ONT-600 Multiport Test Module (MTM)

ONT-601 MTM Stand-Alone Configuration and MTM Plug-in Module for ONT-603/606/612

Key Benefits

- **All-in-one solution for testing L1 to L3 at 155 Mbps to 11.3 Gbps rates**

- **Reduce CapEx with high port density and a comprehensive feature set**

- **Maximize efficiency and minimize test time with multiuser, multiport capability**

- **Maximize value with broad Ethernet, OTN, Fibre Channel, and SONET/SDH protocol coverage**

- **Complex traffic generation, deep analysis, and advanced error/alarm insertion ensure optimal system performance**

- **Terminal, Intrusive Through, and Nonintrusive Through connectivity modes ensure complete test coverage**

Applications

- Validating Carrier Ethernet
- System verification testing
- Client generation to fully load/analyze 40G and 100G systems
- Network element production testing
- 155 Mbps–11.3 Gbps traffic loading

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

To meet the need for increasing bandwidth demand, network equipment manufacturers (NEMs) are building higher port density into their network elements and, therefore, require an increasing number of test equipment ports with minimal budget. The revolutionary design of the JDSU ONT-600 Multiport Test Module (MTM) provides unparalleled value with support for multiple protocols, Layers 1 to 3, and unmatched port density for 155 Mbps to 11.3 Gbps rates.* These unique benefits reduce CapEx and OpEx by eliminating the need to purchase, manage, and maintain multiple tests sets to perform these functions.

The MTM supports multiport testing with four small form pluggable port banks consisting of an SFP for lower rates and an XFP for 10G rates. 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 (GigE)/10 GigE local area network (LAN), 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, 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 a hot-swappable plug-in module. The stand-alone configuration is a compact, stackable 1-RU form factor known as the ONT-601 MTM-4s4x. The plug-in MTM is for use in the ONT-603/606/612 chassis series and enables scalability of up to 48 XFP/SFP test ports within an ONT-612 chassis.

*Hardware ready for 10 Mbps to 11.3 Gbps testing.

2

Capabilities

Optical Interfaces

The optical interfaces are based on XFP and SFP pluggable optics.

Unframed Testing

All available rates are offered with unframed pattern and BERT capabilities. These functions are useful especially for qualifying components and DWDM links.

- Unframed BERT at 17 different rates: 155.52 and 622.08 Mbps, and 1.063, 1.25, 2.125, 2.488, 2.666, 4.25, 8.5, 9.953, 10.313, 10.519, 10.709, 11.049, 11.095, 11.270, and 11.318 G
- Unframed patterns: PRBS 2^{31}-1, 2^{23}-1, 2^{15}-1, 2^{11}-1, 2^7-1 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), forward error correction (FEC) generation and analysis. Also supports comprehensive ODU multiplexing (ODU0, ODUflex, ODU1, and ODU2) with multistage multiplexing.

- Standard and overclocked OTU2 rates
- Bulk and fully structured clients; LAN, SDH/SONET
- Supports all TCM layers
- Transfer delay and service disruption tests
- Overhead byte multiframe sequence capture
- Client offset stuffing control
- ODU0 with GE and SDH/SONET clients

GFP Testing

The GFP functionality encapsulates Ethernet MAC into ODU0 with implementation in accordance with ITU-T G.7041 and G.707.

- Generation and analysis of GFP frame types
- Core header processing
- Payload-type header processing
- Error and alarm processing
- LAN Layer 2/3 traffic with full feature set

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.

- Features at the 10 G PCS layer are the same as 10 GE LAN
- 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 AU3/VC3 and STS 1 SPE 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 AU-3/AU-4, STS-1
- 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

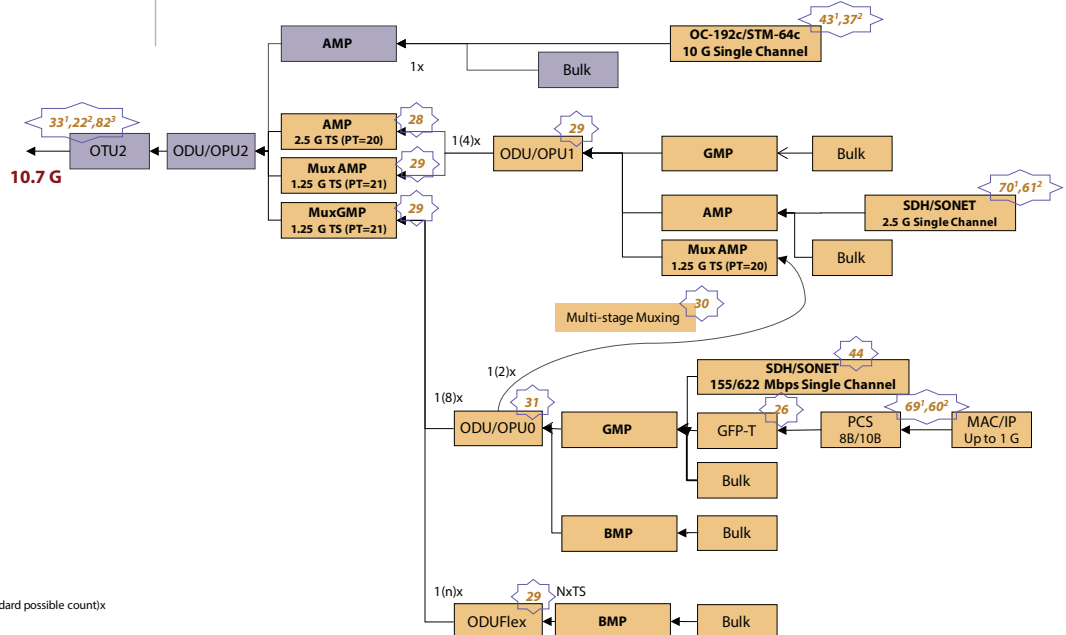## Signal Structures

OTU2 Structure 1

Legend

3076/63. *xy* Required Part Number
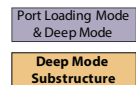
Port Loading Mode & Deep Mode

Deep Mode Substructure

[1] Single-Port Part Number
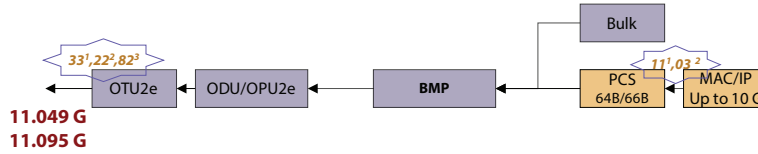[2] Dual-Port Part Number
[3] Port Loading Part Number

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
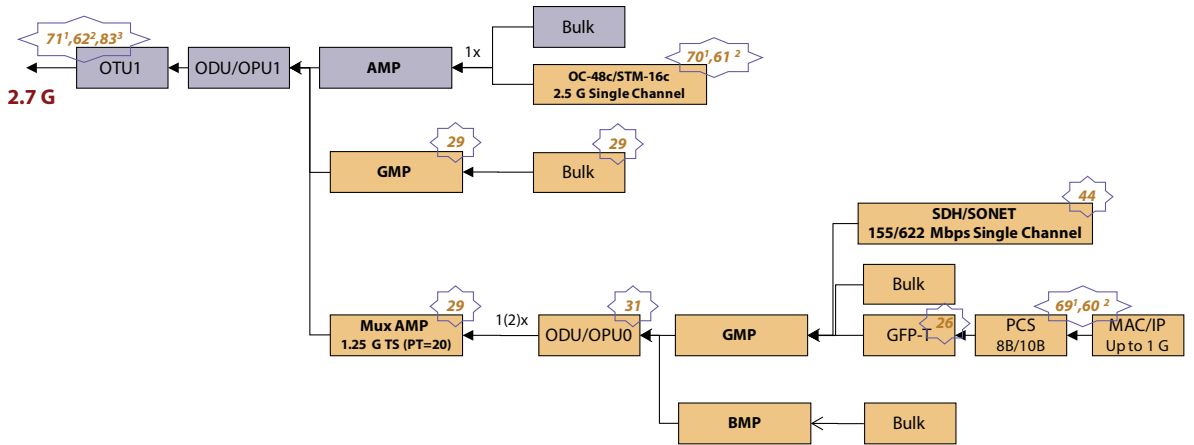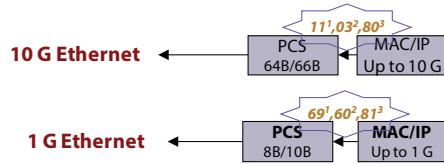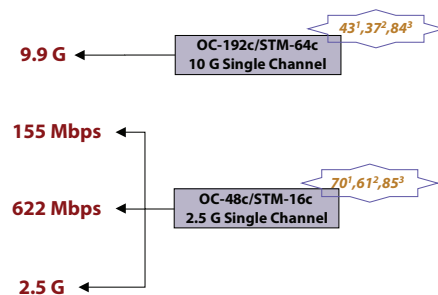
3

Signal Structures

OTU2 Structure 2   G.Sup43

Bulk	

PCS 64B/66B ← MAC/IP Up to 10 G (11[1],03[2])

OTU2e (33[1],22[2],82[3]) ← ODU/OPU2e ← BMP ← PCS 64B/66B

11.049 G
11.095 G

OTU1 Structure

OTU1 (71[1],62[2],83[3]) ← ODU/OPU1 ← AMP ← 1x ← Bulk / OC-48c/STM-16c 2.5 G Single Channel (70[1],61[2])

2.7 G

GMP (29) ← Bulk (29)

SDH/SONET 155/622 Mbps Single Channel (44)

Mux AMP 1.25 G TS (PT=20) (29) ← 1(2)x ← ODU/OPU0 (31) ← GMP ← GFP-T (26) ← PCS 8B/10B ← MAC/IP Up to 1 G (69[1],60[2])

Bulk

BMP ← Bulk

Ethernet Structure

10 G Ethernet ← PCS 64B/66B ← MAC/IP Up to 10 G (11[1],03[2],80[3])

1 G Ethernet ← PCS 8B/10B ← MAC/IP Up to 1 G (69[1],60[2],81[3])

SDH/SONET Structure

9.9 G ← OC-192c/STM-64c 10 G Single Channel (43[1],37[2],84[3])

155 Mbps

622 Mbps ← OC-48c/STM-16c 2.5 G Single Channel (70[1],61[2],85[3])

2.5 G

Legend

3076/63. *xy* Required Part Number

Port Loading Mode & 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

Signal Structures

Fibre Channel Structure
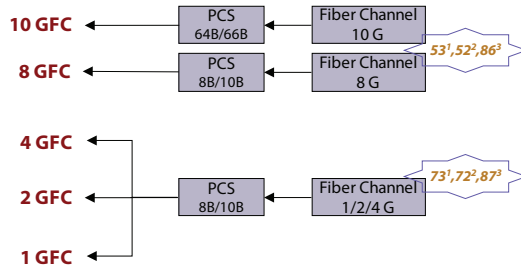
Legend

3076/63. [xy] Required Part Number

Port Loading Mode & Deep Mode

Deep Mode Substructure

[1] Single-Port Part Number
[2] Dual-Port Part Number
[3] Port Loading Part Number

Ordering Information

Part Number	Description
BN 3076/11	ONT-601 MTM
BN 3076/60.11	MTM-4s4x Module for ONT-603/606/612

XFP Port Software	Description
BN 3076/63.11	10 GigE LAN for MTM — Single Port
BN 3076/63.03	10 GigE LAN for MTM — Dual Port
BN 3076/63.80	10 GigE LAN for MTM — 4-Port Loading
BN 3076/63.33	OTN 10.7/11.05/11.1 G for MTM — Single Port
BN 3076/63.22	OTN 10.7/11.05/11.1 G for MTM — Dual Port
BN 3076/63.82	OTN 10.7/11.05/11.1 G for MTM — 4-Port Loading
BN 3076/63.43	OC192/STM-64 BERT for MTM — Single Port
BN 3076/63.37	OC192/STM-64 BERT for MTM — Dual Port
BN 3076/63.84	OC192/STM-64 BERT for MTM — 4-Port Loading
BN 3076/63.53	8/10 G FC for MTM — Single Port
BN 3076/63.52	8/10 G FC for MTM — Dual Port
BN 3076/63.86	8/10 G FC for MTM — 4-Port Loading
BN 3076/63.25	OTN 11.27/11.32 G for MTM

SFP Port Software	Description
BN 3076/63.70	155 Mbps to 2.5 G SONET/SDH for MTM — Single Port
BN 3076/63.61	155 Mbps to 2.5 G SONET/SDH for MTM — Dual Port
BN 3076/63.85	155 Mbps to 2.5 G SONET/SDH for MTM — 4-Port Loading
BN 3076/63.71	OTU1 for MTM — Single Port
BN 3076/63.62	OTU1 for MTM — Dual Port
BN 3076/63.83	OTU1 for MTM — 4-Port Loading
BN 3076/63.69	1 G Ethernet for MTM — Single Port
BN 3076/63.60	1 G Ethernet for MTM — Dual Port
BN 3076/63.81	1 G Ethernet for MTM — 4-Port Loading
BN 3076/63.73	1/2/4 G FC for MTM — Single Port
BN 3076/63.72	1/2/4 G FC for MTM — Dual Port
BN 3076/63.87	1/2/4 G FC for MTM — 4-Port Loading

Deep Mode Software	Description
BN 3076/63.26	GFP-T for MTM
BN 3076/63.29	OTN Multiplexing — Enhanced for MTM
BN 3076/63.31	ODU0 for MTM
BN 3076/63.28	OTN Multiplexing OTU2 for MTM
BN 3076/63.30	OTN Multistage Multiplexing for MTM
BN 3076/63.32	OTN ODUflex for MTM
BN 3076/63.44	SDH/SONET Client in ODU0 for MTM

XFP Optics	Description
BN 3076/96.20	XFP Optics 850 nm for MTM
BN 3076/96.21	XFP Optics 1310 nm for MTM
BN 3076/96.22	XFP Optics 1550 nm for MTM

SFP Optics	Description
BN 3076/96.25	SFP Optics 850 nm for MTM
BN 3076/96.26	SFP Optics 1310 nm for MTM
BN 3076/96.27	SFP Optics 1550 nm for MTM

Accessories	Description
BN 3076/96.03	ONT-601 MTM Hard Carrying Case

Test & Measurement Regional Sales