

SUNRISE TELECOM® STT® Metro

Data Sheet



The STT Metro is part of a family of test modules for the STT Platform

The STT Metro Module is designed for the installation, maintenance, and verification of packet-based metropolitan and transport networks. By combining thorough, accurate statistics with versatile traffic generation options, the STT Metro is ideal for turning up and troubleshooting complex, multi-layered voice, video, and data services. The STT Metro module is a perfect companion to the STT ONE module, for next-generation Ethernet over SONET/SDH networks, verifying network integrity and throughput, from both Ethernet and SONET/SDH interfaces.

FEATURES

- Throughput and Bit Error testing across Layers 1, 2, and 3
- Stacked VLAN (Q-in-Q) and MPLS
- RFC 2544 benchmark testing
- GPS antenna port for one-way latency measurements
- IP connectivity testing
- Bidirectional monitoring of live networks
- Packet capture with decoding up to Layer 7

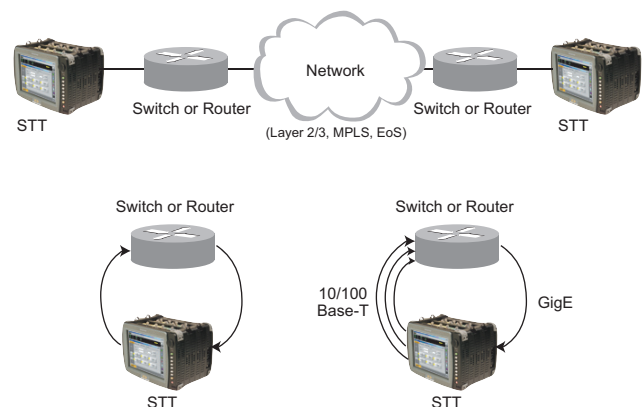
BENEFITS

- Four or eight independent test ports for stressing network elements
- Class of Service (CoS) and Type of Service (ToS) testing across multiple traffic streams
- Metro Ethernet Forum (MEF) compliance testing
- Service Level Agreement (SLA) verification of Ethernet and IP networks
- Simultaneous turn-up of multiple ports and services, maximizing efficiency
- Modular optics for multi-wavelength testing including CWDM and DWDM
- Remote access and network probing capability

TEST MODES AND APPLICATIONS

BERT

The most common method of turning up and qualifying Ethernet services is to perform a bit error rate or throughput test. The STT Metro generates test traffic at a specified bandwidth to the far end, where the frames are either looped or analyzed by another test module. By measuring frame loss rate and bit errors, compliance to a SLA (Service Level Agreement) can be confirmed. Stressing the network is achieved by generating traffic with different parameters, such as varying the frame length, sending constant or bursty traffic, and intentionally introducing errors into the system.



RFC 2544

RFC 2544 is a standardized methodology for benchmarking network devices and Ethernet service. To optimize the speed and efficiency of these tests, the STT Metro module allows users to modify the test parameters from their standard values. Test results are shown in both tabular and graphical form, following the RFC 2544 specifications. For more details on RFC 2544 testing, see *RFC 2544 Application Note*.

IP Test

The complexity of a routed IP network can make traditional throughput testing cumbersome and time consuming. The STT Metro module offers two simple tests, ping and trace route, to verify Layer 3 connectivity, without the detailed stream generation found in BER testing. IP tests also have the advantage that they work to any router or device that responds to ICMP Echo request and trace route packets, and do not require a second test set.

Loopback

Loopback mode allows the specified Ethernet port to send incoming Ethernet frames back to the sender for end-to-end testing. Performing loopback tests is a common means of verifying the roundtrip delay of the network. The Ethernet loopback functions have been designed to emulate those used in traditional T-carrier networks. Manual mode immediately sets the port into loopback, whereas Responder mode allows the near end unit to send loop up and loop down commands.

Monitor

The STT Metro can bidirectionally monitor up to four live circuits, measuring throughput and providing performance statistics and histograms. In stand-alone mode, the STT Metro acts as a network probe, passively monitoring the network, while being accessed remotely. Live traffic can also be captured and decoded for sniffing customer traffic and troubleshooting protocols.



ABOUT STT PLATFORM

The Scalable Test Toolkit is an advanced, modular, and flexible testing solution that addresses Layer 1 through Layer 7 requirements, from fiber optics to Quality of Service. Designed to meet the challenges of designs, installing, maintaining, and troubleshooting core, metro, and access networks, the STT combines an innovative test platform with revolutionary test features, supporting a complete suite of capabilities and technologies for the converging global communications market.

All STT modules are equipped with a unique stand alone feature, and can operate at 100% of their capabilities outside of the platform, maximizing test resources.

- STT NAM. Traditional transport testing from 1.5 Mbps to 10 Gbps. Advanced features include tributary scan, pointer test sequences, APS/service disruption, VF, Pulse mask analysis, and DS_n Jitter measurements.
- STT FAM. Fiber physical layer testing. OTDR, optical power meter, laser source, ORL, and visual fault locator.
- STT DTM. Measures Polarization Mode Dispersion (PMD) and Chromatic Dispersion (CD).
- STT xWDM. OSA for the O, E, S, C and L bands. Channel drop and tunable laser for the C and L bands.
- STT Metro. Ethernet testing for Layers 1, 2, and 3, from 10 Mbps to Gigabit Ethernet. Advanced test features include MPLS, VLAN stacking, and packet capture and decode up to Layer 7.
- STT MSA. Advanced protocol and service analysis, simulation, and troubleshooting of PSTN, VoIP, and 3G wireless.
- STT Ethernet. Ethernet testing for Layers 1, 2, and 3, from 10 Mbps to 10 GigE LAN/WAN and Fibre Channel. Advanced test features includes MPLS, VLAN stacking, and packet capture and decode up to Layer 7.



SPECIFICATIONS

CONNECTIVITY

10/100/1000BASE-T

RJ-45 UTP: Automatic detection of straight/cross-over cable

Auto-Negotiation: Enable or Disable, Pause, Asymmetric

Pause, Half- or Full-Duplex, results displayed

1000BASE-X

SFP: Small Form-factor Pluggable, LC Connectors

Auto-Negotiation: Enable or Disable, Pause, Asymmetric

Pause, results displayed

SA580-850 (850 nm)

Transmitter

Wavelength: 850 nm multi-mode

Power: -9.5 dBm to -4 dBm

Receiver

Wavelength: 770 nm to 860 nm

Signal: -21 dBm to 0 dBm max

SA580-1310 (1310 nm)

Transmitter

Wavelength: 1310 nm single-mode

Power: -9.5 dBm to -4 dBm

Receiver

Wavelength: 1270 nm to 1600 nm

Signal: -25.5 dBm to -3 dBm max

SA580-1550 (1550 nm)

Transmitter

Wavelength: 1550 nm single-mode

Power: +3 dBm to -2 dBm

Receiver

Wavelength: 1270 nm to 1570 nm

Signal: -24 dBm to -3 dBm max

Optical Power Measurement not supported with SA580-1550.

ETHERNET TESTING

Throughput & BERT

Traffic Configurations

- 64 traffic streams
- Independent frame length, frame structure, and band width percentage

MAC

- MAC Frame Type: IEEE 802.3 (Raw, LLC, or LLC/SNAP) and Ethernet II (DIX)
- MAC Source & Destination Address: User-configurable, unicast, multicast, and broadcast
- MAC Length/Type: User-configurable or fixed based on frame length

VLAN

- VLAN: Up to 3 tags for stacked VLAN and Q-in-Q
- VLAN ID, Priority, & CFI

MPLS

- MPLS: Up to 3 tags, unicast or multicast
- MPLS Tag Label, COS, and TTL

IPv4

- IP Source & Destination Address
- IP Header: Type of Service (TOS), Identifier, Fragment flags and offset, Time to Live (TTL), Protocol

Frame and Traffic Settings

- Frame Length: 30 to 12000 bytes
- Frame Rate: 0.00% to 100.00%

Test Patterns

- PRBS: 231-1, 223-1, 220-1, 215-1
- User: 1111, 0000, 1010, & 32-bit user-defined, 10 stored patterns per port
- Other: CRPAT, CJPAT, Increment
- Pattern inversion

Error Injection

- Data: FCS/CRC, IP Checksum, Bit Error
 - Frame: Lost frame, Out of sequence, duplicate frame
 - Injection Mode: Burst and Rate
 - Pause frame generation with user-defined pause delay
- Traffic Measurements

Traffic Measurements

Traffic Filtering

- Aggregate statistics on all incoming traffic
- Per stream statistics on 64 individual, user-defined traffic streams

Signal Status: Loss of Signal, Loss of Link, Event Log showing date and time stamp of event, Optical Power Measurement (if available on SFP module), Service Disruption

Defects: FCS/CRC, IP checksum, Bit Errors, Lost Frames, Out of Sequence Frames, Duplicate Frames

Traffic Statistics: Utilization, Byte Count, Frame Count, Frame Rate

Frame Statistics: Frame length distribution, Non test frames, Pause frames

Loopback

Loopback Layers

- Layer 1 (with FCS/CRC): Frames are looped without any modification
- Layer 2/3: Frames are looped with their MAC and IP (if present) Source and Destination addresses swapped
- Filtering: Errored, Multicast, Broadcast, and Keepalive frames are discarded and not looped

Loopback Modes

- Manual: Fully compatible with all other Ethernet devices
- Responder: Loops up or down based on commands received from another STT Ethernet port or MTT module
- Loopback Commands: Loop Up, Loop Down

RFC 2544 & Network Element Test

Test Configuration

- Automated Sequence: Loopback, Throughput, Latency, Frame loss rate, Back-to-back frames
- Frame Size: 64, 128, 256, 512, 1024, 1280, 1518, 4096, & 12,000; each user-configurable
- Thresholds: User-defined pass/fail criteria for Throughput and Latency
- User-defined parameters: Duration, Starting Rate, Stopping Rate, Resolution or Step Size

IP Test

IP Configuration

- IP Addressing: Static or DHCP
- DNS Server: Static or automatic

Ping

- Rate: 1 to 20 pings/s
- Length: 64 to 1518 bytes
- Mode: Burst or Continuous
- User-defined: TTL, Timeout
- Ping Results: Received, Lost, Unreachable, Timeout
- Round Trip Delay: Current, Average, Minimum, Maximum
- Ping Response: Automatic response to incoming pings

Trace Route

- User-defined: TTL, Timeout
- Details: Log of trace route with time and host address and eyeball diagram

Packet Capture & Analysis

The STT Metro module can capture thousands of Ethernet frames in real time. Captured packets can be analyzed immediately or saved and opened with another application. This feature is compatible with the most popular packet analysis software suites. Packet Capture is available in all Ethernet test modes.

- Identify active VLANs
- Inspect non-test traffic
- Measure delay between packets
- Troubleshoot higher-layer protocols

Packet Filtering

- Packet Buffer: 64 MB per port
- Pre-Filter: MAC source & destination address, Ethertype/Length, LLC SNAP, VLAN tag(s), MPLS tag(s), IP source & destination address, IP header, TCP/UDP source & destination ports, TCP/UDP header

Protocols Decoded

MAC/LLC: 802.1q (VLAN), 802.2 (LLC), 802.3 (ETH), 802.5 (TR),
Ethernet II, Novell Raw, IEEE Vendor Code, MAC Control
(TR), SNAP, Source Routing

Cisco: Cisco ISL

Bridge Protocol: BPDU, GARP, GMRP, GVRP

IP/SPX: IPX, SPX, SAP, RIP, NCP

TCP/IP: ARP, BGP, BOOTP, DHCP, DNS, FTP, GRE, HTTP, ICMP,
IGMP, IP, NNTP, OSPF, POP3, RARP, RIP, RSVP, SMTP,
SNMP, TCP, TELNET, TFTP, UDP

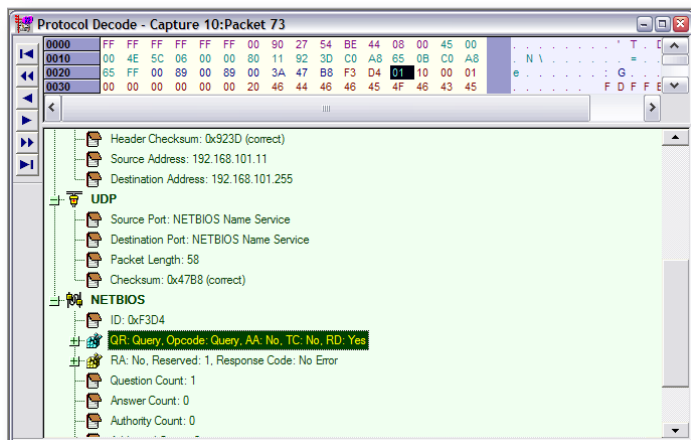
IpSec/Security: AH, ESP, Radius

NETBIOS: NetBIOS, NetBIOS Datagram, NetBIOS Name, Net-
BIOS Session, SMB

APPLETALK: AARP, ADRP, ADSP, AEP, ATP, DDP, NBP, RTMP,
ZIP

PPP: PPP LCP protocol, PPPoE

VoIP: H.225, H.245, H.323, MGCP, PPTP, Q.931, RAS, RTPCP,
RTP, SIP, T.120 protocols



PRODUCT DESCRIPTION

Upgrades: SW upgradeable via LAN or USB memory device

Operating temperature: 0 to 40°C (32 to 104°F)

Storage temperature: -20 to 70°C (-4 to 158°F)

Humidity: 5% to 90% noncondensing

Stand-Alone Operation

Power Input: Stand-alone AC operation with 100 to 240 VAC,
50/60 Hz universal charger

Communication: 10/100BASE-T and RS-232 Serial Port

65 mm Chassis

Weight: 2.5 kg (5.6 lb)

Size: 320 x 220 x 65 mm (12.6 x 8.7 x 2.6 in)

ORDERING INFORMATION

4-Port Configurations

STT-3541 Four 10/100/1000BASE-T

STT-3542 Two 10/100/1000BASE-T plus Two 1000BASE-X

STT-3543 Four 1000BASE-X

8-Port Configurations

STT-3581 Eight 10/100/1000BASE-T

STT-3582 Six 10/100/1000BASE-T plus Two 1000BASE-X

STT-3583 Four 10/100/1000BASE-T plus Four 1000BASE-X

STT-3584 Two 10/100/1000BASE-T plus Six 1000BASE-X

STT-3585 Eight 1000BASE-X

Hardware Options

STT-3951 GPS Clock Input

STT-3952 Clock Synchronization Output

For more information or a directory of sales offices: info@sunrisetelecom.com | www.sunrisetelecom.com

