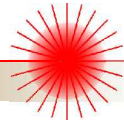




O.W.L.

MANUFACTURER OF QUALITY OPTICAL FIBER TEST EQUIPMENT

OPTICAL WAVELENGTH LABORATORIES



Visual Optical Length Tester (VOLT)



Operations Manual
Version 1.0
November 28, 2001
OWL Part VOLT-1

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SYMBOLS



This symbol signifies a potentially dangerous operation. **Extreme caution must be exercised when performing this operation.**



This symbol signifies a tip or suggestion for ease of use.

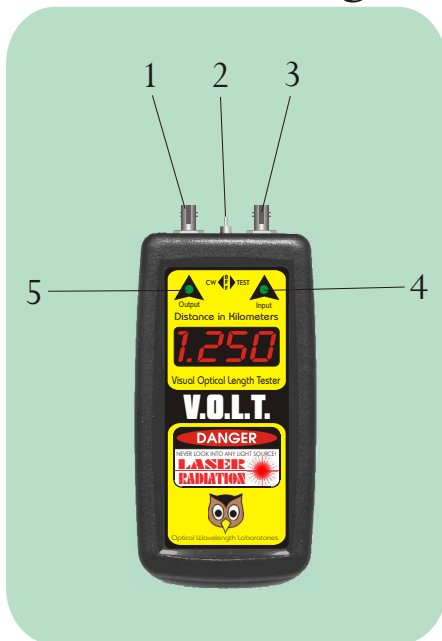
GENERAL

This manual describes the operation of the VOLT (Visual Optical Length Tester). The VOLT is designed to measure the length of single mode and multi-mode fibers. It uses a “round robin” technique for fiber measurement; i.e. it loops back two fibers in the same fiber cable with a patch cord. The round trip time of the optical pulse is converted to kilometers, then divided by two to give the length of the fiber cable. There is no need to measure the length of every fiber; the length will be the same for all fibers in the cable, so this test only needs to be run once for each cable. This technique allows the VOLT to be very accurate (up to ± 2.5 meters).

Many network cabling standards require the fiber cable length to be recorded along with attenuation measurements. Optical measurement of fibers provides a quick and easy alternative to check the fiber jacket for markings or estimating the length by using a measuring wheel, and often provides a greater degree of accuracy.

The VOLT also includes a flashing mode feature for visible fiber identification, as well as a continuous wave mode for visible fault location.

Functional Diagram



(1) Visible Laser Transmitter

This port houses a laser diode that emits visible light into optical fibers, either continuously or intermittently (flashing), depending upon the mode selected.

(2) Continuous Wave/Test Selector Switch

This 3-way switch selects between OFF (center), length testing/ fiber identification mode (left), and continuous wave mode (right).

(3) Detector Port

This port houses a silicon detector used to receive light from an optical fiber.

(4) Test Mode LED

This LED indicates that the tester is in length testing/visual fiber identification mode.

(5) Continuous Wave Mode LED

This LED indicates that the tester is emitting a continuous beam of light for visible fault location.

NOTE: During normal operation, if either LED (4 or 5) is not lit, this indicates that the battery has insufficient power for accurate testing, and must be replaced.

PRECAUTIONS

Safety. Extreme caution must be exercised when operating the VOLT. It produces an ultra-bright beam of red light that can cause permanent damage to the eye with prolonged exposure.



NEVER LOOK INTO A LIGHT SOURCE OR THE END OF A FIBER THAT MAY BE ENERGIZED BY A SOURCE!

Whenever possible, follow these safety tips when operating the VOLT:



Do NOT look directly at the beam of light. Use your peripheral vision or view the beam of light at an angle.



Use a sheet of paper or your hand to reflect the beam of light from the fiber end into your range of vision.



Dim the lights in the room. This will make the beam more visible from a distance.

Operational. In order to insure accurate and reliable readings, it is vitally important to clean the ports on the tester, as well as the ferrules on the patch cords, before each use. If dirt, dust, or oil are allowed to build up inside the connector, the surface of the laser diode may become scratched, producing erroneous results. Replace the dust caps on the tester ports and patch cords when not in use.

REQUIRED ACCESSORIES

Cleaning Supplies. Fiber ferrules, connector ports and bulkheads should be cleaned with 99% or better isopropyl alcohol and a lint-free cloth. A can of compressed air should be available to dry off the ferrules, and to blow dust from the connector ports and bulkheads.

Patch Cords. Two identical patch cords are required to connect the VOLT to the system under test, and an additional patch cord is required to loop back the two fibers being used for the test. The connector styles on the patch cords must match the type on the VOLT and the type of the bulkheads in the system under test.

APPLICATIONS

Fiber Length Measurement. The VOLT uses a “round robin” method of length measurement. This method requires two fibers from the same fiber cable to be looped back at one end with a patch cord. Light is injected into one of the fibers by the transmitter and is received by the detector connected to the other fiber. The round trip travel time is converted into length in kilometers and divided by two to arrive at the length of the fiber cable. It is not necessary to test each fiber for length; the length measurement applies to all fibers in the cable.

Visual Fiber Identification. The VOLT provides a flashing mode for easy visual fiber identification. Fibers are identified by locating the fiber end with the flashing red light on the opposite end of the fiber cable. This is useful for locating fibers that are marked incorrectly or not marked at all.



NEVER LOOK INTO A LIGHT SOURCE OR THE END OF A FIBER THAT MAY BE ENERGIZED BY A SOURCE!

Visual Fault Location. In Continuous Wave Mode, a steady beam of ultra-bright red laser light is injected into the fiber. If this light encounters a break or microbend in the fiber, the light will be redirected into the buffer. If the break or microbend is severe enough, this light will be visible through the fiber jacket, informing the user of a break or microbend in the fiber.



NEVER LOOK INTO A LIGHT SOURCE OR THE END OF A FIBER THAT MAY BE ENERGIZED BY A SOURCE!

OPERATION

Fiber Length Measurement (*Figure 1 - Length Testing Configuration - Page 4*)

- (1) On one end of the fiber cable, loop back two of the fibers with one of the patch cords.
- (2) On the other end of the fiber cable, connect one patch cord to each of the fibers being used for the test. Connect the other end of the patch cords to the receiver and transmitter ports on the VOLT.
- (3) Power ON the VOLT into length test mode by flipping the switch to the left.

NOTE: If the green indicator LED does not light up, this means that the battery power is insufficient for a valid test. The battery must be replaced before continuing.

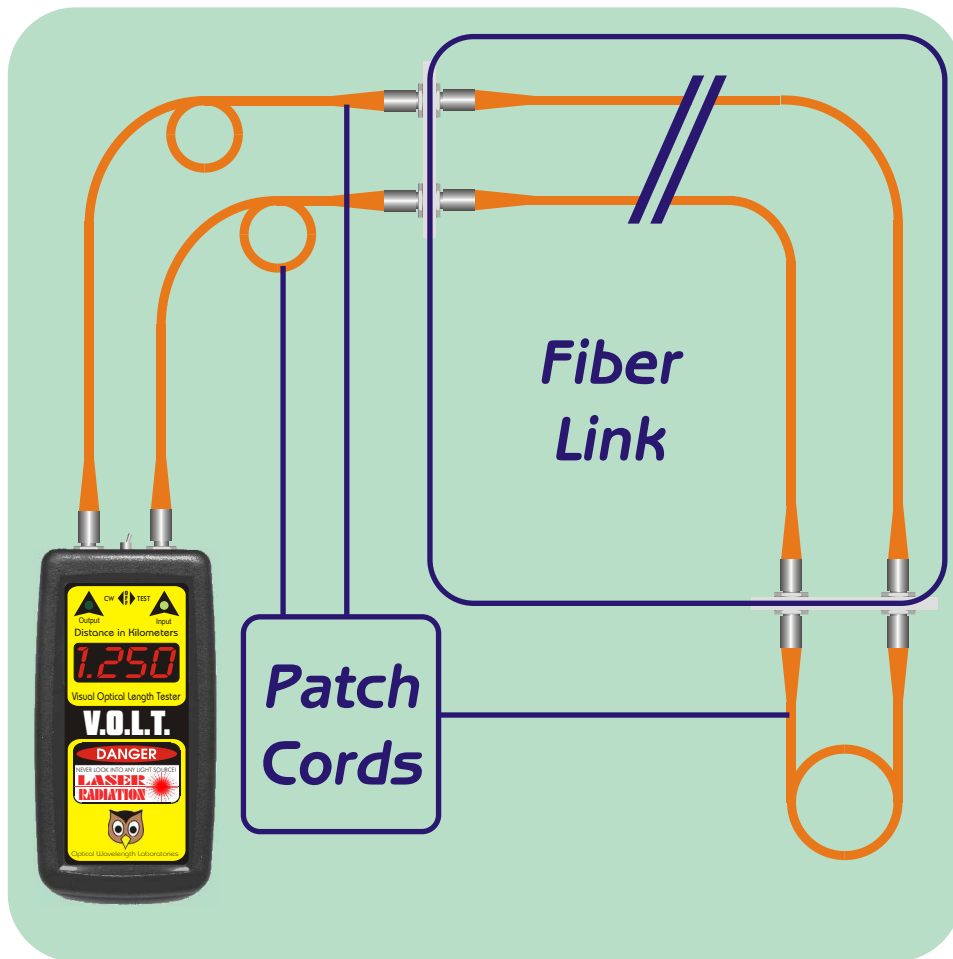


Figure 1 - Length Testing Configuration

Visual Fiber Identification (Figure 2 - Visual Fiber Identification Configuration - Page 5)

- (1) Connect the VOLT to the fiber you are testing via a patch cord as shown in Figure 2.
- (2) Power ON the VOLT into fiber identification mode by flipping the switch to the left. This mode emits a flashing beam of high-intensity red light into the

- fiber.
- (3) Identify the fiber by looking for the flashing red light emitting from the connector.



NEVER LOOK INTO A LIGHT SOURCE OR THE END OF A FIBER THAT MAY BE ENERGIZED BY A SOURCE!

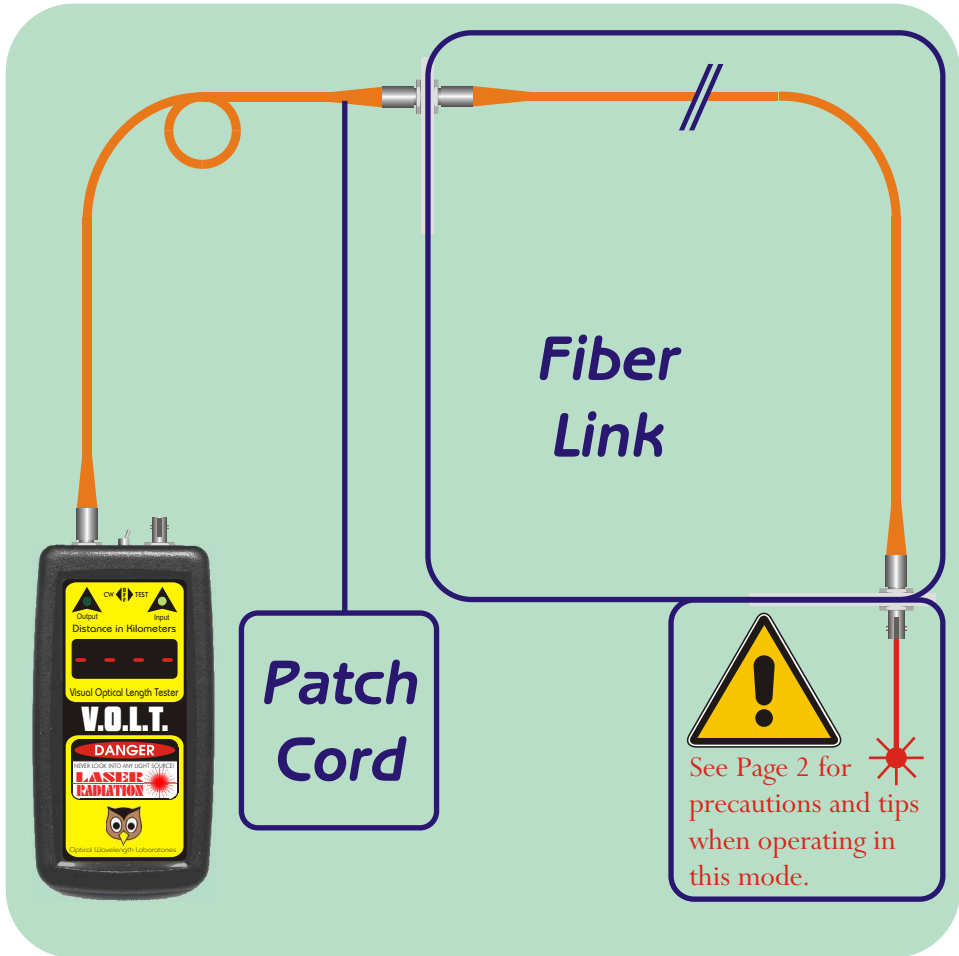


Figure 2 - Visual Fiber Identification Configuration

Visual Fault Location (Figure 3 - Visual Fault Location Configuration - Page 6)

- (1) Connect the VOLT to the fiber you are testing via a patch cord as shown in

Figure 3.

- (2) Power ON the VOLT to visual fault location mode by flipping the switch to the right. The display will show a series of hyphens to indicate fault location mode. If there is a fault in the fiber, red light will appear as a red glow through the fiber jacket.

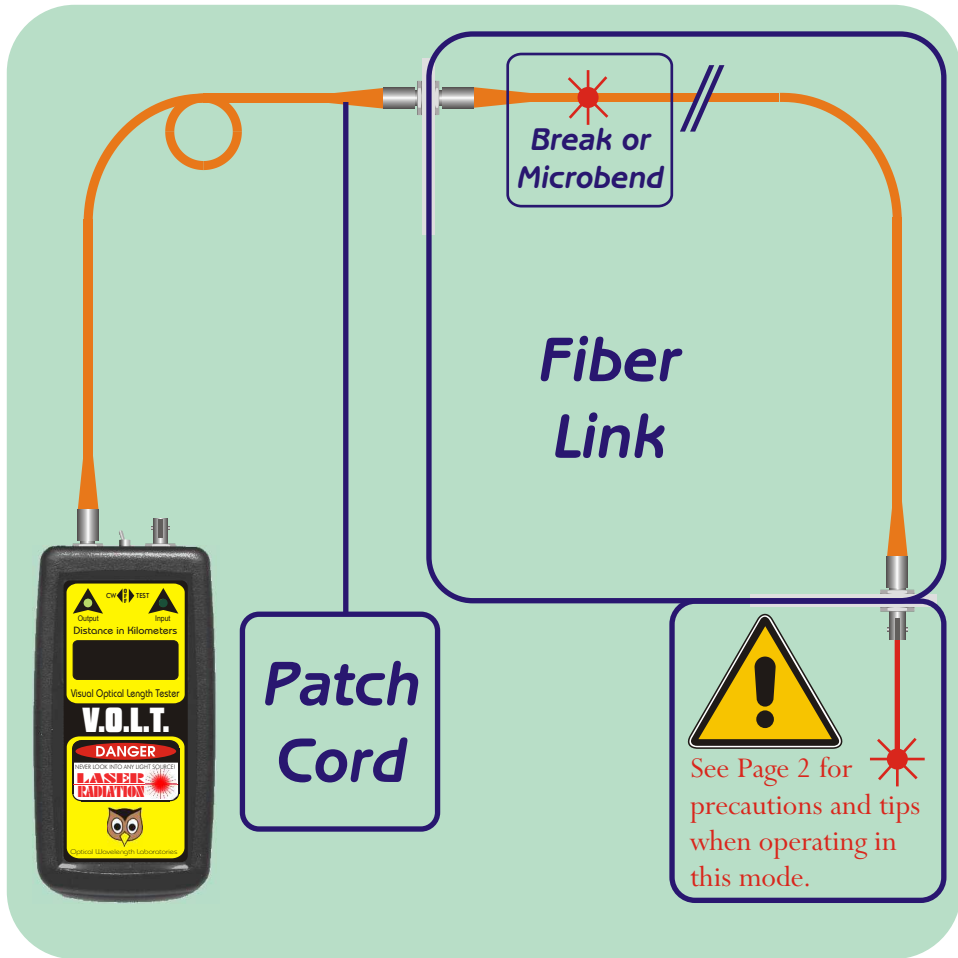


Figure 3 - Visual Fault Location Configuration

MAINTENANCE/CALIBRATION PROCEDURES

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

Battery Replacement. The battery compartment is covered by a sliding plate on the back of the unit. One 9v battery is required for operation.

Cleaning. For accurate readings, the optical connectors on the VOLT and the connectors on the patch cords should be cleaned prior to attaching them to one another. Minimize dust and dirt buildup by replacing the dust caps after each use.

Re-calibration. Due to the nature of the VOLT's functions, re-calibration of this unit is not necessary.


Warranty. The VOLT comes standard with a one-year factory warranty, which covers manufacturer defects and workmanship only.

WARNING AND SERIAL NUMBER INFORMATION

The serial number and model number can be found on the back of the unit, as well as the laser source information.


DANGER

Visible Optical Radiation When Power Switch Is Set To The ON Position – Avoid Eye Exposure To Direct Or Scattered Radiation
Fiber Laser: ~650 nm 2.0 mW



Optical Wavelength Laboratories
Whitewater, WI 53190 (262) 473-0643

MODEL# VOLT-1
SERIAL# VTxxxxx
DATE: 11/27/01
POWER: 9V DC



MADE IN USA

SPECIFICATIONS

Launch Method: _____ Red Laser
Output Power: _____ 2 milliwatts
Resolution: _____ up to 0.005 kilometers
Accuracy: _____ \pm 2.5 meters
Measurement Range: _____ 5 kilometers
Battery Life: _____ 15 hours
Operating Temperature: _____ 0 to 55° C
Storage Temperature: _____ 0 to 75° C
Low Battery Indicator: _____ Yes
Connector Style: _____ ST
Width: _____ 2.75 inches
Height: _____ 4.94 inches
Depth: _____ 1.28 inches
Weight (with battery): _____ 154 grams

CONTACT INFORMATION

Address:

Optical Wavelength Laboratories
N9623 Hwy 12
Whitewater, WI 53190

Phone:

(262) 473-0643

Web:

OWL-INC.COM

CONVERSION FACTORS

The VOLT displays fiber length in kilometers. At times it may be necessary to convert the fiber length to a different unit of measurement. The table below provides conversion factors for various units of measurement.

To calculate the units you need, multiply the number on the VOLT display by the conversion factor listed in the table below:

1 kilometer	1000 meters
1 kilometer	0.6214 miles
1 kilometer	3281 feet

Examples:

Here are some examples of converting the VOLT display into different units of measurement. For these examples, let us assume a fiber length of 1.25 kilometers as shown by the display at right.

Distance in Kilometers



- kilometers to meters

$$1.250 \times 1000 = 1250 \text{ meters}$$

- kilometers to miles

$$1.250 \times 0.6214 = 0.777 \text{ miles}$$

- kilometers to feet

$$1.250 \times 3281 = 4101.25 \text{ feet}$$