SUNRISE TELECOM®

SunSet® SDH

with Jitter and Wander

Data Sheet

Benchtop performance in a handheld test set - the SunSet SDH

Combining the power of a benchtop SDH/PDH set and protocol analyzer into a handheld platform, the SunSet SDH offers advanced testing for SDH, PDH, and ATM networks and services. With electrical and optical interfaces, the SunSet SDH tests from 64 kbit/s to 2.5 Gbit/s (STM-16). Its lightweight, durability, long battery life, and low cost make it the ideal tool for field technicians in the access and metropolitan networks. And with jitter and wander testing capabilities, save time and money for installation, maintenance, troubleshooting, and commissioning tasks, either at the central office or in the field.

FEATURES

- SDH testing at 52, 155, 622 Mbit/s and 2.5 Gbit/s
- PDH & T-Carrier testing at 1.5, 2, 34, 45, and 139 Mbit/s; PDH/T-Carrier structured mode
- Bit error rate testing and error performance analysis per ITU-T G.821, G.826, G.828, G.829, M.2100, M.2101, and M.2110
- SDH-SDH, SDH-PDH MuxTest modes; Independent Tx and Rx for testing ADMs and synchronous multiplexers
- SDH/PDH MuxMode: drop and insert of 1.5/2M tributaries
- Full SDH overhead control and decode
- Tributary scan for alarm and error monitoring
- APS timing measurement and APS bytes capture
- Pointer monitoring, pointer adjustment, pointer offset and G.783 pointer test sequences
- ITU-T compliant Jitter generation, measurement, tolerance & transfer tests, pointer jitter test in MuxTest mode
- Real time wander TIE measurements and offline MTIE/TDEV analysis software conforming to ITU-T G.811, G.812, G.813, G.823
- Pulse mask analysis at 1.5, 2, 34, and 45 Mbit/s

- Tandem connections: errors, alarms, APId capture and generation
- Voice frequency testing: talk/listen, send/receive tones, noise measurements
- ATM testing at 1.5, 2, 34, 45, 155, 622 Mbit/s and 2.5 Gbit/s
- ATM traffic generation, ATM QoS measurements, ATM Adaptation Layer (AAL0, AAL1, AAL2, AAL5) tests
- IP over ATM testing, ATM DSL DSLAM test

BENEFITS

- SDH/PDH/ATM feature-rich
- Lightweight and highly portable
- Eliminates the need for multiple and heavier instruments without compromising test features or accuracy
- Intuitive and easy-to-use
- Cost-effective and future-proof
- Increases efficiency
- Consolidates training and shortens the learning curve
- Handles multiple tasks including installation, maintenance, troubleshooting, and commissioning

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APPLICATIONS

Installation, Maintenance, Troubleshooting & Commissioning

The SunSet SDH is the ideal product for installation and bringing into service tasks in the field and central office. Commissioning and acceptance tests can be performed with the same test set, as jitter and wander features are part of the conformance procedures. Maintenance and troubleshooting in-service tasks can also be completed with the same handheld test set saving time and money.

Out-of-Service Testing

- End-to-end BERT
- Bringing into Service per ITU-T M.2110
- ATM testing
- Trace generation
- Round trip delay
- NE verification
- Pulse mask analysis at 1.5M, 2M, 34M, and 45M
- Voice frequency testing: Talk/listen, send/receive tones
- MuxTest
- Jitter tests
  - Jitter generation and measurement
  - Jitter tolerance and transfer measurement
  - Pointer/mapping jitter test
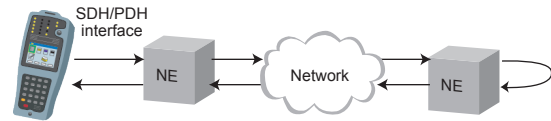- Wander tests

In-Service Monitoring

- Through protected monitoring points or optical splitters
- Line through and payload through mode
- Error performance analysis per G.826, G.828, G.829, M.2101
- SDH overhead bytes decode
- Pointer monitoring
- APS timing measurement and APS capture
- In-service tributary scan
- Voice traffic monitoring
- In-service jitter/wander measurements
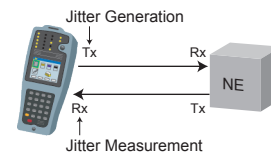- Troubleshooting synchronization problems
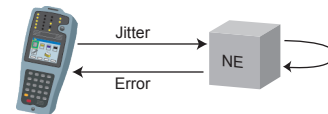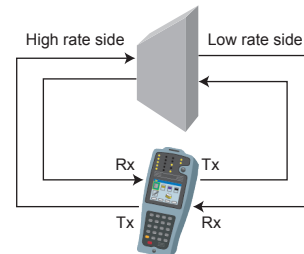

Out-of-Service testing
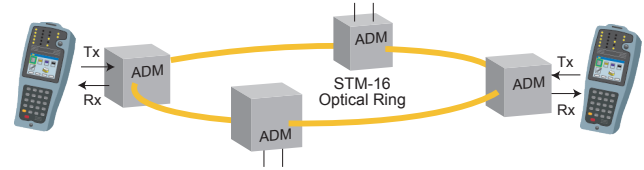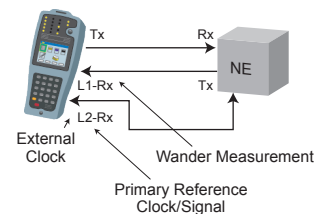

Round trip delay

Jitter generation/measurement
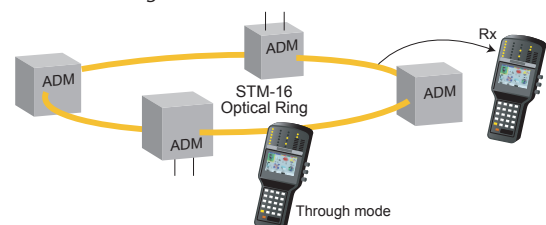

Jitter tolerance/transfer measurements

MuxTest, Pointer jitter tests

Wander testing

In-Service monitoring

SDH SPECIFICATIONS

2.5G/622M/155M/52M Optical (STM-16/4/1/0)
Connector: FCUPC or SCUPC

Transmitter
Clock source: Internal, Loop, External

Receiver
Frequency recovery range
    2.48832 Gbps $\pm$ 50 ppm
    622.080 Mbps $\pm$ 50 ppm
    155.520 Mbps $\pm$ 50 ppm
    51.840 Mbps $\pm$ 50 ppm
Wavelength: 1280 -1580 nm

155M Electrical (STM-1)
Connector: BNC

Transmitter
Clock source: Internal, Frequency offset, Loop, External

Receiver
Frequency recovery range: 155.520 Mbit/s $\pm$ 150 ppm

52M Electrical (STM-0)
Connector: BNC

Transmitter
Clock Source: Internal, Frequency offset, Loop

Receiver
Frequency recovery range: 51.840 Mbit/s $\pm$ 500 ppm

Payloads
ITU-T and ETSI mapping

Test Patterns
PRBS, Fixed, User programmable

SDH Error Injection

SDH Alarm Generation

SDH Measurements (2.5G, 622M, 155M, 52M)
Errors
Alarms
Performance: ITU-T G.821, G.826, G.828, G.829, M.2101/M.2110
Optical power level measurement
Frequency measurements
Automatic tributary scan

SDH Overhead Features
Overhead monitor and decode
Programming K1, K2 APS signalling bytes
J0 Section trace/generation
J1/J2 Path trace/generation
Path overhead monitor and decode
Programmable POH bytes
DCC BER testing through D1 to D3, D4 to D12 bytes
Orderwire: Talk/listen through E1, E2 bytes
Pointer monitor: H1, H2, V1, V2 bytes
Pointer adjustment
SONET mode
Pointer offset

SDH-PDH Mux/Demux Testing

SDH-SDH Mux/Demux Testing (SWSDHJ-116)

Through Mode
Line through
Payload through

Pointer Test Sequences

Tandem Connections Monitoring

Automatic Protection Switch Time Measurement

Service Description

PDH/T-CARRIER SPECIFICATIONS

139M
Connector: BNC

Transmitter
Clock source: Internal, Frequency offset, Loop

Receiver
Frequency recovery range: 139.264 Mbit/s $\pm$ 150 ppm

45M
Connector: BNC

Transmitter
Clock source: Internal, Frequency offset, Loop

Receiver
Frequency recovery range: 44.736 Mbit/s $\pm$ 500 ppm

34M
Connector: BNC

Transmitter
Clock source: Internal, Frequency offset, Loop

Receiver
Frequency recovery range: 34.368 Mbit/s $\pm$ 500 ppm

Dual 2M
Connector: RJ-45 or bantam

Transmitters (Lines 1 and 2)
Clock source: Internal, Frequency offset, External, Recovered, Loop
Fractional E1
Through mode

Receivers (Lines 1 and 2)
Frequency recovery range: 2.048 Mbit/s $\pm$ 5000 ppm

Dual 1.5M
Connector: RJ-45 or bantam

Transmitters (Lines 1 and 2)
Clock source: Internal, Frequency offset, External, Recovered, Loop
Fractional T1
Through mode

Receivers (Lines 1 and 2)
Frequency recovery range: 1.544 Mbit/s ± 500 ppm

Test Patterns
PRBS, Fixed, User programmable

PDH/T-Carrier Error Injection

PDH/T-Carrier Alarm Generation

PDH/T-Carrier Measurements (139M, 45M, 34M, 2M, 1.5M)
Errors/Alarms
ITU–T G.821 analysis
ITU–T G.826 analysis
ITU–T M.2100 analysis
Frequency measurements
Signal level measurement (1.5/2M/34M/45M)

PDH Mux/Demux Testing

Voice Frequency Testing (SWSDHJ-114)
VF level measurement
VF frequency measurement
VF tone generation
Peak code and coder offset measurements
Noise measurements

Pulse Mask Analysis (SWSDHJ-190)
1.5M, 2M, 34M, and 45M pulse mask

COMMON TO SDH/PDH/T-CARRIER

Auto Configuration

Propagation Delay Measurement

Histogram Analysis

JITTER GENERATION & MEASUREMENT

SDH/PDH/T-Carrier Jitter
Jitter measurement
Jitter histogram
Jitter generation
Jitter tolerance measurement
Fast jitter tolerance measurement
Jitter transfer measurement
Pointer jitter test

WANDER GENERATION & MEASUREMENT

SDH/PDH Wander Measurement
Reference clock: 1.544, 2.048, 5, 10 MHz, 1.544/2.048 Mbit/s (L2-Rx)
Off-line measurements (SWSDHJ-WAN)
– Maximum Time Interval Error (MTIE)
– Time Deviation (TDEV)

Wander Generation
Reference clock: 2.048 MHz

SERVICE VERIFICATION

ATM Testing
Interface: UNI and NNI per ITU-T I.361
Quality of Service
Traffic Supervision
VCC Scan
Cell Capture & Decode
Traffic Generation
DSLAM Testing
ATM/IP PING Test

Frame Relay Testing
Interfaces: E1, T1
Frame Relay Basic (SWSDHJ-160)
LMI Analysis
PING Test
FOX Test
Statistics Analysis

V5.x Testing
Interfaces: E1
V5.x Protocol Analysis (SWSDHJ-149)
V5.2 3 C Paths Monitoring (SWSDHJ-150)

GSM Testing
Interfaces: Dual E1
GSM Voice and TRAU Access (SWSDHJ-140)
GSM A-bis Protocol Analysis (SWSDHJ-141)

SS7 Testing
Interfaces: E1, T1
SS7 Analysis (SWSDHJ-170 to SWSDHJ-175)

ISDN Testing
Interfaces: E1, T1
ISDN Primary Rate Testing (SWSDHJ-180)
Call Setup
DTMF Dialing (SPEECH Call)
Keypad Facilities
Automatic Supplementary
Automatic Tele Services Test
Sequential Call
Protocol Analysis

	ETSI	AUSSI	DPNSS*	DASS2*
Protocol Analysis	✓	✓	✓	✓
Call Emulation	✓	✓	✓	✓
Auto Supplementary Services Test	✓	✓		
Auto Tele Services Test	✓	✓		
Sequential Call	✓	✓	✓	✓

**Not supported on T1 interface mode*

PRODUCT DESCRIPTION

Display: Backlit 320 x 240 pixels STN indoor/outdoor Color screen with CFL Backlight
Printer: Report printing via serial port, RS-232 DIN-9
Network: 10Base-T DIN-9
Battery: Built-in NiMH rechargeable battery pack
Power: AC operation w/100 to 240 VAC, 50/60 Hz universal charger
Operating temperature: 32 to 113°F (0 to 45°C)
Storage temperature: -4 to 158°F (-20 to 70°C)
Humidity: 5% to 90% noncondensing
Size: 4.3 x 2.8 x 10.6 in (11 x 7 x 27 cm)
Weight: 3.3 lb (1.5 kg)

ORDERING INFORMATION

SSSDHC-STM16J   SunSet SDHC Jitter and Wander, 2M, 34M, 155M test interfaces.

Optics Options

SSSTM1-13IR	Optical Interface, STM-0/1 1310 nm Intermediate Reach
SSSTM1-13LR	Optical Interface, STM-0/1 1310 nm Long Reach
SSSTM1-15LR	Optical Interface, STM-0/1 1550 nm Long Reach
SSSTM1-13I/15L	Optical Interface, STM-0/1 1310 nm Intermediate Reach, 1550 nm Long Reach
SSSTM1-13L/15L	Optical Interface, STM-0/1 1310 nm/1550 nm Long Reach
SSSTM4-13IR	Optical Interface, STM-0/1/4 1310 nm Intermediate Reach
SSSTM4-13LR	Optical Interface, STM-0/1/4 1310 nm Long Reach
SSSTM4-15LR	Optical Interface, STM-0/1/4 1550 nm Long Reach
SSSTM4-13I/15L	Optical Interface, STM-0/1/4 1310 nm Intermediate Reach, 1550 nm Long Reach
SSSTM4-13L/15L	Optical Interface, STM-0/1/4 1310 nm/1550 nm Long Reach
SSSTM16-13SR	Optical Interface, STM-0/1/4/16 1310 nm Short Reach
SSSTM16-13IR	Optical Interface, STM-0/1/4/16 1310 nm Intermediate Reach
SSSTM16-13LR	Optical Interface, STM-0/1/4/16 1310 Long Reach
SSSTM16-15IR	Optical Interface, STM-0/1/4/16 1550 nm Intermediate Reach
SSSTM16-15LR	Optical Interface, STM-0/1/4/16 1550 nm Long Reach
SSSTM16-13S/15I	Optical Interface, STM-0/1/4/16 1310 nm Short Reach/1550 nm Intermediate Reach
SSSTM16-13I/15I	Optical Interface, STM-0/1/4/16 1310 nm/1550 nm Intermediate Reach
SSSTM16-13S/15L	Optical Interface, STM-0/1/4/16 1310 nm Short Reach/1550 nm Long Reach
SSSTM16-13I/15L	Optical Interface, STM-0/1/4/16 1310 nm Intermediate Reach/1550 nm Long Reach
SSSTM16-13L/15L	Optical Interface, STM-0/1/4/16 1310/1550 nm Long Reach

Optical Interface Connector Options

SSSDHCJ-FC-SM	FCUPC Single Mode Optical Connectors
SSSDHCJ-SC-SM	SCUPC Single Mode Optical Connectors
SSSDHCJ-FC-MM	FCUPC Multimode Optical Connectors
SSSDHCJ-SC-MM	SCUPC Multimode Optical Connectors

Electrical Interface Connector Options

SSSDHCJ-RJ45	1.5/2M RJ-45 Connectors
SSSDHCJ-BTM	1.5M/2M Bantam Connectors

Software Options

SWSDHJ-PDHJIT	PDH Jitter Generation & Measurement
SWSDHJ-DSNJIT	T-carrier Jitter Generation and Measurement
SWSDHJ-155MJIT	STM-1 Jitter Generation Measurement
SWSDHJ-622MJIT	STM-4 Jitter Generation Measurement
SWSDHJ-25GJIT	STM-16 Jitter Generation Measurement
SWSDHJ-SDHJIT	SDH Jitter Generation & Measurement package. Includes SWSDHJ-155MJIT, SWSDHJ-622MJIT, SWSDHJ-25GJIT.
SWSDHJ-TIE	2M TIE Generation and Measurement
SWSDHJ-PDHTIE	PDH TIE Measurements
SWSDHJ-155MTIE	155M TIE Generation and Measurement
SWSDHJ-622MTIE	622M TIE Generation and Measurement
SWSDHJ-25GTIE	2.5G TIE Generation and Measurement
SWSDHJ-SDHTIE	SDH TIE Measurements Package Includes SWSDHJ-155MTIE, SWSDHJ-622MTIE and SWSDHJ-25GTIE.
SWSDHJ-WAN	MTIE/TDEV Analyzer
SWSDHJ-114	Voice Frequency Testing
SWSDHJ-116	SDH-SDH Mux/Demux Testing
SWSDHJ-129	1.5 Mbps ATM Testing Requires SWSDHJ-110
SWSDHJ-130	2 Mbps ATM Testing
SWSDHJ-131	45 Mbps ATM Testing Requires SWSDHJ-111
SWSDHJ-132	34 and 155 Mbps ATM Testing
SWSDHJ-133	622 Mbps ATM Testing Requires any STM4 Optics Option
SWSDHJ-134	2.5Gbps ATM Testing Requires any STM16 Optics Option
SWSDHJ-ATM	ATM Software Package
SSSDHJ-ATM	VC12 ATM Testing
SWSDHJ-140	GSM Voice and TRAU Access
SWSDHJ-141	GSM A-bis
SWSDHJ-160	Frame Relay
SWSDHJ-161	Frame Relay NNI Requires SWSDHJ-160
SWSDHJ-170	SS7 over 2M Analysis
SWSDHJ-171	TUP Analysis ITU Standard Requires SWSDHJ-170
SWSDHJ-172	ISUP Analysis ITU Standard Requires SWSDHJ-170
SWSDHJ-175	Mobile Application Part BSSAP (DTAP + MAP) Requires SWSDHJ-170
SWSDHJ-180	ISDN Monitoring & Call Emulation
SWSDHJ-181	ETSI (Euro ISDN) Protocol Requires SWSDHJ-180
SWSDHJ-182	DPNSS Protocol Requires SWSDHJ-180
SWSDHJ-183	DASS2 Protocol Requires SWSDHJ-180
SWSDHJ-184	AUSSI Protocol Requires SWSDHJ-180
SWSDHJ-190	Pulse Mask Analysis at 1.5M, 2M, 34M and 45M