ONT-600 Multiport Test Module (MTM)
ONT-601 MTM stand-alone configuration and MTM plug-in module for ONT-603/606/612

Our network equipment manufacturing (NEM) customers tell us that they are building higher port density into their network elements to meet the need for ever-increasing bandwidth demand, and, therefore, need more test equipment ports at a lower cost. The revolutionary JDSU ONT-600 Multiport Test Module (MTM) design provides unparalleled value with support for multiple Layers 1 to 3 protocols at 155 Mbps to 11.3 Gbps rate port rates. These unique benefits reduce CapEx and OpEx because our customers no longer have to purchase, manage, and maintain multiple tests sets to perform these functions.

The MTM supports multiport testing with four SFP/SFP+/XFP port banks. Each port bank supports one test, enabling up to four concurrent test sessions. This flexibility enables each user to generate/analyze traffic over a broad range of protocols and line rates.

The MTM also provides unparalleled value with comprehensive protocol coverage that includes the optical transport network (OTN), Gigabit Ethernet (GE)/10 GE local area network (LAN), Generic Framing Procedure (GFP), Fibre Channel (FC), and synchronous optical/synchronous digital hierarchy (SONET/SDH) technologies. It enables generating, analyzing, and selectively erroring protocol-based and unframed test traffic. For OTN testing, users can configure OTN framed clients as LAN, GFP, SONET/SDH, ODU0, ODUflex, or bulk payloads. Full client signal features are maintained when wrapped in OTN. Standard connectivity options supported while connected to a device under test are Terminal, Intrusive Through, and Nonintrusive Through modes.

The MTM is available as a stand-alone configuration or as a hot-swappable plug-in module. The stand-alone configuration is a compact, stackable 1-RU form factor known as the ONT-601 MTM-B. The plug-in MTM is for use in the ONT-603/606/612 chassis series and enables scalability of up to 48 SFP/SFP+/XFP test ports within an ONT-612 chassis.

Key Benefits
- All-in-one solution tests Layers 1 to 3 at 155 Mbps to 11.3 Gbps rates
- Reduces CapEx with high port density and a comprehensive feature set
- Maximizes efficiency and minimizes test time with multiuser, multiport capability
- Maximizes value with broad Ethernet, OTN, GFP, Fibre Channel, and SONET/SDH protocol coverage
- Complex traffic generation, deep analysis, and advanced error/alarm insertion ensures optimal system performance
- For OTN, it supports both Enhanced (ITU-T G.975 I.4 and I.7) and Generic (ITU-T G.709) FEC for complete FEC test coverage
- Unframed 600 Mbps and 1.2, 2.4, 4.9, 6.1, 9.8, and 10 Gbps CPRI rates, infiniband 2.5, 5, and 10 Gbps rates and 1.485, 1.484, 2.970, and 2.967 Gbps SDI rates

Applications
- Validate Carrier Ethernet
- Performs system verification testing
- Generate clients to fully load/analyze 40/100 G systems
- Conduct production testing on network elements
- Load 155 Mbps – 11.3 Gbps traffic

Compliance
- CE Mark
- OTN ITU-T G.709
- LAN/WAN IEEE 802.3
- SONET Telcordia GR-253-Core
- SDH ITU-T G.707
- Safety CSA Certificate of Compliance
Capabilities

Optical Interfaces
The optical interfaces are based on XFP, tunable XFP, and SFP/SFP+ pluggable optics. PIC debug control of pluggable optics.

Unframed Testing
All available rates are offered with unframed pattern and BERT capabilities.
- Unframed BERT at 28 different rates: 155.52, 614.40, and 622.08 Mbps and 1.063, 1.229, 1.25, 1.484, 1.485, 2.125, 2.488, 2.5, 2.666, 2.967, 2.970, 3.072, 4.25, 4.915, 5.0, 6.144, 6.250, 8.5, 9.83, 9.953, 10.0, 10.138, 10.313, 10.519, 10.709, 11.049, 11.095, 11.270, and 11.318 Gbps
- Unframed patterns: PRBS 2^31–1, 2^31–1, 2^23–1, 2^23–1, 2^15–1, 2^11–1, and inverted, PRBS 2^31–1 IEEE, DW 32 bits, square wave (Tx only), repeating ones/zeros editable 4 to 11 bits

OTN OTU2/OTU1 Testing
OTN OTU2/OTU1 testing supports OTU2/OTU1 applications including overclocked OTU2 rates for signal generation and analysis with deep signal manipulation (alarm, error, overhead), generic FEC (GFEC) and enhanced FEC (EFEC) generation and analysis. Also supports comprehensive ODU multiplexing (ODU0, ODUflex, ODU1, and ODU2) with multistage multiplexing as well as ODU multichannel capability.
- Standard and overclocked OTU2 rates
- GFEC and EFEC I.4 and I.7
- Bulk and fully structured clients; LAN, WAN, and SDH/SONET
- ODU multichannel with parallel generation and analysis of ODU0/1/flex mixed mappings
- Supports all TCM layers
- Overhead- and payload-based transfer delay
- Service disruption tests with high-level detail
- Client offset stuffing control at each layer
- ODU0 with GE and SDH/SONET clients
- Capture and analyze HDLC frames on GCC bytes

GFP Testing
The GFP functionality encapsulates Ethernet MAC into ODU0/1/flex or OTU2 with implementation in accordance with ITU-T G.7041, G.707, and ANSI T1.105.02. GFP-F and GFP-T are supported. Also GFP-transparent mapping in accordance with ITU-T G.7041 Par 17.4.1 encapsulates both PCS and Ethernet MAC into OTU2.
- Generation and analysis of GFP frame types
- Core header processing
- Payload-type header processing
- Error and alarm processing
- PCS and LAN Layer 2/3 traffic with full feature set
- GFP-F with extension header and full OAM support

GE and 10 GE LAN Testing
Testing covers the generation and analysis of PCS and MAC/IP Layer traffic. Testing on GE and 10 GE can be a native line interface or a client signal mapped into OTN.
- Layer 1 BERT and Layer 2/3 traffic
- PCS-layer testing with dynamic block errors and coding statistics
- VPLS and MAC-in-MAC Ethernet frame formats
- Up to 256 traffic flows and independent receiver filters, 16 independent traffic profiles
- Real-time QoS, service disruption, and packet jitter analysis per flow
- IPv4, IPv6, VLAN/Q-in-Q, MPLS, TCP, UDP frame structures
- RFC 2544 suite

1/2/4/8/10 G FC Testing
Testing covers the generation and analysis of PCS- and FC-2 layer traffic.
- Full-featured PCS-layer testing at 10 G PCS
- Single stream with constant traffic, bursty traffic, and full bandwidth support
- Implicit flow control login
- Credit buffer support

SDH/SONET Testing
The SDH/SONET functionality includes mappings down to VC-11/12 and VT-1.5/2 and can be a native interface or a client signal for ODU0/1/2.
- Full SDH/SONET testing for STM-1/STM-4/STM-16/STM-64 and OC-3/OC-12/OC-48/OC-192 with mappings down to VC-11/12 and VT-1.5/2
- Dynamic error/alarm insertion including bursts
- Full access to overhead bytes with byte capture
- Pointer sequence generation and analysis
- Service disruption tests with high-level detail
- Performance monitoring ITU-T.G.826/828/829
Signal Structures

OTU2 Standard Structures

Legend
3076/63.  xy  Required part number

Port loading mode and deep mode

Deep-mode substructure

1 Single-port part number
2 Dual-port part number
3 Port loading part number

AMP: Asynchronous mapping procedure
GMP: Generic mapping procedure
BMP: Bit-synchronous mapping procedure
TS: Timeslot
PT: Payload type

1(8)x, for example: full structure supported count (standard possible count)x

10.7 Gbps

OTU2 Overclocked OTU1e/2e/1f/2f Structures

11.049 Gbps
11.095 Gbps

11.27 Gbps
11.31 Gbps
Signal Structures

OTU1 Structures

2.7 Gbps

OTU1

ODU/OPU1

AMP

GMP

Mux AMP

ODU/OPU0

ODU/OPU0

GMP

BMP

AMP

ODUFlex

GMP

Ethernet Structures

10 G Ethernet

MAC/IP

Up to 10 G

1 G Ethernet

MAC/IP

Up to 1 G

Legend

3076/63

Required part number

Port loading model and deep mode

Deep mode substructure

1 Single-port part number
2 Dual-port part number
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AMP: Asynchronous mapping procedure
GMP: Generic mapping procedure
BMP: Bit-synchronous mapping procedure
TS: Timeslot
PT: Payload type
1(8)x, for example: full structure supported count (standard possible count)x
Signal Structures

SDH/SONET Structures

- **9.9 Gbps**
  - SDH / ONU
  - 10 G Single-Channel
  - **155 Mbps**
  - 622 Mbps
  - **622 Mbps**
  - OC-48c/STM-16c
  - 2.5 Gbps Single-Channel

**Legend**
- AMP: Asynchronous mapping procedure
- GMP: Generic mapping procedure
- BMP: Bit-synchronous mapping procedure
- TS: Timeslot
- PT: Payload type
- x: Single-port part number
- y: Dual-port part number
- 1(n)x: Port loading part number
- Required part number
- Required part number
- Port loading mode
- Deep mode
- substructure

**Fibre Channel Structures**

- **10 G FC**
  - PCS 64B/66B
  - Fibre Channel 10 G
- **8 G FC**
  - PCS 8B/10B
  - Fibre Channel 8 G
- **4 G FC**
  - PCS 8B/10B
  - Fibre Channel 1/2/4 G
- **2 G FC**
  - PCS 8B/10B
  - Fibre Channel 1/2/4 G
- **1 G FC**
  - PCS 8B/10B
  - Fibre Channel 1/2/4 G

**Legend**
- 3076/63: Required part number
- 1 Single-port part number
- 2 Dual-port part number
- 3 Port loading part number
- 431,372,843
- 701,612,853
- 111,032
- 111,032
Ordering Information

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<tr>
<th>Description</th>
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<tr>
<td><strong>Main Product and Module</strong></td>
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<tr>
<td>ONT-601 MTM-B</td>
<td>3076/12</td>
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<tr>
<td>MTM-B module for ONT-603/606/612</td>
<td>3076/60.12</td>
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<tr>
<td><strong>Deep Mode Software</strong></td>
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<tr>
<td>GFP-T for MTM</td>
<td>3076/63.26</td>
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<tr>
<td>OTN multiplexing — enhanced for MTM</td>
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<tr>
<td>ODU0 for MTM</td>
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<td>OTN multiplexing OTU2 for MTM</td>
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<td>OTN multistage multiplexing for MTM</td>
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<td>10 G GFP-F for MTM</td>
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<td>OTN control plane enhancements for MTM</td>
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**Lower-Rate Software**

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<td>155 Mbps to 2.5 Gbps SONET/SDH for MTM — dual port</td>
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<td>155 Mbps to 2.5 Gbps SONET/SDH for MTM — 4-port loading</td>
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<td>OTU1 for MTM — single port</td>
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<td>OTU1 for MTM — 4-port loading</td>
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<td>1 G for MTM — single port</td>
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<td>1 G for MTM — dual port</td>
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<td>1 G for MTM — 4-port loading</td>
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<td>1/2/4 G FC for MTM — single port</td>
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<td>1/2/4 G FC for MTM — dual port</td>
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<td>1/2/4 G FC for MTM — 4-port loading</td>
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**Higher-Rate Software**

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<td>10 GE LAN for MTM — dual port</td>
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<td>10 GE LAN for MTM — 4-port loading</td>
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<td>10 GE WAN for MTM — single port</td>
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<td>10 GE WAN for MTM — dual port</td>
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<td>OTN 10.7/11.05/11.1 Gbps for MTM — single port</td>
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<td>8/10 G FC for MTM — single port</td>
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<td>8/10 G FC for MTM — 4-port loading</td>
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<td>OTN 11.27/11.32 Gbps for MTM</td>
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**Accessories**

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<tr>
<td>ONT-601 MTM hard carrying case</td>
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*Deep Mode software supports up to 2 ports simultaneously.*
## Ordering Information

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<tr>
<th>Description</th>
<th>SONET/SDH</th>
<th>OTN</th>
<th>Ethernet</th>
<th>FC</th>
<th>CPRI</th>
<th>Infiniband</th>
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