

MAP Insertion Loss/Return Loss Meter (mORL-A1 with PCT Automation Software)



- Key Features**
- Mandrel-free optical return loss measurements on fiber-optic patch-cords as short as 70 cm with 80 dB dynamic range
 - Fast, compact solution with 1310, 1490, 1550 and 1625 nm laser and automated bidirectional option in a single slot
 - Measures ORL on terminated bulkheads
 - Ultra high IL measurement accuracy with display resolution of ± 0.001 dB
 - Flexible turn-key software platform for manufacturing testing
 - Quick measure mode for R&D users
 - 12 and 24 fiber MT ready with optical switch and integrating sphere option
 - Designed for field maintenance

Applications

- Testing of optical connectors, patch-cords and cables in R&D and Manufacturing
- Verification of connector return loss on line cards and receptacle based transponders

Safety Information

- The MAP Insertion Loss / Return Loss meter when installed in a MAP chassis, complies with CE, CSA/UL/IEC61010-1, plus LXI Class C requirements.

The mORL-A1 is a powerful, compact Insertion Loss and Optical Return Loss meter for use with the JDSU advanced MAP-200 platform. One, single-slot module contains up to 4 sources (1310, 1490, 1550, 1625 nm), integrated power meter and an optional 2x2 optical switch for automated bidirectional testing.

Building on the success of the JDSU RX3000 meter, the mORL-A1 optical return loss measurement is based on time domain technology—often referred to as “mandrel-free.” Mandrel-free technology dramatically reduces test time by relieving the users from making slow, difficult, manual terminations during both the set-up and execution of return loss measurements.

The mORL-A1 has been designed to exceed the measurement performance provided by our industry-standard RX3000 with 80 dB of return loss dynamic range, insertion loss display resolution of 0.001 dB, and measurement times as low as 6 s for two wavelengths. In addition, the mandrel-free technology also enables the length of the patch cord to be measured.

The PCT (Passive Component and Connector Test) Application software provides two unique interfaces for R&D and manufacturing and combines the mORL-A1 with all the necessary peripherals to speed and simplify workflow.



Figure 1: mORL with PCT software solution

PCT Application Environment

PCT (Passive Component and Connector Test) is the application environment for the mORL-A1 module. It is a MAP-200 “Super-Application” as it not only drives the mORL module but several adjacent modules and peripherals (optical switches, bar code reader, and USB printers) to create a total application solution. The PCT software has two main operation modes: Instrument mode and Script mode.

Instrument mode gives users quick and easy access to all the key setup parameters in a simple easy to use intuitive graphical user interface (GUI). This is ideal for the R&D or the Qualification Lab environment where users want maximum control in a rapidly changing environment. At all times, users have access to interactive windows that show the current connection view and measurement setup. Quick save features allow users to save test results to text files and window settings to simplify recall.



Figure 2: Instrument mode - BasicView, Connection View, and RL Window Setup

The image displays three screenshots of the PCT 0.9.14 software interface, which is used for managing test scripts and performing measurements.

Top Screenshot: Database Management (Company Tab)

- File:** Default.pct.db
- Tabs:** Company, MTJ, DUT, Script, XML
- Record Name:** JDSU
- Description:** JDS Uniphase
- Type:** My Company
- Company Name:** JDS Uniphase Corp.
- Address:** 61 Bill Leatham Drive
- City:** Ottawa
- State/Province:** ON
- Country:** Canada
- Zip/Postal Code:** K2J 0P7
- Phone Number:** +1 613 843 3000
- Buttons:** NEW, COPY, EDIT, DELETE

Middle Screenshot: Database Management (Script Tab)

- File:** Default.pct.db
- Tabs:** Company, MTJ, DUT, Script, XML
- Record Name:** Simple Patchcord Test
- Description:** Bi-directional test for simple patchcord
- DUT Definition:** Jumper, 1 fibers
- Instrument Type:** Launch 1, Sources: 1310,1550, Channels: 1
- Test Steps:**
 - Instructions
 - Reference Measurement
 - Measure DUT End A
 - Measure DUT End B
 - 5 Print Reports
- Buttons:** NEW, COPY, EDIT, DELETE

Bottom Screenshot: Simple Patchcord Test (Measure DUT End A Step)

- Step 3: Measure DUT End A**
- NOT TESTED**
- DUT Port Name:** Connect to B SN-00005
- End A:** MTJ1 Channel 1
- End B:** OPM detector
- Generic Patchcord:**
 - SN-00001
 - SN-00002
 - SN-00003
 - SN-00004
 - SN-00005
- Diagram:** A schematic diagram showing the connection between the DUT (Bi-directional test for simple patchcord) and the OPM (Optical Power Meter) detector. The diagram includes a 1x8 Channel Mux, a 1x8 Switch, and a 1x8 Mux. The OPM detector is connected to the 1x8 Mux, which is connected to the 1x8 Switch, which is connected to the 1x8 Channel Mux. The DUT is connected to the 1x8 Channel Mux.
- Buttons:** NEW, COPY, EDIT, DELETE

Figure 3: Script mode - Database Set-up, Serial Number Program, and Script Execution

External Automation

For integration with external automation environments, the PCT Application leverages the full power of the MAP-200 platform. It has a full set of SCPI-based commands accessible through the local area network (LAN) or over the legacy General Purpose Interface Bus (GPIB) interface. The simple, robust, remote interface has been designed as a core requirement of the application. The MAP-200 Linux-based operating system removes the need to maintain legacy Windows-based platforms and reduces work for IT departments on virus and network access.



Optical Switches

Multi-channel implementations are easily created by pairing with the industry leading MAP Large Channel Count (mLCS-A1) switch family. Switches are used to speed workflow and allow multiple master test jumpers (MTJ) to be connected to the system at one time. This enables several potential time saving modes:

- Batch testing of single-fiber patch cords
- Allows for the presence of various connector types at a workstation requiring multiple connector types and hybrid devices
- Fast, efficient testing of ribbon fibers or break-out cables.

The JDSU mLCS-A1 large compact switch family is the industry leader in loss and repeatability and is capable of providing over 10M+ switch cycles without specification degradation. The repeatability and stability of the switch directly impacts the repeatability of the insertion loss measurement.

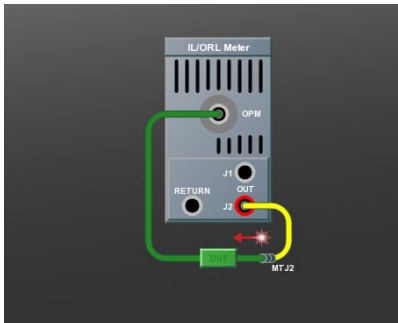


Figure 4: Single Ended - Single MTJ

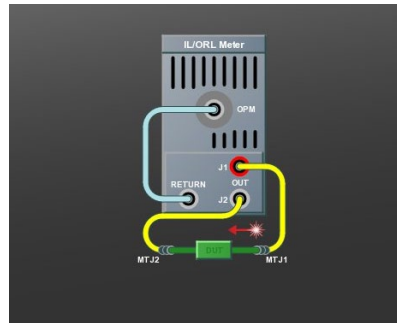


Figure 5: Automated Bidirectional

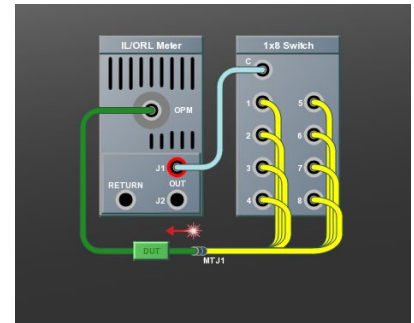


Figure 6: Multi-fiber with 1XN switch

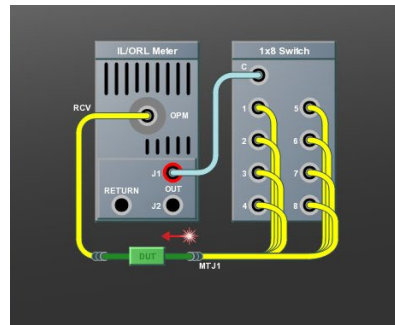
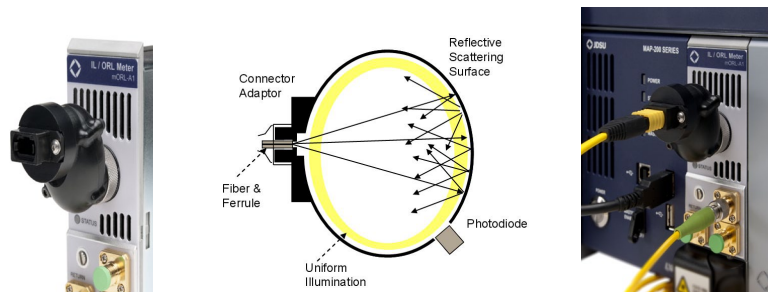


Figure 7: Multi-fiber with 1XN switch and receive fiber

Integrating Sphere and Ribbon Fiber Testing

An optional integrating sphere attachment is available and is intended for ribbon connector and bare fiber measurements. The integrating sphere scatters the input light to create uniform illumination on its inner surface. A small opening at the photodiode allows the optical power level to be measured. The innovative JDSU design allows customers to order the integrating sphere as an option, and remove it for maintenance. The input aperture is large enough to work with 72 fiber MT ferrules when used with the correct detector adaptor.



Workflow Enhancement Options

The PCT Application supports a number of workflow enhancements through several USB peripherals, the most critical of which are the JDSU Fiber Inspection Microscopes such as the FVD Benchtop Microscope and P5000-Series probes. Use these supported microscopes with the PCT Application to ensure that all connector end faces are clean prior to test and, critically, prior to customer shipments. The PCT supports USB barcode readers, printers, and label printers and simplifies data entry and report or label generation.

The BDR option adds an internal 2x2 switch, which when coupled with the time domain RL measurement can dramatically reduce test times by measuring the optical return loss of both connectors with one jumper connection. This is accomplished using the multiple programmable window function. This removes the need to measure the jumper in the other direction, effectively cutting the measurement time by 50%.





Figure 8: Example using the JDSU FVD to verify the connector end face of the jumper under test

Field Serviceability

For manufacturing applications, keeping equipment maintained with minimum downtime is critical to profitability. The mORL-A1 module and the MAP-200 are focussed on this need. An industry-unique feature for modular platforms is the access the mORL provides to the optical connectors. As shown below, removing one easy screw provides full access to the bulkhead connector for cleaning and re-polishing.



Figure 9: Quick plate removal



Figure 10: Fiber pay-out and management system

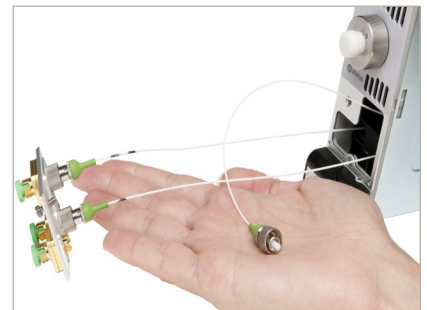


Figure 11: Full access to connector with length to polish

Specifications

Parameter

Wavelengths

Wavelengths: 2-wavelength version	1310, 1550 nm
4-wavelength version	1310, 1490, 1550, 1625 nm

Measurement Time

Initialization time	< 4 s
Averaging time options per wavelength	< 2, 5, 10 s

Insertion Loss

Display resolution	0.001 dB
Total IL uncertainty ¹	±0.02 dB

Additional uncertainties

Due to 1xN switching (if mLCS-A1 added)	±0.01 dB
Due to fiber position in Integrating Sphere ³	±0.03 dB

Return Loss

Display resolution	0.01 dB
DUT length – DUT reflections (both ends) < 40 dB	> 170 cm
DUT reflections (both ends) > 40 dB	> 70 cm

Measurement modes²

Repeatability	– 30 to 65 dB	±0.1 dB
	–65 to 70 dB	±0.2 dB
	–70 to 75 dB	±0.4 dB
	– 75 to 80 dB	±1.5 dB
Accuracy	– 30 to 70 dB	±1.0 dB
	–70 to 75 dB	±1.7 dB
	– 75 to 80 dB	±3.0 dB

Environmental

Parameter

Warm-up time	20 min
Operating temperature, humidity	25 ±5°C, non-condensing humidity
Storage temperature range	–30 to +60°C

Physical

Parameter

Size (W x H x D)	4.06 x 13.26 x 37.03 cm (1.6 x 5.22 x 14.58 in)
Weight (approximate)	1.2 kg (2.65 lb)
Recalibration Period	1 year

1. Total expanded uncertainty (2σ) same connector being reconnected using internal source

2. All measurement specifications provided at 5 s averaging time unless otherwise stated

3. 24-channel ribbon fiber

Ordering Information

For more information on this or other products and their availability, please contact your local JDSU account manager or JDSU directly at 1-800-498-JDSU (5378) in North America and +800-5378-JDSU worldwide or via e-mail at customer.service@jdsu.com.

Product Code	Description
MORL-A13500-MSTD	IL/RL Meter, Standard dual wavelength (1310, 1550 nm)
MORL-A13500-MBID	IL/RL Meter, Integrated bidirectional, dual wavelength (1310, 1550 nm)
MORL-A13456-MSTD	IL/RL Meter, Standard quad wavelength (1310, 1490, 1550, 1625 nm)
MORL-A13456-MBID	IL/RL Meter, Integrated bidirectional, quad wavelength (1310, 1490, 1550, 1625 nm)

Fiber Type Options (Required)

M100 9/125 fiber type

Connector Options (Required)

MFA FC/APC connector type

Optional mLCS-A1

Product Code	Description
MLCS-A1104B	Single 1 x 4 switch, bulkheads
MLCS-A1108B	Single 1 x 8 switch, bulkheads
MLCS-A2112B	Single 1 x 12 switch, bulkheads (dual width)
MLCS-A2124B	Single 1 x 24 switch, bulkheads (dual width)

Fiber Type Options (Required)

M100 9/125 fiber type

Connector Options (Required)

MFA FC/APC connector type

Optional Integrating Sphere¹

Product Code	Description
AC990	72 Fiber Integrating Sphere, locking style

1. For additional mainframe information refer to Multiple Application Platform MAP-200 data sheet.

Test & Measurement Regional Sales

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