



TREND NETWORKS

# NavITEK NT (Plus & Pro)



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TREND Networks

Stokenchurch House  
Oxford Road  
Stokenchurch  
High Wycombe  
Buckinghamshire  
HP14 3SX UK

[www.trend-networks.com](http://www.trend-networks.com)



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**Introduction**

NaviTEK NT is a network tester for troubleshooting and maintenance of active and passive copper and fiber networks. It performs a range of tests to determine as much information as possible about the network and port to which it is connected.

The principle of operation of NaviTEK NT is that it automatically configures itself to match the characteristics of the connected port, whether it is an un-terminated cable, a live copper switch port or a live fiber switch port, and runs tests appropriate to that configuration. These tests are designed to give information about the port, such as the switch MAC address and identification, as well as to confirm that the port has been properly configured and is capable of reaching a number of strategic targets in the local network and the Internet. The user may customize the tests if required.

Because the suite of tests runs and saves the results automatically, it is a simple task for the user to move from port to port, fully testing and saving the results from each one. All that is required is to plug the tester into the port socket and press the Autotest button.

Once all of the required network ports have been tested, the saved reports can be uploaded either using a USB memory key to a PC or via Wi-Fi to a Smartphone, for transfer to client databases or to colleagues for further analysis.

This manual describes NaviTEK NT Pro, and all references to "NaviTEK NT" shall be taken to mean NaviTEK NT Pro. NaviTEK NT Pro includes provision for testing optical fiber networks as well as copper-based Ethernet networks, and 802.1x security log-in.

NaviTEK NT Plus includes provision for testing copper-based Ethernet networks only and no 802.1x support.

The basic version of NaviTEK NT is described in a separate user manual.



### Safety Information

When using NaviTEK NT, always take basic safety precautions to reduce the risk of fire, electric shock and injury to persons. These include the following:

- When connecting to the port, special care must be taken as high voltages may be present and there may be a danger of electrocution.
- Avoid using the tester during an electrical storm - there is a remote risk of electric shock by lightning.
- Use only the mains electricity adaptor supplied with your NaviTEK NT.

### **DO NOT CONNECT ANY TELECOMMUNICATIONS NETWORK TO ANY OF THE TESTER'S PORTS**

## Power and Maintenance

NaviTEK NT can be powered from:

- A rechargeable power module,
- Directly from power connected to the DC inlet built in to the power module.
- An optional non-rechargeable battery pack

### Power Module Management



The power module must be fully charged before you use it for the first time

A fully charged power module will support up to five hours of heavy, continuous use. For maximum life of the power module it is recommended to discharge it fully and then recharge it fully at least once a month. The power module is not user-serviceable. When it has reached the end of its life, please contact your local TREND representative for service.

### Power Module Recharging

The power module can be fully recharged in three hours with the NaviTEK NT switched ON or OFF. To recharge the power module, connect the supplied power adaptor to the DC inlet. For convenience the power module may be removed from, or left attached to, the unit for charging. The Power LED next to the DC inlet glows green to show that the battery is being charged, and flashes green to show that it is not being charged. The power module charge state is indicated at FULL, 2/3, 1/3 and EMPTY by the graphical power meter shown in the display's information bar at the top of its LCD display.

### Switching ON and OFF

To switch ON the tester, press the ON/OFF button. A splash screen showing the TREND logo and model identity is shown on the display. The home screen is then shown on the display and NaviTEK NT automatically searches for a network to test.

To switch OFF, press and hold the Power button for approximately 1/2 second, a shutdown message is displayed on the screen. The currently stored setup is saved. If the unit does not switch OFF within five seconds of pressing the Power button, please see *Master Reset*. Always switch OFF the unit before removing the power module.

### Caution

**Do NOT remove the power module when the tester is switched on.**



## Power Saving

Power saving preferences are selected from SETUP / SYSTEM / PREF. Auto Off can be Disabled (unit remains ON indefinitely), or set to switch the unit OFF after three, 10 or 30 minutes of inactivity. The backlight can be set to Always On, or to dim to 50% brightness after three minutes of inactivity. Note that when mains power is connected the display is always on full brightness and the unit remains ON indefinitely.

## Master Reset

In the unlikely event of a system lock-up which prevents the unit from being switched OFF, it may be necessary to perform a master reset. This will not delete any stored data.

1. Remove the power module to access a small aperture in the NaviTEK NT.
2. Insert a paper clip into the reset hole and press the internal reset switch.



3. Replace the power module.

## Replaceable insert - RJ-45 socket

To replace a damaged or worn RJ-45 socket insert proceed as follows:

Equipment required: Kit, TREND part number 150058 - includes Tool x1 and Replacement Insert x10.

1. Switch the NaviTEK NT off.
2. Remove cables.
3. Carefully push the tool STRAIGHT into the socket. BE CAREFUL - DO NOT MOVE THE TOOL VERTICALLY!
4. Keeping the tool STRAIGHT firmly pull the insert out from the socket.
5. Using fingers replace a new insert STRAIGHT into the socket and secure in place by firmly pushing



3.



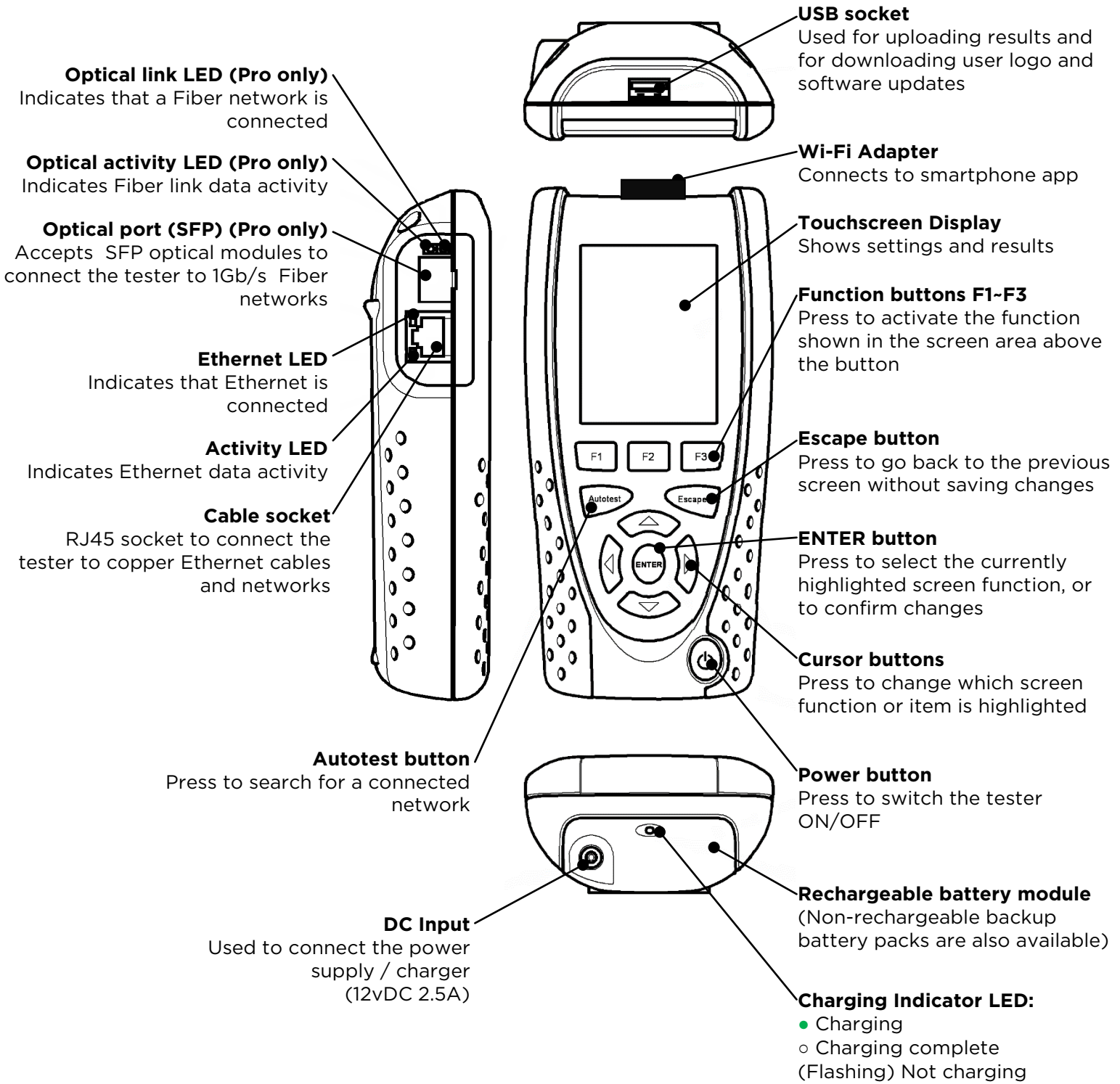
4.



5.



### Tester Layout

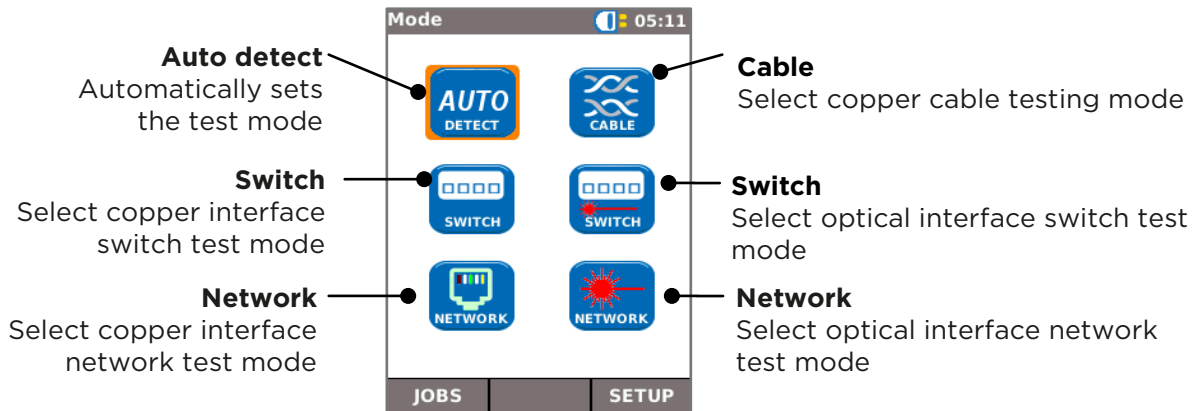






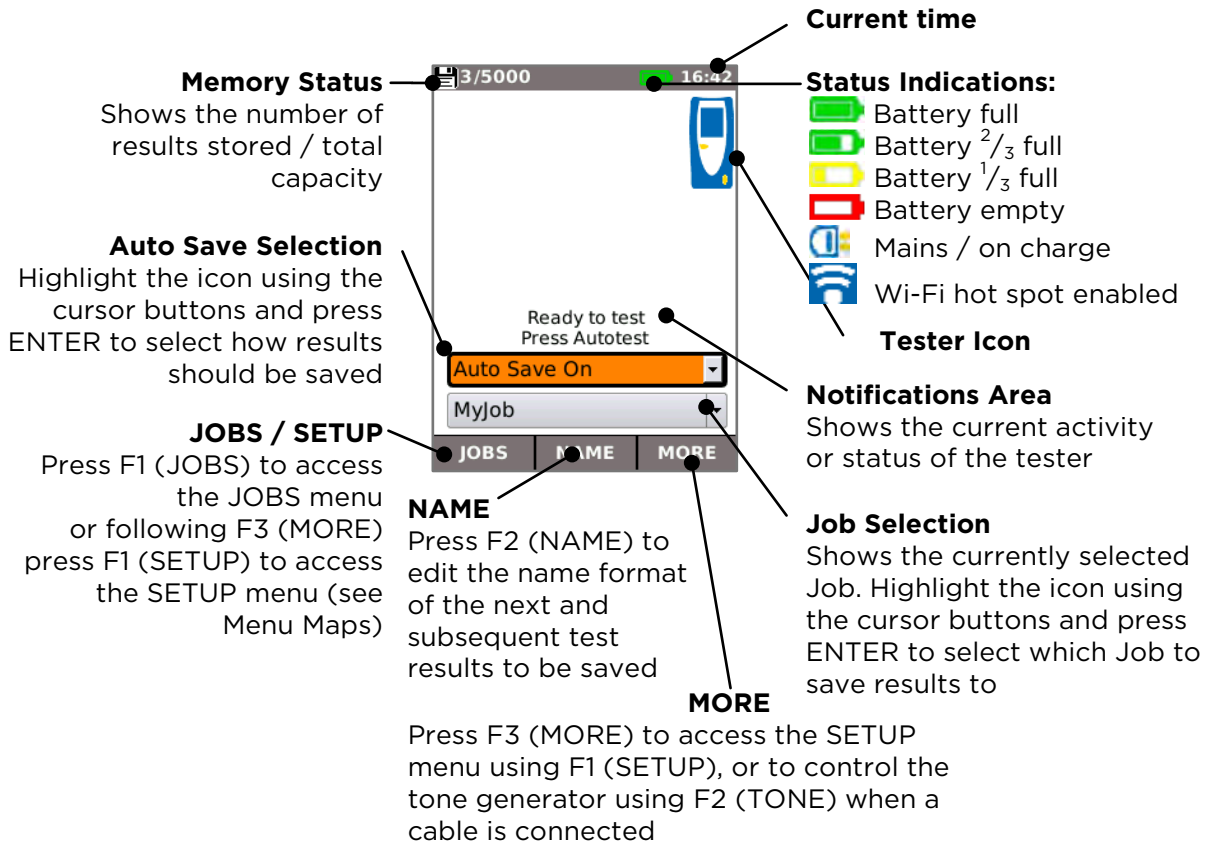
### Mode Selection

Select either with arrow key or top one of the test mode icons to select the desired test function.



### MAIN Screen

- The HOME screen is displayed following start-up.
- To refresh the HOME screen and update the display of the current connection status, press Autotest.
- To display more information about an item on the HOME screen, use the Cursor buttons to move the orange highlight to the required item on the screen, then press ENTER.
- To return to the HOME screen from any other screen, press Escape repeatedly until the HOME screen appears.





### MAIN Screen (with network cable connected)

When the tester is connected to an un-terminated cable greater than ~3m (10ft) long, Autotest displays a graphical illustration of the cable, using the colour scheme set in SETUP/TESTS/WIREMAP, showing the cable length and any faults by pair.

**Overall Cable Length**  
5 m

**Good Pair Indication**  
Indicates a good pair

**Short Circuit Pair Indication**  
Indicates a short circuit at the far end of the cable

**Pair Lengths**  
Indicates the lengths of the individual cable pairs

**Open Circuit Pair Indication**  
Indicates an open circuit at the near end of the cable

**TONE**  
Press F3 (MORE), then F2 (TONE) to generate a tone on the cable for tracing using a compatible Tone Amplifier Probe (available separately)

1	5m
2	5m
3	5m
4	0m
5	0m
6	5m
7	4m
8	4m

5/5000 08:13

Auto Save On

MyJob

SETUP TONE MORE

### MAIN Screen (with unknown network connected)

If the tester is accidentally connected to any type of network carrying voltages, for example a telephone or ISDN network, the HOME screen displays an alarm and details of the voltages. No further testing is possible until the voltages have been removed.

**Alarm** 12:58

**Indication of network type**  
POTS/PBX: 12V

**Indication of overall voltage**  
0V,0V,0V,10V  
-2V,0V,0V,0V

**Indication of pin voltages:**  
1,2,3,4  
5,6,7,8





### MAIN Screen (with network cable connected to Active Remote)

When the tester is connected to a cable that is terminated with an Active Remote, Autotest runs an advanced Wiremap test that can detect split pairs and faults by pin. The HOME screen displays a bar indicating the progress of the test. Select this bar and press ENTER to display the Wiremap result screen. When the test is complete the result is saved (depending on the Auto Save setting).

**Overall Cable Length**

**Active Remote ID number**

**Test Status:**

- Ready to test
- Test in progress
- Test Passed
- Test Failed

**Wiremap test bar**

Indicates progress and final test result (Green = PASS, Red = FAIL)  
Highlight the bar using the cursor keys then press ENTER to display the Wiremap screen

**Result saved indication**

Indicates the name of the last saved result

**Test Result**

**Pair Lengths**

Indicates the lengths of the individual cable pairs

**Active Remote pin numbers**

**Tester pin numbers**

**Overall cable length**

**RUN**

Press F1 (RUN) to re- run the Wiremap test without saving a result

**SETUP**

Press F3 (SETUP) to set the Wiremap parameters according to the type of cable tested

Tester pin numbers	Pair Lengths
1	13m
2	13m
3	12m
4	1m
5	1m
6	12m
7	13m
8	13m



### MAIN Screen (with live copper network connected) and TESTS screen

When the tester is connected to a live copper-based network, Autotest detects the partner Ethernet device at the far end of the cable and automatically tests the network connection and displays information about it.

**Copper network connection**

**Port rate and duplex**  
Select then press ENTER to display the Statistics, VLAN and Port screens

**Power over Ethernet status**  
Select then press ENTER to display the PoE test screen

**MAC and ID of switch port and port VLAN setting**  
Select then press ENTER to display details of the nearest switch, reported by CDP, LLDP or EDP (if supported by the switch)

**TESTS**  
Press F3 (MORE) then F2 (TESTS) to display the TESTS menu to allow individual tests to be selected and run independently of the NET TEST

**Tester IP Status:**

- IP address assignment in progress
- Dynamic (DHCP) IP address assigned
- Static IP address assigned
- IP address assignment failed

Select then press ENTER to display the IP screen

**Tester VLAN ID**

**NET TEST Status:**

- Ready to test
- Test in progress
- Test Passed
- Test Failed

**NET TEST test bar**  
Indicates progress and final test result (Green = PASS, Red = FAIL)  
Select then press ENTER to display the NET TEST screen in detail

**PING4**  
Select to access the screen to run and view Ping4 test results

**PING6**  
Select to access the screen to run and view Ping6 test results

**LOOP**  
Select to access the screen to set up and apply various types of Ethernet loop

**BLINK**  
Select to flash the switch LED to assist in port identification

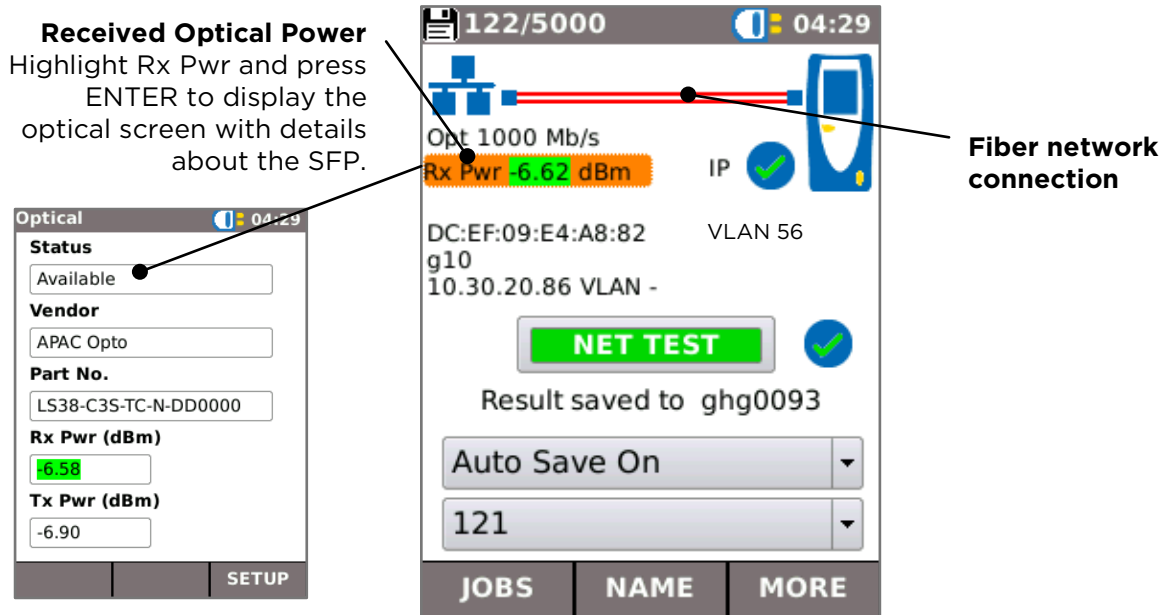
**RESET**  
Press F1 (RESET) to reset the test results

**SAVE**  
Press F2(SAVE) to save the test results



### MAIN Screen (with live fiber network connected - Pro only)

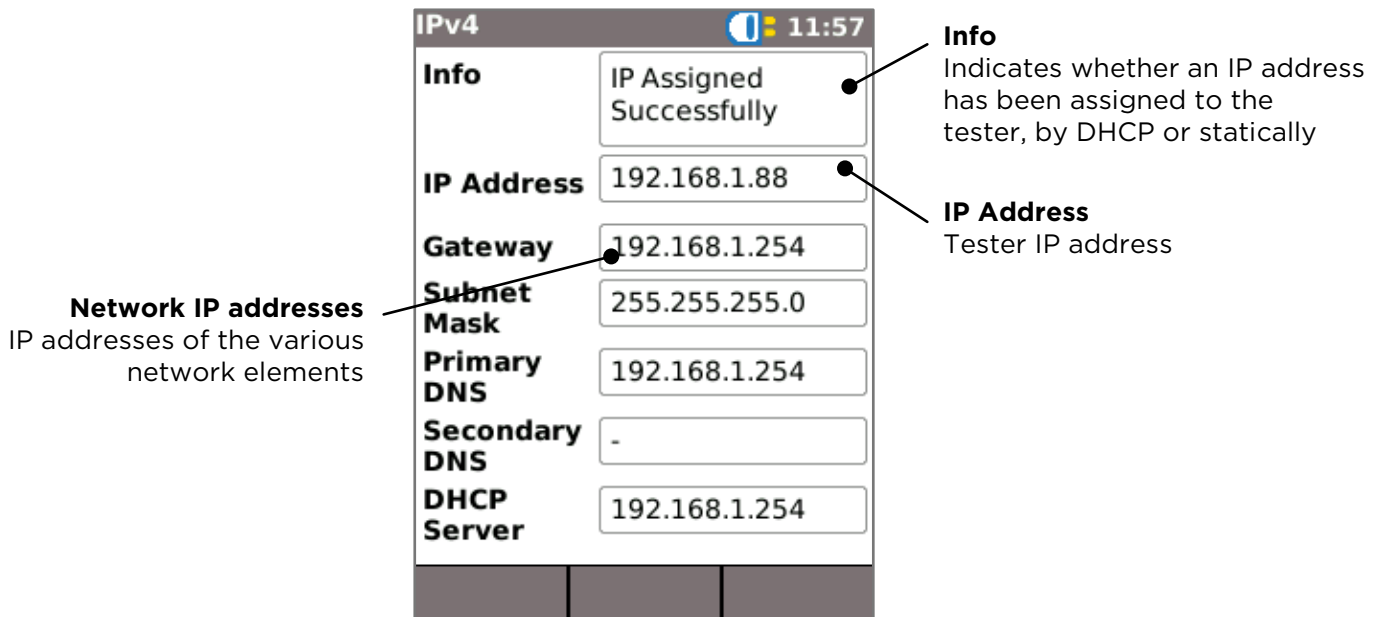
When the Pro tester is connected to a live 1Gb/s fiber network, AUTO DETECT automatically detects the partner Ethernet device at the far end of the fiber.



### IP details screen

In the HOME screen, select the IP icon then press ENTER to display the IP screen.

This screen shows detail of the IP status and address of the tester and the IP addresses of the network elements that are tested by the NET TEST.





### NET TEST and Netscan

When an Ethernet link is established, or Autotest is pressed while a link is up, a NET TEST is run automatically. This test consists of a series of Ping tests to multiple strategic targets in the network, a Trace Route to a set destination, and a scan of all the hosts in the local network. To display the NET TEST screen, select the test bar in the HOME screen and press ENTER.

**Individual test result**

**DNS Ping results**  
The Secondary DNS is only tested if the Primary DNS Ping fails. Select and press ENTER to display full details

**Gateway Ping result**  
The Gateway is the route from the local network to the Internet. Select and press ENTER to display full details

**Internet Ping result**  
If this test passes, the tested port has access to the Internet. Select and press ENTER to display full details

**Trace Route result**  
Select and press ENTER to display a list of all the hops passed en route to the Internet destination

**Network map**  
Each tested network element is shown by an icon that is highlighted when the test result is selected

**Overall Test Result:**

- Not tested
- Test in progress
- Test Passed
- Test Failed

**SETUP**  
Press F3 (SETUP) to access the NET TEST setup screen

**Netscan result**  
Select and press ENTER to display the Netscan screen

**Host list**  
A list of all the hosts detected in the local network

**IPv4 Hosts** 5

**Netscan test result**

**Number of hosts found**

	IPv4 Address
1	192.168.1.64
2	192.168.1.67
3	192.168.1.66
4	192.168.1.75
5	192.168.1.254

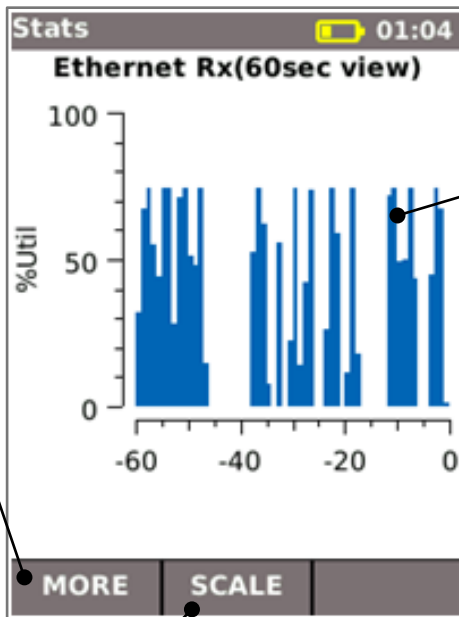
**IPv6 / IPv4**  
Press F1 to display IPv6 hosts or IPv4 hosts

**MAC / IP**  
Press F2 to display the MAC address or IP address for each host listed



### Statistics, VLAN scan, Port, Errors and 802.1x status

When an Ethernet link is established, select the Port Rate / Duplex field in the HOME screen and press ENTER to display detailed information about the connection and the network.



**Traffic graph**

Shows the percentage of the port rate utilised over time. Connect the tester to a mirror port or test port on the switch to monitor traffic in a particular network span

**MORE**  
Press F1 (MORE) to display the next screen

**SCALE**  
Press F2 (SCALE) to adjust the time scale

The screenshot shows a configuration screen titled 'VLAN'. It contains the following fields and controls:
 

- 'Max Rx Bandwidth (Mb/s)' with a value of 743.504.
- 'Detected VLAN IDs' with a list containing 20 and 35.
- 'VLAN ID' with a value of 50.
- 'Change VLAN' with a dropdown menu showing 20 selected.
- Buttons for 'MORE' and 'APPLY' at the bottom.

**Bandwidth**  
Shows the peak traffic bandwidth

**VLANs**  
Lists the VLANs with ID detected in the network traffic

**VLAN ID**  
The current VLAN setting of the tester

**Change VLAN**  
Select a VLAN from the list of network VLANs detected. Press ENTER to set the chosen VLAN as the current tester VLAN setting, then press F2 (APPLY)

**MORE**  
Press F1 (MORE) to display the next screen



**Port data**  
Shows information about the connection and the partner port

Port	
Speed	100 Mb/s-FD
Duplex	Full
MDI/MDIX	MDI
Signal Lvl	Normal
Polarity	Normal
<b>MORE</b>	

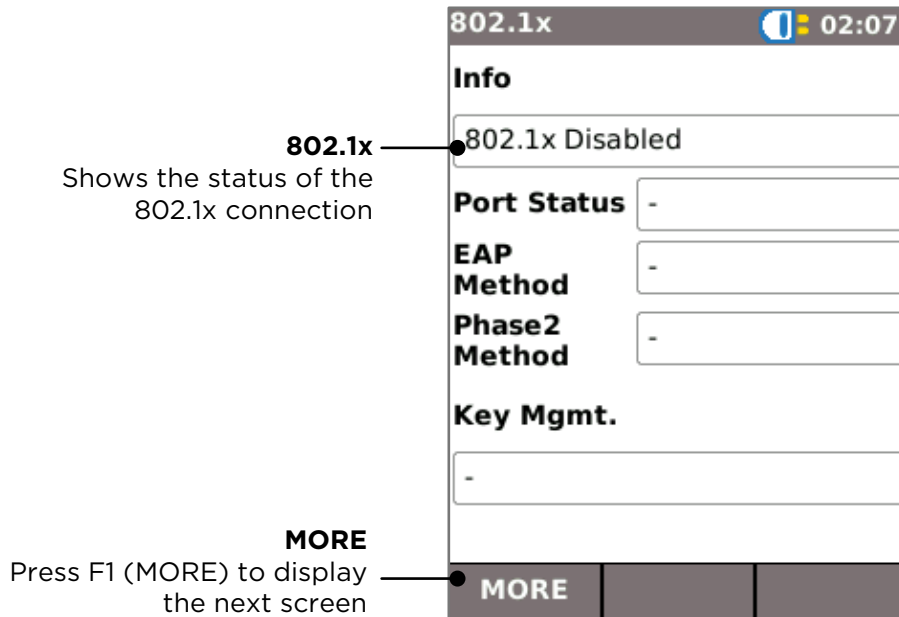
**MORE**  
Press F1 (MORE) to display the next screen

**Error data**  
Shows the number of Ethernet errors detected

Errors	
Collisions	0
<b>FCS Errors</b>	0
Undersize	0
Oversize	0
Jabbers	0
Bad Length	0
<b>MORE</b>	

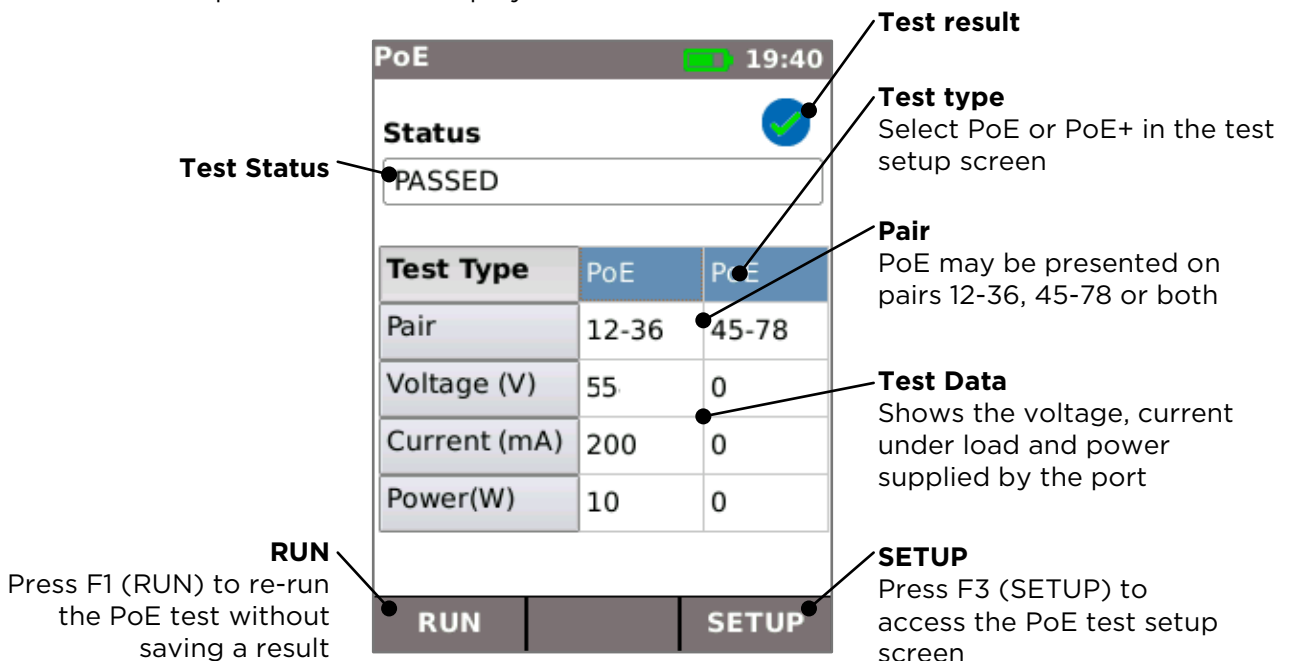
**MORE**  
Press F1 (MORE) to display the next screen





### Power over Ethernet

When an Ethernet link is established, Autotest automatically tests the port for the presence of PoE and measures the available power by applying a minimum load. Select the PoE field in the HOME screen and press ENTER to display the PoE screen.





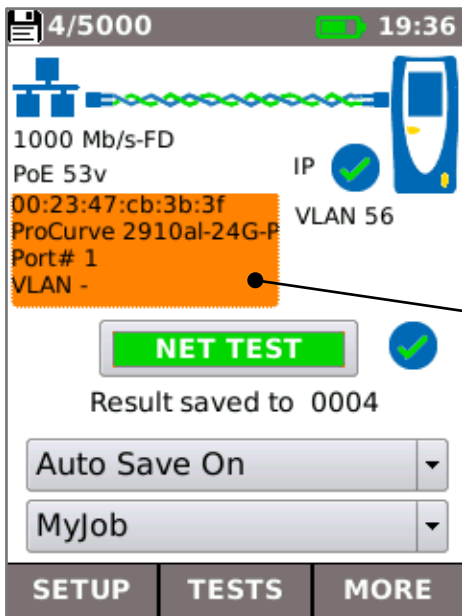
### Port Discovery information details

When an Ethernet link is established, Autotest automatically scans the partner port for Link Layer Discovery Protocol (LLDP), Cisco Discovery Protocol (CDP) and Extreme Discovery Protocol (EDP) messages. These Discovery Protocol messages may contain various details about the switch and the port connected, depending on how they are configured. Discovery Protocol messages may take up to 60 seconds to be transmitted by the switch. In non-standard network configurations it is sometimes possible for Discovery Protocol messages to arrive from other devices in the network. In this case, the tester attempts to resolve which are the messages from the directly connected port.

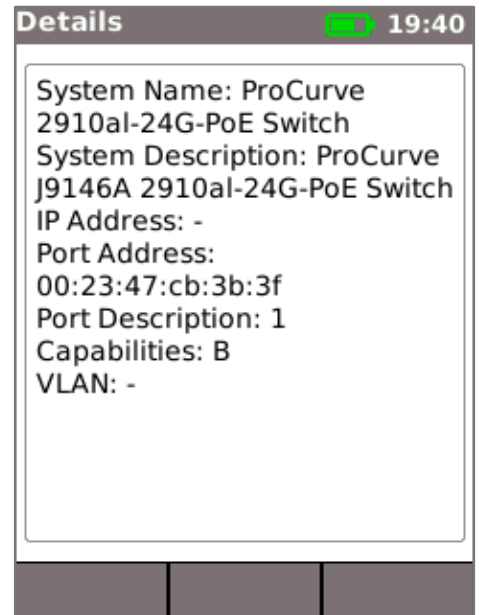
Following link establishment, the screen flashes "Searching for Port Identification" until the first Discovery Protocol message is received. The screen then starts to flash the switch name and MAC address of the port that the Discovery Protocol message has come from. If the message is confirmed as coming from the directly connected port, the screen then shows full details of the port continuously.

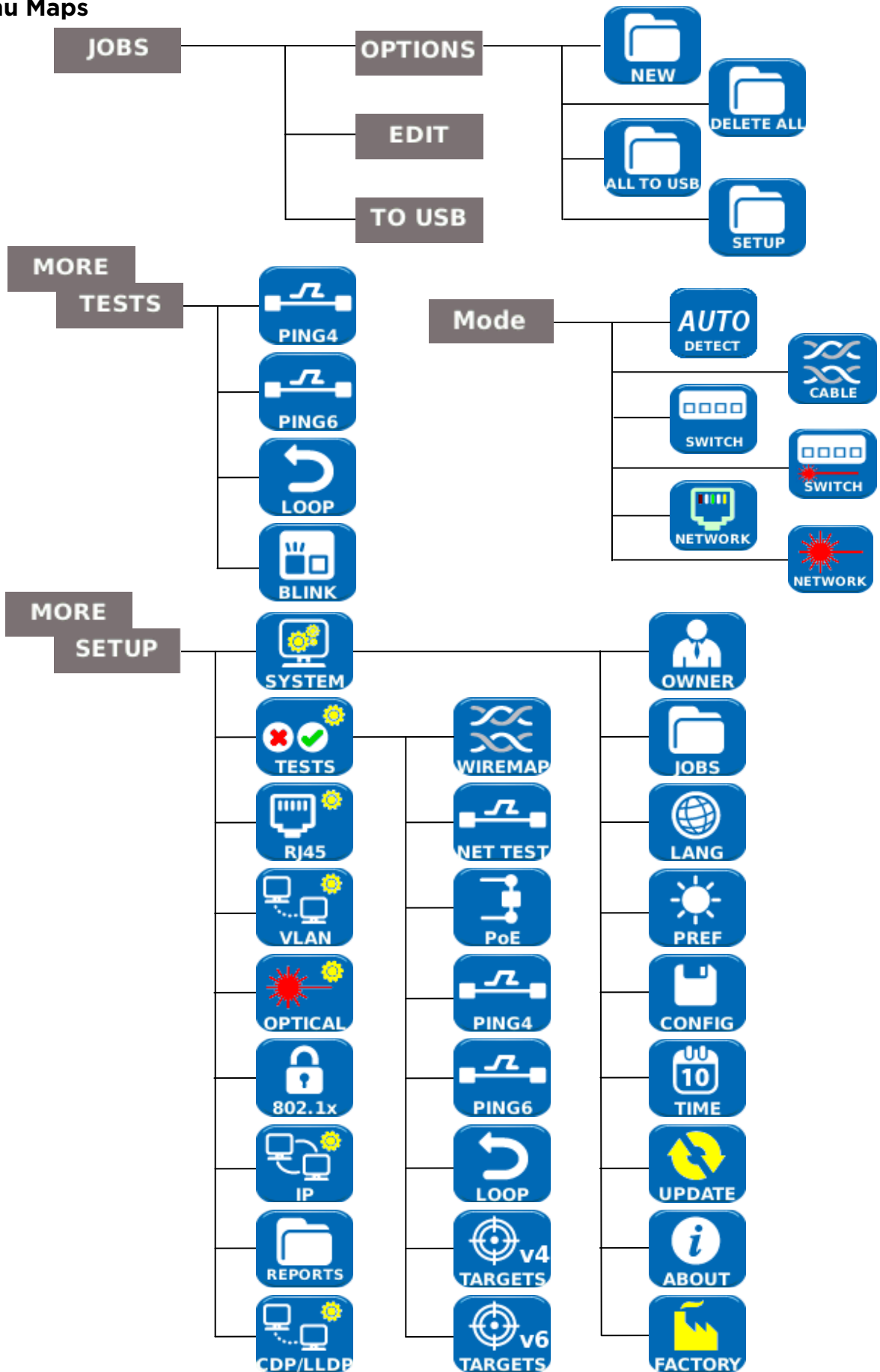
At the end of 60 seconds from link establishment:

- If a unique or confirmed Discovery Protocol message has been received, the screen shows the port details continuously.
- If multiple different Discovery Protocol messages have been received, and it is not possible to resolve which one has come from the directly connected port, the screen shows "Multiple". The user can then select this and review a list of the different Discovery Protocol messages that have been received, to aid in identification of the correct port.
- If no Discovery Protocol message has been received, the screen shows "No Discovery Info".



**Port details**  
Select the switch / port details field in the HOME screen and press ENTER to display the port discovery details screen.



**Menu Maps**




## Setup



Select SYSTEM to access the system setup:



Enter details of the test engineer and company information and logo (see Reports) for inclusion in the reports



Access the JOBS menu



Set the menu language



Set preferences for auto off, backlight, length units, date and time format



Export or import setup information



Set the date and time for inclusion in the reports



Update the software. **All settings and results will be lost. Save data to USB or smartphone first.**



View details about the system information of the tester



Reset to factory defaults. **All settings and results will be lost. Save data to USB or smartphone first.**



Select TESTS to access the tests setup:





Set the details of the Wiremap test:


- Cable Type
  - Cat 3, Cat 5, Cat 5e, Cat 6, Cat 6A, Cat 7 and 7A, Cat 8, USOC8 1Pair, USOC8 2Pair, USOC8 3Pair, USOC8 4Pair, ETH 1236, ETH 1278, PROFINET 4W, COAX RGxx, ISDN BRI, DB, Custom
- Shield Type
  - UTP - Shield must not be connected for test to pass
  - STP - Shield must be connected for test to pass
  - UTP / STP - Test can pass if shield is connected or disconnected
- Display Preference
  - None, 568A, 568B, USOC, TERA
- Custom NVP.
  - Accurate length measurement relies on correct setting of the Nominal Velocity of Propagation (NVP) for the cable to be tested. Use Custom NVP - enabling custom NVP and entering number
- Split Pair:
  - Enable or disable
- Xover Allowed:
  - Enable or disable



Set the details of the NET TEST:

- Primary / Secondary DNS and Gateway
  - Disabled - The target is not tested as part of the NET TEST
  - Auto - IP address of target is assigned by DHCP
  - Manual - IP address of target is assigned manually or picked from the Targets list by selecting 
- Target
  - Disabled - The Internet target is not tested as part of the NET TEST
  - IP Address - Enter a numerical IP address for the Internet target or pick from the Targets list by selecting 



- URL - Enter a URL for the Internet target or pick from the Targets list by selecting 
- Ping Setup
  - Count - Number of Ping attempts
  - Pause - Interval between Ping attempts
  - Length - Number of bytes in the Ping packet
- TRoute Setup
  - TRoute - Include or omit the Trace Route test from the NET TEST
  - Max Hops - The number of hops that can be detected before the test fails to reach the destination target
  - Timeout - the timeout before the test fails to reach the destination target
  - Name Lookup - When ticked, the name of each hop is included in the test result. Note that selecting this option causes the test time to be longer
- IPv4 Netscan setup
  - Netscan - Disable Netscan from inclusion in the NET TEST or select Local or Custom network
  - IP Addr - Set Custom network sub-net
  - Scan range - Select a small scan range (Class C) for fast test time or a larger scan range (Class B) for a wider search



Set the details of the Power over Ethernet test:

- Type
  - PoE - Applies a load to draw current up to the maximum allowed for PoE
  - PoE+ - Applies a load to draw current up to the maximum allowed for PoE+
  - None - PoE test disabled
- Min PoE power (W)
  - Enter the minimum power in watts for the PoE test to pass
- Min PoE+ power (W)
  - Enter the minimum power in watts for the PoE+ test to pass



Set the details of the Ping 4 test



Set the details of the Ping 6 test



Set the parameters for the Ethernet Loop for Wireline (physical), MAC, IP and UDP layer loopback signal



Set up a list of targets to be used in the Ping and TRoute tests using IPv4 addresses or URLs



Set up a list of targets to be used in the Ping and TRoute tests, using IPv6 addresses or URLs



Select RJ45 to set the parameters for the RJ45 copper port including Auto Negotiation, Speed, Mode, Min Rx frame size, MDI and MAC address.



Select VLAN to set the VLAN ID and Priority of the tester if required



Select OPTICAL to set up minimum and maximum receiving optical power of pass fail limit. Select optical power item in the main screen to view information about the SFP. The following SFP types are supported. The use of other SFP types is possible but correct operation is not guaranteed.



Type	Manufacturer	Part No	Speed	Fiber type	Wavelength	Connector Type
SX	Avago	AFBR-5705PZ	1Gb/s	Multimode	850nm	LC Duplex
SX	Apac	LM28-C3S-TI-N-DD	1Gb/s	Multimode	850nm	LC Duplex
LX	Avago	AFCT-5705PZ	1Gb/s	Singlemode	1310nm	LC Duplex
LX	Apac	LS38-C3S-TC-N-DD	1Gb/s	Singlemode	1310nm	LC Duplex
ZX	Apac	LS48-C3U-TC-N-DD	1Gb/s	Singlemode	1550nm	LC Duplex



Select 802.1x to set the tester to use 802.1x security protocol if required



Select IP to set up the IP behaviour of the tester including IP type, address, Netmask, Gateway and DNS if required.



Select REPORTS to set the parameters to be used for the reports:

- Format
  - PDF & CSV - the reports contain both PDF and CSV files
  - PDF - the reports contain only a PDF file
  - CSV - the reports contain only a CSV file
- Size
  - Summary - the reports contain only a summary table listing the overall result of each test
  - Brief - the reports contain a summary table and a single page result for each test
  - Full - the reports contain a summary table and full details of each test
- Results
  - All- every test made is included in the reports
  - Pass - only tests that have passed are included in the reports
  - Fail - only tests that have failed are included in the reports
- SSID - The identity of the Wi-Fi hot spot set up by the tester for report transfer to smartphones (factory set)
- Wi-Fi Password - If required, edit the default password (trend001606) used by the TREND Anyware™ app to access the tester.



Select CDP,LLDP,EDP to enable the various types of Discovery Protocol supported by the tester





## Reports

Reports are very important because they are documented proof that the ports have been tested. To select the required report style press F3 (MORE) then F1 (SETUP) in the HOME screen, then select REPORTS. Alternatively, the setup screen can be accessed by JOBS / OPTIONS / SETUP.

The example 4-page Brief report below shows the results of tests on 3 ports:

	<h3>Page 1</h3> <p>This is the summary of all the tests. (To include your own logo in the PDF reports, select SETUP / SYSTEM / OWNER / F1 (LOGO). Insert a USB memory key containing an image named logo.png with maximum size of 250 x 160 pixels.)</p>
	<h3>Page 2</h3> <p>This is the Brief report for PORT0001. It shows that this port failed the Wiremap test. (Note the Job and Owner details)</p>
	<h3>Page 3</h3> <p>This is the Brief report for PORT0002. It shows that this port passed the Wiremap test. (Note the tester serial number)</p>
	<h3>Page 4</h3> <p>This is the Brief report for PORT0003. It shows that this port passed the NET TEST</p> <p>Details of the setup and results of the port connection and the Discovery information from the port are shown</p> <p>Details of the ping tests are shown</p> <p>Details of the Trace Route test are shown</p> <p>A list of all the hosts found by the Netscan test is shown, with a bar indicating how much of the available address space is used</p>

## Generating and Uploading Reports

### 1. Reports can be generated and exported to a USB key.

To generate a report to USB:

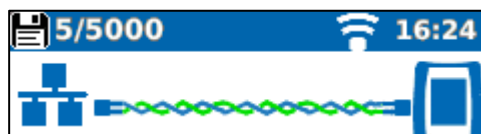
- Insert a USB key into the NavITEK NT USB port.
- From the home screen press F1 (JOBS). The display will show the Job List screen.
- Scroll down to select the required Job
- To generate a report for a single result, press ENTER to display the Results list, select the required result, press ENTER, then TO USB (F3).
- To generate a report for a single Job select the required Job then press TO USB (F3).
- To generate a report for all Jobs, press OPTIONS (F2) then select ALL TO USB.

The dialogue 'Result saved to USB' appears. Reports are now saved on the USB key in the selected format(s).

### 2. Reports can be generated and downloaded to a smartphone (only when no tests are running).

To enable Wi-Fi for results transfer:

- Insert Wi-Fi dongle into the NavITEK NT USB port.
- From the home screen press F1 (JOBS).
- The display will show the Job List screen. Wi-Fi connectivity is indicated by the top bar on the NavITEK NT screen changing from grey to blue:



Now the NavITEK NT is ready for results transfer wirelessly.

#### Note

To minimise battery consumption the Wi-Fi connectivity is only enabled for 5 minutes following power up and whenever the user is in the JOB screen.

To download results to an Android™ smartphone:

- Download and open TREND AnyWARE™ App from the Google Play™ Store.
- Insert the USB Wi-Fi adapter in the USB port of NavITEK NT.
- Search and connect to NavITEK NT. The SSID will be of the form "TREND-XXXXXX". This can be viewed on the NavITEK NT under the SETUP / REPORTS screen.
- You will be prompted for the NavITEK NT Wi-Fi password if it has been changed from the default value. You can change the password inside SETUP / REPORTS. Make sure the USB Wi-Fi adapter is not activated (no blue colour on top bar) otherwise the change will not be allowed.



- Once connected the App will display a list of JOBS on the NaviTEK NT. These can be selected and downloaded to the smartphone.
- Once results are on the smartphone they can then be transferred using email or other share mechanisms.

To download results to an iPhone®:

- Download and open TREND AnyWARE™ App from iTunes®.
- Insert the USB Wi-Fi adapter in the USB port of NaviTEK NT.
- Search and connect to NaviTEK NT. The SSID will be of the form "TREND-XXXXXX". This can be viewed on the NaviTEK NT under the SETUP / REPORTS screen.
- You will be prompted for the NaviTEK NT Wi-Fi password if it has been changed from the default value. You can change the password inside SETUP / REPORTS. Make sure the USB Wi-Fi adapter is not activated (no blue colour on top bar) otherwise the change will not be allowed.
- Once connected the App will display a list of JOBS on the NaviTEK NT. These can be selected and downloaded to the smartphone.
- Once results are on the iPhone® they can then be transferred using email or other share mechanisms.

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## Specifications - NavITEK NT Pro

### Connectors

#### *Test Ports*

##### **RJ45**

*Used for* - Cable Test  
- Ethernet Test

*Connector type* - Lifejack with user-replaceable contacts

##### **Optical**

*Used for* - Ethernet Test  
*Connector type* - SFP socket

#### *System Ports*

##### **USB**

*Used for* - Software Update  
- Results transfer  
- 802.1x certificate transfer  
- Import/export of config  
- WiFi Adapter

*Class* - Host  
*Connector type* - A  
*USB type* - 1.1

##### **Power**

*Used for* - Battery charging  
- Mains powering via adaptor  
*Connector type* - 2.5mm pin power jack  
*Polarity* - Centre pin positive

*Voltage* - 12v  
*Current* - 2 A  
*Location* - Bottom of optional power module  
(Not present in standard alkaline battery pack)

### Controls

#### **ON/OFF**

##### **Push button**

*Used for* - Power ON/OFF

#### **Function Keys**

##### **F1 to F3**

*Used for* - Screen-defined functions

#### **Navigation Keys**

##### **Cursor and ENTER**

*Used for* - User interface navigation

##### **Escape**

*Used for* - Return to previous menu

##### **Autotest**

*Used for* - Launch of automatic test function

#### **Reset**

##### **Push button**

*Used for* - Escape from exceptional lockup condition



## Displays

### Screen

#### LCD Touchscreen

*Used for* - Display of setup functions and results

*Location* - Front

*Size* - 2.8 inch diagonal

*Type* - QVGA Colour

*Pixels* - 240 x 320

### LEDs

#### Charger LED

*Used for* - Indication of charging status

*Colour* - Green

*Location* - Bottom of standard power module

(Not present in optional alkaline battery pack)

#### RJ45 Link LED

*Use* - ON indicates link UP

*Colour* - Green

#### RJ45 Activity LED

*Use* - Flashing indicates link activity

*Colour* - Green

#### Optical Link LED

*Use* - ON indicates Optical link UP

*Colour* - Green

#### Optical Activity LED

*Use* - Flashing indicates Optical link activity

*Colour* - Green

## Ports

### RJ45

#### Setup

*Auto Negotiation* - Enabled  
- Disabled

*Speed* - 10Mb/s  
- 100Mb/s  
- 1Gbps

*Mode* - Full Duplex  
- Half Duplex

*MDI* - AUTO  
- MDI  
- MDIX

*Min Rx Size* - 19:99 bytes

*MAC* - Factory set

*VLAN* - Enabled / Disabled  
- VLAN ID - 0 to 4094  
- VLAN Priority - 0 to 7

(continued)



**Ports** (continued)

**RJ45**

**Setup**

- 802.1x
  - Enabled / Disabled
  - EAP Method
    - EAP-MD5
    - EAP-MSCHAPV2
    - EAP-GTC
    - EAP-TLS
    - EAP-PEAP/MD5
      - EAP-PEAP/MSCHAPV2
      - EAP-PEAP/GTC
      - EAP-PEAP/TLS
      - EAP-TTLS/MD5
      - EAP-TTLS/MSCHAPV2
      - EAP-TTL/GTC
      - EAP-TTLS/TLS
  - Username
  - Password
  - Certificate
  - Import password
  - Root/CA certificate

**Results**

*Link pulse polarity* - Normal or Inverted  
*Link pulse height* - Normal or Low

**Tests**

- Ethernet Mode*
  - Ping4
  - Ping6
  - Trace Route4
  - Trace Route6
  - Hub Blink
  - Netscan
  - Loopback
  - NET TEST (Ping DNS/Gateway/Internet, Trace Netscan)
- Cable Mode*
  - Wiremap
  - Tone Generator
  - Auto (Wiremap)

Route,

**Service Detection**

- Detected Services*
  - PoE (802.3af/at. Not Cisco pre-standard)
  - ISDN S
  - PBX
  - Unknown

**Optical**

**Supported SFPs**

*The following SFP types are supported. Use of other types of SFP is possible but correct operation is not guaranteed.*

**SFP Type SX**

*Manufacturer Part #* - Avago AFBR-5705Z / Apac LM28-C3S-TI-N-DD  
*Speed* - 1Gbps  
*Fibre Type* - Multimode  
*Wavelength* - 850nm  
*Connector Type* - LC Duplex

(continued)





**Ports** (continued)

**Optical**

**SFP Type LX**

*Manufacturer Part #* - Avago AFCT-5705Z  
*Speed* - 1Gbps  
*Fibre Type* - Singlemode  
*Wavelength* - 1310nm  
*Connector Type* - LC Duplex

**SFP Type ZX**

*Manufacturer Part #* - Apac LS48-C3U-TC-N-DD  
*Speed* - 1Gbps  
*Fibre Type* - Singlemode  
*Wavelength* - 1550nm  
*Connector Type* - LC Duplex

**Setup**

*Speed* - 1Gb/s  
*Min Rx Size* - 19:99  
*MAC* - Factory set  
*VLAN* - Enabled / Disabled  
- VLAN ID - 0 to 4094  
- VLAN Priority - 0 to 7  
*802.1x* - Enabled / Disabled  
- EAP Method  
EAP-MD5  
EAP-MSCHAPV2  
EAP-GTC  
EAP-TLS  
EAP-PEAP/MD5  
EAP-PEAP/MSCHAPV2  
EAP-PEAP/GTC  
EAP-PEAP/TLS  
EAP-TTLS/MD5  
EAP-TTLS/MSCHAPV2  
EAP-TTL/GTC  
EAP-TTLS/TLS  
- Username  
- Password  
- Certificate  
- Import password  
- Root/CA certificate

**Tests**

*Optical* - Tx Power dBm (using a specified SFP)  
- Rx Power dBm (using a specified SFP)  
- Rx max and Rx min power limit for the pass/fail indication.

*Ethernet Mode* - Ping4  
- Ping6  
- Trace Route4  
- Trace Route6  
- Hub Blink  
- Netscan  
- Loopback  
- NET TEST (Ping DNS/Gateway/Internet, Trace Route, Netscan)



**Cable Tests**

**Wiremap Setup**

- Cable Type* - Cat 3, Cat 5, Cat 5e, Cat 6, Cat 6A, Cat 7 and 7A, Cat 8, USOC8 1Pair, USOC8 2Pair,USOC8 3Pair, USOC8 4Pair, ETH 1236, ETH 1278, PROFINET 4W, COAX RGxx, ISDN BRI, DB, Custom
- Shield* - UTP  
- STP  
- UTP/STP
- Display Reference* - None,  
- 568A  
- 568B  
- USOC  
- TERA
- NVP* - Fixed 72%  
- Custom 59% - 89%
- Split Pair* - Enable or disable
- Xover Allowed* - Enable or disable

**Termination Type**

- None* - Open
- Active Remote* - #1 - #12

**Tests (No Termination)**

- Faults* - Open circuit by pair  
- Short circuit by pin
- Length of pair* - Metres / Feet (Set in System Setup)  
- Range 3-100m / 10-330ft

**Tests (Active Remote Termination)**

- I/D* - Remote #
- Indications on Remote* - Voltage Warning (>±10volts on any pins)  
- Pass/Fail
- Faults* - Open circuit by pin  
- Short circuit by pin  
- Crossed pairs  
- Split pairs  
- Bridged shorts  
- Remote shorts
- Length of pair* - Metres / Feet (Set in System Setup)  
- Range 3-100m / 10-330ft

**Tone Generator Setup**

- No of Tones* - 3
- Wire I/D* - Tone applied to one of 8 pins relative to the other 7  
- Tone applied across one of 4 pairs

**Test**

*Audible tone detected using compatible tone probe*



***Ethernet Tests***

**IPv4**

**Setup**

- Addressing* - DHCP
  - Static
- Numerical* - Address
  - Netmask
  - Gateway
  - DNS1
  - DNS2

**IPv6**

**Setup**

- IPv6 Enable*- Enabled
  - Disabled
- Addressing* - Stateful (DHCPv6)
  - Stateless
  - Static
- Numerical* - 128bit HEX IP address
- Network Prefix* - 64 bit
  - 128 bit

***Pingv4***

**Setup**

- Target*
  - Numerical address
  - URL (Store up to 10)
- Count* - 1 to 999999
- Pause* - 1 to 5 Sec
- Length* - 8 to 1000 bytes.

**Results**

- Info*
  - READY
  - IN PROGRESS
  - PASSED
  - NO RESPONSE
  - UNKNOWN HOST
- Tx Count* - 1 to 999999
- Rx Count* - 1 to 999999
- Delay(ms)* - Minimum
  - Average
  - Maximum

***Pingv6***

**Setup**

- Target*
  - IPv6 address
  - URL (Store up to 10)
- Count* - 1 to 999999
- Pause* - 1 to 5 Sec
- Length* - 8 to 1000 bytes.

(continued)



***Ethernet Tests*** (continued)

***Pingv6***

**Results**

- Info*
  - READY
  - IN PROGRESS
  - PASSED
  - NO RESPONSE
  - UNKNOWN HOST
- Tx Count* - 1 to 999999
- Rx Count* - 1 to 999999
- Delay(ms)*
  - Minimum
  - Average
  - Maximum

***Trace Routev4***

**Setup**

- Target*
  - Numerical address
  - URL
- Max Hops* - 2 to 100
- Timeout* - 2 to 30 sec
- Type*
  - ICMP
  - UDP

**Results**

- Info*
  - READY
  - IN PROGRESS
  - PASSED
  - NO RESPONSE
  - UNKNOWN HOST
- Hop*
  - Numerical address
- Delay(ms)*
  - t1
  - t2
  - t3

***Trace Routev6***

**Setup**

- Target*
  - Numerical address
  - URL
- Max Hops* - 2 to 100
- Timeout* - 2 to 30 sec
- Type*
  - UDP

**Results**

- Info*
  - READY
  - IN PROGRESS
  - PASSED
  - NO RESPONSE
  - UNKNOWN HOST
- Hop*
  - Numerical address
- Delay(ms)*
  - t1
  - t2
  - t3



**Ethernet Tests** (continued)

***Netscan***

**Setup**

- Netscan* - Local
  - Custom
  - Disabled
- IP Address - IPv4 address
- Scan Range
  - 0 (class C /24)
  - 1 (class C /20)
  - 2 (class B /16)

**Results**

- List of IPv4 hosts
- List of IPv6 hosts

***Blink***

**Test**

- Sequence* - Off/10/Off/100/Off/1000 Mb/s (RJ-45)
- Off/On (Optical)

***Loop***

**Setup**

- Loop Type* - Wireline
  - MAC
  - IP
  - UDP
- All Traffic
  - Yes
  - No

**Statistics**

***IP***

**Results**

**IPv4**

- info: listening, assigned, DHCP failed
- DHCP or Static
- IPv4 Address
- IPv4 Netmask
- IPv4 Gateway
- IPv4 DNS1
- IPv4 DNS2

**IPv6**

- Enabled or Disabled
- info: listening, assigned, DHCP failed
- Stateful (DHCPv6) or Stateless or Static
- IPv6 Address
- IPv6 Network Prefix, 64 bit or 128 bit
- IPv6 Link Address
- IPv6 DNS

(continued)



***Statistics*** (continued)

- Discovery**
  - LLDP/CDP/EDP
  - Protocol
  - MAC address
  - Hostname / address
  - Port Name
  - Max 10 hosts

**VLAN**

- Detection**
  - 1 Level VLAN ID
  - Rx

**802.1x**

- Status**
  - Auth Not Started
  - Auth Started
  - Auth Completed Successfully
  - Auth Failed
  - Connected Successfully (auth)

- Port Status**
  - Unauthorised
  - Authorised

**EAP Method Used  
Key Management Used**

**LINK**

**Results**

- PORT*
  - PoE Voltage 0 - 60V
  - PoE Pairs 12/36 or 45/78
  - Speed, Duplex
  - MDI / MDIX
  - Signal Level
  - Polarity
- PARTNER*
  - 10M-HD
  - 10M-FD
  - 100M-HD
  - 100M-FD
  - 1000M-HD
  - 1000M-FD

(continued)





**Statistics** (continued)

**LINK**

**Results**

- ERRORS*
  - Collisions
  - FCS Errors
  - Undersize
  - Oversize
  - Jabbers
  - Bad Length

**Traffic Utilisation**

**Bargraph**

- Direction* - Rx
- Format* - Percentage of Link rate
  - Peak value
- Time Interval*- 1 min
  - 10 min
  - 60 min

**Storage**

**Configurations**

**Internal storage**

*Number of configurations* - 2 (Current & Factory settings)

**Export/Import**

- Port* - USB
- Format* - xml

**Certificates**

**802.1x**

*Max number* - 10

**Results**

**Internal storage**

*Max Number of Jobs (Projects)* - 50  
*Max Number of result sets per Job* - 5000 depending on tests performed  
*Max total number of result sets* - Up to 5000 depending on tests performed.

**Export**

- Port* - USB
  - Wi-Fi
- Format* - PDF
  - CSV (summary only)

**System**

**Setup**

**Owner**

- Details*
  - Name
  - Company
  - Address
  - Phone

(continued)



**System** (continued)

**Setup**

**Preferences**

- Language* - English
  - French
  - German
  - Spanish
  - Italian
  - Portuguese
  - Chinese
- Auto off* - Disabled
  - 3 mins
  - 10 mins
  - 30 mins
- Backlight* - Always On
  - Dims to 50% after 3 mins
- Length Units* - Meters
  - Feet
- Date Format* - dd/mm/yy
  - mm/dd/yy
- Time Format* - 12 hour
  - 24 hour

**Software update**

- Upgrade* - Via USB

**General**

**Date/Time**

**Internal Clock**

- Used for* - Timestamping results
- Autonomy* - Up to 1 day with battery removed

**Power**

**Battery**

- Supported Types* - Standard power module (4 x AA NiMH cells)
  - Alkaline battery pack with 4 AA cells
- Autonomy* - Up to 5 hours (power module only)
- Recharge time* - 3 hours (Power module only)
- Battery level Indication* - Full
  - 2/3
  - 1/3
  - Empty

**Physical**

**Dimensions**

- Length* - 175mm
- Width* - 80mm
- Depth* - 40mm

**Weight**

- Unit* - 0.22kg
- Batteries* - 0.18kg

(continued)



***General*** (continued)

***Environmental***

**Temperature**

Operating - 0°C to 40°C

Storage - -20°C to 70°C

**Relative Humidity**

Min 5%

Max 90% non-condensing

***Approvals***

**EMC**

EN 55022:2006 / A1:2007

EN55024:1998 / A1:2001 / A2:2003

**Safety**

IEC 60950-1:2005+A1:2009/EN 60950-1:2006+A1:2010



## Glossary, abbreviations and acronyms

Term	Description
10M-HD	10 Mb/s Half Duplex
10M-FD	10 Mb/s Full Duplex
100M-HD	100 Mb/s Half Duplex
100M-FD	100 Mb/s Full Duplex
1000M-HD	1000 Mb/s Half Duplex
1000M-FD	1000 Mb/s Full Duplex
Broadcast	Communication from single sender to all connected receivers
CSV	Comma Separated Value file format
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
IP	Internet Protocol
IPv4	Internet Protocol version 4
Static	IP address assigned manually by the operator
Dynamic	IP address assigned automatically using DHCP
IPv6	Internet Protocol version 6
Stateful	IP address assigned automatically using DHCPv6
Stateless	P address assigned automatically using Stateless Address Autoconfiguration (SLAAC) without DHCPv6
Static	IP address assigned manually by the operator
LAN	Local Area Network
MAC	Media Access Control
MDI	Medium Dependent Interface
MDIX	Medium Dependent Interface Crossover
NVP	Nominal Velocity of Propagation of signals in a cable, expressed as a percentage of the speed of light in a vacuum. Can be determined using cable manufacturers' data or experimentally using a known cable length.
PDF	Portable Document Format
PoE	Power over Ethernet
PoE+	Power over Ethernet which exceeds the IEEE 802.3af limit of 12.95 watts
RJ45	Registered Jack standard for a modular connector using 8 conductors
Rx	Receive
SFP	Small Form-factor Pluggable
SSID	Service Set Identifier
STP	Shielded Twisted Pair
Tx	Transmit
URL	Uniform Resource Locator
USB	Universal Serial Bus
UTP	Unshielded Twisted Pair



Term	Description
Wi-Fi	Wireless Network