Optical Wavelength Laboratories

OPERATIONS GUIDE

FIBER OWL 4 OPTICAL POWER METER
Model Numbers:
FO-4B
FO-4V

Revision 1.6

OWL-INC.COM

INTRODUCTION

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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

INTRODUCTION

APPLICATIONS

Below is a list of test and measurement applications that can be performed using the Fiber OWL 4 optical power meter. The procedure for each one of these applications is covered in detail in this manual.

Active Equipment Optical Power Measurements. Active equipment should be measured periodically for correct power levels. The transmitters in this equipment have a known power value. The Fiber OWL 4 can be directly attached to this equipment via a patch cord to check whether the transmitter is within the manufacturer's specified power range.

Fiber Continuity Testing. Continuity can be measured with the Fiber OWL 4 by placing a calibrated light source on one end of the fiber and the Fiber OWL 4 on the other end. This is also a simple way to measure the attenuation of the fiber.

Patch Cord Testing. Fiber links that are producing incorrect results may have bad patch cords. The Fiber OWL 4 can be used to test the attenuation of a patch cord to see if it is usable, or should be replaced.

Attenuation (Optical Loss) Measurements. After a fiber cable has been installed and terminated, it should be tested to determine if the fiber is installed according to standards and specifications. A comparison of the actual power measurement and the reference value determines if the installation will pass or fail. Up to 1000 fiber measurements may be stored for later download into OWL Reporter software.

Fiber Optic Link Certification. The Link Wizard in the Fiber OWL 4 uses attenuation parameters from popular cabling standards to certify fiber links, and shows a link's PASS/FAIL status right in the field. Stored data can be downloaded into our FREE OWL Reporter software, where certification reports can be printed out with details or summaries of the fibers being certified.

Optical Fiber Cable Length Measurement. Certain models of the Fiber OWL 4 have the ability to perform a "round-robin" optical fiber length measurement.

DESCRIPTION

The Fiber OWL 4 is a high-accuracy, high-resolution, microprocessor-controlled optical power meter. Its wide 75dB dynamic range and NIST-traceable wavelengths make it ideal for both singlemode and multimode fiber testing.

It is enclosed in an attractive hand-held case made from high impact plastic, has a backlit graphic LCD, as well as an 18-key keypad for easy data entry. The 2.5mm universal detector port accepts ST, SC, and FC, as well as many other 2.5mm ferrule connectors. A 1.25mm universal adapter is also included for connection to LC or other SFF connectors.

Each Fiber OWL 4 includes a standard non-rechargeable 9-volt battery, which typically allows 100 hours of continuous operation. A built-in auto-shutdown feature also conserves battery life. The USB port doubles as a battery charger port in case the user wishes to use re-chargeable 9-volt batteries. Re-chargeable batteries are NOT included.

⚠️ **CHARGING NON-RECHARGEABLE BATTERIES COULD POTENTIALLY CAUSE HARM TO THE UNIT AND/OR THE USER.**

The Fiber OWL 4 includes a built-in link wizard that helps you easily calculate optical references (link budgets) used for fiber optic certification testing. It will store up to 1000 measured data points with descriptive link and fiber run labels.

The stored information can be selectively viewed, edited (measured again), printed, or deleted. The data can also be downloaded to our FREE OWL Reporter software to produce professional-looking formatted certification reports, or can be downloaded as a comma-delimited file (requires a COM port terminal program such as Hyperterminal) Comma-delimited files can be imported into computer spreadsheets.

For an additional charge, the length testing port in the Fiber OWL 4 can be replaced by a precision-coupled visual fault locator (VFL) optimized for fiber optics. An optical ball lens placed near the laser output focuses the red laser light for optimum coupling into optical fibers (something pen-style laser pointers do not have), and special electronics prevent the red laser from burnout (a common problem with pen-style red laser pointers), increasing the life of the VFL.

INTRODUCTION

PRECAUTIONS

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

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

Connector - if the optional Visual Fault Locator is installed, do NOT insert APC (Angled Physical Contact) connectors into the VFL port on your Fiber OWL 4 as this may damage the angled ferrule on the APC connector.

PRODUCT LABEL

On the back of each Fiber OWL 4 series optical power meter are labels similar to the ones shown below containing model number, serial number, power requirements, and special cautionary information. If the unit is enclosed in its protective boot, the boot must be removed to view this label.

For models that include length testing:

Optical Wavelength Laboratories
Whitewater, WI 53190 • 262-473-0643

MODEL# FO-4B   Made in USA
SERIAL# FO49999
POWER: 9V DC   Conforms to the Harmonized
                     European Standards
                     EN61726-1 and EN61010-1

DANGER
NEVER LOOK INTO ANY LIGHT SOURCE!
LASER RADIATION

MODEL# FO-4B
LIGHT SOURCE INFORMATION

CLASS 1M LASER PRODUCT
OUTPUT POWER: -10.0dBm
WAVELENGTH: 1310 nm
TYPE: FP LASER

For models that include the optional VFL:

Optical Wavelength Laboratories
Whitewater, WI 53190 • 262-473-0643

MODEL# FO-4V   Made in USA
SERIAL# FO49999
POWER: 9V DC   Conforms to the Harmonized
                     European Standards
                     EN61726-1 and EN61010-1

DANGER
NEVER LOOK INTO ANY LIGHT SOURCE!
LASER RADIATION

MODEL# FO-4V
LIGHT SOURCE INFORMATION

CLASS 2 LASER PRODUCT
OUTPUT POWER: 0.0dBm
WAVELENGTH: 650nm
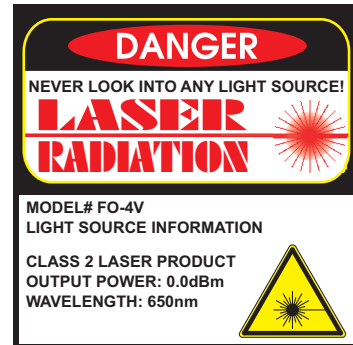
INTRODUCTION

GENERAL FEATURES

1 **2.5mm Universal Connector Port** - accepts many popular 2.5mm ferrule connectors, including ST, SC, and FC. Also included is a 1.25mm universal adapter cap (for connection to LC, MU, and other SFF connectors).

2 **USB Serial Download Port** - downloads stored data to a PC using the supplied USB download cable. Also used for charging re-chargeable batteries (not included).

⚠ **DO NOT USE BATTERY CHARGING PORT WITH NON-RECHARGEABLE BATTERIES, AS THIS COULD POTENTIALLY CAUSE HARM TO THE UNIT AND/OR THE USER.**

3 **Light Source Port** - By default, contains a 1310nm laser source to be used for round-robin length measurement. Optionally, this port could contain a precision-coupled visual fault locator.

4 **LCD Display** - shows optical power/loss levels, power units, temperature, battery life, wavelength, and circuit ID information.

5 F1 F2 F3 - function keys activate certain menu options shown at the bottom of the Fiber OWL 4 LCD display

6 1 2 3 4 5 6 7 8 9 0 - enables user to enter alpha-numeric data, as well as activate certain menu options

7 MENU - activates the MAIN MENU

8 DONE - while in the menu system, reverts the user back one menu level; during data entry, enters the data input and sends the user to the next screen

9 →⚹ - activates the light source menu

10 ⏻ - turns the unit ON and OFF. Also, toggles the backlight state while the unit is powered on.

11 AUTO - toggles AUTO mode on and off. AUTO mode allows the Fiber OWL 4 to automatically switch wavelengths when used with OWL auto-switching light sources

12 🔋 - lights up when the battery charger is active
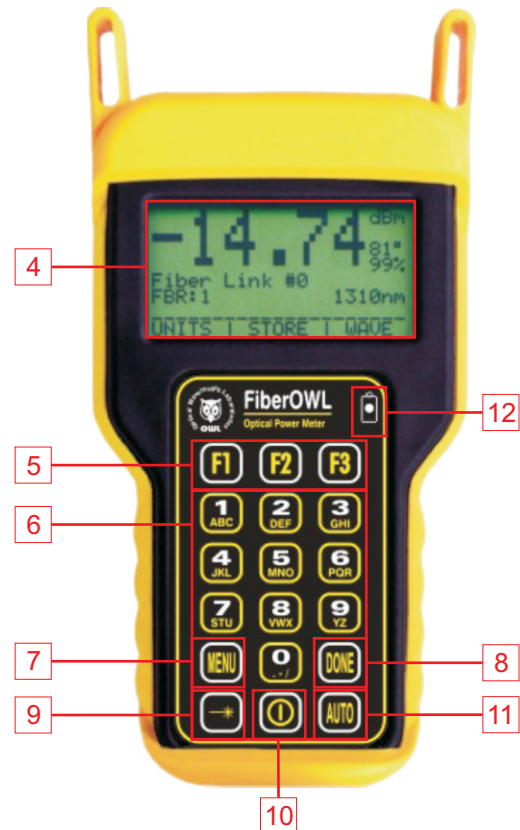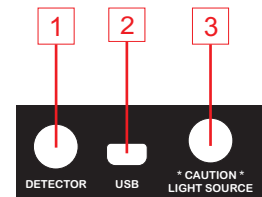
INTRODUCTION

GENERAL FEATURES - LCD DISPLAY

The screen at right shows information when power readings are being taken. We will refer to this screen throughout this manual as **IMMEDIATE MODE**.

1 **POWER READING** - shows the amount of optical power being received by the photodetector based upon the type of power units currently being displayed. "**UNDER**" means there is no measurable optical power and **"OVER"** means the detector is "blinded" by too much optical power

2 **POWER UNITS** - shows the power units which are currently being displayed
dBm - optical power in decibels relative to a milliwatt of optical energy
dB - optical power in decibels relative to a previously set optical reference, also known as optical loss
uW - optical power in micro- (uW) or milli-watts (mW)

Liquid Crystal Display (LCD) Diagram
IMMEDIATE MODE

3 **TONE DETECTION** - shows 'Hz' if a modulated signal is being detected by the meter

**4** **TEMPERATURE** - shows current temperature in degrees (selectable Fahrenheit or Celcius)

5 **BATTERY LIFE** - shows the percentage amount of remaining battery life; will flash [BAT] when battery is low

6 **LINK NAME** - shows the name of the currently loaded fiber link (CERTIFICATION METER mode only)

7 **FIBER RUN** - shows the current fiber information (CERTIFICATION METER mode only)
FBR: - user-configurable descriptive fiber name
123 - auto-incrementing fiber number (from 1 to 999)

8 **FUNCTION OPTIONS MENU** - functions corresponding to the function keys on the keypad; the options on this menu will change according to the current function

9 **POWER METER WAVELENGTH** - shows the currently selected wavelength (see the specifications in the appendix at the end of this manual for a list of wavelengths); will also alternate between wavelength and 'AUTO' when set to automatic wavelength detection
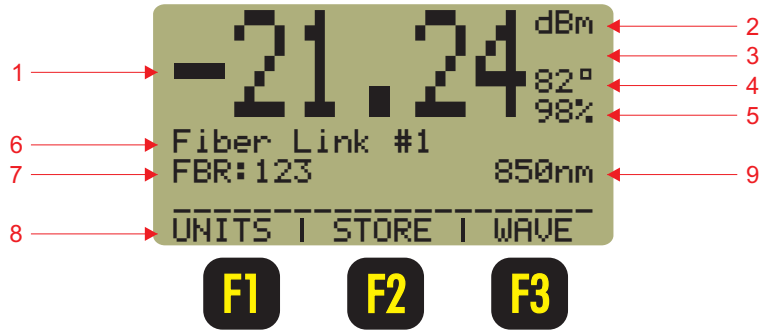
CHECKING YOUR FIBER OWL 4 FIRMWARE VERSION

This manual is written for the Fiber OWL 4 firmware version 4.67. Follow the instructions below to verify your firmware version.

I   Press (0) to start up the meter.

2   After the owl flies across the initial boot-up screen, your display should look like the diagram at right. This screen remains viewable for approximately 2 seconds.

Previous firmware versions may require a different operations guide. Check our website at OWL-INC.COM or call 262-473-0643 for more information about acquiring the correct manual.

COMPANY NAME · · · · · · · · · · · · · · · · · ·
COMPANY PHONE · · · · · · · · · · · ·
SERIAL NUMBER SN:F04xxxx
FIRMWARE VERSION V4.67

TEST PROCEDURES

ACTIVE EQUIPMENT POWER MEASUREMENT

Required Accessories

(1 or 2) one-meter patch cable(s) – (ensure proper connector type and fiber type)

Direct Transmitter Output Power Measurement

To measure the output power from a transmitter, use the following steps:

1   Connect the Fiber OWL 4 detector port to the transmitter port on the active equipment under test, as shown at right.

2   Press ⓘ to power on the Fiber OWL 4 optical power meter, then select SIMPLE METER, if necessary.

3   Determine the output wavelength of the active equipment, then

press **F3** until the wavelength on the Fiber OWL 4 matches.

4   Power on the transmitter port according to manufacturer instructions, if necessary.

Active Equipment Transmitter Power Measurement

5   Monitor the reading on the screen for a few seconds. This reading may fluctuate if the output signal is made up of digital zeroes (0) and ones (1). In this case, estimate the average power level. To calculate maximum output power, add 3 dB to the average power level.

✓   Transmitters may have a diagnostic mode where the output is at a continuous power level. This eliminates the need to compensate 3dB for digital data transmission. Consult the active equipment manufacturer's operations guide for more information.
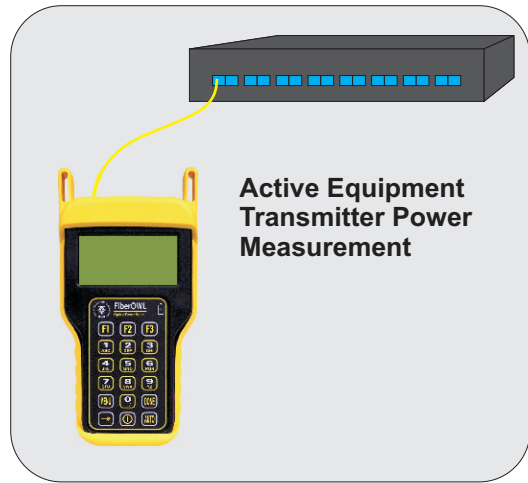
Receive Power Measurement

The Fiber OWL 4 may also be used to measure optical power levels from a transmitter through an installed link to ensure that the Receive power at the far end is within manufacturer specifications.

Follow the same steps as above, except the Fiber OWL 4 must be connected to the active equipment under test through the installed link as shown at right.

Receive Power Measurement
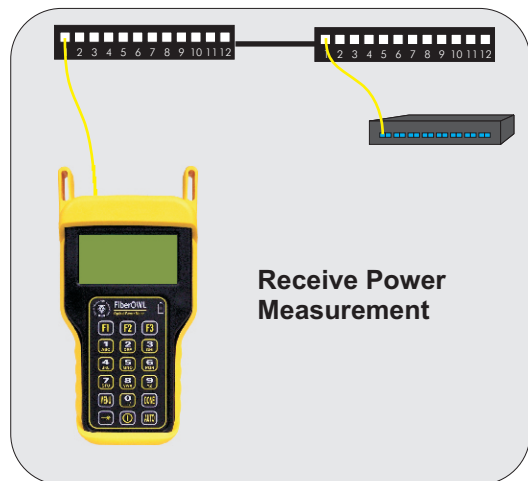
TEST PROCEDURES

FIBER CONTINUITY

Required Accessories

(2) one-meter patch cables – (ensure proper connector type and fiber type)

Checking for Fiber Continuity

The Fiber OWL 4 can be used to verify continuity of a fiber link, or can be used to trace an optical fiber if the fibers are not properly labeled. Use the following procedure to test either multimode and singlemode cables.

1 Connect a fiber optic light source to the network port under test as shown at right. Power on the light source according to manufacturer instructions.

2 Press ⏻ to power on the Fiber OWL 4 optical power meter, then select SIMPLE METER, if necessary.

3 Press **F3** until the wavelength on the Fiber OWL 4 matches the output wavelength of the light source.

FIBER CONTINUITY MEASUREMENT
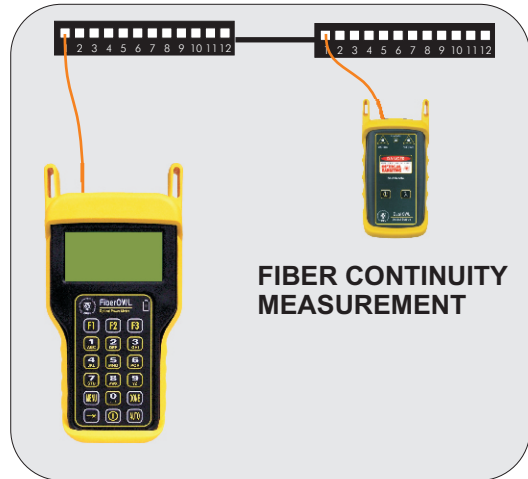
4 Take the Fiber OWL 4 optical power meter to the opposite end of the link under test, and connect into the first port as shown in the diagram above. If the Fiber OWL 4 does not detect any optical power, the display will read "UNDER". Continue connecting to subsequent optical ports until the Fiber OWL 4 display shows an optical power reading.

If none of the ports display an optical power reading, then it is likely that there is a major connectivity problem with the link, and further troubleshooting is necessary to determine the nature of the problem.

TEST PROCEDURES

PATCH CABLE TESTING

Required Accessories

(3) one-meter patch cables – (ensure proper connector type and fiber type)
(2) fiber optic adapters/couplers – (ensure proper connector type)

Patch Cable Insertion Loss

Patch cables should be tested periodically to ensure that they are okay to use for testing. Use the following procedure to test both multimode and singlemode patch cables.

> **If testing at more than one wavelength, this procedure must be performed for each wavelength separately.**

1. Connect the Fiber OWL 4 to a fiber optic light source using the 3-jumper reference method as shown at right. Power on the light source according to manufacturer instructions.

2. Press **①** to power on the Fiber OWL 4 optical power meter, then select SIMPLE METER, if necessary.

3-jumper Reference Method Setup

3. Press **F3** until the wavelength on the Fiber OWL 4 matches the output wavelength of the light source.

4. Press **F2** to set the reference, or "ZERO". The Fiber OWL 4 will change to show loss in 'dB', and the loss value should be very close to 0.00 dB.

> **Setting a reference is commonly referred to as "zeroing".**

5. Remove the center cable as shown at right.

6. Insert a patch cable under test between the two fiber optic adapters/couplers, then record the loss value in 'dB'.

Repeat steps **5** and **6** for each patch cable being tested.

Insertion Loss Test

TEST PROCEDURES

Checking Fiber OWL 4 Series Optical Power Meters For Proper Operation
USING OWL DUAL OWL SERIES MULTIMODE SOURCES

Checking Fiber OWL 4 Series Optical Power Meters for Proper Operation

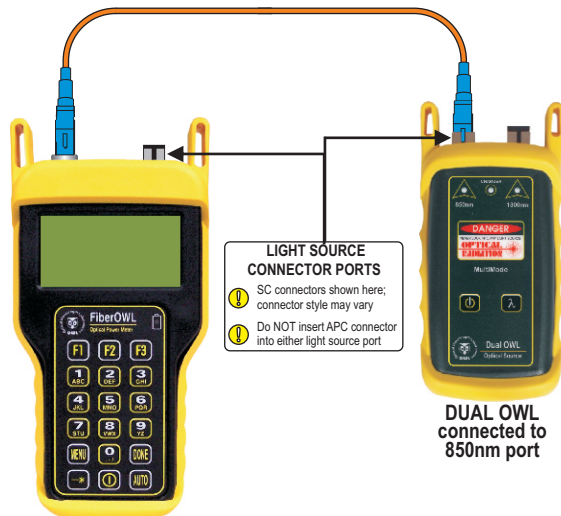### USING A DUAL OWL MULTIMODE LIGHT SOURCE

NOTE: it is recommended to thoroughly clean and inspect all patch cord connectors before making any connection.

### STEP 1 - Connect Fiber OWL 4 and Dual OWL

Connect the Fiber OWL 4 and Dual OWL together with an orange multimode patch cable as shown below.

LIGHT SOURCE CONNECTOR PORTS

⚠️ SC connectors shown here; connector style may vary

⚠️ Do NOT insert APC connector into either light source port

DUAL OWL connected to 850nm port

STEP 2 - Power ON the Fiber OWL 4

Press ⏻ to power on the Fiber OWL 4.

After a few seconds, the OPERATING MODE screen will appear on the Fiber OWL 4 display, with SIMPLE METER being highlighted as shown at right.
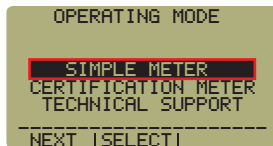
STEP 3 - Enter SIMPLE METER

Press F2 on the Fiber OWL 4 to enter SIMPLE METER.

The display should read '**UNDER**' as shown at right.

By default, the wavelength will be set to '**850nm**' and the measurement units will be set to '**dBm**'.

STEP 4 - Power ON the Dual OWL

Press ⏻ to power on the Dual OWL.

The 850nm indicator LED should now be lit as shown at right.

STEP 5 - Check optical power

The power reading that appears on the Fiber OWL 4 display will depend upon cable type. Consult the table below for a list of acceptable power readings.

Core Size	Acceptable Power Level	Replace at
62.5/125 μM	-19.0 to -21.0 dBm	-21.00 dBm
50/125 μM	-22.0 to -24.0 dBm	-24.00 dBm

NOTE: the following steps are only required if the optical power reading on the Fiber OWL 4 is too low.

STEP 6 - Replace the patch cable

The easiest way to troubleshoot low power levels is to try another patch cable. Over time, patch cables can wear out or become damaged the more they are used for optical loss testing. Replacing the patch cable usually fixes the problem.

STEP 7 - Clean patch cables and optical ports

If the problem still exists after patch cable replacement, there may be some debris, such as dust, dirt, or finger oil, that has collected on the connector endface or in the equipment optical ports.

Thoroughly clean and inspect the optical ports of the Fiber OWL 4 and the Dual OWL, as well as the fiber connector endfaces, according to the brochures that have been included with this kit. Several cleaning cycles may be required.

If the power level is still too low, even after a thorough cleaning and inspection and patch cable replacement, contact OWL technical support at 262-473-0643 for more information.

TEST PROCEDURES

Checking Fiber OWL 4 Series Optical Power Meters For Proper Operation
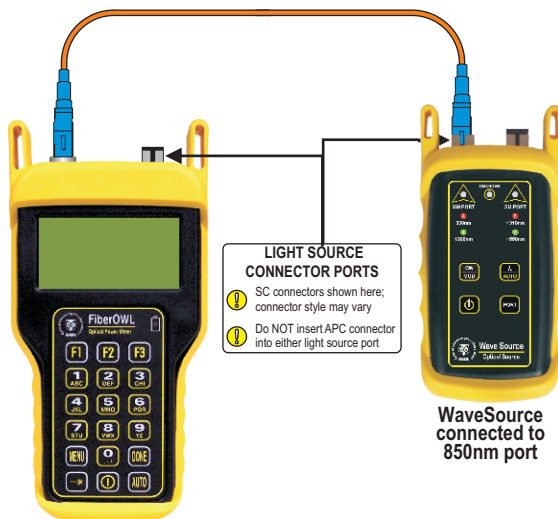## USING OWL WAVESOURCE SERIES MULTIMODE SOURCES

Checking Fiber OWL 4 Series Optical Power Meters for Proper Operation

USING A WAVESOURCE MULTIMODE LIGHT SOURCE

NOTE: thoroughly clean and inspect all patch cord connectors before making any connection.

STEP 1 - Connect Fiber OWL 4 and WaveSource

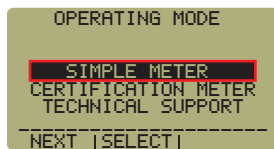Connect the Fiber OWL 4 and WaveSource together with a yellow singlemode patch cable as shown below.

LIGHT SOURCE CONNECTOR PORTS

⚠ SC connectors shown here; connector style may vary

⚠ Do NOT insert APC connector into either light source port

WaveSource connected to 850nm port

STEP 2 - Power ON the Fiber OWL 4

Press ⏻ to power on the Fiber OWL 4.

After a few seconds, the OPERATING MODE screen will appear on the Fiber OWL 4 display, with SIMPLE METER being highlighted as shown at right.
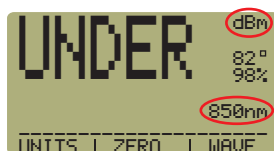
```
     OPERATING MODE

      SIMPLE METER
   CERTIFICATION METER
   TECHNICAL SUPPORT
  _____
  NEXT |SELECT|
```

STEP 3 - Enter SIMPLE METER

Press **F2** on the Fiber OWL 4 to enter SIMPLE METER.

The display should read '**UNDER**' as shown at right.

By default, the wavelength will be set to **'850nm'** and the measurement units will be set to '**dBm**'.

```
UNDER        dBm
              82°
              98%

             850nm
  _____
  UNITS | ZERO | WAVE
```
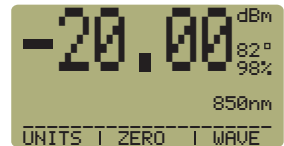
STEP 4 - Power ON the WaveSource

Press ⏻ to power on the WaveSource.

The 850nm indicator LED should now be lit as shown at right.

STEP 5 - Check optical power

The power reading that appears on the Fiber OWL 4 display will depend upon cable type. Consult the table below for a list of acceptable power readings.

```
-20.00      dBm
              82°
              98%

             850nm
  _____
  UNITS | ZERO | WAVE
```

Core Size	Acceptable Power Level	Replace at
62.5/125 μM	-19.0 to -21.0 dBm	-21.00 dBm
50/125 μM	-22.0 to -24.0 dBm	-24.00 dBm

NOTE: the following steps are only required if the optical power reading on the Fiber OWL 4 is too low.

STEP 6 - Replace the patch cable

The easiest way to troubleshoot low power levels is to try another patch cable. Over time, patch cables can wear out or become damaged the more they are used for optical loss testing. Replacing the patch cable usually fixes the problem.

STEP 7 - Clean patch cables and optical ports

If the problem still exists after patch cable replacement, there may be some debris, such as dust, dirt, or finger oil, that has collected on the connector endface or in the equipment optical ports.

Thoroughly clean and inspect the optical ports of the Fiber OWL 4 and the Dual OWL, as well as the fiber connector endfaces, according to the brochures that have been included with this kit. Several cleaning cycles may be required.

If the power level is still too low, even after a thorough cleaning and inspection and patch cable replacement, contact OWL technical support at 262-473-0643 for more information.

TEST PROCEDURES

Checking Fiber OWL 4 Series Optical Power Meters
For Proper Operation
USING OWL LASER OWL SERIES SINGLEMODE SOURCES
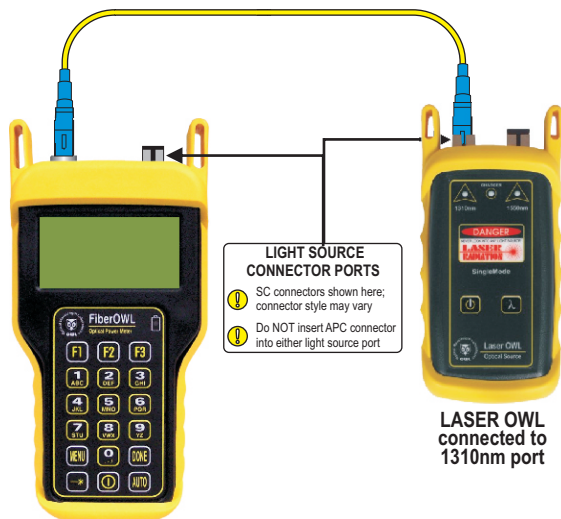
LIGHT SOURCE MODEL NUMBERS:
LO2xx
LO2-13xx
LO2-15xx

Checking Fiber OWL 4 Series Optical Power Meters for Proper Operation

USING A LASER OWL SINGLEMODE LASER SOURCE

NOTE: it is recommended to thoroughly clean and inspect all patch cord connectors before making any connection.

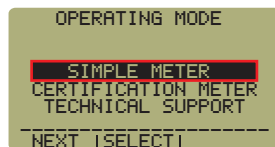## STEP 1 - Connect Fiber OWL 4 and Laser OWL

Connect the Fiber OWL 4 and Laser OWL together with a yellow singlemode patch cable as shown below.

LIGHT SOURCE CONNECTOR PORTS

⚠ SC connectors shown here; connector style may vary

⚠ Do NOT insert APC connector into either light source port

LASER OWL connected to 1310nm port

STEP 2 - Power ON the Fiber OWL 4

Press ⏻ to power on the Fiber OWL 4.

After a few seconds, the OPERATING MODE screen will appear on the Fiber OWL 4 display, with SIMPLE METER being highlighted as shown at right.

```
OPERATING MODE

SIMPLE METER
CERTIFICATION METER
TECHNICAL SUPPORT
_____
NEXT |SELECT|
```

STEP 3 - Enter SIMPLE METER

Press F2 on the Fiber OWL 4 to enter SIMPLE METER.
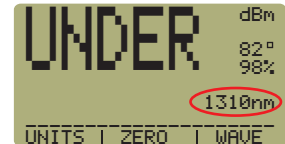
The display should read 'UNDER' as shown at right.

By default, the wavelength will be set to '850nm' and the measurement units will be set to 'dBm'.

```
UNDER          dBm
               82°
               98%

               850nm
_____
UNITS | ZERO | WAVE
```

STEP 4 - Set Fiber OWL 4 to 1310nm

Press F3 F3 F3 on the Fiber OWL 4.

The wavelength display will show '1310nm' as shown at right.

```
UNDER          dBm
               82°
               98%

               1310nm
_____
UNITS | ZERO | WAVE
```

NOTE: this test may also be run at 1550nm by setting the power meter and source to 1550nm.
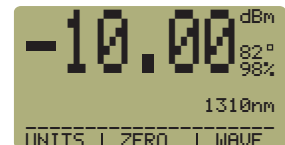
STEP 5 - Power ON the Laser OWL

Press ⏻ to power on the Laser OWL.

The 1310nm indicator LED should now be lit as shown at right.

STEP 6 - Check optical power

The power reading displayed on the Fiber OWL 4 will probably not be exactly -10.00 dBm as shown at right, but should be fairly close.

```
-10.00         dBm
               82°
               98%

               1310nm
_____
UNITS | ZERO | WAVE
```

Repeat this procedure for each additional patch cable that needs testing.

NOTE: the following steps are only required if the optical power reading on the Fiber OWL 4 is -11.00 dBm or below.

STEP 7 - Replace the patch cable

The easiest way to troubleshoot low power levels is to try another patch cable. Over time, patch cables can wear out or become damaged the more they are used for optical loss testing. Replacing the patch cable usually fixes the problem.

STEP 8 - Clean patch cables and optical ports

If the problem still exists after patch cable replacement, there may be some debris, such as dust, dirt, or finger oil, that has collected on the connector endface or in the equipment optical ports.

Thoroughly clean and inspect the optical ports of the Fiber OWL 4 and the Laser OWL, as well as the fiber connector endfaces, according to the brochures that have been included with this kit. Several cleaning cycles may be required.

If the power level is still below -11.00 dBm, even after a thorough cleaning and inspection and patch cable replacement, contact OWL technical support at 262-473-0643 for more information.

TEST PROCEDURES

Checking Fiber OWL 4 Series Optical Power Meters For Proper Operation
USING OWL WAVESOURCE SERIES SINGLEMODE SOURCES
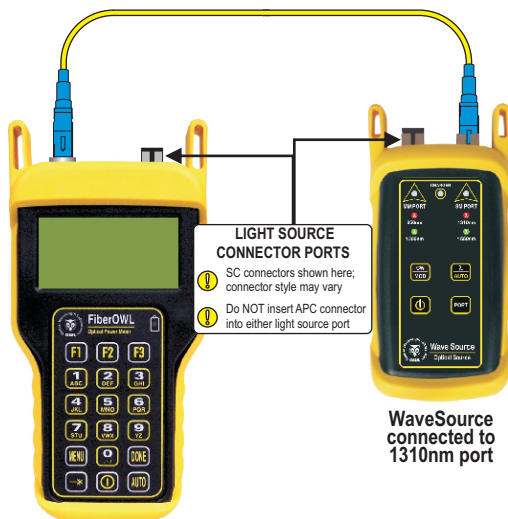
LIGHT SOURCE MODEL NUMBERS:
WS-SDxx
WS-VSDxx
WS-MDSDxx

Checking Fiber OWL 4 Series Optical Power Meters for Proper Operation

USING A WAVESOURCE SINGLEMODE LASER SOURCE

NOTE: thoroughly clean and inspect all patch cord connectors before making any connection.
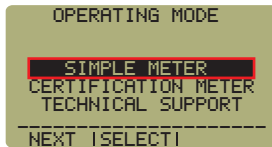
STEP 1 - Connect Fiber OWL 4 and WaveSource

Connect the Fiber OWL 4 and WaveSource together with a yellow singlemode patch cable as shown below.

LIGHT SOURCE CONNECTOR PORTS

⚠ SC connectors shown here; connector style may vary

⚠ Do NOT insert APC connector into either light source port

WaveSource connected to 1310nm port

STEP 2 - Power ON the Fiber OWL 4

Press ⏻ to power on the Fiber OWL 4.

After a few seconds, the OPERATING MODE screen will appear on the Fiber OWL 4 display, with SIMPLE METER being highlighted as shown at right.

STEP 3 - Enter SIMPLE METER

Press **F2** on the Fiber OWL 4 to enter SIMPLE METER.

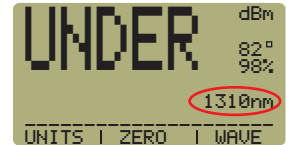The display should read '**UNDER**' as shown at right.

By default, the wavelength will be set to '**850nm**' and the measurement units will be set to '**dBm**'.

STEP 4 - Set Fiber OWL 4 to 1310nm

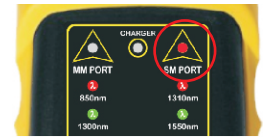Press **F3** **F3** **F3** on the Fiber OWL 4.

The wavelength display will show '**1310nm**' as shown at right.

STEP 5 - Set the WaveSource to 1310nm

Press ⏻ PORT to set the WaveSource to 1310nm.

The SM PORT indicator LED should now be red as shown at right.

STEP 6 - Check optical power

The power reading displayed on the Fiber OWL 4 will probably not be exactly **-10.00** dBm as shown at right, but should be fairly close.

Repeat this procedure for each additional patch cable that needs testing.

NOTE: the following steps are only required if the optical power reading on the Fiber OWL 4 is **-11.00** dBm or below.

STEP 7 - Replace the patch cable

The easiest way to troubleshoot low power levels is to try another patch cable. Over time, patch cables can wear out or become damaged the more they are used for optical loss testing. Replacing the patch cable usually fixes the problem.

STEP 8 - Clean patch cables and optical ports

If the problem still exists after patch cable replacement, there may be some debris, such as dust, dirt, or finger oil, that has collected on the connector endface or in the equipment optical ports.

Thoroughly clean and inspect the optical ports of the Fiber OWL 4 and the Laser OWL, as well as the fiber connector endfaces, according to the brochures that have been included with this kit. Several cleaning cycles may be required.

If the power level is still below **-11.00** dBm, even after a thorough cleaning and inspection and patch cable replacement, contact OWL technical support at 262-473-0643 for more information.

QUICK REFERENCE GUIDES

This quick reference guide demonstrates the procedure for performing a dual-wavelength insertion loss test at both **850nm** and **1300nm**.

💡   <u>**to test at only one wavelength, ignore the steps related to the other wavelength**</u>

There are three main parts to performing an insertion loss test:
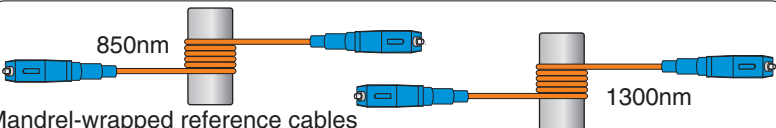
PART 1	verify proper operation of the test equipment and patch cables;
PART 2	run the Link Wizard configuration setup;
PART 3	set a reference for the wavelength(s) used during fiber link measurement;
PART 4	take measurements; and
PART 5	download test results to a PC for printing reports.

EQUIPMENT PORTS

Figure 1 shows the ports used during this procedure. These ports may vary depending upon the model of equipment.

FIGURE 1
Test Equipment Ports

Length Tester
Detector
850 nm
1300 nm

LIGHT SOURCE CONNECTOR PORTS
⚠ SC connectors shown here; connector style may vary
⚠ Do NOT insert APC connector into either light source port

Fiber OWL 4 BOLT power meter

Dual OWL series multimode light source
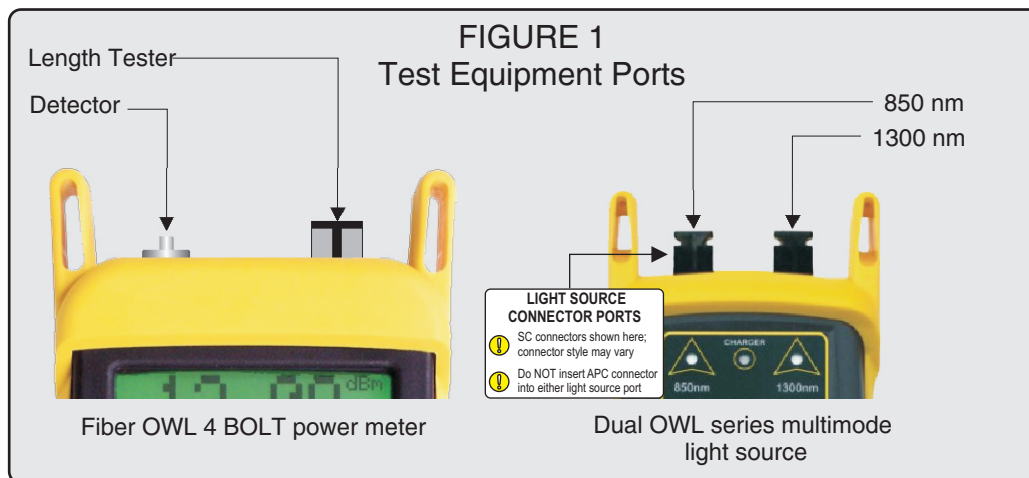
REQUIRED ACCESSORIES

850nm
1300nm
Mandrel-wrapped reference cables

(1) Straight patch cable

💡   **ensure test cables have the proper core size and connector type**

💡   **multimode reference cables must be wrapped and secured around a mandrel as <u>required</u> by national and international Fiber Optic Test Procedures (Figure 1)**

Core Size	50/125 µm	62.5/125 µm
Diameter	0.9 in.	0.7 in.
Wraps	5	5

Figure 1

💡   **a mandrel-wrapped reference cable is required for each light source wavelength being used for testing**

VERIFY PROPER OPERATION OF THE EQUIPMENT

1   Connect the power meter and light source together with one of the patch cables as shown in Figure 3.

**LIGHT SOURCE CONNECTOR
PORT NOTES:**
– CONNECTOR TYPE MAY VARY
– DO NOT INSERT ANGLED
  PHYSICAL CONTACT (APC)
  CONNECTOR

FIGURE 3
Connection
for Straight
Patch Cables

2   Press ⏻ to power on the Dual OWL multimode light source.

3   Press ⏻ to power on the Fiber OWL 4.

4   From the OPERATING MODE menu, press **F1** to highlight SIMPLE METER, if necessary, then press **F2** to SELECT.

5   Compare the reading on the Fiber OWL 4 display to Table 1 for acceptable power levels.

6   Once proper operation has been verified, remove the first patch cable from both units and set it aside.

Core Size	Acceptable Power Level	Replace at
62.5/125 µM	-19.0 to -21.0 dBm	-21.00 dBm
50/125 µM	-22.0 to -24.0 dBm	-24.00 dBm

TABLE 1

7   Connect the second straight patch cable between the Fiber OWL 4 and the Dual OWL, as shown in Figure 3.

8   Compare the reading on the Fiber OWL 4 display to Table 1 for acceptable power levels.

9   Once proper operation has been verified, remove the second patch cable from both units and set it aside.

10   Connect a mandrel-wrapped patch cable between the Fiber OWL 4 and the Dual OWL as shown in Figure 4.

**LIGHT SOURCE CONNECTOR
PORT NOTES:**
– CONNECTOR TYPE MAY VARY
– DO <u>NOT</u> INSERT ANGLED
  PHYSICAL CONTACT (APC)
  CONNECTOR

FIGURE 4
Connection for
Mandrel-Wrapped
Patch Cables
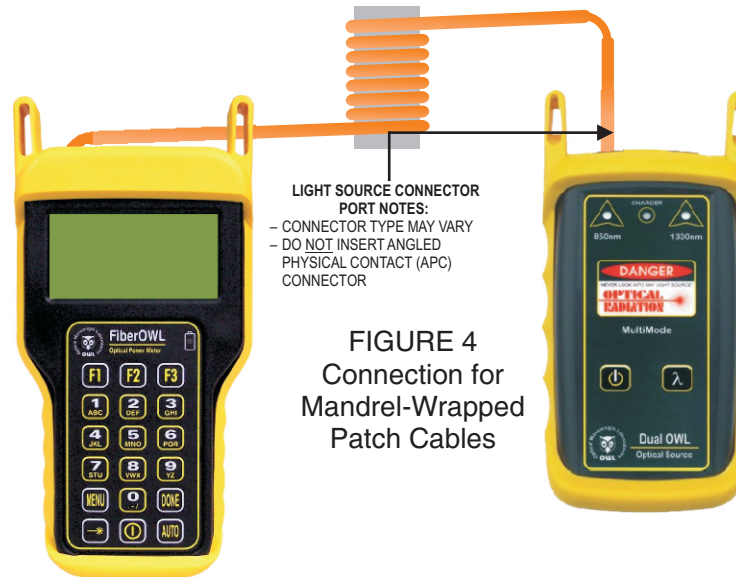
11   Compare the reading on the Fiber OWL 4 display to Table 1 for acceptable power levels.

12   Disconnect this cable from both units, and set it aside. Press **DONE** to return to the OPERATING MODE menu.

RUN LINK WIZARD

13   From the OPERATING MODE menu, press **F1** to highlight CERTIFICATION METER, then press **F2** to SELECT.

14   From the START MENU, press **1 ABC** to start the LINK WIZARD.

```
        START MENU
<1>LINK WIZARD
<2>MAIN MENU
```

15   From the STORED LINKS menu, press **F1** to highlight the stored link name you wish to use and press **F2** to SELECT.

```
       STORED LINKS
Fiber Link 1
Fiber Link 2
Fiber Link 3
Fiber Link 4
_____
 NEXT |SELECT|
```

16   **OPTIONAL:** you may change the link name to something that better describes the group of fibers you are testing. Enter the new name for the link, then press **DONE** to continue.

```
LINK NAME:


[Fiber Link 1    ]
_____
 <--- | SHIFT | --->
```

17   Change the LINK DATE to the date of test using the format **MM-DD-YY**, then press **DONE** .

     💡   The date of test must be set so that the correct date appears on certification reports.

```
DATE: [MM/DD/YY]


[03-20-08]
_____
 <--- | SHIFT | --->
```

18   Press **F1** to highlight the fiber optic cabling standard, then press **F2** to SELECT.

✓   If unsure about which cabling standard to use, select TIA-568-B.3.

```
FIBER STANDARDS

USER DEFINED #1
USER DEFINED #2
TIA-568B.3/CAN-T529
ISO/IEC 11801
---------------------
NEXT |SELECT|
```

19   Press **F1** to highlight the fiber type of the network under test, then press **F2** to SELECT.

```
FIBER TYPES

62.5um MultiMode
50.0um MultiMode
INDOOR SingleMode
OUTDOOR SingleMode
---------------------
NEXT |SELECT|
```

20   Press **1 ABC** to use measure the fiber length with the Fiber OWL 4 BOLT, or to enter the length manually, press **2 DEF** and skip to **23**.

```
FIBER LENGTH METHOD

<1> USE THE METER TO
    MEASURE LENGTH

<2> ENTER LENGTH
    MANUALLY
```

21   Connect the Fiber OWL 4 BOLT to your fiber link as shown in Figure 5, then press **F1** to continue.

```
^  CONNECT  ^
FIBER A      FIBER B
(FIBER PAIR REQUIRED)
PATCH FIBER A TO
FIBER B AT THE FAR
END OF THE LINK.
---------------------
DONE |      |
```


FIGURE 5
Fiber OWL 4 BOLT
Length Test Connection

**LIGHT SOURCE CONNECTOR
PORT NOTES:**
– CONNECTOR TYPE MAY VARY
– DO NOT INSERT ANGLED
  PHYSICAL CONTACT (APC)
  CONNECTOR
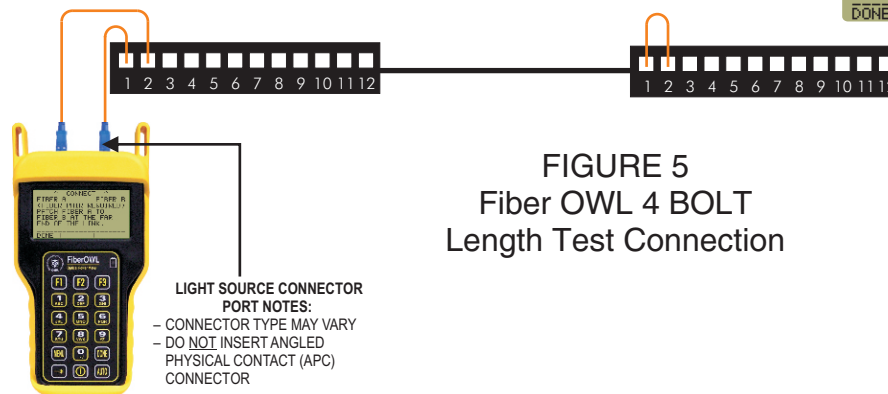
22   Review the end-to-end fiber length, then press **F2** to continue. In the example screenshot at right, the end-to-end fiber length could be within the range of 1000 to 1006 meters.

```
FIBER LENGTH

01000 -0/+6 meters

1310nm Index(n)=1.490
---------------------
TEST | DONE | INDEX
```

23   The end-to-end length shown here is the length that will be entered into the Link Wizard configuration. Press **DONE** to continue.

```
ENTER FIBER LENGTH:
[1 TO 65535]


[01000] METERS
---------------------
<--- | UNITS | --->
```

OPTIONAL: you may also enter the fiber length manually from this screen.

✓   Length testing is complete. You may now remove all of the patch cables from the link under test.

24 Enter the number of connections (i.e. patch panels) in the link under test, then press **DONE** to continue.

> ✅ Typical fiber networks will have 2 connections – one for a patch panel located at each end of the link.

```
INLINE CONNECTIONS?
(A CONNECTION IS WHEN
TWO FIBER CONNECTORS
MATE  USUALLY A PATCH
PANEL)
[2 ]
-------------------
<--- | FEET | --->
```

25 Enter the number of splices in the link under test, then press **DONE** to continue. Splices can be either fusion or mechanical. Typical multimode networks will have zero splices.

> ✅ some connectors use mechanical splice technology for termination. If the link under test is terminated with these "no-polish, no-epoxy" type connectors, they should be considered as mechanical splices.

```
ENTER THE NUMBER OF
SPLICES IN THE FIBER
BEING TESTED:

[0 ]
-------------------
<--- | FEET | --->
```

26 Review your Link Wizard setup.

If correct, press **F1** to continue on to the next step.

If changes need to be made, press **F3** and go back to **16**.

```
Standard »TIA-568B.3/CAN-T529
  Length »01000 Meters
Connections »02 Connections
 Splices »00 Splices
Fiber Type »62.5um MultiMode
          IS THIS CORRECT?
-------------------
YES |     | NO
```

27 Press **F1** until the asterisk (*) is in front of 850nm (as shown at right), then press **F2** to begin the SET REFERENCE procedure for 850nm.

```
SET SOURCE REFERENCES
WAVELEN REF dBm  TYP.
-------------------
* 850nm NOT SET (-20)
  1300nm NOT SET (-20)
-------------------
WAVE |  SET | DONE
```

28 Connect the Fiber OWL 4 detector port and the 850nm light source (left-hand port) together with the mandrel-wrapped cable as shown in Figure 4, then press **F1** to continue.

```
  CONNECT
   850nm
  SOURCE
-------------------
DONE |       |
```

29 Make sure that the 850nm light source port is powered ON and selected (the indicator LED on the left-hand side will be lit).

```
SET   850nm
REFERENCE?
-------------------
YES |       | NO
```

30 Confirm setting the 850nm reference by pressing **F1** to continue. You will be returned to the SET SOURCE REFERENCES screen.

> 💡 if you are also testing at 1300nm, you will need to connect a separate mandrel-wrapped patch cable to the 1300nm port.

```
SET SOURCE REFERENCES
WAVELEN REF dBm  TYP.
-------------------
 850nm -20.00  (-20)
*1300nm NOT SET (-20)
-------------------
WAVE |  SET | DONE
```

31 For setting a 1300nm reference, repeat steps **27** through **30**, except you will select 1300nm (as shown at right). Also, make sure that the Dual OWL is set to 1300nm (the right-hand indicator LED will be lit).

After the 1300nm reference is set, the REF dBm field will be filled in with a reference value.

32 Press **F3** to complete the Link Wizard.

33 Press **F1** to begin taking readings.

TAKE READINGS

34 Disconnect the mandrel-wrapped patch cable from the Fiber OWL 4 and take the units to opposite ends of the link.

Do NOT disconnect the patch cable(s) from the light source at any time until all fibers have been tested.

35 Connect the units to the first fiber to test as shown in Figure 6. Your readings will vary from the example below.

LIGHT SOURCE CONNECTOR PORT NOTES:
– CONNECTOR TYPE MAY VARY
– DO NOT INSERT ANGLED PHYSICAL CONTACT (APC) CONNECTOR

FIGURE 6
Equipment
Connection for
Optical Loss
Measurements
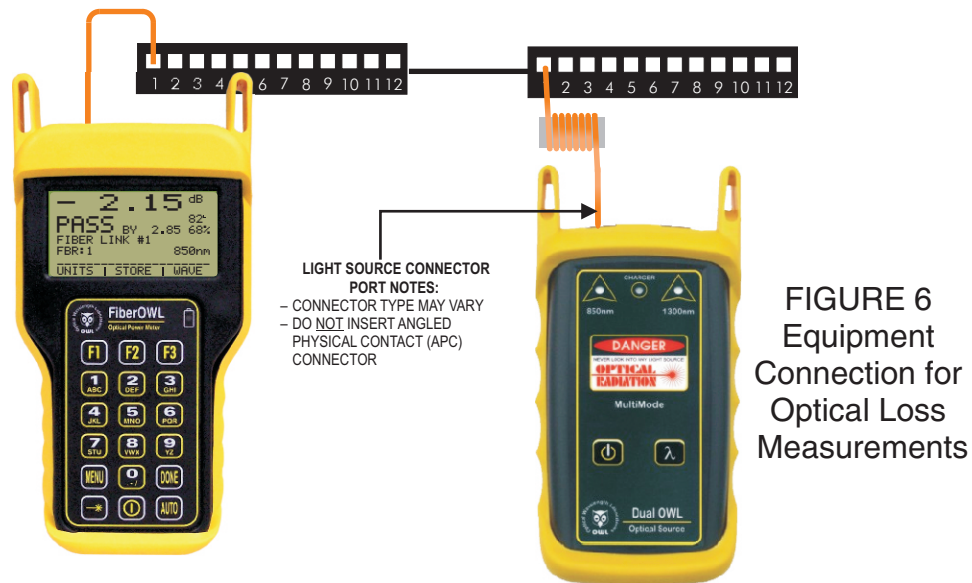
36 Press **F2** to store the data point. If this is the first data point in the link, you may be prompted to enter a new label.

37 Press **F3** to save the data point.

38 Disconnect the patch cables from the patch panels and move them to the next port in the patch panel, then repeat steps **36** through **38** until all fibers in the link have been tested at 850nm.

39 If also testing at 1300nm, repeat steps **35** through **38**, but this time use the mandrel-wrapped patch cable attached to the 1300nm port. Also, make sure that you set the Fiber OWL 4 and the Dual OWL to 1300nm.

QUICK REFERENCE GUIDES

Optical Power Meter:　　　　**Fiber OWL 4**
Fiber Optic Light Source:　　　　**WAVESOURCE Series Multimode Sources**

REQUIRED ACCESSORIES

(2) multimode patch cables
(1) fiber optic mandrel – used for setting references with multimode cables only; see table below for mandrel　　sizes

	50/125 μm	62.5/125 μm
Diameter	0.9 in.	0.7 in.
Wraps	5	5

Figure 1
Mandrel Wrap

multimode reference cables must be wrapped and secured around a mandrel as required by national and international Fiber Optic Test Procedures (FOTPs). See Figure 1 above for a diagram of a mandrel wrap.

EQUIPMENT PORTS
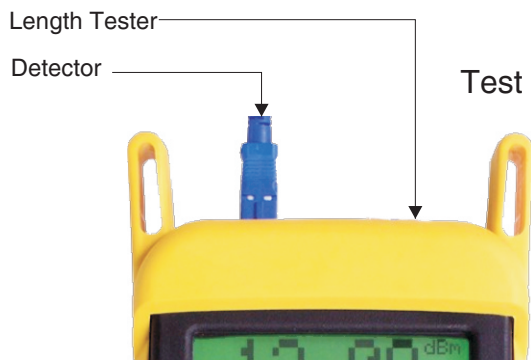
Length Tester
Detector

FIGURE 2
Test Equipment Ports

850 nm /
1300nm

Fiber OWL 4 BOLT power meter
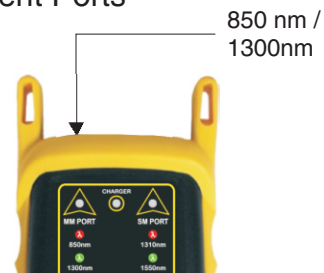
WaveSource light source

Figure 2 shows the ports of the equipment used during this procedure. These ports may vary depending upon the model of equipment.

VERIFY PROPER OPERATION OF THE EQUIPMENT

1　　Connect the power meter and light source together with the straight patch cable as shown in Figure 3.

FIGURE 3
Connection
for Straight
Patch Cables

**LIGHT SOURCE CONNECTOR
PORT NOTES:**
– CONNECTOR TYPE MAY VARY
– DO NOT INSERT ANGLED
PHYSICAL CONTACT (APC)
CONNECTOR

QUICK REFERENCE GUIDES

2   Press ⏻ to power on the light source.

3   Press Ⓘ to power on the Fiber OWL 4.

4   From the OPERATING MODE menu, press **F1** to highlight SIMPLE METER if necessary, then press **F2** to SELECT.

5   Compare the reading on the Fiber OWL 4 display to Table 1 for acceptable power levels.

Core Size	Acceptable Power Level	Replace at
62.5/125 µM	-19.0 to -22.0 dBm	-22.00 dBm
50/125 µM	-22.0 to -25.0 dBm	-25.00 dBm

TABLE 1

6   Once proper operation has been verified, remove the straight patch cable from both units and set it aside.

7   Connect the mandrel-wrapped patch cable between the Fiber OWL 4 and the WaveSource as shown in Figure 4.

FIGURE 4
Connection for
Mandrel-Wrapped
Patch Cables

**LIGHT SOURCE CONNECTOR
PORT NOTES:**
– CONNECTOR TYPE MAY VARY
– DO NOT INSERT ANGLED
PHYSICAL CONTACT (APC)
CONNECTOR

8   Compare the reading on the Fiber OWL 4 display to Table 1 for acceptable power levels.

9   Press **DONE** to return to the OPERATING MODE menu.

RUN LINK WIZARD

10   From the OPERATING MODE menu, press **F1** to highlight CERTIFICATION METER, then press **F2** to SELECT.

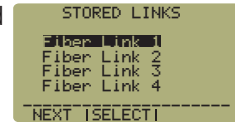**11**   From the START MENU, press **1** to start the LINK WIZARD.

```
START MENU

<1>LINK WIZARD
<2>MAIN MENU
```

Optical Power Meter: Fiber OWL 4
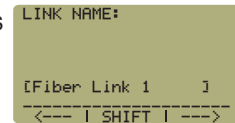**Fiber Optic Light Source:**   WAVESOURCE Series Multimode Sources

12   From the STORED LINKS menu, press **F1** to highlight the stored link name you wish to use and press **F2** to SELECT.

```
   STORED LINKS
 Fiber Link 1
 Fiber Link 2
 Fiber Link 3
 Fiber Link 4
------------------
 NEXT |SELECT|
```
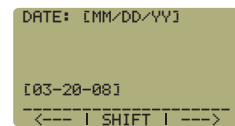
13   OPTIONAL: you may change the link name to something that better describes the group of fibers you are testing. Enter the new name for the link, then press **DONE** to continue.

```
LINK NAME:


[Fiber Link 1    ]
------------------
 <--- | SHIFT | --->
```

14   Change the LINK DATE to the date of test using the format MM-DD-YY, then press **DONE** .

     🔑   The date of test must be set so that the correct date appears on certification reports.

```
DATE: [MM/DD/YY]


[03-20-08]
------------------
 <--- | SHIFT | --->
```

15   Press **F1** to highlight the fiber optic cabling standard, then press **F2** to SELECT.

     ✓   If unsure about which cabling standard to use, select TIA-568-B.3.

```
  FIBER STANDARDS
 USER DEFINED #1
 USER DEFINED #2
 TIA-568B.3/CAN-T529
 ISO/IEC 11801
------------------
 NEXT |SELECT|
```

16   Press **F1** to highlight the fiber type of the network under test, then press **F2** to SELECT.

```
   FIBER TYPES
 62.5um MultiMode
 50.0um MultiMode
 INDOOR SingleMode
 OUTDOOR SingleMode
------------------
 NEXT |SELECT|
```

17   Press **1 ABC** to use measure the fiber length with the Fiber OWL 4 BOLT, or to enter the length manually, press **2 DEF** and skip to **20** .

```
FIBER LENGTH METHOD
 <1> USE THE METER TO
     MEASURE LENGTH

 <2> ENTER LENGTH
     MANUALLY
```

```
 ^  CONNECT  ^
FIBER A      FIBER B
<FIBER PAIR REQUIRED>
PATCH FIBER A TO
FIBER B AT THE FAR
END OF THE LINK.
------------------
DONE |      |
```

FIGURE 5
Fiber OWL 4 BOLT
Length Test Connection

LIGHT SOURCE CONNECTOR PORT NOTES:
– CONNECTOR TYPE MAY VARY
– DO NOT INSERT ANGLED PHYSICAL CONTACT (APC) CONNECTOR
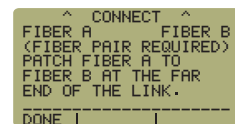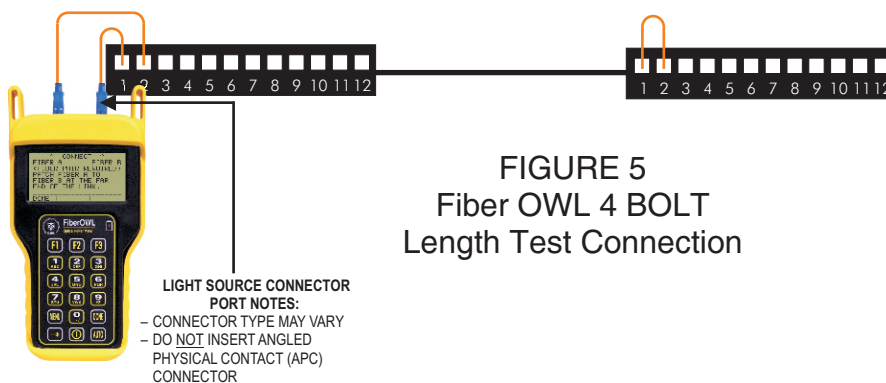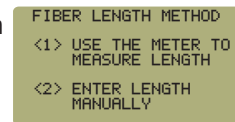
18   Connect the Fiber OWL 4 BOLT to your fiber link as shown in Figure 5, then press **F1** to continue.

19   Review the end-to-end fiber length, then press **F2** to continue. In the example screenshot at right, the end-to-end fiber length could be within the range of 1000 to 1006 meters.

```
   FIBER LENGTH
 01000 -0/+6 meters

1310nm Index(n)=1.490
------------------
 TEST | DONE | INDEX
```
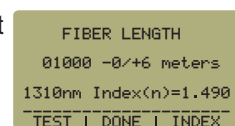
QUICK REFERENCE GUIDES

20 The end-to-end length shown here is the length that will be entered into the Link Wizard configuration. Press DONE to continue.

> **OPTIONAL:** you may also enter the fiber length manually from this screen.

```
ENTER FIBER LENGTH:
[1 TO 65535]


[01000] METERS
------------------
 <--- | UNITS | --->
```

✓ Length testing is complete. You may now remove all of the patch cables from the link under test.

21 Enter the number of connections (i.e. patch panels) in the link under test, then press DONE to continue.

```
INLINE CONNECTIONS?
(A CONNECTION IS WHEN
TWO FIBER CONNECTORS
MATE. USUALLY A PATCH
PANEL)
[2 ]
------------------
 <--- | FEET | --->
```

✓ Typical fiber networks will have 2 connections – one for a patch panel located at each end of the link.

22 Enter the number of splices in the link under test, then press DONE to continue. Splices can be either fusion or mechanical. Typical multimode networks will have zero splices.

```
ENTER THE NUMBER OF
SPLICES IN THE FIBER
BEING TESTED:

[0 ]
------------------
 <--- | FEET | --->
```

✓ some connectors use mechanical splice technology for termination. If the link under test is terminated with these "no-polish, no-epoxy" type connectors, they should be considered as mechanical splices.

23 Review your Link Wizard setup.

If correct, press **F1** to continue on to the next step.

If changes need to be made, press **F3** and go back to **13** .

```
Standard ▶TIA-568B.3/CAN-T529
  Length ▶01000 Meters
Connections ▶02 Connections
  Splices ▶00 Splices
Fiber Type ▶62.5um MultiMode
IS THIS CORRECT?
------------------
 YES |        | NO
```

24 Press **F1** until the asterisk (*) is in front of 850nm (as shown at right), then press **F2** to begin the SET REFERENCE procedure for 850nm.

```
SET SOURCE REFERENCES
WAVELEN REF dBm  TYP.
------------------
* 850nm NOT SET (-20)
  1300nm NOT SET (-20)

------------------
WAVE |  SET  | DONE
```

25 Connect the Fiber OWL 4 detector port and the light source multimode port together with the mandrel-wrapped cable as shown in Figure 4, then press **F1** to continue.

```
CONNECT
850nm
SOURCE
------------------
DONE |       |
```

26 Make sure that the 850nm light source port is powered ON and selected (the indicator LED on the left-hand side will be red).

```
SET  850nm
REFERENCE?
------------------
YES |        | NO
```

27 Confirm setting the 850nm reference by pressing **F1** to continue. You will be returned to the SET SOURCE REFERENCES screen.

28 For setting a 1300nm reference, repeat steps **24** through **27** , except you will select 1300nm (as shown at right). Also, make sure that you set the WaveSource to 1300nm (the left-hand indicator LED will be the color green).

After the 1300nm reference is set, the REF dBm field will be filled in with a reference value.

```
SET SOURCE REFERENCES
WAVELEN REF dBm  TYP.
------------------
  850nm -20.00  (-20)
*1300nm NOT SET (-20)

------------------
WAVE |  SET  | DONE
```

Optical Power Meter: **Fiber OWL 4**
Fiber Optic Light Source: **WAVESOURCE Series Multimode Sources**

29   Press **F3** to complete the Link Wizard.

30   Press **F1** to begin taking readings.

TAKE READINGS

31   If testing only one wavelength, then skip to the next step.

        If testing at two wavelengths, press **AUTO** to set the Fiber OWL 4 into AUTO mode, then press and hold **λ AUTO** on the WaveSource until the multimode port indicator LED starts flashing, then immediately release the button. The WaveSource will begin to alternate between green and red, and after a few seconds, readings for both wavelengths will appear on the Fiber OWL 4 display.

32   Disconnect the mandrel-wrapped patch cable from the Fiber OWL 4 and take the units to opposite ends of the link.

        💡   Do NOT disconnect the patch cable(s) from the light source at any time until all fibers have been tested.

33   Connect the units to the first fiber to test as shown in Figure 6. Your readings will vary from the example below.

FIGURE 6
Equipment
Connection for
Optical Loss
Measurements

LIGHT SOURCE CONNECTOR
PORT NOTES:
– CONNECTOR TYPE MAY VARY
– DO NOT INSERT ANGLED
  PHYSICAL CONTACT (APC)
  CONNECTOR
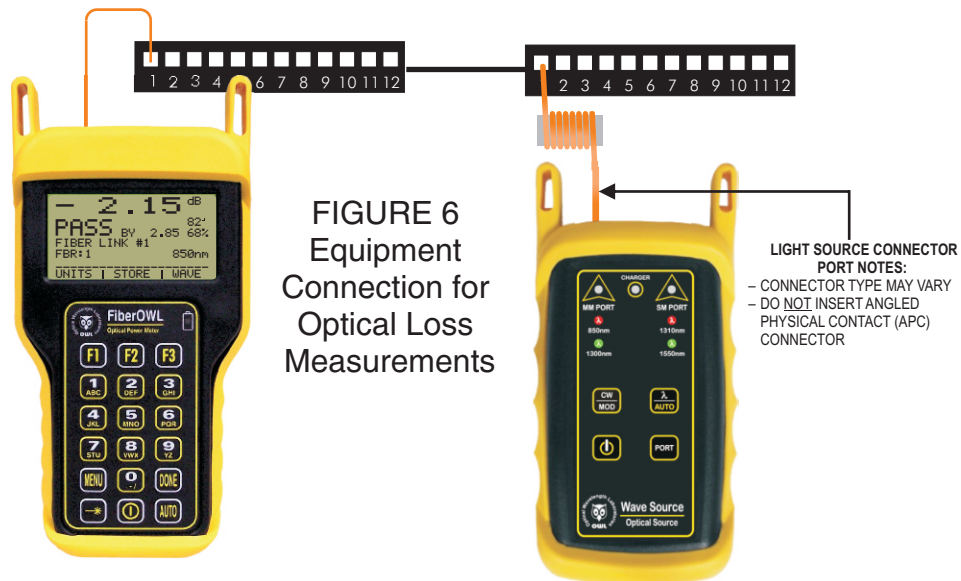
34   Once the STORE option becomes active, press **F2** to store the data point. If this is the first fiber in the link, you may be prompted to enter a new label.

35   Press **F3** to save the data point(s).

36   Disconnect the patch cables from the patch panels and move them to the next port in the patch panel, then repeat steps

        34 through **36** until all fibers in the link have been tested.

QUICK REFERENCE GUIDES

Optical Power Meter: **Fiber OWL 4**
Fiber Optic Light Source: **LASER OWL Series Singlemode Sources**

REQUIRED ACCESSORIES

(2 or 3) singlemode patch cables

if you are testing at both 1310nm and 1550nm, each light source wavelength will require its own singlemode patch cable.

EQUIPMENT PORTS

Figure 1 shows the ports of the equipment used during this procedure. These ports may vary depending upon the model of equipment.

Length Tester

Detector

FIGURE 1
Test Equipment Ports

1310 nm

1550 nm

Fiber OWL 4 BOLT power meter

Laser OWL light source

VERIFY PROPER OPERATION OF THE EQUIPMENT

1   Connect the power meter and light source together with one of the patch cables as shown in Figure 2.

FIGURE 2
Singlemode
Patch Cable
Connection

LIGHT SOURCE CONNECTOR
PORT NOTES:
– CONNECTOR TYPE MAY VARY
– DO NOT INSERT ANGLED
   PHYSICAL CONTACT (APC)
   CONNECTOR

2   Press [⏻] to power on the light source.

3   Press [Ⓘ] to power on the Fiber OWL 4.

4   From the OPERATING MODE menu, press **F1** to highlight SIMPLE METER if necessary, then press **F2** to SELECT.

Optical Power Meter: Fiber OWL 4
Fiber Optic Light Source: **LASER OWL Series Singlemode Sources**

5 Press **F3** on the Fiber OWL 4 until the wavelength reads 1310nm.

6 The Fiber OWL 4 should read approximately -10.00 dBm. If the reading is below -11.00 dBm, the patch cable should be replaced.

7 Once proper operation has been verified, remove the first patch cable from both units and set it aside.

8 Connect the second singlemode patch cable between the Fiber OWL 4 and the Laser OWL as shown in Figure 2.

9 The Fiber OWL 4 should read approximately -10.00 dBm. If the reading is below -11.00 dBm, the patch cable should be replaced.

10 Once proper operation has been verified, remove the second patch cable from both units and set it aside.

11 Connect the third singlemode patch cable between the Fiber OWL 4 and the Laser OWL as shown in Figure 2.

12 The Fiber OWL 4 should read approximately -10.00 dBm. If the reading is below -11.00 dBm, the patch cable should be replaced.

13 Disconnect the third cable from both units, and set it aside. Press **DONE** to return to the OPERATING MODE menu.

RUN LINK WIZARD

14 From the OPERATING MODE menu, press **F1** to highlight CERTIFICATION METER, then press **F2** to SELECT.

15 From the START MENU, press **1 ABC** to start the LINK WIZARD.

```
       START MENU
<1>LINK WIZARD
<2>MAIN MENU
```

16 From the STORED LINKS menu, press **F1** to highlight the stored link name you wish to use and press **F2** to SELECT.

```
      STORED LINKS
 Fiber Link 1
 Fiber Link 2
 Fiber Link 3
 Fiber Link 4
_____
 NEXT [SELECT]
```

17 **OPTIONAL:** you may change the link name to something that better describes the group of fibers you are testing. Enter the new name for the link, then press **DONE** to continue.

```
LINK NAME:

[Fiber Link 1    ]
_____
 <--- | SHIFT | --->
```

18 Change the LINK DATE to the date of test using the format **MM-DD-YY**, then press **DONE** .

The date of test <u>must</u> be set so that the correct date appears on certification reports.

```
DATE: [MM/DD/YY]

[03-20-08]
_____
 <--- | SHIFT | --->
```

19 Press **F1** to highlight the fiber optic cabling standard, then press **F2** to SELECT.

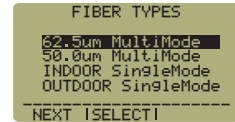If unsure about which cabling standard to use, select TIA-568-B.3.

```
   FIBER STANDARDS
 USER DEFINED #1
 USER DEFINED #2
 TIA-568B.3/CAN-T529
 ISO/IEC 11801
_____
 NEXT [SELECT]
```
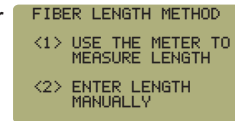
QUICK REFERENCE GUIDES

20 Press **F1** to highlight the fiber type of the network under test, then press **F2** to SELECT.

```
        FIBER TYPES
  62.5um MultiMode
  50.0um MultiMode
  INDOOR SingleMode
  OUTDOOR SingleMode
 --------------------
  NEXT |SELECT|
```
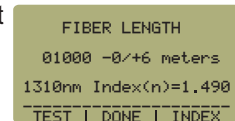
21 Press **1 ABC** to measure the fiber length with the Fiber OWL 4 BOLT. If you wish to enter the fiber length manually, skip to **23**.
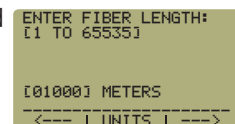
```
 FIBER LENGTH METHOD
 <1> USE THE METER TO
     MEASURE LENGTH

 <2> ENTER LENGTH
     MANUALLY
```

22 Connect the Fiber OWL 4 BOLT to your fiber link as shown in Figure 3.

```
    ^   CONNECT   ^
 FIBER A      FIBER B
 <FIBER PAIR REQUIRED>
 PATCH FIBER A TO
 FIBER B AT THE FAR
 END OF THE LINK.
 --------------------
 DONE |      |
```


FIGURE 3
Fiber OWL 4 BOLT
Length Test Connection

LIGHT SOURCE CONNECTOR PORT NOTES:
– CONNECTOR TYPE MAY VARY
– DO NOT INSERT ANGLED PHYSICAL CONTACT (APC) CONNECTOR

23 Review the end-to-end fiber length, then press **F2** to continue. In the example screenshot at right, the end-to-end fiber length could be within the range of 1000 to 1006 meters.
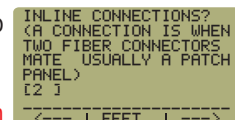
```
     FIBER LENGTH
   01000 -0/+6 meters
 1310nm Index(n)=1.490
 --------------------
  TEST | DONE | INDEX
```

24 The end-to-end length shown here is the length that will be entered into the Link Wizard configuration. Press **DONE** to continue.
OPTIONAL: you may also enter the fiber length manually from this screen.

```
 ENTER FIBER LENGTH:
 [1 TO 65535]


 [01000] METERS
 --------------------
 <--- | UNITS | --->
```

✓ Length testing is complete. You may now remove all of the patch cables from the link under test.

25 Enter the number of connections (i.e. patch panels) in the link under test, then press **DONE** to continue.

```
 INLINE CONNECTIONS?
 <A CONNECTION IS WHEN
 TWO FIBER CONNECTORS
 MATE  USUALLY A PATCH
 PANEL>
 [2 ]
 --------------------
 <--- | FEET  | --->
```

✓ Typical fiber networks will have 2 connections – one for a patch panel located at each end of the link.

26 Enter the number of splices in the link under test, then press **DONE** to continue. Splices can be either fusion or mechanical. Typical multimode networks will have zero splices.

```
 ENTER THE NUMBER OF
 SPLICES IN THE FIBER
 BEING TESTED:

 [0 ]
 --------------------
 <--- | FEET  | --->
```

✓ some connectors use mechanical splice technology for termination. If the link under test is terminated with these "no-polish, no-epoxy" type connectors, they should be considered as mechanical splices.

Optical Power Meter: Fiber OWL 4
Fiber Optic Light Source: **LASER OWL Series Singlemode Sources**

27   Review your Link Wizard setup.
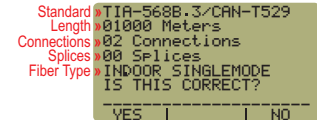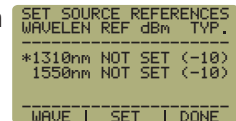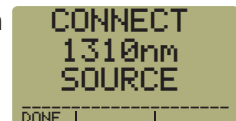
If correct, press **F1** to continue on to the next step.

If changes need to be made, press **F3** and go back to **17**.

```
Standard »TIA-568B.3/CAN-T529
Length »01000 Meters
Connections »02 Connections
Splices »00 Splices
Fiber Type »INDOOR SINGLEMODE
IS THIS CORRECT?
─────────────────
YES  |      |  NO
```
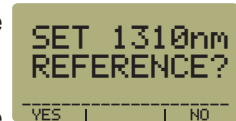
28   Press **F1** until the asterisk (*) is in front of 1310nm (as shown at right), then press **F2** to begin the SET REFERENCE procedure for 1310nm.

```
SET SOURCE REFERENCES
WAVELEN REF dBm  TYP.
─────────────────
*1310nm NOT SET (-10)
 1550nm NOT SET (-10)

─────────────────
WAVE  |  SET  |  DONE
```

29   Connect the Fiber OWL 4 detector port and the 1310nm port together with a singlemode patch cable as shown in Figure 2, then press **F1** to continue.

```
CONNECT
1310nm
SOURCE
─────────────────
DONE  |      |
```

30   Make sure that the 1310nm light source port is powered ON and selected (the indicator LED on the left-hand side will be lit).

```
SET 1310nm
REFERENCE?
─────────────────
YES  |      |  NO
```

31   Confirm setting the 1310nm reference by pressing **F1** to continue. You will be returned to the SET SOURCE REFERENCES screen.

32   For setting a 1550nm reference, repeat steps **28** through **31**, except you will select 1550nm (as shown at right). Also make sure that a SEPARATE singlemode patch cable is connected to the 1550nm port, and that you set the Laser OWL to 1550nm (the right-hand indicator LED will be lit).

After the 1550nm reference is set, the REF dBm field will be filled in with a reference value.

33   Press **F3** to complete the Link Wizard.

34   Press **F1** to begin taking readings.

TAKE READINGS

35   Disconnect the singlemode patch cable from the Fiber OWL 4 and take the units to opposite ends of the link.

36   Connect the units to the first fiber to test as shown in Figure 4. Your readings will vary from the example below.

FIGURE 4
Equipment Connection for Optical Loss Measurements

LIGHT SOURCE CONNECTOR PORT NOTES:
– CONNECTOR TYPE MAY VARY
– DO NOT INSERT ANGLED PHYSICAL CONTACT (APC) CONNECTOR
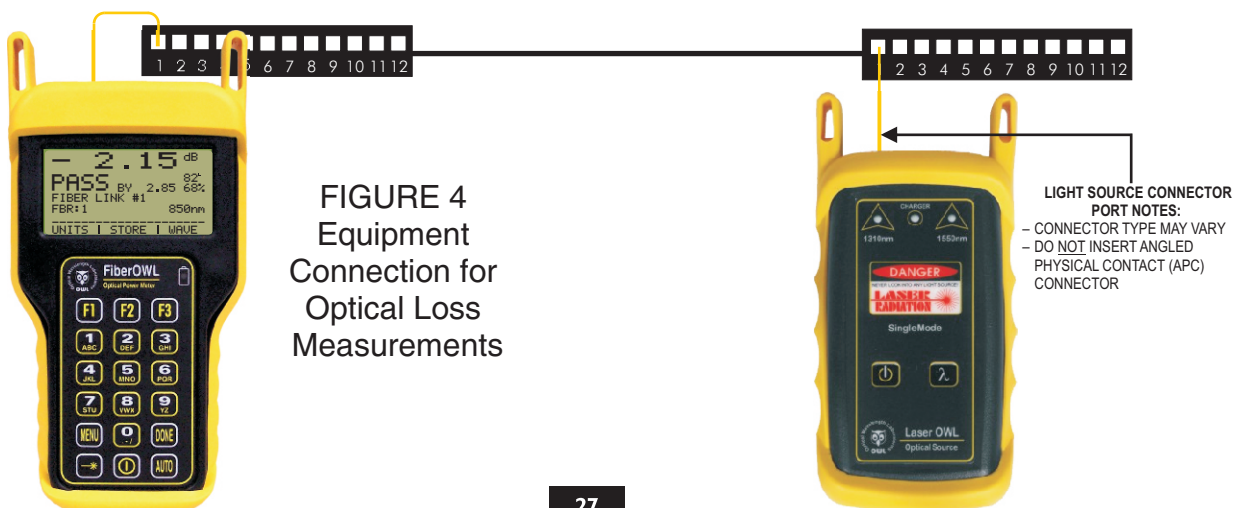
QUICK REFERENCE GUIDES

TAKE READINGS, CONT.

(37)   Press **F2** to store the data point. If this is the first data point in the link, you may be prompted to enter a new label.

(38)   Press **F3** to save the data point.

(39)   Disconnect the patch cables from the patch panels and move them to the next port in the patch panel,

then repeat steps **(36)** through **(38)** until all fibers in the link have been tested at 1310nm.

If also testing at 1550nm, repeat steps **(36)** through **(39)** , but this time use the singlemode patch cable attached to the 1550nm port. Also, make sure that you set the Fiber OWL 4 and the Laser OWL to 1550nm.

(end of procedure)

QUICK REFERENCE GUIDES

Optical Power Meter: **Fiber OWL 4**
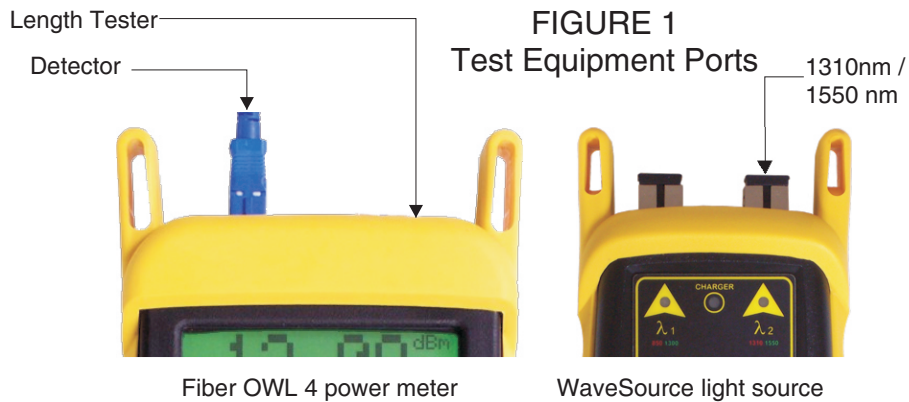**Fiber Optic Light Source:**   **WAVESOURCE Series Singlemode Sources**

REQUIRED ACCESSORIES
    (2 or 3) singlemode patch cables

EQUIPMENT PORTS
Figure 1 shows the ports of the equipment used during this procedure. These ports may vary depending upon the model of equipment.

Length Tester

Detector

FIGURE 1
Test Equipment Ports

1310nm / 1550 nm

Fiber OWL 4 power meter   WaveSource light source

VERIFY PROPER OPERATION OF THE EQUIPMENT

1   Connect the power meter and light source together with one of the patch cables as shown in Figure 2.

FIGURE 2
Singlemode
Patch Cable
Connection

LIGHT SOURCE CONNECTOR PORT NOTES:
– CONNECTOR TYPE MAY VARY
– DO NOT INSERT ANGLED PHYSICAL CONTACT (APC) CONNECTOR

2   Press 🔘 to power on the light source.

3   Press PORT to set the WaveSource to the SM PORT. The right-hand indicator will be red for 1310nm.

4   Press ⓪ to power on the Fiber OWL 4.

5   From the OPERATING MODE menu, press F1 to highlight SIMPLE METER if necessary, then press F2 to SELECT.

6   Press F3 on the Fiber OWL 4 until the wavelength reads 1310nm.

Optical Power Meter: Fiber OWL 4
Fiber Optic Light Source: **WAVESOURCE Series Singlemode Sources**

7   The Fiber OWL 4 should read approximately -10.00 dBm. If the reading is below -11.00 dBm, the patch cable should be replaced.

8   Once proper operation has been verified, remove the first patch cable from both units and set it aside.

9   Connect the second singlemode patch cable between the Fiber OWL 4 and the WaveSource as shown in Figure 2.

10   The Fiber OWL 4 should read approximately -10.00 dBm. If the reading is below -11.00 dBm, the patch cable should be replaced.

11   Once proper operation has been verified, press `DONE` to return to the OPERATING MODE menu.

RUN LINK WIZARD

12   From the OPERATING MODE menu, press `F1` to highlight CERTIFICATION METER, then press `F2` to SELECT.

13   From the START MENU, press `1 ABC` to start the LINK WIZARD.

```
        START MENU
<1>LINK WIZARD
<2>MAIN MENU
```

14   From the STORED LINKS menu, press `F1` to highlight the stored link name you wish to use and press `F2` to SELECT.

```
       STORED LINKS
Fiber Link 1
Fiber Link 2
Fiber Link 3
Fiber Link 4
_____
 NEXT |SELECT|
```

15   **OPTIONAL:** you may change the link name to something that better describes the group of fibers you are testing. Enter the new name for the link, then press `DONE` to continue.

```
LINK NAME:


[Fiber Link 1     ]
_____
 <--- | SHIFT | --->
```

16   Change the LINK DATE to the date of test using the format **MM-DD-YY**, then press `DONE` .

     💡   The date of test must be set so that the correct date appears on certification reports.

```
DATE: [MM/DD/YY]


[03-20-08]
_____
 <--- | SHIFT | --->
```

17   Press `F1` to highlight the fiber optic cabling standard, then press `F2` to SELECT.

     ✅   If unsure about which cabling standard to use, select TIA-568-B.3.

```
     FIBER STANDARDS
USER DEFINED #1
USER DEFINED #2
TIA-568.3/CHN-1525
ISO/IEC 11801
_____
 NEXT |SELECT|
```

18   Press `F1` to highlight the fiber type of the network under test, then press `F2` to SELECT.

```
       FIBER TYPES
62.5um MultiMode
50.0um MultiMode
INDOOR SingleMode
OUTDOOR SingleMode
_____
 NEXT |SELECT|
```

19   Press `1 ABC` to measure the fiber length with the Fiber OWL 4 BOLT. If you wish to enter the length manually, press `F2` and skip to **22** .

```
 FIBER LENGTH METHOD
<1> USE THE METER TO
    MEASURE LENGTH

<2> ENTER LENGTH
    MANUALLY
```

Optical Power Meter: Fiber OWL 4
Fiber Optic Light Source: WAVESOURCE Series Singlemode Sources

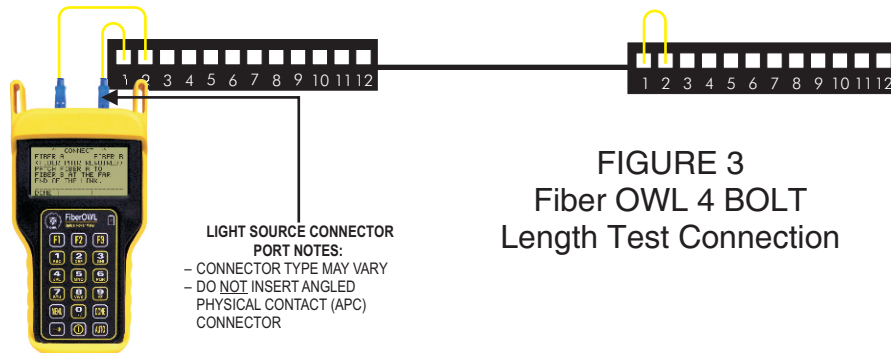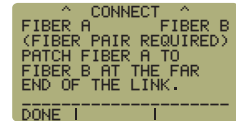**20**   Connect the Fiber OWL 4 BOLT to your fiber link as shown in Figure 3.

```
^   CONNECT   ^
FIBER A       FIBER B
(FIBER PAIR REQUIRED)
PATCH FIBER A TO
FIBER B AT THE FAR
END OF THE LINK.
_____
DONE  |      |
```

FIGURE 3
Fiber OWL 4 BOLT
Length Test Connection

LIGHT SOURCE CONNECTOR PORT NOTES:
– CONNECTOR TYPE MAY VARY
– DO NOT INSERT ANGLED PHYSICAL CONTACT (APC) CONNECTOR

21   Review the end-to-end fiber length, then press **F2** to continue. In the example screenshot at right, the end-to-end fiber length could be within the range of 1000 to 1006 meters.
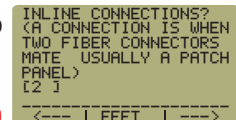
```
FIBER LENGTH

01000 -0/+6 meters

1310nm Index(n)=1.490
_____
TEST | DONE | INDEX
```
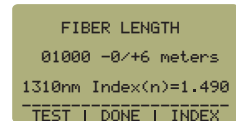
22   The length shown here is what will be entered into the Link Wizard configuration. Press **DONE** to continue.
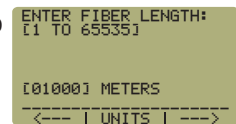
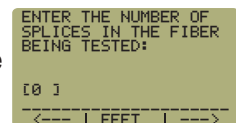OPTIONAL: you may also enter the fiber length manually from this screen.

```
ENTER FIBER LENGTH:
[1 TO 65535]


[01000] METERS
_____
<--- | UNITS | --->
```

✓   Length testing is complete. You may now remove all of the patch cables from the link under test.

23   Enter the number of connections (i.e. patch panels) in the link under test, then press **DONE** to continue.

✓   Typical fiber networks will have 2 connections – one for a patch panel located at each end of the link.

```
INLINE CONNECTIONS?
(A CONNECTION IS WHEN
TWO FIBER CONNECTORS
MATE  USUALLY A PATCH
PANEL)
[2 ]
_____
<--- | FEET | --->
```

24   Enter the number of splices in the link under test, then press **DONE** to continue. Splices can be either fusion or mechanical. Typical multimode networks will have zero splices.
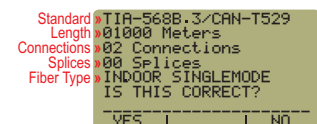
✓   some connectors use mechanical splice technology for termination. If the link under test is terminated with these "no-polish, no-epoxy" type connectors, they should be considered as mechanical splices.

```
ENTER THE NUMBER OF
SPLICES IN THE FIBER
BEING TESTED:

[0 ]
_____
<--- | FEET | --->
```

25   Review your Link Wizard setup.

If correct, press **F1** to continue on to the next step.

If changes need to be made, press **F3** and go back to **15**.

```
Standard »TIA-568B.3/CAN-T529
  Length »01000 Meters
Connections »02 Connections
 Splices »00 Splices
Fiber Type »INDOOR SINGLEMODE
IS THIS CORRECT?
_____
  YES  |      | NO
```

26   Press **F1** until the asterisk (*) is in front of 1310nm (as shown at right), then press **F2** to begin the SET REFERENCE procedure for 1310nm.

```
SET SOURCE REFERENCES
WAVELEN REF dBm  TYP.
_____
*1310nm NOT SET (-10)
 1550nm NOT SET (-10)

_____
WAVE |  SET  | DONE
```

QUICK REFERENCE GUIDES

Optical Power Meter: **Fiber OWL 4**
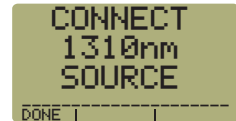**Fiber Optic Light Source:**   **WAVESOURCE Series Singlemode Sources**
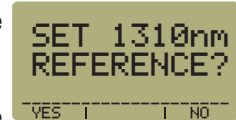
27   Connect the Fiber OWL 4 detector port and the 1310nm port together with a singlemode patch

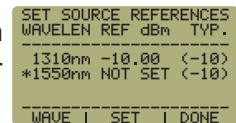cable as shown in Figure 2, then press   **F1**   to continue.

```
CONNECT
1310nm
SOURCE
----------------
DONE |       |
```

28   Make sure that the 1310nm light source port is powered ON and selected (the indicator LED on the
right-hand side will be the color red).

```
SET 1310nm
REFERENCE?
----------------
YES |       | NO
```

29   Confirm setting the 1310nm reference by pressing   **F1**   to continue. You will be returned to the
SET SOURCE REFERENCES screen.

30   For setting a 1550nm reference, repeat steps   **26**   through   **29**   except you will select 1550nm
(as shown at right). Also, remember to set the WaveSource to 1550nm (the right-hand indicator
LED will be the color green).

```
SET SOURCE REFERENCES
WAVELEN REF dBm  TYP.
---------------------
 1310nm -10.00  (-10)
*1550nm NOT SET (-10)
---------------------
 WAVE |  SET | DONE
```

After the 1550nm reference is set, the REF dBm field will be filled in with a reference value.

31   Press   **F3**   to complete the Link Wizard.

32   Press   **F1**   to begin taking readings.

TAKE READINGS

33   If testing only one wavelength, then skip to the next step.

If testing at two wavelengths, press   **AUTO**   to set the Fiber OWL 4 into AUTO mode, then press and hold   **λ AUTO**   on the
WaveSource until the singlemode port indicator LED starts flashing, then immediately release the button. The
WaveSource will begin to alternate between green and red, and after a few seconds, readings for both wavelengths will
appear on the Fiber OWL 4 display.

34   Disconnect the patch cable from the Fiber OWL 4 and take the units to opposite ends of the link.

Do NOT disconnect the patch cable(s) from the light source at any time until all fibers have been tested.

QUICK REFERENCE GUIDES

Optical Power Meter: **Fiber OWL 4**
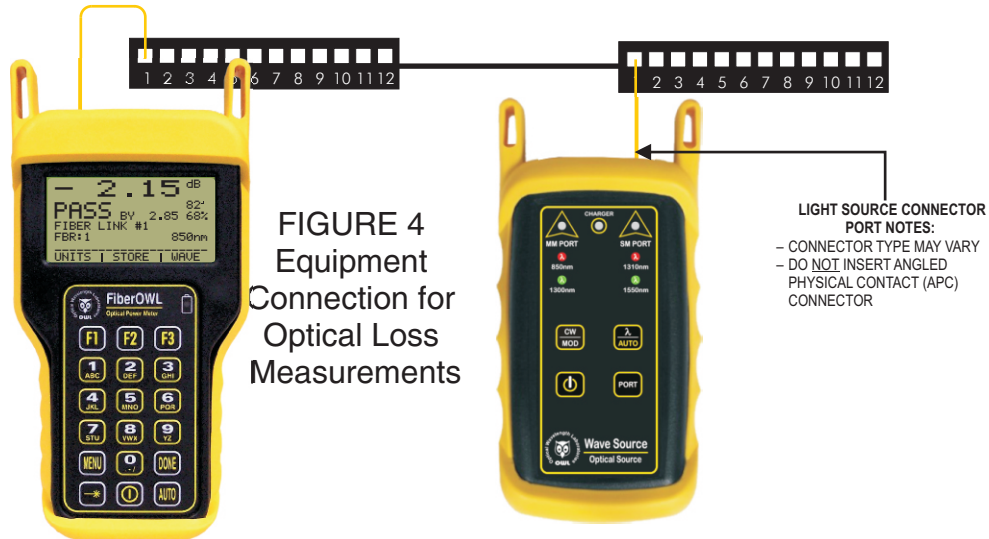**Fiber Optic Light Source:**   **WAVESOURCE Series Singlemode Sources**

TAKE READINGS, CONT.

35 Connect the units to the first fiber to test as shown in Figure 4. Your readings will vary from the example below.

FIGURE 4
Equipment
Connection for
Optical Loss
Measurements

LIGHT SOURCE CONNECTOR
PORT NOTES:
– CONNECTOR TYPE MAY VARY
– DO NOT INSERT ANGLED
  PHYSICAL CONTACT (APC)
  CONNECTOR

36 Once the STORE option becomes active, press **F2** to store the data point. If this is the first fiber in the link, you may be prompted to enter a new label.

37 Press **F3** to save the data point(s).

38 Disconnect the patch cables from the patch panels and move them to the next port in the patch panel, then repeat steps

35 through **37** until all fibers in the link have been tested.

(end of procedure)

OWL REPORTER

INSTALLING THE OWL USB DRIVER

To avoid USB driver conflicts, the OWL USB driver must be installed before connecting the Fiber OWL 4 to the PC. Follow the instructions below:

1   Insert the OWL CD into your CD-ROM drive.

2   When the CD Installation panel appears on your screen, click the "**Install USB Drivers**" button.

3   Click the "**Install**" button on the "**OWL USB to UART Bridge Driver Installe**r" dialog box.

4   Click the "**Continue Anyway**" button on the "**Software Installation**" dialog box.
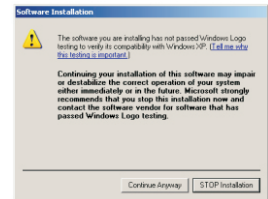
5   Once the software installation is complete, click "**Yes**" to reboot the computer.
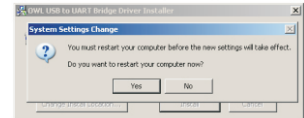
6   Connect the Fiber OWL 4 optical power meter to a USB port on the PC using the supplied USB download cable. The computer will automatically detect the Fiber OWL 4.

7   If Windows asks you to use Windows update to search for the driver, click the radio button labeled "**No, not this time**", then click "**Next**" to continue.
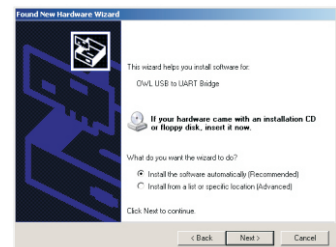
INSTALLING THE OWL USB DRIVER, cont.

8   Click the radio button labeled "**Install the software automatically (Recommended)**", then click "**Next**" to continue.
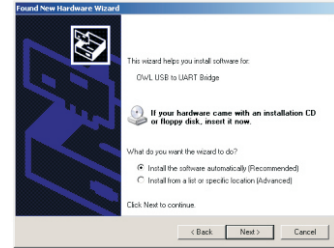
9   Click the "**Continue Anyway**" button on the "**Software Installation**" dialog box.

10   Once the drivers have been completely installed, click the "**Finish**" button.
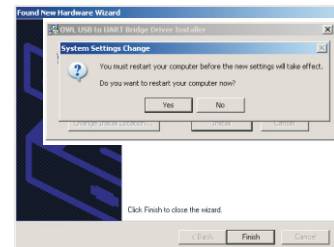
(end of procedure)

OWL REPORTER

INSTALLING OWL REPORTER

OWL Reporter software must be installed before the Fiber OWL 4 is able to download data to a PC. Follow the instructions below:

1   Insert the OWL CD into your CD-ROM drive.

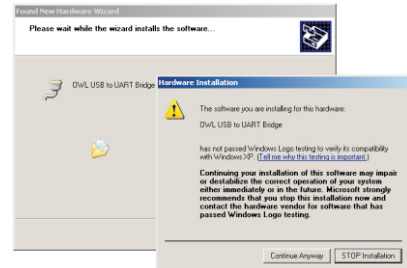**2**   When the CD Installation panel appears on your screen, click the "**Install OWL Reporter**" button.
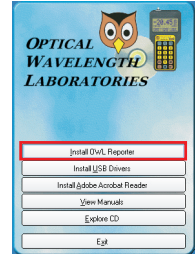
3   Click "**Next**" on the "**Welcome to the OWL Reporter Software Setup Wizard**" dialog box.

4   Click "**Next**" on the "**Choose Components**" dialog box.
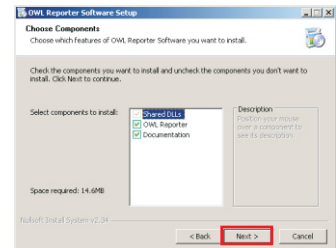
5   Click "**Next**" on the "**Choose Install Location**" dialog box.
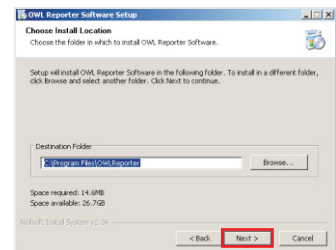
OWL REPORTER

INSTALLING OWL REPORTER, cont.

6 Click "**Install**" on the "**Choose Start Menu Folder**" dialog box to begin the OWL Reporter installation.
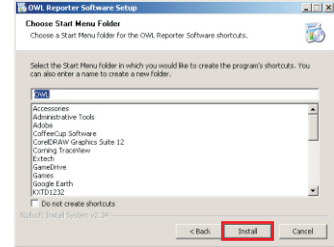
7 Once the OWL Reporter installation has completed, click "**Finish**" on the "**Completing the OWL Reporter Software Setup Wizard**" dialog box.

DOWNLOADING DATA TO A PC

If your Fiber OWL 4 has a USB download port, the USB driver must first be installed from the CD. See page 34 for installation instructions.

OWL Reporter must be installed to download data from the Fiber OWL 4 to the PC. See page 36 for installation instructions.

**1** Press ⏻ to power on the Fiber OWL 4, if necessary.

2 Connect the Fiber OWL 4 to the PC using the supplied USB or RS-232 download cable.

3 Start OWL Reporter. The default location for the OWL Reporter shortcut is **Start » Programs » OWL » OWL Reporter**.

4 Begin the download by clicking the Download icon (as shown at right) or the Download menu option.

Data will appear on the screen once the download has completed.
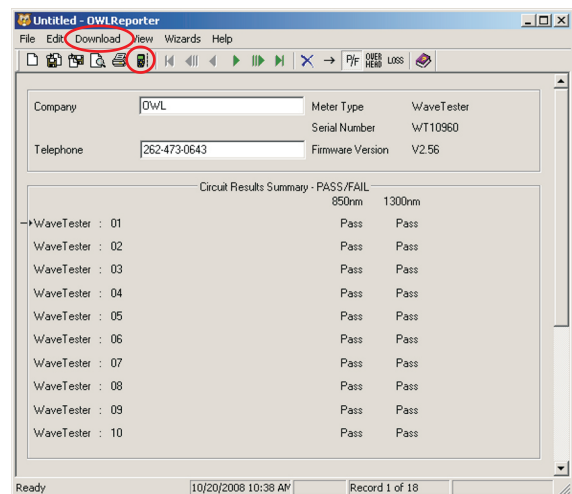
OWL REPORTER

DOWNLOADING DATA TO A PC, cont.

Viewing OWL Reporter Data

By default, OWL Reporter opens up into Detail View. However, Summary view may be more useful for fiber loss test evaluation.

To switch between Summary View and Detail View, press the button that looks like an arrow, highlighted at the right. After you press this button, the view will change to look like the screen shot at the right.

By default, Circuit Results Summary shows the Link ID, each stored data point, and whether the test passed or failed.

The circuit summary results may be viewed in three different ways: Pass/Fail; Optical Loss; and Overhead. Toggle the view by using the P/F, Overhead, and Loss buttons, highlighted at right.

Report Printing

To print the current view to a PC printer, press the print button highlighted at right to print the Summary report.

The printed report will look very much like the screen. See below for a sample report.

✓ Circuit detail reports may also be printed by pressing the printer icon while in Circuit Detail view.

DOWNLOADING DATA TO A PC, cont.

Example Printout

At right is an example of the Circuit Summary Report. Below are descriptions of the columns:

Circuit ID - this is the name of the fiber that was tested

P/F   shows whether the test passed or failed against the chosen cabling standard

O/H   shown in dB; shows the amount of Overhead in the link, or the amount of loss the link can sustain before it will reach a Fail result

Loss   shown in dB; shows the actual amount of loss measured through the link

✓   If you are interested in creating a PDF file of your printouts, there is a shareware program called PDF995 that installs a PDF printer onto your system. Print the file as normal, and save the PDF file to the folder of your choice. See http://pdf995.com for more information.

Circuit Summary Report

Optical Wavelength Laboratories

Link ID:	WaveTester			Page:	1
Company Name:	OWL			Report Date:	10/20/2008
Telephone Number:	262-673-0643				

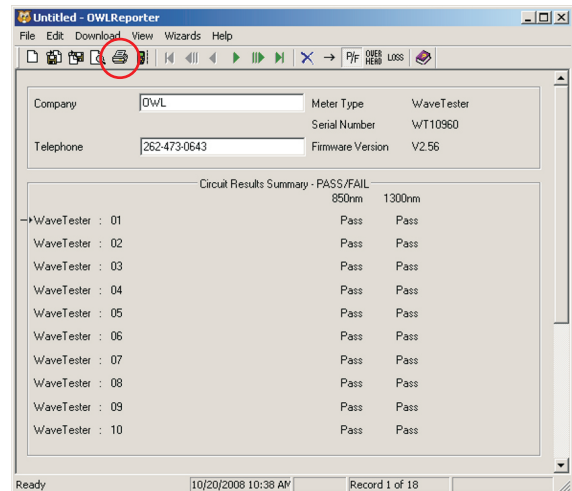| | | 850nm | | | 1300nm | |
Circuit ID	P/F	O/H (dB)	Loss (dB)	P/F	O/H (dB)	Loss (dB)
01	Pass	2.28	13.22	Pass	3.09	4.41
02	Pass	1.95	13.55	Pass	2.37	5.13
03	Pass	2.14	13.36	Pass	2.67	4.83
04	Pass	2.06	13.44	Pass	2.76	4.74
05	Pass	1.79	13.71	Pass	2.45	5.05
06	Pass	1.79	13.71	Pass	2.67	4.83
07	Pass	2.06	13.44	Pass	2.84	4.66
08	Pass	1.93	13.57	Pass	2.91	4.59
09	Pass	1.93	13.57	Pass	3.08	4.42
10	Pass	2.18	13.32	Pass	3.09	4.41
11	Pass	2.28	13.22	Pass	2.98	4.52
12	Pass	2.24	13.26	Pass	2.86	4.64
13	Pass	2.18	13.32	Pass	2.45	5.05
14	Pass	2.10	13.40	Pass	1.74	5.76
15	Pass	2.24	13.26	Pass	2.46	5.04
16	Pass	2.14	13.36	Pass	2.88	4.62
17	Pass	1.22	14.28	Pass	2.39	5.11
18	Pass	2.10	13.40	Pass	2.26	5.24

| Installer/Tester: | _____ | Date: | _____ |
| Customer: | _____ | Date: | _____ |

OWL REPORTER

INTERPRETING OWL REPORTER SCREENS AND REPORTS

The following list of terms appear on the OWL Reporter software screen and/or printed report.

– Connector Loss
– Fiber Loss
– Light Source Reference Power
– Measured Power
– Operating Margin (%)
– Optical Loss
– Pass/Fail
– Splice Loss
– System Overhead
– System Reference Power
– Total Allowable System Loss

Descriptions for each of these terms are listed on the following pages.

Connector Loss

Definition: during the calculation of an optical loss budget, the amount of optical loss attributed to interconnections in the link under test. An interconnection is a device that brings two fiber connectors together; e.g. the ports on a patch panel or a fiber optic adapter. Connector loss is specified by cabling standards that base link budget calculation on the passive components of the link under test; examples of this type of standard are the TIA-568 and the ISO IEC 11801.

Units: dB per connection

Calculation: (Number of interconnections) x (dB loss per connection)
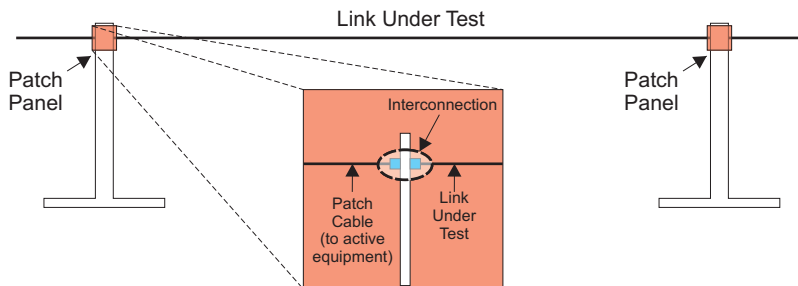
INTERPRETING OWL REPORTER SCREENS AND REPORTS, cont.

Fiber Loss

Definition: during the calculation of an optical loss budget, the amount of optical loss attributed to the optical fiber in the link under test. Fiber loss is specified by cabling standards that base link budget calculation on the passive components of the link under test; examples of this type of standard are the TIA-568 and the ISO IEC 11801.

Units: dB per kilometer; loss values are different for different wavelengths and different fiber types

Calculation: (fiber length in kilometers) x (dB loss per kilometer)

Link Under Test

Patch Panel

Patch Panel
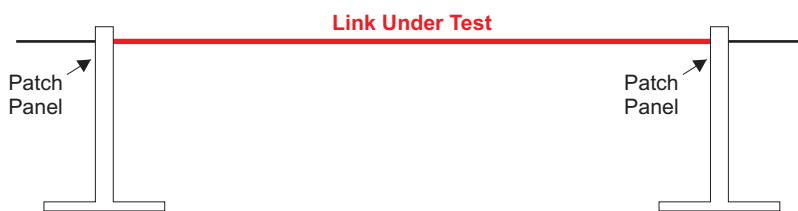
Light Source Reference Power

Definition: the amount of absolute optical power being received directly from the light source by the power meter during the setting of the optical reference. Light Source Reference Power is used as a reference, or starting point, on which a standards-based optical reference is set.

Units: dBm

Calculation: none; Light Source Reference Power is measured via a single patch cord of the appropriate type.

testing standards require multimode reference cables to be wrapped around a device called a mandrel, which is used to filter high-order modes and achieve EMD, or Equilibrium Mode Distribution (shown here).

Singlemode test jumpers do NOT require this mandrel.

Total Allowable System Loss

Optical Loss

INVALID OPERATING MARGIN **

PASS

OPERATING MARGIN or SYSTEM OVERHEAD

FAIL

Light Source Reference Power (dBm)

Measured Power (dBm)

Minimum Required Power (dBm)
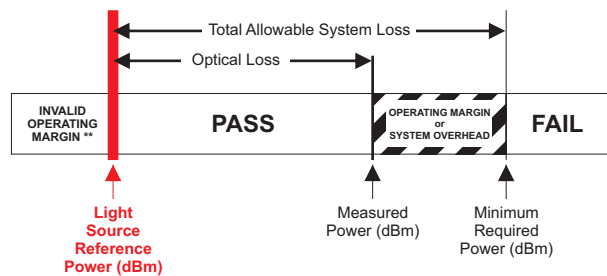
OWL REPORTER

INTERPRETING OWL REPORTER SCREENS AND REPORTS, cont.

Measured Power

Definition: the amount of absolute optical power being received from the light source by the power meter after they have been connected to the link under test. Measured Power is compared to the System Reference Power for Pass/Fail analysis; if Measured Power is greater than the System Reference Power, the link passes; likewise if Measured Power is less than the System Reference Power, the link fails.

Units: dBm

Calculation: none
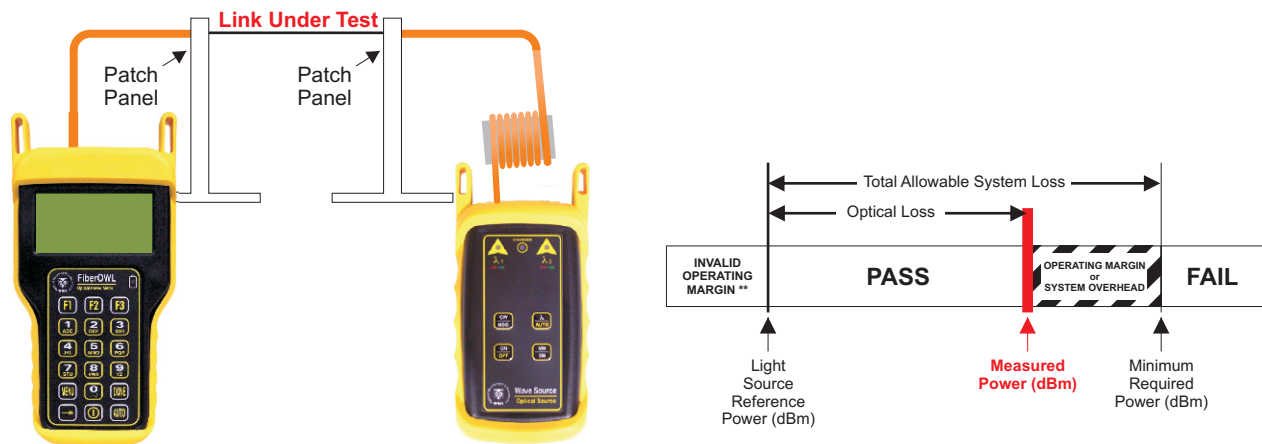
Operating Margin %
(only appears on printed circuit detail reports)

Definition: the difference between the Measured Power and the System Reference Power, also known as headroom, expressed as a percentage.

Units: percentage (%)

Calculation: none

OWL REPORTER

INTERPRETING OWL REPORTER SCREENS AND REPORTS, cont.

Optical Loss

Definition: the amount of optical power that is lost through the link under test due to the attenuation of the passive components of the link (i.e. optical fiber, interconnections, and splices).

Units: dB

Calculation: (Light Source Reference Power) - (Measured Power)

Pass/Fail

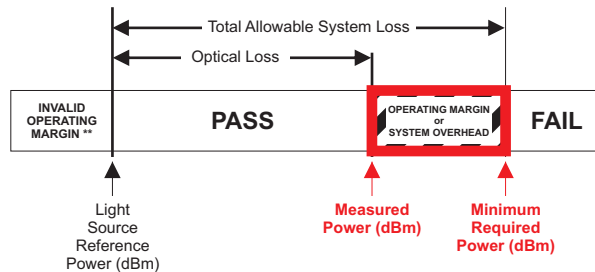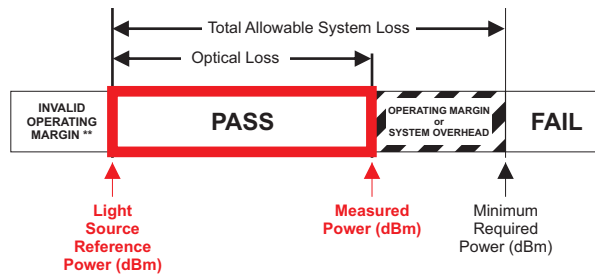**Definition:** the rating a link receives when its Measured Power is compared to its System Reference Power, based upon the attenuation parameters or loss values specified by cabling standards. A link passes when Measured Power is greater than the System Reference Power. A link fails when Measured Power is less than the System Reference Power.

Units: N/A

Calculation: N/A
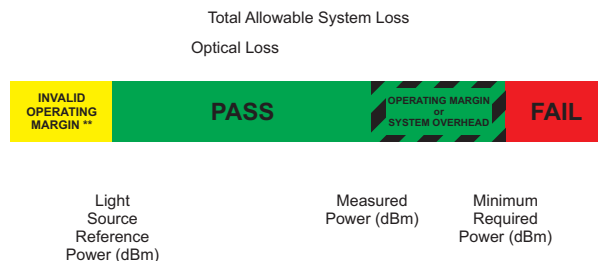
** If the Measured Power is greater than the Light Source Reference Power, then the circuit will receive an Invalid Operating Margin error, indicating an invalid test condition. Circuit test results receiving this error should be considered as a FAIL.

In other words, more light is received through the whole link from end to end than was received through the single reference patch cable. This is physically impossible since this would indicate GAIN in the system rather than LOSS.

This condition usually occurs when the reference was set up incorrectly. The correct sequence of steps to set a reference follow:

1) MULTIMODE ONLY - wrap the reference cable seven (7) times around a 0.7" mandrel (0.7" for 62.5um, and 0.9" for 50um) and secure.
2) Connect the ends of the reference cable to the power meter detector port and the appropriate light source port.
3) Power ON and set the units to the same wavelength.
4) Set the reference (or "ZERO") in the power meter using the procedure in the operations guide.

The most important part of certification testing is to ensure that the integrity of the reference (or "ZERO") is maintained.

 Two factors to keep in mind are:

– Do NOT remove the patch cord from the light source port until all tests have been completed
– MULTIMODE ONLY - do NOT allow the patch cord to unwrap from the mandrel

OWL REPORTER

INTERPRETING OWL REPORTER SCREENS AND REPORTS, cont.

Splice Loss

Definition: during the calculation of an optical loss budget, the amount of optical loss attributed to splices in the link under test. Splice loss is specified by cabling standards that base link budget calculation on the passive components of the link under test; examples of this type of standard are the TIA-568 and the ISO IEC 11801. Splices can be either mechanical or fusion, and can be located anywhere along the link under test.

Units: dB per splice

Calculation: (number of splices) x (dB loss per splice)
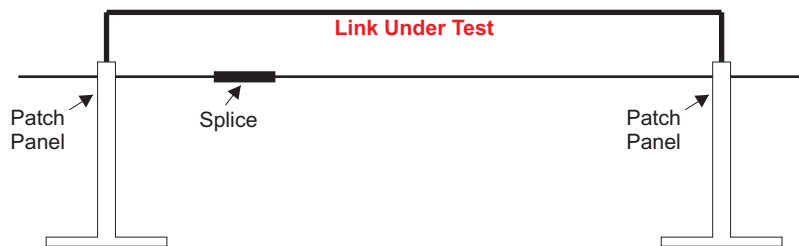
some connectors use mechanical splice technology for fiber termination, such as the Unicam®-compatible. These connectors should be considered splices when calculating optical loss budgets.

System Overhead

Definition: the difference between the Measured Power and the Minimum Required Power. System Overhead is also known as headroom. With a PASS rating, System Overhead shows how much additional loss a link can bear before it will fail. With a FAIL rating, System Overhead shows how much optical loss must be overcome before it will pass.

Units: dB

Calculation: (Measured Power) - (Minimum Required Power)
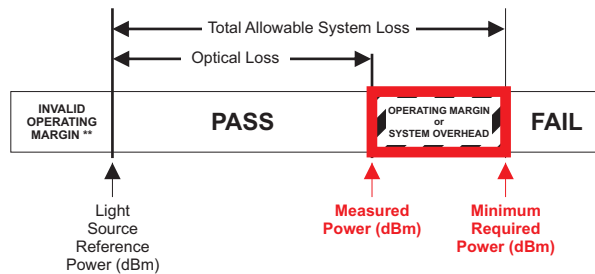
OWL REPORTER

INTERPRETING OWL REPORTER SCREENS AND REPORTS, cont.

System Reference Power
(shown as Minimum Required Power on Circuit Detail Reports)

Definition: the optical power level that determines whether a link passes or fails; a.k.a. Pass/Fail threshold. If the Measured Power is greater than the System Reference Power, the link will show PASS; likewise, if the Measured Power is less than the System Reference Power, the link will show FAIL.

✓ **link measurements that are marginal (meaning that they are close to the System Reference Power, within the accuracy of the test equipment) should be evaluated further.**

Units: dBm

Calculation: (Light Source Reference Power) + (Total Allowable System Loss)
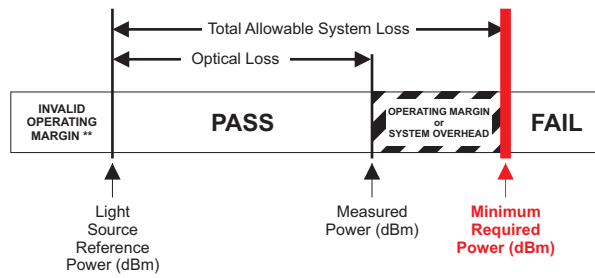
Total Allowable System Loss

Definition: the total amount of optical loss attributed to the passive components of the link (i.e. Fiber Loss, Connection Loss, and Splice Loss). Total Allowable System Loss is also known as a Link Budget. For generic cabling standards such as the TIA 568 or the ISO/IEC 11801, link budgets are calculated based upon the actual configuration of the link under test. Some standards (e.g. various Ethernets) have pre-defined link budget loss values based upon the upper limits of the link configuration.

Units: dB

Calculation: (Fiber Loss) + (Connection Loss) + (Splice Loss)
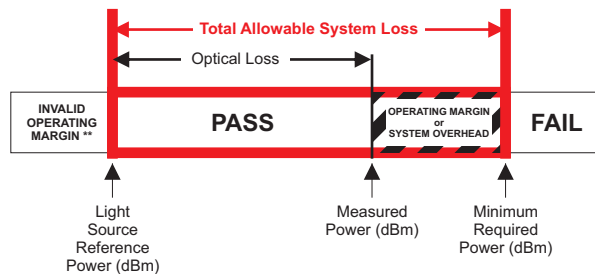
OPERATION/MAINTENANCE

MODES OF OPERATION

As an added convenience, the Fiber OWL 4 has been designed to operate as two different types of meters: SIMPLE METER and CERTIFICATION METER.

Once the Fiber OWL 4 is finished powering on, the OPERATING MODE menu will appear as shown at right:

SIMPLE METER is a basic operating mode used to quickly measure optical attenuation (loss), check patch cables, or measure the output power of an active equipment transmitter, where there is no need to store measurement data in memory. Reference values can be stored for each calibrated wavelength for quick loss readings.

```
   OPERATING MODE

   SIMPLE METER
 CERTIFICATION METER
   TECH SUPPORT
_____
 NEXT  |SELECT|
```
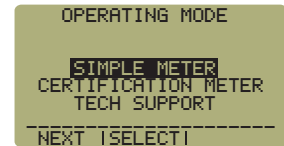
OPERATING MODE
MENU

CERTIFICATION METER is a user-friendly and powerful auto-testing fiber optic network certification tool. Fiber links can be certified against one of many popular cabling standards, as well as against user-defined standards. Up to 1000 data points can be stored for download to a PC. OWL Reporter software organizes and formats these data points, and prints them into professional certification reports.

TECH SUPPORT displays OWL's Internet URL and technical support number.

In addition, users can use the OPERATING MODE menu to switch between SIMPLE and CERTIFICATION mode without the need to power off the Fiber OWL 4.

KEYBOARD ENTRY METHOD

Several screens in the Fiber OWL 4 menu system require the user to enter some input, e.g. fiber length or a descriptive name for a fiber run. This feature allows the Fiber OWL 4 to be more user-friendly.

Alpha-numeric Fields. These fields allow the user to enter either a number, a letter, or a special character. This is accomplished by pressing and holding the key until the desired character appears. When the key is released, the cursor automatically advances to the next position.

Numeric Fields. These fields are for numeric input only, e.g. fiber length, user-defined reference values, etc. The cursor will automatically advance once a number key is pressed. Exception: some numeric operators may be required, such as the minus sign or a decimal point. In this case, they are treated like alpha-numeric fields.

Special Characters. Special characters can be entered by pressing and holding 【O】 .

Press 【DONE】 when character input is complete.

OPERATION/MAINTENANCE

MONITOR MODE

While in Monitor Mode, the Fiber OWL 4 sends absolute power measurements in a comma-delimited format to the download port approximately once per second. A terminal program, such as Hyperterminal, is required to view data in real time, and captured data files can be imported into a spreadsheet for charting purposes.

A typical use for Monitor Mode is for live monitoring of a light source over long periods of time.

Monitor Mode

Monitor Mode can be used in either SIMPLE or CERTIFICATION mode, but can only be activated and de-activated from screens where readings are being taken, such as the one at right. The following keys are used to control Monitor Mode:

5 MNO   Activate Monitor Mode
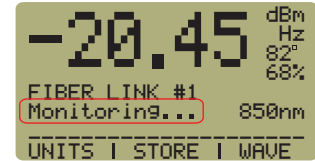
AUTO MODE

The Fiber OWL 4 has the ability to automatically switch wavelengths when used with an OWL WaveSource light source. This is useful for viewing and storing simultaneous dual-wavelength optical power or loss measurements.

AUTO Mode may be used in either SIMPLE or CERTIFICATION mode.

To enable or disable AUTO Mode, press **AUTO** when viewing optical power or loss measurements.

When AUTO Mode is enabled, the wavelength indicator alternates with 'AUTO' (as shown at right). This means that the Fiber OWL 4 is scanning incoming optical power for wavelength-switching signals from an OWL WaveSource, but has not yet received a wavelength-swtiching signal.

AUTO Mode

When a dual-wavelength signal has been received from an OWL WaveSource, the Fiber OWL 4 will display both wavelengths simultaneously on the screen, and the wavelength indicator will alternate between the two wavelengths being received (as shown at right). Dual-wavelength measurements will be shown this way when the Fiber OWL 4 is set to either "dBm" or "dB" mode.
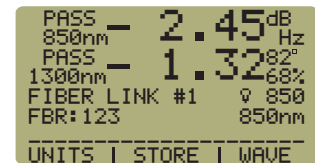
AUTO Mode

AUTO Mode may also be activated through the menu system. See the section labeled 'Setting Tone Detection Options' for instructions.

OPERATION/MAINTENANCE

MAIN MENU

The MAIN MENU activates the advanced functions of the Fiber OWL 4. Pressing **MENU** at most screens will bring up the MAIN MENU as shown in the figure to the right.

These functions are activated by pressing the corresponding key, and are described in more detail below.

```
      MAIN MENU

<1>FIBER LINK SETUP
<2>TAKE READINGS
<3>STORED READINGS
<4>METER PROPERTIES
<5>SOURCE CONTROL
<6>TEST FIBER LENGTH
```
MAIN MENU

FIBER LINK MENU

From the MAIN MENU, press **F1** to access the FIBER LINK MENU.

The FIBER LINK MENU allows the user to configure and manage fiber link configurations in the Fiber OWL 4. Up to eight separate fiber link configurations can be stored. The parameters contained in each fiber link apply to all data points stored while that link was loaded.

```
    FIBER LINK MENU

<1>LINK WIZARD
<2>LOAD/EDIT LINK
<3>CONFIGURE LINK
<4>VIEW LINK CONFIG
<5>DELETE LINK
<6>PRINT LINK
```
FIBER LINK
MENU

LINK WIZARD

From the FIBER LINK MENU, press **1 ABC** to start the Link Wizard.

The Link Wizard is used to configure the Fiber OWL 4 for a fiber optic link certification test. See the section "Quick Reference Guides" in this manual for Link Wizard instructions. Your light source will determine which Quick Reference Guide to use:

LOADING AND EDITING STORED LINKS

LOAD/EDIT LINK is used to change the link name and date of test for STORED LINKS in the Fiber OWL 4. From this menu, STORED LINKS can be edited and/or loaded into memory.

1   From the FIBER LINK MENU, press **2 DEF** to LOAD/EDIT the link. The STORED LINKS menu will appear.

> **F1**   scrolls through the list of STORED LINKS.
>
> **F2**   loads the highlighted STORED LINK into memory. The configuration of the currently loaded STORED LINK will be applied to any test result that is stored while that link is loaded.
>
> **F3**   changes the name and/or test date of the selected STORED LINK.

```
     STORED LINKS

*  Fiber Link #1
   Fiber Link #2
   Fiber Link #3
   Fiber Link #4
_____
 NEXT |SELECT| RENAME
```
STORED LINKS
MENU

> ✓   If the link name or date of test does not appear correctly on certification reports, use the RENAME option to quickly change the link name or date of test without having to re-run the Link Wizard.

2   From the STORED LINKS menu, press **F1** to scroll through the list of STORED LINKS and highlight the link name you wish to use. The currently loaded link is denoted by an asterisk.

3   Press **F3** to edit the link information.

```
ACME CORP.
02-26-07


_____
 LINK  |       |
 NAME  | DATE  |
```
Link Information

4   Edit the LINK NAME by pressing **F1** . It is recommended to change the link name to better describe the link. The link name field can support up to 14-character names.

Press **DONE** when finished entering the LINK NAME.

```
LINK NAME:



[Fiber Link #1    ]
_____
 <--- | SHIFT | --->
```
Edit Link Name

5   Edit the DATE by pressing **F2** . It is of vital importance to change the date using the format **MM-DD-YY**. If the date is entered incorrectly, or not entered at all, OWL Reporter will display an incorrect date on the software and reports.

Press **DONE** when finished entering the date, then press **DONE** again to return to the STORED LINKS menu.

```
DATE:



[01/01/01]
_____
 <--- | SHIFT | --->
```
Edit Link Date

6   Press **F2** to load the link, and return to the FIBER LINK MENU.

ADVANCED CONFIGURATION OF STORED LINKS

The CONFIGURE LINK menu option allows the user some alternate advanced methods for setting optical references in the Fiber OWL 4 without using cabling standards.

💡 **The test methods described in the CONFIGURE LINK menu require a solid understanding of optical references, the calculation of link budgets, and Fiber Optic Test Procedures (FOTPs), and are recommended for advanced fiber optic technicians only**

1 From the FIBER LINK MENU, press **3 GHI** to CONFIGURE LINK.

2 From the STORED LINKS menu, press **F1** to highlight the STORED LINK name you wish to configure. The currently loaded link is denoted by an asterisk.

3 Once the correct STORED LINK name is highlighted, press **F1** to SELECT.

```
      STORED LINKS
* Fiber Link #1
  Fiber Link #2
  Fiber Link #3
  Fiber Link #4
_____
 NEXT  SELECT
```

STORED LINKS
MENU

4 There are three different test methods used to configure a link. Press the number on the keypad for the desired test method:

```
SELECT A TEST METHOD

 <1>USE A STANDARD TO
    CERTIFY LINK
 <2>MANUAL REFERENCE/
    LINK BUDGET
 <3>ZERO LIGHT SOURCE
```

Select a Test
Method

1 ABC USE A STANDARD TO CERTIFY LINK - this is the same as running the Link Wizard. See the "Quick Reference Guide" section in this manual for more information about certifying fiber links.

2 DEF MANUAL REFERENCE/LINK BUDGET. - configure the Fiber OWL 4 to use a manually entered link budget or optical reference level.

To manually enter a pre-calculated link budget, see the section "SET AN OPTICAL REFERENCE USING A MANUALLY ENTERED LINK BUDGET".

To set an optical reference at a specific absolute power level, see the section "MANUALLY SET AN OPTICAL REFERENCE LEVEL".

3 GHI ZERO LIGHT SOURCE - perform a basic optical loss test by "zeroing" the Fiber OWL 4 with a stabilized light source.

SET AN OPTICAL REFERENCE USING A MANUALLY ENTERED LINK BUDGET

Configuring an optical power meter using a manually calculated link budget requires a high level of understanding of fiber optics, link budget calculation the difference between dBm and dB, and thus should only be performed by advanced fiber technicians

The following steps continue from the "SELECT A TEST METHOD" screen from page 50. This test method requires the user to manually enter a fixed link budget in 'dB'.

1 From the FIBER TYPES screen, press **F1** to scroll through the list of fiber types, then press **F2** to select.

2 From the Wavelength Reference screen, press **F1** to highlight the wavelength.

```
Wave   R(dBm) LB(dB)
─────────────────────
850nm  +00.00 -00.01
980nm  +00.00 -00.01
1300nm +00.00 -00.01
─────────────────────
WAVE   |MANUAL | LINK
LENGTH |REF    |BUDGET
```
Wavelength Reference Screen

3 Power on and connect a light source of the highlighted wavelength to the Fiber OWL 4 using the appropriate reference method setup (i.e. 1-jumper, 2-jumper, or 3-jumper reference method).

4 Once the power meter and light source have been connected, press **F3** to manually enter a link budget.

5 Enter the link budget as shown at right. Do not use any mathematical operators, and up to 2 decimal places may be used.

```
Enter  850nm Link
Budget in dB for all
Link Budget links:

[2.57  ]
─────────────────────
<--- | SHIFT | --->
```
Enter Link Budget

6 Once the link budget has been entered, press **DONE** to continue.

7 The Wavelength Reference screen will appear, showing the recently entered link budget.

```
Wave   R(dBm) LB(dB)
─────────────────────
850nm  +00.00 +02.57
980nm  +00.00 -00.01
1300nm +00.00 -00.01
─────────────────────
WAVE   |MANUAL | LINK
LENGTH |REF    |BUDGET
```
Wavelength Reference Screen

Repeat **2** through **7** to set a link budget for a second wavelength, if necessary. Only two wavelengths may be configured at a time.

Press **DONE** to return to the FIBER LINK MENU.

To begin taking readings for this link, press **MENU** to return to the MAIN MENU, then press **2 DEF** to TAKE READINGS.

MANUALLY SET AN OPTICAL REFERENCE LEVEL

🔦 **Configuring an optical power meter using manually set references requires a high level of understanding of fiber optics and the difference between dBm and dB, and thus should only be performed by advanced fiber technicians**

The following steps continue from the "SELECT A TEST METHOD" screen from page 50. This test method requires the user to manually enter the absolute power level in 'dBm' that will determine whether a link will PASS or FAIL.

1 From the FIBER TYPES screen, press [F1] to scroll through the list of fiber types, then press [F2] to select.

2 From the Wavelength Reference screen, press [F1] to highlight the wavelength.

3 Power on and connect a light source of the highlighted wavelength to the Fiber OWL 4 using the appropriate reference method setup (i.e. 1-jumper, 2-jumper, or 3-jumper reference method).

```
Wave   R(dBm) LB(dB)

850nm  +00.00 -00.01
980nm  +00.00 -00.01
1300nm +00.00 -00.01
_____
WAVE  |MANUAL | LINK
LENGTH|REF    |BUDGET
```
Wavelength
Reference
Screen

4 Once the power meter and light source have been connected, press [F2] to manually enter the absolute power reference level.

5 Enter the absolute power reference level as shown at right. Up to 2 decimal places may be used.

```
Enter  850nm
reference value(dBm):


[-23.07  ]
_____
<--- | SHIFT | --->
```
Enter Manual
Reference

6 Once the reference level has been entered, press [DONE] to continue.

7 The Wavelength Reference screen will appear, showing the recently entered link budget.

```
Wave   R(dBm) LB(dB)

850nm  -23.07 -00.01
980nm  +00.00 -00.01
1300nm +00.00 -00.01
_____
WAVE  |MANUAL | LINK
LENGTH|REF    |BUDGET
```
Wavelength
Reference
Screen

Repeat **2** through **7** to set an absolute reference level for a second wavelength, if necessary. Only two wavelengths may be configured at a time.

Press [DONE] to return to the FIBER LINK MENU.

To begin taking readings for this link, press [MENU] to return to the MAIN MENU, then press [2 DEF] to TAKE READINGS.

OPERATION/MAINTENANCE

## SETTING AN OPTICAL REFERENCE BY ZEROING THE LIGHT SOURCE

Configuring an optical power meter using manually set references requires a high level of understanding of fiber optics, and should only be performed by advanced fiber technicians

The following steps continue from the "SELECT A TEST METHOD" screen from page 50. This test method allows the user to "ZERO" the Fiber OWL 4 against a light source of a known power level.

1 Power on and connect a light source of the desired wavelength to the Fiber OWL 4 using the appropriate reference method setup (i.e. 1-jumper, 2-jumper, or 3-jumper reference method).

2 From the Wavelength Selection screen (as shown at right), press **F1** until the wavelength matches the wavelength of the connected light source.
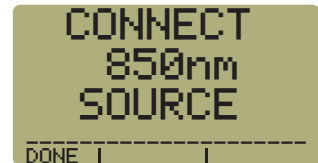
3 Press **F2** to ZERO the meter and light source together.

```
CONNECT
  850nm
 SOURCE
_____
DONE |        |
```

Wavelength
Selection
Screen

4 At the Zero Reference Confirmation screen, press **F1** to confirm, and return to the Wavelength Selection screen.
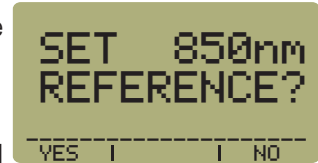
5 If "zeroing" other wavelengths, repeat **1** through **4** for each additional wavelength.

```
SET   850nm
REFERENCE?
_____
YES |       | NO
```

Press **DONE** to return to the FIBER LINK MENU.

To begin taking readings for this link, press **MENU** to return to the MAIN MENU, then press **2 DEF** to TAKE READINGS.

Alternately, the Fiber OWL 4 may be "zeroed" quickly while the meter is displaying measurements in Immediate Mode.

1 Power on and connect a light source of the desired wavelength to the Fiber OWL 4 using the appropriate reference method setup (i.e. 1-jumper, 2-jumper, or 3-jumper reference method), and set the Fiber OWL 4 to the same wavelength as the light source.

2 In CERTIFY LINK mode, press **0 ./**

```
-21.24 dBm
          82°
          98%
Fiber Link #1
FBR:123      850nm
_____
UNITS | STORE | WAVE
```

Immediate Mode
while in CERTFY LINK

In SIMPLE METER mode, either press **0 ./** or **F2**

```
-21.24 dBm
          82°
          98%
             850nm
_____
UNITS| ZERO | WAVE
```

Immediate Mode
while in SIMPLE METER

VIEWING STORED LINK CONFIGURATIONS

Users may view the configuration of stored links in the Fiber OWL 4.

1   From the FIBER LINK MENU, press **4 JKL** to VIEW LINK CFG.

2   Highlight and select the link to view from the STORED LINKS menu.

STORED LINKS
MENU

The link configuration will appear on the display. If the link was stored by using the Link Wizard, a display similar to the one at the right will appear. The items on the display are explained below:

ACME CORP. - link name
TIA-568B.3/CAN-T529 - fiber cabling standard
FIBER = 62.5um MM - fiber type
LENGTH = 1000 METERS - fiber length
2 CONN 0 SPLICES - number of connections and splices
WAVELENGTHS: 850nm 1300nm - wavelengths used with standard

Link
Configuration
Screen

If the link was stored using the Link Budget method, a list of the configured wavelengths will appear.

If the link was stored using the manual reference method, or Zero reference method, or is not in use, the display will indicate ALL MANUAL REFERENCES.

Press **DONE** to return to the FIBER LINK MENU.

OPERATION/MAINTENANCE

DELETING STORED LINK CONFIGURATIONS AND DATA POINTS

At times, it may be necessary to delete a link's configuration in order to use it for a new link. This process will delete the link information and all readings that were stored while this link was loaded. The following steps show how to delete a link:

1 From the FIBER LINK MENU, press **5** .

2 From the STORED LINKS menu, press **F1** to highlight the STORED LINK name you wish to configure. The currently loaded link is denoted by an asterisk.

3 Once the correct STORED LINK name is highlighted, press **F2** to SELECT.

```
      STORED LINKS
* Fiber Link #1
  Fiber Link #2
  Fiber Link #3
  Fiber Link #4
_____
 NEXT │SELECT│ RENAME
```
STORED LINKS
MENU

4 Press **F1** to confirm deletion, and return to FIBER LINK MENU.

💡 **once this STORED LINK is deleted from the Fiber OWL 4, the test results associated with this link can no longer be retrieved. Ensure that the link is no longer needed before confirming deletion**.

```
DELETE LINK INFO. AND
STORED READINGS FOR:

ACME CORP.

_____
 YES  │    │  NO
```
Delete Link
Confirmation
Screen

PRINTING STORED LINK DATA TO A SERIAL CONNECTED DEVICE

The data points stored for particular links can be downloaded to the serial port in an easy-to-read format. This data can be viewed and captured to file by terminal programs such as HyperTerminal for Windows, or printed to a serial device.

COM port parameters should be set to:

Bits per second: 9600, Data bits: 8, Parity: None, Stop bits: 1, Flow control: None

1 From the FIBER LINK MENU, press **6** .

2 From the STORED LINKS menu, press **F1** to highlight the STORED LINK name you wish to print. The currently loaded link is denoted by an asterisk.

3 Once the correct STORED LINK name is highlighted, press **F2** to SELECT.

```
      STORED LINKS
* Fiber Link #1
  Fiber Link #2
  Fiber Link #3
  Fiber Link #4
_____
 NEXT │SELECT│ RENAME
```
STORED LINKS
MENU

The display will show a confirmation, at which time the link information will be printed to the device connected to the Fiber OWL 4 serial port. Once printing is complete, the display will return to the FIBER LINK MENU.

```
   PRINTING
```
**Link Printing
Confirmation Screen**

OPERATION/MAINTENANCE

STORED READINGS MENU

The STORED DATA menu allows the user to manage the test results stored in the Fiber OWL 4. This menu can only be accessed while in CERTIFY LINK mode.

From the MAIN MENU, press **3** GHI to activate the STORED DATA menu.

NOTE: the memory in the Fiber OWL 4 allows for permanent storage of data, including reference and power readings. Data will remain in the meter, even when the unit is powered off or the battery is removed, until it is removed by the user.

NOTE: when the Fiber OWL 4 is completely empty of stored readings, BYTES FREE will equal 3071.

STORED READINGS
MENU

VIEWING AND EDITING STORED DATA

From the STORED DATA menu, press **1** ABC to open the Data Point Review screen.

This menu first appears showing the first data point in memory. Information about the data point includes:

Link Name	(Fiber Link 1)
Fiber Name and Number	(FBR:1)
Fiber Type	(62.5um MM)
Wavelength	(1300nm)
Relative Power	(-1.91dB)
Test Result	(PASS)

Data Point Review
Screen

Several control functions can be performed from this screen. The function keys are used to navigate among the stored data.

F1   NEXT NAME - scrolls through all of the different fiber names stored in the Fiber OWL 4.

F2   NEXT RUN - scrolls through the data points stored with the currently displayed fiber name.

F3   NEXT WAVE - each data point may have data stored for multiple wavelengths. This option scrolls through the different wavelengths stored with this data point.

0 . - /   0=LOAD - loads the currently displayed fiber link, and returns the user to IMMEDIATE MODE to resume taking data starting with the next fiber number. *For example, if there are 12 data points stored for the currently displayed link name and fiber name, then Immediate Mode will show FBR:13.*

5 MNO   5=EDIT - returns the user to IMMEDIATE MODE to overwrite the data point currently displayed on the Data Point Review screen. After the data point is edited, the Fiber OWL 4 returns the user to test the next fiber number for the currently loaded STORED LINK.

7 STU   7=PRINT- sends detailed, formatted information about the data point to the serial port. An screenshot of the serial port print format is at right.

Serial Port Print
Format

OPERATION/MAINTENANCE
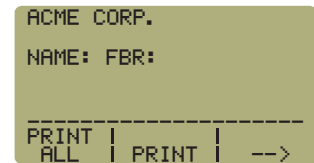
PRINTING STORED DATA TO A SERIAL DEVICE

💡 **Printing stored data to a serial device from the Fiber OWL 4 requires a solid working knowledge of serial COM ports, and requires a terminal program such as Hyperterminal for Windows**

From the STORED DATA menu, press **2 DEF** to open the data point print screen. This screen allows the user to send data for specific links and fiber names to the serial port in an easy-to-read print format.

Information shown on this screen includes:

Link Name (Fiber Link 1)
Fiber Name (FBR:)

The function keys are used to navigate among the stored data.

```
ACME CORP.
NAME: FBR:


_____
PRINT |     |
  ALL | PRINT |  -->
```

Data Point Print Screen

F1 PRINT ALL - sends all data to the serial port

F2 PRINT - sends stored data for the displayed link to the serial port

F3 --> - scrolls through all of the links that have stored data

DOWNLOADING DATA MANUALLY

💡 **Downloading stored data manually to a serial device from the Fiber OWL 4 requires a solid working knowledge of serial COM ports and comma-delimited data formats, and requires a terminal program such as Hyperterminal for Windows**

From the STORED DATA menu, press **4 JKL** to download all data points stored in the Fiber OWL 4 to a PC via serial port. There are two methods of download:

OWL Reporter - data can be downloaded into OWL Reporter software for printing and saving professional-looking certification reports.

The Fiber OWL 4 does not have to be at this screen to download into OWL Reporter. Details on how to download data to OWL Reporter are explained in more detail in the OWL Reporter unit of this manual.

Manual Download - data can be downloaded in a comma-delimited format using a terminal program. Comma-delimited data can be captured from the terminal program and imported into word processing programs, spreadsheets, or databases for making custom reports.

```
DOWNLOAD?


_____
YES |      |  NO
```
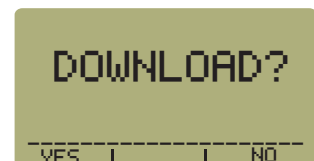
Manual Download Confirmation Screen

Once the PC terminal program is correctly configured and set to capture data, press **F1** from the manual download confirmation screen to download stored data.

CLEARING STORED READINGS FROM FIBER OWL 4 MEMORY

Data cleared from the Fiber OWL 4 is irretrievable. Please ensure that you have downloaded and saved the data to a PC before clearing the Fiber OWL 4 memory.

You must be in CERTIFICATION METER mode to delete data from the Fiber OWL 4. The following methods are used to either delete all of the stored data, or just some of the data in the Fiber OWL 4. Choose the method that best suits your needs, then follow the instructions below.

The following methods do not delete the stored link configurations, only stored readings.

METHOD 1 – IF YOU WANT TO DELETE ALL STORED READINGS:

1. Press **MENU** to access the MAIN MENU.

2. Press **3 GHI** to access the STORED DATA menu.

3. Press **3 GHI** to access the DELETE DATA screen.

4. From the DELETE DATA screen, press **F1** (DEL ALL).

5. Press **F1** to confirm "DELETE ALL READINGS", or press **F3** to return to the DELETE DATA screen without deleting any data.

6. Press **DONE** to return to the STORED DATA menu.

METHOD 2 – IF YOU WANT TO DELETE ONLY SOME OF THE STORED READINGS:

1. Press **MENU** to access the MAIN MENU.

2. Press **3 GHI** to access the STORED DATA menu.

3. Press **3 GHI** to access the DELETE DATA screen.

4. From the DELETE DATA screen, press **F3** to scroll through the list of stored fiber names until the desired fiber name appears (NAME: <fiber name>).

5. Press **F2** to delete all of the data points with the same fiber name, and return to the STORED DATA menu.
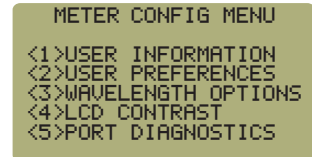
OPERATION/MAINTENANCE

METER SETUP MENU

Several features of the Fiber OWL 4 can be configured from the METER SETUP MENU, and can be accessed from both SIMPLE and CERTIFY modes.

In SIMPLE METER press **MENU** then **2 DEF** METER SETUP.

In CERTIFY LINK press **MENU** then **4 JKL** METER SETUP.

METER SETUP MENU is shown at right. These configuration functions are activated by pressing the corresponding key, and are described in more detail below.

```
METER CONFIG MENU

<1>USER INFORMATION
<2>USER PREFERENCES
<3>WAVELENGTH OPTIONS
<4>LCD CONTRAST
<5>PORT DIAGNOSTICS
```

METER CONFIG
MENU

SETTING USER INFORMATION

From the METER SETUP MENU, press **1 ABC** to view User Information. This information includes the name and telephone number of the owner of the Fiber OWL 4.

Dots will appear (as shown at right) by default when the user information has not yet been entered. These dots will be replaced with the user name and user telephone number.

Press **DONE** to return to the METER CONFIG MENU.

```
...................
.............


_____
USER | USER |
NAME | TELE |
```

Company Information
Screen

SETTING USER NAME

From the User Information screen, press **F1** to set the user name. If the company name has not yet been set, dots will appear in the USER OR COMPANY NAME field (as shown at right).

Press and hold **F1** to backspace to the beginning of the field, then enter the company name. Use the   as a shift key for lower case letters. This field allows for 14-character names.

Press **DONE** when finished to return to the USER INFORMATION screen.

```
USER OR COMPANY NAME:


[..................]


_____
<--- | SHIFT | --->
```
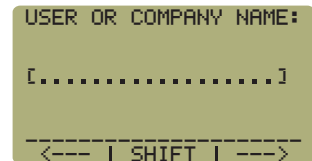
Change Company
Name

SETTING USER TELEPHONE NUMBER

From the User Information screen, press **F2** to set the telephone number. If the telephone number has not yet been set, dots will appear in the PHONE NUMBER field (as shown at right).

Press and hold **F1** to backspace to the beginning of the field, then enter the company phone number. This field allows for 10-digit phone numbers (including 2 spaces for separators), e.g. 262-473-0643.

Press **DONE** when finished to return to the USER INFORMATION screen.

```
PHONE NUMBER:


[...........]


_____
<--- | SHIFT | --->
```
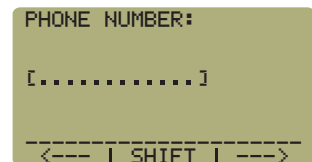
Change Company
Phone Number

OPERATION/MAINTENANCE

SETTING USER PREFERENCES

From the METER SETUP MENU, press **2**_{DEF} to set User Preferences, which includes a power saving feature and the displayed temperature of the Fiber OWL 4.

```
AUTO SHUTDOWN: ON

STARTUP BACKLIGHT
STATE: ON

TEMPERATURE UNITS: °F
_____
 SDWN  |  BKLT  |  TEMP
```
Set Power
Saving Features

F1 toggles the auto-shutdown feature between ON and OFF. This feature is ON by default.

F3 toggles between Fahrenheit (F) and Celcius (C) degrees. This feature is Fahrenheit (F) by default.

CHANGING WAVELENGTH OPTIONS

From the METER SETUP MENU, press **3**_{GHI} to set the various wavelength-related options in the Fiber OWL 4, including setting custom wavelengths and

```
WAVELENGTH OPTIONS

<1>CUSTOM WAVELENGTH
<2>DEFAULT WAVELENGTH
<3>TONE DETECTION
```
WAVELENGTH
OPTIONS MENU

ENTERING CUSTOM WAVELENGTH

🔑 **Setting custom wavelengths requires a high level of understanding of fiber optics, and should only be performed by advanced fiber technicians**

From the WAVE OPTIONS menu, press **1**_{ABC} to set a custom wavelength. The custom wavelength temporarily replaces 980nm, and requires a singlemode light source tuned to -10dBm for calibration.

```
ENTER WAVELENGTH(nm):
 ( 700 to 1700nm )

[1650]

_____
 <---  |  SHIFT  |  --->
```
Set Custom
Wavelength

Enter the 3- or 4-digit custom wavelength between 700nm and 1700nm in the entry field provided; e.g. 1650nm.

Press **DONE** to continue.

Connect a -10 dBm singlemode light source of the appropriate wavelength to the Fiber OWL 4 using a singlemode patch cord.

```
1650nm WILL REPLACE
 980nm

CONNECT 1650nm -10dBm

SOURCE TO CALIBRATE
_____
 YES  |     |   NO
```
Verify Custom
Wavelength

Press **F1** to confirm calibration. The meter will then return to the METER SETUP MENU.

To reset the Fiber OWL 4 back to its default wavelengths, press **2**_{DEF} from the WAVE OPTIONS

OPERATION/MAINTENANCE

SETTING TONE DETECTION OPTIONS

🔍 **Setting tone detection options requires a high level of understanding of fiber optics, and should only be performed by advanced fiber technicians**

From the WAVE OPTIONS menu, press **3 GHI** to view the TONE OPTIONS that are set in the Fiber OWL 4.

TONE OPTIONS are used to associate five tone detection frequencies with five calibrated wavelengths, as well as set the Fiber OWL 4 into AUTO WAVELENGTH detection mode.

The screen at right shows the default tone options.

```
  300Hz     850nm
  600Hz    1310nm
 1000Hz    1300nm
 1500Hz    1490nm
 2000Hz    1550nm
AUTO WAVELENGTH: OFF
_____
 TONE | WAVE | AUTO
```

Set Toning Options

NOTE: shown above is the default tone configuration

F1   TONE - moves the tone selection highlight to the next tone.

F2   WAVE - toggles the wavelength of the currently selected tone.

F3   AUTO - toggles the AUTO WAVELENGTH detection feature ON or OFF.

NOTE: for proper operation of automatic wavelength detection with OWL WaveSource light sources, the toning options MUST appear as shown in the Set Toning Options screenshot above.

SETTING LCD CONTRAST

From the METER SETUP MENU, press **4 JKL** to set the LCD CONTRAST.

This option allows the user to set the contrast of the liquid crystal display (LCD).

```
XXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXX
      CONTRAST
_____
 DOWN |      | UP
```

Set LCD Contrast

F1   DOWN - lightens the screen in case it is too dark

F3   UP - darkens the screen in case it is too light

Press **DONE** to return to the METER CONFIG MENU.

RUNNING THE FIBER OWL 4 SERIAL PORT DIAGNOSTIC – PAGE 1 OF 2

The Fiber OWL 4 contains a diagnostic feature that can check to make sure that Fiber OWL serial port and the RS-232 download cable are working correctly. This is a useful tool for troubleshooting problems related to downloading data from the Fiber OWL 4 to your PC. If the Fiber OWL 4 and download cable both pass this diagnostic, then the problem resides in your PC.

NOTE: OWL fiber optic technicians are NOT trained to troubleshoot modern PC problems.

Some peripheral download software, especially digital camera download software, are known to produce COM port conflicts. Also, if you are using a USB to serial adapter, check the USB adapter driver settings to make sure that the adapter is using an unused COM port. If you cannot resolve your downloading issues, it may be necessary to seek a professional PC technician for assistance.

1 Power ON the Fiber OWL 4.

2 From the OPERATING MODE menu, highlight SIMPLE METER and press **F2** .

```
     OPERATING MODE

    SIMPLE METER
  CERTIFICATION METER
     TECH SUPPORT
  _____
  NEXT |SELECT|
```

OPERATING MODE
MENU

3 From Immediate Mode, press **MENU** , then press **4 JKL** to enter the METER SETUP menu.

```
      MAIN MENU

  <1>FIBER LINK SETUP
  <2>TAKE READINGS
  <3>STORED READINGS
  <4>METER PROPERTIES
  <5>SOURCE CONTROL
  <6>TEST FIBER LENGTH
```

MAIN MENU

4 From the METER SETUP MENU, press **5 MNO** to start the SERIAL TEST.

```
   METER CONFIG MENU

  <1>USER INFORMATION
  <2>USER PREFERENCES
  <3>WAVELENGTH OPTIONS
  <4>LCD CONTRAST
  <5>PORT DIAGNOSTICS
```

METER CONFIG
MENU

To fully troubleshoot the download port and the download cable, three subsequent tests must be performed:

The first test is used to check the DATA port on the Fiber OWL 4 for internal shorts.

The second test is used to test for internal shorts inside the RS-232 download cable.

The third test is used to test the download cable and Fiber OWL 4 serial port together.

RUNNING THE FIBER OWL 4 SERIAL PORT DIAGNOSTIC – PAGE 2 OF 2

TEST 1 - DATA PORT TEST

5   At this time, do NOT attach the download cable to the DATA port. Press **F1** to run the DATA PORT TEST.

```
ATTACH DOWNLOAD CABLE
AND SERIAL LOOPBACK
OR SHORT PINS 2 AND 3

RUN SERIAL PORT TEST?
---------------------
  YES  |      |   NO
```

The result of the DATA PORT TEST should be "FAILED". This means that the Fiber OWL 4 data port is functioning properly.

If the result of the DATA PORT TEST is "PASSED", then there may be a problem with the Fiber OWL 4 data port. Do NOT continue with the rest of the diagnostic tests, and contact OWL technical support.

```
     SERIAL PORT

     FAILED

---------------------
DONE |        |RETEST
```

TEST 2 - RS-232 DOWNLOAD CABLE TEST

6   Now, connect the RS-232 download cable to the serial port on the top of the Fiber OWL 4.

7   Press **F3** (RETEST), then **F1** to run the RS-232 download cable test. At this time, do NOT short pins 2 and 3 together on the DB-9 connector.

The result of the RS-232 DOWNLOAD CABLE TEST should also be "FAILED". This means that there are no internal shorts in the cable.

If the result of the DOWNLOAD CABLE TEST is "PASSED", then there may be a problem with the download cable and it should be replaced.

```
     SERIAL PORT

     FAILED

---------------------
DONE |        |RETEST
```

TEST 3 - SERIAL PORT DIAGNOSTIC TEST

8   Short pins 2 and 3 on the download cable with a short piece of wire as shown in the picture at right. A paper clip works well for this connection.

9   Press **F1** (RETEST), then **F1** to run the SERIAL PORT DIAGNOSTIC TEST.

The result of the SERIAL PORT DIAGNOSTIC TEST should be "PASSED". This confirms that the DATA port on the Fiber OWL 4 and download cable are working together properly.

If the result of this test is "FAILED", re-seat the loopback wire and download cable to make sure the connections are firm and re-test.
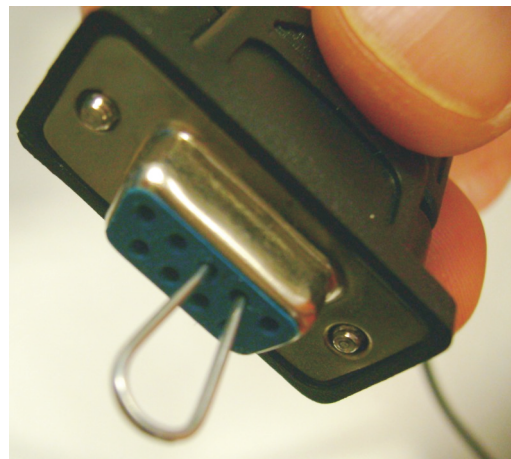
If you have any questions about this diagnostic procedure, please contact OWL at 262-473-0643.

CREATING USER-DEFINABLE CABLING STANDARDS

Creating user-definable cabling standards requires a solid working knowledge of fiber optic link budgets and the passive components of fiber links, and should only be performed by advanced fiber technicians

Some companies have their own set of optical fiber loss parameters – such as fiber loss, connector loss and splice loss – that they need their network to adhere to. Thus, the Fiber OWL 4 allows the user to configure two user-definable cabling standards for the purpose of fiber certification.

These standards are defined when selecting the fiber standard during the Link Wizard process.

NOTE: one of the key parameters for defining these custom cabling standards is fiber loss (dB per kilometer). Each custom standard supports a different range of optical losses for up to 2 wavelengths, thus it is important to know what the fiber loss is because this determines which user-definable standard to use.

USER DEFINED #1 supports fiber losses for up to two wavelengths from **0.01 dB to 2.55 dB** per kilometer
USER DEFINED #2 supports fiber losses for up to two wavelengths from **0.1 dB to 25.5 dB** per kilometer

1. Press **F1** to scroll through the list of fiber standards.

2. When the correct custom standard is highlighted, press **F3** to EDIT.

3. From the SELECT WAVES screen, press **F1** to scroll to the first wavelength to configure.

4. Press **F2** to select this wavelength as the first wavelength.

5. Enter the loss per kilometer in dB for 62.5/125 MM fiber in the entry field. If it is not necessary to enter a value for this fiber type, leave the entry field blank.

6. Press **DONE** to continue. Repeat **5** and **6** for the remaining fiber types.

7. Enter the loss per connection in dB, then press **DONE** to continue.

8. Enter the loss per splice in dB, then press **DONE** to continue, and return to the SELECT WAVES screen.

9. If necessary, highlight the other wavelength to use for this standard and press **F3** to select.

OPERATION/MAINTENANCE

OPTIONAL VFL (visual fault locator) PORT

As an option, a Visual Fault Locator (VFL) can be installed into the Fiber OWL 4 optical power meter in place of the optical length testing port. The VFL is an invaluable troubleshooting tool with two important uses:

Visual Fault Location. Faults, such as breaks or microbends, can be located in the near end of the fiber link under test (within a few feet). When the bright red laser encounters a fault, the light is deflected into the fiber jacket, producing a glow at the point of the fault.

Visual Fiber Identification. Optical fibers can be visually identified by connecting the VFL port to the fiber under test, then inspecting the far end for red light exiting the fiber connector.

Operation of the Optional Visual Fault Locator (VFL) Port

1.   Connect the VFL port to the optical fiber to test.

2.   Press ✳ to enter the SOURCE SETTINGS menu.

3.   Power on the VFL port by pressing **F1** . WAVELENGTH will change to the VFL wavelength.

       OPTIONAL: press **F2** to toggle the VFL between "flashing" and continuous mode.

4.   When finished using the VFL port, press **F1** to set the VFL status to OFF. It is recommended to power off the VFL when not in use to conserve battery life.

5.   Press **MENU** to return to the MAIN MENU.

```
SOURCE SETTINGS

WAVE
LENGTH   TONE    AUTO
------   ----    ----
OFF      NONE    N/A
_____
WAVE | TONE |
```
SOURCE SETTINGS
MENU

OPERATION/MAINTENANCE

VISUAL FAULT LOCATION

The optional VFL port in the Fiber OWL 4 VFL can be used as a troubleshooting tool to determine if there are breaks, micro-bends, or any other anomalies causing excessive loss within the first few feet of the fiber under test located in the splice tray. The bright red laser injects high-intensity red laser light into the near-end connector. If this light encounters any anomalies, such as a break or a micro-bend, the light is deflected into the fiber jacket, producing a red glow at the point of the anomaly.

Follow the steps below:

1 Connect the VFL port to the fiber under test. It is recommended to use a fiber patch cable as shown below to avoid handling the fragile jacketed fiber in the splice tray.

> **do NOT insert an APC (Angled Physical Contact) connector in to the VFL port as this could damage the angled ferrule on the APC connector.**

2 Power on the VFL. See page 65 for instructions on operating the VFL port.

3 Inspect the splice tray for anomalies. Optical fiber jackets are differently colored, making it is difficult to see red light shining through, so for best results, it is recommended to keep the room light at a minimum.
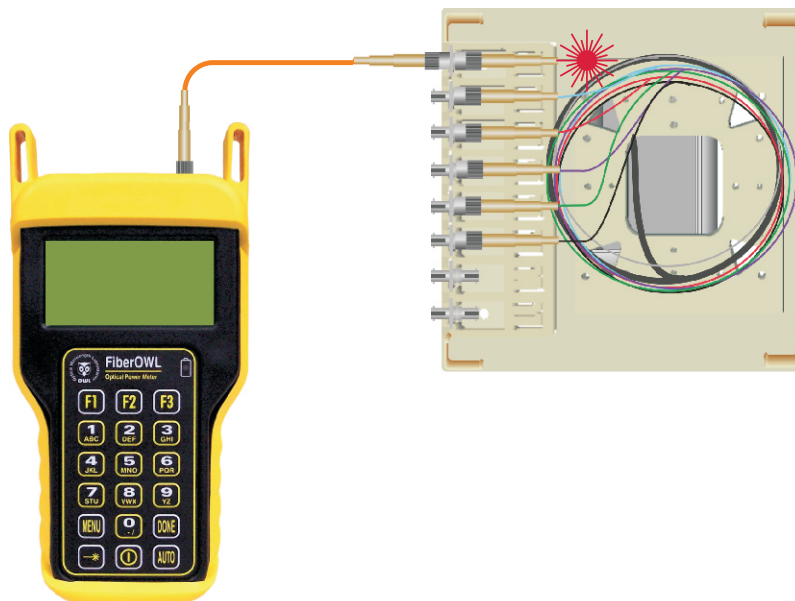
OPERATION/MAINTENANCE

VISUAL FIBER IDENTIFICATION

The optional VFL port in the Fiber OWL 4 optical power meter can help take the guesswork out of identifying ports in a fiber patch panel or checking polarity of a duplex connector. Connect the VFL port to one end of a fiber link, and the high-intensity, precision-coupled red laser diode will allow the user to visually identify the port by the presence of a red glow emitting from the connector on the other end, allowing for visual port identification of fiber optic links up to 5 kilometers (3.1 miles) away.

Follow the steps below:

1   Connect the VFL port to the fiber under test. It is recommended to use a fiber patch cable as shown below to avoid handling the fragile jacketed fiber in the splice tray .

do NOT insert an APC (Angled Physical Contact) connector in to the VFL port as this could damage the angled ferrule on the APC connector.

2   Power on the VFL. See page 65 for instructions on operating the VFL port.

3   Inspect the far-end connectors for the red light exiting the connector.

the laser light exiting the fiber is very bright and could cause damage to your eye if viewed directly!

To assist with viewing of the light exiting the connector, hold a piece of white paper in front of the connectors. This will sufficiently diffuse the light for safe viewing.

Symbolic Fiber Link
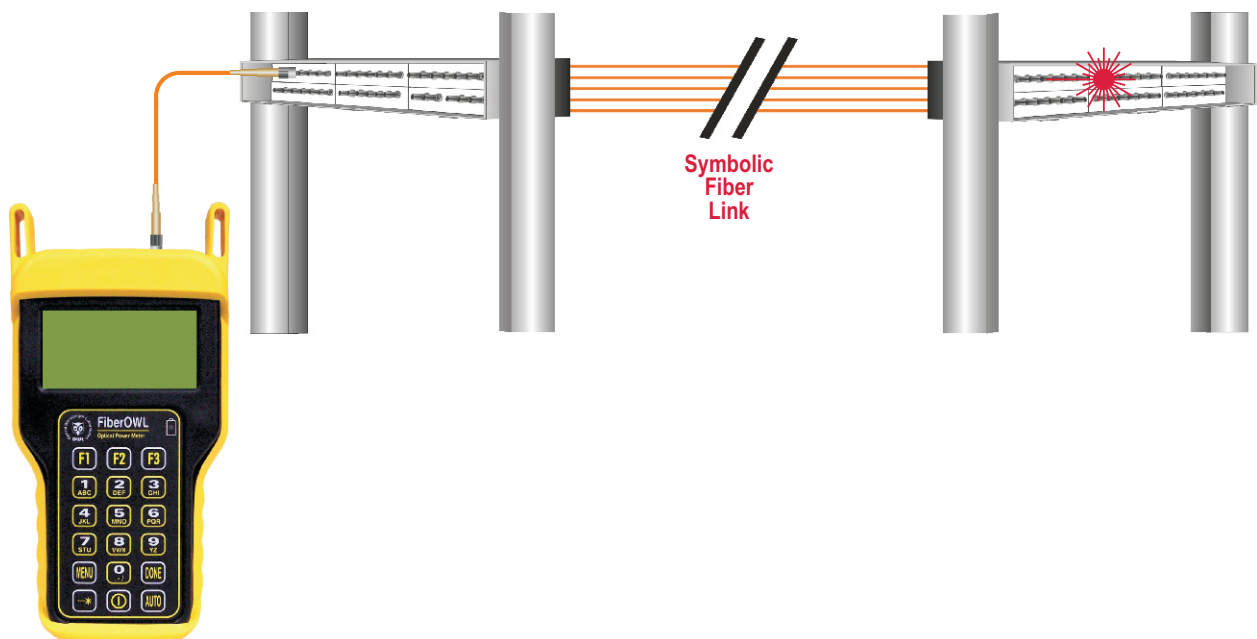
OPERATION/MAINTENANCE

BOOT REMOVAL/REPLACING THE BATTERY

Boot Removal

To remove the boot from the Fiber OWL 4 optical power meter, place your thumb on the back of the unit, then use your fingers to pull the lip off of the front of the unit (as shown below).

Battery Replacement

The battery compartment is covered by a plate on the back of the unit. A small Philips screwdriver is required. Remove the rubber boot to expose the back of the unit. One 9v battery is required for operation.

⚠️ **DO NOT USE BATTERY CHARGING PORT WITH NON-RECHARGEABLE BATTERIES. THERE IS THE POTENTIAL FOR EXPLOSION AND DAMAGE MAY OCCUR TO THE UNIT AND/OR THE USER.**

Universal Port

The Fiber OWL 4 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.).

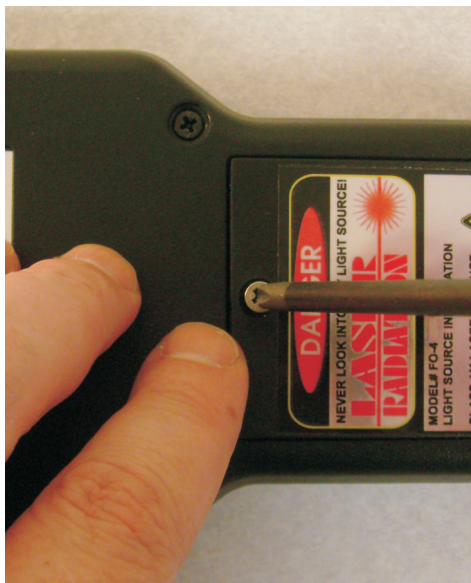What gives this port its flexibility is that only the ferrule is inserted into the port. Since there is no latching mechanism to speak of, any 2.5mm ferrule connector can be inserted into the same port without having to swap adapter ports. There is no longer the need to purchase or maintain additional 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 4 allows the user to remove the 2.5mm adapter and place a 1.25mm adapter (included with each Fiber OWL 4) 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.

62.5/125 μm core — 2.5 mm ferrule — 2.5 mm connector port — 1 mm^2 detector
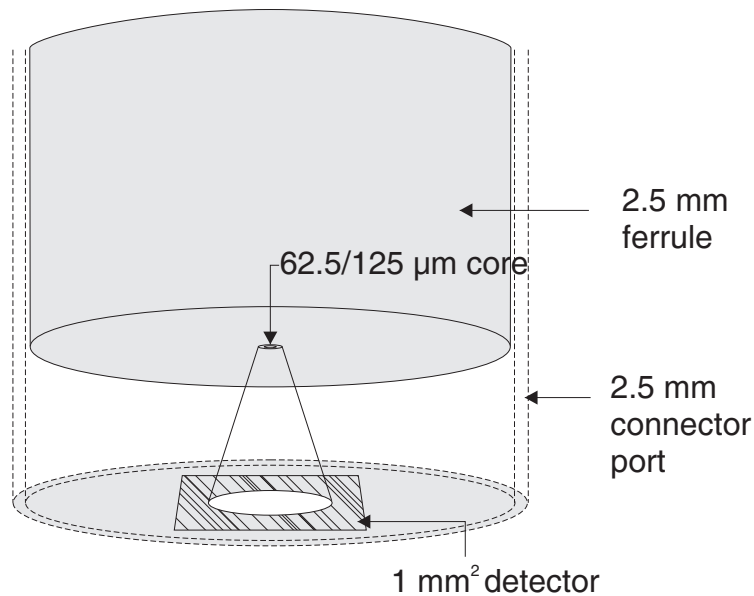
Use of SC Connectors with 2.5mm Universal Port

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

OPERATION/MAINTENANCE

CLEANING THE DETECTOR PORT

Required accessories:

A) Isopropyl Alcohol (91% or better)

B) Round **wooden** toothpick with sharp point
(NOTE: do not use a metal pin or needle since metal will scratch the surface of the detector)

C) Cotton swab

D) Jeweler's loupe (10x magnification recommended)

E) Compressed Air (not shown)

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

2. Wet the cotton toothpick tip with the isopropyl alcohol.

3. Remove the adapter cap from the power meter detector port.
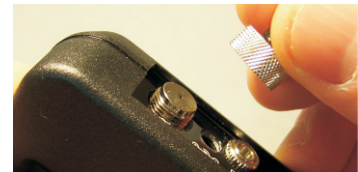
4. **USING GREAT CARE**, gently insert the cotton toothpick tip into the detector port.

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

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

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

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

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

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

OPERATION/MAINTENANCE

CLEANING THE LIGHT SOURCE/VFL PORT

This cleaning procedure applies to the light source/VFL port on the Fiber OWL 4 optical power meter. For more information about cleaning the DETECTOR port on the Fiber OWL 4, see page 23.

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.

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

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

2. Clean out the optical port according to the directions that came with the cleaning accessories.

3. Inspect the optical port with the in-adapter fiber optic inspection scope to ensure the port is clear of obstructions.

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

APPENDICES

SPECIFICATIONS

Detector Type:	InGaAs
Calibrated Wavelengths:	850, 980, 1300, 1310, 1490, 1550, 1625nm
Measurement Range:	+5 to -70 dBm
Measurement Units:	dBm; uW (absolute)
	dB (relative)
Accuracy:	± 0.15 dB[1]
Resolution:	0.01 dB
Battery Life:	up to 100 hours (9v)
Connector Type:	2.5mm Universal / 1.25mm Universal
Operating Temperature:	-10 to 55º C
Storage Temperature:	-30 to 70º C
Size:	2.75"W x 4.94"H x 1.28"D
Weight:	116g
Low Battery Indicator:	Yes
NIST Traceable:	Yes
Data Storage Points:	up to 1000
Auto-shutoff:	after approximately 5 minutes of non-use

1) 0 to -45 dBm

WARRANTY INFORMATION

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

Battery Replacement. The Fiber OWL 4 ships with one 9-volt alkaline non-rechargeable battery. The battery compartment is covered by a sliding plate on the back of the unit. Remove the rubber boot to expose the back of the unit. One 9v battery is required for operation.

Cleaning. For accurate readings, the optical connectors on the Fiber OWL 4 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 4 comes standard with a two-year factory warranty, which covers manufacturer defect and workmanship only.

CONTACT INFORMATION

Address:

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

Phone:

262-473-0643

Internet:

OWL-INC.COM

OPTIONAL UPGRADE INFORMATION

Visual Fault Locator Port Upgrade

The Fiber OWL 4 optical power meter may be upgraded to include an optional visual fault locator (VFL), useful for locating bends, breaks, and other anomalies in the near-end splice tray, as well as visual fiber identification up to 5km away!

Upgrading to a VFL port requires the length testing port to be removed from the unit.

APPENDICES

SUPPORTED CABLING STANDARDS

The Fiber OWL 4 supports the following fiber optic network cabling standards:

ITU G.983.3	EIA/TIA-568	CAN-T529	ISO/IEC 11801
10 Gigabit Ethernet	1000Base-SX	1000Base-LX	100Base-FX
10Base-FL	10Base-FB	FDDI	ATM-155
ATM-622	Fibre Channel	Token Ring	FTTH

10-GIGABIT ETHERNET STANDARD

Support for the IEEE 802.3ae 10-Gigabit Ethernet standard has been added to OWL Reporter, which means that Fiber OWL 4 users can now certify their 10GbE networks.

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

LINK BUDGET CALCULATION WORKSHEET

Operating Wavelength [   ]   Fiber Type [   ]

Calculate System Attenuation

Fiber Loss at Operating Wavelength (Distance x Fiber Loss)

Total Cable Distance ————————————————— [   ] km
Individual Fiber Loss (at operating wavelength) ———— [   ] dB/km
Total Fiber Loss ————————————————————— [   ] dB

Connector Loss (Connector Loss x Connector Pairs)

Individual Connector Loss ——————————————— [   ] dB
Number of Connector Pairs ——————————————— [   ]
Total Connector Loss ————————————————— [   ] dB

Splice Loss (Splice Loss x Splices)

Individual Splice Loss ———————————————— [   ] dB
Number of Splices ——————————————————— [   ]
Total Splice Loss ——————————————————— [   ] dB

Other Components ——————————————————— [   ] dB

Total System Attenuation ————————————— [   ] dB

Calculate Link Loss Budget

Determine System Gain (Avg. Transmitter Power - Receiver Sensitivity)

Average. Transmitter Power ——————————————— [   ] dBm
Receiver Sensitivity ——————————————————— [   ] dBm @ 10^{-9} BER
System Gain ——————————————————————— [   ] dB

Power Penalties (Operating Margin + Receiver Power Penalties + Repair Margin # Splices at 0.3dB each)

Operating Margin ——————————————————— [   ] dB
Receiver Power Penalties ————————————————— [   ] dB
Repair Margin ———————————————————————— [   ] dB
Total Power Penalty ——————————————————— [   ] dB

Determine Link Loss Budget (System Gain - Power Penalty)

System Gain ——————————————————————— [   ] dB
Total Power Penalty ——————————————————— [   ] dB

Total Link Loss Budget ————————————————— [   ] dB

Verify Performance

Verify Adequate Power (Total Link Loss Budget - Total System Attenuation)

Total Link Loss Budget ———————— [   ] dB
Total System Attenuation ———————— [   ] dB
System Performance Margin* ——————— [   ] dB

* System Performance Margin must be greater than 0 dB in order for the system to operate using the specified electronics.