Fiber OWL 4 ORL
Optical Return Loss Meter
Operations Guide
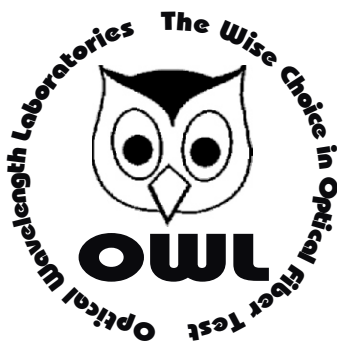
Optical Wavelength Laboratories

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Why Use An Optical Return Loss Meter?

Many high bandwidth systems use high-powered laser transmitters to couple optical energy into singlemode fibers, including telco, CATV, and PONs. Laser stability is critical in these systems, and great care must be taken to ensure a high level of Quality of Service (QoS).

One of the major causes of laser instability is light that is reflected back into the transmitter from the fiber, which is called back reflection. The goal of the system is to minimize the amount of back reflection, which is the same as maximizing Optical Return Loss (ORL).

Optical return loss is defined as the ratio of the total power reflected from a component or link as compared to the incident power being transmitted into the fiber under test.

The Fiber OWL 4 ORL meter is designed to measure the amount of optical return loss and compare it to a user-defined ORL reference level to determine if the fiber has a sufficient amount of ORL to ensure quality transmission.

ORL meters have several features that make them preferable over OTDRs for ORL measurement:

Ease of Use. ORL meters are designed to inject a known level of continuous optical power into the fiber under test and measure the total amount of reflection received back from the component or link, resulting in an easy-to-read numeric value.

Better Accuracy. ORL meters generally have an accuracy of ±0.5 dB, while OTDRs are accurate to ±2.0 dB or worse.

Faster Test. ORL meters give immediate readings, where OTDRs could take up to 30 seconds to complete a test.

Less Expensive. ORL meters are based upon optical power meter technology, which is inherently less expensive than an OTDR.

Description

The Fiber OWL 4 ORL is a high-accuracy, high-resolution, microprocessor-controlled optical return loss meter. It has a wide dynamic range making it ideal for testing ORL and optical loss in singlemode fiber systems.

It has an attractive handheld case made from high impact plastic, a large backlit graphic LCD, and an 18-key keypad for easy data entry. The connector port is designed to accept angled physical contact (APC) connectors. It will operate for over 200 hours on a standard 9-volt battery and has a built-in auto shutdown feature.

The Fiber OWL 4 ORL can easily set ORL reference levels, and can 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 meter will print formatted reports of selected stored data directly using the built-in serial port, or all of the stored data can be downloaded to a computer spreadsheet or our free OWL Reporter software to produce professional-looking formatted certification reports.

Checking Your Fiber OWL 4 ORL Firmware Version

This manual is written for Fiber OWL firmware version 4.xx. It is not valid for previously released Fiber OWL versions. Follow the instructions below to verify your firmware version.

1 - Press ⏻ to start up the meter.
2 - After the owl flies across the initial boot-up screen, your display should look like the diagram below. This screen remains viewable for approximately 2 seconds.

If the firmware version is not V4.xx, check our website at OWL-INC.COM for the correct version of the manual.

COMPANY NAME	. . . .
COMPANY PHONE	. . . .
SERIAL NUMBER	SN:FO4xxxx
FIRMWARE VERSION	V4.xx

Applications

Optical Return Loss Measurements. Some singlemode fiber systems, including telco, CATV, and PONs, require a specific amount of optical return loss in order for the laser transmitter to remain stable. The Fiber OWL 4 ORL quickly and easily compares ORL levels to a pre-set reference level to determine pass or fail.

Attenuation Measurements. After a fiber link has been installed, optical attenuation should be measured to determine the quality of the installation. When compared to a pre-calculated link budget, a simple calculation can be used to determine if the link will perform as installed. See the appendix at the end of this manual for a link budget calculation worksheet. Instructions on performing this type of test are outside the scope of this manual, but can be found in the Fiber OWL 4 optical power meter operations guide.

Fiber Network Certification Testing. The Link Wizard in the Fiber OWL 4 ORL uses attenuation parameters from popular cabling standards to certify fiber links. Stored data can be referenced to the standards to determine if the link passes or fails. 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. Instructions on performing this type of test are outside the scope of this manual, but can be found in the Fiber OWL 4 optical power meter operations guide.

Fiber Continuity Testing. Continuity can be measured by placing a calibrated light source on one end of the fiber and the Fiber OWL 4 ORL on the other end. A power reading on the liquid-crystal display (LCD) shows the presence of optical power. Instructions on performing this type of test are outside the scope of this manual, but can be found in the Fiber OWL 4 optical power meter operations guide.

Patch Cord Testing. Fiber links that are producing incorrect results may have bad patch cords. The Fiber OWL 4 ORL can be used to test the attenuation of a patch cord to see if it is usable, or should be replaced. Instructions on performing this type of test are outside the scope of this manual, but can be found in the Fiber OWL 4 optical power meter operations guide.

Active Equipment Optical Power Measurements. Active equipment should be monitored periodically to test its power levels and stability. The Fiber OWL 4 ORL can be directly attached to this equipment via a patch cord to check whether the transmitter is stable and within the manufacturer's specified power range. Instructions on performing this type of test are outside the scope of this manual, but can be found in the Fiber OWL 4 optical power meter operations guide.

General Features

Ports

1   BATTERY CHARGER PORT - charges battery when a rechargeable 9-volt battery is in use. **WARNING - Use ONLY rechargeable batteries when charger port is in use. Failure to comply to this warning may damage the unit or cause harm to the user.**

2   COMPUTER PORT - downloads data from the meter to a PC via 9-pin RS-232 serial cable

3   OPTICAL RETURN LOSS PORT - contains optics that allow for optical return loss and optical power measurements, as well as a singlemode laser source.
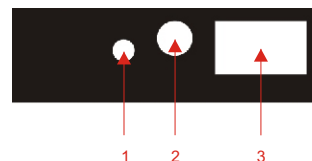
Ports Diagram

Keypad

1   FUNCTION KEYS - activate the options on the Function Options Menu

2   ALPHA-NUMERIC KEYS - enter letters, numbers, and symbols into field prompts

3   MENU KEY - used to enter the menu system

4   DONE KEY - activates menu options

5   LIGHT SOURCE KEY - activates the SOURCE SETTINGS menu

6   POWER KEY - turns the meter ON or OFF, and toggles the backlight ON or OFF.

7   AUTO KEY - toggles the automatic wavelength recognition mode ON and OFF

8   BATTERY INDICATOR LED - indicates when the battery charger is in use
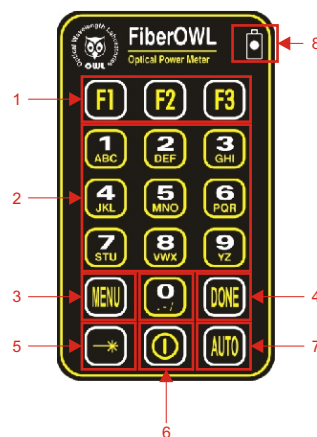
Keypad Diagram

Keyboard Entry Method

Several screens in the Fiber OWL 4 ORL menu system require the user to enter some input, e.g. a fiber length measurement or a descriptive name for a fiber run. This feature allows the Fiber OWL 4 ORL 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. The 🔘 key contains special characters. In this case, they are treated like alpha-numeric fields.

Press the 🔲 key when character input is complete.

Modes of Operation

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

```
OPERATING MODE
   ORL METER
  SIMPLE METER
CERTIFICATION METER
 TECHNICAL SUPPORT
--------------------
NEXT  |SELECT|
```

OPERATING MODE MENU

ORL METER is used for measuring the optical return loss of angled physical contact (APC) connectors. Minimum ORL thresholds can be easily set. ORL METER is covered in more detail in this guide.

SIMPLE METER is used for simple optical power or attenuation measurements. Users may set up temporary reference values for each wavelength for quick loss readings. SIMPLE METER is covered in more detail in the Fiber OWL 4 optical power meter operation guide.

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-looking certification reports. CERTIFICATION METER is covered in more detail in the Fiber OWL 4 optical power meter operation guide.

Users may return to the OPERATING MODE menu from:
1) ORL METER by pressing 🔲 from the MAIN MENU.

OWL's Internet URL and technical support number appears when TECHNICAL SUPPORT is chosen.
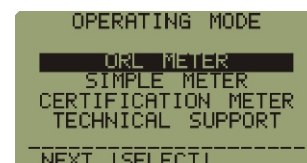
Monitor Mode

Monitor Mode sends absolute power measurements in a comma-delimited format to the serial port. A terminal program is required to view data in real time, and captured data files can be imported into a spreadsheet for charting purposes.

Monitor Mode is useful for live monitoring of a light source or fiber optic transmitter.

To enter Monitor Mode, press 5 MNO while in Immediate Mode. Press DONE to exit Monitor Mode and return to Immediate Mode.
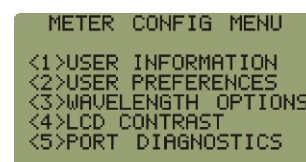
Monitor Mode

METER CONFIGURATION FUNCTIONS

Several features of the Fiber OWL 4 ORL can be configured from the METER CONFIG MENU. In SIMPLE METER, pressing MENU , then <2>METER PROPERTIES will open this menu. In ORL METER and CERTIFICATION METER, press <2>MAIN MENU then select <4>METER PROPERTIES.

METER CONFIG 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

Changing User Information

<1>USER INFORMATION - this option changes the name and telephone number of the owner of the Fiber OWL 4 ORL.

The dots appear in these fields by default when the meter is turned on for the very first time. These dots will be replaced with company information.

Press DONE to return to the METER CONFIG MENU.
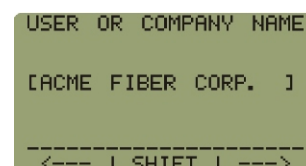
Company Information Screen

Changing User Name

F1   USER NAME - dots will first appear in the USER OR COMPANY NAME field. Press and hold the F1 key to backspace to the beginning of the field, then enter the company name. Use the F2 as a shift key for lower case letters. This field allows for 18-character names.

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

Change Company Name

Changing User Telephone Number

F2 USER TELE- dots will first appear in the PHONE NUMBER field. Press and hold the **F1** key to backspace to the beginning of the field, then enter the company phone number. This field allows for 12-character phone numbers.

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

```
PHONE NUMBER:

[262-473-0643]


_____
 <--- | SHIFT | --->
```

**Change Company
Phone Number**

Setting User Preferences

<2>USER PREFERENCES - sets the power saving features and the displayed temperature of the Fiber OWL 4 ORL.

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

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

F2 STARTUP BACKLIGHT STATE - determines whether the backlight is ON or OFF when the Fiber OWL 4 ORL is powered ON. This feature is ON by default.

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

```
AUTO SHUTDOWN: ON

STARTUP BACKLIGHT
STATE: OFF

TEMPERATURE UNITS: °C
_____
 SDWN | BKLT | TEMP
```

**Set Power
Saving Features**

Changing Wavelength Options

<3>WAVELENGTH OPTIONS - this option is used to set various wavelength-related options in the Fiber OWL 4 ORL, including setting custom wavelengths and tone detection options.

```
WAVELENGTH OPTIONS

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

**WAVELENGTH
OPTIONS MENU**

Entering Custom Wavelength

<1>CUSTOM WAVELENGTH - the Fiber OWL 4 ORL has the capability of setting a custom wavelength. The custom wavelength temporarily replaces 980nm, and requires a singlemode light source tuned to -10dBm for calibration.

Enter the 3- or 4-digit custom wavelength between 700nm and 1700nm in the entry field provided, then press **DONE** to continue. An example of a custom wavelength would be 1490nm.

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

[1490]


_____
 <--- | SHIFT | --->
```

Set Custom Wavelength

Setting Custom Wavelength

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

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

```
1490nm  WILL REPLACE
 980nm

CONNECT 1490nm -10dBm

SOURCE  TO  CALIBRATE
_____
 YES  |       |  NO
```

Verify Custom Wavelength

Resetting Custom Wavelength to Default

<2>DEFAULT WAVELENGTH - this WAVELENGTH OPTION resets a previously set custom wavelength to the default wavelength of 980nm.

Press **F1** to confirm the default wavelength. The meter will then return to the METER CONFIG MENU.

```
      RESTORE  980nm

_____
 YES  |       |  NO
```

Restore Custom Wavelength

Setting Tone Detection Options

<3>TONE DETECTION - this WAVELENGTH OPTION is used to associate four tone detection frequencies with four calibrated wavelengths, as well as set the Fiber OWL 4 ORL into AUTO WAVELENGTH detection mode.

The screen at right shows pre-configured tone options.

Set Toning Options

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.
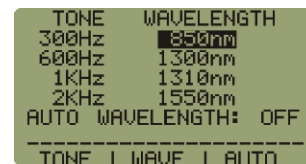
Setting LCD Contrast

<4>LCD CONTRAST - this option allows the user to set the contrast of the liquid crystal display (LCD).

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.

Set LCD Contrast

Port Diagnostics

<5>PORT DIAGNOSTICS - this option performs diagnostic tests on the RS-232 serial port, and also the optical ports, if the optional light source is installed.

PORT DIAGNOSTICS

Test Download Port

<1>DOWNLOAD PORT - this test checks the RS-232 download port for send and receive capability.

1)   Attach the download cable that came with the Fiber OWL 4 ORL to the serial port on the top of the unit.
2)   Short pins 2 and 3 on the download cable with a short piece of wire as shown in the diagram at right.
3)   Press **F1** to confirm the test.

If the test fails, double-check the wire that is shorting pins 2 and 3, and re-test. If the test still fails, contact OWL technical support.

RS-232 Serial Port Test
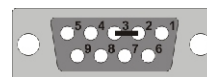
Short Pins 2 & 3

Test Optical Data Port

<2>OPTICAL DATA PORT - this test checks the detector port and light source port (if optional light source is installed)

1)   Attach a patch cord between the detector port and source port.
2)   Press **F1** to confirm the test. Characters will begin to scroll across the display, confirming the success of the test.
3)   Press **F3** to complete the test.

If no characters scroll across the display, check the connections to the ports and/or replace the patch cord. Contact OWL technical support if the test still fails.

Optical Data Port Test

LIGHT SOURCE MENU

The SOURCE SETTINGS menu allows the user to control the options of the light source. The options on this menu will change based upon the configuration of the installed light source.

1)   Press [※] .
2)   [F1] WAVELENGTH - turns the light source OFF or ON. If multiple wavelengths are present, this button will cycle through all of the available wavelengths.
              [F2] TONE - toggles the TONE option for the currently selected wavelength, and shows the toning frequency.
              [F3] AUTO - this option sets the light source into AUTO mode when multiple wavelengths are present; it is deactivated for single-wavelength configurations.
3)   Press [DONE] when finished.

An indicator will appear in Immediate Mode (shown in red box at right).

The lightbulb icon indicates whether the light source is in continuous wave (CW) mode (icon stays on), or in toning mode (icon flashes). The number next to the icon shows the currently selected light source wavelength.
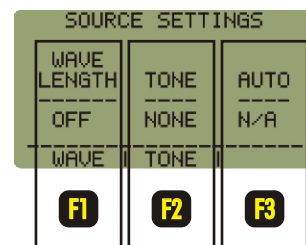
SOURCE SETTINGS MENU
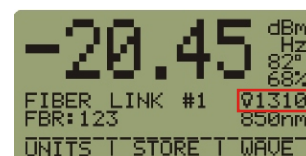
IMMEDIATE MODE Light Source Indicator

Test Fiber Length

NOTE: fiber length testing with the Fiber OWL 4 ORL is currently a BETA feature. Your results may vary. It is best to verify your results with an OTDR.

<4>TEST FIBER LENGTH - The Fiber OWL 4 ORL can be used to measure the approximate length of a singlemode fiber.

1)   When viewing the MAIN MENU, attach the singlemode patch cord   directly to the fiber under test.
2)   Press [4 JKL] TEST FIBER LENGTH to begin the length test.
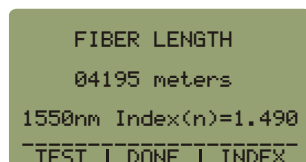
For best results, set the index of refraction in the Fiber OWL 4 ORL to match the index of refraction of the fiber under test (which can typically be found in the fiber manufacturer's data sheet). Press [F3] to change the index of refraction.

Due to the width of the pulse used for length measurement, the minimum length that the Fiber OWL 4 ORL can measure is approximately 20 meters.

If the display shows "CANNOT DETERMINE LENGTH", the fiber link is too long for the meter to measure.

Overview

ORL Meter is a mode within the Fiber OWL 4 ORL that allows the user to quickly and easily display the optical return loss (ORL) of a fiber connector or link.

Many singlemode fiber systems, including telco, CATV, and PONs, require ultra-stable, high-powered laser sources to transmit their signals reliably. Light from a connector endface or optical fibers could reflect back into the transmitter, thus causing instability in the laser. The higher the laser power, the more light that gets reflected back into the transmitter.

Using connectors with high return loss keeps reflected light to a minimum. Many networks specify a minimum ORL level on their connectors to ensure that reflected light does not hinder transmission. The Fiber OWL 4 ORL is designed to measure the amount of back reflection and compare it to a user-defined ORL reference value. Results are displayed in a Pass / Fail format and can be stored for later download into OWL Reporter software.

Required ORL Measurement Accessories

Cleaning and Inspection Accessories. In order to measure ORL accurately, air gaps must be eliminated from all connections. Connector air gaps are known to limit the effectiveness of ORL tests. Even the smallest amount of dirt or dust on a connector will produce enough of an air gap to produce invalid readings.

Thus, it is of vital importance to clean and inspect each connector before connecting it to the Fiber OWL 4 ORL, as well as any other connection in the fiber under test.

Non-reflective termination. In order to measure the correct amount of ORL, it is important to insert a non-reflective termination at the appropriate point in the fiber under test. This termination attenuates the signal so that unwanted light will not be reflected back from the far-end connector.

This termination can be accomplished by gently pressing the far-end connector into an index-matching gel block, or by wrapping the fiber under test around a mandrel. Ten wraps should be enough to attenuate the signal sufficiently at both 1310nm and 1550nm. Great care should be taken to avoid breaking the optical fiber when wrapping it around a mandrel. Optimum mandrel size is between 5mm and 10mm.

ORL Measurement Types

The Fiber OWL 4 ORL can be used to measure the optical return loss of a fiber link or the reflectance of a single connector on a patch cord.

Method A - Optical return loss of a fiber link - using reference jumper to connect to link under test - page 2-2
Method B - Optical return loss of a patch cord connector - page 2-3

Method A - Optical return loss of a fiber link

STEP 1 Press the ⏻ button.

STEP 2 After a few seconds, you will be prompted to choose an operating mode. Highlight ORL METER and press **F2** to select.

```
OPERATING MODE

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

STEP 3 From the STORED LINKS menu, highlight the link you wish to use for ORL measurements, and press **F3** to set additional link parameters.

NOTE: if readings are already stored for the chosen link, a confirmation screen will appear allowing you to continue, abort, or choose a new link.

```
  STORED LINKS

* Fiber Link #1
  Fiber Link #2
  Fiber Link #3
  Fiber Link #4
_____
 NEXT | LOAD | RENAME
```

STEP 4 From the link information screen, press **F1** to change the link name, and press **F2** to change the date.

NOTE: 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.

```
Fiber Link #1
01/01/01



_____
 LINK |
 NAME | DATE |
```
(default values shown)

STEP 5 Once the link name and date have been entered, press **DONE** from the link information screen to return to the STORED LINKS menu.

```
OWL
06-13-08



_____
 LINK |
 NAME | DATE |
```
(after link information has been changed)

STEP 6 Ensure that the chosen link is highlighted, and press **F2** to LOAD the link.

STEP 7 Clean and inspect the APC connector on the reference cable and the Fiber OWL 4 ORL port before inserting the reference cable.

STEP 8 Connect the reference cable to the ORL port, and carefully wrap the cable around a mandrel (approximately 5/16" in diameter) until the minimum power level is achieved (usually around -70 dBm).

```
 CONNECT REFERENCE
CABLE AND ATTENUATE
  TO MINIMUM POWER

ORL ZERO = -71.53 dBm
-71.58 dBm      1310nm
_____
 ZERO | DONE | WAVE
```

STEP 9 Once the power level has reached minimum, press **F1** to set the ORL ZERO point.

STEP 10 If additional wavelengths are required, press **F3** to change to the next wavelength. Repeat steps 8 & 9 to set ZERO for the new wavelength. Once all wavelengths have been set, carefully unwrap the reference cable from the mandrel, and press **F2** or **DONE** to continue.

Method A - Optical return loss of a fiber link, cont.

STEP 11 Press **F1** to enter your system's ORL threshold in dB. Type the minimum required return loss, then press **DONE** to continue. In this example, the ORL reference is 55 dB.

```
Minimum Required
Return Loss (dB):


[ 55.00]
_____
<--- | SHIFT | --->
```

STEP 12 Press **F3** or **DONE** to continue, then press **F1** to begin taking readings.

```
ORL REF = +55.00 dB



SET REF |       | DONE
```

STEP 13 Using the diagram shown below, connect the Fiber OWL 4 ORL meter to the link under test and carefully wrap the far end jumper around a mandrel (an index-matching gel block may also be used). The link is sufficiently attenuated when the ORL reading stops increasing.

Once the readings stop increasing, or if you receive a PASS rating prior to that, the link has sufficient return loss to meet the system's requirements. Remember to check all configured wavelengths.

To store data, see the section called ORL Immediate Mode in this unit.
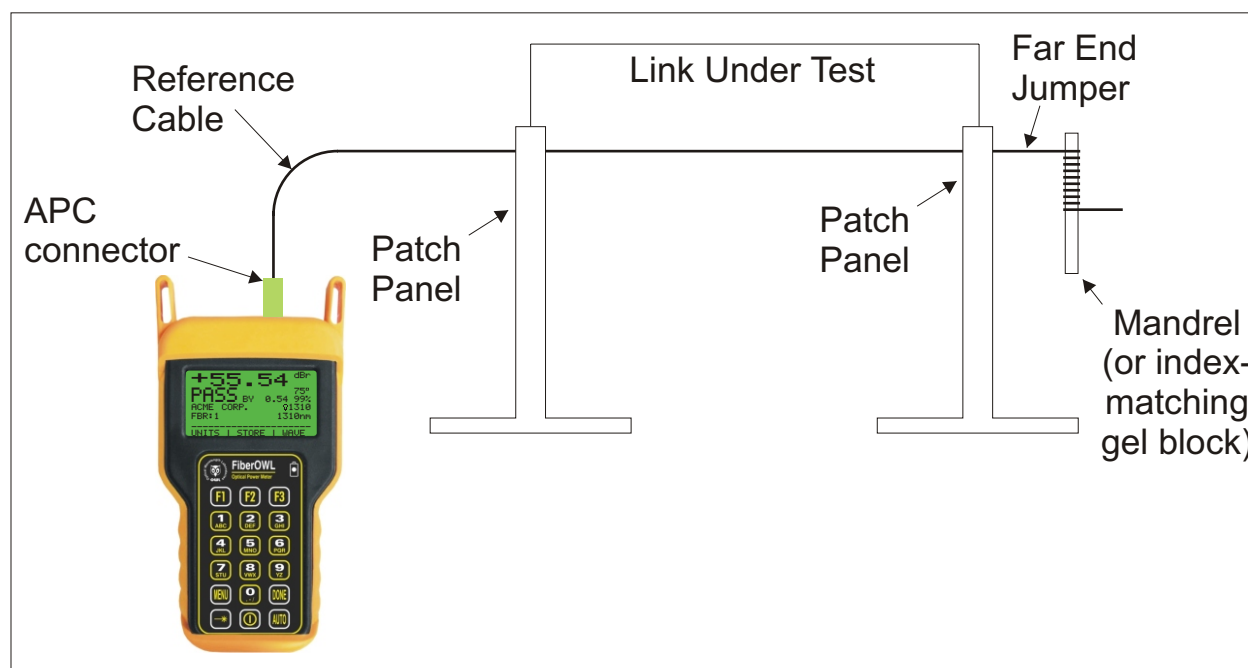
Method B - Optical return loss of a patch cord connector

STEP 1   Press the ⏻ button.

STEP 2   After a few seconds, you will be prompted to choose an operating mode. Highlight ORL METER and press **F2** to select.

```
    OPERATING MODE
 ───────────────────
      ORL METER
     SIMPLE METER
   CERTIFICATION METER
    TECHNICAL SUPPORT
 ───────────────────
  NEXT │SELECT│
```

STEP 3   From the STORED LINKS menu, highlight the link you wish to use for ORL measurements, and press **F3** to set additional link parameters.

NOTE: if readings are already stored for the chosen link, a confirmation screen will appear allowing you to continue, abort, or choose a new link.

```
    STORED LINKS

 * Fiber Link #1
   Fiber Link #2
   Fiber Link #3
   Fiber Link #4
 ───────────────────
  NEXT │ LOAD │ RENAME
```

STEP 4   From the link information screen, press **F1** to change the link name, and press **F2** to change the date.

NOTE: 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.

```
 Fiber Link #1
 01/01/01


 ───────────────────
  LINK │
  NAME │ DATE │
```
(default values shown)

STEP 5   Once the link name and date have been entered, press **DONE** from the link information screen to return to the STORED LINKS menu.

```
 OWL
 06-13-08


 ───────────────────
  LINK │
  NAME │ DATE │
```
(after link information has been changed)

STEP 6   Ensure that the chosen link is highlighted, and press **F2** to LOAD the link.

STEP 7   Clean and inspect the APC connector on the reference cable and the Fiber OWL 4 ORL port before inserting the reference cable.

STEP 8   Connect the reference cable to the ORL port, and carefully wrap the cable around a mandrel (approximately 5/16" in diameter) until the minimum power level is achieved (usually around -70 dBm).

```
  CONNECT REFERENCE
 CABLE AND ATTENUATE
   TO MINIMUM POWER

 ORL ZERO = -71.53 dBm
 -71.58 dBm     1310nm
 ───────────────────
  ZERO │ DONE │ WAVE
```

STEP 9   Once the power level has reached minimum, press **F1** to set the ORL ZERO point.

STEP 10   If additional wavelengths are required, press **F3** to change to the next wavelength. Repeat steps 8 & 9 to set ZERO for the new wavelength. Once all wavelengths have been set, carefully unwrap the reference cable from the mandrel, and press **F2** or **DONE** to continue.

Method B - Optical return loss of a patch cord connector, cont.

STEP 11   Press **F1** to enter your system's ORL threshold in dB. Type the minimum required return loss, then press **DONE** to continue. In this example, the ORL reference is 55 dB.

```
Minimum Required
Return Loss (dB):


[ 55.00]
_____
<--- | SHIFT | --->
```

**STEP 12**   Press **F3** or **DONE** to continue, then press **F1** to begin taking readings.

```
ORL REF = +55.00 dB



SET REF |      | DONE
```

STEP 13   Using the diagram shown below, connect the Fiber OWL 4 ORL meter to the patch cable under test and carefully wrap the cable under test around a mandrel (an index-matching gel block may also be used). There is sufficient attenuation when the ORL reading stops increasing.

Once the readings stop increasing, or if you receive a PASS rating prior to that, the patch cable connector has sufficient return loss to meet the system's requirements. Remember to check all configured wavelengths.

To store data, see the section called ORL Immediate Mode in this unit.
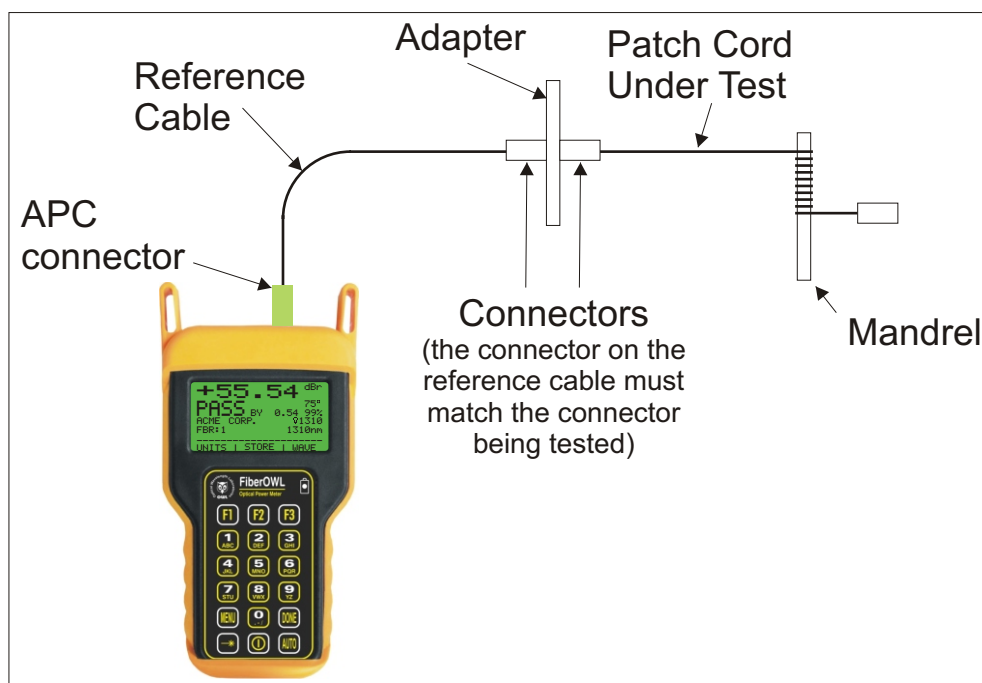
ORL Immediate Mode

The diagram at right shows the display when ORL readings are being taken. The screen items are described in more detail below:
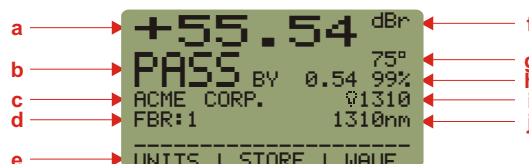
a) *ORL reading* - shows the amount of optical return loss for the current connector. This number is compared to the ORL reference to check for pass or fail.

b) *ORL result* - shows either PASS or FAIL, as well as the pass/fail margin in dB.

c) *Link name* - shows the name of the currently selected link.

d) *Fiber name* - shows the name and number of the fiber that is currently being tested. The number after the colon auto-increments. If this line shows *New Name?*, this means that no data has yet been stored for the currently selected link.

e) *Function Options Menu* - shows the different functions associated with the Function keys.

f) *Power units* - this is set to *dBr*, which stands for decibels of return loss.

g) *Temperature* - shows the current temperature (Fahrenheit or Celcius selectable). By default, this is set to degrees Fahrenheit.

h) *Battery life* - shows the amount of life left in the battery. When the battery is low, this area will begin to flash 'BAT', and the STORE button may become inactive.

i) *Light source wavelength* - the light bulb icon shows that light is being emitted from the optical port, at the wavelength shown.

j) *ORL measurement wavelength* - shows the wavelength that is currently being used to receive optical power. During ORL measurements, this will always match the currently selected light source wavelength.

To store readings:

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

2) From the data point confirmation screen, press **F3** to save the data point, and return to Immediate Mode.

3) Disconnect and move to the next fiber under test.

Repeat this procedure for each fiber under test.

Overview

SIMPLE METER is a mode within the Fiber OWL 4 ORL that allows the user to quickly and easily display the attenuation of a singlemode fiber link. This mode is used when data storage is not necessary, only the most basic functions are required: fiber loss measurement, optical power measurement, patch cord testing, or active equipment monitoring.

Operation

1)　　　　Press the ⓘ button.

2)　　　　After a few seconds, you will be prompted to choose an operating mode. When SIMPLE METER is highlighted, press **F2** to select.

You are now ready to take fiber measurements.

Function Options Menu

Immediate Mode will appear after the unit is booted up into SIMPLE METER. Your display may show 'UNDER' - this will occur if the dustcap is still covering the detector port.

There are three functions on the function options menu:

　F1　　UNITS - toggles the power units between dBm, dB, and microwatts;

　F2　　ZERO - sets an optical reference, or "zero" for the currently selected wavelength; and

　F3　　WAVE - toggles the wavelength between the calibrated wavelengths
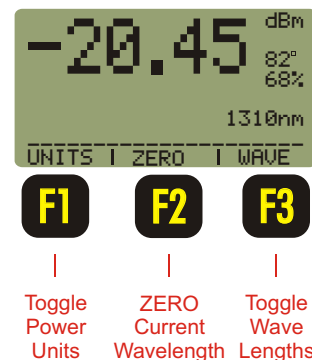
SIMPLE METER Test Procedures

SIMPLE METER can be used for several different types of tests on singlemode fiber. These tests include:

Attenuation Measurement
Fiber Continuity Testing
Patch Cord Testing
Active Equipment Measurement

Each of these tests will be described in more detail in this unit.

SIMPLE METER - Attenuation Test

After a fiber link has been installed, optical attenuation (or loss) should be measured to determine the quality of the installation. When compared to a pre-calculated link budget, a simple comparison of power values can be used to determine if the link will perform as installed. A singlemode light source, two singlemode patch cords, and a fiber optic adapter are also required for this test. Use the following steps to perform an attenuation test in SIMPLE METER:

Calculate Maximum System Attenuation.
1)   Use the link budget calculation worksheet at the end of this manual to calculate the Maximum System Attenuation. This is the first section on the worksheet.
2)   Record the Maximum System Attenuation.

Set the optical reference (or "ZERO").
3)   Power on the Fiber OWL 4 ORL and select SIMPLE METER.
4)   Power on the light source being used for the test, and allow it to warm up according to manufacturer's specifications.
5)   Set the Fiber OWL 4 ORL and light source to matching wavelengths.
6)   Connect one of the reference cables to the Fiber OWL 4 ORL port, and the other cable to the light source port, and connect the cables together using the fiber optic adapter.
7)   Press **F2** or **O** to set the optical reference. The power units will automatically change to dB, and the power reading should be very close to 0.00 dB. The optical reference in dBm will also appear below the power reading.
NOTE: the memory in the Fiber OWL 4 ORL allows for permanent storage of data, including reference and power readings. Data will remain in the meter, even when the unit is powered off, until it is removed by the user.

Measure attenuation (or loss) of the fiber link under test.
8)   Remove the adapter from between the reference cables. Take great care to leave the patch cords connected to the equipment.
9)   Take the Fiber OWL 4 ORL and light source to opposite ends of the fiber link under test.
10)   Connect the Fiber OWL 4 ORL and light source to the corresponding ports on the fiber optic patch panel.
11)   Record the power value that appears in the upper left hand corner of the display without the minus (-) sign. This is the amount of loss across the link.
12)   Remove the patch cords from the patch panel, and move to the next fiber under test.
13)   Repeat steps 10 through 12 for each fiber in the fiber link under test. Repeat this procedure for each wavelength to be tested.

**Optical Loss
Displayed in dB**

Interpreting the results.
Compare the Total System Attenuation from the link budget to the actual recorded loss. If the Maximum System Attenuation exceeds the actual recorded loss, the link passes.

For example, if the Maximum System Attenuation is 2.0 dB, and the actual recorded loss is 1.54 dB (like the display above), then the link is said to pass, and has a margin of 0.46 dB.

UNIT 3 SIMPLE METER

SIMPLE METER - Fiber Continuity Test / Fiber Identification

A fiber continuity test determines if optical power can be passed through the entire fiber link, and can also be used as a simple way to identify fibers. A light source is also required for this test.

Use the following steps to perform an fiber continuity test in SIMPLE METER:

1)   Power on the Fiber OWL 4 ORL and select SIMPLE METER.
2)   Power on the singlemode light source being used for the test.
3)   Set the Fiber OWL 4 ORL and light source to matching wavelengths.
4)   Take the Fiber OWL 4 ORL and light source and connect them to opposite ends of the fiber under test via the appropriate singlemode patch cables.

The Fiber OWL 4 ORL will display either a power level (which means continuity has been achieved), or 'UNDER' when it cannot detect any optical power.   'UNDER' can mean one of the following:
      a)   there is too much attenuation in the link (e.g. broken fiber, excessive length, dirty connections, microbends, etc.);
      b)   the Fiber OWL 4 ORL is not connected to the correct fiber; or
      c)   the light source is powered off.

To use the Fiber OWL 4 ORL as a fiber identifier, follow the steps above and connect the Fiber OWL 4 ORL to each fiber until a power reading appears.

SIMPLE METER - Testing Patch Cords

Poor quality patch cords can cause instability in fiber optic attenuation tests. The Fiber OWL 4 ORL can be used to determine if the singlemode patch cord is of sufficient quality to be used for fiber optic attenuation tests, or whether it should be replaced.   A singlemode light source is also required for this test.

Use the following steps to test a patch cord in SIMPLE METER:

1)   Power on the Fiber OWL 4 ORL and select SIMPLE METER.
2)   Power on the light source being used for the test, and allow it to warm up according to the manufacturer's specifications.
3)   Set the Fiber OWL 4 ORL and light source to matching wavelengths, and ensure that the Fiber OWL 4 is set to dBm mode.
4)   Clean the connectors of the patch cord(s) under test, and connect the Fiber OWL 4 ORL and light source to the opposite ends of the patch cord.   Depending upon your patch cord connectors, it may be necessary to use an additional patch cable and fiber optic adapter.
5)   Consult the manufacturer's specifications for the light source's calibrated power level, and compare this number to the power level displayed on the Fiber OWL 4 ORL.

Quality patch cords will produce very little loss, so the power levels compared in step 5 should be fairly close, usually within 0.3 dB. Consider replacing the patch cord if the loss of the patch cord exceeds 0.3 dB.

SIMPLE METER - Active Equipment Measurement

Active equipment should be monitored periodically to test its power levels and stability. The Fiber OWL 4 ORL can be directly attached to this equipment via a singlemode patch cord to check whether the singlemode transmitter is stable and within the manufacturer's specified power range.

NOTE: maximum transmitter output power exceeding the high end of the Fiber OWL 4 ORL measurement range could damage the photodector in the Fiber OWL 4 ORL. If this is the case, a fiber optic attenuator will be necessary to attenuate the signal sufficiently. Consult the manufacturer's specification sheet for more information.

Use the following steps to measure the optical power of active equipment in SIMPLE METER:

1)   Power on the Fiber OWL 4 ORL and select SIMPLE METER.
2)   Power on the active equipment to be tested.
3)   Set the Fiber OWL 4 ORL to match the output wavelength of the active equipment, and ensure that the Fiber OWL 4 ORL is set to dBm mode.
4)   Connect the Fiber OWL 4 ORL to the active equipment with a singlemode patch cord.
5)   Consult the active equipment manufacturer's specifications to determine the correct power level of the transmitter, and compare this number to the displayed optical power.

SIMPLE METER - MAIN MENU

Pressing **MENU** will enter the MAIN MENU.

<1>TAKE READINGS - return to Immediate Mode.
<2>METER PROPERTIES - see page 1-3.
<3>SOURCE CONTROL - see page 1-8.
<4>TEST FIBER LENGTH - **BETA FEATURE** - see page 1-8.

```
      MAIN MENU

<1>TAKE READINGS
<2>METER PROPERTIES
<3>SOURCE CONTROL
<4>TEST FIBER LENGTH
```

Overview

Certification Meter allows the user to store data points for the purpose of certifying singlemode fiber links against known industry cabling standards; EIA/TIA 568, ISO/IEC 11801, and Gigabit Ethernet are some examples. A user-friendly link configuration wizard is provided to enter fiber link parameters, which are used to calculate reference values for easy PASS/FAIL readings.

The Fiber OWL 4 ORL is capable of certifying and storing up to 1000 data points with user-configurable fiber labels.

Data points are downloaded into our free OWL Reporter Windows-compatible software for organizing data

Operation

1)   Press the 🔘 button.
2)   After a few seconds, you will be prompted to choose an operating mode. Highlight "CERTIFICATION METER" and press F2 to select.
3)   From the START MENU, you may either enter <1>LINK WIZARD (see page 3-2), <2>TAKE READINGS, or enter <3>MAIN MENU (see below).

CERTIFICATION METER Test Procedures

CERTIFICATION METER is designed to certify fiber links against popular cabling standards. An easy to use Link Wizard is provided to walk the user through the certification setup process.

All of the tests listed in SIMPLE METER can also be performed in CERTIFICATION METER, as well as three additional advanced test methods:

Cabling Standard Certification Test
Manual Link Budget Test
Manual Reference Test

Manual Link Budget Test and Manual Reference Test are only recommended for users who have a firm grasp of calculating link budgets manually.

MAIN MENU

The MAIN MENU activates the advanced functions of the Fiber OWL 4 ORL. To open the MAIN MENU, press [MENU] and it will appear as shown as the figure at 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

MAIN MENU - FIBER LINK MENU

<1>FIBER LINK SETUP - enters the FIBER LINK MENU. This menu allows the user to configure and manage fiber links in the Fiber OWL 4 ORL. The meter can store up to eight separate fiber link configurations. 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

MAIN MENU - FIBER LINK MENU - LINK WIZARD

This menu option runs the Link Wizard. See the section "CERTIFICATION METER - Cabling Standard Certification Test" in this unit for instructions on running the Link Wizard.

MAIN MENU - FIBER LINK MENU - LOAD/EDIT LINK

1)   From the FIBER LINK MENU, press [2 DEF] to LOAD/EDIT the link.

2)   From the STORED LINKS menu, highlight the link name you wish to use. The currently loaded link is denoted by an asterisk.

      NOTE: take care to NOT overwrite a previously configured link unless it is no longer needed.

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

STORED LINKS MENU

3)   Press [F3] to set the 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 17-character names. Press [DONE] when finished.

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 continue.

6)   Press [F2] to load the link.

```
ACME CORP.
02-26-07




_____
LINK  |      |
NAME  | DATE |
```

Link Information

MAIN MENU - FIBER LINK MENU - CONFIGURE LINK

From the STORED LINKS menu, highlight the link name you wish to use. The currently loaded link is denoted by an asterisk.

NOTE: take care to NOT overwrite a previously configured link unless it is no longer needed.

```
   STORED LINKS

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

Configure Link Properties and Set Reference

There are three different test methods used to configure a link:

<1>USE A STANDARD TO CERTIFY LINK - this is the same as running the Link Wizard. See the section "CERTIFICATION METER - Cabling Standard Certification Test" in this unit for instructions.

<2>MANUAL REFERENCE - see below

<3>ZERO LIGHT SOURCE - see page 3-5

```
SELECT A TEST METHOD

<1>USE A STANDARD TO
   CERTIFY LINK
<2>MANUAL REFERENCE/
   LINK BUDGET
<3>ZERO LIGHT SOURCE
```
**Select a Test
Method**

Configure Link Properties and Set Reference - Manual Reference Method

Manual references are used to configure the Fiber OWL 4 ORL with custom link loss requirements.

There are two types of manual reference methods: Link Budget and Manual Reference. Each of these methods are recommended for advanced users only.

The **Wave** column shows the wavelengths available for referencing.

```
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**

The **R(dBm)** column shows the light source reference power level in dBm. By default, this shows **+00.00dBm**.

The **LB(dB)** column shows the manually-set link budget in dB. By default, this shows **-00.01 dB**.

F1 WAVELENGTH - scrolls between the wavelengths in the Fiber OWL 4. The currently selected wavelength is highlighted.

F2 MANUAL REF - allows the user to manually set a reference level. See page 3-4 for instructions.

F3 LINK BUDGET - allows the user to manually set their own link budget. See page 3-4 for instructions.

Setting a Manual Reference

NOTE: this method is recommended for advanced users only.

Manual Reference Method sets an optical reference by allowing the user to input an absolute optical power level (in dBm).

1)   Connect a light source of the appropriate wavelength to the Fiber OWL 4, and power on the light source. Remember to allow the light source to warm up according to manufacturer's specifications.

Wavelength Reference Screen

2)   Using the **F1** key, scroll to the appropriate wavelength.

3)   Press **F2**. The actual optical power being received by the Fiber OWL 4 will be shown in the entry field. Backspace over this number to enter the desired reference level in dBm. Follow steps 2 & 3 for each wavelength, then press **DONE** to continue.

The Wavelength Reference Screen will now show the optical reference as previously entered. Readings may be now stored as normal.

Setting a Manual Reference Using a Link Budget

NOTE: this method is recommended for advanced users only.

Link Budget Method sets an optical reference by adding a pre-calculated link budget (in dB) to the optical power from a light source.

1)   Connect a light source of the appropriate wavelength to the Fiber OWL 4, and power on the light source. Remember to allow the light source to warm up according to manufacturer's specifications.

Wavelength Reference Screen

2)   Using the **F1** key, scroll to the appropriate wavelength.

3)   Press **F3** to enter the pre-calculated link budget. Backspace over the characters in the entry field and type the amount of link budget (for example, 4.00). Follow steps 2 & 3 for each wavelength, then press **DONE** to continue.

The Wavelength Reference Screen will now show the light source reference level as well as the link budget.

For example: a 1300nm light source is outputting -19.65 dBm and the pre-calculated link budget is 4.00 dB. The PASS/FAIL threshold would then be -23.65 dBm.

Readings may be now stored as normal.

Setting an Optical Reference by Zeroing the Light Source

This method allows the user to "zero" the light source for the purpose of viewing optical attenuation values, or loss, in Immediate Mode.

```
CONNECT
1310nm
SOURCE
-------------------
WAVE | ZERO |
```

**Zero Reference
Confirmation Screen**

1)   Connect a light source of the appropriate wavelength to the Fiber OWL 4 ORL, and power on the light source. Remember to allow the light source to warm up according to manufacturer's specifications.

2)   Using the **F1** key, change to the appropriate wavelength.

3)   Press **F2** to "zero" the light source power. Press **DONE** to continue.

Optical loss may be viewed in Immediate Mode by setting the power units to dB. Readings may now be stored as normal.

NOTE: zeroing the light source can also be done from Immediate Mode by pressing **O**.

MAIN MENU - FIBER LINK MENU - VIEW LINK CONFIG

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

```
ACME CORP.
TIA-568B.3/CAN-T529
FIBER = INDOOR SM
LENGTH = 1000 METERS
2 CONN 0 SPLICES
WAVELENGTHS:
1310nm 1550nm
```

**Link Configuration
Screen**

1)   From the FIBER LINK MENU, press **4** to VIEW LINK CONFIG.

2)   Highlight and select the link to view from the 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 = INDOOR SM - fiber type
LENGTH = 1000 METERS - fiber length
2 CONN 0 SPLICES - number of connections and splices
WAVELENGTHS: 1310nm 1550nm - wavelengths used with standard

If the link was stored by a manual reference method, or is not in use, the display will say ALL MANUAL REFERENCES.

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

MAIN MENU - FIBER LINK MENU - DELETE LINK

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** (MNO) .

2) Highlight and select the link to delete.

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

NOTE: once this information is deleted from the Fiber OWL 4, it can no longer be retrieved. Double-check to 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**

MAIN MENU - FIBER LINK MENU - PRINT LINK

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.

1) From the FIBER LINK MENU, press **6** (PQR) .

2) Highlight and select the link to print.

The display will show a confirmation, then will return to the FIBER LINK MENU.

```
PRINTING
```

**Link Printing
Confirmation Screen**

MAIN MENU - TAKE READINGS

<2>TAKE READINGS - returns the user to Immediate Mode, where readings can be stored for the currently loaded link.

MAIN MENU - STORED READINGS

<3>STORED READINGS - opens the STORED READINGS menu, which is used to manage the data stored in the Fiber OWL 4 ORL.

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

```
   STORED READINGS

<1>VIEW/EDIT/LOAD/PRN
<2>PRINT READINGS
<3>DELETE READINGS
<4>DOWNLOAD DATA

  BYTES FREE = 3071
```

**STORED READINGS
MENU**

MAIN MENU - STORED READINGS - VIEW/EDIT/LOAD/PRN

<1>VIEW/EDIT/LOAD/PRN - opens a data point review screen. This first appears showing the first data point in memory. Information about the data point includes:

Data Point Review Screen

Link Name (ACME CORP.)
Fiber Name and Number (FBR:1)
Fiber Type (INDOOR SM)
Wavelength (1310nm)
Absolute Optical Power (-10.98dBm)
Relative Power (-1.98dB)
Test Result (PASS)

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 ORL.

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 at the end of the stored readings of the link. *For example, if there are 12 data points for this link, then Immediate Mode will show FBR:13.*

5 MNO   5=EDIT - loads the currently displayed fiber link, and returns the user to Immediate Mode to re-save the data point. After the data point is edited, the user is returned to the end of the stored readings of the current link. *Using the example from above, Immediate Mode will show FBR:1, and after the data is stored, the fiber name and number will show FBR:13.*

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

MAIN MENU - STORED READINGS - PRINT READINGS

<2>PRINT READINGS - opens the data point print screen. All data for specific links and fiber names are sent to the serial port in an easy-to-read print format.

Information shown on this screen includes:

Link Name (ACME CORP.)
Fiber Name (FBR:)

Data Point Print Screen

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

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

MAIN MENU - STORED READINGS - DELETE READINGS

<3>DELETE READINGS - opens the data point delete screen. Data for specific links can be deleted, or all data can be deleted.

Information shown on this screen includes:

Link Name (ACME CORP.)
Fiber Name (FBR:)

**Data Point
Delete Screen**

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

F1   DELETE ALL - deletes all data stored in the Fiber OWL 4 ORL

F2   DEL - deletes data for the currently displayed link and fiber name

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

## MAIN MENU - STORED READINGS - DOWNLOAD DATA

<4>DOWNLOAD DATA - downloads all data points stored in the Fiber OWL 4 ORL 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 ORL 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
Confirmation Screen**

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.

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.
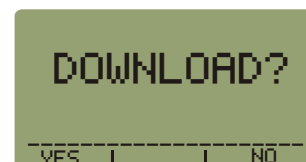
MAIN MENU - METER PROPERTIES

METER CONFIG MENU is covered in more detail in Unit 1.

MAIN MENU - LIGHT SOURCE MENU

See the section "LIGHT SOURCE MENU (light source versions only)" in Unit 1 for instructions.

MAIN MENU - TEST FIBER LENGTH

See the section "FIBER LENGTH MEASUREMENT on Page 2-4 for instructions.

CERTIFICATION METER - Cabling Standard Certification Test

The main function of CERTIFICATION METER is to test and certify fiber links using attenuation parameters of various cabling standards. Certification includes setting a standards-based optical reference, measuring the attenuation of a fiber using this reference, storing the measurement, and finally downloading and printing the data as a professional certification report.

It is important to understand the term "LINK" as it applies to a Fiber OWL 4 ORL certification test. In the Fiber OWL 4 ORL, a link is defined as *any number of fibers, or fiber cables, that all have the same set of characteristics from one end to the other; typically begin together and end together; and follow the same pathway. These characteristics include fiber length, fiber type, connector loss, and splice loss, as well as the cabling standard.*

CERTIFICATION METER includes a Link Wizard which is used to configure the Fiber OWL 4 ORL for certification of singlemode fiber links. The Link Wizard will prompt the user to enter information about the link. Prior to running the Link Wizard, have the following information ready:

Cabling Standard (a list of supported standards is in the appendix at the end of this manual)
Fiber Type (singlemode only)
Fiber Length (not necessary if the optional light source is installed)
Number of connections (a connection is where two fiber connectors meet; e.g. a patch panel)
Number of splices

Follow the steps below to perform a certification test. These steps show how to set up the Fiber OWL 4 ORL for storing automatic dual-wavelength measurements when using a separate OWL WaveSource light source. OWL WaveSource light sources are the only sources that will work automatically with the Fiber OWL 4 ORL. If you are using any other light source, these steps can be performed manually.

CERTIFICATION METER - Cabling Standard Certification Test

LOAD/EDIT LINK INFORMATION

1) From the MAIN MENU, press **1 ABC** to start the LINK WIZARD.

2) From the STORED LINKS menu, use **F1** to scroll through the list of links, and highlight the link name you wish to use. The currently loaded link is denoted by an asterisk. NOTE: a warning screen will appear at any time when link information is about to be overwritten.

```
     STORED LINKS
* Fiber Link #1
  Fiber Link #2
  Fiber Link #3
  Fiber Link #4
_____
 NEXT |SELECT|
```
F1 **F2**

3) Press **F2** to load the selected link.

4) Edit the LINK NAME. Use **F1** to backspace, then enter the link name using the alpha-numeric keys. Press **DONE** when finished entering the link name.

```
LINK NAME:

[Fiber Link #1     ]

_____
 <--- | SHIFT | --->
```
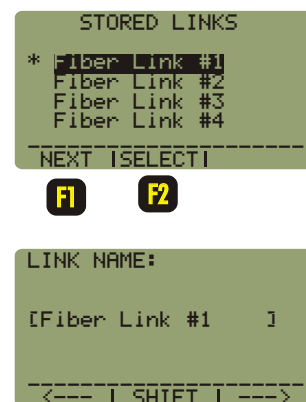
NOTE: changing the link name is not required, however, it is recommended in order to more easily interpret the data in a certification report.

CERTIFICATION METER - Cabling Standard Certification Test; cont.

5)   Edit the DATE. Use **F1** to backspace, then enter the link name using the alpha-numeric keys. Press **DONE** when finished entering the date.

```
DATE:

[01/01/01]

_____
<--- | SHIFT | --->
```

NOTE: 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.

CONFIGURE LINK PROPERTIES AND SET REFERENCE

6)   Use **F1** to scroll through the list of fiber standards. Once the chosen standard is highlighted, press **F2** to select.

```
FIBER STANDARDS

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

NOTE: users may create their own standards. See page 3-15 for instructions.

7)   Use **F1** to scroll through the list of fiber types. Once the fiber type that matches the cable under test is highlighted, press **F2** to select.

```
FIBER TYPES

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

8)   Connect the patch cable to the Fiber OWL 4 ORL port, then press **F1** to run the length test.

```
FIBER LENGTH

01000 +/-3 METERS

1550nm Index(n)=1.490
_____
TEST | DONE | INDEX
```

NOTE: if **CANNOT DETERMINE LENGTH** appears on the display, the fiber link is too long to measure.

9)   Press **F2** to continue.

10)   After the length test is complete, the fiber length will be displayed in meters. Press **DONE** to continue.

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

[01000]

_____
<--- | FEET | --->
```

NOTE: if you received the **CANNOT DETERMINE LENGTH** message, you should find an alternate way to measure the length of the cable, and enter the length manually, then press **DONE** to continue.

11)   Press **DONE** to continue.

12)   Remove the patch cable from the link under test.

CERTIFICATION METER - Cabling Standard Certification Test; cont.

13)   Enter the number of connections in the link, and press **DONE** to continue.

```
INLINE CONNECTIONS:

[   ]

_____
<--- | SHIFT | --->
```

NOTE: an inline connection is the junction where two fiber connector endfaces meet, such as in a patch panel or bulkhead adapter. For example, if the link under test is installed into patch panels, then the number of connections to be entered would be '2'.

14)   Enter the number of splices in the link, and press **DONE** to continue. Splices can be either fusion or mechanical.

```
INLINE SPLICES:

[   ]

_____
<--- | SHIFT | --->
```

NOTE: some pre-polished connectors, such as the Unicam®, use mechanical splice technology for fiber termination. These connectors should be counted as splices when running the Fiber OWL 4 Link Wizard.

15)   Connect the light source to the port on the Fiber OWL 4 ORL using the reference patch cord that matches the fiber type and connector type of the cable under test.

```
CONNECT
1310nm
SOURCE
_____
DONE |        |
```

16)   Power on the light source and set it to the wavelength shown on the Fiber OWL 4 ORL display. Allow the source to warm up according to manufacturer's specifications.

NOTE: only wavelengths that are supported by the chosen cabling standard will appear on the screen during the LINK WIZARD.

17)   Press **DONE** to continue.

18)   Review the reference data to ensure that the proper link characteristics were used.

         modify fiber type and fiber length

         modify number of connections and splices

```
SOURCE POWER = -20.00
1000 Meters = - 1.00
2 CON  2 SPL= - 2.10
REFERENCE PWR= -23.10
1310nm INDOOR SM
_____
 WAVE | TYPE/ |CONN/
LENGTH|LENGTH |SPLICE
```

19)   Press **F2** to continue.

20)   Press **F3** to confirm setting the wavelength reference.

```
SET 1310nm
REFERENCE?

_____
YES  |        | NO
```

NOTE: if a reference was previously set for this link position, a prompt will appear asking to replace the reference.

NOTE: most cabling standards support testing for multiple wavelengths, so the meter may prompt the user to set an additional wavelength. To set the reference for the additional wavelength, repeat steps 15 through 20. However, **IF THE ADDITIONAL WAVELENGTH IS IN A SEPARATE LIGHT SOURCE PORT, DO NOT USE THE REFERENCE JUMPER FROM THE FIRST WAVELENGTH**. A separate reference jumper must be used.
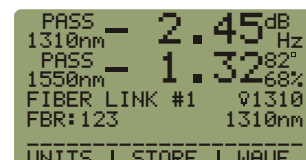
CERTIFICATION METER - Cabling Standard Certification Test; cont.

21)   Press **DONE** to begin taking readings. The meter will begin to display power readings.

The Fiber OWL 4 ORL is now ready to store readings. Immediate Mode will appear and should be set to display power in 'dB' for PASS/FAIL readings.

While measuring in 'dB', the display will show the amount of attenuation in the fiber under test, and whether it passes or fails and by what amount. Attenuation will always be shown as a negative number. The amount of optical loss is known by removing the minus sign.

CERTIFICATION METER
Immediate Mode

22)   Disconnect the patch cord from the Fiber OWL 4 ORL. NOTE: remember to keep the patch cord connected to the light source for the duration of the test.

23)   Set the WaveSource light source into automatic mode by holding the λ/AUTO button for approximately 2 seconds. You will notice that the indicator LED will begin to alternate between red and green. At this point, the WaveSource is sending signals that will tell the Fiber OWL 4 which wavelength to switch to.

24)   Set the Fiber OWL 4 ORL into automatic mode by pressing the **AUTO** button. You will notice that the wavelength indicator is alternating between AUTO and the currently selected wavelength. The meter will now scan incoming signals for wavelength-switching information from the WaveSource.
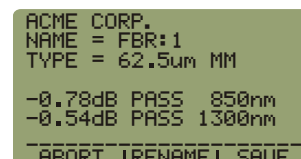
NOTE: when the meter and light source are both set to AUTO mode, dual-wavelength measurements will appear as shown in the display at right. Single-wavelength measurements will only show one power level.

25)   Connect the meter and light source to opposite ends of the link under test. If the meter and light source are communicating properly, you will notice that the wavelength on the meter display will alternate between the output wavelengths of the light source.

26)   Since the meter and light source are both in AUTO mode, the meter may take several seconds to acquire power levels for both wavelengths. Once the **F2** button becomes active, press it to store the dual-wavelength data.

27)   If this is the first data point stored for this link, a prompt will appear for entering a more descriptive fiber name. Press **DONE** to continue.

28)   A review screen will appear with three options:

     F1   ABORT - do NOT save the data point, and return to Immediate Mode to re-test the same data point. If a FAIL reading appears, it is recommended to ABORT, clean all connections, and then re-test.

Data Point Review

     F2   RENAME - change the descriptive fiber name (same as step 27).

     F3   SAVE - save the data point, and advance to the next data point in Immediate Mode.

CERTIFICATION METER - Cabling Standard Certification Test; cont.

29)   Once the data has been stored for the current fiber, move the units to the next fiber, and repeat steps 26 through 28 until all fibers have been tested.

Once all data is stored in the Fiber OWL 4 ORL, they can be downloaded to a PC which has OWL Reporter installed. Please consult the OWL Reporter unit for more information.

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

CERTIFICATION METER - Creating User-Definable Cabling Standards

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.

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

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

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

```
 SELECT WAVELENGTHS(2)

   *1  850nm
   *2  980nm
       1300nm
       1310nm
 ─────────────────────
  NEXT | SEL1 | SEL2
```

5)   Enter the loss per kilometer in dB for 62.5/125 MM fiber in the entry field. Decimals can be entered by holding the **0** key to scroll through the special characters. If it is not necessary to enter a value, leave the entry field blank.

```
  850nm 62.5um MM
 loss/km(0.01-2.55dB):

 [        ]


 ─────────────────────
  <--- | SHIFT | --->
```

6)   Press **DONE** to continue. Repeat Steps 5 & 6 for the remaining fiber types.

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

```
 Enter Loss/Connector
 (dB):

 [        ]


 ─────────────────────
  <--- | SHIFT | --->
```

8)   Enter the loss per splice in dB, then press **DONE** to continue.

9)   Highlight the other wavelength to use for this standard and press **F3** to select.

```
 Enter Loss/Splice
 (dB):

 [        ]


 ─────────────────────
  <--- | SHIFT | --->
```

10)   Repeat steps 5 through 8 for the second wavelength. Press **DONE** to return to the fiber standard selection screen, then press **F2** to select the custom standard.

Overview

OWL fiber optic certification meters are designed to certify fiber optic links using cabling standards because we understand the importance of qualifying your fiber installations with standards-compliant test equipment.

OWL Reporter software comes FREE with OWL certification meters, and is used to print professionally formatted reports showing the conformity to these popular industry standards. You can print out these reports as a record of the original conformity to quality set by the standards. These documents signed by all associated parties may prove valuable in any future disputes concerning the installation.

Each OWL certification meter comes with a CD-ROM containing OWL Reporter software and a RS-232 download cable. OWL Reporter requires a PC with a Pentium or better processor and Windows 95 or later, as well as a RS-232 serial port. PCs that only have USB ports can use a USB-to-serial converter.

Installing OWL Reporter

Use the following steps to install OWL Reporter onto a PC.

1) Insert the OWL CD-ROM into the PC. You may be prompted to choose your language.
2) Click the "Install OWL Reporter" button from the installation selection panel.
3) Click "Next" on the Setup Wizard greeting screen.
4) Choose the components to install, then click "Next" on the Choose Component screen.
5) Click "Next" on the Choose Install Location screen.
6) Click "Next" on the Choose Start Menu Folder screen.
7) Select the appropriate software option for your meter and click "Next" on the Choose Software Version screen to begin copying files to the hard drive.

Once the files have completed copying you will be prompted to reboot your PC to complete the installation.

Using OWL Reporter

Below is a screenshot of the opening screen. When OWL Reporter is opened, the data area will be empty, and the status bar will show a status of "Ready".
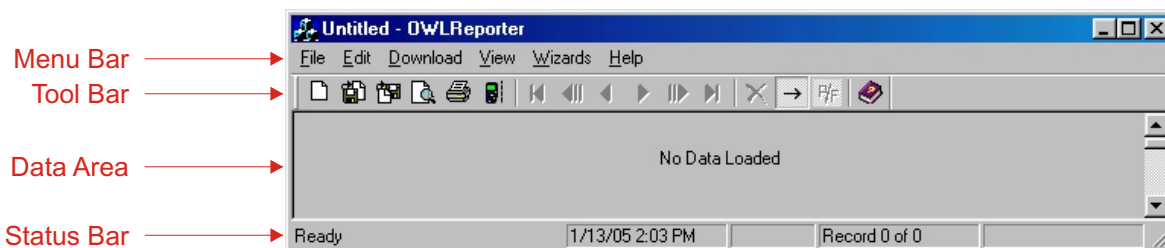
Downloading Data into OWL Reporter

Once testing is complete, data should be downloaded to the PC for report printing and data storage. The following steps demonstrate how to download data from the Fiber OWL 4 ORL.

1)   Power on the Fiber OWL 4 ORL meter, and select CERTIFICATION METER.
2)   Connect the meter to the PC serial port via the supplied download cable.
3)   Launch OWL Reporter.
4)   Either click the Download menu option, or press the 🔲 button from the Tool Bar.

All stored readings will be downloaded into OWL Reporter.

Viewing OWL Reporter Data - Summary View

Once data has been downloaded, they appear in the data area of OWL Reporter in an easy-to-read summary format, called Summary View.

The top section contains information about the meter, including company name and telephone, meter type, serial number, and firmware version.

The bottom section (called Circuit Results Summary) shows a summary of data points. This information includes fiber link name, fiber name and number, and a PASS or FAIL rating. Different wavelengths will have separate columns.

Wavelength information can be toggled between PASS/FAIL and overhead in dB by using the tool bar button 🔲 . Overhead will be either positive (PASS) or negative (FAIL).
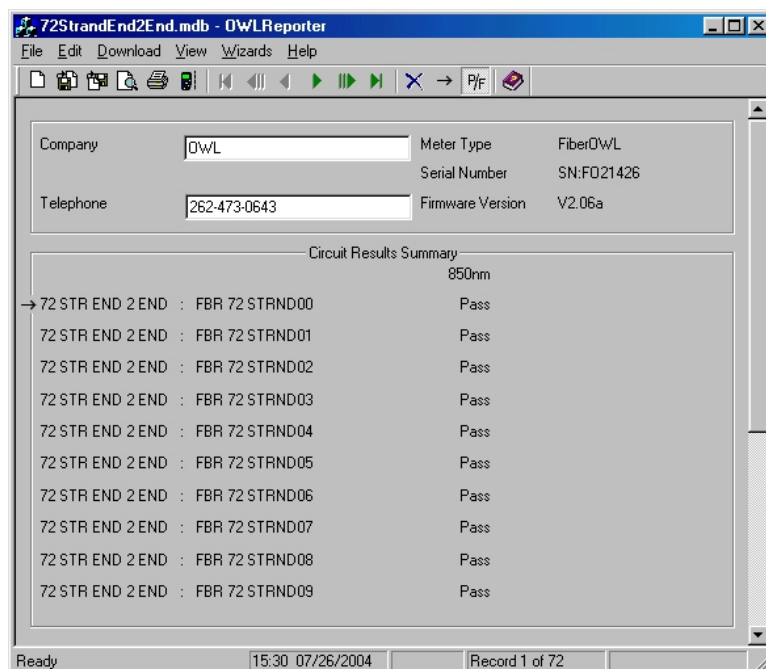
Use the navigation buttons on the tool bar (the green arrows) to advance forward or backward in the data, either one at a time, 10 at a time, or to the beginning or end of the data. Data points may also be deleted by using either the delete button or the delete option under the Edit menu.

Viewing OWL Reporter Data - Detail View

Data can also be viewed in more detail for each fiber name and number. This view is called Detail View.

Use the button → to toggle between Summary View and Detail View.

The top section contains information about the meter, including company name and telephone, meter type, serial number, and firmware version.

The next section contains information such as Link ID, Circuit ID, date of meter calibration, date of test, temperature, and date of download. NOTE: if the Date of Test has an incorrect date, and you have not deleted the data, you can fix this by editing the link date in the Configure Link option from the FIBER LINK MENU.

The Circuit Characteristics section shows the information that was entered during the Link Wizard, and used to calculate the optical reference.

The Circuit Test Results section shows detailed information about the specific data point for each wavelength.

System Reference Power is the optical power level that determines if a link will pass or fail the certification test. All data points with the link are measured against this number. If the Measured Power is higher than the System Reference Power, the fiber passes. Likewise, if it is lower, it fails.

NOTE: fibers with marginal System Overhead values (0.5 dB or less) may indicate a fail rating and should be re-examined and re-tested. Clean all fiber connections and examine all connector endfaces for dirt or cracks. Replace patch cords or re-terminate fiber connectors, if necessary, then re-test the fiber link.

If the link continues to be marginal, further troubleshooting will be necessary.

Printing Reports from OWL Reporter

Reports can be printed from OWL Reporter by using the print function, either from the File Menu or the Print button on the Tool Bar.

The current view will determine which report will be printed, (i.e. if data is being viewed in Summary View, a Circuit Summary report, like the one at right, will be printed).

Reports will look nearly the same as the views they were printed from.

Areas for signatures and dates are included at the bottom of the reports.

Circuit Summary Report

Optical Wavelength Laboratories

Link ID:	FBR:		Page:	1
Company Name:	OWL		Report Date:	08/26/2003
Telephone Number:	262-473-0643			

Circuit ID	Date	P/F	850nm	P/F	1300nm
01	08/22/2003	Pass	1.47dB	Pass	1.20dB
02	08/22/2003	Pass	4.45dB	Pass	3.19dB
03	08/22/2003	Pass	2.67dB	Pass	4.50dB
04	08/22/2003	Pass	5.10dB	Pass	2.51dB
05	08/22/2003	Pass	3.53dB	Pass	5.28dB
06	08/22/2003	Pass	5.61dB	Pass	1.74dB
07	08/22/2003	Pass	4.49dB	Pass	3.17dB
08	08/22/2003	Pass	4.98dB	Pass	4.98dB
09	08/22/2003	Pass	3.17dB	Pass	4.49dB
10	08/22/2003	Pass	1.74dB	Pass	5.61dB
11	08/22/2003	Pass	5.28dB	Pass	3.53dB
12	08/22/2003	Pass	2.51dB	Pass	5.10dB
13	08/22/2003	Pass	4.50dB	Pass	2.67dB
14	08/22/2003	Pass	3.19dB	Pass	4.45dB
15	08/22/2003	Pass	1.20dB	Pass	1.47dB

*1 - Manually set reference   *2 - Fiber type mismatch   *3 - Not covered by TIA standard

Installer/Tester: _____ Date:_____

Customer: _____ Date:_____

NOTE: 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.

Saving and Retrieving Data in OWL Reporter

It is recommended to save OWL Reporter data to disk after downloading for backup and later retrieval. The save function can be activated from the File Menu or the Tool Bar.

OWL Reporter data files can be re-opened by using the File Menu or Tool Bar.

NOTE: if data downloaded from the Fiber OWL 4 ORL needs to be separated into multiple files, it is recommended to save the original file as a master. This master file is then used to create individual files by deleting the unneeded data.

Help Menu

The Help Menu contains OWL Reporter software version information, as well as links to several operations manuals.

Glossary

Absorption. The loss of power in an optical fiber, resulting from conversion of optical power into heat and caused principally by impurities, such as transition metals and hydroxyl ions, and also by exposure to nuclear radiation.

Acceptance Angle. The half-angle of the cone within which incident light is totally internally reflected by the fiber core. It is equal to arcsin (NA).

Attenuation. A general term indicating a decrease in power from one point to another. In optical fibers, it is measured in decibels per kilometer at a specified wavelength.

Bandwidth. The transmission capacity of a system.

Buffering. 1. A protective material extruded directly on the fiber coating to protect the fiber from the environment (tight buffering). 2. Extruding a tube around the coated fiber to allow isolation of the fiber from stresses on the cable (loose buffered)

Buffer Tubes. Loose-fitting covering over optical fibers used for protection and isolation.

Bundle. Many individual fibers contained within a single jacket or buffer tube. Also, a group of buffered fibers distinguished in some fashion from another group in the same cable core.

Cladding. The outer concentric layer that surrounds the fiber core and has a lower index of refraction.

Connector. A mechanical device used to provide a means for aligning, attaching, and achieving continuity between fibers.

Consolidation Point. A location for interconnection between horizontal cables that extend from building pathways and horizontal cables that extend into work area pathways.

Core. The central, light-carrying part of an optical fiber; it has an index of refraction higher than that of the surrounding cladding.

Cross-Connection. A connection scheme between cabling runs, subsystems, and equipment using patch cords or jumpers that attach to connecting hardware on each end.

Decibel (dB). In fiber optics, a standard logarithmic unit for the ratio of the power that was received over the power that was originally sent.

dBm. Decibel referenced to a milliwatt.

dBµ. Decibel referenced to a microwatt.

Detector. An optoelectronic transducer used in fiber optics for converting optical power to electric current. In fiber optics, usually a photodiode.

Diffraction. The bending of radio, sound, or light waves around an object, barrier, or aperture edge.

Glossary, cont.

Dispersion. A general term for those phenomena that cause a broadening or spreading of light as it propagates through and optical fiber. the three types are modal, material, and waveguide.

Entrance Facility. An entrance to a building for both public and private network service cables including the entrance point at the building wall and continuing to the entrance room or space.

Equilibrium Mode Distribution (EMD). The steady modal state of a multimode fiber in which the relative power distribution among modes is independent of fiber length.

Equipment Room. A centralized space for telecommunications equipment that serves the occupants of the building. Equipment housed herein is considered distinct from a telecommunications closet because of its nature or complexity of the equipment.

Frequency. Of a periodic wave, the number of identical cycles per second. Usually expressed in Hertz.

Fresnel Reflection. The reflection that occurs at the planar junction of two materials having different refractive indices; Fresnel reflection is not a function of the angle of incidence.

Graded-index Fiber. An optical fiber whose core has a nonuniform index of refraction. The core is composed of concentric rings of glass whose refractive indices decrease from the center axis. The purpose is to reduce modal dispersion and thereby increase fiber bandwidth.

Horizontal Cross-Connect (HC). A cross-connect of horizontal cabling to other cabling, e.g., horizontal, backbone, equipment.

Index of Refraction. The ration of the velocity of light in free space to the velocity of light in a given material.

Insertion Loss. The loss of power that results from inserting a component, such as a connector or splice, into a previously continuous path.

Interconnection. A connection scheme that provides for the direct connection of a cable to another cable or to an equipment cable without a patch cord or jumper.

Intermediate Cross-Connect (IC). A cross-connect between the main cross-connect and the horizontal cross-connect in backbone cabling.

Laser. Light Amplification by Stimulated Emission of Radiation. A light source producing, through stimulated emission, coherent, near monochromatic light. Lasers in fiber optics are usually solid-state semiconductor types.

Light-Emitting Diode (LED). A semiconductor diode that spontaneously emits light from the PN junction when forward current is applied.

Main Cross-Connect (MC). The cross-connect in the main equipment room for connecting entrance cables, backbone cables, and equipment cables.

Glossary, cont.

Material Dispersion. Dispersion resulting from the different velocities of each wavelength in an optical fiber.

Modal Dispersion. Dispersion resulting from the different transit lengths of different propagating modes in a multimode optical fiber.

Mode. A possible path followed by light rays.

Multi-mode Fiber. A type of optical fiber that supports more than one propagating mode.

Numeric Aperture (NA). The number that expresses the light-gathering ability of a fiber.

Optical Time Domain Reflectometry (OTDR). A method of evaluating optical fibers based on detecting backscattered (reflected) light. Used to measure fiber attenuation, evaluate splice and connector joints, and locate faults. Also, the equipment used to perform such measurements (Optical Time Domain Reflectometer).

Photodetector. An optoelectronic transducer, such as a PIN photodiode or avalanche photodiode.

Photodiode. A semiconductor diode that produces current in response to incident optical power and used as a detector in fiber optics.

Photon. A quantum of electromagnetic energy; a particle of light.

Receiver. An electronic device which converts optical signals to electrical signals.

Responsivity. The ratio of a photodetector's electrical output to its optical input in an optical fiber.

Single Mode Fiber. An optical fiber that supports only one mode of light propagation above the cutoff wavelength.

Source. The light emitter, either an LED or laser diode, in a fiber optic link.

Spectral Width. A measure of the extent of a spectrum. For a source, the width of wavelengths contained in the output at one half of the wavelength of peak power. Typical spectral widths are 20 to 60 nm for an LED and 2 to 5 nm for a laser diode.

Splice. An interconnection method for joining the ends of two optical fibers in a permanent or semi-permanent fashion.

Step-Index Fiber. An optical fiber, either multi-mode or single mode, in which the core refractive index is uniform throughout so that a sharp step in refractive index occurs at the core-to-cladding interface. It usually refers to a multi-mode fiber.

Telecommunications Closet (TC). An enclosed space for housing telecommunications equipment, cable terminations, and cross-connects. The closet is the recognized cross-connect between the backbone cable and horizontal cabling.

Glossary, cont.

Tight Buffer. A cable construction where each fiber is tightly buffered by a protective thermoplastic coating to a diameter of 900 uM.

Transmitter. An electronic package which converts an electrical signal to an optical signal.

Wavelength. The distance between the same two points on adjacent waves; the time required for a wave to complete a single cycle.

Work Area. A building space where the occupants interact with telecommunications terminal equipment; i.e. PCs, telephones, and other office equipment.

Fiber OWL 4 ORL Specifications

Detector Type	InGaAs
NIST-Traceable	1310, 1490, 1550, 1625
Calibrated Power Meter Wavelengths	+8 to -67 dBm
Power Meter Measurement Range	68 dB
Dynamic Range	-67 dBm
Detector Sensitivity	76 dB
Measurement Range	±0.15 dB
Accuracy	0.01 dB
Resolution	up to 100 hours (9V)
Battery Life	Universal 2.5mm
Connector Type	-10 to 55 C
Operating Temperature	-30 to 70 C
Storage Temperature	3.48"W x 6.48"H x 1.1"D
Size	373g (12 oz.)
Weight	up to 1000
Data Storage Points	OWL Reporter Software
Download Data Points	Yes
Absolute/Relative Measurements	Yes
Battery Capacity Display	Yes
Backlight	Yes
NIST Traceable	

Warranty Information

Your Fiber OWL 4 ORL comes standard with a two-year limited warranty which covers the meter against manufacturing and assembly defects. Any returns not related to these types of defects are not covered under the warranty. Call tech support at (262) 473-0643 with any warranty concerns you may have.

Over time, the meter may lose its accuracy. This is natural for scientific equipment of this type. Re-calibration may be necessary to restore the meter to its original accuracy. Re-calibration is not covered under warranty, but is offered as a service. Call OWL at (262) 473-0643 for more details on our re-calibration services.

Cleaning and Care Instructions

1 - Do NOT drop any piece of sensitive scientific equipment. Damage may occur to the case or electronic components on the circuit board may become dislodged, and inaccuracy may occur.

2 - Keep the meter in an enclosed case when not in use. This will help protect the meter from the elements and accidental droppage.

3 - Store the meter in a cool dry area when not in use in order to keep the meter in top working condition.

4 - We recommend not removing the universal connector as it is not necessary for cleaning. Its parts are very fragile, small, and easy to lose.

5 - Always remember to replace the rubber cap on the connector. This will keep out dust and dirt when the meter is not in use.

6 - Use only 99% or better Isopropyl alcohol when cleaning the detector. Any less than 99% contains too much water and will begin to corrode the components. 99% Isopropyl alcohol is very flammable, so additional care must be taken when cleaning the detector. 99% Isopropyl alcohol can be purchased at your local drug store.

7 - Whenever possible, use specially designed 2.5mm cleaning sticks to clean the detector. These do not require alcohol and do not damage the insides of the connector. Do not used sticks or swabs of any other type because they may damage the zirconium ferrule or the coating of the detector inside the connector, or may leave behind dust or fibers that will add loss to the fiber reading.

8 - The detector port should be cleaned at the beginning and end of each testing day to keep connector loss during testing at a minimum.

9 - When cleaning the meter itself, do not use any household cleaner that contains ammonia as this will damage any plastic it comes in contact with.

10 - The case is splash-proof, so it is not necessary to clean the inside of the meter.

11 - Only use lint-free cloths when cleaning the display. Anything else may scratch the plastic.