

Net.Storm GbE Impairment Generator

The ALBEDO Telecom Net.Storm is a handheld tester which is capable to emulate different degradations or impairments that are often found in Ethernet / IP networks. Thanks to this capability, Net.Storm is useful in determining whether a network application or device is appropriate for operation in such networks.

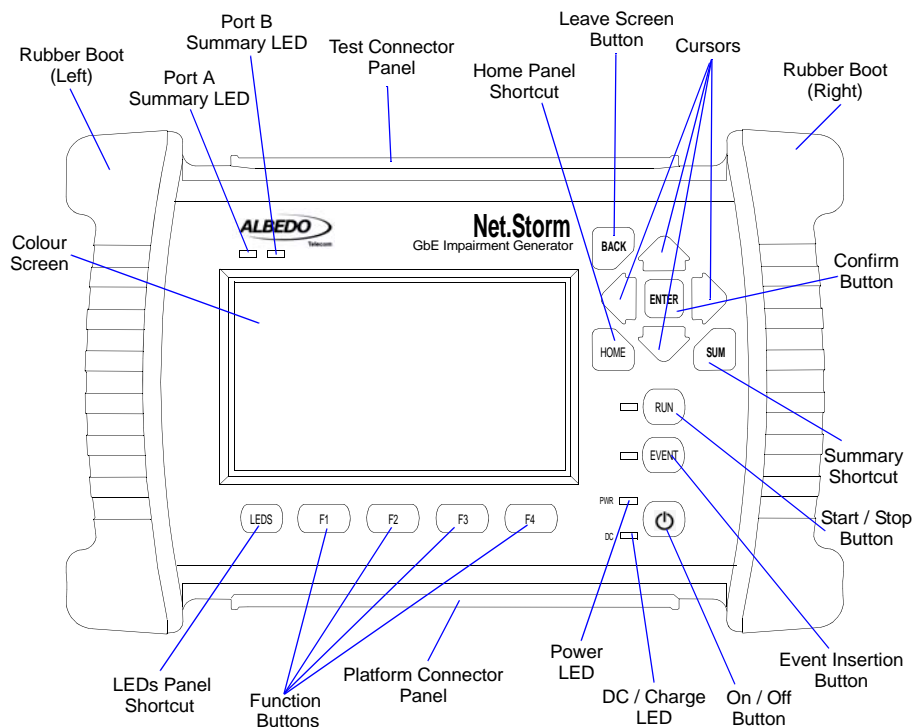


Figure 1: Net.Storm Front view. The tester presents results by means a colour screen and the LEDs. The configuration is performed through the keyboard.

The Net.Storm has an external DC input but it also has internal batteries. This makes this tester suitable both for laboratory applications and field applications which require versatile and reliable operation.

Within your Net.Storm test kit you will find the following items:

- One Net.Storm test unit.
- One AC/DC adapter with a power cord specific for your country.
- One Carrying bag.
- Two Cat. 5e cables with RJ-45 connectors certified for operation at 1 Gb/s rates.
- Two SFPs for connection to optical interfaces (if ordered).
- Two MMF or SMF cables to be used with the SFPs (if ordered).
- One CD-ROM with user documentation.
- One printed copy of this user manual (if ordered).

Check with your distributor the availability of other optional items for your Net.Storm unit.

1. Important Notice

Operation, manipulation and disposal warnings for your Net.Storm unit are listed below.

1.1. Warranty

The ALBEDO Telecom Net.Storm is supplied with a warranty that includes replacement of damaged or faulty components in the terms and period described in the ordering information. This Warranty does not apply to:

1. Product subjected to abnormal use or conditions, accident, mishandling, neglect, unauthorized alteration, misuse, improper installation or repair or improper storage.
2. Product whose mechanical serial number or electronic serial number has been removed, altered or defaced.
3. Damage from exposure to moisture, humidity, excessive temperatures or extreme environmental conditions.
4. Damage resulting from connection to, or use of any accessory or other product not approved or authorized by the Company;
5. Product damaged from external causes such as fire, flooding, dirt, sand, weather conditions, battery leakage, blown fuse, theft or improper usage of any electrical source.

1.2. Battery Safety

The ALBEDO Telecom Net.Storm tester contains a built-in battery, improper use of which may result in explosion. Do not heat, open, puncture, mutilate, or dispose of the product in fire. Do not leave the device in direct sunlight for an extended period of time, which could cause melting or battery damage.

1.3. WEEE Notice

This product must not be disposed of or dumped with other waste. You are liable to dispose of all your electronic or electrical waste equipment by relocating over to the specified collection point for recycling of such hazardous waste. For more information about electronic and electrical waste equipment disposal, recovery, and collection points, please contact your local city centre, waste disposal service, or manufacturer of the equipment.

2. The Tester

Interaction with Net.Storm is based on a high resolution colour screen, different kinds of status LEDs, and a keyboard. These are the keyboard elements:

- *Cursors*: Enable navigation through the graphical user interface. Including menus, keyboards and configuration lists. To leave a menu or configuration list, the left arrow can be used. In menus, the right arrow enters in the lower level menu or list.
- *ESC*: Leaves the current panel (menus, lists, and special panels).
- *ENTER*: In menus, enters in the lower level menu or list. In a configuration list, it selects the current item and leaves. In keyboards and some special panels, it selects the current item without leaving.
- *HOME*: Shortcut to the *Home* panel. From any menu, list, or special panel, it returns directly to *Home*.
- *SUMMARY*: Displays the *Summary* panel. If the Summary panel is already shown, it returns to the previous panel.
- *LEDS*: Displays the *LEDS* panel. If the LEDs panel is already shown, it returns to the previous panel.
- *EVENT*: Starts (and sometimes stops) the event insertion. The exact way this button works depends on the actual event insertion mode. For example, if single event inversion is configured, each time you press *EVENT* a new event will be inserted but if continuous insertion is the current configured value, you will need to press *EVENT* during event insertion to stop the action.
- *RUN*: This button starts / stops a new test. Some results (LEDs, some analogue values) are available without an ongoing test. Most of the configuration is blocked during a test execution.
- *Function keys (F1, F2, F3, F4)*: These keys do not have a fixed purpose. Their associated action depends on the panel being displayed.
- *On/Off key*: If the tester is in off status, push to switch it on. If the tester is on, use this key to switch it off (long push).

There are four LEDs (PWR, DC, Port A summary, Port B summary). Their description is given below:

- *PWR*: Displays the current tester on / off status. The green colour is displayed under normal operation conditions. Orange and red are shown to indicate a low battery load.
- *DC*: This led is lit when the DC input is connected. Orange indicates a charging batteries status and green means that the internal batteries are ready.
- *Port A / Port B Summary*: These LEDs provide a permanent indication of the current input signal (or signals) status. The LEDs summarize the Port A and Port B information given by the event LEDs. If any event LEDs for a test port is in 'red' status, the port summary led will be set to 'red'. If any event LED is 'orange' but there is no 'red' event, the summary led will be set to 'orange'. The 'green' colour is used when no events are found in the input signal. Finally, the LED is switched off when the port is disabled.

2.1. Test Connectors

The Net.Storm is connected to the DUT / SUT through the test connector panel. Ports and elements included in this panel are described in the following list:

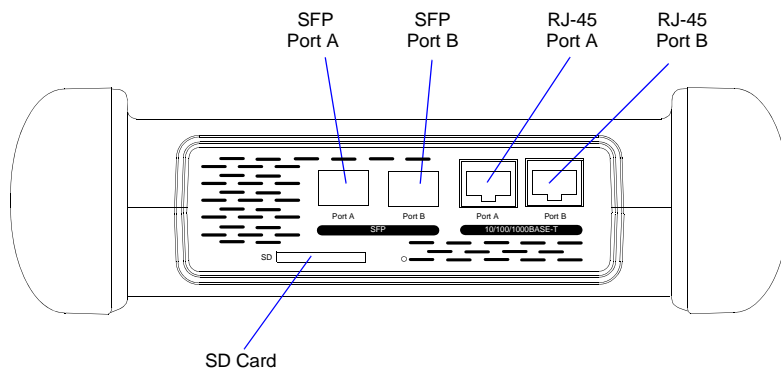


Figure 2: Net.Storm test connector panel. Connection to the DUT / SUT is done in this panel

- *RJ-45 Port A.* This is the first full featured 10/100/1000BASE-T port for Ethernet transmit and receive.
- *RJ-45 Port B.* This is the second full featured 10/100/1000BASE-T port for Ethernet transmit and receive. This port is identical to the RJ-45 Port A.
- *SFP Port A.* This port is used to connect the tester to the network through an optical interface with the help of an SFP module.
- *SFP Port B.* This port is used to connect the tester to the network through an optical interface with the help of an SFP module. This port is identical to the SFP Port A.
- *SD Card:* Slot for SD Cards. These cards can be used as external storage devices.

2.2. Platform Connectors

There is a connector panel specifically devoted to the platform ports. This panel includes capabilities like remote control and external device connection. A more detailed description is given below:

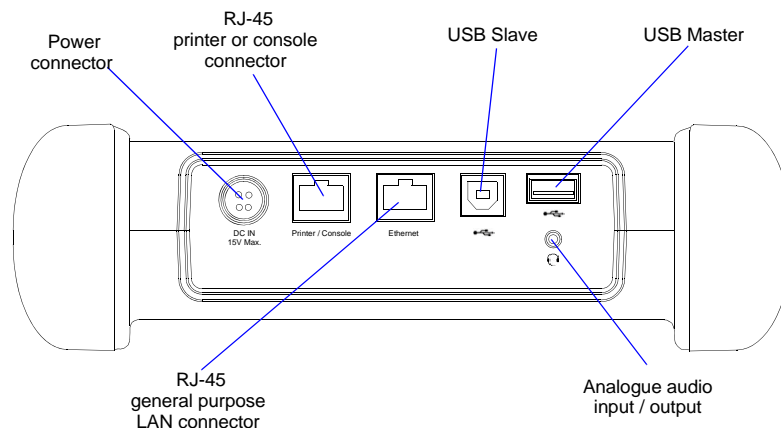


Figure 3: Net.Storm platform connector panel. This panel includes connectivity to USB devices,

- *Power connector*: The input must be 12 V DC, 4 A. A suitable external AC/DC adapter for your country is provided with the tester.
- *RJ-45 printer or console*: Console connector. This interface is prepared for connecting a serial printer.
- *USB Slave*: Use a USB cable with Slave type connector (Type B, *Device*) for this port. Currently this port enables connection of a PC to the tester and access to the internal tester file system.
- *USB Master*: Use a USB cable with a Master type connector (Type A, *Host*) for this port. Currently this port is used for software upgrades and connection of external storage devices.
- *RJ-45 general purpose LAN connector*: This is the platform Fast Ethernet connector (10/100BASE-T). It is used for remote management of the test unit.
- *Analogue audio input / output*: It is a 2.5 mm audio jack for connecting external speakers and microphone.

3. The Graphical User Interface

The Net.Storm graphical user interface is based in a 480 x 272 colour screen and a set of keys attached to the front panel. Some of these keys have a permanent purpose but the specific function for some other keys depend on the context.

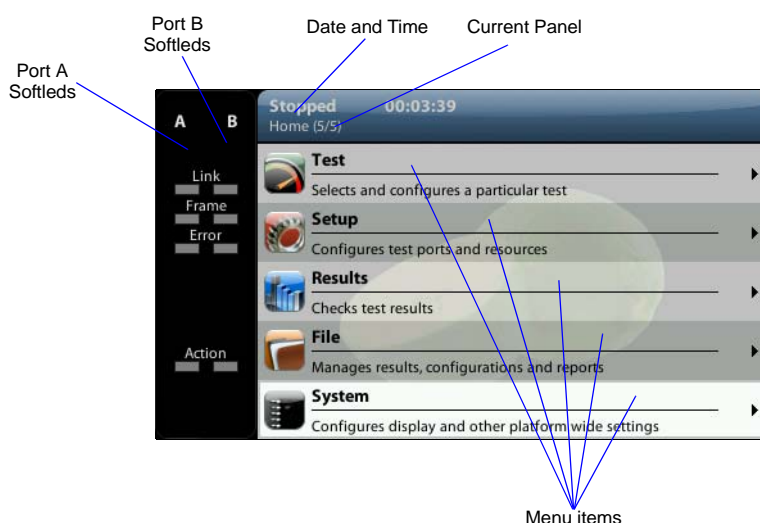


Figure 4: Net.Storm, the Home panel.

The keyboard and the screen allow the user setting configuration values, starting tests and displaying results. The user is always aware of the current status of the received signal through the Softleds shown on the left. The Softleds are always displayed and they work even when there is no test running. On the top side of the screen there is a header zone which contains information about the current tester status (date, time, tests running, event insertion active) and an identifier for the currently displayed panel.

Most of the graphical user interface panels are menus containing a variable number of items. All the menus are available from the *Home* panel. Users can press the HOME button at any time to go to the *Home* panel. The *Home* panel contains the following menu items:

- *Test*: Contains configuration items related with general test configuration like delayed test settings, performance objectives, event insertion, and report configuration.
- *Setup*: Provides access to test resource configuration. For the impairment generation application, the setup submenus contain configuration of Port A and Port B.
- *Results*: This item enables the user to browse test results. Most of them are not available if a measurement has not been previously started but there are some exceptions to this rule like the LEDs.
- *File*: File management menus. Includes configuration, result and report file management. Files can be deleted, copied, exported or imported.
- *System*: Provides platform management tools. For example language selection, screensaver configuration and others.

There are two special panels as well. These are the *Summary* panel and the *LEDs* panel. The *Summary* provides some details about the current configuration and results. The *LEDs* panel gives extended the information about the received signal status

already given by the Softleds. Both the *Summary* panel and the *LEDs* panel can be displayed at any moment by pressing the *SUM* and *LEDS* buttons.

	Count
Frames	30327
Bytes	44455633
Broadcast frames	396
Multicast frames	396
Control frames	0
Flow control frames	0
Tagged frames	0
Oversized frames	0

Figure 5: Net.Storm test results represented as a counter list

Menus and submenus are organized in a tree. The root of the tree is the *Home* panel and the leaves are configuration or result panels. Results are usually presented in a list or a table. If all results cannot be simultaneously displayed, then the user is allowed to use the cursors up and down to browse the list.

Configuration panels are usually selection lists. Sometimes you can select only one simultaneous item in the list and sometimes selection of several items at the same time is possible. Keyboards are available if selection through lists is not possible. There is one keyboard for numeric settings and one for alphanumeric settings.



(a)



(b)



(c)

Figure 6: Different kinds of configuration panels: (a) Selection list, (b) Alphanumeric keyboard, (c) Numeric keyboard.

4. Running Tests

Most of the results provided by Net.Storm are not available until you start a test. This section provides a high level description of the procedure to follow to configure your unit, start a test and review the results.

1. Configure the tester to send / receive signals in the right operation mode and through the right ports. Connect it to the network.
2. Program the test start time and duration with the help of the *Program* menu (within *Test*) or start the test immediately by pressing RUN.
Note: Most of the configuration is blocked when there is an ongoing test.
3. Wait for the test to finish or press RUN to finish immediately.
4. Check the test results in the *Results* menu.
Note: All test results are upgraded in real time as the test progresses. That means that is not really necessary to wait for the test to finish to check current results.

5. Upgrading the Unit

The test unit software can be upgraded with the help of a USB memory stick. Before proceeding with the upgrade copy the ALBEDO software to the root directory in the memory stick. The file name of the upgrade package must not be modified. The USB must have a FAT32 file system.

Once the USB memory stick is ready. Follow this procedure to install the new software:

1. Switch the unit off
2. Press HOME and ENTER simultaneously and, without releasing the keys, press the On / Off button.
3. Now, keeping all three the keys pressed, wait until you hear a beep. Then release the keys.
The ALBEDO Software Installer is loaded and executed. An informative panel displays the Net.Storm software version number found in the storage device.
4. Press ENTER to continue with the installation process.
5. Select *Install* or *Upgrade*. *Install* regenerates all the software in the unit even if it is up to date. Upgrade regenerates only the software that has changed since the last upgrade. Use *Install* (F2 key) if you need to recover the unit after operation failure due to corrupted software. Use *Upgrade* (F1 key) otherwise.
6. Confirm your previous selection by pressing ENTER or cancel with ESC.
7. Wait for the installation process to finish.
Note: The full process may take a few minutes.
Note: Do not disconnect the unit or remove the USB memory stick during installation.
8. Press ENTER to close the Software Installer and finish the installation process.
The unit will be automatically restarted. The new software will be loaded.