

# Optical Wavelength Laboratories

## OPERATIONS GUIDE

### ZOOM 2 OPTICAL POWER METER

Model Numbers:

ZO2

ZO2V



# INTRODUCTION

## TABLE OF CONTENTS

### Introduction

Before You Begin	1
About This Manual	1
Applications	2
Active Equipment Optical Power Measurements	2
Fiber Continuity Testing	2
Patch Cord Testing	2
Attenuation (Optical Loss) Measurements	2
Description	2
Precautions	3
Safety	3
Operational	3
Connector	3
Product Label	3
General Features	4
Charger Port	4
2.5mm Universal Connector Port	4
LCD Display	4
User Controls	4

### Test Procedures

Active Equipment Power Measurement	5
Fiber Continuity	6
Patch Cable Testing	7
Check MM Reference Cables with a Dual OWL MM Light Source	8
Check MM Reference Cables with a WaveSource MM Light Source	9
Check SM Reference Cables with a Laser OWL SM Laser Source	10
Check SM Reference Cables with a WaveSource SM Laser Source	11

### Quick Reference Guides

ZOOM 2/Dual OWL MM Test Kit (P/N: KIT-Z2-D2xx)	12
ZOOM 2/Laser OWL SM Test Kit (P/N: KIT-Z2-L2xx)	17

### Operation/Maintenance

Optional VFL Port	20
Visual Fault Location	21
Visual Fiber Identification	22
Boot Removal	23
Battery Replacement	23
Universal Port	24
Cleaning the Detector Port	25
Cleaning the Optional VFL Port	26
AUTO mode	27

### Appendices

Specifications	28
Maintenance and Calibration Information	28
Contact Information	28
Optional Upgrade Information	29
Link Budget Calculation Worksheet	

# INTRODUCTION

## BEFORE YOU BEGIN

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

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

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

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

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

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

## ABOUT THIS MANUAL

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



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



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



Warns the operator of a potentially dangerous condition

# INTRODUCTION

## APPLICATIONS

Below is a list of test and measurement applications that can be performed using the ZOOM 2 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 ZOOM 2 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 ZOOM 2 by placing a calibrated light source on one end of the fiber and the ZOOM 2 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 ZOOM 2 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 must 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.

## DESCRIPTION

This manual describes the operation of the ZOOM 2 optical power meter. ZOOM stands for Zeroed Output Optical Meter.

The ZOOM 2 is a very economical option for measuring the optical power of both multimode and singlemode fibers. The ZOOM 2 is NIST traceable, and is calibrated 850, 1300, 1310, and 1550nm, as well as 1490nm, one of the key wavelengths used in FTTx PON networks. Reference values used for optical loss readings are stored for each of these wavelengths.

Its user-friendly interface includes two push-buttons: one for power and wavelength selection, and one for setting references and toggling between dBm (optical power) and dB (optical loss).

The ZOOM 2 includes a 2.5mm universal connector, which is compatible with many popular fiber connectors, such as ST, SC, and FC. A 1.25mm universal connector port can be purchased for an additional charge that allows for connection to LC, MU, and other SFF connectors.

The ZOOM 2 is ideal for fiber optic professionals who need to quickly measure the loss in their fiber optic links and do not require data point storage.

For an additional charge, the charger port in the ZOOM 2 can be replaced by a precision-coupled visual fault locator optimized for fiber optics. An optical ball lens placed near the laser output focuses the light for optimum input into fiber optic cables, and special current-limiting electronics prevents laser burnout (a common problem with pen-style laser pointers), increasing the life of the VFL.



# INTRODUCTION

## PRECAUTIONS

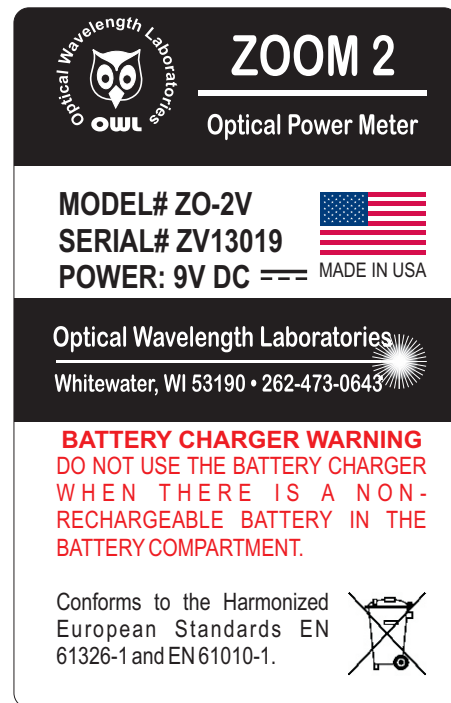
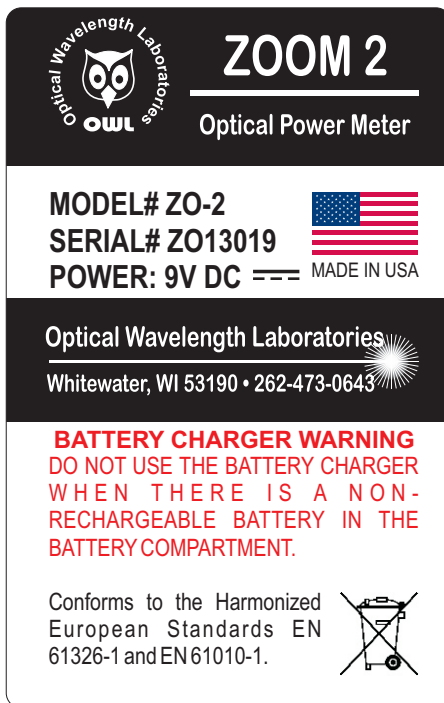
**Safety** - Exercise caution when working with any optical equipment. High-intensity fiber optic laser sources output potentially dangerous high energy invisible light, and could cause serious, irreparable damage to the eye. Thus, it is recommended to **NEVER** look into the connector port of a light 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 you have the optional Visual Fault Locator installed, do NOT insert APC (Angled Physical Contact) connectors into the VFL port on your ZOOM 2 as this may damage the angled ferrule on the APC connector.

## PRODUCT LABEL

On the back of each ZOOM 2 series optical power meter is a label similar to the one 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.



# INTRODUCTION

## GENERAL FEATURES

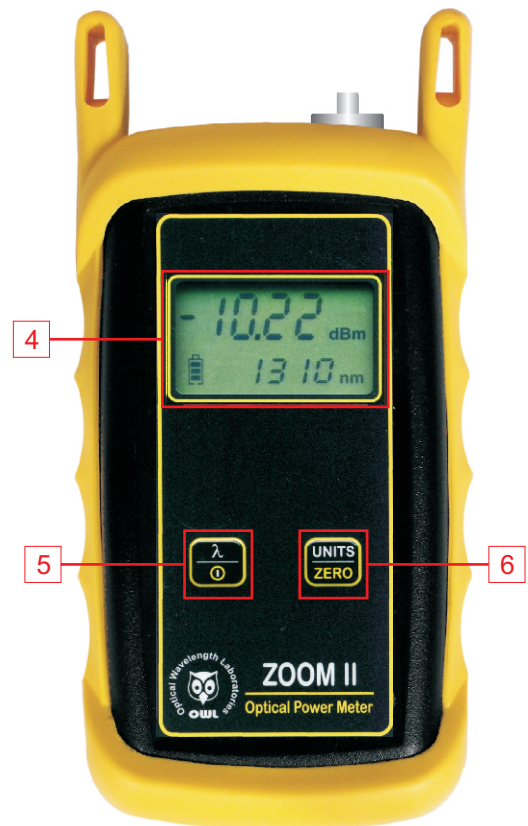
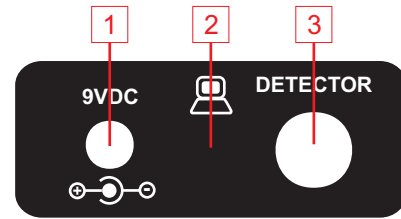
- 1 Charger Port / Optional VFL Port** - Allows for charging of re-chargeable 9-volt batteries, as well as wall power operation (9VDC transformer and 9-volt re-chargeable battery not included).



**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.**

As an option, a Visual Fault Locator (VFL) can be installed in place of the charger port.

- 2 NOT USED**
- 3 2.5mm Universal Connector Port** - accepts many popular 2.5mm ferrule connectors, including ST, SC, and FC. Also, for an additional charge, a 1.25mm universal cap is available (for connection to LC, MU, and other SFF connectors).
- 4 LCD Display** - shows optical power/loss levels, power units, wavelength, and battery status.
- 5  $\frac{\lambda}{0}$**  - single press changes wavelength; holding button powers the unit ON or OFF.
- 6 UNITS ZERO** - single press toggles the power units between dBm, dB, and uW; holding sets the reference for the selected wavelength.



# 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:

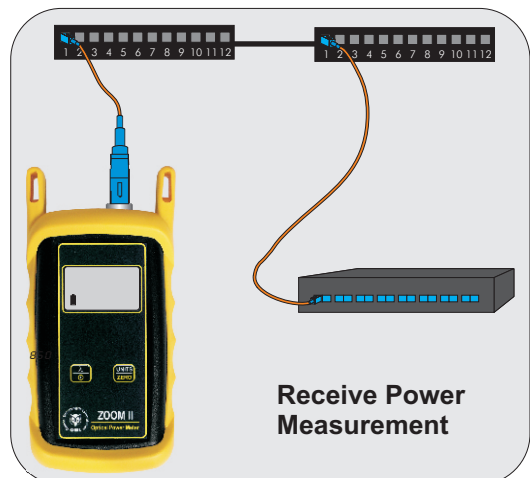
- 1 Connect the ZOOM 2 to the transmitter port on the active equipment under test, as shown at right.
  - 2 Press  to power on the ZOOM 2 optical power meter, if necessary.
  - 3 Determine the output wavelength of the active equipment, then press  until the wavelength on the ZOOM 2 matches.
  - 4 Power on the transmitter port according to manufacturer instructions, if necessary.
  - 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.
-  Some transmitters have a diagnostic mode where the output is continuously at its maximum power. 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 ZOOM 2 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 ZOOM 2 must be connected to the active equipment under test through the installed link as shown at right.



# TEST PROCEDURES

## FIBER CONTINUITY

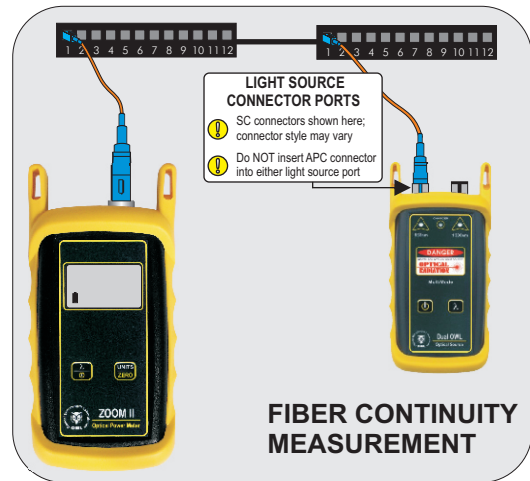
### Required Accessories

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

### Checking for Fiber Continuity

The ZOOM 2 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  $\frac{\lambda}{0}$  to power on the ZOOM 2 optical power meter, if necessary.
- 3 Press  $\frac{\lambda}{0}$  until the wavelength on the ZOOM 2 matches the output wavelength of the light source.
- 4 Take the ZOOM 2 optical power meter to the opposite end of the link under test, and connect into the first port. If the ZOOM 2 does not detect any optical power, the display will read "LO". Continue connecting to subsequent optical ports until the ZOOM 2 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 ZOOM 2 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  to power on the ZOOM 2 optical power meter, if necessary.

**3** Press  until the wavelength on the ZOOM 2 matches the output wavelength of the light source.

**4** Press and hold  for approximately 2 seconds to set the reference. The ZOOM 2 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.



**3-jumper Reference Method Setup**



**Insertion Loss Test**

# TEST PROCEDURES

## Checking ZOOM 2 Series Optical Power Meters For Proper Operation USING OWL DUAL OWL SERIES MULTIMODE SOURCES

### LIGHT SOURCE MODEL NUMBERS:

DO2xx  
DO2-85xx  
DO2-13xx

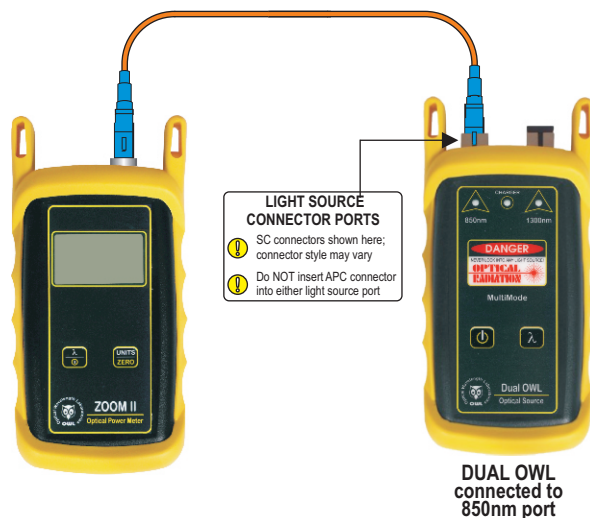
### Checking ZOOM 2 Series Optical Power Meters for Proper Operation

#### 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 ZOOM 2 and Dual OWL

Connect the ZOOM 2 and Dual OWL together with an orange multimode patch cable as shown below.



#### STEP 2 - Power ON the ZOOM 2

Press **ON** to power on the ZOOM 2.

After a few seconds, the ZOOM 2 display should read 'LO', and will appear similar to the diagram shown at right.

**NOTE:** the wavelength and measurement units may be different from the display at right.

#### STEP 3 - Set the ZOOM 2 to 'dBm'

Press **UNITS ZERO** on the ZOOM 2 until the measurement units read 'dBm' as shown at right. You may need to press the button several times.



#### STEP 4 - Set ZOOM 2 to 850nm

Press **2 AUTO** on the ZOOM 2 until the wavelength display shows '850nm' as shown at right. You may need to press the button several times.



#### STEP 5 - Power ON the Dual OWL

Press **POWER** to power on the Dual OWL.

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



#### STEP 6 - Check optical power

The power reading that appears on the ZOOM 2 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 $\mu$ M	-19.0 to -21.0 dBm	-21.00 dBm
50/125 $\mu$ M	-22.0 to -24.0 dBm	-24.00 dBm

**NOTE:** the following steps are only required if the optical power reading on the ZOOM 2 is too low.

#### 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 ZOOM 2 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 ZOOM 2 Series Optical Power Meters For Proper Operation USING OWL WAVESOURCE SERIES MULTIMODE SOURCES

### LIGHT SOURCE MODEL NUMBERS:

WS-MDxx  
WS-MDVxx  
WS-MDSDxx

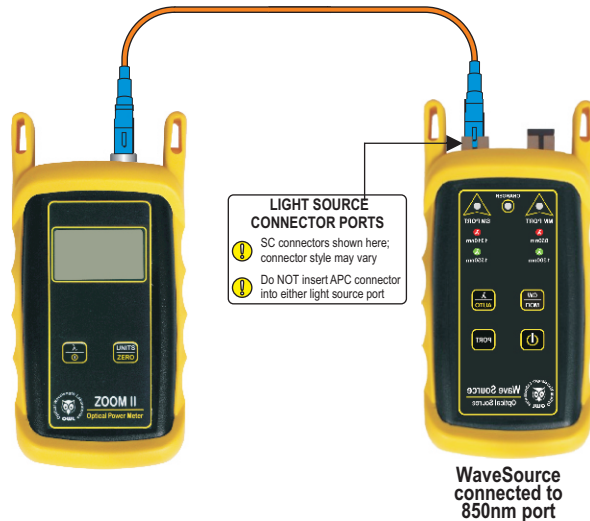
### Checking ZOOM 2 Series Optical Power Meters for Proper Operation

#### USING A WAVESOURCE MULTIMODE LIGHT SOURCE

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

#### STEP 1 - Connect ZOOM 2 and WaveSource

Connect the ZOOM 2 and WaveSource together with an orange multimode patch cable as shown below.



#### STEP 2 - Power ON the ZOOM 2

Press **ON/OFF** to power on the ZOOM 2.

After a few seconds, the ZOOM 2 display should read 'LO', and will appear similar to the diagram shown at right.

**NOTE:** the wavelength and measurement units may be different from the display at right.



#### STEP 3 - Set the ZOOM 2 to 'dBm'

Press **UNITS ZERO** on the ZOOM 2 until the measurement units read 'dBm' as shown at right. You may need to press the button several times.



#### STEP 4 - Set ZOOM 2 to 850nm

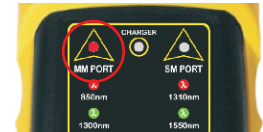
Press **2 AUTO** on the ZOOM 2 until the wavelength display shows '850nm' as shown at right. You may need to press the button several times.



#### STEP 5 - Power ON the WaveSource

Press **POWER** to power on the WaveSource.

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



#### STEP 6 - Check optical power

The power reading that appears on the ZOOM 2 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 $\mu$ m	-19.0 to -21.0 dBm	-21.00 dBm
50/125 $\mu$ m	-22.0 to -24.0 dBm	-24.00 dBm

**NOTE:** the following steps are only required if the optical power reading on the ZOOM 2 is too low.

#### 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 ZOOM 2 and the WaveSource, 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 ZOOM 2 Series Optical Power Meters For Proper Operation

### USING OWL LASER OWL SERIES SINGLEMODE SOURCES

#### LIGHT SOURCE MODEL NUMBERS:

LO2xx  
LO2-13xx  
LO2-15xx

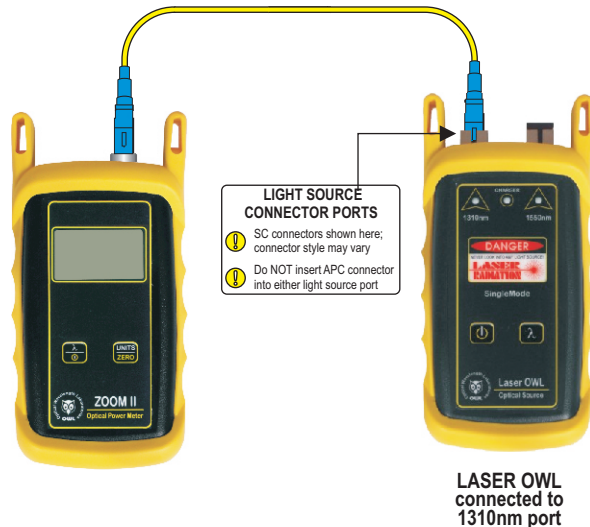
#### Checking ZOOM 2 Series Optical Power Meters for Proper Operation

##### 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 ZOOM 2 and Laser OWL

Connect the ZOOM 2 and Laser OWL together with a yellow singlemode patch cable as shown below.



#### STEP 2 - Power ON the ZOOM 2

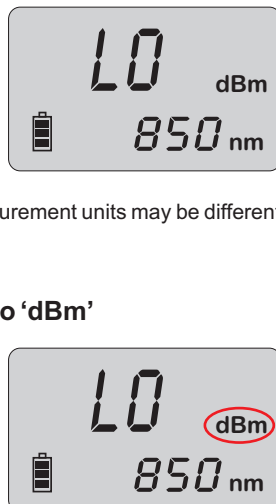
Press **ON/OFF** to power on the ZOOM 2.

After a few seconds, the ZOOM 2 display should read 'LO', and will appear similar to the diagram shown at right.

**NOTE:** the wavelength and measurement units may be different from the display at right.

#### STEP 3 - Set the ZOOM 2 to 'dBm'

Press **UNITS ZERO** on the ZOOM 2 until the measurement units read 'dBm' as shown at right. You may need to press the button several times.



#### STEP 4 - Set ZOOM 2 to 1310nm

Press **2 AUTO** on the ZOOM 2 until the wavelength display shows '1310nm' as shown at right. You may need to press the button several times.



#### STEP 5 - Power ON the Laser OWL

Press **POWER** 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 ZOOM 2 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 ZOOM 2 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 ZOOM 2 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 ZOOM 2 Series Optical Power Meters For Proper Operation USING OWL WAVESOURCE SERIES SINGLEMODE SOURCES

### LIGHT SOURCE MODEL NUMBERS:

WS-SDxx  
WS-VSDxx  
WS-MDSDxx

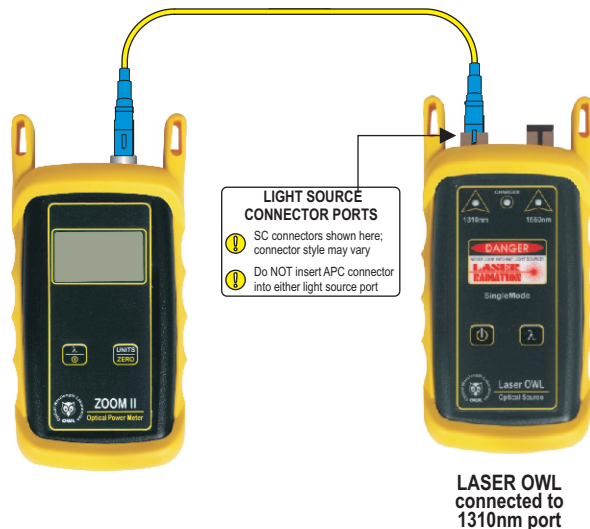
### Checking ZOOM 2 Series Optical Power Meters for Proper Operation

#### 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 ZOOM 2 and Laser OWL

Connect the ZOOM 2 and Laser OWL together with a yellow singlemode patch cable as shown below.



#### STEP 2 - Power ON the ZOOM 2

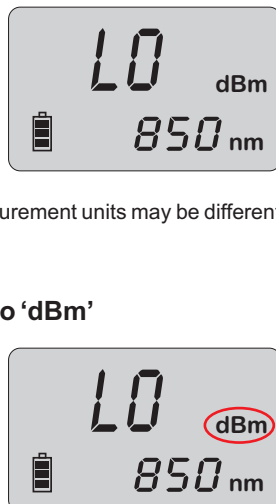
Press **ON** **OFF** to power on the ZOOM 2.

After a few seconds, the ZOOM 2 display should read 'LO', and will appear similar to the diagram shown at right.

**NOTE:** the wavelength and measurement units may be different from the display at right.

#### STEP 3 - Set the ZOOM 2 to 'dBm'

Press **UNITS** **ZERO** on the ZOOM 2 until the measurement units read 'dBm' as shown at right. You may need to press the button several times.



#### STEP 4 - Set ZOOM 2 to 1310nm

Press **2** **AUTO** on the ZOOM 2 until the wavelength display shows '1310nm' as shown at right. You may need to press the button several times.



#### STEP 5 - Power ON the Laser OWL

Press **ON** 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 ZOOM 2 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 ZOOM 2 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 ZOOM 2 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

## Required Accessories

- (2-3) one-meter patch cables – ensure proper connector type and fiber type
- (1-2) fiber optic mandrel – used for setting references with multimode cables only; see table below for mandrel sizes

-  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.
-  if you are testing at both 850nm and 1300nm, each light source wavelength will require its own mandrel-wrapped patch cable.

	50/125 $\mu$ m	62.5/125 $\mu$ m
Diameter	0.9 in.	0.7 in.
Wraps	5	5

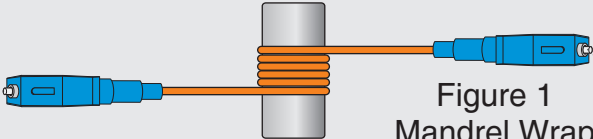
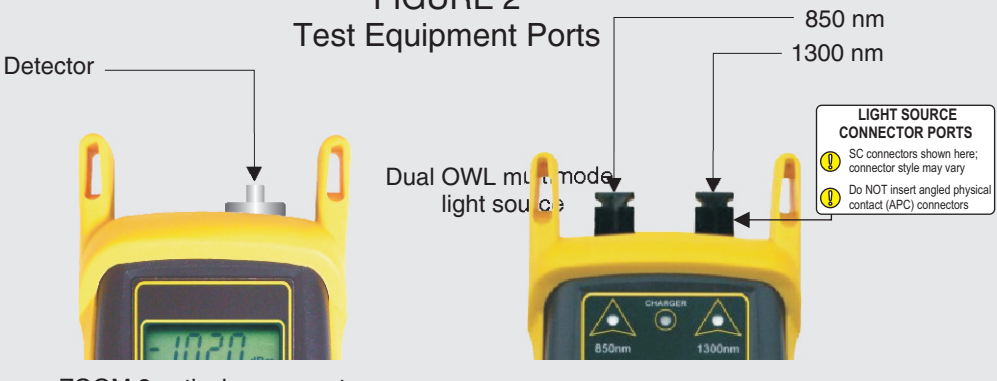


Figure 1  
Mandrel Wrap

## Equipment Ports

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

FIGURE 2  
Test Equipment Ports





Detector

Dual OWL multimode light source

850 nm

1300 nm

ZOOM 2 optical power meter

**LIGHT SOURCE CONNECTOR PORTS**  
 SC connectors shown here; connector style may vary  
 Do NOT insert angled physical contact (APC) connectors

# QUICK REFERENCE GUIDES

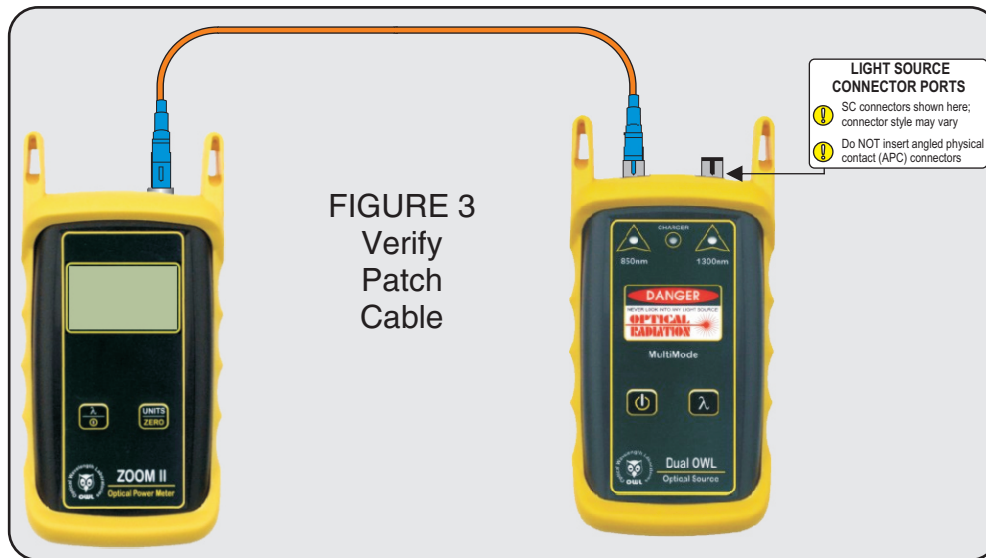
Optical Power Meter: **ZOOM 2**




Fiber Optic Light Source: **DUAL OWL Series Multimode Sources**

PAGE 2 OF 5

## Verify Proper Operation of the Equipment

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



- 2 Press  to power on the Dual OWL multimode light source. The 850nm port powers on first by default.
- 3 Press  to power on the ZOOM 2 optical power meter.
- 4 Press  several times on the ZOOM 2 until the wavelength is set to 850nm.
- 5 Compare the reading on the ZOOM 2 to Table 1 for acceptable power levels for non-mandrel wrapped reference cables. The patch cable should be replaced if it is below the acceptable power level.

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

TABLE 1

- 6 Once proper operation has been verified, remove the first patch cable from both units and set it aside.
- 7 Connect the power meter and light source together with the second patch cable as shown in Figure 3.
- 8 Compare the reading on the ZOOM 2 to Table 1 for acceptable power levels. The patch cable should be replaced if it is below the acceptable power level.

# QUICK REFERENCE GUIDES

Optical Power Meter: **ZOOM 2**

Fiber Optic Light Source: **DUAL OWL Series Multimode Sources**

PAGE 3 OF 5

## Verify Proper Operation of the Equipment, cont.

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



- 10 Connect the power meter and light source together with the mandrel-wrapped patch cable as shown in Figure 4 below.
- 11 Compare the reading on the ZOOM 2 to Table 1 for acceptable power levels. The patch cable should be replaced if it is below the acceptable power level.
- 12 Once proper operation has been verified, continue on to the next step.

## Set Reference

✓ **Setting a reference is commonly referred to as “zeroing”.**

- 13 With the power meter and light source still connected as shown in Figure 4, press and hold **UNITS ZERO** button on the ZOOM 2 to set the reference for 850nm.

The ZOOM 2 display should change to show readings in 'dB', and the power reading should be approximately 0.00 dB. This means that the meter and light source have been successfully “zeroed” at 850nm.

ⓘ **If testing at 1300nm is also required, connect a mandrel-wrapped patch cable to the 1300nm port, then perform 14 through 16. Otherwise, skip to 17.**

# QUICK REFERENCE GUIDES

Optical Power Meter: **ZOOM 2**

Fiber Optic Light Source: **DUAL OWL Series Multimode Sources**

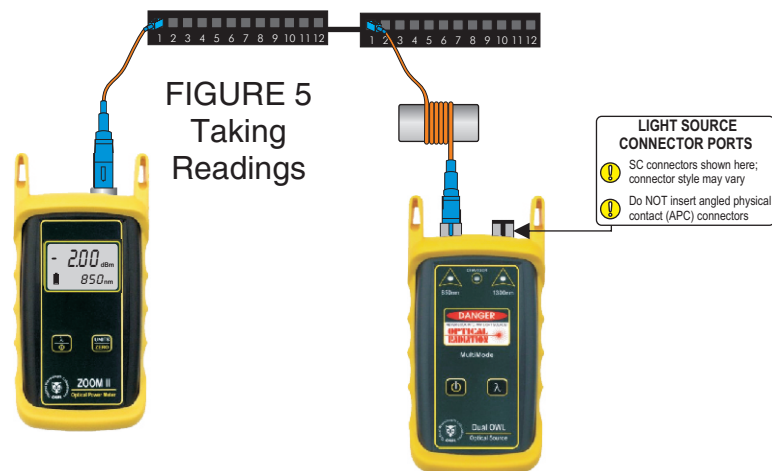
PAGE 4 OF 5

## Set Reference, cont.

- 14 Connect the 1300nm mandrel-wrapped patch cable to the detector port on the ZOOM 2.
- 15 Press  $\frac{\lambda}{0}$  several times until the ZOOM 2 is set to 1300nm.
- 16 Press and hold  $\frac{\text{UNITS}}{\text{ZERO}}$  on the ZOOM 2 to set the reference for 1300nm. The ZOOM 2 display should show a power reading of approximately 0.00 dB. This means that the meter and light source have been successfully “zeroed” at 1300nm.

## Take Readings

- 17 Remove the patch cable from the detector port on the ZOOM 2, and bring both units to the opposite ends of the link under test.
- 18 Connect the ZOOM 2 and Dual OWL to the link under test as shown in Figure 5 below.



- 19 Press  $\frac{\lambda}{0}$  several times until the ZOOM 2 is set to 850nm.
- 20 Record the reading for the current fiber under test.
- 21 Disconnect the patch cables from both ends of the patch panel and move to the next port on the patch panel.
- 22 Repeat 20 and 21 for each fiber in the cable under test until all fibers have been tested at 850nm.
- 23 For testing 1300nm, again connect to the first fiber under test, except this time use the mandrel-wrapped patch cable connected to the 1300nm port.

# QUICK REFERENCE GUIDES


**Optical Power Meter: ZOOM 2**

**Fiber Optic Light Source: DUAL OWL Series Multimode Sources**

**PAGE 5 OF 5**

---

**Take Readings, cont.**

- 24 Press  several times until the ZOOM 2 is set to 1300nm.
- 25 Record the reading for the current fiber under test.
- 26 Disconnect the patch cables from both ends of the patch panel and move to the next port on the patch panel.
- 27 Repeat 25 and 26 for each fiber in the cable under test until all fibers have been tested at 1300nm.

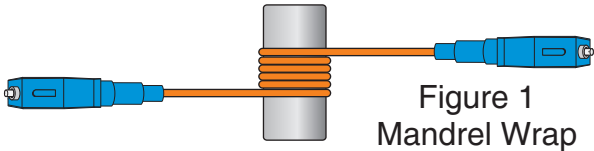
(end of procedure)


# QUICK REFERENCE GUIDES

## Required Accessories

- (2) one-meter patch cables – ensure proper connector type and fiber type
- (1) fiber optic mandrel – used for setting references with multimode cables only; see table below for mandrel sizes

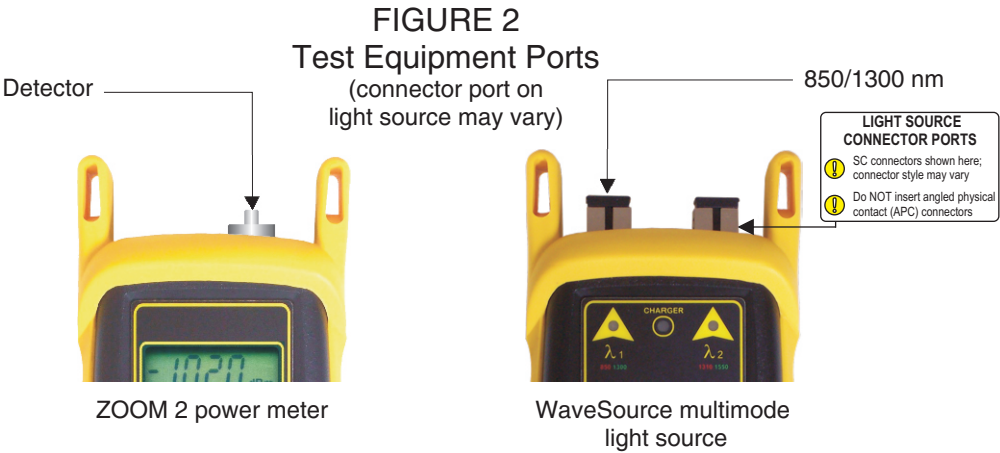
	50/125 $\mu\text{m}$	62.5/125 $\mu\text{m}$
Diameter	0.9 in.	0.7 in.
Wraps	5	5



 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

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



# QUICK REFERENCE GUIDES

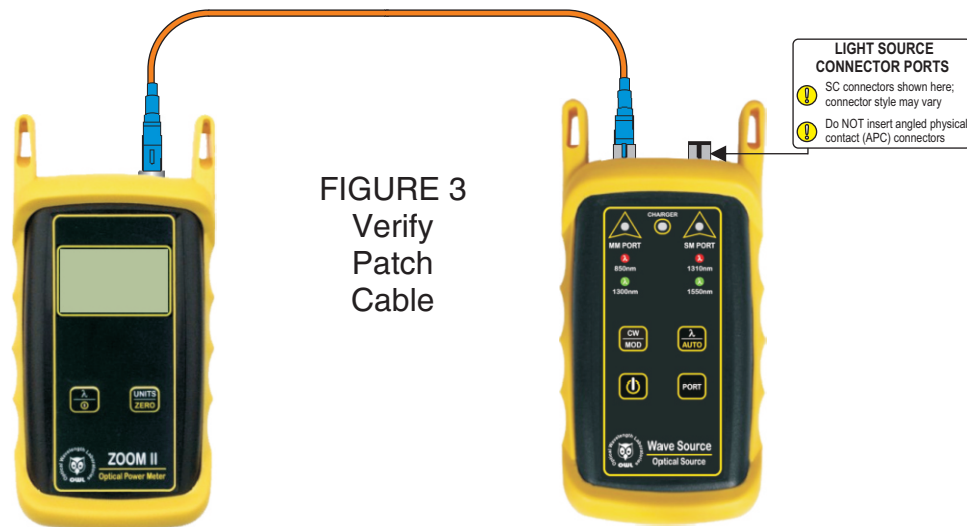
Optical Power Meter: **ZOOM 2**




Fiber Optic Light Source: **WaveSource Series Multimode Source**

PAGE 2 of 4

## Verify Proper Operation of the Equipment

- 1 Connect the power meter and light source together with the straight patch cable (i.e. no mandrel wrap) as shown in Figure 3.



- 2 Press  to power on the WaveSource multimode light source. By default, the light source will be set to 850nm (RED indicator LED on the left-hand side).
- 3 Press  to power on the ZOOM 2 optical power meter.
- 4 If necessary, press  several times on the ZOOM 2 until the wavelength is set to 850nm.
- 5 Compare the reading on the ZOOM 2 to Table 1 for acceptable power levels. The patch cable should be replaced if it is lower than the acceptable power level (i.e. more negative).

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

TABLE 1

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



# QUICK REFERENCE GUIDES

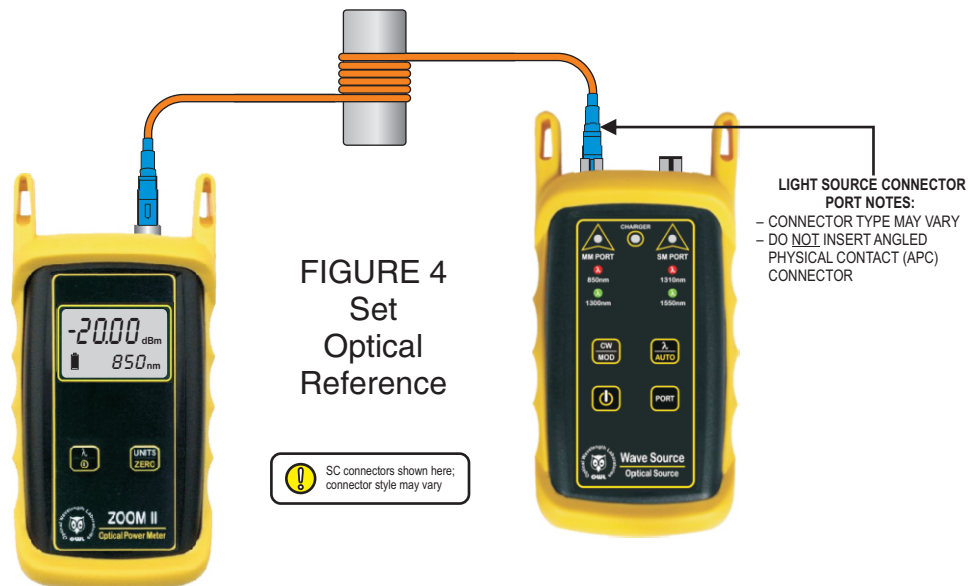
Optical Power Meter: **ZOOM 2**

Fiber Optic Light Source: **WaveSource Series Multimode Source**

PAGE 3 of 4

## Verify Proper Operation of the Equipment, cont.

- 7 Connect the power meter and light source together with the mandrel-wrapped patch cable as shown in Figure 4 below.



- 8 Compare the reading on the ZOOM 2 to Table 1 for acceptable power levels. The patch cable should be replaced if it is lower than the acceptable power level (i.e. more negative).
- 9 Once proper operation has been verified, continue on to the next step.

## Set Reference

✓ **Setting a reference is commonly referred to as “zeroing”.**

- 10 With the ZOOM 2 and WaveSource still connected as shown in Figure 4, press and hold **UNITS ZERO** on the ZOOM 2 to set the reference for 850nm.
- The ZOOM 2 display should change to show readings in 'dB', and the power reading should be approximately 0.00 dB. This means that the meter and light source have been successfully “zeroed” at 850nm.
- 11 Press **λ 0** on the ZOOM 2 to set the power meter wavelength to 1300nm.
- 12 Press **λ AUTO** on the WaveSource to set the light source wavelength to 1300nm. The indicator LED on the left-hand side should turn **GREEN**.
- 13 Press and hold **UNITS ZERO** on the ZOOM 2 to set the reference for 1300nm. The power reading should be approximately 0.00 dB.

# QUICK REFERENCE GUIDES

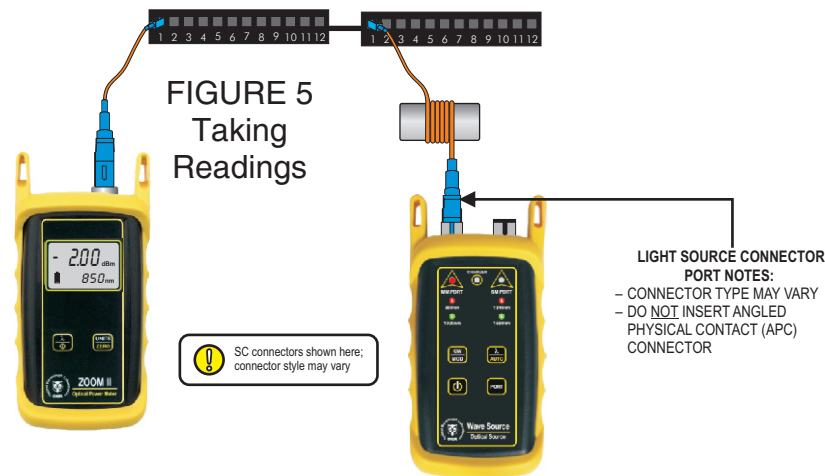
Optical Power Meter: **ZOOM 2**





Fiber Optic Light Source: **WaveSource Series Multimode Source**

PAGE 4 of 4

## TAKE READINGS

- 14 Remove the patch cable from the detector port on the ZOOM 2, and bring both units to the opposite ends of the link under test, leaving the mandrel-wrapped cable attached to the WaveSource.
- 15 Connect the ZOOM 2 and WaveSource to the link under test as shown in Figure 5.



- 16 Press  on the ZOOM 2 several times until the wavelength is set to 850nm.
- 17 Press  on the WaveSource once to set the wavelength to 850nm (the **RED** LED will now be lit).
- 18 Record the 850nm 'dB' loss value for the current fiber under test.
- 19 Disconnect both patch cables from the patch panels and move to the next port on the patch panels.
- 20 Repeat steps 17 and 18 for each fiber in the cable under test until all fibers have been tested at 850nm.
- 21 Press  on the ZOOM 2 once to set the wavelength to 1300nm.
- 22 Press  on the WaveSource once to set the wavelength to 1300nm (the **GREEN** LED will now be lit).
- 23 Record the 1300nm 'dB' loss value for the current fiber under test.
- 24 Disconnect both patch cables from the patch panels and move to the next port on the patch panels.
- 25 Repeat steps 23 and 24 for each fiber in the cable under test until all fibers have been tested at 1300nm.

# QUICK REFERENCE GUIDES

Optical Power Meter: **ZOOM 2**

Fiber Optic Light Source: **LASER OWL Series Singlemode Sources**

PAGE 1 OF 3

## Required Accessories

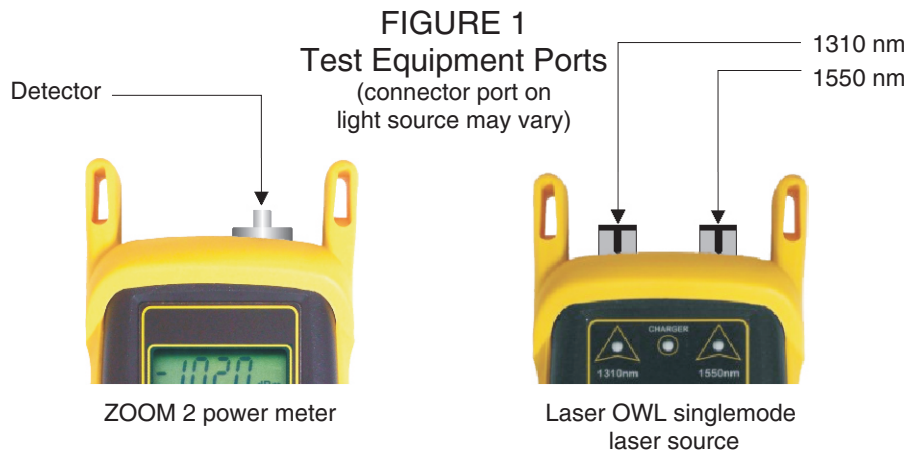
(2-3) one-meter patch cables – ensure proper connector type and fiber type



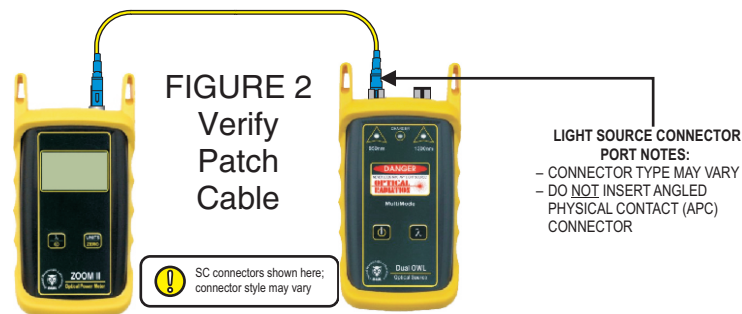
if you are testing at both 1310nm and 1550nm, each light source wavelength will require its own patch cable.



## Equipment Ports

Figure 1 shows the ports 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 first patch cable as shown in Figure 2.
- 2 Press  to power on the Laser OWL singlemode laser source. The 1310nm port powers on first by default.
- 3 Press  to power on the ZOOM 2 optical power meter.


# QUICK REFERENCE GUIDES

**Optical Power Meter: ZOOM 2**

**Fiber Optic Light Source: LASER OWL Series Singlemode Sources**

**PAGE 2 OF 3**


## Verify Proper Operation of the Equipment, cont.

- 4 Press  several times on the ZOOM 2 until the wavelength is set to 1310nm.
- 5 The ZOOM 2 should show approximately -10.00 dBm. If the reading is below -12.00 dBm, the patch cable should be replaced.
- 6 Once proper operation has been verified, remove the first patch cable from both units and set it aside.
- 7 Connect the power meter and light source together with the second patch cable as shown in Figure 2.
- 8 The ZOOM 2 should show approximately -10.00 dBm. If the reading is below -12.00 dBm, the patch cable should be replaced.
- 9 Once proper operation has been verified, remove the second patch cable from both units and set it aside.
- 10 Connect the power meter and light source together with the mandrel-wrapped patch cable as shown in Figure 2.
- 11 The ZOOM 2 should show approximately -10.00 dBm. If the reading is below -12.00 dBm, the patch cable should be replaced.
- 12 Once proper operation has been verified, continue on to the next step.

## Set Reference



**Setting a reference is commonly referred to as “zeroing”.**



- 13 With the power meter and light source still connected as shown in Figure 2, press and hold  button on the ZOOM 2 to set the reference for 1310nm.

The ZOOM 2 display should change to show readings in 'dB', and the power reading should be approximately 0.00 dB. This means that the meter and light source have been successfully “zeroed” at 1310nm.



**If testing at 1550nm is also required, connect a singlemode patch cable to the 1550nm port, then perform**

**14 through 16. Otherwise, skip to 17.**

- 14 Connect the 1550nm singlemode patch cable to the detector port on the ZOOM 2.
- 15 Press  several times until the ZOOM 2 is set to 1550nm.
- 16 Press and hold  on the ZOOM 2 to set the reference for 1550nm. The ZOOM 2 display should show a power reading of approximately 0.00 dB. This means that the meter and light source have been successfully “zeroed” at 1550nm.

# QUICK REFERENCE GUIDES

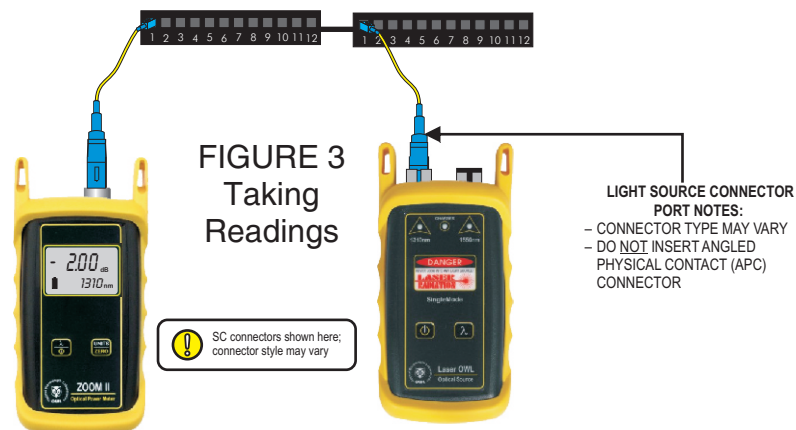
Optical Power Meter: **ZOOM 2**

Fiber Optic Light Source: **LASER OWL Series Singlemode Sources**

PAGE 3 OF 3

## Take Readings

- 17 Remove the patch cable from the detector port on the ZOOM 2, and bring both units to the opposite ends of the link under test.
- 18 Connect the ZOOM 2 and Laser OWL to the link under test as shown in Figure 3 below.



- 19 Press  $\frac{\lambda}{0}$  several times until the ZOOM 2 is set to 1310nm.
- 20 Record the reading for the current fiber under test.
- 21 Disconnect the patch cables from both ends of the patch panel and move to the next port on the patch panel.
- 22 Repeat 20 and 21 for each fiber in the cable under test until all fibers have been tested at 1310nm.
- 23 For testing 1550nm, again connect to the first fiber under test, except this time use the patch cable connected to the 1550nm port.
- 24 Press  $\frac{\lambda}{0}$  several times until the ZOOM 2 is set to 1550nm.
- 25 Record the reading for the current fiber under test.
- 26 Disconnect the patch cables from both ends of the patch panel and move to the next port on the patch panel.
- 27 Repeat 25 and 26 for each fiber in the cable under test until all fibers have been tested at 1550nm.

(end of procedure)

# QUICK REFERENCE GUIDES

**Optical Power Meter: ZOOM 2**

**Fiber Optic Light Source: WaveSource Series Singlemode Source**

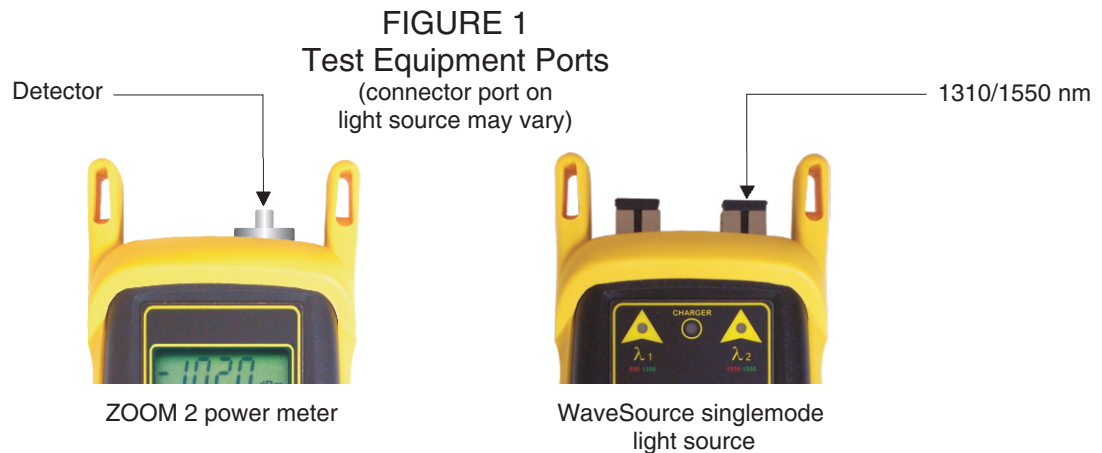
**PAGE 1 of 3**

## REQUIRED ACCESSORIES




- (2) singlemode patch cables

## EQUIPMENT PORTS

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



## VERIFY PROPER OPERATION OF THE EQUIPMENT

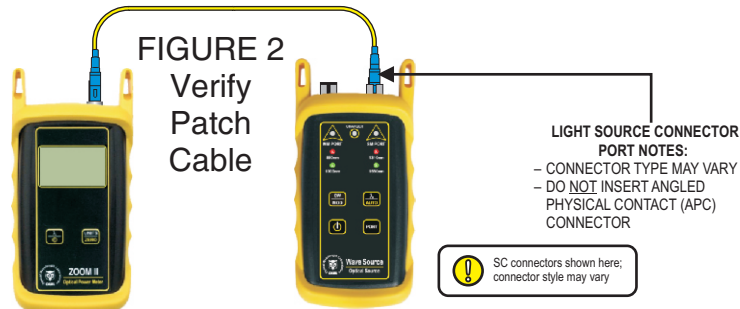
- 1 Connect the power meter and light source together with the first patch cable as shown in Figure 2.
- 2 Press  to power on the WaveSource singlemode light source. By default, the light source powers on to the multimode port.
- 3 Press  to switch the WaveSource to the SM PORT. The right-hand indicator LED should be **RED**.
- 4 Power on the ZOOM 2.
- 5 Press  on the ZOOM 2 several times until the wavelength is set to 1310nm.
- 6 The ZOOM 2 should show 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 power meter and light source together with the second patch cable as shown in Figure 2.

# QUICK REFERENCE GUIDES

Optical Power Meter: **ZOOM 2**





Fiber Optic Light Source: **WaveSource Series Singlemode Source**

PAGE 2 of 3





- 9 The ZOOM 2 should show 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, continue on to the next step.

## SET REFERENCE

- 11 With the ZOOM 2 and WaveSource still set to 1310nm, press and hold  button on the ZOOM 2 to set it the 1310nm reference.  
The ZOOM 2 display now also should change to show readings in 'dB', and will be approximately 0.00 dB.
- 12 Press  on the ZOOM 2 twice to set it to 1550nm.
- 13 Press  on the WaveSource once to set it to 1550nm.
- 14 Press and hold  on the ZOOM 2 to set the reference for 1550nm. Again, the ZOOM 2 display shows readings in 'dB', and will be approximately 0.00 dB.

## TAKE READINGS

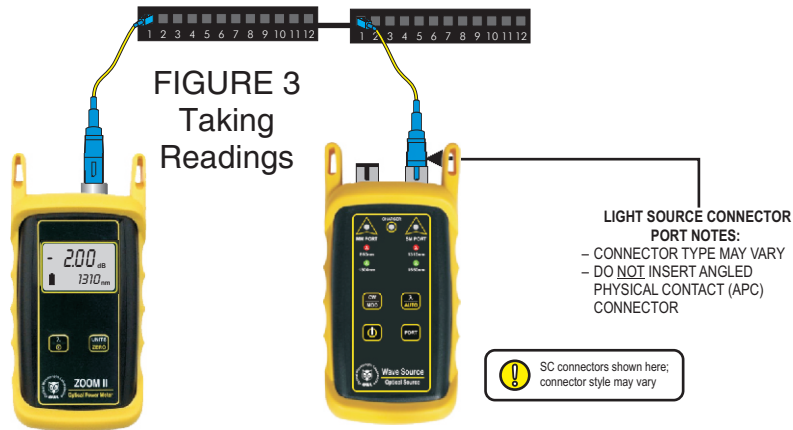
- 15 Remove the patch cable from the detector port on the ZOOM 2, and bring both units to the opposite ends of the link under test.
- 16 Connect the ZOOM 2 and WaveSource to the link under test as shown in Figure 3 below.
- 17 Press  on the ZOOM 2 several times until the wavelength is set to 1310nm.
- 18 Press  on the WaveSource once to set the wavelength is to 1310nm (the red LED will now be lit).
- 19 Record the 1310nm 'dB' loss value for the current fiber under test.

# QUICK REFERENCE GUIDES

Optical Power Meter: **ZOOM 2**

Fiber Optic Light Source: **WaveSource Series Singlemode Source**

PAGE 3 of 3



- 20 Disconnect both patch cables from the patch panels and move to the next port on the patch panels.
- 21 Repeat 19 and 20 for each fiber in the cable under test until all fibers have been tested at 1310nm.
- 22 Press  $\frac{\lambda}{0}$  on the ZOOM 2 two times until the wavelength is set to 1550nm.
- 23 Press  $\frac{\lambda}{\text{AUTO}}$  on the WaveSource once to set the wavelength is to 1550nm (the green LED will now be lit).
- 24 Record the 1550nm 'dB' loss value for the current fiber under test.
- 25 Disconnect both patch cables from the patch panels and move to the next port on the patch panels.
- 26 Repeat 24 and 25 for each fiber in the cable under test until all fibers have been tested at 1550nm.



# OPERATION/MAINTENANCE

## OPTIONAL VFL (visual fault locator) PORT

As an option, a Visual Fault Locator (VFL) can be installed into the ZOOM 2 optical power meter in place of the charger 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

There are three modes for the optional VFL port, which toggle in the following order: off, continuous, and flash. The VFL will be off when the power meter is first powered on.

To toggle the VFL mode:

- 1 Press  several times until 'VFL' appears in the lower right-hand corner of the display. 'VFL' will appear after '1550nm'.
- 2 While 'VFL' is shown on the wavelength display, do not press any buttons for approximately 3 seconds. This will toggle the VFL to the next mode, and then automatically return to the '850nm' wavelength.



To maintain the current VFL mode while scrolling through the list of wavelengths, press the  button again before 3 seconds have elapsed.

The VFL port can be turned off two different ways:


- power off the meter completely, or
- toggle through the VFL modes using the above steps until the VFL turns off.

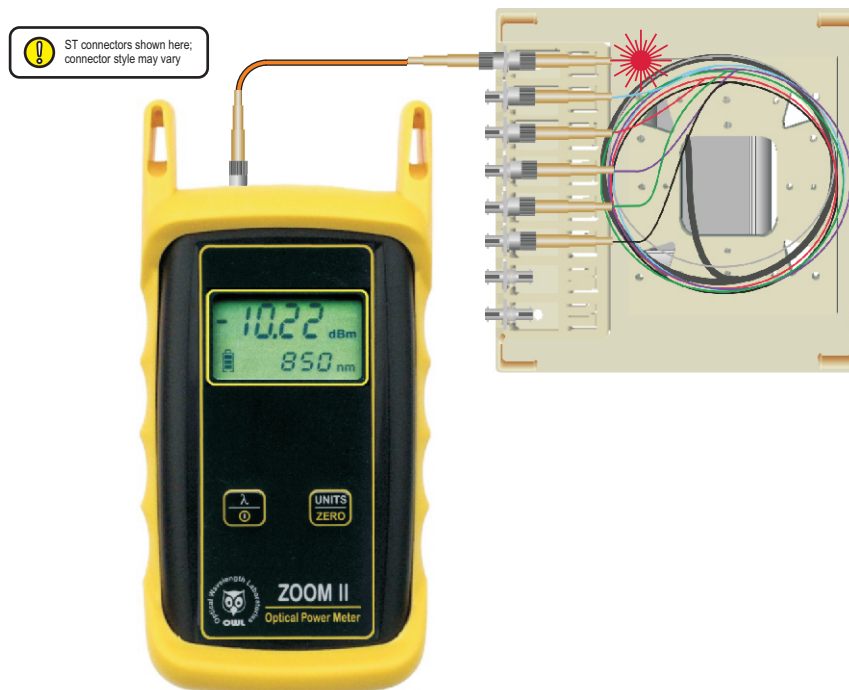
# OPERATION/MAINTENANCE

## VISUAL FAULT LOCATION

The optional VFL port in the ZOOM 2 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 18 for instructions on operating the VFL port.
- 3 Inspect the splice tray for anomalies. Optical fiber jackets are differently colored, making it 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 ZOOM 2 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 18 for instructions on operating the VFL port.

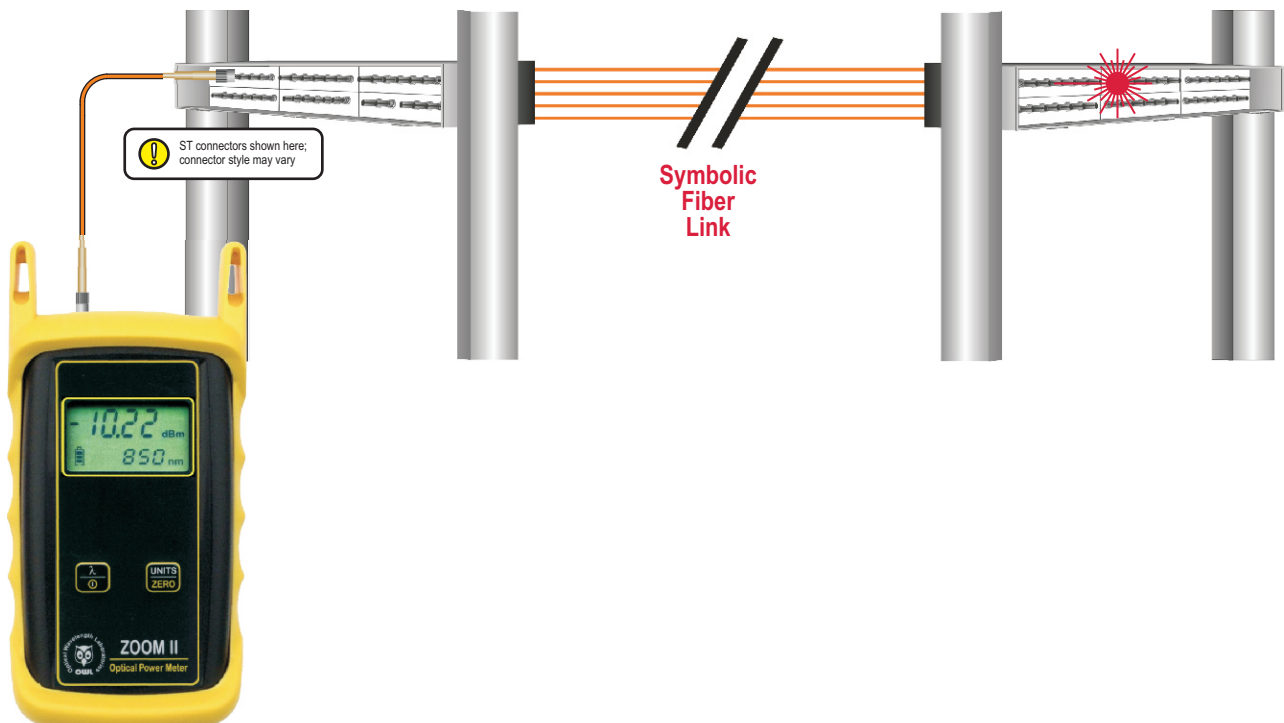
- 3 Inspect the far-end connectors for the red light exiting the connector.



**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.**



# OPERATION/MAINTENANCE

## BOOT REMOVAL/REPLACING THE BATTERY

### Boot Removal

To remove the boot from the ZOOM 2 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 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.



**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.**



# OPERATION/MAINTENANCE

## UNIVERSAL PORT

### Universal Port

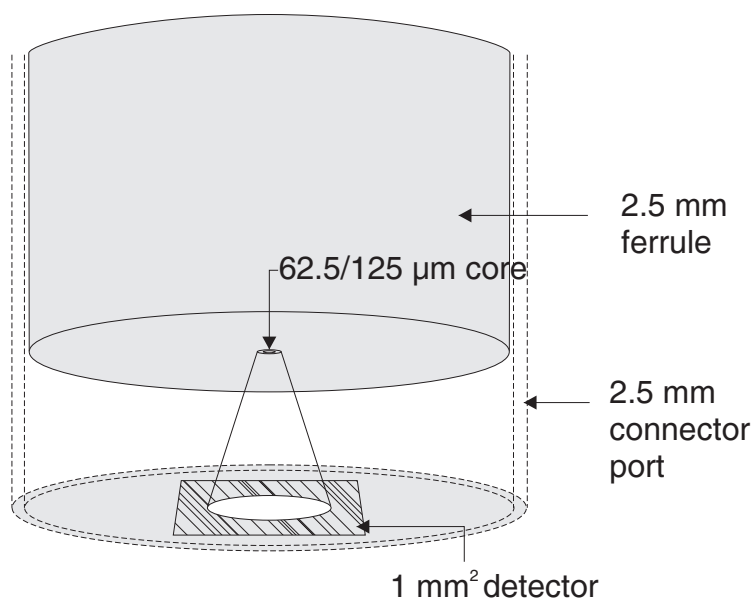
The ZOOM 2 optical power meter contains a universal connector port which allows for coupling to any fiber optic connector that uses a 2.5mm ferrule (e.g. ST, SC, FC, etc.).

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 ZOOM 2 allows the user to remove the 2.5mm adapter and place a 1.25mm adapter (which can be purchased separately as an option) for connection to LC, MU, and other SFF connectors which use the 1.25mm ferrule.

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



### Use of SC Connectors with 2.5mm Universal Port

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

# OPERATION/MAINTENANCE

## CLEANING THE DETECTOR PORT

### Required accessories:

A) Isopropyl Alcohol (91% or better)

B) Round **wooden** toothpick with sharp point

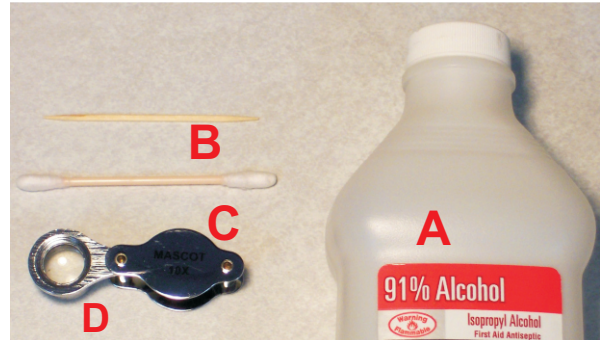


(NOTE: do not use a metal pin or needle since metal will scratch the surface of the detector)

C) Cotton swab

D) Jeweler's loupe (10x magnification recommended)

E) Compressed Air (not shown)

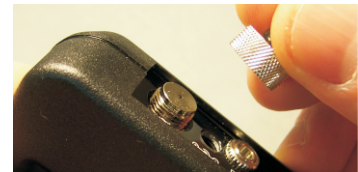


1 Place a small amount of cotton from the swab onto the wooden toothpick as shown at right.



2 Wet the cotton toothpick tip with the isopropyl alcohol.

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



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



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



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

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

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



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

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

# OPERATION/MAINTENANCE

## CLEANING THE OPTIONAL VFL PORT

This cleaning procedure applies to the optional VFL port on the ZOOM 2 optical power meter. For more information about cleaning the DETECTOR port on the ZOOM 2, 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.

### “DRY” CLEAN PROCEDURE

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

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



# OPERATION/MAINTENANCE

## AUTO MODE









AUTO mode is used to perform simultaneous dual-wavelength optical power and loss measurements. Simultaneously measuring two wavelengths simultaneously cuts testing time in half and prevents wavelength mismatch errors between the power meter and light source during reference setting and power/loss measurement.



**NOTE: AUTO mode is only usable with OWL WaveSource light sources:**

**Model numbers: WS-MDxx, WS-MDVxx, WS-SDxx, WS-VSDxx, and WS-MDSDxx**

### SETTING UP AUTO MODE IN THE ZOOM 2 TO PERFORM DUAL-WAVELENGTH MEASUREMENTS

- 1 Connect the ZOOM 2 optical power meter to the appropriate WaveSource light source port – either multimode or singlemode – using a 1-meter patch cable that matches the fiber under test.
- 2 With the ZOOM 2 powered off, hold down , then press . Once the ZOOM 2 is powered on, release . The wavelength display will then begin to alternate between a wavelength and “AUO”.
-  **NOTE: while in AUTO mode, do not press  on the ZOOM 2 as this will disable AUTO mode.**
- 3 Press  to power on the WaveSource.
- 4 If necessary, press  to set the WaveSource to the appropriate light source port, depending upon the fiber type of the fiber under test.
- 5 On the WaveSource, press and hold  until the appropriate indicator LED begins flashing, then immediately release the button.

Once the WaveSource has been successfully set to AUTO mode, the appropriate indicator LED will begin alternating between green and red, and solid and flashing. Also, the wavelength display on the ZOOM 2 will begin alternating between the two appropriate wavelengths: i.e. 850/1300nm for multimode or 1310/1550nm for singlemode.

Optical loss measurements can now be taken as normal by taking the ZOOM 2 and WaveSource to opposite ends of the fiber under test.



**NOTE: do not disconnect the patch cable from the WaveSource port.**



**NOTE: during the time that the ZOOM 2 and WaveSource are not connected, such as connecting to the next fiber under test, the ZOOM 2 wavelength display will alternate between a wavelength and “AUO”. This is normal. When the ZOOM 2 and WaveSource are re-connected to the next fiber under test, they will resume auto-switching of wavelengths.**



# APPENDICES

## SPECIFICATIONS

Detector Type:	1mm InGaAs
Calibrated Wavelengths:	850, 1300, 1310, 1490, 1550nm
Measurement Range:	+5 to -60 dBm
Measurement Units:	dBm; uW (absolute) dB (relative)
Accuracy:	$\pm 0.15$ dB <sup>1</sup>
Linearity:	$\pm 0.20$ dB <sup>1</sup>
Resolution:	0.01 dB
Battery Life:	up to 250 hours (9v)
Connector Type:	2.5mm Universal
Operating Temperature:	-10 to 55° C
Storage Temperature:	-30 to 70° C
Size:	2.75"W x 4.94"H x 1.28"D
Weight:	116g
Low Battery Indicator:	Yes
NIST Traceable:	Yes
	1) 0 to -45 dBm

## MAINTENANCE AND CALIBRATION INFORMATION

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

*Battery Replacement.* The ZOOM 2 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 ZOOM 2 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 ZOOM 2 comes standard with a two-year factory warranty, which covers manufacturer defect and workmanship only.

## CONTACT INFORMATION

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

# APPENDICES

## OPTIONAL UPGRADE INFORMATION

### Visual Fault Locator Port Upgrade

The ZOOM 2 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 charger port to be removed from the unit.

## 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<sup>-9</sup> 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.