

T-BERD®/MTS-6000A

Multi-Services Application Module



Key Features

- Modular form factor enables field upgrade of test capabilities by adding or replacing PIMs and optics
- Multi-service capability allows simultaneous Ethernet and SONET/SDH testing through physical port
- Performs two independent tests in parallel with dual-port chassis
- Provides support for VLAN, Q-in-Q, VPLS, MPLS Tunneling applications, and IP
- Identifies problems with fiber optics faster with optical power source, high accuracy power meter, OTDR, CD, PMD, and WDM
- Provides visual fault locator and fiber microscope
- Allows for control remotely (Ethernet/IP)

Applications

- Tests 10 GigE LAN- and WAN-PHY at 850, 1310, and 1550 nm wavelengths (single-port)
- Tests dual- and single-port 10 Mb/s to 1 GigE
- Tests SONET/SDH at OC-3/STM-1 through OC-192/STM-64 line rates
- Tests Layer 1-4 Ethernet with RFC 2544, VLAN, Q-in-Q, VPLS, and MPLS
- Tests TCP/UDP at 10 Mb/s to 10 Gb/s with stateful emulation
- Tests FTP/HTTP/Telnet
- Tests IP Video at 10 Mb/s to 10 GigE line rates

In one rugged, handheld unit, the T-BERD/MTS-6000A Multi-Services Application Module delivers the industry's most compact 10-Gigabit Ethernet (GigE) multifunction tester for the installation and maintenance of carrier-grade Ethernet and Internet Protocol (IP) services. Technicians can also add testing capability with pluggable physical interface modules (PIMs), small form-factor pluggable modules (SFPs), and 10 Gb/s small form-factor modules (XFPs) to create a variety of field-configurable optical/electrical test combinations.

Transport technicians using this modular handheld field tester can quickly turn up and maintain Metro Core networks. Features include Ethernet and synchronous optical network technologies/synchronous digital hierarchy (SONET/SDH) testing at line rates from 10 Mb/s up to 10 Gb/s. It can also verify and troubleshoot higher-layer IP video, Layer 4 User Datagram Protocol/Transmission Control Protocol (UDP/TCP), File Transfer Protocol (FTP), and Hypertext Transfer Protocol (HTTP). A powerful user interface helps technicians quickly set up and evaluate tests as well as troubleshoot problems, reducing operational expense.

With field applications for servicing Metro Core telecom networks, wireless/cable switch centers and backhaul networks, government telecommunications and network equipment manufacturer field installation and support groups, the Multi-Services Application Module is the latest innovation for the award-winning, industry-leading T-BERD/MTS family of test solutions.

Ethernet, IP, TCP, and UDP Support

The Multi-Services Application Module supports 10 Mb/s to 10 GigE (local and wide area network physical layer [LAN-PHY and WAN-PHY]) testing to the Transmission Control Protocol (TCP)/UDP layer, ensuring that proven test methodologies for carrier-grade Ethernet services remain regardless of rate. Test capabilities range from testing bit error rate (BER) and verifying end-to-end connectivity to determining whether throughput, utilization, frame loss, packet jitter, and round-trip delay (RTD) characteristics meet service level agreements (SLAs).

VLAN, Q-in-Q, VPLS and MPLS Tunneling Technologies

Various mechanism and tunneling technologies exist today that let providers effectively deliver carrier-grade Ethernet services across their networks, while maintaining a specified class of service (CoS). These technologies are grouped into two categories:

- Native Ethernet protocol extensions (IEEE-based)—Virtual LAN (VLAN) tags (often referred to as 802.1q/p) and Q-in-Q (often referred to as VLAN stacking or 802.1ad) techniques
- Encapsulations by Multi-Protocol Label Switching (MPLS) networks, which also come in Layer 2 (Virtual Private LAN Service, VPLS) and Layer 3 versions

The Multi-Services Application Module enables the installation and maintenance of these technologies.

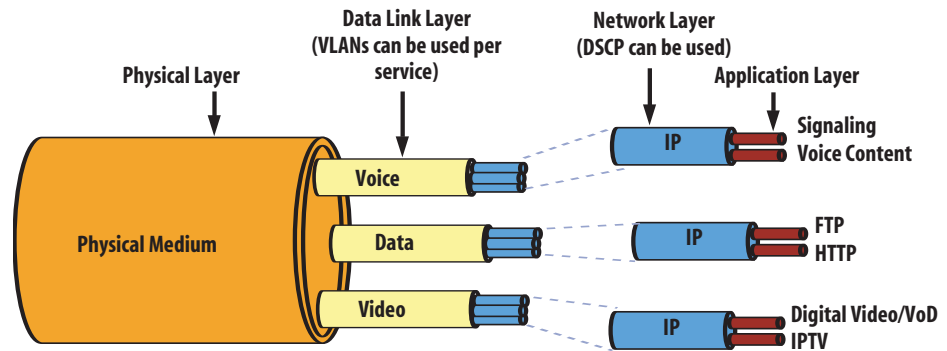


Figure 1: Example of CoS tagging structure for triple-play service delivery

Ethernet Test Features

- 10 Gb/s LAN/WAN Single-port
- 10 Mb/s to 1 Gb/s (electrical/optical) Single- and Dual-port
- 850, 1310, and 1550 nm Wavelength
- VLAN, Q-in-Q, VPLS, MPLS Tunneling
- Layer 1 BER Test
- Layer 2 Multiple Streams and Traffic Generation^a
- Layer 3 Multiple Streams and Traffic Generation^b
- Layer 4 TCP/UDP stateful emulation, Traffic Blasting
- FTP/HTTP/Telnet Connectivity and Throughput Test
- RFC-2544
- Optical Power Measurement

^a Constant, bursty, ramp, configurable source and destination address, frame format, type field (for Digital, Intel, Xerox [DIX]), frame length (including jumbo and undersized), VLAN tag, pause frames, payload, utilization percent

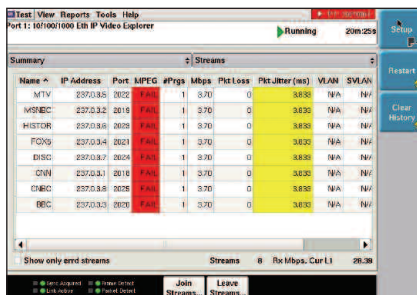
^b Configurable source and destination IP address, Domain Name Server (DNS) type, DNS server, transmit (TX) payload, type of service/differentiated services code point (TOS/DSCP), transistor-to-transistor logic (TTL), packet size length (34 to 1500 bytes), ping, trace route

IPTV-Specific Test Features

- 10 Mb/s to 10 GbE line rate test for IP television (IPTV)
- Single Program Transport Stream (SPTS)
- Multiple Program Transport Stream (MPTS)
- Video Explorer: up to 512 SPTS and 32 MPTS streams
- Bandwidth, packet loss, packet jitter
- Video Analyzer up to 16 SPTS and 1 MPTS:
 - Program clock reference (PCR) jitter, media delivery index (MDI) (per RFC-4445), continuity error bit, and error indicator bit
 - TR 101 290 priority 1 errors such as program identification (PID), program association table (PAT), and program map table (PMT)
 - Loss distance and period errors (per RFC-3357)
 - Results per transport stream, and per PID
 - Internet Group Management Protocol (IGMP) support

Additional Features and Applications

Numerous configurations and options are available for the T-BERD/MTS-6000A, including a dual test option that enables performing two independent tests in parallel; optical power source, high-accuracy power meter, optical time domain reflectometer (OTDR), chromatic dispersion (CD), polarization mode dispersion (PMD), and wavelength division multiplexing (WDM) test options that help identify fiber optic problems faster; visual fault locator (VFL), and fiber microscope options for inspection and cleaning tasks; and a remote control option for Ethernet and IP.



T-BERD/MTS-6000A Video Explorer

**T-BERD 6000 Technical Specifications
(Typical 25°C)**
General Specifications
Display

Touchscreen, TFT color, 8.4 in LCD, 800 x 600, high-visibility

Storage and I/O Interfaces

Internal memory 1000 test results

Extended memory Minimum 1 GB

2x USB V1.1, 1x RJ45 Ethernet

Power Supply

Battery type Standard removable Li-ion battery

AC/DC adapter Input 100–240 V, 50–60 Hz

Output 19 V DC/3.1 A

Operation time Typical operation time is 3 hours, depending on the application

Size and Weight

 Mainframe with one plug-in module and battery
(l x h x w) 285 x 195 x 93 mm (11.2 x 7.7 x 3.7 in)

Mainframe only (without battery and module) 2.4 kg (5.3 lb)

Mainframe with one plug-in module and battery 4 kg (9 lb)

Environmental Specifications

 Operating temperature range (no options) –20 to +50°C
(–4 to 122°F)

 Operating temperature range (all options) 0 to +40°C
(32 to 104°F)

 Storage temperature range –20 to +60°C
(–4 to 140°F)

Humidity, non-condensing 95%

Base Unit Optical Interfaces (optional)
Power Meter

Power level +10 to –55 dBm

Calibrated wavelengths 850, 1310, and 1550 nm

Connector type Universal push/pull (UPP)

Talk Set

Wavelength 1550 nm ±20 nm

Dynamic range >45 dB range

Function With data/file transfer

Laser safety Class 1M laser

Connector type Field interchangeable

Visual Fault Locator (VFL)

Wavelength 635 nm ±15 nm

Output power level <1 mW

Laser safety Class 2 laser

Connector type Universal push/pull (UPP)

Continuous Wave (CW) Light Source

Wavelengths (selection) 1310, 1550, and 1625 nm

Output power level –3.5 dBm

Stability in 15 min ±0.02 dB

Stability in 8 hrs ±0.2 dB

Laser safety Class 1M laser

Connector type Field interchangeable

Video Inspection Scope (via USB)

Magnification 250X or 400X, through the USB port

Ordering information
Chassis

C0400 Single port 10 Mb/s to 2.5 Gb/s

C0404 Dual port 10 Mb/s to 2.5 Gb/s

C1000 Single port 10 Mb/s to 10 Gb/s

C1004 Dual port

(one port 10 Mb/s to 10 Gb/s, one port 10 Mb/s to 2.5 Gb/s)

C1000LB Single port 10 Mb/s to 10 Gb/s

loopback only

Low Rate Interface Options

CT10M1GE 10/100/1000 Mb/s Elect Ethernet & 1 GigE Optical

CT25GSONSDH OC-48/STM-16

CT622MSONSDH OC-12/STM-4

CT155MSONSDH OC-3/STM-1

High Rate Interface Options

CT10GELAN 10 GigE LAN

CT10GEWAN 10 GigE WAN

CT10GSONSDH OC-192/STM-64

Additional Test Options

CTMPLSVPLS MPLS/VPLS

CTCOS Multiple Streams/COS

CTIPVIDEO IP VIDEO

CTLAYER4 Layer 4 TCP/UDP

Physical Interface Modules (PIMs)

CPSFP SFP PIM

CPXFP XFP PIM

GigE SFPs

CSFP-2G-8-1 SFP GigE and 2/1 Gb/s Fibre Channel, 850 nm, 300 m, SX

CSFP-2G-3-1 SFP GigE and 2/1 Gb/s Fibre Channel, 1310 nm, 20 km, LX

CSFP-2G-5-1 SFP GigE and 2/1 Gb/s Fibre Channel, 1550 nm, 80 km, ZX

CSFP-1G-CU SFP 10/100/1000 Mb/s Copper RJ45

2.5 Gb/s & GigE SFPs

CSFP-2G5-3-1 SFP 2.5 – 2.7 Gb/s & GigE & 2/1 Gb/s FC, 1310 nm, 40 km, LR1

CSFP-2G5-5-1 SFP 2.5 – 2.7 Gb/s & GigE & 2/1 Gb/s FC, 1550 nm, 80 km, LR2

CSFP-2G5-5-2 SFP 2.5 – 2.7 Gb/s & GigE & 2/1 Gb/s FC, 1550 nm, 15 km, IR2

155 – 622 Mb/s SFPs

CSFP-622M-3-1 SFP 155 – 622 Mb/s, 1310 nm, 15 km, LR1

CSFP-622M-5-1 SFP 155 – 622 Mb/s, 1550 nm, 80 km, LR2

100 Mb/s SFPs

CSFP-100M-3-1 SFP 100 Mb/s, 1310 nm, 2 km, MM

CSFP-100M-3-2 SFP 100 Mb/s, 1310 nm, 10 km, SM

10 Gb/s XFPs

CXFP-10G-8-1 XFP 9.95 Gb/s & 10 GigE & 10 Gb/s FC, 850 nm, 300 m, SR

CXFP-10G-3-1 XFP 9.95 – 11.1 Gb/s & 10 GigE & 10 Gb/s FC, 1310 nm, 10 km, SR1

CXFP-10G-5-1 XFP 9.95 – 11.1 Gb/s & 10 GigE & 10 Gb/s FC, 1550 nm, 40 km, IR2

CXFP-10G-5-2 XFP 9.95 – 11.1 Gb/s & 10 GigE & 10 Gb/s FC, 1550 nm, 80 km, IR2, APD

Accessories

CB-2216 SC-to-SC Cable, Single-Mode

CB-019967 LC-to-LC Cable, Single-Mode

CB-2002 FC-to-FC Cable, Single-Mode

CB-019965 LC-to-LC Cable, Multimode

CB-019011 SC-to-LC Cable, Single-Mode

CB-019013 SC-to-LC Cable, Multimode

CB-LCFC2M FC-to-LC Cable, Single-Mode

CLC10DB 10 DB LC-LC Attenuator M-F Single-Mode

CLC15DB 15 DB LC-LC Attenuator M-F Single-Mode

CLC5DB 5 DB LC-LC Attenuator M-F Single-Mode

Test & Measurement Regional Sales

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