Quick Start Guide

ODTF-1 Optical Distance-to-Fault Module

Wavelength: 1550 nm (typical)

Anritsu

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部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 [Cr(VI)]	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷线路板 (PCA)	×	○	×	×	○	○
机壳、支架 (Chassis)	×	○	×	×	○	○
其他（电缆、风扇、连接器等） (Appended goods)	×	○	×	×	○	○

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Equipment marked with the Crossed-out Wheelie Bin symbol complies with the European Parliament and Council Directive 2002/96/EC (the "WEEE Directive") in the European Union.

For Products placed on the EU market after August 13, 2005, please contact your local Anritsu representative at the end of the product's useful life to arrange disposal in accordance with your initial contract and the local law.

Safety Symbols Used in Manuals

To prevent the risk of personal injury or loss related to equipment malfunction, Anritsu Company uses the following symbols to indicate safety-related information. For your own safety, please read the information carefully *before* operating the equipment.

Danger

This indicates a very dangerous procedure that could result in serious injury or death, and possible loss related to equipment malfunction, if not performed properly.

Warning

This indicates a hazardous procedure that could result in light-to-severe injury or loss related to equipment malfunction, if proper precautions are not taken.

Caution

This indicates a hazardous procedure that could result in loss related to equipment malfunction if proper precautions are not taken.

Safety Symbols Used on Equipment and in Manuals

The following safety symbols are used inside or on the equipment near operation locations to provide information about safety items and operation precautions. Ensure that you clearly understand the meanings of the symbols and take the necessary precautions *before* operating the equipment. Some or all of the following five symbols may or may not be used on all Anritsu equipment. In addition, there may be other labels attached to products that are not shown in the diagrams in this manual.

This indicates a prohibited operation. The prohibited operation is indicated symbolically in or near the barred circle.

This indicates a compulsory safety precaution. The required operation is indicated symbolically in or near the circle.

This indicates a warning or caution. The contents are indicated symbolically in or near the triangle.

This indicates a note. The contents are described in the box.

These indicate that the marked part should be recycled.

For Safety

Warning

Always refer to the operation manual when working near locations at which the alert mark, shown on the left, is attached. If the operation, etc., is performed without heeding the advice in the operation manual, there is a risk of personal injury. In addition, the equipment performance may be reduced.

Moreover, this alert mark is sometimes used with other marks and descriptions indicating other dangers.

Warning

When supplying power to this equipment, connect the accessory 3-pin power cord to a 3-pin grounded power outlet. If a grounded 3-pin outlet is not available, use a conversion adapter and ground the green wire, or connect the frame ground on the rear panel of the equipment to ground. If power is supplied without grounding the equipment, there is a risk of receiving a severe or fatal electric shock.

Warning

This equipment can not be repaired by the operator. Do not attempt to remove the equipment covers or to disassemble internal components. Only qualified service technicians with a knowledge of electrical fire and shock hazards should service this equipment. There are high-voltage parts in this equipment presenting a risk of severe injury or fatal electric shock to untrained personnel. In addition, there is a risk of damage to precision components.

For Safety

Warning

Laser radiation may be present at fiber-optic cable connectors and ports. This laser radiation could present a nominal ocular hazard from either direct viewing or by diffuse reflection. Do not view the emitted laser radiation directly or indirectly because permanent blindness may result.

Caution

Electrostatic Discharge (ESD) can damage the highly sensitive circuits in the instrument. ESD is most likely to occur as test devices are being connected to, or disconnected from, the instrument's front and rear panel ports and connectors. You can protect the instrument and test devices by wearing a static-discharge wristband. Alternatively, you can ground yourself to discharge any static charge by touching the outer chassis of the grounded instrument before touching the instrument's front and rear panel ports and connectors. Avoid touching the test port center conductors unless you are properly grounded and have eliminated the possibility of static discharge.

Repair of damage that is found to be caused by electrostatic discharge is not covered under warranty.

1 — Scope of Manual

This manual provides general information, installation and operating information, and performance specifications for the Anritsu ODTF-1 Optical Distance-to-Fault Module. Throughout this manual, the terms ODTF-1 and module are used interchangeably to refer to the device. Manual organization is shown in the table of contents.

2 — Module Description

The ODTF-1 module can be used with Anritsu's handheld cable & antenna analyzers to make high resolution Optical DTF (Distance-To-Fault) measurements over fiber-optic cables. While the module works on any analyzer equipped with DTF or time domain modes, an Optical DTF mode is available in the Anritsu Site Master and Cell Master products that is specifically designed to optimize the ease of use when making DTF measurements over fiber-optic cables with the ODTF-1 module.

The external module runs on rechargeable batteries and can be recharged with the standard 40-168 Anritsu Power Supply.

The ODTF-1 module is primarily intended for field use by technicians and engineers responsible for the deployment and maintenance of "FTTA" or Fiber-To-The-Antenna BTS systems. The ability to make both fiber and RF measurements is crucial for some of these systems. RF technicians trained to read RF DTF displays can get up to speed quickly with the Optical DTF display as it looks very similar to, and is read in the same way, as the RF DTF display.

As the use of fiber grows in short haul systems, such as fiber to the premise and military platforms, there is a need to locate failures in fiber-optic cables with accuracies to a few centimeters at distances of less than a few hundred meters. The same trade-offs that we see with the RF DTF measurement carry over to the Optical DTF measurement in fiber, meaning better fault resolution translates to shorter maximum distance, and vice-versa.

Identification Number

All Anritsu modules are assigned a unique seven digit serial number, such as "0701012." The serial number is imprinted on a label that is affixed to the module. When ordering parts or corresponding with Anritsu Customer Service, please use the correct serial number with reference to the specific module's model number (for example, model ODTF-1 Optical Distance-To-Fault Module, serial number: 0701012).

Optional Accessories

The following optional items can be ordered for the ODTF-1:

- **15NNF50-1.5C:** Armored Test Port Cable, 1.5 meters, N(m) to N(f)
- **806-186-R:** Test Port Cable, 0.91 meters, N(m) to N(f)
- **OSLN50-1:** Precision Open/Short/Load, DC to 6 GHz, 42 dB Return Loss

3 — Initial Inspection

Inspect the shipping container for damage. If the shipping container is damaged, retain until the contents of the shipment have been checked against the packing list and the power sensor has been checked for mechanical and electrical operation.

If the shipment is incomplete or if the module is damaged mechanically or electrically, notify your local sales representative or Anritsu Customer Service. If the shipping container is damaged or shows signs of stress, notify the carrier as well as Anritsu. Keep the shipping materials for the carrier's inspection.

4 — Preparation for Storage/Shipment

Preparing the ODTF-1 module for storage consists of cleaning the module, packing the storage container with moisture-absorbing desiccant crystals, and storing the module in the recommended temperature environment.

To provide maximum protection against damage in transit, the module should be repackaged in the original shipping container. If this container is no longer available and the module is being returned to Anritsu for repair, please advise Anritsu Customer Service; they will send a new shipping container free of charge. In the event that neither of these two options are possible, packaging and shipment information is given below:

- **Use a Suitable Container:** Obtain a corrugated cardboard carton. This carton should have inside dimensions of no less than 15 cm larger than the module dimensions to allow for cushioning
- **Protect the module:** Surround the module with polyethylene sheeting to protect the finish.
- **Cushion the module:** Cushion the module on all sides by tightly packing urethane foam between the carton and the module. Provide at least three inches of dunnage on all sides.
- **Seal the Container:** Seal the carton by using either shipping tape or an industrial stapler.
- **Address the Container:** Mark the address of the appropriate Anritsu service center and your return address on the carton in one or more prominent locations.

5 — Performance Specifications

Table 1. Performance Specifications

Item	Description
Wavelength	1550 nm typical
Fiber Type	SMF
Initial Dead Zone	0 meters
Event Resolution	10 cm (0.328 ft.) maximum
Horizontal Range	1020 meters (3345 ft.) maximum
Optical Dynamic Range	30 dB
Optical Output Power	3 dBm typical
Input and Output Ports	
RF Connector	N(m)
Max RF Input Power	+5 dBm
Optical Connector	FC/APC
General Specifications	
External DC Input	+12.5 to +15 VDC, 3 A maximum
Electromagnetic Compatibility	Meets European Community requirements for CE marking.
Temperature	Operating: 0 to 50 ºC Non-operating: 0 to 70 ºC recommended
Dimensions	
Size	(W x H x D) 15.7 x 5.37 x 18.6 cm (6.18 x 2.1 x 7.3 in.)
Weight	<1 kg (2.2 lbs.)

6 — Optical DTF Measurements

The following optical DTF measurement procedures illustrate the use of the ODTF-1 module with the Anritsu Site Master and Cell Master, and the BTS Master instruments.

Site Master and Cell Master Measurement Procedure

1. Press the **MODE** (#9) key and select DTF Optical.
2. Press D2 and enter the stop distance

Note	To change the units from feet to meters or meters to feet, press **SYS** | System options | Units to toggle between English and Metric.

3. Press Wavelength and select 1310 nm or 1550 nm.
4. Calibrate the Site Master or Cell Master as follows:
   a. Press **SYS** | Application Options | Cal Mode and toggle between "OSL Cal" or "FlexCal".

Note	The bottom of the display indicates OSLCal or FlexCal as you toggle the Cal Mode soft key. The FlexCal mode allows you to change the stop distance without performing additional calibrations. For optimum accuracy, use OSL Cal.

   b. Connect the test port cable to RF Out and press **START CAL**.
   c. Connect the Open to the end of the cable connected to RF Out and press **ENTER**.
   d. Connect the Short to the end of the cable connected to RF Out and press **ENTER**.
   e. Connect the Load to the end of the cable connected to RF Out and press **ENTER**.
   f. Verify that "Cal ON" is displayed in the upper left corner.

5. Connect the Optical DTF module as follows:

a. Connect the RF In port of the ODTF-1 module to the RF cable on the Site Master / Cell Master.

b. Connect any adapters to the Optical FC/APC connector, then connect the fiber-optic cable to the module.

c. Turn on the ODTF-1 module by pressing the **ON/OFF** power key (if required, use the Anritsu P/N 40-168 power supply to charge the battery).

6. Read and save the measurement as follows:

a. Press the **MARKER** | M1 | On/Off | Marker To Peak keys.

b. Press the LIMIT | Single Limit | On/Off | Edit keys to turn on the limit line.

c. Connect the device under test to the optical connector.

d. Press SAVE DISPLAY and enter the file name.

BTS Master Measurement Procedure

1. Press the **MODE** (Shift and #9) key and select Cable & Antenna Analyzer.
2. Press the Measurement key and select DTF Return Loss.
3. Press Freq/Dist | Stop Dist and enter the desired stop distance.
4. Press Start Freq and set the frequency range to 1 GHz.
5. Press Stop Freq and set the stop frequency to 2 GHz.

Note	If DMax is smaller than the stop distance, you can decrease the span and/or increase number of data points.

6. Press Next | Data points | Toggle to 551.
7. Lower the span until DMax is smaller than Stop Dist.
   Make sure that the start frequency is greater than 1 GHz and that the stop frequency is smaller than 2 GHz.
8. Press the Cable Loss key and enter 0.00035 dB/m for 1310 nm.
9. Press the Cable Loss key and enter 0.00020 dB/m for 1550 nm.
10. Select Prop Velocity and enter 0.681.
11. Enter the **Sweep Menu** (Shift and #3). Make sure RF Immunity is set to "Normal".

Note	To change the units from feet to meters or meters to feet, press **SYS** | System options | Units to toggle between English and Metric.

12. Save the setup for future measurements by pressing:
    File (Shift and #7) | Save | Setup.

13. Calibrate the BTS Master as follows:

a. Press **Calibrate** (Shift and #2)

b. Set the Cal Mode to "FlexCal."

Note	The bottom of the Cal Mode button display indicates Standard or FlexCal as you toggle the soft key. The FlexCal mode allows you to change the stop distance without performing additional calibrations. For optimum accuracy, use Standard.

c. Press Start Cal.

d. Connect Open to the end of the cable connected to RF Out and press Enter.

e. Connect Short to the end of the cable connected to RF Out and press Enter.

f. Connect Load to the end of the cable connected to RF Out and press Enter.

g. Verify that the upper left part of the display says "Cal Status: On."

h. Connect the Optical DTF module.

i. Connect the RF In port of the ODTF-1 module to the RF cable on the BTS Master.

j. Connect any adapters to the Optical APC connector, then connect the fiber-optic cable to the module.

k. Turn on the ODTF-1 module by pressing the **ON/OFF** power key (if required, use the Anritsu P/N 40-168 power supply to charge the battery).

14. Read and save the measurement as follows:

a. Press the **Marker** key, then Peak Search.

b. Press **Limit** (Shift and #6) | Limit Edit | Move Limit and Enter the value.

c. Connect the device under test to the optical connector.

d. Enter the **File Menu** (Shift and #7) and press Save | Save Measurement.

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