

User Guide Lenovo UEFI Diagnostics for Think and Idea Version 03.08.000

Revision	Date	Description of changes
1	April 18, 2016	Initial Version
2	June 03, 2016	Updated to version 3.5
3	Aug 12, 2016	Updated to version 03.06.000
4	Aug 23, 2016	Updated to version 03.07.000 - Recover Bad Sectors tool runs on SSDs devices
4.1	Oct 18, 2016	Updates for UEFI 03.07.001 - Minor changes and bugfixes
4.2	Nov 21, 2016	 Minor changes: Improved section Download the Bootable UEFI Diagnostics and Create a Bootable USB Repalaced LCD by Display; Removed any mentions of Configuration File as this version does not include that feature;
4.3	Nov 29, 2016	Updated for UEFI 03.08.000 - Updated Storage test section; - Added new test: Smart Wearout Test - Updated Figure 21
5 Jan 05, 2017 Reviewed the User's Guide - Minor changes and bugfix - Updated all mock-ups		Reviewed the User's Guide - Minor changes and bugfixes; - Updated all mock-ups

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Objective

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

Install and Run the UEFI diagnostics

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

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

- 1. Save the UEFI Diagnostics image and Bootable Generator:
 - a. Go to www.Lenovo.com/diags
 - b. Click "Downloads."
 - c. Under "Lenovo UEFI Bootable Diagnostics," click on "Create Bootable USB with UEFI Diagnostics".
 - d. Download UEFI Diagnostics zip file. Save the file. (*If your system has an Atom CPU, then click on "Lenovo UEFI Diagnostics Bootable USB for Atom CPU based Tablet ThinkPad 10" instead.*)
 - e. Download Bootable Generator Zip file.

2. Run the Bootable Generator application.

- a. Insert a USB flash drive.
- b. Go to the folder where you saved the bootable generator and double click on it.
- c. Double click "BootableGenerator.exe."
- d. Your flash drive name will appear under "Select a device." Click to select it. If you want to, you can type a new name for the device.
- e. Click "Search." Click on the image name that you saved in step 1, letter d.
- 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.



Run the UEFI Diagnostics

3. Run the UEFI Diagnostics from a Bootable Flash Drive

- a. Create the Bootable flash drive, as explained in sections 1 and 2.
- b. If Secure Boot is enabled in BIOS, disable it.
- c. Insert the flash drive.
- d. Restart the machine, then immediately, press F12.
- e. On the boot menu, select your usb flash drive, and press Enter.
- f. The UEFI diagnostics menu will display on your screen.

4. 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.



Main Screen

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



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.

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The currently selected option is squared in red. The other options are not squared. 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 tab key is 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:

- CPU
- Display
- Fan
- Memory
- Motherboard
- Optical
- PCI-e
- Raid
- Storage

Tools options are:

- System Information
- Recover Bad Sectors tools

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 "Display test" is an option that runs the Display test and displays the test screen.

The "Fan test" is an option that runs the Fan test and displays the test screen.

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 "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 "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 "Storage device test" is an option that runs the storage device quick test and displays the storage device quick test Screen.

"System Information" option, displays tabs with the machine and memory information displaying "System Information" screen.

"Recover Bad sectors" option allows the execution of the tool in oder to recover bad sectots on storage devices.

The "Exit Application" is an option that closes the application;



CPU					
Welcome, time	04:24	🋞 Ler	novo Dia	gnostics	Version 03.XX.XXX
		-	Diagnostics Ty	De:	
		0	x]CPU Quick Tes]CPU Extended	t Test	
			•		
			Next 🜔		
†∔:Up/Down	Tab:Switch Menu	Space Bar:Check/Uncheck	Enter:Select	Esc:Back to Home	Home

Figure 2 – CPU screen

CPU Quick Test

The system allows the user to access the CPU quick test diagnostic from the Main screen -> Diagnostics -> CPU.

The currently selected option has a "x" in front of the option. To access the CPU quick test diagnostic on screen, the user can press the UP/DOWN arrow keys until the "CPU quick test" and press SPACE Key to select it.

To run selected option user has to press the ENTER key on button "Next". After that, the system will show a list of tests, as illustrated in figure below, and all the tests are initially selected to be tested ('X' between brackets means the test is selected).

The user can deselect a selected test by pressing the SPACE key when 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 option" is selected. If the user presses the SPACE key or ENTER key on that option, then all test options will be deselected. If the user selects the "Select/deselect all option" again, all tests options will also be selected again.

Welcome, time	e 04:24	🛞 Ler	novo Dia	gnost	tics	Version 03.XX.XXX
		-	Select Algorit	hm :		
			x]Select / Dese x]Register test x]Bt Instructio x]X87 Floating x]MMX test x]30 Now! test x]SSE test x]AES test	lect All (t n test Point test	Options t	
			Run Tests	_₽ ⊐ 0		
↑↓:Up/Down	Tab:Switch Menu	Space Bar:Check/Uncheck	Enter:Select	Esc:Back	to Home	Home

Figure 3 – CPU quick test

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





Welcome,	time 04:24	🛞 Lenovo	Version 03.XX.XXX	
		Diagnost	ics Progress:	
		Information	Resul	ts
	Test: # of test: Progress of cur Progress of dia	X87 Floating Point test 4 of 7 rrent test - 0 % agnostics - 42 %	Final Result Code: CPU Started at: Register test Bt Instruction test X87 Floating Point test HHX test 3D Now! test SSE test AES test Result code: Finished at:	 2017/05/01 04:25:36 PASSED PASSED IN PROGRESS WAITING WAITING WAITING 0000/00/00 00:00:00
↑↓:Up/	/Down Tab:Switch	Menu Enter:Select Esc:Stop tests		Stop Tests

Figure 4 - CPU quick test progress

The CPU diagnostics progress screen provides information about the CPU 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), Instruction Bar contains instructions to run the test. The CPU 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.

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);
- Progress of diagnostic (bar with progress in percentage of all diagnostic, with its entire test).

The Results section contains the following information:

- Final Result Code: (an encrypted code that informs which modules were tested);
- Date and time that test has started;
- A list with all the algorithms which compose device test and their respective status (an algorithm can have six status:
 - WAITING, indicating test is waiting to be run;
 - IN PROGRESS, indicating test is being run;
 - o PASSED, indicating algorithm has found no problems at device;
 - o FAILED, indicating that algorithm has found one or more faults at algorithm;
 - CANCELED, indicating algorithm was canceled by user;
 - o NOT APPLICABLE, indicating algorithm is not supported by device),
- Result Code for test:
- Date and time that the tests are finished (displayed after test is finished);
- 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 Main Screen (by pressing ESC key again) or see the test log (by pressing the F3 key).



CPU Extended Test

The system allows the user to access the CPU Extended Test diagnostic from the Main screen -> Diagnostics -> CPU.

The currently selected option has a "x" in front of the option. To access the CPU Extended Test diagnostic, the user can press the UP/DOWN arrow keys until the "CPU Extend Test" option inside CPU module. To run selected option user has to press the ENTER key on button "Next". When the user presses ENTER, the application will run the "Stress test", and it will take about 10 minutes to complete.

The CPU diagnostics progress screen provides information about the CPU 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), Instruction Bar contains instructions to run the test. The CPU 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.

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);
- Progress of diagnostic (bar with progress in percentage of all diagnostic, with its entire test).

The Results section contains the following information:

- Final Result Code: (an encrypted code that informs which modules were tested);
- Date and time that test has started;



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- A list with all the algorithms which compose device test and their respective status (an algorithm can have six status:
 - WAITING, indicating test is waiting to be run;
 - IN PROGRESS, indicating test is being run;
 - PASSED, indicating algorithm has found no problems at device;
 - o FAILED, indicating that algorithm has found one or more faults at algorithm;
 - CANCELED, indicating algorithm was canceled by user;
 - o NOT APPLICABLE, indicating algorithm is not supported by device),
- Result Code for test:
- Date and time that the tests are finished (displayed after test is finished);
- 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 Main Screen (by pressing ESC key again) or see the test log (by pressing the F3 key).

Display

After the user starts the "Display 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 below.



Welcome, time	04:26	🛞 Ler	novo Dia	gnostics		Version 03.XX.XXX
		[Select Algorit	hm :		
			xlSelect / Dese xlRed solid col xlBlue solid co xlBlack solid c xlBhack solid c xlWhite solid c xlLuminance VES xlGeometry VESA xlFocus VESA te xlFocus VESA te	elect All Optic or test Jor test color test color test color test color test to test test test	ITS	
			Run Tests d	-0		
t∔:Up/Down	Tab:Switch Menu	Space Bar:Check/Uncheck	Enter:Select	Esc:Back to Ho	ome	Home

Figure 5 - Select Algorithms Screen

The "Select Algorithm" 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 "Run Tests" option on the "Select Algorithms" screen, the Display tests starts:

Before an algorithm is run, a window containing instructions about the algorithm is displayed, as shown in Figure 6. The User can press the 'Enter' key to proceed with the algorithm execution or can press 'Esc' to abort the test.



Welcome,	time (04:26) Lenovo Dia	agnostics	Versio	on 03.XX.XXX
			Diagnostics Pro	gress:		
	Test # of Prog	The entire screen will be red. your screen, click, touch or p Press OK to confirm or CANCEL	RED SOLID C Check to see if any p ress Enter key to cont to cancel.	OLOR pixels are not red in color. tinue. WCEL	After checking	36
	Progr		G F C R F	communice (ESA test ocus VESA test ombination test esult code: inished at:	WAITING WAITING WAITING 0000/00/00 00:00:0	00
t∔:Up/	'Down	Tab:Switch Menu Enter:Select Es	sc:\$top tests		Stop Te	sts

Figure 6 - 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 7. After the user checks the LCD, any key can be pressed to proceed with running the





Figure 7 - 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 Display 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 8.



Welcome,	time 04:26	🛞 Lenovo I	Diagnostics	Version 03.XX.XXX
		Diagnostics Disp	Progress:	
	Inf Test: Red # of test: 1 of Progress of current te Progress of diagnostic	RED SOL Was your screen painted corre Press YES to confirm or NO to YES s - 0 %	ID COLOR ctly? cancel. NO Luminance VESA test Geometry VESA test Focus VESA test Focus VESA test Combination test Result code: Finished at:	 2017/05/01 04:27:36 IN PROGRESS WAITING WAITING WAITING WAITING WAITING WAITING WAITING WAITING WAITING WAITING WAITING WAITING
†↓:Up/	/Down Tab:Switch Menu E	inter:Select Esc:Stop tests		Stop Tests

Figure 8 - 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.

Fan Test

After the user starts the "PCI-e" option, the application computes the number of algorithms that can be performed by the test and starts the test, as shown in Figure 9.



Welcome, t	ime 18:32 🛞 Lenovo	Diagnostics	Version 03.XX.XXX
	Diagnost	ics Progress:	
	Information	Resu	lts
	Test: Control test # of test: 1 of 1 Progress of current test - 16 % Progress of diagnostics - 16 %	Final Result Code: FAN Started at: Control test Result code: Finished at:	2017/05/04 18:33:08 IN PROGRESS 0000/00/00 00:00:00
↑↓:Up/Do	own Tab:Switch Menu Enter:Select Esc:Stop tests		Stop Tests

Figure 9 - Fan test screen

The Fan diagnostic progress screen provides information about the Fan 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, Fan), Instruction Bar contains instructions to run the test. The Fan 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.

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);
- Progress of diagnostic (bar with progress in percentage of all diagnostic, with its entire test).

The Results section contains the following information:

- Final Result Code: (an encrypted code that informs which modules were tested);
- Date and time that test has started;
- A list with all the algorithms which compose device test and their respective status (an algorithm can have six status:
 - WAITING, indicating test is waiting to be run;
 - IN PROGRESS, indicating test is being run;
 - PASSED, indicating algorithm has found no problems at device;
 - o FAILED, indicating that algorithm has found one or more faults at algorithm;
 - CANCELED, indicating algorithm was canceled by user;
 - NOT APPLICABLE, indicating algorithm is not supported by device),
- Result Code for test:
- Date and time that the tests are finished (displayed after test is finished);
- 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 Main Screen (by pressing ESC key again) or see the test log (by pressing the F3 key).



Memory

Memory quick test

The Memory quick test Screen is shown in Figure 10.

Welcome,	time 04:27	Lenovo Diagnostics Version O				
		Diagnosti Met	nory			
		Information	Result	s		
	Test: # of test: Progress of cu Progress of di	Quick random pattern test 1 of 1 rrent test - 4 % agnostics - 4 %	Final Result Code: MEHORY Started at: Quick random pattern test Result code: Finished at:	 2017/05/01 04:28:02 IN PROGRESS 0000/00/00 00:00:00		
↑↓:Up/	'Down Tab:Switch	n Menu Enter:Select Esc:Stop tests		Stop Tests		

Figure 10 - Memory – Quick test Screen

The system allows the user to access the Memory Quick Test diagnostic from the Main screen - > Diagnostics -> Memory.

The Memory diagnostics progress screen provides information about the Memory 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, Memory), Instruction Bar contains instructions to run the test. The Memory 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.

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);
- Progress of diagnostic (bar with progress in percentage of all diagnostic, with its entire test).

The Results section contains the following information:

- Final Result Code: (an encrypted code that informs which modules were tested);
- Date and time that test has started;
- A list with all the algorithms which compose device test and their respective status (an algorithm can have six status:
 - WAITING, indicating test is waiting to be run;
 - IN 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;
 - NOT APPLICABLE, indicating algorithm is not supported by device),
- Result Code for test:
- Date and time that the tests are finished (displayed after test is finished);
- 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 Main Screen (by pressing ESC key again) or see the test log (by pressing the F3 key).

Memory Extended Tests

The system allows the user to access the Memory Extended Diagnostic from the Main screen -> Diagnostics -> Memory.

The currently selected option has a "x" in front of the option. To access the Memory Extended Test diagnostic on screen, the user can press the UP/DOWN arrow keys until the "CPU quick test" and press SPACE Key to select it.

To run selected option user has to press the ENTER key on button "Next". After that, the system will show a list of tests, as illustrated in Figure 11 below, and all the tests are initially selected to be tested ('X' between brackets means the test is selected).

The user can deselect a selected test by pressing the SPACE key when 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 option" is selected. If the user presses the SPACE key or ENTER key on that option, then all test options will be deselected. If the user selects the "Select/deselect all option" again, all tests options will also be selected again.



Welcome, time	. 04:27	🛞 Ler	novo Dia	gnostics	Version 03.XX.XXX
		<	Select Algorit	hm:	
			JSelect / Desa x]Advanced inta x]Address test x]Bit ligh test x]Bit low test x]Walking ones x]Walking ones x]Walking ones x]Moving invers x]Moving invers x]Andom pattee x]Random number x]Block move te]Bit fade test	elect All Options egrity test t right test left test sions-8bit test sions-32bit test rn test r sequence test est t (~180 min)	
			Run Tests C		
↑↓:Up/Down	Tab:Switch Menu	Space Bar:Check/Uncheck	Enter:Select	Esc:Back to Home	Home

Figure 11 - Memory extended test

At least one test must be selected so the application can run the diagnostic. After the user chooses which tests must be performed, the user can select the "Run Tests" option by pressing the ENTER key. The system will run all tests, as illustrated in Figure 12 below. The user can also press the ESC key to go back to the Main Screen.



Welcom	me, time 04:28	Lenovo Diagnostics	Version 03.XX.XXX
		Diagnostics Progress:	
	Information	Results	
	Test: Address test # of test: 2 of 12 Progress of current test - 8 % Progress of diagnostics - 8 %	Final Result Code: MEMORY Started at: Advanced integrity test Address test Bit high test Bit low test Walking ones right test Walking ones left test Modulo-20 test Hoving inversions-8bit test Random pattern test Random number sequence test	2017/05/01 04:28:27 PASSED IN PROGRESS WAITING WAITING WAITING WAITING WAITING WAITING WAITING WAITING WAITING WAITING WAITING
†‡:I	Up/Down Tab:Switch Menu Enter:Select	Esc:Stop tests	Stop Tests

Figure 12 - Memory extended test progress

The Memory diagnostics progress screen provides information about the Memory 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, Memory), Instruction Bar contains instructions to run the test. The Memory 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.

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);
- Progress of diagnostic (bar with progress in percentage of all diagnostic, with its entire test).

The Results section contains the following information:

- Final Result Code: (an encrypted code that informs which modules were tested);
- Date and time that test has started;
- A list with all the algorithms which compose device test and their respective status (an algorithm can have six status:
 - WAITING, indicating test is waiting to be run;
 - IN PROGRESS, indicating test is being run;
 - o PASSED, indicating algorithm has found no problems at device;
 - o FAILED, indicating that algorithm has found one or more faults at algorithm;
 - CANCELED, indicating algorithm was canceled by user;
 - o NOT APPLICABLE, indicating algorithm is not supported by device),
- Result Code for test:
- Date and time that the tests are finished (displayed after test is finished);
- 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 Main Screen (by pressing ESC key again) or see the test log (by pressing the F3 key).





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 13.

Welcome, time	04:28	🛞 Ler	novo Diag	gnostic	S	Version 03.XX.XXX
			Select Algorith	m: rd		
			x]Select / Dese x]Chipset test x]PC1/PC1e test x]RTC test x]RTC test x]USB test	lect All Opt	ions	
			Run Tests 占	P		
t∔:Up/Down 1	ſab∶Switch Menu	Space Bar:Check/Uncheck	Enter:Select	Esc:Back to	Home	Home

Figure 13 - Select Algorithm Screen

The system allows the user to access the Motherboard Diagnostic from the Main screen -> Diagnostics -> Motherboard.

The currently selected option has a "x" in front of the option. To run selected option user has to press the ENTER key on button "Next". After that, the system will show a list of tests, as illustrated in Figure 13 above, and all the tests are initially selected to be tested ('X' between brackets means the test is selected).

The user can deselect a selected test by pressing the SPACE key when 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 option" is selected. If the user presses the SPACE key or ENTER key on that option, then all test options will be deselected. If the user selects the "Select/deselect all option" again, all tests options will also be selected again.

At least one test must be selected so the application can run the diagnostic. After the user chooses which tests must be performed, the user can select the "Run Tests" option by pressing the ENTER key. The system will run all tests, as illustrated in Figure 14 below. The user can also press the ESC key to go back to the Main Screen.

Welcome,	time 04:28	Lenovo Diagnostics	Version 03.XX XXX
		Diagnostics Progress:	
	Information	n	Results
	Test: PCI/PCIe tes # of test: 3 of 4 Progress of current test - (Progress of diagnostics - !	t HOTHERBOARD Started at: Chipset test PCI/PCIe test USB test USB test Result code: 50 %	2017/05/01 04:29:24 PASSED PASSED IN PROGRESS WAITING 0000/00/00 00:00:00
†↓:Up/	/Down Tab:Switch Menu Enter:Sel	lect Esc:Stop tests	Stop Tests

Figure 14 - Motherboard test screen

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The Motherboard diagnostics progress screen provides information about the Motherboard 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, Memory), Instruction Bar contains instructions to run the test. The Memory 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.

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);
- Progress of diagnostic (bar with progress in percentage of all diagnostic, with its entire test).

The Results section contains the following information:

- Final Result Code: (an encrypted code that informs which modules were tested);
- Date and time that test has started;
- A list with all the algorithms which compose device test and their respective status (an algorithm can have six status:
 - WAITING, indicating test is waiting to be run;
 - IN 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;
 - NOT APPLICABLE, indicating algorithm is not supported by device),



- Result Code for test:
- Date and time that the tests are finished (displayed after test is finished);
- 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 Main Screen (by pressing ESC key again) or see the test log (by pressing the F3 key).

PCI-e Test

After the user starts the "PCI-e" option, the application computes the number of algorithms that can be performed by the test and starts the test, as shown in Figure 15.

Welcome,	time 04:29						
Diagnostics Progress:							
		Information	Re	sults			
	Test: # of test: Progress of cu Progress of dia	Status test 1 of 1 rrent test - 100 % agnostics - 100 %	Final Result Code: PCI EXPRESS Started at: Status test Result code: Finished at: Elapsed time:	U1645NDW2=GEFH94 2017/05/01 04:30:34 PASSED UPE001000-DH7V7H 2017/05/01 04:30:34 00:00:00			
		View 1	og 🙀				
†↓:Up/	↑↓:Up/Down Tab:Switch Menu Enter:Select F3:View log Esc:Back to Home						

Figure 15 - PCI Express test screen

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The PCI-e diagnostic progress screen provides information about the PCI 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, Memory), Instruction Bar contains instructions to run the test. The Memory 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.

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);
- Progress of diagnostic (bar with progress in percentage of all diagnostic, with its entire test).

The Results section contains the following information:

- Final Result Code: (an encrypted code that informs which modules were tested);
- Date and time that test has started;
- A list with all the algorithms which compose device test and their respective status (an algorithm can have six status:
 - WAITING, indicating test is waiting to be run;
 - IN 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;
 - o CANCELED, indicating algorithm was canceled by user;



- o NOT APPLICABLE, indicating algorithm is not supported by device),
- Result Code for test:
- Date and time that the tests are finished (displayed after test is finished);
- 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 Main Screen (by pressing ESC key again) or see the test log (by pressing the F3 key).

RAID Test

After the user selects "Raid" option, the application will display the number of Raid devices installed in the machine. If there is more than one raid device installed in the machine, the menu "Select Device" is displayed, as shown in Figure 16.



Welcome, time	04:29	🏶 Ler	novo Diag	gnostic	CS	Version 03.XX.XXX
		_	Select Device			
			x1Select / Dese x1Bus: 0X4 Dev: x1Bus: 0X5 Dev:	ect All Opt	Lions 0X1000 0X1001	
			Next 🜔			
†∔:Up/Down	Tab:Switch Menu	Space Bar:Check/Uncheck	Enter:Select	ESC:Back t	o home	Home ┢

Figure 16 - RAID test selecting device

The currently selected option has a "x" in front of the option. To run selected option user has to press the ENTER key on button "Next". After that, the system will show a list of tests, as illustrated in Figure 16 above, and all the tests are initially selected to be tested ('X' between brackets means the test is selected).

The user can deselect a selected test by pressing the SPACE key when 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 option" is selected. If the user presses the SPACE key or ENTER key on that option, then all test options will be deselected. If the user selects the "Select/deselect all option" again, all tests options will also be selected again.

At least one device must be selected so the application can run the diagnostic. After the user chooses which devices must be performed, the user can select the "Next" option by pressing the ENTER



key. The system will show the screen where user can select the tests wants to performed for selected devices.

Welcome, time	07:56	🛞 Ler	novo Dia	gnostics	Version 03.XX.XXX
		-	Select Algorit	-m:	
			x]Select / Dese x]Status test x]Slot test x]Link test x]Advanced erro	lect All Options r test	
			Run Tests	₽ ■ 0	
î↓:Up/Down	Tab:Switch Menu	Space Bar:Check/Uncheck	Enter:Select	Esc:Back to Home	Home

Figure 17 - 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 20 below. The User can also press the ESC key to go back to the Main Screen.

The screen will list the tests that can be performed for each selected device type. At least one test must be selected so the application can run the diagnostic. After the user chooses which devices must be performed, the user can select the "Run Test" option by pressing the ENTER. It will start the diagnostic.




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Welcome,	time 07:56	🛞 Lenovo I	Diagnostics	Version 03.XX.XXX		
		Diagnostics	Progress:			
	:	Information		Results		
	Test: Ad # of test: 4 Progress of current Progress of diagnost	vanced error test of 4 test – 100 % ics – 100 %	Final Result Code: RAID Started at: Status test Slot test Link test Advanced error test Result code: Finished at: Elapsed time:	U1PRB1AKB-SFCPS3 2017/05/01 07:57:09 PASSED PASSED NDT APPLICABLE URD007000-5M7V5H 2017/05/01 07:57:11 00:00:02		
View log Die 1						

Figure 18 - RAID test progress

The Storage diagnostic progress screen provides information about the Storage 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, Memory), Instruction Bar contains instructions to run the test. The Memory 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.

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);
- Progress of diagnostic (bar with progress in percentage of all diagnostic, with its entire test).

The Results section contains the following information:

- Final Result Code: (an encrypted code that informs which modules were tested);
- Date and time that test has started;
- A list with all the algorithms which compose device test and their respective status (an algorithm can have six status:
 - WAITING, indicating test is waiting to be run;
 - IN PROGRESS, indicating test is being run;
 - PASSED, indicating algorithm has found no problems at device;
 - o FAILED, indicating that algorithm has found one or more faults at algorithm;
 - CANCELED, indicating algorithm was canceled by user;
 - NOT APPLICABLE, indicating algorithm is not supported by device),
- Result Code for test:
- Date and time that the tests are finished (displayed after test is finished);
- 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 Main Screen (by pressing ESC key again) or see the test log (by pressing the F3 key).



Storage Test

After the user selects "Storage" option, the application will display the number of storage devices available in the system. If there is more than one storage device installed, the menu "Select Device" is displayed, as shown in Figure 19.

This screen has also an option where user can view the devices details. To access this feature user has to highlight the device that wants to see details and press F1 key, it will open a popup on screen with device details, as shown in Figure 20.

Welcome, tim	e 04:29	🛞 Ler	novo Dia	gnostics	5		Version 03.XX.XX	x
		ī	Select Devic	e:				
		0	xlSelect / Des	elect All Optio	ons			
		Ι	x]\$t500lm000-s	SHD-8GB-SEAGATI	E 🛈			
			Next 🜔					
†∔:Up/Down	Tab:Switch Menu	Space Bar:Check/Uncheck	Enter:Select	F1:Help for s	election	ESC:Back to ho	Me Home 🔶	

Figure 19 - Select Devices Screen



Welcome, time (••• Lenovo Diagnostics ••	ersion 03.XX.XXX
	Select Device:	
	[x]Select / Deselect All Options Ix 1ST500LH000-SSHD-8GB_SEAGATE Storage Device: Name: ST500LH000-SSHD-8GB Manufacturer: SEAGATE Device Type: SATA Size: 465 GB	
	Next 🔊	
†∔:Up/Down T	Tab:Switch Menu Space Bar:Check/Uncheck Enter:Select F1:Help for selection ESC:Back to home	Home 🔶

Figure 20 - Select Devices Screen popup details

The currently selected option has a "x" in front of the option. To run selected option user has to press the ENTER key on button "Next". After that, the system will show a list of tests, as illustrated in Figure 19 above, and all the tests are initially selected to be tested ('X' between brackets means the test is selected).

The user can deselect a selected test by pressing the SPACE key when 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 option" is selected. If the user presses the SPACE key or ENTER key on that option, then all test options will be deselected. If the user selects the "Select/deselect all option" again, all tests options will also be selected again.

At least one device must be selected so the application can run the diagnostic. After the user chooses which devices must be performed, the user can select the "Next" option by pressing the ENTER



key. The system will show the screen where user can select the tests wants to performed for selected devices.

Welcome, time	e 04:30	🏶 Ler	novo Dia	gnostio	CS		۷	ersion 03.XX.XXX
		ī	Select Algorit	hm :				
			xlSelect / Dese ATA Device test xlSmart status xlSmart short s xlDrive self-te xlRandom seek xlFunnel seek xlTarget read t	elect All Op ts: test self-test set test test test	tions 0 0 0 0			
			Run Tests d	0				
†∔:Up/Down	Tab:Switch Menu	Space Bar:Check/Uncheck	Enter:Select	F1:Help for	selection	ESC:Back t	o home	Home ┢

Figure 21 - Select Tests Screen

The screen will list the tests that can be performed for each selected device type. The On example displayed on Figure 21, it is possible to see that user selected a "SATA" device type, so the tests that can be performed for each device as listed below them.

At least one test must be selected so the application can run the diagnostic. After the user chooses which devices must be tested, the user can select the "Run Test" option by pressing the ENTER. It will start the diagnostic.





Welcome,	time 04:30	🛞 Lenovo	Diagnostics	Version 03.XX.XXX
		Diagnostic	rage	
		Information	Resu	Its
	Test: # of test: Progress of cur Progress of dia	Smart short self-test 2 of 6 rrent test - 10 % agnostics - 17 %	Final Result Code: STORAGE Started at: Smart status test Smart status test Drive self-test Random seek test Funnel seek test Target read test Result code: Finished at:	 2017/05/01 04:31:17 PASSED IN PROGRESS WAITING WAITING WAITING WAITING WAITING 0000/00/00 00:00:00
↑↓:Up/	'Down Tab:Switch	Menu Enter:Select Esc:Stop tests		Stop Tests

Figure 22 – Storage Test Screen

The Storage diagnostic progress screen provides information about the Storage 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, Storage), Instruction Bar contains instructions to run the test. The Storage 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.

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);
- Progress of diagnostic (bar with progress in percentage of all diagnostic, with its entire test).

The Results section contains the following information:

- Final Result Code: (an encrypted code that informs which modules were tested);
- Date and time that test has started;
- A list with all the algorithms which compose device test and their respective status (an algorithm can have six status:
 - WAITING, indicating test is waiting to be run;
 - IN PROGRESS, indicating test is being run;
 - PASSED, indicating algorithm has found no problems at device;
 - o FAILED, indicating that algorithm has found one or more faults at algorithm;
 - CANCELED, indicating algorithm was canceled by user;
 - o NOT APPLICABLE, indicating algorithm is not supported by device),
- Result Code for test:
- Date and time that the tests are finished (displayed after test is finished);
- 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 Main Screen (by pressing ESC key again) or see the test log (by pressing the F3 key).



Optical Device Test

The system allows the user to access the Memory Extended Diagnostic from the Main screen -> Diagnostics -> Memory.

The currently selected option has a "x" in front of the option. To access the Memory Extended Test diagnostic on screen, the user can press the UP/DOWN arrow keys until the "CPU quick test" and press SPACE Key to select it.

To run selected option user has to press the ENTER key on button "Next". After that, the system will show a list of tests, as illustrated in Figure 23 below, and all the tests are initially selected to be tested ('X' between brackets means the test is selected).

The user can deselect a selected test by pressing the SPACE key when 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 option" is selected. If the user presses the SPACE key or ENTER key on that option, then all test options will be deselected. If the user selects the "Select/deselect all option" again, all tests options will also be selected again.



Welcome, time	: 04:28	🏶 Ler	novo Dia	gnostic	S	Version 03.XX.XXX
			Select Algorit	hm :		
			xlSelect / Deso xlMedia-less of xlLinear seek · xlRandom seek · xlFunnel seek · xlRead and com xlWrite test	elect All Opt	ions est	
			^{Run Tests} C			
†∔:Up/Down	Tab:Switch Menu	Space Bar:Check/Uncheck	Enter:Select	Esc:Back to	home	Home 🔶

Figure 23 - Select Algorithm Screen

At least one test must be selected so the application can run the diagnostic. After the user chooses which tests must be performed, the user can select the "Run Tests" option by pressing the ENTER key. The system will run all tests, as illustrated in Figure 25 above. The user can also press the ESC key to go back to the Main Screen.





Welcome,	time 04:29	Lenovo Diagnostics Version 03.XX.XX				
		Diagnostic	cs Progress:			
		Information	Results			
	Test: # of test: Progress of curr Progress of diag	Media-less optical self-test 1 of 6 rent test - 0 % gnostics - 0 %	Final Result Code: OPTICAL Started at: Media-less optical self-test Linear seek test Random seek test Funnel seek test Read and compare test Write test Result code: Finished at:	2017/05/01 04:29:47 IN PROGRESS WAITING WAITING WAITING WAITING WAITING 0000/00/00 00:00:00		
t↓:Up/	'Down Tab:Switch	Menu Enter:Select Esc:Stop tests		Stop Tests		

Figure 24 - Optical Device Test screen

The Optical diagnostic progress screen provides information about the optical 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, Optical), Instruction Bar contains instructions to run the test. The Optical 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.

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);
- Progress of diagnostic (bar with progress in percentage of all diagnostic, with its entire test).

The Results section contains the following information:

- Final Result Code: (an encrypted code that informs which modules were tested);
- Date and time that test has started;
- A list with all the algorithms which compose device test and their respective status (an algorithm can have six status:
 - WAITING, indicating test is waiting to be run;
 - IN PROGRESS, indicating test is being run;
 - o PASSED, indicating algorithm has found no problems at device;
 - o FAILED, indicating that algorithm has found one or more faults at algorithm;
 - CANCELED, indicating algorithm was canceled by user;
 - o NOT APPLICABLE, indicating algorithm is not supported by device),
- Result Code for test:
- Date and time that the tests are finished (displayed after test is finished);
- 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 Main Screen (by pressing ESC key again) or see the test log (by pressing the F3 key).

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Video Card test

The Video Card test is not available to end user, but it's possible to access it from ShellView version. User has to type the command on shellview and the test is started. User will know the result of the test on log generated by application after test diagnostic is finished.

Run All Tests

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

The currently selected option has a "x" in front of the option. To select the type of test that user wants to run, can be used the UP/DOWN arrow keys to navigated until the desired item. User can press SPACE Key to select it, as illustrated in Figure 25 below

The system will show a list of tests, and all the tests are initially selected to be tested ('X' between brackets means the test is selected).

The user can deselect a selected test by pressing the SPACE key when 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 option" is selected. If the user presses the SPACE key or ENTER key on that option, then all test options will be deselected. If the user selects the "Select/deselect all option" again, all tests options will also be selected again.

To run selected option user has to press the ENTER key on button "Run Tests".



Welcome, time	04:30	🛞 Ler	novo Dia	gnostics	5	Version 03.XX.XXX
			Select Algorit	100 :		
			xlQuick tests xlExtended test xlRestricted te	s sts to unatte	nded on ly	
			Run Tests	<u>Р</u> • О		
t∔:Up/Down	Tab:Switch Menu	Space Bar:Check/Uncheck	Enter:Select	Esc:Back to I	Home	Home

Figure 25 – Run All test

At least one test must be selected so the application can run the diagnostic. After the user chooses which tests must be performed, the user can select the "Run Tests" option by pressing the ENTER 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.

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.





Welcome,	time 04:31	🛞 Lenov	o Diagnostics	Version 03.XX.XXX
		D i agnos	Run all	
		Information	Resul	ts
	Test: # of test: Progress of cu Progress of dia	X87 Floating Point test 4 of 34 rrent test - 0 % agnostics - 8 %	Final Result Code: CPU Started at: Register test Bt Instruction test X87 Floating Point test MHX test 3D Now! test SSE test AES test Result code: Finished at: CPU	 2017/05/01 04:31:50 PASSED PASSED IN PROGRESS WAITING
↑↓:Up/	Down Tab:Switch	Menu Enter:Select Esc:Stop tests		Stop Tests

Figure 26 – Run all test progress

The Run all diagnostic progress screen provides information about the run all 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, Optical), Instruction Bar contains instructions to run the test. The Optical 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.

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);
- Progress of diagnostic (bar with progress in percentage of all diagnostic, with its entire test).

The Results section contains the following information:

- Final Result Code: (an encrypted code that informs which modules were tested);
- Date and time that test has started;
- A list with all the algorithms which compose device test and their respective status (an algorithm can have six status:
 - WAITING, indicating test is waiting to be run;
 - IN PROGRESS, indicating test is being run;
 - PASSED, indicating algorithm has found no problems at device;
 - o FAILED, indicating that algorithm has found one or more faults at algorithm;
 - CANCELED, indicating algorithm was canceled by user;
 - NOT APPLICABLE, indicating algorithm is not supported by device),
- Result Code for test:
- Date and time that the tests are finished (displayed after test is finished);
- 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 Main Screen (by pressing ESC key again) or see the test log (by pressing the F3 key).





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 27.

Welcome, time 04:31	Lenovo Diagnostics	Version 03.XX.XXX
	Log: Run all	
Lenovo diagnostics Log Serial number: BIOS version: Machine model: Final Result Code: CPU QUICK DIAGNOSTIC 2017/01/05 04:32:0	YB08262870 D5CN14WW(L004) ideapad 300-141SK U12NANAJ3-64HH13	
Result code: Model: Vendor: Number of cores: Number of threads: Signature: Max speed: Current speed: Features: Cache L1: Cache L2: Cache L3:	UCP003000-DH7V7H Intel(R) Core(TH) i3-6100U CPU 0 2.30GHz INTEL 2 4 406e3 2.300 GHz 2.305 GHz MHX, EH64T, SSE, SSE2, SSE3, SSSE3, SSE4.1, SSE4.2, AES, FHA, PSE, PSE-36, IDA/Turbo boost, HTT, XD, VHX 2 x 32 KB Data, 2 x 32 KB Instruction 2 x 256 KB Unified 1 x 3 MB Unified	AVX, AVX2, CLMUL,
t∔:Up/Down Tab:Switch Menu Enter:Select	Save log Esc:Back to home	Home 🔶

Figure 27 - 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;

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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;

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.

Save Log Window

If the user chooses to save the log by pressing the "F2" key on the "Log Screen", the "Save Log" window is displayed, as shown in Figure 28.

Welcome, time	e 04:56	🛞 Ler	novo Dia	gnostics		Version 03.XX.XXX
		-	Select Device	<u>.</u>		
		[[x JUEF I JUU I			
			Save log			
t∔:Up/Down	Tab:Switch Menu	Space Bar:Check/Uncheck	Enter:Select	ESC:Back to Vi	iew log	K Back

Figure 28- Save Log Window

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The "Save Log" window is composed of:

- Window Title Bar;
- Saving Options List;
- 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;

Cancel Option is used to perform a cancel operation.

The currently selected option is highlighted in black. 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 29). 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.



Welcome, time 04:55	time 04:55		
	Log:		
Lenovo diagnostics Log Serial number: BIOS version: Machine model: Final Result Code: CPU QUICK DIAGNOSTIC 2017/01. Result code: Model: Vendor: Number of cores: Number of threads: Signature: Max speed: Current speed: Features: Cache L1: Cache L2: Cache L3:	Message: Log successfully saved at device UEF1! Press 0K to continue. 0K 0K 406e3 2.300 GHz 2.305 GHz HHX, EH64T, SSE, SSE2, SSE3, SSSE3, SSE4.1, SSE4.2, FHA, PSE, PSE-36, IDA/Turbo boost, HTT, XD, VHX 2 x 256 KB Unified 1 x 3 HB Unified	AES, AVX, AVX2, CLHUL,	
	Save log		
†∔:Up/Down Tab:Switch Menu E	nter:Select F2:Save log Esc:Back to home	Home	

Figure 29 - Log saving operation was successful



System Information

The System Information Screen with System tab selected is shown in Figure 30.



Figure 30 - System Information Screen – System Tab



System Information Screen with CPU tab selected is shown in Figure 31.

Welcome, time 04:32	Lenovo Diagnostics	ersion 03.XX.XXX
	System information:	
SystemSystemSystemSystemSystemSystemDisplaySeed:MemoryMotherboardOpticalPCI-eStorage	Intel(R) Core(TH) i3-6100U CPU 0 2.30GHz INTEL 2 4 4006e3 2.300 GHz 2.305 GHz HHX, EH64T, SSE, SSE2, SSE3, SSSE3, SSE4.1, SSE4.2, AE AVX, AVX2, CLHUL, FHA, PSE, PSE-36, IDA/Turbo boost, H XD, VHX 2 x 32 KB Data, 2 x 32 KB Instruction 2 x 256 KB Unified 1 x 3 MB Unified	55, HTT,
†∔:Up/Down Tab:Switch Menu Enter:Selec	t Esc:Back to home	Home

Figure 31 - System Information Screen – CPU Tab



System Information Screen with Display tab selected is showed at Figure 32.

Welcome, time 04:32	Lenovo Diagnostics	Version 03.XX.XXX
	System information:	
Image: System Har	nufacturer ID: SDC del Name: LTN140AT35L01 ID version: 1.4 x resolution: 1366 x 768 pixels x image size: 31 cm x 17 cm put type: Digital splay type: RGB 4:4:4 + YCrCb 4:4:4	
†↓:Up/Down Tab:Switch M	Menu Enter:Select Esc:Back to home	Ноте

Figure 32 - System Information Screen – Display Tab



The System Information Screen with Memory tab selected is shown in Figure 33.

Welcome, time 04:32	🛞 L	enovo Diagnostics	Version 03.XX.XXX
		System information:	
Image: System Image: CPU Image: Display Image: Display Image: Motherboard Image: Optical Image: PCI-e Image: Storage	Total physical memory: Origin: Type: Manufacturer: Speed: Size: Part number: Origin: Type: Manufacturer: Speed: Size: Part number: Serial number: Serial number:	8192 MB SMB10S DDR3 Samsung 1600 MHz 4096 MB M471B5173EB0-YK0 15240083 SMB10S DDR3 Samsung 1600 MHz 4096 MB M471B5173EB0-YK0 15240077	
†∔:Up/Down Tab:Swite	ch Menu Enter:Select Esc:B	ack to home	Home

Figure 33 - System Information Screen – Memory Tab



System Information Screen with Motherboard tab selected is shown in Figure 34.

Welcome, time 04:32	Een	ovo Diagnostics	Version 03.XX.XXX
	Sy	stem information:	
C Sustan	Number of USB host controllers:	1	
	Number of PCI:	16	
	RTC presence:	Yes	
CPU	Page 1	PCI recourse	
	Resource:	1	
Di	Slot:		
	Class name:	Bridge	
	Subclass name:	Host bridge	
Memory			
	Resource:	PCI resource	
	Index:	2	
Motherboard	Slot:	0	
	Class name:	Display controller	
Optical	Subclass name:	VGA compatible controller	
1	Resource:	PC1 resource	
📇 PCI-e	Index:	3	
	Slot:	0	
O Channel	Class name:	Serial bus controller	
Storage	Subclass name:	USB controller	
	Resource:	PC1 resource	
	Index:	4	
	Slot:	0	
	Class name:	Signal processing controller	
	Subclass name:	Signal processing controller	
†↓:Up/Down Tab:Swit	ch Menu Enter:Select Esc:Back to) home	Home

Figure 34 - System Information Screen – Motherboard Tab



System Information Screen with Optical Device tab selected is shown in Figure 35.

Welcome, time 04:32		Lenovo Diagnostics	Version 03.XX.XXX
		System information:	
Image: System Image: CPU Image: Display Image: Display Image: Memory Image: Motherboard Image: Optical Image: PCI-e Image: Storage	Model number: Manufacturer: Serial number: Firmware revision: Size: Sector size:	DVD-RAM UJ8HC MATSHITA 8S5DX0086787 G801 0 HB 0 bytes	
†↓:Up/Down Tab:Swite	ch Menu Enter∶Selec†	Esc:Back to home	Home

Figure 35 - System Information Screen – Optical Device Tab



System Information Screen with PCI Express tab selected is shown in Figure 36.



Figure 36 - System Information Screen – PCI Express Tab



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

Welcome, time 04:32	(⊯ Le	novo Diagnostics	Version 03.XX.XXX
		System information:	
System Image: CPU Image: Display Image: Display Image: Memory Image: Motherboard Image: Determine PCI-e Image: Storage	Model number: Manufacturer: Serial number: Firnware revision: Size: Rotation rate: Temperature: Physical sector size: Logical sector size: Number of logical sectors: Supported standards: ATA/ATAPI 4: ATA/ATAPI 5: ATA/ATAPI 5: ATA/ATAPI 6: ATA/ATAPI 6: ATA/ATAPI 7: ATA8_ACS: Standard version:	ST500LM000-SSHD-8GB SEAGATE W764HBZ3 LVD5 465 GB 5400 rpm 35 C 4096 bytes 512 bytes 976773168 sectors Supported Supported Supported Supported Supported Reserved	
†↓:Up/Down Tab:Swit	ch Menu Enter:Select Esc:Back	: to home	Home 🔶

Figure 37 - System Information Screen – Storage 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

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);



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;

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 **System tab**, the following information is displayed in the Tab Content Region:

- Machine Manufacturer;
- Product Name;
- Product Version;
- Serial Number;
- BIOS Revision;
- BIOS Release Date;
- BIOS Manufacturer;
- Processor Manufacturer;
- Processor Version.

For the <u>CPU tab</u>, the following information is displayed in the Tab Content Region:

- Model;
- Vendor;
- Number of 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 in the Tab Content Region:

- Manufacturer ID (a three-letter code identifying the manufacturer);
- Model Name;
- Date of Manufacture;
- EDID Version;
- Max resolution (in pixels);
- Max Image Size (in cm);
- Input Type (analog or digital); and
- Display Type.

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

- CPU fan speed;
- CPU temperature;

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

- Total Physical Memory (total of physical memory of machine in Gigabytes) and, for each memory device installed on machine:
- Identification of memory device (Origin);
- Type of memory (DDR2, DDR3, EEPROM and so on);
- Memory Manufacturer;



- Speed of memory (in MHz);
- Memory size (in Gigabytes);
- Memory Part Number;
- Memory Serial Number.

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

- Number of USB host controllers;
- Number of PCI;
- RTC presence;
- Resource:
- Index;
- Slot;
- Class name;
- Subclass name;

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

- Manufacturer;
- Model number;
- Serial number;
- Firmware revision;
- Size;
- Sector size;
- Supported features.

For the *PCI-e tab*, the following information is displayed in the Tab Content Region:



- Resource
- Bus (current item bus hexadecimal id);
- Device (current item device hexadecimal id);
- Function (current item function hexadecimal id);
- Device Connected (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 **Storage tab**, the following information is displayed in the Tab Content Region:

- Model number
- Manufacturer;
- Serial Number;
- Firmware Revision;
- Size (in GB);
- Rotation rate;
- Temperature (in Celsius);
- Physical Sector Size (in bytes);
- Logical Sector Size (in bytes);
- Number of logical sectors;
- Supported Standards;
- ATA/ATAPI 4:
- ATA/ATAPI 5:
- ATA/ATAPI 6:
- ATA/ATAPI 7:
- Standard version;





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

Recover Bad Sectors Tool Screen

Recover bad sectors is a tool that allows user to perform a test on system storages, identifying bad slots and allows user to recover these found bad blocks. When user selects this option on Main screen it displays two options to user.

- Check bad sector: this option makes a test on system storages and list the found bad blocks.
- Check and recover bad sector: this option makes a test on system storages list them to user and starts to correct the found bad blocks.

Welcome, time	04:32	🛞 Ler	novo Dia	gnostics	Version 03.XX.XXX
			Select Algorit Recover Bad S	hm: iector	
		[[x]Check bad sec]Check and rec	tors cover bad sectors	
			Run Tests d		
†∔:Up/Down	Tab:Switch Menu	Space Bar:Check/Uncheck	Enter:Select	Esc:Back to Home	Home

Figure 38 - Select Device Screen for Repair Bad Sectors Tool

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When one of the options above are selected the 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.

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.

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 write operations on a device, which may cause data loss. The user must make a backup of his data before running that operation.

If the user selects the "Check Bad Sectors" operation, a pop-up window will appear as shown in Figure 39.





Figure 39 - 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 the user 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 40.



Welcome, time	^{04:33}	Version 03.XX.XXX
	Tool Progress: Recover Bad Sector	
Device Size: Total s Testing Progres	Alert: This tool will identify and remap bad sectors, which might contain irretrievable data. Before running the tool, you must perform a backup to keep your existing data and operating system files. Press YES to confirm or NO to cancel. YES NO	3:47 0:00
†∔:Up/Down	Tab:Switch Menu Enter:Select Esc:Stop tests Sto	op Tests

Figure 40 - 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 41. User can also abort operation pressing 'N' key.



Welcome, time 04:33	Lenovo Diagnostics	Version 03.XX.XXX
	Tool Progress:	
Infor Device 0: SEAGATE Size: 465 GB Total sectors: Testing sectors: Progress of Operation	Alert: Are you sure you want to continue with the Sector Recovery? Press YES to confirm or NO to cancel. YES NO	s 2017/05/01 04:33:47 s IN PROGRESS 0000/00/00 00:00:00
↑↓:Up/Down Tab:Switch Menu E	inter:Select Esc:Stop tests	Stop Tests

Figure 41 - 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 42.




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Welcome, time 04:33	Lenovo	Diagnostics	Version 03.XX.XXX
Tool Progress:			
Information		Results	
Device O: Size: Total sectors: Testing sectors: Progress of Opera	SEAGATE - ST500LM000-SSHD-8GB 465 GB 976773168 196608 - 262143 tion - 100 %	RECOVER BAD SECTORS Started at: Check and recover bad sectors Finished at: Status message: Elapsed time:	2017/05/01 04:33:47 CANCELED 2017/05/01 04:34:06 Test canceled by user 00:00:19
View log			
t↓:Up/Down Tab:Switch Menu Enter:Select F3:View log Esc:Back to Home			

Figure 42 - 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 'F3' key.

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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.