



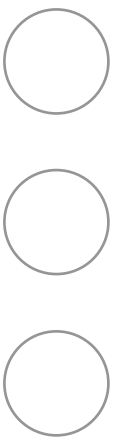
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OMNIScannerTM 2

OMNIFiberTM





OMNIScANNER2™

OMNIFIBER™

User Guide

ENGLISH

A Guide to using the OMNIScANNER to install, manage, and troubleshoot high performance cabling systems as well as multi- and single-mode fiber.

OMNIScANNER verifies installed links against all common cabling and network standards including Category 6/Class E and Gigabit Ethernet.

OMNIFIBER verifies installed links against TIA and ISO standards, as well as other fiber network application requirements.

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Fluke Networks, Inc.
P.O. Box 777
Everett, WA 98206-0777
U.S.A.

Fluke Europe B.V.
P.O. Box 1186
5602 BD Eindhoven
The Netherlands

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Chapter 1 - Introduction

The Digital Solution for Fiber and Copper

OMNIScANNER is the most advanced hand-held certification and diagnostic tool for the verification of copper links. The Category 7, 6, 5E (Enhanced), 5 and ISO Class F, E, D, and C tester has an extended frequency range of 300 MHz. OMNIScANNER provides full software compliance with TIA and ISO/IEC requirements for measurement reporting and analysis (including Length, Delay, ACR, NEXT, ELFEXT, Return Loss, Resistance, PSNEXT, PSACR, PSELFEXT and Attenuation). In addition, OMNIScANNER measures Length, Delay, Impedance, and Resistance on coaxial cabling.

OMNIFIBER MM (multimode) and OMNIFIBER SM (single-mode) expand the tester's capabilities to certify installed fiber links against TIA and ISO standards. Fiber cabling can be verified at 850, 1300, 1310, and 1550 nm wavelengths.

The Graphical User Interface

OMNIScANNER's graphical user interface consists of a backlit LCD display, quick access menus, arrow keys, and descriptive menu options that guide you through certifying or troubleshooting cabling systems.

OMNIREMOTE

For test and certification of twisted pair cabling, the OMNIScANNER requires the OMNIREMOTE unit at the opposite end of the cabling link under test. OMNIScANNER communicates with OMNIREMOTE to obtain status and perform measurements from both ends of the link.

OMNIREMOTE is equipped with a speaker to generate tones, and several colored LEDs to indicate overall test results and status.

OMNIFIBER™

OMNIFIBER *transforms* OMNIScANNER and OMNIScANNER2 into a fiber optic tool for testing and certification of multimode and single-mode fiber premise networks. OMNIFIBER consists of two test heads that attach directly onto OMNIScANNER and OMNIREMOTE to become a part of each unit. Using the 1-Button Autotest feature, OMNIFIBER measures loss and length over two fibers simultaneously. The measurements are compared against the selected LAN standard for instant PASS/FAIL analysis. OMNIFIBER measures loss at 850 and 1300 nm over multimode fiber and at 1310 and 1550 nm over single-mode fiber.

Up to 1000 Autotests can be saved to nonvolatile memory. Saved results can be easily uploaded to the PC with Scanlink™ software.

Scanlink™ Tools Software

PC-based software expands OMNIScANNER's user interface and aids with the management of projects. Scanlink Tools consist of the **OMNIScANNER Configuration** software, the **Scanlink Upload** software, and the **OMNIScANNER Remote Control** software. These programs allow you to store, retrieve, manage, edit and print network cabling information. Scanlink Tools provide the ability to create professional reports, remote control OMNIScANNER, and define cable and project configurations that can be downloaded to OMNIScANNER.

OMNIScANNER's Display

Scanner Display **Function**

- 1-2 or 12/36: The paired numbers in the display indicate wire pairs. For example, 1-2 indicates the wire pair of pins 1 and 2. 12/36 indicates two wire pairs tested, the first pair of pins 1 and 2, and the second pair of pins 3 and 6.
- Pop-up lists: Pop-up lists are available by pressing ENTER when the cursor is located on user definable fields. A predefined selection list will appear, and the rest of the display will be inactive.
- Spin Control: The spin control is available by pressing ENTER on editable fields that allow for increasing or decreasing numeric values by depressing the **↑** or **↓** keys.
- Scrollbars: Use the **↑** and **↓** keys on the keypad to move up and down in a scrollable screen.
- Graph: Use the **←** or **→** to move the graph cursor on the frequency axis. Use the **↑** or **↓** to zoom in and out on graphs.

ADAPTER CONNECTOR



OMNIScANNER's Keypad

 **ON/OFF**

When turned on OMNIScANNER will display the project screen.

 **Backlight**

Press the Backlight key to toggle the backlight between its two levels of brightness. Press and hold the Backlight key to display the **CON-TRAST** screen. Use the **↑** and **↓** keys on the keypad to adjust the

display contrast. In addition to contrast adjustments, the screen displays hardware version, software version, serial number information, and the date and time when the unit was last **Factory Calibrated**.



Autotest

Press the Autotest key to run a custom or predefined Autotest.



ESC

Press the Escape key to cancel the current operation.



Arrow keys

Press the ←→↑↓ arrow keys to navigate within a list, menu, graph, or editable field.



ENTER

When in a selection field press the ENTER key to open the listbox and then select the highlighted item as the new default. When in an editable field press the ENTER key to start the edit process, and press ENTER again when finished with the editing process.

Alphanumeric Keys

1

Use the 0 through 9 keys to enter numeric and alphabetic characters in editable fields. Alphabetic and special characters are shown above each numbered key on the keypad. The 1 key allows entry of the following characters: - (hyphen), . (period), and , (comma)

The 0 key allows entry of an empty space.

The alphanumeric keys also allow direct selection of items in numbered lists.

A/a

Use this key to toggle between upper and lower case letters.

?

Use this key to quickly display a window listing the functionality of the function keys in the current display.

Function Keys

The functions of the 4 keys vary depending on the current display. The assigned functions are:



Setup



Measurements



Diagnostics



Results



New



Edit



Delete



Save Options



Save



Save w/Graphs



Save to MMC



Save w/Graphs to MMC



Copy Project to MMC



Copy Results to MMC



Erase a letter



Clear a field



Copy Circuit ID



List Circuit IDs



Detail



Retest



Graph



Pair



Next Page



Previous Page



Select



Set Default



Switch to 850nm



Switch to 1300nm



Switch to 1310nm



Switch to 1550nm



Set Reference



Continue Test



Switch to Continuous Wave



Switch to Modulated (2KHz) Wave



Switch to OMNIScANNER Info



Switch to OMNIRemote Info



Dial phone number



End connection

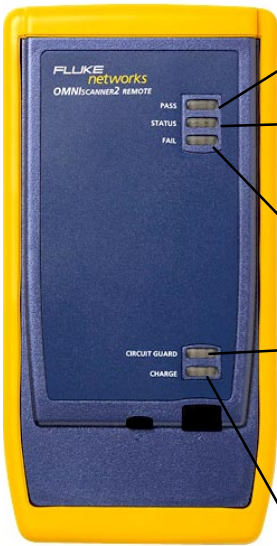


Print label



Select a template

OMNIREMOTE's LED Indicators



LED	Color	Description
PASS	Green	Overall Autotest Result is PASS
Status	Green (flashing)	OMNIREMOTE is ready for testing
	Green (consistent)	OMNIREMOTE is active
FAIL	Red	Overall Autotest Result is FAIL
Circuit Guard	Orange	Hazard condition is detected. LED will be lit in 5 second intervals until the hazard condition disappears.
REMOVE CABLE FROM HAZARDOUS SOURCE!		
Charge	Green	OMNIREMOTE is inactive, the AC adapter is present, and the battery pack is being charged
	Green (flashing)	OMNIREMOTE battery is fully charged
	Red (flashing)	OMNIREMOTE battery is low

OMNIREMOTE Keys

 **ON/OFF**

When turned on OMNIREMOTE will blink the LEDs.

 **λ (Lambda)**

When OMNIFIBER is attached to OMNIREMOTE, the remote unit can be used as a light source. With the OMNIFIBER adapter attached, press the λ key to activate the light source and provide continuous or modulated light at 850, 1300, 1310 or 1550 nm. The green LED of the appropriate

wavelength will blink rapidly when modulated light is transmitted. If the transmitted light is continuous, the green LED will not blink. (See OMNIFIBER'S LED indicators in this chapter for further information.)

When To Use OMNIREMOTE

Most measurements require the use of OMNIREMOTE at the far end of the cable. For other measurements, OMNIREMOTE can be connected, but its use is optional. OMNIScANNER detects the presence of the remote unit and automatically configures it for the measurement to be performed.

Twisted Pair Measurements requiring the use of OMNIREMOTE:

- *Autotest*
- *Wiremap*
- *NEXT and Power Sum NEXT*
- *Attenuation*
- *Return Loss*
- *ELFEXT and Power Sum ELFEXT*
- *ACR and Power Sum ACR*

Twisted Pair Measurements not requiring the use of OMNIREMOTE:



- *Length / Delay / Skew*
- *Resistance*

COAX Measurements do not require the use of OMNIREMOTE.

Fiber Measurements require the use of OMNIREMOTE with an OMNIFIBER Adapter.

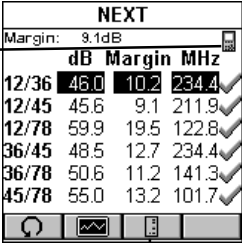
Displaying OMNIScANNER and OMNIREMOTE Results

OMNIScANNER and OMNIREMOTE are used together to perform measurements, which allow the scanner to verify installed links or assist in the diagnosis of physical layer network problems. To accomplish these measurements, OMNIScANNER and OMNIREMOTE are connected at either end of a network-cabling link. The end at which the scanner is connected, is referred to as the 'Scanner end', and the end at which the remote unit is connected, is referred to as the 'Remote end'.

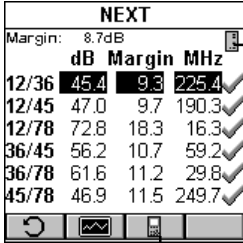
OMNIScANNER displays test results for both ends of the link. Press  or  to toggle the display between Scanner and Remote test results.

Note

Refer to the graphics in Chapter 2 - Getting Started: **Typical Test Configurations** for instructions on connecting OMNIScANNER and OMNIREMOTE for basic link and full channel tests.




Indicates OMNIScANNER test results.




Indicates OMNIREMOTE test results.

Toggles the display from Scanner to Remote end test results.

OMNIFIBER MM LED Indicators

	LED	Color	Description
	850nm	Green	OMNIFIBER is transmitting at 850 nm
	850nm	Green (flashing)	OMNIFIBER is transmitting modulated light at 850 nm
	850nm	Orange	Part 1 of Two Way test completed, switch fibers
	1300/ 1310nm	Green	OMNIFIBER is transmitting at 1300/1310nm
	1300/ 1310nm	Green (flashing)	OMNIFIBER is transmitting modulated light at 1300/1310nm
	1300/ 1310nm	Orange	Part 1 of Two Way test completed, switch fibers

OMNIFIBER SM LED Indicators

	LED	Color	Description
	1310nm	Green	OMNIFIBER is transmitting at 1310 nm
	1310nm	Green (flashing)	OMNIFIBER is transmitting modulated light at 1310 nm
	1310nm	Orange	Part 1 of Two Way test completed, switch fibers
	1550nm	Green	OMNIFIBER is transmitting at 1550nm
	1550nm	Green (flashing)	OMNIFIBER is transmitting modulated light at 1550 nm
	1550nm	Orange	Part 1 of Two Way test completed, switch fibers

Attaching the OMNIScANNER Fiber Adapters

Note

Use dust caps to protect the connectors from dirt. Keep the connectors covered when the Fiber Adapters are not in use. This helps to ensure that contaminants from handling fiber do not affect test measurements.

Note

Both OMNIFIBER adapters have 160 pin connector covers. Keep the 160 pin connectors covered when the Fiber Adapters are not in use.

To attach a fiber adapter to OMNIScANNER proceed as follows:

1. Remove the 160 pin connector cover from the OMNIFIBER adapter by gently pressing the black push button latches. The cover will be released.
2. Push the OMNIFIBER adapter onto OMNIScanner's 160 pin connector until it snaps into position.
3. To remove OMNIFIBER, use the push button latches to release the secured adapter.
4. Protect OMNIFIBER's 160 pin connector by snapping the cover back in place.



Attaching the Connector Adapter

OMNIFIBER has one ST-style connector port (TX) and one threaded optical receiver port (RX) which accepts different connector adapters.

Attach the included ST connector adapters to the OMNIFIBER RX receiver ports before connecting jumpers.

Note

Keep the connectors covered when the Fiber Adapters are not in use.

Several connector adapters are available (as optional accessories) for the OMNIFIBER optical receiver port (RX).

Editing with OMNIScANNER

OMNIScANNER includes sophisticated easy-to-use editing methods to accommodate a variety of user-definable items. Different fields have different editing procedures. Please follow the described procedures to make editing with the OMNIScANNER effortless.

Note

All editable fields can be easily recognized by their dotted borders.

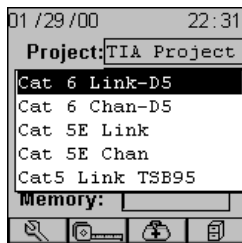
Predefined Lists

To quickly and easily select Projects, Autotests, Cables, etc. OMNIScANNER uses predefined lists.

1. Use the **↑** or **↓** arrow keys to move the cursor to the field to be edited and press ENTER.

A pop-up list will be displayed while the main screen becomes inactive.

2. Use the **↑** or **↓** arrow keys to move the cursor to the appropriate item or value and press ENTER to select it as the new default.



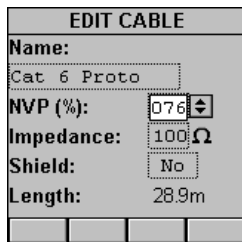
Editing Numeric Fields with the Spin Control

1. Use the **↑** or **↓** arrow keys to move the cursor to the field to be edited. The entire field will be highlighted in black.

2. Press ENTER. Notice that the field is now highlighted in white and the main screen in the background turns gray to indicate that the edit mode has been launched.

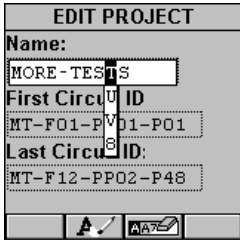
3. Press the **↑** or **↓** arrow keys on your keypad to scroll through the string of numbers.

4. Press ENTER or ESC to accept the value and terminate edit mode.



Editing Alphanumeric Fields

To start the editing procedure for fields that contain alphabetic and numeric characters use the alphanumeric keypad.



1. Use the **↑** or **↓** arrow keys to move the cursor to the field to be edited. The entire field will be highlighted in black.



2. Press **ENTER**. Notice that the field is now highlighted in white and the main screen in the background turns gray to indicate that the edit mode has been launched. The first letter in the field is highlighted in black.

3. Press any numerical key on your keypad to display a small drop-down list containing letters to choose from. Example: Press **8** to choose **t**, **u**, **v** or the number **8**.

Note

*Alphabetic and special characters are printed above each numbered key on the keypad. For example, **ABC** is printed above the **2** key.*

4. Use the **↑** or **↓** arrow key to move to the appropriate character, or simply press **8** on your keypad repeatedly until the appropriate letter or number appears in the highlighted field. Press the **Aa** key to toggle between uppercase and lowercase letters.

5. Press the **→** to close the drop-down list and highlight the next letter to be edited. Notice that OMNIScANNER does not overwrite existing characters. To delete single characters use the  function key. To clear an entire field use the  function key.

6. Press **ENTER** to accept the field and exit the edit mode.

Technical Support

If you have technical questions, you may contact Fluke Networks Technical Support by phone, fax, or e-mail.

Note

Before calling Technical Support, please have your Serial number, and the Hardware and Software Version numbers available. See Product Versions section below.

Visit the Fluke Networks website at **www.flukenetworks.com**. Send email to **fluke-assist@flukenetworks.com**.

To order accessories or get the location of the nearest Fluke Networks distributor or service center, call:

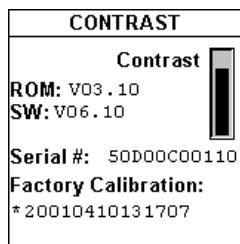
- USA: 1-888-99-FLUKE (1-888-993-5853)
- Canada: 1-800-363-5853
- Europe: +31-402-675-200
- Beijing: 86 (10) 6512-3435
- Japan: +81-3-3434-0181
- Singapore: +65-738-5655
- Anywhere in the world: +1-425-446-4519


For operating assistance in the USA, call 1-800-283-5853.

Product Versions

To display the software version #, the hardware version #, the serial #, and the factory calibration data for OMNIScANNER, press and hold the Backlight key.

The **CONTRAST** screen will be displayed, which contains information that you may need to provide when calling Technical Support.




To display software, hardware and serial number information for OMNIRemote, connect the units with the supplied Link Adapter and the Channel -, Mod 8 -, or Set Reference Adapter and then press the .


(Setup) function key.



Select **Remote Info** to open the **REMOTE INFO** screen, which contains the date the reference was last set, the hardware and software information, the serial number, the battery indicator, and the factory calibration data.

The serial number can also be found on the back of each unit.

To display information for OMNIFIBER, attach the OMNIFIBER adapters to OMNIScANNER and OMNIREMOTE, connect the units with the supplied fiber launch cable and press the  (Setup) function key.

Select **Fiber Info** to open the **FIBER INFO** screen, which contains the serial numbers, the date the adapters were last factory calibrated, and the current reference method.

REMOTE INFO	
Reference Date:	05/29
ROM:	V03.20
SW:	V06.10
Serial #:	50E00A00398
Battery:	
Factory Calibration:	
	*20020127155109

FIBER INFO	
	#: 50C99I00736
	* Date: 09/24/00
	#: 50C99I00649
	* Date: 09/23/00
Reference Method(s):	
	2

Chapter 2 - Getting Started Twisted Pair Networks

Charging OMNIScANNER's Battery

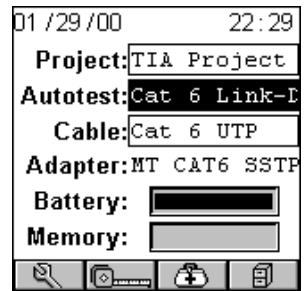
In order to operate the OMNIScANNER and OMNIREMOTE with battery power, the battery must first be charged. Until the charging cycle is complete, the units can run with the AC adapter plugged in. (See *Appendix B - Batteries* for more information about the batteries.)

OMNIScANNER's Project Screen

OMNIScANNER's project screen is designed to allow you to perform all typical work flow operations. The project, the test specifications, and the cable types are all selectable from the OMNIScANNER **Project** screen.


Press the **ON/OFF** key to power the unit on and display the Project screen with its three user definable items: **Project**, **Autotest**, and **Cable**.


The **Project** name will be highlighted. Use the **↓** to move the highlight to the **Autotest** or **Cable** field. Press **ENTER** when a field is highlighted to change the current Project, Autotest, or Cable. OMNIScANNER will auto-sense the **Adapter**.




Battery and Memory status are graphically indicated by gauges with a display ranging from empty (left hand side) to full (right hand side).

Press  (Setup) to select Autotests, configure Cables, and more.

Press  (Measurements) to measure a cable's performance, utilizing a variety of tests.

Press  (Diagnostics) to identify network cabling faults

Press  (Results) to view and manage stored test results.

Certification of Network Installations

OMNIS_{SCANNER} is designed to efficiently certify cabling installations through its Autotest feature. Test results, test specifications, and cable types are organized into Projects. The Project, its test specifications and cable types are selectable from the OMNIS_{SCANNER} **Project** screen.

OMNIS_{SCANNER} contains a number of predefined projects, grouped by test standards, to allow easy and fast operation.

The typical order of operations performed when certifying a cable installation is as follows:

Preparation

Prior to initial certification, perform the following:

1. Run a self-test by setting the reference for OMNIS_{SCANNER} and OMNI_{REMOTE} periodically, e.g. weekly.
2. Select the appropriate **Project**, **Autotest** specification, and **Cable** type.

Certification

Perform the following for each installed cable to be tested:

3. Attach OMNIS_{SCANNER} to one end of the link, which is typically at the patch panel in a wiring closet.
4. Attach OMNI_{REMOTE} to the corresponding outlet at the other end of the cable link.
5. Run Autotest.
6. Save test results.

Completion

At the end of the day or shift, the test results are uploaded using **Scanlink Tools** software.

Scanlink Tools support the following:

- Upload test results
- Storage of test results to files (Scanlink proprietary format)
- Print test reports
- Export results in CSV format

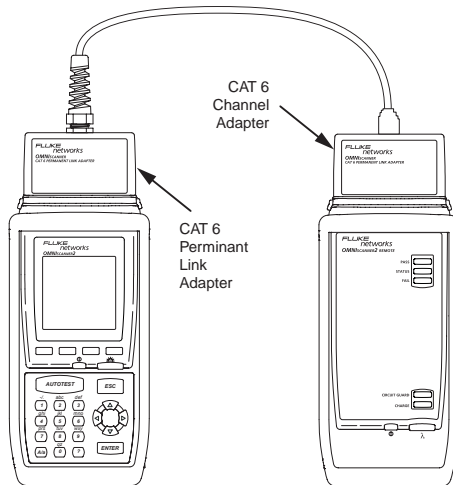
- Setup Projects
- View Graphs
- Edit Autotest information

The following sections provide detail on the certification process.

Setting the Reference

A reference must be set when OMNIScANNER and OMNIRemote are used as a set for the first time. After the initial reference setting, the process should be repeated periodically to ensure unit verification.

OMNIScANNER stores reference data for up to 5 remote units by serial number.

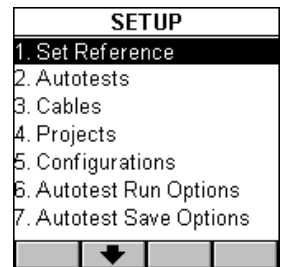


1. To set the reference, connect OMNIScANNER and OMNIRemote using the PERMANENT LINK ADAPTER and CHANNEL ADAPTER supplied with the scanner (as shown).

2. Turn OMNIScANNER on.

3. Press  (Setup).

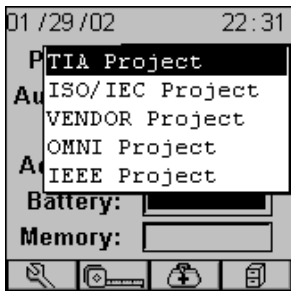
4. Select **Set Reference**.



5. On finding OMNIREMOTE, the scanner reports: **Acquiring Reference Data**. A gauge will indicate the progress.
6. Once the reference values has been recorded, OMNIScANNER displays the **REMOTE INFO** screen.
7. Press ESC to return to OMNIScANNER's **SETUP** screen.

Project Selection

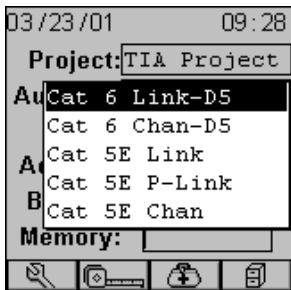
A project name must be selected for test result management. Autotests and Cables were previously assigned to a specific project through the use of the **OMNIScANNER Configuration** utility. (See Chapter 9 - *Uploading and Printing for further information about OMNIScANNER Configuration.*)



The Project feature is very useful for grouping test results and eases uploading and sorting of Autotests stored in the scanner.

1. Use the **↑** or **↓** to highlight **Project:** and press ENTER.

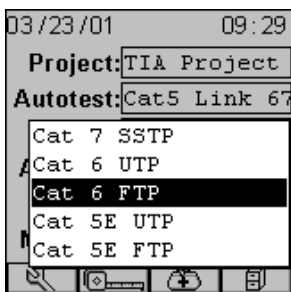
2. Select the appropriate Project from the pop-up list and press ENTER.



3. Use the **↑** or **↓** to highlight **Autotest:** and press ENTER.

4. Select the appropriate Autotest from the pop-up list and press ENTER.


5. Use the **↑** or **↓** to highlight **Cable:** and press ENTER.



6. Select the cable type to be tested from the pop-up list and press ENTER.


OMNIScANNER auto-senses the adapter and the **Adapter:** field changes to reflect the adapter that is currently attached. If the adapter is changed, OMNIScANNER will automatically adjust the content in the fields **Autotest:** and **Cable:** to reflect the new setup.

Every Project has certain Autotests and cables

assigned already. These associated lists will appear in the pop-up lists for each item. If the Autotest or Cable you want to use is not in a pop-up list, open  (Setup) to select the appropriate item. (See Chapter 4 - Setup: **Autotest**, **Cable**, or **Project** for further information.)

Running an Autotest for Twisted Pair Cabling

1. Connect OMNIScANNER to the near end of the twisted pair cable you are testing and connect OMNIREMOTE to the far end. (See the **Typical Test Configurations for Twisted Pair Cabling** section in this chapter for more information.)

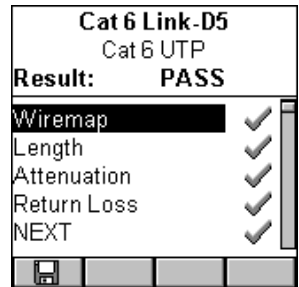
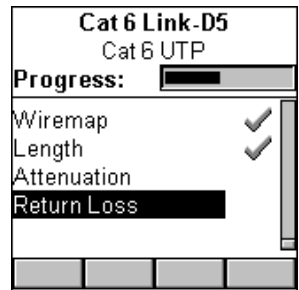
2. Press the  key. When testing twisted pair cable, OMNIScANNER will immediately verify that OMNIREMOTE is attached. If OMNIREMOTE is not attached, OMNIScANNER will wait until it is attached before running the Autotest.

3. Press ESC at any time to cancel the Autotest.

4. The **AUTOTEST** screen is displayed while Autotest is running.

The **Autotest** and the **Cable** name are displayed at the top of the screen. A gauge indicates the test progress. Tests will be listed with their individual ✓ (PASS) or ✗ (FAIL) results as soon as a test is completed.

Once all tests are performed, the overall test **Result:** is displayed as **PASS** or **FAIL**.



Note


The list of tests varies depending on the kind of Autotest that was performed.

An Autotest will PASS ✓ if all the selected tests met the specified criteria. An Autotest will FAIL ✗ if one or more of the selected tests failed.

If the measured result fails by an amount less than or equal to the

accuracy of the OMNIScANNER measurement system, a ✖ (marginal FAIL) will be reported. If the measured result passes by an amount less than or equal to the accuracy of the measurement, a ✔ (marginal PASS) will be reported. Marginal results are very close to the PASS/FAIL line and are within the accuracy of the measurement for that type of link. Accuracy varies depending upon several conditions including the type of link model and the measurement being performed. In most cases this uncertainty zone is much less than 1 dB.


Saving Twisted Pair Autotest Results


1. Press  (Save) from the **AUTOTEST** screen to open the **SAVE AUTOTEST** screen, where the Autotests can be stored into OMNIScANNER's memory.
2. The **Project:** field contains the name of the project.
3. To assign a unique name to the Autotest, enter a Circuit ID into the **Circuit ID:** field.



Circuit IDs can be setup to automatically increment. (See Chapter 4 - Setup: **Projects: Editing a Circuit ID** for further information.)

If an incrementing Circuit ID was created in the **PROJECT** Setup screen, the **Circuit ID:** field will already contain the next available Circuit ID that can be used as a default.


4. To change the name using OMNIScANNER's edit feature, highlight the field, and press ENTER to initiate the editing mode. (See Chapter 1 - Introduction: **Editing with** OMNIScANNER for more information.)
5. To change the Name using the list function, press  (List). The **CIRCUIT ID** screen opens and displays all Circuit IDs available for the project. Use the ← or → to quickly scroll through the pages. Use the ↑ or ↓ to highlight a Circuit ID and press ENTER to select it as the name for the Autotest to be saved and return to the **SAVE AUTOTEST** screen.


6. Press  (Autotest Save Options) to open the **SAVE OPTIONS** screen. Select the Destination for saved test results and select or

unselect the graphs to be saved. (See Chapter 4 - Setup: **Autotest Save Options** for more information.)

Press  (Save) to save the settings and return to the **SAVE AUTOTEST** Screen


7. The **SAVE AUTOTEST** screen's save function key indicates the selected Save Option.


Press  (Save) to save the test results to OMNIScANNER's internal memory.

Press  (Save with Graphs) to save the test results with their graphs to OMNIScANNER's internal memory.

Note

Saving graphs will reduce the number of Autotests that can be stored.

Press  (Save to MMC) to save the test results to the MultiMediaCard. (OMNIScANNER2 only.)

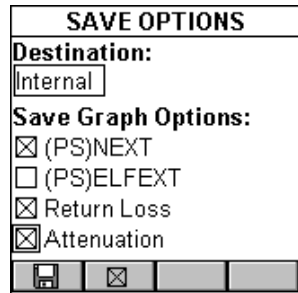
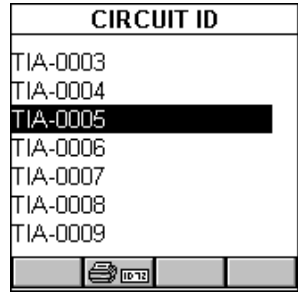
Press  (Save with Graphs to MMC) to save the test results with their graphs to the MultiMediaCard. (OMNIScANNER2 only.)

Note

Saving graphs will reduce the number of Autotests that can be stored.

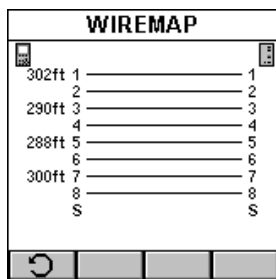
8. Press ESC to return to the Autotest screen without saving the Autotest.

9. To run the next Autotest press the  key.



Viewing Twisted Pair Autotest Results

This viewing option is only available immediately after the Autotest was performed.



LENGTH/DELAY

Length(ft):	Limit
288	308
Delay(nS):	
395	513
Skew(nS):	
20	42

LENGTH/DELAY

Limit:	308ft	513nS
1-2	302ft	415nS
3-6	290ft	399nS
4-5	288ft	395nS
7-8	300ft	412nS
Skew:	20nS	
Limit:	42nS	

NEXT

Margin: 10.8dB

dB Margin	MHz
12/36	47.1 11.0 225.4
12/45	60.0 11.0 36.3
12/78	73.8 19.2 16.3
36/45	57.7 12.1 59.2
36/78	62.4 12.0 29.5
45/78	48.7 13.4 249.7

ATTENUATION

Margin: 5.3dB

dB Margin	MHz
1-2	26.4 5.3 248.8
3-6	26.2 5.6 248.8
4-5	26.1 5.6 247.9
7-8	26.0 5.8 248.8

RETURN LOSS

Margin: 7.0dB

dB Margin	MHz
1-2	26.7 7.7 5.0
3-6	26.6 7.6 5.5
4-5	26.3 7.3 5.2
7-8	27.1 8.1 7.5

RESISTANCE

Limit: 40.0Ω

1-2	13.5Ω
3-6	13.4Ω
4-5	13.5Ω
7-8	13.0Ω

POWER SUM ELFEXT

Margin: 12.8dB

dB Margin	MHz
1-2	27.3 12.8 241.6
3-6	34.5 14.6 131.4
4-5	32.3 15.9 195.3
7-8	28.5 14.1 244.3

POWER SUM ACR

Bandwidth: 250 MHz

dB Margin	MHz
1-2	53.5 14.1 27.1
3-6	69.3 15.6 6.8
4-5	52.8 13.4 27.1
7-8	73.3 17.3 5.2

ACR

Bandwidth: 250 MHz

dB Margin	MHz
12/36	22.1 15.5 234.4
12/45	53.6 11.8 27.1
12/78	77.5 21.8 7.0
36/45	41.8 17.6 96.1
36/78	74.1 15.8 5.2
45/78	58.8 15.9 24.6

POWER SUM NEXT


Margin: 11.5dB

dB Margin	MHz
1-2	45.2 11.7 225.4
3-6	45.9 12.4 225.4
4-5	55.4 12.3 59.0
7-8	61.1 13.1 29.5

ELFEXT



Margin: 10.9dB



dB Margin	MHz
12/36	40.1 16.3 117.4
12/45	37.8 18.5 197.1
12/78	29.1 11.6 243.4
36/12	89.4 15.9 121.9
36/45	33.5 14.1 195.3
36/78	38.9 16.0 130.0

To view stored test results at a later time, press the  (Results) function key located in the Project screen. (See *Chapter 7 - Results for more information.*)

Note


The list of tests varies depending on the kind of Autotest that was performed.


1. To view detailed results of all the tests that were performed during Autotest, highlight a specific test in the Autotest screen using the  or  and press ENTER.

2. Use the  or  to quickly browse through all other detailed test result screens and their results.

All Tests that can run during Autotest are displayed on the next page. (See *Chapter 5 - Measurements for detailed descriptions of each available test.*)

Most Autotest result screens have a retest feature for diagnostic purposes.


Press  (Retest) to run continuous tests for the same cable. The arrow located on the Retest button will be turning for the duration of the test.

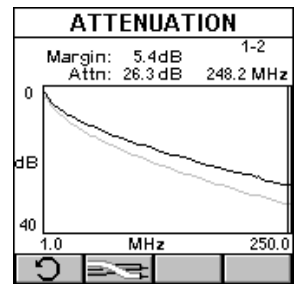
Press  (Retest) once more to stop the continuous measurement. OMNIScANNER will display the last measured data.

Note

Retest invalidates an Autotest. After using the retest feature, the Autotest must be repeated before results can be saved.


The NEXT, Attenuation, Return Loss, Power Sum NEXT, ELFEXT, ACR, Power Sum ELFEXT, and Power Sum ACR test result screens have a graph feature to display the graph associated with the test. To avoid misinterpretation, the limit line is shown in a gray color, while the actual measurement is represented in black.



Press  (Graph) to display a graph for a pair or a pair combination.





LENGTH/DELAY		
Length(ft):	Limit	
288	308	
Delay(nS):		
395	513	
Skew(nS):		
20	42	


LENGTH/DELAY		
Limit:	308ft	513nS
1-2	302ft	415nS
3-6	290ft	399nS
4-5	288ft	395nS ✓
7-8	300ft	412nS
Skew:	20nS	✓
Limit:	42nS	

The Length results screen has a  (Detail) function key that allows you to view detailed test results for each pair.


Tests that require the use of OMNIREMOTE will have small icons in the upper right corner of the titlebar to indicate whether the information is pertinent for  OMNIScANNER or  OMNIREMOTE.

ACR				
Bandwidth:		250 MHz 		
	dB Margin	MHz		
12/36	22.1	15.5	234.4	✓
12/45	53.6	11.8	27.1	✓
12/78	77.5	21.8	7.0	✓
36/45	41.8	17.6	96.1	✓
36/78	74.1	15.8	5.2	✓
45/78	58.8	15.9	24.6	✓

To toggle between the two screens press  to open the screen that contains the information for OMNIScANNER.

Press  to display the information for OMNIREMOTE.



The RETURN LOSS and NEXT screens have  (Diagnostic) function keys to help you with the interpretation of failed test results. (See Chapter 6 - TDRL and TDNXT for detailed information.)

Typical Test Configurations for Twisted Pair Cabling

Link

The graphic shows the connection of OMNIScANNER to a Modular 8 Jack in the wiring closet, and OMNIREMOTe to a Modular 8 jack in the work area.

Use the supplied **LINK ADAPTERS** at both ends of the link to attach OMNIScANNER and OMNIREMOTe to the Modular 8 jacks.

During permanent link Autotests, the effects of the link adapters are removed from the measurements.

The permanent link method measures the link only, from jack to jack (including the Modular 8 plug that plugs into the Jack).

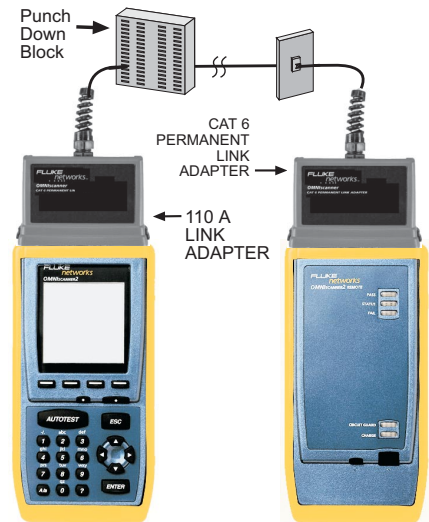


Link with Punch Down Block and Modular 8 Jack

The graphic shows the connection of OMNIScANNER to an IDC (110) block in the wiring closet, and OMNIREMOTe to a Modular 8 jack in the work area.

The Punch Down Block Adapter kits **110 A LINK ADAPTER** and **110 B LINK ADAPTER** are available (as optional accessories) to interface the OMNIScANNER and OMNIREMOTe with IDC (110) punch-down blocks.

Use the **110 A or B LINK ADAPTER** to attach OMNIScANNER to the 110 Punch Down block. At the other end of the link, use the



LINK ADAPTER to attach OMNIREMOTE to the Modular 8 jack.

Full Channel with Modular 8 Jacks

A Full Channel consists of all the link elements from the hub to the workstation.

For cables terminated with a modular 8 plug, use the supplied modular 8 **CHANNEL ADAPTER** and attach OMNIScANNER and OMNIREMOTE to the channel patch cords.

Note

Best results for Category 6 channel tests will be obtained when using OMNIScANNER software version 4.0 or higher, which utilizes AVC (Adaptive Vector Cancellation™).





For more information on the Permanent Link, the Basic Link, and the Channel, please visit www.cabletesting.com.


Coaxial “Autotests”

The Project Screen

Press the **ON/OFF** key to power the unit on and display the Project screen with its user definable items: **Project** and **Cable**.

Press  (Setup) to select and configure Cables and Projects, edit User Options, and more.

Press  (Measurements) to measure a cable’s performance, utilizing a variety of tests.

Press  (Results) to view and manage stored test results.



Running an Autotest for Coaxial Cabling

1. Connect OMNIScANNER to the near end of the coaxial cable you are testing.

OMNIScANNER auto-senses the adapter. The **Adapter:** field changes to reflect the coax adapter that is now attached.

2. Use the **↑** or **↓** to highlight **Project:** and press ENTER.


3. Select the appropriate Project from the pop-up list and press ENTER.

Select a project name for test result management. Cables were previously assigned to a specific project through the use of the **OMNIScANNER Configuration** utility. (See *Chapter 9 - Uploading and Printing for further information about OMNIScANNER Configuration.*)


The Project feature is very useful for grouping test results and eases uploading and sorting of Autotests stored in the scanner.

4. When a coax adapter is attached, the **Cable:** field displays the coaxial cable that is appropriate for the selected Project.

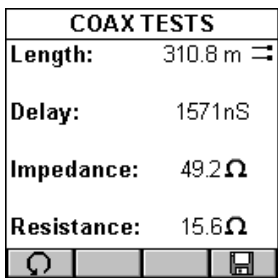
If the Cable you want to use is not in the **Cable:** pop-up list, open


 (Setup) to select the appropriate cable.

(See *Chapter 4 - Setup: Cables* for further information.)

5. Press the  key to start the test.
6. Press ESC at any time to cancel the Autotest.
7. The **COAX TESTS** screen is displayed when the Autotest is completed.



Saving Coaxial Autotest Results




1. Press  (Save) from the **AUTOTEST** screen to open the **SAVE AUTOTEST** screen, where the Autotests can be stored into OMNIScANNER's memory.
2. The **Project:** field contains the name of the project.
3. To change the name using OMNIScANNER's edit feature, highlight the field, and press ENTER to initiate the editing mode. (See *Chapter 1 - Introduction: **Editing with OMNIScANNER** for more information.*)
4. To assign a unique circuit id to the Autotest, enter a Circuit ID into the **Circuit ID:** field.

Circuit IDs can be setup to automatically increment. (See *Chapter 4 - Setup: **Projects: Editing a Circuit ID** for further information.*)


If an incrementing Circuit ID was created in the **PROJECT** Setup screen, the **Circuit ID:** field will already contain the next available Circuit ID that can be used as a default.


5. To change the circuit ID using the list function, press  (List). The **CIRCUIT ID** screen opens and displays all Circuit IDs available for the project. Use the **←** or **→** to quickly scroll through the pages. Use the **↑** or **↓** to highlight a Circuit ID and press ENTER to select it as the name for the Autotest to be saved and return to the **SAVE AUTOTEST** screen.
6. Press  (Autotest Save Options) to open the **SAVE OPTIONS**

screen. (See Chapter 4 - Setup: **Autotest Save Options** for further information.)

Press  (Save) to save the settings and return to the **SAVE AUTOTEST** Screen

7. Press ESC to return to the **COAX TESTS** screen without saving the Autotest.


8. Press  (Retest) to run continuous tests for the same coaxial cable. The arrow located on the Retest button will be turning for the duration of the test.

9. Press  (Retest) once more to stop the continuous measurement.

Note

Retest invalidates a coaxial Autotest. After using the retest feature, the coaxial test must be repeated before results can be saved.

Viewing Coaxial Test Results

To view stored test result, press the  (Results) function key located in the Project screen. (See Chapter 7 - Results for more information.)

Chapter 3 - Getting Started Fiber Optic Networks

Charging OMNIScANNER's Battery

In order to operate the OMNIScANNER and OMNIREMOTE with battery power, the battery must first be charged. Until the charging cycle is complete, the units can run with the AC adapter plugged in. (See *Appendix B - Batteries* for more information about the batteries.)

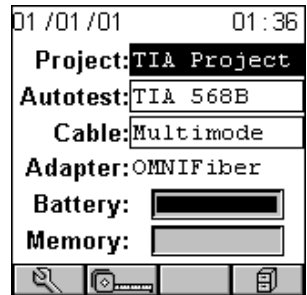
OMNIScANNER's Project Screen

The Project screen is designed to allow you to perform all typical work flow operations. The Project, the test specifications, and the cable types are all selectable from the Project screen.


Press the **ON/OFF** key to power the unit on and display the project screen with its three user definable items: **Project**, **Autotest**, and **Cable**.


The **Project** name will be highlighted. Use the ↓ to move the highlight to the **Autotest** currently selected. Use the ↓ to highlight the currently selected **Cable** type. OMNIScANNER will auto-sense the **Adapter**.

Battery and Memory status are graphically indicated by gauges with a display ranging from empty (left hand side) to full (right hand side).



Press  (Setup) to select Autotests, configure Cables and Projects, view OMNIFIBER information, edit User Options, and more.

Press  (Measurements) to measure a cable's performance, utilizing a variety of tests.

Press  (Results) to view and manage stored test results.

Certification of Fiber Installations

OMNIS_{SCANNER} and OMNIF_{FIBER} are designed to efficiently certify fiber optic cabling installations through the Autotest feature. Test results, test specifications, and cable types are organized into Projects. The Project, its test specifications and cable types are selectable from the OMNIS_{SCANNER} **Project** screen.

OMNIS_{SCANNER} contains a number a predefined projects, grouped by test standards, to allow easy and fast operation.

The typical order of operations performed when certifying a cable installation is as follows:

Preparation

Prior to initial certification, perform the following:

1. Attach an OMNIF_{FIBER} to OMNIS_{SCANNER}. This will be referred to as the OMNIF_{FIBER} MAIN.
2. Attach an OMNIF_{FIBER} to OMNIR_{REMOTE}. This will be referred to as the OMNIF_{FIBER} REMOTE.
3. Establish a reference power by setting the reference.
4. Select the appropriate **Project**, **Autotest** specification, and **Cable** type.

Certification

Perform the following for each installed fiber to be tested:

5. Attach OMNIF_{FIBER} MAIN to one end of the link, which is typically at the patch panel in a wiring closet.
6. Attach OMNIF_{FIBER} REMOTE to the corresponding patch panel or outlet at the other end of the cable link.
7. Run Autotest.
8. Save test results.

Completion

At the end of the day or shift, the test results are uploaded using **Scanlink Tools** software.

Scanlink Tools support the following:

- Upload test results
- Storage of test results to files (Scanlink proprietary format)
- Print test reports
- Export results in CSV format
- Setup Projects
- Edit Autotest Information


Setting the Reference for Fiber Optic Cabling

Note


To ensure consistent accurate measurements, the reference value must be set each time the connector adapter or the test configuration is changed. Since the reference value expires each day at midnight, a reference must be established least once each calendar day that the OMNIFIBER is used.

1. Attach the connector adapters to each of the OMNIFIBER RX ports.

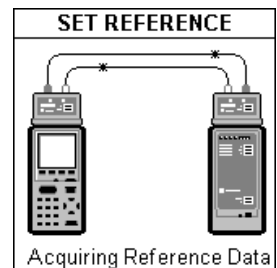
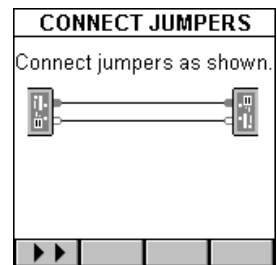
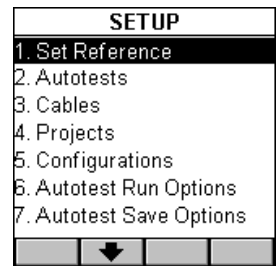
2. To set the reference value, connect the OMNIFIBER MAIN and OMNIFIBER REMOTE using launch cables (jumper) and couplers. See *Chapter 8 - Fiber Optic Reference Methods for further information.*

3. Press  (Setup) and then select Set Reference.

4. The **CONNECT JUMPERS** screen will display how the jumpers need to be connected so that the reference value can be recorded.

5. Connect the jumpers as shown and press  (Continue) to collect the reference data while the **SET REFERENCE** screen is displayed.

OMNIScANNER will store a separate reference value for each wavelength.



OMNIS_{SCANNER} will store reference data for up to 5 OMNIFIBER pairs.

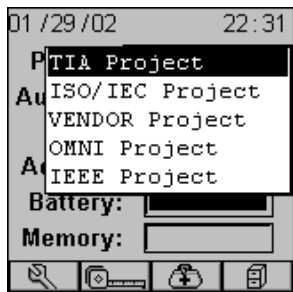
Note

Once the reference value has been set, ensure that both launch cables remain attached to the fiber adapters' TX (transmit) ports so that the connections are not disturbed.

6. Once the reference value has been set, OMNIS_{SCANNER} will display the **FIBER INFO** screen.
7. Press ESC to return to the **SETUP** screen.

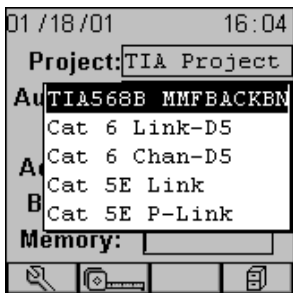
Project Selection

A project name must be selected for test result management. Autotests and Cables were previously assigned to a specific project through the use of the OMNIS_{SCANNER} **Configuration** software. (See Chapter 9 - *Uploading and Printing for further information about OMNIS_{SCANNER} Configuration.*)



The Project feature is very useful for grouping test results and eases uploading and sorting of Autotests stored in the scanner.

1. Use the **↑** or **↓** to highlight **Project:** and press ENTER.
2. Select the appropriate Project from the pop-up list and press ENTER.
3. Use the **↑** or **↓** to highlight **Autotest:** and press ENTER.



Note

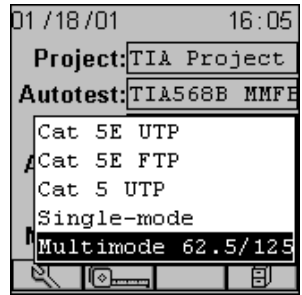
Different Autotests have different reference methods already assigned to them.

4. Select the appropriate Autotest from the pop-up list and press ENTER.
5. Use the **↑** or **↓** to highlight **Cable:** and press ENTER.


6. Select the cable type to be tested from the pop-up list and press ENTER.

The **Adapter:** field will automatically change to reflect that OMNIFIBER is currently attached.

OMNIScANNER auto-senses the adapter. If the adapter is changed, OMNIScANNER will automatically adjust the content in the fields **Autotest:** and **Cable:** to reflect the new setup.



Every Project has certain Autotests and cables assigned already. These associated lists will appear in the pop-up lists for each item. If the Autotest or Cable you

want to use is not in a pop-up list, open  (Setup) to select the appropriate item. (See Chapter 4 - Setup: **Autotest**, **Cable**, or **Project** for further information.)

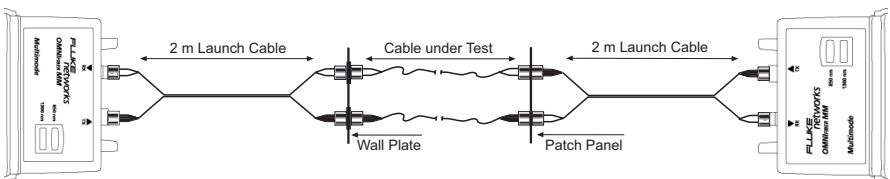
Running an Autotest for Fiber Optic Cabling

Preparing an Autotest

Connect OMNIFIBER MAIN to the near end of the RX/TX fiber pair you are testing and connect OMNIFIBER REMOTE to the far end. Depending on the method that was used to obtain the reference, connect your fibers as follows:

2 JUMPER METHOD AUTOTEST

To run an Autotest when the 2-Jumper Method was used to set the Reference proceed as follows:



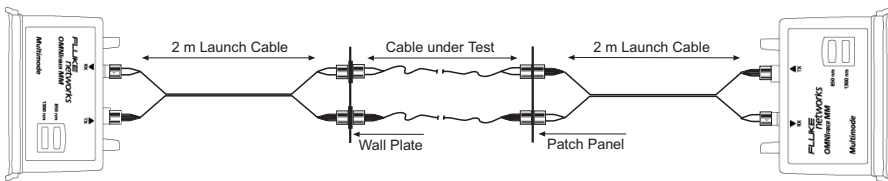
1. Do not disconnect the launch cables from the OMNIFIBER.
2. Remove the connector sleeves that connect the two launch cables.
3. Connect the OMNIFIBER MAIN to one end of the duplex link under test, and the OMNIFIBER REMOTE to the opposite end.

4. Press



1 JUMPER METHOD AUTOTEST

To run an Autotest when the 1-Jumper Method was used to set the Reference proceed as follows:



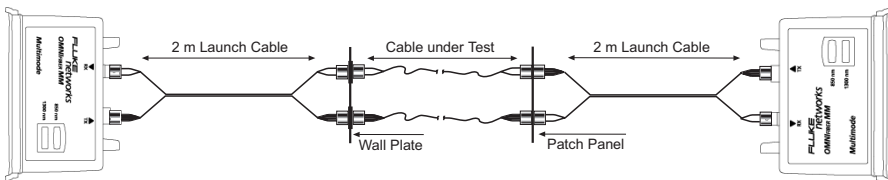
1. Do not disconnect the black connectors which are attached to the TX port of the OMNIFIBER.
2. Disconnect the black connectors that are attached to the RX ports of the OMNIFIBER.
3. Connect the **white** connectors to the RX ports on the OMNIFIBER.
4. Connect the OMNIFIBER MAIN to one end of the duplex link under test and the OMNIFIBER REMOTE to the opposite end.

5. Press



3 JUMPER METHOD AUTOTEST

To run an Autotest when the 3-Jumper Method was used to set the Reference proceed as follows:



1. Do not disconnect the launch cables that are attached to the OMNIFIBER.

- Remove the middle launch cable and the connector sleeves that were attached to the middle launch cable.
- Connect the OMNIFIBER MAIN to one end of the duplex link under test and the OMNIFIBER REMOTE to the opposite end.

- Press **AUTOTEST**.

Loopback Autotest using OMNIFIBER MAIN

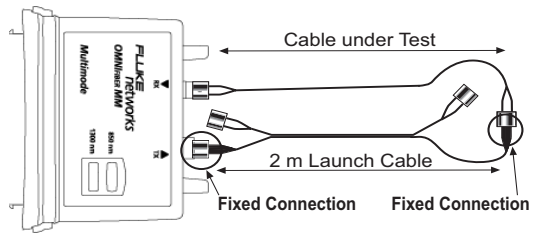
This configuration is used to test single fibers, reels and short cables when both ends of the fiber under test are accessible from the same location.

Note

The loopback Autotest assumes that the 2-Jumper Method was used to make the reference measurement.

To run a Loopback Autotest proceed as follows:

- Do not disconnect the **black** launch cable, which is attached to the TX port of the OMNIFIBER (it is circled in the graphic).
- Do not disconnect the coupler from the **black** launch cable (it is circled in the graphic).



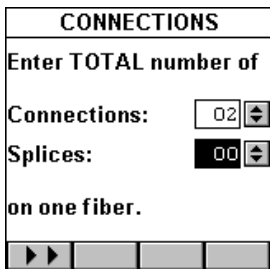
- Disconnect the **white** launch cable from the RX port of the OMNIFIBER and the connector sleeve. Leave the two white connectors dangling.
- Attach the cable to be tested to the RX port on the OMNIFIBER and the connector sleeve.

- Press **AUTOTEST**.

Running a Fiber Autotest

Some Autotests do not have a fixed loss limit. The Optical Link Budget (OLB) is calculated based on the wavelength, the length of the cable, and the number of connectors and splices.

OMNIScANNER will automatically display the **CONNECTIONS** screen if you are running an equation based Autotest (TIA 568B, ISO 11801, or 1000 Base F).

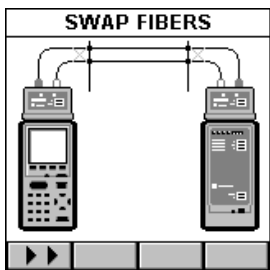


1. With the **Connections:** field highlighted, press ENTER. Use the **↑** or **↓** arrow key to adjust the number of connections in your link. To determine the total number of connections, simply count **all** of the connections (connector pairs) on **one** fiber. OMNIScANNER will assume that both fibers of a duplex link have the same number of connections.

2. To change the number of **Splices**, use the **↓** to highlight the field and press ENTER. Use the **↑** or **↓** arrow key to adjust the number of splices in your link. To determine the total number of splices, simply count **all** of the splices on **one** fiber. OMNIScANNER will assume that both fibers of a duplex link have the same amount of splices.

3. After editing the fields, press **▶▶** to run the Autotest.

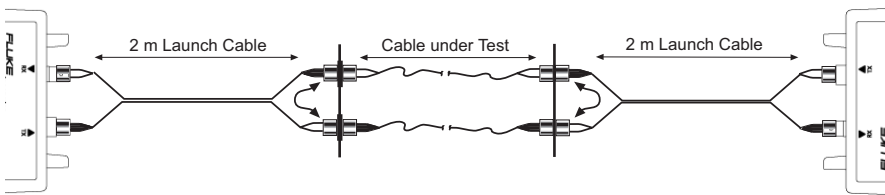
OMNIScANNER starts the Autotest after the number of connections and splices has been entered.




Note

If you are running a Two Way test, you will be prompted to swap the fibers. (See Chapter 4 - Setup: Fiber Test Options for further information.)

4. Swap the Launch Cable's connectors as indicated in the graphic. Do not disconnect the Launch Cables from the OMNIFIBER!



5. Press  to complete the Autotest.

Fiber Autotest Results

Once the Autotest is completed the Autotest screen will be displayed.

The arrows at the top of the screen indicate the direction of the light.



▼ points to the result measured from OMNIREMOTE to OMNIScANNER.



▲ points out the result measured from OMNIScANNER to OMNIREMOTE.


The overall test result for each fiber is located right below the arrows, ✓ (PASS) or ✗ (FAIL).

The name of the Autotest is displayed at the top of the screen followed by the name of the fiber.

1, **2**, and **3** indicate the method that was used to set the reference, 1 Jumper, 2 Jumpers, or 3 Jumpers.


When a bidirectional test was performed an icon for  OMNIScANNER or  OMNIREMOTE will appear next to the fiber's name.

Press  or  to view results for the fibers with light transmission in the opposite direction. The arrows flip vertically to indicate that there are two results for each fiber, one from **TX to RX** and one from **RX to TX**.


TIA 568B			
2	Multimode		
✓	Result		✓
7 m		39 nS	
0.00 dB	850	1.24 dB	
0.14 dB	1300	0.60 dB	
1.97 dB	Margin	0.88 dB	
Conn.: 2		Splices: 2	


Note

Values measured with OMNIFIBER will be compared against the preprogrammed PASS/FAIL limits. OMNIScANNER will report independent PASS/FAIL indication for both fibers.

The Autotest Results screen displays the  (Length) and the loss. Further, the margin is displayed. It is the worst case margin for all wavelengths on each fiber in both directions. A positive margin indicates that the measured loss was less than the PASS/FAIL value, a negative margin indicates a fail and shows how much the measurement exceeded the maximum allowable PASS/FAIL amount.

The number of Connections and Splices is displayed at the bottom of the screen (if applicable).

To store the Autotest Result for the fiber listed on the right side, press the  (Save) function key located on the right side.

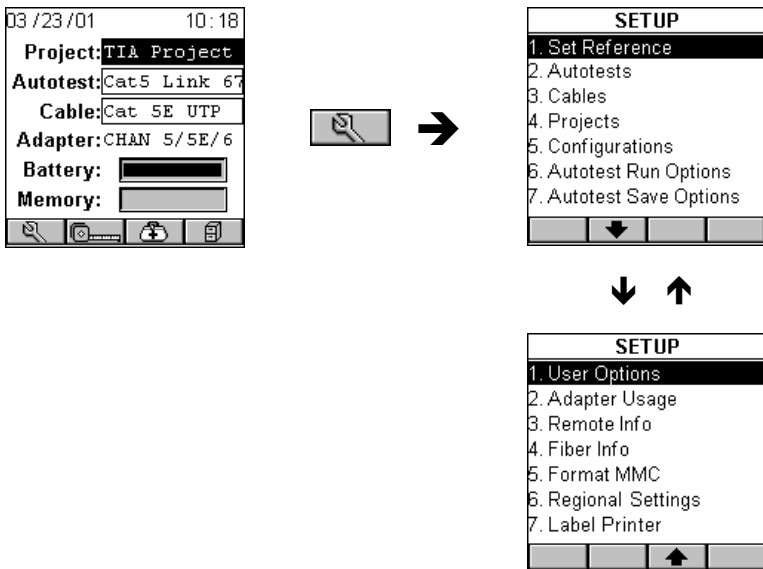
To store the Autotest Result for the fiber listed on the left side, press the  (Save) function key located on the left side.

Chapter 4 - Setup

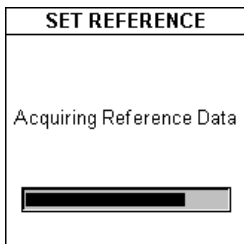
Configuring OMNIScANNER

OMNIScANNER's easy-to-use setup feature allows you to define, edit and preset many items. They are conveniently organized and can be easily accessed by pressing the assigned number on your alphanumeric keypad, or by highlighting the item and then pressing ENTER.

From the Project screen press the  (Setup) function key to open the **SETUP** screen.



Set Reference



Connect OMNIScANNER and OMNIREMOTe through their test connector ports using the Link Adapter and the Channel Adapter. Select **Set Reference** to display the **SET REFERENCE** screen. OMNIScANNER will immediately start to communicate with OMNIREMOTe.

While the reference data is being established, a gauge indicates the progress.

OMNIScANNER notifies you when the process has been completed. The **REMOTE INFO** screen will be displayed.

Note

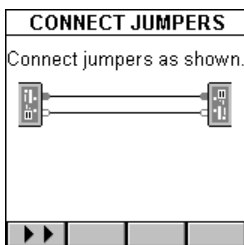
Set Reference is needed to periodically verify and establish the signal reference for attenuation.

Press ESC to return to the **SETUP** screen.

Set Reference with the OMNIFIBER Adapters

Note

The fiber reference expires each day at midnight. It must be set each calendar day that OMNIFIBER adapters are used. The reference value should also be set every time the test configuration changes.



A reference value must be established before a loss measurement can be calculated.

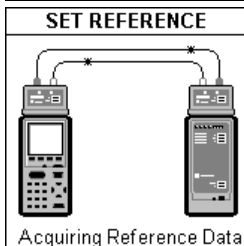
With the OMNIFIBER adapters attached to OMNIScANNER and OMNIREMOTe, and the launch cable(s) (jumper(s)) in place, select **Set Reference** to display the **CONNECT JUMPERS** screen.

Connect the jumpers as displayed and press

 to continue.

The **SET REFERENCE** screen will be displayed while the reference data is being established.



OMNIScANNER notifies you when the process has been completed and the **FIBER INFO** screen will be displayed.






Press ESC to return to the **SETUP** screen.


Autotests

Select **Autotests** to display the **AUTOTESTS** screen. It contains a list of standard Autotest specifications supported by OMNIScANNER. Standards are grouped by TIA, ISO, VENDOR, OMNI, IEEE, ATM, and AS/NZ.


If there are Autotest specifications in a folder, it will appear full , otherwise it will be empty .

Highlight a folder containing items  and press ENTER to display the list of Autotests contained in that folder.

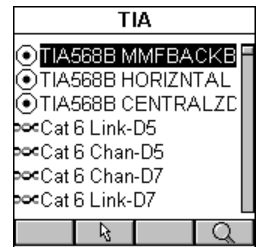
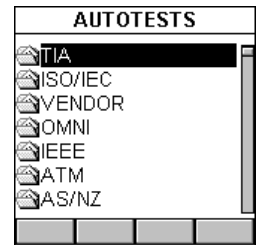
Use the  or  arrow key to highlight a specific Autotest.

Copper tests are marked with a  twisted pair icon.


Fiber optic tests are marked with a  fiber icon.

Press  (Set Default) to select it as the Autotest to run.

Press  (Detail) to review the Autotest's limits.



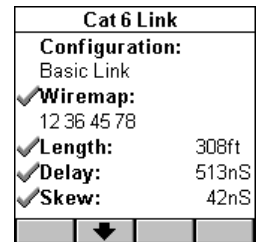
Viewing Details for Copper and Fiber Autotests

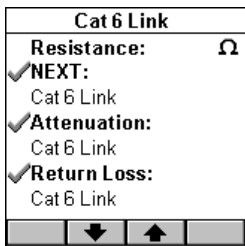
For  twisted pair cabling the Autotest Detail screen consists of four pages.

Use the  and  function keys to browse through the pages.

The screen titles show the standard being used to set the limits (e.g. Cat 6 Link).

The first page displays the Configuration of the Autotest (Basic Link, Channel, or Permanent Link).

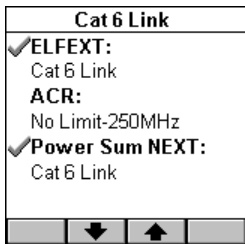




Wiremap, Length, Delay and Skew limits are also displayed. The Wiremap numbers show the pairs that are being tested.

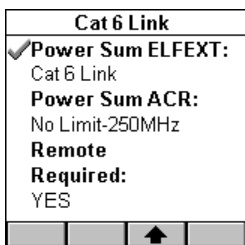
The second page shows limits for Resistance, NEXT, Attenuation, and Return Loss.

The third page lists limits for ELFEXT, ACR, and Power Sum NEXT measurements.



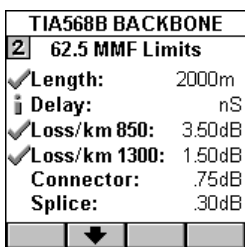
The fourth page shows limits for Power Sum ELFEXT and Power Sum ACR. This screen also informs you whether or not OMNIREMOTE is required to perform the selected Autotest.

Test that are performed during an Autotest are clearly marked ✓. Tests that are not required when performing an Autotest have no icon.



Disabled tests may or may not show limits in the description field. An **i** precedes the test name for tests being performed during the Autotest, but the results are not used to determine PASS or FAIL.

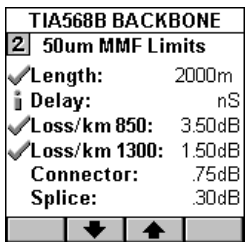
Defined test limits will be displayed right below the test name. If a test has no limit, the limit description field will be empty.



For **⊙** fiber optic cabling the View Autotest Detail screen shows the standard being used in the titlebar.


The test that are performed during an Autotest are clearly marked ✓.

If an **i** precedes the test name, the test will be performed for information purpose only; the results are not used to determine PASS or FAIL.



The required reference method **1** Jumper, **2** Jumpers, or **3** Jumpers is displayed in the View Autotest Detail screen together with the limits. Use the **↓** function key to view the limits for 50 mm fibers. When running an

Autotest, OMNIScANNER will choose the appropriate Autotest limits based on the selected fiber.

Use the  function key to view the limits for single-mode fibers.

When viewing limits for equation-based Autotests like TIA 568B, ISO 11801, and 100Base-F, the Loss per km (kilometer) will be displayed.



For all other tests the Loss for 850nm, 1300nm, 1310nm, and/or 1550nm is displayed.


1000BASE-LX SMF	
2 Single-Mode Limits	
✓ Length:	5000m
Delay:	nS
✓ Loss 1310 nm:	4.70dB
✓ Loss 1550 nm:	4.70dB
Connector:	dB
Splice:	dB








Press ESC to return to the **SETUP** screen.



Cables

Select **Cables** to display the **CABLES** screen. It contains a list of cable manufacturers.


If there are cables in a folder, the manufacturer folder will appear  full, otherwise it will be  empty.


Highlight a cable manufacturer that is marked by a folder containing items  and press ENTER to display the list of cables in that manufacturer's folder.

CABLES	
 Generic	
 AMP	
 Belden	
 Berk-Tek	
 BICC	
 Champlain	
 CommScope	








Use the  or  arrow key to highlight the desired cable.


Copper cables are marked with a  twisted pair icon.

Multimode fiber optic cables are marked with a  fiber icon.


Single-mode fiber optic cables are marked with a  fiber icon.




Coaxial cables are marked with the  COAX icon.

Generic	
 Cat 4 UTP	
 Cat 3 UTP	
 RG-6	
 RG-58	
 RG-59	
 Singlemode	
 Multi-mode 50/125	

Press  (Set Default) to select the cable to be tested.




Selecting the correct cable type will ensure accurate length measurements. If you cannot find or do not know the name of your cable manufacturer, simply select a cable from the **Generic** folder, or create a new cable.

Press  (Delete) to permanently remove a custom cable. **Note:** *Default cables cannot be removed.*

With a  twisted pair or a  coaxial cable highlighted, press  (Edit) to edit an existing custom cable. Cable Name, NVP, or Impedance can be changed.

Note

Default cables cannot be edited.





With a  twisted pair or a  coaxial cable highlighted, press  (New) to create a new cable based on the NVP and Impedance values of the highlighted cable. Name, NVP, and Impedance are definable.

Note

*A new or edited cable will be saved in the **Custom Cables** folder.*



For an accurate Length test, the NVP (Nominal Velocity of Propagation) must be set correctly. The value is usually specified by the cable vendor, and OMNIScANNER has a large library of cables with the manufacturer's specified NVP.




EDIT CABLE	
Name:	New Cable
NVP (%):	084
Impedance	93 Ω
Shield:	Yes
Length:	30.8m
 	

To determine the NVP of a cable with a known length, press  (Measure) to capture the length of the cable using the displayed NVP. Use the  to highlight the **NVP:** field and press ENTER. Use the  or  arrow key to increase or decrease the value by 1% (percent) and adjust the NVP until the known length is displayed. The **Length:** changes accordingly.

Note



The known cable must have a length of at least 50 feet or 15 meters.


EDIT CABLE	
Name:	CAT 6 Proto
NVP (%):	074
Impedance:	100 Ω
Shield:	Yes
Length:	30.8m
 	


To change the Impedance; use the  to highlight the field and press ENTER. Use the  or  arrow key to select the appropriate Impedance in Ω

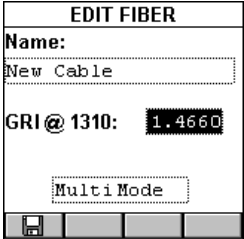
(Ohms) from the predefined list.

To setup whether or not the cable is shielded, use the ↓ to highlight **Shield:** and press ENTER. Use the ↑ or ↓ arrow key to make the appropriate selection. If 'Yes' is selected, the wiring for the shield will be measured during the Autotest and used to determine if the Wiremap will PASS or FAIL.

With a  or  fiber optic cable highlighted,

press  (Edit) to edit an existing custom

cable, or press  (New) to create a new fiber based on the GRI values of the highlighted cable. Cable Name and GRI @ 1300 (multimode) or 1310 (single-mode) can be viewed and changed.




Note

Default fibers cannot be edited.

A fiber cable's Graded Refractive Index (GRI) differs depending on the supplier. To receive accurate length results, OMNIScANNER allows you to define the GRI values for both wavelengths.

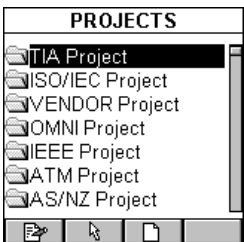
To change the fiber's mode, use the ↑ or ↓ arrow key to highlight the mode. Press Enter to select **Multimode 62.2 mm**, **Multimode 50 mm** or **Single-mode**.



Press  (Save) to save the edited cable into the Custom Cable folder.

Press ESC to return to the **CABLES** screen.

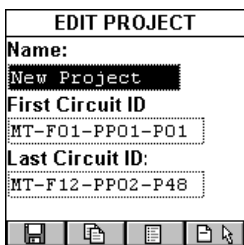
Projects


Select **Projects** to display the **PROJECTS** screen. It contains a list of all projects that are currently stored in OMNIScANNER. Predefined default projects are: TIA, ISO/IEC, VENDOR, OMNI, IEEE, ATM, AS/NZ, ANSI. OMNIScANNER's project feature allows you to organize test specifications, cables types, and test results into Projects.




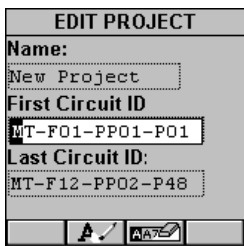
If there are tests stored in a project the folder will appear full  otherwise it will be empty .


Use the  or  arrow key to highlight a specific Project.



Press  (Set Default) to select it as the Project to be used and to return to the **SETUP** screen.


Press  (Delete) to permanently remove a project. **Note:** *Default Projects cannot be deleted. Only projects without stored Autotests can be deleted.*

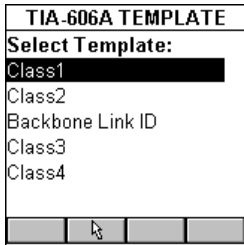



Press  (Edit) to edit an existing project and its Circuit ID.


The project name will appear in the **Name:** field. The first and last Circuit ID fields contain a default circuit ID. (See **Editing a Circuit ID** for further information.)

When the first Circuit ID field is completed, press




 (Copy) to copy the First Circuit ID into the Last Circuit ID field. Quickly edit the Last Circuit ID field.





Press  (List) to display the **Circuit ID** screen. It contains a scrollable list of all Circuit IDs created for the project. Highlight a circuit ID and press


 (Print label) to quickly print a label.

(See **Label Printer** in this Chapter for further information.)

Press  (Select a template) to select a Circuit ID from a Circuit Identification template. Available TIA 606A compliant templates are: Class 1, Class 2, Backbone Link ID, Class 3, and Class 4. Use the  or 

arrow key to highlight a template and press  to copy a circuit ID into the First Circuit ID and Last Circuit ID fields. To further edit the fields see the following section: **Editing a Circuit ID**.



Press  (New) to create a new project.

The **Name:** field is initially empty. Press ENTER to edit the name. The first and last Circuit ID fields contain the default Circuit ID from the Project that was highlighted when the  (New) key was pressed.

Note

*New and edited project names are placed at the bottom of the list in the **PROJECTS** screen. OMNIScANNER can store up to 16 projects.*

Editing a Circuit ID

To edit or create a Circuit ID, highlight an item in the **PROJECTS** screen and press  (New) or  (Edit).

Use the  to highlight the **First Circuit ID:** field and press ENTER.

The Circuit ID consists of 16 characters, which allows the sophisticated construction of Circuit IDs. Each character can be incremented.

The example shows how to quickly create an incremental Circuit ID.


Enter **MT-F01** (MyTest - Floor 01) **-PP01** (- Patch Panel 01) **-P01** (- Position 01) in the **First Circuit ID:** field.

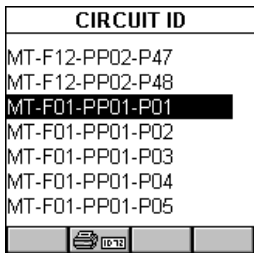
Press ENTER to terminate the edit mode.

Use the  to highlight the **Last Circuit ID:** field and press ENTER.

Enter **MT-F12** (MyTest - Floor 12) **-PP02** (- Patch Panel 02) **-P48** (- Position 48) in the **Last Circuit ID:** field. Press ENTER to terminate the edit mode.

The Circuit IDs will increment from right to left. The positions will change first from 01 to 48. Next the Patch Panels will increase from 01 to 02. Last the floors will increase from 01 to 12.

Press  (List) to review the continuous list of Circuit IDs that was just created.



MT-F01-PP01-P01 (1st Circuit ID to be used)
 MT-F01-PP01-P02 (2nd Circuit ID to be used)
 MT-F01-PP01-P03 (3rd Circuit ID to be used)
 ⋮
 MT-F01-PP01-P48 (48th Circuit ID to be used)
 MT-F01-PP02-P01 (49th Circuit ID to be used)
 ⋮ ⋮
 MT-F01-PP02-P48 (96th Circuit ID to be used)
 MT-F02-PP01-P01 (97th Circuit ID to be used)
 MT-F02-PP01-P02 (98th Circuit ID to be used)
 ⋮ ⋮ ⋮
 MT-F12-PP02-P48 (last Circuit ID to be used)

Press (Save) to save the Circuit ID and return to the **PROJECTS** screen.

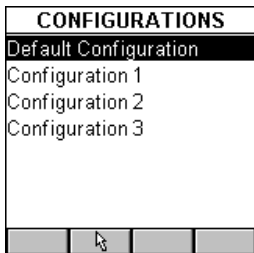
Note

To quickly edit the **Last Circuit ID**, press (Copy) once you have completed the **First Circuit ID**. This function will copy the First Circuit ID into the Last Circuit ID field. Now edit the Last Circuit ID field.

Press ESC to return to the **SETUP** screen.


Configurations

Select **Configurations** to display the **CONFIGURATIONS** screen. It contains a list of all configurations which are currently stored on the MultiMediaCard that can be read by OMNIScANNER2. (See Chapter 11 - MultiMediaCard for more information about the MMC).



The predefined **Default Configuration** is always present and can be used to reset OMNIScANNER to the factory default. It contains the following projects: TIA, ISO/IEC, VENDOR, OMNI, IEEE, ATM, AS/NZ, ANSI.



Use the **↑** or **↓** arrow key to highlight a specific Configuration.

Press  (Set Default) to select it as the Configuration to be used and to return to the **SETUP** screen.



While the selected Configuration is being loaded onto OMNIScANNER2, a gauge indicates the progress. Do **not** remove the MultiMediaCard from OMNIScANNER2 during the data transfer.



Autotest Run Options


Select **Autotest Run Options** to display the **RUN OPTIONS** screen. With the presented options you are able to further customize the way OMNIScANNER will perform an Autotest.

Press  if you want OMNIScANNER to abort the Autotest if a FAIL occurs. The **Abort on Fail** box will be checked .

Use the  to highlight the next checkbox.

Press  if you want OMNIScANNER to automatically move to the failed test result. The **Jump to Fail** box will be checked .



RUN OPTIONS	
<input type="checkbox"/>	Abort On Fail
<input type="checkbox"/>	Jump To Fail
Report:	<input type="text" value="Margin"/>
Fiber Test Option	
<input type="checkbox"/>	Test in both directions
	


Use the  to advance to the **Report:** field and press ENTER. Select **Margin** if you want OMNIScANNER to report the result, measured in dB, for the worst margin. Select **Worst dB** if you want the worst overall dB value to be reported, as in OMNIScANNER software versions prior to v4.0. Press ENTER to set the default.

Note

*Attenuation results in dB will always be reported for the worst value, regardless of what is selected in the **Report:** listbox.*

Use the  to highlight the **Fiber Test Options** checkbox. You will be able to define the way fiber optic Autotests are performed.

Press  if you want OMNIFIBER to test the fiber link in both directions. The **Test in Both Directions** box will be checked .

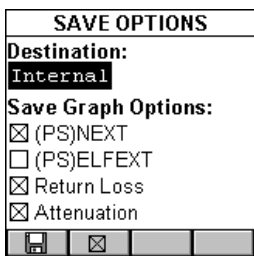
Press  (Save) to save your changes and return to the **SETUP** screen.

Press **ESC** to discard all changes and return to the **SETUP** screen.

Autotest Save Options

Select **Autotest Save Options** to display the **SAVE OPTIONS** screen. This screen contains several options that allow you to customize the way OMNIS_{SCANNER} will save Autotests.

Press **ENTER** to change the **Destination:** from **MMC** (MultiMediaCard™) to **Internal**. Use the **↑↓** keys to highlight the desired destination and press **ENTER** to select it as the default destination.



Select **MMC** if you want to collect test results on the MultiMediaCard, or select **MMC (Auto Save)** if you want the results to be saved on the MultiMediaCard automatically after the test has been completed. (See Chapter 11 - MultiMediaCard for more information about MMC.)

Select **Internal** if you want to save the results to OMNIS_{SCANNER}'s internal memory, or select **Internal (Auto Save)** if you want the results stored automatically after a test has been completed.

In either case, results can be transferred to the Scanlink™ Tools software program. (See Chapter 9 - Uploading and Printing for more information.)

In the **Save Graph Options** section you will be able to define which of the graphs will be saved.

Note

This options is not available when performing coaxial Autotests.


If a checkbox is checked , OMNIS_{SCANNER} will store an Autotest with the graph information for that particular test.


Note

Saving graphs reduces the number of Autotest that can be stored.

Depending on the performed Autotest, NEXT/PSNEXT, ELFEXT/-PSELFEXT, Return Loss, and Attenuation graphs can be saved.

Use the **↑↓** to highlight the Save Graph Option checkboxes.

Press  to select the graph to be saved.

Press  (Save) to save your changes and return to the **SETUP** screen.

Press ESC to discard the changes and return to the **SETUP** screen.

User Options

Select **User Options** to display the **USER OPTIONS** screen. This screen contains several user definable preferences.

Press ENTER to turn the **Auto Shutoff** on or off. Select **YES** if you want OMNIScANNER to automatically shut off after 10 minutes when operated with battery power. Select **NO** if you don't want to use the function. Press ENTER to set the default.


Use the → to advance to the **Volume:** field and press ENTER. OMNIScANNER has a 3 setting volume control: Select **High** if you want to use the default volume, select **Low** to turn the volume down, and select **OFF** to turn the sound off. Use the ↑↓ keys to highlight the desired volume and press ENTER to select it as the default volume.

USER OPTIONS	
Auto Shutoff:	No
Volume:	High
Date:	Time:
12/20/00	12:56
Owner Name:	
Thompson, M.	
   	

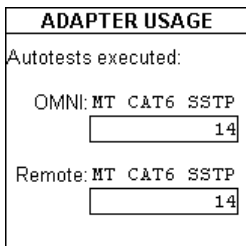
To edit the **Date** (Month/Day/Year) use the → key to highlight the portions you want to change. Press ENTER to edit the highlighted segment. Use the ↑↓ keys to change the displayed values in increments of 1. Press ENTER when done.

To edit the **Time** use the → key to highlight the portions you want to change. Press ENTER to edit the highlighted segment. Use the ↑↓ keys to change the displayed values in increments of 1. Press ENTER when done.

Use the → to highlight the **Owner Name:**. Press ENTER to start the edit mode. You can enter up to 19 characters for the Owner Name. The owner name will appear on printed reports. Press ENTER to end the edit mode.

Press  to save all settings and return to the **SETUP** screen.

Adapter Usage



Select **Adapter Usage** to display the **ADAPTER USAGE** screen.

The number of Autotests that have been performed with the Adapter that is currently attached to **OMNI:** and **Remote:** is displayed below each adapter's name (Adapter ID String).

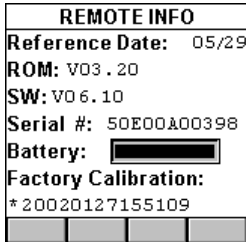
Press ESC to return to the **SETUP** screen.

Remote Info

Select **Remote Info** to display the **REMOTE INFO** screen.

The date the **Reference** value for OMNIScANNER and OMNIRemote was last set is shown at the top of the screen.

The **Hardware** and **Software Versions**, and the **Serial** number of the remote unit are displayed.



The **Battery** status is represented with a gauge. **Factory Calibration*** data is displayed at the bottom of the screen.

You may need to provide Serial Number and Factory Calibration data when having repairs or refurbishments done, or when calling for Technical Support.

Press ESC to return to the **SETUP** screen.

*OMNIScANNER and OMNIRemote should be calibrated annually with specialized equipment. Contact Technical Support for information on calibration and service requirements.



Fiber Adapter Info

Select **Fiber Info** to display the **FIBER INFO** screen.

The Serial numbers and the date the adapters were last factory calibrated is displayed.

The currently used reference method(s) are displayed on the bottom of the screen.

Press ESC to return to the **SETUP** screen.

FIBER INFO	
	#: 50C99I00736
	* Date: 09/24/99
	#: 50C99I00649
	* Date: 09/23/99
Reference Method(s):	
2	
<div style="display: flex; justify-content: space-between; width: 100%;"> <div style="width: 25%; height: 15px; background-color: #ccc;"></div> <div style="width: 25%; height: 15px; background-color: #ccc;"></div> <div style="width: 25%; height: 15px; background-color: #ccc;"></div> <div style="width: 25%; height: 15px; background-color: #ccc;"></div> </div>	


Format MMC

When using the MultiMediaCard for the first time, it may require formatting.

Insert the MMC into OMNIScANNER2's MMC slot.

Select **Format MMC** to open the **FORMAT MMC** screen. Formatting will start immediately.

The formatting time is dependent on the capacity of the MultiMediaCard, 8MB will require 2 minutes.

FORMAT MMC
Formatting MMC


Regional Settings

Select **Regional Settings** to open the **REGIONAL** screen. The settings affect the way OMNIScANNER displays dates and numbers.


The **REGIONAL** screen displays the **Language** that is currently selected. To change the language, press ENTER and use the $\uparrow\downarrow$ keys to highlight a language. Press ENTER once more to select it as the default language.

Use the \rightarrow to advance to the **Units:** field. Press ENTER to switch the units from **Meters** to **Feet**. Use the $\uparrow\downarrow$ keys to highlight the desired measurement unit and press ENTER to select it as the default measurement.

REGIONAL	
Language:	English
Units:	Meters
Date Format:	MM/DD/YY
Decimal Separator:	###.##
<div style="display: flex; justify-content: space-between; width: 100%;"> <div style="width: 25%; height: 15px; background-color: #ccc;"></div> <div style="width: 25%; height: 15px; background-color: #ccc;"></div> <div style="width: 25%; height: 15px; background-color: #ccc;"></div> <div style="width: 25%; height: 15px; background-color: #ccc;"></div> </div>	

Use the → to advance to the **Date:** field. Press ENTER to change the date format. **DD** is the day setting, **MM** is the month setting, **YY** is the year setting. Use the ↑↓ keys to highlight the desired format and press ENTER to select it as the default date format.


Use the → to advance to the **Decimal Separator:** field and switch the decimal symbol from , (comma) to . (period). Use the ↑↓ keys to highlight the desired symbol and press ENTER once more to select it as the default separator.

Press  to save all settings and return to the **SETUP** screen.

Label Printer

Select **Label Printer** to display the **LABEL PRINTER** screen.

The label printer name is displayed.

LABEL PRINTER	
Brady TLS PC Link	
Auto Print:	No
Font Size:	Small
Copies:	01
	


Press ENTER to turn the **Auto Print** feature on or off. Select **YES** if you want OMNIScANNER to automatically print a label after the Autotest has been saved. Select **NO** if you want to manually initiate the print process. Press ENTER when done.

Use the → to advance to the **Font Size:** field and press ENTER. Labels can be printed with small or large fonts. Select **Small** or **Large** depending on your requirements. Press ENTER when done.

Note

The font size is proportional to the label size. A large font printed on a small label could appear smaller than a small font on a bigger label.

Use the → to advance to the **Copies:** field. Use the ↑↓ keys to change the number of labels you want to print for a specific circuit ID. Press ENTER when done.

Press  to save all settings and return to the **SETUP** screen.

Chapter 5 - Measurements

Note


The list of tests in the Measurement screen changes depending on the adapter that is currently attached to OMNIScANNER.


Performing Individual Measurements with OMNIScANNER


OMNIScANNER allows you to perform tests on twisted pair, fiber optic and coaxial cabling.


Measuring Twisted Pair Cabling


OMNIScANNER allows you to run various individual tests. The tests are conveniently grouped into two screens and can be accessed separately with the alphanumeric keypad.

Press the  (Measurements) function key to display the **MEASUREMENTS** screen.


MEASUREMENTS	
1. Wiremap	
2. Length/Delay	
3. NEXT	
4. Attenuation	
5. Return Loss	
6. ELFEXT	
7. ACR	
	

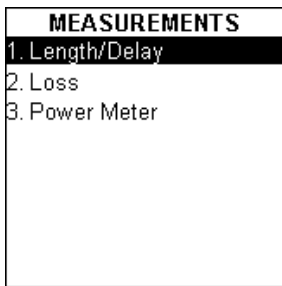
MEASUREMENTS	
1. Resistance	
2. Power Sum NEXT	
3. Power Sum ELFEXT	
4. Power Sum ACR	
	

Press the  (Page Down) function key to scroll to the second screen containing **MEASUREMENTS**.


Press the  (Page Up) function key to return to the first screen containing **MEASUREMENTS**.

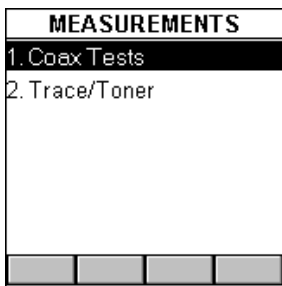
Measuring Fiber Optic Cabling

With the OMNIFIBER adapter attached, press the  (Measurements) function key to display the **MEASUREMENTS** screen for fiber optic cabling.





Measuring Coaxial Cabling

With the coax adapter attached, press the  (Measurements) function key to display the **MEASUREMENTS** screen for coaxial cabling.





Selecting an individual Test

Highlight the test you want to perform using the  or  keys on your keypad and press ENTER, or direct-dial a test by pressing its associated number on the OMNIScANNER keypad.


General Information


Most test result screens have a retest feature for diagnostic purposes.



Press  (Retest) to run continuous tests for the same cable.

Press  (Retest) once more to stop the continuous measurement. OMNISCANNER will display the last measured data.

Tests that require the use of OMNIREMOTE will have small icons in the upper right corner of the titlebar indicating whether the information on the screen is pertinent for  OMNISCANNER or  OMNIREMOTE.


RETURN LOSS				
Margin: 4.4dB 				
	dB Margin		MHz	
1-2	23.4	4.4	3.9	✓
3-6	21.7	9.4	178.2	✓
4-5	21.8	10.5	249.7	✓
7-8	23.6	11.4	189.0	✓


RETURN LOSS				
Margin: 4.4dB 				
	dB Margin		MHz	
1-2	16.6	4.7	207.4	✓
3-6	18.4	7.1	249.7	✓
4-5	17.3	6.0	249.7	✓
7-8	17.2	5.8	248.8	✓

Toggle between the screens by pressing  to open the screen that contains the information for OMNISCANNER, and  to display the information for OMNIREMOTE.

Note

The PASS/FAIL criteria are based on the Autotest currently selected in the Project screen.

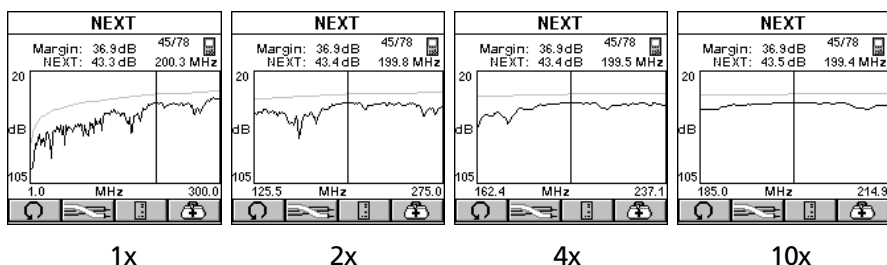
Several measurements will display results in a graph format. When a graph can be displayed, the  (Graph) function key is available.

Press  (Graph) to display test results for the highlighted pair or

pair combination.

Use the \uparrow or \downarrow keys to magnify the area of the graph where the cursor is located. The graph can be magnified 1x, 2x, 4x, or 10x.

Use the \leftarrow or \rightarrow keys to move the cursor within the graph.






Use the cursor to display values for the desired frequency.

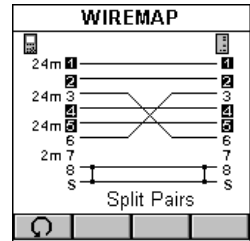
Twisted Pair Measurements with OMNIScANNER

Wiremap

The **Wiremap** function tests twisted-pair cabling for proper wiring. Your cabling configuration is checked for shield continuity, opens, shorts, crossed pairs, split pairs, and reversed pairs. For each pair, Wiremap displays the length.

The screen displays a graphical representation of the wiring in your cable, where the  near end wiring is shown on the left side, and the  far end wiring on the right side of the screen.

- A reverse video number  indicates a split pair
- A straight line between pairs indicates a good pair
- No line between wire pairs indicates an open
- An **X** between a wire pair indicates a reversed pair
- A **J** between wirepairs indicates a short
- The measured length of the pairs 1-2, 3-6, 4-5, and 7-8 are shown on the left side.



In the example, OMNIScANNER displays split pairs on 1 - 2 and 4 - 5 (although they are wired straight through), a reversed pair 3 - 6, an open on wire 7, and a short on wire 8 to the Shield.

Press ESC to exit the **WIREMAP** screen.

Length/Delay

The **Length/Delay** function measures a cable's length, propagation delay and skew. OMNIScANNER will determine whether the cable is open or shorted.

The accuracy of the NVP (Nominal Velocity of Propagation) setting determines the exactness of the Length measurements. The NVP specified by cable manufacturers is used for all the cables in OMNIScANNER's

library. When creating or editing cables, the NVP value can be customized. (See *Chapter 4 - Setup: **Cables** for further information.*)

Delay is a measure of the time required for a pulse to travel from one end of the link to the other. OMNIS_{SCANNER} measures the delay from when the pulse was sent to when the reflection was received. Knowing the speed that the pulse propagates down the cable (NVP), OMNIS_{SCANNER} then calculates the length of the cable.

Skew is the difference OMNIS_{SCANNER} pairs with the longest and shortest delay.

LENGTH/DELAY		
Limit:	308ft	513nS
1-2	302ft	415nS
3-6	290ft	399nS
4-5	288ft	395nS ✓
7-8	300ft	412nS
Skew:	20nS	✓
Limit:	42nS	

The **LENGTH/DELAY** screen shows the test result information for all pairs.

The Limit is displayed at the top of the screen.

The pairs are displayed in the first column followed by small icons to indicate whether the pair is open or shorted .

The measured Length and the Delay are displayed for each pair. The result for the shortest pair is tagged with a PASS ✓ or FAIL ✗ indicator.

OMNIS_{SCANNER}End Found) is displayed instead of a value the cable is either too long or properly terminated.

The length result can be displayed in meters or feet (See *Chapter 4: Setup - **User Options** for further information.*)

Delay is displayed in nS (nanoseconds).

The Skew value and thOMNIS_{SCANNER}it are displayed right below the pairs.

Press ESC to exit the **LENGTH/DELAY** screen.

NEXT

The **NEXT (Near End Crosstalk)** function measures the electromagnetic coupling that occurs between pairs at the near end. OMNIS_{SCANNER} and OMNIS_{REMOTE} allow NEXT to be measured at both ends of the link without having to swap ends.



OMNIS_{REMOTE} functions as a terminator while OMNIS_{SCANNER} transmits a


signal which is monitored on each of the other pairs. The received signal is compared to the transmitted signal and the difference is reported as the NEXT value in dB. When measuring the NEXT for the OMNIREMOTE end, the roles of the two units are reversed. OMNIScANNER provides the termination; OMNIREMOTE transmits and measures the signal.

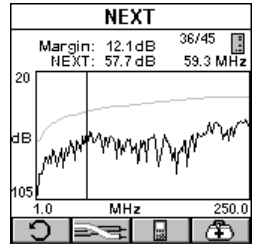
In the **NEXT** screen, the worst case margin for all near and far pair combinations is shown at the top of the screen.


The pair combinations are displayed in the column on the left side, followed by the measured NEXT value, margin/limit, and frequency. The result for each pair combination is tagged with a PASS ✓, Marginal PASS *✓, Marginal FAIL *✗, or FAIL ✗ indicator.


NEXT				
Margin: 10.8dB				
	dB	Margin	MHz	
12/36	47.1	11.0	225.4	✓
12/45	60.0	11.0	36.3	✓
12/78	73.8	19.2	16.3	✓
36/45	57.7	12.1	59.2	✓
36/78	62.4	12.0	29.5	✓
45/78	48.7	13.4	249.7	✓

Press  or  to toggle between the NEXT results for OMNIScANNER and OMNIREMOTE.

Press  (Graph) to display the NEXT graph for the highlighted pair combination. NEXT is displayed for the frequency indicated by the cursor position.



Press  (Pairs) to view NEXT graphs for other pair combinations.

Press  (Diagnostics) to display the **TDNXT** screen, where cabling and/or connection faults can be identified. (See Chapter 6 - Diagnostics: **Using TDNXT to diagnose a Link** for further information.)

Press ESC to exit the **NEXT** screen.

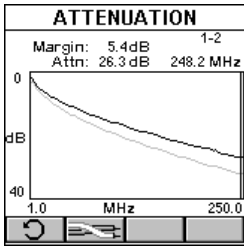
Attenuation


The **Attenuation** function measures signal loss in a cable as a function of frequency. OMNIREMOTE generates and injects a signal at the far end of the cable. OMNIScANNER measures the signal at the other end of the cable to determine cable loss.


ATTENUATION				
Margin: 5.3dB				
	dB	Margin	MHz	
1-2	26.4	5.3	248.8	✓
3-6	26.2	5.6	248.8	✓
4-5	26.1	5.6	247.9	✓
7-8	26.0	5.8	248.8	✓

In the **ATTENUATION** screen, the worst case margin for all pairs is shown at the top of the screen.

The pairs are displayed in the column on the left side, followed by the Attenuation in decibels (dB), the Attenuation margin/limit values, and the frequency. The result for each pair is tagged with a PASS ✓, Marginal PASS *✓, Marginal FAIL *✗, or FAIL ✗ indicator.



Press  (Graph) to display the Attenuation graph for the highlighted pair. The Attenuation is displayed for the frequency indicated by the cursor position.

Press  (Pairs) to view Attenuation results for other pairs.

Press ESC to exit the **ATTENUATION** screen.

Note

Attenuation always reports the worst dB value regardless of the Report: setting in the RUN OPTIONS screen.

Return Loss

The **Return Loss** function measures the uniformity of a cable’s impedance. OMNIScANNER injects a signal into the cable and measures the reflected signal strength. Return Loss measures the difference between the transmitted signal delivered to the cable and the reflected signal at the input port of the cable. The reflected signal is the result of impedance mismatches in the link under test.


In the **RETURN LOSS** screen, the worst case margin for all near and far pairs is shown at the top of the screen.

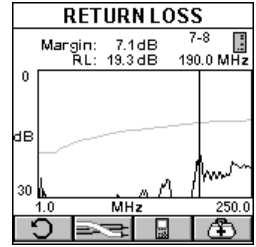
	dB	Margin	MHz	
Margin:	7.0dB			
1-2	26.7	7.7	5.0	✓
3-6	26.6	7.6	5.5	✓
4-5	26.3	7.3	5.2	✓
7-8	27.1	8.1	7.5	✓


The pairs are displayed in the column on the left side, followed by the Return Loss in decibels (dB), the Return Loss margin/limit, and the frequency. The result for each pair is tagged with a PASS ✓, Marginal PASS *✓, Marginal FAIL *✗, or FAIL ✗ indicator.


Press  or  to toggle between the

Return Loss results for OMNIScANNER and OMNIRemOTE.

Press  (Graph) to display the Return Loss graph for the highlighted pair. The Return Loss is displayed for the frequency indicated by the cursor position.



Press  (Pairs) to view Return Loss graphs for other pairs.

Press  (Diagnostics) to display the **TDRL** screen, where cabling and/or connection faults can be identified. (See Chapter 6 - Diagnostics: **Using TDRL to diagnose a Link** for further information.)

Press ESC to exit the **RETURN LOSS** screen.

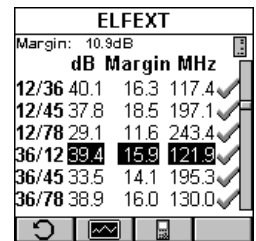
ELFEXT

ELFEXT (Equal Level Far End Crosstalk) measures the electromagnetic coupling at the far end and normalizes the result to account for the cable's attenuation. ELFEXT is reported in dB and results are computed for twelve pair combinations at the OMNIScANNER and the OMNIRemOTE end of the cabling.


In the **ELFEXT** screen, the worst case margin for all near and far pair combinations is shown at the top of the screen.

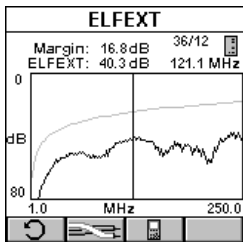
The pair combinations are displayed in the column on the left side, followed by the ELFEXT value, the margin/limit and the frequency. The result for each pair combination is tagged with a PASS ✓, Marginal PASS *✓, Marginal FAIL *✗, or FAIL ✗ indicator.

The scrollbar indicates that there are more test results. Use the ↓ on OMNIScANNER's keypad to scroll through the list and view results for the other six pair combinations.




Press  or  to toggle between the ELFEXT results for OMNIScANNER and OMNIRemOTE.

Press  (Graph) to display the ELFEXT graph for the currently highlighted pair combination. ELFEXT is displayed for the frequency



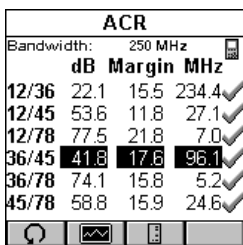
indicated by the cursor position.

Press  (Pairs) to view ELFEXT graphs for other pair combinations.

Press ESC to exit the **ELFEXT** screen.

ACR/Bandwidth



Attenuation to Crosstalk Ratio (ACR) is an indication of how much larger the received signal is compared to the Near End Crosstalk (NEXT) on the same pair. ACR is calculated from the measured NEXT and Attenuation. The ACR value is computed at each measured Attenuation frequency. The worst case ACR is reported for each pair combination.

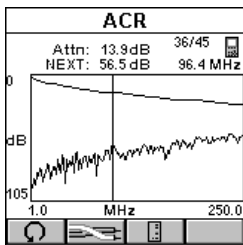



Bandwidth is a measure of the usable frequency range of the link under test. For most networks, this is the highest frequency at which the signal can easily be distinguished from background noise. Bandwidth is reported as the frequency where ACR is 3dB.

In the **ACR** screen the Bandwidth is displayed at the top of the screen.

The pair combinations are located in the column on the left side, followed by the measured ACR, the ACR margin/limit, and the frequency. The result for each pair combination is tagged with a PASS ✓ or FAIL ✗ indicator.

Press  or  to toggle between ACR results for OMNIScANNER and OMNIRemote.



Press  (Graph) to view the graph for the currently highlighted pair combination. The values for Attenuation and NEXT are shown at the top of the screen. Attenuation and NEXT graphs are displayed for the frequency indicated by the cursor position.

Press  (Pairs) to view Attenuation/NEXT

graphs for other pair combinations.

Press ESC to exit the **ACR** screen.

Resistance

Resistance is measured in a loop through each pair in the cable. In a twisted pair cable, Resistance is measured by using OMNIREMOTE to short the far end of the pair under test.

The **RESISTANCE** screen displays the Resistance Limit and the test results in Ohms for each pair.

The result for each pair is tagged with a PASS ✓ or FAIL ✗ indicator.

Press ESC to exit the **RESISTANCE** screen.

RESISTANCE	
Limit:	40.0 Ω
1-2	13.5 Ω ✓
3-6	13.4 Ω ✓
4-5	13.5 Ω ✓
7-8	13.0 Ω ✓



Power Sum NEXT

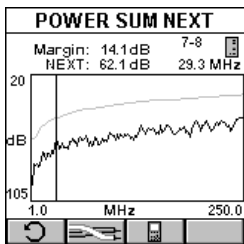
Like NEXT, **Power Sum NEXT** is a measurement of electromagnetic coupling between adjacent pairs. While NEXT reports test results for each pair combination, Power Sum NEXT is calculated from NEXT for individual pair combinations and takes into account the crosstalk from multiple transmission pairs. When reporting Power Sum NEXT, OMNIScANNER displays results for pairs, rather than pair combinations. The PS NEXT measurement is required to assure proper operation of networks employing simultaneous transmission on more than one pair in a link (i.e. Gigabit Ethernet).


In the **POWER SUM NEXT** screen, the worst case margin for all near and far pairs is shown at the top of the screen.


The pairs are displayed in the column on the left side, followed by the PSNEXT in decibels (dB), the margin/limit, and the frequency. The result for each pair is tagged with a PASS ✓, Marginal PASS *✓, Marginal FAIL *✗, or FAIL ✗ indicator.

POWER SUM NEXT			
Margin: 11.5dB			
	dB	Margin	MHz
1-2	45.2	11.7	225.4 ✓
3-6	45.9	12.4	225.4 ✓
4-5	55.4	12.3	59.0 ✓
7-8	61.1	13.1	29.5 ✓

Press  or  to toggle between the PSNEXT results for OMNIScANNER and OMNIREMOTE.



Press  (Graph) to display the PSNEXT graph for the currently highlighted pair. PSNEXT is displayed for the frequency indicated by the cursor position.

Press  (Pairs) to view PSNEXT graphs for other pairs.

Press ESC to exit the **POWER SUM NEXT** screen.



Power Sum ELFEXT

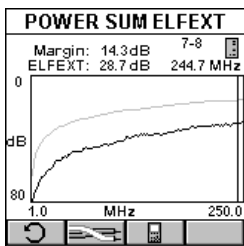
Power Sum ELFEXT is calculated from the summation of the individual ELFEXT effects on each pair by the other three pairs.


Pair	dB Margin	MHz	Status
1-2	27.3	12.8	241.6 ✓
3-6	34.5	14.6	131.4 ✓
4-5	32.3	15.9	195.3 ✓
7-8	28.5	14.1	244.3 ✓


In the **POWER SUM ELFEXT** screen, the worst case margin for all near and far pairs is shown at the top of the screen.

The pairs are displayed in the column on the left side, followed by the PSELFEXT in decibels (dB), the margin/limit, and the frequency. The result for each pair is tagged with a PASS ✓, Marginal PASS *✓, Marginal FAIL *✗, or FAIL ✗ indicator.

Press  or  to toggle between the PSELFEXT results for OMNIScanner and OMNI-Remote.



Press  (Graph) to display the PSELFEXT graph for the currently highlighted pair. PSELFEXT is displayed for the frequency indicated by the cursor position.

Press  (Pairs) to view PSELFEXT graphs for other pairs.

Press ESC to exit the **POWER SUM ELFEXT** screen.


Power Sum ACR

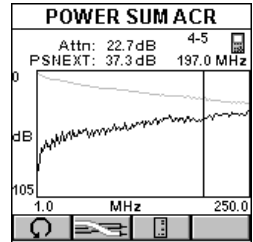
Power Sum ACR is calculated from the Attenuation of the disturbing pair subtracted from the Power Sum NEXT for the pair. The worst case Power Sum ACR is reported for each pair.


The **POWER SUM ACR** screen displays the pairs in the column on the left side, followed by the PSACR in decibels (dB), the margin/limit, and the frequency. The result for each pair is tagged with a PASS ✓ or FAIL ✗ indicator.

POWER SUM ACR				
Bandwidth: 250 MHz				
	dB	Margin	MHz	
1-2	53.5	14.1	27.1	✓
3-6	69.3	15.6	6.8	✓
4-5	52.8	13.4	27.1	✓
7-8	73.3	17.3	5.2	✓

Press  or  to toggle between Power Sum ACR results for OMNIScANNER and OMNIREMOTE.

Press  (Graph) to view the graph for the currently highlighted pair. Attenuation and PSNEXT are displayed for the frequency indicated by the cursor position.



Press  (Pairs) to view Attenuation and PS NEXT graphs for other pairs.

Press ESC to exit the **POWER SUM ACR** screen.

Fiber Optic Measurements with OMNIFIBER

Length/Delay

The **Length/Delay** function measures a fiber’s length and propagation delay. Length measurements are derived from the propagation delay results using the GRI (Graded Refractive Index) at the appropriate wavelength.

Propagation Delay is the measure of the time required for a signal to advance from one end of the link to the other. When measuring propagation delay, OMNIScANNER measures the round trip delay through both fibers, and then divides the result by two, assuming that the cables are equal in length.

LENGTH/DELAY	
GRI @ 1300:	1.4810
Limit:	200 m
Length:	7 m
Delay:	39 nS

OMNIScANNER measures the full length of the fibers under test.

The **LENGTH/DELAY** screen displays the GRI @ 1300 nm (nanometers) for multimode fiber and @ 1310 nm for single-mode fiber.

The length limit and the actual derived length are displayed in meters or feet.

The delay is displayed in nanoseconds (nS).

Press ESC to exit the **LENGTH/DELAY** screen.

Loss

The **Loss** function measures the signal loss in a fiber optic cable. The adapters inject a signal into the fiber cable and OMNIScANNER and OMNI-Remote measure the received signals at 850 and 1300 nm for multimode fiber and 1310 and 1550 for single-mode fiber.

LOSS		
▼	850	▲
11.65	Power dBm	12.01
0.00	Loss dB	1.24
2.12	Limit dB	2.12
	1300	
14.96	Power dBm	14.10
0.15	Loss dB	0.60
2.11	Limit dB	2.11

The **LOSS** screen displays the measured power in dBm (decibels; one milliwatt reference) for each wavelength.

The measured loss and limit values in decibel (dB) are displayed for both wavelengths.

For dual fiber testing the arrows ▲▼ at the top of

the screen point out the direction of the light and indicate which fiber the result is for.

Press ESC to exit the **LOSS** screen.



Power Meter

The **Power Meter** function reports the overall received power. Use it to quickly verify and correct cabling and equipment problems.



The **POWER METER** screen shows the currently selected wavelength and light source mode.



The overall power is displayed.

OMNIFIBER main is designed to provide a consistent, calibrated light source for effectively measuring signal loss in fiber optic cables. The transmitted light can be operated continuously or modulated.

POWER METER	
1300 nm Continuous Wave	
Power:	14.37 dBm
Ref.:	14.33 dBm
Loss:	0.04 dB
 850	 REF

When testing loss, use the continuous light source, when identifying fiber cables with a tone locator, use the 2KHz modulated mode.

Press  (Continuous) or  (Modulated) to change the light source.

When using OMNIFIBER MM (multimode), press  or  to change the wavelength of the OMNIFIBER Main transmitted and received wavelengths.

When using OMNIFIBER SM (single-mode), press  or  to change the wavelength of the OMNIFIBER Main transmitted and received wavelengths.

Either Main or Remote can be used as the light source with the main power meter.

When OMNIFIBER is attached to OMNIREMOTE, the remote unit can be used as light source. With the OMNIFIBER adapter attached, press the **λ** key to activate the light source and provide continuous or modulated light at 850 or 1300 nm for multimode fiber, or at 1310 or 1550 for single-mode fiber. The green LED of the appropriate wavelength will blink rapidly when modulated light is transmitted. If the transmitted

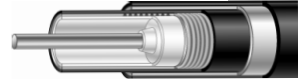
light is continuous, the green LED will not blink.

Press **REF** to set the reference value, place it in the appropriate field, and start calculating the loss.

Press ESC to exit the **POWER METER** screen.

Coaxial Measurements with OMNIScANNER



Coax Tests








In coaxial cable, an insulated wire runs through the middle of the cable and a second wire, called the shield, surrounds the insulation of the inner wire like a sheath. The outer insulation jacket wraps around the second wire.

The **Coax Tests** screen displays the measured Length, Termination, Impedance, and Resistance.

The **Length** function measures the cable length. OMNIScANNER will display the overall length in meters or feet. If **NEF** (No End Found) is displayed instead of a value, the cable is either too long or terminated in its characteristic impedance.

The **Termination** function displays whether a cable is open  or shorted .

COAX TESTS	
Length:	101ft 
Delay:	155nS
Impedance:	49.0 Ω
Resistance:	OVR Ω
   	

When the field **Length:** displays NEF, the Termination will display .


Impedance defines the relationship of voltage and current in an electrical circuit.






Each Cable or transmission line is designed to have specific impedance, which allows proper matching to the currents of the transmitter and receiver. OMNIScANNER measures the characteristic impedance of the coax cable in Ohms.

OMNIScANNER displays the **Resistance** in Ohms.

AUTOTEST

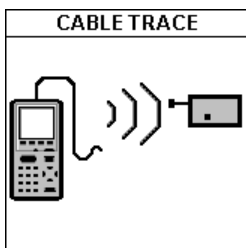
If the **AUTOTEST** button was used to execute the coax test, the result can be stored with a Project Name and Circuit ID.

Press  to open the SAVE AUTOTEST screen. See Chapter 2 - Getting Started: **Saving Coaxial Autotest Results** for further information.

COAX TESTS	
Length:	310.8 m 
Delay:	1571nS
Impedance:	49.2 Ω
Resistance:	15.6 Ω
   	

Cable Trace

Tracer/Toner is a cable tracing function that assists in tracking cables hidden in walls, ceilings, floors, or patch panels by generating a signal that can be converted into an audible tone by Cable Tracer II (sold separately) or any other equivalent tracing device.



1. Attach the end of the cable you want to trace to the OMNIScANNER using a patch cord and the Channel Adapter or the Link Adapter. Make sure that the cable is not grounded, as a grounded cable will weaken the signal.

A multi-tone trace signal will begin transmitting. To enhance the signal, insert a grounding plug into the ground jack located left of the DB-9 Serial

Connector. A grounding plug is included in the optional Cable Tracer II kit; you may use any grounding cable that has a standard insulated phone tip plug.


2. To determine the cable path use the multi-tone sound as a guide and simply trace along the wire where the tone is loudest. The tracer needs to be within one foot of the hidden cable.

Press ESC to exit the **CABLE TRACE** screen.

Chapter 6 - Diagnostics

OMNIScANNER's Diagnostic Functions

OMNIScANNER has several advanced diagnostic test functions to help you with the identification of network cabling faults. Diagnostics allows you to locate opens, breaks, and short circuits as well as NEXT and Return Loss cabling faults in twisted pair cabling. Further, OMNIScANNER allows you to measure Impulse Noise, trace cables, and locate office drops.

Press the  (Diagnostics) function key to display the **DIAGNOSTICS** screen.

DIAGNOSTICS
1. Wiremap
2. TDNXT
3. TDRL
4. Impulse Noise
5. Trace/Toner
6. Office Locator

Wiremap

Wiremap identifies the location of opens, breaks and pairs that are shorted. This allows quick identification of the fault location.

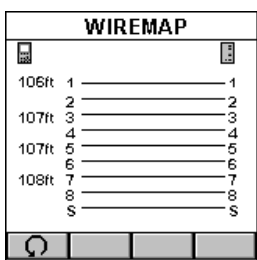
Select Wiremap to display the **WIREMAP** screen. The screen displays the wire connections between OMNIScANNER and OMNIREMOTE. The pairs that are being tested are defined by the selected test standard. Shield continuity is tested if a shielded cable type is selected. (See *Chapter 4 - Setup: Cables* for further information about shielded cables.)

For each of the 8 conductors and the Shield, Wiremap can indicate proper pin termination on each end, continuity to OMNIREMOTE, shorts between any two or more conductors, crossed pairs, reversed pairs, split pairs, and any other miswiring. For each pair, Wiremap displays the length. When a pair is faulty the length indicates the distance to the fault from the OMNIScANNER end.

Wiremap Displays

The OMNIScANNER icon on the left side indicates the wiring at the OMNI end of the cable link.

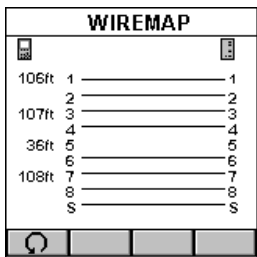
The OMNIREMOTE icon on the right side indicates the wiring at the OMNIREMOTE end of the cable link.



CORRECT CONNECTIVITY:

The measured lengths of pairs 1-2, 3-6, 4-5, and 7-8 are shown on the left side of the Wiremap.

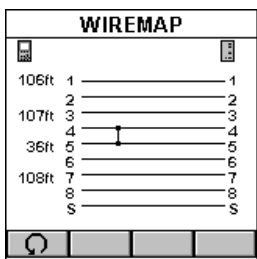
If the selected cable is shielded or screened, shield continuity will be measured, and if the shield fails the test, Wiremap will display the error.



WIRE IS OPEN:

Wiremap checks the continuity of each wire.

In this example, there is no line between pin 5 at each end, which indicates a break in connection. Use the number on the left side of the screen to find the exact location of the open. For example if 36ft is displayed, the open can be found 36ft away from OMNIScANNER.



WIRES ARE SHORTED:

Wiremap finds shorts in the cable being tested.

In this example, the wiremap indicates that wires 4-5 are shorted. Use the number on the left side of the screen to find the exact location of the short. For example if 36ft is displayed, the short can be found 36ft away from OMNIScANNER.

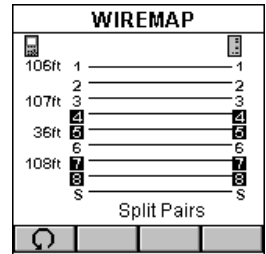
SPLIT PAIRS:

If a cable is wired correctly, pin-to-pin, but there is a split pair, Wiremap displays Split Pairs and highlights the pins in error.

In our example, one wire from the 4-5 pair is twisted with one wire in the 7-8 pair. The Split Pair will be highlighted with reversed numbers.

The message SPLIT PAIRS will be displayed below the Wiremap.

Press ESC to exit the **WIREFMAP** screen.



TDNXT


NEXT faults are diagnosed by using the TDNXT (Time Domain NEXT) function. OMNIScANNER uses TDNXT to determine the amount of NEXT as a function of distance. TDNXT with new S-Band™ technology (Standard Connector Band technology) can help you distinguish between connection and cable faults. It assists you with diagnosis and troubleshooting of NEXT failures and the verification of test cables, connectors and plugs.

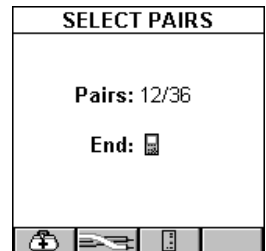
While the NEXT graph shows the link test limits and the frequency at which a failure occurred, the TDNXT graph displays NEXT vs. distance.



S-Bands™ provide a time domain limit to verify that the connections are within the desired category of performance. In a typical link, failures are a result of either a non-compliant connection or a faulty cable. The ability to determine if a connection meets the expected performance requirement significantly simplifies the diagnosis of a failure.


To diagnose a failure, select TDNXT in the DIAGNOSTICS screen and press ENTER. The TDNXT function is also available from the NEXT Graph screen.

The **SELECT PAIRS** screen opens.

Use the  (Pair) function key to select the pairs you want to analyze.

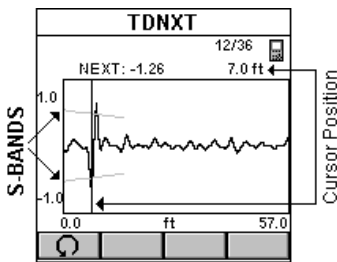


Use  or  to select which end, OMNIScANNER or OMNIrEMOTE, you want to view the results for.

Press  to open the **TDNXT** screen.

The screen displays the TDNXT (Time Domain NEXT) graph. The funnel-like lines are the upper and lower S-Bands. S-Bands are limit lines for connections as a function of distance from the cable end. They provide a quantitative measure of the NEXT at the connection point, which is typically located at the end of the test cable at 2 meters (7ft). The measurement unit for the horizontal graph can be displayed in meters (m) or feet (ft.). (See Chapter 4 - Setup: **User Options** for further information about units.)

Initially, the cursor is located at the point with the worst NEXT.



The NEXT at the cursor position relative to the S-Band, the corresponding pair combination, and the distance to the cursor position are displayed above the graph.

The example shows a Time Domain NEXT that exceeds the S-Bands. The worst NEXT is displayed at 7ft, the connection location. The conclusion is that the connection caused the failure.



Press ESC to exit the **TDNXT** screen.

Using TDNXT to Diagnose a Link

The S-Band limit lines provide an easy method to pinpoint faults located at the connection or the cable. S-Bands allow you to determine if the connections in a link meet the desired performance level. They are designed to match the standard category of the selected Autotest.

A graph containing peaks that are located outside the S-bands at the connection distance indicates that the connection and not the installed cable is the most likely reason for failure.

If NEXT failed but the TDNXT graph displays peaks within the S-Bands at the connection distance, the fault is caused by the cable portion of the link.


If failures occur at both ends of the link, use  or  to diagnose each end. Failures at both ends of the link can interact.

TDNXT Examples

The following examples show the diagnostics process that is performed to identify failures on typical links with 2 meter test cables.

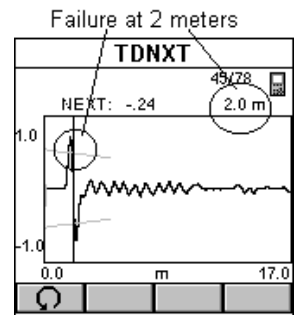
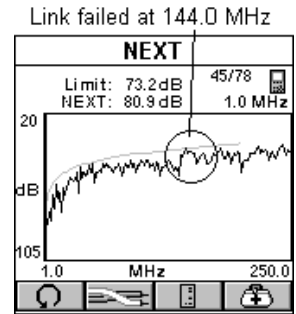
GOOD CABLE, BAD CONNECTION:

The cursor in the NEXT graph is located at the worst NEXT at 144.0 MHz, which is outside the limit line. (For display purposes the cursor is moved.) The Link failed. Why?

Press  to open the TDNXT screen to further review and diagnose the graph.


The cursor is positioned at the worst peak, which is outside the S-Bands.

Looking at the TDNXT graph we can reach the conclusion that the connection located at 2 meters did not meet the required performance and is the cause of failure.

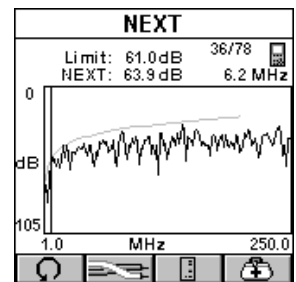


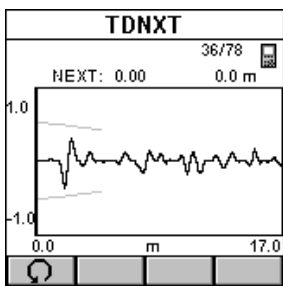
BAD CABLE, GOOD CONNECTION:

The cursor in the NEXT graph is located at the worst NEXT at 6.2 MHz, which is outside the limit line. (For display purposes the cursor is moved to the Zero-position.) The Link failed. Why?

Press  to open the TDNXT screen to further review and diagnose the graph.

The NEXT response from the connector located at 2 m is well within the S-Bands and performs significantly better than the requirements. The





NEXT in the cable is the source of the failure even though the cable’s NEXT response peaks are less than those of the connection. By knowing that the connection meets its performance requirement, the cable is easily identified as the non-compliant component of the link.

The following table summarizes the typical diagnosis process.

NEXT	TDNXT exceeds S-Band limits	Conclusion
PASS	N/A	NEXT of link is within limits
FAIL	YES	Connection fails. Replace or reterminate. Plug and/or jack can be at fault.
FAIL	NO	Cable is not within specifications

TDRL

Return Loss is a measure of the amount of reflected energy in a link. Reflections occur at points of impedance discontinuity, such as connectors, transitions from patch cables to horizontal cables, and impedance structure within a cable.


Return Loss faults are diagnosed by using the TDRL (Time Domain Return Loss) function. OMNIScANNER uses TDRL to determine the amount of Return Loss as a function of distance. TDRL with new S-Band™ technology (Standard Connector Band technology) can help you to distinguish between connection faults and cable faults. It assists you with diagnosis and troubleshooting of Return Loss failures and the verification of test cables, connectors and plugs.

While the Return Loss graph shows the link test limits and the frequency at which a failure occurred, the TDRL graph displays Return Loss vs. distance.

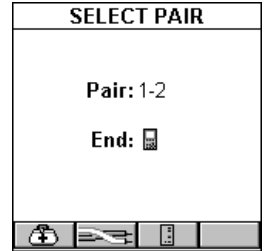
S-Bands™ provide a time domain limit to verify that the connections are within the desired category of performance. In a typical link, failures are a result of either a non-compliant connection or a faulty cable. The ability to determine if a connection meets the expected performance requirement significantly simplifies the diagnosis of a failure.

Select TDRL in the DIAGNOSTICS screen and press ENTER. The TDRL function is also available from the RETURN LOSS Graph screen.

The **SELECT PAIR** screen opens.

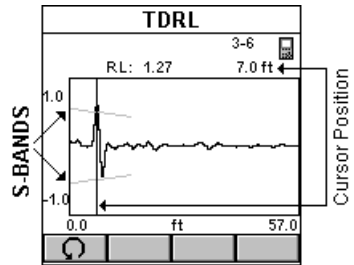
Use the  (Pair) function key to select the Pair you want to analyze.

Use  or  to select which end, OMNIScANNER or OMNIRemote, you want to view the results for.



Press  to open the **TDRL** screen

The screen displays the TDRL (Time Domain Return Loss) graph. The funnel-like lines are the upper and lower S-Bands. S-Bands are limit lines for connections as a function of distance from the cable end. They provide a quantitative measure of Return Loss at the connection point, which is typically located at the end of the test cable, at about 2 meters (7ft). The measurement unit for the horizontal graph can be displayed in meters (m) or feet (ft.).



Initially, the cursor is located at the point with the worst Return Loss.

The Return Loss at the cursor position, the corresponding pair, and the distance to the cursor position are displayed above the graph.

The example shows a Time Domain Return Loss that exceeds the S-Bands. The worst Return Loss is displayed at 7ft, the connection. The conclusion is that the reflection at the connection is the cause of the failure. This could be due to a connector problem or excessively un-twisted pairs at the connector.



Press ESC to exit the **TDRL** screen.

Using TDRL to Diagnose a Link

S-Bands provide an easy method to pinpoint if the fault is located at the connection or at the cable. The S-Bands allow you to determine if the connections in a link meet the desired performance level. They are designed to match the standard category of the selected Autotest.

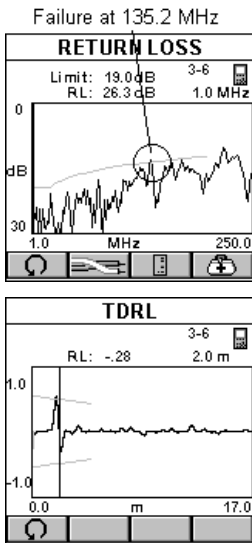
A graph containing peaks that are located outside the S-Band at the connection distance indicates that the connection and not the installed cable failed.

If Return Loss fails but the TDRL graph displays peaks within the S-Band at the connection distance, the fault is caused by the cable portion of the link.

If failures occur at both ends of the link, use  or  to diagnose each end. Failures at both ends of the link can interact.


TDRL Examples

The following examples show the diagnostics process that is performed to identify failures on typical links with 2 meter test cables.



GOOD CABLE, BAD CONNECTION:

The cursor in the Return Loss graph is located at the worst Return Loss at 135.2 MHz, which is outside the limit line. (For display purposes the cursor was moved.) The Link failed. Why?


Press  to open the TDRL screen to further review and diagnose the graph.

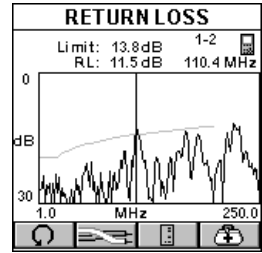
The cursor is positioned at the worst peak, which is outside the S-Bands.

Looking at the TDRL graph we can reach the conclusion that the connection located at 2 meters did not meet the required performance and is the cause of failure.

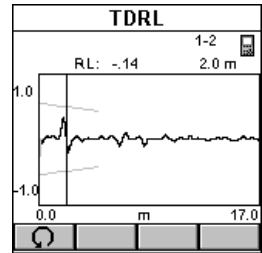
BAD CABLE, GOOD CONNECTION:

The cursor in the Return Loss graph is located at the worst Return Loss at 110.4 MHz, which is outside the limit line. The Link failed. Why?

Press  to open the TDRL screen to further review and diagnose the graph.



The Return Loss response from the connector located at 2 m is well within the S-Bands and performs significantly better than the requirements. The Return Loss in the cable is the source of the failure even though the cable's Return Loss response peaks are less than those of the connection. By knowing that the connection meets its performance requirement, the cable is easily identified as the non-compliant component of the link.



The following table summarizes the typical diagnosis process.

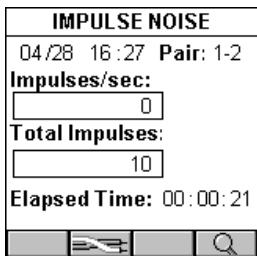
Return Loss	TDRL exceeds S-Band limits	Conclusion
PASS	N/A	Return Loss of link is within limits
FAIL	YES	Connection fails. Replace or reterminate. Plug and/or jack can be at fault.
FAIL	NO	Cable is not within specifications

Impulse Noise

Noise is undesirable electrical energy that falls within the typical network frequency bands of operation (generally 1-20 Mhz). It interferes with a network's ability to transmit data reliably. Noise sources may include AC transmission lines, fluorescent light fixtures, industrial equipment, elevators, etc. Noise problems also occur when other wire pairs in the same sheath are used for non-LAN applications.

Testing for noise involves turning off all LAN devices and measuring for background electrical activity in the cabling. Often, noise problems can be corrected by moving the cable away from the source or by removing the source itself.

Impulse Noise counts the impulses detected on a given pair




Select Impulse Noise to open the **IMPULSE NOISE** screen. The current date and time is shown in the upper left. The monitored pair is shown in the upper right.


Impulses/sec indicates the number of wide band impulses that exceed 30 mv peak-to-peak that were detected in the last 1second interval.

Total Impulses indicates the total number of impulses detected since noise monitoring was started.

Elapsed Time indicates the time since the test was started.

Press  (Pair) to clear the current log and monitor impulse noise on another pair.

LOG		
Date	Time	Peak
04/28	16:28:19	21
04/28	16:28:00	3
04/28	16:28:03	3
04/28	16:28:07	3
04/28	16:28:12	3
04/28	16:28:14	3
04/28	16:28:18	3

Press  (Detail) to open the **LOG screen**.

OMNIScANNER keeps a log during impulse noise monitoring. The log represents the seven largest impulse noise counts detected and the date and times at which they occurred.

Press ESC to exit the **LOG** screen.

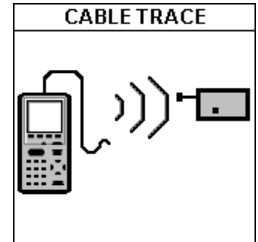
Press ESC to exit the **IMPULSE NOISE** screen.

Cable Trace

Tracer/Toner is a cable tracing function that assists in tracking cables hidden in walls, ceilings, floors, or patch panels by generating a signal that can be converted into an audible tone by Cable Tracer II (sold separately) or any other equivalent tracing device.

1. Attach the end of the cable you want to trace to the OMNIScANNER using a patch cord and the Channel Adapter or the Link Adapter. Make sure that the cable is not grounded, as a grounded cable will weaken the signal.

A multi-tone trace signal will begin transmitting. To enhance the signal, insert a grounding plug into the ground jack located left of the DB-9 Serial Connector. A grounding plug is included in the optional Cable Tracer II kit; you may use any grounding cable that has a standard insulated phone tip plug.



2. To determine the cable path use the multi-tone sound as a guide and simply trace along the wire where the tone is loudest. The tracer needs to be within one foot of the hidden cable.

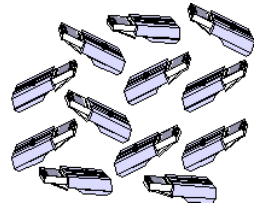
Press ESC to exit the **CABLE TRACE** screen.

Office Locator

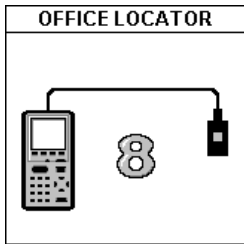
The **Office Locator** function allows you to find the termination of an office cable drop from a wiring closet. It eliminates the need to trace cables through walls and ceilings.

1. Connect the cable to be tested to OMNIScANNER.

2. Insert the RJ-45 Office Locator adapters into wall outlets in the offices you wish to identify. You can connect any or all of the twelve Office Locators before beginning your test.



3. At the patch panel, run the Office Locator function to identify, which office is connected to a given port.




OMNIScANNER will identify office locations and display the ID of the Office Locator adapter found at the far end of the attached cable.

If you are testing a cable that does not have an Office Locator attached at the other end, OMNIScANNER will display a question mark.







Press ESC to exit the **OFFICE LOCATOR** screen.


Chapter 7 - Results


Autotest Results


To view previously saved Autotests, press the  (Results) function key. The **RESULTS** screen displays Project names together with the number of Autotests that are








stored within each project. In the bottom row you will find the total number of Autotests currently stored in OMNIScANNER's memory.

RESULTS	
 TIA	49
 ISO	2
 VENDOR	37
 OMNI	190
 IEEE	MMC
 ATM	MMC
Total	467

Light  Project folders identify internally stored results.


Black  Project folders identify results stored on MMC. (See Chapter 11 - MultiMediaCard for further information.)


To quickly remove all Autotests from a project, highlight the project in the **RESULTS** screen and press the  (Delete) function key. A message will prompt you to confirm the operation.

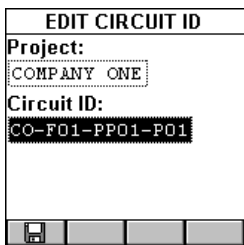
My Test	7/190
MT-F01-PP01-P07	
MT-F01-PP01-P08	
MT-F01-PP01-P09	
MT-F01-PP01-P10	
MT-F01-PP01-P11	
MT-F01-PP01-P12	
MT-F01-PP01-P13	

To view more detailed test information, highlight a project name and press ENTER.

The previously highlighted **PROJECT NAME** will now appear in the title bar together with a numeric test counter that shows the number of Autotest results stored within the project.


To remove an Autotest from the list, press the  (Delete) function key.

Press  (Edit) to move the Autotest to another project or to change the **Circuit ID**.



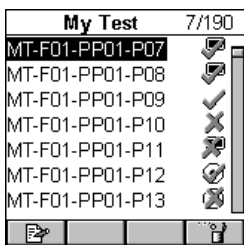
Press ENTER with the **Project:** highlighted to reveal a list of all projects that are currently stored. Use the $\uparrow\downarrow$ to highlight the project you want to store the Autotest within, and press ENTER to select it.











Use the \downarrow to highlight the **Circuit ID:** and press ENTER to edit the field. Press ENTER to terminate the edit mode.

Press  (Save) to save the changes and return to the **PROJECT NAME** screen. If the PROJECT NAME was changed, it will now appear in the title bar together with the numeric test counter.

Viewing Autotest Results

The Project Name screen shows a Circuit ID and a PASS/FAIL icon for each saved Autotest. The following PASS/FAIL icons can be displayed:



-  Passed twisted pair Autotest.
-  Failed twisted pair Autotest.
-  Twisted Pair Autotest without PASS/FAIL criteria.
-  Passed twisted pair Autotest with graphs.
-  Failed twisted pair Autotest with graphs.
-  Twisted pair Autotest with graphs without PASS/FAIL criteria.
-  Passed fiber Autotest.
-  Failed fiber Autotest.
-  Fiber Autotest without PASS/FAIL criteria.
-  Coax test result

To view detailed information about a saved Autotest use the \uparrow on your keypad to highlight a Circuit ID in the Project Name screen and press ENTER.

For Twisted Pair Cabling:

The Autotest Results screen will be displayed. The name of the Autotest, the cable that was used to run the test, and the overall test result (PASS or FAIL) are shown.

All measurements that were performed during the Autotest are listed in the left column. Passed tests are marked with a \checkmark (PASS) or a $\ast\checkmark$ (Marginal PASS). If a test result did not pass, the test name will be followed by a \times (Fail) or a $\ast\times$ (Marginal FAIL) symbol.

Cat 6 Link-D7	
Cat 6 UTP	
Result:	PASS
Wiremap	\checkmark
Length	\checkmark
Attenuation	\checkmark
Return Loss	\checkmark
NEXT	\checkmark

Note



The list of tests varies depending on the kind of Autotest that was performed. (See Chapter 5 - Measurements for detailed information about each measurement screen.)

Use the $\uparrow\downarrow$ on your keypad to highlight a test.

Press ENTER to open the test result screen for that particular test.

Use the \leftarrow or \rightarrow on your keypad to quickly page through all test results.

Note


If  (Save with Graphs) or  (Save with Graphs to MMC) was selected when saving the Autotest, graphs associated with NEXT, Attenuation, Return Loss, PSNEXT, ELFEXT, ACR, PSELFEXT, and/or PSACR are available when viewing Autotest results. Only the graphs that were selected in the SAVE OPTIONS screen will be saved. (See Chapter 4 - Setup: **Save Options** for information about selecting graphs to be saved.)



Press ESC to return to the **PROJECT NAME** screen.

Press ESC to return to the **RESULTS** screen.

For Fiber Optic Cabling:

The Autotest Results screen will be displayed. The name of the Autotest, the cable that was used to run the test, and the overall test result (✓ PASS or ✗ FAIL) for both fibers are shown.





1, **2**, **3**, or  (Loopback) are displayed to indicate the Method used to set the reference. (See Chapter 8 - Fiber Optic Reference for further information.)

TIA 568B			
2	Multimode		
✓	Result	✓	
7 m		39 nS	
0.00 dB	850	1.24 dB	
0.14 dB	1300	0.60 dB	
1.97 dB	Margin	0.88 dB	
Conn.: 2	Splices: 2		

When dual fiber is measured, arrows at the top of the screen point out the direction of the light.

The arrows also indicate the fiber that the ✓ (PASS) or ✗ (FAIL) result is for.


The number of Connectors and Splices is shown at the bottom of the screen if the Autotest loss criteria is formula based. (See Appendix C for further information.)

Press  or  to toggle between the results for  OMNIScANNER and  OMNIRemote.

Press ESC to return to the **PROJECT NAME** screen.

Press ESC to return to the **RESULTS** screen.

For Coaxial Cabling:

COAX TESTS	
Length:	310.8 m 
Delay:	1571nS
Impedance:	49.2Ω
Resistance:	15.6Ω

The **COAX TESTS** result screen displays the results for length, termination, impedance, and resistance.

(See Chapter 5 -Measurements: **Coax Tests** for further information.)

Press ESC to return to the **PROJECT NAME** screen.

Press ESC to return to the **RESULTS** screen.

Results stored on a MultiMediaCard

OMNIScANNER2 allows you to view results that are stored on the MMC.




Internally stored results are identified by a light  Project folder.

Results stored on MMC are identified by a black  Project folder.

Viewing is accomplished as described above.













When a MultiMediaCard is inserted, OMNIScANNER2 will allow you to copy results to the portable card.

To copy the test result(s) contained in one project to the MMC, highlight the appropriate

 Project folder in the **RESULTS** screen and then press  (Copy Project to MMC). This function is available only for Projects in the internal flash  (light Project folder).

To copy all internal Projects that are listed in the

RESULTS screen, press  (Copy Results to MMC).

RESULTS	
 TIA	49
 ISO	2
 VENDOR	37
 OMNI	190
 IEEE	MMC
 ATM	MMC
Total	467
     	

Chapter 8 – Fiber Optic Reference Methods

Establishing the Reference

Different methods can be used when making a reference measurement with OMNIFIBER. The reference measurement to use depends on how the standard defines the link, and how the network is interconnected. There are three basic link definitions and three corresponding reference methods.

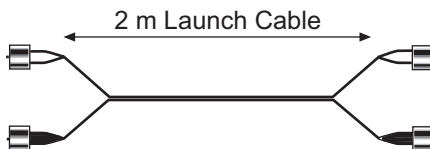
Link Definition	Reference Method	Multimode Standard	Single-mode Standard	Where Used
link = 2 cross connects + cable plant	1 jumper or equivalent	TIA-526-14A Method B	TIA-526-7 Method A.1	TIA-568-B, ISO 11801 100Base-X, 1000Base-X, ATM, Fibre Channel, FDDI, Token Ring
link = 1 cross connect + cable plant	2 jumper or equivalent	TIA-526-14A Method A	TIA-526-7 Method A.2	10 Base-X, TIA 455-171 Method B
link = cable plant	3 jumper or equivalent	TIA-526-14A Method C	TIA-526-7, Method A.3	

The Launch/Jumper Cable

The launch/jumper cables are 2 m fiber cables and need to be of good quality and in excellent condition. Always clean and inspect the launch cables before use.

Note

The launch cable used to set the reference value should be the same type of fiber as the cables to be tested and certified, 50/125, 62.5/125 or single-mode.



The fiber cables included with your OMNIFIBER kit are duplex launch cables. One fiber has **white** connector boots and the other fiber has **black** boots. These colors are consistently used for all graphics throughout this user guide to avoid confusion.

Fibers can be marked with other color schemes or cable markings to differentiate them. Pay close attention to the colors to avoid improper fiber connections.

The Reference Methods

For testing of networks with different connector styles, please consult the Fluke Networks web site (<http://www.flukenetworks.com/support>).

It is very important that the transmitter (TX port) connections are not disturbed after the reference value is established.

Note

When a connector is removed and then reattached, it is unlikely to go back into the exact same position. As a result, measurements will change when connections are made or broken.

OMNIFIBER measures two fibers of a duplex link in one Autotest operation. Four reference values will be stored, two from OMNIScANNER to OMNIREMOTE (**TX - RX**), the others from OMNIREMOTE to OMNIScANNER (**TX - RX**).

One Jumper Reference Method

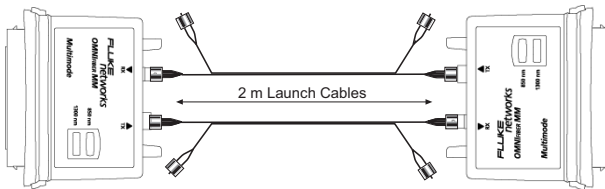
This method is used when the link includes:


- the loss of one connection at the near end cross connect
- the loss of one connection at the far end cross connect/outlet
- the loss of the cable plant

TIA/EIA -568-B, ISO 11801, and IEEE 802.3 (100 Base-X, 1000Base-X) specify the one jumper method.

Note

This method is called 'Method B' in TIA-526-14A and 'Method A.1' in TIA-526-7.



1. Connect one end of a **black** launch cable to the **TX** (transmit) port of the fiber adapter that is attached to OMNIScANNER.
2. Connect the other end of that **black** launch cable to the **RX** (receive) port of the fiber adapter that is attached to OMNIRemote.
3. Leave the two **white** fiber connectors dangling and unconnected.
4. Connect one end of another **black** launch cable to the **TX** (transmit) port of the fiber adapter that is attached to OMNIRemote.
5. Connect the other end of that **black** launch cable to the **RX** (receive) port of the fiber adapter that is attached to OMNIScANNER.
6. Leave the two **white** fiber connectors dangling and unconnected.
7. Press  (Setup) to open the **SETUP** screen and then select **Set Reference** to set the reference.
8. Disconnect only the following two ends: OMNIFIBER Main **RX** (receive) and OMNIFIBER Remote **RX** (receive). OMNIFIBER Main **TX** and OMNIFIBER remote **TX** stay connected!
9. Connect the white fibers to the appropriate **RX** ports.

Two Jumper Reference Method

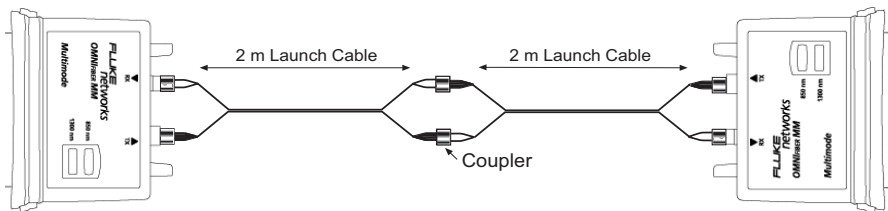
This method is used when the link includes:


- the loss of one connection at the near or far end cross connect
- the loss of the cable plant

TIA/EIA -455-171 and IEEE 10 Base-X specify the two jumper method.

Note

This method is called 'Method A' in TIA-526-14A and 'Method A.2' in TIA-526-7.



1. Connect a launch cable to the fiber adapter that is attached to OMNIScANNER. The **black** fiber attaches to the **TX** (transmitter) port and the **white** fiber to the **RX** (receiver) port.
2. Connect a launch cable to the fiber adapter that is attached to OMNIrEMOTE. The **black** fiber attaches to the **TX** (transmitter) port and the **white** fiber to the **RX** (receiver) port.
3. Use a connector adapter to mate the two black fiber connectors.
4. Use a connector adapter to mate the two white fiber connectors.
5. Press  (Setup) to open the **SETUP** screen and then select **Set Reference** to set the reference.
6. Disconnect the connectors from the connector adapters without disturbing the fiber connections to the OMNI**Fibers**.
7. Set the connector adapters aside.

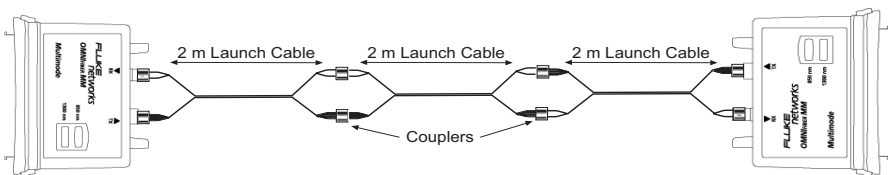
Three Jumper Reference Method


This method is used when the link includes:

- the loss of the cable plant

Note

This method is called '**Method C**' in TIA-526-14A and '**Method A.3**' in TIA-526-7.



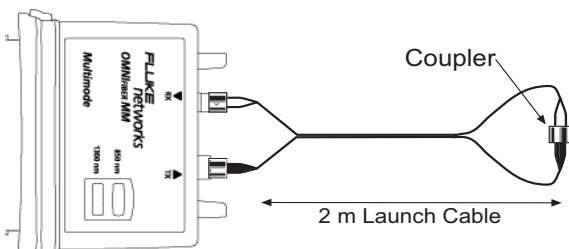
1. Connect the first launch cable to the fiber adapter that is attached to OMNISCANNER. The **black** fiber attaches to the **TX** (transmitter) port and the **white** fiber to the **RX** (receiver) port.
2. Connect the second launch cable to the fiber adapter that is attached to OMNIREMOTE. The **black** fiber attaches to the **TX** (transmitter) port and the **white** fiber to the **RX** (receiver) port.
3. Use two connector adapters to mate the **black TX** connector to the **white RX** connector through a third jumper cable.
4. Use two connector adapters to mate the other **black TX** connector to the **white RX** connector through a third jumper cable.
5. Press  (Setup) to open the **SETUP** screen and then select **Set Reference** to set the reference.
6. Remove the third jumper cable, located in the center, and the connector adapters without disturbing the OMNIFIBER connections.

Two Jumper Reference Method in Loopback Mode

The OMNIFIBER Main can be used without the remote to make measurements on a single fiber. In this state the TX fiber is looped back to the RX port of the same OMNIFIBER adapter.


Note

During the Autotest, the loss and length of the white fiber will be subtracted from the length of the fiber under test. Since the loss in a short jumper cable is negligible, the loss measurement of the fiber under test will be accurate. The length measurement will be off by the length of the jumper cable (about 2 meters). This primarily affects the length accuracy of very short cables.



1. Connect the launch cable to the OMNIFIBER. The **black** fiber attached to the **TX** (transmit) port and the **white** fiber to the **RX** (receive) port.

2. Use a connector adapter to mate the connections on the other end.

3. Press  (Setup) to open the **SETUP** screen and then select **Set Reference** to set the reference.

4. Disconnect the white connector from both the RX port and the connector adapter. Do not disturb the black fiber attached to OMNIFiber's TX port.

5. Leave the two **white** ends dangling.

6. Attach the cable to be tested to the connector adapter and the OMNIFiber's open RX port .

Chapter 9 - Uploading and Printing

Scanlink™ Tools

Scanlink Tools consist of three parts: the Scanlink program, the OMNIScANNER Configuration program, and the OMNIScANNER Remote Control program.

Scanlink™ is designed to upload data measured with OMNIScANNER, PENTAScANNER, SIMPLIFIBER, or CERTIFIBER. Collected data can be viewed or saved to disk. **Scanlink** supports different report formats, like **Autotest Certification** and **Summary Reports** that can be printed from the PC to a printer or a file.

OMNIScANNER Configuration allows for easy setup and management of projects, the configuration of OMNIScANNER, the specification of tests, and the construction and structuring of cable libraries. Projects can easily be downloaded to several OMNIScANNER. **OMNIScANNER Configuration** allows you to import limits that can be used in custom Autotests. These limits can be viewed and printed with the extensive graphing utility.

OMNIScANNER Remote Control is designed to control OMNIScANNER from your PC. It allows you to run Autotests that can be uploaded, viewed, and printed. OMNIScANNER Remote Control contains an extensive graphing utility allowing you to view and print saved graphs of uploaded test results.

Refer to the Scanlink Tools on-line help for detailed instructions about the installation and the use of the application. The Getting Started Guide together with the software is part of the Scanlink Tools CD that is included with OMNIScANNER. Scanlink Tools are also available for download from the Fluke Networks web site at www.flukenetworks.com.

Chapter 10 - Updating Scanner Software

Downloading Software from the WWW site

Software updates can be easily downloaded from the Fluke Networks World Wide Web site. If you are connected to the Internet, you can access our web site by entering <http://www.flukenetworks.com/support> in the URL address field.

Select the file you need by clicking on it, and then save it to the hard disk.

Execute the downloaded .exe file to extract the software update.

Note

To ensure compatibility, always update the OMNIScANNER software together with the Scanlink® Tools software.

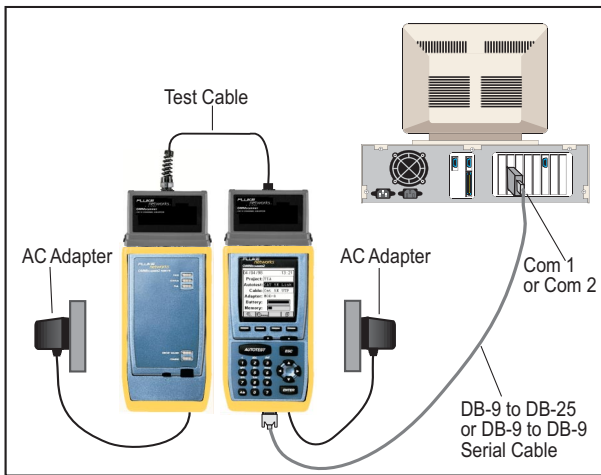
Updating OMNIScANNER and OMNIRemote Software

Note

*The update process will erase all test results stored in memory. Use **Scanlink** to upload the results before updating OMNIScANNER's software.*

To update OMNIScANNER with the files you have downloaded from the WWW to your PC proceed as follows:

1. Connect the DB-9 end of the serial cable to OMNIScANNER's serial port, and then connect the DB-9 or DB-25 end of the serial cable to your PC's serial port.
2. Plug the AC adapter into OMNIScANNER.
3. Connect OMNIScANNER and OMNIRemote using the provided test cable and adapter.




4. Plug the AC adapter into OMNIRREMOTE.

5. Turn on OMNIScANNER.

You are now ready to download the new flash update from the PC. Follow the instructions in the ReadMe that accompanies the update file.

6. To verify the software update, press and hold the Backlight key (located right above the ESC key). The software version # will be displayed

7. To verify the update for OMNIRREMOTE, press OMNIScANNER's  (Setup) function key, and then select the option **Remote Info**. The new software version will be displayed.

Chapter 11 - MultiMediaCard

The MultiMediaCard is the world’s smallest solid state storage device. It weighs less than two grams and is the size of a postage stamp (32mm high by 24mm wide and 1.4mm thick). The card is available in 8MB, 16MB, and 32MB capacities.



The MMC can store OMNIScANNER2 test results that can then be uploaded to **Scanlink**. Configurations that were created with **OMNIScANNER Configuration** software can be downloaded onto the card for easy replacement of the current OMNIScANNER configuration. (See *Chapter 9 for further information about Uploading and Downloading.*)



Portable Data







OMNIScANNER2 can store data on a very small, removable MultiMediaCard. This allows for unlimited expansion of memory capacity and transferal of test data without taking OMNIScANNER2 out of service.

Available MultiMediaCard readers and adapters allow data to be uploaded directly to laptops or PCs.

Tests can be saved in OMNIScANNER2’s internal flash memory or to the optional removable MultiMediaCard. If the MultiMediaCard slot is empty, OMNIScANNER will automatically save the test results to the internal memory area.

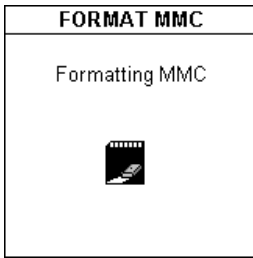
When the MultiMediaCard is inserted,

OMNIScANNER will allow you to save the  selected project or  all test results to the card. (See *Chapter 7 - Results: Copying Results to a MultiMediaCard* for further information about saving results to the MMC.)

RESULTS	
	TIA 49
	ISO 2
	VENDOR 37
	OMNI 190
	IEEE MMC
	ATM MMC
Total	467

MultiMediaCard Maintenance

Multi Media Flash memory cards store data just like a PC stores data on the hard disk. Saved files are broken into segments and stored in any free segment of the multi media flash memory card. Prior to the initial use, the MMC may require formatting. Use the OMNIScANNER2 **Format MMC** function to perform this task.



To format the MultiMediaCard, select **Format MMC** in the **SETUP** screen. A gauge will indicate the progress. (See *Chapter 4 - Setup: **Format MMC*** for further information.)

Formatting time varies depending on the size of the MultiMediaCard, the 8MB card can be formatted in about 2 minutes.

The MMC Structure

The file structure on the MMC is Windows® file system compatible.

When saving test results to the MMC, Project folders will be created, which allow you to easily retrieve the files with Scanlink. Each folder can be expanded to view all tests (Circuit IDs) it contains.

Configurations stored on the MMC by the **OMNIScANNER Configuration** software will be contained in a Configuration folder.

Chapter 12 - Universal Serial Bus Port

USB allows you to instantly connect OMNIScANNER2 to your computer running Windows® 98 (2nd Edition) or Windows® 2000.

A standardized plug and port replaces all the different kinds of serial and parallel port connectors and combinations.

When using a USB-compliant PC, you just turn on your PC, attach OMNIScANNER2 to the USB port, and turn on the scanner. USB makes the connection process automatic and hassle free. Up to 10 OMNIScANNER2s can be connected simultaneously.



Note

Most PCs, including many notebooks, on the market today are fully USB-ready.

The “Hot-swapping” feature allows you to attach or remove OMNIScANNER2 on the fly, without having to shut down and restart your PC. OMNIScANNER2 will be detected automatically. This feature is especially useful when uploading results from several scanners.

Of course the USB works with Scanlink Upload Utility, OMNIScANNER Configuration and OMNIScANNER Remote Control. (See Chapter 9 - *Uploading and Printing for more information.*)

Installing the USB Driver

Note

*OMNIScANNER2 supports high speed USB connections. Please use only **high-speed** USB cables. Make sure the length of the cable does not exceed 5 meters (1m recommended).*

To install the USB driver on your PC proceed as follows:

Note

Make sure that you are running Windows® 98 (2nd Edition) or Windows® 2000.

This wizard searches for new drivers for:

OMNIScanner2

A device driver is a software program that makes a hardware device work.

What do you want Windows to do?

Search for the best driver for your device. (Recommended).

Display a list of all the drivers in a specific location, so you can select the driver you want.

Windows will search for new drivers in its driver database on your hard drive, and in any of the following selected locations. Click Next to start the search.

Floppy disk drives

CD-ROM drive

Microsoft Windows Update


Specify a location:

Windows driver file search for the device:

OMNIScanner2 USB

Windows is now ready to install the best driver for this device. Click Back to select a different driver, or click Next to continue.

Location of driver:

 D:\MTUSB.INF

1. Turn your PC on.
2. Connect the PC with OMNIScANNER2 via the high-speed USB cable.
3. Turn OMNIScANNER2 on.
4. Insert the **Scanlink Tools CD** which contains the USB driver software.
5. Follow the instructions on the screen to install the driver.

First, the install wizard will find the new device: **OMNIScanner2**. Click Next > to continue

Then, it will search for a driver for OMNIScANNER2. We recommend accepting the default setting: **Search for the best driver for your device**. Click Next > to continue.

Now, select the option: **CD-Rom drive** to start the search for the USB driver. Click Next > to continue.

Next, Windows will detect the location of the file **OMNIScanner2 USB**. Click Next > to install the driver file.

Once windows has finished installing the driver, OMNIScANNER2 USB will


appear in your PC's driver list.

Windows 98: When connecting OMNIScANNER2 to a different USB port, the driver will be automatically installed.

Windows 2000: When connecting OMNIScANNER2 to a different USB port, a separate installation of the driver from the Scanlink Tools CD is required.

Uploading OMNIScANNER2 Test Results to the PC

1. To send test results from OMNIScANNER2(s) to a PC, first turn your PC on.
2. Connect the PC with OMNIScANNER2 via the high-speed USB cable.
3. Turn on OMNIScANNER2

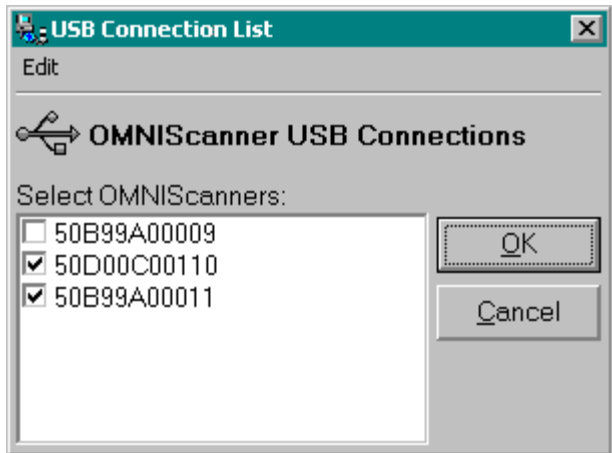
4. Run the **Scanlink** software and click on the  (Upload) button in the toolbar, or select Upload in the File menu.

5. In the **Scanner Type** field, select OMNIScANNER.

6. Select the appropriate port (USB).

7. Click **Upload** to establish communications between **Scanlink** and OMNIScANNER2 and upload the Autotest data that are stored in the scanner's memory.

8. **Scanlink** can upload data from several scanners at once. If you have more than one scanner connected, the **USB Connection List** will appear and allow you to select the scanners you wish to upload from. The OMNIScANNER2s are listed by serial number. Select the appropriate scanner(s) and click OK to continue.



9. If more than one Project is found, the **Project List** will appear and allow you to select the project(s) you wish to upload. Make the appropriate choice and press OK to continue the upload process.

Once the connection is established, the scanner's serial number is displayed in the lower left display panel. A gauge in the lower right display panel indicates the progress during the upload process.

Scanlink will transfer all of the Autotest results from the scanner and display a summary of the tests in the main program window.

10. Click **Cancel** to abort the upload process.

To review collected Autotest data, select the items to be viewed, then select View Autotest from the View menu. (*Consult the Scanlink on-line help for further information.*)

Downloading Configurations to OMNIS_{SCANNER}2

1. To download Configurations from OMNIS_{SCANNER} Configuration software to one or several OMNIS_{SCANNER}2s, first turn your PC on.

2. Connect the PC with OMNIS_{SCANNER}2 via the high-speed USB cable.

3. Turn OMNIS_{SCANNER}2 on.

4. Run the **OMNIS_{SCANNER} Configuration** software, highlight a



Configuration and click the



Download button.

5. To make sure that you are downloading the desired Configuration, the **Download Configuration** dialog box displays the name of the Configuration.

6. The Scanner Type is OMNIS_{SCANNER}.

7. Select the Port (USB) and click OK to continue.

Note

OMNIS_{SCANNER} Configuration can be used to download configurations to several scanners at once. If you have more than one scanner connected, the **USB Connection List** will appear and allow you to select the scanners you wish to download to. The OMNIS_{SCANNER}2s are listed by serial number. Select the appropriate scanner(s) and click OK to continue.

8. Click Cancel to abort the Download process.

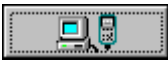
During the Download operation, the Download Status screen appears and a gauge indicates the progress. The OMNIScANNER2 keypad is locked during the download process.

9. The message 'Download complete' will be displayed to inform you when the Configuration is downloaded. Click OK to return to the main screen.

The new Configuration is now implemented, and OMNIScANNER2 displays the Project screen. *(Consult the OMNIScANNER Configuration on-line help for further information.)*

Remote Controlling OMNIScANNER2

1. To remote control OMNIScANNER2, first turn your PC on.
2. Connect OMNIScANNER2 and OMNIREMOTE via the link to be tested.
3. Use the USB Cable to connect OMNIScANNER2 to the PC and then turn on OMNIScANNER2.
4. Run the **OMNIScANNER Remote Control** software.
5. Select Setup | Communication Port and select USB as the Port.



6. Click the  (Connect) button.

As soon as the connection occurs, the OMNIScANNER's serial number will be displayed.

OMNIScANNER Remote Control will detect the Adapter that is currently attached to OMNIScANNER2 and display the name of the adapter. If an OMNIFiber adapter is attached the serial number will be displayed.

The Remote Control program will read OMNIScANNER's Configuration (Projects, Autotest, and cables).

Once the connection is completed the Connection Status bar displays **Ready!**. *(Consult the OMNIScANNER Remote Control on-line help for further information.)*

Note

OMNIScANNER Remote Control software can be connected to several OMNIScANNER2s, but only one at a time can be remote controlled. If you have more than one scanner connected, the **USB Connection List** will appear and allow you to select the scanner you wish to remote control. The OMNIScANNER2s are listed by serial number. Select a scanner and click OK to continue.

Appendix A - Technical Specifications

Specifications apply to both OMNIScANNER and OMNIREMOTE unless otherwise noted.

Physical Characteristics

OMNIScANNER

- Dimensions: 8.75" x 4.50" x 2.12" (22.25 cm x 11.4 cm x 5.4 cm)
- Weight: 2.20 lbs (1 kg)

OMNIREMOTE

- Dimensions: 8.75" x 4.50" x 2.12" (22.25 cm x 11.4 cm x 5.4 cm)
- Weight: 1.96 lbs (0.89 kg)

OMNIFIBER

- Dimensions: 3.54" x 3.88" x 1.55" (9 cm x 9.85 cm x 3.94 cm)
- Weight: 0.24 lbs (0.11 kg)

User Interface

OMNIScANNER

- 62 x 62 mm Graphic LCD with backlight
- Backlit keypad with tactile feedback, numeric input, dedicated functions, four soft functions, and cursor pad
- Context sensitive help and operating instructions
- Tone generating audio for warning or other user feedback
- Date stamp of all tests

OMNIREMOTE LED Displays

- Pass Indicator (GREEN) for test results
- Status Indicator (GREEN) for OMNIREMOTE status, various blink rates
- Fail Indicator (RED) for test results
- Circuit Guard (ORANGE) for high voltage input protection warning
- Charge (RED) for OMNIREMOTE low battery status
- Charge (GREEN) while OMNIREMOTE battery is charging

OMNIFIBER MM LED Displays

- 850 nm Indicator (GREEN) for transmitting at 850 nm
- 1300 nm Indicator (GREEN) for transmitting at 1300 nm

- 850 nm Indicator (ORANGE) for switching fibers
- 1300 nm Indicator (ORANGE) for switching fibers

OMNIFIBER SM LED Displays

- 1310 nm Indicator (GREEN) for transmitting at 1310 nm
- 1550 nm Indicator (GREEN) for transmitting at 1550 nm
- 1310 nm Indicator (ORANGE) for switching fibers
- 1550 nm Indicator (ORANGE) for switching fibers

Power

- Removable, rechargeable battery pack
- 9.6 Volts @ 1900 mA-Hr NiMH (OMNIS_{SCANNER}2)
- Built-in fast charger using AC adapter
- Charging Time: 3½ hours for fully discharged batteries.
- Battery life : 10+ hours operation (typical)
- AC: 15 VDC - 1 amp AC adapter for continuous operation or charging

Environmental

- Operating Temperature: 0°C to 50°C (32°F to 122°F)
- Storage Temperature: -10°C to 55°C (14°F to 131°F)
- Operating Humidity: (non-condensing): 5% to 90%
- Storage Humidity: 5% to 95%
- Regulatory Compliance: C E Class A

Measurement Port (Test Interface)

- Ultra low Crosstalk test interface that supports testing of all four pairs
- 160 pin test interface connector which exceeds 10,000 mating cycles
- Variety of test cables and adapter modules support testing of 110 block and shielded modular jack and plug interfaces

Serial Port

- Connector: DB-9
- Baud Rate: 300 to 57,600 baud
- Parity: None
- Length: 8 Bits
- Handshaking: None, RTS/CTS, and XON/XOFF

Universal Serial Bus

- Type Self Powered Device
- Link 12 MB/s Full Speed Bulk Transfer with two 128 byte FIFOs and Automatic Retry
- Connector Type 'B' Receptacle

- Recommended Cable Full Speed Shielded Twisted Pair with A-B Plugs (USB V1.1 Complaint)

MultiMediaCard Interface

- Link 4.6 MB/s SPI Mode with 16 bit CRC
- Format 512 byte sector size, 32Bit FAT File System
- Socket Non-Locking Seven Contact with Ejector
- Recommended Media Sandisk SDMB-xx or Infineon MultiMediaCard-F00xx (xx denotes memory size in Megabytes)

Memory

- Control: Flash Memory allows electronic upgrading of both OMNIScANNER and OMNIREMOTE programs.
- Test Storage: Up to 1000 complete Autotest results can be stored in permanent flash memory. They are not subject to loss due to power or battery failures.

OMNIScANNER Autotest Functions

- Full suite of tests to determine if cable meets generic cabling or network type requirements.
 - Extended performance range Cabling (CAT 6 and CAT 7)
 - **TIA** standard Autotests
 - **ISO/IEC** standard Autotests
 - **Vendor** specific Autotests
 - **IEEE** standard Autotests
 - **ATM** standard Autotests
 - **FDDI** standard Autotests
 - **AS/NZ** standard Autotests
 - **ANSI** standard Autotests

OMNIScANNER Test Functions

- Wire Map
- NEXT (Near End Crosstalk)
- Return Loss
- Attenuation
- ELFEXT (Equal Level FEXT)
- ACR (Attenuation to Crosstalk Ratio)
- Bandwidth
- Length/Delay
- Resistance
- Power Sum NEXT, ACR and ELFEXT
- **Coax Tests:** Length, Delay, Impedance, Resistance

OMNIFIBER Test Functions

- Multimode Fiber: Length, Propagation Delay, Loss
- Single-mode Fiber: Length, Propagation Delay, Loss

Transmission Performance Measurement Method

All cabling transmission performance measurements (NEXT, RL, Attenuation, and ELFEXT) are implemented using swept frequency domain, vector, digital signal processing measurement methods to ensure accurate, repeatable results.

Transmission Parameter Measurement Accuracy

The accuracy of the RF transmission performance measurements is calculated in accordance with error models documented in related TIA documents. OMNIScANNER is designed to significantly exceed Level III accuracy requirements. The following tables provide typical specifications for the intrinsic instrument parameters relating to the measurement accuracy model and the calculated typical accuracy for the basic link, permanent link and channel configurations.

Note

Refer to the TIA field tester specifications for a definition of the accuracy model.

TABLE A1.1: INSTRUMENT INTRINSIC MEASUREMENT PARAMETERS AS A FUNCTION OF MEASUREMENT CONFIGURATION

Parameter @ 100 MHz	Basic Link (Baseline)	Permanent Link	Channel
Residual NEXT	110 dB	100 dB	70 dB
Noise Floor	100 dB	100 dB	100 dB
NEXT Detector Accuracy	0.2 dB	0.3 dB	0.3 dB
Insertion Loss & ELFEXT Detection Accuracy	0.4 dB	0.5 dB	0.5 dB
Residual FEXT	95 dB	85 dB	43 dB
Output Signal Balance	48 dB	43 dB	40 dB
Common Mode Rejection	48 dB	43 dB	40 dB
Source Load RL	25 dB	23 dB	20 dB
Directivity	44 dB	35 dB	35 dB
RL Tracking	0.1 dB	0.1 dB	0.1 dB
RL Source Match	45 dB	35 dB	30 dB

TABLE A1.2: CALCULATED TYPICAL ACCURACY PER TIA ERROR MODEL AS A FUNCTION OF MEASUREMENT CONFIGURATION

Typical Accuracy @ 100 MHz measuring a 50 m link/chan.	Basic Link (Baseline)	Permanent Link	Channel
Insertion Loss Accuracy	0.6 dB	0.8 dB	1.0 dB
PP NEXT Accuracy	0.5 dB	0.8 dB	1.2 dB
PS NEXT Accuracy	0.5 dB	0.8 dB	1.2 dB
PP ELFEXT Accuracy	0.8 dB	1.1 dB	2.7 dB
PS ELFEXT Accuracy	0.8 dB	1.1 dB	3.0 dB
RL Loss Accuracy	0.5 dB	0.9 dB	0.8 dB

Wire Map

- Finds miswires, opens, shorts, crossed and split pairs and presents results in a schematic format
- Includes shield test if connected
- Uses OMNIREMOTE for complete mapping of wiring at both ends of the cable

NEXT

- Test all six pair combinations from both directions using OMNIREMOTE
- Frequency Range: 1 to 300 MHz
- Dynamic Range: >100dB
- Measurement Accuracy: Calculated per TIA error model
- Accuracy: Significantly exceeds Level III requirements
- Measurement Resolution: 0.1dB

Return Loss

- Measures Return Loss on all four pairs from both directions using OMNIREMOTE
- Frequency Range: 1.0 to 300 MHz
- Dynamic Range: > -35 dB
- Factory Calibrated to ensure measurement port match to reference 100 ohm impedance.
- Measurement accuracy: Significantly exceeds Level III requirements
- Measurement resolution: 0.1dB

Attenuation

- Tests all four pairs using OMNIREMOTE as far end active signal injector.
- Frequency Range: 1.0 to 300 MHz
- Dynamic Range: > 60 dB

- Measurement Accuracy: Significantly exceeds Level III requirements
- Measurement resolution: 0.1dB

ELFEXT (Equal Level FEXT)

- Tests from both directions using OMNIREMOTE and reports all 24 pair combinations.
- Frequency Range: 1 to 300 MHz
- Dynamic Range: >100dB
- Measurement Accuracy: Significantly exceeds Level III requirements
- Measurement Resolution: 0.1dB

ACR (Attenuation to Crosstalk Ratio)

- Computed for 6 pair combinations from both ends at all frequency points from the respective pair to pair NEXT and Attenuation measurements.

Bandwidth

- Computed for the link or channel under test, bandwidth indicates the highest frequency for which the worst case pair to pair crosstalk (NEXT) is at least 3dB less than the attenuation.

Length

- Range: 0 to maximum distance, where max. distance = 457 m (1500 ft.) for twisted pair cable
- Accuracy: $\pm K \pm \text{Length resolution} \pm \text{NVP uncertainty}$, where $K = \pm 4\%$ of length or 0.6 m (2ft.), whichever is greater.
- Length resolution: 0.3 m (1ft.)

Resistance

- Range: 0 - 500 Ω
- Accuracy: $\pm 0.5 \Omega$ @ 0 to 15 W, $\pm 2\%$ @ 15 to 500 Ω
- Resolution: 0.1 Ω

Power Sum NEXT, ACR and ELFEXT

- Computed for 4 pairs from both ends from the respective pair to pair NEXT, Attenuation and FEXT measurements.

Optical Measurements (OMNIFIBER)

- +3dBm to -55dBm
- .01dB resolution
- $\pm .25$ dB typical accuracy

Length (OMNIFIBER MM, multimode)

- Maximum 2000m (6600ft)
- Resolution: 1m (1ft)

Length (OMNIFIBER SM, single-mode)

- Maximum 16,000m (52,500ft)
- Resolution: 1m (1ft) from 0 to 2000m, 2m (6ft) from 2,000 to 16,000m

Delay (OMNIFIBER MM, multimode)

- 0 to 10000nS
- 1nS resolution 0-10,000nS

Delay (OMNIFIBER SM, single-mode)

- 0 to 80,000nS
- 1nS resolution 0-10,000nS; 8nS resolution 10,000 - 80,000nS

High Voltage Input Protection

- The test interface withstands input hazard conditions that arise from normal telephone interfaces (48 VDC at less than 80 mA) or 24 VAC power used to power many telephone keysets. The unit detects when a voltage of greater than ± 15 volts is applied on the inputs and sounds a warning to alert the user to remove the hazard condition immediately to prevent possible damage to the input circuits.

Note

Measurements cannot be performed when hazard conditions are present.

Appendix B - Batteries

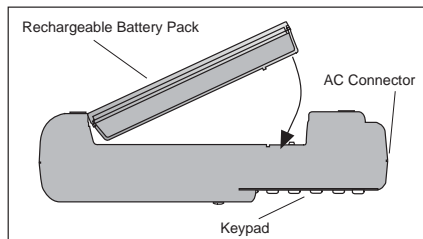
Battery Packs

OMNIScANNER and OMNIRemote are powered by rechargeable, recyclable battery packs.

Under various state and local laws, it may be illegal to dispose of this battery pack into the municipal waste stream. Check with your local solid waste officials for details in your area for recycling options or proper disposal.

To remove the battery pack, place the instrument face down and slide the arrow-shaped tab downward. Then lift the battery pack up towards you.

To install the battery pack, insert the two tabs on the top of the battery in the Scanner and press down on the battery pack until it clicks into place.



The batteries have a limited number of recharge cycles. Typically, capacity is warranted by the battery manufacturer for about 200 recharge cycles. The capacity of a battery is highly dependent on the way it is recharged. Generally batteries that are fully discharged before the recharge cycle may have a longer life than those subject to extended cycles of shallow discharge. Conditions of shallow discharge promote a phenomenon known as voltage depression, which gives the appearance of reduced capacity. Battery life can also be effected by the temperature conditions under which charging is performed. Charging by room temperature (77°F/25°C) maximizes the battery life.

OMNIS_{SCANNER} and OMNIR_{REMOTE} use a charging mechanism that minimizes the effects of shallow discharging. To maximize battery life, the battery temperature is monitored and maintained within limits during the charging process. Charging under high temperature conditions may result in longer recharge times or premature termination of charging.

Battery Charging

Charging of the battery is enabled in the OMNIS_{SCANNER} and OMNIR_{REMOTE} whenever the AC adapter is plugged in and the units are powered off.

The recharge time is typically 4½ hours to completely charge a fully discharged battery.

Charging is automatically terminated by the units when full capacity or over temperature conditions are reached. To enhance long term life and capacity of the battery a maintenance and topping charge period starts right after the rapid charge is completed. The charging status is displayed on both units. The graphic LCD displays charging status on the OMNIS_{SCANNER}, while LEDs indicate the status on the OMNIR_{REMOTE} unit.

Status conditions are as follows:

- Charge (RED) for OMNIR_{REMOTE} low battery status
- Charge (GREEN) while OMNIR_{REMOTE} battery is charging
- Charge (GREEN - blinking) when battery is charged

Battery Tips

- Power off the unit before changing the battery pack. Charging is only enabled when the unit is turned OFF.
- If not on AC power, the battery packs must be replaced within five minutes to avoid loss of time and date in the OMNIS_{SCANNER} unit.
- If the display goes blank while the AC adapter is plugged into the Scanner, it indicates that the battery pack is on maintenance (“trickle”) charge.
- The average time to recharge the battery pack is about 4½ hours.
- To maximize battery pack life, avoid extreme temperatures.
- Using OMNIS_{SCANNER} with the backlight turned ON causes increased battery drain. (See *Chapter 1 - Introduction: OMNIS_{SCANNER}'s Keypad: Backlight*)
- Average daily life of the battery pack is about ten hours.
- An external charger is also available. Contact your Fluke Networks distributor for details on the external charger.

Appendix C - OMNIFiber PASS/FAIL Criteria

For the latest cable installation, international standards, and conformance techniques: http://cabletesting.com/Fiber_Standards.html

Formula 1: 568B Equation for 850nm fiber:

(# of mated connections \times 0.75) + (# of splices \times 0.3) + (length \times 3.5dB/1000m) = OLB*

Formula 2: 568B Equation for 1300nm fiber:

(# of mated connections \times 0.75) + (# of splices \times 0.3) + (length \times 1.5dB/1000m) = OLB*

Formula 3: 11801 Equation for 850nm fiber:

(# of mated connections \times 0.75) + (# of splices \times 0.3) + (length \times 3.5dB/1000m) = OLB*

Formula 4: 11801 Equation for 1300nm fiber:

(# of mated connections \times 0.75) + (# of splices \times 0.3) + (length \times 1dB/1000m) = OLB*

*Optical Link Budget (OLB) is the loss measured in a fiber link. Loss in the connectors, the splices, and the cable are added up to the total link loss or OLB.

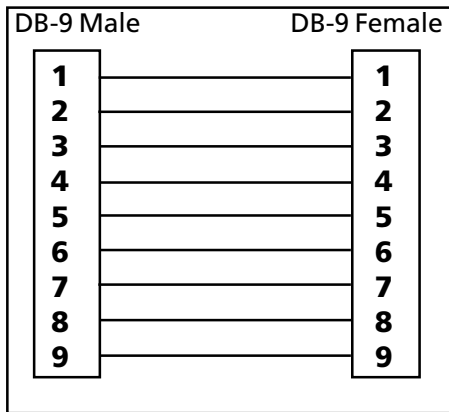
The TIA 568B Equation and the ISO 11801 Equation specify the OLB. Each has certain PASS/FAIL criteria based on the number of connectors and splices located along the cable to be tested. These amounts can be entered as test limits. OMNIScANNER then calculates optical power loss as follows: Max. Loss (dB) = Cable Loss + Connector Loss + Splice Loss.

The Optical Link Budget (OLB) is the PASS/FAIL point in dB. The number of connections and splices is entered in the first Autotest screen.

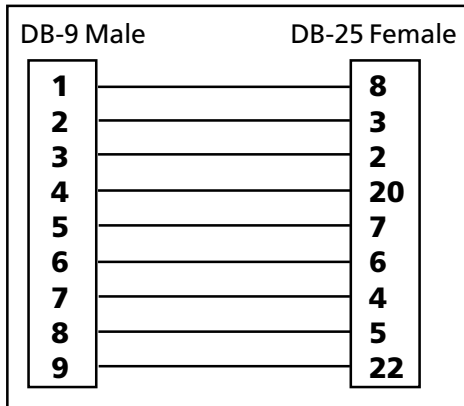
Appendix D - Cable Pin-Outs

Described below are the functions of the electronic signals transmitted through each pin in a connector.

Serial Cable DB-9 Male to DB-9 Female Pin-outs



Serial Cable DB-9 Male to DB-25 Female Pin-outs



Cable Pin-Out Signals

The signals for the cable pin-outs are as follows:

DB-9 Male Pin	DB-25 Female Pin	DB-9 Female Pin	Signal	Signal Description
5	7	5	GND	Protective Ground
3	2	3	TXD	Transmitted Data
2	3	2	RXD	Received Data
7	4	7	RTS	Request to Send
8	5	8	CTS	Clear to Send
4	20	4	DTR	DataTerm Ready
6	6	6	DSR	Data Set Ready
1	8	1	CD	Received Line Signal Detector
9	22	9	RI	Ring Indicator

