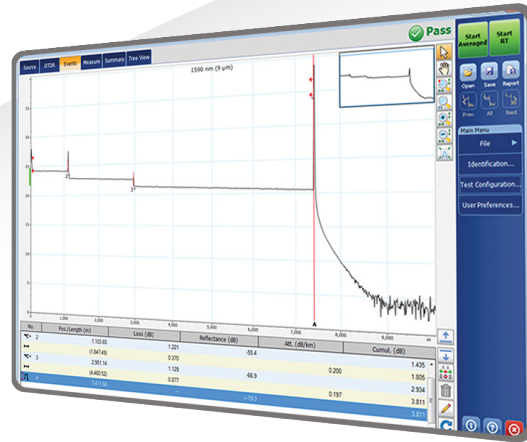


Optical Wave Expert

MEASURE, DIAGNOSE AND TROUBLESHOOT ON A SINGLE PORT



Feature(s) of this product is/are protected by one or more of : US patent 8,576,389 and equivalent patents pending and/or granted in other countries; US patent 9,170,173; US patent 9,571,186; US patent 10,014,935; US patent 9,641,243; US patent 9,134,197 and equivalent patents pending and/or granted in other countries; and US 9,506,838, US design patent D710,222 and equivalent(s) in other countries; and other US pending patent(s).



An industry-first device that combines channel power validation with tunable DWDM OTDR capabilities on a single port.

KEY FEATURES

- Integrated DWDM channel checker and OTDR on a single port (patent-pending)
- Intelligent channel power level measurements
- Compact and portable form factor
- iOLM-ready: one-touch multiple acquisitions, with clear MUX/DEMUX characterization
- C-BAND ITU-T G.692 DWDM grid channels (12-62)
- Bar graph and table view on wide touchscreen display
- In-channel and testing of active networks
- Intuitive graphical user interface (GUI) and workflow

APPLICATIONS

- DWDM link characterization through MUX, DEMUX and OADM
- DWDM link troubleshooting (DAA, RPHY, C-RAN)
- DWDM metro Ethernet links
- Deployment of commercial services
- P2MP access networks

RELATED PRODUCTS



Fiber inspection probe
FIP-400B (WiFi or USB)



xWDM OTDR
FTBx-740C



Optical spectrum analyser
FTBx-5235



100G multiservice test module
FTBx-88200NGE



INTELLIGENT, AUTOMATED AND INTEGRATED. INNOVATION AT WORK.

The Optical Wave Expert integrates channel power validation and reflectometry characterization on a single port. This means that technicians can automatically identify faulty channels and follow through with fault location by leveraging OTDR or iOLM (intelligent Optical Link Mapper) capabilities.

Technicians can now perform instant channel power readings through an intuitive GUI environment and seamlessly benefit from tunable OTDR capabilities. The rugged and compact MaxTester platform provides the most efficient and practical form factor for field use.

The integration of channel checker and OTDR capabilities on a single port means less unnecessary manipulation of the optical fiber and improved field efficiency. This translates into faster mean-time-to-repair (MTTR) and makes the trial and error approach—which can disable nodes—obsolete.

CHANNEL CHECKER

Thanks to the bar graph and the intuitive wide touchscreen, the channel power diagnostics are displayed clearly.

By combining a channel checker and OTDR capabilities on a single port, the workflow becomes highly efficient. Technicians can assess the power levels and locate faults on the spot, for improved mean time to repair (MTTR). This patent-pending feature not only saves time but also reduces unnecessary manipulations, hence avoiding damage to the connectors.

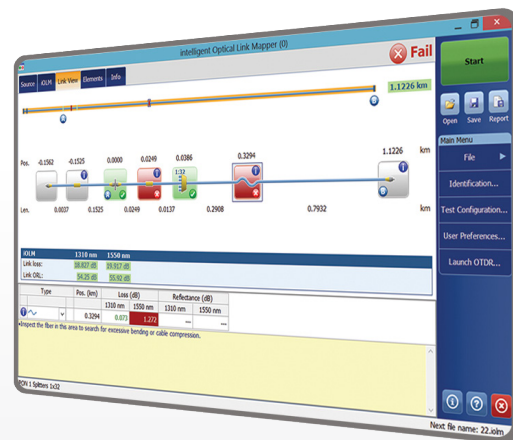


DWDM OTDR

Once the channel power diagnosis has detected a faulty channel, the OTDR can be configured with the appropriate parameters. This combination of channel checker and OTDR avoids additional manipulations and reduces the risk of human error.

Use a DWDM tunable OTDR for:

- › Characterizing a single-ended fiber link
- › Validating continuity and end-to-end loss through MUX, OADM and DEMUX (during construction)
- › In-service testing using the customer's wavelength port—without impacting other customer wavelengths nor incurring downtime
- › Troubleshooting and characterization by a single operator from the headend
- › Live troubleshooting without damaging SFPs^a



a. The iOLM advanced package includes the Optimode—SFP safe.

iOLM—REMOVING THE COMPLEXITY FROM OTDR TESTING

OTDR testing comes with its load of challenges...



WRONG OTDR TRACES



COUNTLESS TRACES TO ANALYZE



REPEATING THE SAME JOB TWICE



COMPLEX INSTRUMENT TRAINING/SUPPORT

In response to these challenges, EXFO developed a better way to test fiber optics: The iOLM is an OTDR-based application designed to simplify OTDR testing by eliminating the need to configure parameters, and/or analyze and interpret multiple complex OTDR traces. Its advanced algorithms dynamically define the testing parameters, as well as the number of acquisitions that best fit the network under test. By correlating multipulse widths on multiple wavelengths, the iOLM locates and identifies faults with maximum resolution—all at the push of a single button.

How does it work?



Turning traditional OTDR testing into clear, automated, first-time-right results for technicians of any skill level.

Patent protection applies to the iOLM, including its proprietary measurement software.

Three ways to benefit from the iOLM

COMBO



Run both iOLM and OTDR applications (Oi code)

UPGRADE



Add the iOLM software option to your iOLM-ready unit, even while in the field

iOLM ONLY



Order a unit with the iOLM application only

iOLM features value pack

In addition to the standard iOLM feature set, you can select added-value features as part of the **Advanced** package or standalone options. Please refer to the iOLM specification sheet for the complete and most recent description of these value packs.

iOLM for DWDM networks

All iOLM benefits tailored to DWDM network topologies and challenges: optimized DWDM algorithm, new icon to represent MUX, DEMUX and OADM.

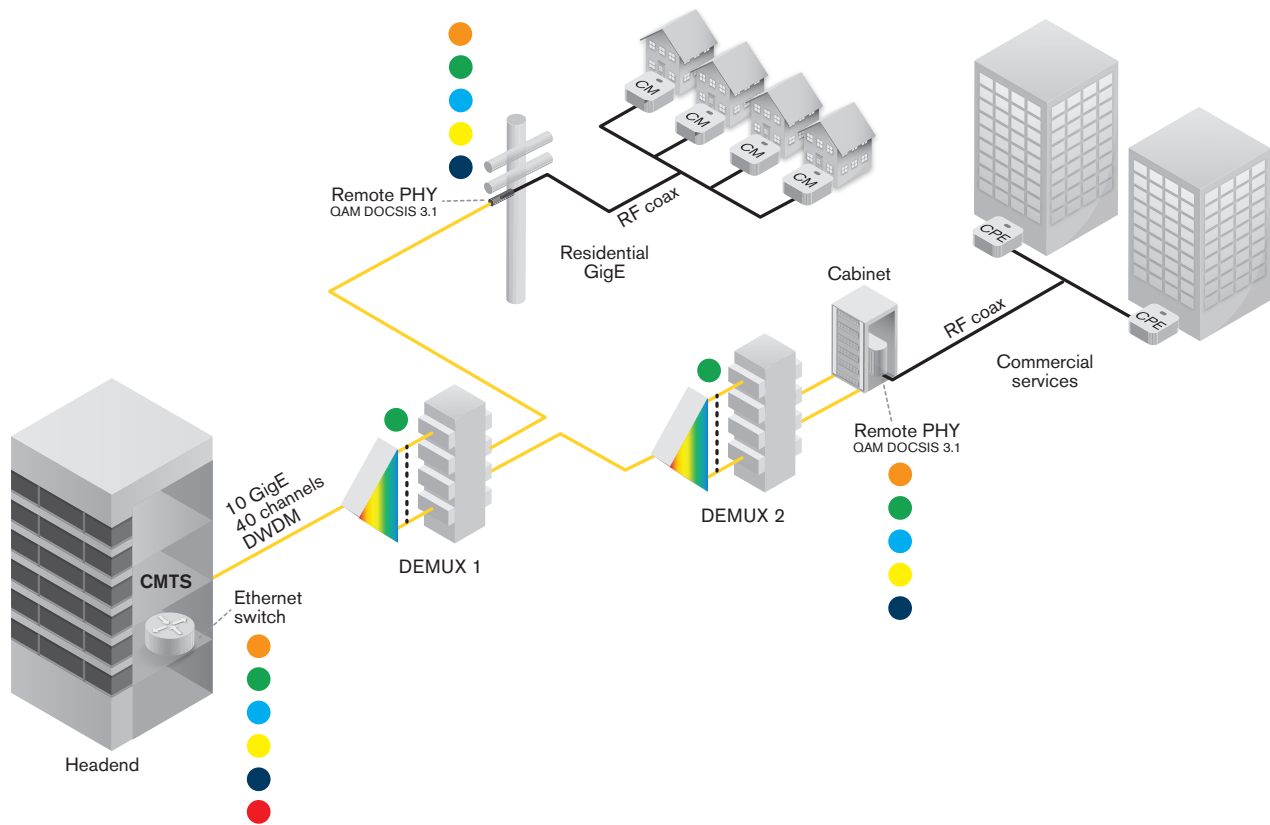
Typical DWDM passive networks will exhibit a series of high loss MUX/DEMUX or OADM, which would lead the technician to use longer pulse widths to reach the end of the link at the expense of front-end resolution, in a very similar way to what has been seen in PON networks. iOLM's dynamic multipulse acquisition accurately characterizes the complete link with all necessary pulses, for best resolution along the link and generating a single iOLM file per link to facilitate reporting.

Many DWDM passive networks rely on duplex fibers for TX/RX on the same wavelength, iLoop (iOLM's loopback mode) will greatly increase efficiency in those cases, by characterizing TX and RX link in a single acquisition. iLoop guides the user in the test sequence and automates the process of generating single files and reports per link. ^a

a. For more details about iLoop, refer to the iOLM specification sheet.

END-TO-END DWDM FOOTPRINT

Empowering the technician from the headend to the node



Essential tools for comprehensive testing

Optical Wave Expert



Orange circle icon: DWDM troubleshooting

FIP-400B Series



Green circle icon: Connector inspection

FTB-740 Series



Blue circle icon: DWDM and CWDM testing

FTB-5235



Yellow circle icon: DWDM spectral validation

EtherCHK-1-10



Dark blue circle icon: Ethernet service validation

FTB-5700



Red circle icon: Dispersion testing

Figure 1. Architecture example of Node+0 with Remote PHY

ALSO AVAILABLE IN FTBx FORMAT

The Optical Wave Expert is also available as an FTBx module, that can be used with the following FTB test platforms:



FTBx module
Optical Wave Expert

THE OPTICAL WAVE EXPERT FTBx MODULE IS COMPATIBLE WITH:



Platform
FTB-1v2/FTB-1Pro



Platform
FTB-2/FTB-2 Pro



Platform
FTB-4 Pro

OTDR SPECIFICATIONS (for MAX and FTBx version)

All specifications valid at 23 °C ± 2 °C with an FC/APC connector, unless otherwise specified.

| TECHNICAL SPECIFICATIONS | |
|---|---|
| Laser nominal wavelength | C-band tunable 1527.99-1567.95 nm ITU-T G694.1 channels 12-62 (191.2-196.2 THz) |
| Central wavelength uncertainty ^a | DWDM 50 GHz channel wavelength control |
| Channel spacing tuning | 50 GHz and 100 GHz increments on ITU-T G694.1 grid |
| Dynamic range at 20 µs (dB) ^b | 40 |
| Event dead zone (m) ^c | 0.7 |
| Attenuation dead zone (m) ^c | 3.5 |
| Distance range (km) | 0.1 to 400 |
| Pulse widths (ns) | 5 to 20 000 |
| Sampling points | Up to 256 000 |
| Sampling resolution (m) | 0.04 to 10 |
| Distance accuracy (m) ^d | ±(0.75 + 0.0025 % x distance + resolution) |

OPTICAL CHANNEL CHECKER SPECIFICATIONS (for MAX and FTBx version)

| TECHNICAL SPECIFICATIONS ^e | |
|---|--------------------------------------|
| Wavelength range (C-band) | 1527.99-1567.95 nm (191.2-196.2 THz) |
| ITU channels | ITU-T G694.1 channels 12-62 |
| Channel spacing | DWDM 100 GHz |
| Dynamic range per channel (dBm) | 10 to -40 |
| Maximum total safe power (dBm) | 20 |
| Absolute power uncertainty (dB) (typical) | 1 |
| ORL (dB) | > 35 |
| Measurement time (s) | < 3 |

Note: For complete details on all available configurations, please refer to the ordering information section further below.

- a. Typical, using a 10-µs pulse.
- b. Typical dynamic range with a three-minute averaging at SNR = 1.
- c. Typical for reflectance at -45 dB, using a 5-ns pulse.
- d. Does not include uncertainty due to fiber index.
- e. All specifications typical at 1550 nm and 23 °C ± 2 °C, with an SC connector.

SPECIFICATIONS (for MAX version only)

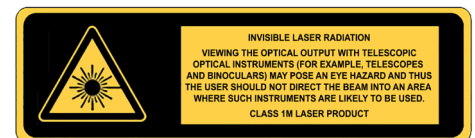
BUILT-IN POWER METER SPECIFICATIONS (GeX) (optional) ^a

| | |
|--|---|
| Calibrated wavelengths (nm) | 850, 1300, 1310, 1490, 1550, 1625, 1650 |
| Power range (dBm) ^b | 27 to -50 |
| Uncertainty (%) | ±5 % ± 10 nW |
| Display resolution (dB) | 0.01 = max to -40 dBm 0.1 = -40 dBm to -50 dBm |
| Automatic offset nulling range ^{b, d} | Max power to -30 dBm |
| Tone detection (Hz) | 270/330/1000/2000 |

VISUAL FAULT LOCATOR (VFL) (optional)

| |
|--|
| Laser, 650 nm ± 10 nm |
| CW/Modulate 1 Hz |
| Typical P _{out} in 62.5/125 μm: > -1.5 dBm (0.7 mW) |
| Laser safety: Class 2 |

LASER SAFETY ^e



GENERAL SPECIFICATIONS (for MAX version only)

TECHNICAL SPECIFICATIONS

| | |
|-----------------------|--|
| Display | 7-in (178-mm) outdoor-enhanced touchscreen, 800 x 480 TFT |
| Interfaces | Two USB 2.0 ports RJ45 LAN 10/100 Mbit/s |
| Storage | 2 GB internal memory (20 000 OTDR traces, typical) |
| Batteries | Rechargeable lithium-polymer battery 8 hours of operation as per Telcordia (Bellcore) TR-NWT-001138 |
| Power supply | Power supply AC/DC adapter, input 100-240 VAC, 50-60 Hz |
| Size (H x W x D) | 166 mm x 200 mm x 68 mm (6 9/16 in x 7 7/8 in x 2 3/4 in) |
| Weight (with battery) | 1.5 kg (3.3 lb) |
| Temperature | Operating ^f -10 °C to 50 °C (14 °F to 122 °F) Storage -40 °C to 70 °C (-40 °F to 158 °F) |
| Relative humidity | 0 % to 95 % noncondensing |

ACCESSORIES (optional)

| | | | |
|-----------|--|---------|--|
| GP-10-100 | Rigid carrying case | GP-2208 | Spare stylus |
| GP-10-061 | Soft carrying case | GP-2209 | Spare battery |
| GP-10-072 | Semi-rigid carrying case | GP-2240 | Utility glove |
| GP-1008 | VFL adapter (2.50 mm to 1.25 mm) | GP-2242 | Replacement hand strap |
| GP-2155 | Carry-on size backpack | GP-2243 | Spare AC/DC adapter (specify country power cord) |
| GP-2205 | DC vehicle battery-charging adaptor (12 V) | GP-3115 | Kickstand |

a. At 23 °C ± 1 °C, 1550 nm and FC connector. With modules in idle mode. Battery operated after 20-minute warm-up.

b. Typical.

c. At calibration conditions.

d. For ±0.05 dB, from 10 °C to 30 °C.

e. Class 2 laser safety applicable for the VFL option.

f. Valid for OTDR/iOLM tests; for Channel Checker tests operating temperature 0 °C to 40 °C.

ORDERING INFORMATION

MAX-740C-DWOCC-XX-XX-XX-XX-XX-XX-XX-XX-XX-XX

Model

MAX-740C-DWOCC = DWDM tunable SM OTDR
+ channel checker C-band
1528-1568 nm (ITU 12-62),
100 GHz, 40 dB (9/125 μm)

Base software

OTDR = Enables OTDR application only
iOLM = Enables iOLM application only
Oi = Enables OTDR and iOLM applications

iOLM Software Option

00 = iOLM Standard software
iADV = Enables iOLM Advanced
iLOOP = Enables loopback testing mode

Connector

EA-EUI-28 = APC/DIN 47256
EA-EUI-89 = APC/FC narrow key
EA-EUI-91 = APC/SC
EA-EUI-95 = APC/E-2000
EA-EUI-98 = APC/LC

Power meter

00 = Without power meter
VFL = Visual fault locator (650 nm)
PM2X = Power meter; GeX detector
VPM2X = VFL and power meter; GeX detector

Power meter connector adapter

FOA-22 = FC/PC, FC/SPC, FC/UPC, FC/APC
FOA-32 = ST: ST/PC, ST/SPC, ST/UPC
FOA-54B = SC: SC/PC, SC/SPC, SC/UPC, SC/APC
FOA-96B = E-2000/APC
FOA-98 = LC
FOA-99 = MU

WiFi and Bluetooth*

00 = Without RF components
RF = With RF capability (WiFi and Bluetooth) ^{a, b}

Extra FIP-400B tips^c

Bulkhead tips
FIPT-400-LC = LC tip for bulkhead adapters
FIPT-400-LC-APC = LC/APC tip for bulkhead adapter
FIPT-400-SC-APC = SC APC tip for bulkhead adapter^e
FIPT-400-SC-UPC = SC UPC tip for bulkhead adapter

Patchcord tips

FIPT-400-U12M = Universal patchcord tip for 1.25 mm ferrules
FIPT-400-U12MA = Universal patchcord tip for 1.25 mm ferrules APC
FIPT-400-U25M = Universal patchcord tip for 2.5 mm ferrules^d
FIPT-400-U25MA = Universal patchcord tip for 2.5 mm ferrules APC^e

Base tips^f

APC = Includes FIPT-400-U25MA and FIPT-400-SC-APC
UPC = Includes FIPT-400-U25M and FIPT-400-FC-SC

Inspection probe model^g

00 = Without inspection probe
FP410B = Digital video inspection probe
Triple magnification
FP420B = Analysis digital video inspection probe
Automated pass/fail analysis
Triple magnification
Autocentering
FP425B = Wireless digital video inspection probe^b
Automated pass/fail analysis
Triple magnification
Autocentering
FP430B = Automated analysis digital video inspection probe
Automated focus
Automated pass/fail analysis
Triple magnification
Autocentering
FP435B = Wireless analysis digital video inspection probe^b
Automated focus
Automated pass/fail analysis
Triple magnification
Autocentering

Example: MAX-740C-DWOCC-Oi-iLOOP-EA-EUI-91-VPM2X-FOA-54B-FP435B-APC-RF

a. Not available in China.

b. RF option is mandatory and automatically included if FP425B or FP435B fiber inspection probe model is selected.

c. This list represents a selection of fiber inspection tips that covers the most common connectors and applications but does not reflect all the tips available. EXFO offers a wide range of inspection tips, bulkhead adaptors and kits to cover many more connector types and different applications. Please contact your local EXFO sales representative or visit www.EXFO.com/FIPTips for more information.

d. Included when UPC base tips are selected.

e. Included when APC base tips are selected.

f. Available if inspection probe is selected.

g. Includes ConnectorMax2 software.

ORDERING INFORMATION

FTBx-740C-DWOCC-XX-XX-XX

Model

FTBx-740C-DWOCC = DWDM tunable SM OTDR
+ channel checker C-band
1528-1568 nm (ITU 12-62),
100 GHz, 40 dB (9/125 μ m)

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OTDR = Enables OTDR application only
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Connector

EA-EUI-28 = APC/DIN 47256
EA-EUI-89 = APC/FC narrow key
EA-EUI-91 = APC/SC
EA-EUI-95 = APC/E-2000
EA-EUI-98 = APC/LC

Example: FTBx-740C-DWOCC-Oi-EA-00-EUI-91

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