



## Introducing Module-E 10G within ONT-503 ONT-506/512

All major operators view 10 Gigabit interfaces as the key enabling technology in today's market and are implementing it in their networks as LAN, WAN, or in combination with OTN.

The major challenge of manufacturers is to provide interface cards with capabilities for multiple technologies. They need to verify the ports against various standards, such as IEEE and ITU-T, to ensure that all of the network layers are interacting properly. As Ethernet behavior changes from "best effort" to "carrier grade", comprehensive testing is required.



The Module-E 10G for JDSU's ONT-503/506/512 addresses the needs of R&D and SVT labs by providing all of the necessary functionality for testing layers 1 up to 3 of 10 G line interfaces at different optical wavelengths.

For these applications Module-E 10G provides all necessary technologies LAN, WAN, FC, SONET/SDH, OTN including comprehensive jitter & wander testing functionality.



### R&D and Compliance Testing

- Built-in switchable and XFP optics and electrical interface
- Unframed BERT at 9.95, 10.0, 10.3, 10.5, 10.66, 10.7, 11.05, 11.1, 11.27, 11.32 Gb/s
- SONET/SDH framed signals with HO mappings
- SONET/SDH MultiChannel (192xSTS-1, AU-3; 64xAU-4)
- OTN at 10.7, 11.05, 11.1, 11.27, 11.32 Gb/s with FEC stress testing
- ONT Wrapper/de-wrapper testing
- 10GigE PCS BERT and L2/L3 traffic
- 256 MAC/IP Flows with 256 independent filters
- 10 mixed VLAN / MPLS tags
- Enhanced Ethernet frames VPLS, MAC-in-MAC
- QoS, service disruption, packet jitter, BERT per flow
- 10G FC1 PCS BERT + FC2 layer testing
- MAC and IP capture
- Jitter/wander testing



## Applications

### 10GigE LAN/WAN

- 10GigE LAN BERT with A/B seed
- 10GigE LAN with MAC/IP traffic
- Sophisticated PCS layer testing with dynamic block errors, coding statistics and block capture
- 256 MAC/IP Flows with 256 independent filters
- 10 mixed VLAN / MPLS tags
- Enhanced Ethernet Frames VPLS, MAC-in-MAC
- QoS, service disruption, packet jitter, BERT per flow
- Three different types of packet jitter tests: Instantaneous, RFC3550 and absolute
- Online hitless traffic control
- IPv4/IPv6 and packet capture
- Support of RFC 2544
- MAC/IP capture

### 10G FC testing

- 10G FC BERT with A/B-seed
- 10G FC Layer 2 testing

### 10G SONET/SDH testing

- STS-1 /3c/6c/9c/12c/24c/48c/192c
- VC-4-2c/3c/4c/8c/16c/64c
- Analysis of BER, service disruption, errors, alarms in all channels
- Dynamic error/alarm insertion including pulse bursts
- Best-in-class service disruption testing with high level of details
- All pointer sequences
- Performance monitoring G.826/828/829
- Byte capture all SOH/TOH bytes
- 10G VCAT/GFP for STS1, AU3/VC3 and AU4/VC4 at full bandwidth

### Multi-Channel 10G High Order

- Best-in-class service disruption testing with high level of details
- Generation and analysis of up to 192 × STS-1, AU-3; 64 × AU-4
- Mixed mappings
- STS-1 /3c/6c/9c/12c/24c/48c/192c
- VC-4-2c/3c/4c/8c/16c/64c
- Enhanced through mode with error and alarm injection in multiple channels
- Dynamic error/alarm insertion including pulse bursts
- Byte capture all SOH/TOH bytes

### OTN OTU2 10/11G testing

- Standard and overclocked OTU2 line rates
- OTN wrapper/dewrapper testing
- OTU multiplexing with SDH/SONET clients as single channel, multi-channel and VCAT
- 10G Ethernet via GFP in OTU2
- GCC capture
- Support of all TCM layers
- Transfer delay and service disruption
- Unique FEC stress testing with walking pattern
- OH byte capture
- Dynamic error/alarm insertion including pulse bursts

### 10G Jitter/Wander testing

- Jitter/wander generation and analysis for rates 10G SDH/SONET, 10.7G OTN and 10.3G Synch Ethernet and for further rates under preparation 11.05G and 11.09G
- Framed and unframed signals with optical and differential electrical interfaces
- TDEV noise wander generation for all line rates incl. DS1/E1
- Automatic measurements MTJ, FMTJ, JTF, MTW, WTF
- Online TIE/MTIE/TDEV wander measurements for SDH/SONET, OTN and SyncE rates

## On the Same Platform

Combining broadest range of technologies with real multi-user capabilities the JDSU ONT-503/506/512 is the lab tool enabling users to get the most out of their testing time.

Highly developed Tcl- and C-libraries together with LW CVI drivers facilitate and speed the development of automated test scripts

### Jitter testing at all rates from 155M up to 43G

For analyzing electrical and optical SDH/SONET/OTN systems including jitter and wander functionality in one unit.

The jitter solution provides the highest accuracy on the market. It complies to ITU-T O.172 Appendix VII and VIII. Wander measurements are processed with up to 1000 samples/s.

### OTN all rates

For system testing with all G.709 mappings and multiplexing OTU1/2/3, including overclocked OTU2. Various clients are supported together with the wrapper/de-wrapper test functionality.

### Ethernet lower rates and 100GE

For testing native Ethernet interfaces 10/100/1000M and GigE and verifying real interworking with the NewGen solution.

Comprehensive test solution for evolving 100GE interfaces.

### MultiChannel Low Order

Analyses all >1000 channels of a 2.5 Gb/s bandwidth in 2.5 and 10 Gb/s signals.

Uses multiple service disruption measurements to see all detailed effects during switching processes in SDH/SONET systems. No blind spots.



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