Optical Wavelength Laboratories

OPERATIONS GUIDE

FIBER OWL 7+ FIBER OPTIC LINK CERTIFIERS



Revision 1.0d

Optical Wavelength Laboratories (OWL) N9623 West US Hwy 12 Whitewater, WI 53190 Phone: 262-473-0643 Internet: OWL-INC.COM

OWL-INC.COM



This device contains <u>expensive</u>, <u>extremely fragile</u> 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 coupling to laser and photodiode

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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



SPECIFICATIONS

OPTICAL TIME DOMAIN REFELCTOMETER (OTDR)				
	FO7+M		F07+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	12 miles (20 kilometers)		8 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		> 64 km: 2 meters	
Pulse Width:	1, 2, 5, 10, 20, 50, 100 meters 1, 2, 5, 10, 20, 50, 100, 200, 500, 1k mete), 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

sensitive help

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	1)
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





Press: toggle between light source ports

SPECIFICATIONS

FIBER OPTIC LIGHT SOURCE					
Fiber Type:	Multi	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)

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CW

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PORT

WaveSource Pro

Optical Source

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:

• The output power of the transmitter can be measured by connecting the meter directly to the transmitter port; and

• 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.



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.



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.

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.



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:

Operation	Section
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	OPMMODE
Measure length of fiber cables Characterize the network Troubleshoot problems in the fiber	OTDR MODE OTDR MODE OTDR MODE
Basic optical loss measurement and store test results	LOSS MODE
Certify fiber links only (Tier 1 testing only; no OTDR results)	CERTMODE
OTDR testing only	OTDRMODE
Tier 2 testing – Tier 1 certification + OTDR results	FULLMODE
Visual fault location Visual fiber identification	VFL VFL

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



- **ZERO** set an optical reference
- change measurement units between dBm (ABS) and dB (REL)
- **LOAD** resume testing for a previously stored project
- switch to SIMPLE OTDR mode (see OTDR section)
- return to STARTUP MENU



OPM MODE

ACCESSING OPM MODE





B The meter will immed	liately b	egin to display optical power (dBm; AB	3S) or loss (dB; REL) readings.
	AVAILABL	E FUNCTIONS	
	ZERO	Select next wavelength Set optical reference	
	UNITS LOAD	Toggle display units between dBm (optical power) and Load a previously stored link (make sure that reference measurement)	dB (optical loss) es are re-set before taking further
LOW dBm	OTDR MENU	Switch to SIMPLE OTDR mode (see OTDR section) Return to STARTUP MENU	
	DISPLAYE	D RESULT	
HAVE 1210	LOW	No measurable amount of incoming optical power 🔗	Possible causes for "LOW":
	HIGH	Incoming optical power is too bright to be measured	 Test cable not connected to OPM port Light source not powered on
	(black)	Normal optical power/loss measurement	- Light source set to incorrect port
	(blue)	INVALID OPERATING MARGIN (indicates invalid	- 100 much link loss
ا 🖵 🕑 🕒		"negative loss" or "gain" test condition;	
		recommended to re-set the reference using the ZERO function)	

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)

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 <u>dBm</u>.



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.



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.







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.



OPM MODE

OPTICAL LOSS MEASUREMENT

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



OPM MODE

OPTICAL LOSS MEASUREMENT, cont.





OPM MODE

OPTICAL LOSS MEASUREMENT, cont.



OPM MODE

OPTICAL LOSS MEASUREMENT, cont.

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



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.



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.

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 <u>always</u> take precedence over an OTDR for end-to-end attenuation measurements.

OTDR MODE

OTDR DISPLAY

5

∆dB 2.43

RFL



cursors for the currently active trace.

Function Options Menu – displays the on-screen menu options for trace control

9

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.



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.

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 wave button appears.

WAVE

 \checkmark

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 wave 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:

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

Press SAVE when finished.

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





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 dualwavelength 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).



LOCK

CURSOR

and green

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



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



 \checkmark 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



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;

P

- -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 <u>possible</u> interpretations of the data:

0	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
6	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.

CURSOR 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.

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-toend 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.

 \bigcirc

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:

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





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

EVENT 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

(

VIEW

PAGE

DONE

WAVE

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





indicates that the event fails to meet user-set thresholds

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)

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.



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.



SAVING A TRACE



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 **SA** currently displayed trace to memory.

SAVE

to enter the fiber name and save the

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



BACKSPACE



TOGGLE BETWEEN UPPER AND LOWER CASE ALPHABET



FORWARD SPACE



SELECT THE HIGHLIGHTED CHARACTER



FINISHED ENTERING NAME



OTDR MODE

LOADING A PREVIOUSLY STORED TRACE

Previously stored tr	STORED TRACES			
The STORED TRA	CE menu may be accessed from the Function Options menu on the	Trace Name	Date	Time
trace screen by pressing LOAD .		SM-BB-F1-F2:1 SM-BB-F1-F2:2 SM-BB-F1-F2:3 SM-BB-F1-F2:4 SM-BB-F1-F2:5	10/05/09 10/05/09 10/05/09 10/05/09 10/05/09	04:16PM ◀ ✓ 04:17PM 04:19PM 04:21PM 04:24PM
	moves the cursor up and down in the list of stored traces	SM-BB-F1-F2:6	10/05/09 Overlay sta Download	04:27PM
	return to the previous screen			
	view detailed information about the selected item	Trace Parameters		
0	accesses context-sensitive help		AY DELETE	PAGE
LOAD	loads the currently selected fiber trace into the trace screen			
OVERLAY	allows the user to overlay a previously stored trace on top of the curren overlaid at a time, and the overlay trace is denoted by a dark arrow to the button again to clear the overlay status	ntly loaded trace. e right of the trace	Only one information	trace can be n. Press this
DELETE	gives the user the option: 1) to delete the currently selected fiber trace delete all traces; or 4) delete only traces that have been previously STATUS below)	; 2) to not delete t downloaded (see	he selecte TRACE E	d trace; 3) to OOWNLOAD
PAGE	displays the next page of fiber traces if there are more traces than will fit of	on the screen		

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

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

 \checkmark

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.

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.

CONFIGURE OPTIONS USER INFORMATION					
USER INFORMATION					
DISPLAY OPTIONS					
POWER OPTIONS					
UTILITIES MENU					
► OTDR MENU					
CUSTOM STANDARD					
✓ BACK → SELECT Φ EXIT					
Configure OTDR operating					

OTDR SETUP

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

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.



OTDR MODE

EVENTS SETUP

From the SETUP MENU, highlight EVENTS SETUP, then press D

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

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.





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



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.



 (\checkmark)

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.

TRAC	E OPTIONS
CAPTURE MODE	LIVE
PULSE WIDTH	1 m
TRACES TO AVERAGE	4096
DEAD ZONE LENGTH(m)	1100
RANGE	10km
STEP	1m
SAVE QUIT	HELP


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:

EVENTS EOF MENU VFL

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** re-position the EOF cursor.

key again to







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.



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.

LTUE NAME PROTECT ACCME_CORP CORTION HQ WEST HETER/MATTER END 'N' MC VIDEO (ANOTE END 'N'	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
SOURCE/REMOTE END 'R' WA10 NEXT BACK (HELP)	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 apper 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 lig METER TEST CABLE – the test cord attached to the Fiber OWL 7+ OPM p NOTE: these test cables automatically count as connections, and should as interconnections in the next step	endix for list) s ght source port d <u>NOT</u> be counted
--	---

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 calls standard (see appendix for a fiber type diagram) CONNECTIONS – Number of inter-connections (e.g. patch panels, other mating sleeves) in 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 for 2-jumper reference method NOTE: use 1-jumper for LC patch panels; use 2-jumper for all other connector types	oling the
--	--------------

ENCIRCLED FLUX – is EF compliance required for this test: YES or NO (only required for <i>multimode</i> 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 569.2 Distandard requires EE compliance for all multimode testing

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 fibe	er test results within the job to uniquely identify individual fiber strands
NUMBER 1	NAME	The name used to identify the group of individual fiber strands in the link
FIDERS 12	NUMBER	The starting fiber strand number in the link. The number will be automatically
NOTE: FULL TEST MODE REQUIRES OTDR TRACES BEFORE LOSS TESTING		incremented as the test results are saved.
	FIBERS	The total number of fiber strands to be tested
NEXT BACK HELP		NOTE: applies to FULL MODE only; LOSS and CERT mode ignore this setting
	TESTMODE	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) METER 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	LOCATION (14 characters) SOURCE END (14 characters) TEST MODE LOSS loss measurement only CERT loss measurement w/PASS-FAIL FULL CERT + OTDR
LINK CON FIBER TYPE CONNECTIONS 62.5um (OM1) 50.0um (OM2/3/4) Do not count patch indoor SM Outdoor SM TIA Standards also use CS1 = horizontal cabling REFE	FIGURATION INFORMATION S SPLICES LENGTH h panels g in mechanical splices CERT MODE (measure with OTDR to enter manually) LOSS MODE (not used) FULL MODE (measured during test) RENCE METHOD 1-JUMPER 2-JUMPER
CS2/3 = backbone cabling (LC pa	E SOURCE TEST CABLE Reference Standard Cables automatically count is connections. Do NOT include the patch panels the number of Connections
ENCIRCLED FLUX COMPLIANCE (MULTIMODE TESTING OF Is Encircled Flux compliant testing required?* YES No	NLY) *NOTE: if YES, Source Test Cable is automatically REFERENCE-grade
RUN NAME SETTINGS NAME (11 characters)	NUMBER FIBERS Used for FULL MODE only LOSS (CEPT MODE : server this realize

LINK WIZARD

STEP 2: GATHER ACCESSORIES







LINK WIZARD

STEP 3: ENTER LINK INFORMATION



LINK WIZARD



LINK WIZARD



LINK WIZARD



LINK WIZARD



LINK WIZARD

STEP 4: SETTING THE REFERENCE



LINK WIZARD

STEP 4: SETTING THE REFERENCE, cont.



LINK WIZARD

STEP 4: SETTING THE REFERENCE, cont.



LINK WIZARD

STEP 4: SETTING THE REFERENCE, cont.



LINK WIZARD

STEP 4: SETTING THE REFERENCE, cont.





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.

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



LOSS MODE

VERIFY REFERENCE LEVELS

THIS IS A CONTINUATION FROM WHERE THE LINK WIZARD LEFT OFF



LOSS MODE

TAKE READINGS



REPEAT STEPS @ THROUGH @ FOR EACH SUBSEQUENT FIBER TO BE TESTED.

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 save test result
- **ZERO** set an optical reference
- Change measurement units between dBm (ABS) and dB
 (REL)
- edit link information
- **LOAD** resume testing for a previously stored project
- **DATA** view stored test readings
- Switch to SIMPLE OTDR mode (see OTDR section)
- **MENU** return to STARTUP MENU



CERT MODE

TAKE UNITS TO THEIR ASSIGNED LOCATIONS

THIS IS A CONTINUATION FROM WHERE THE LINK WIZARD LEFT OFF



CERT MODE

ENTER THE LINK LENGTH



CERT MODE

TAKE READINGS AND STORE TEST RESULTS



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

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 save test result
- **ZERO** set an optical reference
- CNITS change measurement units between dBm (ABS) and dB (REL)
- edit link information
- **LOAD** resume testing for a previously stored project
- **DATA** view stored test readings
- switch to SIMPLE OTDR mode (see OTDR section)
- return to STARTUP MENU



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:



FULL MODE

TAKE UNITS TO THEIR ASSIGNED LOCATIONS

THIS IS A CONTINUATION FROM WHERE THE LINK WIZARD LEFT OFF



FULL MODE

OTDR MEASUREMENTS



FULL MODE

OTDR MEASUREMENTS



REPEAT STEPS @ THROUGH @ 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.

FULL MODE

TAKE READINGS AND STORE TEST RESULTS

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



REPEAT STEPS @ THROUGH @ FOR EACH SUBSEQUENT FIBER TO BE TESTED.

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

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.

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 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.







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".

Common Actions		
Download (more) (Rune) (from Deane		
Start Low Minde	🐺 Invested Options 🛛 🛶 🔤	
West Hulp Widows		
Batch Convert to SOR	Charleng and or Chergeneter Sources	
Print Multiple Reports	Jula Traca	
Recent Flics		

CREATING A TRI-REPORT

USING OWLVIEW SOFTWARE

Alist 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.

Common Actions	
Down and I more (C/Runn) Channe	
Start Lize Minde	
Then Hulp modes	
Batch Convert to SCR	
Print Matagia Najaria	🤴 Select the July to Due-Head 🛛 👝 🛄 🔜
Recent Flics	PTShow provides by deminanced jobs
	Loss increas (see los inprevios) 11.000 increas 201 activity increases 201 activity increases 201 activity increases
	Mitwell / Invest 10 (Invested

SUMMARY VIEW

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

W OwlView for FiberOWL7				
File Edit Tools Help				
Project List	Customer Info	Installer Info	Meter OTDR Trace	Meter End Face
Project Location Meter Er *	Name	Name		
ACME FULL HQ ER	Phone	Phone		
	Email	Email		
	Job Info			
	Name ACME FULL	Meter End ER		
	Location HQ	Injector End MC		
	Standard EIA/TIA 568C.3 •	Tester		
	New Standard			
	Summary Details			
	Run Name	1310 nm 1550 nm		
	FBR:1 View Details	Pass Pass 🔺		
	FBR:2 View Details	Pass Pass		
	FBR:3 View Details	Pass Pass	Meter Events	
	FBR:5 View Details	Pass Pass		Televisor Facil Face
	FBR:6 View Details	Pass Pass		Injector end Pace
	<u> </u>			
		*		
< III >	Delete Run(s)		Injector Events	

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

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.

3 OwlView for FiberOWL7			
File Edit Tools Help			
Project List	Customer Info	Meter OTDR Trace Meter End Face	0
Project Location Meter Er *	Name Name	= 1310nm	
ACME FULL HQ ER	Phone Phone		
	Email Email		
		-	
	Job Info	20.0-	
	Name ACME FULL Meter End ER		
	Location HQ Injector End MC		
	Standard EIA/TIA 568C.3 Tester		
	New Standard	0.0 1000.0 2000.0 3000.0 4000.0	
		Remove Trace	
	Summary Details		
	Run Name FBR: Num 1 🖛 📫	Meter Events	
	Direction MC->ER	# Event Type Event Start Event End Reflectivity Lo	
	Wavelength 1310 nm 1550 nm	1 Reflective Start 🔑 📑 -2 m 10 m -47.93 dB -1.2	
	Link Budget Link Parameters	Import End Fac	<u>.e</u>
	Fiber Loss 1.00 km 1.00 dB 1.00 dB	Injector OTDR Trace	
	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 Data (5-3) Threaded d 12.81 dBm 12.84 dBm		
	Optical Power Measurement -10.88 dBm -10.87 dBm		
	Optical Loss 0.67 dB 0.53 dB		
	Overhead 1.83 dB 1.97 dB		
	Pass/Fail Pass Pass		
		Import Trace	
<		Injector Events Import End Fac	æ

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".

GowlView for FiberOWL7 File Edit Tools Help						
Project List Custome Project Location Meter Er * ACME FULL HQ ER Email Job Info	er Info	Installer Info Name Phone Email Meter End ER	Meter OTDR Trace	- 1310nm	Meter End Face	•
W Oper	n Look in: 🔒 End Faces	• • •	* •			
Recer Der Löv Cor Net	Flaces delop FIBER#1.png FIBER#1.png	FIBER#2.png FIBER#3.png	FIBER#4.png FIBER#5.png	FIBER#6.png	c	•
	File <u>n</u> ame: Files of type:	FIBER#1.png Image Files (*.jpg, *.png, *.bmp)		•	Qpen Cancel	
· · · ·			Injector Events		Import End Face	

CREATING A TRI-REPORT

USING OWLVIEW SOFTWARE

OWLVie

Analyzing End Face. Please Wait...

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.

🐺 OwlView for FiberOWL7			
<u>File E</u> dit <u>T</u> ools <u>H</u> elp			
Project List	Outsomer Info Installer Info Name Name Phone Phone Email Email Job Info Email Location HQ Injector End MC Standard EA/TIA SSC3 ~ Tester	Meter OTDR Trace	Veter End Face
	Summary Details Run Name FBR: Num 1 Image: Constraint of the second	Remove Trace Meter Events Event Type Event Start Event Start Cvent Start -2 m 10 m -47.93 dB -1.2 · m · m	Analyze End Face Remove End Face
	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 2.50 dB Pass/Fail Threshold -12.81 dBm -10.34 dBm -10.34 dBm Optical Power Measurement -10.98 dBm -10.87 dBm -10.87 dBm Optical Power Measurement 1.83 dB 1.97 dB Pess/Fail Pass Pess/Fail Pass Pass Pass Pass	Injector OTDR Trace	Injector End Face
×		Import Trace Injector Events	Import End Face

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.

1	PASS		non-fail defect	
×	FAIL		fail defects	
🖗 OwlView for FiberOWL7				
File Edit Tools Help				
	tild Cocation Meter Er * AF FINI HQ FR	Customer Inio Installer Info Name Phone Phone Phone Email Email Job Info Image of the second sec	Meter OTDR Trace	Meter Erd Face Image: Test Rule: IEC-51300-3-35 Zone Defects Scratches A:0 to 25µM Image: Scratches Scratches B: 25 to 115µ Image: Scratches Image: Scratches Image: Scratches Image: Scratches Scratches Image: Scratches Image: Scratches Image: Scratches Sensitivity Medium • Medium • Remove Analysis Remove Crud Face
-			Injector Events	Import End Face
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

STARTUP MENU

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

CERTIFICATION MENU

RESUME TESTING CREATE NEW LINK LOAD STORED LINK Resume testing the current project Create a new project 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 USER INFORMATION DISPLAY OPTIONS POWER OPTIONS UTILITIES MENU OTDR MENU CUSTOM STANDARD Miscellaneous functions Enter users name and phone number Configure display-related functions Configure power saving functions Configure device-related functions Configure OTDR-related functions 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 NEW LINK
 Create a new link – see LINK WIZARD section

 LOAD STORED LINK
 View, load, and delete stored data





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

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 currently selected run
- 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

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

- Project name / location
- Meter / Source ends
- 8 Run name information
- OTDR trace area
- dB loss wavelengths
- dB loss results
- fiber length
- test mode
- cabling standard
- number of connections
- fiber type
- number of splices





STORED TRACES LIST

TRACES view list of stored traces

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

- trace selection cursor
- \checkmark download status: checkmark indicates previously downloaded trace
- ወ context-sensitive help topics
- scroll through list of stored traces
- return to STORED LINKS screen \triangleleft
- \triangleright view trace details for currently selected trace
- load currently selected stored trace (to re-test a previously stored trace) LOAD delete currently selected trace DELETE PAGE
 - page down when there is more than one page of test stored traces

VIEW TRACE DETAILS

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

	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

- Project name / location 0
- Meter / Source ends 0
- Run name information €
- 0 OTDR trace area
- 6 dB loss wavelengths
- 0 dB loss results
- Ø fiber length
- 0 test mode
- 0 cabling standard
- O number of connections
- Ð fiber type
- D number of splices

DELETE STORED RUNS

DELETE	delete selected stored run(s)

- run selection cursor
- J download status: checkmark indicates previously downloaded run
- context-sensitive help topics ወ
- return to STORED LINKS screen

confirm deletion of selected stored run YES

- do not delete selected stored run (return to STORED LINKS screen)
- delete all stored runs
 - delete all previously downloaded stored runs









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



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 QUIT HELP

Save settings and return to SETUP MENU Exit without saving settings and return to SETUP MENU 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 HELP Save settings and return to SETUP MENU

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



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



Save settings and return to SETUP MENU

Exit without saving settings and return to SETUP MENU

Context-sensitive help

SETUP MENU POWER OPTIONS

POWER OPTIONS	- set duration for various power saving modes
DIMTIME	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
------	--

Context-sensitive help



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 CLOCKSet real-tiSET APD BIASSet avalaFORMAT DATA FLASHFormat daFACTORY RESETReset to fiMANUFACTURER SETUPNot usedPROGRAM CPLDNot usedVIEW SLIDESView slide

Set real-time clock Set avalanche photodiode bias voltage Format data storage Reset to factory defaults Not used Not used 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 III 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.



UTILITIES MENU III 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.



Proceed with format 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



Proceed with format Do not proceed with format and return to UTILITIES MENU



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



OTDR CONFIGURATION

OTDR MENU ⇒ OTDR SETUP

OTDR CONFIGURATION - configure OTDR operating parameters

OTDR CONFIGURATION – configure OTDR operating parameters			
		LENGTH UNITS	METERS
LENGTHUNITS	unit of length used during OIDR testing	FIBER INDEX	1,4681
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 EVENT PASS/FAIL	3.25 dB OFF
EOF EVENT THRESHOLD	required backscatter level prior to an event for that event to be	OTDR AUTO DEAD ZONE	FRONT
	the required backscatter level is considered the end of the fiber. Range of values: 3.25 to 9.99 dB	TAIL REMOVAL	OFF
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	SAVE QUIT	HELP
OTDR AUTO DEAD ZONE	the OTDR will use the first reflective event as the end of the launch cable cable in the fiber's length measurement. Options: OFF / FRONT	and will not inc	clude the launch
TAIL REMOVAL	the OTDR will attempt to remove any trace saturation tails cause by larg increase trace acquisition time and slightly lower the trace backscatter le Options: OFF / ON	e reflections. 1 evel.	This process will

Save settings and return to SETUP MENU SAVE

Exit without saving settings and return to SETUP MENU OUIT

Context-sensitive help HELP

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	R E L T M
	coefficient.	N
	Range of values: -58 to -85 dB	L
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	
MAXIMUMLOSS	The maximum loss an event can have before failing.	
	Range of values: 0.10 to 20.00 dB	



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



Save settings and return to SETUP MENU

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

OTDR MENU ⇒ SET BACKSCATTER COEFFICIENT

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

SET BACKSCATTER COEFFICIENT

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.



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 Singlemode fibe	types 62.5um OM1 / 50.0um OM2 / 50.0um OM3 / 50.0um OM4 / er types Indoor SM / Outdoor SM	SET CUSTOM STANDA FIBER TYPE
Scroll EDIT Selec EXIT Exit a HELP Conte	I through the list of fiber types t the fiber type to be edited; it is recommended to set up each fiber type nd return to the SETUP MENU ext-sensitive help	62.5um OM1
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)	62.5um 0M1 Wave (nm) Loss/km (d8) Max loss 0.00

GENERIC STANDARDS (link budget is <u>calculated</u> 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

62.5um OM1						
Wave (nm) Loss/km (dB) Max loss (dB) Min loss (dB) Max len	850 3.50 0.00 0.00	1300 1.50 0.00 0.00				
(m) 30 30 Reference Standard (dB) Sp1 loss (dB) 0.30 0.30						
SAVE QUIT HELP						

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.

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)



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



3

Wet the cotton toothpick tip with the isopropyl alcohol.

Remove the adapter cap from the power meter detector port.



91% Alcohol



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

BE VERY CAREFUL WHEN INSERTING THE WARNING! 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.



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



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.



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 OWL7+, 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.

B

3

"WET" CLEAN PROCEDURE

Wet the tip of a 2.5mm cleaning swab with isopropyl alcohol.



port.

D

Carefully insert the wet tip of the swab into the optical



Clean out the optical port according to the directions provided with the swabs.



5

Blow dry the optical port with the compressed air. If compressed air is not available, allow 2 minutes for the alcohol to evaporate.

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.

"DRY" CLEAN PROCEDURE

Carefully insert a dry 2.5mm cleaning swab or a 2.5mm HUXCleaner[™] into the optical port.





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:

Phone:

Internet:

Optical Wavelength Laboratories, Inc. N9623 US Hwy 12 Whitewater, WI 53190 262-473-0643

OWL-INC.COM

APPENDICES

SUPPORTED CABLING STANDARDS

The Fiber OWL 7+ supports the following fiber optic network cabling standards:TIA 568.3-DTIA 568C.31GBASE-SX1GBASE-LX10GBASE-S10GBASE-LX410GBASE-L10GBASE-E40GBASE-S40GBASE-LR4100GBASE-S100GBASE-LR10FTTH A/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 Fimware > 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.

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

Battery charger electrical specifications:

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