SUNRISE TELECOM

SunSet™ T1

April 2001

SPECIFICATIONS

Connectors
Bantam jacks (Eq Tx, Eq Rx, Fac Tx, Fac Rx)
8-pin mini DIN RS232C serial port, DTE

Access
Single Mode
- DSX Monitor: 100Ω
- Bridged Monitor: > 1000Ω
- Terminated: 100Ω
- Terminated Loop: 100Ω
- Bridged Loop: > 1000Ω
- DSX Monitor Loop: 100Ω

Dual Mode
- Thru A/B, Split A/B, Split E/F, Loop E/F, Mon E/F Termination
- Thru, Split, Loop: 100Ω
- Mon: > 1000Ω

Transmitter
Framing: SF-D4, ESF, SLC-96, T1DM
Coding: AMI, B8ZS
Line Build Out (LBO): 0, 7.5, 15 dB
DSX pre-equalization: 0 to 655 ft, 133 ft per step
Clock: Internal (1.544 MHz ± 5 ppm), looped, external
Pulse shape to Telcordia TR-TSY-000499; reference: G.703, CB113, CB119, CB132, CB143, PUB62508, PUB62411
Transmit Patterns
- Repeating: 3 in 24, 1 in 8 (1:7), all 1s, 1 in 16, 55 octet, alt 1010, all 0s, T1-T6, DDS1-DDS6
- User programmable pattern 1 to 2048 bits
- Store up to 10 programmable patterns with alphanumeric names
- Pseudo random: QRS, PRBS, n = 6, 7, 9, 11, 15, 20, 23
- Test pattern inversion
- Insert errors: BPV, logic, frame errors; programmable error burst 1 to 9999 counts, or error rate 2 x 10^{-3} to 1 x 10^{-9}

Receiver
Input sensitivity
- Terminate, Bridge: +6 to -36 dB cable loss
- DSXMON: -15 to -30 dB, resistive

Coding: AMI, B8ZS, Auto
Framing: SF, ESF, SLC-96, T1DM, auto frame
Frequency range: 1542 kHz to 1546 kHz
Auto pattern synchronization
Received pattern sync independent of transmitted pattern
Programmable loss of frame criteria, error averaging interval

Basic Measurements
Summary Measurements
Elapsed time, remaining time, framing, line coding, transmitted pattern, received pattern, BPV count and rate, bit error count and rate, framing bit error count, pulse level (dB), CRC-6 block error count, line frequency, errored second count and percent, severely errored second count and percent, error free second percent, available second percent, unavailable second count and percent

Logical Error Measurements
Bit error count and current rate, average bit error rate since start, bit slips, bit errored seconds and percent, severely bit errored seconds and percent, available seconds and percent, unavailable seconds and percent, degraded minutes count and percent, loss of sync seconds count and percent

Signal Measurements
Signal available seconds count and percent, loss of signal seconds count and percent, low density seconds count, excess 0s seconds count, AIS seconds count, signal unavailable seconds percent
Simplex current: 1 to 150 mA, ± 1 mA ± 5%.
Receive bit rate: 1542 to 1546 kbps, ± 1 bps, ± clock source accuracy, external or internal clock
Receive level (volts and dBdsx)
- Peak to peak: 60 mV to 15V, ± 10 mV, ± 5%
- Positive pulse: 30 mV to 7.5V, ± 10 mV, ± 5%
- Negative pulse: -30 mV to -7.5V, ± 10 mV, ± 5%

. . . a step ahead

SunSet™ T1

Line Error Measurements
BPV count and rate (current and average), BPV error seconds count and percent, BPV SES count and percent, BPV AS count and percent, BPV UAS count and percent, BPV degraded minutes count and percent

Path - Frame Measurements
Frame bit error count and rate (current and average), frame slip count, OOF second count, COFA count, frame synch loss seconds, yellow alarm second count, frame error second count and percent, frame severely errored second count and rate, frame available second count and percent, frame unavailable second count and percent

Path - CRC-6 Measurements
CRC-6 block error count and rate (current and average), CRC-6 errored second count and percent, CRC-6 severely errored second count and percent, CRC-6 available second count and percent, CRC-6 unavailable second count and percent

Frequency Measurements
Moving bar graph of slip rate, received signal frequency, max frequency, min frequency, clock slips, frame slips, max positive wander, max negative wander

Other Measurements
View Received Data
View T1 data in binary, hex, ASCII
Shows data in bytes by time slot
Shows 8 time slots per display page
Captures 256 consecutive time slots as test pattern

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

Quick Test I and II
2 programmable automated loopback tests that save time when performing standardized acceptance tests

Bridge Tap
Automated transmission and measurement of 21 different patterns to identify possible bridge taps at some point on line

Loopbacks
Loopback Control, In-band
CSU, NIU, 100000
10 programmable user patterns, 1 to 32 bits

Loopback Control, ESF-Facility Data Link
Payload, Line, Network
10 programmable user patterns, 1 to 32 bits

Westell & Teltrend Looping Devices Control (SW1010)
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.

Voice Frequency Capability
Monitor speaker with volume control
Built-in microphone for talk
View all 24 channel A, B (C, D) bits
Control A, B (C, D) bits (E&M ground/loop start, FXO, FXS, on/off hook, wink)
Generator: 404, 1004, 1804, 2713, 2804 Hz @ 0 dBm and -13 dBm
DTMF dialing, 32 digits, 10 sets preprogrammable speed dial number
Programmable tone and interdigital period
Companding law - μ Law
Hitless drop and insert
Programmable idle channel A, B (C, D) bits
Selectable idle channel code, 7F or FF hex

VF Level, Freq & Noise Measurement (SW111)
Generator: 50 to 3950 Hz @ 1 Hz step; +3 to -60 dBm @ 1 dBm step
Level, Freq measurements: 50 to 3950 Hz +3 dBm to -60 dBm
Noise: 3 kHz flat, C-message, C-notch, S/N

MF/DTMF/DP Dialing, Decoding and Analysis (SW141)
MF/DTMF/DP dialing
Programmable DP %break and interdigital period @ 10 pps
MF/DTMF decode up to 40 received digits. Analyze number, high/low frequencies, high/low levels, twist, tone period, interdigital time.
DP decode up to 40 digits. Analyze number, %break, PPS, interdigital time.
Signaling Analysis
- Live: Graphical display of A, B (C, D) signaling state changes
- Trigger: Programmable A, B (C, D) trigger state to start analysis on the opposite side
- MFR1: Timing analysis of signaling transition states and decoding of dialed digits
- MFR1M: Modified MFR1 CO switches signaling analysis
- MIXTONE: Decode a signaling sequence that has both MF and DTMF digits

Fractional T1 (SW105, SW1010)
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
Scan for active channels
Rx and Tx do not need to be same channels
Hitless drop and insert
Programmable idle channel A, B (C, D) bits
Selectable idle channel code, 7F or FF hex

ESF Facility Data Link (SW107, SW1010)
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
AT&T 54016, 24 hr performance report retrieval
T1.403, 24 hour PRM collection per 15 min interval

SLC-96 Data Link (SW107, SW1010)

Send and receive message
WP1, WP1B, NOTE formats
Alarms, switch-to-protect, far end loop
To Telcordia TR-TSY-000008 specifications
SLC-96 FEND loop

CSU/NI Emulation (SW106, SW1010)

Bidirectional (Equipment and Facility Directions)
CSU/NI replacement emulation
Responds to loopback commands - inband and datalink
Graphic indication of incoming signal status in both directions
Simultaneous display of T1 line measurements
Automatic generation of AIS
Loopbacks
- Facility: Line and payload loopback
- Equipment: Line loopback
- Simultaneous loopbacks in both directions
- Local and remote loopback control

Remote Control (SW100)

VT100 emulation with same graphical interface used by test set
Circuit status table provides current & historical information on test set LEDs
Uses test set's serial port at 9600 baud, 8-pin MINI DIN
Serial port can not be connected to printer during remote control

Westell PM NIU and MSS (SW120)

Supports Westell 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 function for Westell and Teltrend.

Pulse Mask Analysis (SW130)

Scan Period: 800 ns
Measurements: Pass/Fail, ns Rise time, ns fall time, ns 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 (SW170)

Choose receive and transmit time slots 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-5, DDS-6, 8-bit user
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
Access Mode: Loopback tests require intrusive access to T1

Teleos & Switched 56 Tests (SW144)

Switched 56 call set up: Supervision and dialing
Send test patterns: 2047, 511, 127, 63, all 1s, all 0s, FOX, DDS1-6, USER
Bit error, bit error rate measurement
Teleos signaling sequence timing analysis and dial digits decoding

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: 2.7 lb [1.2 kg]
Battery operation time: 2.5 hr nominal
AC operation: 110V/120V @ 60 Hz, or 220V/240V @ 50/60 Hz

ORDERING INFORMATION

Test Set

SS100	SunSet T1 Chassis Includes battery charger, User's manual, Instrument stand. Software cartridge must be ordered separately. CLEI: T1TUW04HAA CPR: 674488

Software Options

SW1000	Software T1 Includes basic measurements, loopback control, test patterns send/rcv, bridge tap, propagation delay, quick test. Also includes VF channel capabilities: Talk/listen, view/control A, B (C ,D), DTMF dialing, send 5 tones at 2 levels CLEI: T1TUW01HAA CPR: 674485
SW1010	Software FT1 Includes all Software T1 features and adds: Fractional T1, Teltrend/Westell looping device control, CSU/NIU emulation, ESF/SLC-96 data link control CLEI: T1TUW02HAA CPR: 674486
SW100	Remote Control Graphical, menu driven VT100 emulation Includes SS115 & SS122
SW105	Fractional T1 Purchased with SW1000 only
SW106	CSU/NIU Emulation Purchased with SW1000 only
SW107	ESF & SLC-96 Data Link Send and Receive Purchased with SW1000 only
SW111	VF Level, Frequency & Noise Measurement
SW120	Westell Maintenance Switch, PM NIU, RAMP Purchased with SW1010 only
SW130	Pulse Mask Analysis
SW141	MF/DTMF/DP Dialing, Decoding, and Analysis
SW144	Teleos/Northern Switched 56 tests
SW170	Basic DDS Package

Accessories

SS101	Carrying Case
SS104	Cigarette Lighter Battery Charger
SS105	Repeater Extender
SS106	Single Bantam to Single Bantam Cable, 6'
SS107	Dual Bantam to Dual Bantam Cable, 6'
SS108	Single Bantam to Single 310 Cable, 6'
SS109	Single Bantam to Probe Clip Cable, 6'

SS110	Dual Bantam to 15-pin D Connector Cable, Male, 6'
SS111	Dual Bantam to 15-pin D Connector Cable, Female, 6'
SS112	Dual Bantam to 8-position Modular Plug Cable, 6'
SS113A	AC Battery Charger, 120VAC
SS113B	AC Battery Charger, 110VAC
SS114	SunSet T1 User's Manual
SS115	DIN-8 to RS232C Printer Cable
SS115B	DIN-8 to DB-9 Printer Cable
SS116	Instrument Stand
SS117A	Printer Paper, 5 rolls, for SS118B/C
SS118B	High Capacity Thermal Printer with 110 VAC charger. Includes SS115B.
SS118C	High Capacity Thermal Printer with 220 VAC charger. Includes SS115B.
SS121A	SunSet AC Charger, 230VAC, 50/60 Cycle European style connector
SS121B	SunSet AC Charger, 220VAC, 50/60 Cycle 3-prong IEC connector
SS121C	SunSet AC Charger, 240VAC, 50/60 Cycle 3-prong IEC connector
SS122	Null Modem Adapter, DB-25
SS122A	Null Modem Adapter, DB-9
SS123A	SunSet Jacket
SS125	SunSet T1 Training Tape, English
SS130A	Removable SunSet Rack Mount - 19"/23"
SS130B	Permanent SunSet Rack Mount - 19"/23"
SS132	Two Single Bantams to 4-position Modular Plug Cable

Note: Specifications subject to change without notice.

Printed in USA.

22 Great Oaks Blvd.
San Jose, CA 95119
ph 1 408 363 8000
fax 1 408 363 8313
info@sunrisetelecom.com

www.sunrisetelecom.com