

Optical Wavelength Laboratories

OPERATIONS GUIDE

FIBER OWL 7+ FIBER OPTIC LINK CERTIFIERS



Revision 1.0d

OWL-INC.COM

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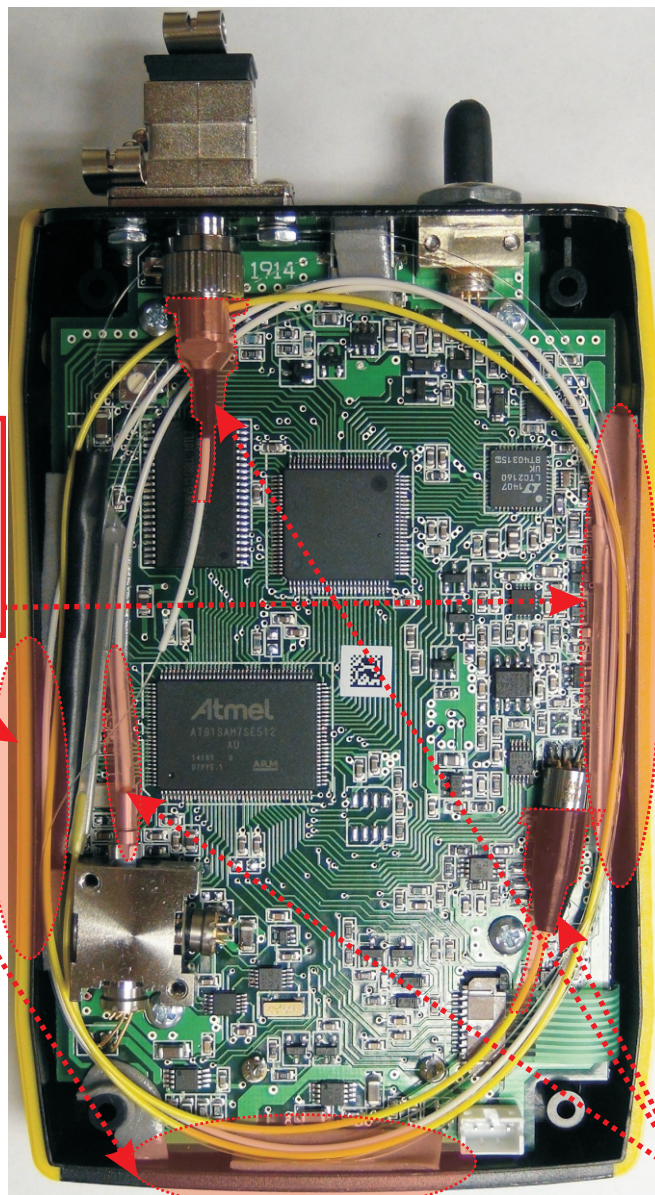
WARNING!!!

HANDLE WITH EXTREME CARE!

This device contains expensive, extremely fragile optical fibers, lasers, and photodiodes.

This device is **highly susceptible** to **damage** from **impact** – avoid dropping this device.

DO NOT OPEN THIS UNIT!



CRITICAL DAMAGE POINT
Fiber crush point near enclosure's edge.

NOTE: This is an issue for ALL SIDES of the enclosure when re-sealing the unit

CRITICAL DAMAGE POINT
Fiber coupling to laser and photodiode

INTRODUCTION

TABLE OF CONTENTS

Introduction

Before You Begin	6
About This Manual	6
Fiber OWL 7+ Certification Power Meter General Features	7
Fiber OWL 7+ Certification Power Meter Specifications	7
WaveSource Pro Fiber Optic Light Source General Features	8
WaveSource Pro Fiber Optic Light Source Specifications	8
Description	9
Applications	
Transmitter Power Measurement	9
Checking Patch Cables	10
OTDR Measurement	10
Visual Fault Location	10
Attenuation (Optical Loss) Measurements	11
Fiber Optic Link Certification	11
TIER 2 Certification	11
Precautions	12
Product Label	12
What Do You Want To Do?	13

OPM MODE

Overview	14
Accessing OPM MODE	15
Transmitter Output Power Measurement	16
Receiver Sensitivity Measurement	17
Patch Cable Verification	18
Optical Loss Measurement	19

OTDR MODE

Overview	23
Description	24
Performance Expectations and Limitations	24
OTDR Display	25
Key OTDR Trace Parameters	26
Setting Test Parameters	27
Starting an OTDR trace	28
Cursor Navigation	28
Trace Analysis	29
Events	29
Fiber Length Measurement/Link Loss	30
Fiber Attenuation Measurement	30
Reflectance Measurement	31
Trace Events Menu	31
Stored Readings	32
Saving a Trace	32
Loading a Previously Stored Trace	33
OTDR-Related Menu Options	34
OTDR Setup	34
Events Setup	35
Set Backscatter Coefficient	35
Live Mode Operation	36
Manually Setting End of Fiber (EOF) Marker	37

INTRODUCTION

TABLE OF CONTENTS

LINK WIZARD	
Overview	38
Step 1: Gather Link Information	39
Link Planning Worksheet	40
Step 2: Gather Accessories	41
Step 3: Enter Link Information	42
Step 4: Setting the Reference	47
LOSS MODE	
Overview	52
Verify Reference Levels	53
Take Readings	54
CERT MODE	
Overview	55
Take Units to Their Assigned Locations	56
Enter the Link Length	57
Take Readings and Store Test Results	58
FULL MODE	
Overview	59
Process Flow	60
Take Units to Their Assigned Locations	61
OTDR Measurements	62
Take Readings and Store Test Results	64
CREATING A TRI-REPORT	
Overview	65
Gathering Test Data	66
Using OWLView Software	
Install OWLView Software	67
Download Test Results	67
Summary View	68
Detail View	69
Import Endface Images	70
Analyze Endface Images	71
Printing a Report	73
OPERATION/MAINTENANCE	
Startup Menu	74
Certification Menu	74
Working with Stored Links	75
Stored Runs List	75
View Run Details	75
Stored Traces List	76
View Trace Details	76
Delete Stored Runs	76
Setup Menu	77
Configure Options	77
User Information	77
Display Options	78
Power Options	78

INTRODUCTION

TABLE OF CONTENTS

OPERATION/MAINTENANCE, cont.	
Utilities Menu	79
Set System Clock	79
Set APD Bias	79
Format Data Flash	80
Factory Reset	80
OTDR Menu	81
OTDR Setup	81
Events Setup	82
Set Backscatter Coefficient	82
Custom Standard	83
Universal Port	84
Cleaning the Detector Port	85
Cleaning the OTDR/VFL Port	86
APPENDICES	
Warranty Information	87
Contact Information	87
Supported Cabling Standards	88
10-Gigabit Ethernet Standard	88
Updating Firmware	89
Re-charging the Device Battery	89

INTRODUCTION

BEFORE YOU BEGIN

All personnel testing optical fibers should be adequately trained in the field of fiber optics before using any fiber optic test equipment.

If the user is not completely familiar with testing fiber optics, they should seek competent training. Such training can be acquired from a variety of sources, such as local hands-on training classes.

Valuable information about fiber optic testing can also be gathered from reading printed literature carefully or by thoroughly reading supplied operations manuals.

Fiber optic testers vary from other types of test equipment due to issues such as:

- 1) standards-based testing
- 2) proper fiber optic test procedures (FOTPs)
- 3) "zeroing" or referencing of power levels
- 4) determining the correct link budget to pass or fail by

Complete understanding of each of these issues is critical for performing proper fiber optic tests.

ABOUT THIS MANUAL

Throughout this manual you will find various symbols that assist with understanding the procedures outlined in this manual. Below is a list of these symbols and a short description of their purpose:



Shows a helpful tip that will make a procedure go more smoothly



Tells the user some useful information about the successful completion of a procedure



Warns the operator of a potentially dangerous condition

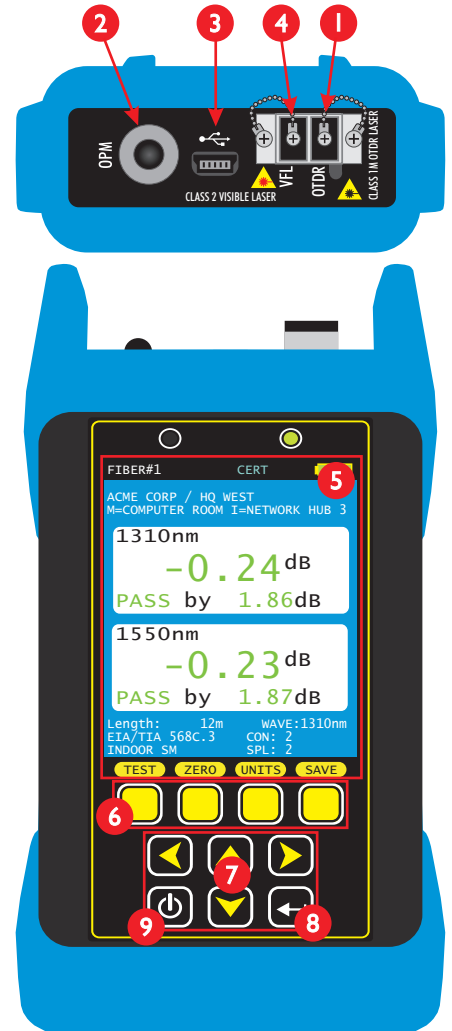
FIBER OWL 7+ SERIES

CERTIFICATION POWER METER

(MODEL #s: FO7+M; FO7+S)

GENERAL FEATURES

- 1 **OTDR** - optical time domain reflectometer: options include multimode only or singlemode only. Connector port accepts LC connectors.
- 2 **OPM** - optical power meter; connector port accepts any 2.5mm ferrule connectors (such as SC, ST, and FC), and 1.25mm ferrule connectors (such as LC).
- 3 **USB** - downloads stored data to a PC using the supplied USB download cable. Also used for charging the Lithium polymer batteries.
- 4 **VFL** - visual fault locator; Connector port accepts LC connectors.
- 5 **High-resolution Color LCD Display**
- 6 **Function keys** - activate corresponding menu options shown at the bottom of the Fiber OWL 7+ LCD display
- 7 **Arrow keys**
- 8 **Enter key**
- 9 **Power key** - powers the device on and off; some screens use this key to display context-sensitive help



SPECIFICATIONS

OPTICAL TIME DOMAIN REFLECTOMETER (OTDR)			
	FO7+M		FO7+S
Fiber Type:	Multimode		Singlemode
Output Wavelength:	850 nm	1300 nm	1310 nm 1550 nm
Dynamic Range (SNR=1) ¹ :	27 dB	29 dB	28 dB 27 dB
Distance Range ⁴ :	12 miles (20 kilometers)		80 miles (128 kilometers)
Event Dead Zone ² :	2 meters (typical)		
Attenuation Dead Zone ³ :	5 meters (typical)		
Maximum Data Points:	64000		
Data Point Spacing:	1 meter		< 64 km: 1 meter / > 64 km: 2 meters
Pulse Width:	1, 2, 5, 10, 20, 50, 100 meters		1, 2, 5, 10, 20, 50, 100, 200, 500, 1k meters
Index of Refraction:	1.4000 to 1.6000		
Distance Accuracy:	Up to 64km: 1 + (distance in meters/10000) / Over 64km: 2 + (distance in meters/10000)		
Number of Stored Traces:	Maximum trace distance: up to 200 / Minimum trace distance: 3000+		

- 1: Using maximum pulse width
- 2: Width measured 1.5dB down on each side of a reflective event using 1 meter pulse width
- 3: Distance from event beginning to within 0.5dB where backscatter resumes using 1 meter pulse width
- 4: Out to furthest reflective event

OPTICAL POWER METER (OPM)	
Detector Type	InGaAs
Wavelengths	850, 980, 1300, 1310, 1490, 1550, 1625 nm
Measurement Range	+5 to -70 dBm
Accuracy (Uncertainty)	±0.15 dB
Display Resolution	0.01 dB
Measurement Units	dBm, dB
Connector Type	2.5mm / 1.25mm universal
Data Storage Points	<10,000
Download Port Connection	USB
Software	OWLView
Modes of Operation	PAIR, BIDI, CERT, LOSS, OPM

GENERAL	
Display Type	2.8" Color LCD
Battery Type	Lithium Polymer
Battery Life	up to 50 hours
Auto-shutdown	Yes
Operating Temperature	-10 to 55° C
Storage Temperature	-30 to 70° C
Dimensions	2.87" x 4.42" x 1.25"
Weight	10 ounces (284 g)






VISUAL FAULT LOCATOR	
VFL Output Wavelength	650 nm Laser
VFL Output Power	1 mW
VFL Operating Modes	CW, Modulated
Connector	LC

WAVESOURCE PRO SERIES

FIBER OPTIC LIGHT SOURCE

(MODEL #s: WPMX; WPSX; WPMS)

GENERAL FEATURES

- 1 **Light Source Port (left)** - WPMX and WPMS (multimode 850/1300); WPSX (singlemode 1310/1550); port accepts SC connectors
- 2 **USB** - downloads stored data to a PC using the supplied USB download cable. Also used for charging re-chargeable batteries (not included).
- 3 **Light Source Port (right)** - WPMX (blank); WPSX and WPMS (singlemode 1310/1550); port accepts SC connectors
- 4 **Light Source Port Selection LED (left)** - lit when the left-hand port is active
- 5 **Power/Battery Charter LED** - lit when unit is powered on
 Battery/charging status
 GREEN battery fully charged
 ORANGE battery charging
 RED problem with battery and/or charger
- 6 **Light Source Port Selection LED (right)** - lit when the right-hand port is active
- 7 **Wavelength Display LED** - displays current output wavelength when lit; LED turns off after 3 seconds; press  to show wavelength
- 8  - CW / MOD button
 Press: toggle source between CW (continuous wave) and MOD (modulated) mode.
- 9  - Power button
 Hold: power ON and OFF
 Press: display wavelength
- 10  - λ / AUTO button
 Press: toggle between wavelengths in the selected port
 Hold: set AUTO mode; source alternates wavelengths within the active port for automatic dual-wavelength testing
- 11  - PORT button
 Press: toggle between light source ports



SPECIFICATIONS

FIBER OPTIC LIGHT SOURCE				
Fiber Type:	Multimode		Singlemode	
Source Type:	LED		Laser	
Calibrated Wavelengths	850 nm	1300 nm	1310 nm	1550 nm
Output Power (CW)	-20 dBm		-10 dBm	
Accuracy	±0.10 dB @ 25°C		±0.10 dB @ 25°C	
Light Source Drift (1hr.)	±0.05 dB	±0.05 dB	±0.05 dB	±0.04 dB
Spectral Width (FWHM)	50nm	180nm	2nm	3nm
Modulation Frequencies	300 Hz / 600 Hz / 1 kHz / 2 kHz			

GENERAL	
Display Type	2.8" Color LCD
Battery Type	Lithium Polymer
Battery Life	up to 50 hours
Auto-shutdown	Yes
Operating Temperature	-10 to 55° C
Storage Temperature	-30 to 70° C
Dimensions	2.87" x 4.42" x 1.25"
Weight	10 ounces (284 g)

INTRODUCTION

DESCRIPTION

Fiber OWL 7+ certification test kits include a Tier 2 certification meter and light source that enable fiber optic professionals to perform a wide range of tests, from basic optical power/loss measurement all the way up to full-featured Tier 2 certification (PASS/FAIL and OTDR trace results) for their clients.

Models are available that can test multimode only, singlemode only, or both multimode and singlemode. Optional accessories such as OTDR fiber rings and video inspection microscopes are also available to take full advantage of Tier 2 certification capability.

Fiber OWL 7+ certification power meter. Test readings and graphical help screens can be easily viewed on the color LCD, and an intuitive 10-key keypad allows for easy data entry.

The intuitive built-in Link Wizard prompts the user to enter key information used to calculate standards-based link budgets for fiber optic certification testing, and helpful diagrams guide the user through the setup and testing procedure.

Thousands of data points with descriptive link and fiber run labels can be stored in internal memory. Stored information can be selectively viewed, re-tested, or deleted from the device.

WaveSource Pro fiber optic light source. An intuitive 4-button keypad controls key functions such as port and wavelength selection, and a 7-segment LED displays the currently selected wavelength.

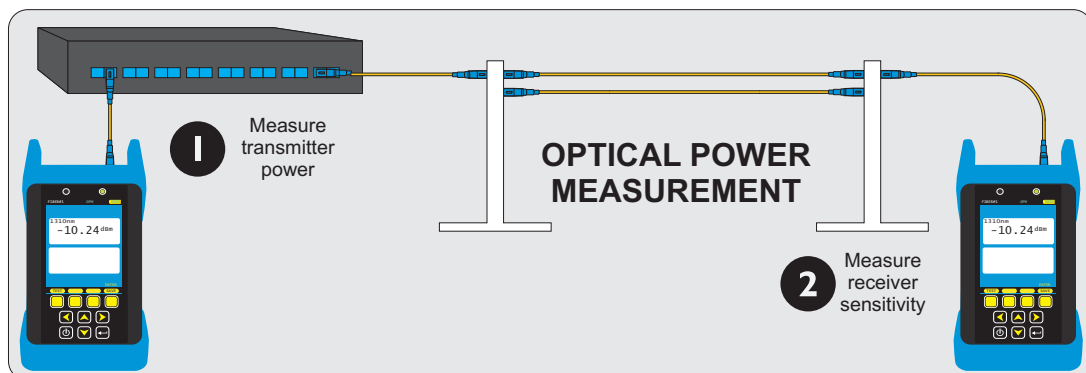
Both the meter and source are enclosed in attractive hand-held cases made from high impact plastic and protected by a protective rubber boot, and are powered by re-chargeable lithium polymer batteries which are re-charged through a USB port via a supplied battery charger and cable.

Following is a short description for each of the functions that can be performed with these devices, which will be covered in more detail later in this manual.

APPLICATIONS

Transmitter Power Measurement (OPM MODE). The Fiber OWL 7+ meter can be used as a basic power meter (OPM) to measure the output power of active equipment transmitters, which is useful for two different purposes:

- 1 The output power of the transmitter can be measured by connecting the meter directly to the transmitter port; and
- 2 The transmitter power can also be measured through the link, which is helpful for determining if the received power of the equipment at the far end is within the equipment's receiver sensitivity range.

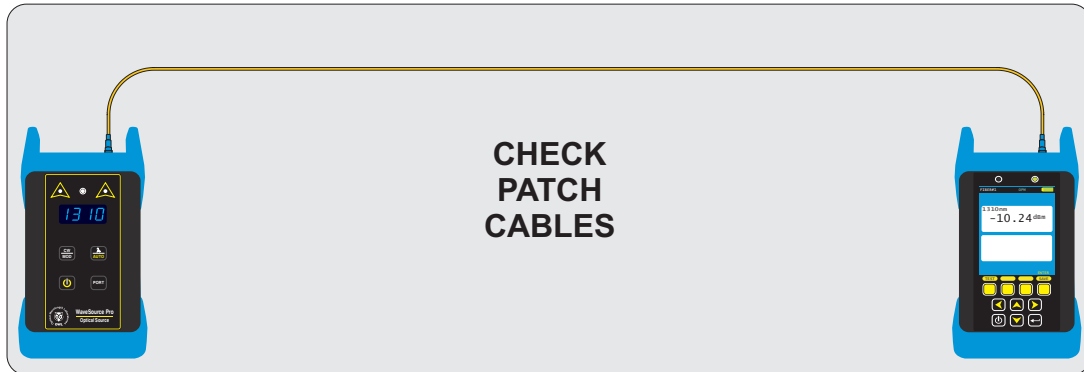


INTRODUCTION

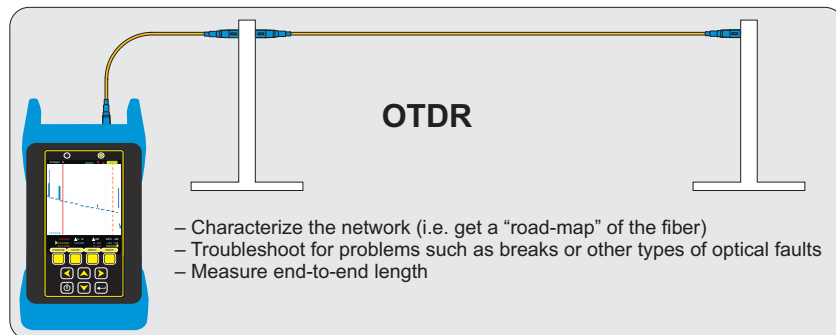
APPLICATIONS, cont.

Checking patch cables (OPM MODE). As an optical power meter (OPM), the Fiber OWL 7+ is also useful for performing a quick check of patch cables, to ensure that the patch cables are okay to use for testing (when connected to the output of the NIST calibrated light source).

And, assuming the patch cable is good, users can periodically monitor the NIST calibration levels of the light source outputs and power meter detector to make sure they are within the device specifications.

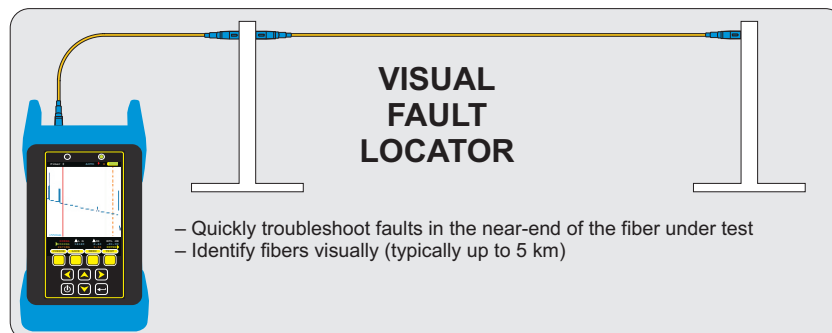


OTDR Measurement. Using the OTDR in Fiber OWL 7+ fiber certifiers, users can acquire a trace of events for the purpose of characterizing the network or troubleshooting for problems, as well as determine the end-to-end length of the fiber link.



Visual Fault Location. The Fiber OWL 7+ contains a visual fault locator port used for quick troubleshooting of optical faults close to the near-end of the optical fiber under test, or for visually identifying fibers (up to 5km in typical fiber links).

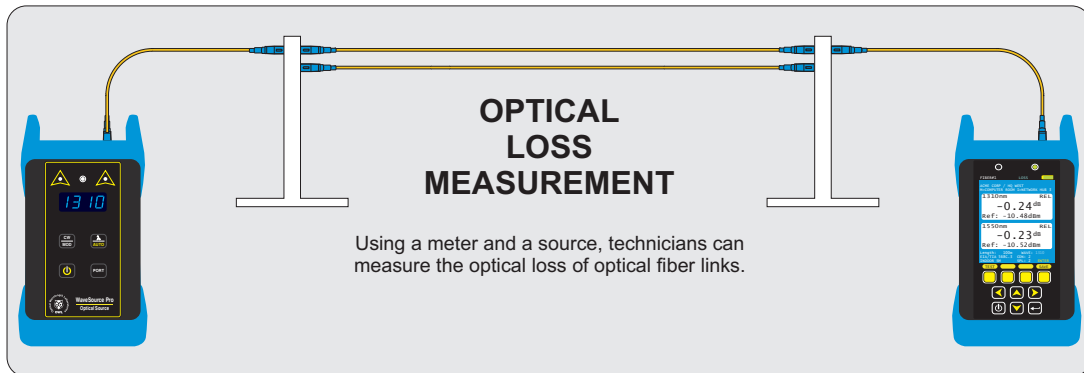
The 2.5mm universal VFL port is located on the left-hand side on the top of the OTDR.



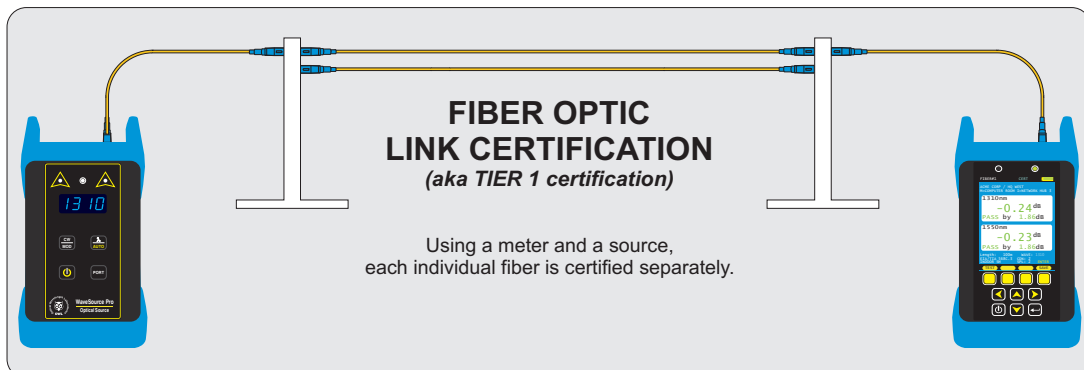
INTRODUCTION

APPLICATIONS, cont.

Attenuation (Optical Loss) Measurements (LOSS MODE). After a fiber cable has been installed and terminated, optical loss measurements can be used to determine if the fiber is installed according to standards and specifications. A comparison between the actual power measurement and the reference value determines how much optical power is lost through the link.



Fiber Optic Link Certification (CERT MODE). Certify individual optical fibers at up to two wavelengths simultaneously. The Link Wizard in the Fiber OWL 7+ uses attenuation parameters from popular cabling standards to certify fiber links, and shows a link's PASS/FAIL status right in the field.



TIER 2 Certification (FULL MODE). Tier 2 certification is defined in the TIA-568 cabling standard as a way to give end users a more comprehensive set of test results. Tier 2 certification combines traditional certification test results (i.e. Tier 1) with OTDR test results. The Fiber OWL 7+ includes a test mode called FULL mode that guides the user through the Tier 2 certification process – first, all fibers are tested with the OTDR, then certification results are added once all the OTDR traces have been taken.

OWLView software enables users to download FULL MODE test results into one convenient project file, and both sets of results conveniently appear on printed test reports and PDFs.

INTRODUCTION

PRECAUTIONS

Safety - Exercise caution when working with any optical equipment. High-intensity fiber optic laser sources output potentially dangerous high energy invisible light, and could cause serious, irreparable damage to the eye. Thus, it is recommended to **NEVER** look into the connector port of a light source or the end of a fiber.

Operational - It is important to keep connector ferrules and optical connector ports clean. If dirt, dust, and oil are allowed to build up inside connector ports, irreparable damage may occur to the optics inside the port. For best results, replace dust caps after each use.

Light Source Connector - Do NOT insert APC (Angled Physical Contact) connectors into any light source or OTDR port on your Fiber OWL 7+ or WaveSource Pro as this may damage the angled ferrule on the APC connector.

PRODUCT LABEL

On the back of each unit included with Fiber OWL 7+ series fiber link certifiers are labels similar to the one shown below containing model number, serial number, power requirements, and special cautionary information.



INTRODUCTION

WHAT DO YOU WANT TO DO?

Below is a list of the available operations in the Fiber OWL 7+, and the test mode to use for those operations:

<u>Operation</u>	<u>Section</u>
Measure the output of active equipment transmitters	OPM MODE
Measure the output power at active equipment receiver	OPM MODE
Check patch cables	OPM MODE
Verify NIST calibration levels	OPM MODE
Basic optical loss measurement without storing test results	OPM MODE
Measure length of fiber cables	OTDR MODE
Characterize the network	OTDR MODE
Troubleshoot problems in the fiber	OTDR MODE
Basic optical loss measurement and store test results	LOSS MODE
Certify fiber links only (Tier 1 testing only; no OTDR results)	CERT MODE
OTDR testing only	OTDR MODE
Tier 2 testing – Tier 1 certification + OTDR results	FULL MODE
Visual fault location	VFL
Visual fiber identification	VFL

TEST PROCEDURES

OPM MODE

OVERVIEW

OPM MODE

Optical power is an absolute measurement of the amount of light intensity; i.e. “brightness”, and is one of the most basic tests performed by an optical power meter (OPM). The Fiber OWL 7+ contains a basic OPM MODE for this purpose.

APPLICATIONS

OPM MODE enables users to perform the following basic tests:

- Transmitter power measurement
- Receiver sensitivity measurement
- Checking patch cables
- Verification of NIST calibration levels
- Basic optical loss measurement

OPM MODE is indicated at the top of the display.

- 🔔 Since OPM MODE is designed for basic power and loss measurements only, data storage functions are not available.

FUNCTION KEY OPTIONS

Several OPM-related functions are available via the yellow function button menu located at the bottom of the display.

- 🔑 toggle between menu lists
- WAVE change currently selected wavelength (when source is NOT set to AUTO)
- ZERO set an optical reference
- UNITS change measurement units between dBm (ABS) and dB (REL)
- LOAD resume testing for a previously stored project
- OTDR switch to SIMPLE OTDR mode (see OTDR section)
- MENU return to STARTUP MENU



TEST PROCEDURES

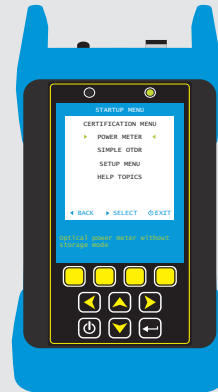
OPM MODE

ACCESSING OPM MODE

- 1** Power on the Fiber OWL 7+.
Or, if meter is already powered on, press MENU.









- 2** Press  to POWER METER, then  to continue.




- 3** The meter will immediately begin to display optical power (dBm; ABS) or loss (dB; REL) readings.




AVAILABLE FUNCTIONS

-  Select next wavelength
-  Set optical reference
-  Toggle display units between dBm (optical power) and dB (optical loss)
-  Load a previously stored link (make sure that references are re-set before taking further measurement)
-  Switch to SIMPLE OTDR mode (see OTDR section)
-  Return to STARTUP MENU

DISPLAYED RESULT

- LOW** No measurable amount of incoming optical power 
- HIGH** Incoming optical power is too bright to be measured

- (black) Normal optical power/loss measurement
- (blue) **INVALID OPERATING MARGIN** (indicates invalid "negative loss" or "gain" test condition; recommended to re-set the reference using the ZERO function)

-  Possible causes for "LOW":
- Test cable not connected to OPM port
 - Light source not powered on
 - Light source set to incorrect port
 - Too much link loss
 - Transmitter power too low
 - No continuity

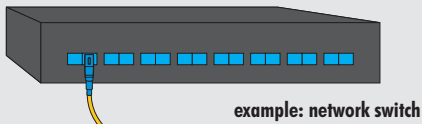
TEST PROCEDURES

OPM MODE

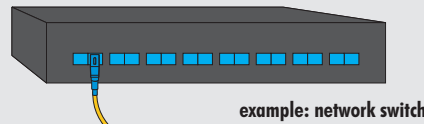
TRANSMITTER OUTPUT POWER MEASUREMENT

Measure the output power directly from network transmission equipment to determine if the equipment is transmitting within manufacturer output power specifications.

Connect the Fiber OWL 7+ to the transmitter (TX) port of the transmission equipment (e.g. switch, router, hub, GBIC, light source, etc.) and make sure the equipment is powered on.

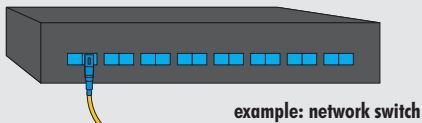


Press WAVE until the meter is set to the same wavelength as the network equipment. Press UNITS until the meter is set to display optical power in dBm.



View the displayed optical power.

NOTE: if the transmitter is sending out digital data, the displayed power level will fluctuate based on average power of data bits received during the sampling period.

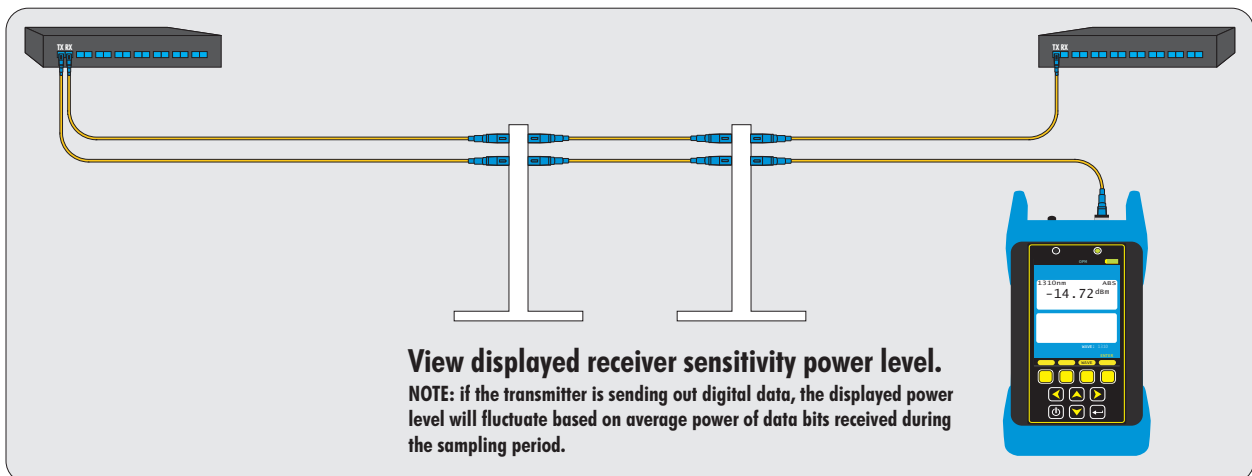
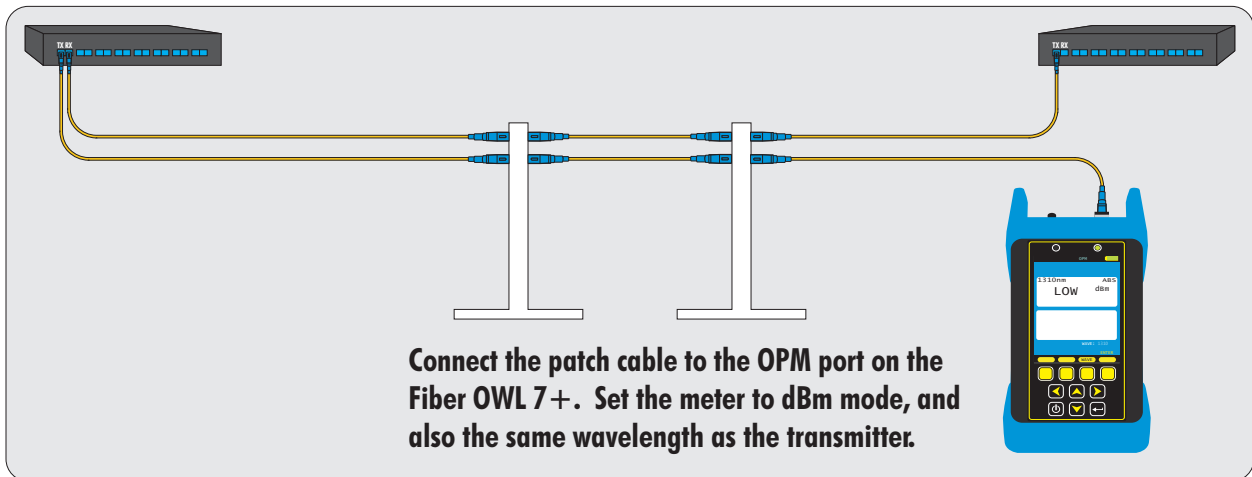
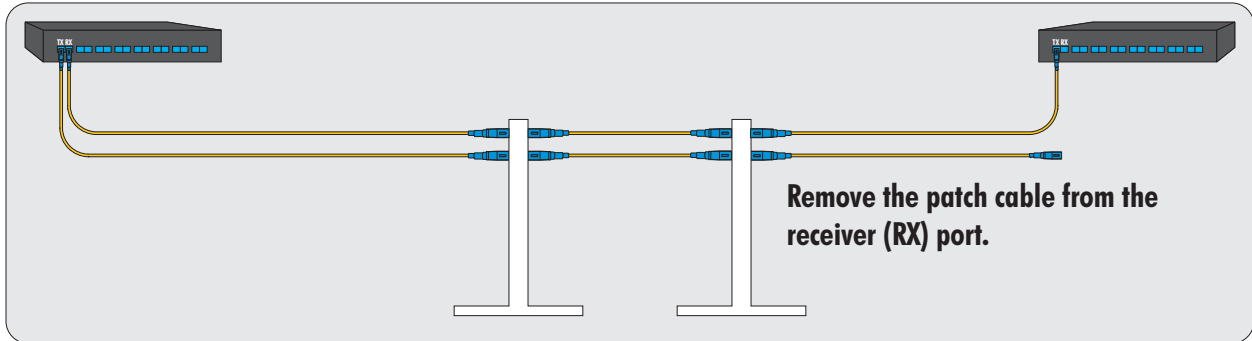


TEST PROCEDURES

OPM MODE

RECEIVER SENSITIVITY MEASUREMENT

Output power measured from a transmitter through a link at the far-end receiver will determine if the received power is within manufacturer receiver sensitivity specifications.



TEST PROCEDURES

OPM MODE

PATCH CABLE VERIFICATION

Check patch cables before testing to determine if they are okay to use.

If patch cable measurements are within specifications, the user has verified that: 1) the patch cable is good; and 2) the units are measuring within their calibration levels.

Connect the patch cable to be tested between the OPM port on the Fiber OWL 7+, and the appropriate source port on the WaveSource Pro.

Hold  – set the WaveSource Pro to AUTO mode

 – set measurement units to dBm

Both available wavelengths should appear on the Fiber OWL 7+ display.

Light source calibration levels (🕒):

Singlemode: -10.00 dBm

62.5/125 multimode: -20.00 dBm

50/125 multimode: -23.00 dBm

🕒 actual measurements values may be slightly above or below light source calibration levels, but should be close



TEST PROCEDURES

OPM MODE

OPTICAL LOSS MEASUREMENT

Measure the attenuation, or loss, of optical fiber links.

Power ON the Fiber OWL 7+.



1

 – Power ON the Fiber OWL 7+


 – Select **POWER METER** option from the **STARTUP MENU**

Start the Set Optical Reference procedure.



2

 – toggle function menu

 – begin set reference procedure

TEST PROCEDURES

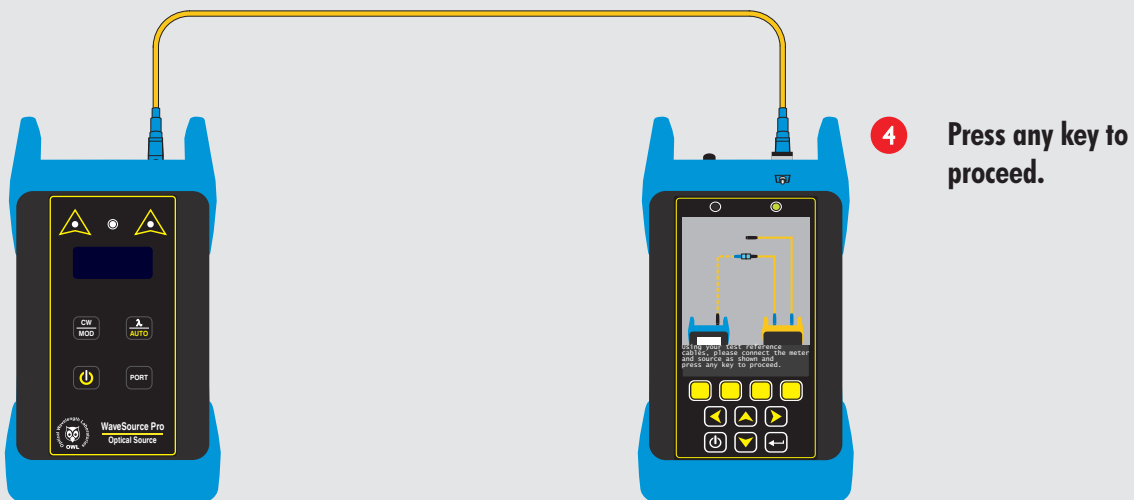
OPM MODE

OPTICAL LOSS MEASUREMENT, cont.

Review the "Setting a reference" screen.



Connect the appropriate reference cables between the Fiber OWL 7+ and WaveSource Pro.



TEST PROCEDURES

OPM MODE

OPTICAL LOSS MEASUREMENT, cont.

Set up the WaveSource Pro.



5 – Power ON the WaveSource Pro.

– change port (if necessary)

Hold – set the WaveSource Pro to AUTO mode



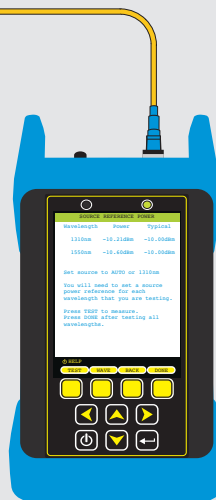
6 The source is now set to AUTO mode.

– acquire reference values from the source

Store the reference values.



7 – store the reference value and continue.



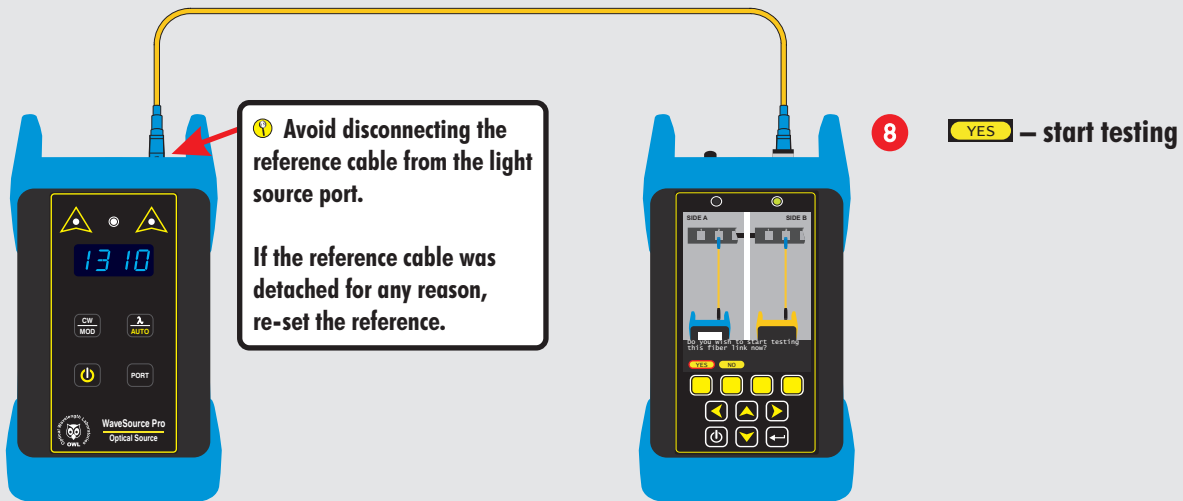
TEST PROCEDURES

OPM MODE

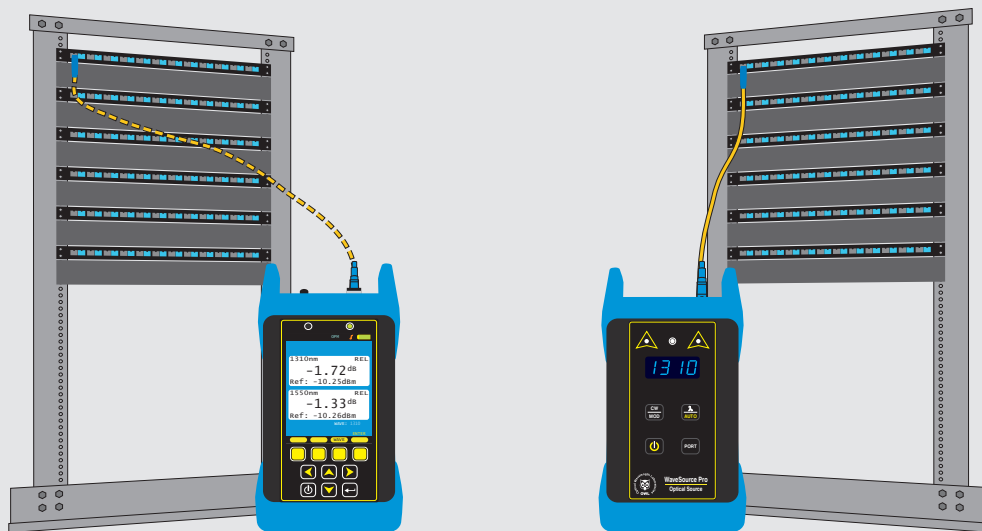
OPTICAL LOSS MEASUREMENT, cont.

Measure the attenuation, or loss, of optical fiber links.

The Fiber OWL 7+ and WaveSource Pro are now ready to take measurements.



Connect the meter and source into the each fiber in the link under test as shown. The meter will begin to display loss readings automatically after a few seconds.



TEST PROCEDURES

OTDR MODE

OVERVIEW

All personnel testing optical fibers should be adequately trained in the field of fiber optics before using any fiber optic test equipment. If the user is not completely familiar with testing fiber optics, they should seek competent training. Such training can be acquired from a variety of sources, such as local hands-on training classes or online courses.

Valuable information about fiber optic testing can also be gathered from reading printed literature carefully or by thoroughly reading supplied operations manuals.

OTDR basics

The above is especially true for Optical Time Domain Reflectometers (OTDRs). OTDRs are complicated technical devices, requiring a great amount of technical skill, knowledge, and expertise to operate. Proper setup and trace interpretation are paramount to a successful OTDR test, and the consequences of being inadequately trained could result in a significant amount of network down-time and repair costs.

In addition, OTDRs are delicate scientific instruments, and should be treated as such. Great care should be taken to ensure that all optical ports are kept clean and free from debris. The reasons for this are two-fold: 1) a clean OTDR produces accurate and precise results; and 2) if debris is allowed to build up in the OTDR test port, over time connector insertions will grind the debris into the OTDR port endface, resulting in scratches or "pits" that require extensive and costly repairs.

The main purpose of an OTDR is to locate faults in an optical fiber that exhibits unacceptable amounts of optical loss, or is no longer functioning properly. These faults are commonly called "events" and include anomalies such as breaks, shatters, connector endfaces, patch panels, splices, macro-bends, and micro-bends. By knowing the precise distance to an event, the technician can determine the nature of the event and quickly restore the network to its former working state.

There are two types of events detectable by an OTDR: Fresnel (reflective) and backscatter (non-reflective).

Fresnel events are caused by "glass-to-air" boundaries in the optical fiber, which causes a high amount of light to be reflected directly back toward the OTDR. Common Fresnel events include breaks, shatters, connector endfaces, patch panels, or even the end of the fiber. End-of-fiber detection can also be used to measure the end-to-end length of the fiber.

Backscatter events are caused by the intrinsic properties of the optical fiber. The make-up of the optical fiber scatters the light in all directions, including a small amount that gets scattered back towards the OTDR. Common backscatter events are splices (either fusion or mechanical), macro-bends, and micro-bends. Backscatter can also be used to measure the attenuation (loss) on a certain section of an optical fiber.

TEST PROCEDURES

OTDR MODE

DESCRIPTION

Upholding OWL's commitment to high-quality, yet affordable, fiber optic test equipment, the Fiber OWL 7+ enables fiber optic professionals to quickly and easily troubleshoot and locate optical faults in multimode and singlemode fibers.

The Fiber OWL 7+ is truly a hand-held unit, being one of the smallest OTDR devices on the market today – easily able to fit into a shirt pocket – yet having capabilities of other devices costing thousands of dollars more.

Optical fiber traces are displayed on a high-resolution color LCD display which implements state-of-the-art display technology to allow the OTDR's high-resolution color LCD display to “flip” between portrait or landscape mode automatically simply by rotating the device 90°. By “flipping” from portrait to landscape, the user sees a wider viewing area, displaying more trace information on the high-resolution color LCD, and allowing for greater viewing detail.

Important OTDR trace parameters such as pulse width, index of refraction, and data point averaging are fully user-configurable, and are accessible through an intuitive menu system.

Powering the Fiber OWL 7+ is a re-chargeable Lithium-polymer battery that allows for up to 20 hours of normal usage.

The Fiber OWL7+ is equally suited to testing multimode and singlemode fibers in many test environments, including LAN, MAN, WAN, FTTH, Telco, CATV, Manufacturing, and Laboratory.

PERFORMANCE EXPECTATIONS AND LIMITATIONS

REFLECTIVE EVENTS

Fault Location. The main function of the OTDR port in the Fiber OWL 7+ is to detect the presence of highly reflective events, otherwise known as Fresnel events, such as breaks, shatters, patch panels, or the end of the fiber link. The distance to an event is shown as a spike on the OTDR trace, allowing the technician to quickly locate the problem and restore the network.

Fiber Length Measurement. The OWLTrek II can give the operator a general idea of the length of the optical fiber by placing the cursors at the first and last reflective events, although the last reflective event is not guaranteed to be the end of the fiber. For example, a severe enough break mid-span could prevent the OTDR from detecting other events beyond the break, or the OTDR trace could show echoes or ghosts of previous Fresnel events.

BACKSCATTER EVENTS

Backscatter Events. The OTDR port in the Fiber OWL 7+ has some ability to locate and measure backscatter events. Tweaking pulse-width and averaging settings may enhance the device's ability to detect backscatter events. However, even with optimal settings, low loss backscatter events will become less detectable as the event gets farther away from the beginning of the fiber, especially on longer fibers.

Backscatter events are also more difficult to measure and interpret. Proper cursor placement is vital to the accurate measurement of backscatter events. Only individuals with OTDR training and expertise should attempt backscatter event measurement. Interpreting OTDR traces will be covered in more detail later in this manual.

Attenuation Measurement. Backscatter can be used to measure the attenuation (or loss) of certain sections of an optical fiber by placing the cursors at the beginning and end of the segment of fiber to be measured.

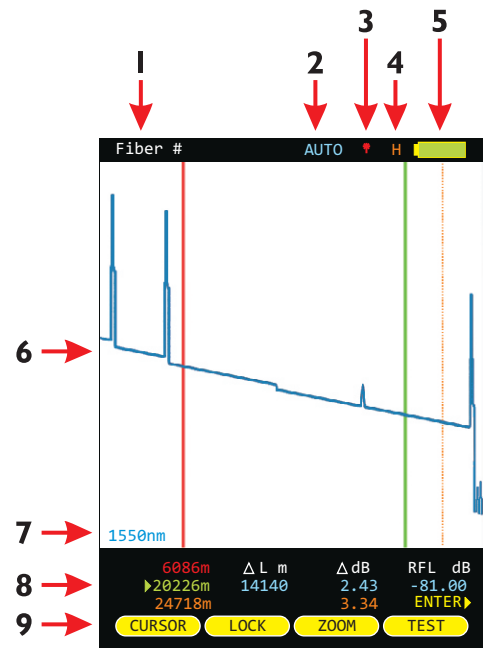
If available, however, a Power Meter / Light Source (PMLS) test kit or Optical Loss Test Set (OLTS) should always take precedence over an OTDR for end-to-end attenuation measurements.

TEST PROCEDURES

OTDR MODE

OTDR DISPLAY

- 1 **Fiber ID** – name of the currently loaded fiber trace
- 2 **OTDR Test Mode** – shows which test mode the OTDR is in – AUTO, USER, SEMI, or FILT
- 3 **VFL Indicator** – shows the current VFL mode: blank = OFF; red = ON continuous; pink = ON flashing
- 4 **Zoom Indicator** – displays “H” for horizontal zooming, and “V” for vertical zooming
- 5 **Battery Life Indicator** – displays the remaining battery life
- 6 **Trace Viewing Area** – displays the results of the OTDR trace(s), which users can zoom in on for more detailed trace analysis
- 7 **Trace Wavelength** – shows the wavelength(s) of the traces displayed in the trace viewing area. The active trace wavelength will be listed on the left.



If more than one wavelength is present, the color of the trace corresponds with the color of the wavelength number

- 8 **Trace Information** – displays the relative position and power levels at and between the red and green cursors for the currently active trace.
- 9 **Function Options Menu** – displays the on-screen menu options for trace control

TEST PROCEDURES

OTDR MODE

KEY OTDR TRACE PARAMETERS

WAVELENGTH – range of values: **Multimode: 850, 1300, BOTH; Singlemode: 1310nm, 1550nm, BOTH.** Allows the user to select one or two wavelength(s) used for testing. Wavelength selection only applies to dual-wavelength OTDR.

INDEX OF REFRACTION – range of values: **1.4000 to 1.6000.** To ensure the most accurate distance to events, Index of Refraction (IoR) should be set to the fiber manufacturer's refractive index specification for the fiber under test. If unknown, set IoR to:

SINGLEMODE – 1.4681 // MULTIMODE – 1.4920

The following values can be entered on the TRACE OPTIONS screen:

CAPTURE MODE – range of values: **AUTO, SEMI, USER, FILT, LIVE.**

- AUTO** all trace options are determined automatically, except dead zone length.
- SEMI** same as AUTO except the pulse width is not automatically determined.
- USER** all user configured options are used when capturing the trace.
- FILT** same as USER plus the software will filter (smooth) the trace to remove noise. This will help produce a cleaner trace with less averaging required.
- LIVE** uses the user-defined trace settings to continuously update the trace on the screen. The trace will be updated after the user-defined number of averages is completed. The cursors and zoom functions work in LIVE mode. To start and exit LIVE mode, press the TEST function button.

TRACE OPTIONS

CAPTURE MODE **AUTO**

PULSE WIDTH **1m**

TRACES TO AVERAGE **4096**

DEAD_ZONE LENGTH(m) **1100**

RANGE **10km**

STEP **1m**

SAVE QUIT HELP

NOTE: if connected to a PC running OWLView software, LIVE mode also updates the software trace area

PULSE WIDTH – range of values: **Multimode: 1, 2, 5, 10, 20, 50, 100 m; Singlemode: 1, 2, 5, 10, 20, 50, 100, 200, 500, 1000 m.** Pulse width offers a trade-off between the ability to measure longer cable distances (longer pulse width) versus the ability to see two events that are closely spaced (shorter pulse width).

NUMBER OF AVERAGES – range of values: **Multimode: 256, 512, 1024, 2048, 4096, 8192; Singlemode: 1024, 2048, 4096, 8192, 16384, 32768.** Increasing the number of averages allows the OTDR to have better display resolution (events are easier to see, especially near the noise level), but also increases the trace acquisition time.

DEAD_ZONE LENGTH(m) – range of values: **0 to 1500.** Allows the user to enter the length of a dead-zone box (a.k.a. pulse suppressor), if one is being used. If a value is entered for dead zone, the dead zone portion of the OTDR trace will be grayed out. The active portion of the trace will begin where the dead zone ends.

RANGE – range of values: **1, 2, 5, 10, 25, 50, 65, 128 km.** Allows the user to manually enter the total length of the trace. NOTE: for best results, this value should be set to the next highest value from the actual length of the fiber under test.

STEP – range of values: **1, 2, 4, 8 m.** Trace sample spacing. Smaller steps produce more accurate distance to events, but trace acquisition takes longer.

TEST PROCEDURES


OTDR MODE

SETTING TEST PARAMETERS

SET WAVELENGTH

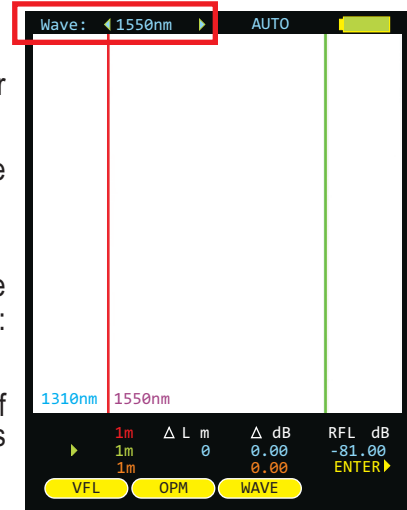
When using a dual-wavelength OTDR, traces can be run at either one or two wavelengths.



To set the trace wavelength(s), press  from the trace screen until the  button appears.

 allows the user to select one or both wavelengths to be used for testing. Arrow keys scroll through three options: 1310nm, 1550nm, BOTH. Press key again to exit.

The selected wavelength(s) will appear at the bottom of the trace screen. If two wavelengths are present on the trace screen, they will be displayed as either **blue** or **brown**.

The cursor information below the trace screen applies to the wavelength listed in **blue**.



 If the OTDR only has one wavelength installed, the  menu option will not appear.

SET INDEX OF REFRACTION

Index of refraction should be set to the optical fiber manufacturer's index of refraction specification. If unknown, use the recommended values below:

SINGLEMODE – 1.4681


MULTIMODE – 1.4920

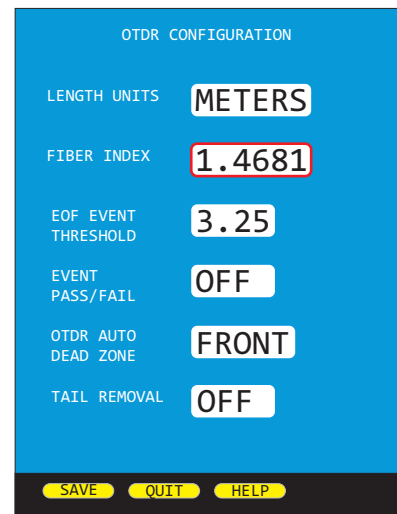
To change the index of refraction:

 → STARTUP MENU → SETUP MENU → OTDR SETUP

Highlight FIBER INDEX, then use   to increase and decrease the FIBER INDEX.

Press  when finished.

To return to the OTDR trace screen, press  until the STARTUP MENU appears, then select the SIMPLE OTDR menu option.



TEST PROCEDURES

OTDR MODE

STARTING AN OTDR TRACE

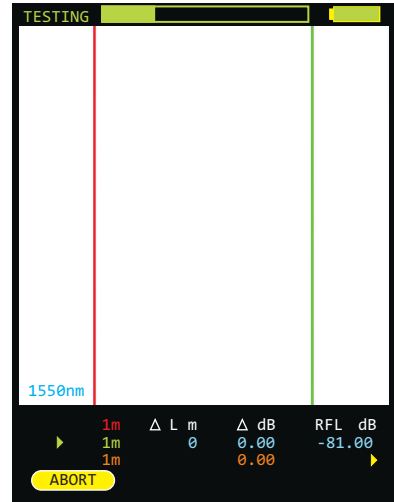
Once the OTDR parameters have been set, an OTDR trace can be run.

TEST

starts an OTDR trace based upon the current OTDR parameters

During the OTDR test (as shown at right):

- the ABORT soft-key appears (used to abort an OTDR trace)
- all soft-keys are disabled
- a bar graph appears at the top of the screen showing the progress of the OTDR test
- dual-wave test will run a separate trace automatically for each wavelength
- ✔ starting a new trace will replace the old trace on the display with the new trace after a few seconds (depending upon the trace length).



CURSOR NAVIGATION

Once the OTDR trace is complete, the OTDR trace will appear on the screen, and the OTDR information – distance and optical power – will be updated.

- ✔ two color coded traces will appear on the screen if a dual-wavelength trace was run

Trace information is color-coded. **Red** and **green** refer to the cursors. **Blue** text refers to the difference between the two cursors. **Orange** text refers to the perceived end of the fiber link (the position of the **orange** dotted line).

CURSOR

sets the active cursor – no cursor, **red**, **green**, or both **red** and **green**

LOCK

locks the active cursor at its current location; unlocks a locked cursor. When a cursor is locked, a colored padlock symbol will appear next to the appropriate cursor information

ZOOM

sets the ZOOM mode to Horizontal (H) or Vertical (V)



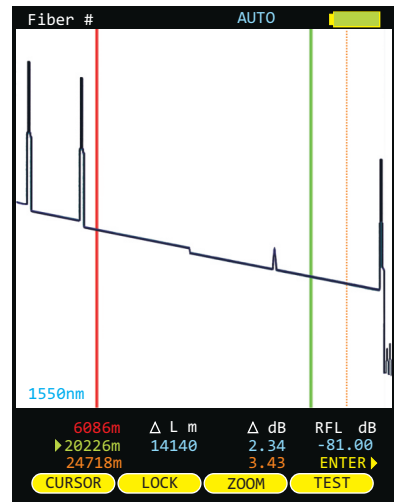
WHEN ONE OR MORE CURSORS ARE SELECTED: moves the cursor(s) left or right; holding these buttons speeds up the cursor movement

WHEN NO CURSOR IS SELECTED: screen pans left and right



WHEN ONE OR MORE CURSORS ARE SELECTED: zooms in or out on the active cursor(s)

WHEN NO CURSOR IS SELECTED: zooms in and out on the center of the screen



TEST PROCEDURES

OTDR MODE

TRACE ANALYSIS

This section will provide a basic overview about how to analyze an OTDR trace, and will cover the different types of information that can be gathered from an OTDR trace, including:

- event location;
- fiber length measurement;
- fiber attenuation (loss); and
- reflectance measurement.



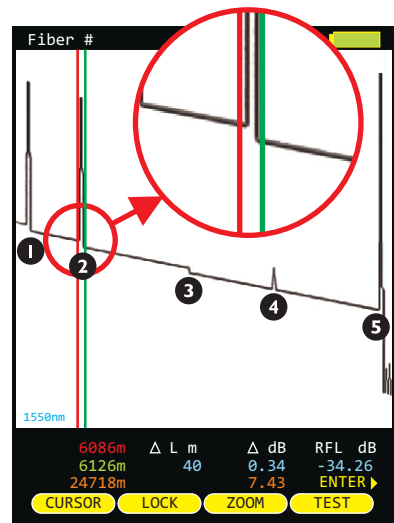
proper interpretation of OTDR test results requires a significant amount of technical skill, knowledge, and expertise. Proper trace interpretation is paramount to a successful OTDR test, and the consequences of interpreting a trace incorrectly could result in a significant amount of network down-time and repair costs.

EVENTS

The primary function of an OTDR is to locate events along the optical fiber. On an OTDR trace, events appear as deviations from an otherwise gently sloping line.

Below is a list of the different events shown in the example at right, including the type of event, and possible interpretations of the data:

- | | | |
|---|-------------|---|
| 1 | Fresnel | end of dead-zone box (pulse suppressor) |
| 2 | Fresnel | patch panel using flat polish connectors |
| 3 | Backscatter | fusion splice or macro-bend |
| 4 | Fresnel | patch panel using APC (angled physical contact) connectors |
| 5 | Fresnel | end of fiber link; could also indicate a severe break where no other events can be detected after the break |



If the slope of the trace appears to “dip” to a lower level after the event (events 1, 2, and 3), this could mean one of two things: 1) if the slope of the line changes, the refractive index of the fiber preceding the event is different from the refractive index of the fiber following the event, or 2) if the slope stays the same, then the event is simply a loss-inducing event.



Tall spikes usually indicate flat polish connections or other highly reflective events (breaks, shatters, end of fiber, etc.), while short spikes usually indicate angled polish connections.

CURSORS PLACEMENT

Proper cursor placement is critical in determining the exact distance to an event, as well as the relative effect the event has on optical power traveling through the event.

The **red** cursor should be placed immediately before the slope of the line begins to spike.

The **green** cursor should be placed after the event, at a point where the slope of the line returns to the normal backscatter level.

Cursor information is located below the trace. **Red** and **green** cursor information shows the distance to each cursor. The **blue** length information shows the distance between the cursors, and the **blue** dB number is the dB loss of the event being measured.

TEST PROCEDURES

OTDR MODE

FIBER LENGTH MEASUREMENT/LINK LOSS

By placing the cursors at the beginning and ending points of the fiber trace, the distance between the cursors will show a close approximation of the total length of the optical fiber link, as well as a close approximation of the total fiber link loss.

CURSOR PLACEMENT

Proper cursor placement is necessary to determine the end to end length and link loss of an optical fiber link. Refer to the diagram at right when placing cursors for fiber length measurement.

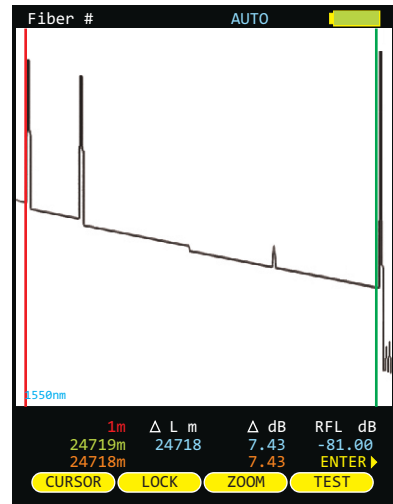
The **red** cursor should be placed directly before the first reflective event, before the slope of the line begins to spike.

The **green** cursor should be placed directly before the last event, before the slope of the line begins to spike.

Cursor information is located below the trace. **Red** and **green** cursor information shows the distance to the cursor, and the **blue** information shows the distance and relative power (in dB) between the **red** and **green** cursors.

With cursors placed as shown at right, the **blue** length number is the approximate end-to-end length of the fiber link, and the **blue** dB number is the approximate dB loss of the link (not including the loss of the far end patch panel.)

In this example, the total link length is **24718 meters**, and the end-to-end link loss (not including the far end patch panel) is **7.43 dB**.



NOTE: use this length as the length to enter during CERT mode

FIBER ATTENUATION MEASUREMENT

The fiber attenuation, or loss, for a certain section of an optical fiber link can be determined by placing the cursors at the beginning and end points of the segment of fiber under test.

CURSOR PLACEMENT

Proper cursor placement is necessary to determine the attenuation of a certain segment of fiber.

The **red** cursor should be placed at the beginning of the section of fiber under test.

The **green** cursor should be placed at the end of the section of fiber under test.

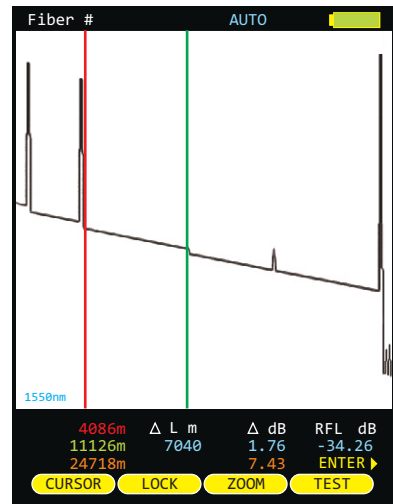
Cursor information is located below the trace. **Red** and **green** cursor information shows the distance to the cursor, and the **blue** information shows the distance and relative power (in dB) between the **red** and **green** cursors.

With cursors placed as shown at right, the **blue** length number is the length of fiber between the cursors, and the **blue** dB number is the dB loss of the fiber between the cursors.

In this example, the section of fiber being analyzed has **1.76 dB** of loss, and is **7040 meters**.

Using this information, attenuation of fiber (dB per kilometer) can also be calculated, which can then be compared to the fiber manufacturer attenuation specification. To determine dB/km:

$$1.76 \text{ dB} / 7.040 \text{ km} = 0.25 \text{ dB/km}$$



TEST PROCEDURES

OTDR MODE

REFLECTANCE MEASUREMENT

The reflectance of a specific event can be determined by placing the cursors on either side of an event. The OTDR will show the reflectance in dB of the highest reflective event between the cursors.

CURSOR PLACEMENT

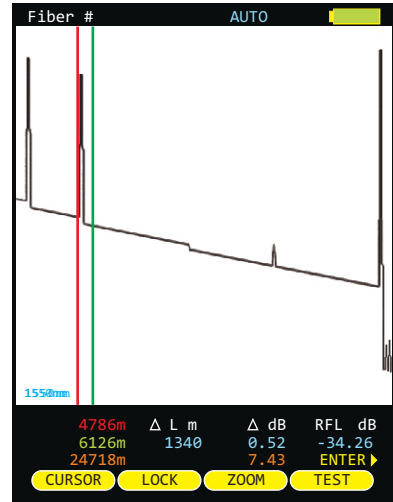
Proper cursor placement is important when determining the reflectance of a reflective event.

The **red** cursor should be placed on the backscatter line directly before the event, on the sloping line before the spike.

The **green** cursor should be placed on the backscatter line at the point where the backscatter line returns to its normal slope.

Cursor information is located below the trace. **Red** and **green** cursor information shows the distance to the cursors, and the **blue** information shows the length, relative power, and reflectance between the **red** and **green** cursors.

With cursors placed as shown at right, the **blue** reflectance number is the point of highest reflectance (in dB) between the cursors.



NOTE: if multiple reflective events are included between the cursors, the reflectance number will display the most reflective of the events.

In this example, the reflective event being measured has a reflectance of **-34.26 dB**.

TRACE EVENTS MENU

Automatic event location can be performed from the trace screen by accessing the **EVENTS** function option. See Section 1: INTRODUCTION – DISPLAY for more information about function option menus.



IMPORTANT NOTE: automatic event location is only meant to be used as a guideline for the location of possible events. It is ultimately up to the user to verify and determine if an event actually exists at that location.

LOCATION	the distance to the start of the event
TYPE	type of event (reflective, loss, etc.)
REFL	reflectance of the event
LOSS	loss of the event



moves the cursor up and down in the list of detected events



returns the user to the trace screen, zoomed in on the selected event



displays the next page of events, if there are more events than will fit on the screen



returns the user to the trace screen



view events for additional wavelength (if available)

1310nm TRACE EVENTS			
Location	Type	Refl	Loss
14m	REFL	-47.38	0.87
24011m	LOSS	-81.00	0.21
50539m	REFL	-17.54	11.63

NOTE: red text in the event table indicates that the event fails to meet user-set thresholds

Once an event has been selected from this menu, each individual event will be marked with a “tic” mark at the top of the trace area.

TEST PROCEDURES

OTDR MODE

STORED READINGS



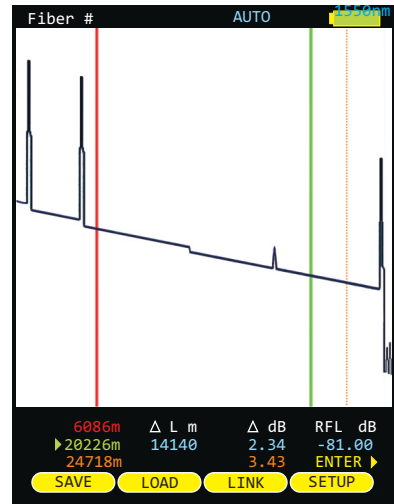
sets the Function Options Menu to allow access to Data Storage and Setup Menu options. The following soft-keys apply to data storage functions.

SAVE

SAVING A TRACE

LOAD

LOADING A PREVIOUSLY STORED TRACE



SAVING A TRACE

Traces may be stored in permanent memory for later viewing or download to hard disk for data file retrieval.

From the trace screen, press **SAVE** to enter the fiber name and save the currently displayed trace to memory.

To enter a fiber name, use the arrow keys to highlight the appropriate character on the grid.

<--

BACKSPACE

SHIFT

TOGGLE BETWEEN UPPER AND LOWER CASE ALPHABET

SPACE

FORWARD SPACE



SELECT THE HIGHLIGHTED CHARACTER

DONE


FINISHED ENTERING NAME

TEST PROCEDURES

OTDR MODE

LOADING A PREVIOUSLY STORED TRACE

Previously stored traces can be loaded from memory for later on-screen analysis.

The STORED TRACE menu may be accessed from the Function Options menu on the trace screen by pressing  .



moves the cursor up and down in the list of stored traces



return to the previous screen



view detailed information about the selected item



accesses context-sensitive help



loads the currently selected fiber trace into the trace screen



allows the user to overlay a previously stored trace on top of the currently loaded trace. Only one trace can be overlaid at a time, and the overlay trace is denoted by a dark arrow to the right of the trace information. Press this button again to clear the overlay status



gives the user the option: 1) to delete the currently selected fiber trace; 2) to not delete the selected trace; 3) to delete all traces; or 4) delete only traces that have been previously downloaded (see TRACE DOWNLOAD STATUS below)



displays the next page of fiber traces if there are more traces than will fit on the screen

STORED TRACES		
Trace Name	Date	Time
SM-BB-F1-F2:1	10/05/09	04:16PM ✓
SM-BB-F1-F2:2	10/05/09	04:17PM
SM-BB-F1-F2:3	10/05/09	04:19PM
SM-BB-F1-F2:4	10/05/09	04:21PM
SM-BB-F1-F2:5	10/05/09	04:24PM
SM-BB-F1-F2:6	10/05/09	04:27PM

Trace Parameters

n=1.4681 EOF=33600 P= 1m S=1m

Overlay status column
Download status column

HELP BACK VIEW
LOAD OVERLAY DELETE PAGE

TRACE PARAMETER INFORMATION. Information at the bottom of the STORED TRACES screen shows trace parameter settings used when the trace was taken:

- n index of refraction
- L fiber length
- P pulse width
- S step



TRACE DOWNLOAD STATUS. If the trace has already been downloaded to the PC, this trace will be marked by a green checkmark which appears at the right of each trace.

TEST PROCEDURES

OTDR MODE

OTDR-RELATED MENU OPTIONS

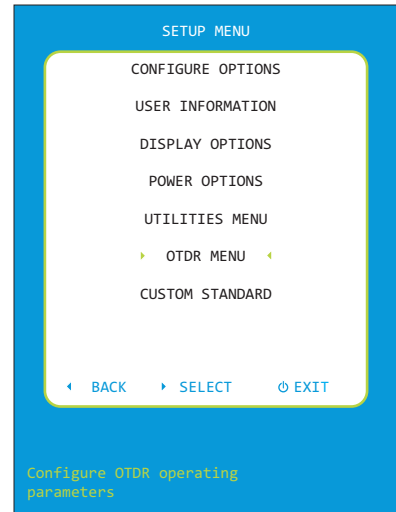
OTDR-related menu options are located in the SETUP MENU:

To access the SETUP MENU: press  → SETUP MENU

OTDR-RELATED MENU OPTIONS

The OTDR MENU contains OTDR-related settings:

OTDR SETUP, EVENTS SETUP, and SET BACKSCATTER COEFF.



OTDR SETUP

From the SETUP MENU, highlight OTDR SETUP MENU, then press 

LENGTH UNITS – Options: *FEET* or *METERS*

Changes the length units displayed on the OTDR trace results screen.

FIBER INDEX

This is the index of refraction value for the fiber under test. This value determines the speed of light in the fiber and is used to calculate distances on the OTDR trace.

EOF EVENT THRESHOLD

End Of Fiber backscatter threshold is the required backscatter level prior to an event for that event to be considered as part of the fiber and not an echo. The last event with the required backscatter level is considered to be the end of the fiber.

EVENT PASS/FAIL

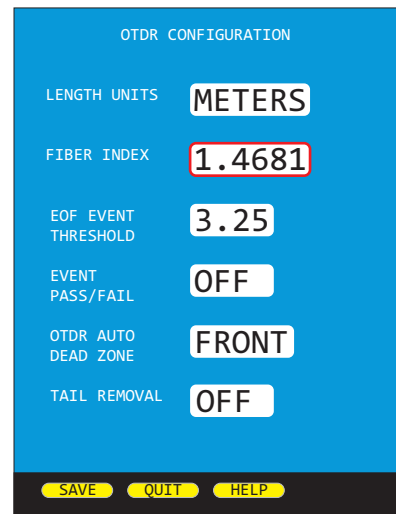
If turned on, events in the OTDR event table will be highlighted in RED if they exceed the values set in the EVENT CONFIGURATION menu.

OTDR AUTO DEAD ZONE

If turned on, the OTDR will use the first reflective event as the end of the launch cable (dead zone) and will not include the launch cable in the fiber's length.

TAIL REMOVAL

If turned on, the OTDR will attempt to remove any trace saturation tails caused by large reflections. This process will take longer and slightly lower the trace backscatter level.



TEST PROCEDURES

OTDR MODE

EVENTS SETUP

From the SETUP MENU, highlight EVENTS SETUP, then press 

REFLECTIVE EVENT THRESHOLD

This sets the minimum event threshold in dB for reflective events. Events must have this much reflectivity before they are marked in the event table. The smallest reflectivity value is limited by the fibers backscatter coefficient.

LOSS EVENT THRESHOLD

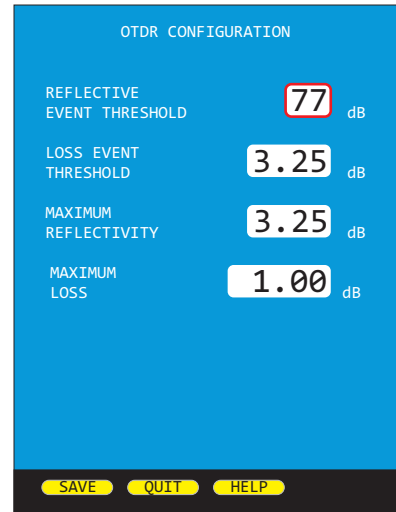
This sets the minimum event threshold in dB for loss events. Events must fall at least this amount below the backscatter power to be marked in the event table.

MAXIMUM REFLECTIVITY

The maximum reflectivity that an event can have before failing.

MAXIMUM LOSS

The maximum loss that an event can have before failing.



SET BACKSCATTER COEFFICIENT

From the SETUP MENU, highlight SET BACKSCATTER COEFF., then press 

SET BACKSCATTER COEFFICIENT

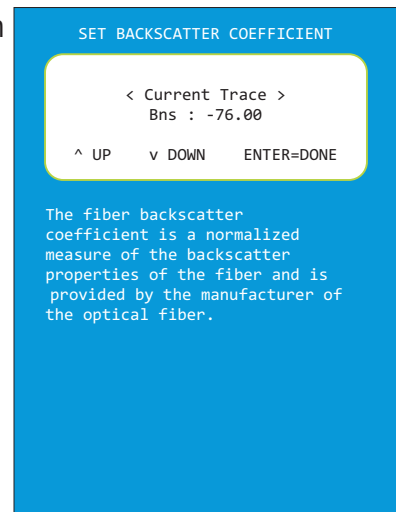
<backscatter option> – options: Current Trace, (Wave1), (Wave2)
Use left and right arrow keys to change value.

Bns – range: -60.00 to -85.00 dB

Use up and down arrow to increase/decrease backscatter value.

Backscatter coefficient is a measure of the backscatter properties of the fiber under test, and is provided by the fiber manufacturer.

Backscatter coefficient is important in accurately determining reflectance measurements in the OTDR.



TEST PROCEDURES

OTDR MODE

LIVE MODE OPERATION

LIVE MODE is an advanced feature that periodically updates the OTDR screen while the OTDR is taking a trace, in order to view events as they happen in real-time.

LIVE MODE OPERATION

SETUP opens the TRACE OPTIONS menu

▲ ▼ highlight CAPTURE MODE

◀ ▶ change the value to LIVE

Press SAVE to return to the trace screen.

Press **TEST** to start LIVE mode. After a few seconds the OTDR screen will acquire its initial trace.

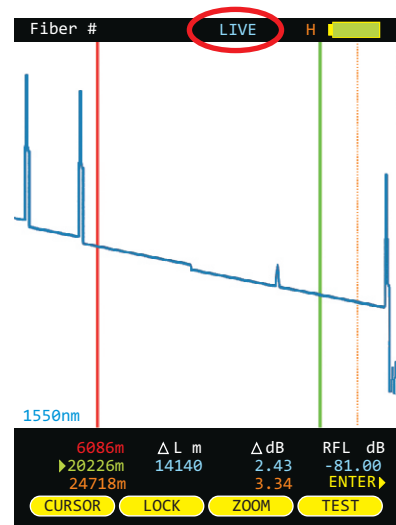
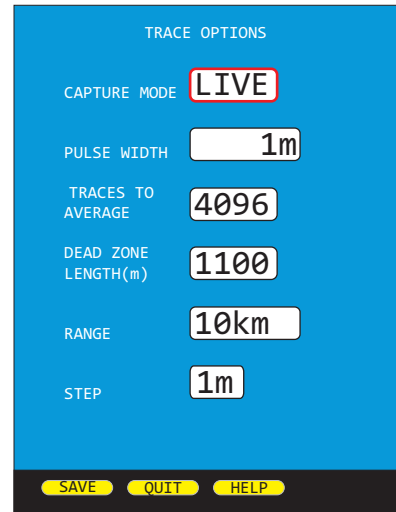
After acquiring its initial trace, the trace screen will begin to update every few seconds.

- ✓ The frequency of screen updates will depend upon the selected TRACE OPTIONS. Lowering the number of samples and/or increasing the STEP value will increase the frequency of screen updates, but will also lower the trace resolution.
- ✓ If the screen does not appear to be changing, the characteristics of the fiber are not changing.
- ✓ When the OTDR is connected to a PC, OWLView software allows users to display LIVE mode on the software trace screen. This enables users to view real-time trace updates on the large PC monitor in order to better see events that may not be visible on the OTDR LCD display.

To enable LIVE mode in OWLView software:

- 1) Launch OWLView software;
- 2) Click "Start Live Mode"
- 3) If the OTDR is not already in LIVE mode, follow the instructions that appear on the software screen, wait for LIVE mode on the OTDR to begin, then click "Start Live Mode" again.

When LIVE testing is complete, press **TEST** again to exit LIVE mode.



TEST PROCEDURES

OTDR MODE

MANUALLY SETTING END OF FIBER (EOF) MARKER

The OTDR marks the perceived end-of-fiber event with an **orange** dotted line.

However, in certain cases, the “end-of-fiber” event may be mis-marked due to factors such as echoes that occur in the noise area of the trace.

The EOF function gives technicians a way to manually set the EOF marker to the correct position.

SETTING EOF MARKER

Select either one (and only one) of the cursors to be the active cursor (in this example, the **green** cursor is the only active cursor).

Move this active cursor to the actual EOF position. This cursor should be positioned on the backscatter immediately where the actual EOF event occurs.

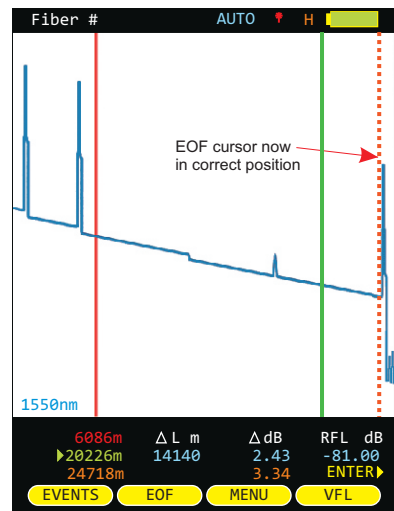
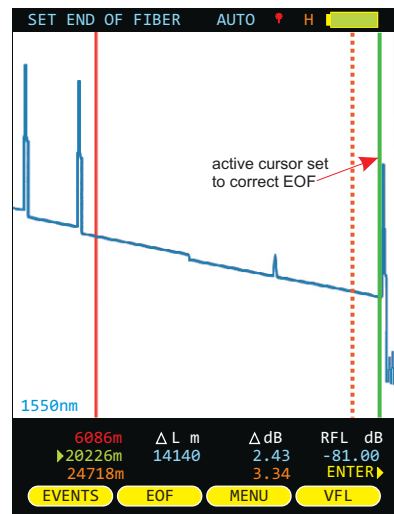
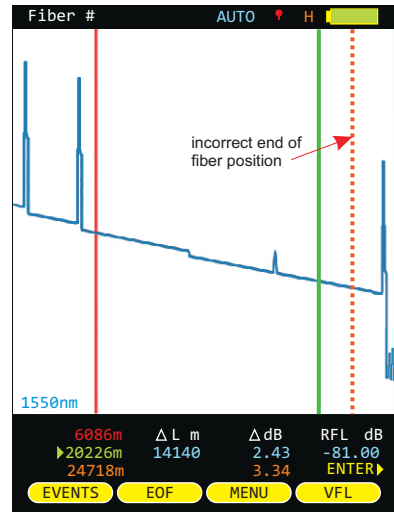
Press the Enter key until the following menu appears at the bottom of the OTDR display:



Press **EOF** key once. A “SET END OF FIBER” message will indicate that the OTDR is ready to re-position the EOF cursor.

(If the active cursor is not yet set in the correct EOF position, the technician can move the active cursor at this time.)

Once the active cursor is in the correct EOF position, press **EOF** key again to re-position the EOF cursor.



TEST PROCEDURES

LINK WIZARD

OVERVIEW

LINK WIZARD

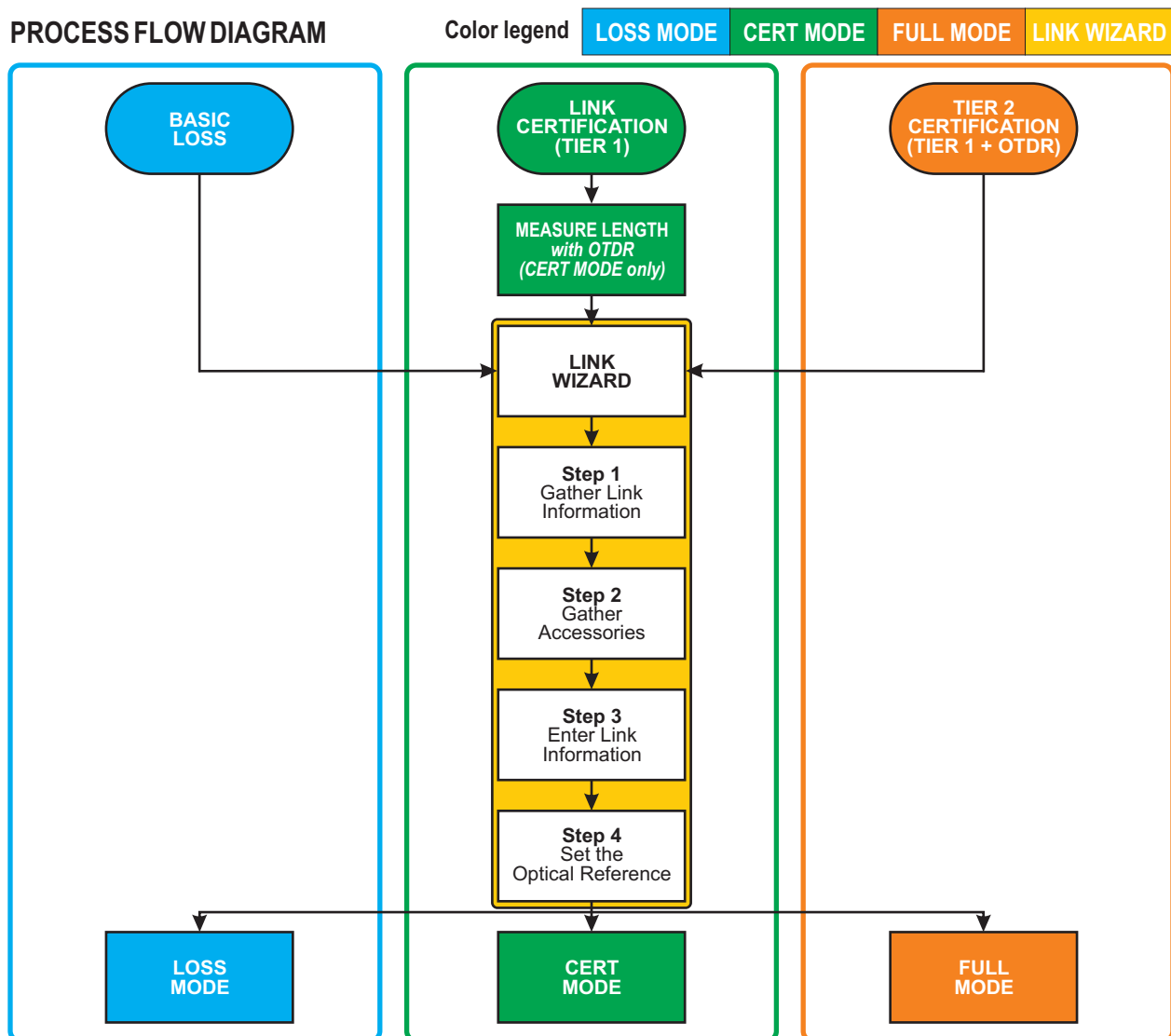
The Fiber OWL 7+ has several test modes that provide users with varying levels of test results, including:

- Basic optical loss (with data storage function; shows optical loss only)
- Fiber link certification (Tier 1 certification; shows optical loss along with PASS / FAIL results)
- Full-featured Tier 2 certification (Tier 1 + OTDR results)

Each of the test modes uses the same set of accessories, and follows a common procedure for entering the appropriate link information – a process called the LINK WIZARD.

This section will guide the user through the process of gathering the necessary accessories and link information required to create a new link with the LINK WIZARD. Subsequent sections will cover the remaining processes for LOSS, CERT, and FULL modes.

PROCESS FLOW DIAGRAM

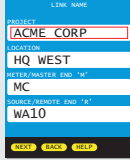


TEST PROCEDURES

LINK WIZARD

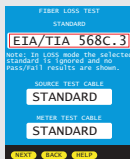
STEP I: GATHER LINK INFORMATION

Below are diagrams of the various LINK WIZARD screens, along with descriptions of the various settings. Print the Link Planning Worksheet from the next page to assist with gathering link information.



LINK NAME – general information about the job (informational only; user-definable)

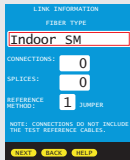
PROJECT – Name of the overall project
LOCATION – Building or general area where the fiber link is located
METER END – End of the fiber link where the Fiber OWL 7+ will be used
SOURCE END – End of the fiber link where the WaveSource Pro will be used



FIBER LOSS TEST – choose cabling standard, and define test cord types

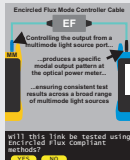
STANDARD – cabling standard used to determine PASS/FAIL parameters (see appendix for list)
NOTE: Standard only applies to links that use CERT and FULL test modes
NOTE: see Operation/Maintenance section to configure custom standard

TEST CORD TYPE – defines the quality of the test cables
Options: **REFERENCE**-grade or **STANDARD**-grade
SOURCE TEST CABLE – the test cord attached to the WaveSource Pro light source
METER TEST CABLE – the test cord attached to the Fiber OWL 7+ OPM port
NOTE: these test cables automatically count as connections, and should NOT be counted as interconnections in the next step



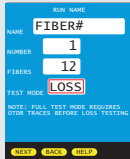
LINK INFORMATION – define the physical configuration of the link under test

FIBER TYPE – Type of fiber used in the link under test; options may vary based on chosen cabling standard (see appendix for a fiber type diagram)
CONNECTIONS – Number of inter-connections (e.g. patch panels, other mating sleeves) in the middle of the link under test
NOTE: do NOT include the connections defined by TEST CORD TYPE in this count
SPLICES – Number of splices in the link under test; can be either fusion or mechanical splices
REFERENCE METHOD – the number of cables used to set the optical reference
Options: **1-jumper** or **2-jumper** reference method
NOTE: use 1-jumper for LC patch panels; use 2-jumper for all other connector types



ENCIRCLED FLUX – is EF compliance required for this test: YES or NO (only required for **multimode** testing)

Consult cabling standard documentation or end user requirements to determine if EF compliance is required; if so, special mode controller cables will be required for setting the optical reference (aka “zeroing”).
NOTE: TIA-568-3.D standard requires EF compliance for all multimode testing
NOTE: for the purpose of TEST CORD TYPE, Encircled Flux test cables automatically count as REFERENCE-grade



RUN NAME – naming of fiber test results within the job to uniquely identify individual fiber strands

NAME – The name used to identify the group of individual fiber strands in the link
NUMBER – The starting fiber strand number in the link. The number will be automatically incremented as the test results are saved.
FIBERS – The total number of fiber strands to be tested
NOTE: applies to FULL MODE only; LOSS and CERT mode ignore this setting
TEST MODE – Determines the type of test results to be stored with this project
Options: **LOSS** – shows optical loss test results only
CERT – compares loss readings to cabling standard to show PASS or FAIL (Tier 1)
FULL – same as CERT mode but adds OTDR test results (commonly called Tier 2)

LINK PLANNING WORKSHEET

PROJECT
(14 characters)

LOCATION
(14 characters)

METER END (14 characters)

SOURCE END (14 characters)

STANDARD

EIA/TIA 568C.3 TIA 568.3-D
 1G-SX / LX 10G-S
 10G-LX4 10G-L/E
 40G-S/LR4 100G-S/LR10
 FTTH A/B/C USER DEFINED

TEST MODE

LOSS loss measurement only
 CERT loss measurement w/PASS-FAIL
 FULL CERT + OTDR

LINK CONFIGURATION INFORMATION

FIBER TYPE

62.5um (OM1)
 50.0um (OM2/3/4)
 Indoor SM
 Outdoor SM

*TIA Standards also use
 CS1 = horizontal cabling
 CS2/3 = backbone cabling*

CONNECTIONS

*Do not count patch panels
 where testers plug in*

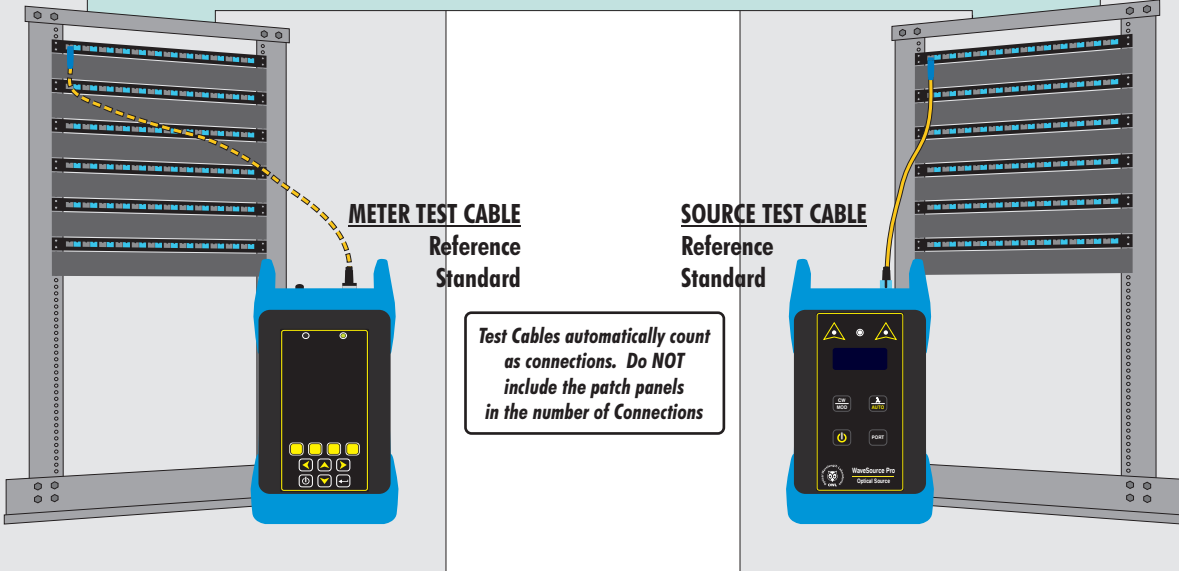
SPLICES

*Either fusion or
 mechanical
 splices*

LENGTH

*CERT MODE (measure with OTDR
 to enter manually)
 LOSS MODE (not used)
 FULL MODE (measured during test)*

REFERENCE METHOD 1-JUMPER 2-JUMPER
(LC patch panels use 1-jumper; all others use 2-jumper)



ENCIRCLED FLUX COMPLIANCE (MULTIMODE TESTING ONLY)

Is Encircled Flux compliant testing required?* YES NO

**NOTE: if YES, Source Test Cable is automatically REFERENCE-grade*

RUN NAME SETTINGS

NAME (11 characters)

NUMBER

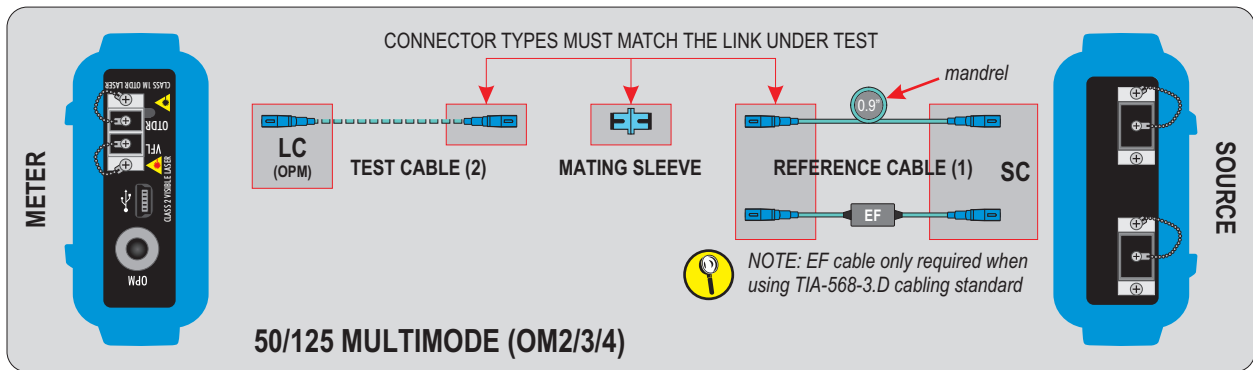
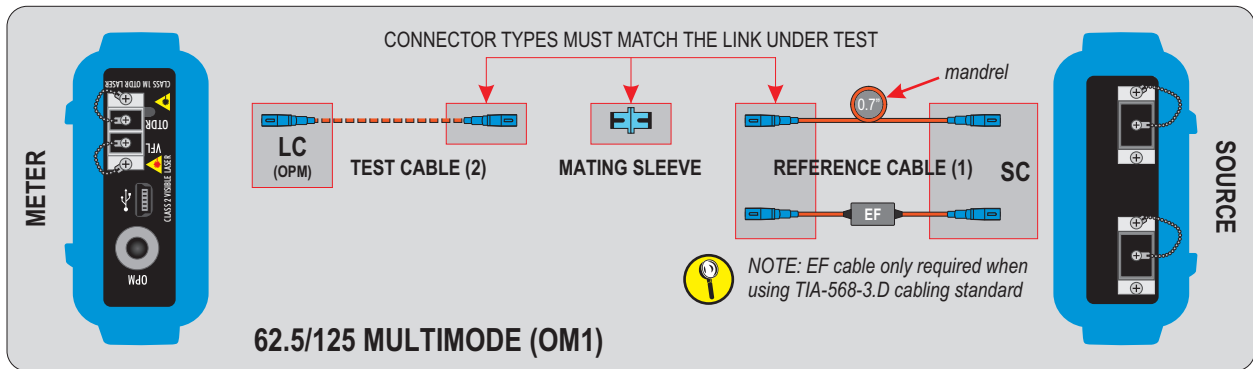
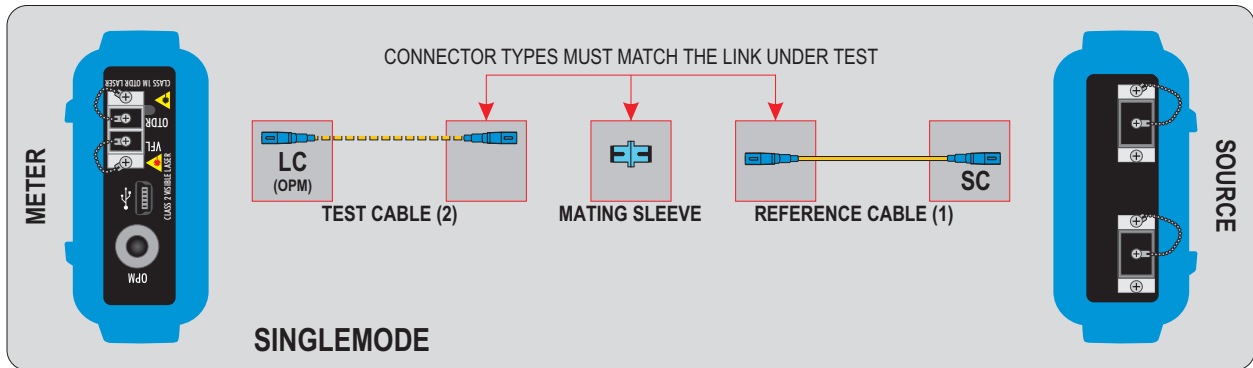
FIBERS

*Used for FULL MODE only
 LOSS/CERT MODE ignore this value*

TEST PROCEDURES

LINK WIZARD

STEP 2: GATHER ACCESSORIES



TEST PROCEDURES

LINK WIZARD

STEP 3: ENTER LINK INFORMATION

1 Power on the Fiber OWL 7+.



2 Press **▶** to access the CERTIFICATION MENU.



TEST PROCEDURES

LINK WIZARD

STEP 3: ENTER LINK INFORMATION, cont.

3

CERTIFICATION MENU

✓ to CREATE NEW LINK, ▶ to start the LINK WIZARD



4

LINK INFORMATION

✓ ▲ to navigate the entry fields, and ▶ to edit the contents of the selected field. Press **NEXT** to continue.



TEST PROCEDURES

LINK WIZARD

STEP 3: ENTER LINK INFORMATION, cont.

5

FIBER LOSS TEST

✓ ▲ to navigate the entry fields, and ▶ to select the appropriate setting.
Press **NEXT** to continue.



⚠ LOSS mode ignores the selected STANDARD.



6

LINK INFORMATION

✓ ▲ to navigate the entry fields, and ▶ to edit the contents of the selected field.
Press **NEXT** to continue.



⚠ Use the 1-jumper method if the testers will connect into LC patch panels.

Otherwise, select the 2-jumper method.



TEST PROCEDURES

LINK WIZARD

STEP 3: ENTER LINK INFORMATION, cont.

7

ENCIRCLED FLUX *(only appears if a multimode fiber type was selected)*

Select **YES** if Encircled Flux compliance is being used; if not, select **NO**.

NOTE: EF compliance is required for TIA-568-3.D; otherwise, EF compliance is optional



8

RUN NAME

Use **▲** and **▼** to navigate the entry fields, and **▶** to edit the contents of the selected field.

Press **▶** to continue.



⚙️ select test mode:
LOSS: dB loss only
CERT: dB loss and PASS/FAIL
FULL: CERT mode + OTDR traces



TEST PROCEDURES

LINK WIZARD

STEP 3: ENTER LINK INFORMATION, cont.

9

Review the LINK INFORMATION. If the information is correct, **SAVE** to continue.



10

On the METER, **YES** to begin the SET REFERENCE procedure.



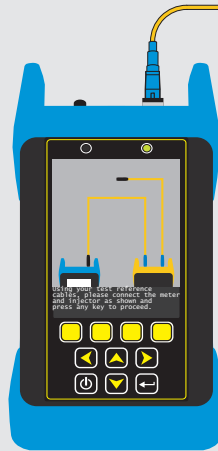
TEST PROCEDURES

LINK WIZARD

STEP 4: SETTING THE REFERENCE



Connect the appropriate reference cable(s) as shown on the Fiber OWL 7+, then press any key to continue.



The diagram will vary based on which reference method and fiber type that was chosen during the LINK WIZARD.

This example shows the 1-jumper method.

If the 2-jumper method was chosen, skip to 11.



Prepare the WaveSource Pro for testing.



– Power ON the WaveSource Pro.

– change port (if necessary)

Hold – set the WaveSource Pro to AUTO mode



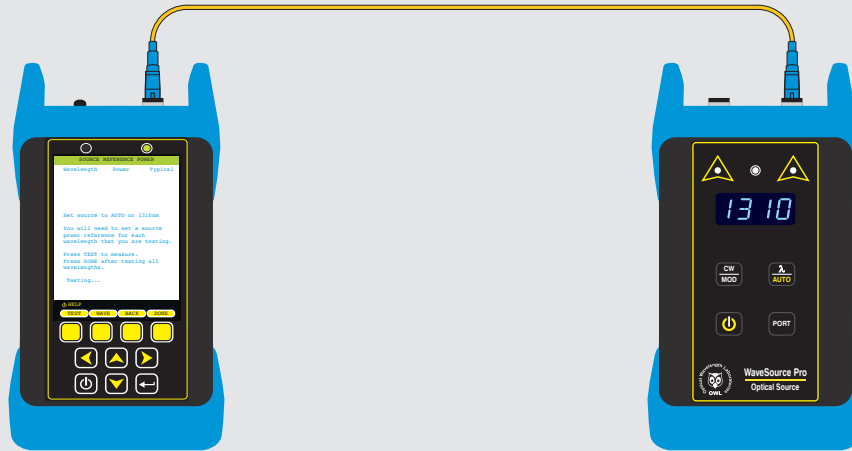
TEST PROCEDURES

LINK WIZARD

STEP 4: SETTING THE REFERENCE, cont.

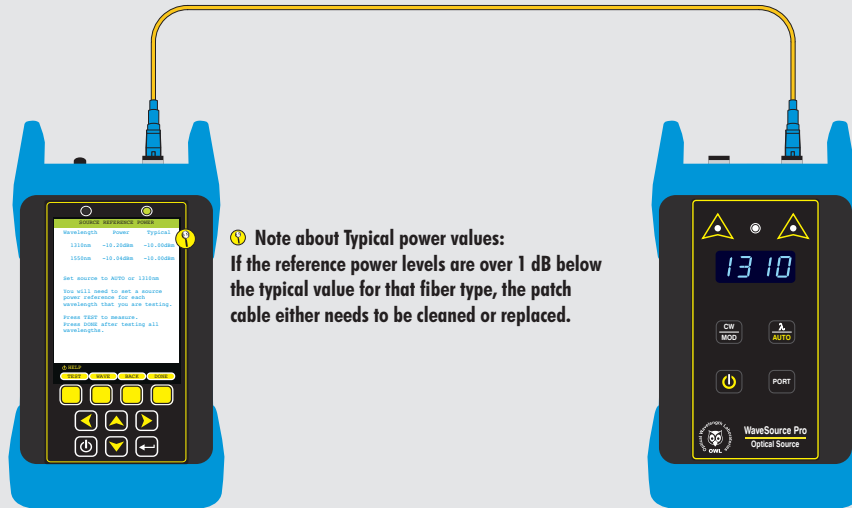
13

Once the WaveSource Pro is set to AUTO mode, press **TEST** on the Fiber OWL 7+ to set the **SOURCE REFERENCE POWER**.



14

After a few seconds, the **SOURCE REFERENCE POWER** will be shown. Press **DONE** to continue.



Note about Typical power values:
If the reference power levels are over 1 dB below the typical value for that fiber type, the patch cable either needs to be cleaned or replaced.

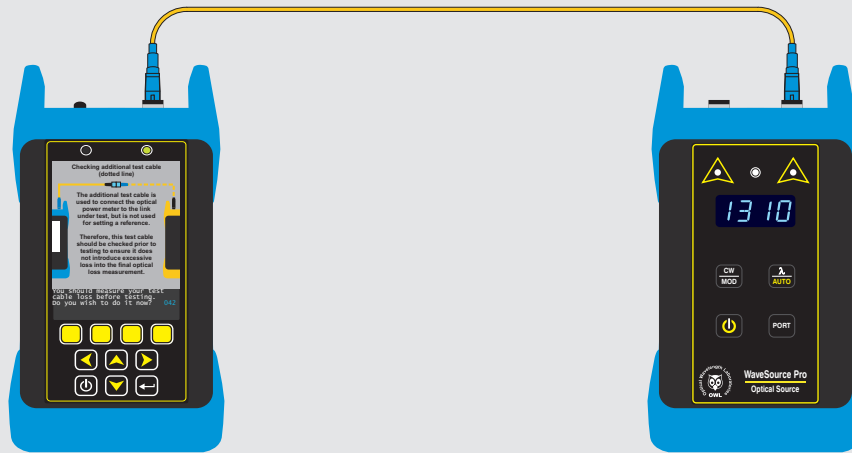
TEST PROCEDURES

LINK WIZARD

STEP 4: SETTING THE REFERENCE, cont.

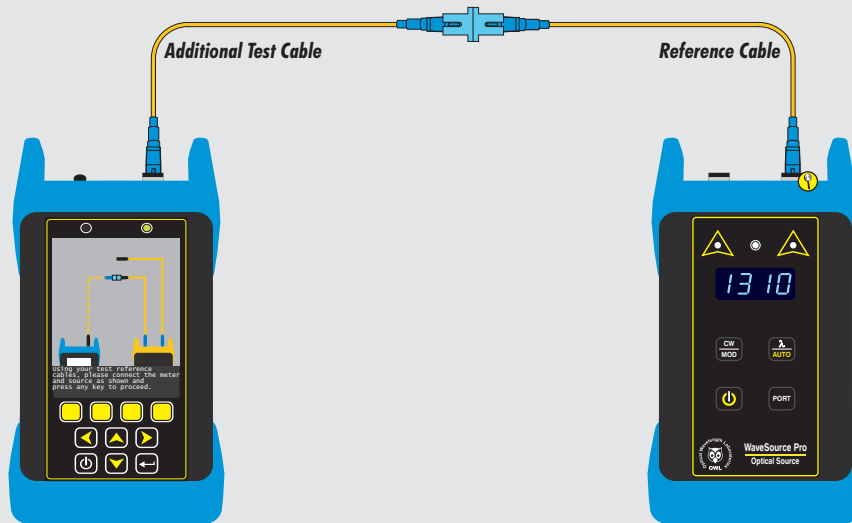
15

This slide explains testing the additional test cable. Press **YES** to continue.



16

Disconnect the reference cable from the OPM port, connect a mating sleeve to the end of the reference cable, then connect the additional test cable (as shown). Press any key to continue.



⚠ Do NOT disconnect the cable from the light source port.

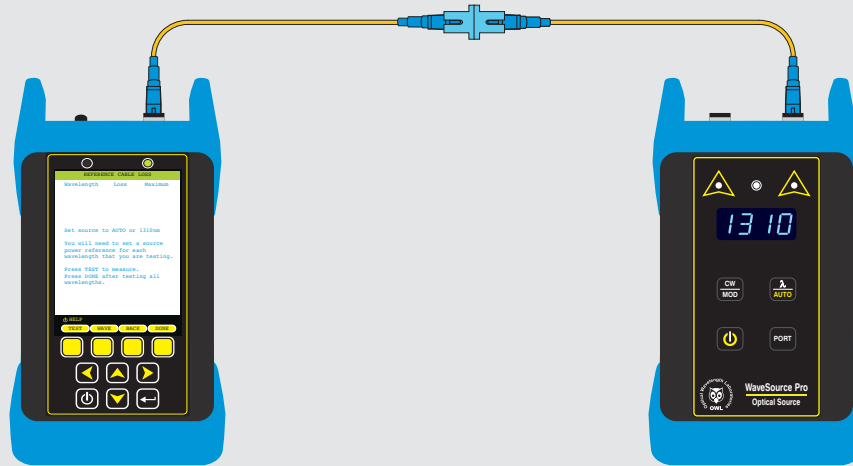
If it becomes disconnected for any reason, the reference will need to be re-set.

TEST PROCEDURES

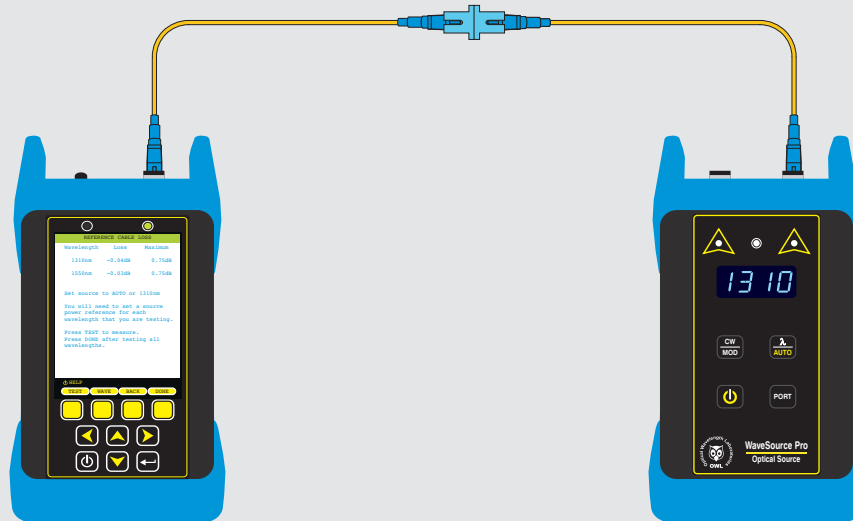
LINK WIZARD

STEP 4: SETTING THE REFERENCE, cont.

17 Press **TEST** to check the loss of the additional cable.



18 After a few seconds, the **REFERENCE CABLE LOSS** will be shown.
(NOTE: If Loss exceeds Maximum, it is recommended to replace the additional test cable and/or mating sleeve.)
Press **DONE** to record the **REFERENCE CABLE LOSS** and continue.



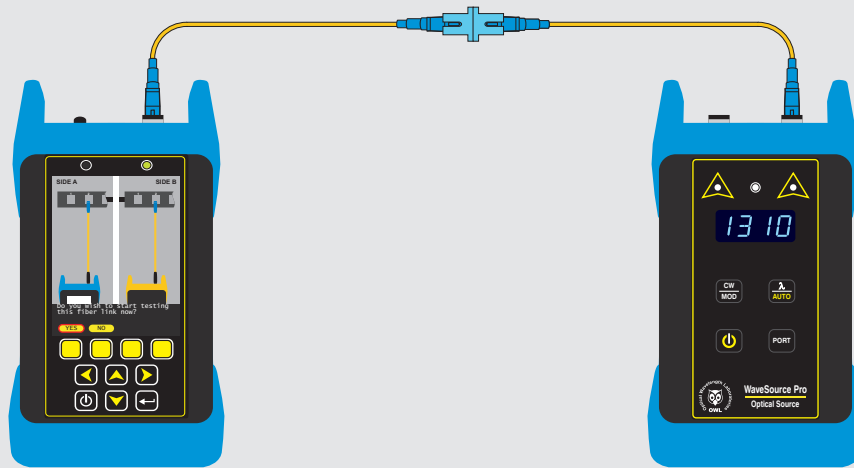
TEST PROCEDURES

LINK WIZARD

STEP 4: SETTING THE REFERENCE, cont.

19

The testers are now ready to take measurements. Press **YES** on the meter to review the reference levels, and begin testing the fiber link at this time.



The **LINK WIZARD** is now complete. To begin testing the fiber link, go to the appropriate section in the manual, based on which **TEST MODE** was selected: **LOSS**, **CERT**, or **FULL**.

TEST PROCEDURES

LOSS MODE

OVERVIEW

LOSS MODE

After a fiber cable has been installed and terminated, optical loss measurements can be used to measure the quality of a fiber link. A comparison between the actual power measurement and the reference value determines how much optical power is lost through the link.

The Fiber OWL 7+ includes a LOSS MODE that measures the end-to-end loss of fiber links, and then stores the test results in the meter. These data can then be downloaded to a PC for later retrieval and report printing.

APPLICATIONS













While in LOSS MODE, users can perform the following tests:

- Optical power/loss measurement

LOSS MODE is indicated at the top of the display.

FUNCTION KEY OPTIONS

Several functions related to LOSS MODE are available via the yellow function button menu located at the bottom of the display.

-  toggle between menu lists
-  take an optical measurement
-  enter the length of the fiber manually (if known)
-  change currently selected wavelength (when source is NOT set to AUTO)
-  save test result
-  set an optical reference
-  change measurement units between dBm (ABS) and dB (REL)
-  edit link information
-  resume testing for a previously stored project
-  view stored test readings
-  switch to SIMPLE OTDR mode (see OTDR section)
-  return to STARTUP MENU



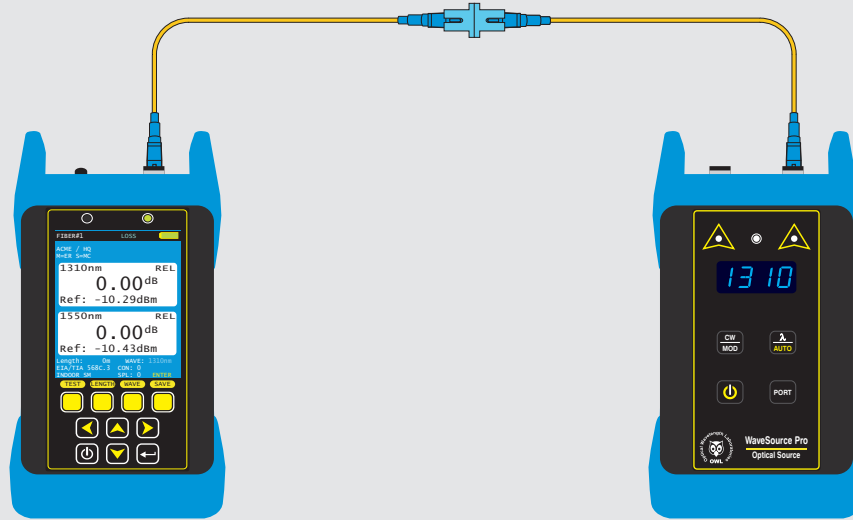
TEST PROCEDURES

LOSS MODE

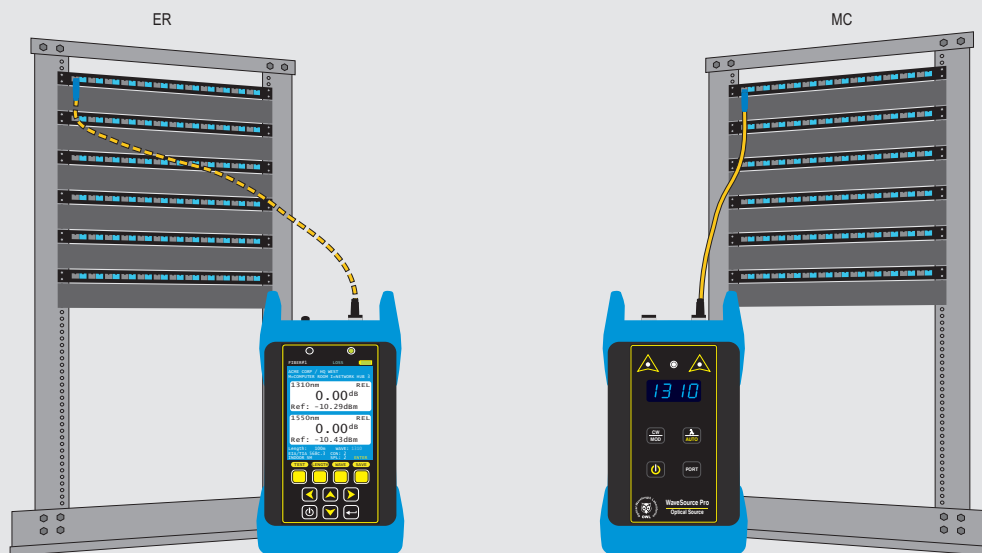
VERIFY REFERENCE LEVELS

THIS IS A CONTINUATION FROM WHERE THE LINK WIZARD LEFT OFF

- 20** Review the testing screen. The REL reference values should be very close to 0.00 dB. This confirms the references were set correctly, and that AUTO mode is functioning properly.



- 21** Connect the meter and source into the first fiber in the link under test as shown, then press TEST.



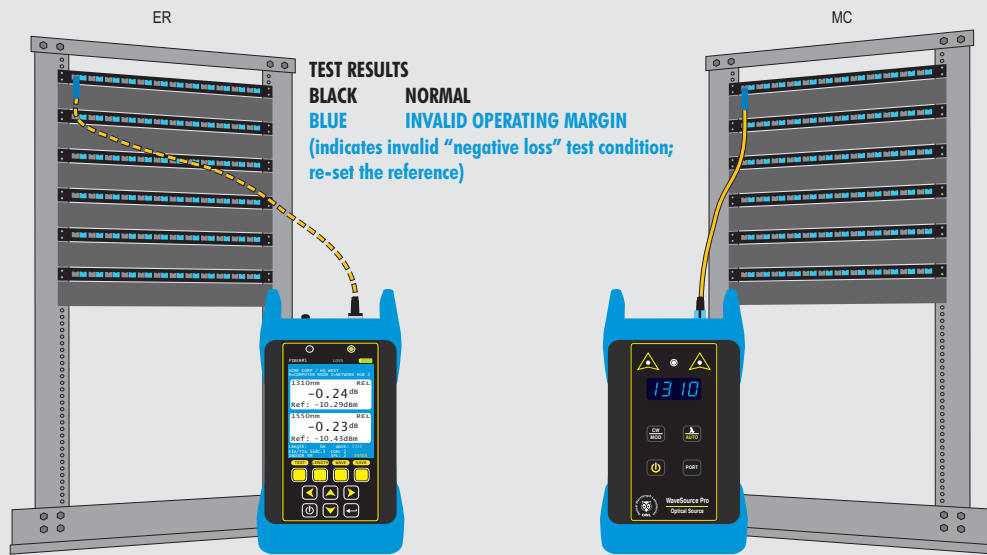
TEST PROCEDURES

LOSS MODE

TAKE READINGS

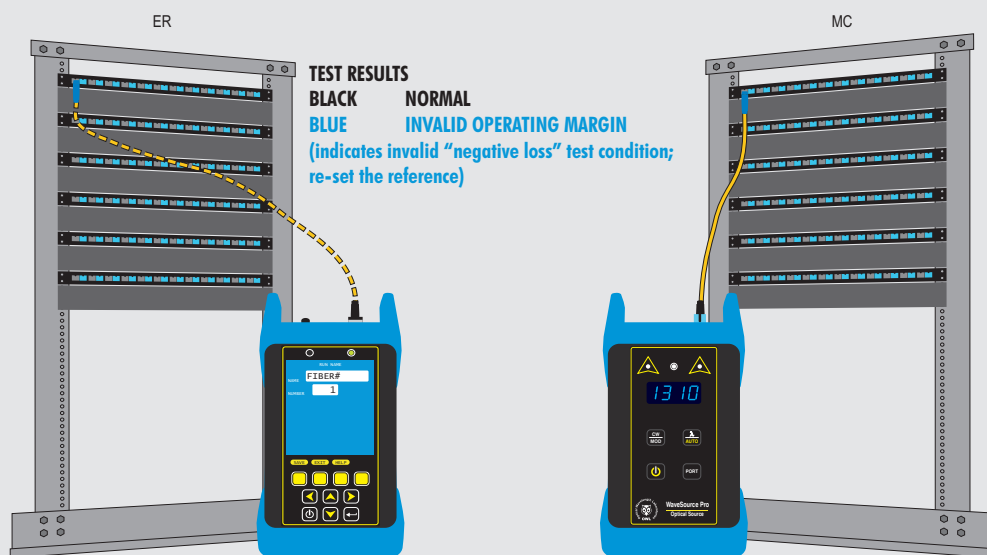
22

After a few seconds, test results for both wavelengths will appear on the screen.



23

To store the test result, press **SAVE**. Then press **SAVE** again at the RUN NAME screen



REPEAT STEPS 21 THROUGH 23 FOR EACH SUBSEQUENT FIBER TO BE TESTED.

TEST PROCEDURES

CERT MODE

OVERVIEW

CERT MODE

After a fiber cable has been installed and terminated, optical loss measurements can be compared to industry cabling standards to ensure the quality of a fiber link. This process is called certification and shows the user a PASS or FAIL reading based the comparison of loss readings to cabling standard requirements.

Fiber link certification is an important process for proving the quality of work done by installers, and gives end users assurance that their network will support the application for which the network was designed.

In addition, link certification is required by cabling system manufacturers when issuing long-term cabling system warranties.

The Fiber OWL 7+ includes a CERT MODE that certifies fiber links against a myriad of national and international cabling standards, such as the TIA-568. Stored data is downloaded to a PC for later retrieval and report printing.

APPLICATIONS













While in CERT MODE, users can perform the following tests:

- Tier 1 certification (i.e. PASS/FAIL)

CERT MODE is indicated at the top of the display.

FUNCTION KEY OPTIONS

Several functions related to CERT MODE are available via the yellow function button menu located at the bottom of the display.

-  toggle between menu lists
-  take an optical measurement
-  enter the length of the fiber manually (if known)
-  change currently selected wavelength (when source is NOT set to AUTO)
-  save test result
-  set an optical reference
-  change measurement units between dBm (ABS) and dB (REL)
-  edit link information
-  resume testing for a previously stored project
-  view stored test readings
-  switch to SIMPLE OTDR mode (see OTDR section)
-  return to STARTUP MENU



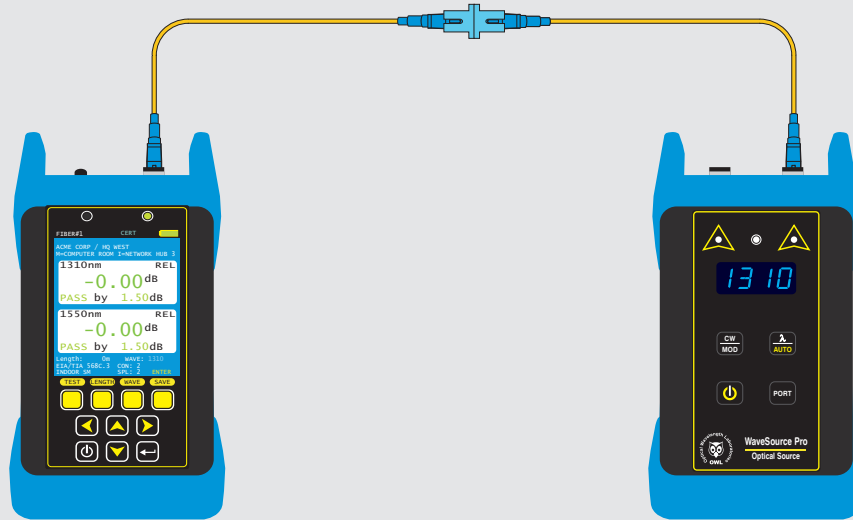
TEST PROCEDURES

CERT MODE

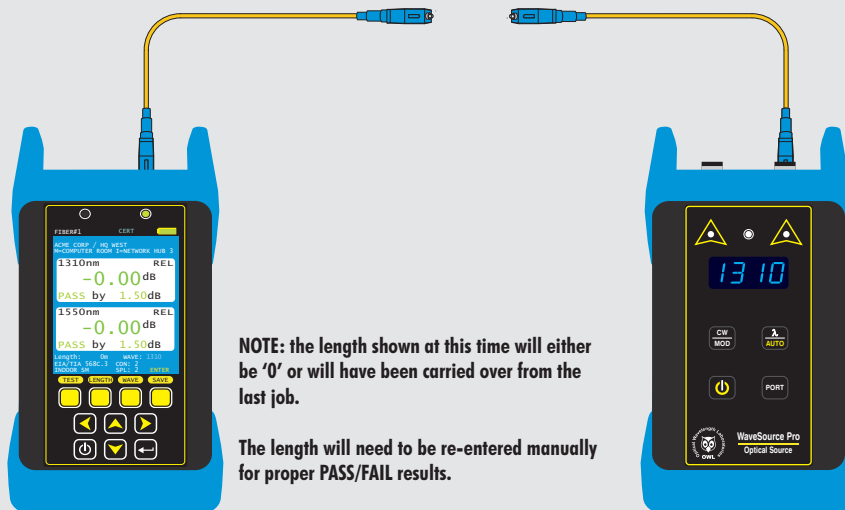
TAKE UNITS TO THEIR ASSIGNED LOCATIONS

THIS IS A CONTINUATION FROM WHERE THE LINK WIZARD LEFT OFF

- 20** Review the testing screen. The REL reference values should be very close to 0.00 dB. This confirms the references were set correctly, and that AUTO mode is functioning properly.



- 21** Remove the mating sleeve from between the reference cable and test cable.

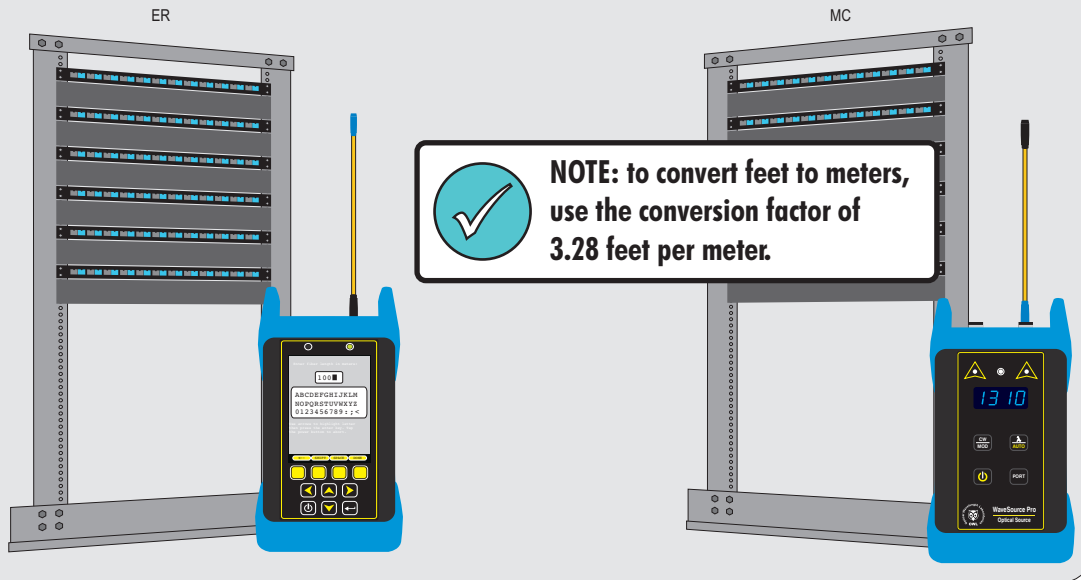


TEST PROCEDURES

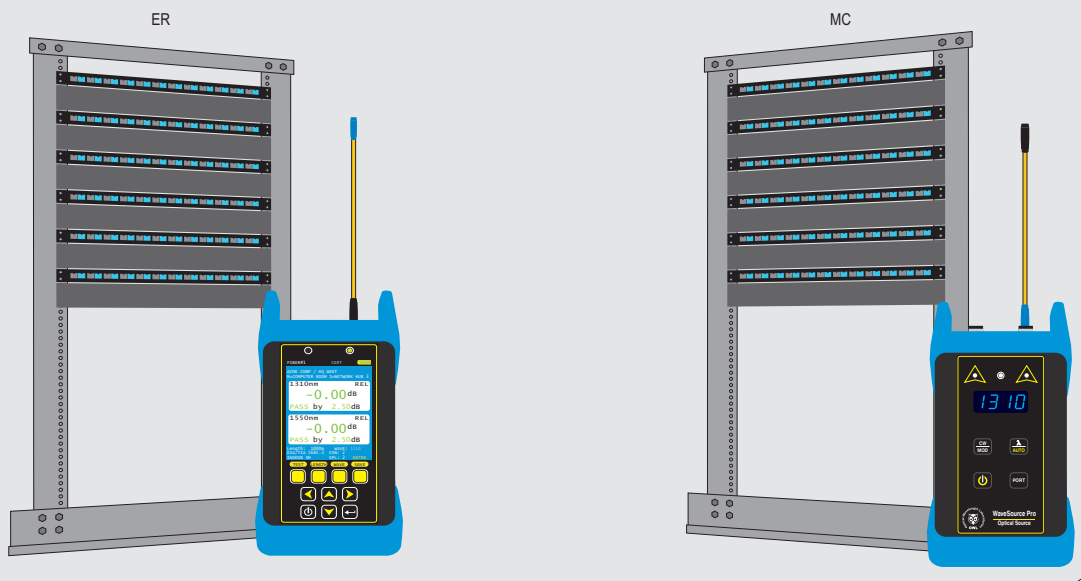
CERT MODE

ENTER THE LINK LENGTH

- 22** On the meter, press **LENGTH**. Enter the length in meters using the keypad that appears, then press **DONE**.



- 23** The link budget will be adjusted (based on the cabling standard) to accommodate the fiber length.

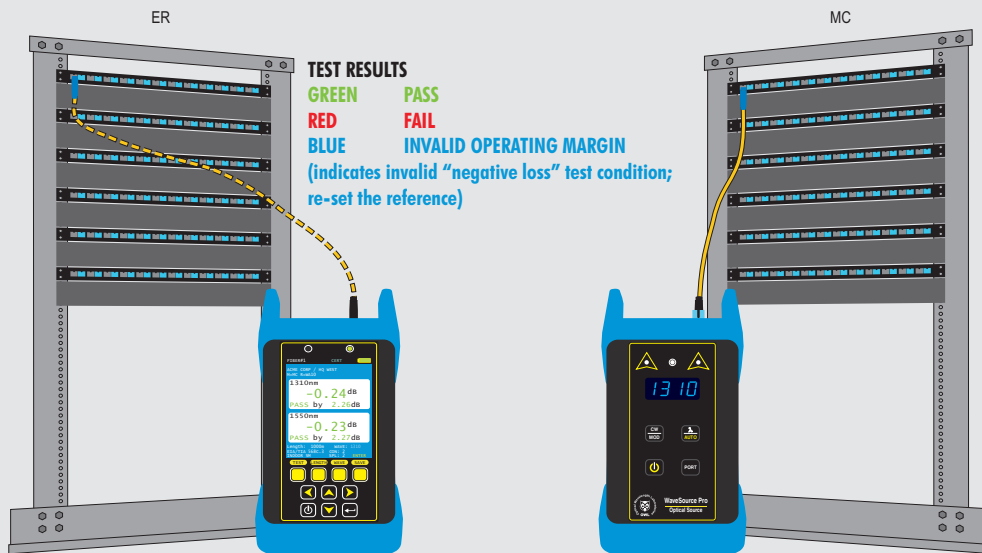


TEST PROCEDURES

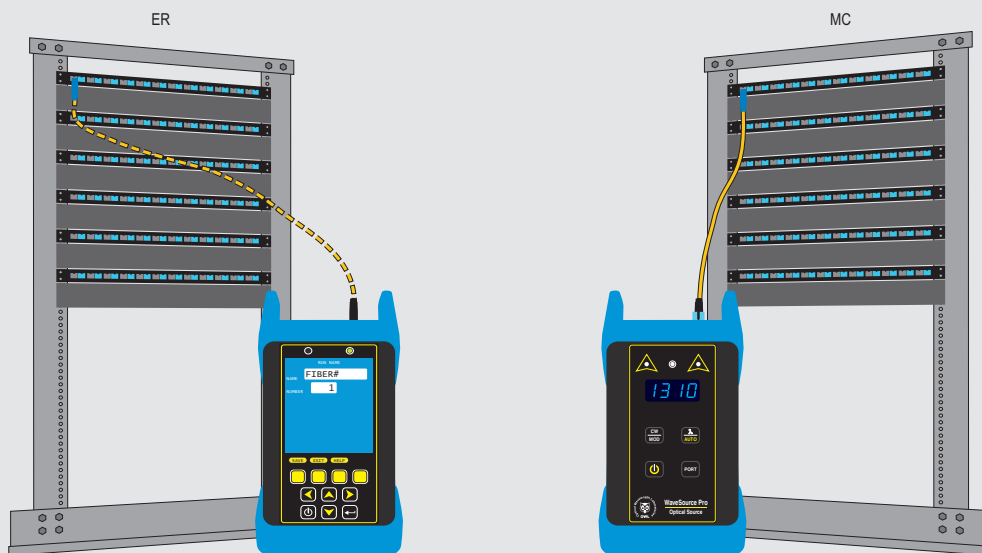
CERT MODE

TAKE READINGS AND STORE TEST RESULTS

- 24** Connect the meter and source into the first fiber in the link under test as shown, then press **TEST**. After a few seconds, the test reading(s) will appear on the screen.



- 25** Press **SAVE** to store the test result, then **SAVE** again at the RUN NAME screen (run name can be changed if necessary).



REPEAT STEPS 24 THROUGH 25 FOR EACH SUBSEQUENT FIBER TO BE TESTED. THE USER MAY BE PROMPTED TO RE-ENTER THE LENGTH FOR EACH SUBSEQUENT TEST.

TEST PROCEDURES

FULL MODE

OVERVIEW

FULL MODE (A.K.A. "TIER 2 CERTIFICATION")

After a fiber cable has been installed and terminated, optical loss measurements can be compared to industry cabling standards to ensure the quality of a fiber link. This process is called certification and shows the user a PASS or FAIL reading based the comparison of loss readings to cabling standard requirements.

Fiber link certification is an important process for proving the quality of work done by installers, and gives end users assurance that their network will support the application for which the network was designed.

In addition, link certification is required by cabling system manufacturers when issuing long-term cabling system warranties.

FULL MODE certifies fiber links against a myriad of national and international cabling standards, such as the TIA-568, where OTDR measurements are also required. Stored data is downloaded to a PC for later retrieval and report printing.

APPLICATIONS













While in FULL MODE, users can perform the following tests:

- Tier 2 certification (i.e. PASS/FAIL and OTDR measurements)

FULL MODE is indicated at the top of the display.

FUNCTION KEY OPTIONS

Several functions related to LOSS MODE are available via the yellow function button menu located at the bottom of the display.

-  toggle between menu lists
-  take an optical measurement
-  enter the length of the fiber manually (if known)
-  change currently selected wavelength (when source is NOT set to AUTO)
-  save test result
-  set an optical reference
-  change measurement units between dBm (ABS) and dB (REL)
-  edit link information
-  resume testing for a previously stored project
-  view stored test readings
-  switch to SIMPLE OTDR mode (see OTDR section)
-  return to STARTUP MENU



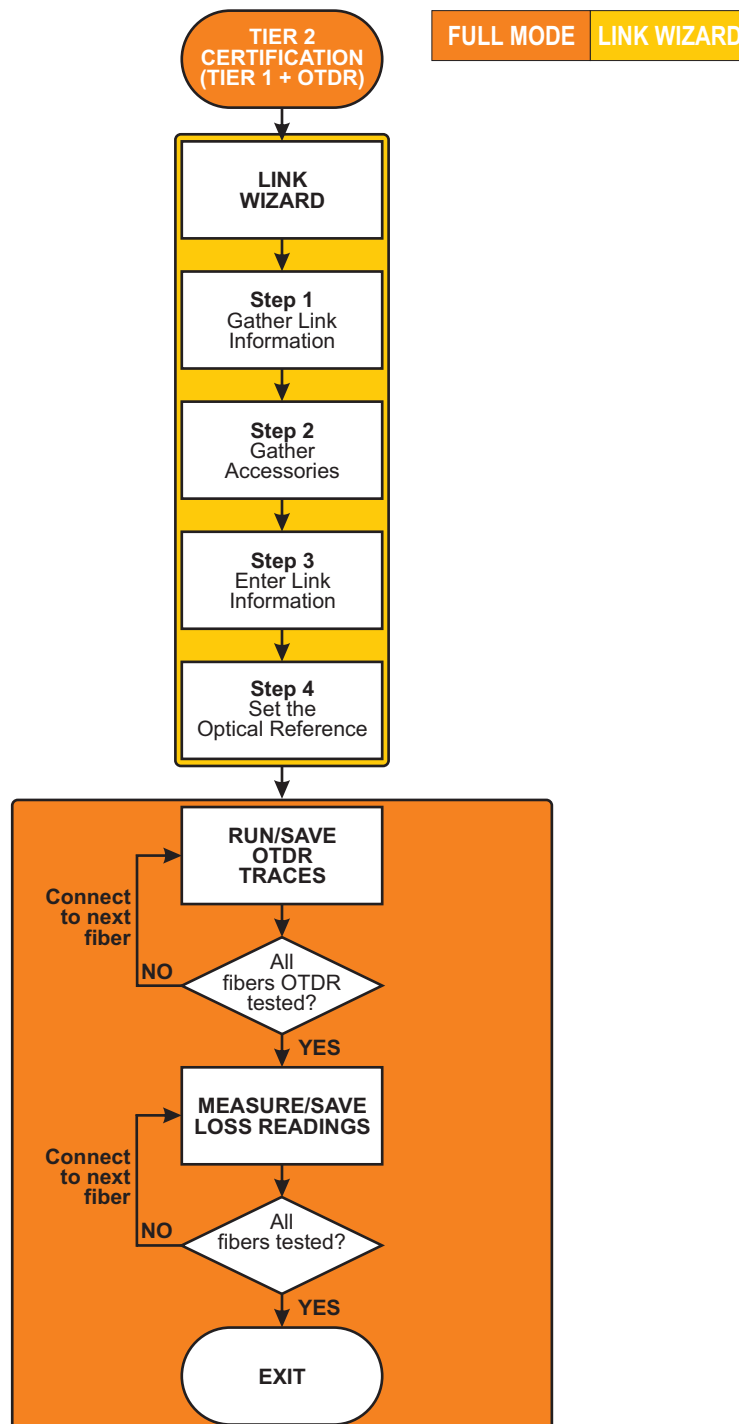
TEST PROCEDURES

FULL MODE

PROCESS FLOW

Since FULL mode integrates two key types of fiber measurements – OTDR and PASS/FAIL – it is important to follow a specific process in order to ensure the PASS/FAIL results associate with their corresponding OTDR results.

Below is a helpful diagram showing the basic process flow of FULL MODE:



TEST PROCEDURES

FULL MODE

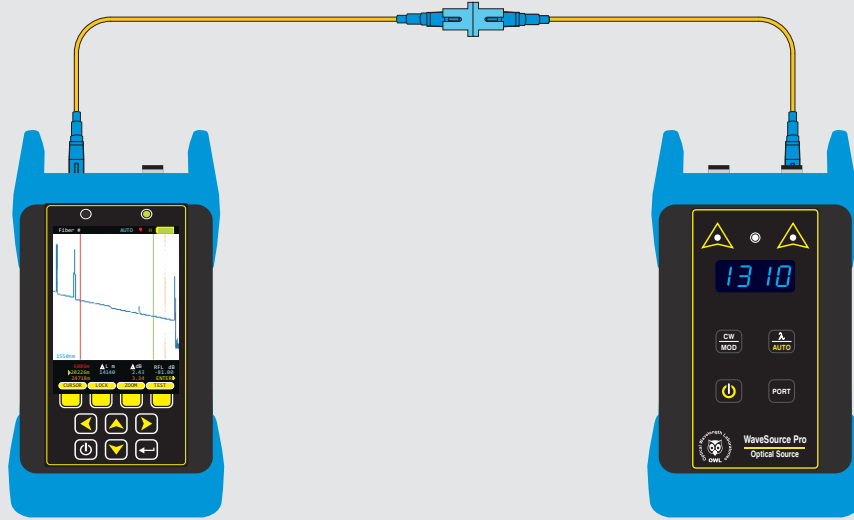
TAKE UNITS TO THEIR ASSIGNED LOCATIONS

THIS IS A CONTINUATION FROM WHERE THE LINK WIZARD LEFT OFF

20

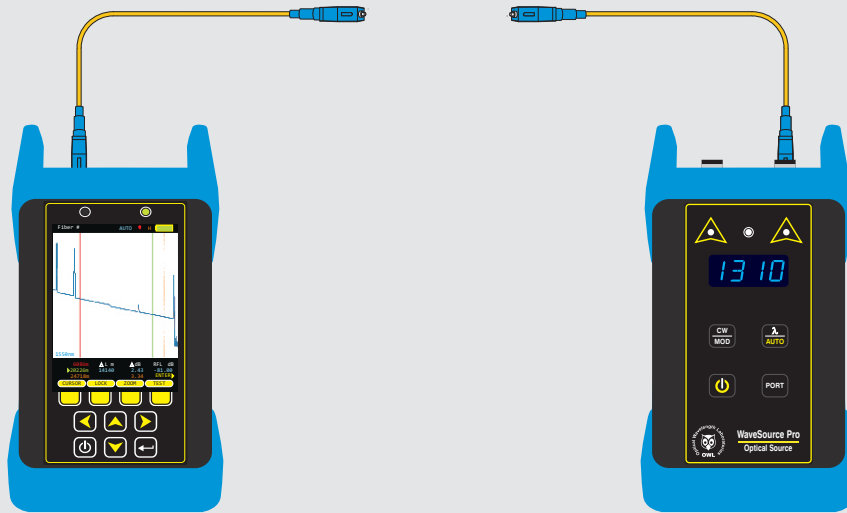
The screen should automatically advance to the OTDR screen.

NOTE: any OTDR trace on the screen would have been stored from a previous test.



21

Remove the mating sleeve from between the reference cable and test cable. Leave these cables attached to their respective ports.



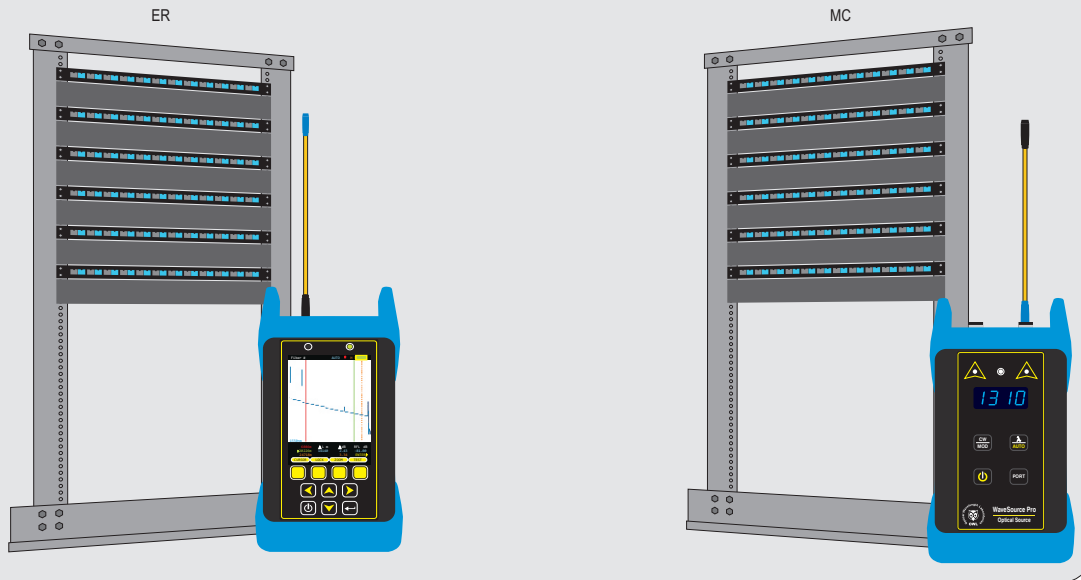
TEST PROCEDURES

FULL MODE

OTDR MEASUREMENTS

22

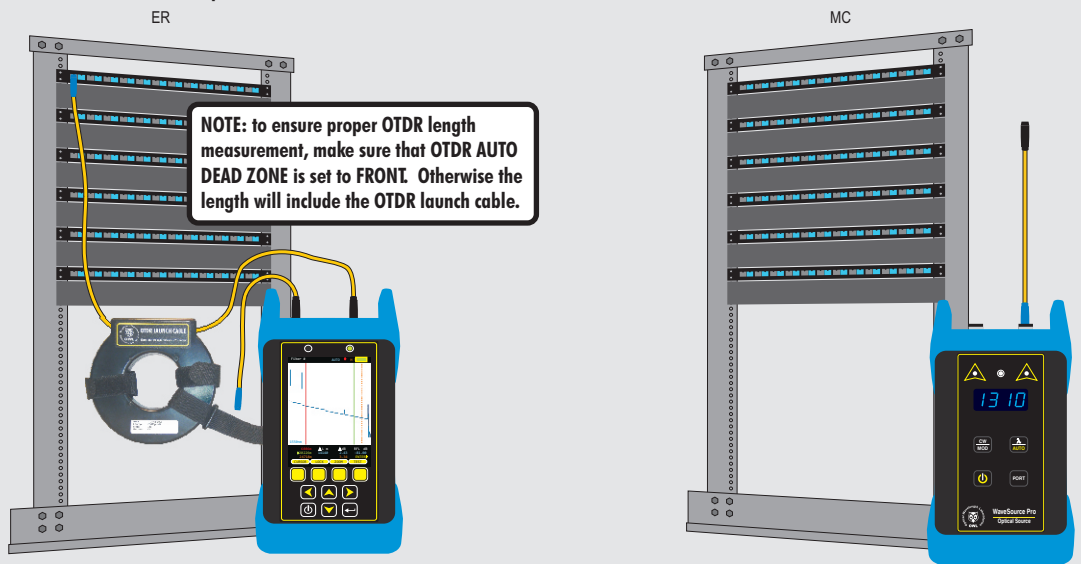
Take both units to their respective locations, according to the link setup.



23

Using an appropriate OTDR launch cable, connect the OTDR port to the first fiber to test.

NOTE: changes to OTDR settings should be made at this time (see OTDR MODE). To resume testing, go to STARTUP MENU > CERTIFICATION MENU, and select the RESUME TESTING option.



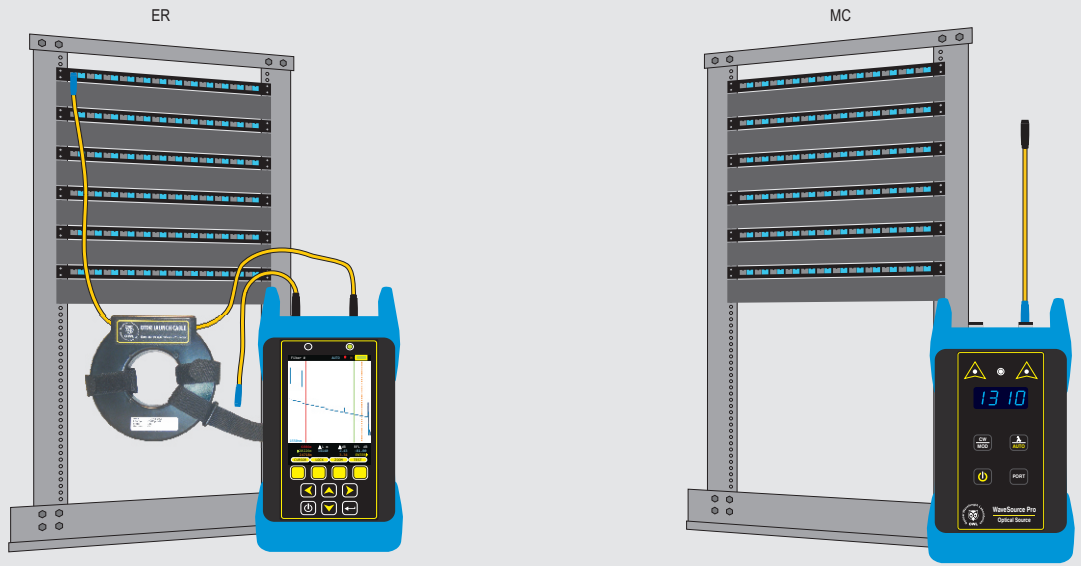
TEST PROCEDURES

FULL MODE

OTDR MEASUREMENTS

24

Press **TEST** to begin the OTDR trace. Test duration may vary based on settings and the link length.

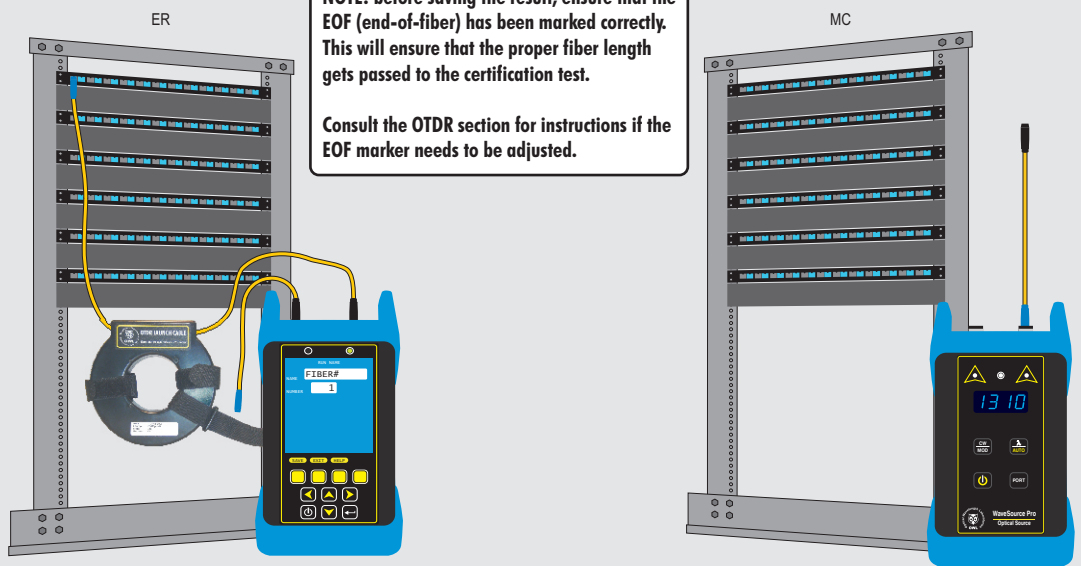


25

Once the OTDR trace is completed, press **SAVE** to save the trace, and rename the fiber if necessary.

NOTE: before saving the result, ensure that the EOF (end-of-fiber) has been marked correctly. This will ensure that the proper fiber length gets passed to the certification test.

Consult the OTDR section for instructions if the EOF marker needs to be adjusted.



REPEAT STEPS 23 THROUGH 25 FOR EACH SUBSEQUENT FIBER TO BE OTDR TESTED.

WHEN ALL FIBERS IN THE LINK HAVE THEIR CORRESPONDING OTDR TRACE, REMOVE THE FIBER RING AND MOVE ON TO THE NEXT STEP TO BEGIN THE CERTIFICATION TEST.

TEST PROCEDURES

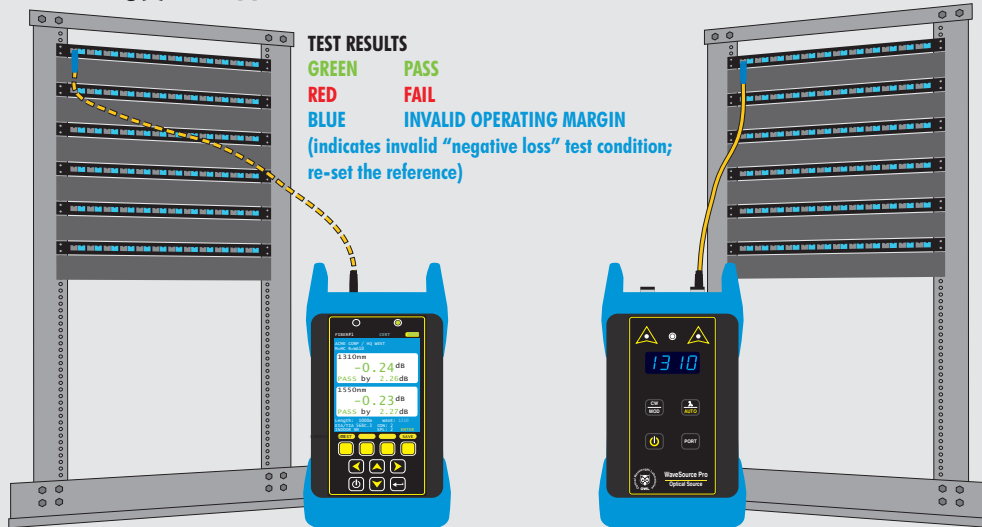
FULL MODE

TAKE READINGS AND STORE TEST RESULTS

DO NOT PROCEED TO THIS STEP UNTIL ALL FIBERS HAVE BEEN OTDR TESTED

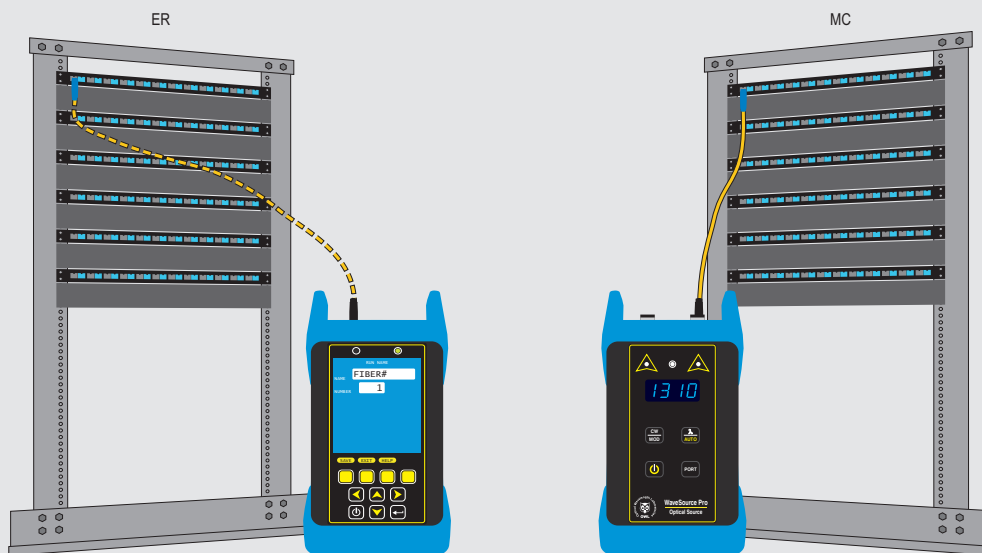
26

Connect the meter and source into the first fiber in the link under test as shown, then press **TEST**. The meter will show the fiber length from the associated OTDR result. After confirming the length, the test reading(s) will appear on the screen after a few seconds.



27

Press **SAVE** to store the test result, then **SAVE** again at the RUN NAME screen (run name can be changed if necessary).



REPEAT STEPS 26 THROUGH 27 FOR EACH SUBSEQUENT FIBER TO BE TESTED.

THE USER MAY BE PROMPTED TO RE-ENTER THE LENGTH FOR EACH SUBSEQUENT TEST.

TEST PROCEDURES

CREATING A TRI-REPORT

OVERVIEW

Tri-report. Sooner or later, technicians will be required to provide their clients with comprehensive certification reports that include standards-based link certification results, OTDR traces and events, and fiber endface analysis.

OWLView software gathers together all three of these critical data and formats them onto one single-page “TRI-report” (similar to the one shown here).

Link certification provides clients with a PASS/FAIL test result, ensuring that fiber links are installed and tested according to popular industry standards, including TIA-568 and various levels of Ethernet.

When used with a corresponding light source, Fiber OWL 7+ certifiers allow users to certify multimode and/or singlemode optical fiber links.

Many clients are also requesting **OTDR traces** for the purpose of “link characterization”; i.e. a visual “roadmap” of the fiber link. OTDR traces include a graphical representation of the fiber link that shows the different “events” in the fiber link including patch panels, and event tables show the relative loss of individual events.

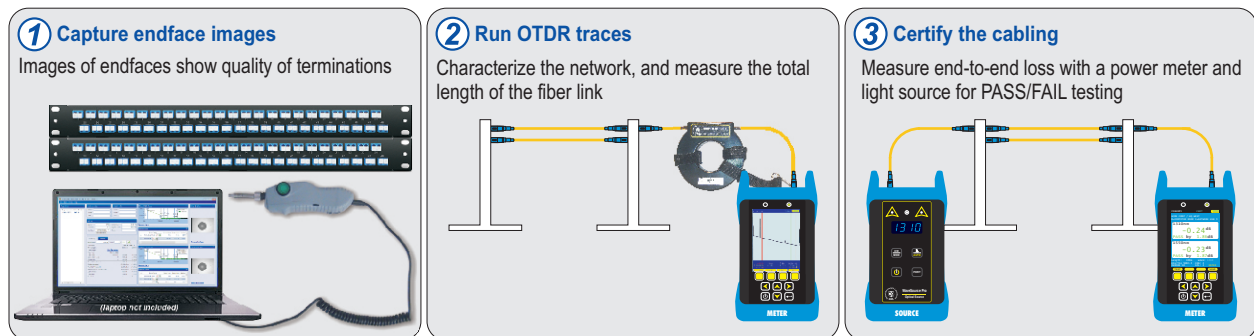
OWLView software allows users to import OTDR traces taken with Fiber OWL 7+ certification meters, and appends the traces to the link certification report.

Clients are also interested in seeing the quality of their fiber endfaces at the time of testing. **Endface analysis** digitally inspects a fiber endface image for scratches and defects that may adversely affect data transmission.

OWLView software includes PASS/FAIL endface analysis based on the popular IEC 63500-3-35 endface inspection standard, and can analyze JPG endface images taken with any fiber videoscope.

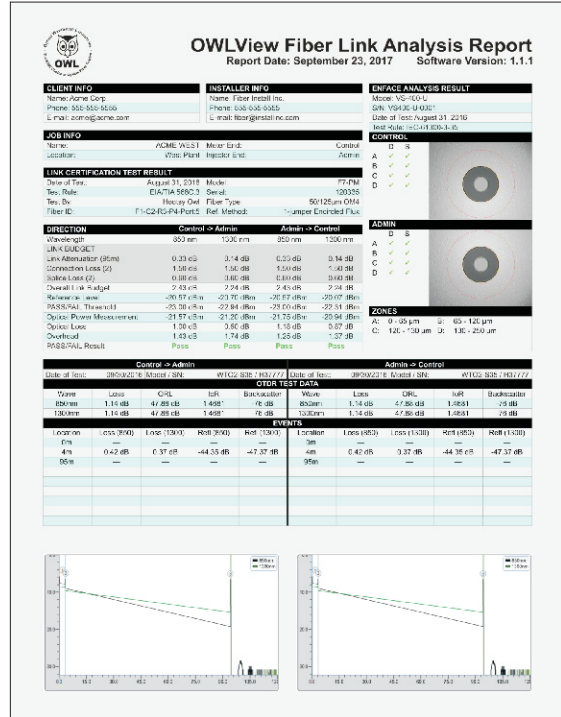
CREATING A TRI-REPORT

Creating a tri-report is a simple three step process. The recommended order of operations is as follows:



Once all of the information has been gathered, OWLView software integrates the data into a single report.

This section will cover how to use OWLView to create a TRI-report.



TEST PROCEDURES

CREATING A TRI-REPORT

GATHERING TEST DATA

STEP 1 – CAPTURE ENDFACE IMAGES

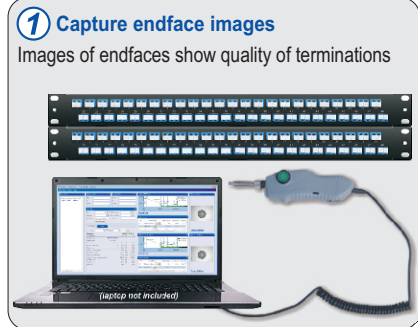
Fiber endfaces must be inspected separately by a fiber videoscope capable of:

- capturing endface images in either **.JPG** or **.BMP** format, and
- downloading the images to a PC.

NOTE: Videoscopes are available for purchase from OWL, but any vendor's videoscope can be used.

HELPFUL TIPS TO STAY ORGANIZED

- inspect the fiber ends in the same order as the fibers will be tested
- name the endface images similarly to the fibers to be tested
- store the images on the PC in an easy location to remember



STEP 2 – RUN OTDR TRACES

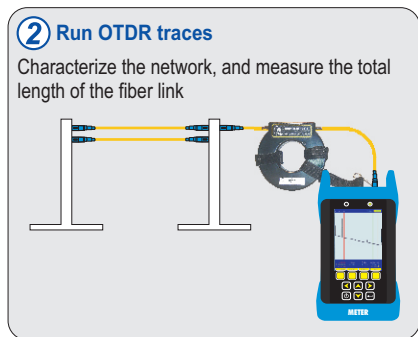
Run OTDR tests to characterize the network and measure the total length of the fiber link.

NOTE: OTDR traces are required for Tier 2 certification

For questions about testing fibers with the OTDR, see the OTDR MODE section.

In FULL MODE, OTDR traces are taken as a part of the process.

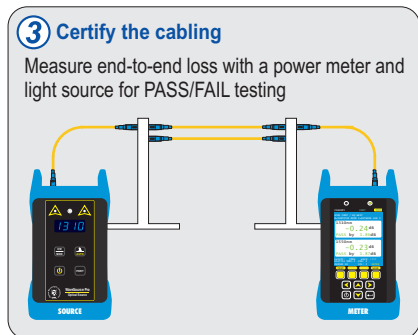
In CERT MODE, OTDR traces must be acquired separately.



STEP 3 – CERTIFY THE CABLING

Measure the end-to-end loss with a power meter and light source for PASS/FAIL testing (also referred to as Tier 1 certification).

Cable certification can be done with either CERT or FULL mode.



TEST PROCEDURES

CREATING A TRI-REPORT

USING OWLVIEW SOFTWARE

INSTALL OWLVIEW SOFTWARE

To produce TRI-reports, OWLView software must be installed on a PC. OWLView software can be installed from the supplied USB flash drive, or downloaded from OWLs website at:

<http://www.owl-inc.com/literature/sub/htm/owlview.htm>

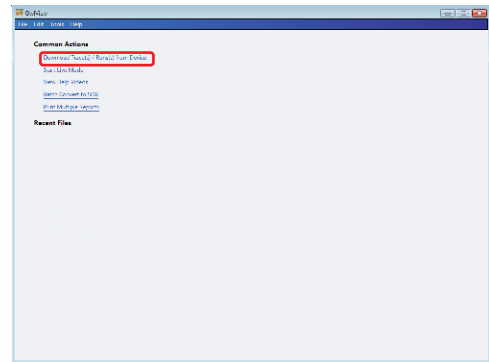
Installing the software also installs the necessary USB drivers onto the PC.

Once installed, OWLView software can be launched either from the desktop shortcut, or through the OWLView shortcut located in START > OWL > OWLVIEW.

DOWNLOAD TEST RESULTS

Connect the Fiber OWL 7+ power meter via the supplied USB cable, and power on the device.

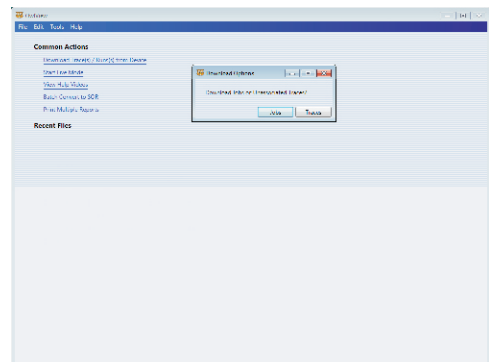
Click “Download Trace(s) / Run(s) from Device” to initiate the download.



From the “Download Options” dialog box, click “Jobs”

NOTE: if the dialog box does not appear, either try connecting to a different USB port, or re-install OWLView software.

NOTE: OWLView software can also be used for OTDR trace analysis by clicking “Traces”.



TEST PROCEDURES

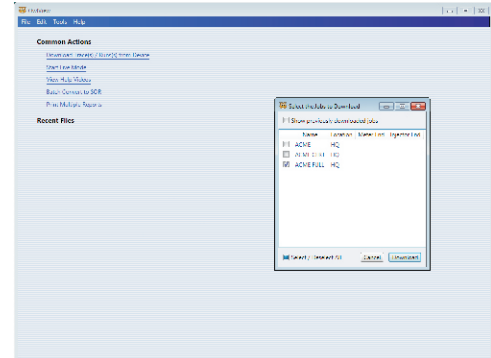
CREATING A TRI-REPORT

USING OWLVIEW SOFTWARE

A list of jobs (projects) stored in the device will appear.

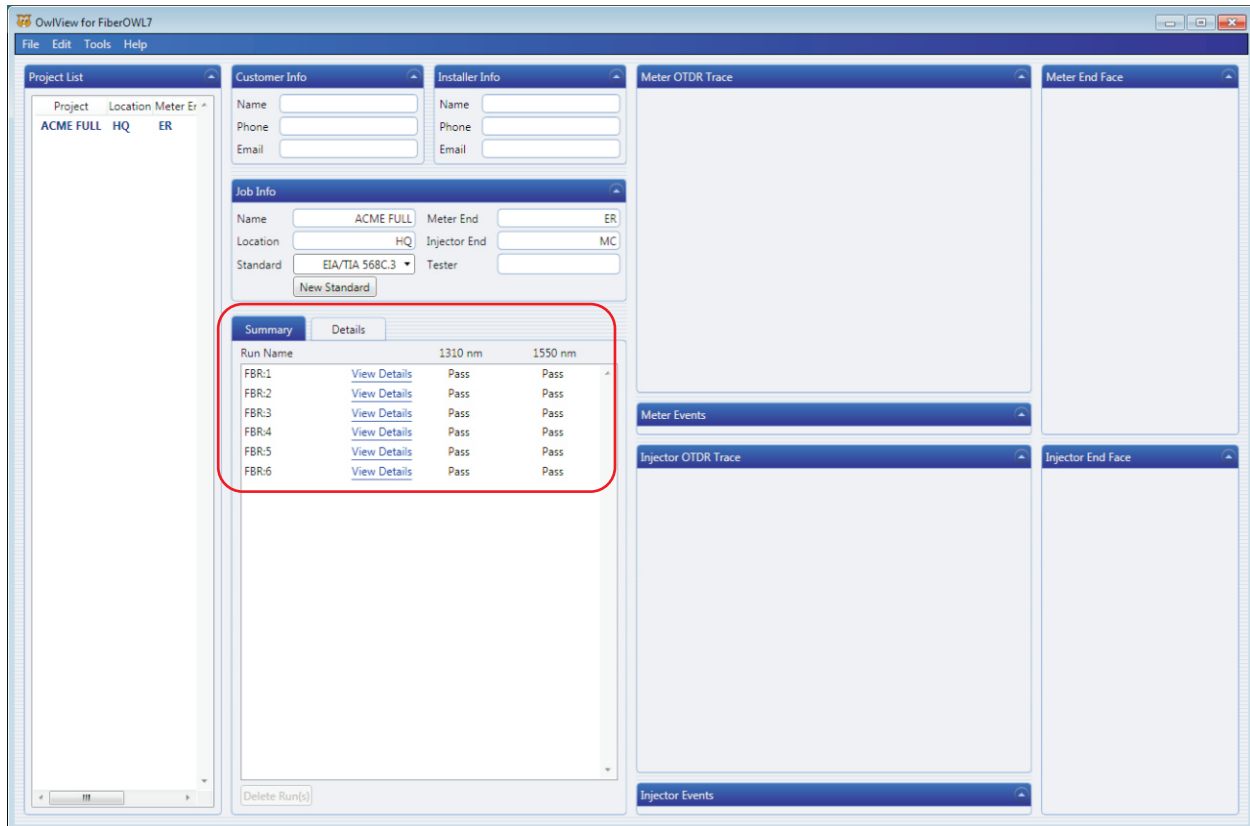
Select the job(s) to download, then click “Download”.

In this example, the job called ACME FULL will be selected.



SUMMARY VIEW

The job initially is displayed in Summary view, which displays basic PASS / FAIL results.



NOTE: the Job Info section is populated with link information entered during the LINK WIZARD.

Optional project-related information can be entered:

Customer Info: Company Name / Phone Number / E-mail address

Installer Info: Installer Company / Phone Number / E-mail address

Tester (in Job Info): Name of the technician performing the test

TEST PROCEDURES

CREATING A TRI-REPORT

USING OWLVIEW SOFTWARE

DETAIL VIEW

Click the Detail tab to switch to Detail View. Detail View shows detailed information about the link test results, including key information such as link budget information, dB loss readings, and overhead.

FULL MODE tests will automatically load associated OTDR traces (shown here in this example).

CERT MODE tests will require the user to import traces manually.

The screenshot displays the OwlView for FiberOWL7 software interface. The main window is divided into several sections:

- Project List:** A table with columns for Project, Location, Meter, and Er. The entry 'ACME FULL HQ ER' is selected.
- Customer Info:** Fields for Name, Phone, and Email.
- Installer Info:** Fields for Name, Phone, and Email.
- Job Info:** Fields for Name (ACME FULL), Location (HQ), Standard (EIA/TIA 568C.3), Meter End (ER), and Injector End (MC). A 'New Standard' button is also present.
- Summary/Details:** A tabbed interface showing test parameters. The 'Details' tab is active, displaying a table of link parameters for a 1.00 km Indoor SM fiber link.
- Meter OTDR Trace:** A graph showing the OTDR trace for the 1310 nm test. The y-axis represents power in dB, and the x-axis represents distance in meters. A 'Remove Trace' button is located below the graph.
- Meter Events:** A table listing detected events. One event is shown: 'Reflective Start' at -2 m, with a reflectivity of -47.93 dB and a loss coefficient (Lc) of -1.2.
- Injector OTDR Trace:** A section for manual trace import, including an 'Import Trace' button.
- Injector Events:** A section for manual event import, including an 'Import End Face' button.

Direction	Wavelength	Link Parameters	1310 nm	1550 nm
Link Budget				
Fiber Type		Indoor SM		
Fiber Loss	1.00 km		1.00 dB	1.00 dB
Connection Loss	2		1.50 dB	1.50 dB
Splice Loss	0		0.00 dB	0.00 dB
Overall Link Budget			2.50 dB	2.50 dB
Reference Level			-10.31 dBm	-10.34 dBm
Pass/Fail Threshold			-12.81 dBm	-12.84 dBm
Optical Power Measurement			-10.98 dBm	-10.87 dBm
Optical Loss			0.67 dB	0.53 dB
Overhead			1.83 dB	1.97 dB
Pass/Fail			Pass	Pass

TEST PROCEDURES

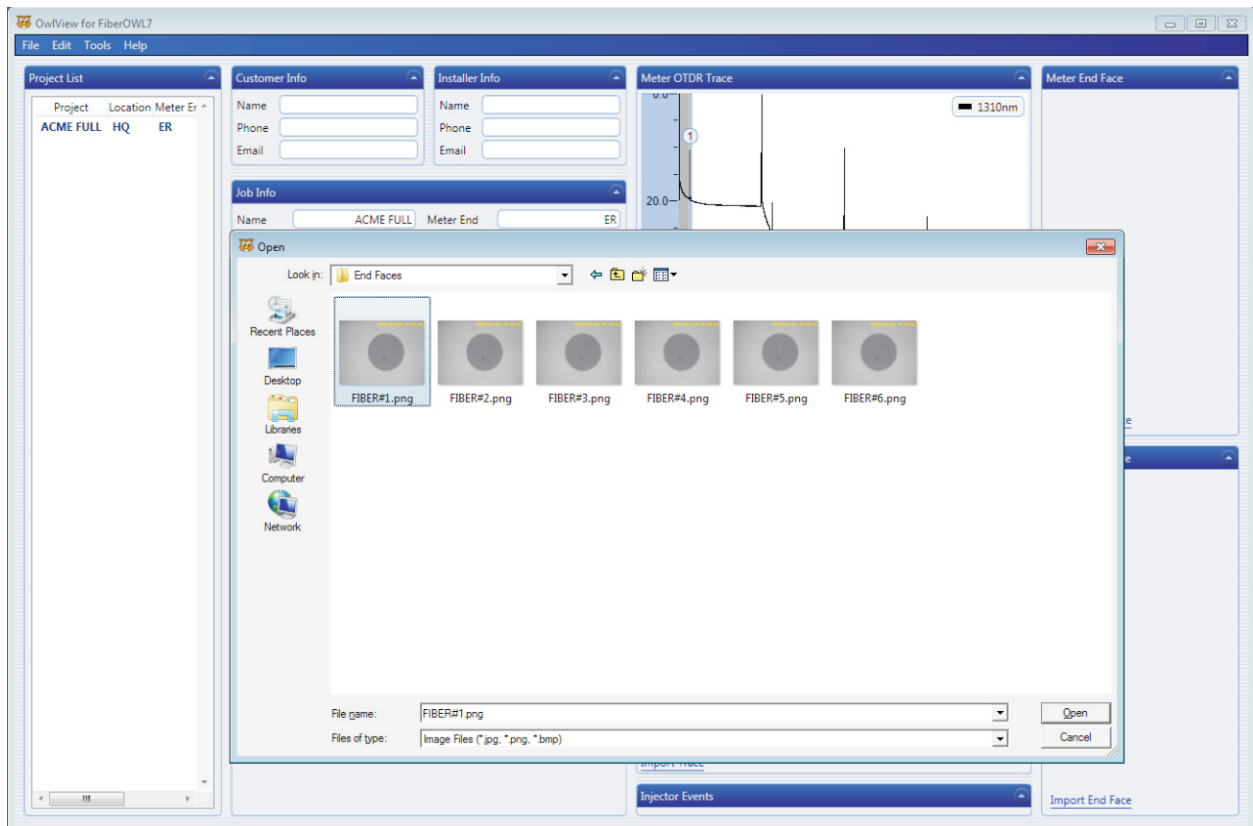
CREATING A TRI-REPORT

USING OWLVIEW SOFTWARE

IMPORT ENDFACE IMAGES

To import endface images, click “Import End Face” next to the OTDR trace.

Browse to the folder where the endface images are stored, click the image to import, then click “Open”.



TEST PROCEDURES

CREATING A TRI-REPORT

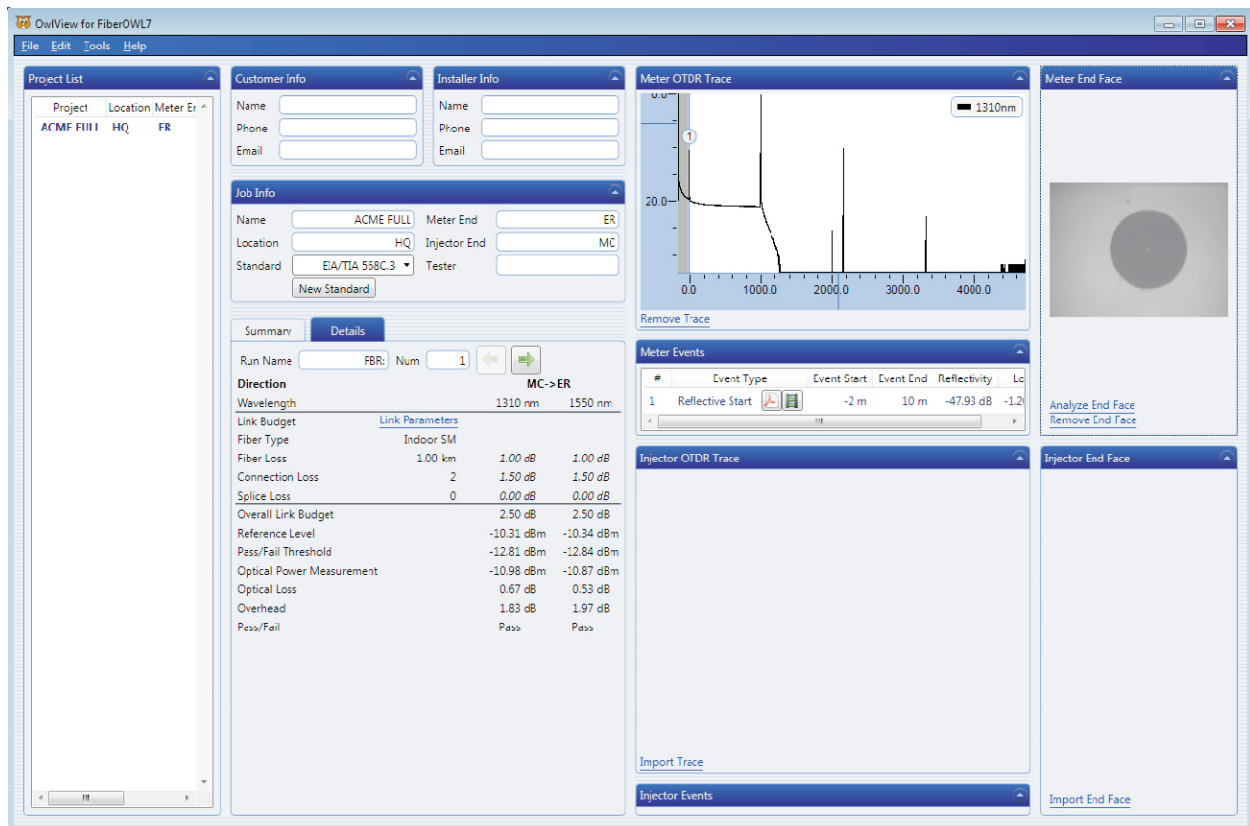
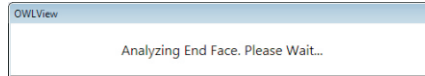
USING OWLVIEW SOFTWARE

ANALYZE ENDFACE IMAGES

To analyze the endface image, click “Analyze End Face” next to the OTDR trace.

NOTE: the Fiber OWL 7+ must be connected and powered on to enable endface analysis.

During endface analysis, a message box will appear.



The screenshot shows the OwlView for FiberOWL7 software interface. The window title is "OwlView for FiberOWL7". The interface is divided into several panes:

- Project List:** A table with columns "Project", "Location", "Meter", and "Er". One entry is visible: "ACMF FIII HQ FR".
- Customer Info:** Fields for Name, Phone, and Email.
- Installer Info:** Fields for Name, Phone, and Email.
- Job Info:** Fields for Name (ACME FULL), Location (HQ), Standard (EA/TIA 558C.3), Meter End (ER), and Injector End (MC). A "New Standard" button is also present.
- Summary/Details:** A table showing link parameters for MC->ER at 1310 nm and 1550 nm. The "Details" tab is active.
- Meter OTDR Trace:** A graph showing OTDR trace data. A "Remove Trace" button is below it.
- Meter Events:** A table with columns "#", "Event Type", "Event Start", "Event End", "Reflectivity", and "Lc". One event is listed: "1 Reflective Start -2 m 10 m -47.93 dB -1.2".
- Meter End Face:** A placeholder for an endface image. Buttons "Analyze End Face" and "Remove End Face" are at the bottom.
- Injector OTDR Trace:** A placeholder for an injector OTDR trace. An "Import Trace" button is below it.
- Injector End Face:** A placeholder for an injector endface image. An "Import End Face" button is below it.

TEST PROCEDURES

CREATING A TRI-REPORT

USING OWLVIEW SOFTWARE

ANALYZE ENDFACE IMAGES

Once endface analysis is complete, information will appear about the quality of the endface based on the IEC-61300-3-35 endface analysis standard definition of defects and scratches.



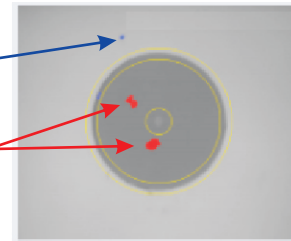
PASS



FAIL

non-fail defect

fail defects



The screenshot displays the OwlView for FiberOWL7 software interface. The main window is divided into several panes:

- Project List:** Shows a table with columns for Project, Location, Meter, and Er. The entry 'ACMF FULL HQ FR' is selected.
- Customer Info:** Fields for Name, Phone, and Email.
- Installer Info:** Fields for Name, Phone, and Email.
- Job Info:** Fields for Name (ACME FULL), Location (HQ), Meter End (ER), and Injector End (MC). A 'Tester' field is also present.
- Summary:** A table showing test results for 'MC->ER' at 1310 nm and 1550 nm. The 'Pass/Fail' status is 'Pass' for both wavelengths.
- Meter OTDR Trace:** A graph showing the OTDR trace for 1310 nm. A 'Reflective Start' event is marked at -2 m with a reflectivity of -47.93 dB.
- Meter End Face:** Shows the test rule 'IEC-91300-3-35' and a table of defects and scratches. The table shows 'Defects' and 'Scratches' for zones A, B, C, and D, all marked as 'Pass'.
- Injector OTDR Trace:** A blank area for the injector trace.
- Injector End Face:** A blank area for the injector endface image.

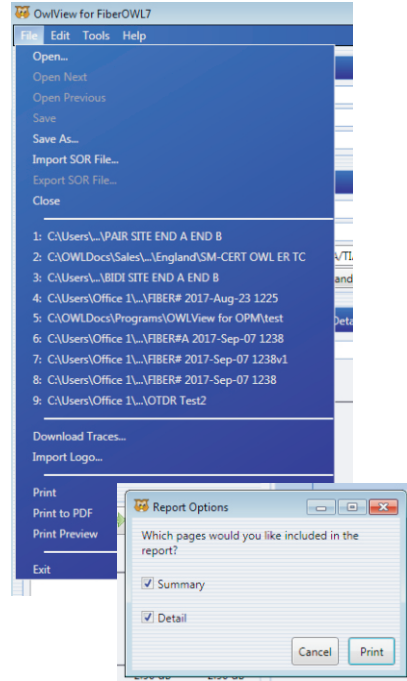
TEST PROCEDURES

CREATING A TRI-REPORT

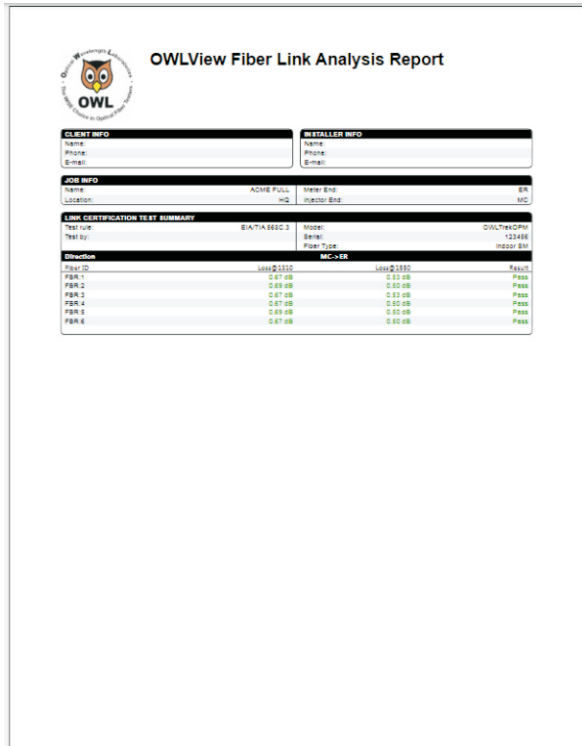
USING OWLVIEW SOFTWARE

PRINTING A REPORT

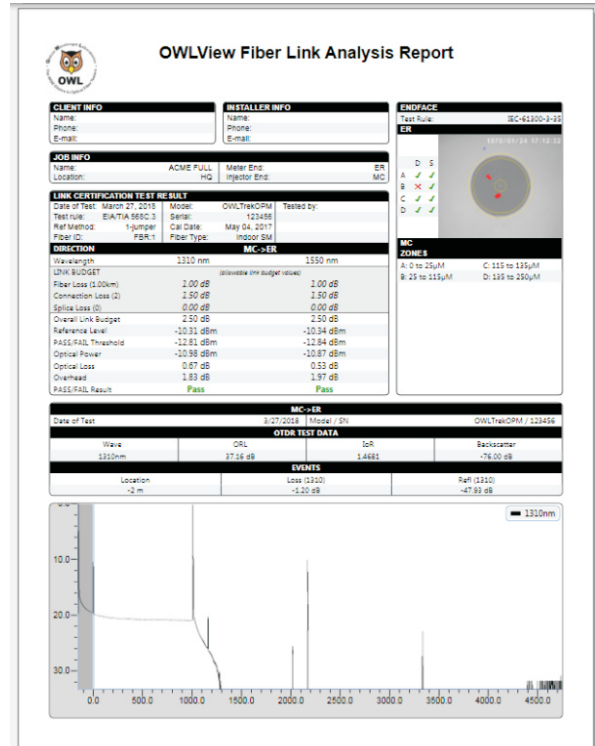
The software allows users to print SUMMARY or DETAIL test results to a hard-copy printer, PDF file, or a print preview.



SUMMARY



DETAIL



TRI-REPORT

OPERATION/MAINTENANCE

STARTUP MENU

The STARTUP MENU appears when the meter is powered on, or when the MENU button is pressed.

CERTIFICATION MENU

RESUME TESTING	Resume testing the current project
CREATE NEW LINK	Create a new project
LOAD STORED LINK	Open a previously configured project

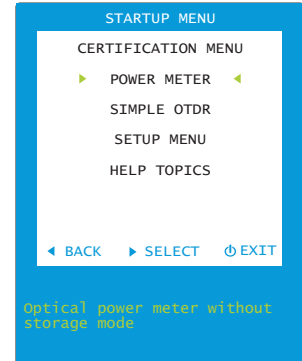
POWER METER – take basic power/loss measurements. See OPM MODE for instructions.

SIMPLE OTDR – take basic OTDR measurements. See OTDR MODE for instructions.

SETUP MENU

CONFIGURE OPTIONS	Miscellaneous functions
USER INFORMATION	Enter users name and phone number
DISPLAY OPTIONS	Configure display-related functions
POWER OPTIONS	Configure power saving functions
UTILITIES MENU	Configure device-related functions
OTDR MENU	Configure OTDR-related functions
CUSTOM STANDARD	Configure the user-defined cabling standard

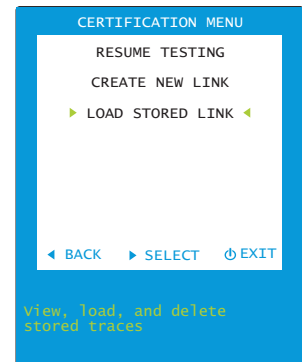
HELP TOPICS – view various help topics regarding the operation of the meter



CERTIFICATION MENU

From the SETUP MENU, select CERTIFICATION MENU.

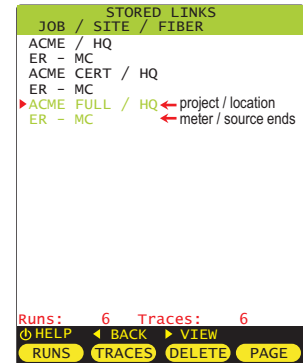
RESUME TESTING	Continue testing the currently loaded link – see LOSS MODE, CERT MODE or FULL MODE (depending upon which mode was originally used to configure the link)
CREATE NEW LINK	Create a new link – see LINK WIZARD section
LOAD STORED LINK	View, load, and delete stored data



OPERATION/MAINTENANCE

WORKING WITH STORED LINKS

- ▶ link selection cursor
- GREEN currently loaded link
- ⓘ context-sensitive help topics
- ▲ ▼ scroll through list of stored links
- ◀ return to previously loaded link
- ▶ view link configuration details
- RUNS** view list of stored loss measurements
- TRACES** view list of stored OTDR traces
- DELETE** delete currently selected link
- PAGE** page down when there is more than one page of test results



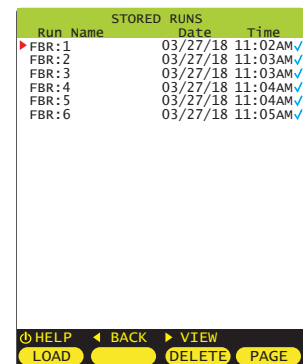
STORED RUNS LIST

- RUNS** view list of stored runs

Loss measurement data includes run name, and date and time of test

- ▶ run selection cursor
- ✓ download status: checkmark indicates previously downloaded run
- ⓘ context-sensitive help topics
- ▲ ▼ scroll through list of stored runs
- ◀ return to STORED LINKS screen
- ▶ view run details for currently selected run

- LOAD** load currently selected stored run (to re-test a previously stored run)
- DELETE** delete currently selected run
- PAGE** page down when there is more than one page of test stored runs

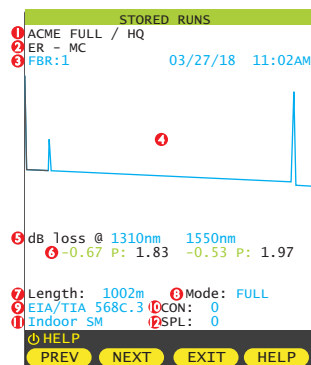


VIEW RUN DETAILS

Loss/trace measurement data includes run name, and date and time of test

- ⓘ / **HELP** context-sensitive help topics
- ▲ ▼ zoom in / out horizontally on OTDR trace (if one is present)
- PREV** go to previous stored run for this link
- NEXT** go to next stored run for this link
- EXIT** return to STORED RUNS list

- 1 Project name / location
- 2 Meter / Source ends
- 3 Run name information
- 4 OTDR trace area
- 5 dB loss wavelengths
- 6 dB loss results
- 7 fiber length
- 8 test mode
- 9 cabling standard
- 10 number of connections
- 11 fiber type
- 12 number of splices



OPERATION/MAINTENANCE

STORED TRACES LIST

TRACES view list of stored traces

Trace data includes run name, and date and time of test

- ▶ trace selection cursor
- ✓ download status: checkmark indicates previously downloaded trace
- ⓘ context-sensitive help topics
- ▲ ▼ scroll through list of stored traces
- ◀ return to STORED LINKS screen
- ▶ view trace details for currently selected trace

- LOAD** load currently selected stored trace (to re-test a previously stored trace)
- DELETE** delete currently selected trace
- PAGE** page down when there is more than one page of test stored traces

STORED RUNS			
Run Name	Date	Time	
▶ FBR:1	03/27/18	11:02AM	✓
FBR:2	03/27/18	11:03AM	✓
FBR:3	03/27/18	11:03AM	✓
FBR:4	03/27/18	11:04AM	✓
FBR:5	03/27/18	11:04AM	✓
FBR:6	03/27/18	11:05AM	✓

n=1.4681 EOF= 1002m P= 1m S=1m

ⓘ HELP ◀ BACK ▶ VIEW

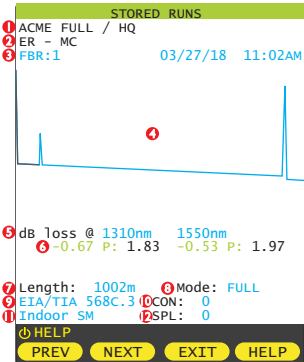
LOAD **OVERLAY** **DELETE** **PAGE**

VIEW TRACE DETAILS

Loss/trace measurement data includes run name, and date and time of test

- ⓘ / **HELP** context-sensitive help topics
- ▲ ▼ zoom in / out horizontally on OTDR trace (if one is present)
- PREV** go to previous stored run for this link
- NEXT** go to next stored run for this link
- EXIT** return to STORED RUNS list

- ① Project name / location
- ② Meter / Source ends
- ③ Run name information
- ④ OTDR trace area
- ⑤ dB loss wavelengths
- ⑥ dB loss results
- ⑦ fiber length
- ⑧ test mode
- ⑨ cabling standard
- ⑩ number of connections
- ⑪ fiber type
- ⑫ number of splices



DELETE STORED RUNS

DELETE delete selected stored run(s)

- ▶ run selection cursor
- ✓ download status: checkmark indicates previously downloaded run
- ⓘ context-sensitive help topics
- ◀ return to STORED LINKS screen

- YES** confirm deletion of selected stored run
- NO** do not delete selected stored run (return to STORED LINKS screen)
- ALL** delete all stored runs
- ✓ delete all previously downloaded stored runs

STORED RUNS			
Run Name	Date	Time	
▶ FBR:1	03/27/18	11:02AM	✓
FBR:2	03/27/18	11:03AM	✓
FBR:3	03/27/18	11:03AM	✓
FBR:4	03/27/18	11:04AM	✓
FBR:5	03/27/18	11:04AM	✓
FBR:6	03/27/18	11:05AM	✓

ⓘ HELP ◀ BACK ▶ VIEW

YES **NO** **ALL** ✓

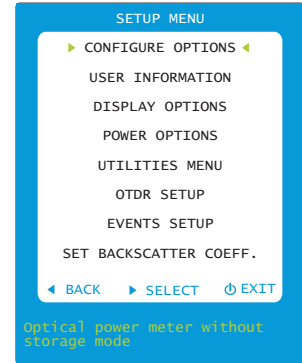
OPERATION/MAINTENANCE

SETUP MENU

From any test results screen on the MASTER, press the MENU button to access the MAIN MENU.

From the MAIN MENU, select SETUP MENU.

CONFIGURE OPTIONS	Miscellaneous functions
USER INFORMATION	Enter users name and phone number
DISPLAY OPTIONS	Configure display-related functions
POWER OPTIONS	Configure power saving functions
UTILITIES MENU	Configure device-related functions
OTDR SETUP	Configure OTDR-related functions
EVENTS SETUP	Configure OTDR event thresholds
SET BACKSCATTER COEFF.	Set fiber backscatter coefficient

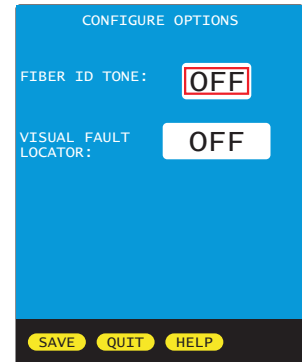


SETUP MENU ⇨ CONFIGURE OPTIONS

CONFIGURE OPTIONS – control miscellaneous functions

FIBER ID TONE	Output a 2kHz tone from the OTDR Options: OFF / ON
VISUAL FAULT LOCATOR	Control visual fault locator Options: OFF / ON / BLINK

SAVE	Save settings and return to SETUP MENU
QUIT	Exit without saving settings and return to SETUP MENU
HELP	Context-sensitive help

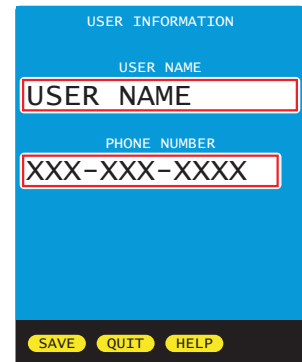


SETUP MENU ⇨ USER INFORMATION

USER INFORMATION – set user name and phone number

USER NAME	15 characters
PHONE NUMBER	10-digit phone number

SAVE	Save settings and return to SETUP MENU
QUIT	Exit without saving settings and return to SETUP MENU
HELP	Context-sensitive help



OPERATION/MAINTENANCE

SETUP MENU ⇨ DISPLAY OPTIONS

DISPLAY OPTIONS – set options for the user interface such as display dimness and brightness levels, internal speaker operation, and OTDR trace clipping.

MODE	display orientation Options: PORTRAIT / LANDSCAPE / FLIP
DIMNESS	dimness level during power saving mode Range of values: 25 to 125 (dim level previews as value changes)
BRIGHTNESS	Brightness level during normal operation Range of values: 150 to 254 (brightness level previews as value changes)
SPEAKER	speaker operation Options: ON / OFF
TRACE CLIPPING	clip the top of OTDR reflective events to raise the backscatter farther above the noise level Options: ON / OFF

DISPLAY OPTIONS

MODE **FLIP**

DIMNESS **63**

BRIGHTNESS **255**

SPEAKER **ON**

TRACE CLIPPING **ON**

SAVE **QUIT** **HELP**

SAVE	Save settings and return to SETUP MENU
QUIT	Exit without saving settings and return to SETUP MENU
HELP	Context-sensitive help

SETUP MENU ⇨ POWER OPTIONS

POWER OPTIONS – set duration for various power saving modes

DIM TIME	minutes before display dims Range of values: 1 to 250
STANDBY TIME	minutes before unit goes into standby mode (only display turns off) Range of values: 2 to 250
OFF TIME	minutes before unit turns completely off Range of values: 3 to 250

SAVE	Save settings and return to SETUP MENU
QUIT	Exit without saving settings and return to SETUP MENU
HELP	Context-sensitive help

POWER OPTIONS

DIM TIME: **63**

STANDBY TIME: **255**

OFF TIME: **255**

Times in minutes

SAVE **QUIT** **HELP**

OPERATION/MAINTENANCE

UTILITIES MENU

From any test results screen on the MASTER, press the MENU button to access the MAIN MENU.

From the MAIN MENU, select SETUP MENU, then select UTILITIES MENU.

SET SYSTEM CLOCK	Set real-time clock
SET APD BIAS	Set avalanche photodiode bias voltage
FORMAT DATA FLASH	Format data storage
FACTORY RESET	Reset to factory defaults
MANUFACTURER SETUP	Not used
PROGRAM CPLD	Not used
VIEW SLIDES	View slide graphics

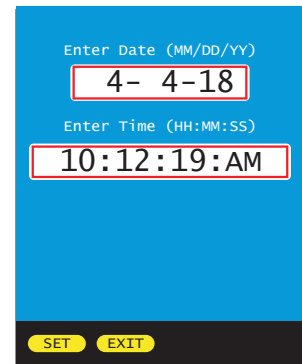


UTILITIES MENU ⇨ SET SYSTEM CLOCK

SET SYSTEM CLOCK – set time and date

DATE Format: MM/DD/YY (MM=month/DD=day/YY=year)
TIME Format: HH:MM:SS (HH=hour/MM=minute/SS=second) :AM/PM

- NEXT / PREVIOUS field
- DECREASE / INCREASE currently selected value
- Save settings and return to UTILITIES MENU
- Exit without saving settings and return to SETUP MENU



UTILITIES MENU ⇨ SET APD BIAS

SET APD BIAS – set avalanche diode bias voltage

Sets a baseline voltage for the OTDR avalanche photodiode.

Under normal operation the voltage percentage should count up to 70-80%.

If it does not, contact OWL technical support for more information.



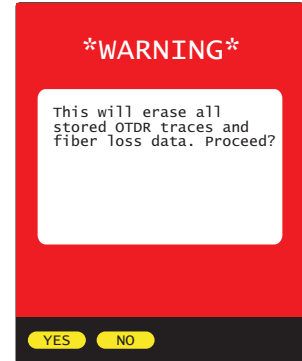
OPERATION/MAINTENANCE

UTILITIES MENU ⇨ FORMAT DATA FLASH

FORMAT DATA FLASH – format the data storage memory.

NOTE: formatting the data flash will erase all stored data, and the data will be unrecoverable.

- YES Proceed with format
- NO Do not proceed with format and return to UTILITIES MENU

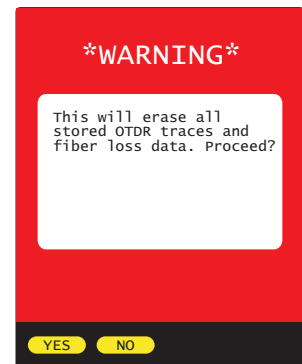


UTILITIES MENU ⇨ FACTORY RESET

FACTORY RESET – reset all user settings to factory defaults

NOTE: after reset, all user settings will need to be set again

- YES Proceed with format
- NO Do not proceed with format and return to UTILITIES MENU



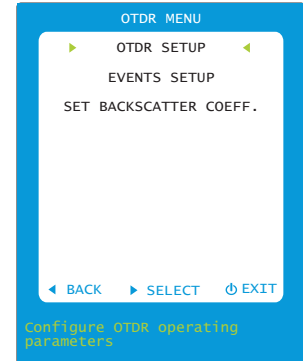
OPERATION/MAINTENANCE

OTDR MENU

From any test results screen on the meter, press the MENU button to access the MAIN MENU.

From the MAIN MENU, select SETUP MENU, then select OTDR MENU.

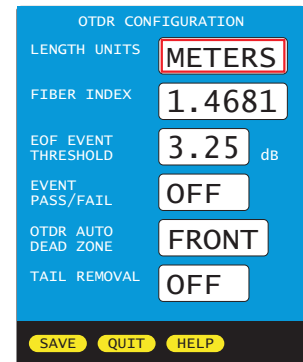
OTDR SETUP	configure OTDR operating parameters
EVENTS SETUP	configure OTDR event parameters
SET BACKSCATTER COEFF.	set fiber backscatter coefficient



OTDR MENU ⇒ OTDR SETUP

OTDR CONFIGURATION – configure OTDR operating parameters

LENGTH UNITS	unit of length used during OTDR testing Options: METERS / FEET
FIBER INDEX	index of refraction for the fiber under test; must be set properly for the distance measurements to be accurate Range of values: 1.4000 to 1.6000
EOF EVENT THRESHOLD	required backscatter level prior to an event for that event to be considered as part of the fiber and not an echo. The last event with the required backscatter level is considered the end of the fiber. Range of values: 3.25 to 9.99 dB
EVENT PASS/FAIL	events in the OTDR event table will be highlighted in RED if they exceed the values set in the EVENT CONFIGURATION menu. Options: OFF / ON
OTDR AUTO DEAD ZONE	the OTDR will use the first reflective event as the end of the launch cable and will not include the launch cable in the fiber's length measurement. Options: OFF / FRONT
TAIL REMOVAL	the OTDR will attempt to remove any trace saturation tails cause by large reflections. This process will increase trace acquisition time and slightly lower the trace backscatter level. Options: OFF / ON



SAVE	Save settings and return to SETUP MENU
QUIT	Exit without saving settings and return to SETUP MENU
HELP	Context-sensitive help

OPERATION/MAINTENANCE

OTDR MENU ⇨ EVENTS SETUP

EVENT CONFIGURATION – configure OTDR event parameters

REFLECTIVE EVENT THRESHOLD Sets the minimum event threshold in dB for reflective events. Events must have this much reflectivity before they are marked in the event table. The smallest reflectivity value is limited by the fiber's currently set backscatter coefficient.
Range of values: -58 to -85 dB

LOSS EVENT THRESHOLD Sets the minimum event threshold in dB for loss events. Events must fall at least this amount below the backscatter power to be marked in the event table.
Range of values: 0.05 to 0.50 dB

MAXIMUM REFLECTIVITY The maximum reflectivity an event can have before failing.
Range of values: -30.0 to -80.0 dB

MAXIMUM LOSS The maximum loss an event can have before failing.
Range of values: 0.10 to 20.00 dB

EVENT CONFIGURATION

REFLECTIVE EVENT THRESHOLD	77	dB
LOSS EVENT THRESHOLD	0.05	dB
MAXIMUM REFLECTIVITY	75.0	dB
MAXIMUM LOSS	1.00	dB

SAVE QUIT HELP

NOTE: in order for these settings to take effect, remember to turn ON the EVENT PASS/FAIL setting on the OTDR CONFIGURATION screen

- SAVE** Save settings and return to SETUP MENU
- QUIT** Exit without saving settings and return to SETUP MENU
- HELP** Context-sensitive help

OTDR MENU ⇨ SET BACKSCATTER COEFFICIENT

From the SETUP MENU, highlight SET BACKSCATTER COEFF., then press **▶**

SET BACKSCATTER COEFFICIENT

<backscatter option> – options: Current Trace, (Wave1), (Wave2)
Use left and right arrow keys to change value.

Bns – range: -60.00 to -85.00 dB
Use up and down arrow to increase/decrease backscatter value.

Backscatter coefficient is a measure of the backscatter properties of the fiber under test, and is provided by the fiber manufacturer.

Backscatter coefficient is important in accurately determining reflectance measurements in the OTDR.

SET BACKSCATTER COEFFICIENT

< Current Trace >
Bns : -76.00

^ UP v DOWN ENTER=DONE

The fiber backscatter coefficient is a normalized measure of the backscatter properties of the fiber and is provided by the manufacturer of the optical fiber.

OPERATION/MAINTENANCE






SETUP MENU ⇔ CUSTOM STANDARD

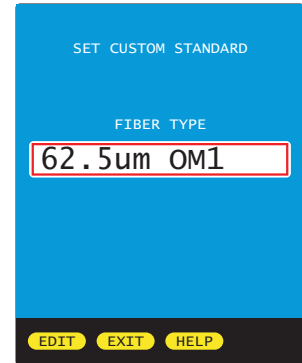
CUSTOM STANDARD -- configure a custom standard with user-definable standard parameters. Parameters are set for each fiber type.

FIBER TYPE

Options:

Multimode fiber types 62.5um OM1 / 50.0um OM2 / 50.0um OM3 / 50.0um OM4 /
 Singlemode fiber types Indoor SM / Outdoor SM

-   Scroll through the list of fiber types
-  Select the fiber type to be edited; it is recommended to set up each fiber type
-  Exit and return to the SETUP MENU
-  Context-sensitive help

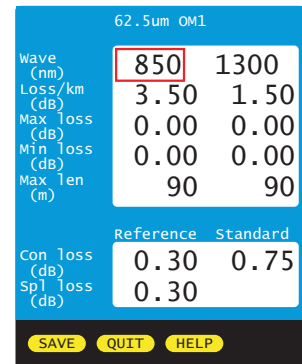


Wave (nm) Up to 2 wavelengths (column A and B) can be defined per fiber type
 Options: 850, 980, 1300, 1310, 1490, 1550, 1625, 0
 (use 0 in column B if configuring for only one wavelength)

Two types of standards can be defined:

GENERIC STANDARDS (link budget is *calculated* based on link configuration)
 uses Loss/km, Max len, Con loss, and Spl loss

APPLICATION STANDARDS (link budget is a *fixed* number)
 uses Max loss, Min loss, and Max len






GENERIC STANDARD PARAMETERS

- Loss/km (dB)** Amount of acceptable dB loss (attenuation) per kilometer of fiber
- Max loss (dB)*** MUST BE SET TO 0.00
- Min loss (dB)*** MUST BE SET TO 0.00
- Max len (m)** Maximum length of fiber link in meters (range of values: 50m to 50000m)
- Con loss (dB)** dB loss per interconnection; defines loss for both reference-grade and standard-grade reference cables
- Spl loss (dB)** dB loss per splice; can be either fusion or mechanical splices

*** NOTE: any value greater than 0.00 for Max loss and/or Min loss will override values for Loss/km, Con loss, and Spl loss**

APPLICATION STANDARD PARAMETERS

- Max loss (dB)** loss measurements that exceed Max loss will show as a FAIL
- Min loss (dB)** loss measurements that do not reach the Min loss will show as a FAIL
- Max len (m)** Maximum length of fiber link in meters (range of values: 50m to 50000m)

-  Save settings and return to SETUP MENU
-  Exit without saving settings and return to SETUP MENU
-  Context-sensitive help

OPERATION/MAINTENANCE

UNIVERSAL PORT

Universal Port

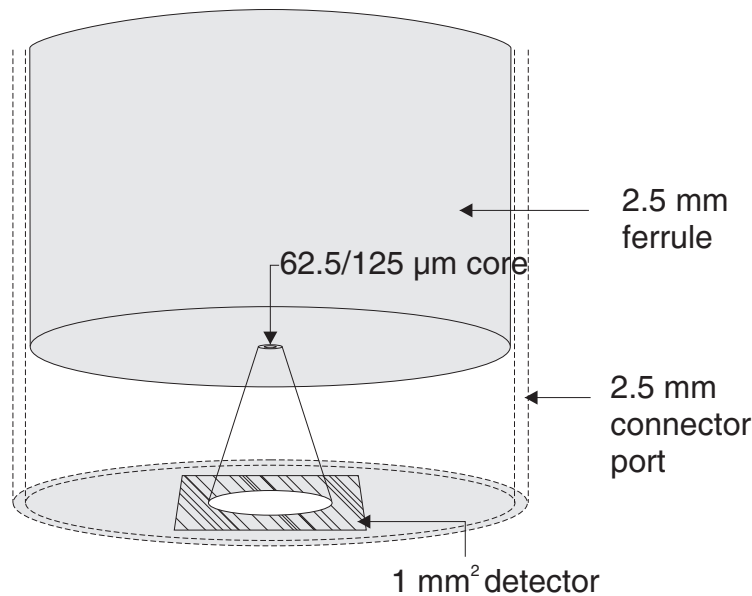
The Fiber OWL 7+ optical power meter contains a universal connector port which allows for coupling to any fiber optic connector that uses a 2.5mm ferrule (e.g. ST, SC, FC, etc.).

What gives this port its flexibility is that only the ferrule is inserted into the port. Since there is no latching mechanism to speak of, any 2.5mm ferrule connector can be inserted into the same port without having to swap adapter ports. There is no longer the need to purchase or maintain additional adapter caps for each different connector type.

This detector port is designed so that the cone of acceptance falls completely onto the detector, regardless of how the connector may turn, twist, or wiggle in the port. Because of this, you can be assured that the connection will always produce an accurate reading as long as it is inserted completely into the port (see the diagram below).

Additionally, some connectors use a 1.25mm ferrule. The flexible universal port system on the Fiber OWL 7 allows the user to remove the 2.5mm adapter and place a 1.25mm adapter (included with each Fiber OWL 7) for connection to LC, MU, and other SFF connectors which use the 1.25mm ferrule.

Please call 262-473-0643 with any questions you may have about the universal port, or any other of our fiber optic test products.



Use of SC Connectors with 2.5mm Universal Port

Take extra care when inserting SC connectors into the 2.5mm universal port as the spring-loading action of the SC connector may cause improper insertion. Call OWL at (262) 473-0643 with any questions.

OPERATION/MAINTENANCE

CLEANING THE DETECTOR PORT

Required accessories:

- A) Isopropyl Alcohol (91% or better)
- B) Round **wooden** toothpick with sharp point
(NOTE: do not use a metal pin or needle since metal will scratch the surface of the detector)
- C) Cotton swab
- D) Jeweler's loupe (10x magnification recommended)
- E) Compressed Air (not shown)

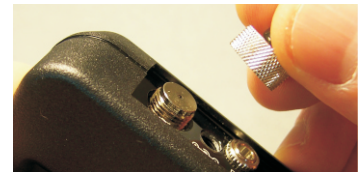


1 Place a small amount of cotton from the swab onto the wooden toothpick as shown at right.



2 Wet the cotton toothpick tip with the isopropyl alcohol.

3 Remove the adapter cap from the power meter detector port.



4 **USING GREAT CARE**, gently insert the cotton toothpick tip into the detector port.



WARNING! BE VERY CAREFUL WHEN INSERTING THE TOOTHPICK INTO THE DETECTOR PORT. THERE IS A VERY THIN GLASS WINDOW THAT WILL EASILY BREAK WITH TOO MUCH PRESSURE.



5 Using as little pressure as possible, rotate the cotton toothpick tip in the detector port to clear away any dust or dirt that has accumulated on the detector.

6 Using light pressure from the compressed air, blow out the detector port.

7 Use the jewelers loupe to inspect the detector end face.

If dust or dirt are still present, repeat steps 5 6 7 until the detector port is free of debris.

If no dust or dirt is found, replace the adapter cap on the detector port and cover the detector port with the dust cap.



OPERATION/MAINTENANCE

CLEANING THE OTDR/VFL PORT

This cleaning procedure applies to the OTDR/VFL port on the Fiber OWL 7+ optical power meter. For more information about cleaning the DETECTOR port on the Fiber OWL 7+, see CLEANING THE DETECTOR PORT.

Required Accessories:

- › Isopropyl alcohol (91% or better)
- › In-adapter fiber optic cleaning accessories, such as 2.5mm cleaning swabs or 2.5mm HUXCleaner™
- › In-adapter fiber optic inspection scope (200x magnification or greater recommended)
- › Compressed Air (optional)

Below are procedures for “wet” cleaning and “dry” cleaning. For best results, a combination of these cleaning methods is recommended.



IMPORTANT SAFETY NOTE: WHEN INSPECTING AN OPTICAL PORT, NEVER LOOK DIRECTLY OR INDIRECTLY INTO THE PORT WITHOUT SUFFICIENT EYE PROTECTION. THE OPTICAL PORT MAY BE ENERGIZED WITH POWERFUL INVISIBLE RADIATION THAT IS HARMFUL TO THE HUMAN EYE.

INVISIBLE LIGHT IS ESPECIALLY DANGEROUS SINCE THE EYE IS NOT AWARE OF EXPOSURE TO HARMFUL INVISIBLE ENERGY, AND BECOMES INCREASINGLY DANGEROUS WITH PROLONGED EXPOSURE.

TO AVOID ACCIDENTAL EXPOSURE TO OPTICAL ENERGY, IT IS HIGHLY RECOMMENDED TO POWER OFF EQUIPMENT BEFORE INSPECTING OPTICAL PORTS.

IT IS ALSO HIGHLY RECOMMENDED TO USE AN LCD-BASED FIBER INSPECTION SCOPE, WHICH CAN INSPECT OPTICAL PORTS AND FIBER ENDFACES WITHOUT EXPOSING THE EYE TO HARMFUL OPTICAL RADIATION.

“WET” CLEAN PROCEDURE

- 1 Wet the tip of a 2.5mm cleaning swab with isopropyl alcohol.
- 2 Carefully insert the wet tip of the swab into the optical port.
- 3 Clean out the optical port according to the directions provided with the swabs.
- 4 Blow dry the optical port with the compressed air. If compressed air is not available, allow 2 minutes for the alcohol to evaporate.
- 5 Inspect the optical port with the in-adapter fiber optic inspection scope to ensure the port is clear of obstructions.

“DRY” CLEAN PROCEDURE

- 1 Carefully insert a dry 2.5mm cleaning swab or a 2.5mm HUXCleaner™ into the optical port.
 - 2 Clean out the optical port according to the directions that came with the cleaning accessories.
 - 3 Inspect the optical port with the in-adapter fiber optic inspection scope to ensure the port is clear of obstructions.
- If the port is still dirty, another round of cleaning will be necessary. You may also want to use a combination of “wet” and “dry” cleaning to achieve best results.

If the port is still dirty, another round of cleaning will be necessary. You may also want to use a combination of “wet” and “dry” cleaning to achieve best results.

APPENDICES

WARRANTY INFORMATION

Repair. Repair of this unit by unauthorized personnel is prohibited, and will void any warranty associated with the unit.

Cleaning. For accurate readings, the optical connectors on the Fiber OWL 7 and the connectors on the patch cords should be cleaned prior to attaching them to each other. Minimize dust and dirt buildup by replacing the dust caps after each use.

Calibration. It is recommended to have Optical Wavelength Laboratories calibrate this unit once per year.

Warranty. The Fiber OWL 7 comes standard with a two-year factory warranty, which covers manufacturer defect and workmanship only.

CONTACT INFORMATION

Address:

Optical Wavelength Laboratories, Inc.
N9623 US Hwy 12
Whitewater, WI 53190

Phone:

262-473-0643

Internet:

OWL-INC.COM

APPENDICES

SUPPORTED CABLING STANDARDS

The Fiber OWL 7+ supports the following fiber optic network cabling standards:

TIA568.3-D	TIA568C.3	1GBASE-SX	1GBASE-LX	10GBASE-S	10GBASE-LX4
10GBASE-L	10GBASE-E	40GBASE-S	40GBASE-LR4	100GBASE-S	100GBASE-LR10
FTTHA/B/C					

In addition, users can define their own standard.

10-GIGABIT ETHERNET STANDARD

Support for the IEEE 802.3ae 10-Gigabit Ethernet standard is part of the list of standards for Fiber OWL 7 series testers.

With this new standard, users are given the option of choosing from one of several versions of this standard, based on the fiber type, wavelength, and 10GbE electronics used. Below is a summary of the various 10GbE standards.

In order to choose the correct 10GbE standard, it is important to know the specifications of the fiber under test, especially the fiber type and modal bandwidth.

If these specifications are unknown, contact the optical fiber manufacturer for more details.

IEEE Standard Name	Fiber OWL Link Wizard Name	Fiber Type	Modal Bandwidth	Wavelength	Loss (dB)	Maximum Distance (m)
10GBASE-S	10GBASE-S LEGACY	62.5/125 multimode	160 MHz • km	850nm	2.6	26
10GBASE-S	10GBASE-S OM1/OM2	62.5/125 multimode	200 MHz • km	850nm	2.5	33
10GBASE-S	10GBASE-S LEGACY	50/125 multimode	400 MHz • km	850nm	2.2	66
10GBASE-S	10GBASE-S OM1/OM2	50/125 multimode	500 MHz • km	850nm	2.3	82
10GBASE-S	10GBASE-S OM3	laser-optimized 50/125 multimode	2000 MHz • km	850nm	2.6	300
10GBASE-LX4	10GBASE-LX4 LEGACY	62.5/125 multimode	500 MHz • km	1300nm	2.5	300
10GBASE-LX4	10GBASE-LX4 LEGACY	50/125 multimode	400 MHz • km	1300nm	2.0	240
10GBASE-LX4	10GBASE-LX4	50/125 multimode	500 MHz • km	1300nm	2.0	300
10GBASE-LX4	10GBASE-LX4	50/125 multimode	2000 MHz • km	1300nm	2.0	300
10GBASE-LX4	10GBASE-LX4	singlemode	NA	1310nm	6.3	5000
10GBASE-L	10GBASE-L/E	singlemode	NA	1310nm	6.2	5000
10GBASE-E	10GBASE-L/E	singlemode	NA	1550nm	11.4	5000

APPENDICES

UPDATING FIRMWARE

The firmware in Fiber OWL 7+ series devices can be updated on any computer that has OWLView software installed.

To update the firmware:

- 1) Save the firmware file to the PC
- 2) Connect the device to the computer via the supplied USB cable
-- do NOT remove the USB cable until the whole process is complete
- 3) Power on the device
- 4) Open OWLView software
- 5) Click Tools > Update Firmware > From file...
- 6) Browse to the location of the firmware file, then click Open
- 7) The software and the device will indicate the firmware update process

Once the firmware is updated, the device will re-boot. Now it is safe to remove the USB cable.

RE-CHARGING THE DEVICE BATTERY

The Lithium Polymer battery in the Fiber OWL 7+ is re-charged through the USB port.

A battery charger and USB cable is supplied for this purpose.

The device can either be recharged using the battery charger or a computer USB port.



To avoid damage to the unit or harm to the user, only use approved battery chargers.

Battery charger electrical specifications:

INPUT: 100-240V AC 50-60Hz
OUTPUT: DC 5.0V 100mA +/- 5%