test
[X] Bit High Test
[X] Bit Low Test
[X] Walking Ones Right Test
[X] Walking Ones Left Test
[X] Modulo-20 Test
[X] Moving Inversions-8bit Test
[X] Moving Inversions-32bit Test
[X] Random Pattern Test
[X] Random Number Sequence Test
[X] Block Move Test

[1/2]

Confirm [C]   ...More [M]

Navigation [Arrows]   Enter [Space]   Exit [Esc]

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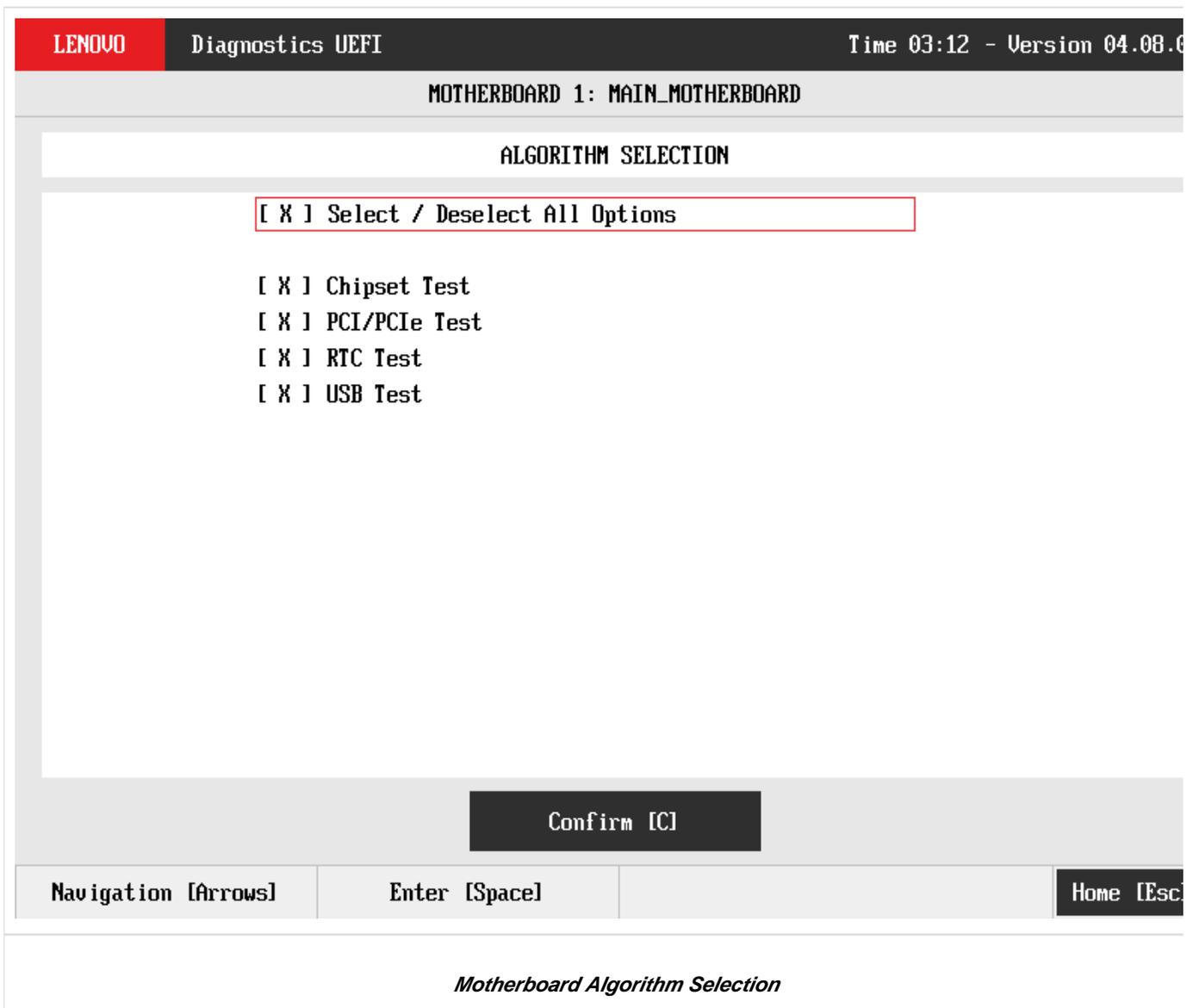
- Final Result Code (an encrypted code that informs which modules were tested).
- Date and time that diagnostic has started.
- Test (name of the test being currently run).
- Progress of the current test (current test's progress in percentage).
- A list with all the algorithms which compose device test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

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.

LENOVO	Diagnostics UEFI	Time 03:12 – Version 04.08.0

MOTHERBOARD 1: MAIN_MOTHERBOARD

ALGORITHM SELECTION

[X] Select / Deselect All Options

[X] Chipset Test
[X] PCI/PCIe Test
[X] RTC Test
[X] USB Test

Confirm [C]

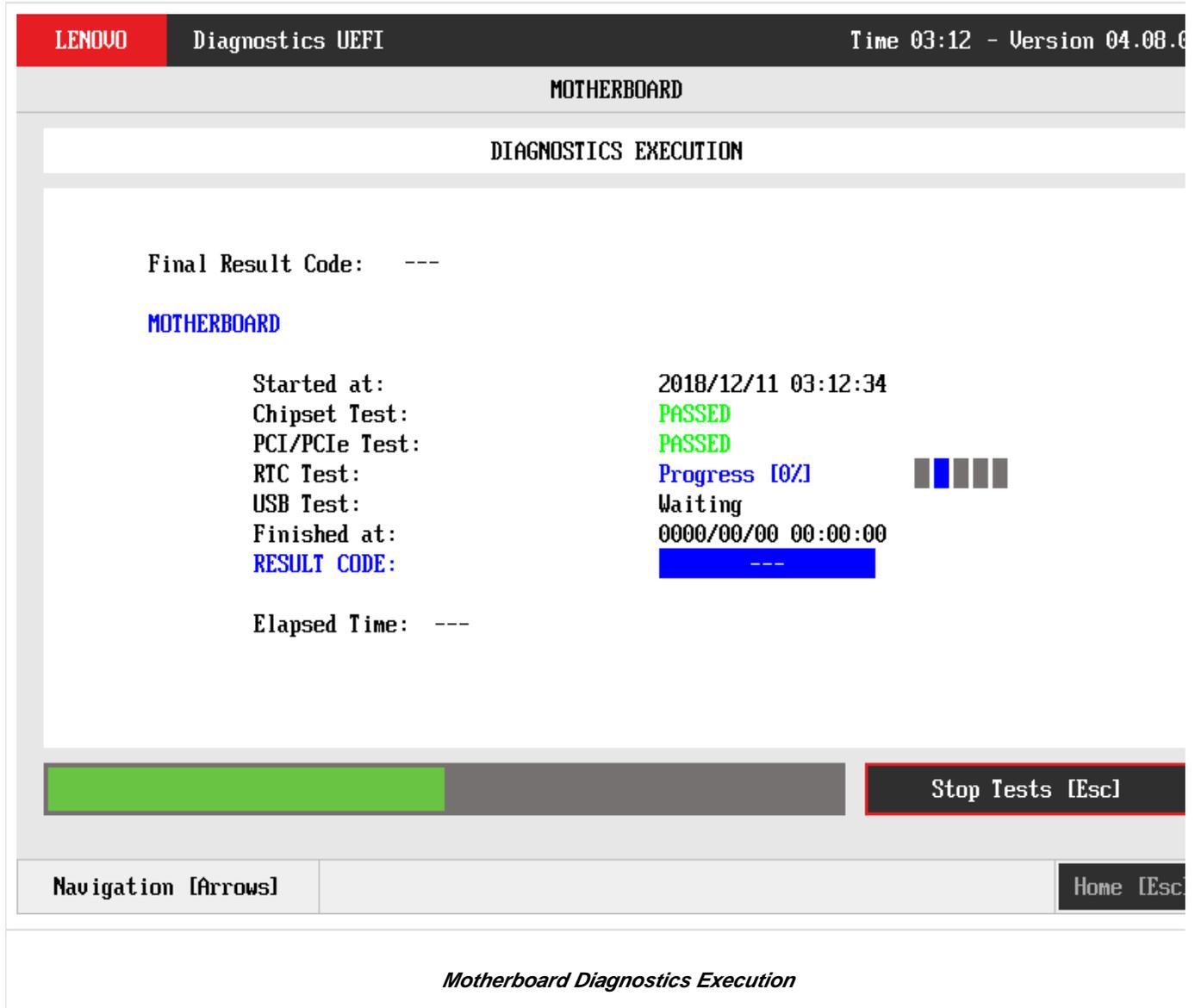| Navigation [Arrows]	Enter [Space]		Home [Esc]

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).
- 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).

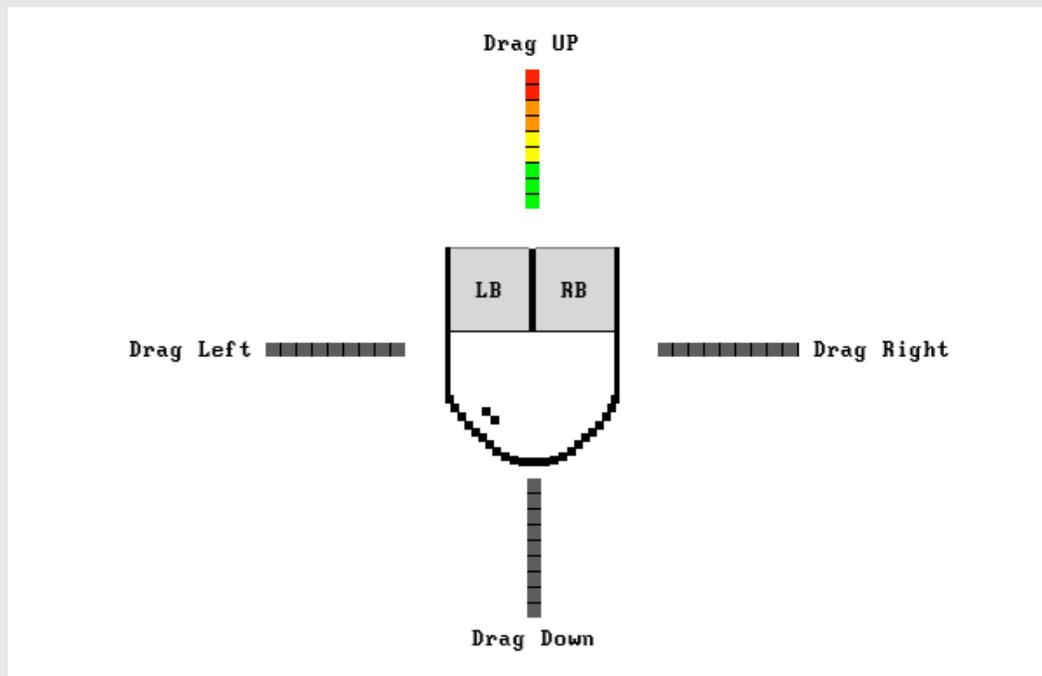# Mouse

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

Check whether the mouse functions and track point movement detection are working correctly

Drag UP

LB   RB

Drag Left ▮▮▮▮▮▮▮▮▮   ▮▮▮▮▮▮▮▮▮ Drag Right

Drag Down

Please test each mouse device separately

∗ If no movement was tracked it may be caused by device not properly detected by BIOS

Press [Esc/F3] to exit the test

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, whereas an algorithm can have seven status:
    - **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).
- 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).
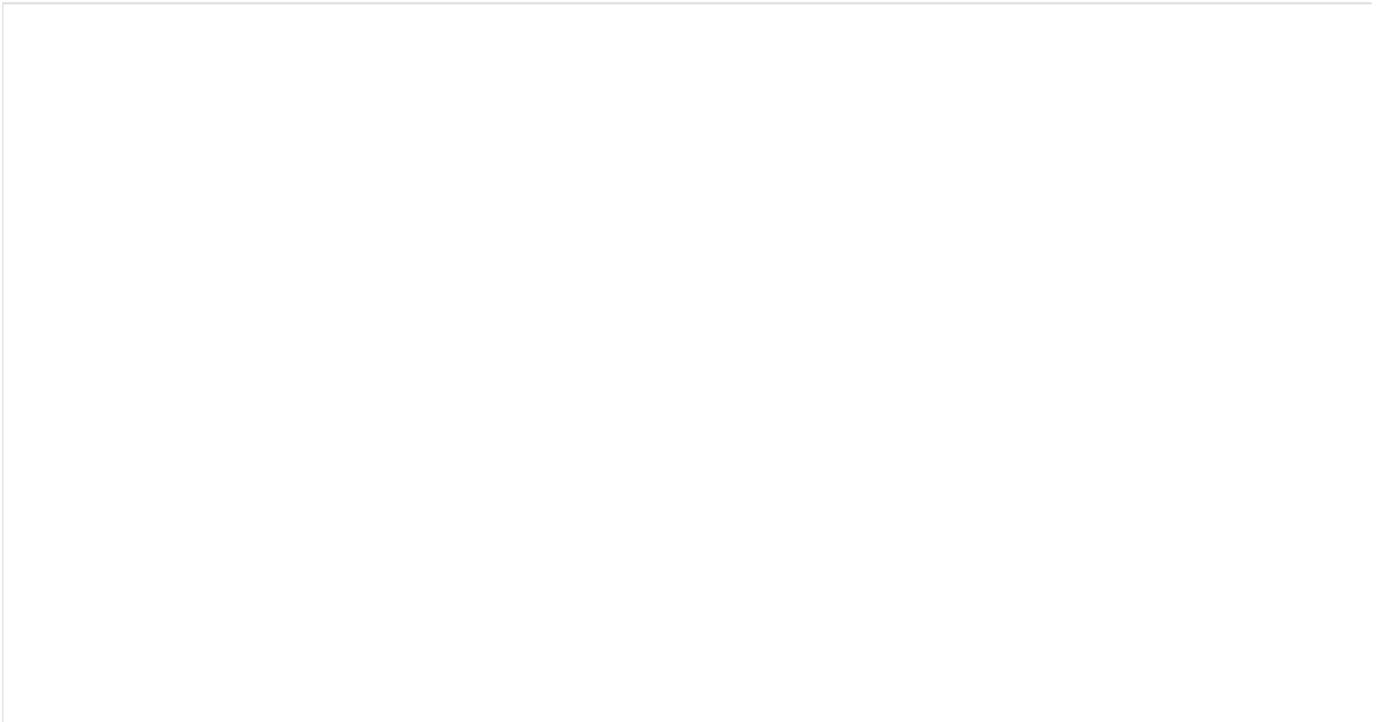
RAID

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 1: RAID

ALGORITHM SELECTION

[X] Select / Deselect All Options

[X] Status test
[X] Slot test
[X] Link test
[X] Advanced error test

Confirm [C]

Navigation [Arrows]   Enter [Space]   Exit [Esc

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).
- 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).

Storage

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.
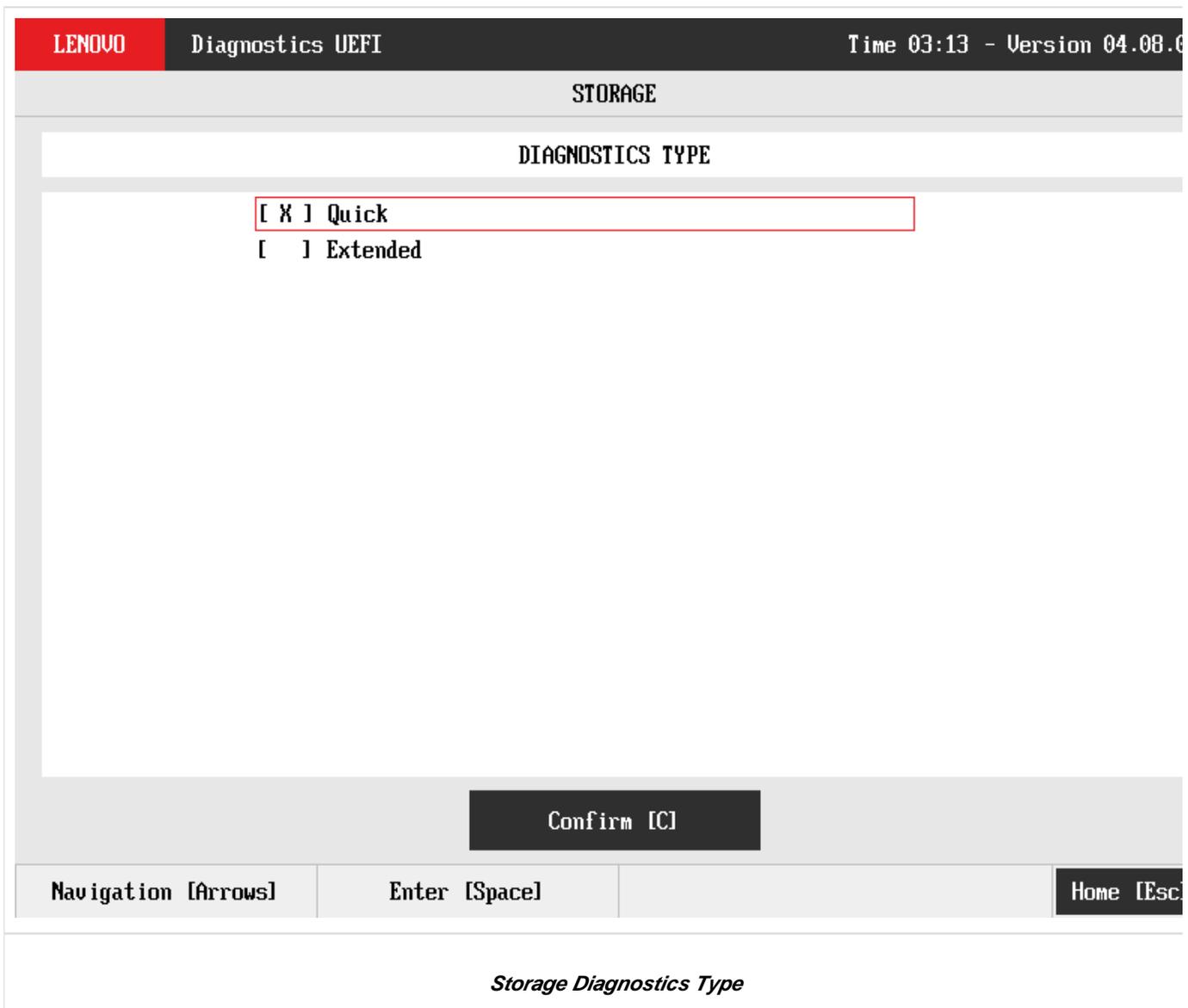
Storage Diagnostics Type

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

[X] Select / Deselect All Options

[X] CV3-8D128-LITE-ON IT Corporation   (i)
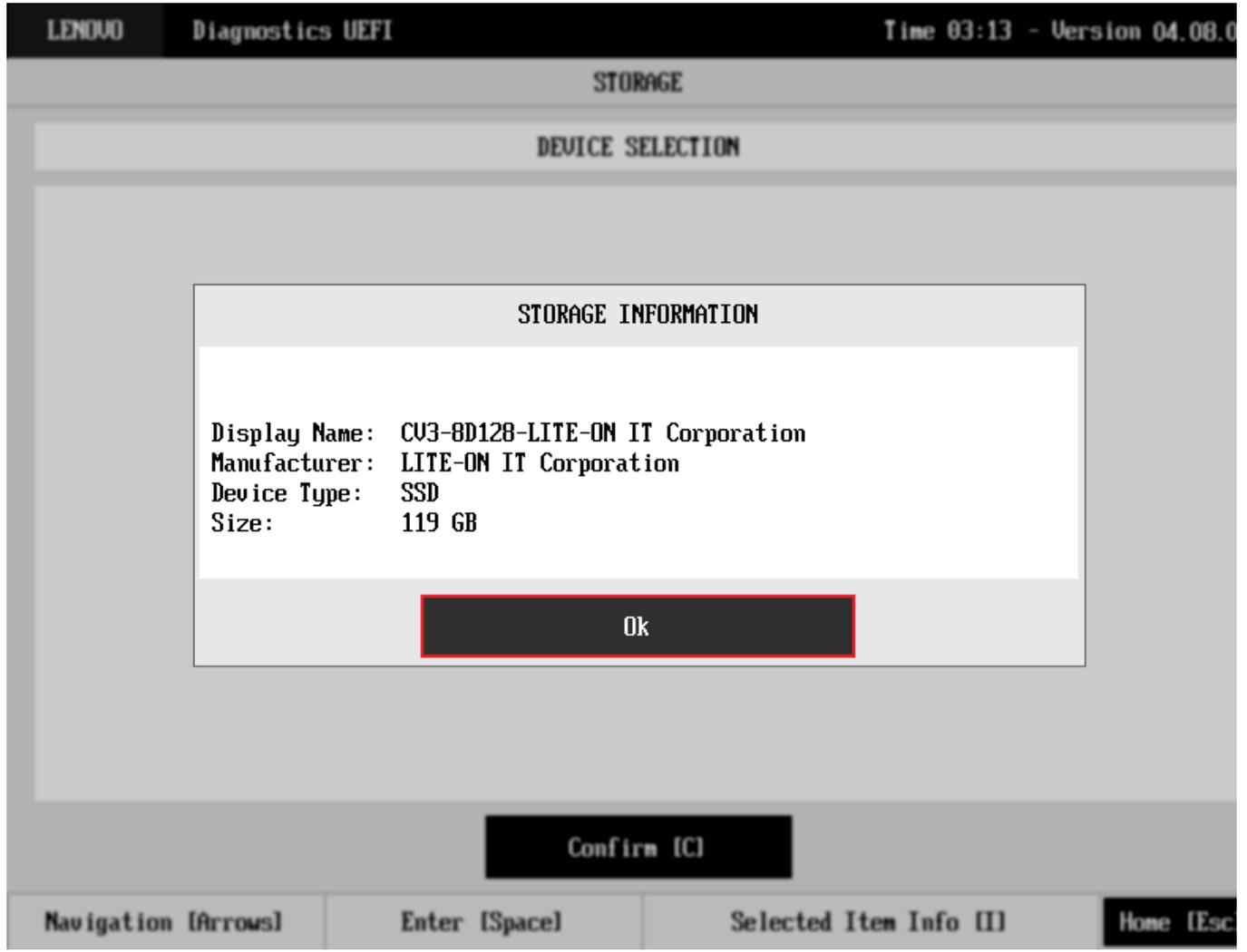
Confirm [C]

Navigation [Arrows]   Enter [Space]   Selected Item Info [I]   Home [Esc]

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.

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 1: ST500LM021-1KJ152-Seagate Technology

ALGORITHM SELECTION

[X] Select / Deselect All Options

[X] SMART Status Test   (i)
[X] SMART Short Self-Test   (i)
[X] Drive Self-Test   (i)
[X] Random Seek Test   (i)
[X] Funnel Seek Test   (i)
[X] Target Read Test   (i)
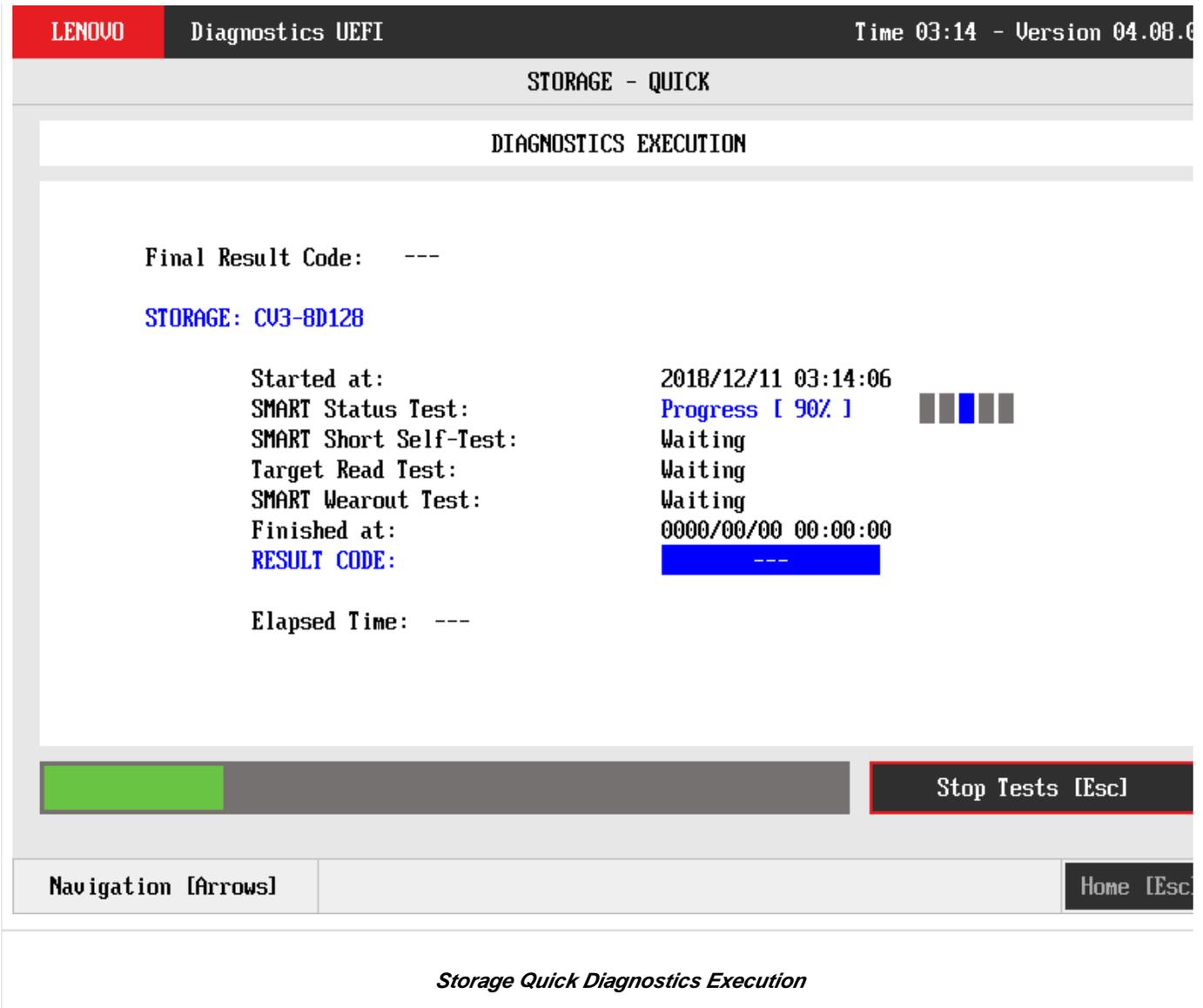
Confirm [C]

| Navigation [Arrows] | Enter [Space] | Selected Item Info [I] | Home [Esc] |

Storage Quick 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 Quick Diagnostics Execution

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).
- 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).
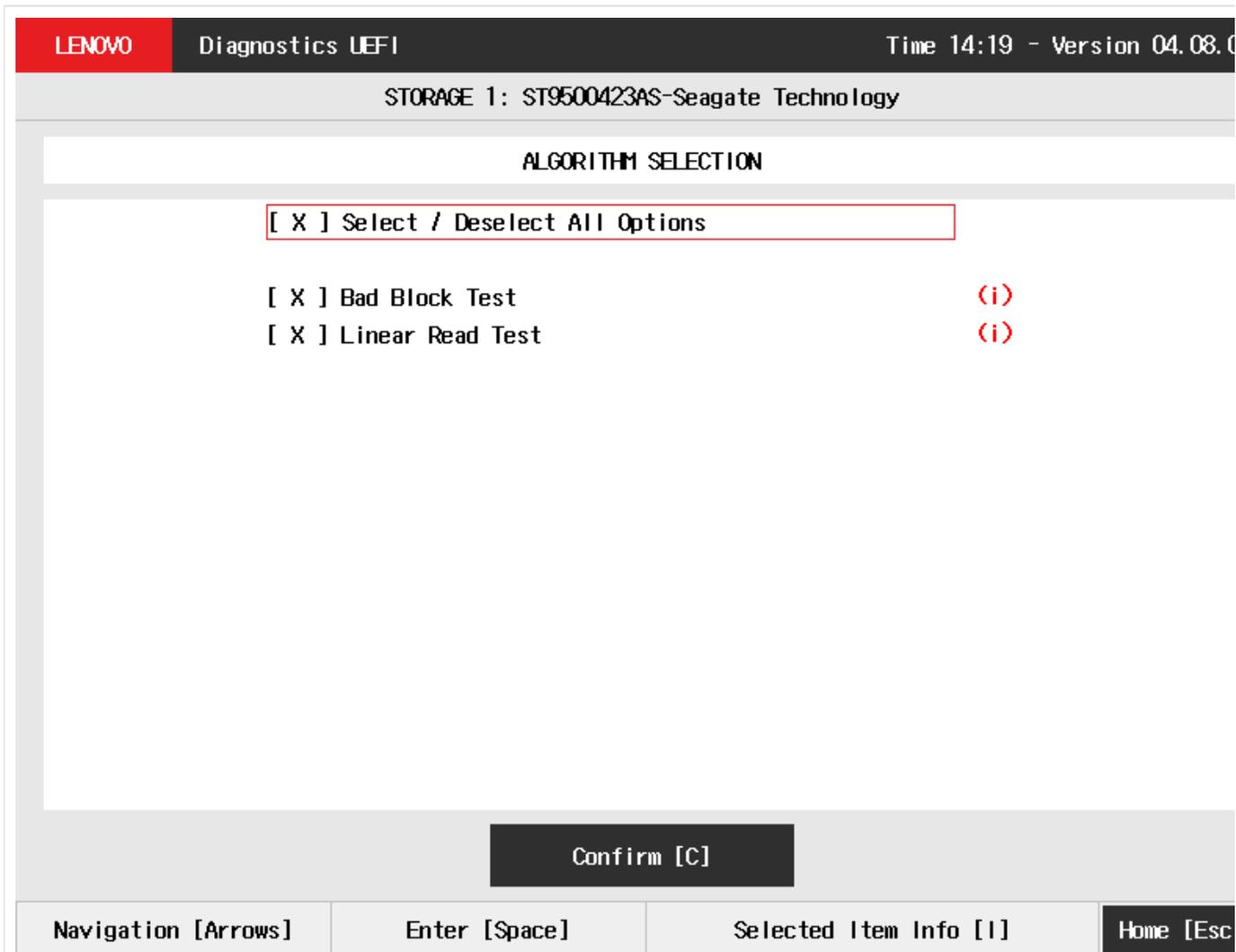
Storage Extended Diagnostics

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:
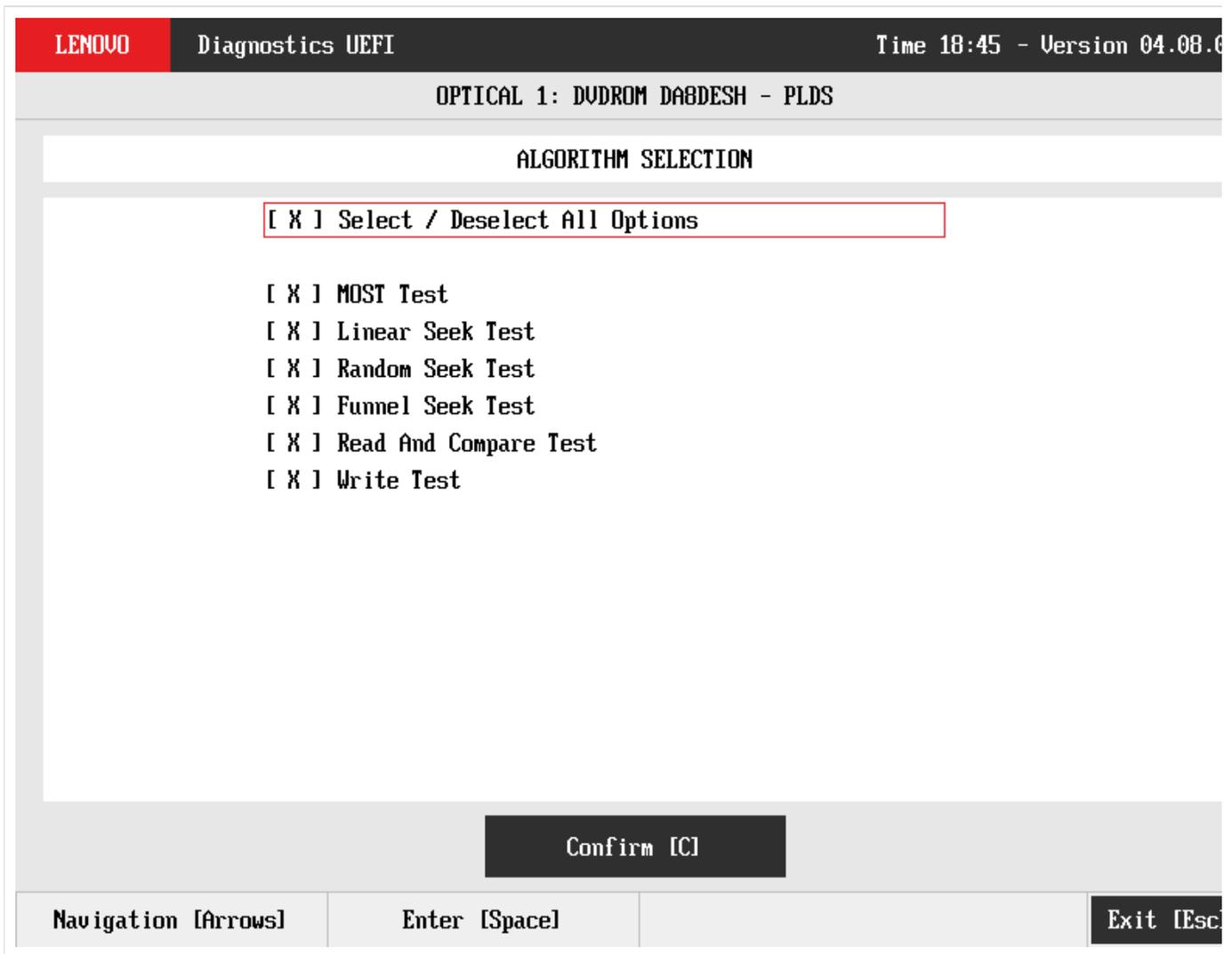
- Final Result Code (an encrypted code that informs which modules were tested).

- 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).
- 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).

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.

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).


Video Card

The video card diagnostic is not available to the end user, but it's possible to access it from ShellView version. The user has to type the command on ShellView and the diagnostic is started. S/he will have the diagnostics's result into a log generated by the application.
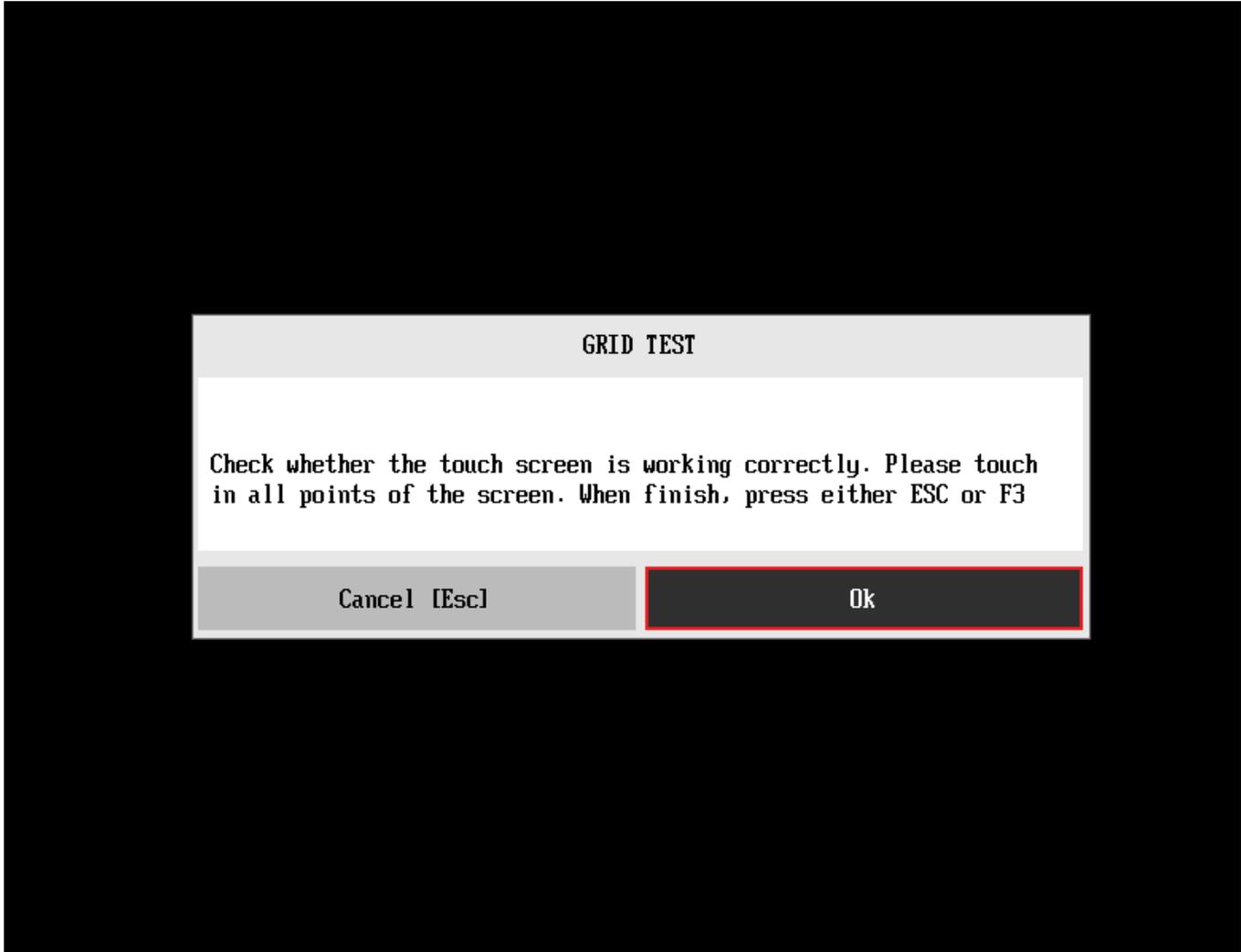

Touch

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.
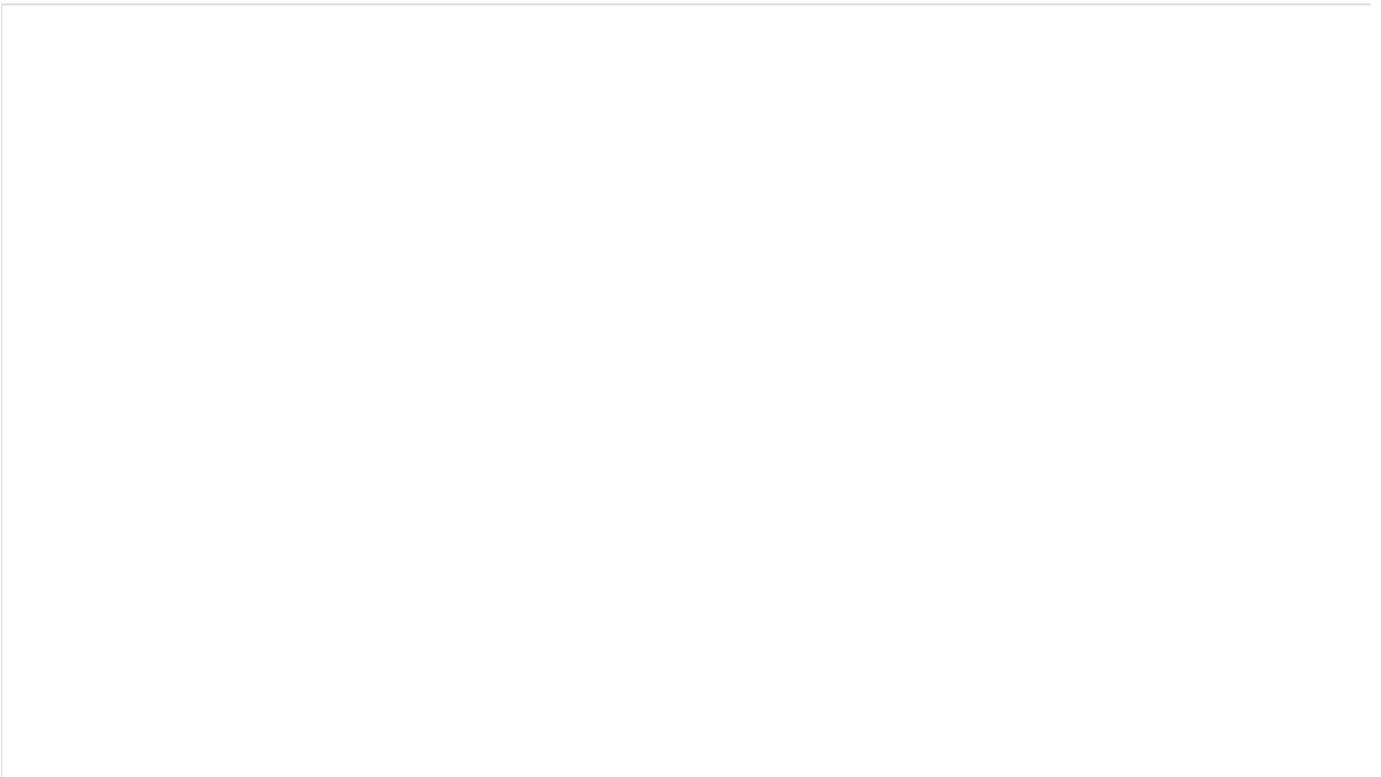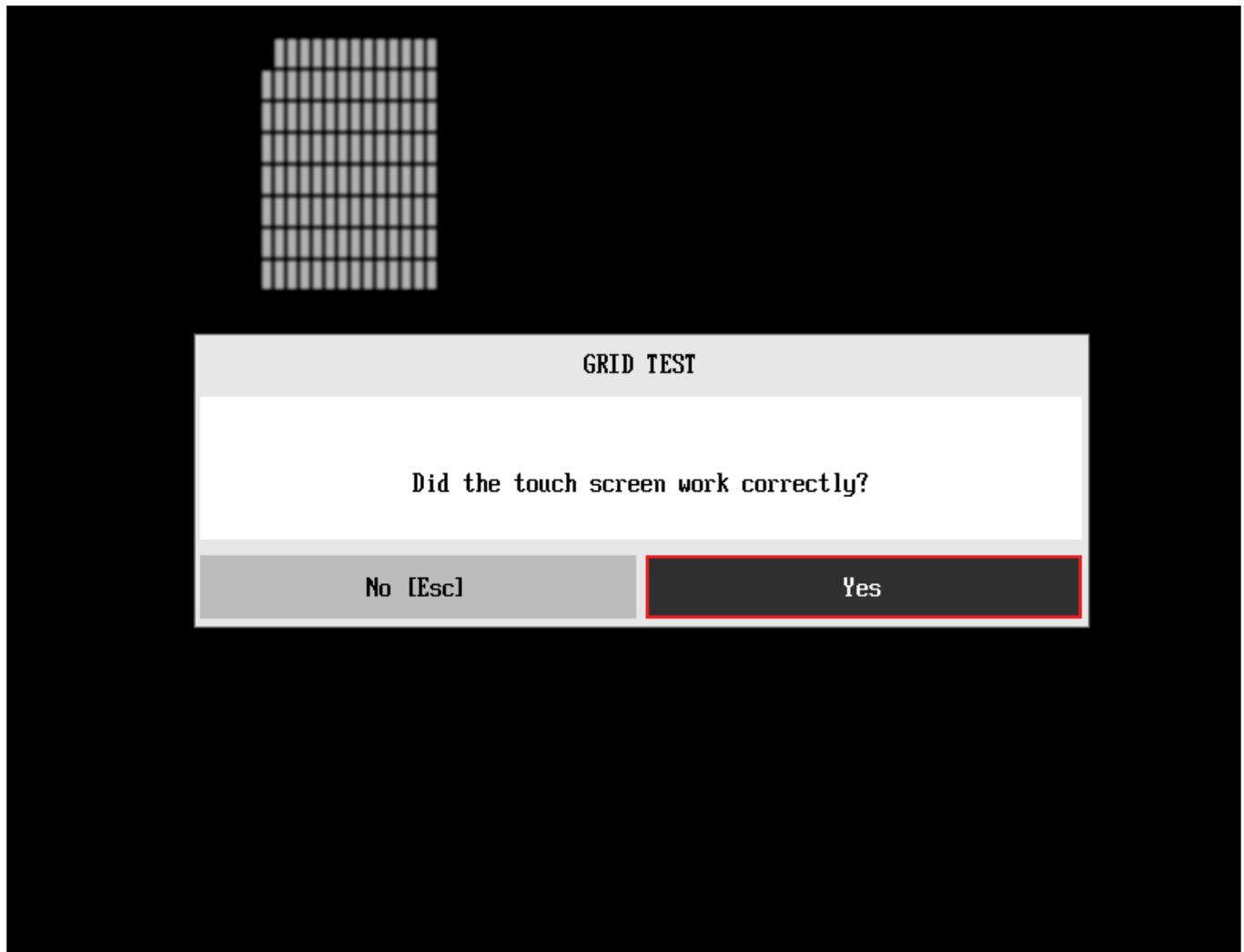
Touch Grid Test start pop-up

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, whereas an algorithm can have seven status:
    - **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).

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).

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. A desired item is selected when it shows "[X]" preceding it. 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

Quick (Unattended) [Q]

Quick [W]

Full (Unattended) [E]

Full [R]

Quick:
Excludes extended tests of modules that take
more than 10 minutes to complete each test.
e.g. Extended tests of CPU, Memory and Storage.
This test mode takes about 15 minutes to complete.

Full:
Includes all quick and extended tests of modules.
WARNING: This test mode can take several hours
to complete.

Unattended:
Test mode that excludes tests that need
user interaction.
e.g. Mouse, Keyboard, Touch, etc.

Navigation [Arrows]   Enter [Space]   Exit [Esc
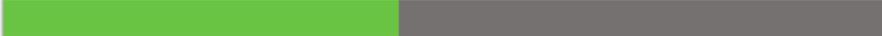
Run All Diagnostics Type

Run All is an option that runs all the available diagnostics, such as Battery, CPU, Display, Fan, Memory, Motherboard, Optical, PCI-e, RAID and Storage. The choices the user have are: "Quick", "Extended" and "Restrict prior selection to unattended tests".

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

```
LENOVO    Diagnostics UEFI                          Time 11:15 - Version 04.08.0

Diagnostic     Status      Progress                    Summary
 DISPLAY       NOT SELECTED        >   Finished at:              2019/03/19 11:08:26
 KEYBOARD      PASSED       100% >       RESULT CODE:            UME0080000000-U07XIM
 MOUSE         PASSED       100% >
 OPTICAL       NOT FOUND           >                          MEMORY
 TOUCH         NOT FOUND           >
 BATTERY       NOT FOUND           >   Started at:               2019/03/19 11:08:26
 CPU           FAILED       100% >     Advanced Integrity Test:  PASSED
 FAN           NOT FOUND           >   Address Test:             PASSED
 MEMORY        IN PROGRESS   47% >     Bit High Test:            PASSED
 MOTHERBOARD   PENDING       0% >      Bit Low Test:             PASSED
 PCI EXPRESS   PENDING       0% >      Walking Ones Right Test:  PASSED
 RAID          NOT FOUND           >   Walking Ones Left Test:   Progress [ 62% ]  ████
 STORAGE       PENDING       0% >      Modulo-20 Test:           Waiting
                                       Moving Inversions-8bit Test:  Waiting
                                       Moving Inversions-32bit Test: Waiting
                                       Random Pattern Test:      Waiting
                                       Random Number Sequence Test: Waiting
                                       Block Move Test:          Waiting
                                       Bit Fade Test (~180 min): Waiting

 Total estimated time: 00:16:32 of 08:11:06                FINAL RESULT CODE
 [████████████░░░░░░░░░░░░░░░░]                            XXXXXXXXX-XXXXXX
 Passed: 02   Failed: 01   Not Found: 05   Canceled/Not Selected: 01

 Navigation [Arrows]                                       Stop Tests [Esc
```

Run All Diagnostics Execution

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

- Application Header Bar
- Screen Title Bar
- Screen Sub-title Bar
- Diagnostic Table menu
- Total progress bar and diagnostic status counter area
- Summary 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 Diagnostic Table menu shows the overall execution status and progress of each module and the user can navigate among the diagnostics changing what is showed on the main section (Summary Diagnostic Information Section). The Diagnostic Table menu contains the following information which are updated dynamically through the execution:

- The module progress information is relative to all devices and tests of that module.
- The diagnostic general status, which can be one of the following:
    - **PENDING**, indicating the diagnostic is waiting to be run.
    - **IN PROGRESS**, indicating the diagnostic is being run.
    - **PASSED**, indicating all test algorithm of the diagnostic has found no problems for all its devices.
    - **WARNING**, when applicable, indicating the diagnostic has detected signs to the user be aware (for instance, of an imminent failure).

- **FAILED**, indicating the diagnostic has found one or more faults.
- **CANCELED**, indicating the diagnostic has been canceled by user.
- **NOT APPLICABLE**, indicating the diagnostic is not supported.
- **NOT SELECTED**, indicating the diagnostic was not selected for the current execution.
- **NOT FOUND**, indicating the diagnostic is not supported or is unavailable on the system.

The total progress bar and diagnostic status counter area, as the name describe, has the total progress overall diagnostics, the current and total estimated time for the execution and also have the counters for the following diagnostics status:

- **Passed**, counting how many diagnostics has PASSED status.
- **Failed**, counting how many diagnostics has FAILED status.
- **Not Found**, counting how many diagnostics are not supported or are unavailable on the system.
- **Canceled/Not Selected**, counting how many diagnostics were canceled or were not selected for the current execution.

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).

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
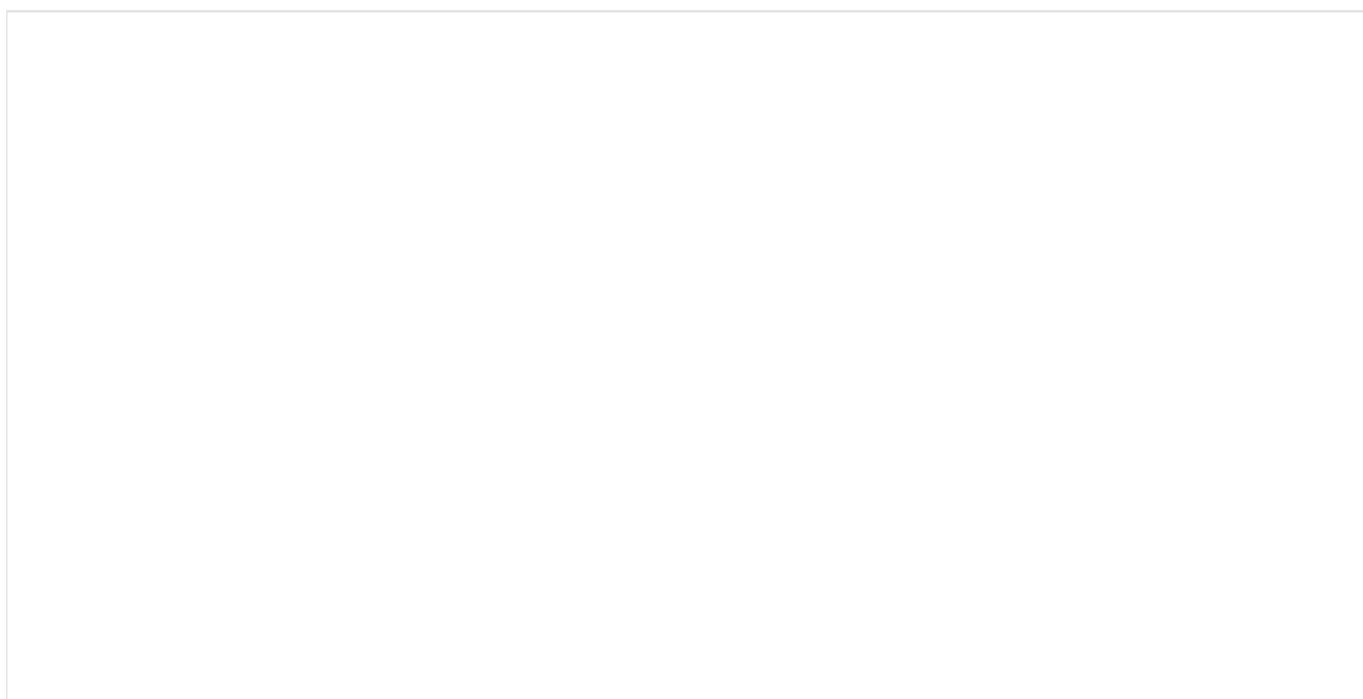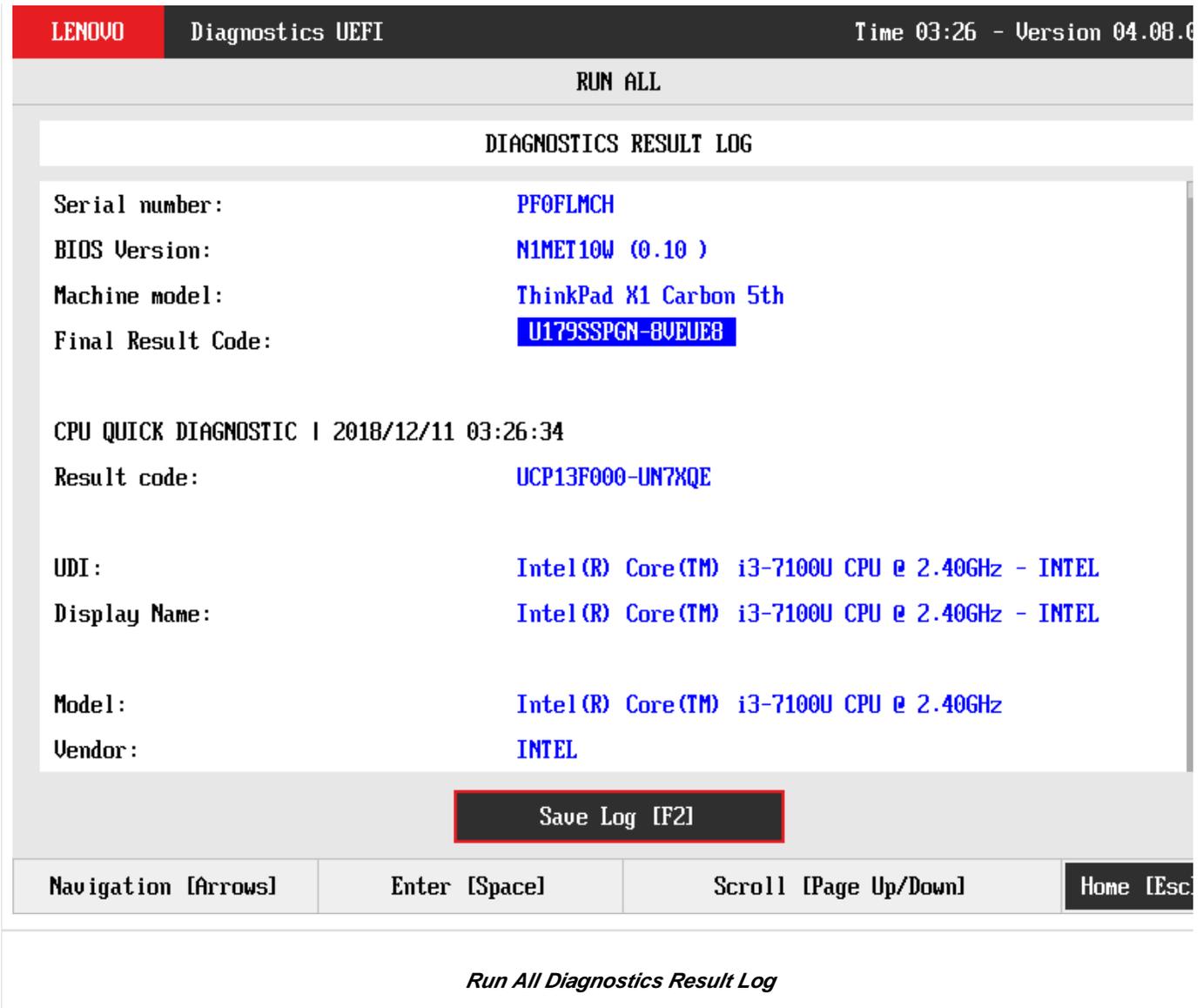
The Diagnostics Result Log screen is composed of:

- Application Header Bar
- Screen Title Bar
- Screen Sub-title Bar
- Diagnostic Log Section
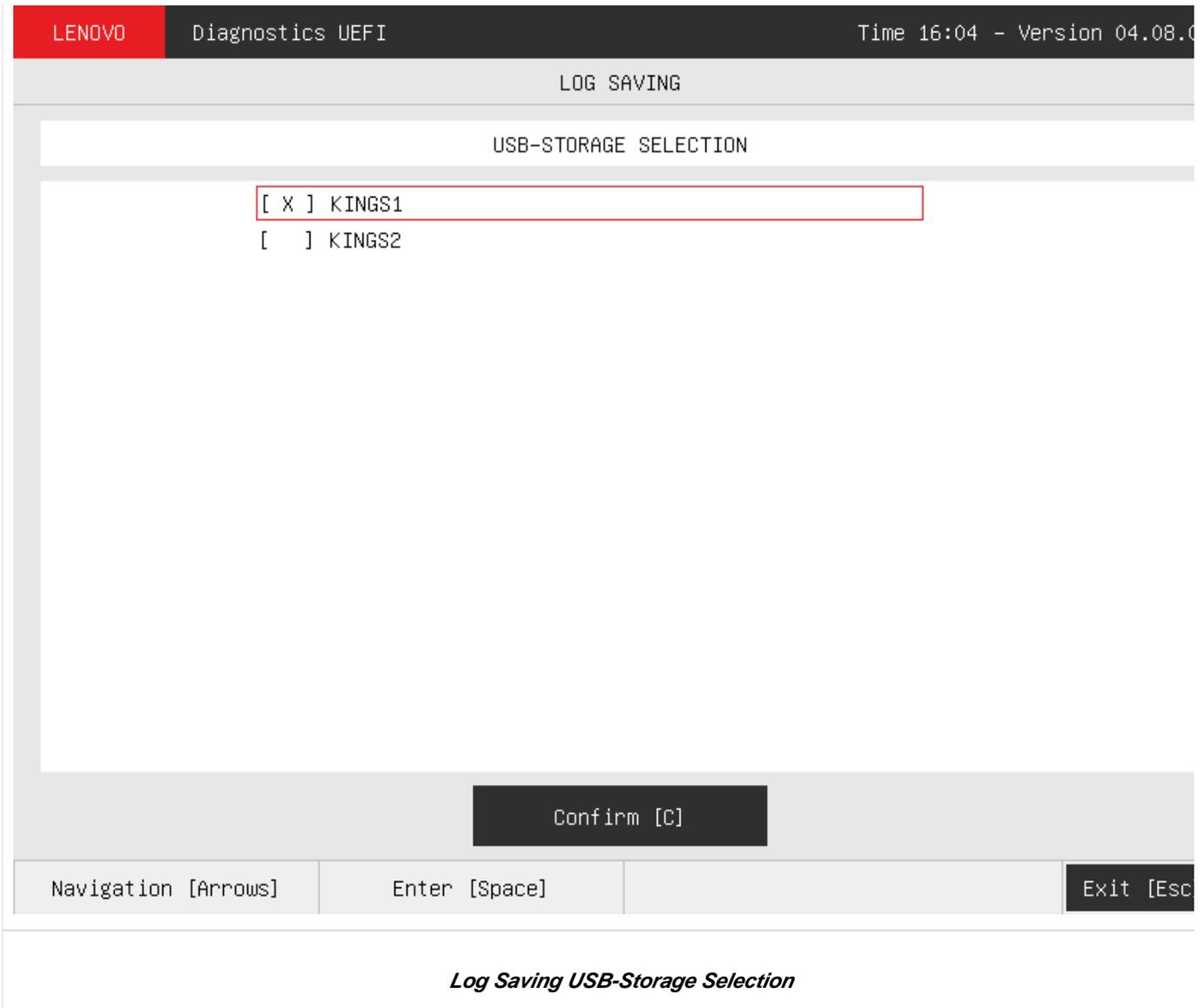- Save Log Button
- Instruction Footer Bar

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

[X] KINGS1

[   ] KINGS2

Confirm [C]

Navigation [Arrows]   Enter [Space]   Exit [Esc

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.
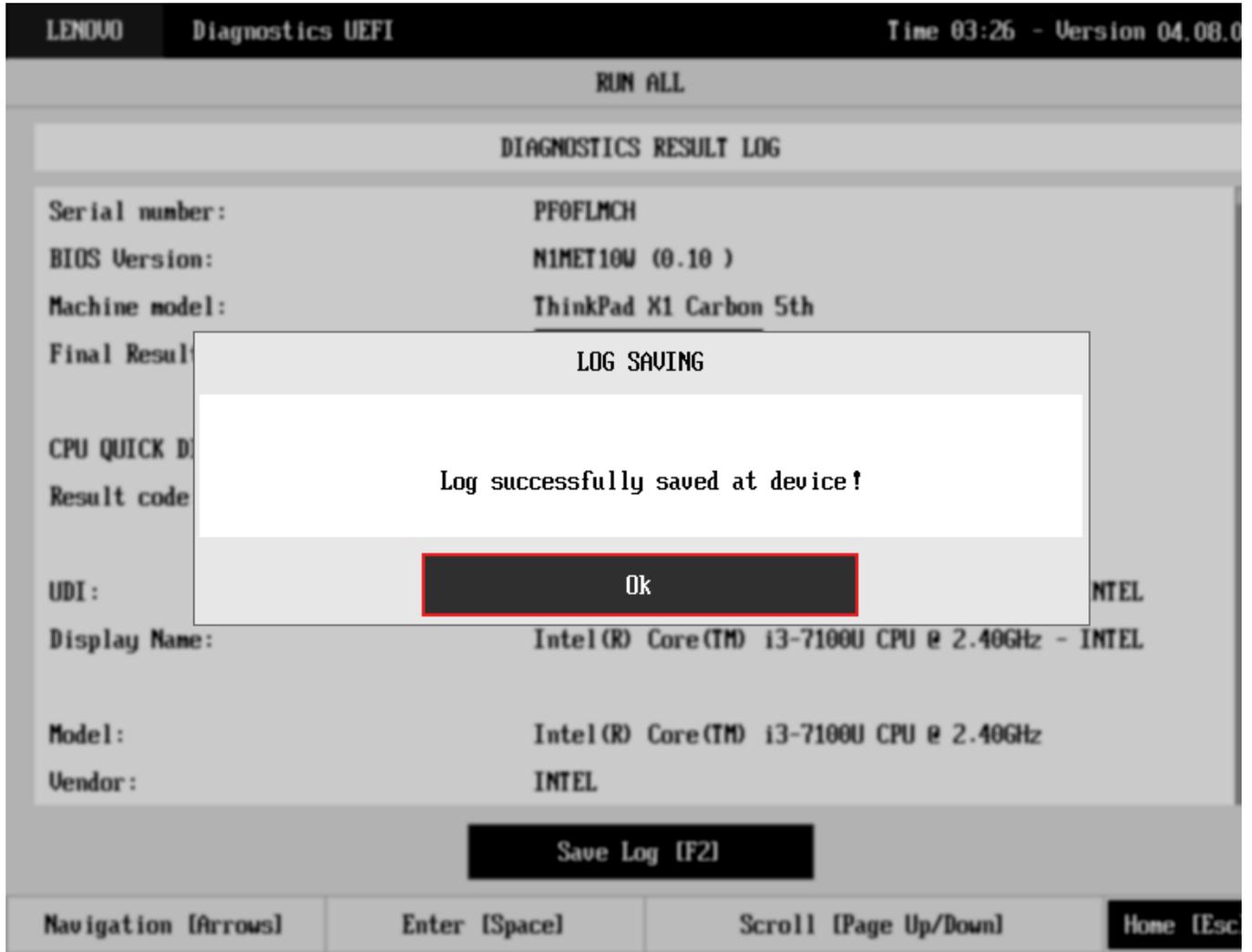
Log Saving Information Popup

System Information

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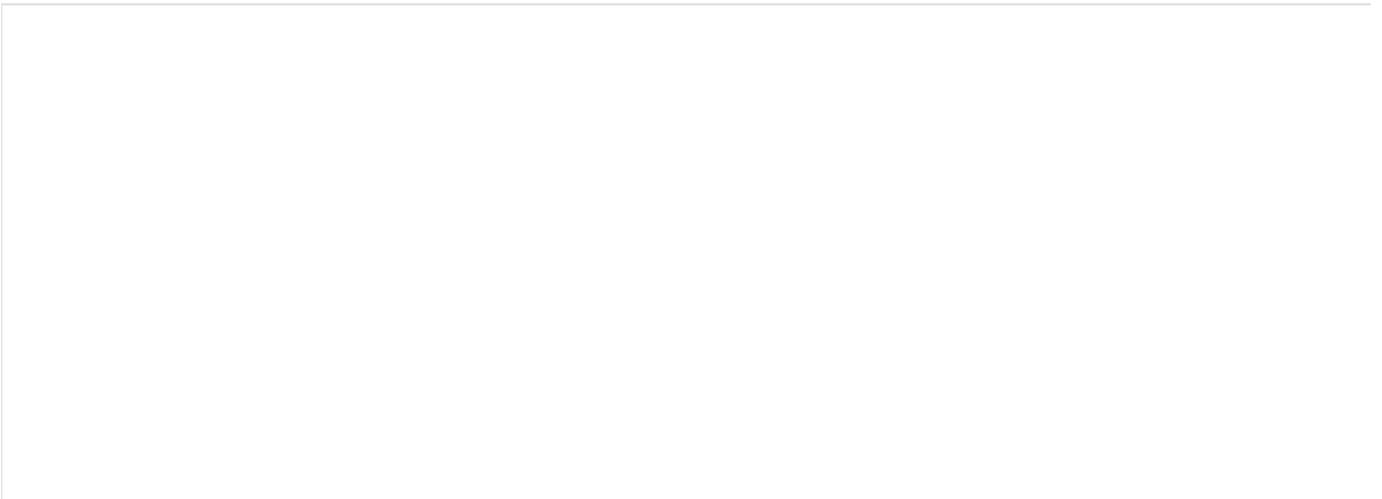
SYSTEM INFORMATION

CHOOSE A MODULE:

SYSTEM [0]

CPU [1]

DISPLAY [2]

KEYBOARD [3]

MEMORY [4]

MOTHERBOARD [5]

MOUSE [6]

PCI EXPRESS [7]

STORAGE [8]

MACHINE INFORMATION

Machine manufacturer: LENOVO
Product name: DX120NPI22
Product version: ThinkPad X1 Carbon 5th
Serial number: PF0FLMCH
Eth Physical Address: C8-5B-76-68-A8-A8

BIOS INFORMATION

BIOS Version: N1MET10W (0.10)
BIOS release date: 09/12/2016
BIOS manufacturer: LENOVO

Export System Information [F2]

| Navigation [Arrows] | Enter [Space] | Scroll [Page Up/Down] | Home [Esc] |

System Information's System Tab

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

SYSTEM INFORMATION

CHOOSE A MODULE:

- SYSTEM [0]
- BATTERY [1]
- CPU [2]
- DISPLAY [3]
- MEMORY [4]
- MOTHERBOARD [5]
- PCI EXPRESS [6]
- STORAGE [7]

BATTERY INFORMATION

UDI:	SANYO
Display Name:	213-SANYO
Primary:	YES
Manufacturer:	SANYO
Serial number:	213
Bar code number:	P1SG563006M
FRU number:	00HW022
Firmware level:	16
Manufacture date:	2015/06/03
First use date:	2000/12/31
Temperature:	292.8 K

Export System Information [F2]

| Navigation [Arrows] | Enter [Space] | Scroll [Page Up/Down] | Home [Esc] |

System Information's Battery Tab

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

| LENOVO | Diagnostics UEFI | Time 03:27 - Version 04.08.0 |

SYSTEM INFORMATION

CHOOSE A MODULE:

- SYSTEM [0]
- CPU [1]
- DISPLAY [2]
- KEYBOARD [3]
- MEMORY [4]
- MOTHERBOARD [5]
- MOUSE [6]
- PCI EXPRESS [7]
- STORAGE [8]

CPU INFORMATION

UDI:	Intel(R) Core(TM) i3-7100U CPU @ 2.40GHz - INTEL
Display Name:	Intel(R) Core(TM) i3-7100U CPU @ 2.40GHz - INTEL
Model:	Intel(R) Core(TM) i3-7100U CPU @ 2.40GHz
Vendor:	INTEL
Number of cores:	2
Number of enabled cores:	2
Number of threads:	4
Signature:	806e9

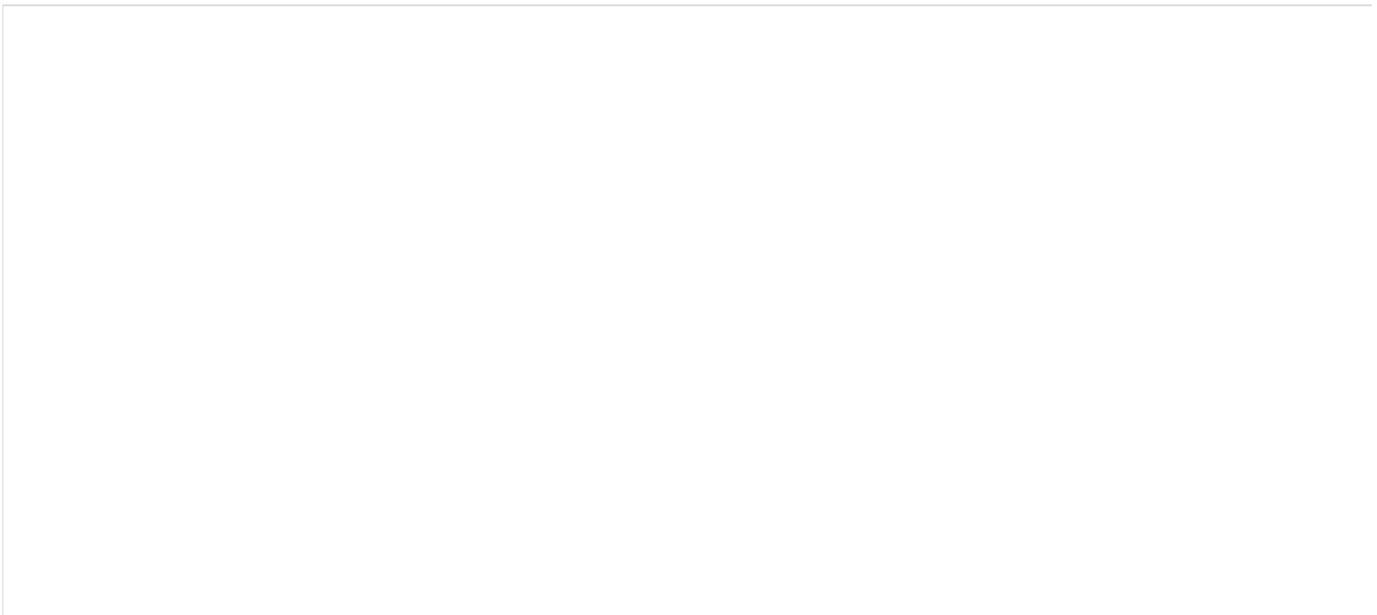Export System Information [F2]

| Navigation [Arrows] | Enter [Space] | Scroll [Page Up/Down] | Home [Esc] |

System Information's CPU Tab

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

SYSTEM INFORMATION

CHOOSE A MODULE:

SYSTEM [0]

CPU [1]

DISPLAY [2]

KEYBOARD [3]

MEMORY [4]

MOTHERBOARD [5]

MOUSE [6]

PCI EXPRESS [7]

STORAGE [8]

DISPLAY INFORMATION

UDI:	HV140FHM-N61 - BOE
Display Name:	HV140FHM-N61 - BOE
Manufacturer ID:	BOE
Model Name:	HV140FHM-N61
EDID version:	1.4
Max resolution:	1920 x 1080 pixels
Max image size:	31 cm x 17 cm
Input type:	Digital
Display type:	RGB 4:4:4

Export System Information [F2]

Navigation [Arrows]	Enter [Space]	Scroll [Page Up/Down]	Home [Esc]

System Information's Display Tab

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

SYSTEM INFORMATION

CHOOSE A MODULE:

SYSTEM [0]

CPU [1]

DISPLAY [2]

FAN [3]

MEMORY [4]

MOTHERBOARD [5]

PCI EXPRESS [6]

STORAGE [7]

FAN INFORMATION

UDI: FAN_SYSTEM
Display Name: FAN_SYSTEM

CPU fan speed: 2680 RPM
CPU temperature: 30 C

Export System Information [F2]

| Navigation [Arrows] | Enter [Space] | Scroll [Page Up/Down] | Home [Esc] |

System Information's Fan Tab

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

SYSTEM INFORMATION

CHOOSE A MODULE:

| SYSTEM [0] |
| CPU [1] |
| DISPLAY [2] |
| KEYBOARD [3] |
| **MEMORY [4]** |
| MOTHERBOARD [5] |
| MOUSE [6] |
| PCI EXPRESS [7] |
| STORAGE [8] |

MEMORY INFORMATION

UDI:	MEMORY_UDI
Display Name:	MAIN_MEMORY
Total physical memory:	4096 MB
Origin:	SMBIOS
Type:	LPDDR3
Manufacturer:	Micron
Maximum Speed:	1867 MT/s
Current Speed:	1867 MT/s
Size:	2048 MB
Rank Locator:	RANK 0

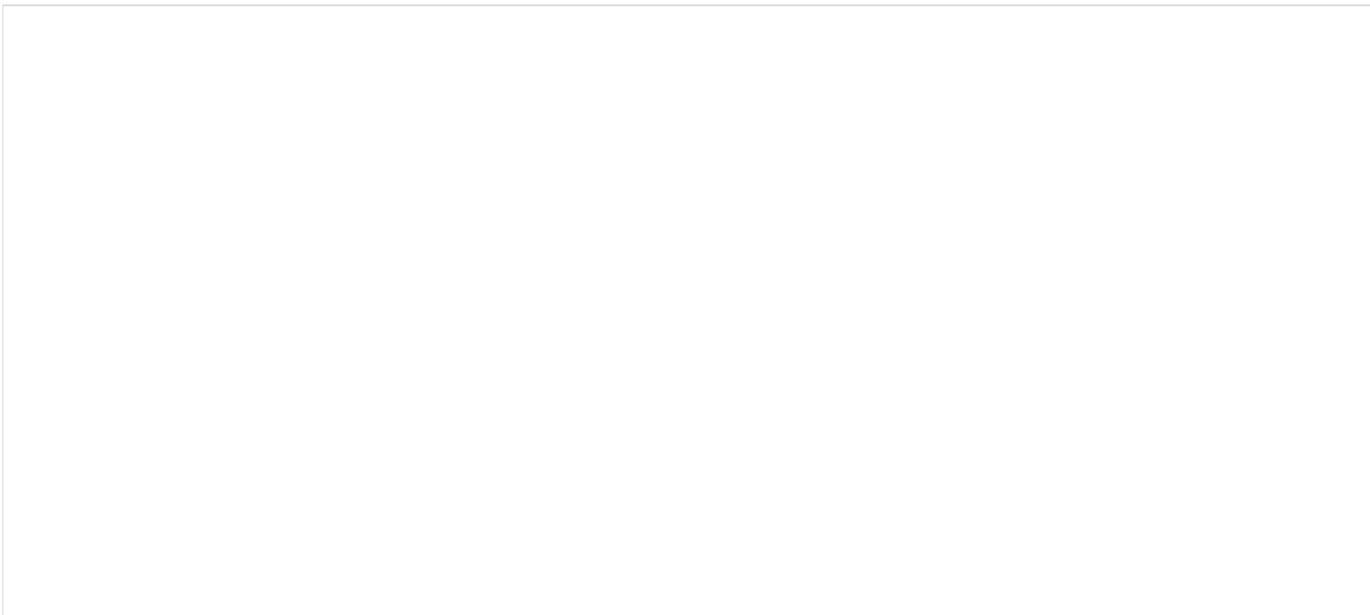Export System Information [F2]

| Navigation [Arrows] | Enter [Space] | Scroll [Page Up/Down] | Home [Esc] |

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

CHOOSE A MODULE:

- SYSTEM [0]
- CPU [1]
- DISPLAY [2]
- **FAN [3]**
- MEMORY [4]
- MOTHERBOARD [5]
- PCI EXPRESS [6]
- STORAGE [7]

FAN INFORMATION

UDI:	FAN_SYSTEM
Display Name:	FAN_SYSTEM
CPU fan speed:	2680 RPM
CPU temperature:	30 C

Export System Information [F2]

| Navigation [Arrows] | Enter [Space] | Scroll [Page Up/Down] | Home [Esc] |

System Information's Optical Tab

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

SYSTEM INFORMATION

CHOOSE A MODULE:

- SYSTEM [0]
- CPU [1]
- DISPLAY [2]
- KEYBOARD [3]
- MEMORY [4]
- MOTHERBOARD [5]
- MOUSE [6]
- PCI EXPRESS [7]
- STORAGE [8]

PCI EXPRESS INFORMATION

UDI:	PCI_EXPRESS_SYSTEM
Display Name:	PCI_EXPRESS_SYSTEM
Resource:	PCI-Express resource
Bus:	0x0
Device:	0x2
Function:	0x0
Offboard Device:	No
Vendor Id:	0x8086
Class:	Display controller
Subclass:	VGA compatible controller

Export System Information [F2]

Navigation [Arrows]	Enter [Space]	Scroll [Page Up/Down]	Home [Esc]

System Information's PCI Express Tab

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

SYSTEM INFORMATION

CHOOSE A MODULE:

SYSTEM [0]

CPU [1]

DISPLAY [2]

MEMORY [3]

MOTHERBOARD [4]

PCI EXPRESS [5]

RAID [6]

STORAGE [7]

RAID INFORMATION

UDI:	RAID
Display Name:	RAID
Resource:	Raid Device
Bus:	0x17
Device:	0x0
Function:	0x0
Vendor Id:	0x1000

Export System Information [F2]

Navigation [Arrows]	Enter [Space]	Scroll [Page Up/Down]	Home [Esc]

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 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 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;

- Product Name;
- 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 **_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;
- Resource;
- Index;
- Slot;
- Class Name;
- Subclass Name.

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).

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:

- UDI;
- Display Name;
- Model Number;
- Manufacturer;
- Device Type;
- Serial Number;
- Firmware Revision;
- Size (in GB);
- Rotation Rate;
- Temperature (in Celsius);
- Physical Block Size (in bytes);
- Logical Block Size (in bytes);
- No. of Logical Blocks;
- Supported Standards;
    - ATA/ATAPI 4;
    - ATA/ATAPI 5;
    - ATA/ATAPI 6;
    - ATA/ATAPI 7;
    - ATA8_ACS;
- Standard Version;

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;
- Manufacturer;
- Product Name;

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

For more information about each event code, select "code lookup" on this web site:
http://www.thinkworkstationsoftware.com

Date	Time	Code	Descriptions
2018/08/10	03:57:05	S008	5V standby bus – High voltage error
2018/08/10	03:57:05	N000	Power button pressed
2018/08/09	09:16:56	N000	Power button pressed
2018/08/09	09:13:02	S008	5V standby bus – High voltage error
2018/08/09	09:13:02	N000	Power button pressed
2018/08/09	08:56:48	N000	Power button pressed
2018/08/09	08:49:04	S040	Motherboard voltage regulation error
2018/08/09	08:49:04	S014	Startup timing error
2000/01/01	12:00:00	S008	5V standby bus – High voltage error
2000/01/01	12:00:00	N000	Power button pressed
2018/08/06	14:08:04	S040	Motherboard voltage regulation error
2018/08/06	14:08:04	S014	Startup timing error
2018/08/06	14:08:03	N000	Power button pressed

Serial Number: INVALID   Clear Front Panel LED [Delete]

| Navigation [Arrows] | Enter [Space] | Scroll [Page Up/Down] | Home [Esc |

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 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.

HOME

DIAGNOSTICS   TOOLS

CPU [1]   DISPLAY [2]   SYSTEM INFORMATION [F1]

KEYBOARD [3]   MEMORY [4]   BAD BLOCK RECOVERY [F3]

MOTHERBOARD [5]   MOUSE [6]

PCI EXPRESS [7]   STORAGE [8]

RUN ALL [R]

Navigation [Arrows]   Enter [Space]   Exit [Esc]

Home

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 SELECTION

STORAGE INFORMATION

Display Name: ST2000LM007-1R8174-Seagate Technology
Manufacturer: Seagate Technology
Device Type: SATA
Size: 1863 GB

Ok

Confirm [C]

Navigation [Arrows]   Enter [Space]   Selected Item Info [I]   Home [Esc
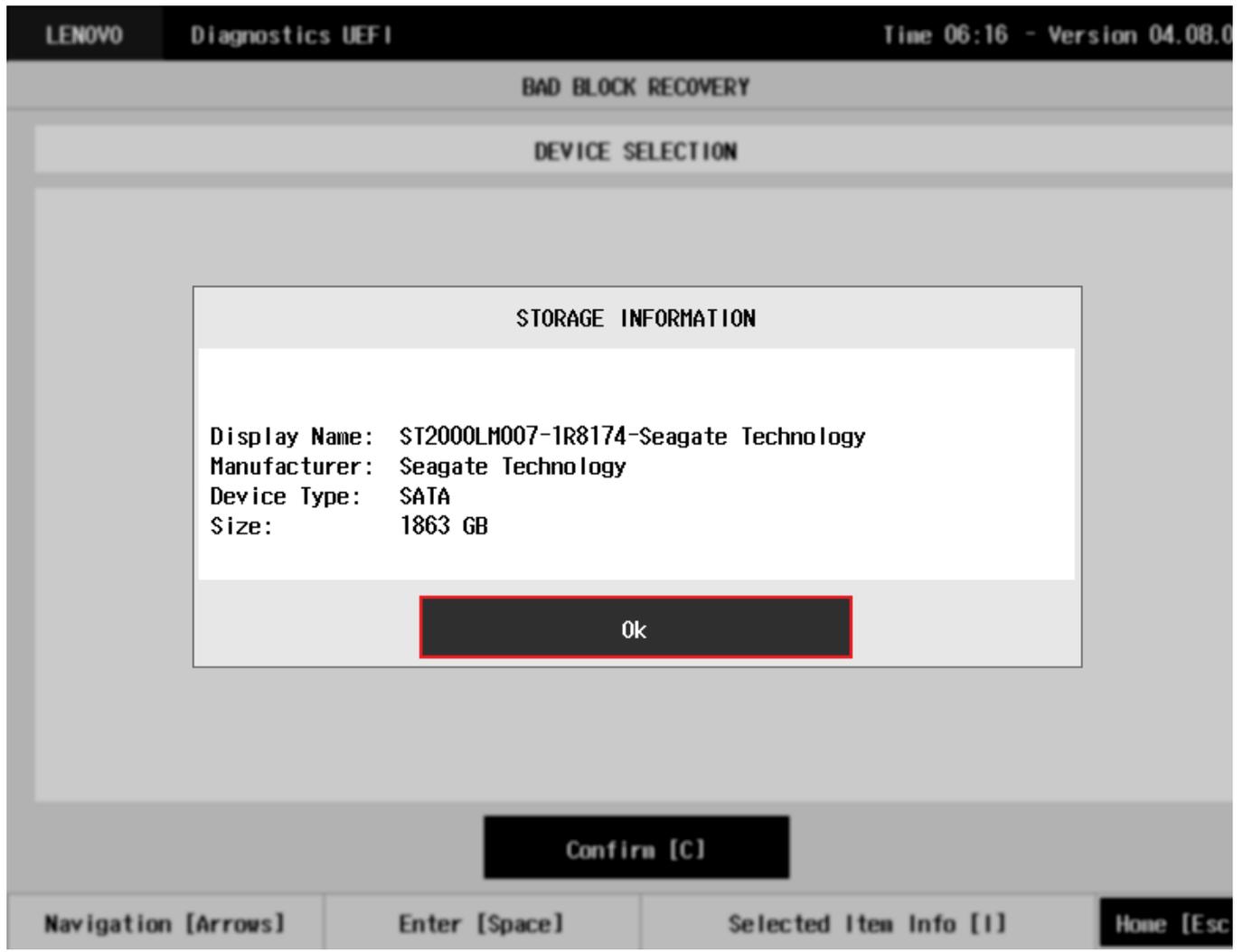
Bad Block Recovery Device Information

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.
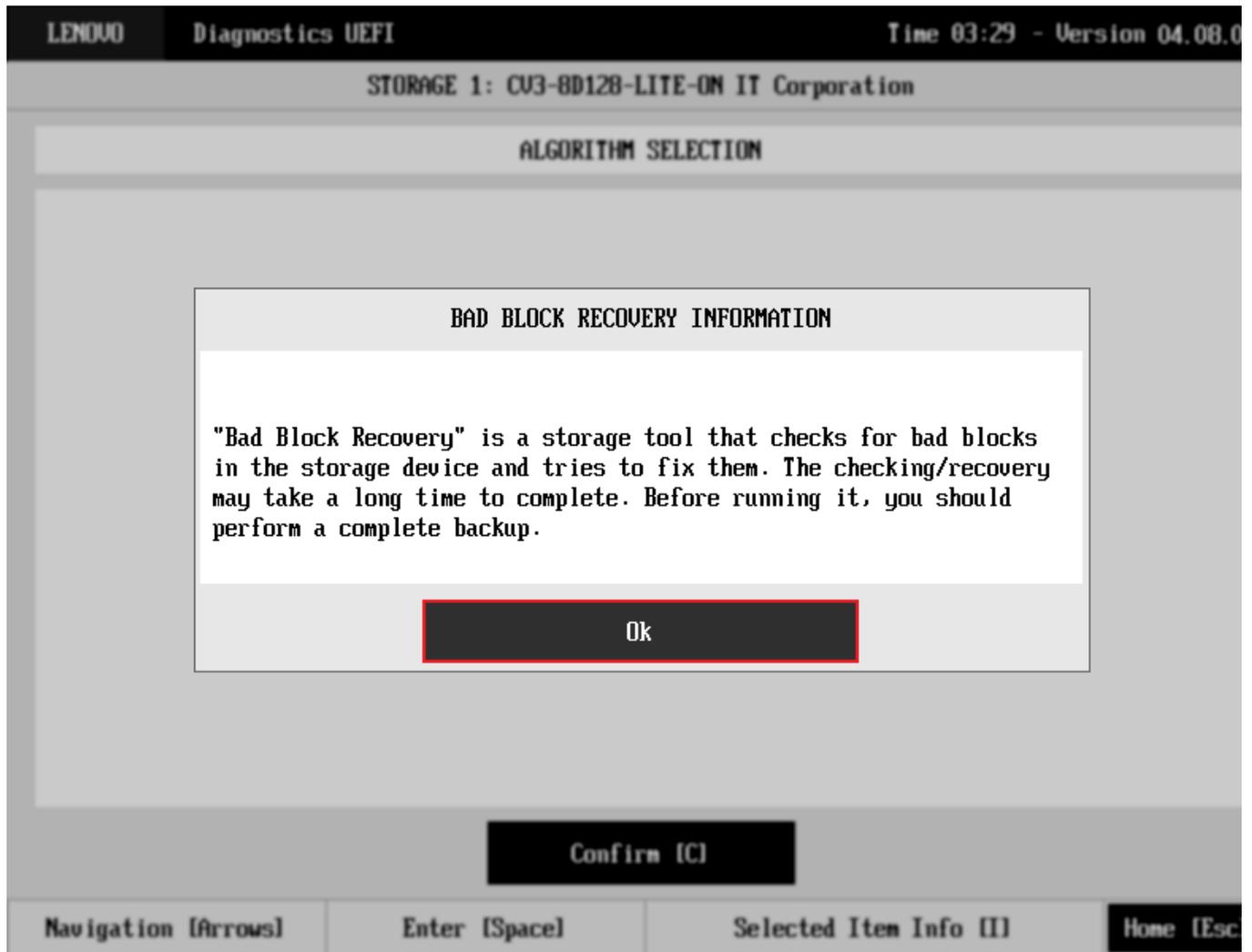
Storage Algorithm Selection

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.

STORAGE 1: CV3-8D128-LITE-ON IT Corporation

ALGORITHM SELECTION

BAD BLOCK RECOVERY INFORMATION

"Bad Block Recovery" is a storage tool that checks for bad blocks in the storage device and tries to fix them. The checking/recovery may take a long time to complete. Before running it, you should perform a complete backup.

Ok

Confirm [C]

Navigation [Arrows]   Enter [Space]   Selected Item Info [I]   Home [Esc

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
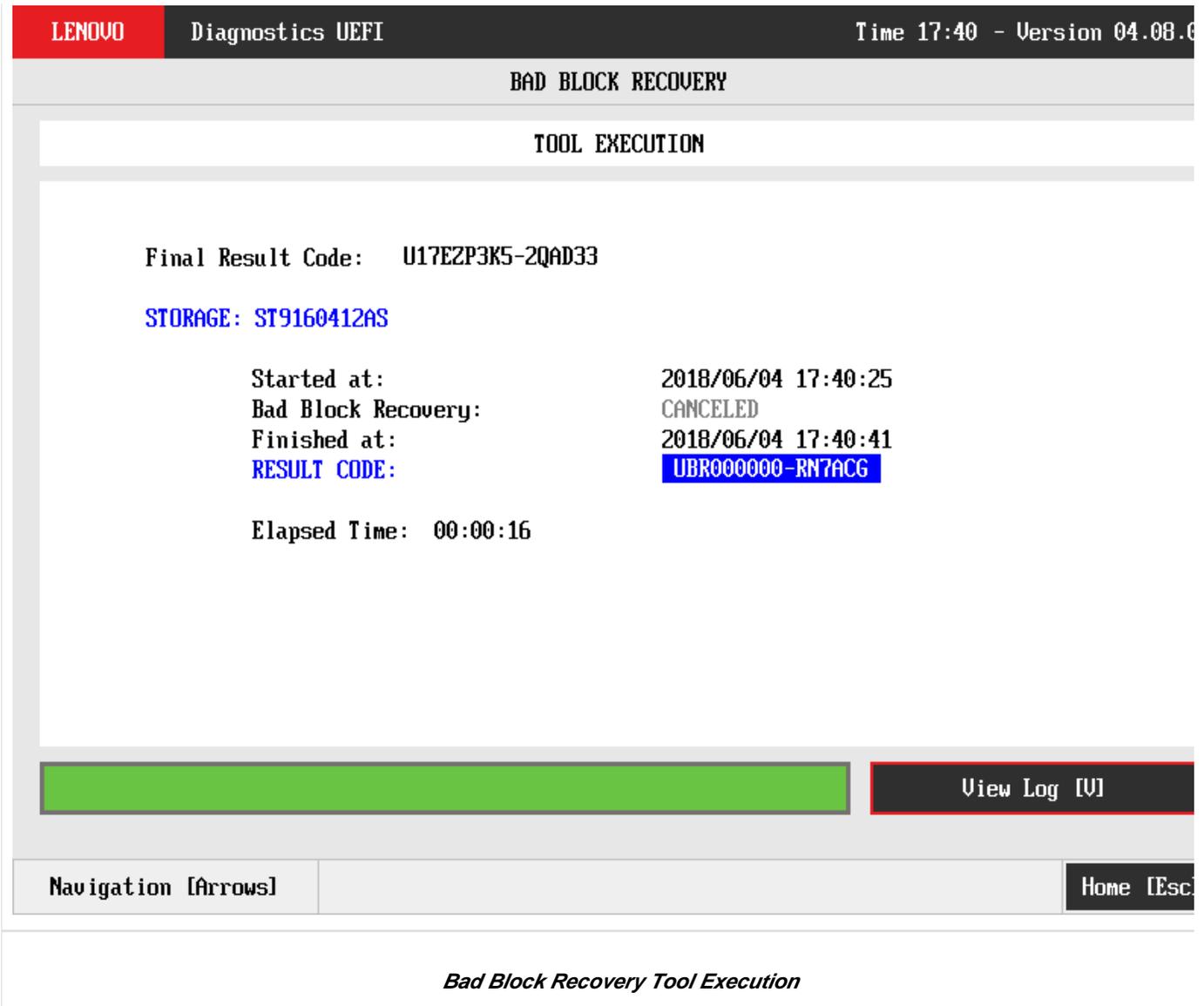
The Bad Block Recovery Tool Execution screen provides information about the Bad Block Recovery tool progress, as well as its result when it has finished. This screen is composed of:

- 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 seven status:
    - **Waiting**, indicating the algorithm is waiting to be run.
    - **Progress** (plus the tool execution percentage), indicating the tool 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 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.

This tool is currently available in HDD devices only

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

HOME

DIAGNOSTICS   TOOLS

CPU [1]   DISPLAY [2]   SYSTEM INFORMATION [F1]

KEYBOARD [3]   MEMORY [4]   BAD BLOCK RECOVERY [F3]

MOTHERBOARD [5]   MOUSE [6]   STORAGE DATA DISPOSAL [F4]

OPTICAL [7]   PCI EXPRESS [8]

STORAGE [9]

RUN ALL [R]

Navigation [Arrows]   Enter [Space]   Exit [Esc]

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

[X] Select / Deselect All Options

[X] ST9160412AS-Seagate Technology   (i)

Confirm [C]

Navigation [Arrows]   Enter [Space]   Selected Item Info [I]   Home [Esc]

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 1: ST9160412AS-Seagate Technology

ALGORITHM SELECTION

[X] Select / Deselect All Options

[X] Storage Data Disposal   (i)

Confirm [C]

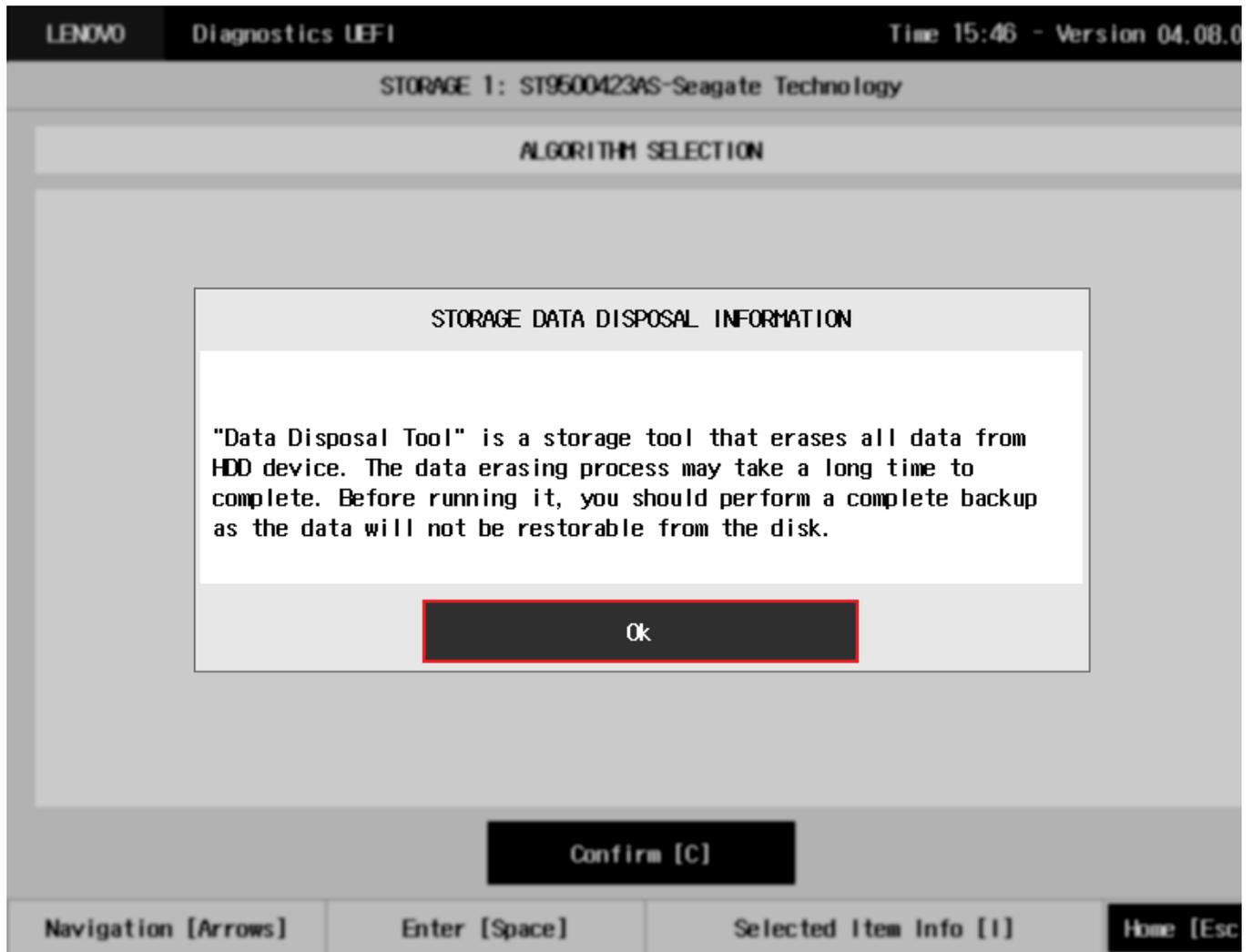Navigation [Arrows]   Enter [Space]   Selected Item Info [I]   Home [Esc]

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 1: ST9500423AS-Seagate Technology

ALGORITHM SELECTION

STORAGE DATA DISPOSAL INFORMATION

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

Ok

Confirm [C]

Navigation [Arrows]   Enter [Space]   Selected Item Info [I]   Home [Esc

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.
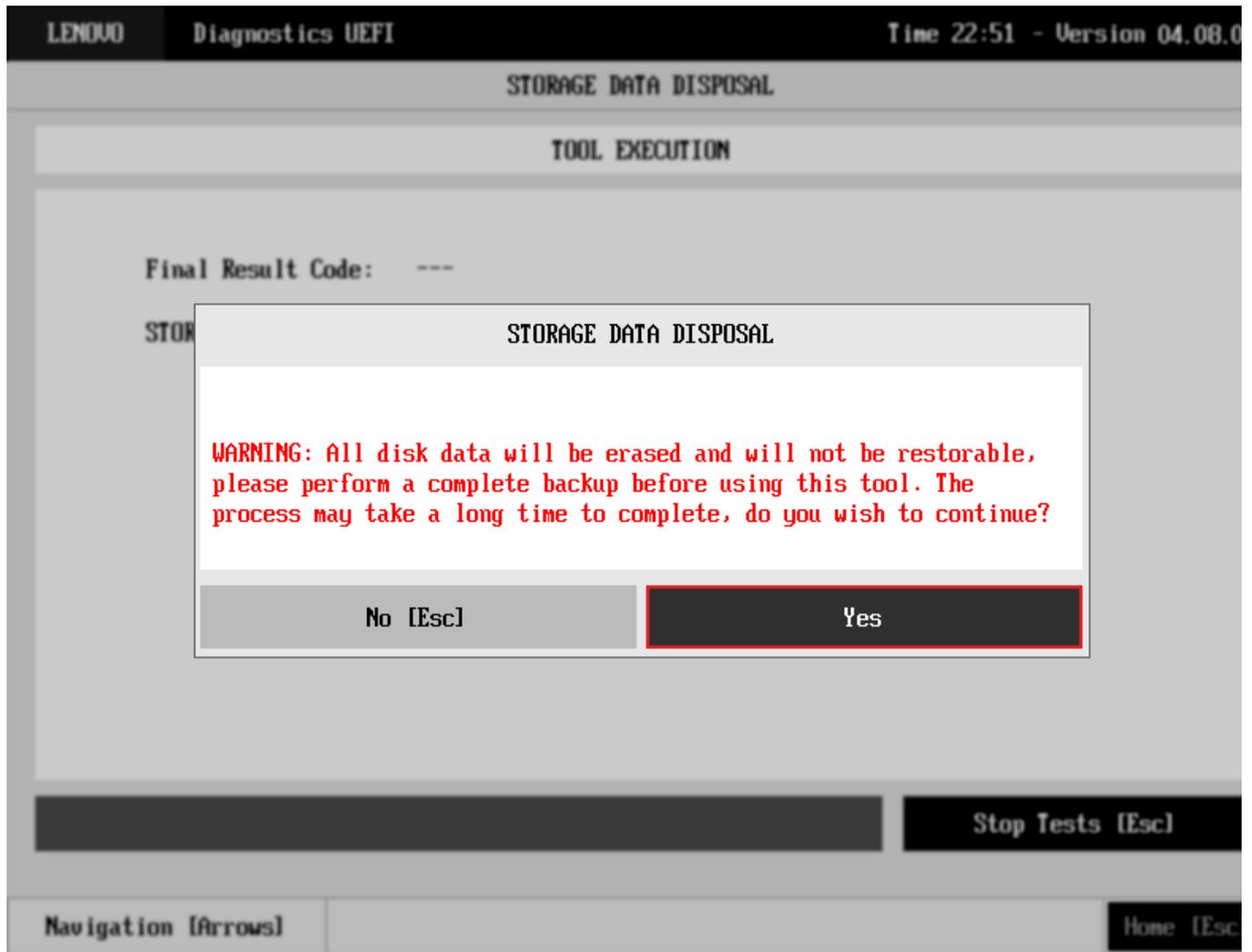
Storage Data Disposal Warning Message

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
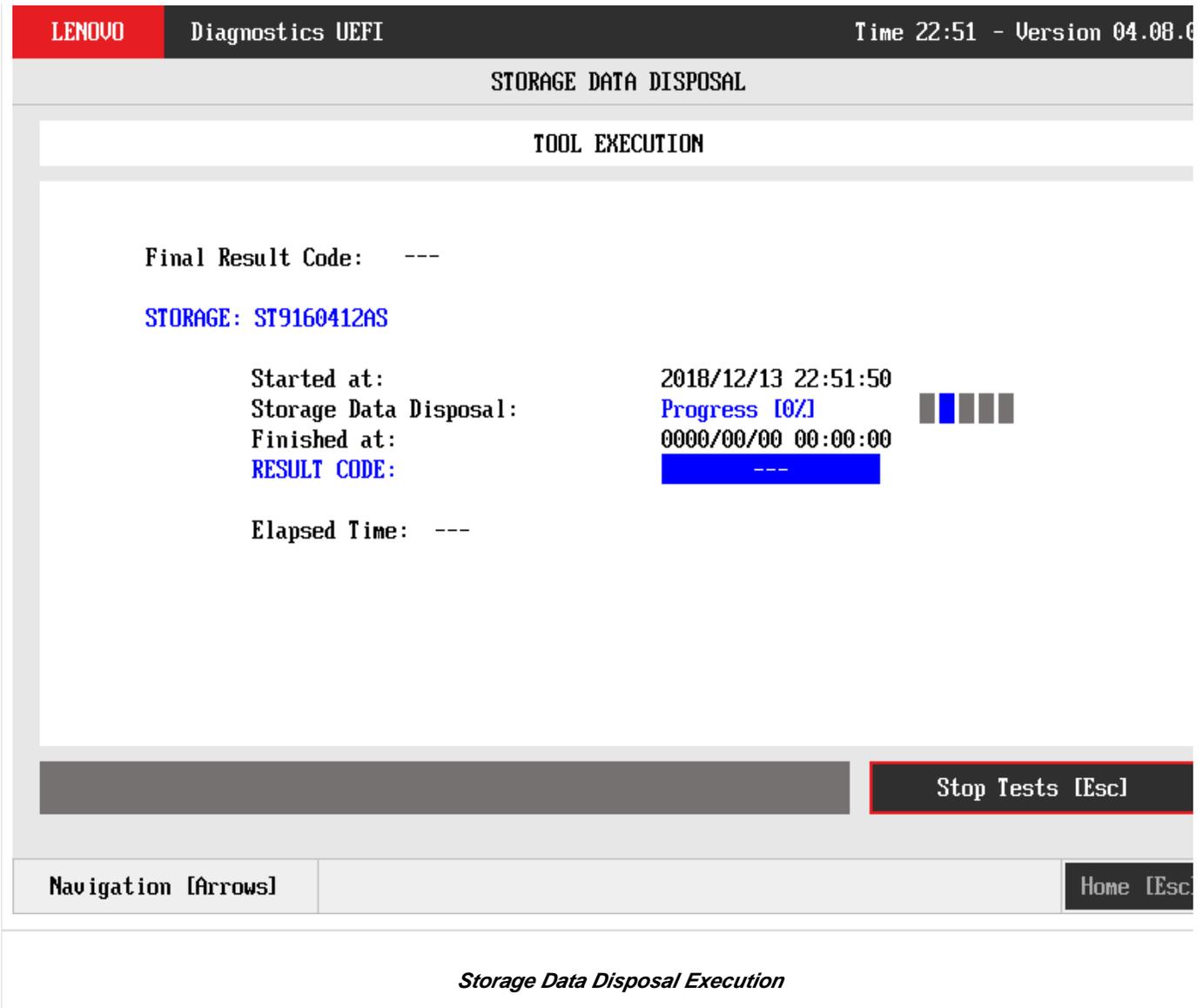
The Storage Data Disposal Tool Execution screen provides information about the data disposal progress, as well as its result when it has finished. This screen is composed of:

- 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 seven status:
    - **Waiting**, indicating the algorithm is waiting to be run.
    - **Progress** (plus the tool execution percentage), indicating the tool is being run.
   - **SUCCESS**, 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 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 and SSDs , 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
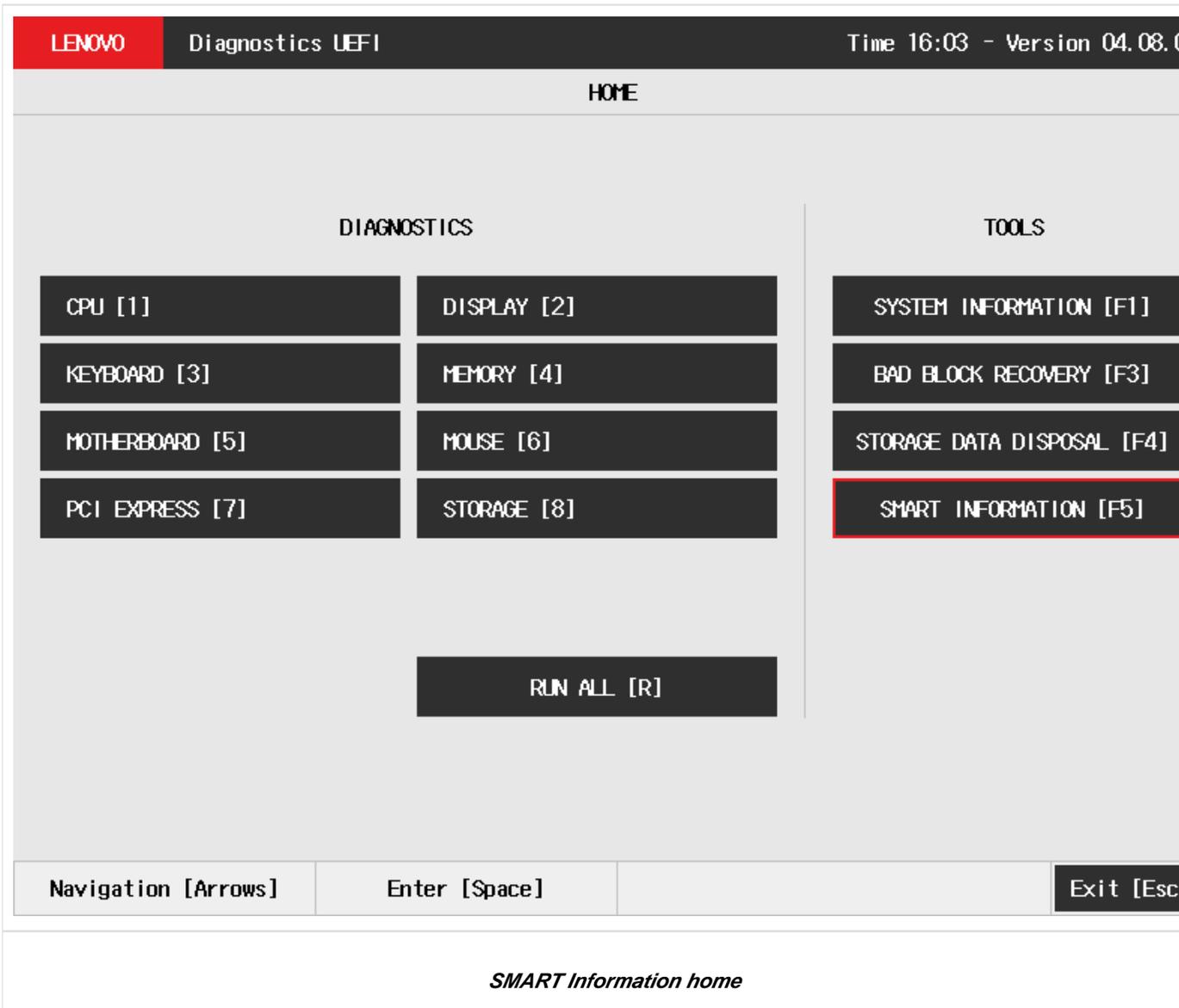
After the user enters the SMART Information option, the application will display the storage devices available in the system. The menu Device Selection is displayed, as shown in the next figure.

SMART INFORMATION TOOL

DEVICE SELECTION

[X] THNSFJ256GCSU-Toshiba   (i)

Confirm [C]

Navigation [Arrows]   Enter [Space]   Selected Item Info [I]   Home [Esc]

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

Refresh [R]   Export SMART Information [F2]

Navigation [Arrows]   Enter [Space]   Scroll [Page Up/Down]   Home [Esc]

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.

About

Lenovo Diagnostics for UEFI

04.08.000

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