

# Optical Wavelength Laboratories

## OPERATIONS GUIDE

### FIBER OWL 7 SERIES BI-DIRECTIONAL CERTIFIERS

#### MODEL #s:

**F7BMS (MM / SM)**

**F7BMX (MM only)**

**F7BMV (MM / VFL)**

**F7BSX (SM only)**

**F7BSV (SM / VFL)**



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# 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

# INTRODUCTION

## DESCRIPTION

The Fiber OWL 7 BIDI is a high-accuracy, high-resolution, microprocessor-controlled optical loss test sets (OLTS) capable of performing a wide variety of testing applications, from basic optical loss measurement up to simultaneous bi-directional, dual-wavelength fiber link certification. With a wide measurement range and NIST-traceable wavelengths, the Fiber OWL 7 BIDI is ideal for both singlemode and multimode fiber link certification.

Enclosed in an attractive hand-held case made from high impact plastic and protected by a protective rubber boot, test readings and graphical help screens can be viewed on the color LCD, and an intuitive 10-key keypad allows for easy data entry.

Each Fiber OWL 7 BIDI is powered by re-chargeable lithium polymer batteries, typically allowing up to 50 hours of continuous use. A built-in auto-shutdown feature further conserves battery life. Batteries are re-charged through the USB port via supplied battery chargers.

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.

The data can also be downloaded to OWLView certification software to produce professional-looking formatted certification reports. OWLView software includes a “tri-report” option that integrates power meter certification, OTDR traces, and endface analysis results all on the same report (separate fiber microscope and OWL OTDR required for tri-report).

# APPLICATIONS

## PAIR MODE

**Fiber Optic Link Pair Certification.** PAIR mode is the fastest, easiest, and most innovative way to certify a fiber pair at up to two wavelengths simultaneously, including length measurement with each test, since bi-directional testing is not required by cabling standards; i.e. test direction does not matter.

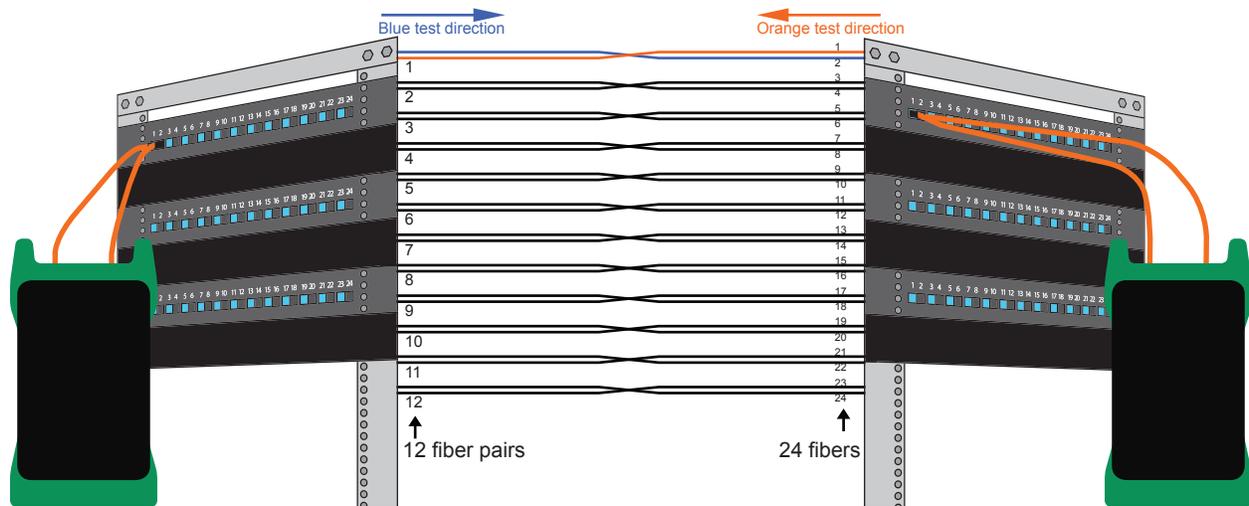
*PAIR mode is twice as fast as bi-directional link certification and much less confusing.*

Testing bi-directionally requires a two-step process: test in one direction, swap fiber ports, then test in the other direction. PAIR mode cuts testing time in half by eliminating the second (not required) direction, and keeps things simple by eliminating the often-confusing and error-prone step of swapping fiber ports.

*PAIR mode is twice as fast as traditional link certification.*

Traditional link certification certifies one fiber at a time. PAIR mode tests two fibers at a time, significantly speeding up the certification process. In addition, PAIR mode allows length measurement with each test, something that traditional link certification cannot do.

The Link Wizard in the Fiber OWL 7 uses attenuation parameters from popular cabling standards to certify fiber links, and shows complete PASS/FAIL test results for both fibers at both wavelengths, all on the same screen, right in the field.



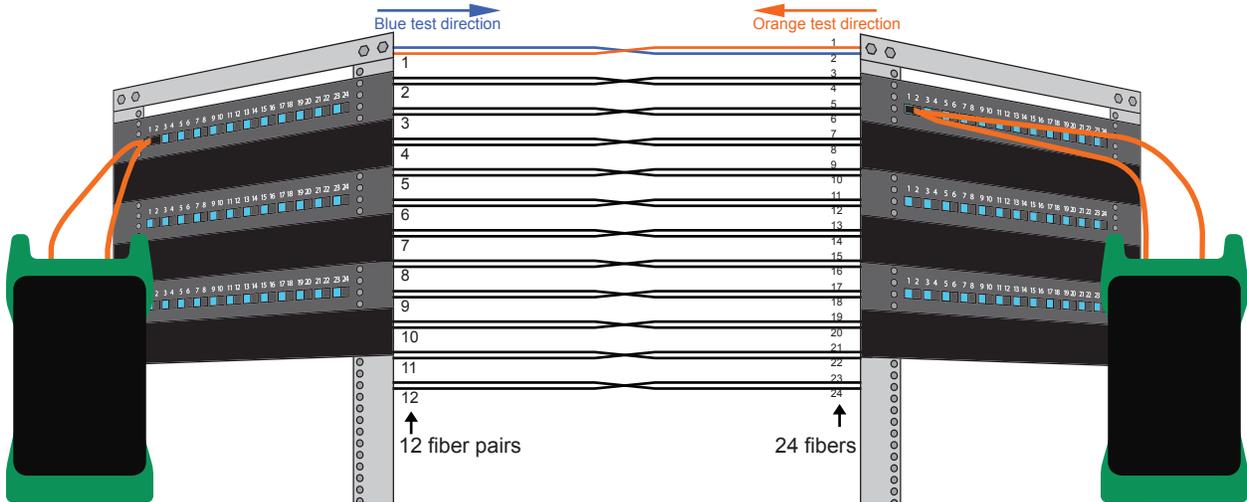
# APPLICATIONS

## BIDI MODE

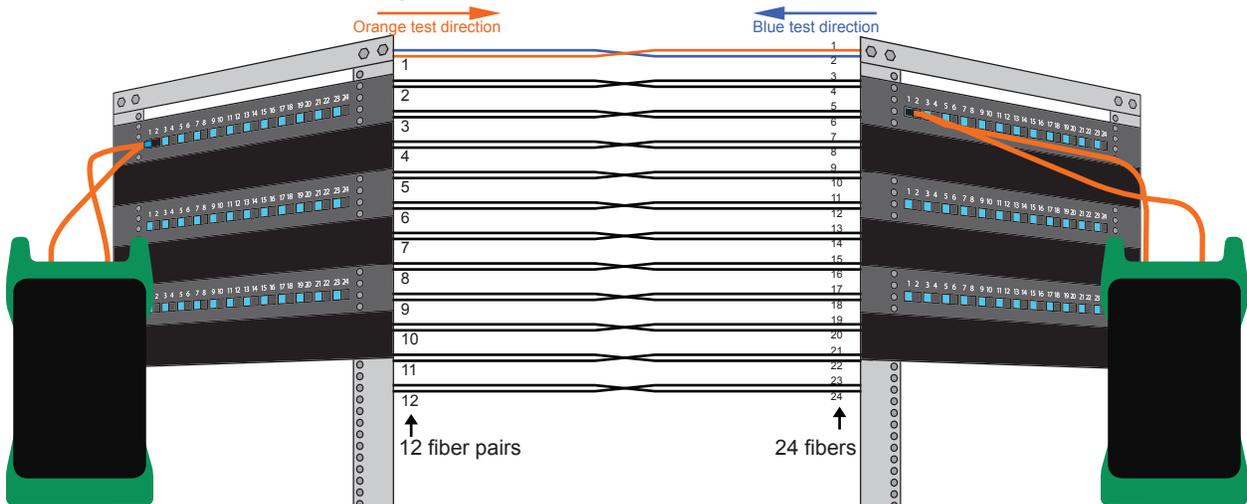
**Bi-directional (BIDI) Fiber Optic Link Certification.** Similar to PAIR mode, BIDI (bi-directional) mode allows users to quickly and conveniently certify a fiber pair in both directions at up to two wavelengths simultaneously, including length measurement with each test. Keep in mind that while bi-directional testing is not a requirement of cabling standards, it may still be required by the end user.

The Link Wizard in the Fiber OWL 7 uses attenuation parameters from popular cabling standards to certify fiber links, and shows complete PASS/FAIL test results for both fibers at both wavelengths, all on the same screen, right in the field.

Connect patch cables straight in to test in first direction



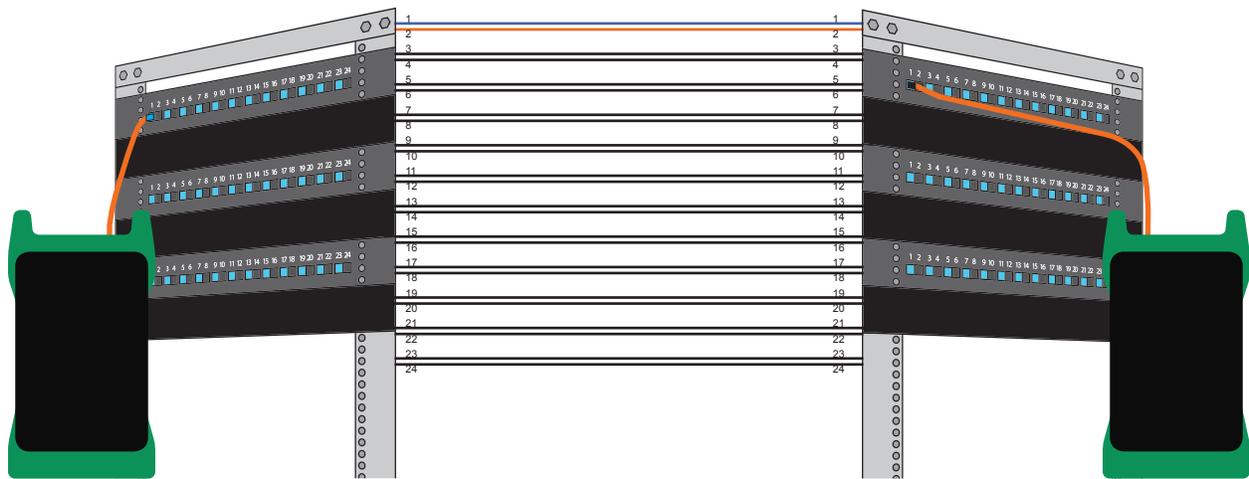
Cross patch cables to test in second direction



# APPLICATIONS

## CERT MODE

**Traditional Single-fiber Link Certification.** When the remote is set as a stand-alone light source (or a separate stand-alone source is available), CERT (certification) mode allows users to 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.



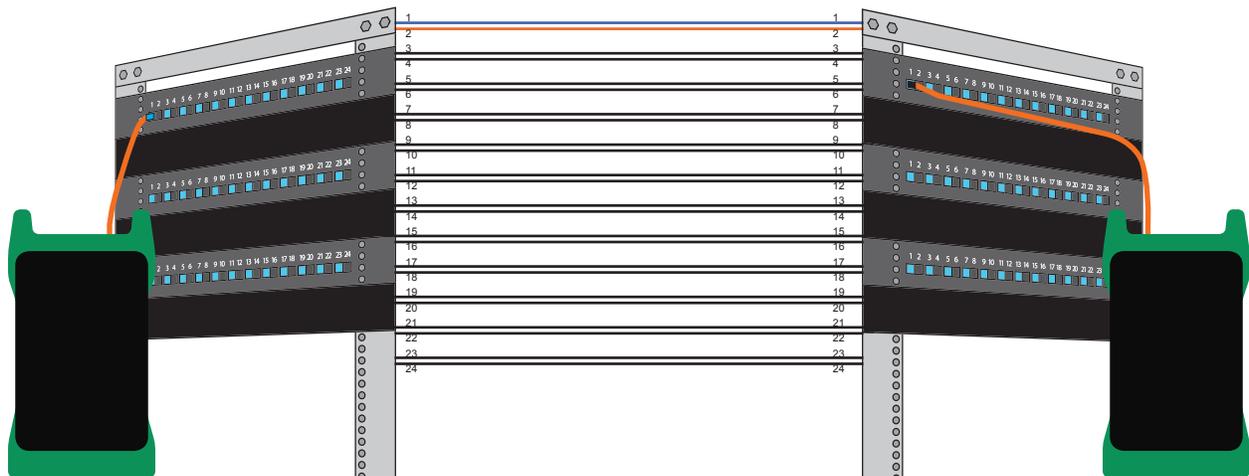
Remote used as stand-alone light source

# APPLICATIONS

## LOSS MODE

**Attenuation (Optical Loss) Measurements.** 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.

Loss mode requires the remote to operate as a stand-alone light source, or another stand-alone light source.



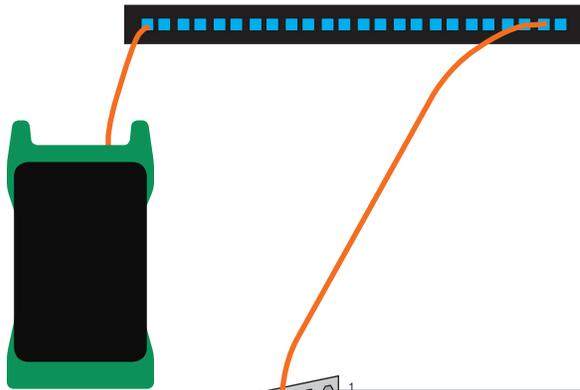
Remote used as stand-alone light source

# APPLICATIONS

## OPTICAL POWER MEASUREMENT

**Optical Power Measurements.** Optical power is an absolute measurement of the amount of light intensity; i.e. “brightness”, and can be measured either at the output of a transmitter (transmit power), or at the input of a receiver (receiver sensitivity). When in OPM mode, the Fiber OWL 7 can be directly attached to this equipment via a patch cord to check whether the transmitter is within the manufacturer’s specified power range.

Measure transmitter power directly from the equipment port...



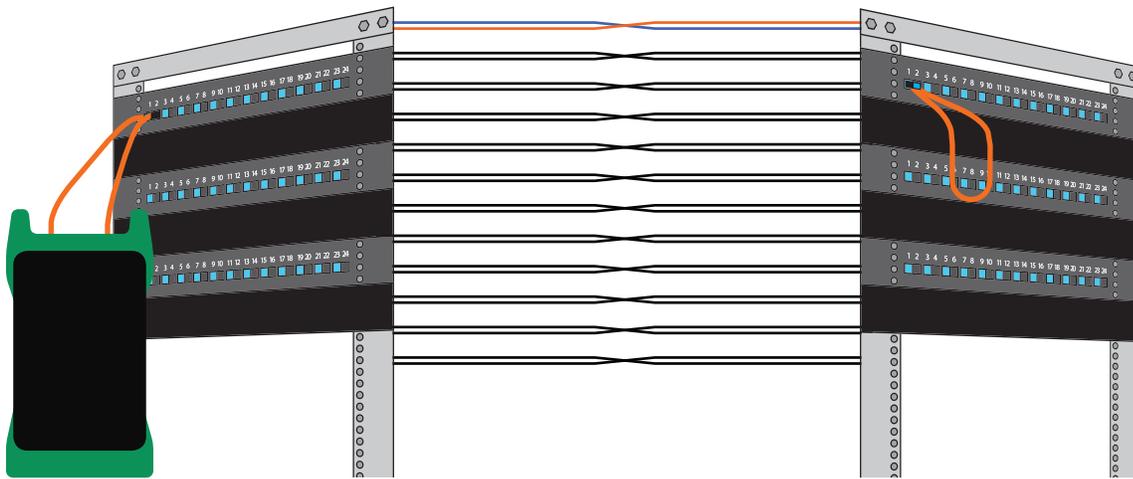
...or measure the transmitter power through the link.



# APPLICATIONS

## OPTICAL LENGTH MEASUREMENT

**Optical Length Measurement.** The Fiber OWL 7 can perform a “round-robin” optical length measurement using a pair of fibers in the link.



# APPLICATIONS

## TEST PATCH CORDS

**Patch Cord Testing.** Fiber links that are producing incorrect results may have bad patch cords. The Fiber OWL 7 can be used to measure the optical power through a patch cord to see if it is usable, or should be replaced.



# GENERAL FEATURES

## 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.



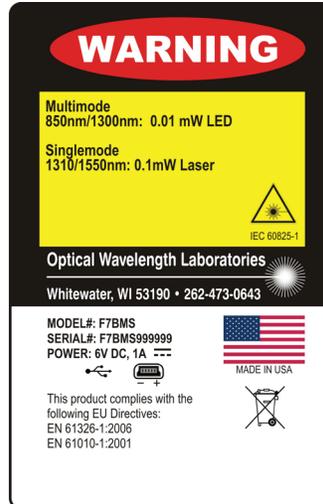
**Operational** - It is important to keep connector ferrules and optical connector ports clean. If dirt, dust, and oil are allowed to build up inside connector ports, irreparable damage may occur to the optics inside the port. For best results, replace dust caps after each use.



**Light Source Connectors** - Do NOT insert APC (Angled Physical Contact) connectors into the light source ports on your Fiber OWL 7 BIDI as this may damage the internal light source endfaces or the angled ferrule on the APC connector.

## LABEL

On the back of each unit is a label similar to the one shown below containing model number, serial number, power requirements, and special cautionary information.



# GENERAL FEATURES

**1: Universal Detector Port (OPM)** - includes two adapter caps: 2.5mm for popular 2.5mm ferrule connectors including ST, SC, and FC; and 1.25mm for LC, MU, and other SFF connectors.

**2: USB Download/Charger Port** - downloads stored data to a PC using the supplied USB download cable. Also used for charging the re-chargeable Lithium Polymer battery.

**3: Light Source Port (MM/SM/VFL)** - MM: (850/1300nm); SM: (1310/1550nm); VFL (650nm).  
Dual source port: LC connector (x2)  
Single source port: SC connector (x1)

**4: High-resolution Color LCD**

**5: Function Keys** - activates corresponding menu options shown at the bottom of the LCD display.

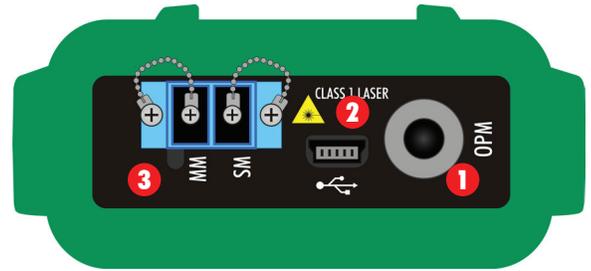
**6: Arrow Keys** - move the active cursor or pointer up, down, left, or right.

**7: Enter Key**

**8: Power Key** - power on or off the unit; on some screens, this key also accesses a context-sensitive help screen.

**9: Charging Status LED**

**10: Standby Status LED**



# SPECIFICATIONS

GENERAL			
Display Type	2.8" Color LCD		
Battery Type	Lithium Polymer		
Battery Life -- full brightness -- dim mode	<table border="0"> <tr> <td><i>MASTER</i> up to 25 hours up to 55 hours</td> <td><i>REMOTE</i> up to 20 hours up to 50 hours</td> </tr> </table>	<i>MASTER</i> up to 25 hours up to 55 hours	<i>REMOTE</i> up to 20 hours up to 50 hours
<i>MASTER</i> up to 25 hours up to 55 hours	<i>REMOTE</i> up to 20 hours 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)		

OPTICAL POWER METER (OPM) PORT -- RECEIVE	
Detector Type	InGaAs
Wavelengths	850, 980, 1300, 1310, 1490, 1550, 1625nm
Measurement Range	+5 to -70 dBm
Accuracy (Uncertainty)	±0.15 dB
Display Resolution	0.01 dB
Measurement Units	dBm, dB
Connector Type	Universal (2.5mm and 1.25mm)
Data Storage Points	<10,000
Download Port Connection	USB
Software	OWLView
Modes of Operation	PAIR, BIDI, CERT, LOSS, OPM
Length Measurement Range	up to 25 km
Length Measurement Accuracy	±2.5 meters

FIBER OPTIC LIGHT SOURCE (MM/SM) PORT -- TRANSMIT	
Type (MM / SM)	LED / FP Laser
Center Wavelength	850 +30/-10 nm 1300 ±50 nm 1310 ±30 nm 1550 ±30 nm
Spectral Width (FWHM)	850 nm: 50 nm 1300 nm: 180 nm 1310 nm: 2 nm 1550 nm: 2 nm
Output Power (MM / SM)	-20 dBm / -10 dBm
Initial Accuracy (Uncertainty)	±0.1 dB
Output Modes	CW, Modulated

VFL PORT	
Type (MM / SM)	Red Laser
Center Wavelength	650nm
Output Power	0 dBm (1mw)
Output Modes	CW, Modulated
Connector Type	2.5mm universal

# INTRODUCTION

## 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 Fiber OWL 7 series testers and the connectors on test 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.* Fiber OWL 7 series testers come standard with a two-year factory warranty, which covers manufacturer defect and workmanship only.

## SUPPORTED CABLING STANDARDS

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

## CONTACT INFORMATION

**Address:**

Optical Wavelength Laboratories  
N9623 Old Hwy 12  
Whitewater, WI 53190

**Telephone:**

262-473-0643

**Internet:**

OWL-inc.com

# INTRODUCTION

## ROLES

Each Fiber OWL 7 BIDI comes in a matched set of two units. Both units contain identical hardware, but are defined by their unique roles during setup and testing. For the purpose of this manual, the units will be called MASTER and REMOTE, based on their specific roles.

**MASTER** the MASTER functions as the “main” or “master” unit of the test set.

**REMOTE** the REMOTE functions as the “remote” unit of the test set.

The MASTER performs most of the functions of the test set, including test setup, display of test readings, and data storage; as the master unit, the MASTER controls the setup and testing process by sending commands to the REMOTE, which in turn sends its response and data back to the MASTER.

The diagrams below show what each unit looks like after they have been powered on. The MASTER shows the STARTUP MENU, while the REMOTE is waiting for commands from the MASTER.



# TEST PROCEDURES

## BEFORE YOU BEGIN

When using any fiber optic test equipment, it is assumed that the user is familiar with the basics of fiber optics testing, including link configuration and test procedures (such as “zeroing” and link budgets).

While Fiber OWL 7 BIDI fiber certifiers are able to test any fiber link configuration, the test procedures described in this section assume that the fiber link was properly designed, installed, and tested according to industry standard requirements and recommended “best practices”.

**NETWORK DESIGN.** Both ends of an installed fiber link should terminate at an interconnection, such as patch panels in telecom closets or wall outlets in work areas.

Interconnections provide an external connection point for any attached equipment -- whether it be active equipment or test equipment -- for the purpose of protecting fragile installed fiber from direct handling.

**REFERENCE METHOD.** The preferred reference method is the 1-JUMPER REFERENCE METHOD as defined in TIA/EIA-526-7 (singlemode) and TIA/EIA-526-14 (multimode). This method is called “1-jumper” because only one test jumper is connected between the test equipment light source port and power meter port during the process called “setting a reference” (a.k.a. “zeroing”).

To most technicians, it seems logical to connect two test jumpers together with an adapter -- one for the power meter and one for the light source -- to set a reference. However, this extra adapter introduces significant uncertainty into the reference power, resulting in a less accurate final insertion loss measurement.

Eliminating the second test cable and adapter with the 1-jumper method reduces uncertainty. While the loss of the second cable does become part of the loss measurement, the technician will check the second cable prior to actual testing to ensure it introduces only a small amount of loss. Doing so will improve the overall accuracy of the final insertion loss measurement.

**NOTE:** for non-standard link configurations, such as a patch panel on one end, or “home run” (i.e. no patch panels), technicians may need to adjust their test procedure and reference method accordingly.

# CERTIFICATION TESTING

## STEP 1: GATHER LINK SETUP INFORMATION

To make the setup process go more smoothly, have the following information ready in advance.

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

<b>Project</b>	Name of the overall project
<b>Location</b>	Building or geographic area where the fiber link is located
<b>Master End</b>	End of the fiber link where the master unit will be used
<b>Remote End</b>	End of the fiber link where the remote unit will be used

FIBER TEST MODE – how to go about testing the fiber link

<b>Test Mode</b>	PAIR or BIDI
<b>Standard</b>	Cabling standard used for the certification test; most technicians will use EIA/TIA 568C.3
<b>Test Cords</b>	Type or quality of the SOURCE PORT and OPM PORT test cords (standard grade vs. reference grade). These settings are considered to be the inter-connections at the ends of the fiber link; do NOT include these two interconnections when entering the number of connections on the LINK INFORMATION screen.

LINK INFORMATION – physical configuration of the link under test

<b>Fiber Type</b>	Type of fiber used in the link under test; options may vary based on chosen cabling standard
<b>Connections</b>	Number of interconnections in the link under test (patch panels, wall outlets, other mating sleeves). Do NOT include the connections at the far end of the link (see <b>TEST CORDS</b> above).
<b>Splices</b>	Number of splices in the link under test; can be either fusion or mechanical splices
<b>Reference Method</b>	1-jumper reference method

ENCIRCLED FLUX (MULTIMODE ONLY) – is EF compliance required for this test: YES or NO

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”), replacing the mandrel-wrapped reference cables.

FIBER PAIR SETTINGS – physical fiber pair orientation and fiber numbering

<b>Fiber Pair Geometry</b>	Refers to the order of the optical fiber strands from left to right as they are installed behind patch panels OPTIONS: STRAIGHT or CROSSED STRAIGHT – also called ‘consecutive-fiber positioning’, fibers are arranged consecutively (e.g. 1-12) on both ends of the link. One end of the link has adapters installed with ‘keys up’ and the other end has adapters installed ‘keys down’. CROSSED – also called ‘reverse-pair positioning’, fibers are arranged consecutively (e.g. 1-12) on one end of the link, but each duplex pair is reversed on the other end (i.e. 2,1 4,3 6,5 etc.). Both ends of the link have adapters installed with ‘keys up’. <i>NOTE: for vertically-mounted duplex adapters, ‘keys up means the keys face to the left, while ‘keys down’ means the keys face to the right.</i>
<b>Number Fiber Pairs By</b>	Sets the test result numbering system, either by individual strand or by duplex fiber pair, based on the fiber pair geometry described above. OPTIONS: STRAND or PAIR STRAND – test results are numbered by individual fiber strand PAIR – test results are numbered by duplex pair, with each fiber labeled individually within the duplex pair.

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

<b>Name</b>	The name used to identify the group of individual fiber strands in the link
<b>Number</b>	The starting fiber strand number in the link. The number will be automatically incremented as the test results are saved.

# LINK PLANNING WORKSHEET

Fill out the blanks below with information about the link under test. This information will help you plan out the key information about the link, and will be used to enter the link setup information in the MASTER.

## PROJECT INFORMATION

Project Name:

Location:

## LINK CONFIGURATION INFORMATION

Fiber Type:

Standard:

Connections:

Splices:

Test Mode: PAIR BIDI CERT LOSS

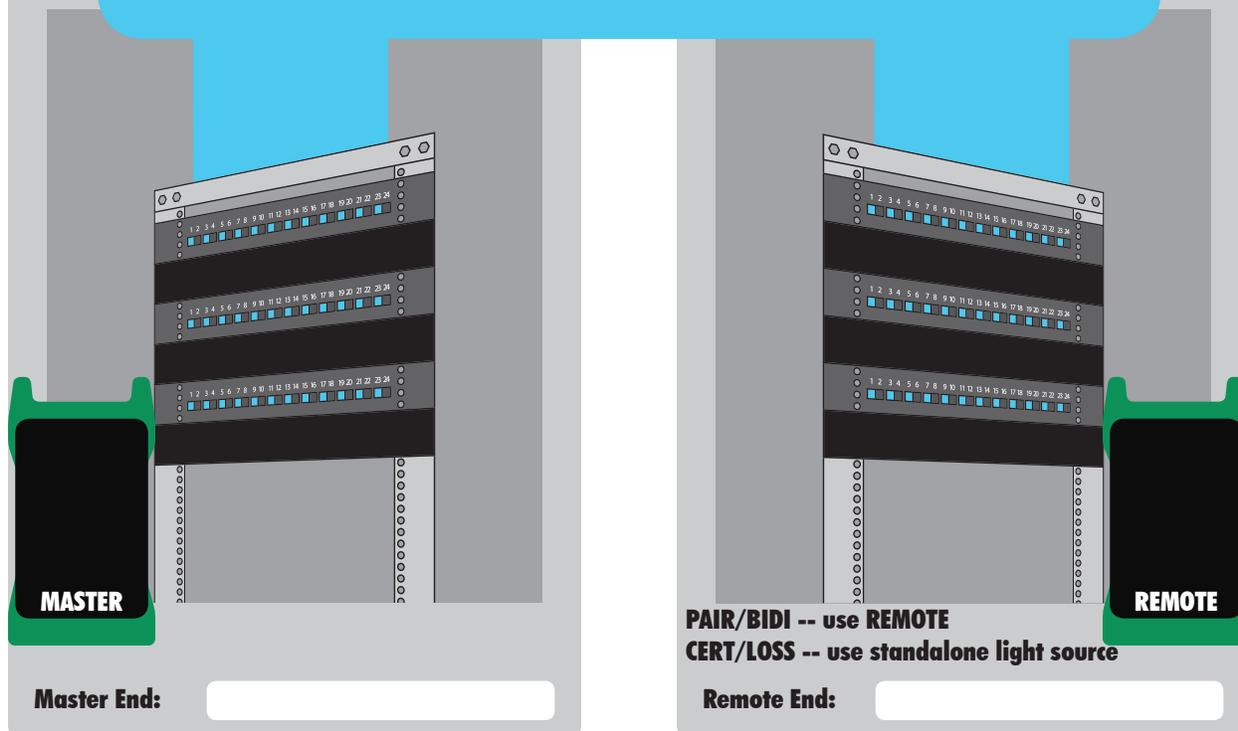
\*Length (m):

Reference Method:  -jumper

\* for manual length entry in CERT mode only

Source Port Test Cord: REFERENCE STANDARD

OPM Port Test Cord: REFERENCE STANDARD



## ENCIRCLED FLUX COMPLIANCE (MULTIMODE TESTING ONLY)

Is Encircled Flux compliance testing required? YES NO

## FIBER PAIR SETTINGS (PAIR/BIDI MODES ONLY)

Fiber Pair Geometry: STRAIGHT CROSSED

Number Fiber Pairs By: STRAND PAIR

## RUN NAME SETTINGS

Fiber Group Name:

Starting Fiber Number:

# KEY TEST PARAMETERS

## FIBER STANDARD

Fiber standards are a common set of rules or guidelines written by various national and international standards organizations for the purpose of defining criteria used to determine a PASS/FAIL reading (i.e. "good or not").

Most testing should use the EIA/TIA 568 suite of standards, but there are many other choices. Below is a list of standards defined in the Fiber OWL 7 BIDI fiber certifier:

EIA/TIA 568-C.3	EIA/TIA 568.3-D	1000BASE-SX	1000BASE-LX
10GBASE-S	10GBASE-LX4	10GBASE-L	10GBASE-E
40GBASE-S	40GBASE-LR4	100GBASE-S	100GBASE-LR10
FTTH CLASS A/B/C			

## TEST MODE

Fiber OWL 7 BIDI fiber certifiers can certify fiber links in three different ways:

- BIDI** Certifies two fibers in a fiber pair simultaneously, one fiber in one direction and the other fiber in the opposite direction, then the fibers are swapped at both ends to certify the fibers in the opposite directions
- PAIR** Certifies two fibers in a fiber pair simultaneously, one fiber in one direction and the other fiber in the opposite direction (minimum requirement for standards-based certification)
- CERT** Certifies fiber cable in one direction on one fiber at a time

## FIBER TYPE

The following terminology may appear during fiber type selection:

### Fiber types

62.5	62.5/125µm multimode
50	50/125µm multimode
SM	singlemode

### Link types

CS1	terminates at a wall outlet on one end (Cabling Subsystem 1; also called horizontal)
CS2	terminates at a patch panel on both ends (Cabling Subsystems 2/3; also called backbones)
Indoor	does not extend past the building's outside wall
Outdoor	extends past the building's outside wall
In/Out	when indoor/outdoor fiber cabling is used, but the link does not extend past the building's outside wall

### Special designations

OM1	62.5/125µm multimode
OM2	standard 50/125µm multimode
OM3	laser-optimized 50/125µm multimode @ 2000 MHz-km bandwidth
OM4	laser-optimized 50/125µm multimode @ 4700 MHz-km bandwidth
OS1/OS2	singlemode

# KEY TEST PARAMETERS

## FIBER TYPE - Link Types

Horizontal	terminates at a wall outlet on one end, and a patch panel on the other end
Backbone	terminates at a patch panel on both ends
Indoor	fully enclosed inside a building
Outdoor	extends past a building's outside wall

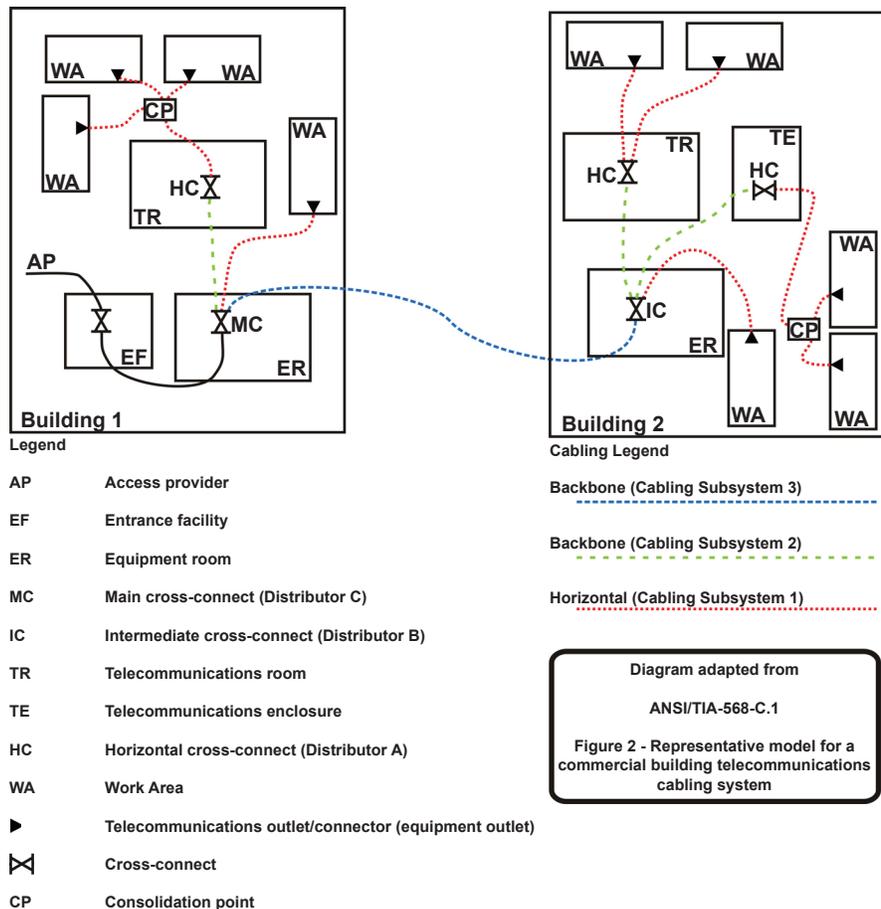
Horizontal links: .....  
 are typically indoor-only links  
 may include a consolidation point (CP)

Backbone links could be:  
 indoor .....  
 outdoor .....

If testing a combination of horizontal and backbone links in the same test, the link should be considered to be a backbone link

Indoor links can use fibers rated as indoor, outdoor, or indoor/outdoor

Outdoor links must use fibers rated as outdoor or indoor/outdoor



# KEY TEST PARAMETERS

## TEST CORD TYPE

Introduced with the release of the TIA 568-3.D cabling standard, allowable loss of interconnections at the very ends of the fiber link (where the testers connect to the fiber under test) will vary depending upon the quality of the test cord.

The options are standard-grade vs. reference-grade test cords.

These are automatically counted as interconnections, and should not be counted as normal interconnections (see below).

## CONNECTIONS

Connections refer to mid-span interconnections in the link under test, but do NOT include the interconnections at the very ends of the link (where the test cables connect).

Types of interconnections include:

Cross-connects                      connection points found in equipment rooms and cabling closets, such as at cross connects (MC, IC, HC) that occur between (but do not include) the end-points of the fiber link under test

Consolidation points                patch panel conveniently placed near a group of closely situated work areas that allows the work areas to connect into a common backbone cable without using a dedicated horizontal cross-connect or cabling closet

## SPLICES

Splices can be either fusion or mechanical.

When splices are used, they are typically found in singlemode fibers (where fiber pigtails are permanently fusion-spliced onto the installed fiber link).

However, some multimode fiber connectors use mechanical-splice technology for termination, also referred to as “no-polish, no-epoxy” (NPNE) connectors. It is at the discretion of the technician whether or not to include the NPNE connectors as splices in link budget calculations.

# KEY TEST PARAMETERS

## ENCIRCLED FLUX

Encircled Flux (EF) is a recent evolution in standards-based multimode fiber testing developed as an attempt to further decrease uncertainty between optical loss measurements taken with different manufacturer's test equipment, or with the same test equipment but at a different time.

EF-compliant testing requires a special multimode reference cable called a Mode Controller that ensures light exiting any EF-compliant Mode Controller reference cable always has a consistent modal pattern, no matter which manufacturer's multimode light source was used.



The use of EF-compliant test cables is typically focused on testing OM3/OM4 multimode fiber networks running at 10-gigabit or greater, and usually only when a cabling standard specifies it. Technicians should consult customer documents or applicable cabling standards to verify if EF-compliant testing is required.

However, EF-compliant testing can be performed on any multimode network provided the correct mode controller cable is used.



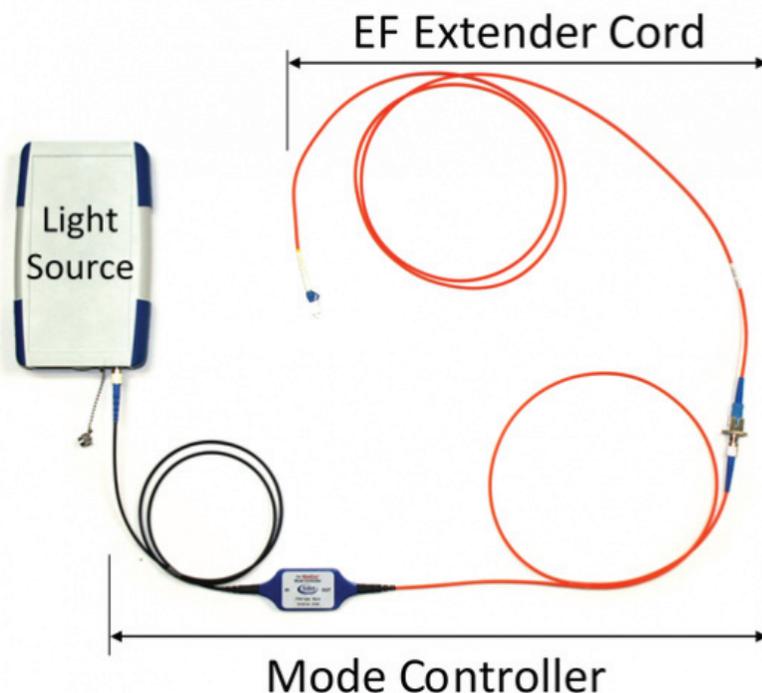
**NOTE: the TIA 568-3.D cabling standard requires EF compliance when testing any multimode network.**

**Mode Controller Cable Maintenance.** If the output endface of an EF mode controller cable becomes damaged, it is no longer compliant to EF requirements. Due to the fragile nature of these endfaces and the extremely high cost of EF Mode Controllers, it is vitally important to protect the output endface from damage.

Encircled Flux extender cords are low-loss reference grade patch cables that provide two economical advantages:

1) EF extender cords act as sacrificial cords that protect the fragile output endface of the more expensive mode controller cable i.e. replacing extender cords costs less than replacing EF mode controllers; and

2) adapt the EF Mode Controller output to different connector types i.e. one mode controller and several extender cords are less expensive than multiple mode controllers



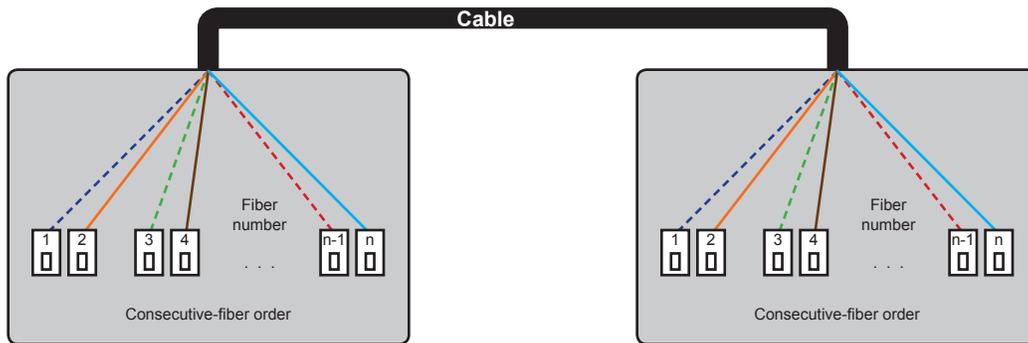
# KEY TEST PARAMETERS

## FIBER PAIR GEOMETRY

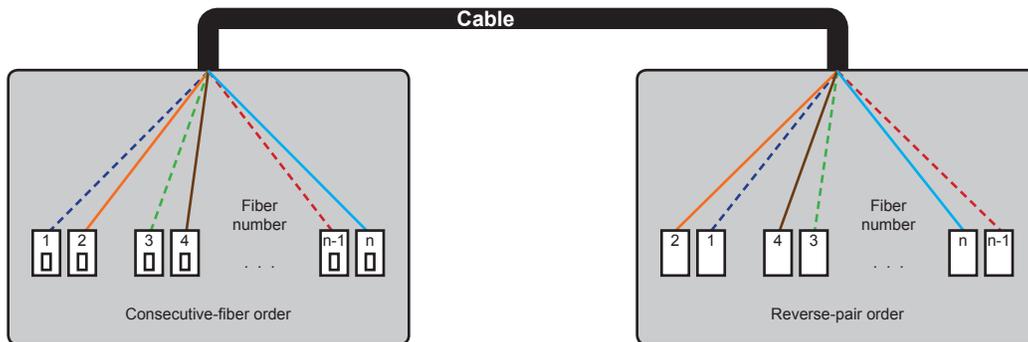
The TIA 568-3.D cabling standard includes instructions on how to maintain polarity for duplex fiber installations, ensuring that “transmit” always goes to “receive”. Fiber OWL 7 series testers keep track of FIBER PAIR GEOMETRY: 1) to maintain polarity during testing by displaying helpful connection diagrams; and 2) to keep track of the direction of the test for each fiber under test.

TIA 568-3.D Annex C defines two methods for maintaining proper duplex polarity: consecutive-fiber positioning (STRAIGHT) and reverse-pair positioning (CROSSED). The diagrams below are adapted from the standard.

*Consecutive-fiber positioning.* Fibers are arranged consecutively (e.g. 1-n) from left to right on both ends of the link. Behind the patch panel, all connectors are installed “keys up”.



*Reverse-pair positioning.* Fibers are arranged consecutively (e.g. 1-n) on one end of the link, but each duplex pair is reversed on the other end (i.e. 2,1 4,3 6,5 etc.). Behind the patch panel, the consecutive-fiber side connectors are installed “keys up” while the reverse-pair side connectors are installed “keys down”.



# KEY TEST PARAMETERS

## REFERENCE METHOD

Reference methods refer to the number of patch cables required to properly set a reference between the power meter and light source used for testing (also referred to as “zeroing”).

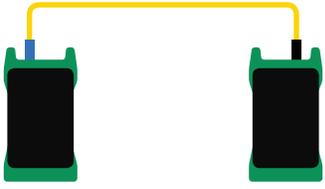
Setting a reference involves recording a baseline optical power level (called a reference) between a power meter and light source prior to taking measurements. The difference between this reference level and the link power measurement is called optical loss.

The most commonly used standard for defining reference methods is the EIA/TIA 526. This standard allow three methods: 1-jumper, 2-jumper, and 3-jumper.

To comply with industry recommendations, the 1-jumper reference method is preferred. This method eliminates mating sleeves from the optical reference, thereby minimizing uncertainty in the measurement.

Technicians should always use the 1-jumper reference method whenever possible, unless there is a situation where using other methods cannot be avoided.

Instructions in this manual assume the 1-jumper reference method.



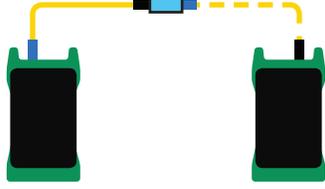
**1-jumper reference method**

Preferred by national and international cabling standards

Setting a reference through one patch cable eliminates mating sleeves, thus minimizing uncertainty in optical loss measurements

Additional “known good” test cable is required to connect power meter in to link under test

Can also be used to test links with an interconnection on only one end as long as the interconnection matches the connector type on the power meter detector port



**2-jumper reference method**

Most logical “looking” method, but is not preferred because the additional mating sleeve introduces unwanted error in optical loss measurements

Typically used when 1-jumper method does not work; e.g. when the interconnections on the end of the fiber link are not compatible with the connector ports



**3-jumper reference method**

Typically used when the fiber under test does not include interconnections on the ends of the fiber link

Examples:

- Patch cables
- Fiber on the spool
- Complex optical fiber cable assemblies

Channel testing (includes both the installed fiber link and the station cables in the test)

# REQUIRED ACCESSORIES

## STEP 2: GATHER ACCESSORIES

Testing with BIDI and PAIR modes will require:

- (2) reference cables
- (2) additional test cables
- (2) mating sleeves
- (2) fiber optic mandrels -- 0.7" for OM1, 0.9" for OM2/OM3/OM4 (for all standards except 568.3-D)

Testing with CERT mode will require:

- (1) reference cables
- (1) additional test cables
- (1) mating sleeves
- (1) fiber optic mandrels -- 0.7" for OM1, 0.9" for OM2/OM3/OM4 (for all standards except 568.3-D)

NOTE: if testing with the TIA 568.3-D standard, Encircled Flux cables will replace the reference cables and mandrels.

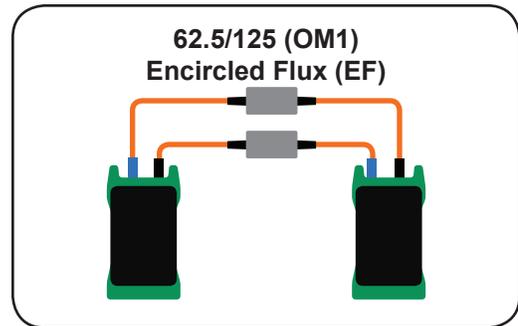
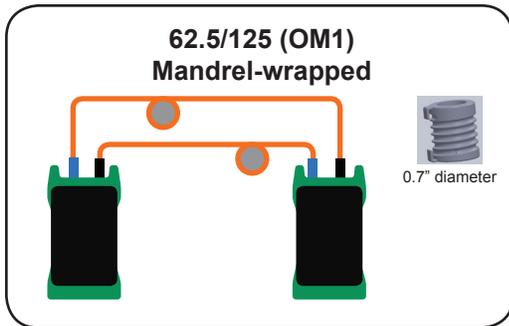
# REQUIRED ACCESSORIES

## REFERENCE CABLES AND MANDRELS

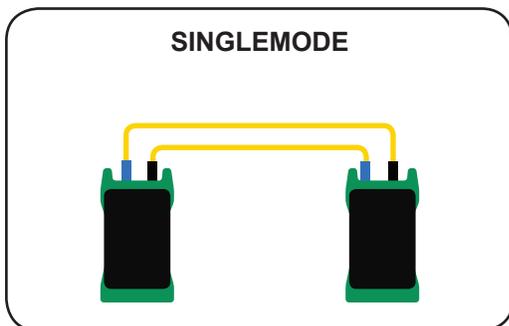
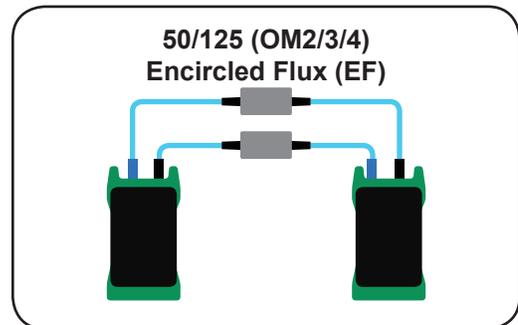
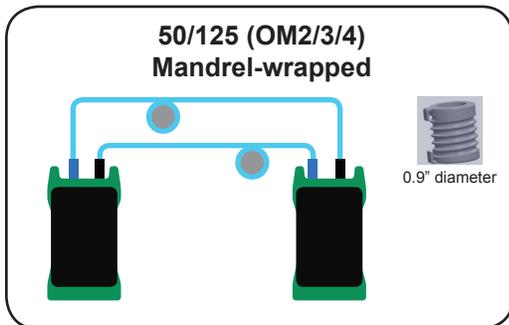
REFERENCE CABLES (2 each): used to set references (aka “zeroing”), and connect the light source (transmit) ports into the link during testing. Each test unit includes a transmit port and receive port, thus the need for 2 cables.

Please note whether these reference cables are standard-grade or reference-grade.

There are five different types of reference cables that could be used, depending upon the fiber type of the link under test and the test parameters:



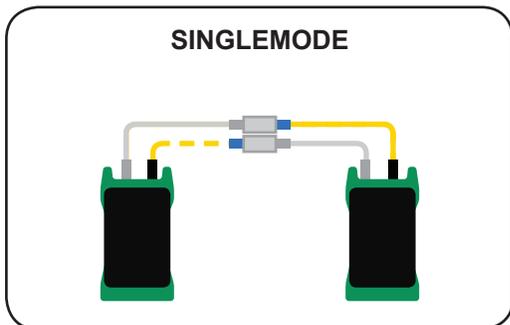
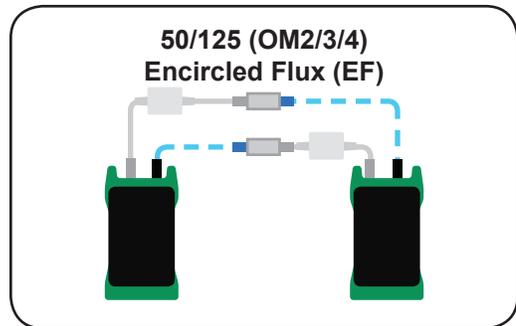
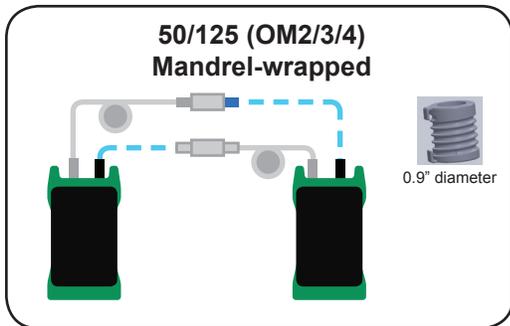
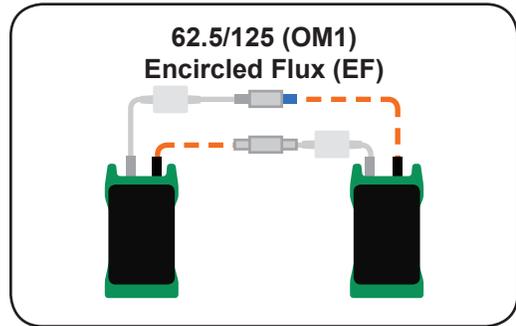
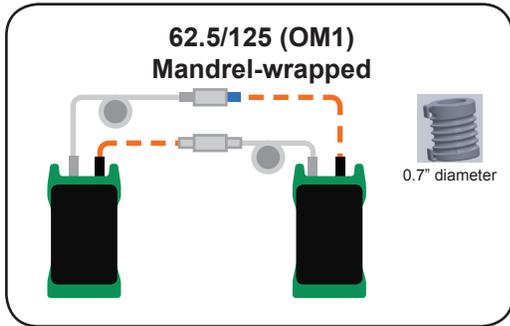
 **NOTE:** EF cables are always considered as reference-grade.



# REQUIRED ACCESSORIES

## ADDITIONAL TEST CABLES

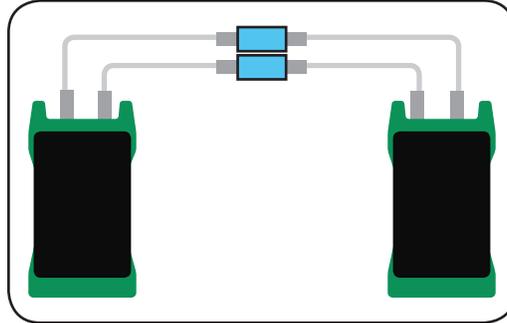
ADDITIONAL TEST CABLES (2 each): used to provide the connection between the detector (receiver) port and the link under test.



# REQUIRED ACCESSORIES

## MATING SLEEVES

MATING SLEEVES (2 each; one for each set of test cables): used to verify the quality of the additional test cables by temporarily connecting them to the reference cables; duplex mating sleeves also work for this purpose.



# BIDI MODE

## OVERVIEW

The Link Wizard is the name of the process used to set up the Fiber OWL 7 BIDI for a certification test. During the Link Wizard, the user will input job-related information and key test parameters, set the optical reference, and verify the quality of any additional test cables.

This section will walk the user through the Link Wizard for a typical bi-directional certification test using **BIDI** mode. It is assumed the link has patch panels on both ends of the fiber link under test, and the user is using the 1-jumper reference method.

**PAIR** and **CERT** test modes also utilize the Link Wizard. Users should be able to adapt this **BIDI** mode example to **PAIR/CERT** mode tests.

## STARTUP

All related test parameters entered into the Link Wizard will occur in the MASTER unit.

The REMOTE unit is not needed until the SET REFERENCE step, and may be set aside until then.

Press the Power button  on the MASTER. The STARTUP MENU will appear when the MASTER has completed powering on.



# BIDI MODE

## CREATING A NEW LINK

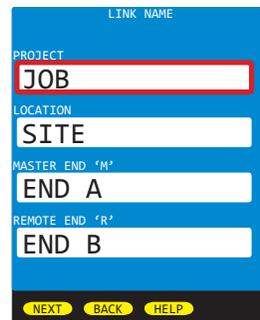
- 1    
 highlight the CREATE NEW LINK menu option  
 activate CREATE NEW LINK menu option



- 2 **LINK NAME** -- information about the job as a whole

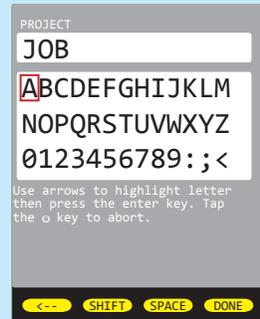
PROJECT name of the project (ex. *client's company name*)  
 LOCATION physical location of the job (ex. *building where the job occurs*)  
 MASTER END 'M' location where the MASTER will be used  
 REMOTE END 'R' location where the REMOTE will be used

-  open the on-screen keyboard to enter alpha-numeric or special characters  
  navigate between entry fields



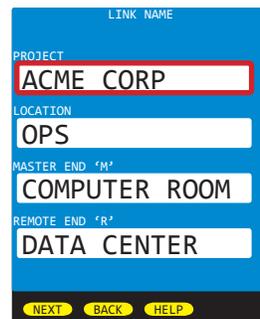
### ALPHA-NUMERIC / SPECIAL CHARACTER ENTRY

-     Move red character selection box  
 Enter selected character into entry field
- < -- Backspace  
 SHIFT Grid with lower case letters and other special characters  
 SPACE Add a space  
 DONE Enters the selected characters into the final entry field



- 3 **NEXT** Accept LINK NAME data as entered and continue  
**BACK** Go to previous screen  
**HELP** Access context-sensitive help

Example:  
 the client is ACME CORP;  
 the fiber network is located in their operations (OPS) building;  
 the MASTER will be used in the COMPUTER ROOM; and  
 the REMOTE will be used in the DATA CENTER.



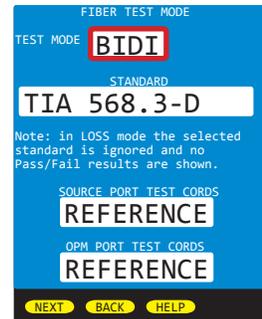
# BIDI MODE

## CREATING A NEW LINK, cont.

### 4 FIBER TEST MODE -- defines overall test 'rules' (see KEY TEST PARAMETERS for details)

TEST MODE	<b>BIDI</b>
STANDARD	<b>TIA 568.3-D</b>
SOURCE PORT TEST CORDS	<b>REFERENCE</b>
OPM PORT TEST CORDS	<b>REFERENCE</b>

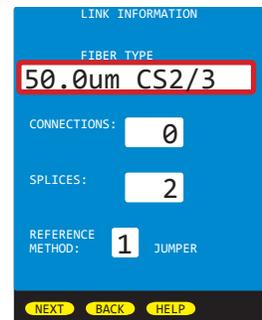
NEXT Accept FIBER TEST MODE data as entered and continue  
BACK Go to previous screen  
HELP Access context-sensitive help



### 5 LINK INFORMATION -- defines the physical link characteristics and reference method (see KEY TEST PARAMETERS for details)

FIBER TYPE	<b>50.0um CS2/3</b>
CONNECTIONS	<b>0</b>
SPLICES	<b>2</b>
REFERENCE METHOD	<b>1-jumper</b>

NEXT Accept FIBER TEST MODE data as entered and continue  
BACK Go to previous screen  
HELP Access context-sensitive help



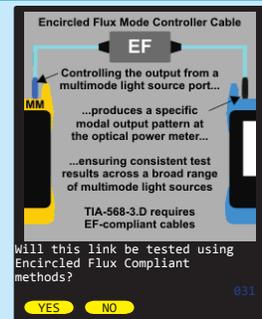
### ENCIRCLED FLUX (EF) MODE CONTROLLER CABLE

This help screen will appear if the user selected a multimode fiber type.

With the release of the TIA 568.3-D cabling standard, multimode networks must be tested with EF-compliant test methods and special reference cables called EF Mode Controllers. EF compliance is optional for all other standards.

The output of EF Mode Controllers is always to be considered as "REFERENCE GRADE".

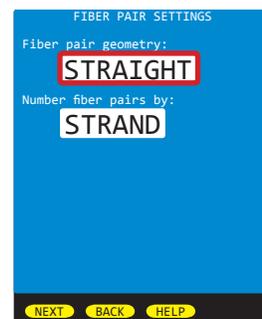
Answering 'NO' to this question will return the user to the LINK INFORMATION screen. To select a different standard, go back to the FIBER TEST MODE screen.



### 6 FIBER PAIR SETTINGS -- defines fiber orientation and fiber numbering scheme (see KEY TEST PARAMETERS for details)

Fiber pair geometry	<b>STRAIGHT</b> (fibers are installed 1-n from left to right)
Number fiber pairs by	<b>STRAND</b> (give each fiber a separate fiber number)

NEXT Accept LINK NAME data as entered and continue  
BACK Go to previous screen  
HELP Access context-sensitive help



# BIDI MODE

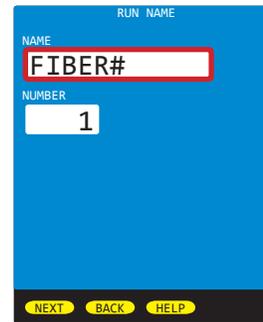
## CREATING A NEW LINK, cont.

### 7 RUN NAME -- format: (NAME)(NUMBER)

NAME 11-character prefix  
NUMBER starting fiber number

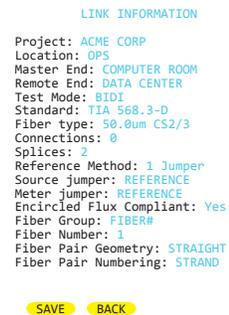
Example: FIBER#1 through FIBER#n

NEXT Accept RUN NAME as entered and continue  
BACK Go to previous screen  
HELP Access context-sensitive help



### 8 LINK INFORMATION REVIEW SCREEN

SAVE Accept LINK INFORMATION data as shown and continue  
BACK Go to previous screen

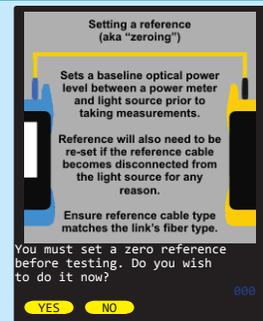


### SETTING A REFERENCE

This help screen will appear when the optical reference need to be set (a.k.a. “zeroing out” the test equipment).

It is recommended to set a reference at this time.

Press YES to continue.

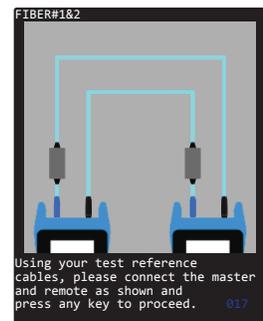


### 9 SET REFERENCE CONNECTION DIAGRAM -- demonstrates how to connect the MASTER and REMOTE together for the purpose of setting a reference.

The reference cables diagram is based on the fiber type and standard selection:

Singlemode yellow  
50/125um light blue; either with a mandrel wrap or an EF mode controller cable  
62.5/125um orange; either with a mandrel wrap or an EF mode controller cable

Do **NOT** press any key at this time.



# BIDI MODE

## SETTING THE OPTICAL REFERENCE

- 10 Power ON the REMOTE unit.

Once the REMOTE is fully powered on, the screen will say "Waiting for response from master..."



# BIDI MODE

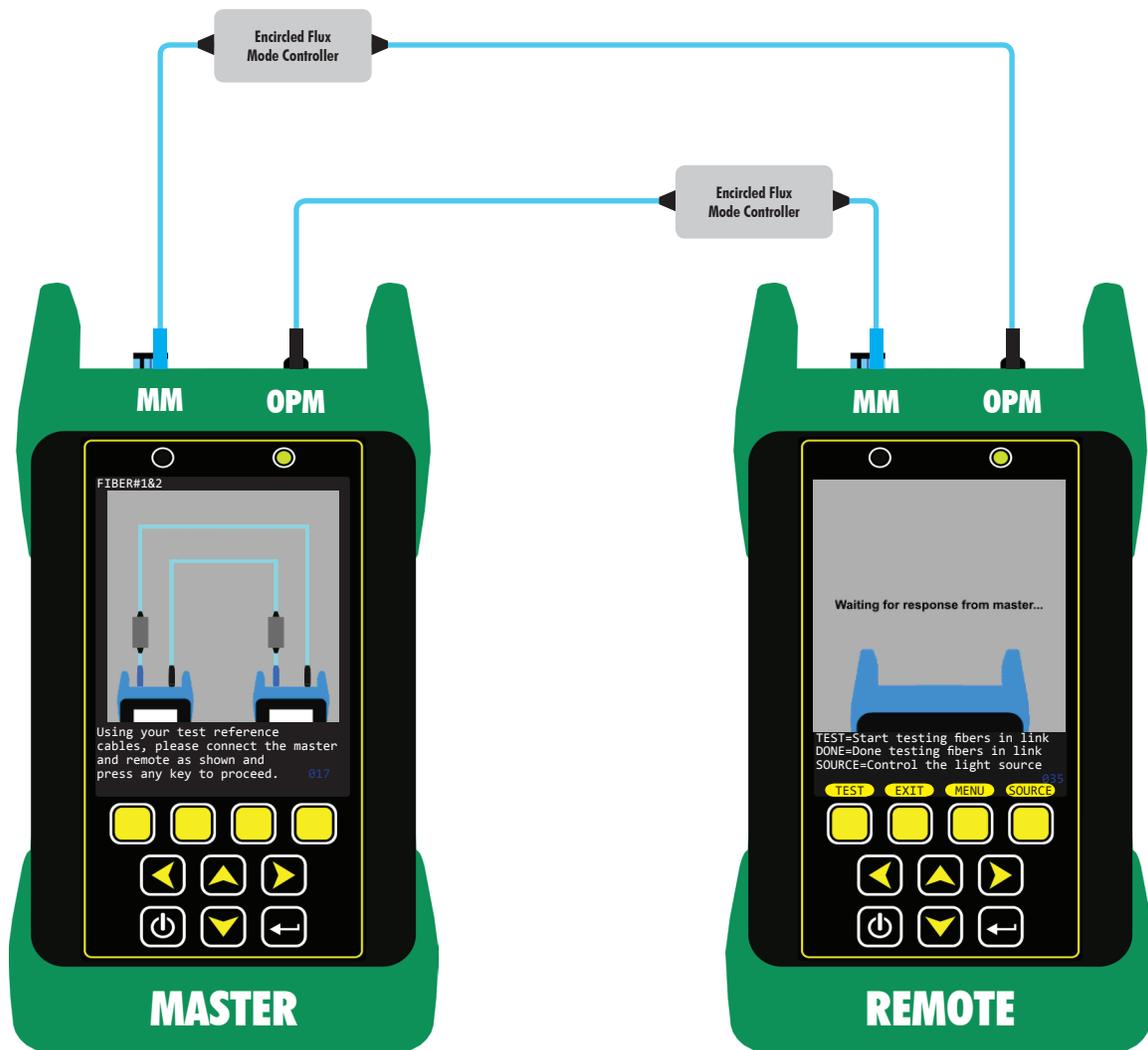
## SETTING THE OPTICAL REFERENCE

- 11 Connect the MASTER and REMOTE together with the appropriate reference cables, as shown on the MASTER screen.

In this example, the input of the EF mode controller is connected to the MM port on each unit, and the output of the EF mode controller is inserted into the OPM port.

Once the MASTER and REMOTE are connected as shown, press any key on the MASTER to continue.

The MASTER and REMOTE will begin communication, and the MASTER will show the progress of the communications.

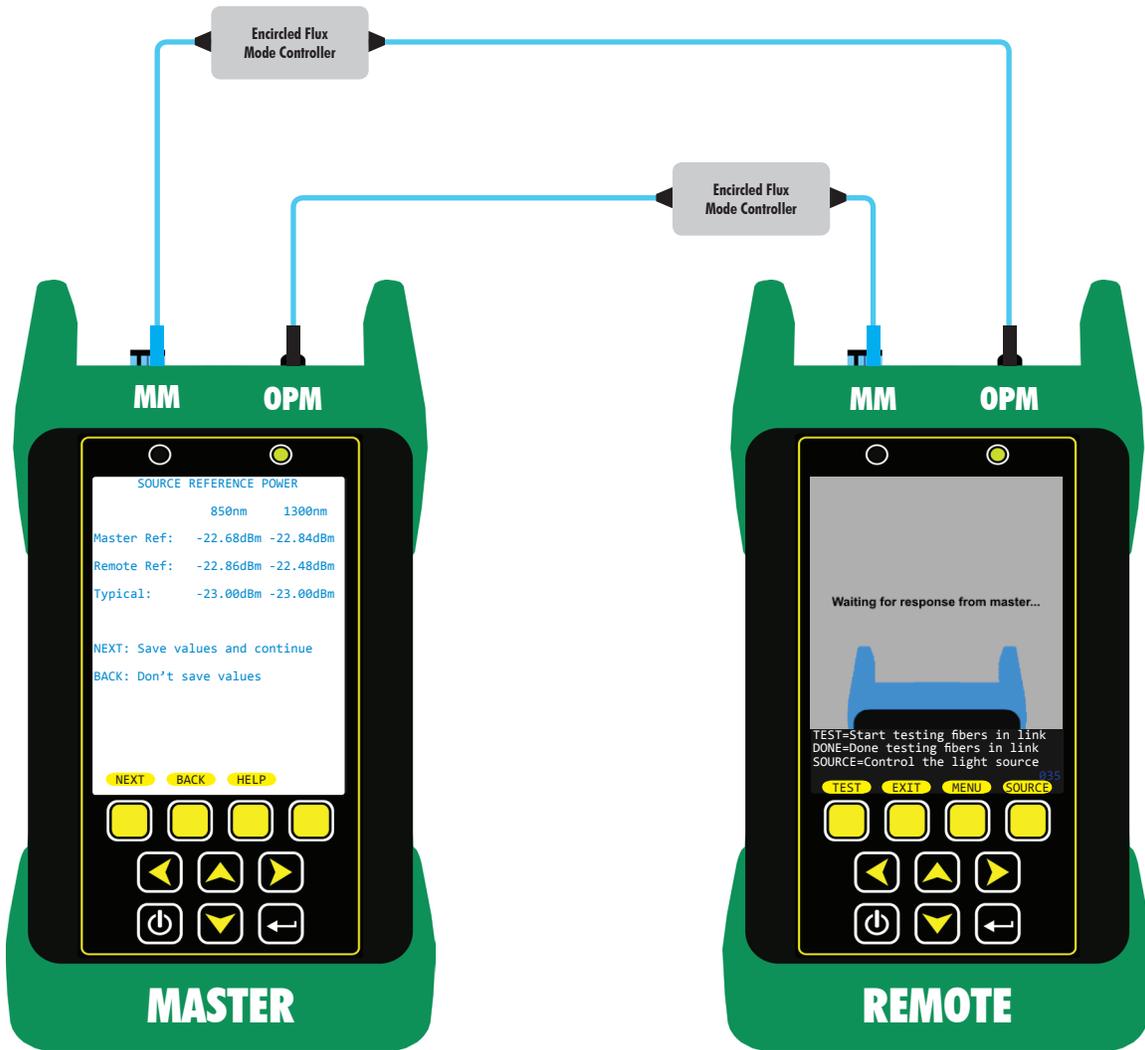


# BIDI MODE

## SETTING THE OPTICAL REFERENCE

- 12 Once the reference has been set, the SOURCE REFERENCE POWER will be shown for both units in both directions.

Press NEXT on the MASTER to accept the reference values and continue.



# BIDI MODE

## CHECKING THE ADDITIONAL TEST CABLE

- 13 The MASTER will now prompt the user to check the additional test cable to ensure it does not introduce too much additional loss into the final loss measurement.

The helpful slide explains why checking the additional test cable is recommended.

Press YES on the MASTER to continue.



# BIDI MODE

## CHECKING THE ADDITIONAL TEST CABLE

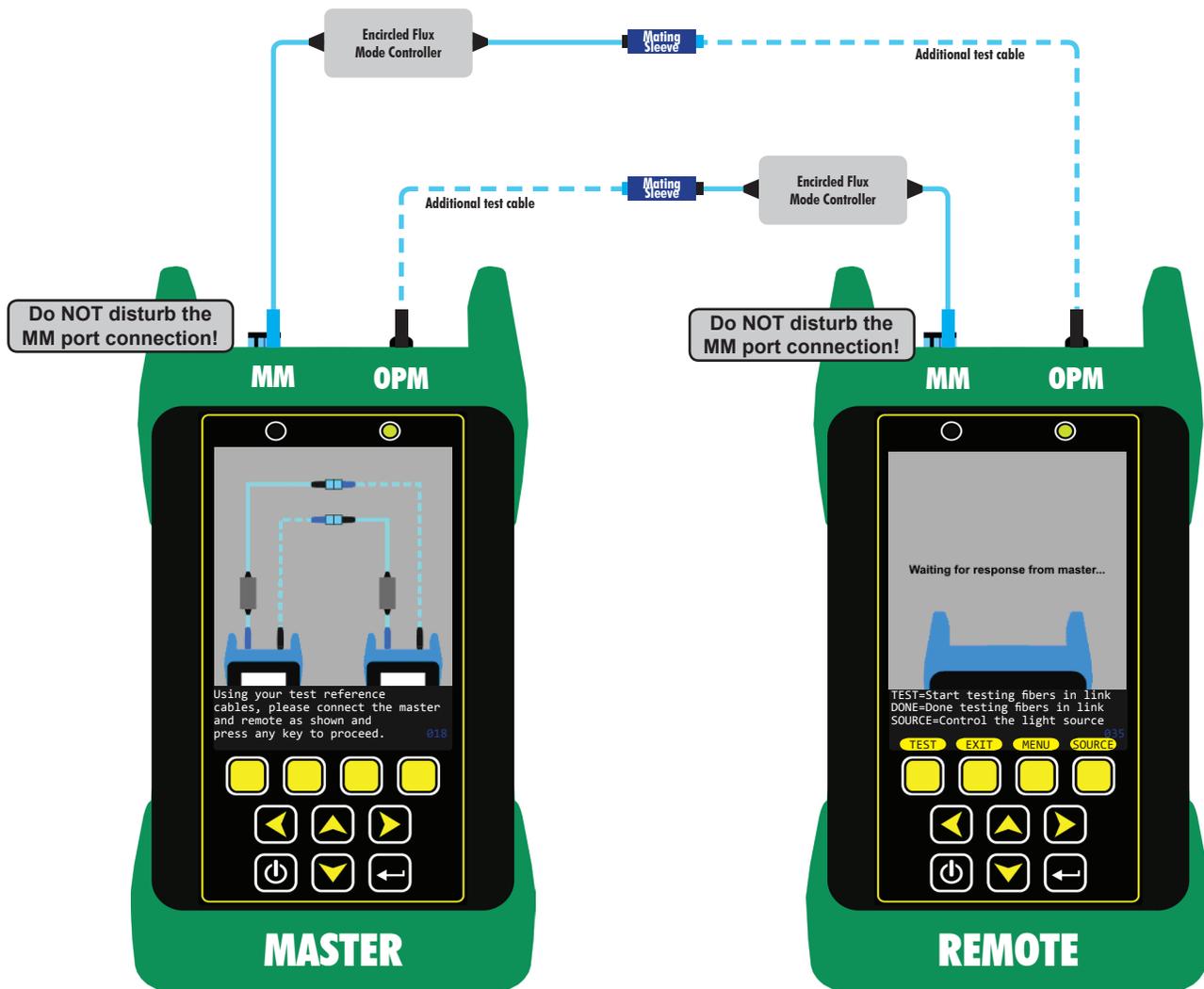
- 14 The MASTER will now show a help slide that demonstrates how to connect the additional test cables and adapters.

At this time, disconnect the reference cable (solid line) from the OPM port and insert the additional test cable (dotted line) into the OPM port.

Finally, connect the cables together (as shown) with mating sleeves.

Press any key on the MASTER to check the additional test cables.

The MASTER and REMOTE will again begin communication, and the MASTER will show the communications progress.

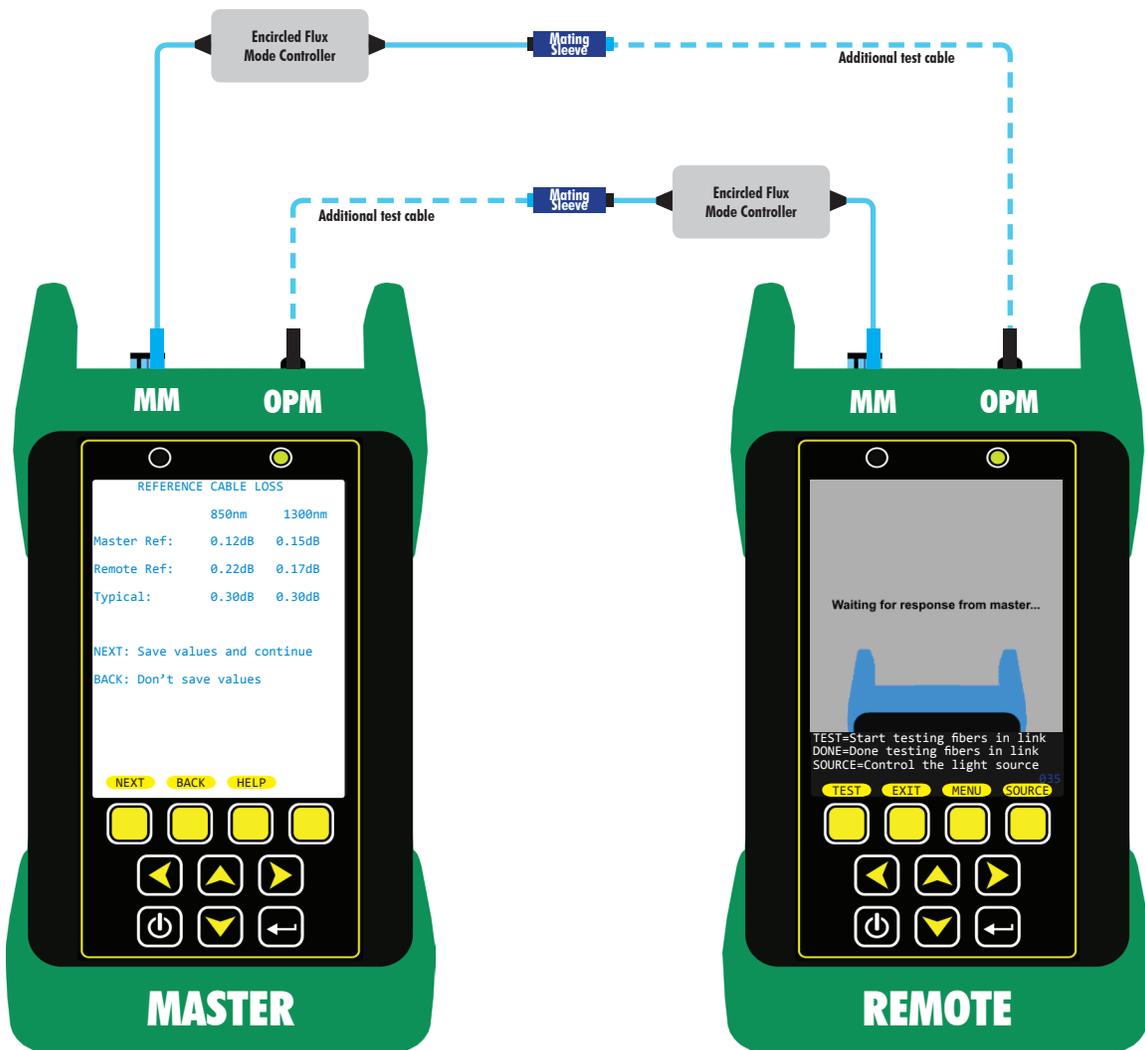


# BIDI MODE

## CHECKING THE ADDITIONAL TEST CABLE

- 15 Once the reference has been set, the REFERENCE CABLE LOSS will be shown for both units in both directions.

Press NEXT on the MASTER to accept the reference cable loss values and continue.



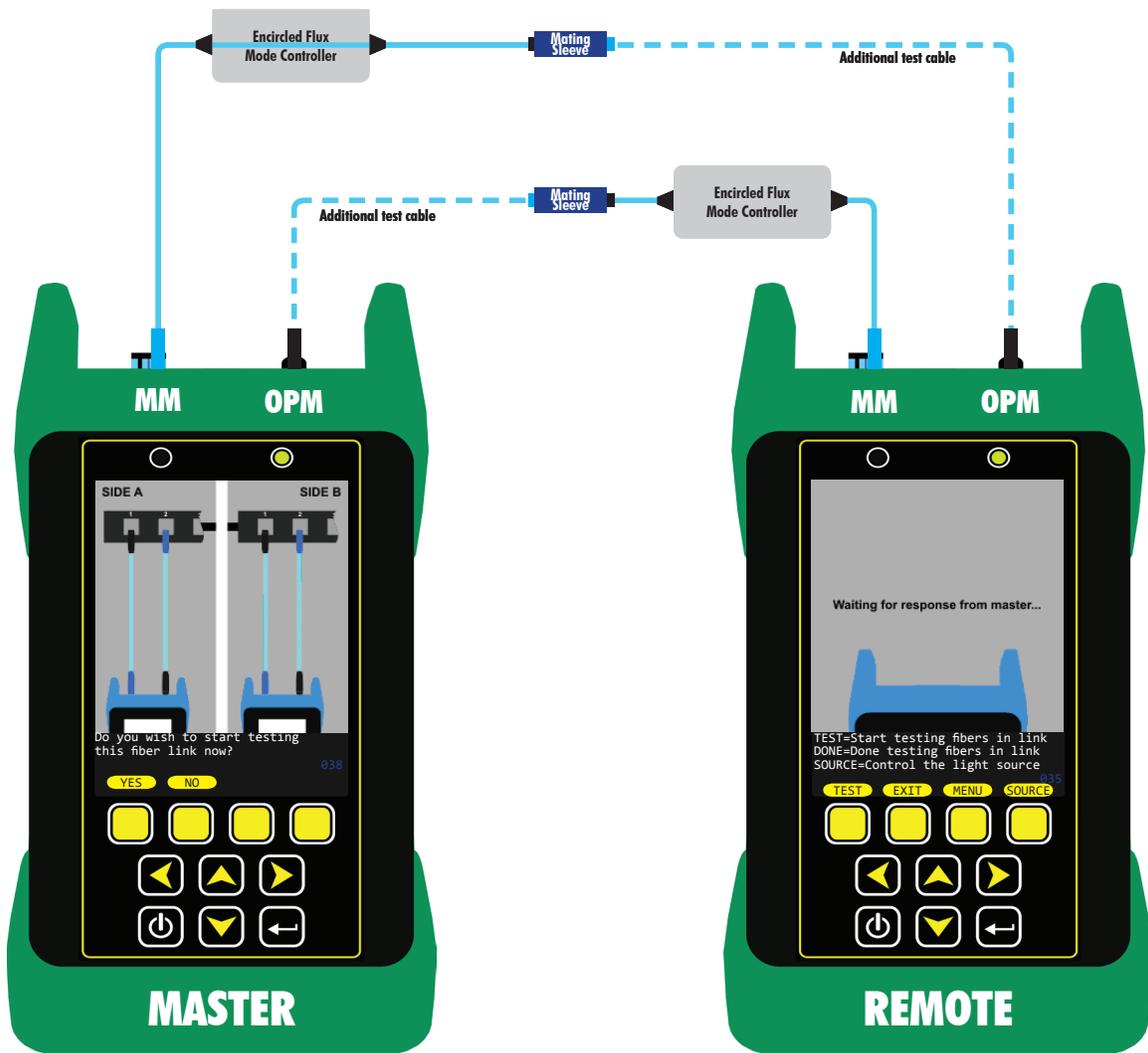
# BIDI MODE

## READY TO BEGIN TESTING

- 16 The units are now ready to begin testing.

Do NOT disconnect any of the test cables or mating sleeves at this time.

Press YES on the MASTER to continue.



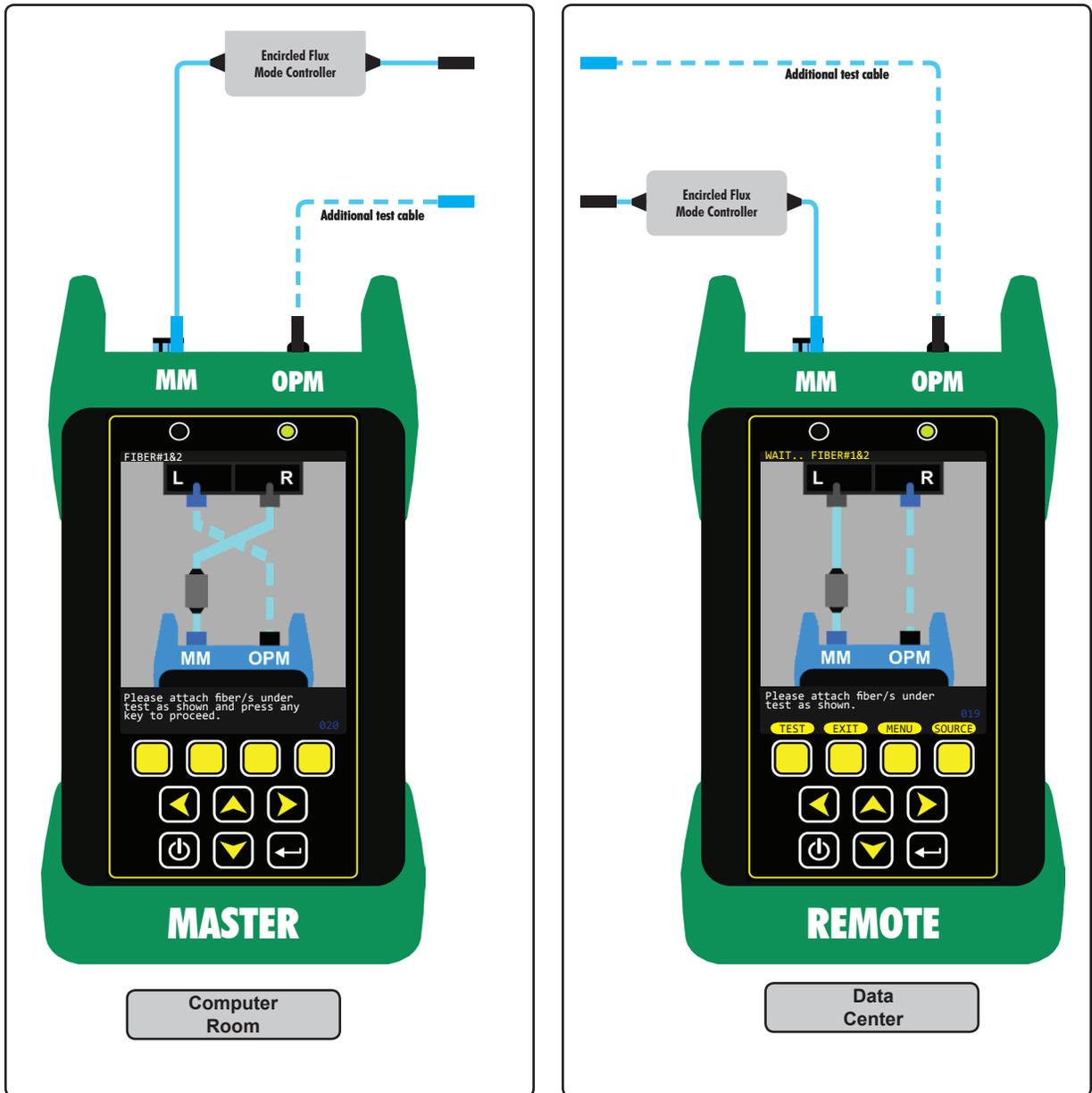
# BIDI MODE

## BEGIN TESTING (FIRST BIDI DIRECTION)

- 17 At this time, remove the mating sleeves.

Then, bring the units to their assigned locations as defined during the LINK NAME entry.

In this example, the MASTER is assigned to the Computer Room, and the REMOTE is assigned to the Data Center.



# BIDI MODE

## BEGIN TESTING (FIRST BIDI DIRECTION)

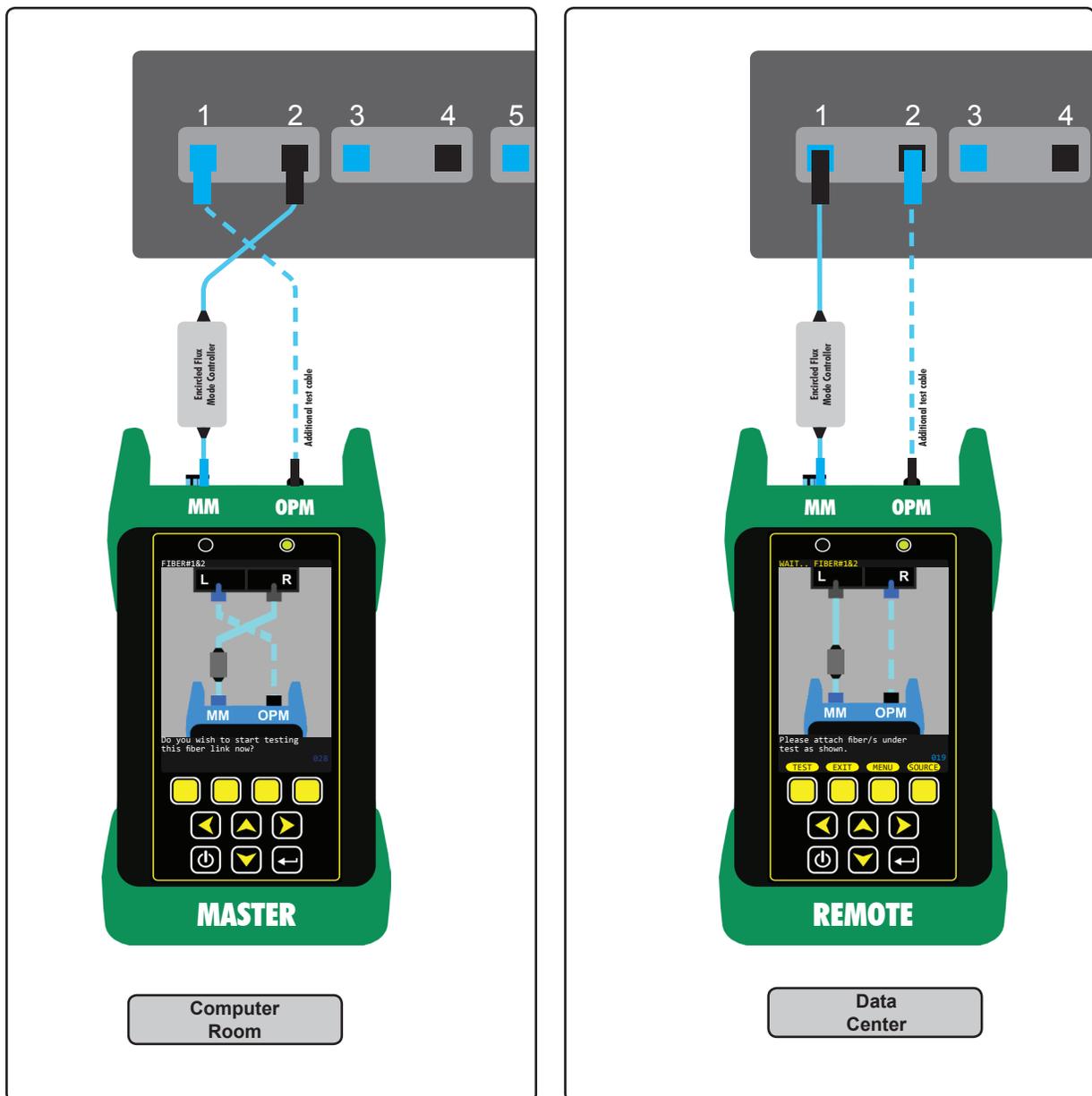
- 18 Connect the testers into the link under test as shown on the displays. The fiber numbers to connect into are listed at the top of the display.

The FIBER PAIR GEOMETRY setting will determine the orientation of the test cables.

In this example, the FIBER PAIR GEOMETRY was set to STRAIGHT. To ensure proper polarity of transmit/receive, the test cables are crossed for the MASTER, and are straight in for the REMOTE.

The top of the display shows the fiber name and number to be tested (FIBER#1&2). Fiber # 1 is on the left (L) and Fiber # 2 is on the right (R).

Once the fibers are connected as shown, press any key to begin the test. The MASTER will show communications progress (as long as proper continuity is achieved).



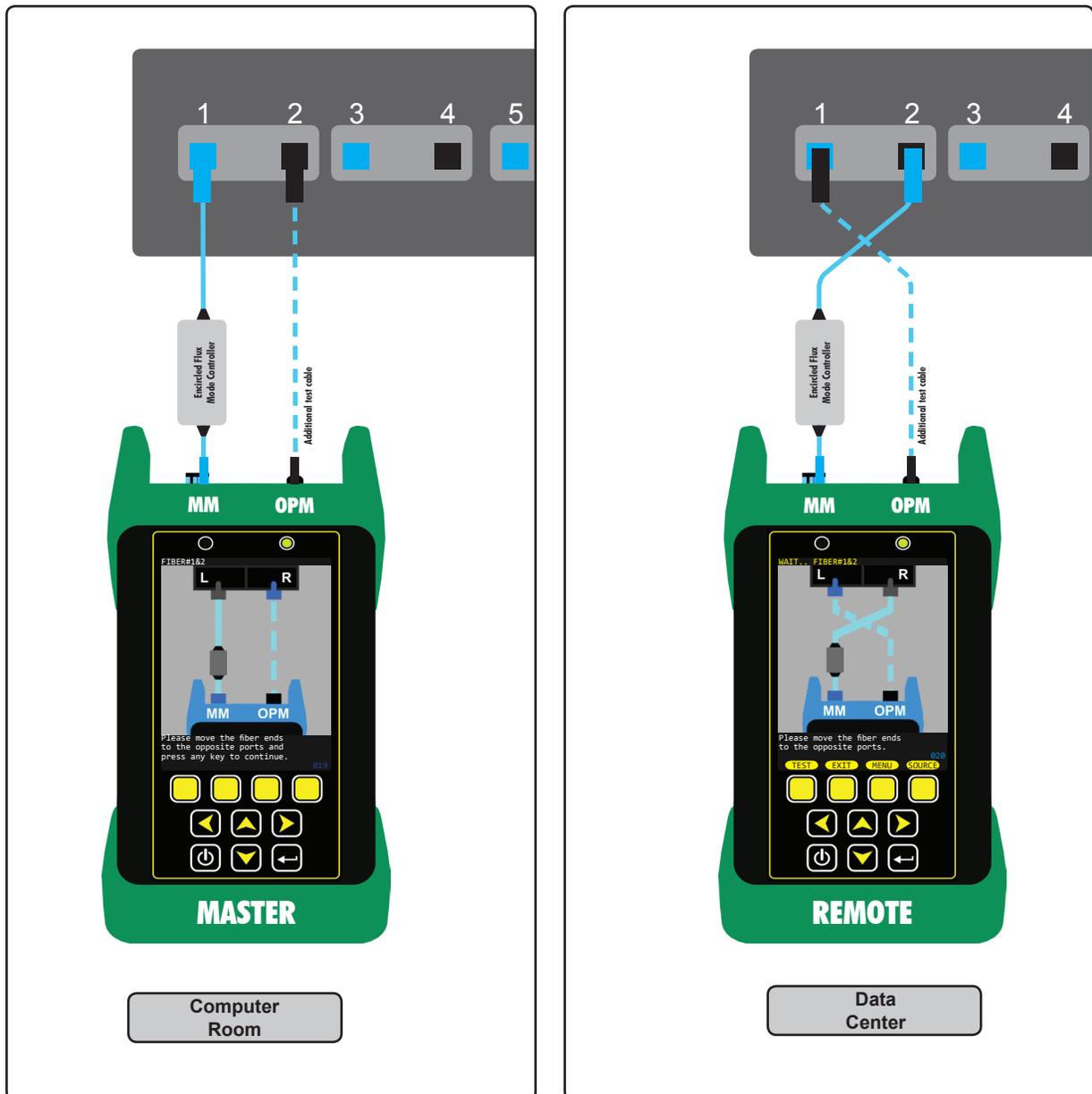
# BIDI MODE

## BEGIN TESTING (SECOND BIDI DIRECTION)

- 19 Once the fibers have been tested in the first direction, swap the fibers as shown on the displays to test in the second direction.

The fiber numbers to connect into are listed at the top of the display.

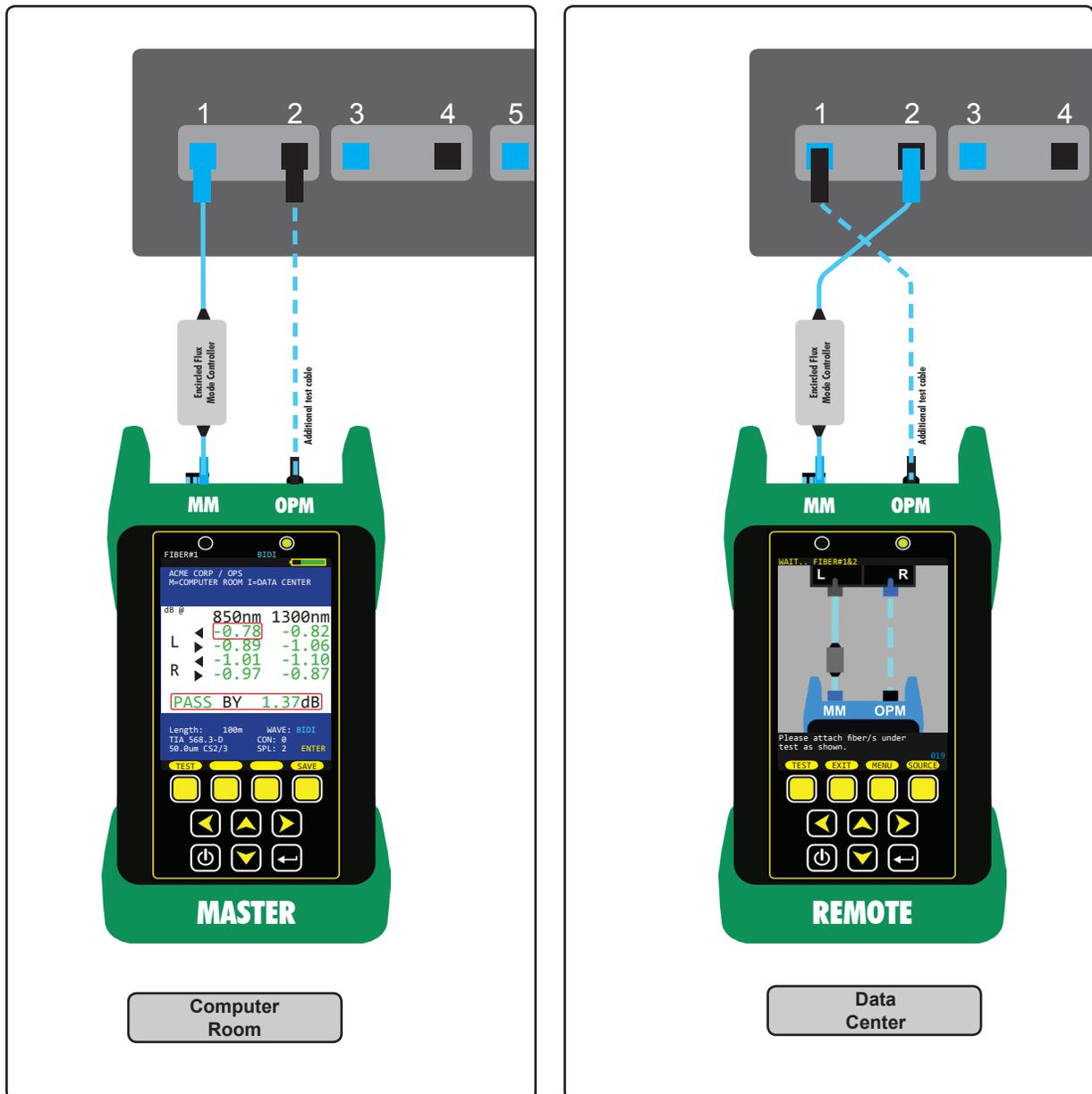
Once the fibers are connected as shown, press any key to continue the test. The MASTER will show communications progress (as long as proper continuity is achieved).



# BIDI MODE

## TEST RESULTS SCREEN

- 20 Once the second direction is tested, the bi-directional test results will be shown on the MASTER.



# BIDI MODE

## TEST RESULTS SCREEN

### Link Information

Project  
Location  
Master End (M)  
Remote End (R)

ACME CORP / OPS  
M=COMPUTER ROOM R=DATA CENTER

### Test Direction

Shown from the perspective of the **MASTER**

L ◀ test received from the left-hand port  
L ▶ test transmitted into the left-hand port  
R ◀ test received from the right-hand port  
R ▶ test transmitted into the right-hand port

dB @		850nm	1300nm
L	◀	-0.78	-0.82
	▶	-0.89	-1.06
R	◀	-1.01	-1.10
	▶	-0.97	-0.87

### dB loss readings

Green = PASS  
Red = FAIL  
(user may wish to troubleshoot test failures, and re-test when fixed)  
Blue = Invalid Reading  
(indicates gain; user should re-set the reference for any reading that shows as invalid)  
Orange = not enough loss to meet minimum loss values  
(used only for standards that define minimum loss values)

### Test Parameters

Length: BIDI/PAIR mode -- measured during the test; All other modes -- entered or measured manually

NOTE: length value will be red if it exceeds that standard's length limitation

WAVE: current test wavelength or test mode

Standard selected during Link Wizard

Connections: entered during Link Wizard (only includes mid-span connections)

Fiber Type selected during Link Wizard

Splices: entered during Link Wizard

PASS BY 1.37dB

Length: 100m WAVE: BIDI  
TIA 568.3-D CON: 0  
50.0um CS2/3 SPL: 2 ENTIR

Use arrow keys to move the red selection box among the various tests; PASS/FAIL results will also be updated

BIDI mode will show a grid of 8 test results

PAIR mode will show a grid of 4 test results

CERT mode will show individual test results for up to 2 test wavelengths

**Function Button Menu Options** -- located at the bottom of the screen; press ENTER key to view the various functions

**TEST** begin the fiber link test; if previous test was not stored, a warning screen will appear

**SAVE** save the current test results; if the test results have already been saved, a **NO VALID DATA!** warning will appear at the top of the screen

**ZERO** re-set the optical reference; MASTER and REMOTE will need to be brought together to re-set the reference

**UNITS** toggle between dB (loss) and dBm (power)  
**EDIT** edit the link information, including standard, connections, and splices

**LOAD** load a new STORED LINK  
**DATA** view test details for the current test result  
**MENU** access the MAIN MENU

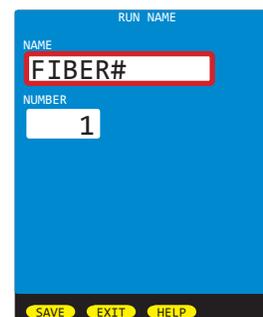
**21** Press SAVE on the test results screen to accept the test results as shown on the display.

NAME 11-character prefix  
NUMBER STRAND numbering: fiber number of the left-hand port  
PAIR numbering: fiber pair number

SAVE Accept RUN NAME as entered and continue testing the next fiber or pair

EXIT Return to test results screen

HELP Access context-sensitive help



# BIDI MODE

## TEST NEXT FIBER/PAIR (FIRST BIDI DIRECTION)

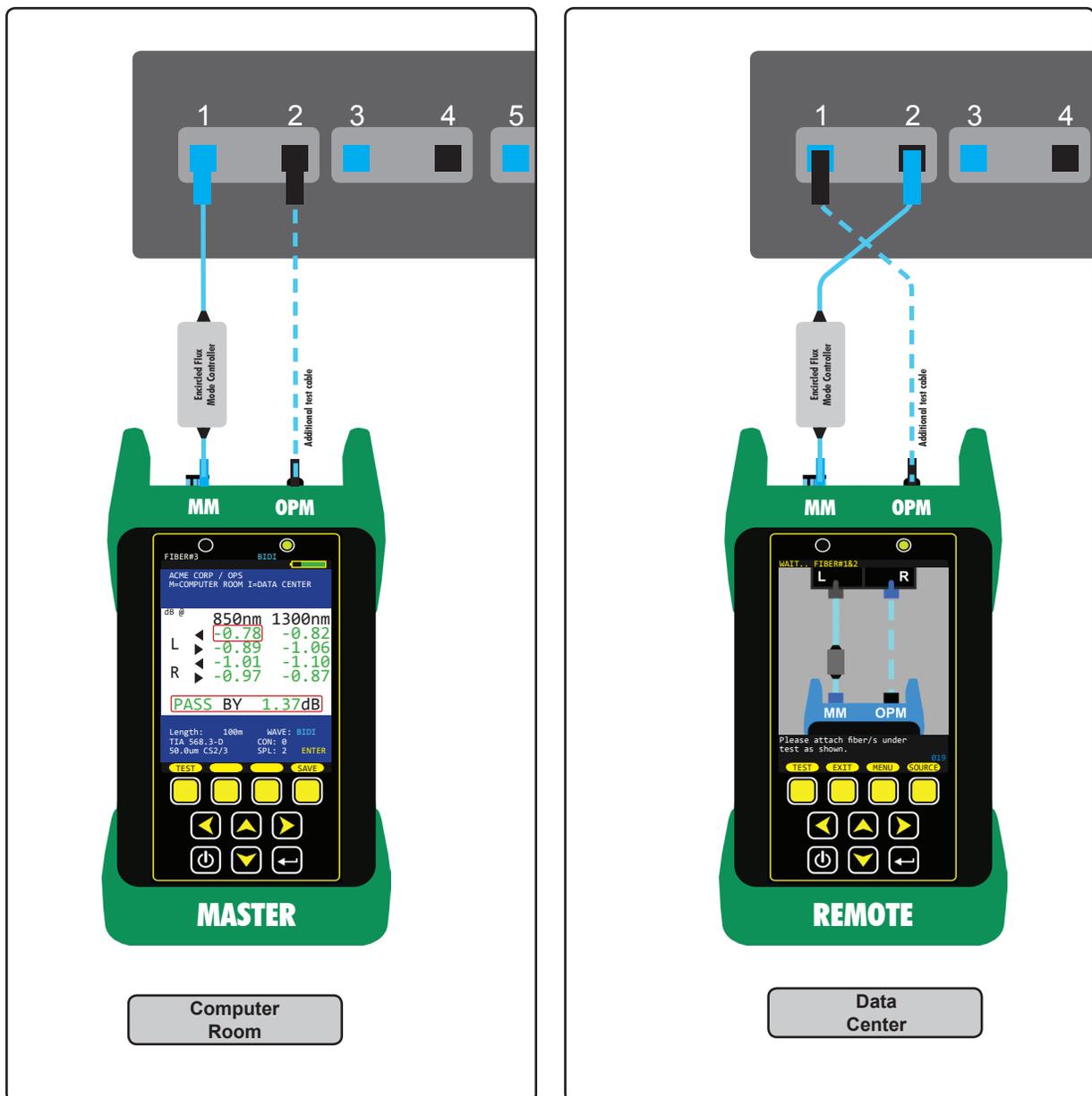
- 22 At this point, the fibers are still connected to the current fiber/pair under test, and the MASTER is still displaying the current test results.

The fiber numbers at the top of the MASTER display has been updated with the next fiber/pair number.



Before connecting to the next fiber pair, press TEST on the MASTER to initiate the next test.

(Do NOT press any buttons on the REMOTE. The MASTER will tell the REMOTE what to do next.)



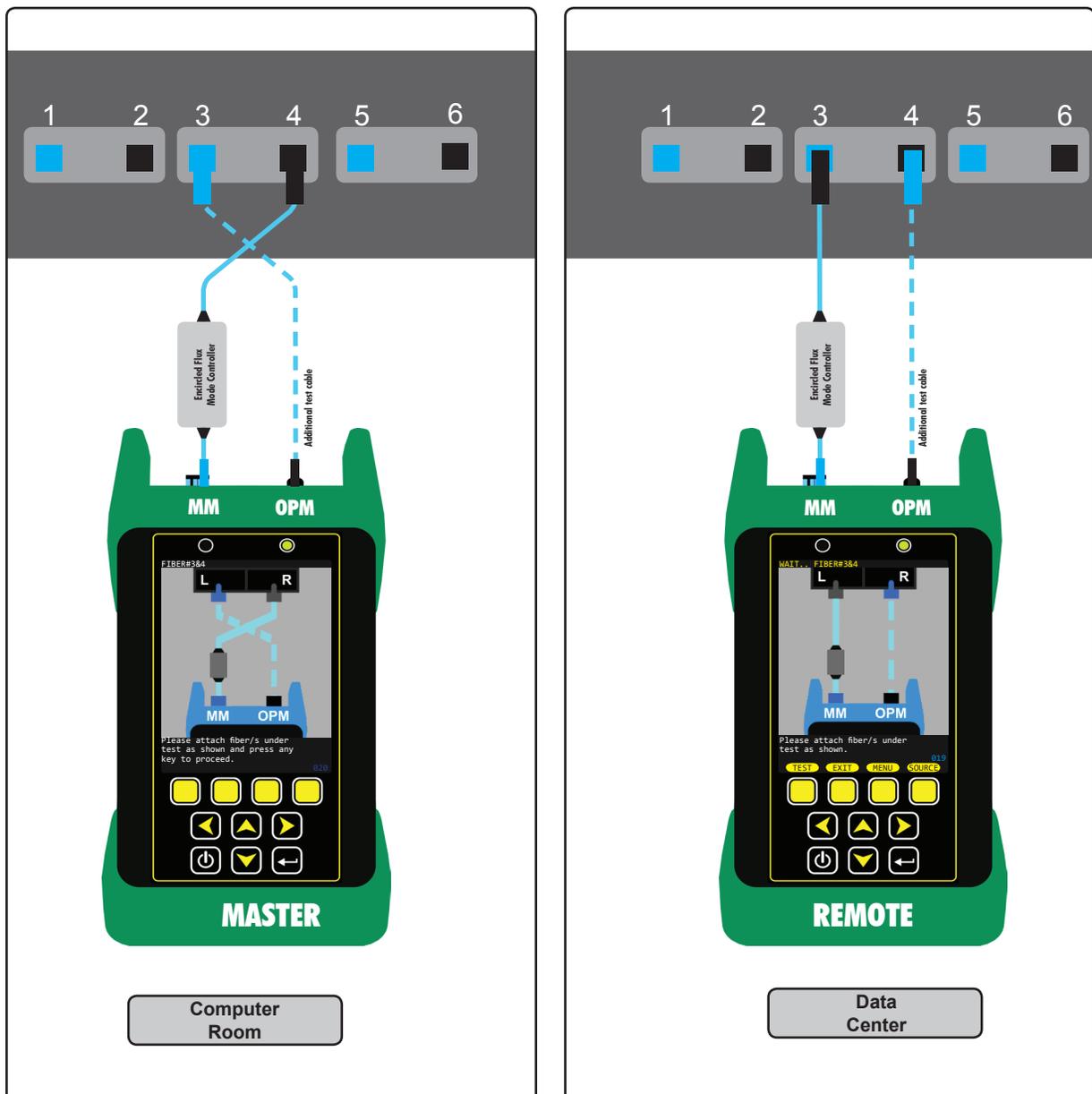
# BIDI MODE

## TEST NEXT FIBER/PAIR (FIRST BIDI DIRECTION)

- 23 Connect the testers into the next fiber/pair under test as shown on the displays.

The fiber numbers to connect into are listed at the top of the display.

Once the fibers are connected as shown, press any key on the MASTER to begin the test. The MASTER will show communications progress (as long as proper continuity is achieved).



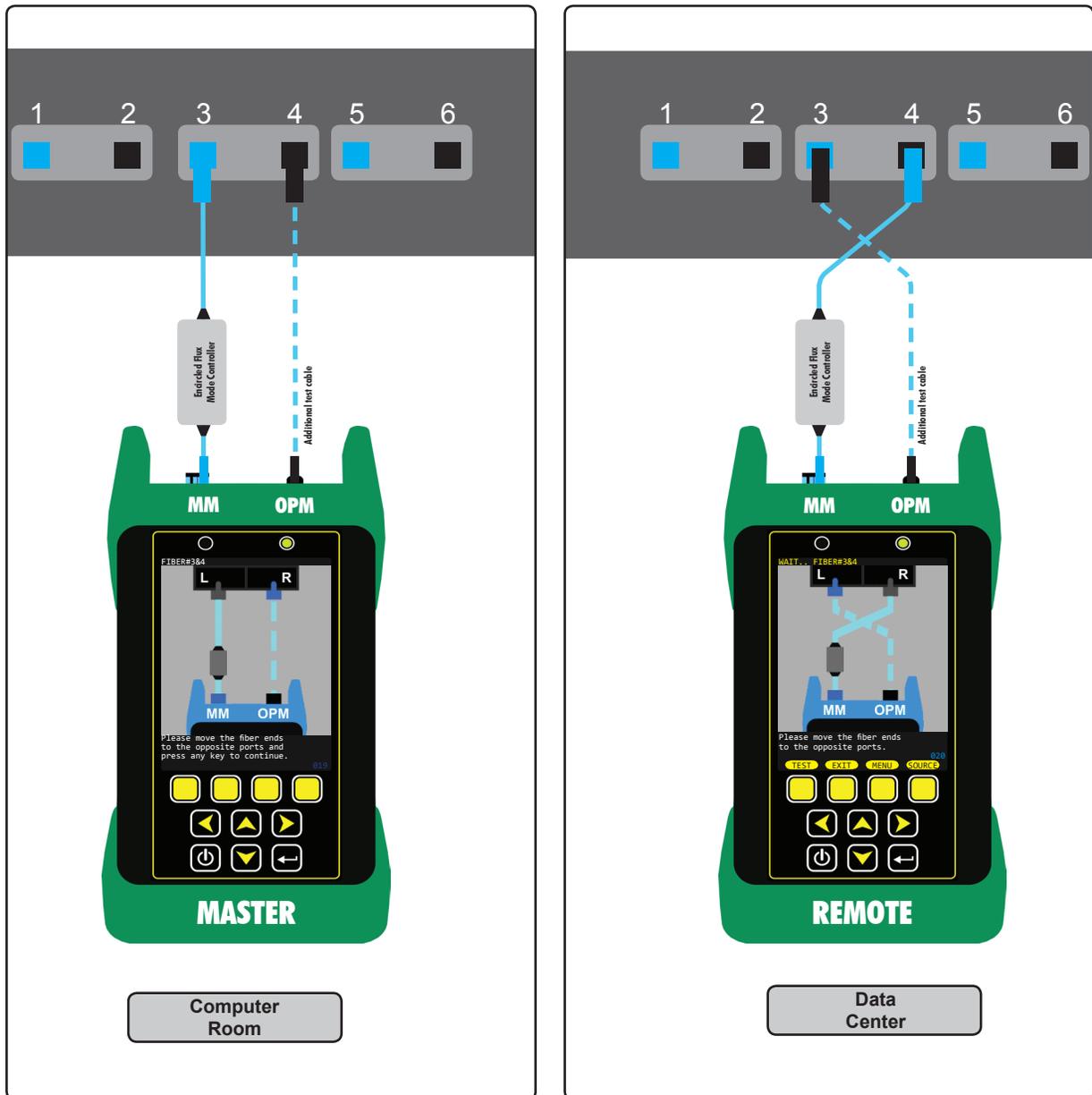
# BIDI MODE

## TEST NEXT FIBER/PAIR (SECOND BIDI DIRECTION)

- 24 Once the fibers have been tested in the first direction, swap the fibers as shown on the displays to test in the second direction.

The fiber numbers to connect into are listed at the top of the display.

Once the fibers are connected as shown, press any key on the MASTER to test in the second direction. The MASTER will show communications progress (as long as proper continuity is achieved).



# BIDI MODE

## TEST NEXT FIBER/PAIR (SECOND BIDI DIRECTION)

- 25 Test results will appear for the next set of tests.

Press SAVE from the test results screen to store the test results.

The RUN NAME screen will show the same fiber name as before, as well as the auto-incremented fiber number for this set of test results.

If the user needs to change the fiber name and/or number, they can do so on the RUN NAME screen.

ACME CORP / OPS	
M=COMPUTER ROOM R=DATA CENTER	
dB @	850nm 1300nm
L ▶	-0.78 -0.82
▶	-0.89 -1.06
R ▶	-1.01 -1.10
▶	-0.97 -0.87
PASS BY 1.37dB	
Length: 100m	WAVE: BIDI
TIA 568.3-D	CON: 0
50.0um CS2/3	SPL: 2 ENTER

RUN NAME	
NAME	FIBER#
NUMBER	3
SAVE EXIT HELP	

Repeat steps 22 through 25 until all fibers/pairs are tested.

# OPERATIONS/MAINTENANCE

## MAIN MENU

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

### OPERATIONS MENU

CREATE NEW LINK	See "Link Wizard" section
CONFIGURE SOURCE	Control the light source port
SYSTEM INFORMATION	Display system information
ENTER OPM MODE	Optical Power Meter (OPM) mode

### SETUP MENU

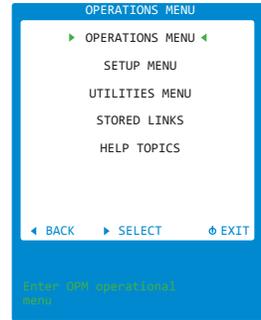
OPERATING PARAMETERS	Set Length units / index of refraction
USER INFORMATION	Enter user name and phone number
DISPLAY PREFERENCES	Display dimness / brightness / speaker
POWER OPTIONS	Display timer: dim / standby / off
CUSTOM STANDARD	Configure a user-customizable standard

### UTILITIES MENU

SET SYSTEM CLOCK	Set real-time clock
FORMAT DATA FLASH	Formats data storage - erases all stored links
FACTORY RESET	Reset to factory defaults
VIEW SLIDES	View help slides
MANUFACTURER SETUP	Manufacturer only - no user configurable settings

STORED LINKS View the data stored in the MASTER

HELP TOPICS View various help topics regarding the operation of the MASTER



# OPERATIONS/MAINTENANCE

## OPERATIONS MENU

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

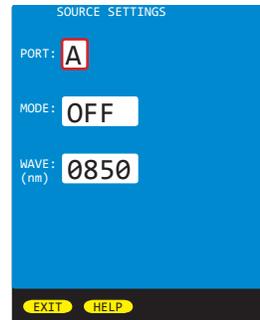
From the MAIN MENU, select OPERATIONS MENU.

CREATE NEW LINK	See "Link Wizard" section
CONFIGURE SOURCE	Control the light source port
SYSTEM INFORMATION	Display system information
ENTER OPM MODE	Optical Power Meter (OPM) mode

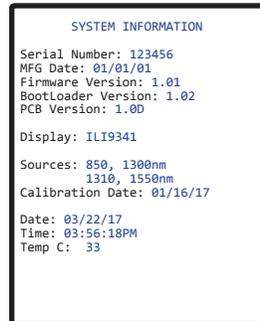


**OPERATIONS MENU > CONFIGURE SOURCE** -- Control the light source port in the MASTER

<b>PORT</b>	A	Multimode (MM) port -- <b>WAVE (nm):</b> 850nm / 1300nm
	B	Singlemode (SM) port -- <b>WAVE (nm):</b> 1310nm / 1550nm
<b>MODE</b>	OFF	source is powered off
	CW	displayed WAVE is on continuously
	TONE	displayed WAVE modulates at specific frequency
	AUTO	displayed PORT auto-switches (MM: 850/1300, SM: 1310/1550)
<b>EXIT</b>	Save settings and return to OPERATIONS MENU	
<b>HELP</b>	Context-sensitive help	



**OPERATIONS MENU > SYSTEM INFORMATION** -- View system-specific hardware, firmware, calibration, and date/time information



**OPERATIONS MENU > ENTER OPM MODE** -- Allows the user to perform basic optical power measurements in dBm when certification or loss measurements are not required -- such as measuring output power from an active transmitter (NIC, SFP, GBIC, switch port, etc.)

When used with an OWL auto-wavelength light source, up to 2 wavelengths can be measured simultaneously.

context-sensitive help

scroll through various groups of menu options



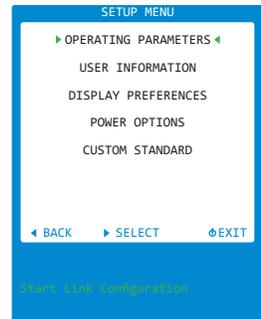
# OPERATIONS/MAINTENANCE

## 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.

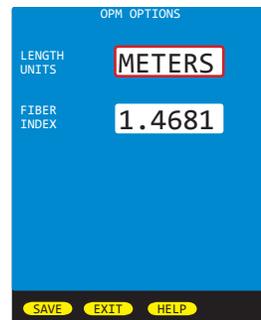
OPERATING PARAMETERS	Set Length units / index of refraction
USER INFORMATION	Enter user name and phone number
DISPLAY PREFERENCES	Display dimness / brightness / speaker
POWER OPTIONS	Display timer: dim / standby / off
CUSTOM STANDARD	Configure a user-customizable standard



**SETUP MENU > OPERATING PARAMETERS** -- set length units and index of refraction

<b>LENGTH UNITS</b>	METERS	display length measurements in meters
	FEET	display length measurements in feet
<b>FIBER INDEX</b>	sets the index of refraction used for length measurements	
	Range of values: 1.4000 to 1.6000	
	Default value: 1.4681	

<b>SAVE</b>	Save settings and return to SETUP MENU
<b>EXIT</b>	Exit without saving settings and return to SETUP MENU
<b>HELP</b>	Context-sensitive help



**SETUP MENU > USER INFORMATION** -- Set user name and phone number

<b>USER NAME</b>	15 characters
<b>PHONE NUMBER</b>	10-digit phone number

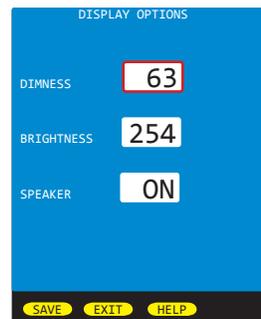
<b>SAVE</b>	Save settings and return to SETUP MENU
<b>EXIT</b>	Exit without saving settings and return to SETUP MENU
<b>HELP</b>	Context-sensitive help



**SETUP MENU > DISPLAY OPTIONS** -- Set options for the user interface such as display dimness and brightness levels, and internal speaker operation.

<b>DIMNESS</b>	dimness level during power saving mode
	Range of values: 25 to 125 (dim level previews as value changes)
<b>BRIGHTNESS</b>	Brightness level during normal operation
	Range of values: 150 to 254 (brightness level previews as value changes)
<b>SPEAKER</b>	turns speaker ON or OFF

<b>SAVE</b>	Save settings and return to SETUP MENU
<b>EXIT</b>	Exit without saving settings and return to SETUP MENU
<b>HELP</b>	Context-sensitive help

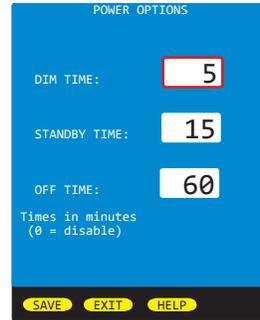


# OPERATIONS/MAINTENANCE

## SETUP MENU

**SETUP MENU > POWER OPTIONS** -- Set duration for various power saving modes

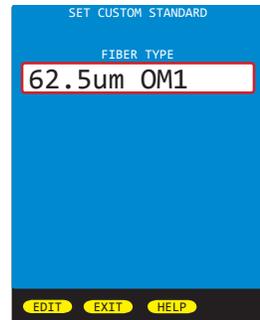
- DIM TIME** minutes before display dims  
Range of values: 1 to 250
- STANDBY TIME** minutes before unit goes into standby mode (only display turns off)  
Range of values: 2 to 250
- OFF TIME** minutes before unit turns completely off  
Range of values: 3 to 250
- SAVE** Save settings and return to SETUP MENU
- EXIT** Exit without saving settings and return to SETUP MENU
- HELP** Context-sensitive help



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

- FIBER TYPE** Options: 62.5um OM1 / 50.0um OM2 / 50.0um OM3 / 50.0um OM4  
Indoor SM / Outdoor SM

Select a fiber type and press EDIT to set parameters for that fiber type.



- 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

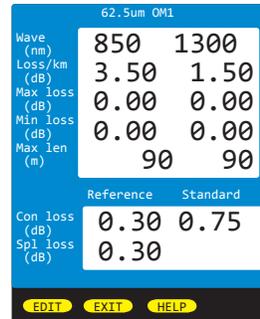
Two types of standards can be defined:

**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 len (m)** Maximum length of fiber link in meters
- Con loss (dB)** dB loss per interconnection; defines both reference-grade and standard-grade reference cable connectors
- Spl loss (dB)** dB loss per splice; can be either fusion or mechanical splices

### 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

# OPERATIONS/MAINTENANCE

## UTILITIES MENU

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

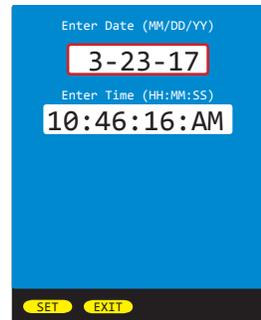
From the MAIN MENU, select UTILITIES MENU.

SET SYSTEM CLOCK	Set real-time clock
FORMAT DATA FLASH	Formats data storage - erases all stored links
FACTORY RESET	Reset to factory defaults
VIEW SLIDES	Browse through the various help slides
MANUFACTURER SETUP	Manufacturer only - no user configurable settings



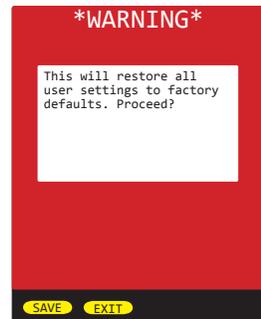
**UTILITIES MENU > SET SYSTEM CLOCK** -- set time and date

<b>DATE</b>	Format: MM/DD/YY (MM=month/DD=day/YY=year)
<b>TIME</b>	Format: HH:MM:SS (HH=hour/MM=minute/SS=second) : AM/PM
<b>SET</b>	Save settings and return to UTILITIES MENU
<b>EXIT</b>	Exit without saving settings and return to UTILITIES MENU



**UTILITIES MENU > FACTORY RESET** -- reset to factory defaults

<b>YES</b>	Reset device to factory defaults
<b>NO</b>	Exit without resetting device and return to UTILITIES MENU



# OPERATIONS/MAINTENANCE

## WORKING WITH STORED DATA

Each stored link has two lines of information:

Job / Site info  
Location info for the MASTER and REMOTE.

**GREEN** text shows the link that is currently loaded in memory.

Use the link selection cursor ( **▶** ) to select a link to work with.

**Stored runs:** shows how many data points are stored at the link selection cursor.

**LOAD** loads the selected link, and displays a list of fiber runs stored for that link  
**DONE** exits the stored links list without loading a link (prompting the user to set a reference and start testing the selected fiber link), or exits the stored runs list while loading the last run in the selected link  
**DELETE** delete the selected link, or all links  
**PAGE** loads the next page of stored links (if more links than will fit on one page)  
**HELP** view context-sensitive help  
**BACK** same as **DONE**  
**VIEW** view LINK INFORMATION screen

**LOAD** displays the test results for the currently selected fiber run  
**DONE** exits the stored runs list while loading the last run in the selected link  
**DELETE** delete the selected fiber, or all fiber runs for that link  
**PAGE** loads the next page of stored runs (if more runs than will fit on one page)  
**HELP** view context-sensitive help  
**BACK** same as **DONE**  
**VIEW** view all STORED RUN data for the selected fiber run

**NEXT** displays next set of fiber runs  
**PREV** displays the previous set of fiber runs  
**BACK** return to the previous STORED LINKS screen  
**HELP** view context-sensitive help

Information includes:

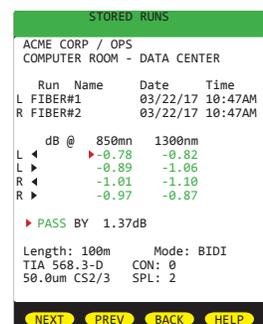
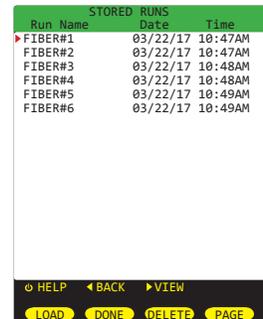
Project / Job info (ACME CORP / OPS)  
 MASTER / REMOTE location info (COMPUTER ROOM - DATA CENTER)  
 Fiber run info (L FIBER#1 03/22/17 10:47AM)  
 Fiber test direction, result, and wavelength  
 Fiber parameters (Length, Mode, Standard, Fiber Type, Connections, Splices)

Use arrow keys to navigate through the available fiber data

**GREEN** text indicates a PASS

**RED** text indicates a FAIL

**BLUE** text indicates an invalid reading



# OPERATIONS/MAINTENANCE

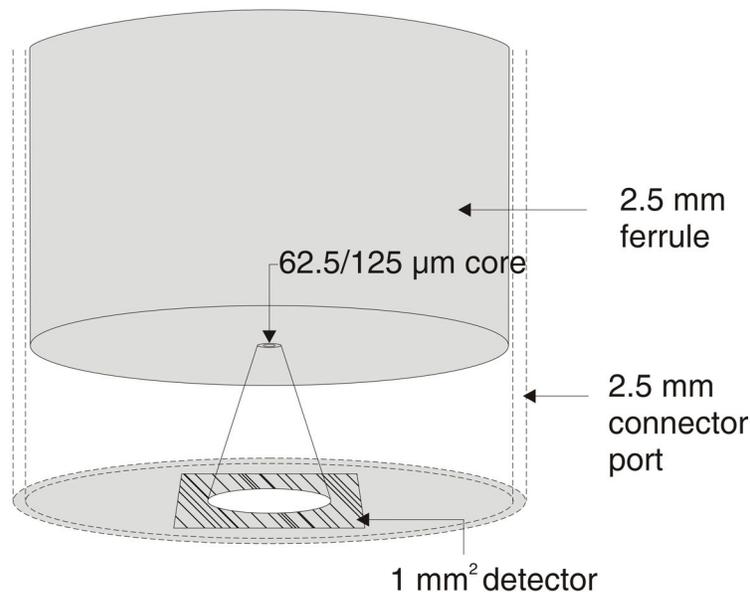
## UNIVERSAL DETECTOR PORT

The Fiber OWL 7 BIDI 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.



# OPERATIONS/MAINTENANCE

## CLEANING THE LIGHT SOURCE PORT

This cleaning procedure applies to the light source ports on the Fiber OWL 7 BID1 devices.

### 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 cleaning swab or in-adapter ferrule connector cleaner 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 consider using a combination of “wet” and “dry” cleaning to achieve best results.

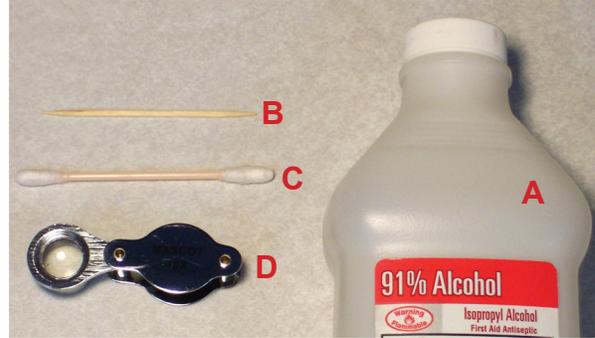
If the port is still dirty, another round of cleaning will be necessary. You may also want to consider using a combination of “wet” and “dry” cleaning to achieve best results.

# OPERATIONS/MAINTENANCE

## CLEANING THE OPM PORT

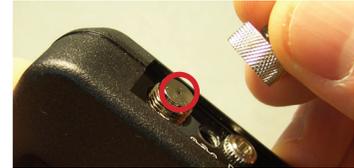
### Required accessories:

- 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) Remove the adapter cap from the power meter detector port.
- 2) Blow some of the compressed air into the small hole in the universal adapter.
- 3) Use the jeweler's loupe to inspect the detector end face.

Repeat the above steps until the detector surface appears clean, then replace the universal adapter cap.



If the detector surface is still dirty after using the compressed air:

- 4) Place a small amount of cotton from the swab onto the wooden toothpick as shown at right.
- 5) Wet the cotton toothpick tip with the isopropyl alcohol.



- 6) 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.**

- 7) 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.



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

Repeat steps 4-8 until the detector port is free of debris, then replace the adapter cap on the detector port and cover the detector port with the dust cap.

# OPERATIONS/MAINTENANCE

## UPDATING FIRMWARE

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

NOTE: any firmware updates must be applied to both the MASTER and REMOTE.

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 BATTERIES

The Lithium polymer batteries in Fiber OWL 7 series devices are re-charged through the USB port on each device.

A battery charger and USB cable is supplied for each unit.

The devices 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 100 mA +/-5%