SUNRISE TELECOM

SunSet™ T10

April 2001

SPECIFICATIONS

Connectors
Bantam jacks, Line 1 and 2 Tx/Rx
Serial Port: 8 DIN, RS232C (V.24), DTE
Datacom Port: SCSI-36 system expansion port

Test Mode
T1SINGLE: T1 line testing
T1DUAL: Bidirectional T1 line testing, DS0/VF channelized drop/insert, SS7 protocol analysis, ISDN PRI protocol analysis and call setup, DDS testing
T1-MUX: Fractional T1 datacom port drop/insert testing
DATACOM: V.35, RS449/V.36, X.21/V.11, RS232/V.24

Status/Alarm Indicators
Power and low battery LED indicators
16 dual-color LED indicators for Line 1 & 2: Pulses, B8ZS, AIS, Yellow Alarm, SF-D4, ESF, SLC-96, Error
Logical: Test Pattern Sync, bit error

T1 Interface
Framing: SF-D4, ESF, SLC-96
Coding: AMI, B8ZS
Access Mode
- DSX Monitor: 100Ω, ±1%
- Bridge: > 1000Ω
- Terminated: 100Ω, ±1%

Transmitter
- Line Build Out (LBO): 0, -7.5, -15, -22.5 dB
- Clock: Internal (1.544 MHz, ± 5 ppm), looped, external
- Pulse shape to TR-TSY-000499; reference: G.703, CB113, CB119, CB132, CB143, PUB62508, PUB62411

Receiver
- Terminate, Bridge: +6 to -36 dB cable loss
- DSXMON: -15 to -25 dB, resistive
- Frequency range: 1542 kHz to 1546 kHz

Test Patterns
Repeating: 3 in 24, 1 in 8 (1:7), 1 in 16, 55 octet, 55 Daly, Alt 1010, All 0s, All 1s, FOX, T1-T6, DDS1, DDS2, DDS3, DDS4, DDS6
Pseudo random: QRS, PRBS 2^{-n} - 1, n = 6, 7, 9, 11, 15, 20, 23
Programmable: 10 patterns, 2048 bits long with user defined alphanumeric labels
Test pattern inversion

Error Injection
BPV, logic, frame errors; programmable error burst 1 to 9999, or error rate 2 x 10^{-3} to 1 x 10^{-9}

Measurements
Error Types: BPV, Bit error, Framing bit error, CRC-6 error
Error Reports: Total count, error rate, ES, %ES, SES, %SES, UAS, %UAS, AS, %AS, DGRM, %DGRM
Alarm Statistics: AIS seconds, loss of signal seconds, Yellow Alarm seconds, loss of frame seconds, change of frame alignment seconds
G.821 Analysis

Signal Measurements
- Signal available seconds count and percent, loss of signal seconds count & percent, low density seconds count, excess 0s seconds count, AIS seconds count
- Receive bit rate: 1542 to 1546 kbps, ± 1 bps, ext/int clock
- Receive level (volts and dBdsx): Vpeak-peak, V+peak, V-peak
- Simplex current: 1 to 200 mA, ± 1 mA, ± 5%

Frequency Measurements
- Moving bar graph of slip count, max frequency, min frequency, clock slips, frame slips, max positive wander, max negative wander

General
- Measurement Duration: Continuous or timed (programmable from 1 min to 999 hours)
- Printing at timed interval or at end of test
- Printing on alarm or event with timestamp
- Error/Alarm events and test results may be stored in NVRam in absence of printer

Other Measurements
View Received Data
View T1 data in binary, hex, ASCII
Shows data in bytes by timeslot
Trap 60 pages of data, 8 bytes per page
Captures 256 consecutive timeslots and stores as user pattern

Bridge Tap
Automated transmission & measurement of 21 different patterns to identify possible bridge taps on line

. . . a step ahead

SunSet™ T10

Propagation Delay
Measure roundtrip propagation delay in unit intervals ± 1 UI, with translation to microseconds and one way distance over cable

Quick Tests
Two programmable automated loopback tests that save time when performing standardized loopback tests

CSU & NI Loopback Control
In-band Codes
- CSU, NI, 100000
- 10 programmable user patterns

ESF-FDL
- Payload, Line, Network
- 10 programmable user patterns

HDSL Span Control
Looping and control of HDSL equipment from DS1 access
Supports loopback commands for HTU-C, HTU-R, HRU, HLU, HRE
Graphical display updates with span status
Includes SF/ESF modes, arm, disarm, loop up, loop down, timeout disable

Westell & Teltrend Looping Device Control (SW184)
Automated looping of Westell and Teltrend line and central office repeaters. Includes SF and ESF modes, arm, loop up/down, loopback query, sequential loopback, power loop query, span power down/up, unblocking

ESF Facility Data Link (SW182)
Read and Send T1.403 message on FDL (PRM and BOM)
- Automatic HDLC protocol handling

YEL ALM, LLB ACT, LLB DEA, PLB ACT, PLB DEA
T1.403 24 hour PRM collection per 15 min interval

SLC-96 Data Link (SW182)
Send and receive message
WP1, WP1B, NOTE formats
Alarms, switch-to-protect, far end loop
To Telcordia TR-TSY-000008 specifications, mode I and III

Westell & Teltrend PM NIU and MSS (SW184)
Supports Westell and Teltrend performance monitoring network interface unit and maintenance switch system with ramp. Set/query NIU time and date. Query performance data by hour or all. Reset performance registers. Read data over RAMP line. Perform maintenance switch.

Pulse Mask Analysis (SW190)
Scan Period: 800 ns
Measurements: Pass/Fail, rise time, fall time, pulse width, %overshoot, %undershoot
Resolution: 1 ns or 1%, as applicable
Masks: ANSI T1.102, T1.403; AT&T CB119, Pub 62411
Pulse/Mask Display: Test set screen and SS118 printer

DDS Basic Package (SW188)
Test from T1 interfaces
Choose receive and transmit timeslots independently
Test rates: 2.4, 4.8, 9.6, 19.2, 56, 64 kbps
Patterns: 2047, 511, 127, 63, All 1s, All 0s, DDS-1, DDS-2, DDS-3, DDS-4, DDS-6, 8-bit user, Alt 1010
Loopbacks: Latching, interleaved. CSU, DSU, OCU, DSO-DP, 8-bit user
Measurements: Bit errors, Bit error rate
Control code send/receive: Abnormal, mux out-of-sync, idle

Teleos & Switched 56 Tests (SW187)
Switched 56 call setup and bit error rate testing
Teleos signaling sequence timing analysis and dial digits decoding

Fractional T1
Error measurements, channel configuration verification
Nx64 kbps, Nx56 kbps, N=1 to 24
Sequential, alternating, or random channels
Auto scan and auto configure to any FT1 order

CSU & NI Emulation (SW181)
Bidirectional
Responds to loopback commands, in-band and out-of-band (ESF datalink T1.403)
Graphic indication of incoming signal status in both directions
Simultaneous display of T1 line measurements
Automatic generation of AIS and Yellow alarm
Loopbacks
- Line 1: Line and payload loopback
- Line 2: Line loopback
- Simultaneous loopbacks in both directions
- Local and remote loopback control

Remote Control (SW180)
VT100 emulation with same graphical interface used by test set
Circuit status table provides current and historical information on test set LEDs
Uses 8 pin MINI DIN, RS232C, 9600 baud preferred

Voice Frequency Capabilities
Monitor speaker with volume control for Line 1 and 2
Built-in microphone for talk
View all 24 channel A, B (C, D) bits for Line 1 and 2
Control A, B (C, D) bits (E&M ground/loop start, FXO, FXS, on/off hook, wink)
Companding law - μ Law
Programmable idle channel A, B (C, D) bits
Selectable idle channel code, 7F or FF hex
VF Level and Frequency Measurement
- Level: +3 to -60 dBm, resolution 0.1 dBm
- Frequency: 50 to 3950 Hz, resolution 1 Hz

VF tone generation
- Variable tone: 50 to 3950 Hz @ 1 Hz step, +3 to -60 dBm @ 1 dBm
- Fixed tones: 404, 1004, 1804, 2713, 2804 Hz @ 0 dBm and -13 dBm

Noise Analysis (SW183)

Signal to noise (S/N)
Noise with filters: 3 kHz flat, C-message, C-notch

MF/DTMF/DP Dialing, Decoding/Analysis (SW185)

MF/DTMF/DP dialing up to 32 digits, 10 user programmable quick dial number for each tone type
MFR1 digits, 0 - 9, KP, ST, ST1-3, Pause
DTMF digits, 0 - 9, *, #, A, B, C, D, Pause
DP digits, 0 - 9, Pause
MF/DTMF decode up to 40 received digits. Analyze number, high/low frequencies, high/low levels, twist, tone period, interdigital time.
Analyzer dynamic range: 0 to -25 dBm
DP decode up to 40 digits. Analyze number, %break, PPS, interdigital time
Programmable interdigital period, tone period, and tone level (MF, DTMF)
Programmable %break and interdigital period @ 10 pps (DP)

Signaling Analysis

Analyze mode
- Tracer on A, B (C, D) signaling state changes for Line 1 and 2 with timestamps
- MFR1: Timing analysis of signaling transition states and dialing digits decoding of MFR1 signaling
- MFR1M: Modified MFR1 CO switches signaling analysis
- MIXTONE: Decode a signaling sequence that has both MF and DTMF digits

Protocol Analysis

SS7 (SW189A)

Layer 2, 3, 4 analysis to bit level
SU traffic analysis
- Counters for FISU, LSSU, TUP, ISUP, SNM, SNT messages
- Counters for FIB and BIB retransmissions
- % analysis on different types of messages

MSU tracer
- User programmable trace filter; CIC, DPC, OPC, H1H0, Signaling address
- View bidirectional real time message flow
- Messages are interpreted up to layer 4 or displayed in hex format. The trace storage holds up to 1000 messages.

SS7 TCAP Analysis (SW189B)

ANSI T1.114
TCAP filter: And/or filtering on Origination and Destination Transaction ID
Decoding: For Transaction, Dialogue, and Component Portions
- Transaction Portion decoding includes Package Type and Transaction ID
- Dialogue Portion decoding for Information Element Identifier and Context
- Component decode screen displays Component Type, Correlation ID, Operation Code (Operation Family & Operation Specifier), and Parameter Identifier and Contents

ISDN PRI (SW186)

Bidirectional monitoring and call analysis
National ISDN-2, AT&T 5ESS, ETSI, and Northern Telecom DMS-100 compatible
NT and TE emulation
Voice and data call setup and receive
Built-in microphone and speaker for B-channel talk/listen
Supports multirate Nx64k data calls
Generates 2047, 511, 127, 63, All 1s, All 0s, and user programmable 8-bit test patterns
Bit error rate test with G.821 analysis
Supports 23B+D, 47B+D, and 46B+2D
Test for Backup D-channel in 46B+2D
User programmable trace filter, view bidirectional real time message flow. Messages are interpreted up to layer 3 or displayed in hex format.
Trace storage holds up to 1000 messages with timestamps
On-screen help for special optional call feature programming

GSM 16K Voice/TRAU Analysis (SW191)

Supports GSM 06.10, 08.60
Drop/Monitor 16 kbps GSM channel at 13 kbps voice rate to built-in speaker
Selectable timeslot (1 to 24) and subchannel (1 to 4)
Codification RPE LTP at 13 kbps
Frame type decode of 16 kbps subchannel (Voice, Data, Idle)
Identify uplink or downlink direction
Transmit encoded 13 kbps voice message on timeslot/subchannel
BERT (G.821) on 16 kbps subchannel: Bit error/rate, ES, SES, EFS, UAS, LOSS
Send test pattern on 16 kbps: 2047, All 1s, All 0s, Alt 1010

GR-303 Analysis (SW193)

Bidirectional monitoring of TMC/CSC/EOC channels
Tricordia GR-303-CORE
TMC/CSC Monitoring
- Decode to Layer 3
- Statistics counters for each cause value
- 1000 messages can be stored with date & timestamp, direction, and full L3 decode
- Trace filters for: Call Reference Value, DS0, DS1, Cause Value

EOC Verification
- Decode to Layer 2
- Errored or discarded frame counters
- Filter on SAPI/TEI combination

Frame Relay Analysis (SW194)

Supported from DS1 or V.35 interface
Test Rate: 1.544 Mbps, Nx56 kbps, Nx64 kbps
Supports ITU-T Q.933, ANSI T1.617
Mode: UNI DTE/DCE
Requires factory installation
LMI Analysis
- Auto configuration for protocol type
- Settings: T391 Status Enquiry, T393 Status, N391 Full Status Polling, N392 Error Threshold, N393 Monitor Events
- Results: Link O.K. Total, Link Errored Total, Timeout Error, Response Sequence Number, Wrong message
- PVC Status: New, Active, New & Active, or Inactive DLCI indication

PING Testing
- Transmit and respond to PING messages
- Send Settings: DLCI length (2-4 bytes), DLCI value, Local IP, Destination IP, Network Layer Protocol Identifier (NLPID), Timeout, Number of PINGS
- Results: Number of PINGs, Number sent, PING status (received, unreached, errored), Round Trip Time (current, average, maximum, minimum)
- Response settings: Local IP
- Response results: PVC status, Number of PINGS, Number received, PING from IP address with timestamp

Datacom Interface (SS151)

Supports V.35, X.21 (V.11), RS232 (V.24), RS449 (V.36) RS530 interfaces
DTE, DCE Emulation
SCSI-36 connector to test set: Adapter cables for V.35, X.21, RS232 (V.24), RS449 (V.36), RS530
Synchronous data rates: 300 bps to 1.544 Mbps
Asynchronous data rates: 50 bps to 19.2 kbps (RS232-V.24 only)
Send test patterns and make G.821 measurements
Bit error injection
View transmit and receive signal status: TxD, TxC, RxD, RxC, DTR, RTS, CTS, DSR, RL, LL, RI
Control signal leads: DTR, RTS, CTS, DSR, DCD, RL, LL, RI
Invoke Local Loopback (LL), Remote Loopback (RL)
Internal or received clock selectable
Hitless 1.544k, Nx56k and Nx64k T1 drop and insert, via V.35, X.21 (V.11), RS232 (V.24), RS449 (V.36) interface; DCE mode only

GENERAL

Operating temperature: 0˚C to 50˚C
Operating humidity: 5% to 90%, noncondensing
Storage temperature: -20˚C to 70˚C
Size: 2.4" (max.) x 4.2" (max.) x 10.5"
Weight: 2.5 lb [1.1 kg]
Battery operation time: 2 1/2 hr nominal
AC operation: 110V/120V @ 60 Hz, or 220V/240V @ 50 Hz
3 year warranty on chassis
1 year warranty on accessories and battery

ORDERING INFORMATION

Test Set

SS150B	SunSet T10 Chassis Includes chassis, Software cartridge, NiMH battery, Universal Charger (SS138C), Instrument Stand, and User's Manual

Hardware Option

SS151	Datacom Module Includes cable adapters for V.35, RS449/V.36, X.21, RS232, DTE and DCE

Software Options

SW180	Remote control
SW181	CSU/NIU Emulation
SW182	ESF & SLC-96 Data Link Send and Receive
SW183	VF Level, Frequency, and Noise Measurement
SW184	Westell, Teltrend Intelligent Products
SW185	MF/DTMF/DP Dialing, Decoding, and Analysis
SW186	ISDN PRA (also known as PRI) Call Setup & D-channel Monitor
SW187	Switched Call Setup and BERT
SW188	DDS testing (T1 interface access)
SW189A	SS7 Protocol Analysis
SW189B	SS7 TCAP Analysis
SW190	Pulse Mask Analysis
SW191	GSM 16K Voice/TRAU Analysis
SW193	GR-303 Analysis
SW194	Frame Relay Analysis (Requires factory installation)

Accessories

SS101	Carrying case
SS104	Cigarette lighter battery charger
SS105	Repeater extender
SS106	Single bantam to bantam cable, 6'
SS107	Dual bantam to bantam cable, 6'
SS108	Single bantam to 310 cable, 6'
SS109	Single bantam to alligator clip cable, 6'
SS110	Dual bantam to 15-pin D-sub connector cable, Male, 6'
SS111	Dual bantam to 15-pin D-sub connector cable, Female, 6'
SS112	2 single bantams to RJ-48 8 position modular plug cable, 6'
SS115B	8-pin mini DIN to DB9 Printer cable
SS116	Instrument stand
SS117	Printer paper, 5 rolls, for SS118
SS118B	High capacity thermal printer. Includes SS115B.
SS122C	Null Modem Adapter
SS123A	SunSet jacket
SS127	Printer 220VAC charger for SS118
SS128A	120V/12V 1.2A SunSet Charger
SS130A	19"/23" SunSet Rack Mount - Removable
SS130B	19"/23" SunSet Rack Mount - Permanent
SS132	Two single bantams to 4-position modular plug cable
SS136	SunSet T10 User's Manual
SS138C	SunSet AC Adapter, 100-240 VAC, 50/60 Hz input, output 15 VDC @ 2A
SS152	SunSet T10 Training Tape
SS252	V.35 DTE/DCE Adapters
SS253	X.21/V.11 DTE/DCE Adapters
SS254	RS232/V.24 DTE/DCE Adapters
SS255	RS449/V.36 DTE/DCE Adapters
SS262	RS530 DTE/DCE Adapters
SS308	Datacom Cable SCSI-36 (m) to DB-37 (f), 6'

Note: Specifications subject to change without notice.

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