

SUNRISE TELECOM® STT® Metro

Data Sheet



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

Now with Link OAM and PDV measurement!

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.

KEY FEATURES

- Throughput and Bit Error testing across Layers 1, 2, and 3
- Stacked VLAN (Q-in-Q) and MPLS
- RFC 2544, RFC 2889 benchmark testing
- Link OAM Loopback and Discovery
- PDV measurement per stream per RFC 3393
- GPS antenna port for one-way latency measurements
- IP connectivity testing
- Bidirectional monitoring of live networks
- Packet capture with decoding up to Layer 7

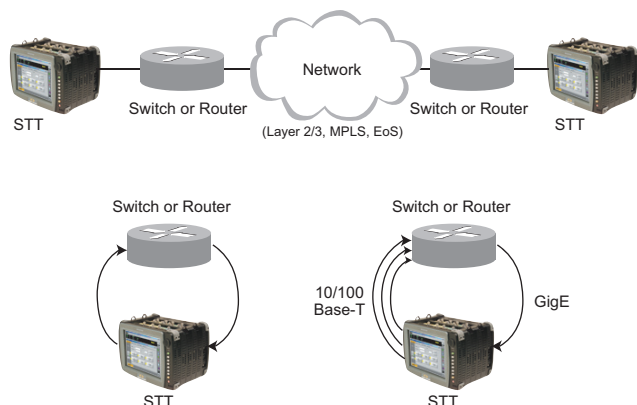
BENEFITS

- 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 ramping traffic, and intentionally introducing errors into the system.



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.

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.

RFC 2889 Testing

Similar to RFC 2544, RFC 2889 is a "Benchmarking Methodology for LAN Switching Devices." After connecting two or more STT Metro test ports to the device under test, the STT Metro generates traffic to each of the other ports and measures the throughput, frame loss, and forwarding rates for all the interfaces. This test comprehensively measures the capacity of the device and is a better choice than RFC 2544 for simultaneously testing multiple interfaces.

Flooding

The MAC and VLAN flooding feature tests the ability of a network device to properly forward frames when presented with thousands of different MAC addresses or VLAN tags. The ARP flooding test verifies the ability of a device to handle ARP requests from thousands of different IP source addresses. In each case, flooding stress-tests the device by sending it more traffic than it may be able to handle.

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.

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 DSn 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

100BASE-FX

SFP: Small Form-factor Pluggable, LC Connectors
Auto-Negotiation: Pause Enable or Disable, Pause

1000BASE-X

SFP: Small Form-factor Pluggable, LC Connectors
Auto-Negotiation: Enable or Disable, Pause, Asymmetric Pause, results displayed

Optical Specifications

SFP Module	Line Rate	Fiber Type	Wavelength (nm)	
			Tx	Rx
SSMTT-28-FXM	100M	MM	1310	1270 to 1380
SSMTT-28-FXS	100M	SM	1310	1260 to 1570
SA580-850	1G	MM	850	770 to 860
SA580-1310	1G	SM	1310	1270 to 1600
SA580-1550	1G	SM	1550	1270 to 1570

SFP Module	Power (dBm)		Power Measurement
	Tx	Rx	
SSMTT-28-FXM	-22 to -14	-29 to -14 max	No
SSMTT-28-FXS	-15 to -8	-34 to -8 max	No
SA580-850	-9 to -3	-20 to 0 max	Yes
SA580-1310	-9.5 to -3	-22 to 0 max	Yes
SA580-1550	-2 to +3	-24 to -3 max	Yes

ETHERNET TESTING

Throughput and BERT

Traffic Configurations

- 64 traffic streams per port
- Independent frame length, frame structure, and bandwidth (constant or ramp)

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, and CFI

MPLS

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

IPv4

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

TCP/UDP

- Source and Destination Ports
- TCP Header: Sequence Number, Acknowledgment Number, Data Offset, Reserved, Window Size, Urgent Pointer, and Flags.

Frame and Traffic Settings

- Frame Length: 30 to 12000 bytes
- Bandwidth: 0.0% to 100.00%

Test Patterns

- PRBS: $2^{31}-1$, $2^{23}-1$, $2^{20}-1$, $2^{15}-1$
- 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 transmit and receive statistics on 64 individual, user-defined traffic streams

LED indicators: Link, activity, loss of signal, laser on

Event Log:

Date and time stamp of events, such as loss of link and errors

Signal Status:

Tx and Rx utilization, line rate, data rate and optical power (if available on SFP module)

Aggregate Statistics:

Total frames, total bytes, frame rate, utilization, frame size distribution, service disruption, non-test frames, pause frames, bit errors, lost frames, duplicated frames, out of sequence frames, FCS errors, collisions, MAC unicast, multicast, and broadcast frames, VLAN tagged frames

Stream Statistics:

Total frames, total bytes, bit errors, bit error ratio (BER), IP checksum error, L4 checksum error, lost frames, duplicated frames, out of sequence frames, delay and delay variation, frame interval and variation

Packet Delay Variation per RFC 3393: Minimum, Maximum, Average and Current

Histogram:

Aggregate bandwidth utilization, CRC/FCS and optical power. Per stream transmit and receive bandwidth utilization.

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 and 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
- PDV measurement setup:
 - duration, repetitions
 - customized testrate: 0.01% - 100%

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

RFC 2889

Test Configuration

- Benchmark Test: Fully Meshed throughput
- Number of Ports: 3 to 8
- Throughput: Starting load, Resolution, Trial duration
- Forwarding Rate: Starting load, Step Size, Trial duration

Flooding

MAC

- MAC Addresses: 16384
- Bandwidth: 0.01% to 100.00%

VLAN

- VLAN Addresses: 4096
- VLAN Mask: 0, 1, 4095
- Bandwidth: 0.01% to 100.00%

ARP

- MAC Source Addresses: 4096
- ARP Rate: 1 to 20 per second

Link OAM

Loopback and Discovery per IEEE 802.3ah
Interoperable with Accedian EtherNiID

Statistics

MAC, Peer Description, Discovery (L), Discovery (R), Flags (L), Flags (R), Revision (L), Revision (R), Parser (L), Parser (R), Mux (L), Mux (R), Vendor Spec (L), Vendor Spec (R), OUI (L), OUI (R)

Packet Capture and 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, NetBIOS 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, RTCP, 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 × 220 × 65 mm (12.6 × 8.7 × 2.6 in)

Ordering Information

For questions about applications and accessories for the STT Metro, please contact your local distributor or sales representative.

