



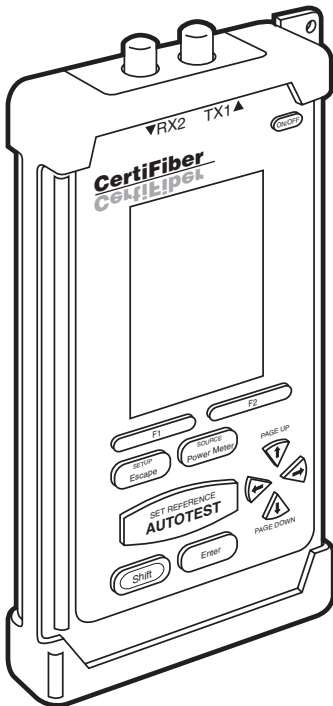
Microtest #2955-4503-03

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CertiFiber™



CUSTOMER SUPPORT INFORMATION

Order **toll-free** in the U.S.: Call **877-877-BBOX** (outside U.S. call **724-746-5500**)
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NORMAS OFICIALES MEXICANAS (NOM)**ELECTRICAL SAFETY STATEMENT****INSTRUCCIONES DE SEGURIDAD**

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc..
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser conectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precaución debe ser tomada de tal manera que la tierra física y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.

14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las líneas de energía.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objetos líquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
 - A: El cable de poder o el contacto ha sido dañado; u
 - B: Objetos han caído o líquido ha sido derramado dentro del aparato; o
 - C: El aparato ha sido expuesto a la lluvia; o
 - D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
 - E: El aparato ha sido tirado o su cubierta ha sido dañada.

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1. Specifications

Compliance — CE

Standards — LAN: IEEE 802.3 Ethernet v. 2

Interfaces —

Fiber optic: Multimode;

Serial: TIA-574 (DB9) subset of TIA RS-232, DCE

Standards Autotested Against — TIA-568-A, ISO 11801, ATM155, ATM155SWL, ATM622, 10BASE-F, 100BASE-F, 100BASE-SX, 100BASE-LX, FDDI, Fiber Channel, Token Ring, or user-defined

Autotest Results Reported — 850- and 1300-nm loss, pass/fail margin, and optical link budget; length; propagation delay; and overall pass/fail analysis, all for each of the two attached fibers

Wavelengths — 850 and 1300 nm

Transmit Level — Greater than -20 dBm for both 850 and 1300 nm

Dynamic Range —

Loss: +3 to -55 dBm;

Length: 1 to 2000 m (3 to 6562 ft.);

Propagation delay: 10 to 10,000 ns

Resolution —

Power/loss: 0.01 dB/dBm;

Length: 1 m or 1 ft.;

Propagation delay: 1 ns

Accuracy/Linearity — ± 0.25 dBm

Optical Link Budget — Automatically calculated based on measured length, number of mated connections, number of splices, and user-selected standard to be tested against

Internal Memory — Nonvolatile flash RAM for storing autotest results for as many as 1000 fibers

User Controls —

ScanLink PC software (on included 3.5" PC-format diskette);

All others front-mounted:

Main unit:

(12) Pushbuttons for power and test options;

Remote:

(2) Pushbuttons for power and battery test

Indicators —

All front-mounted:

Main unit: (1) 640-x-128-pixel graphical LCD;

Remote: (4) LEDs for pass/fail and wavelength

Connectors —

Fiberoptic: (2) ST female with indium gallium arsenide (InGaAs) photodiodes;

Serial: (1) DB9 female

Leads Supported — DB9: All

Power —

Both main unit and remote:

From (3) AA batteries (included)

Battery Life — Varies depending on use and battery quality; on average, long enough to test at least 500 cables

Temperature Tolerance —

Operating: 32 to 113° F (0 to 45° C);

Storage: -4 to 140° F (-20 to 60° C)

Humidity Tolerance —

Operating: 5 to 90% noncondensing;

Storage: 5 to 95% noncondensing

Size —

Both main unit and remote:

7.1"H x 3.1"W x 1.6"D (18 x 7.9 x 4 cm)

Weight —

Main unit: 14.9 oz. (0.9 lb., 422 g, 0.4 kg);

Remote: 13.4 oz. (0.8 lb., 380 g, 0.4 kg)

2. Introduction

2.1 The Complete Fiber Solution

CertiFiber™ is an advanced handheld certification tool for fiber links, and is designed to be the complete solution for professional cable installers, service providers, and network administrators.

With the push of a button, CertiFiber certifies two multimode fibers simultaneously at both wavelengths.

Rather than just providing a number, CertiFiber analyzes the fiber link and determines whether cabling and network standards are met.

The CertiFiber main unit and CertiFiber Remote have an optical source that provides a consistent calibrated dual-wavelength light. The level of light injected into or emerging from the fiber network can be measured at any point so that the performance of fiberoptic transmission paths and equipment can be accessed quickly and accurately.

The CertiFiber helps you identify faulty patch cables, failing splices, and bad couplers and connectors.

CertiFiber also accurately tests the link's propagation delay, which is then used to calculate length.

CertiFiber incorporates a graphical user interface, display, menus, arrow keys and descriptive menu options that guide you

quickly and easily through the completely automated process of certifying or troubleshooting fiberoptic cabling systems.

2.2 Standard Features

- Certifies a duplex fiber link (two fiber cables) simultaneously.
- Measures Optical Power Loss in the direction of data transmission for both multimode wavelengths on two fiber cables without changing connectors.
- Measures Length and Propagation Delay for a dual fiber cable.
- Makes bidirectional measurements for duplex fiber links.
- Utilizes preprogrammed test templates to easily certify fiberoptic cabling to industry or network standards.
- Pinpoints the margin available on the tested cable above and beyond the PASS/FAIL requirements.
- Stores a thousand autotest results in memory with user-friendly alphanumeric names, job names, and unique time- and date-stamps.
- Transmits light continuously or modulated.
- Downloads stored test results to a computer database for printing and professional record management.
- Includes a custom-tailored, non-removable impact cover for added protection.

2.3 The CertiFiber Illustrated

Figure 2-1 below and Figure 2-2 on the next page show the CertiFiber main unit and the CertiFiber Remote in detail and point out their indicators and controls.

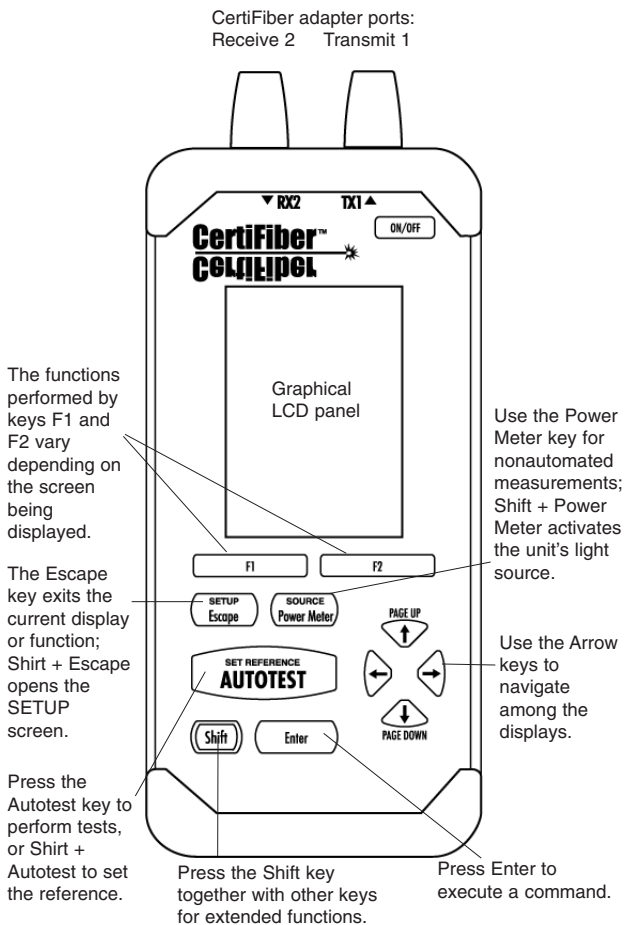


Figure 2-1. The CertiFiber main unit.

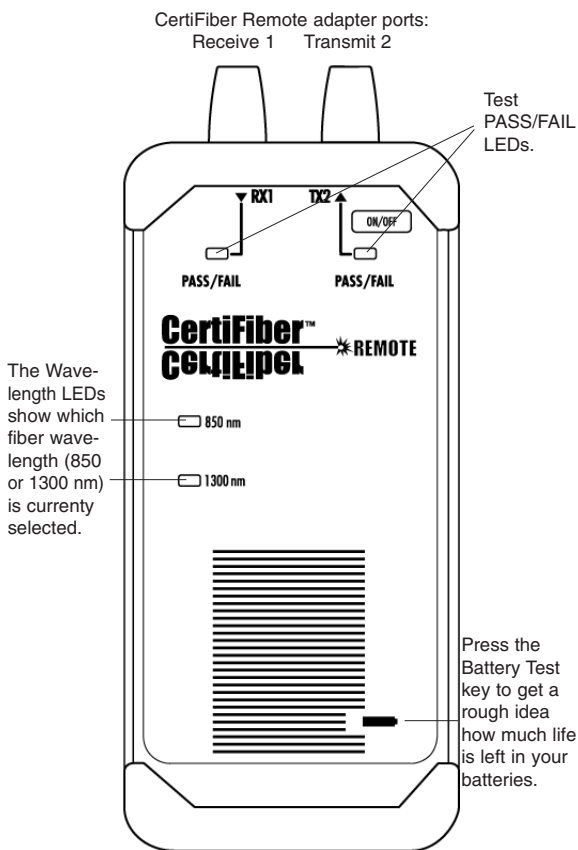


Figure 2-2. The CertiFiber Remote.

2.4 The CertiFiber Main Unit

CertiFiber's user interface has plenty of graphical elements. It consists of an LCD display, quick-access menus, arrow keys, and descriptive menu options that simplify certifying and troubleshooting fiber cabling systems. Here's a quick introduction to the keypad keys:

ON/OFF ON/OFF

When turned ON, CertiFiber will display its opening screen. To save battery power, CertiFiber will turn off automatically after 10 minutes without activity.

SETUP **Escape** Escape

Press Escape to return to the previous screen.

SOURCE **Power Meter** Power Meter

Press Power Meter to manually measure power and loss at either the 850-nm or 1300-nm wavelength. (Refer to **Section 5.1.**)



Autotest

Press Autotest to measure cable length, to measure power loss, and to obtain a PASS/FAIL analysis against a selected standard. (Refer to **Section 4.2.**)

Shift Shift

To execute one of CertiFiber's extended functions, press Shift along with Autotest, Power Meter, Escape, or one of the arrow keys.

Enter Enter

Press Enter to execute the current screen command.



The up and down arrows in the display area indicate that more information is available by pressing the up- or down-arrow keys. Press Shift and use the up- and down-arrow keys for page-up and page-down navigation. Use the left or right arrow key to move left or right within a string of characters for editing purposes.

Shift + SOURCE Power Meter = Source

In addition to the fully automated test functions, CertiFiber can be operated in a manual mode. Press Shift + Power Meter to quickly transform CertiFiber into a manual light source. Source Mode also allows you to change the light source from steady to modulated. (Refer to **Section 5.2.**)

Shift +  = **Set Reference**

Press Shift + Autotest to set the Reference value for calculating the loss measurement. (Refer to **Section 4.1.**)

Shift + **SETUP
Escape** = **Setup**

Press Shift + Escape to configure (customize) CertiFiber. From any screen, press Shift + Escape to quickly return to the Setup menu. (Refer to **Chapter 3.**)

2.5 The CertiFiber Remote

The CertiFiber Remote is an active and intelligent far-end device that works with the CertiFiber main unit to verify optical-cable transmission quality. All information is processed and transferred to the main unit. Both units provide a consistent, calibrated light source that increases the ease and effectiveness of fiberoptic testing.

2.5.1 THE LEDs

The CertiFiber Remote has four LED indicators:

LED Name	Color	Description
RX1 PASS/FAIL	red	Fiber 1 has failed
	green	Fiber 1 has passed
TX2 PASS/FAIL	red	Fiber 2 has failed
	green	Fiber 2 has passed
850nm*	green	CertiFiber Remote is transmitting at 850nm
1300nm*	green	CertiFiber Remote is transmitting at 1300nm

* Press and hold the Battery button.

The LEDs also show the results of a battery test (which you run by pressing the Battery button):

RX1 and TX2 LEDs	red	Low Battery < 10%
TX2 LED	red	Battery 10 to 25%
RX1 LED	green	Battery 25% to 75%
RX1 and TX2 LEDs	green	Good Battery > 75%
RX1 and TX2 LEDs*	yellow	Part 1 of Two Way Autotest completed

*Switch fiber connectors: RX2 to TX1, TX1 to RX2, RX1 to TX2, TX2 to RX1.

2.5.2 THE KEYPAD

ON/OFF (CertiFiber Remote)

When you turn it on, CertiFiber Remote will flash the LCD power-up sequence. To save battery power, CertiFiber Remote will turn off automatically after 30 minutes without activity.



Battery (CertiFiber Remote)

CertiFiber Remote has a battery-level indicator that allows you to check the battery if CertiFiber Remote is not connected to the CertiFiber main unit. Press the Battery button to illuminate the RX1 and TX2 LEDs on the CertiFiber Remote unit. If both LEDs blink red, the batteries are low and should be replaced. If the LEDs blink green, the remote unit's batteries are good and testing can proceed.

CertiFiber and CertiFiber Remote each require three AA alkaline batteries. If CertiFiber and CertiFiber Remote will be stored for more than one month, the batteries should be removed.

To conserve battery life, CertiFiber will turn off automatically when no key has been used for 10 minutes.

NOTES

CertiFiber and CertiFiber Remote will not function properly with carbon batteries. Alkaline batteries are required.

Stored Autotests and setup parameters are stored in flash memory. They are not affected by the battery status.

2.6 The Unit's Batteries

To check CertiFiber's battery:

1. Connect the CertiFiber to the Remote unit using a launch cable.
2. Turn both units on.
3. Press F2 to display the About screen. This screen displays CertiFiber and CertiFiber Remote's remaining battery power ("Battery"), as well as other info (see the next section).

To change batteries, slide off the battery cover located on the back of each unit. Replace the three AA alkaline batteries and position the replacements according to the display in the battery case.

2.7 Displaying Product Information About CertiFiber

To have CertiFiber display information about itself, connect the main and remote units using a duplex cable. Then take these steps:

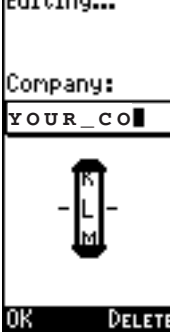
1. Turn both units on.
2. Press F2 to display the About screen. This screen, shown at right, displays the serial numbers of the CertiFiber and CertiFiber Remote, as well as their software ("S/W") and hardware ("H/W") revision levels and their remaining battery power ("Battery").

About	
Main Unit	
55A97M00104	
S/W:	1.12
H/W:	1.10
Battery:	100%
Remote Unit	
55B97M00104	
S/W:	1.10
H/W:	1.00
Battery:	51%

3. Press Escape to return to the Setup screen.

2.8 Editing with CertiFiber

You can edit some of the fields on several of CertiFiber's screens. For example, the owner and company names, the Autotest name, and certain numeric values can be edited. Editable fields can contain up to 12 alphanumeric and special characters. To edit a field, take these steps:

1. Open a screen that contains an editable field and press Edit to display the Edit screen. This screen, shown at right, contains the field you want to edit and a "character wheel." The first character in the editable field will be highlighted.
- 
2. To enter a new name or number press F2 (Delete) to delete the character at the cursor. To clear the entire field, repeat this step as often as necessary.
 3. Use the up- or down-arrow key to scroll through the characters (letters, numbers, and special characters).
 4. Spin the wheel to the character you want to select.
 5. Press Enter to select a non-alphabetic character or to select an alphabetic

character as a *lowercase* letter, or press Shift + Enter to select an alphabetic character as an *uppercase* letter. The highlight will move to the next position in the field automatically. If you make a mistake, press F2 (Delete) to erase the character and back up.

6. Repeat steps 3 through 5 until the field is completed.
7. Press F1 (OK) or Escape to exit the Edit screen.

2.9 Getting Started

With CertiFiber, you can certify a fiber link in seconds using the one-button Autotest. To run an Autotest, take these steps (see **Section 4.2** for more detailed information):

1. Set the reference value (refer to **Section 4.1**).
2. Remove the covers from the ST connectors on the CertiFiber and CertiFiber Remote.

CAUTION!

Both units come with covers on their ST connectors to protect the connectors from dirt and other foreign matter. Keep the connectors covered when the units are not in use. This helps to ensure that contaminants do not affect test measurements.

3. Attach the cable to be tested to CertiFiber and CertiFiber Remote's ST connectors. Run one fiber from RX2 to TX2, the other from TX1 to RX1.

CAUTION!

Improperly polished or manufactured fiber-connector ferrules can damage the CertiFiber's transmit LED. To avoid out-of-warranty repairs, please use cables with clean, properly polished ST connectors.

3. Select a fiber standard. TIA-568-A and ISO 11801 are the most widely used fiber standards.
4. Press the Autotest button.
5. Enter the number of splices and connectors.
6. Press F1 (Run). CertiFiber will now run the length, propagation delay, and dual fiber-loss measurements for 850 nm and 1300 nm and provide a PASS/FAIL analysis based on the chosen fiber standard.
7. Press F1 (Save) to name and store the test result for each fiber.
8. Press F2 (View) to display test results and move between fibers.
9. Put the covers back on the ST connectors on the CertiFiber and CertiFiber Remote.

Test results can now be viewed in the Results screen. To print test results, they need to be uploaded to a PC using the included ScanLink® software. Refer to **Section 4.2.3**.

2.10 Display Contrast

CertiFiber's display contrast can be adjusted. From the logo screen, press Shift + up-arrow or down-arrow to increase or decrease the contrast.

NOTE

The display contrast returns to the default setting when the unit is turned off.

2.11 Calibrating CertiFiber

CertiFiber and CertiFiber Remote should be calibrated annually by the manufacturer with specialized equipment. Contact Black Box Technical Support for information on calibration and service requirements.

3. Configuration

Press **Shift** + **SETUP Escape** to display the main Setup screen. Use the up- or down-arrow keys to highlight a setup feature. Press Enter to display the relevant setup screen. Press Escape to return to the CertiFiber logo screen.



3.1 Autotests

3.1.1 SELECTING AN AUTOTEST STANDARD

CertiFiber certifies fiber links based on the common standard TIA-568-A and the international standard ISO 11801, as well as common LAN cabling standards such as FDDI, Fiber Channel and other application-specific fiber requirements. (See the **Standards Autotested Against** specification in **Chapter 1** for a complete list of supported network types.) To select an Autotest standard, take these steps:



- 1 To display the Autotest screen, highlight Autotest in the Setup screen and press Enter or F1 (Select).
2. Use the up- or down-arrow keys to scroll through the list of Autotests.

3. Highlight the preferred Autotest and press F1 (Select) to select it as the Autotest to run and to return to the Setup screen.

3.1.2 EDITING AUTOTESTS

In addition to the pre-programmed certification standards, CertiFiber allows you to customize Autotest settings and to develop new custom Autotests by specifying the PASS/FAIL limits to be used. To edit an Autotest, take these steps:

1. From the Autotest setup screen, use the up- or down-arrows to highlight the Autotest you want to customize and then press F2 (Edit). A screen like the one shown at right appears. If you are editing an existing Autotest, the test name will be preceded with an asterisk (“*”).

Testname:	*TIA 568A
Loss Per:	
Conn:	0.5%
Splice:	0.1%
Loss Per Km:	
@850:	1.0%
@1300:	1.0%
Length:	1000m
Delay:	N/A
SAVE SELECT	

2. With the Test Name field highlighted, press F1 (Edit) to name the Autotest. Refer to **Section 2.8**.
3. Edit the other test values. (Editable fields for an *equation-based* Autotest are the Test Name, the Loss per Connector, the Loss per Splice, the Loss per Kilometer for both wavelengths, the Length, and the Delay. Editable fields for an Autotest with *fixed PASS/FAIL criteria* are the Test Name, the Loss per Kilometer for both wavelengths, the Length and the Delay.)

First press F2 (Select) to highlight the value you want to edit. Then use the up- and down-arrow keys to change the displayed values in small increments such as 0.1 dB or 1 m, or use the left- and right-arrow keys to change the displayed values in large increments such as 1 dB or 100 m.

4. Press F1 (Save) to open the Overwrite Autotest screen. It contains a list of four user-definable Autotest names (User 1, User 2, User 3, and User 4).
5. Use the up- and down-arrow keys to highlight one of the four Autotest names you want to overwrite with the new testname and settings. (To ensure that the default Autotests are not overwritten, the asterisk preceding the names of edited existing Autotests cannot be removed.)
6. Press F1 (Select) to save the Autotest and list the new test name in the Autotest screen.
7. Press F1 (Select) to select the highlighted Autotest as the test to run and return to the Autotest-Setup screen.

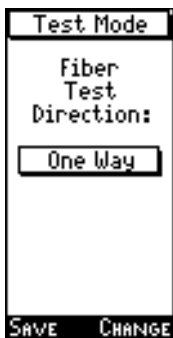
3.1.3 TEST MODE

CertiFiber allows you to control the test direction. Dual fibers can be tested in opposite single direction or in both directions. Choose **One Way** to measure a duplex fiber link or choose **Two Way** to measure a duplex fiber link in both directions (bidirectional test).

1. To display the **Test Mode** screen, use the up-arrow to scroll to **Test Mode** in the **Setup** screen and press **Enter** or **F1 (Select)**.

The display shows the currently selected test mode.

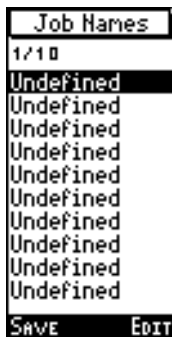
2. Press **F2 (Change)** to change the test mode.
3. Press **F1 (Save)** to save the setting and return to the **Setup** screen.



3.1.4 JOB NAMES

CertiFiber allows you to assign predefined or customized Job Names so that you can uniquely identify different job sites, for example, Project 1 has 102 fiber test results stored, etc.

1. To display the **Job Names** setup screen, use the up-arrow to scroll to **Job Names** in the **Setup** screen and press **Enter** or **F1 (Select)**.



2. Use the up-arrow or down-arrow to scroll through the list of job names.

3. Highlight a Job Name and press **(F2) Edit** to customize it with up to 10 characters.

4. Highlight the Job Name you want to use and press **Enter** or **F1 (Save)** to save the list of Job Names.

If you choose not to use Job Names, the first item in the Job Name list will automatically default to **Not Used** when an Autotest is saved.

3.2 Length Measurements: Meters vs. Feet

You can change CertiFiber's length-measurement unit from meters to feet and vice versa. To do so, take these steps:

1. To display the Meters/Feet setup screen, use the down-arrow key to scroll to Meters/Feet in the main Setup screen and press Enter or F1 (Select). The display will show the currently selected measurement unit.
2. Press F2 to toggle the measurement setting between meters and feet, or use the up- or down-arrow keys to change the measurement unit.
3. Press F1 (Save) to save the setting and return to the main Setup screen.



3.3 Time/Date

You can set the date and time of the CertiFiber's internal clock. CertiFiber will maintain these settings until either you change them again or the unit's battery is removed for more than one hour. To set the date and time, take these steps:

1. To display the Time/Date setup screen, use the down-arrow key to scroll



to Time/Date in the Setup screen and press Enter or F1 (Select).

2. Use the left- and right-arrow keys to scroll through the segments in the screen.
3. Select a portion of the time or date field to change.
4. Use the up- or down-arrow key to change the value in that field segment. (All fields are editable in increments of 1 unit. Hold down the up- or down-arrow key to scroll through the possible values more quickly.)
5. CertiFiber has two time displays available: 12-hour (a.m./p.m.) or 24-hour (military-time) clock. You can toggle back and forth between these displays by moving the cursor to the clock-type field. Use the up- or down-arrow key to select the 12- or 24-hour option.
6. Press F1 (Save) to save the new settings and return to the Setup screen.

3.4 Owner's Name

You can also change the owner and company names that appear on the logo screen of the CertiFiber and on printed reports. To do so, take these steps:

1. To display the Owner Name setup screen, use the down-arrow key to scroll to Owner Name in the Setup screen and press Enter or F1 (Select).
2. Use the up- or down-arrow key to highlight the Company Name.
3. With the Company Name highlighted, press F2 (Edit).
4. The Edit screen will appear with the cursor in the Company Name field. Follow the directions in **Section 2.8** to edit this field as desired.
5. Now highlight the Operator Name and press F2 (Edit).
6. The Edit screen will appear again, this time with the cursor in the Operator Name field. Follow the directions in **Section 2.8** to edit this field as desired.
7. Press F1 (Save) to save the names and return to the Setup screen.

3.5 Fiber GRI

The Graded Refractive Index (GRI) of fiber cables differs depending on the manufacturer. So that you can get accurate length results for different cables, CertiFiber has user-definable GRI values for both test wavelengths.



The default GRI values used for a 62.5-micron cable are 1.5014 at 850 nm and 1.4966 at 1300 nm. If you are using 50-micron cable and do not have the GRI values published by the fiber manufacturer, the defaults should be set to 1.4897 at 850 nm and 1.4856 at 1300 nm.

The standard GRI values for 62.5-micron fiber produced before 1994 are 1.478 at 850 nm and 1.422 at 1300 nm.

1. To display the Fiber GRI setup screen, use the down-arrow key to scroll to Fiber GRI in the Setup screen and press Enter or F1 (Select).
2. Press F2 (Select) to highlight the GRI to be changed.
3. Use the up- or down-arrow key to increase or decrease the value by .0001 dB, or use the left- or right-arrow key to increase or decrease the value by .01 dB.
4. Press F1 (Save) to save the settings and return to the Setup screen.

3.6 Language

CertiFiber offers a selection of languages for the screen display. To choose a different display language, take these steps:

1. To display the Language setup screen, use the down-arrow key to scroll to Language in the Setup screen and press Enter.
2. Use the up- or down-arrow key to scroll to the appropriate language.
3. Press Enter or F1 (Select) to select the highlighted language as the default language and return to the Setup screen.



3.7 Upload to PC

All test results can be uploaded to a PC using the included ScanLink software. To display the Upload to PC setup screen, use the down-arrow key to scroll to Upload to PC in the Setup screen and press Enter. For the rest of the upload procedure, see **Section 4.2.5**.

4. Operation: Automatic Measurements

CAUTION!

All connectors and fiber-end faces need to be clean prior to testing. Use the appropriate optical cleaning supplies to keep connectors and adapters free from contamination.

Both CertiFiber units come with covers on their ST connectors to protect the connectors from dirt and other foreign matter. Keep the connectors covered when the units are not in use. This helps to ensure that contaminants do not affect test measurements.

4.1 Setting the Reference

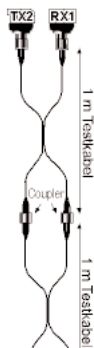
4.1.1 IN NORMAL OPERATION



Accurate, repeatable measurements of optical power and signal loss are fundamental for the installation and maintenance of fiber optics.

To make an accurate measurement, you need to know the loss in your attached launch cable and the power being transmitted. (The launch cable used to set the reference value should be the same type of fiber as the cables to be tested and certified, either 50/125 or 62.5/125.)

The reference value must be stored before a loss measurement can be calculated. CertiFiber requires the reference value to compensate for the signal loss in the launch cable. This value is then subtracted from the actual

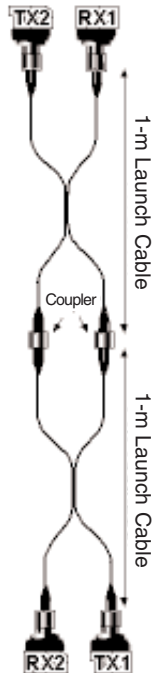


measured value to determine loss.

Once the reference value is established, consistent readings for loss, delay, and length measurements are ensured.

To set the reference value, take these steps:

1. Connect CertiFiber and CertiFiber Remote using the ST-ST launch cables and couplers as shown at right.
2. Press Shift + Autotest to record the reference value. The Reference screen shown below will appear briefly. Once the reference data has been saved, the CertiFiber logo screen will be displayed.



3. Remove the couplers.

NOTES

Once the reference value has been set, make sure that both launch cables remain attached to the CertiFiber units. Try to remove the coupler without disturbing these connections.

If the test configuration changes, a new reference value needs to be established.

CertiFiber will store a separate reference value for each wavelength.

The new reference value will be subtracted from the actual measured value to determine loss.

CertiFiber will store reference data for up to five CertiFiber Remote units and one loopback setup (see the next section).

NOTE

To ensure consistently accurate measurements, the reference value must be set each calendar day that CertiFiber is used. The reference value expires each day at midnight.

4.1.2 IN LOOPBACK MODE

If a single cable needs to be measured, the reference value can be set for a single launch cable. To do so, take these steps:

1. Attach one end of the cable to the CertiFiber main unit's TX1 connector, and the other end to the RX2 connector, as shown at right.
2. Use a coupler to connect the Launch cables.
3. Press Shift + Autotest to record the reference value.



4. Remove the coupler without disturbing the connection to the CertiFiber.

4.2 Regular Autotesting



Using its completely automated Autotest feature, CertiFiber runs cable tests, checks test results against standards, and displays a PASS/FAIL indication.

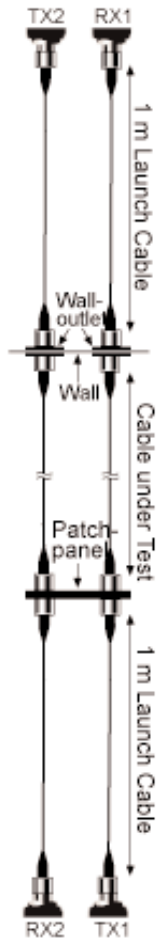
An Autotest can be easily customized to run the different certification tests required for your site or system.

Autotest supports many different network types. The tests and results vary depending on the type of network. (See the **Standards Autotested Against** specification in **Chapter 1** for a complete list of supported network types.)

For certain Autotests, the PASS/FAIL criteria need to be customized in the Edit Autotest screen. (Refer to **Section 3.1.**)

To run an Autotest, take these steps:

1. Attach the cables to CertiFiber and CertiFiber Remote as shown at right.



2. Press the Autotest key.

At this point, if you are running an equation-based Autotest (TIA-568-A, ISO 11801, or 100BASE-F), a screen like the one shown below will be displayed to allow for connector- and splice-number editing. Take steps 3 through 5 *only if* you need to customize the number of connectors and splices.



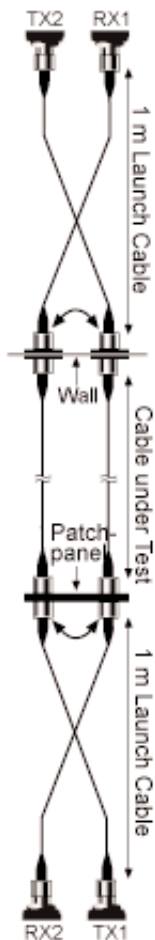
3. Press F2 (Select) to toggle the highlight between the number of connector pairs and the number of splices.
4. Use the up- and down-arrow keys to change the number of connector pairs and splices.
5. After editing these numbers, press F1 (Run) to save the changes and run the Autotest.
6. The Autotest Results screen (see the next section) will be displayed while CertiFiber is verifying both fiberoptic cables.

- To continue the two-way test, switch the connectors that attach to the cable under test as shown in the graphic.

NOTE

Do not switch the launch cable connectors that are attached to the units.

- Press **F1 (Run)** to complete the two-way test.



During Autotesting, CertiFiber measures a cable's Loss, Length, and Delay:

Optical Power Loss is a measurement of the signal loss in a cable. A signal is injected into the fiber cable by the Remote unit. CertiFiber measures the received signal to determine loss. It displays the loss in decibels (dB), as well as the margin values, for both wavelengths.

Length measurements are derived from the propagation-delay results by using the cable's GRI (Graded Refractive Index) at the appropriate wavelength. CertiFiber measures the full length of the fibers under test. (See **Section 3.5** for information on how to change the GRI values.) In the Autotest Results screen, the length is displayed in meters or feet depending on how your unit is set up. (See **Section 3.2.**)

Propagation Delay is a measurement of the time required for a signal to advance from one end of the circuit to the other. When measuring propagation delay, CertiFiber measures the round-trip delay through both fibers, and then divides the result by two, assuming that the cables are equal in length. Propagation delay cannot be measured on a single fiber; duplex fibers must be used. The Autotest Results screen displays the Propagation Delay in nanoseconds (ns).

4.2.1 THE AUTOTEST RESULTS SCREEN

The arrows at the top of the screen indicate whether the results are for a **One Way** or a **Two Way** test.

The Autotest Results screen displays the loss for each fiber at 850 and 1300 nm. For bidirectional measurements the Worst case loss is displayed.

NOTE

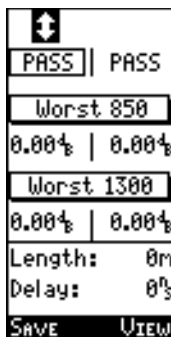
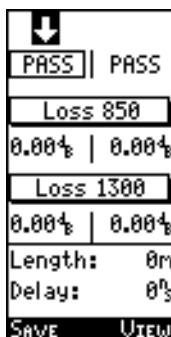
There is a $\pm 0.25\text{dB}$ margin of error in all PASS/FAIL indications.

Length and Propagation Delay will be measured. The values will then be compared against the preprogrammed PASS/FAIL limits and CertiFiber will provide a indication for both fibers.

The first page of the screen displays the results for Fiber 1. Use the right-arrow key to highlight and display the results for Fiber 2.

To save the highlighted Autotest result, press **F1 (Save)**.

To view all results for the highlighted Autotest, press **F2 (View)**.



4.2.2 SAVING AN AUTOTEST

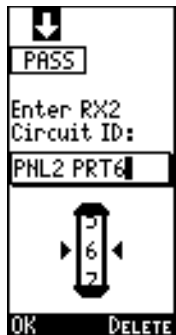
To save the results of an Autotest, take these steps:

1. Highlight Fiber 1 on the RX side or Fiber 2 on the TX side and press F1 (Save) to name and store the measured values with a time stamp.
2. The Job Name screen will be displayed.
3. Highlight a Job name and press F1 (Select).

The performed Autotest will now be saved under the selected Job Name.

If you do not want to use CertiFiber's Job Name feature, highlight the first item on the list (Not Used), and press F1 (Select).

4. If the Job Name you wish to use was not predefined in the Job Name setup screen, CertiFiber allows you to edit one by pressing F2 (Edit).
5. The Save Circuit ID screen will be displayed with an arrow in the titlebar indicating which fiber the test result is for. The overall Test Result is located right below the arrow.



- The last saved Autotest name is displayed in the Circuit ID field with the cursor on the last character. Modify the Circuit ID. CertiFiber allows entering of up to 10 alphabetic and special characters.
- Press F1 (OK) when the Circuit ID is modified or a new Circuit ID is entered.
- The Save Circuit ID screen for the other Fiber is now displayed.
- Edit the Circuit ID and press F1 (OK).

NOTE

If you choose a bidirectional test, the data for both directions is automatically stored in the Autotest test record for that fiber.

4.2.3 VIEWING AUTOTEST RESULTS

Once the Autotest has been saved, CertiFiber returns to the Autotest Result screen. F2 (View) is available.

The arrow on the titlebar shows whether the fiber was tested one way or bidirectional. For a one way test, the arrow has one pointer; for a bidirectional test, the arrow has two pointers.

- Press F2 (View).

The overall test result is displayed right below the arrow.

The Autotest name that was specified in Setup as the test to run is shown.

The worst case difference between the PASS/FAIL

↑	
PASS	
TIA 568A	
850nm	0.00%
Margin	1.50%
1300nm	0.00%
Margin	1.50%
Length:	0m
Delay:	0%
▼	

value and the actual measurement for each fiber will be displayed as Margin. 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.

NOTE

If the overall result is FAIL, the failed parameters will be marked with a reverse highlight.

During Autotest, CertiFiber measures a cable's Loss, Length, and Delay. The results are shown in the top part of the screen.

Optical Power Loss measures the signal loss in a cable. A signal is injected into the fiber cable by the remote unit. CertiFiber measures the received signal to determine loss. The loss in decibel (dB) and the margin values are displayed for both wavelengths.

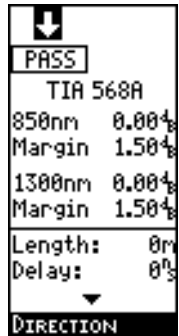
Length measurements are derived from the propagation delay results using the GRI (Graded Refractive Index) at the appropriate wavelength. CertiFiber measures the full length of the fibers under test.

In the Autotest Results screen, the length is displayed in meters or feet depending on your unit's setup.

↑	
PASS	
TIA 568A	
850nm	0.00dB
Margin	1.50dB
1300nm	0.00dB
Margin	1.50dB
Length:	0m
Delay:	0ns
Job Name:	COMPANY 1
Circuit ID:	PHL2 PRT7
Connector Pairs:	2
Splices:	0
2/1000	
27 Apr 1998	
12:40:42 PM	
▲	

Propagation Delay is the measure of the time required for a signal to advance from one end of the circuit to the other. When measuring propagation delay, CertiFiber measures the round trip delay through both fibers, and then divides the result by two, assuming that the cables are equal in length. Propagation delay cannot be measured on a single fiber; duplex fibers must be used.

- To view results for bidirectional Autotests, press F1 (Direction) to switch between the results measured for each direction. The arrow in the titlebar will indicate the direction in which the fiber was measured.
- Use the up and down arrow keys to scroll to the bottom part of the Autotest results screen.

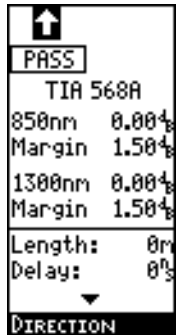


↓
PASS
TIA 568A
850nm 0.00%
Margin 1.50%
1300nm 0.00%
Margin 1.50%
Length: 0m
Delay: 0%
▼
DIRECTION

The Job Name, the Circuit ID, the number of Connector Pairs and Splices used for the Autotest are revealed.

Each test is stored with a date and time stamp.

- Use the left- or right-arrow keys to toggle between results for Fiber 1 and Fiber 2.



↑
PASS
TIA 568A
850nm 0.00%
Margin 1.50%
1300nm 0.00%
Margin 1.50%
Length: 0m
Delay: 0%
▼
DIRECTION

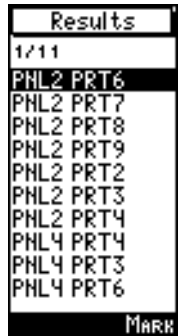
5. Press Escape to exit the Autotest Results screen.

4.2.4 STORING RESULTS

CertiFiber will store 1000 Autotest results.

1. To display the Results screen, press F1 (Results) from the logo screen.

The results screen will be displayed with all stored test results sorted by reverse date, where the oldest test is at the top of the list.



The screenshot shows a terminal window titled "Results". The content is as follows:

Results
1/11
PHL2 PRT6
PHL2 PRT7
PHL2 PRT8
PHL2 PRT9
PHL2 PRT2
PHL2 PRT3
PHL2 PRT4
PHL4 PRT4
PHL4 PRT3
PHL4 PRT6
MARK

2. To quickly move to the last page of the list, use the right-arrow key. Use the left-arrow key to return to the first page.
3. To view detailed test results, use the up-arrow or down-arrow keys to highlight the appropriate item and press Enter.

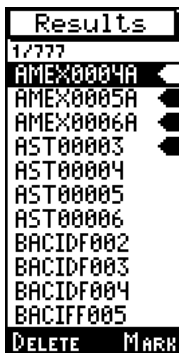
The Results screen will be displayed with the overall test result in the titlebar. The type of Autotest used, the Circuit ID (Test name), the loss for both wavelengths, the length, the delay, the number of connectors and splices, the overall test number, and the time and date the test was taken will be shown in the scrollable screen.

4. Press Escape to return to the Results screen.

4.2.5 DELETING RESULTS

CertiFiber allows you to delete selected Autotest results. To do so, take these steps:

1. Display the Results screen and use the up- and down-arrow keys to highlight the Autotest result you want to delete.
2. Press F2 (Mark) to mark the Autotest name with a large arrow on the right side, as shown at right. The highlight will automatically advance to the next line.
3. To manually select several test results, press F2 (Mark) continuously until all the Autotest names to be deleted are marked with arrows.
4. To automatically select several test results, turn on block mode by pressing Shift + F2 (Block). Each highlighted Autotest will automatically be marked with the arrow.
5. Press Shift + down-arrow once to page down and automatically mark each test in the block. Pressing Shift + down-arrow continuously will rapidly mark several pages of Autotest names. Press Shift + up-arrow to unmark a page of Autotest names.
6. If tests were accidentally marked and should not be deleted, press F2 (Block) once more to turn the mark or block



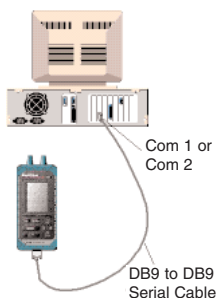
mode off. Unselect the Autotests by pressing F2 (Unmark).

7. Press F1 (Delete) to delete all tests that are currently marked.
8. A confirmation screen will prompt you. Make the appropriate choice and continue.

4.2.6 UPLOADING RESULTS TO A PC

Test results can be uploaded to a PC using the included ScanLink software. To do so, take these steps:

1. Connect CertiFiber's serial port to the serial port on your PC with the included communications cable, as shown at right.
2. Turn CertiFiber on to display the logo screen.
3. Press Shift + Escape to display the Setup screen.
4. Highlight Upload to PC and press F1 (Select). CertiFiber is now in upload mode.
5. Run the ScanLink software.
6. Click on the software's Upload button (it shows an arrow pointing from a CertiFiber to a PC) to establish communications between ScanLink and CertiFiber. Autotests that are stored in



CertiFiber's memory will be transferred directly to the PC. Consult the ScanLink Help file for further instructions for uploading and storing test results.

Additionally, the collected data can be easily transferred into the MT Crimp for Windows database, where CertiFiber Autotests can be viewed in detail, managed, saved, printed, and distributed.

NOTE

MT Crimp for Windows products are available separately.

7. Turn CertiFiber off when the transfer is completed.

4.2.7 PRINTING TEST RESULTS

Uploaded Autotest results can be printed from the PC to a printer. ScanLink or MT Crimp for Windows can be used to save and print the data. Consult the ScanLink Help file for further information about printing test results.

4.2.8 SAMPLE AUTOTEST CERTIFICATION REPORT

The information on your Autotest printout varies depending on the type of Autotest that was used.

The name of the Autotest that was used to run the test is displayed right below the company name, and the report title.

The heading provides information on the Circuit ID, the overall test result, etc. The number of connections and splices used in the link will only appear when the Autotest performed was equation-based.

The Test Direction depends on your scanner setup. Choices are CertiFiber-->Remote, Remote-->CertiFiber, Bidirectional.

The Actual Results vary depending on your scanner setup. For bidirectional tests, the results will be displayed as follows: 1.20/1.40, where the first number represents a measurement from CertiFiber to CertiFiber Remote. The second number indicates a measurement from CertiFiber Remote to CertiFiber. Margin and Pass/Fail results are based on the worst of the two values.

Networks also supported by CertiFiber's test results are listed on the bottom of the printout.

A sample certification report is shown on the next page.

Company Name**CertiFiber Certification Report
TIA 568 A**Circuit ID: MICRO-IDF-002 Test Date/Time: 20 Dec 97
14:34:09

Test Result: PASS # of fiber connectors: 2

CertiFiber S/N: 39PT7748322 # of splices: 1

Remote S/N: 39WT70288212 Fiber GRI@850nm: 1.4776

SW Version: V1.07 Fiber GRI@1300nm: 1.4719

Test Direction: Bidirectional

Test	Expected Results	Actual Results	Margin	Pass/Fail
		C->R R->C		
850 loss dB	OLB = 2.6	1.2	+1.4	PASS
1300 loss dB	OLB = 2.1	1.0	+1.1	PASS
Prop. Delay nS	-	60	-	n/a
Length m	<2000	88	-	PASS

Networks Supported:

TIA 568A IS 11801 ATM 155 ATM155SWL

ATM622 FDDI 100BASEF 100BASEFL

10BASEFB 1000BASESX 1000BASELX Token Ring

Fiber Chan

Signature: _____ Date: _____

4.3 Loopback-Mode Autotesting

CertiFiber also allows you to run an Autotest for a single cable. The results will be displayed in the RX (left) side of the Autotest Results screen. To perform a loopback autotest, take these steps:

1. To quickly verify the optical power loss of a single fiber, attach one end to CertiFiber's TX1 connector and the other end to the RX2 connector.
2. Press the Autotest key. The results will be displayed on the RX (left) side of the Autotest Results screen.

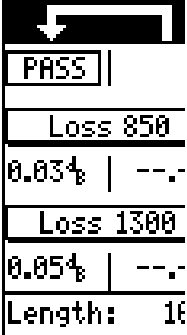
NOTE

When running Autotest for a single fiber cable, only Optical Power Loss will be measured. Length and Delay cannot be determined without connecting two fiber cables.

3. Press F1 (Save) to name and store the measured values for the cable with a Job Name, a Circuit ID, and a time stamp.



4. When viewing results for bidirectional Loopback Autotests, press F1 (Direction) to switch between the measured results.
5. Press Escape to return to the logo screen.



↓	
PASS	
Loss 850	
0.03%	--.-
Loss 1300	
0.05%	--.-
Length:	16

5. Operation: Manual Measurements

CAUTION!

All connectors and fiber-end faces need to be clean prior to testing. Use the appropriate optical cleaning supplies to keep connectors and adapters free from contamination.

Both CertiFiber units come with covers on their ST connectors to protect the connectors from dirt and other foreign matter. Keep the connectors covered when the units are not in use. This helps to ensure that contaminants do not affect test measurements.

5.1 Power Loss

SOURCE Power Meter

The proper operation of a fiber network can be affected by the operation of its active components, such as transmitters and receivers. Excessive loss could actually be a result of a transmitter launching light at an unacceptable power level. Transmitters can also deliver too much light into the fiberoptic cable, causing the receiver to overload.

You can use CertiFiber's Power Meter function to quickly verify and correct cabling and equipment problems. For both test wavelengths, Power Meter reports the overall power, the previously stored reference value, and the loss.

To perform a Power Meter test, take these steps:

1. Connect CertiFiber directly to a cable or use a launch cable to connect to the equipment to be tested.

2. Press the Power Meter button. The Power Meter screen, shown at right, will be displayed.

3. The test direction will be indicated in the titlebar. The power, reference, and loss are displayed for each wavelength.

4. Press Escape to exit the Power Meter screen.

↓	
850nm	
Power	-13.90
Ref	-12.95
Loss	0.95
1300nm	
Power	-14.30
Ref	-13.46
Loss	0.84

5.2 Loopback

Power and loss for both wavelengths can also be measured in a Loopback.

1. Attach the cable to be tested to the launch cable as described in the Loopback Autotest section.

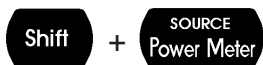
2. Press the Power Meter button.

3. The direction of the power flow will be indicated in the titlebar.

4. Press Escape to exit the Power Meter screen.

↺	
850nm	
Power	-14.48
Ref	-14.24
Loss	0.24
1300nm	
Power	-14.73
Ref	-14.56
Loss	0.17

5.3 Light Source



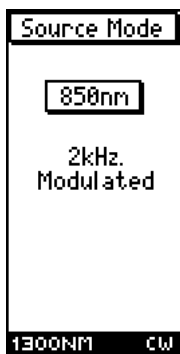
5.3.1 LOCAL

CertiFiber and CertiFiber Remote are designed to provide a consistent, calibrated light source for effectively measuring signal loss in fiberoptic cables. The light can be transmitted continuously or modulated: When testing loss, use CertiFiber to function as a continuous-wave (CW) light source; when identifying fiber cables with a tone locator, use the 2-KHz modulated mode.

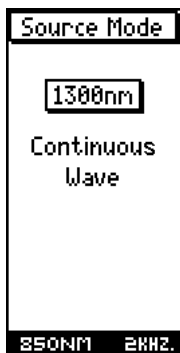
To perform a loss test or fiber identification, take these steps:

1. Attach the cable to the the TX1 connector on the CertiFiber.

2. Hold down the Shift key while pressing Power Meter. The Source Mode screen will be displayed. This display includes the wavelength and the light-source frequency, as shown below.



3. Press F2 to change the light-source frequency only, or press F1 to change both the wavelength and frequency, as shown below:



4. Press Escape to exit the Source Mode screen.

5.3.2 REMOTE

To use the calibrated light source in the CertiFiber Remote for loss testing or fiber identification, take these steps:

1. Press and hold the CertiFiber Remote's Battery button.
2. The RX1 and/or TX2 LEDs slowly flash five times as the unit performs its battery test.
3. The Wavelength LED then blinks rapidly until the Battery button is released.
4. The unit steadily lights the Wavelength LED to indicate that it is ready to provide a consistent light source for the currently selected wavelength.
5. Press and hold the Battery button if you want to switch to the other wavelength.
6. Press the Battery button to turn the light source off.

6. Troubleshooting

6.1 Calling Black Box

If your CertiFiber seems to be malfunctioning, *do not attempt to alter or repair the unit*. It contains no user-serviceable parts. Call Black Box Technical Support at 724-746-5500; the problem might be solvable over the phone.

Before you call, make a record of the history of the problem. We will be able to provide more efficient and accurate assistance if you have a complete description, including:

- the nature and duration of the problem.
- when the problem occurs.
- the components involved in the problem.
- any particular application that, when used, appears to create the problem or make it worse.
- the results of any tests you've already done.

6.2 Shipping and Packaging

If you need to transport or ship your CertiFiber:

- Package it carefully. We recommend that you use the original container.
- If you are returning the unit, make sure you include everything you received with it. If for whatever reason you are shipping the unit back to us, contact Black Box to get a Return Materials Authorization (RMA) number.

Appendix: PASS/FAIL Criteria

For the latest cable installation, international standards, and conformance techniques, go to:
http://cabletesting.com/Fiber_Standards.html

Legal Information

License Provisions

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