OV-1000 Optical Time Domain Reflectometer (OTDR)

An Evolant[®] Solutions Product

Applications

 Testing and troubleshooting of LAN, Telco, CATV and FTTx networks

Description

Corning Cable Systems OV-1000 Optical Time Domain Reflectometer (OTDR) provides testing flexibility by combining a rugged platform with field-interchangeable multimode, single-mode and advanced testing modules. All OTDR modules can be used as continuous wave (CW) light sources.

Available as options on the mainframe are a power meter and Visual Fault Locator (VFL). The OV-1000 utilizes Windows® CE technology allowing for a fast power-up time of four seconds from sleep mode. The OV-1000 has an 80 MB internal flash memory that typically stores up to 1500 traces and eliminates the need for a hard drive, which can fail under extreme field conditions. If extra storage capacity is needed, the unit offers USB A/B ports and a compact flash slot.

The OV-1000 OTDR product line offers a wide variety of multimode and single-mode modules. The OV-1000 has the capacity to hold up to two OTDR modules or one OTDR module and one advanced testing module at the same time. Modules can be easily switched out in the field, in just a matter of seconds, without the use of tools.

The OV-1000 has a 6.4-in color touch screen that is resistant to shock, water and most common chemicals used in the field. The screen is large enough to view both the trace and the event table simultaneously, eliminating the need to toggle back and forth between the two.

Along with offering three OTDR test modes — Auto, Advanced and Template Trace — the OV-1000 is future-ready with the ability to accept protocol testing modules, such as Gigabit Ethernet, as they are made available.



OV-1000 OTDR | Photo LAN731



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Features / Benefits

- Rugged, splash-proof mainframe allows for testing in harsh conditions
- 6.4-in color thin-film transistor (TFT) liquid crystal display (LCD) is easily readable when testing indoors under artificial light and outdoors in the sunlight
- Dial and keypad make scrolling and selecting faster and easier
- Accommodates up to two field-interchangeable modules, eliminating the need to change modules as often
- Windows® CE-based technology with four second power-up time from sleep mode allows the user to begin testing immediately
- Instantaneous AutoSync USB makes it easier and faster to transfer files and perform software upgrades
- Portable file transfer can be achieved via compact flash or with a USB memory stick
- Touch screen keyboard eliminates the need for an external keyboard



OV-1000 OTDR Kit | Photo LAN730

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Specifications

OV-1000 OTDR Mainframe ¹		
Parameter	Specification	
Display	Color touch screen, 640 x 480 TFT 163 mm (6.4 in)	
Interfaces	USB A main; USB B remote; compact flash; fiber inspection probe connector port (video)	
Storage	Internal 80 MB (flash); USB stick 2 GB (optional); compact flash cards (optional)	
Batteries ²	Rechargeable lithium ion	
Battery Operating Time	8 h as per Bellcore TR-NWT-001138	
Power Supply	AC/DC adapter, input: 100 to 240 V, 50 to 60 Hz, 2 A max, output; 24 V DC, 90 watts	
Operating Temperature	-5° to 50°C (23° to 122°F)	
Storage Temperature ³	-40° to 70°C (-40° to 158°F)	
Relative Humidity	0% to 95% max, non-condensing	
Size (H x W x D)	32.2 x 19.7 x 10.9 cm (12.6875 x 7.75 x 4.3125 in)	
Weight	2.5 kg (5.4 lb)	
Vibration	< 1.5 g at 10 to 500 Hz (on 3 main axes)	
Mechanical Shock	< 760 mm on 6 sides and 8 main edges (according to GR-196-CORE)	

Power Meter 4- Optional

Calibrated Wavelengths (nm)	850, 1300, 1310, 1490, 1550, 1625, 1650
Detector	InGaAs
Power Range (dBm)	10 to -86
Uncertainty ⁵	± 5% ± 3 pW (InGaAs)
Display Resolution (dB)	0.01 = max to -76 dBm; 0.1 = -76 dBm to -86 dBm; 1 = -86 dBm to min
Automatic Offset Nulling Range ⁶	Max to -63 dBm for InGaAs
Tone Detection (Hz)	270/1000/2000
Safety	21 CFR 1040.10 and IEC 60825-1:1993 + A2:2001

Visual Fault Locator (VFL)- Optional

Central Wavelength	Laser, 650 nm ± 10 nm
Pulse	Continuous wave (CW)
Typical Power Output ⁷	3 dBm (2 mW)

Notes:

- ¹ All specifications valid at 23°C (73°F).
- ² Standard recharge time is 3 hours. Recharge temperature: 0° to 35°C (32° to 95°F). ³ Not including internal batteries. Battery maximum storage temperature: 60°C (140°F).
- 4 At 23°C \pm 1°C, 1550 nm and FC connector. With modules in idle mode. Battery operated.
- ⁵ Up to 5 dBm. ⁶ For ± 0.05 dB, from 18° to 28°C.
- ⁷ For 62.5/125 µm fiber.

(continued)



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Specifications (continued)

Multimode Module ¹				
Model	Wavelength (nm)	Dynamic Range².³ (dB) Zone⁴ (m)	Event Dead Zone⁴ (m)	Attenuation Dead Zone⁴ (m)
400-MD26 (-V)	$850 \pm 20/1300 \pm 20$	27/26	1/1	3/4

Single-mode Modules¹

Model	Wavelength (nm)	Dynamic Range ⁵ at 10 µs (dB)	Dynamic Range⁵ at 20 μs (dB)	Event Dead Zone ⁶ (m)	Attenuation Dead Zone ⁶ (m)
400-SD34 (-V)	$1310 \pm 20/1550 \pm 20$	35/34	37/35	1/1	4.5/5
400-SD37 (-V)	1310 ± 20/1550 ± 20	38/37	39/38	1/1	5/6 (4/4)

Quad Module¹

Model	Wavelength (nm)	Dynamic Range ^{2,3,5} at 10 μs (dB)	Event Dead Zone⁴,⁵ (m)	Attenuation Dead Zone ^{4,6} (m)
400-MDSD (-V)	$850 \pm 20/1300 \pm 20$	27/26	1/1	3/4
	$1310 \pm 20/1550 \pm 20$	35/34	1/1	4.5/5

General Specifications

- Control of the Cont		
	400-MD26/400-MDSD	400-SD34/400-SD37/400-MDSD
Distance Range (km)	0.1, 0.3, 0.5, 1.3, 2.5, 5, 10, 20, 40	1.25, 2.5, 5, 10, 20, 40, 80, 160, 260
Pulse Width (ns)	5, 10, 30, 100, 275, 1000	5, 10, 30, 100, 275, 1000, 10,000, 20,000
Multimode Launch Conditions ⁷	Class CPR 1 or 2	N/A
Linearity (dB/dB)	± 0.03	± 0.03
Loss Threshold (dB)	0.01	0.01
Loss Resolution (dB)	0.001	0.001
Sampling Resolution (m)	0.04 to 2.5	0.04 to 5
Sampling Points	Up to 128,000	Up to 128,000
Distance Uncertainty ⁸ (m)	$\pm (0.75 + 0.0025\% \text{ x distance})$	$\pm (0.75 + 0.0025\% \text{ x distance})$
Measurement Time	User-defined (60 min. maximum)	User-defined (60 min. maximum)
Real-time Refresh (s)	Guaranteed: ≤ 0.4	Guaranteed: ≤ 0.4 , Typical: ≤ 0.3
Stable Source Output Power ⁹ (dBm)	-1.5	-8 (SD34, MDSD), -4.5 (SD37)
Recommended Calibration Cycle (yr)	1	1
Visual Fault Locator ¹⁰ (optional)	650 nm \pm 10 nm, $P_{out} = 3 \text{ dBm}$	650 nm \pm 10 nm, $P_{out} = 3 \text{ dBm}$

Notes:

- All specifications valid at $23^{\circ}C \pm 2^{\circ}C$ (73.4°F ± 3.6 °F) with an FC/PC connector, unless otherwise specified.
- ² Typical dynamic range with longest pulse and three-minute averaging at SNR = 1.
- ³ Multimode dynamic range is specified for 62.5 µm fiber; a 3 dB reduction is seen when testing 50 µm fiber.
- t Typical dead zone of multimode reflectance below -35 dB and single-mode reflectance below -45 dB, using a 5 ns pulse.
- Typical dynamic range with three-minute averaging at SNR = 1.
- Typical dead zone of single-mode modules for reflectance below -45 dB, using a 10 ns pulse (5 ns pulse for 400-SD34/SD37/SD135/ST37/ST137).
- Controlled launch conditions allow 50 µm and 62.5 µm multimode fiber testing.
- ⁸ Does not include uncertainty due to fiber index and sampling resolution.
- ⁹ Typical output power is given at 1300 nm for multimode and 1550 nm for single-mode.
- 10 Power output is for 62.5/125 µm fiber.



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Part Number	Description
Basic Kits	
Basic Kits include OV software and user's ma	7-1000 Mainframe, power supply, battery, appropriate OTDR adapter(s), CD with OTSView PC emulation anual, cleaning supplies and hard-shell transit case.
1000BK-SD34	Short-Range Dual Single-Mode OTDR (module 400-SD34) with SC and FC OTDR port adapters
1000BK-SD37	Mid-Range Dual Single-Mode OTDR (module 400-SD37) with SC and FC OTDR port adapters
1000BK-MD26	Dual Multimode OTDR (module 400-MD26) with SC and ST® Compatible OTDR port adapters
1000BK-MDSD	Dual Multimode and Single-Mode OTDR (module 400-MDSD) with SC and ST Compatible OTDR port adapters

Deluxe Kits

Deluxe Kits include OV-1000 Mainframe with power meter and VFL, power supply, battery, appropriate OTDR port adapters, CD with OTSView PC emulation software and user's manual, OTS Batch PC batch processing software, cleaning supplies and hard-shell transit case.

1000DK-SD34	Short-Range Dual Single-Mode OTDR (module 400-SD34) Mainframe has power meter and VFL, SC and FC OTDR and meter port adapters, OTS Batch Software
1000DK-SD37	Mid-Range Dual Single-Mode OTDR (module 400-SD37) Mainframe has power meter and VFL, SC and FC OTDR and meter port adapters, OTS Batch Software
1000DK-MD26	Dual Multimode OTDR (module 400-MD26) Mainframe has power meter and VFL, SC and ST Compatible OTDR and meter port adapters, OTS Batch Software
1000DK-MDSD	Dual Multimode and Dual Single-Mode OTDR (module 400-MDSD) Mainframe has power meter and VFL, SC and ST Compatible OTDR and meter port adapters, OTS Batch Software

Mainframes

Standard components on mainframes include 6.4-in color touch screen, USB A/B ports, RJ-45 port and compact flash slot.		
1000-MAINF	OTDR Controller (same frame as basic frame)	
1000-MAINF-VPM OTDR Controller with power meter and VFL (same frame as deluxe frame)		

OV-1000 Modules

400-MD26 Multimode OTDR Module,	850/1300 nm (27/26 dB)
400-SD34 Single-Mode Short-Range O	TDR Module, 1310/1550 nm (34/32.5 dB)
400-SD37 Single-Mode Mid-Range OT	TDR Module, 1310/1550 nm (37/35.5 dB)
400-MDSD Multimode/Single-Mode Qu	ad OTDR Module, 850/1300/1310/1550 nm (26/25/35/34 dB)



OV-1000 Optical Time Domain Reflectometer (OTDR)

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Ordering Information (continued)

Accessories	
UI-SC	Universal Interface Source/OTDR Connector Adapter, SC
UI-ST	Universal Interface Source/OTDR Connector Adapter, ST® Compatible
UI-FC	Universal Interface Source/OTDR Connector Adapter, FC
OA-SC	Power Meter Connector Adapter, SC
OA-ST	Power Meter Connector Adapter, ST Compatible
OA-FC	Power Meter Connector Adapter, FC
OA-LC	Power Meter Connector Adapter, LC
OA-MTRJ	Power Meter Connector Adapter, MTRJ
OTSBATCH	PC Batch Processing Software
CASE-OV-1000	Hard-Shell Transit Case with wheels
PS-OV-1000	Power Supply for 100-240 V AC with US line cord
1000-OV-BATT	Replacement Battery for OV-1000
1000-MEMORY-2G	OV-1000 Memory Stick for 2 GB of USB Storage (Windows® CE compatible)
1000-STYLUS	Replacement Stylus for OV-1000
TE-WARRANTY-1	1-year Extended Warranty, includes all repairs and replacement charges of defective parts excluding freight; does not include normal, yearly calibration
TE-WARRANTY-2	2-year Extended Warranty, includes all repairs and replacement charges of defective parts excluding freight; does not include normal, yearly calibration

Accessories- OTDR Access Jumpers

PTF-100M-6P5050	Portable Test Fiber Box, MM 62.5 µm (standard) fiber, ST to ST Connectors, 100 m
PTF-100M-6P3950	Portable Test Fiber Box, MM 62.5 µm (standard) fiber, SC to ST Connectors, 100 m
PTF-100M-6P3939	Portable Test Fiber Box, MM 62.5 µm (standard) fiber, SC to SC Connectors, 100 m
PTF-100M-5P5050	Portable Test Fiber Box, Pretium 300™ Solutions Multimode Laser-optimized, ST to ST Connectors, 100 m
PTF-100M-5P3950	Portable Test Fiber Box, Pretium 300 Solutions Multimode Laser-optimized, SC to ST Connectors, 100 m
PTF-300M-SP5865	Portable Test Fiber Box, single-mode fiber, SC UPC to SC APC connectors, 300 m
PTF-300M-SP5454	Portable Test Fiber Box, single-mode fiber, FC UPC to FC UPC connectors, 300 m
PTF-300M-SP5858	Portable Test Fiber Box, single-mode fiber, SC UPC to SC UPC connectors, 300 m
PTF-300M-SP6161	Portable Test Fiber Box, single-mode fiber, ST UPC to ST UPC connectors, 300 m

Note: $ST = ST^{\otimes}$ Compatible Connector

Note: Additional portable test fiber box configurations are available on request. Please contact a Corning Cable Systems Customer Service representative for more information.



OV-1000 Optical Time Domain Reflectometer (OTDR) Optional Video Probe for Connector Inspection

An Evolant[®] Solutions Product

Applications

The video probe allows for the inspection of a fiber optic connector's end-face quality. The resulting images can be used as documentation of end-face quality and cleanliness.

Description

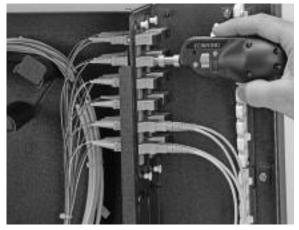
The hand-held analog video probe is the ideal solution for inspecting the quality of a fiber optic connector end-face. The probe's design and thumb wheel placement allow for an easy one-hand operation. The magnification control thumb wheel can be used to adjust the image from 200x to 400x. Likewise, the focus control wheel is used to bring the image into focus.

The probe has the National Television System Committee (NTSC) video output format in order to maintain high-level analog video quality. A 4-pin output connection allows for a seamless connection to OV-1000 platform with the supplied video cable. These images can be saved in JPEG format to the OV-1000 flash memory.

A variety of precision inspection tips are available for the video probe. The "universal" tips are used when viewing a patch cord connector end-face or when viewing a connector before plugging it into the patch panel. The "bulkhead" tips are used when viewing a connector on the backside of patch panels through the front of the adapter. This allows for convenient inspection without removing the connector from the patch panel.

Features / Benefits

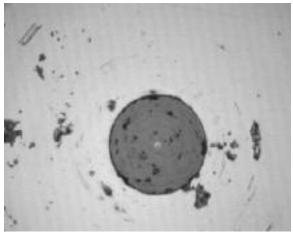
- Interfaces with the OV-1000 without the need for an additional external monitor
- Interchangeable inspection tips for a variety of connector types
- 200x to 400x microscope probe in one unit
- Ability to save images for documentation of connector end-face quality
- Coaxial illumination provides clear view of end-face condition



Video Probe in Patch Panel | Photo TEQ36



Video Probe Connected to OV-1000 | Photo TEQ35



Contaminated Connector End-Face | Photo NS134



OV-1000 Optical Time Domain Reflectometer (OTDR) Optional Video Probe for Connector Inspection

An Evolant[®] Solutions Product

Specifications

Model Number	VIP-HH-2-4
End-Face Lighting	Coaxial illumination
Magnification	200x to 400x
Connector Output	4-pin
Video Image Format	NTSC
Still Image Format	JPEG

Ordering Information

Part Number	Description
VIP-HH-2-4	Video Inspection Probe for use with OV-1000; 200x/400x magnification with coaxial lighting; includes (1) universal 2.5 mm patch cord; transfer cable for OV-1000
VIP-HH-TIP	Video Inspection Probe (VIP-HH-2-4) bulkhead tip set; includes SC, ST and FC tips for viewing connectors on the backside of the patch panel through the adapter
VIP-HH-TIP-LC	Video Inspection Probe (VIP-HH-2-4) tip set for LC connector; includes (1) LC bulkhead tip for viewing connectors on the backside of the patch panel through the adapter and (1) 1.25 mm universal patch cord tip
VIP-HH-TIP-APC	Video Inspection Probe (VIP-HH-2-4) tip set for APC connectors; includes (1) SC APC, (1) LC APC and (1) FC APC bulkhead tip for viewing connectors on the backside of the patch panel; (1) 1.25 mm APC and (1) 2.5 mm APC universal adapter for viewing an APC patch cord connectors
VIP-HH-TIPSET-SF	Complete tip set including all tips in VIP-HH-TIP, VIP-HH-TIP-LC and VIP-HH-TIP-APC
VIP-HH-OPTITIP	Video Inspection Probe Tip for viewing the connector end-face on an OptiTip™ MT Plug and Jack; includes a scroll knob to pan across the connector end-face
VIP-HH-OPTITAP	Video Inspection Probe tip set for viewing the connector end-face on an OptiTap™ Connector and an OptiTap™ Connector port

Note: Additional inspection tips are available upon request. Please contact a Corning Cable Systems Customer Service Representative for more information. Note: $ST=ST^{\circ}$ Compatible Connector



OV-1000 Optical Time Domain Reflectometer (OTDR) Optional Ethernet Module

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Applications

This Gigabit Ethernet testing module brings performance assurance to Ethernet-based services. Its testing functionality provides all the necessary measurement tools for verifying connectivity in its native format: 10/100/1000BaseT, 1000BaseSX, 1000BaseLX and 1000BaseZX.

Description

The Gigabit Testing Module offers three essential Ethernet testing methods:

Ethernet Performance Validation (RFC 2544)

The Internet Engineering Task Force (IETF) has put together a test methodology to address the issues of performance verification at the layer two and three levels. RFC 2544, a "Benchmarking Methodology for Network Interconnect Devices," specifies the requirements and procedures for testing throughput, back-to-back frames (burst), frame loss and latency. The Gigabit Testing Module can perform the RFC 2544 test suite for 10/100/1000BaseT and optical GigE interfaces at all frame sizes and at full-line rate. The Gigabit Testing Module supports automated RFC 2544 testing, which helps ensure repeatable results. Automation also provides ease of use for field technicians by enabling accurate, efficient measurements and results through a clear and simple pass/fail indication.

Bit-Error Rate Testing (BERT)

Ethernet is increasingly carried across a variety of layer-one media for longer distances. This creates a growing need for the certification of Ethernet transport on a bit-per-bit basis, which can be done using bit-error rate testing (BERT).

BERT uses a pseudo-random binary sequence (PRBS) encapsulated into an Ethernet frame, making it possible to go from a frame-based error measurement to a bit-error-rate measurement. This provides the bit-per-bit error count accuracy required for the acceptance testing of physical-medium transport systems. BERT over Ethernet should usually be used when Ethernet is carried transparently over layer-one media.



Gigabit Ethernet Module | Photo TEQ33



Gigabit Ethernet Module in OV-1000 | Photo TEQ34

OV-1000 Optical Time Domain Reflectometer (OTDR) Optional Ethernet Module

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Description (continued)

Quality of Service (Frame Analysis)

Data services are making a significant shift towards supporting a variety of applications on the same network. This shift has fuelled the need for quality of service (QoS) testing to ensure the condition and reliability of services. Service providers need to assign different qualities of service to each type of service they offer. By providing the ability to configure different Ethernet and IP QoS parameters such as VLAN ID (802.1Q), VLAN priority (802.1p), VLAN stacking (802.1ad Q-in-Q), ToS and DSCP on multiple streams, the Gigabit Testing Module allows service providers to simulate and qualify different types of applications running over their Ethernet network.

This frame analysis feature enables multi-stream traffic generation and analysis allowing for the troubleshooting of Ethernet circuits as well as customer-traffic analysis and error identification. Thanks to its packet jitter-measurement capability (RFC 3393), the Gigabit Testing Module lets service providers efficiently benchmark transport networks when it comes to delay-sensitive traffic such as voice and video over IP.



Diverter with Media Converter | Photo TEQ31

Features / Benefits

- Module is compatible with OV-1000 mainframe
- Unit can be used in multiple configurations for tesing; module to module (requires two modules); module to switch (requires an installed switch and one gigabit module); or module to diverter (requires one module and the diverter)
- Can test both copper (10/100/1000BaseT) and optical (1000BaseSX, LX or ZX) based networks
- Measures throughput, back-to-back, latency and frame loss as per RFC 2544
- Performs packet jitter measurement (IP packet-delay variation as per RFC 3393) to qualify Ethernet transport networks for transmission of delay-sensitive traffic such as voice over IP (VoIP) and video

- Simultanious traffic generation and reception at 100 percent wire speed for 10/100/1000BaseT, 1000BaseSX, 1000BaseLX or 1000BaseZX full-duplex networks at all packet sizes
- Transmits and analyzes multiple streams, perfect for installing, commissioning and maintaining Ethernet networks
- Expert-mode capability to set test thresholds for clear pass/fail test results
- Easy-to-use smart user interface (SUI) for configurable screens, customization of test suites, as well as performance reporting real-time and historical performance
- EtherBERT for bit-error-rate testing of 10, 100 and 1000 Mb/s Ethernet



OV-1000 Optical Time Domain Reflectometer (OTDR) Optional Ethernet Module

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Optical Interfaces			
	1000-SFP-850	1000-SFP-1310	1000-SFP-1550
PMD	1000BaseSX	1000BaseLX	1000BaseZX
Wavelength (nm)	850	1310	1550
Tx Level (dBm)	-9 to -3	-9.5 to -3	0 to +5
Rx Level Sensitivity (dBm)	-20	-22	-22
Maximum reach	550 m	10 km	80 km
Transmission Bit Rate (Gb/s)	1.25	1.25	1.25
Reception Bit Rate (Gb/s)	1.25	1.25	1.25
Tx Operational Wavelength Range (nm)	830 to 860	1270 to 1360	1540 to 1570
Laser type	VCSEL	FP	DFB
Eye safety	CLASS 1	CLASS 1	CLASS 1
Connector	LC	LC	LC
Transceiver type	SFP	SFP	SFP

Electrical Interfaces

	10BaseT	100BaseT	1000BaseT
Tx bit rate	10 Mb/s	125 Mb/s	1 Gb/s
Tx accuracy (ppm)	±100	±100	±100
Rx bit rate	10 Mb/s	125 Mb/s	1 Gb/s
Rx measurement accuracy (ppm)	±4.6	±4.6	±4.6
Duplex mode	Half and full duplex	Half and full duplex	Full duplex only
litter compliance	IEEE 802.3	ANSI X3.263-1995	IEEE 802.3
Connector	RJ-45	RJ-45	RJ-45
Maximum reach (m)	100	100	100

Gigabit Module

	1000-GIG-MOD	
Ports	(1) 10/100BaseT (1) 10/100/1000BaseT and (1) SFP port for GigE	
Connector types	RJ-45 (ISO 8877) and SFP	
Connector speed (Mb/s)	10/100/1000	
Duplex mode	Full/half duplex Auto-negotiation	
Maximum port capacity (Mb/s)	2000 (bi-directional)	
Size (H x W x D)	250 mm x 96 mm x 260	
Weight (without transceivers)	0.5 kg (1.1 lb)	
Operating Temperature	32°F to 104°F (0°C to 40°C)	



OV-1000 Optical Time Domain Reflectometer (OTDR) Optional Ethernet Module

An Evolant[®] Solutions Product

Ordering Information

Part Number	Description
1000-GIG-MOD	Gigabit Ethernet Testing Module for OV-1000 platform; module has two 10/100/1000BaseT and 1 Gigabit Ethernet SFP optical port; performs RFC 2544, BERT and frame analysis
1000-SFP-850	1000BaseSX (850 nm) Optical SFP Transceiver Module with LC connectors for gigabit testing module (VCSEL source)
1000-SFP-1310	1000BaseLX (1310 nm) Optical SFP Transceiver Module with LC connectors for gigabit testing module (FP Laser source)
1000-SFP-1550	1000BaseZX (850 nm) Optical SFP Transceiver Module with LC connectors for gigabit testing module (DFB Laser source)
1000-DIVERTER	Diverter for Gigabit Ethernet testing; includes Ethernet Network Interface Unit with a loop back testing feature with RJ45 interface; also includes a media converter with SFP interface; power supplies and manual; SFP purchased separately

