User Guide

Lenovo UEFI Diagnostics for Think and Idea

Version 02.09.06

Revision History

Revision	Date	Description of changes
1	July 15, 2011	Initial Version
2	July 29, 2011	Updated to Sprint 5
3	October 20, 2011	Updated to Sprit 9
4	December 7, 2011	Updated with information about pop-up displayed after some failure is detected at Storage Device Test
5	January 6, 2012	Document for Gold Version
6	July 25, 2012	Document for version 2.00.00
7	August 3, 2012	PCI Express images added for version 2.00.00
8	August 16, 2012	Updated for release 02.00.01
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11	April 30, 2013	Updated for release 02.01.01
12	April 7, 2014	Updated for release
13	December 17, 2014	Updated for release 02.07.01
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Summary

1. **Objective**

This document describes what is necessary to run the Lenovo UEFI Diagnostic tests.

2. **Install and Run the UEFI diagnostics**

Note: No installation is required for the embedded UEFI Diagnostics.

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

1. **Save the UEFI Diagnostics image:**

   a. Go to www.Lenovo.com/diags

   b. Click "Downloads."

   c. Under "Lenovo UEFI Bootable Diagnostics," click on "UEFI Bootable USB Generator. 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*.)

2. **Save the Bootable Generator:**

   a. Go to www.Lenovo.com/diags

   b. Click "Downloads."

   c. Under "Lenovo UEFI Bootable Diagnostics," click on "UEFI Bootable ISO Generator (GUI).

3. **Run the Bootable Generator program.**

   a. Go to the folder where you saved the bootable generator and double click on it .

   b. Double click "BootableGenerator.exe."

   c. Insert a USB flash drive.

   d. Your flash drive name will appear under "Select a device." Click to select it. If you want to, you can type a new name for the device.

   e. Click "Search." Click on the image name that you saved in step 1.

   f. Click "Generate."

   g. A message will appear, warning that all existing files on the flash drive will be erased if you continue. If you are OK with that, then press "Yes" to continue.

2.2 Run the UEFI Diagnostics

2.2.1 **Run the UEFI Diagnostics from a Bootable Flash Drive**

1. Create the Bootable flash drive, as explained in section 2.1.

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.

    The UEFI diagnostics menu will display on your screen.

2.2.2 **Run the Embedded UEFI Diagnostics**

Boot the system, then immediately press:

- F10 for Think systems

- F11 for Idea systems

The UEFI diagnostics menu will display on your screen.

2.3 Interface

2.4 Main Screen

The main screen for UEFI Lenovo Diagnostics is shown in Figure 1.

```
Lenovo diagnostics                                        12:00:00
                              Home

        DIAGNOSTICS                              TOOLS
  CPU - Quick test                   System information
  CPU - Extended test                Recover Bad Sectors
  Fan test
  LCD test                           Generate configuration file
  Memory - Quick test                Execute configuration file
  Memory - Extended test
  Motherboard test
  Optical device test                Exit application
  Pci-e test
  RAID test
  Storage test
  Video Card test

  Run all



                  Arrow keys:navigation   ESC:Exit
                       Version XX.XX.XX
```

Figure 1 - Application Main Screen

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

- An Application Title Bar

- Two main sections (Diagnostics and Tools)

- An Instruction Bar

The Application Title Bar contains the name of the application and the Instruction Bar contains instructions for using the application. The Main Screen has two main sections: Diagnostics and Tools. The Diagnostics section provides options to run all installed tests and an option to exit the application. The Tools section provides options to use several tools.

The currently selected option is highlighted in blue. The other options are not highlighted. The user can change the selected option by pressing the arrow keys. The up and down arrow keys are used to change the selected option in the same section (Diagnostics or Tools). The left arrow and right arrow keys are used to change the section (from Diagnostics to Tools, and vice versa). To run the selected option, the user must press the ENTER key.

Diagnostics options are:

- Memory - Quick test (Memory quick test)

- Memory - Extended test (Memory extended test)

- Storage test (Quick storage device test)

- LCD test

- PCI-e test

- RAID test

- Motherboard test

- Optical test (Optical Device Test)

- CPU - Quick test (CPU quick test)

- CPU - Extended test (CPU extended test)

- Video Card test

- Fan test

- Exit Application

Tools options are:

- System Information

- Generate configuration file

- Execute from configuration file

- Recover Bad Sectors tools

The "Memory quick test" is an option that runs memory quick test and displays the memory quick test screen. The "Memory extended test" is an option that runs the memory extended test and displays the memory extended test screen. The "Memory bit fade test (180 min)" is an option that runs the memory bit fade test and displays the memory bit fade test screen. The "Quick storage device test" is an option that runs the storage device quick test and displays the storage device quick test Screen. The

"LCD test" is an option that runs the LCD test and displays the LCD test screen. The "PCI-e test" is an option that runs the PCI express test and displays the PCI express test screen. The "RAID test" is an option that runs the RAID test and displays the RAID test screen. The "Motherboard test" is an option that runs the Motherboard test and displays the Motherboard test screen. The "Optical device test" is an option that runs the Optical device test and displays the Optical device test screen. The "CPU quick test" is an option that runs the cpu quick test and displays the CPU quick test screen; The "CPU extended test" is an option that runs the CPU extended test and displays the CPU extended test screen. The "Exit Application" is an option that closes the application, "System Information" option, displays tabs with the machine and memory information displaying "System Information" screen. The "Generate configuration file" allows the user to generate a configuration file with several saved diagnostics. The "Execute from configuration file" runs all diagnostics saved on the configuration file, and The "Recover Bad Sectors Tool" is an option that runs the bad sectors recovering operation and displays "Recover Bad Sectors Tools" screen.

2.5   Memory quick test
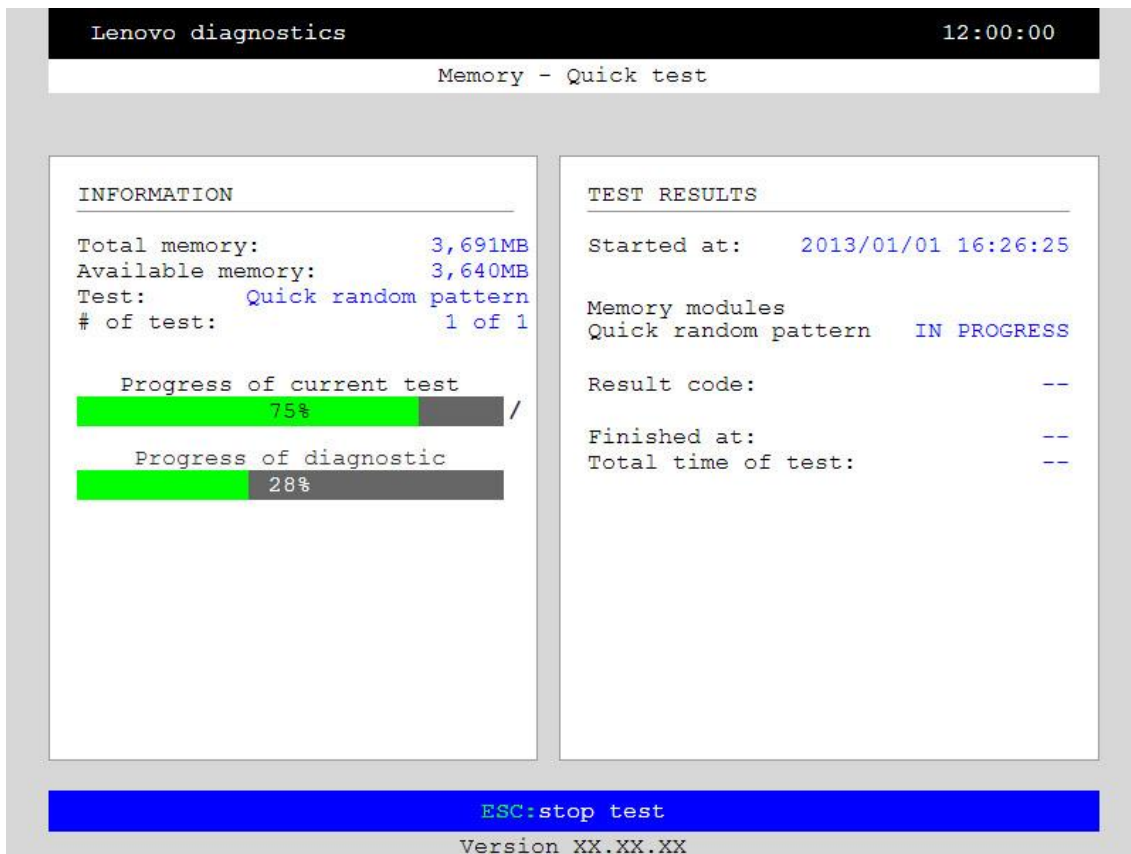
The Memory quick test Screen is shown in Figure 2.

Figure 2 - Memory – Quick test Screen

The Memory quick test screen is displayed when the user runs the "Memory quick test" option on the Main Screen. The Memory quick test screen provides the user information about memory test progress, as well as information about results. This screen is composed of:

- An Application Title Bar

- A Screen Title Bar

- Two sections (Information and Results)

- An Instruction Bar

The Application Title Bar contains the name of the application, The Screen Title Bar contains the name of the screen (in this case, "Memory quick test"), and the Instruction Bar contains instructions to run he test. The Version Bar contains the application version number and the current time. The Memory quick test screen has also two main sections: Information and Results. The first section provides information to the user about the test progress and the second section providest information about the results of the thetest and its algorithms.

For The Quick Memory Test, the Information section contains the following information: Total Memory (total number of physical memory the machine has, in Megabytes), Available Memory (memory that the test has allocated to be tested, in Megabytes), Test (name of the test that is currently being currently run), # of Test (number of the current test among all tests to be d), Progress of current test (a progress bar showing the percentage progress of the current test) and Progress of diagnostic (bar with progress in percentage of all diagnostic, with all its test).

The "Results section" contains the following information: date and time that the test was started, a list of all the algorithms which comprise the device test, and status (an algorithm can have six types of status: ON QUEUE, indicating that the test is waiting to be run; IN PROGRESS, indicating that the test is being run; PASSED, indicating that the algorithm found no problems with the device; FAILED, indicating that the algorithm ound one or more; CANCELED, indicating that the algorithm was canceled by the user; and NOT SUPPORTED, indicating that the algorithm is not supported by the device), unique error code for test, date and time that the test was finished (displayed after test is finished) and the duration of test in hours, minutes and seconds (displayed after the test is finished).

During execution of the diagnostic, the user can stop it at any time by pressing ESC key. If the user does that, the diagnostic is aborted and the test that was being run has its status changed to CANCELED. After the diagnostic is finished or canceled, the user can go back to the Main Screen by pressing the ESC key again, or pressing the F3 key to see the test log.

2.6 Memory extended test

The system allows the user to access the Memory extended diagnostic from the Main screen.

The Currently selected option is highlighted in blue. To access the Memory extended diagnostic, use the UP/DOWN/LEFT/RIGHT arrow keys until the "Memory extended test" option is selected, then press the ENTER key. After that, the system will show a list of tests, as illustrated in Figure 3 below, and all tests will initially be selected. The "X" between the brackets means the test is selected. You can deselect a test by selecting it, then pressing the SPACE key. An empty space will appear between the brackets. To select a test again, the user can press the SPACE key again when the desired test is highlighted.

```
Lenovo diagnostics                                    12:00:00
                    Memory - Extended test

    ▶ SELECT TESTS

    [ ] Select/Descelect All

    [x] Address test
    [ ] Advanced integrity test
    [x] Bit fade test (~180min)
    [x] Bit high test
    [ ] Bit low test
    [ ] Block move test
    [ ] Modulo-20 test
    [x] Moving inversions-32bit
    [ ] Moving inversions-8bit
    [ ] Random number sequence
    [x] Random pattern test
    [ ] Walking ones left test
    [ ] Walking ones right test

        Run test >

    Arrows:navigation  Space bar:check/uncheck  ESC:exit
                    Version XX.XX.XX
```

Figure 3 - Memory extended test

Initially, the "Select/deselect all" option is selected. If the user presses the SPACE key on that option, then all test options will be deselected. If the user selects "Select/deselect all" option again, all test options will be selected again.

At least one test must be selected for the application to run the diagnostic. After the user chooses which tests to perform, the user can press the ENTER key or select the RUN TEST option by pressing the

SPACE key. The system will run all tests, as illustrated in Figure 4 below. You can press the ESC key to go back to the Main Screen.


```
Lenovo diagnostics                              12:00:00
                    Memory - Extended test

INFORMATION                     TEST RESULTS

Total memory:        3,691MB    Started at:   2013/01/01 16:26:25
Available memory:    3,640MB
Test:           Address test    Memory modules
# of test:          1 of 4      Address test           IN PROGRESS
                                Block move test            WAITING
     Progress of current test   Modulo-20 test             WAITING
           75%         /        Randon pattern test        WAITING

     Progress of diagnostic
           28%                  Result code:                    --




                        ESC:stop test
                       Version XX.XX.XX
```

Figure 4 - Memory extended test progress

The Memory extended test screen provides information about the memory extended test progress, as well as information about results. This screen is composed of:

• An Application Title Bar

• A Screen Title Bar

• Two sections (Information and Results)

• An Instruction Bar

The Application Title Bar contains the name of the application, the Screen Title Bar contains the name of the screen (in this case, Memory extended test), and the Instruction Bar contains instructions to run the test. The Memory extended test screen has two main sections: Information and Results. The first section provides information about the test and the diagnostic progress. The second section provides information about results of the test and the test algorithms.

For The Memory Extended test, the information section contains the following information: Total Memory (total amount of physical memory the machine has, in Megabytes), Available Memory (memory that the test has allocated to be tested, in Megabytes), Test (name of test that is currently running), # of Test (number of the current test among all tests to be run), Progress of current test (bar showing percentage of the current test completed) and the Progress of diagnostic (bar showing percentage of all diagnostics completed).

The Results section can be scrolled up or down by using the Up and Down arrow keys. If the number of content rows for this section is greater than the screen rows, tThe Result Code of all tested devices will be displayed in the Results section.

While running the diagnostic, the user can stop it at any time by pressing the ESC key. If the user does that, the diagnostic will be aborted and the status of the test that was running will be changed to CANCELED. After the diagnostic is finished or canceled, the user can go back to the Main Screen by pressing the ESC key again or can see the test log by pressing the F3 key.

2.7   Quick storage device test

After the user selects and starts "Quick storage device test" option, the application will display the number of storage devices installed in the machine. If there is more than one storage device installed in the machine, the menu "Select Devices" is displayed, as shown in Figure 5.

```
Lenovo diagnostics                                          12:00:00
                           Storage test


        ▶ SELECT DEVICE

      [x] Select/Deselect All

      [x] SAMSUNG M27PA128HMCD
      [x] SAMSUNG G58AI877KLAA

          Run test >




          Arrows:navigation  Space bar:check/uncheck  ESC:exit
                           Version XX.XX.XX
```

Figure 5 - Select Devices Screen

The "Select Devices" screen allows the user to select which devices will be tested by the application. This screen is composed of:

- An Application Title Bar

- A Screen Title Bar

- A Select Devices section

- An Instruction Bar

The Application Title Bar contains the name of the application, the Screen Title Bar contains the name of the screen, and the Instruction Bar contains instructions for using the screen.

The Select Devices section displays a list of all storage devices plugged into the system, an option to select/deselect all options, and an option NEXT to go to the next screen. The Currently selected option is highlighted in blue. The user can change the selected option by pressing the Up and Down arrow keys.

All devices are initially selected to be tested (an "X" etween the brackets means that the device is selected). The user can deselect a selected device by selecting it and then pressing the SPACE key. That

way, an empty space will appear between the brackets. To select a device again, the user can press SPACE again on the desired device.

Initially, the "Select/deselect all" option is selected. If the user deselects this option by pressing SPACE, then all device options will be deselected. If the user selects "Select/deselect all" option again, all device options will be selected again.

At least one device must be selected so that the application can go to the next screen. After the user chooses which devices to test, the user can press ENTER key or select NEXT option and press the SPACE key. Then, the application will show the next screen. The User can also press the ESC key to go back to the Main Screen.

After the "Select Devices" screen, the application computes the number of algorithms that can be performed for each test. If a test has more than one algorithm, the menu "Select Algorithms" is displayed, as shown in Figure 6.

```
Lenovo diagnostics                                    12:00:00
                          Storage test

        ▶ SELECT TESTS

        [x] Select/Deselect All

        [x] Smart test
        [x] Smart short self-test
        [x] Drive self-test
        [x] Random seek test
        [x] Funnel seek test
        [x] Targeted read test

            Run test >




        Arrows:navigation  Space bar:check/uncheck  ESC:exit
                          Version XX.XX.XX
```
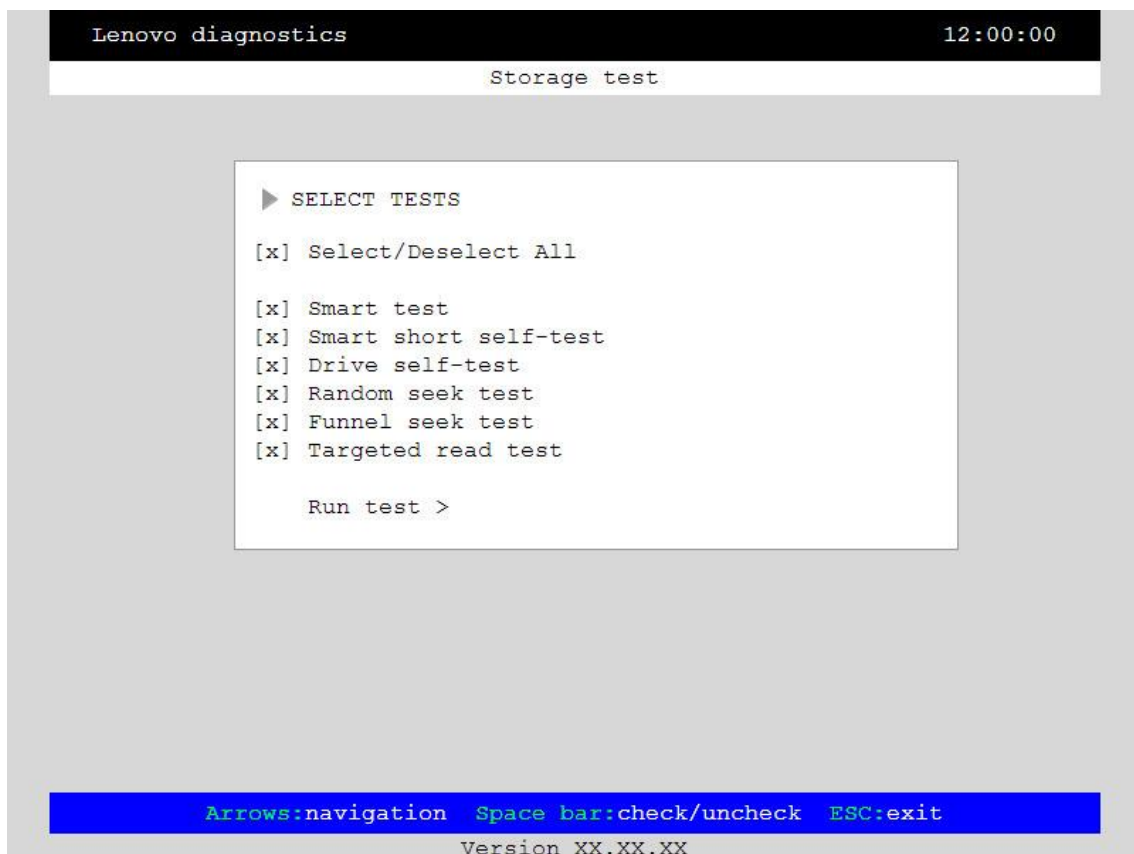
Figure 6 - Select Algorithms Screen

The "Select Algorithms" screen allows the user to select which algorithms will be tested by the application. This screen is composed of:

- An Application Title Bar

- A Screen Title Bar

- A Select Devices section

- An Instruction Bar

The Application Title Bar contains the name of the application, the Screen Title Bar contains the name of the screen, and the Instruction Bar contains instructions.

The Select Algorithms section displays a list of all the storage diagnostic algorithms, an option to select/deselect all options, and an option RUN TEST to run the test. Currently selected options are highlighted in blue. The user can change the selected option by pressing the Up and Down arrow keys.

All algorithms are initially selected to be tested (an 'X' between brackets means that the device is selected). The user can deselect a selected algorithm by selecting it and then pressing the "Space" key. An empty space will appear between the brackets. To select that algorithm again, the user can press "Space" again on the desired algorithm.

Initially, the "Select/deselect all" option is selected. If the user deselect this option by pressing SPACE, then all the algorithm options will be deselected. If the user selects the "Select/deselect all" option again, all algorithm options will be selected again.

At least one algorithm must be selected for the application to run the test. After the user chooses which algorithms must be performed, the user can press the ENTER key or select the RUN TEST option and press the SPACE key. Then, the application will run the test. The user can also press the ESC key to go back to the Main Screen.

After the user chooses the RUN TEST option on the "Select Algorithms" screen, the Quick Storage Device Test Screen is displayed, as shown in Figure 7.
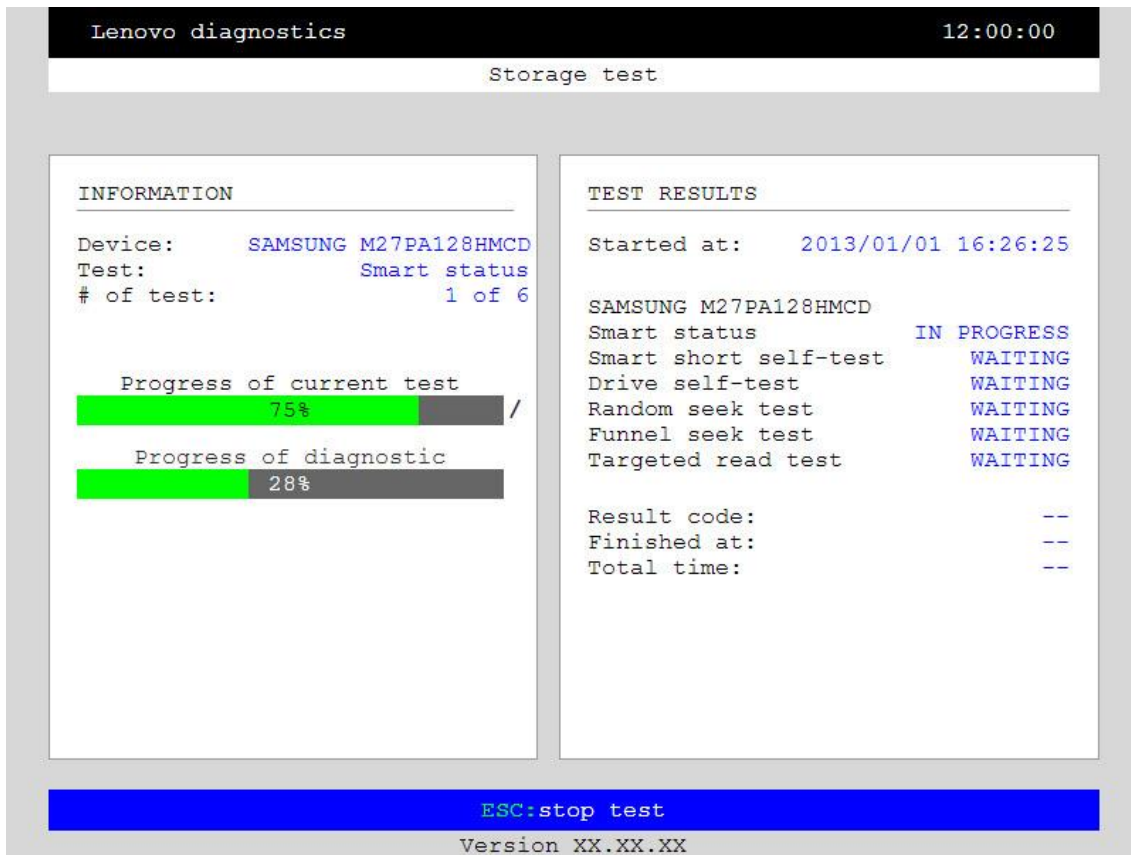
```
Lenovo diagnostics                                    12:00:00
                         Storage test

 INFORMATION                      TEST RESULTS

 Device:     SAMSUNG M27PA128HMCD  Started at:    2013/01/01 16:26:25
 Test:            Smart status
 # of test:           1 of 6      SAMSUNG M27PA128HMCD
                                  Smart status           IN PROGRESS
                                  Smart short self-test     WAITING
          Progress of current test Drive self-test          WAITING
                75%             /  Random seek test          WAITING
                                  Funnel seek test          WAITING
          Progress of diagnostic   Targeted read test       WAITING
                28%
                                  Result code:                   --
                                  Finished at:                   --
                                  Total time:                    --



                         ESC:stop test
                        Version XX.XX.XX
```

Figure 7 - Quick Storage Device Test Screen

The Quick Storage Device Test Screen provides information about the storage device test progress, as well as information about the results from the storage device test. This screen is composed of: Application Title Bar, Screen Title Bar, and two sections (INFORMATION ABOUT TEST and RESULTS FROM TEST).

The Application Title Bar contains the name of the application, the Screen Title Bar contains the name of the screen (in this case, Quick Storage Device Test), and the Instruction Bar contains instructions to run the test. The Quick Storage Device Test Screen has two main sections: INFORMATION ABOUT THE TEST and RESULTS OF THE TEST. The first section provides information about the test progress, and the second section provides information about the results of the test and the test algorithms.

For the Quick Storage Device Test, the INFORMATION ABOUT THE TEST section contains the following information: Device (device name), Algorithm (name of algorithm currently running), # of Algorithm (number of current algorithm among all the algorithms to be run), Progress of Current Algorithm (bar whoing percentage of current algorithm completed) and Progress of Device Test (bar showing percentage of all device tests completed).

RESULTS OF THE TEST section contains the following information: the date and time that the test started, a list for each selected device with all algorithms selected by the user and the status of each (an algorithm can have six types of status: ON QUEUE, indicating the test is waiting to be run; ON PROGRESS, indicating the test is being run; PASSED, indicating the algorithm has found no problems with the device; FAILED, indicating that the algorithm has found one or more faults CANCELED, indicating algorithm was canceled by user; and NOT SUPPORTED, indicating algorithm is not supported by device), unique error code for each tested storage device, date and time test finished (displayed after test is finished), and duration of test in hours, minutes and seconds (displayed after test is finished).

The RESULTS OS TEST section can be scrolled up or down using Up and Down arrow keys if the number of content rows for this section is greater than the number of rows of screen.

During the execution of each test, the user can stop it at any time by pressing ESC key. If the user does that, the test is aborted and the algorithm that was being run has its status changed to CANCELED. After the test is finished or canceled, the user can go back to the Main Screen by pressing the 'ESC' key again or see Log Screen by pressing the F3 key.

After the Quick Storage Device Test is finished, if any failure was detected, a pop-up window will be displayed, instructing the user to backup their data as soon as possible, as the device can crash at any moment. This window also lets you know that you can try to restore the device by using the Recover Bad Sectors tool. This window is shown in Figure 8.
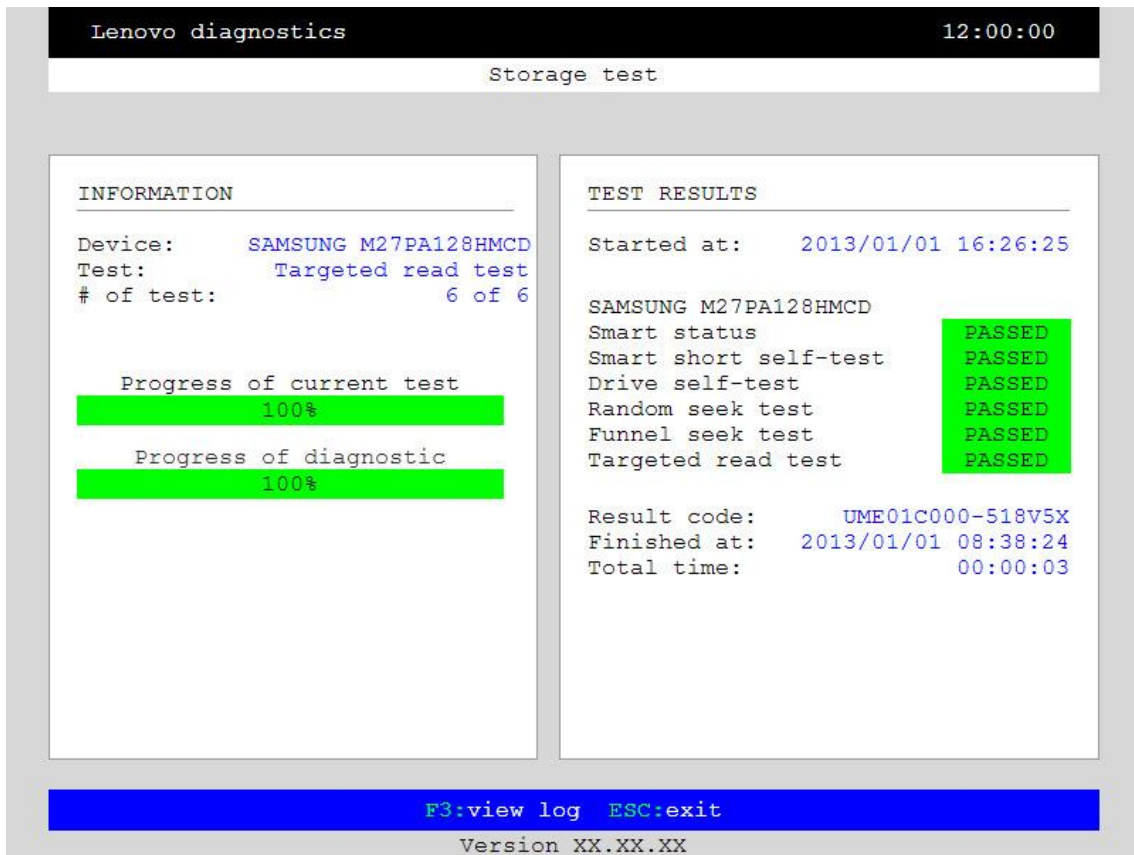
Figure 8 - Pop-up window displayed after Quick Storage Device Test is finished and any failure is detected

2.8 LCD Test

After the user starts the "LCD Test" option, the application computes the number of algorithms that can be performed by the test. If the test has more than one algorithm, "Select Algorithms" is displayed, as shown in Figure 9.
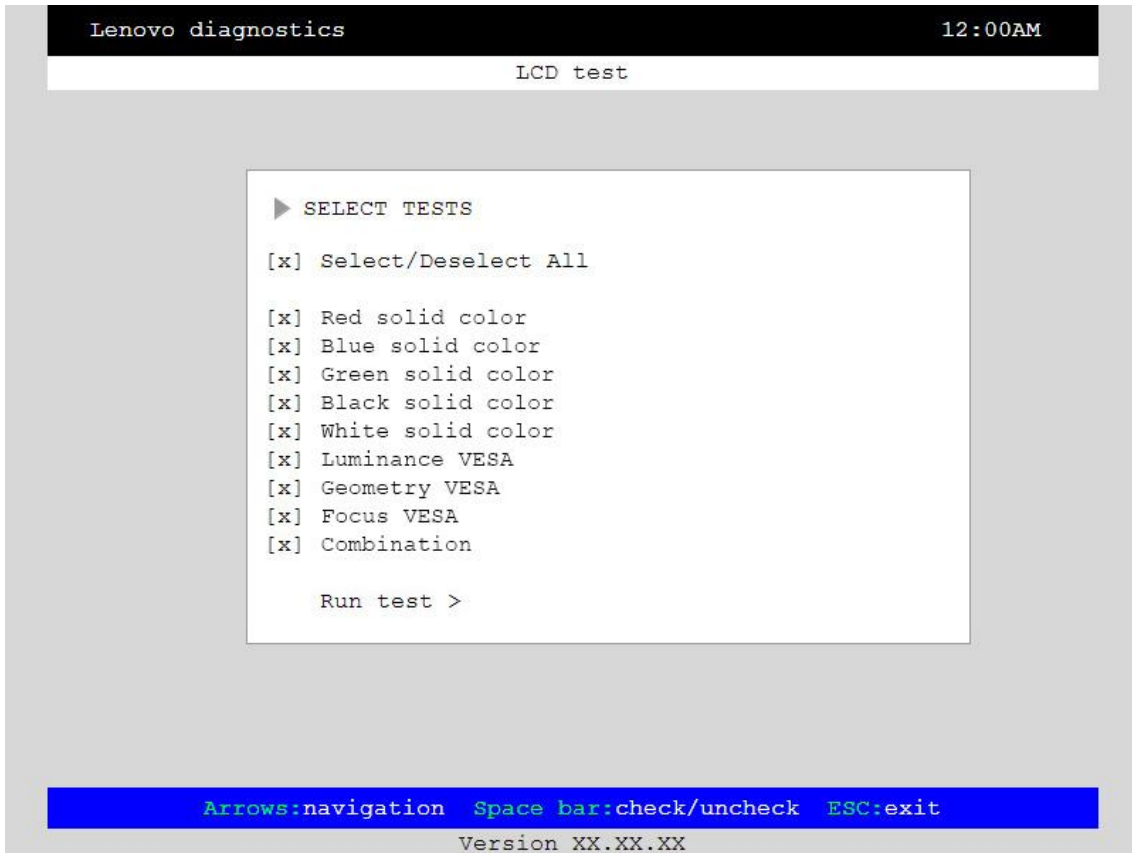
Figure 9 - Select Algorithms Screen

The "Select Algorithms" screen allows the user to select which algorithms will be tested by the application. This screen has the same behavior as the selection screens for the Quick Storage Test.

After the user chooses the RUN TEST option on the "Select Algorithms" screen, the LCD Test screen is displayed.

The LCD Test screen has the same behavior and components as the test screens for Quick Memory Test and Quick Storage Device Test.

Before an algorithm is run, a window containing instructions about the algorithm is displayed, as shown in Figure 9. The User can press the 'Enter' key to proceed with the algorithm execution or can press 'Esc' to abort the test.
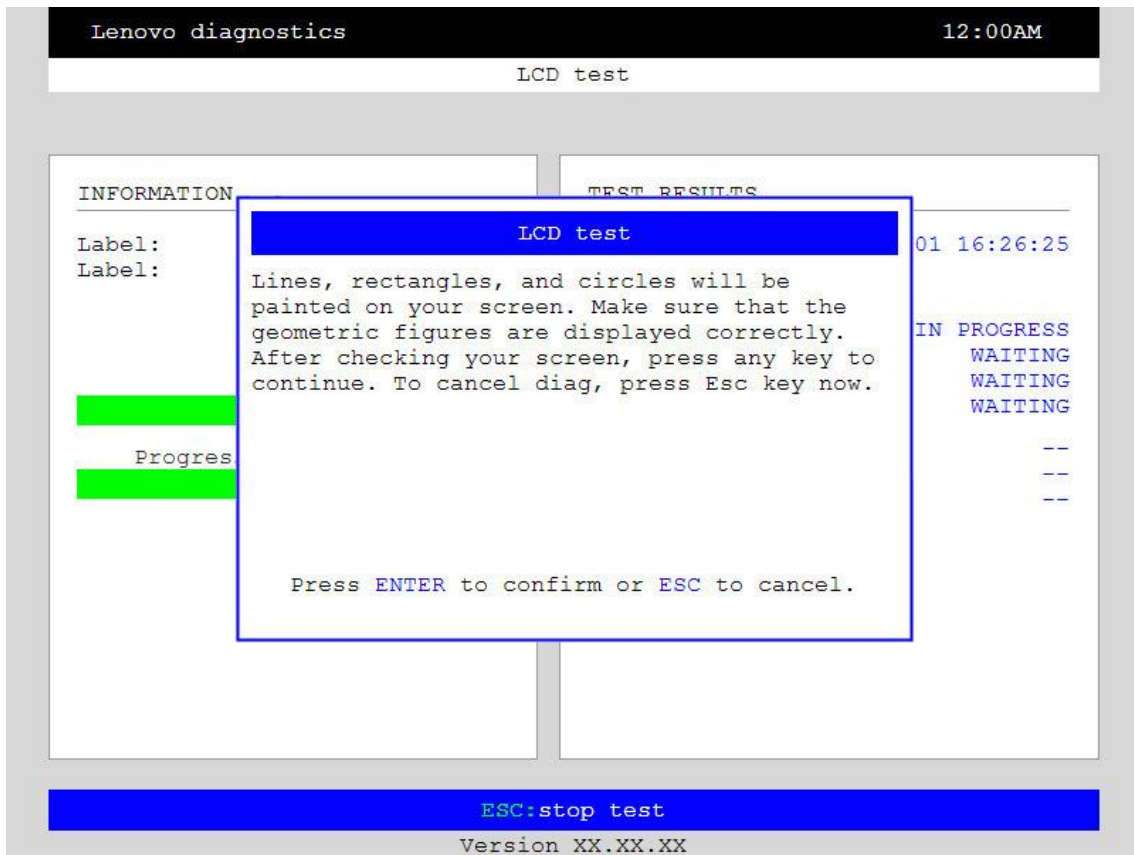
Figure 10 - Window is displayed with instructions for user about current LCD test

If the user chooses to proceed with running the test, an image pattern will be displayed on the screen, as shown in Figure 10. After the user checks the LCD, any key can be pressed to proceed with running the
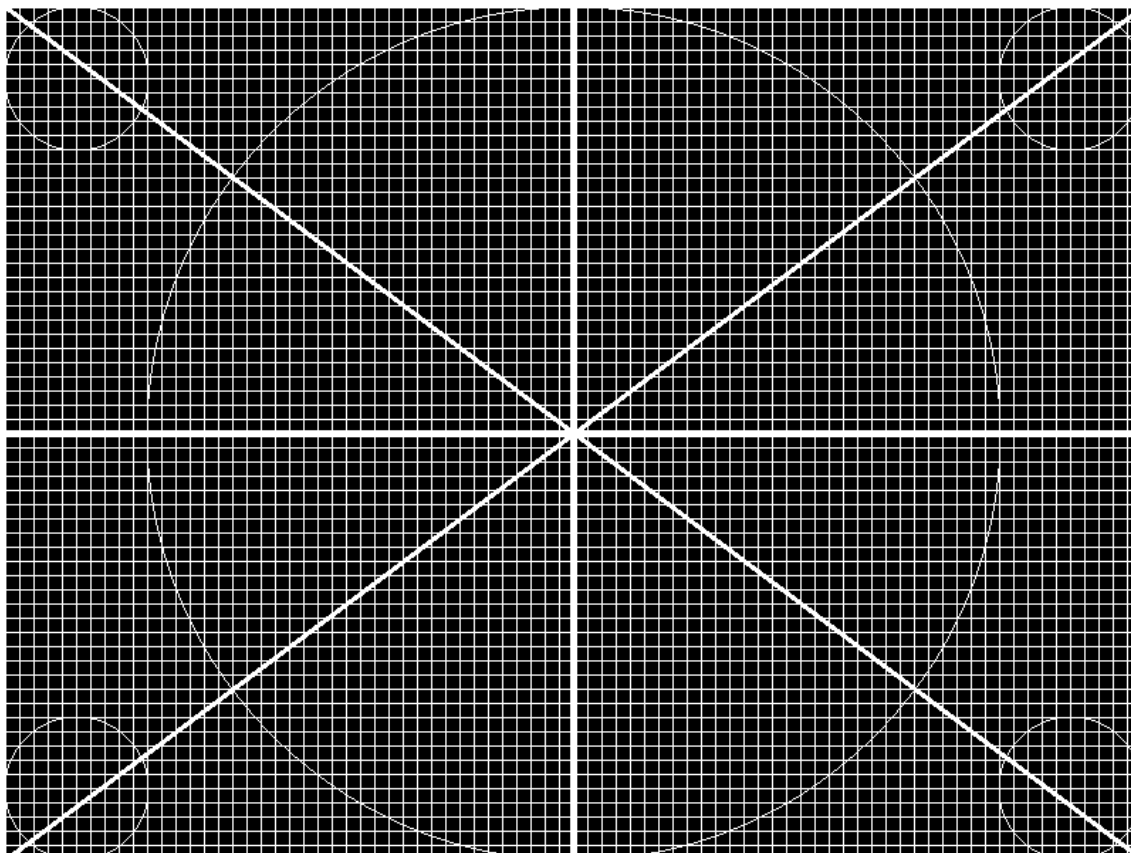
test.

Figure 11 - Screen painted with pattern of current LCD test

After that, a window is displayed, asking the user if the pattern was painted correctly on the LCD screen. If so, the user must press the 'Y' key; if not, the user must press the 'N' key. This window can be seen in Figure 12.
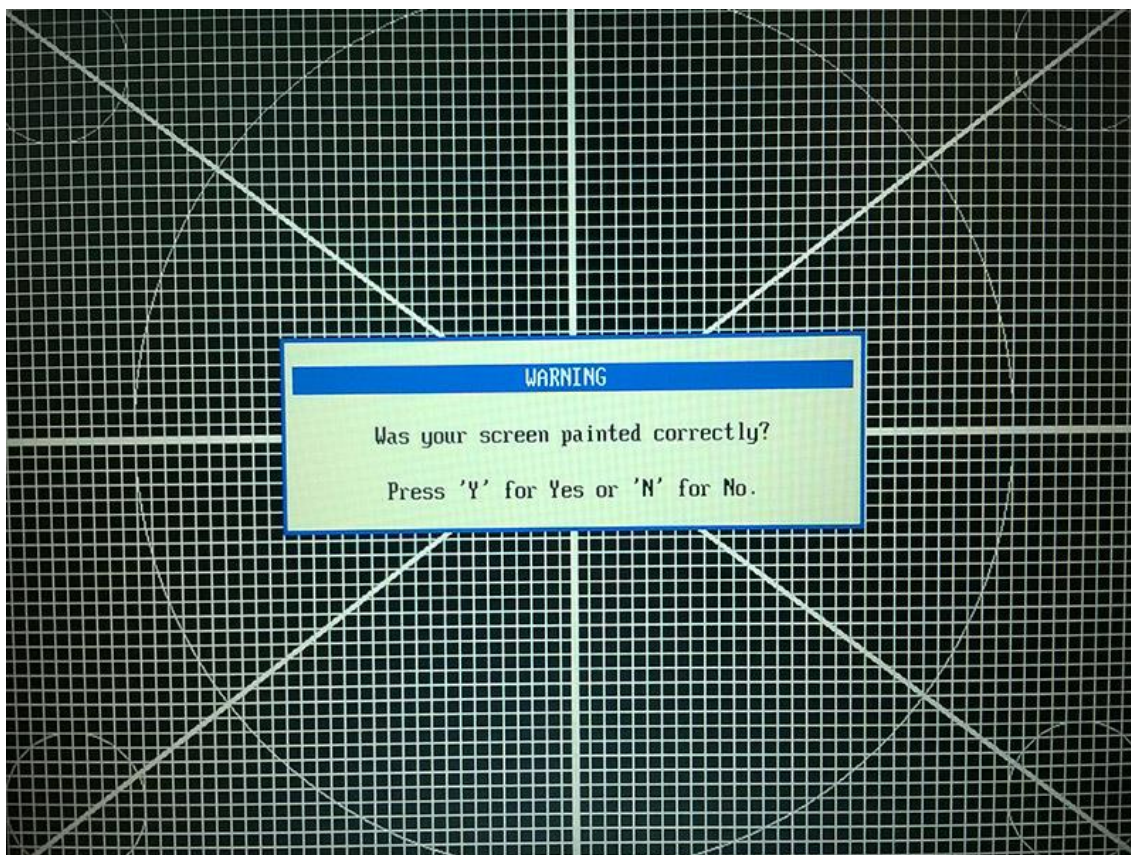
Figure 12 - Window asking user if screen was painted correctly

This process is repeated for each selected algorithm. After the test is finished or canceled, the user can go back to the Main Screen by pressing the ESC key again or to the Log Screen by pressing the F3 key.

2.9   PCI-e Test

After the user starts the "PCI-e Test" option, the application computes the number of algorithms that can be performed by the test and starts the test, as shown in Figure 13.

```
Lenovo diagnostics                                    12:00:00
                          PCI-e test

  INFORMATION                      TEST RESULTS

  # of devices:             3      Started at:    2013/01/01 16:26:25
  # of offboard devices:    1
  Test:           Status test      PCI EXPRESS
  # of test:          1 of 1       Status test                PASSED

       Progress of current test    Result code:     UME01C000-518V5X
            100%
                                    Finished at:   2013/01/01 08:38:24
       Progress of diagnostic       Total time:            00:00:03
            100%




                    F3:view log  ESC:exit
                       Version XX.XX.XX
```
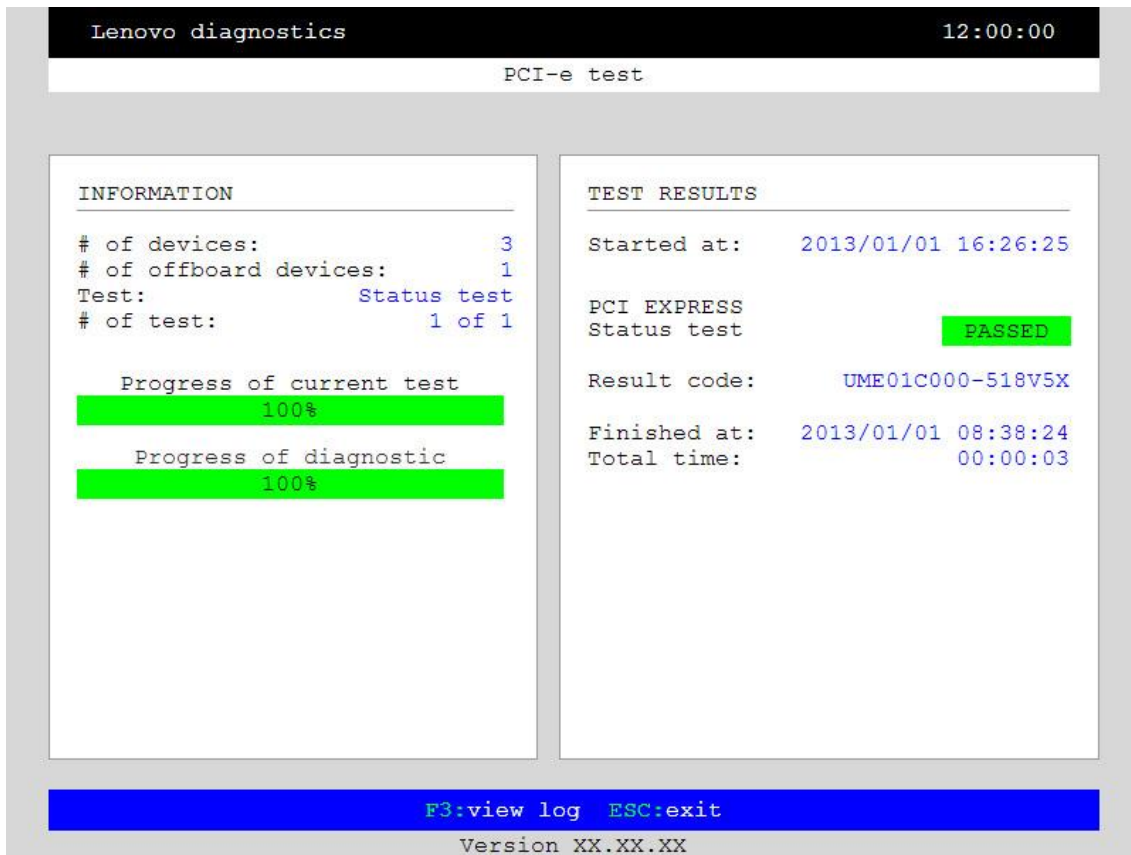
Figure 13 - PCI Express test screen

The PCI-e Test Screen provides information about the test progress, as well as information about the test results.

This screen is composed of: Application Title Bar, Screen Title Bar, two sections (INFORMATION ABOUT TEST and RESULTS FROM TEST), Instruction Bar, and Version Bar.

Application Title Bar contains the name of the application, Screen Title Bar contains the name of the screen (in the case, PCI Express Test), Instruction Bar contains instructions for executing the test, and Version Bar contains the application version number and the current time.

The first section provides information about the test progress, and the second section provides information about the results of the test and the test algorithms.

For the PCI Express Test, the INFORMATION ABOUT TEST section contains the following information: the number of devices (the number of PCI Express devices, in this case internal devices and off board devices connected), the number of connected devices (the number of PCI Express devices that are connected to some slot), Algorithm (the name of the current algorithm), the number of the Algorithm (number of current algorithm among all the algorithms to be run), Progress of Current Algorithm (bar with

progress in percentage of current algorithm) and Progress of Device Test (a bar indicating the progress in percentage of all device tests).

The RESULTS OF THE TEST section contains the following information: date and time that the test started and thestatus of each test (an algorithm can have six types of status: ON QUEUE, indicating the test is waiting to be run; IN PROGRESS, indicating the test is being run; PASSED, indicating the algorithm found no problems with the device; FAILED, indicating that the algorithm has found one or more faults; CANCELED, indicating algorithm was canceled by user; and NOT SUPPORTED, indicating algorithm is not supported by the device), unique error code for the test, date and time test finished (displayed after test is finished), and duration of the test in hours, minutes, and seconds (displayed after the test is finished).

The RESULTS OF TEST section can be scrolled up or down using the Up and Down arrow keys if the number of content rows for this section is greater than the number of rows on the screen.

During execution of a test, the user can stop it at any time by pressing the ESC key. If the user does that, the test will be aborted, and the algorithm that was being run will have its status changed to CANCELED. After the test is finished or canceled, the user can go back to the Main Screen by pressing the ESC key again or view the Log Screen by pressing the F3 key.

2.10 RAID Test

The system allows the user to access the RAID diagnostic from the Main screen.

The currently selected option is highlighted in blue. To access the RAID diagnostic, the user must use the UP/DOWN/LEFT/RIGHT arrow keys until the cursor is on the"RAID test" option, then press the ENTER key. The system will then show a list of the RAID devices, as illustrated in Figure 14 below, and all devices are initially selected to be tested ('X' letter between brackets means that device is selected). The user can deselect a device by selecting it and then pressing the SPACE key. Then, an empty space will appear between the brackets. To select a device again, the user can press the SPACE key again on the desired device. Next, the user should select NEXT option and press the ENTER key to open the RAID tests screen.
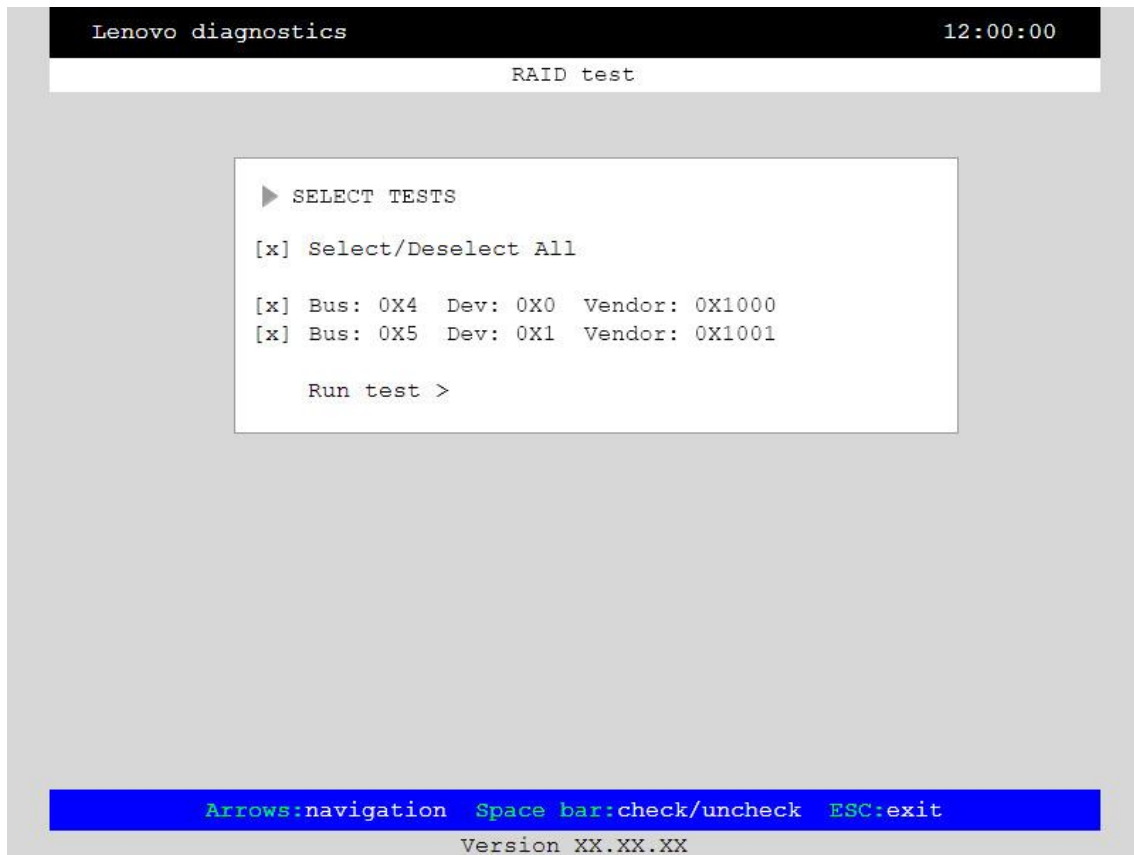
```
Lenovo diagnostics                                    12:00:00
                          RAID test


        ▶ SELECT TESTS

    [x] Select/Deselect All

    [x] Bus: 0X4  Dev: 0X0  Vendor: 0X1000
    [x] Bus: 0X5  Dev: 0X1  Vendor: 0X1001

        Run test >




        Arrows:navigation  Space bar:check/uncheck  ESC:exit
                          Version XX.XX.XX
```

Figure 14 - RAID test selecting device

The system will show a list of the RAID tests, as illustrated in Figure 16 below. All the tests are initially selected to be tested ('X' letter between brackets means that test is selected). The user can deselect a device by selecting it and then pressing the SPACE key. An empty space will appear between the brackets. To select a device again, the user can press the SPACE key again on the desired test. To go to the next step, the user selects the Next option and press the ENTER key.
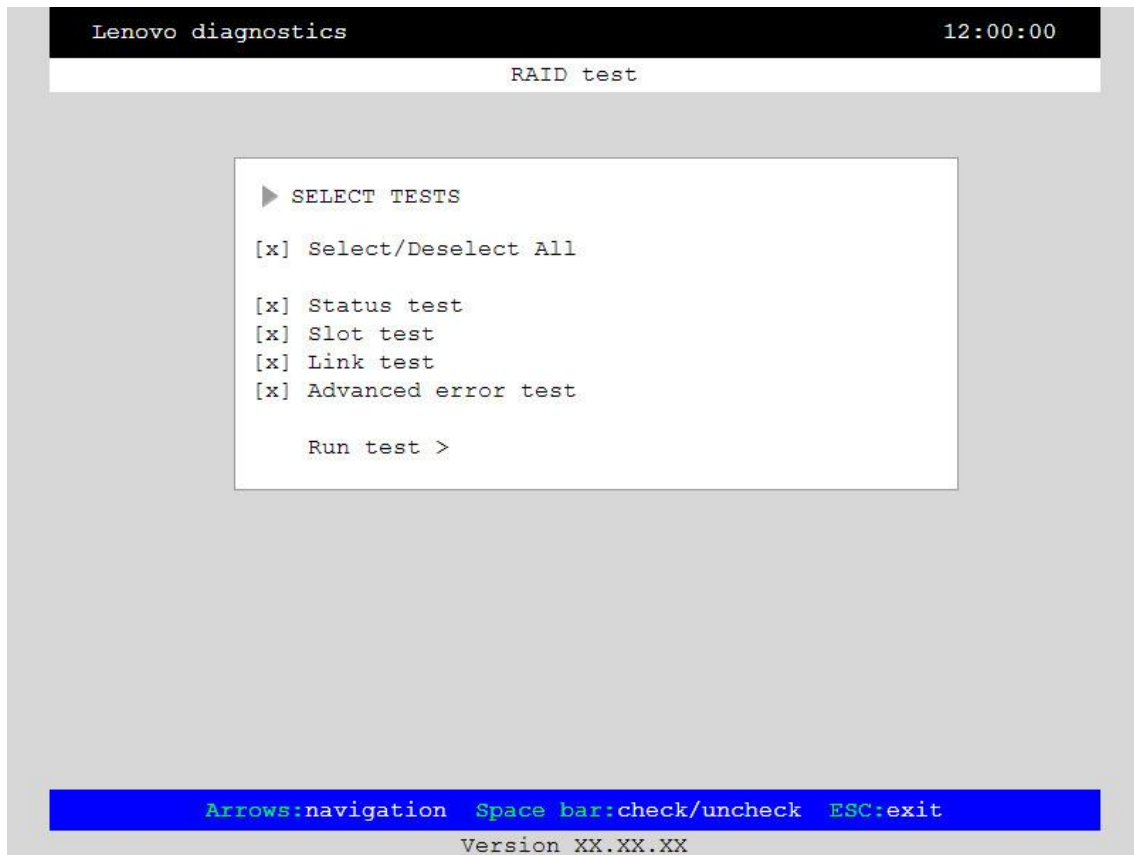
Figure 15 - RAID selecting tests

Initially, the "Select/deselect all" option is selected. If the user deselects this option by pressing SPACE, then all the test options will be deselected. If the user selects the "Select/deselect all" option again, all the test 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 will be performed, the user can press the ENTER key or select the RUN TEST option and press the SPACE key. The system will run the tests, as illustrated in Figure 15 below. The User can also press the ESC key to go back to the Main Screen.
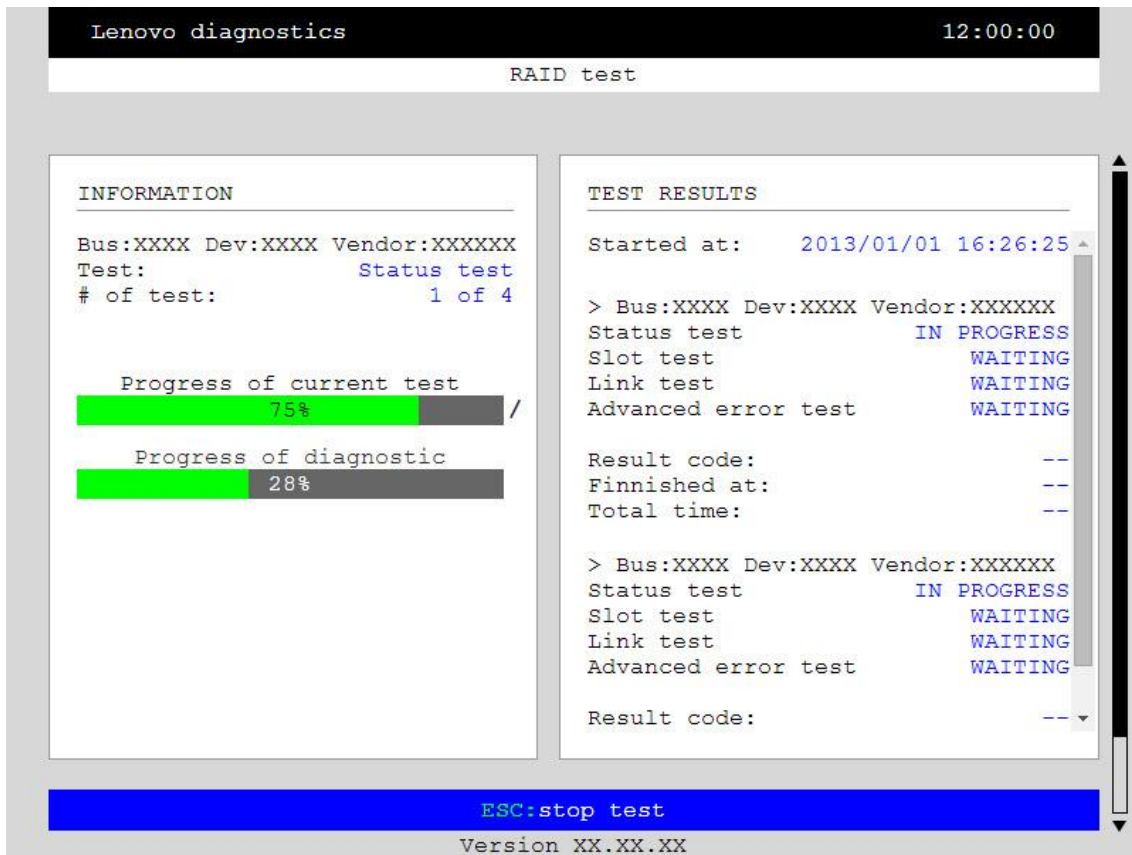
Figure 16 - RAID test progress

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

- Application Title Bar

- Screen Title Bar

- Two sections (Information and Results)

- Instruction Bar

The Application Title Bar contains the name of the application, the Screen Title Bar contains the name of the screen (in this case, RAID test), the Instruction Bar contains instructions for running the test. The RAID test screen has two main sections: Information and Results. The first section provides information about the test and diagnostic progress, and the second section provides information about the results of the test and its algorithms.

For the RAID test, the information section contains the following information: Device (the bus, device and vendor of the current RAID), Test (name of test currently running), # of Test (number of current

test among all the tests to be run), Progress of current test (bar with progress in percentage of current test) and Progress of diagnostic (bar with progress in percentage of all diagnostic, with all its test).

The Results section can be scrolled up or down using the uUp and down arrow keys if the number of content rows for this section is greater than the number of rows on the screen. The Result Code of all tested devices will be on Results section.

The user can stop the execution of the diagnostic at any time by pressing theESC key. If the user does that, thediagnostic will be aborted, and the status of the test that was being run will change to CANCELED. After the diagnostic finishes or iscanceled, the user can go back to the Main Screen (pressing ESC key again) or to see test log (pressing F3 key).

2.11 Motherboard Test

After the user starts "Motherboard test" option, the application computes the number of algorithms that can be performed by the test. If the test has more than one algorithm, "Select Algorithms" is displayed, as shown in Figure 17.

Figure 17 - Select Algorithm Screen

The "Select Algorithms" screen allows the user to select which algorithms will be tested by the application. This screen has the same behavior as the selection screens for Quick Storage Test.

After the user selects the RUN TEST option on the "Select Algorithms" screen, the Motherboard test Screen is displayed.

The Motherboard test screen provides information about the test progress, as well as information about results from the test.

This screen is composed of Application Title Bar, Screen Title Bar, two sections (INFORMATION ABOUT TEST and RESULTS FROM TEST), Instruction Bar and Version Bar.

Application Title Bar contains the name of the application, Screen Title Bar contains the name of the screen (in this case, Motherboard Test), Instruction Bar contains instructions to run the test and Version Bar contains application version number and current time.

The first section provides information about the test progress, and the second section provides information about the results of the test and the test algorithms.

For Motherboard Test, the INFORMATION ABOUT TEST section contains the following information: Current Device Name, Algorithm (the name of the current algorithm), # of Algorithm (number of current algorithm among all the algorithms to be run), Progress of Current Algorithm (bar with progress in percentage of current algorithm) and Progress of Device Test (bar with progress in percentage of all devices test).

The RESULTS OF THE TEST section contains the following information: date and time that the test started, and their respective status (an algorithm can have six types of status: ON QUEUE, indicating test in waiting to be run; ON PROGRESS, indicating test is being run; PASSED, indicating algorithm has found no problems at device; FAILED, indicating that algorithm has found one or more faults at algorithm; CANCELED, indicating algorithm was canceled by user; and NOT SUPPORTED, indicating algorithm is not supported by device), unique error code for the test, date and time test finished (displayed after test is finished), and duration of test in hours, minutes and seconds (displayed after test is finished).

The RESULTS OF TEST section can be scrolled up or down using the Up and Down arrow keys if the number of content rows for this section is greater than the number of rows on the screen.

While the test is running, the user can stop it at any time by pressing the ESC key. If the user does that, the test will be aborted and the status of the algorithm that was running will be changed to CANCELED. When the test is finished or canceled, the user can go back to the Main Screen by pressing 'ESC' key again or see the Log Screen by pressing the "F3" key.

Before the application starts the 'USB Test,' a message appears to ask the user to plug in a USB key, remove the USB Hub and provide other information, as shown in Figure 18.
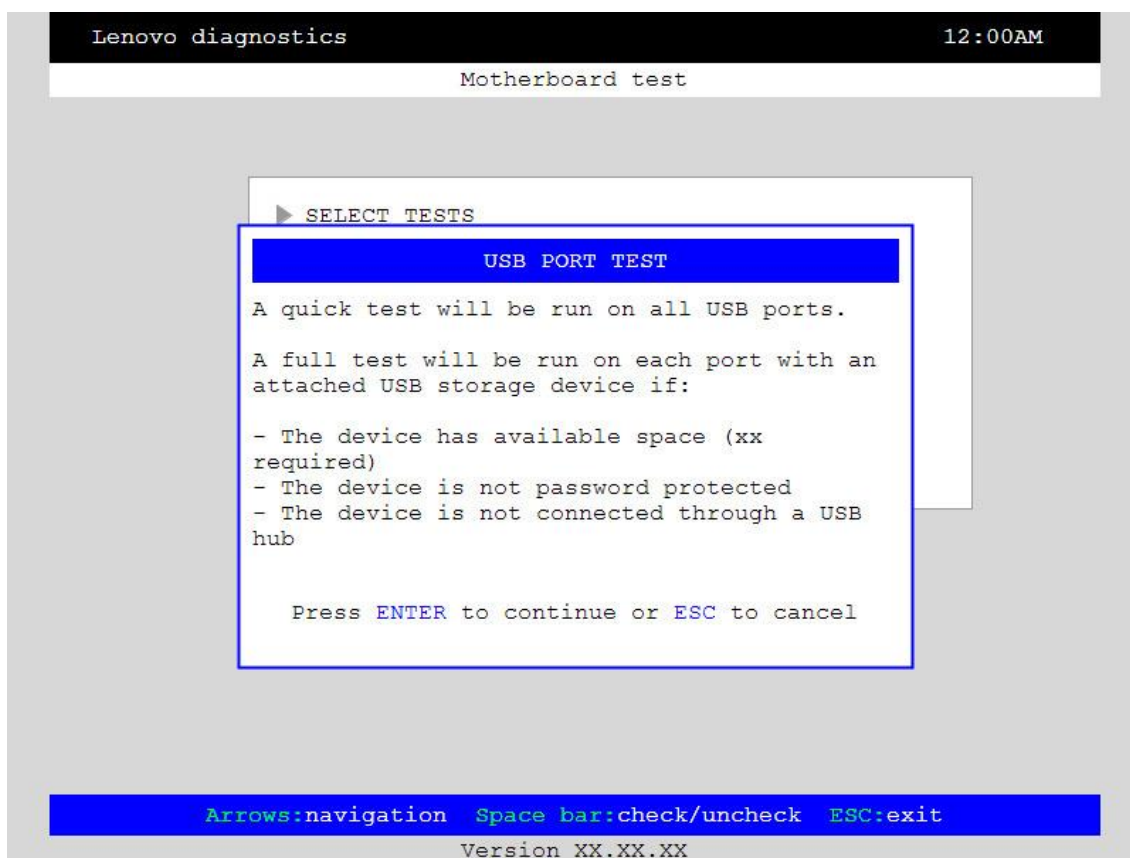
Figure 18 - Message of USB Test

After the user plugs in a USB key, the application shows a pop-up message listing the devices detected, as shown in Figure 19.
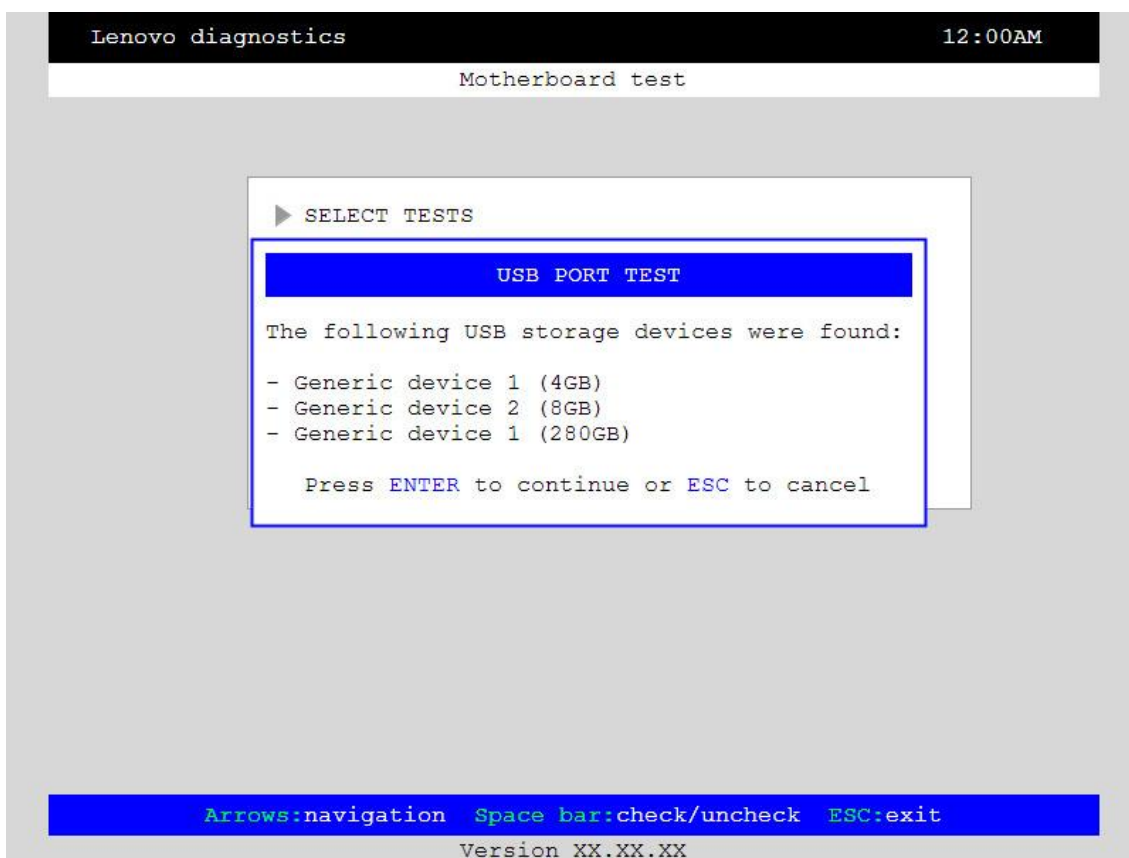
Figure 19 - Message of USB Test, USB Key detected

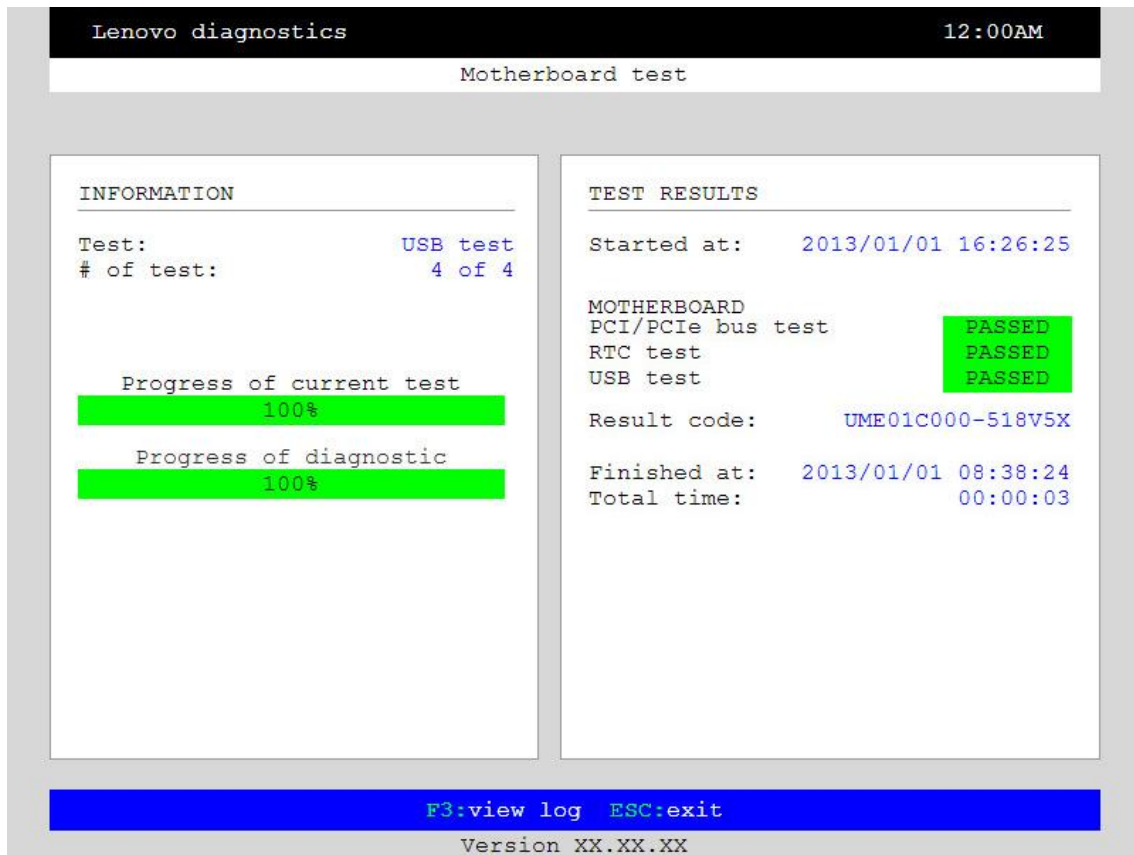In Figure 20, the Motherboard test Screen is shown.

Figure 20 - Motherboard test screen

2.12 Optical Device Test

After the user starts the "Optical Device Test" option, the application computes the number of algorithms that can be performed by the test. If the test has more than one algorithm, "Select Algorithms" is displayed, as shown in Figure 21.

```
Lenovo diagnostics                                   12:00:00
                    Optical device test



      ▶ SELECT TESTS

      [x] Select/Deselect All

      [x] Media-less optical serf-test
      [x] Linear seek test
      [x] Random seek test
      [x] Funnel seek test
      [x] Read and compare test
      [x] Write test

          Run test >






      Arrows:navigation  Space bar:check/uncheck  ESC:exit
                        Version XX.XX.XX
```

Figure 21 - Select Algorithm Screen

The "Select Algorithms" screen allows the user to select which algorithms will be tested by the application. This screen has the same behavior as the selection screens for Quick Storage Test.

After the user chooses the RUN TEST option on the "Select Algorithms" screen, the Optical Device Test Screen is displayed.

The Optical Device Test Screen provides information about the test progress, as well as information about results from the test.

This screen is composed of Application Title Bar, Screen Title Bar, two sections (INFORMATION ABOUT TEST and RESULTS FROM TEST), Instruction Bar and Version Bar.

The Application Title Bar contains the name of the application, the Screen Title Bar contains the name of the screen (in this case, Optical Device Test), and the Instruction Bar contains instructions to run the test.

The first section provides information about the test progress, and the second section provides information about the results of the test and the test algorithms.

For Optical Device Test, INFORMATION ABOUT TEST section contains the following information: Current Device Name, Testing Blocks, Operation, Algorithm (the name of the current algorithm), # of Algorithm (number of current algorithm among all the algorithms to be run), Progress of Current Algorithm (bar with progress in percentage of current algorithm) and Progress of Device Test (bar with progress in percentage of all device test).

The RESULTS OF THE TEST section contains the following information: date and time that the test started, and their respective status (an algorithm can have six types of status: ON QUEUE, indicating test in waiting to be run; ON PROGRESS, indicating test is being run; PASSED, indicating algorithm has found no problems at device; FAILED, indicating that algorithm has found one or more faults at algorithm; CANCELED, indicating algorithm was canceled by user; and NOT SUPPORTED, indicating algorithm is not supported by device), unique error code for the test, date and time the test finished (displayed after the test is finished), and duration of test in hours, minutes and seconds (displayed after the test is finished).

The RESULTS OF TEST section can be scrolled up or down using the Up and Down arrow keys if number of content rows for this section is greater than number of rows on the screen.

During execution of the test, the user can stop it at any time bypressing the ESC key. If the user does that, the test is aborted and the status of the algorithm that was being run is changed to CANCELED. After the test is finished or canceled, the user can go back to the Main Screen by pressing the "ESC" key again or see the Log Screen by pressing the "F3" key.

Before the application starts the "Unattended Optical Test", a message will be shown to the user to remove any media in the tray. The message appears in Figure 22.
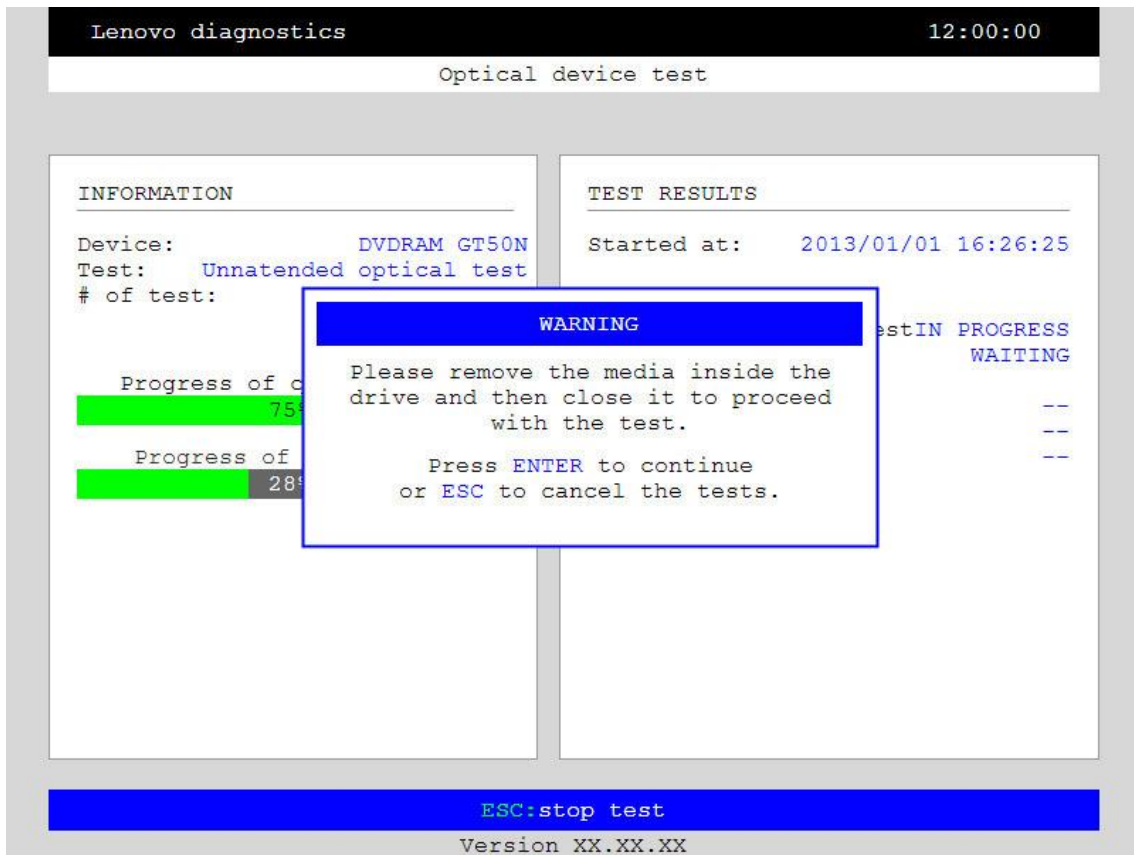
Figure 22 - Warning message before unattended optical test

If no media is inserted before the application runs 'Linear Seek Test', 'Random Seek Test', 'Funnel Seek Test' or 'Read Compare Test', the application shows a message asking the user to insert a non-blank media, see Figure 23. If the size of the media inserted is too small, a warning message appears, see Figure 24.
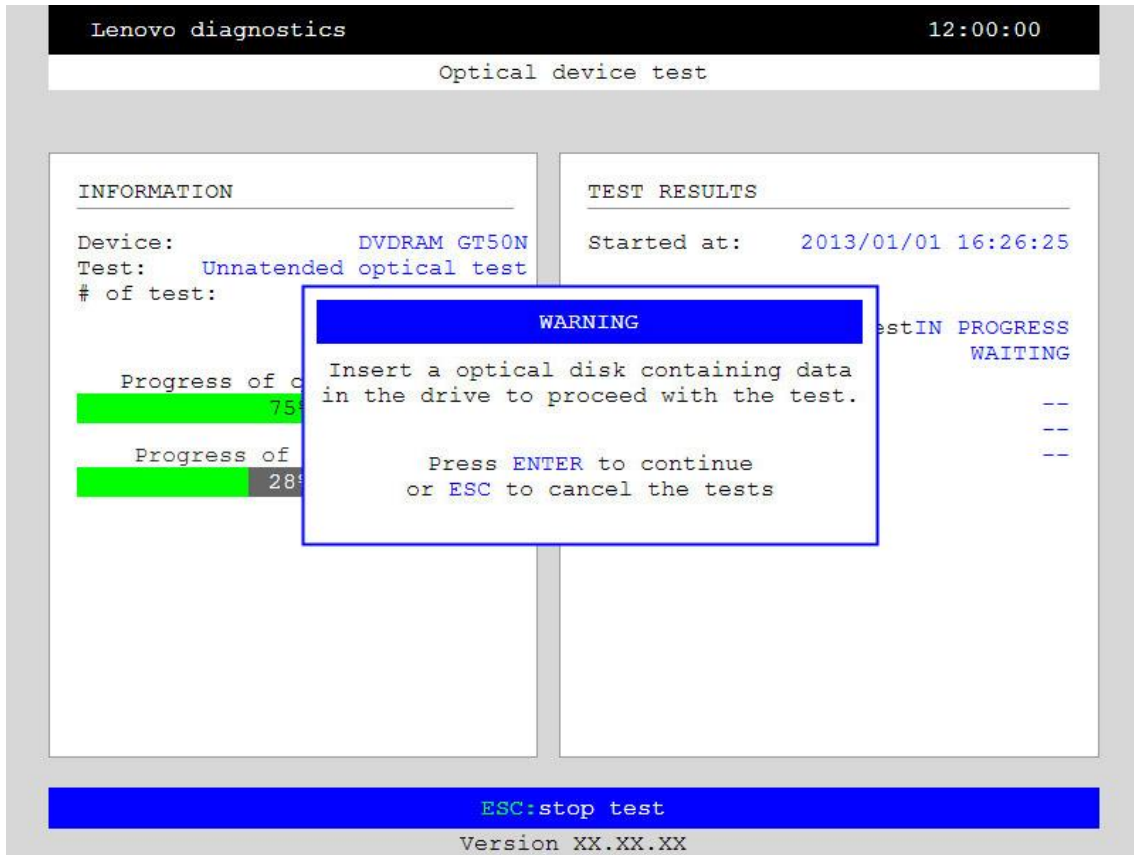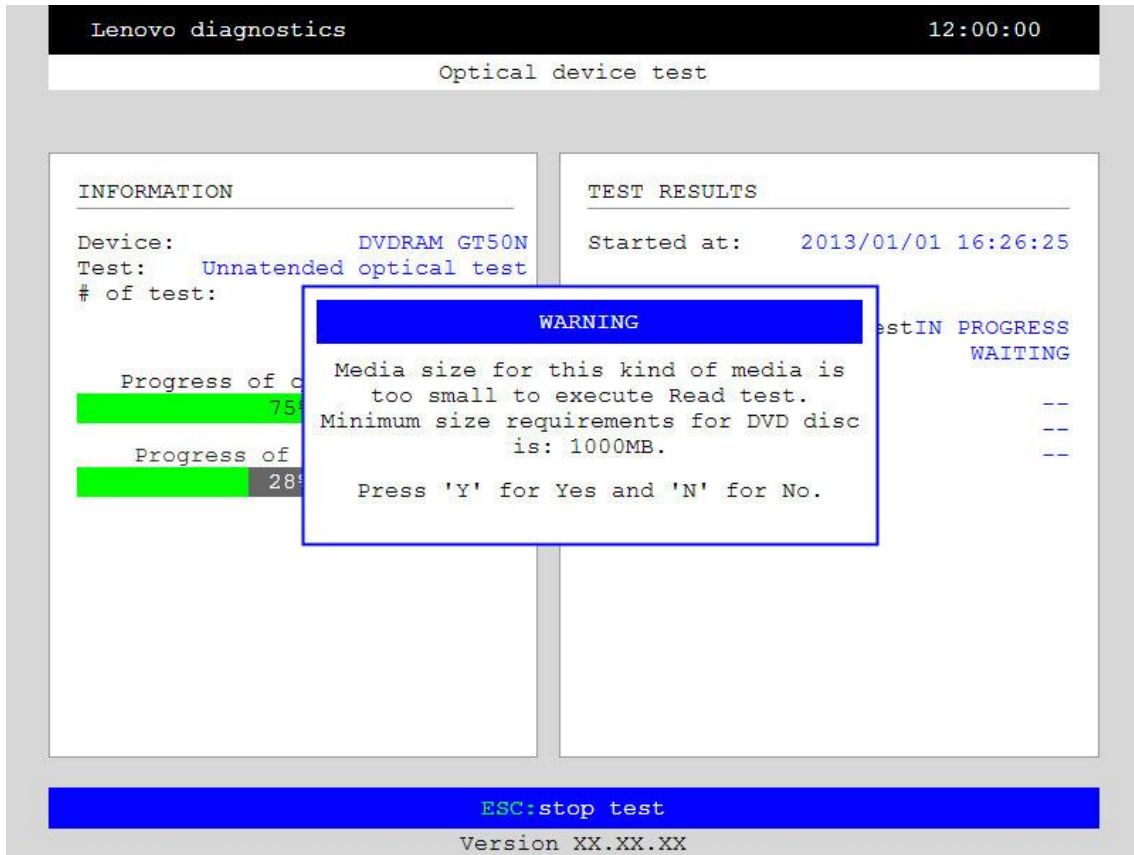
Figure 23 - Warning message for Read test

Figure 24 - Warning message for small media

If there is no blank or rewritable media inserted before 'Write Test' starts, a message will appear, see Figure 25.
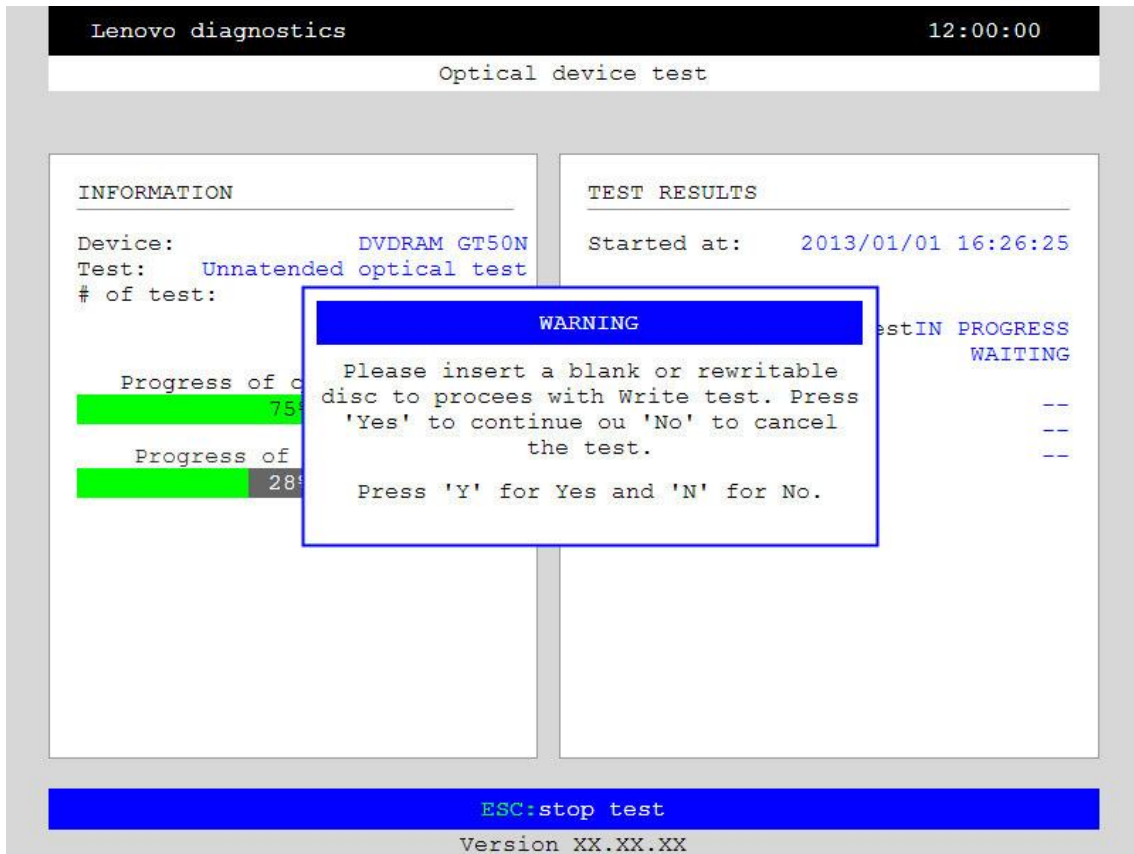

Figure 25 - Warning message for blank or rewritable media

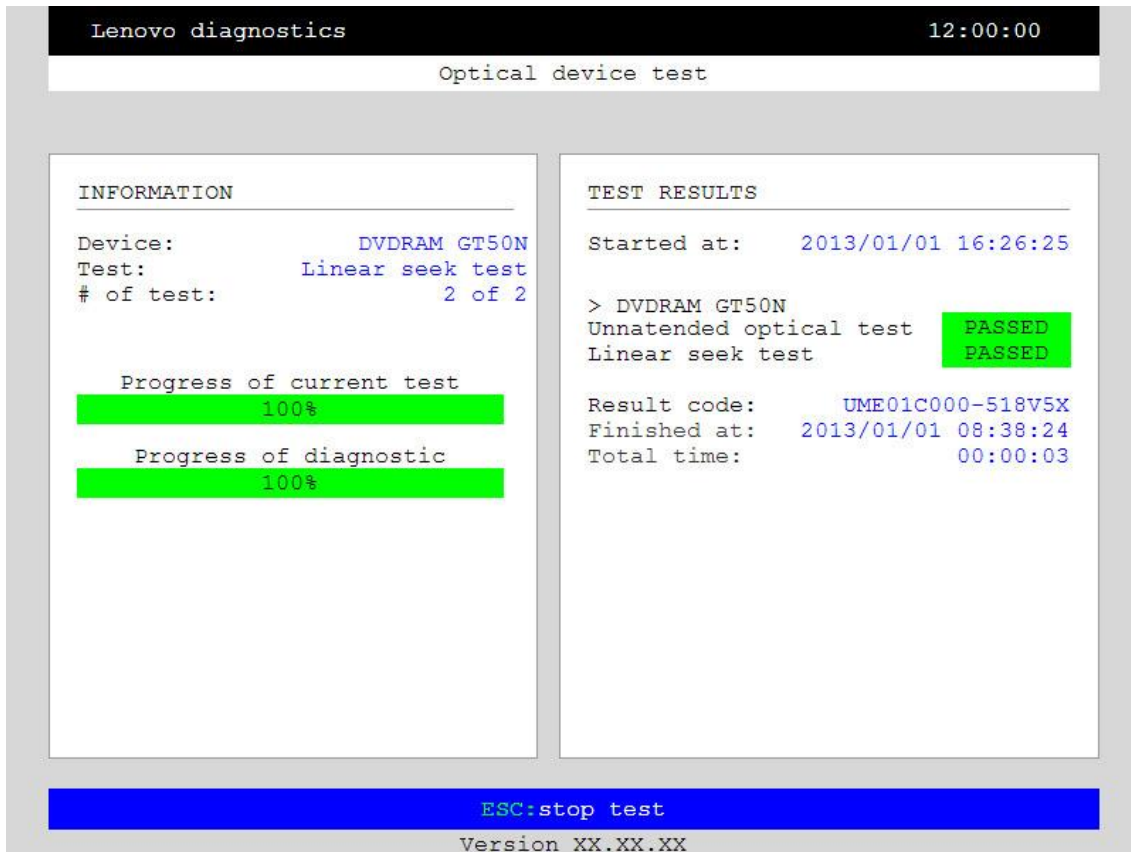In Figure 26 is shown the Optical Device Test Screen.

Figure 26 - Optical Device Test screen

by pressing the SPACE key. The system will run all tests, as illustrated in Figure 28 below. The user can also press the ESC key to go back to the Main Screen.
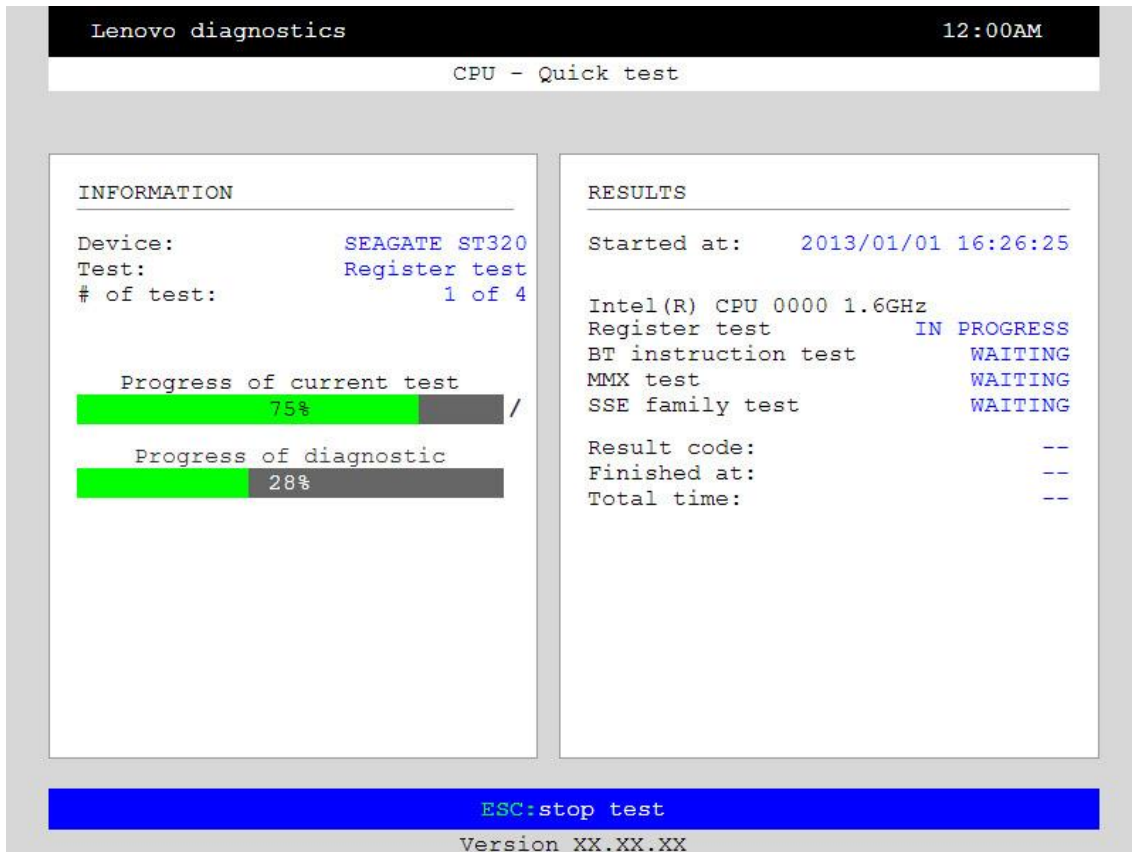
Figure 28 - CPU quick test progress

The CPU quick test screen provides information about the CPU quick test progress, as well as information about the results. This screen is composed of:

• Application Title Bar;

• Screen Title Bar;

• Two sections (Information and Results);

• Instruction Bar;

Application Title Bar contains the name of the application, Screen Title Bar contains the name of screen (in the case, CPU quick test), Instruction Bar contains instructions to run the test. The CPU quick test screen has also two main sections: Information and Results. The first section provides information

about the test and diagnostic progress, and the second section provides information about the results of the test and the test algorithms.

For the CPU quick test, the information section contains the following information: Test (name of test being currently run), # of Test (number of the current test among all tests to be run), Progress of current test (bar with progress in percentage of current test) and the Progress of diagnostic (bar with progress in percentage of all diagnostic, with its entire test).

The Results section can be scrolled up or down using the Up and Down arrow keys if the number of content rows for this section is greater than the screen number of rows. The Result Code of all tested devices on the diagnostic will be displayed in the Results section.

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 Main Screen (by pressing ESC key again) or see the test log (by pressing the F3 key).

2.14 CPU extended test

The system allows the user to access the CPU extended test diagnostic from Main screen.

The currently selected option is highlighted in blue. To access the CPU extended test diagnostic, the user can use the UP/DOWN/LEFT/RIGHT arrow keys until the "CPU extended test" option is highlighted, then press the ENTER key. When the user presses ENTER, the application will run the "Stress test", and it will take about 10 minutes to complete.

Before an algorithm is run, a window containing instructions about the algorithm is displayed, as seen in Figure 29. The user must press the 'Enter' key to run the algorithm. The user can press 'Esc' to abort the test.

The CPU extended test warning Screen is shown in Figure 29.
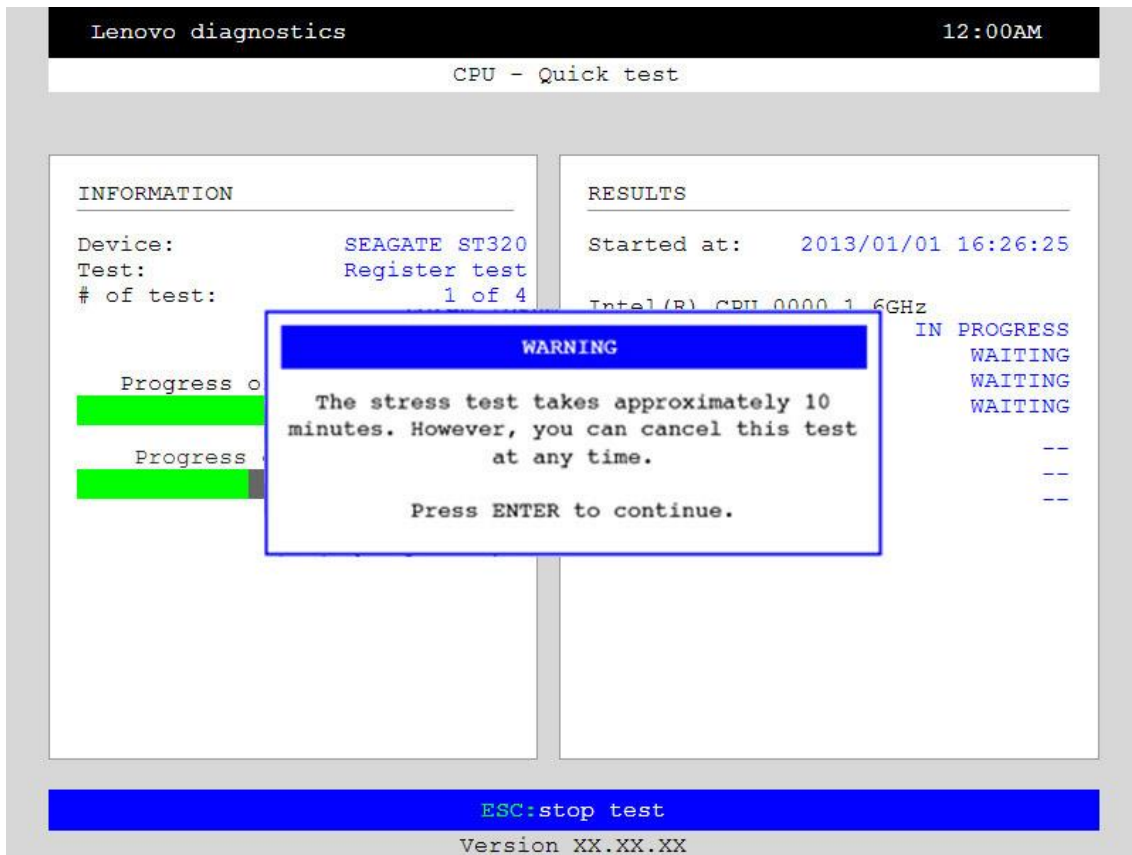
Figure 29 - CPU extended test Warning Screen

The CPU extended test screen is displayed when the user runs the "CPU Extended test" option on the Main Screen. The CPU Extended test screen provides information about the CPU extended text progress, as well as information about the results. This screen is composed of:

- Application Title Bar;

- Screen Title Bar;

- Two sections (Information and Results);

- Instruction Bar;

Application Title Bar contains the name of application, Screen Title Bar contains name of screen (in the case, CPU extended test), Instruction Bar contains instructions to run the test and Version Bar contains application version number and current time. The CPU extended test screen has also two main sections: Information and Results. The first section provides information to user about test progress and the second section provides to user information about the results of test and the testalgorithms.

For the CPU Extended Test, the Information section contains the following information: Test (name of test being currently run), # of Test (number of current test among all the tests to be run), Progress of current test (bar with progress in percentage of current test) and Progress of diagnostic (bar with progress in percentage of all diagnostic, with its entire test).

The Results section contains the following information: date and time that test started, a list with all the algorithms which compose device test and their respective status (an algorithm can have six status: ON QUEUE, indicating test is waiting to be run; ON PROGRESS, indicating test is being run; PASSED, indicating algorithm has found no problems at device; FAILED, indicating that algorithm has found one or more faults at algorithm; CANCELED, indicating algorithm was canceled by user; and NOT SUPPORTED, indicating algorithm is not supported by device), unique error code for test, date and time that the test finished (displayed after test is finished) and duration of test in hours, minutes and seconds (displayed after test is finished).

Whil the diagnostic is running, the user can stop it at any time by pressing the ESC key. The diagnostic will be aborted and the status of the test that was being run is changed to CANCELED. After the diagnostic is finished or canceled, the user can go back to the Main Screen (by pressing ESC key again) or display thetest log (by pressing F3 key)

2.15 Video Card test

After the user starts the "Video Card test" option, the application computes the number of algorithms that can be performed by the test. If the test has more than one algorithm, "Select Algorithms" is displayed, as shown in Figure 30.

Figure 30 - Select Algorithm Screen

The "Select Algorithms" screen allows the user to select which algorithms will be tested by the application. This screen has the same behavior as the selection screens for Optical test.

After the user chooses the RUN TEST option on the "Select Algorithms" screen, the Video Card Test Screen is displayed.

This test is permorfed on system only if application is started with config.ini file and paramether VIDEO_CARD_UEFI_DIAG_ENABLED on global area is set as 1 into the config file.

The Video Card Test will not provide any screen with information about the test progress, and will not provide information about results from the test. It will only show a black screen with the information that are been tested.

During execution of the test, the user can stop it at any time by pressing the ESC key, if paramether USER_INTERRUPT is set as 1 on config.ini file when application is started. This will abort the running tests and will set the status of the algorithm that was being running to CANCELED. After the test is finished or canceled, the application goes back to the Main Screen.

2.16 Fan Test

After the user starts the "Fan test" option, the application computes the number of algorithms that can be performed by the test and starts the test, as shown in Figure 31.
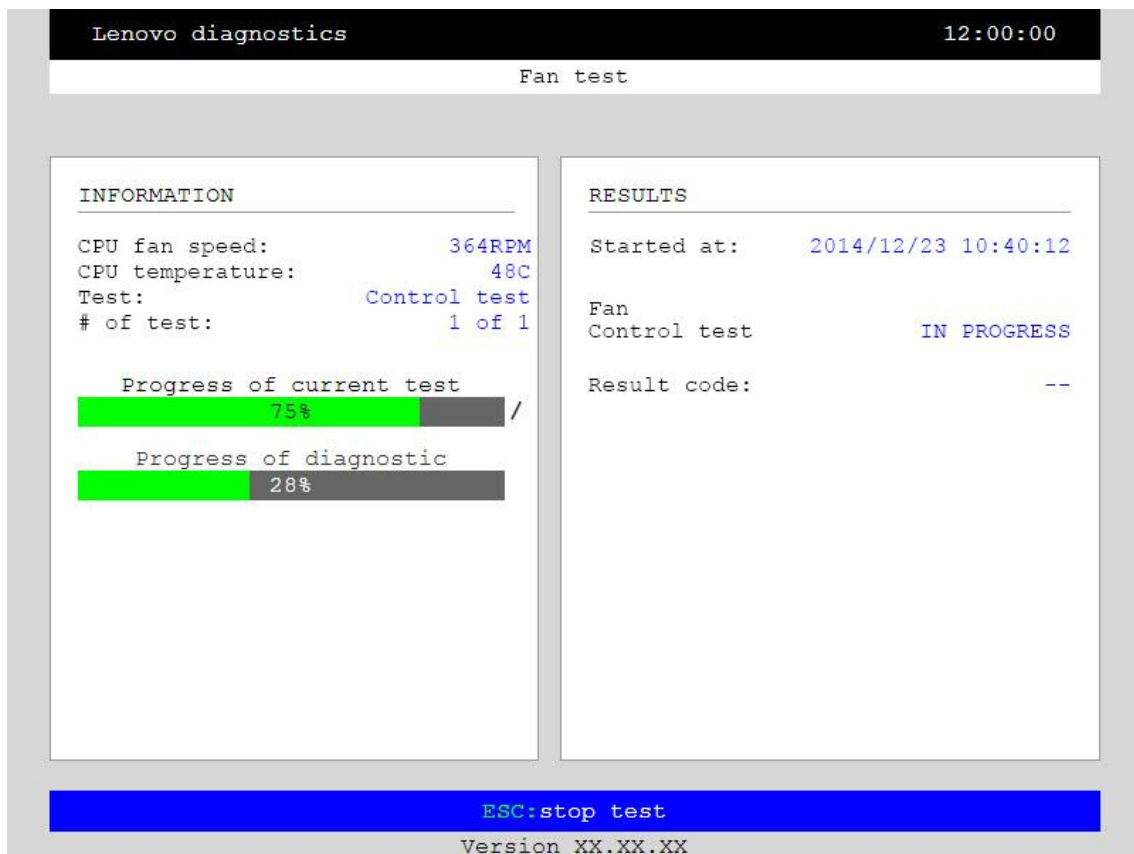
Figure 31 - Fan test screen

The Fan Test Screen provides information about the test progress, as well as information about the test results.

This screen is composed of: Application Title Bar, Screen Title Bar, two sections (INFORMATION ABOUT TEST and RESULTS FROM TEST), Instruction Bar, and Version Bar.

Application Title Bar contains the name of the application, Screen Title Bar contains the name of the screen (in the case, PCI Express Test), Instruction Bar contains instructions for executing the test, and Version Bar contains the application version number and the current time.

The first section provides information about the test progress, and the second section provides information about the results of the test and the test algorithms.

For the PCI Express Test, the INFORMATION ABOUT TEST section contains the following information: CPU fan speed (the spped of the fan when test is running), CPU temperature (the temperature of the fan when test is running), Test (the name of the current algorithm), # of test (number of current algorithm among all the algorithms to be run), Progress of Current Algorithm (bar with progress in percentage of current algorithm) and Progress of Device Test (a bar indicating the progress in percentage of all device tests).

The RESULTS OF THE TEST section contains the following information: Started at (date and time that the test started), the status of each test (an algorithm can have six types of status: ON QUEUE, indicating the test is waiting to be run; IN PROGRESS, indicating the test is being run; PASSED, indicating the algorithm found no problems with the device; FAILED, indicating that the algorithm has found one or more faults; CANCELED, indicating algorithm was canceled by user; and NOT SUPPORTED, indicating algorithm is not supported by the device), Result Code (unique error code for the test), Finish date (date and time test finished: displayed after test is finished), and Total time of test (duration of the test in hours, minutes, and seconds: displayed after the test is finished).

The RESULTS OF TEST section can be scrolled up or down using the Up and Down arrow keys if the number of content rows for this section is greater than the number of rows on the screen.

During execution of a test, the user can stop it at any time by pressing the ESC key. If the user does that, the test will be aborted, and the algorithm that was being run will have its status changed to CANCELED. After the test is finished or canceled, the user can go back to the Main Screen by pressing the ESC key again or view the Log Screen by pressing the F3 key.

### 3.	Run All Test

The system allows the user to access the Run all test diagnostic from the Main screen.

The currently selected option is highlighted in blue. To access the Run all diagnostic, the user can press the UP/DOWN/LEFT/RIGHT arrow keys until the "Run All" option is highlighted, thenpress the ENTER key. After that, the system will show a list of tests, as illustrated in Figure 31 below, and all tests are initially selected to be tested ('X' between the brackets means that the test is selected). The user can deselect a test by selecting it, then pressing the SPACE key. An empty space will appear between the brackets. To select a test again, the user can press the SPACE key again at the desired test.

```
Lenovo diagnostics                                    12:00:00
                           Run all


        ▶ SELECT TESTS

     [x] Select/Deselect All

     [ ] Quick tests
     [x] Extended tests
     ---------------------------------------
     [ ] Restrict tests to
     [ ] Unattended only

          Run test >




     Arrows:navigation  Space bar:check/uncheck  ESC:exit
                      Version XX.XX.XX
```

Figure 32 – Run All test

Initially, the "Select/deselect all" option is selected. If the user presses the SPACE key on that option, then all the test options will be deselected. If the user selects the "Select/deselect all" option again, all the test options will be selected again.

At least one test must be selected so the application can run the diagnostic. After the user chooses which tests will be performed, the user can press the "ENTER" key or select the RUN TEST option by pressing the SPACE key. The system will run all tests, as illustrated in Figure 32 below. The user can also press the ESC key to go back to the Main Screen.

Run All is a test that runs all diagnostics included in the tool, such as CPU, LDC, Memory, Motherboard, Optical, PCI and Storage. The only choice the user has is: Quick, Extended or Restricted.
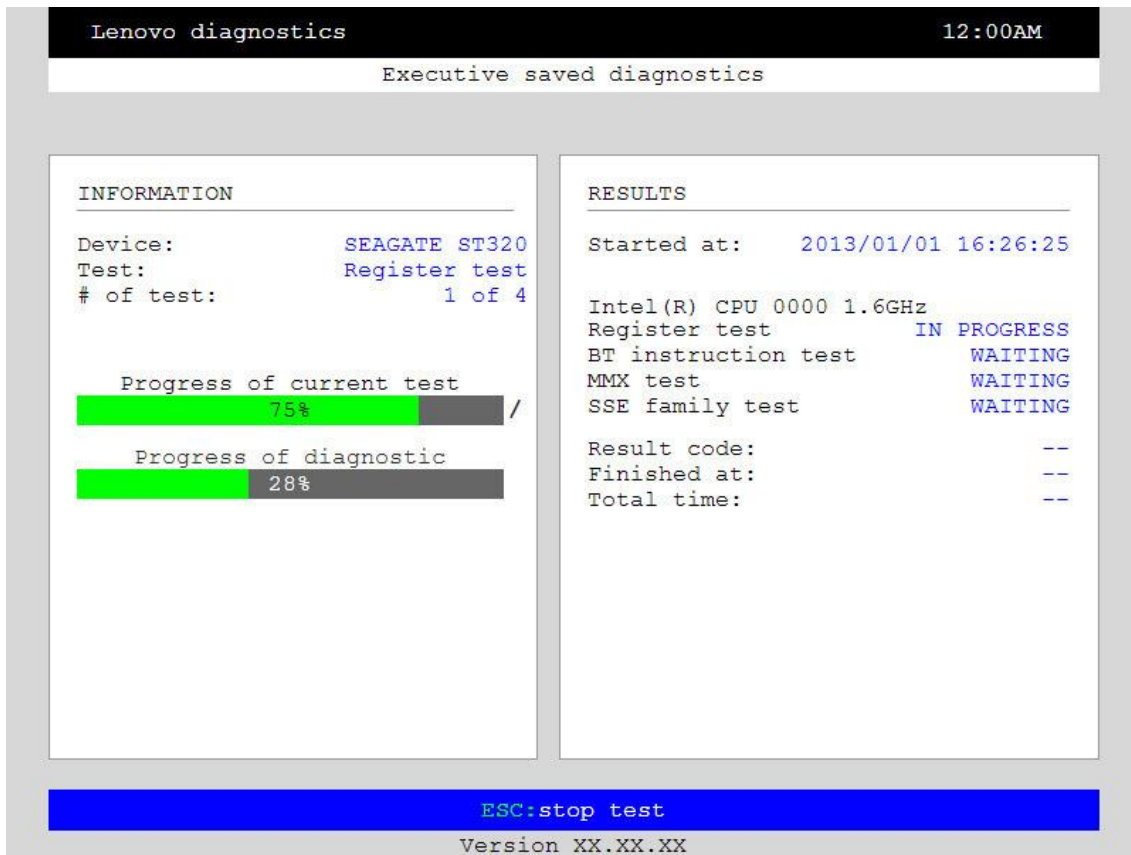
```
Lenovo diagnostics                                    12:00AM
                    Executive saved diagnostics

INFORMATION                          RESULTS

Device:          SEAGATE ST320       Started at:    2013/01/01 16:26:25
Test:            Register test
# of test:             1 of 4        Intel(R) CPU 0000 1.6GHz
                                     Register test          IN PROGRESS
                                     BT instruction test        WAITING
       Progress of current test      MMX test                   WAITING
              75%              /      SSE family test            WAITING

                                     Result code:                    --
       Progress of diagnostic        Finished at:                    --
              28%                     Total time:                     --




                        ESC:stop test
                       Version XX.XX.XX
```

Figure 33 – Run all test progress

The "Run all test" screen provides information about the progress of the run all test, as well as information about the results. This screen is composed of:

•   Application Title Bar;

•   Screen Title Bar;

•   Two sections (Information and Results);

•   Instruction Bar;

Application Title Bar contains the name of the application, Screen Title Bar contains the name of screen (in the case, Run saved diagnostics), Instruction Bar contains instructions to run the test. The run all test screen has also two main sections: Information and Results. The first section provides information to the user about test and diagnostic progress and the second section provides to user information about the results of the test and its algorithms.

For the Quick Memory Test, the Information section contains the following information: Total Memory (total of physical memory that machine has, in Megabytes), Available Memory (memory that the test allocated to be tested, in Megabytes), Test (name of test being currently run), # of Test (number of

current test among all the tests to be run), Progress of current test (bar with progress in percentage of current test) and Progress of diagnostic (bar with progress in percentage of the entire diagnostic, including all tests).

The Results section contains the following information: date and time that test started, a list with all the algorithms which compose device test and their respective status (an algorithm can have six status: ON QUEUE, indicating test is waiting to be run; ON PROGRESS, indicating test is being run; PASSED, indicating algorithm has found no problems at device; FAILED, indicating that algorithm has found one or more faults at algorithm; CANCELED, indicating algorithm was canceled by user; and NOT SUPPORTED, indicating algorithm is not supported by device), unique error code for test, date and time that the test finished (displayed after test is finished) and duration of test in hours, minutes and seconds (displayed after the 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 running is changed to CANCELED. After the diagnostic is finished or canceled, the user can go back to the Main Screen (by pressing ESC key again) or display the test log (by pressing F3 key).

4.   Log Screen

After a test or a recover operation is finished or canceled, the user can see the "Log Screen" by pressing the 'L' key. The "Log Screen" for Memory Test is shown in Figure 34.
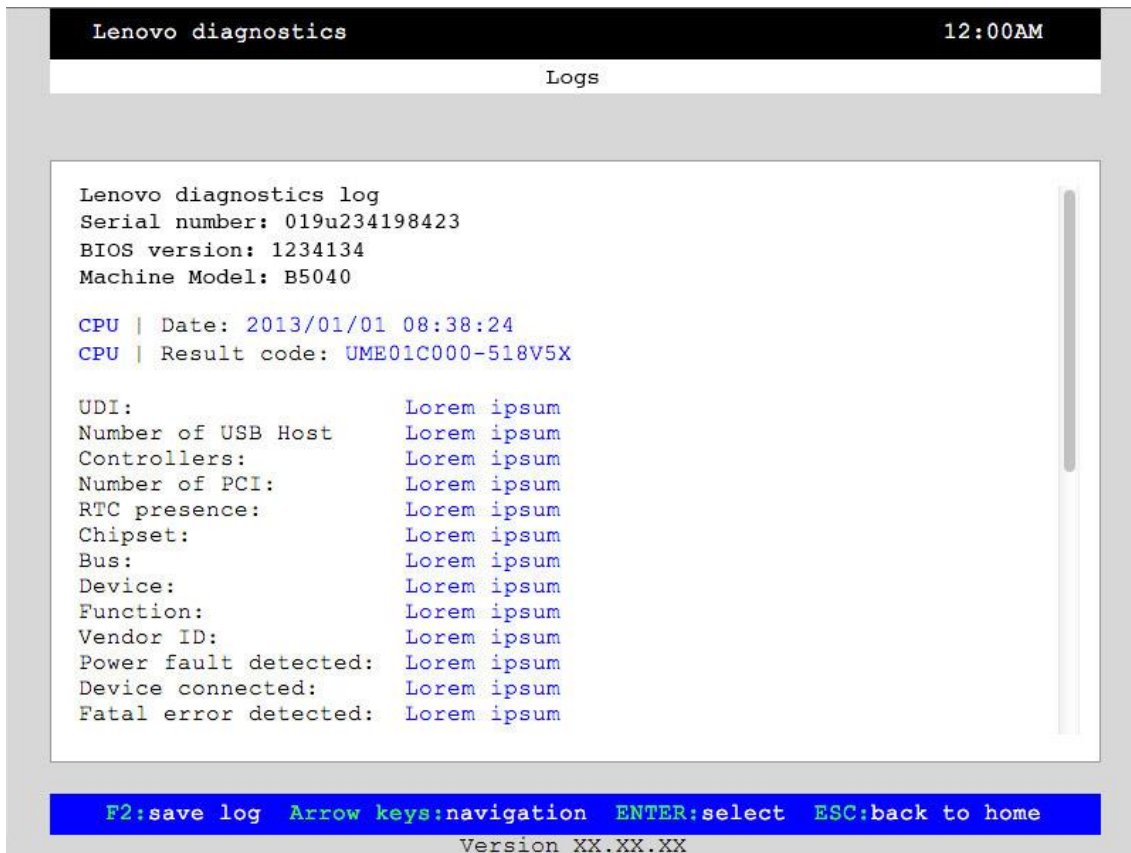
Figure 34 - Log Screen for Quick Memory Test

"Log Screen" is composed of:

- Application Title Bar;

- Screen Title Bar;

- Instruction Bar;

- Log Content Region;

- Scroll Bar.

The Application Title Bar contains the name of the application, Screen Title Bar contains name of screen (in the case, Log Screen), Instruction Bar contains instructions to use screen and current time, Log Content Region shows log content and Scroll Bar shows which portion of all log is displayed at Log Content Region.

If the log content has more rows than screen, the user can scroll by pressing the Up and Down arrow keys to move the displayed region up and down, respectively. The user can also go back to the Main Screen by pressing the 'ESC' key and save the log by pressing the "F2" key.

5. **Save Log Window**

If the user chooses to save the og by pressing the "F2" key on the "Log Screen", the "Save Log" window is displayed, as shown in Figure 35.
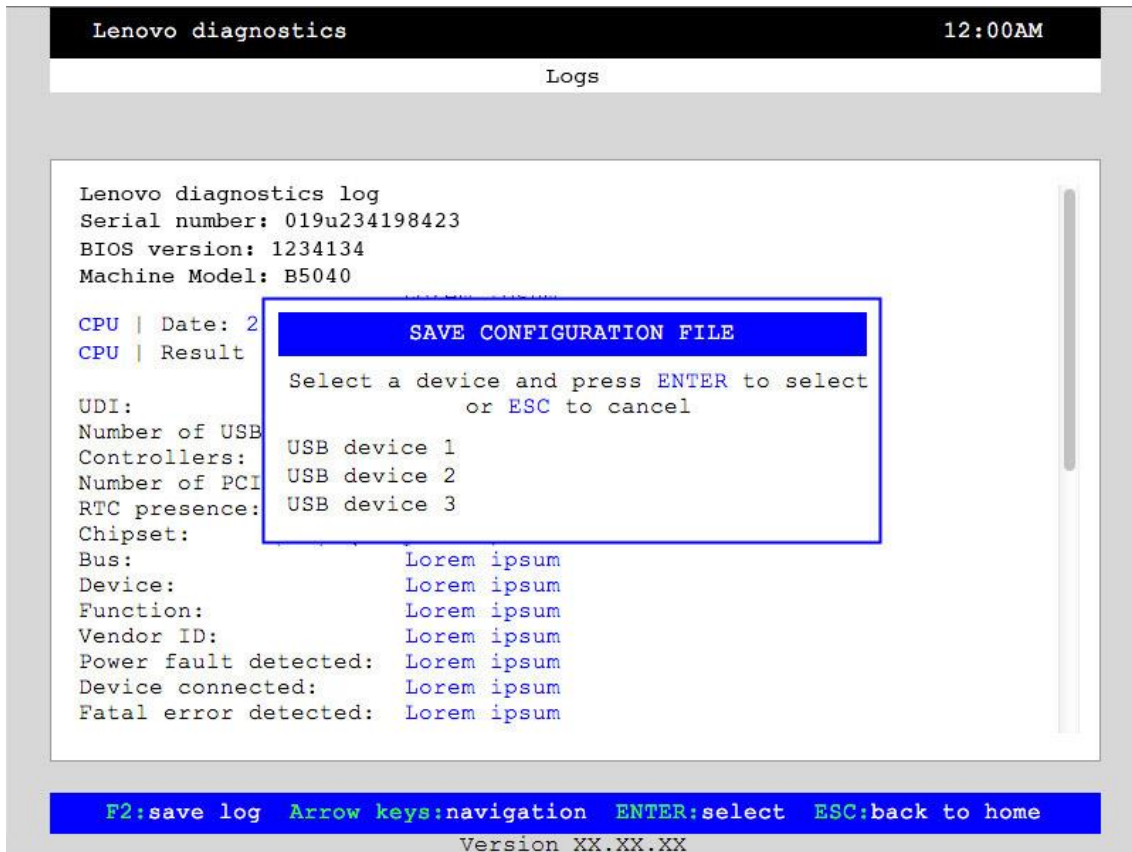

Figure 35 - Save Log Window

The "Save Log" window is composed of:

- Window Title Bar;

- Saving Options List; and

- Cancel Option.

The Window Title Bar contains the name of the window (in this case, Save Log), the Save Log List shows all devices where the log can be saved, and Cancel Option is used to perform a cancel operation.

The currently selected option is highlighted in blue. The user can change the selected option by pressing the up and down arrow keys. The user can choose which device to save the log in. After the user

chooses a device, the user can press ENTER. The application will attempt to save the log on 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 Figure 36). 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 "Log Test" screen will be displayed again.
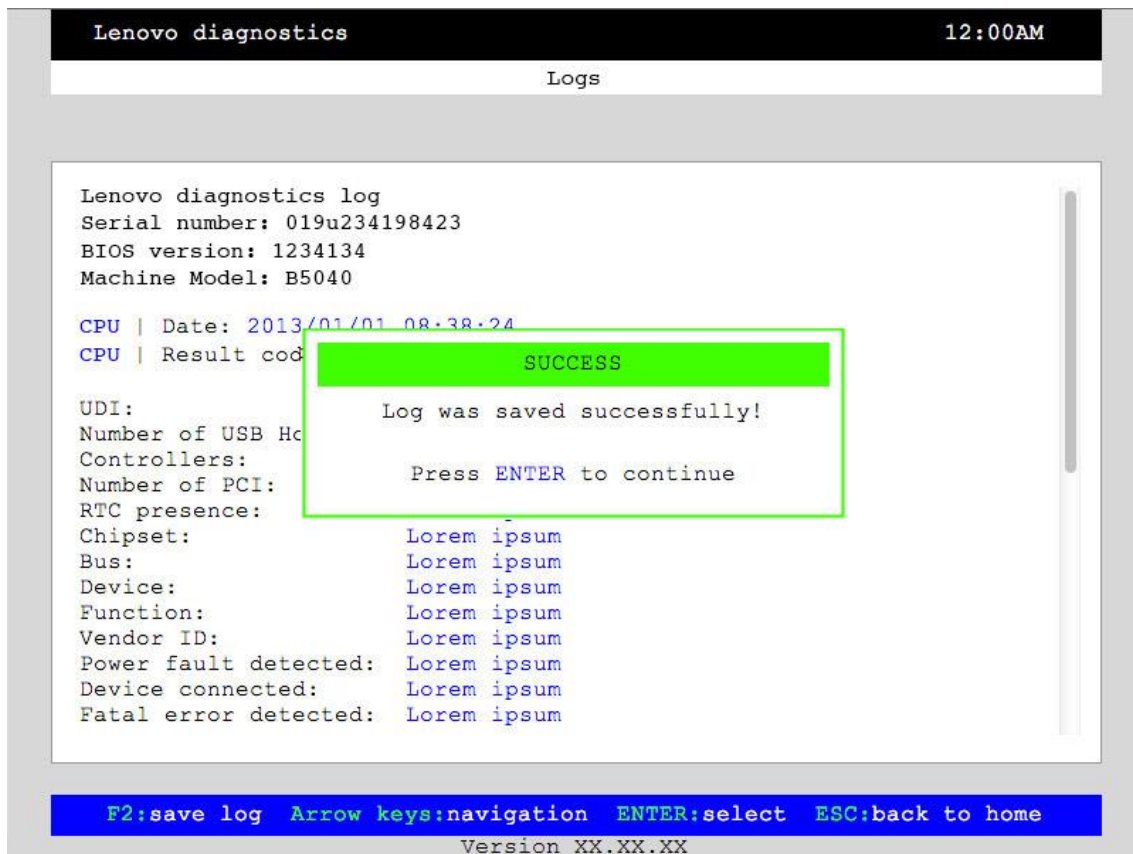

Figure 36 - Log saving operation was successful

If the user chooses not to save the log, he can select the Cancel option and press ENTER. Then, the Save Log window will be closed without saving the log.

6. **System Information**

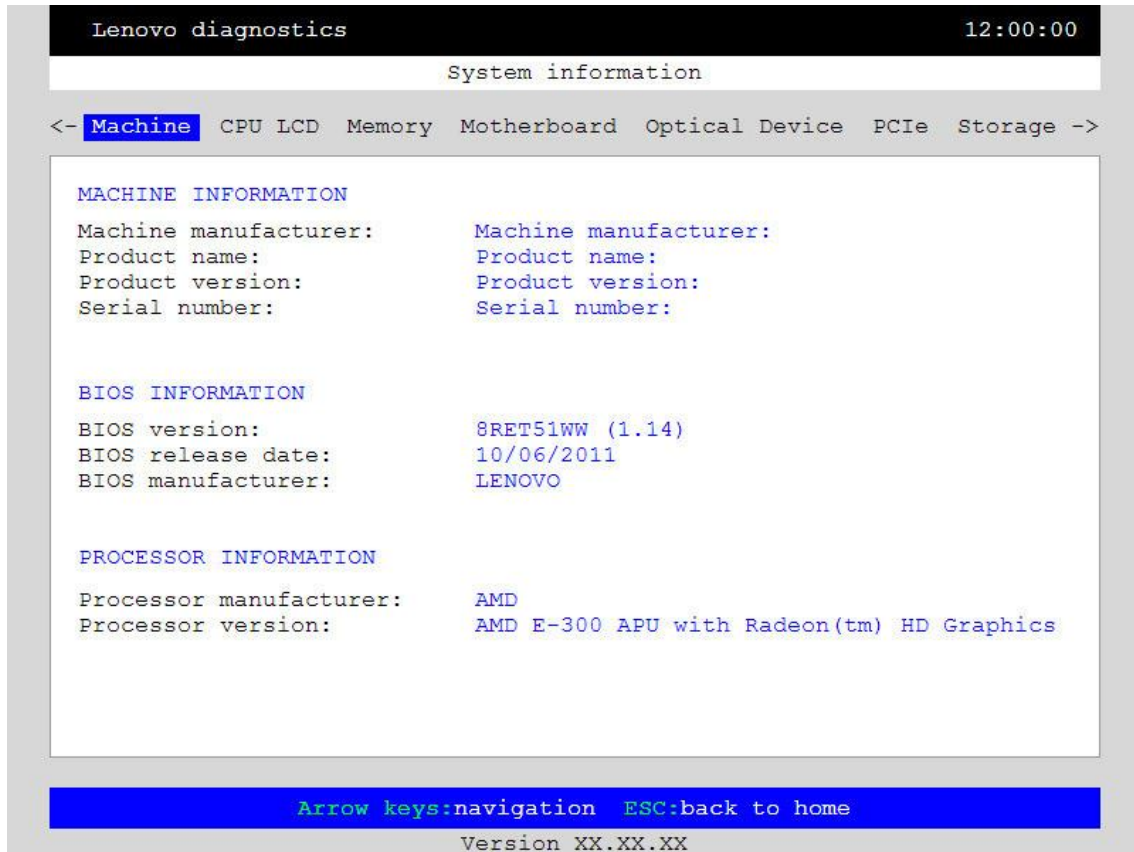The System Information Screen with Machine tab selected is shown in Figure 37.

Figure 37 - System Information Screen – Machine Tab

The System Information Screen with Memory tab selected is shown in Figure 38.

```
Lenovo diagnostics                                    12:00:00
                        System information

<- Machine   CPU LCD  Memory  Motherboard  Optical Device  PCIe  Storage ->

  MEMORY INFORMARTION

  Total physical memory:       4GB

  Memory device 1 DDR3 (1333MHz)
  Origin:                      SMBIOS
  Memory size:                 2GB
  Memory manufacturer:         80CE
  Memory part number:          4D34373142353737
  Memory serial number:        00190B98

  Memory device 2 DDR3 (1333MHz)
  Origin:                      SMBIOS
  Memory size:                 2GB
  Memory manufacturer:         80CE
  Memory part number:          4D34373142353737
  Memory serial number:        00190B9D




           Arrow keys:navigation  ESC:back to home
                     Version XX.XX.XX
```
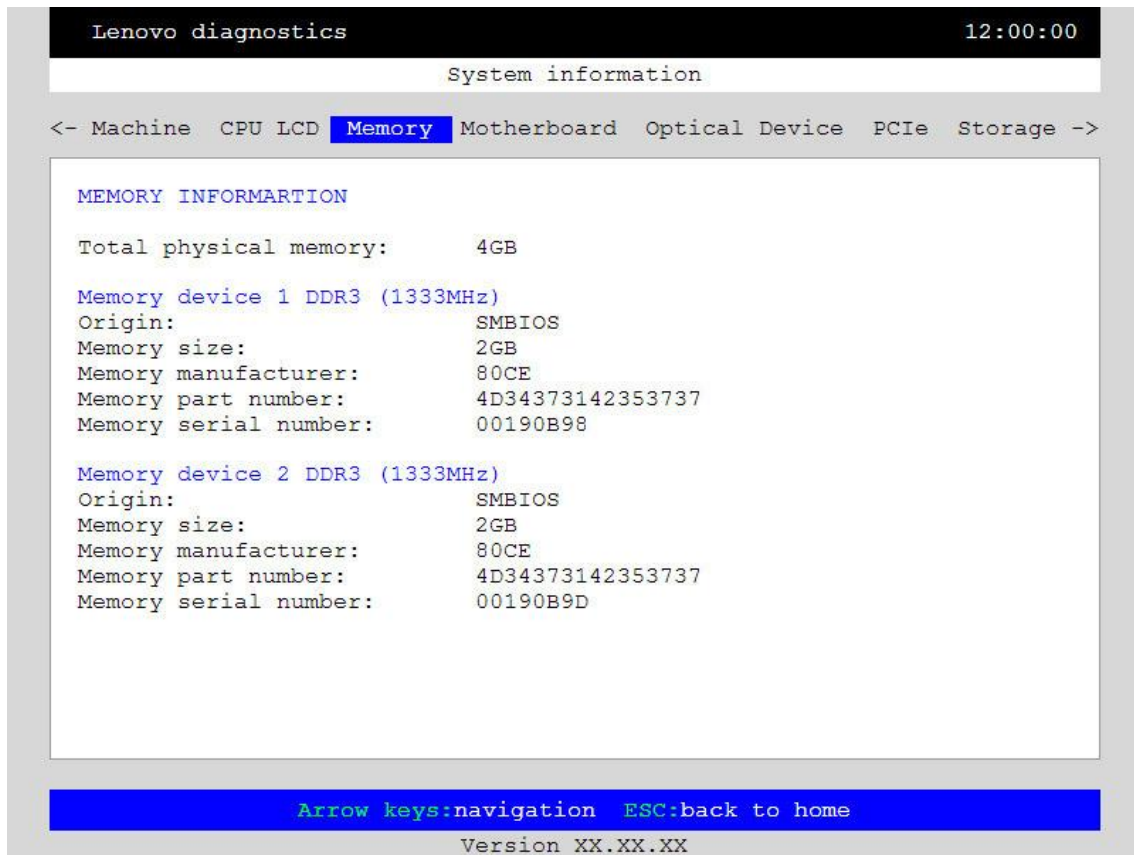
Figure 38 - System Information Screen – Memory Tab

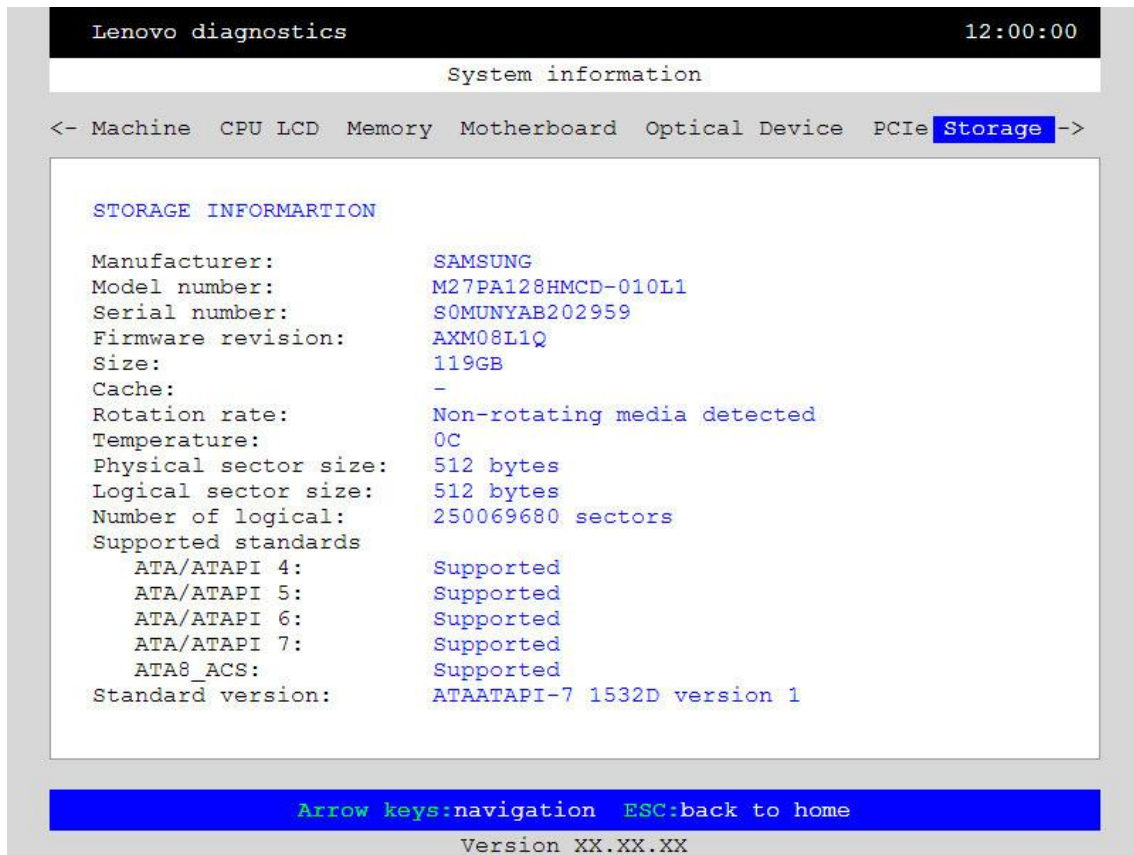The System Information Screen with the Storage tab selected is shown in Figure 39.

Figure 39 - System Information Screen – Storage Tab

System Information Screen with LCD tab selected is showed at Figure 40.
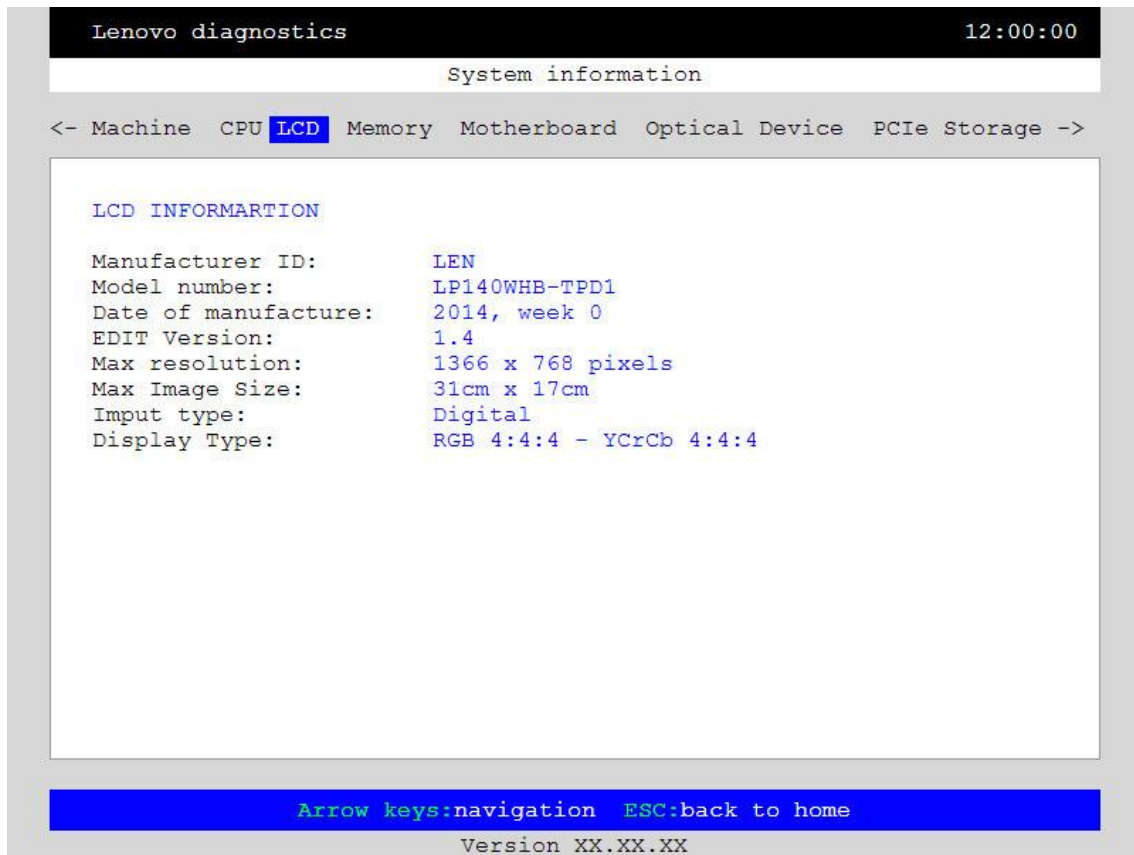

Figure 40 - System Information Screen – LCD Tab

System Information Screen with PCI Express tab selected is shown in Figure 41.
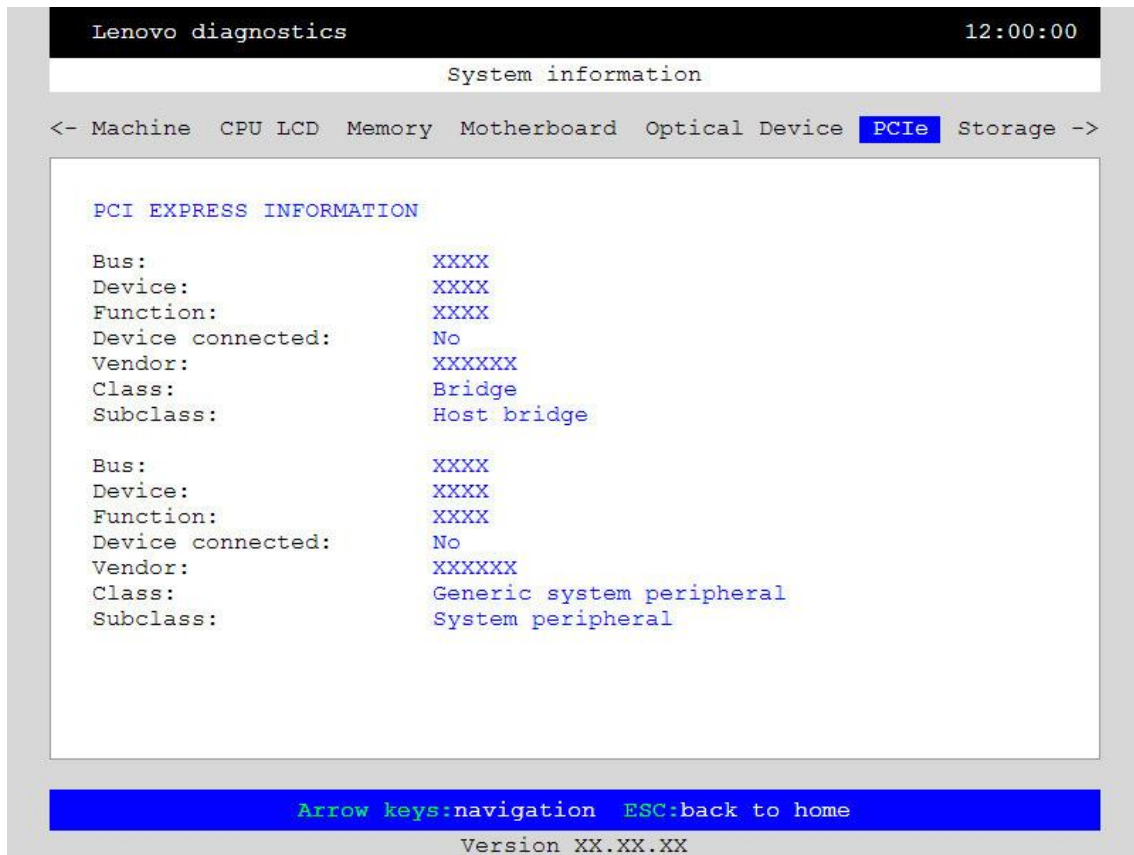

Figure 41 - System Information Screen – PCI Express Tab

System Information Screen with Optical Device tab selected is shown in Figure 42.
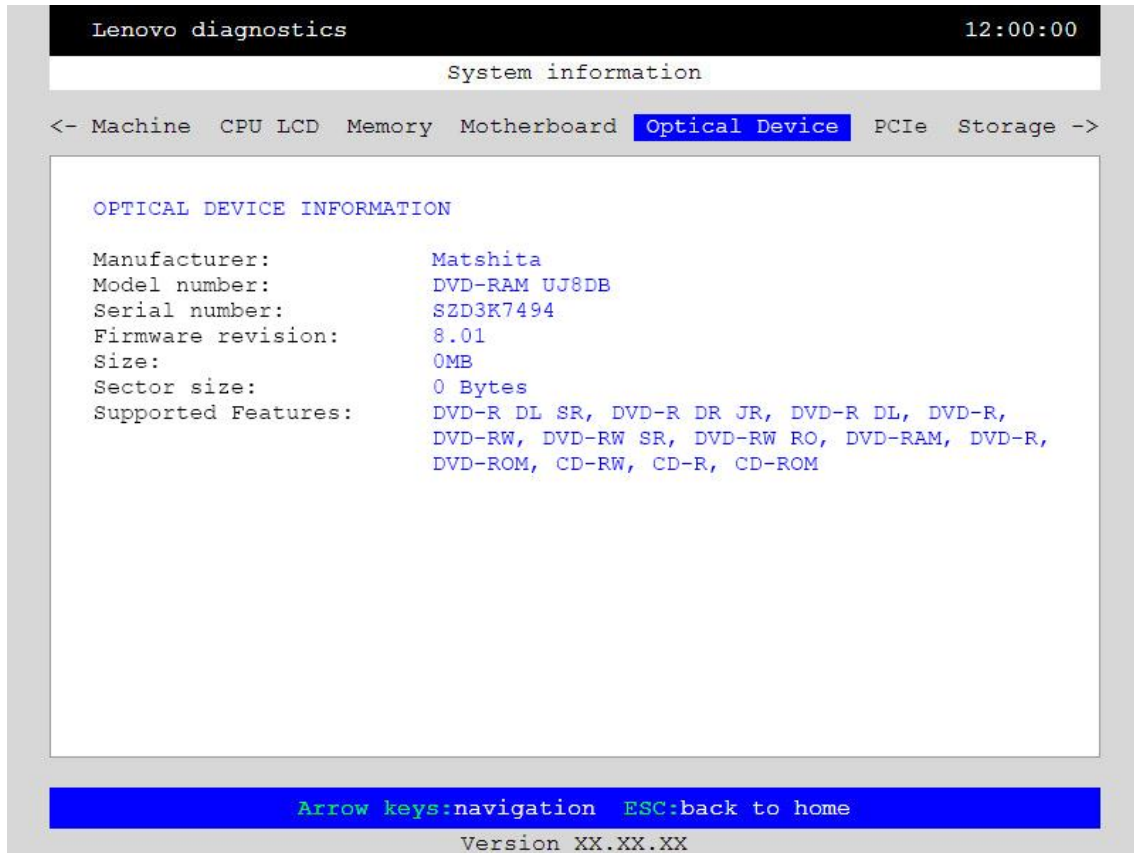

Figure 42 - System Information Screen – Optical Device Tab

System Information Screen with Video Card tab selected is shown in Figure 43.
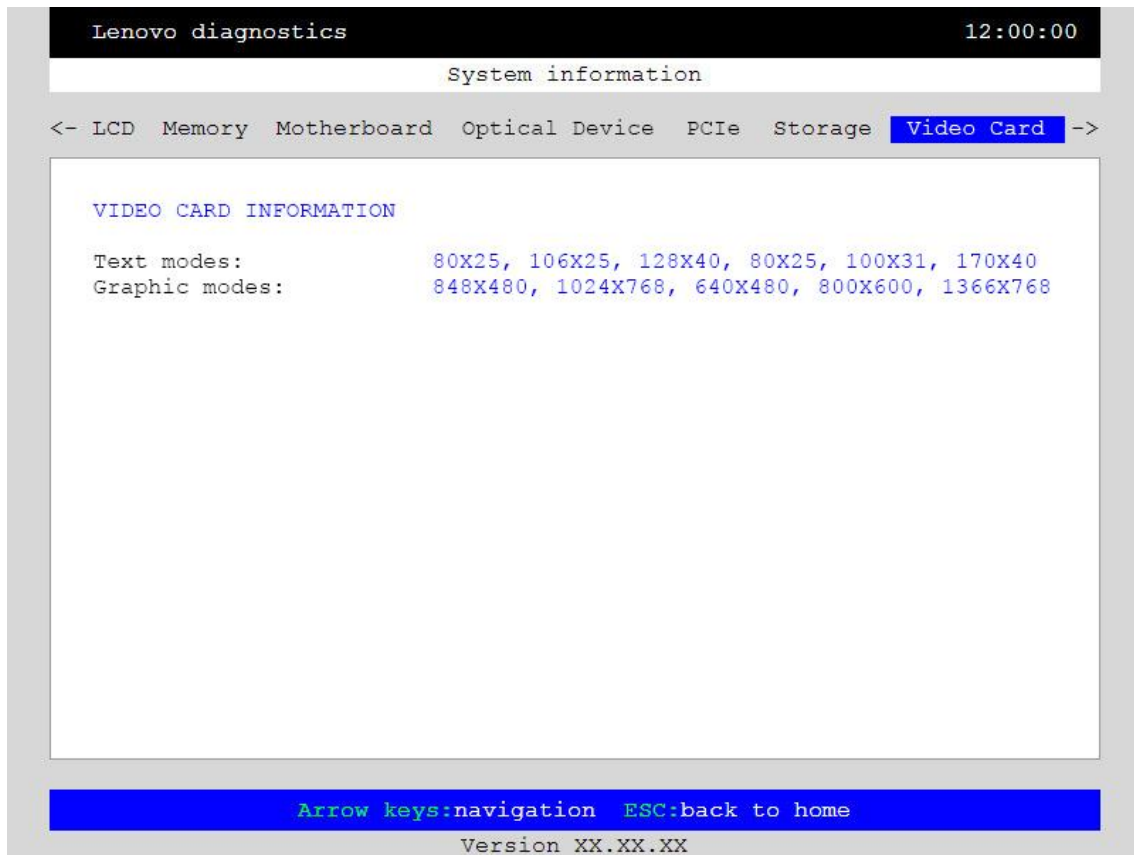

Figure 43 - System Information Screen – Video Card Tab

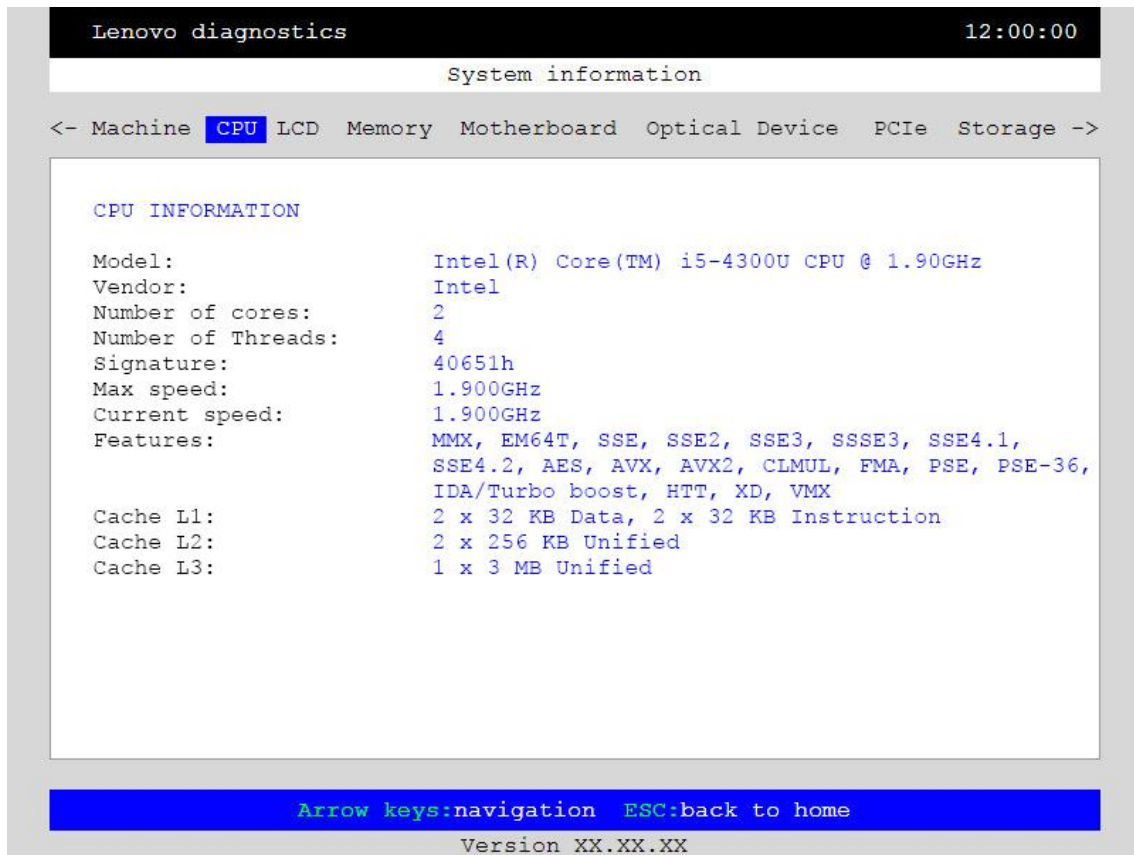System Information Screen with CPU tab selected is shown in Figure 44.

Figure 44 - System Information Screen – CPU Tab

System Information Screen with Motherboard tab selected is shown in Figure 45.
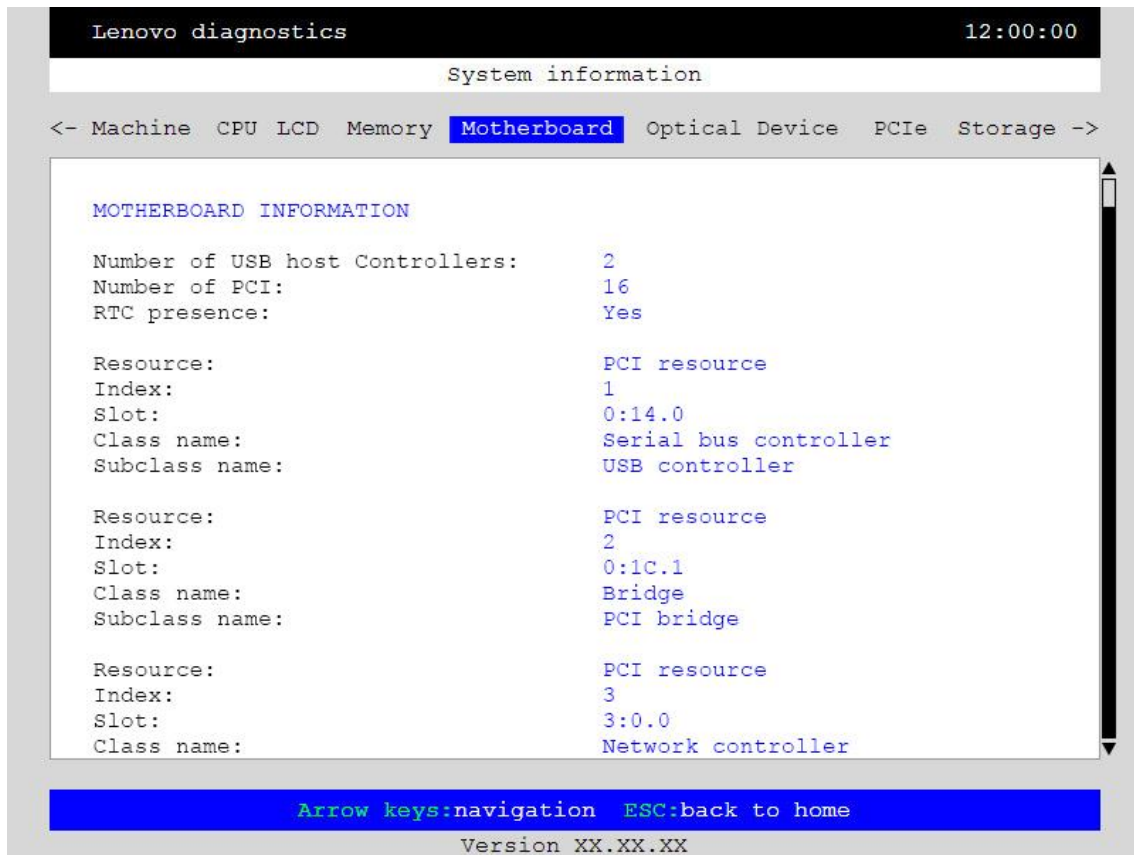

Figure 45 - System Information Screen – Motherboard Tab

The System Information Screen is displayed after the user runs the option "System Information" on the Main Screen. The System Information Screen provides detailed information about the machine, the memory devices, and the storage devices. This screen is composed of:

- Application Title Bar;

- Screen Title Bar;

- Tab Names Bar;

- Tab Content Region;

- Instruction Bar; and

The Application Title Bar contains the name of the application, the Screen Title Bar contains the name of the screen (in this case, System Information), and the Instruction Bar contains instructions to manage the screen.

The Tab Name Bar contains the name of all the available tabs and displays the tab currently selected (the name of current tab has a blue background to differentiate it from the other tabs). The Tab Content Region contains information corresponding to tab currently selected.

The user can change the current tab by pressing the Left and Right arrow keys. The Tab Content Region will display information about device on the current tab. User can also scroll information content using the Up and Down arrow keys if the number of content rows is greater than the number of rows on the screen.

For the Machine tab, the following information is displayed in the Tab Content Region:

1. Machine Manufacturer;

2. Product Name;

3. Product Version;

4. Serial Number;

5. BIOS Revision;

6. BIOS Release Date;

7. BIOS Manufacturer;

8. Processor Manufacturer;

9. Processor Version.

For the CPU tab, the following information is displayed in the Tab Content Region:

10. Model;

11. Vendor;

12. Number of cores;

13. Number of threads;

14. Signature;

15. Max speed;

16. Current speed;

17. Features;

18. Cache L1;

19.   Cache L2;

20.   Cache L3.

For the LCD tab, the following information is displayed in the Tab Content Region:

1.   Manufacturer ID (a three-letter code identifying the manufacturer);

2.   Model Name;

3.   Date of Manufacture;

4.   EDID Version;

5.   Max resolution (in pixels);

6.   Max Image Size (in cm);

7.   Input Type (analog or digital); and

8.   Display Type.

For Memory tab, the following information is displayed in the Tab Content Region:

1.   Total Physical Memory (total of physical memory of machine in Gigabytes) and, for each memory device installed on machine:

a.   Identification of memory device (number of memory);

b.   Type of memory (DDR2, DDR3, EEPROM and so on);

c.   Speed of memory (in MHz);

d.   Memory size (in Gigabytes);

e.   Memory Manufacturer;

f.   Memory Part Number;

g.   Memory Serial Number.

For Motherboard tab, the following information is displayed in the Tab Content Region:

1. Number of USB host controllers;

2. Number of PCI;

3. RTC presence;

4. Resource:

5. Index;

6. Slot;

7. Class name;

8. Subclass name;

For Optical Device tab, the following information is displayed in the Tab Content Region:

1. Manufacturer;

2. Model number;

3. Serial number;

4. Firmware revision;

5. Size;

6. Sector size;

7. Supported features.

For the Storage tab, the following information is displayed in the Tab Content Region for each storage device:

1. Manufacturer;

2. Model Name;

3. Serial Number;

4. Firmware Revision;

5. Size (in GB);

6. Cache Size (in MB);

7. Temperature (in Celsius);

8. Physical Sector Size (in bytes);

9.   Logical Sector Size (in bytes);

10.   Count of logical sectors;

11.   Supported Standards; and

12.   Specification Version.

For the PCI Express tab, the following information is displayed at the Tab Content Region:

1.   Bus (current item bus hexadecimal id);

2.   Device (current item device hexadecimal id);

3.   Function (current item function hexadecimal id);

4.   Device Connected (in case it's a external PCI Express off board connected)

5.   Vendor ID (current item vendor hexadecimal id)

6.   Class (current item class name)

7.   Subclass (current item subclass name)

All this information is displayed for each PCI Express device on the computer, as shown in Figure 41.

For the Fan tab, the following information is displayed at the Tab Content Region:

1. CPU fan speed;

2. CPU temperature;

For the Video Card tab, the following information is displayed at the Tab Content Region:

1. Text modes;

2. Graphic modes;

To exit the System Information Screen and go back to the Main Screen, the user must press the "ESC" key.

7.   Recover Bad Sectors Tool Screen

After the user runs the "Recover Bad Sectors Tool" option, application computes the number of storage devices installed on the system. If there is more than one storage device installed on the system, "Select Devices" is displayed, as shown in Figure 46.
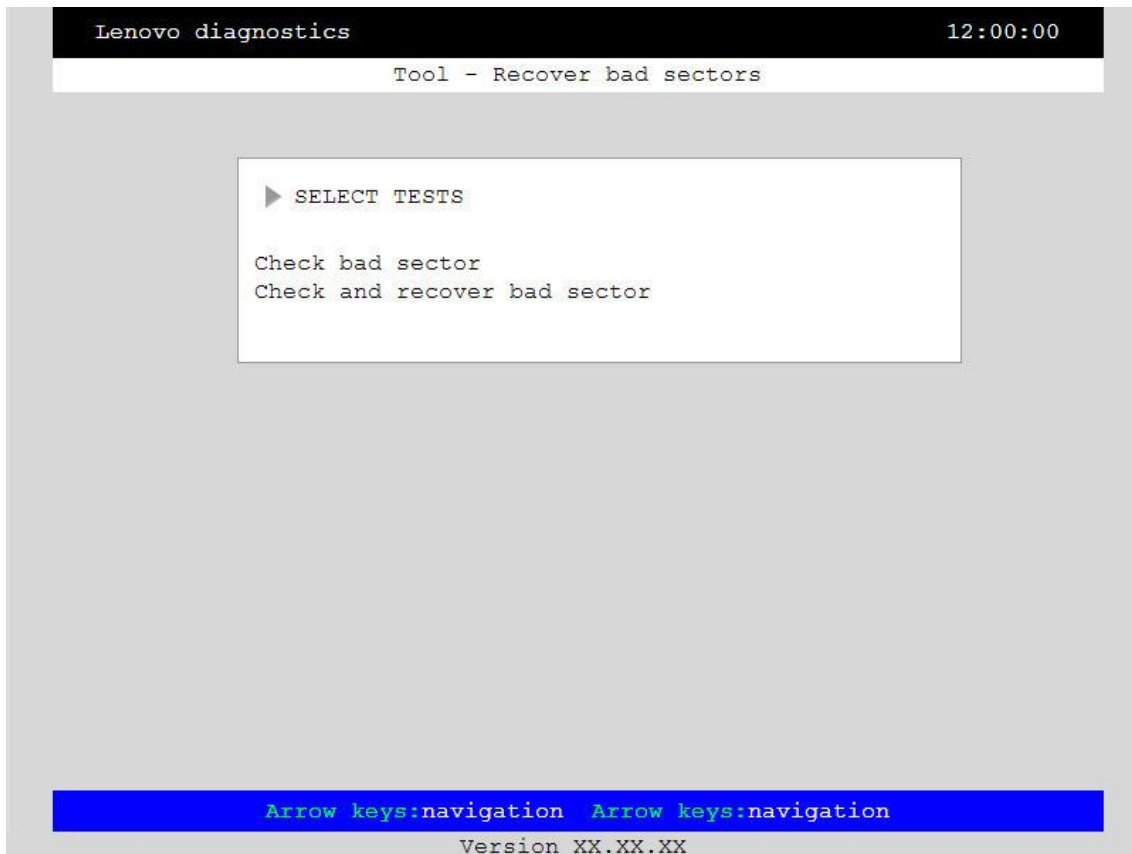

Figure 46 - Select Device Screen for Repair Bad Sectors Tool

The Select Device screen for the Repair Bad Sectors Tool is very similar to the Select Device Screen for Storage Device Test. One difference is that, for the Storage Device Test, the user can choose more than one device to be tested. For the Recover Bad Sectors Tool, the user can select only one device to be recovered.

Initially, only one device is selected. If the user selects another device, this device is selected and the device selected previously is deselected.

Another difference is that the Select Device screen for the Recover Bad Sectors Tools does not have a "Select/deselect all" option.

After the "Select Devices" screen, the application displays the "Select Algorithms" screen, as shown in Figure 47.
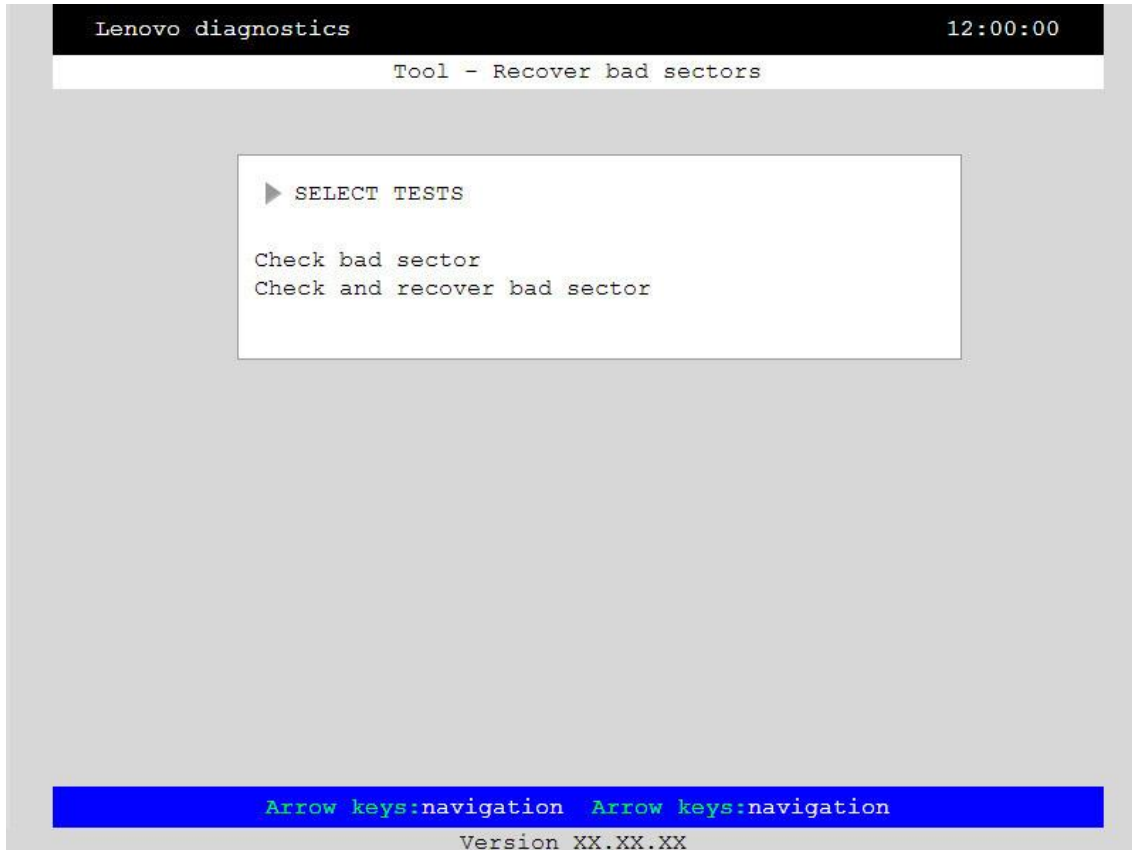

Figure 47 - Select Algorithms Screen for Repair Bad Sectors

The Select Algorithm screen for the Repair Bad Sectors Tool is very similar to the Select Algorithm screen for the Storage Device Test. One difference is that, for the Storage Device Test, the user can choose more than one algorithm to be tested. For the Recover Bad Sectors Tool, the user can only select one operation to be run.

Initially, only one operation is selected. If the user selects another operation, this operation is selected and the operation selected previously is deselected.

Another difference is that the Select Algorithm screen for the Recover Bad Sectors Tools does not have a "Select/deselect all" option.

Initially, the selected operation is "Check Bad Sectors". This operation checks all Storage Device's sectors looking for bad sectors. The other selectable operation is "Check and Recover Bad Sectors" (to check all sectors and recover found bad sectors).

IMPORTANT: The "Check and Recover Bad Sectors" operation performs writr operations on a device, which may cause data loss. The user must make a backup of his data before runnig that operation.

If the user selects the "Check Bad Sectors" operation, a pop-up window will appear as shown in Figure 48.
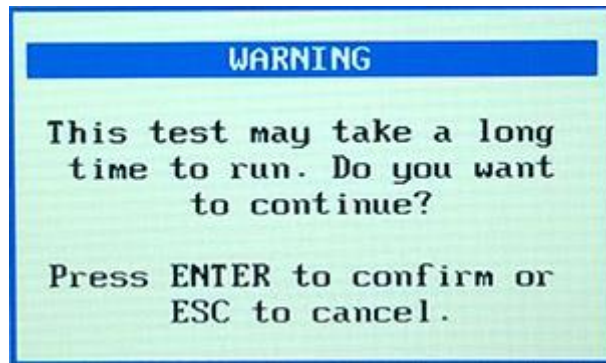

Figure 48 - Check Bad Sectors pop-up window

This pop-up window tells the user that this operation will take more than one hour to be finished and asks if the user wants to continue. To continue, the user must press the 'Y' key. If theuser doesn't want to continue, the user must press the 'N' key.

If the user selects the "Check and Recover Bad Sectors" operation, a pop-up window will appear as shown in Figure 49.

Figure 49 - Check and Recover Bad Sectors pop-up window 1

This pop-up window warms user that this operation may cause data loss on Storage Device. To continue, user must press 'Y' key. After that, another pop-up window will appear as shown at Figure 50. User can also abort operation pressing 'N' key.

Figure 50 - Check and Recover Bad Sectors pop-up window 2

This pop-up window asks the user if the user really wants to continue this operation, due to the possibility of data loss. If the user wants to continue, the user must press the 'Y' key. If not, the user must press the 'N' key.

After all pop-up windows are closed, the Recover Bad Sectors Screen is displayed, as shown in Figure 51.
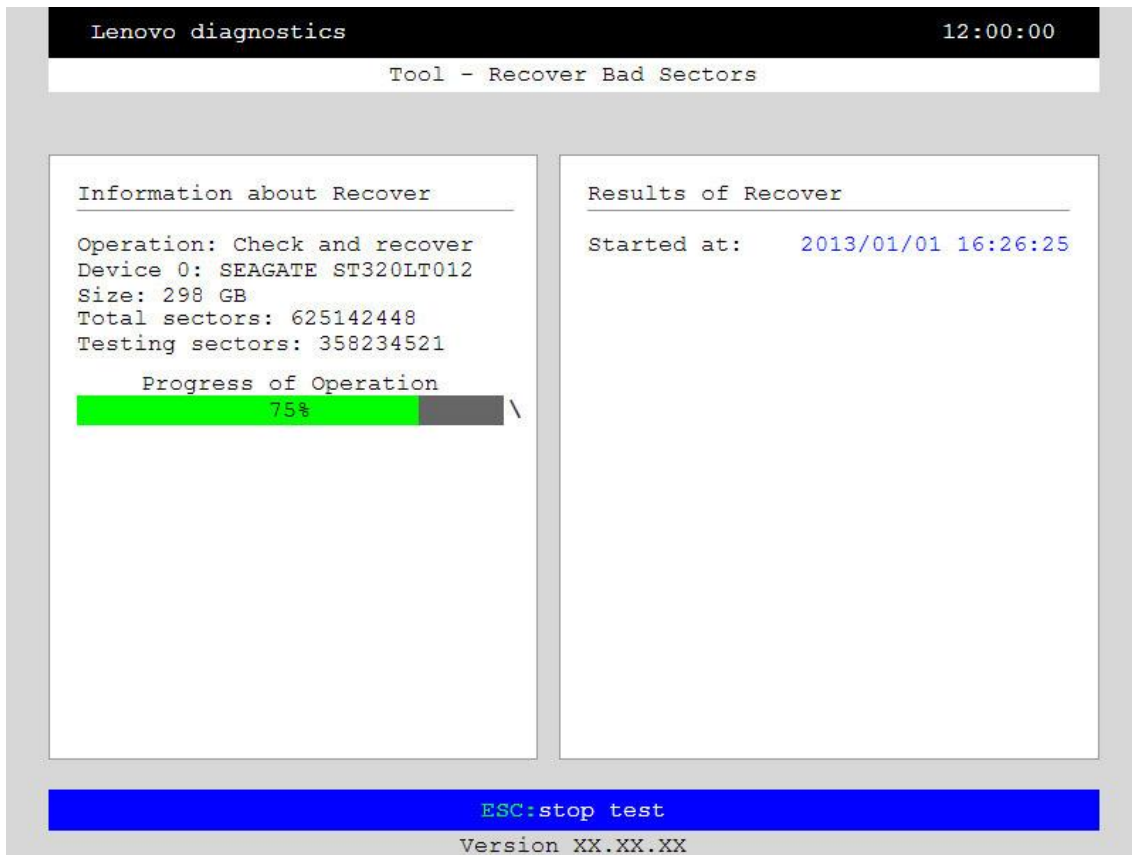
Figure 51 - Recover Bad Sectors Tool Screen

The Recover Bad Sectors screen is very similar to the Quick Storage Device Test Screen, with a few differences.

In the Recover Results section, besides test start time, test end time, duration of Recover and instructions to user after operation is finished, additional information is shown.

For the Check Bad Sectors operation, the found bad sectors are displayed on the screen. For the Check and Recover Bad Sectors operation, the found bad sectors and result of their recovery (i.e. if bad sectors could be recovered or not) are displayed on the screen.

The Recover Result section can be scrolled up or down using the Up and Down arrow keys if the number of content rows for this section is greater than the number of rows on the screen.

During execution of the Recovery operation, the user can stop it at any time by pressing the ESC key. If the user does that, the operation is aborted. After the operation is finished or aborted, the user can go back to the Main Screen by pressing the 'ESC' key again or the user can see the Repair Log Screen by pressing the the 'F3' key.

8.   **Generate configuration file**

The "Generate configuration file" option on the Main Screen allows the user to select a list of different diagnostics and save them into a file, called configuration file. Afterwards, the list of diagnostics saved on this configuration file can be run automatically (see next section).

When the user selects the "Generate configuration file" option, the system checks if there is at least one diagnostic installed on the machine. If not, an error message is displayed. If so, a select screen with all the diagnostics available is displayed, as shown in Figure 52.

```
Lenovo diagnostics                                    12:00:00
                    Generate configuration file


   ▶ Select tests

   [x] Select/Descelect All

   [x] Memory - quick test
   [x] Memory - extended test >>
   [x] Memory - bit fade test
   [x] Storage device - quick test >>
   [x] LCD test >>
   [x] PCI-e test

       Generate file




         Arrow keys:navigation  Spacebar:select/deselect  ESC:back
                          Version XX.XX.XX
```

Figure 52 - Selection screen for diagnostics

As show in Figure 53, some diagnostic names are followed by the expression '(+)'. These diagnostics contain more than one test, which can be selected, or contain selectable devices, as shown in Figure 53.

```
Lenovo diagnostics                                    12:00:00
                    Generate configuration file

  ▶ Select tests                    [x] Select/Descelect All

  [x] Select/Descelect All          [x] Red solid color
                                    [x] Blue solid color
  [x] Memory - quick test           [x] Green solid color
  [x] Memory - extended test >>     [x] Black solid color
  [x] Memory - bit fade test        [x] White solid color
  [x] Storage device - quick test >> [x] Luminance VESA
  [x] LCD test >>                    [x] Geometry VESA
  [x] PCI-e test                     [x] Focus VESA
                                    [x] Combination
      Generate file
                                        < Back




      Arrow keys:navigation  Spacebar:select/deselect  ESC:back
                    Version XX.XX.XX
```
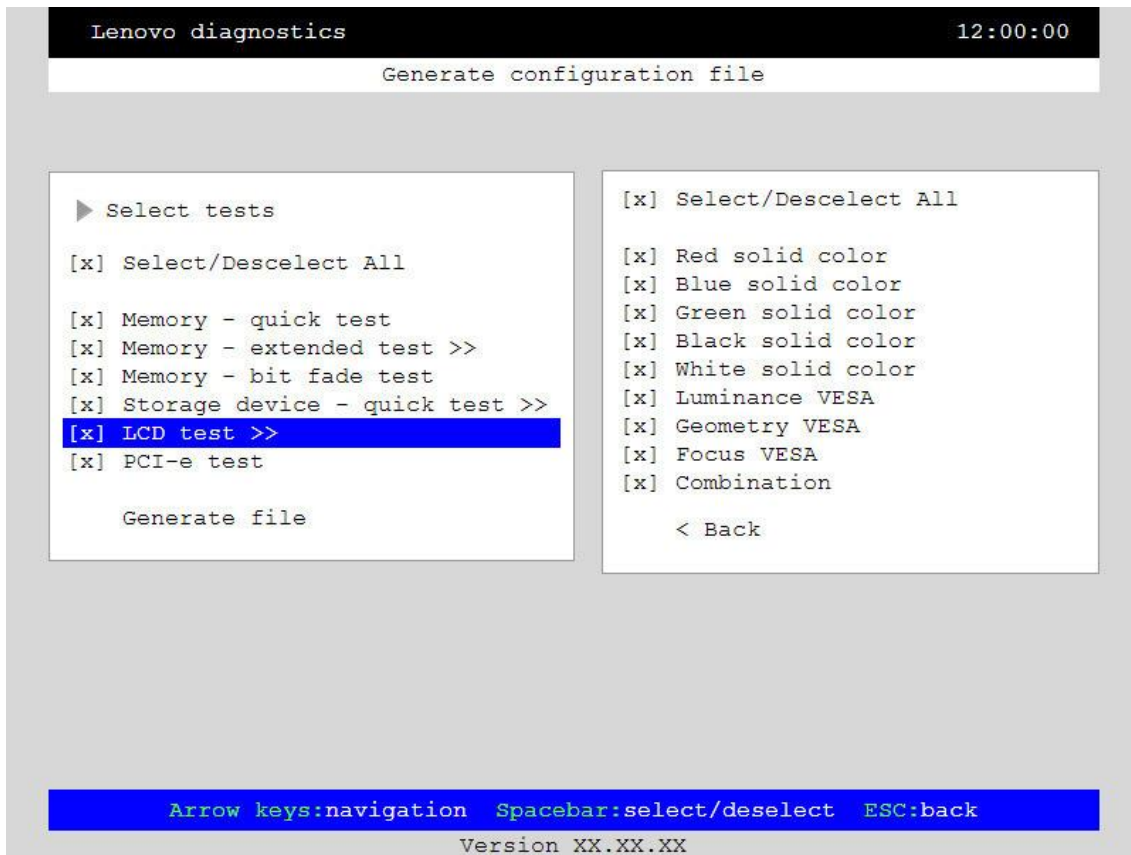
Figure 53 - Some diagnostics support test selection and/or device selection

This selection screen has the same behavior as the select screens for Quick Storage Test and the LCD Test. After a selection is made (by pressing the 'Enter' key or selecting the 'Generate file' option), a window is displayed so that the user can select which USB key to save the file on, as shown in Figure 54.
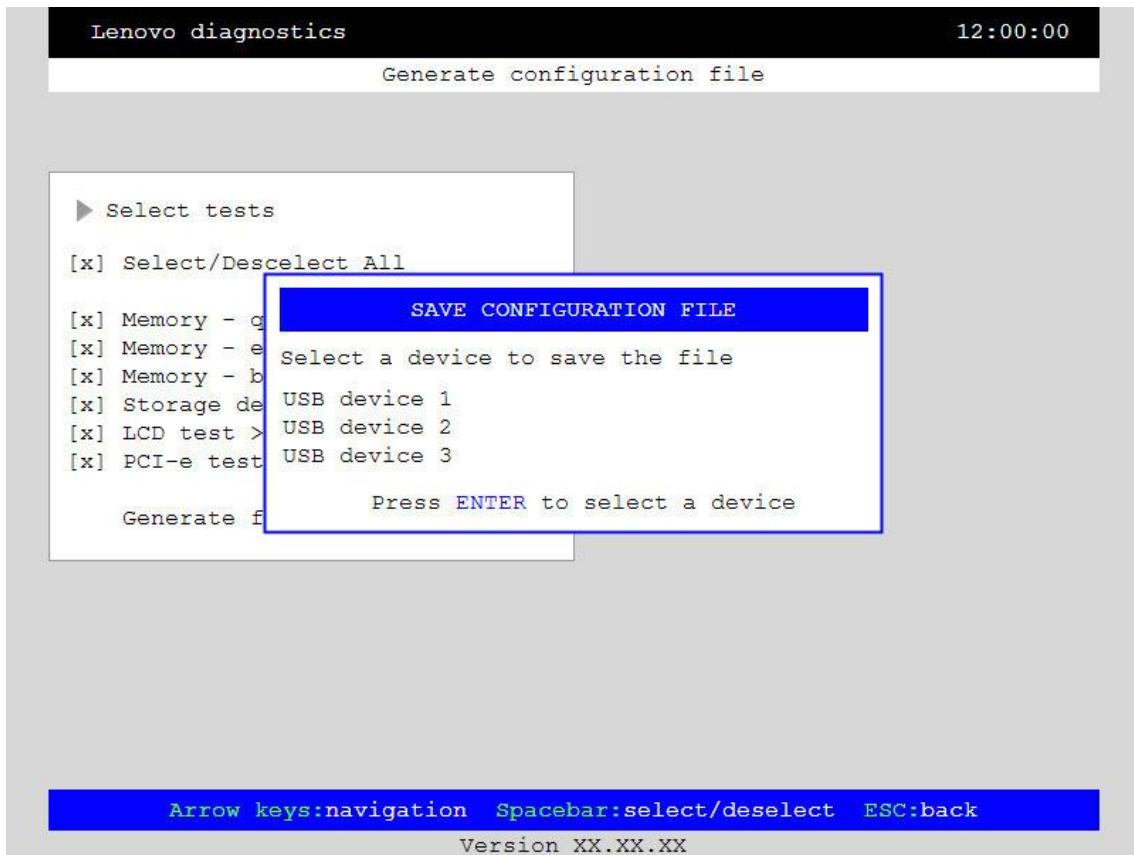
Figure 54 - Window with all the available USB keys

To select a USB key, the user must highlight its name using the up and down arrow keys and press 'Enter'. To cancel the operation, the user can press the 'Esc' key. After a USB key is selected, another window is displayed so that the user can enter the file name, as shown in Figure 55.
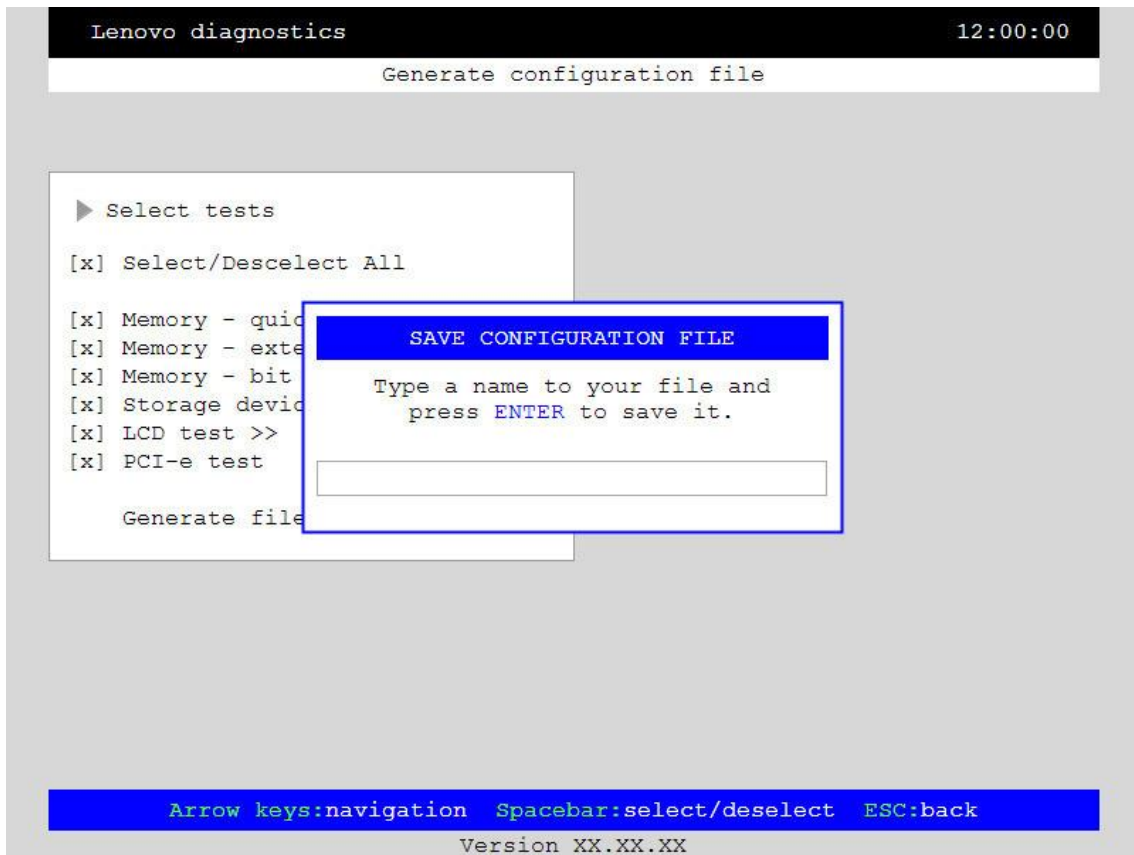
Lenovo diagnostics   12:00:00
                    Generate configuration file

▶ Select tests

[x] Select/Descelect All

[x] Memory - quic   SAVE CONFIGURATION FILE
[x] Memory - exte
[x] Memory - bit   Type a name to your file and
[x] Storage devic   press ENTER to save it.
[x] LCD test >>
[x] PCI-e test

    Generate file

      Arrow keys:navigation Spacebar:select/deselect ESC:back
                        Version XX.XX.XX

Figure 55 - Window to get file name

The configuration file name can contain any number, letter and underscore. To cancel the operation, the user can press the 'Esc' key. After entering the name, the user must press the 'Enter' key. Then, a success message will be displayed informing that the configuration file was generated successfully, as shown in Figure 56.
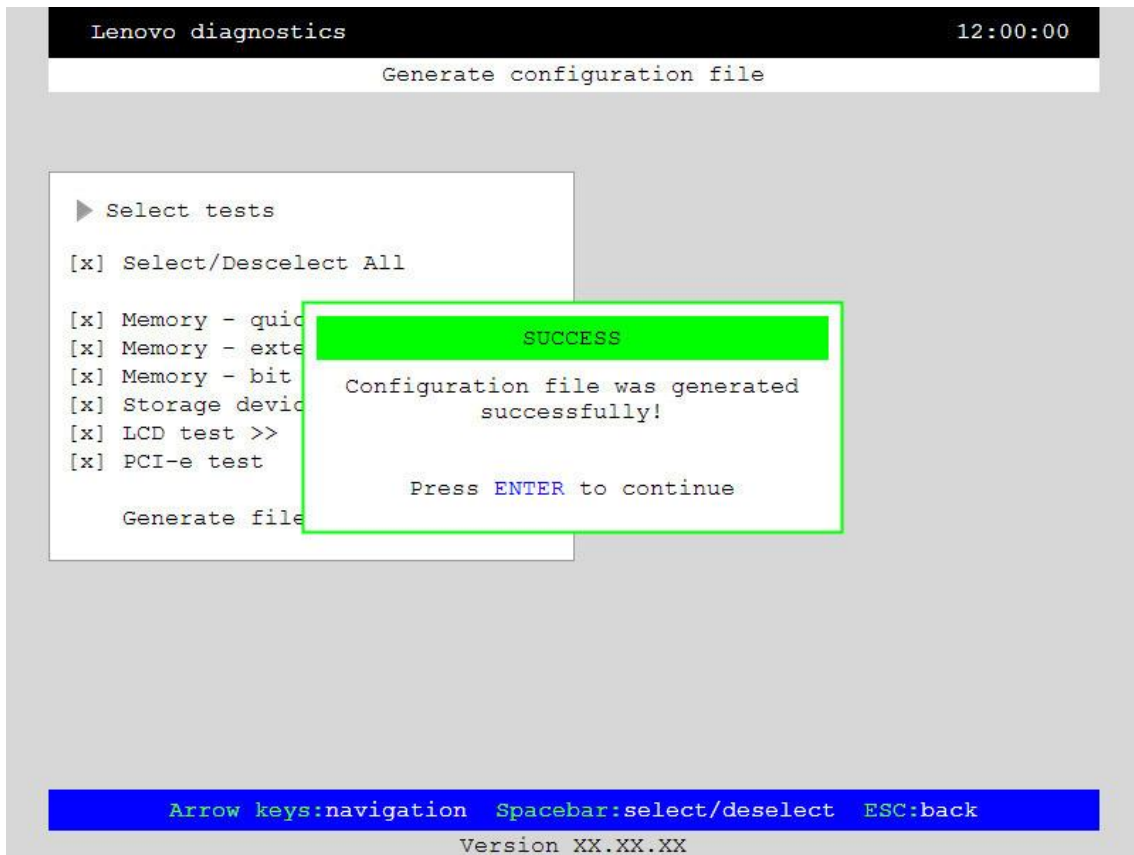
UEFI – User Guide

Figure 56 - File was generated successfully

9.   **Execute from configuration file**

The 'Execute from configuration file' option on the Main Screen allows the user to select a configuration file (which could have been generated using the 'Generate configuration file' option or in Windows and Linux environments). This file will be read, and all the diagnostics saved on it will be run automatically.

When the "Execute configuration file" option is triggered, the system checks if there is at least one diagnostic installed on the machine. If not, an error message is displayed. If so, the system checks if there is at least one USB key plugged into the machine. If not, another error message is displayed, as shown in Figure 57. If so, a window is displayed with all the available USB keys so that user can select one, as shown in Figure 58.
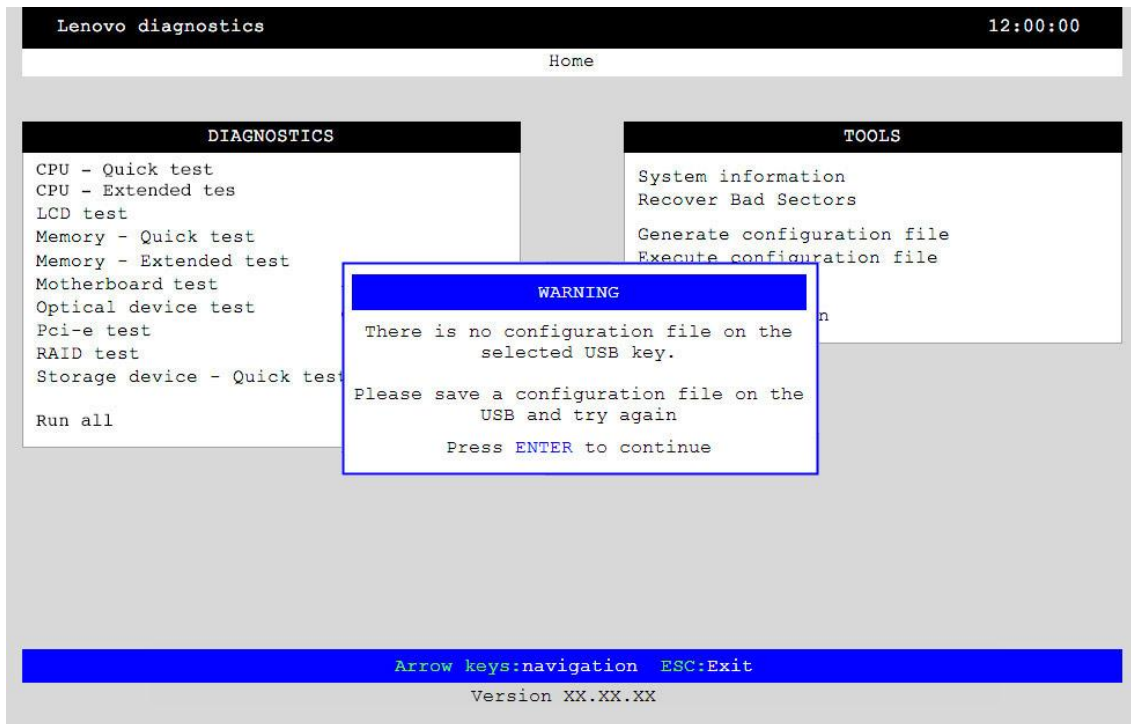
Figure 57 - When there is no USB key to read, an error message is displayed
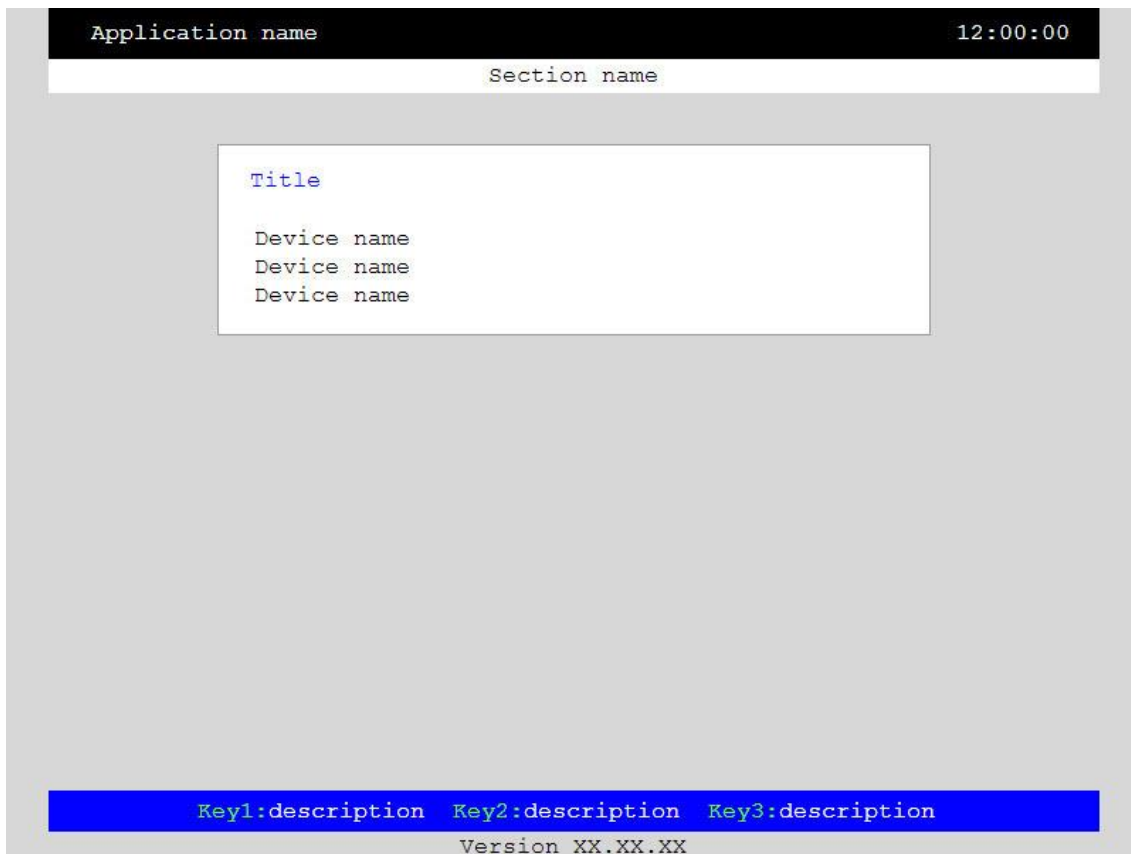

Figure 58 - Window to select USB key

After a USB key is selected, another window is displayed with all the configuration files saved on it so that user can select one file to be run, as shown in Figure 59.
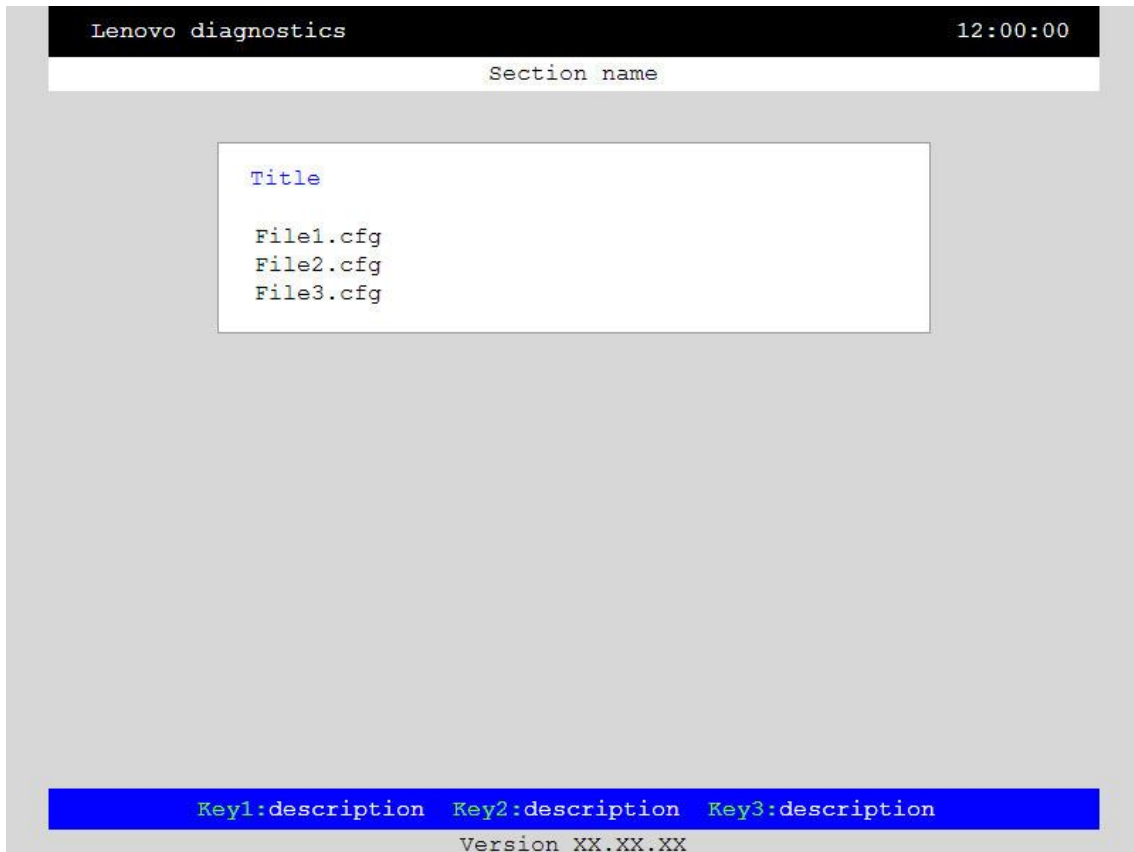

Figure 59 - Window to select configuration file

After a configuration file is selected, it is read and all the diagnostics saved on it are listed on the "List of saved diagnostics" screen, as shown in Figure 60. The User can press the 'Enter' key to run the diagnostics listed or can press the'Esc' key and abort the operation.
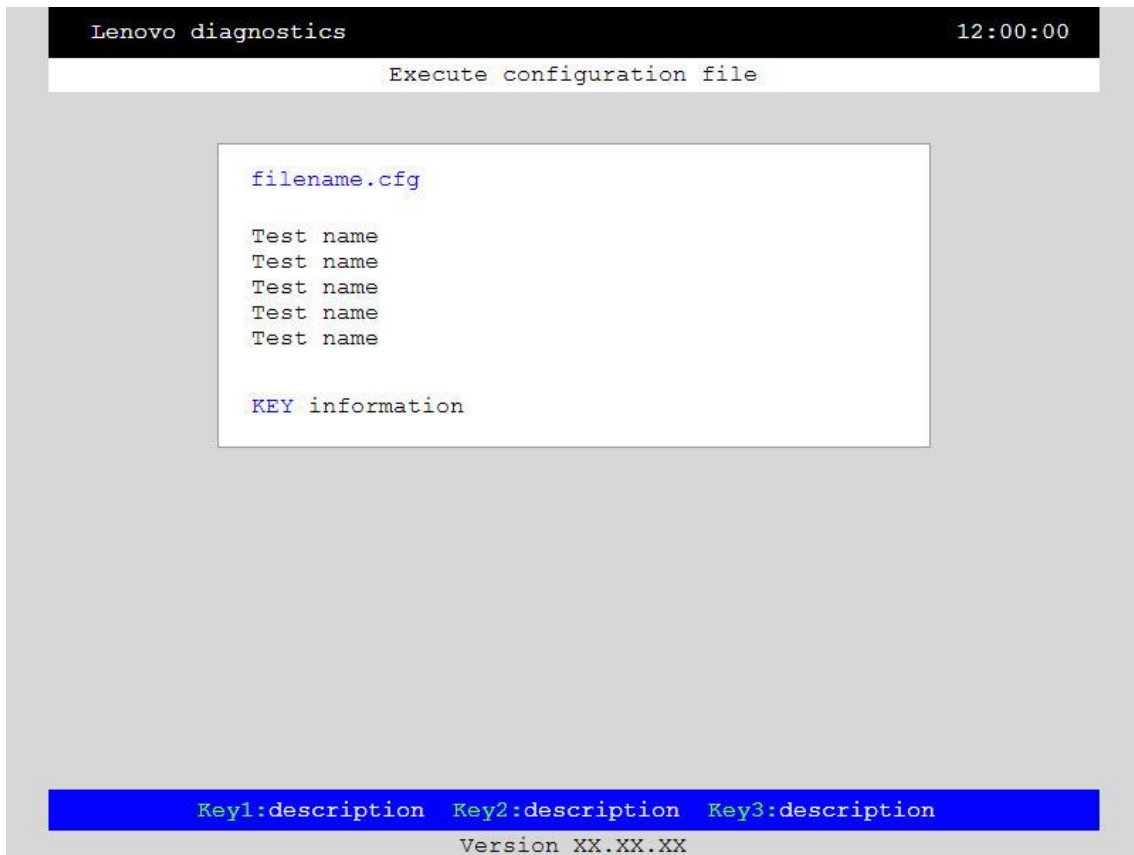
Figure 60 - Screen with a list of all diagnostics saved on the selected configuration file

If the user chooses to run the diagnostics, a Test Screen will be displayed with all the diagnostics listed, which will be run sequentially, as shown in Figure 61. After all the diagnostics are finished, the user can press the "F3" key to see the log or the 'Esc' key to return to the Main Screen.
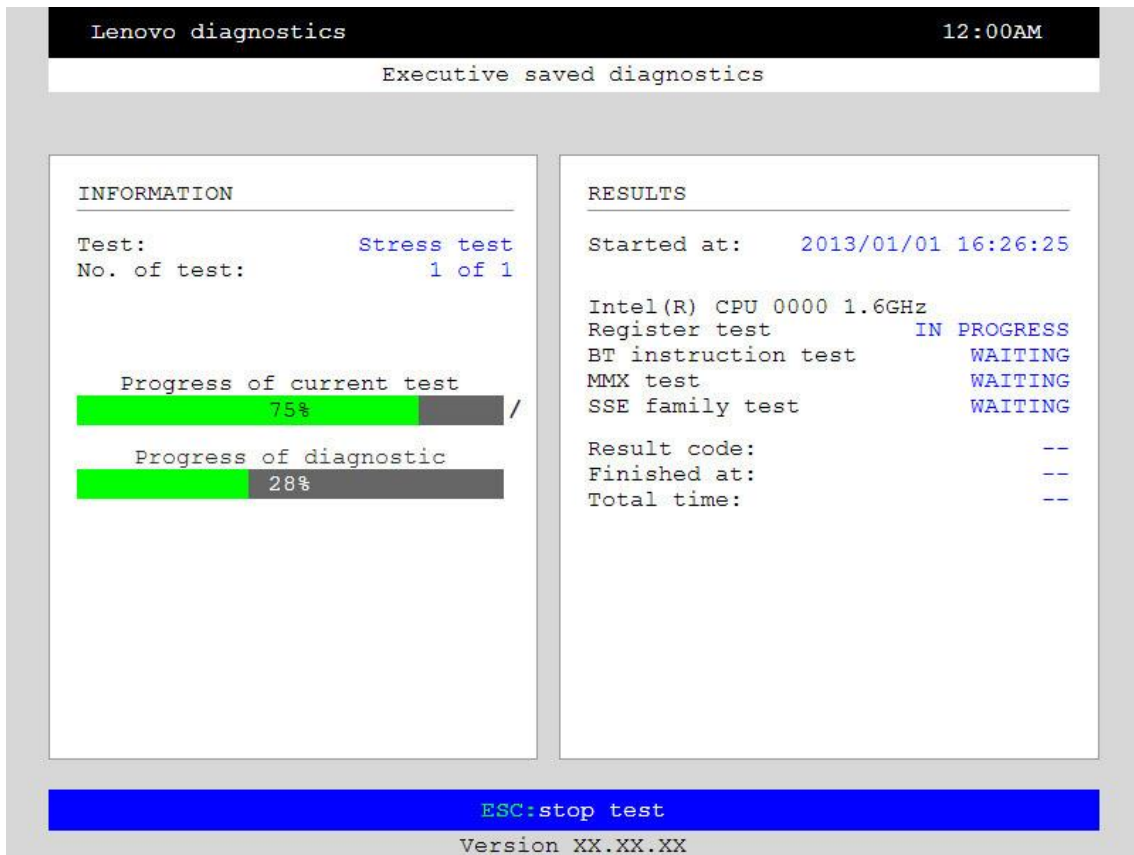
Figure 61 - Test Screen for all the saved diagnostics

10.   Exit Application

To exit the application, the user must select the option "Exit Application" on the Main Screen and press the ENTER key. Then, the interface will be closed and the machine will be reset.