

MSA 2020/2030 Module

for NIC Platform



Single Module for Advanced Telecom and Datacom Testing...

Available with...

- SONET/SDH up to 10Gbps
- 10GigE LAN/WAN
- GigE (dual port)
- 10/100/1000BaseT (dual port)
- 100BaseFX
- OTN up to 10.7Gbps
- 10GigE FEC (OTU-1e and OTU-2e)
- ODU-1 to ODU-2 Multiplexing
- ATM
- Fibre Channel
- GFP and GFP-T
- VCAT (MSA 2030 only)
- LCAS (MSA 2030 only)
- PDH/T-carrier drop/insert
- All Path Testing™

The MSA 2020 and 2030 are available in three basic packages, with additional capabilities available as Test Options:

MSA 2020 SONET/SDH Bundle

SONET/SDH from 51M-10G with Test Options available to support Ethernet, OTN, Fibre Channel, GFP, All Path Testing and more

MSA 2030 SONET/SDH Bundle

Includes all features of the MSA 2020 SONET/SDH bundle and also supports VCAT and LCAS Test Options

MSA 2020 Ethernet Bundle

Ethernet 10GigE, GigE (dual port), 10/100/1000BaseT with Test Options available to support SONET/SDH, OTN, Fibre Channel, GFP, All Path Testing and more

KEY FEATURES

- Cost effective - With "Test Options", order only the features you need today and add additional capabilities as required
- Investment protection - Existing NIC products can be upgraded with MSA 2020/2030 modules
- Time saving - Run SONET/SDH/OTN plus two Ethernet tests simultaneously
- GFP-F, GFP-T and GFP Bulk
- VCAT/LCAS (MSA 2030 only)
- Telecom and Datacom testing capability with just one module
- Flexible 10G Ethernet testing — 10G LAN (10.3G), 10G WAN (9.953G), 10G Ethernet FEC (11.049/11.095G)
- ODU-1 to ODU-2 Mapping
- Hot-swappable SFP/XFP optical transceiver modules

PLATFORMS



NIC^M



NIC BP™



NIC Plus®



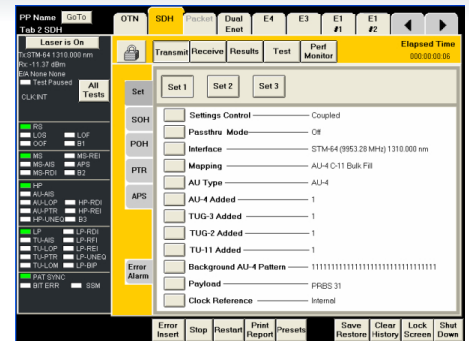
NIC EP™

SONET/SDH Testing

Standard on SONET/SDH Bundle, available as Test Option on Ethernet Bundle

- Available with OC-192/STM-64, OC-48/STM-16, OC-12/STM-4, OC-3/STM-1, EC-3/STM-1e, OC-1/STM-0, and EC-1/STM-0e interfaces
- Complete overhead control and monitor
- Overhead Byte capture
- User-definable alarms for power level, frequency, trace and expected path label
- Line and pointer (STS, VT, AU, TU) frequency offset +/- 100ppm
- GFP, VCAT, LCAS, ATM and All Path Testing™ available - see below
- Intrusive/Passive Through Mode capability
- APS testing and Service Disruption Measurement with user-selectable criteria

For complete list of features and specifications, see SONET/SDH Features datasheet

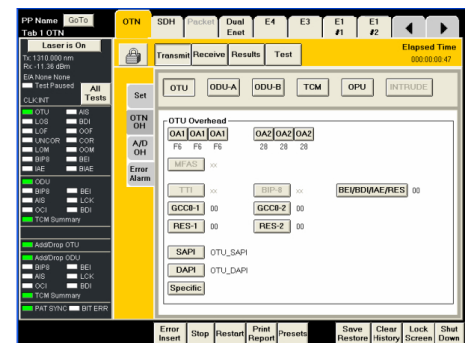


Optical Transport Network (OTN) Testing

Available as Test Options

- Supports the full range of OTN test:
 - OTU-1 (2.66Gbps)
 - OTU-2 (10.7Gbps)
 - OTU-1e (11.049Gbps)
 - OTU-2e (11.095Gbps)
- Activation via license-based Test Option
- Full overhead access/manipulation
- Intrusive/non-intrusive through mode
- GFP mapping available (10G and below)

For complete list of features and specifications, see OTN Features datasheet

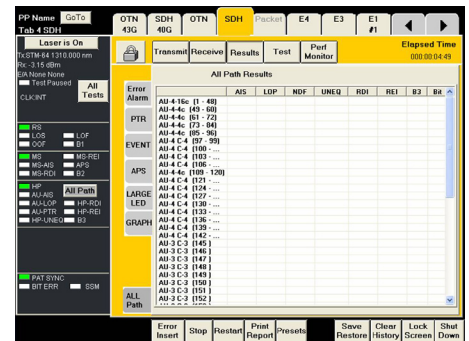


All Path Testing™ (APT)

Available as Test Option

- Simultaneous testing of all HP/STS containers/SPEs
- Each path can be configured separately with any test pattern desired
- Supports any combination of homogenous or mixed mappings
- Auto-detection of mapping type and pattern (if standard PRBS type) for the entire bandwidth
- Service Disruption Measurement on all containers/SPEs simultaneously. With selectable criteria, All Path Testing detects single or multiple disruptions, reporting the latest event, shortest, longest and average events.

For complete list of features and specifications, see All Path Testing™ Features datasheet

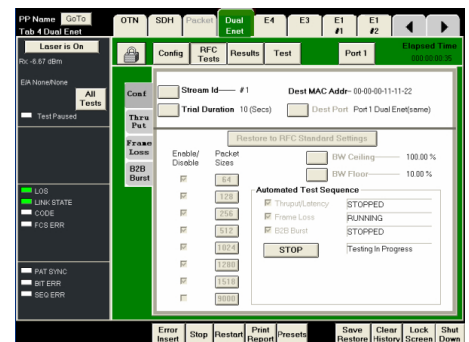


Ethernet Testing

Standard on Ethernet Bundle, available as Test Option on SONET/SDH Bundle

- Available with 10GigE LAN/WAN and 10GigE FEC (OTU-1e, OTU-2e)
- Dual port GigE, 10/100/1000BaseT and 100BaseFX
- Supports RFC 2544 and RFC 1242 Benchmarking with Throughput, Frame Loss, Latency, Back-to-Back Burst and Round-Trip Delay testing
- Up to 32 simultaneous streams per port
- Rate setting by interpacket gap up to 18 minutes, burst traffic, ramped traffic, through mode, ARP support, runt frame support, an increase of max frame size to 16,000 bytes
- IP reflection mode enables RFC testing through routers
- Stacked VLAN (Q in Q), up to four

For complete list of features and specifications, see Ethernet Features datasheet



NOTE: Features listed above require specific hardware and software plus license-based Test Options in order to operate. See ordering information.

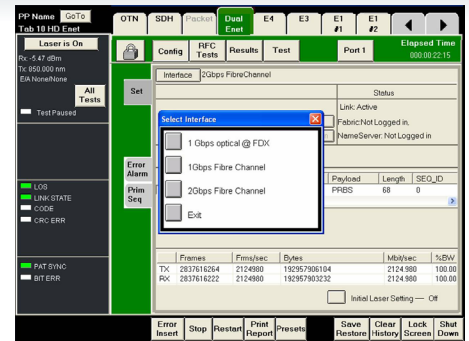
Fibre Channel (FC) Testing

Available as Test Option

- 1 Gbps and 2 Gbps Fibre Channel testing
- Dual port simultaneous testing
- BER testing, round-trip latency and performance monitoring and characterization of in-service Fibre Channel
- Simultaneous traffic generation and testing at 100% wire speed on all ports simultaneously
- Supports Primitive Sequence Generation

- Supports RFC 2544 and RFC 1242 Benchmarking with Throughput, Frame Loss, Latency, Back-to-Back Burst and Round-Trip Delay testing
- Characterize performance of Fibre Channel networks for varying frame sizes

For complete list of features and specifications, see *Fibre Channel Features datasheet*



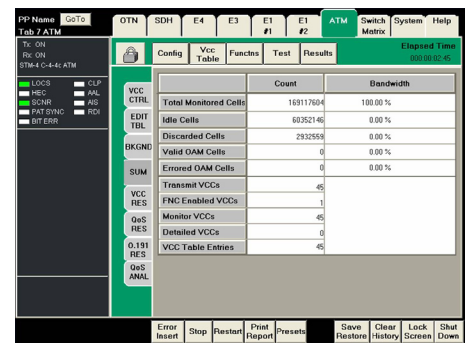
Asynchronous Transfer Mode (ATM) Testing

Available as additional module, daughter board

- Asynchronous Transfer Mode testing at the following rates: 622M, 155M, 52M
- If equipped with A11 or A14 module, installed adjacent to MSA, supports ATM testing (Direct&PLCP) at DS1/E1/E3/DS3 rates
- UNI/NNI interface types
- AAL0, AAL1, AAL5

- PVC and SVC support
- 240 VCCs transmit/255 VCCs receive
- Bit error rate testing plus ATM alarm/error insertion and monitoring
- VCC scan for automatic detection of VCCs

For complete list of features and specifications, see *ATM Features datasheet*



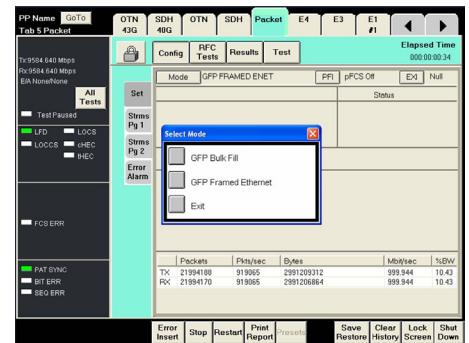
Generic Framing Procedure (GFP) Testing

Available as Test Option

- GFP-F, GFP-T and GFP Bulk
- Supports FULL Ethernet test functionality including the following:
 - 32 independent test streams
- Supports RFC 2544 and RFC 1242 Benchmarking with Throughput, Frame Loss, Back- to-Back Burst testing
- IP reflection mode enables RFC testing through routers

- Rate setting by interpacket gap up to 18 minutes, burst traffic, ramped traffic, through mode, ARP support, runt frame support, frame size to 16,000 bytes in GFP-F and GFP-T
- Simultaneously test and monitor OTN, SONET/SDH, GFP and Ethernet layers

For complete list of features and specifications, see *GFP Features datasheet*



Virtual Concatenation (VCAT) and Link Capacity Adjustment Scheme (LCAS) Testing

Available as Test Option (MSA 2030 only)

VCAT Features Include:

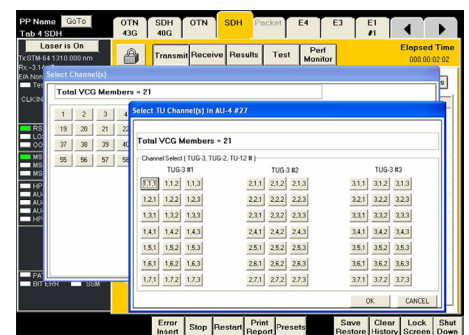
- High-Order and Low-Order support
- Insert frame delay or pointer delay on each VCG member
- Supports GFP payload with Ethernet functionality

LCAS Features Include:

- Automatic Source and Sink state machine emulation

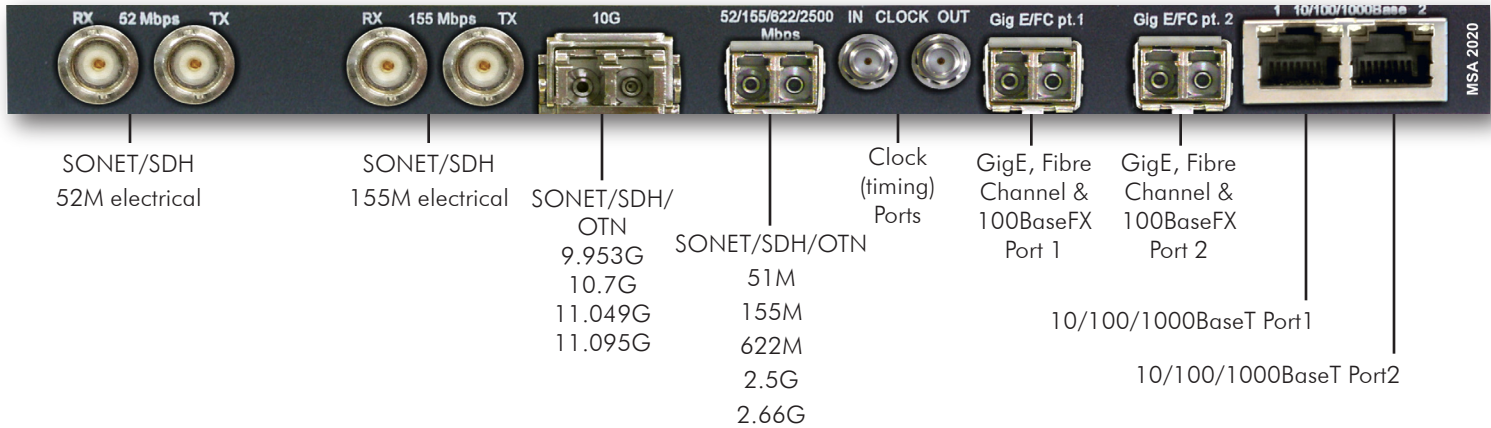
- Monitoring and evaluation of Control Packets
- Plain text State Machine Trace
- LCAS Protocol Emulation

For complete list of features and specifications, see *VCAT/LCAS Features datasheet*



NOTE: Features listed above require specific hardware and software plus license-based Test Options in order to operate. See ordering information.

CONNECTOR PANEL LAYOUTS



ORDERING INFORMATION

Base Modules - MSA 2020 SONET/SDH Bundle:

- MSA 2020 155M to 52M, 1310nm SFP standard - [NL51](#)
- MSA 2020 622M to 52M, 1310nm SFP standard - [NL61](#)
- MSA 2020 2.5G to 52M - [NL71](#)(1310), [NL71b](#)(1550)
- MSA 2020 2.5G to 52M, no optics, sold only with jitter module - [NL78](#)
- MSA 2020 10G to 52M, [NL81](#)(1310/1310), [NL81b](#)(1310/1550), [NL81c](#)(1550/1550)
- MSA 2020 10G only - [NL84](#)(1310), [NL84b](#)(1550)
- MSA 2020 10G only, no optics, sold only with Jitter Module - [NL88](#)

Base Modules - MSA 2030 SONET/SDH Bundle:

- MSA 2030 155M to 52M, 1310nm SFP standard - [N51](#)
- MSA 2030 622M to 52M, 1310nm SFP standard - [N61](#)
- MSA 2030 2.5G to 52M - [N71](#)(1310), [N71b](#)(1550)
- MSA 2030 2.5G to 52M, no optics, sold only with jitter module - [N78](#)
- MSA 2030 10G to 52M, [N81](#)(1310/1310), [N81b](#)(1310/1550), [N81c](#)(1550/1550)
- MSA 2030 10G only - [N84](#)(1310), [N84b](#)(1550)
- MSA 2030 10G only, no optics, sold only with Jitter Module - [N88](#)

Base Modules - MSA 2020 Ethernet Bundle:

- MSA 2020 Ethernet, 850nm SFP (x2) / 1310nm XFP - [NE81](#)

ATM Module (add to any MSA module):

- ATM Testing daughter board - [C9](#)

Optical modules available:

- 100BaseFX - 1310nm SFP
- GigE/Fibre Channel - 850nm SFP
- GigE/Fibre Channel - 1310nm SFP
- GigE/Fibre Channel - 1550nm SFP

- SONET/SDH/OTN 2.66G to 52M - 1310nm SFP
- SONET/SDH/OTN 2.66G to 52M - 1550nm SFP
- SONET/SDH/OTN 10/10.7/11.049/11.095 - 850nm XFP
- SONET/SDH/OTN 10/10.7/11.049/11.095 - 1310nm XFP
- SONET/SDH/OTN 10/10.7/11.049/11.095 - 1550nm XFP

Test Options for SONET/SDH Bundle modules:

- 10/100/1000BaseT Test Option
- GigE plus 10/100/1000BaseT Test Option
- 10G Ethernet LAN (10.3G) Test Option

Test Options for Ethernet Bundle modules:

- Add SONET/SDH Testing 10G-52M (requires SFP+XFP)
- Add SONET/SDH Testing 2.5G-52M (requires SFP)
- Add SONET/SDH Testing 622M-52M (requires SFP)
- Add SONET/SDH Testing 155M-52M (requires SFP)
- Add SONET/SDH Testing 10G-Only (requires XFP)

Test Options for all modules:

- 10G Ethernet WAN (9.9953G) Test Option
- 10G Ethernet FEC OTU-1e (11.049G) / OTU-2e (11.095G) Test Option
- Fibre Channel Test Option
- OTU-1 (2.66G) Test Option
- OTU-2 (10.7G) Test Option
- ODU-1 to ODU-2 Mapping Test Option
- GFP over OTN (OTU-1e/OTU-2e) Mapping Test Option
- Generic Framing Procedure (bulk/framed) Test Option
- Generic Framing Procedure-Transparent Test Option
- Virtual Concatenation (VCAT) High-Order Test Option
- Virtual Concatenation (VCAT) Low-Order Test Option
- Link Capacity Adjustment Scheme (LCAS) Test Option
- All Path Testing™ Test Option
- Ethernet 100BaseFX Test Option

For more information or a sales quote, visit www.lightwave.com/contact or email dlsales@lightwave.com