SUNRISE TELECOM

SunSet™ T3

April 2001

SPECIFICATIONS

Connectors
DS3 Receive/Transmit: BNC
DS3 External Clock Input: Coax SMC, TTL
DS1/E1 Receive/Transmit: Bantam
DS1/E1 External Clock Input: Bantam, AMI, 0 to -30 dB
Serial Port: 8-pin Mini DIN RS232C (V.24), DTE
DC power

Status/Alarm Indicators
DS3: Pulses, Idle, Errors, M13 Frm, C-Bit Frm, AIS, Yel Alm (X-bit), FEBE
DS2: Frame
DS1: Pulses, B8ZS, Errors, SF, ESF, SLC-96, Yel Alm, AIS
E1: Pulses, HDB3, Errors, PCM-30, PCM-31, CRC det, Alarm, AIS
General: Pat Sync, Power, Battery

DS3 General
Framing: Unframed, M13, C-bit parity. Conforms to ANSI T1.102, 107, 107A, 403, and 404. Also Telcordia TR-TSY-000009 and TR-TSY-000191.
Line Coding: B3ZS
Clock Source: 44.736 MHz, External (± 300 ppm, TTL, 50% ± 1% duty cycle), Internal (± 5 ppm), Loop (± 300 ppm)
Standard Test Patterns: 1111, 1100, 1010, 2^{15}-1, 2^{20}-1, 2^{23}-1
User Programmed Patterns: 10 programmable 24-bit patterns with alphanumeric names
Test Pattern Inversion
Error Injection: Logic, BPV, Logic+BPV, C-bit, P-bit parity, FEBE, Frame, Burst or Rate
Alarm Generation: AIS, Yellow, Idle
Loopbacks: FEAC loopbacks per ANSI T1.401, M13 C-bit loopback per TR-TSY-000009 (requires SW361)
FEAC transmit/receive per ANSI (requiress SW301)

DS3 Transmitter
Transmit Signal Source: DS3 Test pattern, DS1 Test pattern broadcast, DS1 AIS broadcast, loop received DS3 signal
Pulse Shape: Conforms to ITU-T G.703, Telcordia TR-TSY-000499. High, DSX, Low
DS1 Insert: Insert DS1 on desired channel. Other channels have DS1 test pattern copies or AIS. DS1 generated internally or from DS1 RX connector
E1 Insert: Insert E1 on desired channel. Other channels have AIS. E1 generated internally.

DS3 Receiver
Input Impedance: 75Ω
Input Sensitivity
DSX: Up to 26 dB resistive or 6 dB cable loss from DSX
High/low: +6 dB to -26 dB resistive loss
Jitter tolerance: Conforms to Telcordia TR-TSY-000009
Auto Configure to received signal, line coding, & test pattern
T1/E1 Drop: Drop to internal receiver or drop to DS1 TX connector

DS1 General (Requires SW310)
Signal Directions: Multiplexed to DS3 jacks or to DS1 jacks
Clock Source: Internal (± 5 ppm), Loop (recovered, ± 300 ppm), External (± 300 ppm, 0 to -30 dB resistive)
Framing: Unframed, Superframe (SF-D4), ESF, SLC-96*. Conforms to ANSI T1.102, 107, 107A, 403, and 404. Also Telcordia TR-TSY-000009 and TR-TSY-000191. *SLC is a registered trademark of AT&T.
Line Coding: AMI, B8ZS
Standard Test Patterns: All 1s, All 0s, Alt 10, 1100, 1-in-8 (1:7), 1-in-16, 3-in-24, Quasi-Random Signal (QRS), 2^{6}-1, 2^{7}-1, 2^{9}-1, 2^{11}-1, 2^{15}-1, 2^{20}-1, 2^{23}-1, 55 Daly, T1-1 through T1-6, DDS-1, DDS-2, DDS-3, DDS,4, DDS-6 (Idle, Yellow, 2-8, FOX)
User Programmed Patterns: 10 programmable 2048-bit patterns with alphanumeric names
Test Pattern Inversion: All Standard Test Patterns and User Programmed Patterns
Error Injection: Logic, BPV, Logic+BPV, Frame, Burst or Rate
Alarm Generation: AIS, Yellow, Idle
Fractional T1: Any arbitrary combination of 1 to 24 channels. Nx56k or Nx64k format. Autoconfigure to active channels. Requires SW311.
Loopbacks: CSU/NIU loop up/down, Inband, ESF datalink, programmable 32-bit control. M13 C-bit loopbacks per Telcordia TR-TSY-000009.
DS3/DS1 based FEAC loopbacks per ANSI T1.404

DS1 Transmitter
Pulse Shape: Conforms to ITU-T G.703, Telcordia TR-TSY-000499
Output Levels: 0, -7.5, -15, -20 dB

. . . a step ahead

SunSet™ T3

DS1 Receiver
Input Frequency: 1.544 Mbps, ± 300 ppm
Input Impedance: 100Ω, +6 dB to -36 dB
External Clock Input: 1.544 Mbps, ± 300 ppm, 0 to -30 dB resistive with ALBO
Auto Configure to received signal, Line Coding, Test Pattern

E1 2.048 Mbps (Requires SW324)
Drop and insert one E1 channel to/from a DS3
Transmit and receive at E1 interface
Transmit
- Pulse Shape: Conforms to ITU-T G.703, 3.0V ± 10%
- Clock: De-jittered from DS3, Internal 2.048 Mbps ± 5 ppm
- Line coding: AMI, HDB3

Receive
- Impedance: 120Ω, +6 to -20 dB
- Line coding: AMI, HDB3
- Framing: PCM-30 and PCM-31 with or without CRC, unframed

Test Patterns
- Standard Patterns: All 1s, All 0s, Alt 10, 1-in-8 (1:7), 3-in-24, QRS, 2^6-1, 2^7-1, 2^9-1, 2^{11}-1, 2^{15}-1, 2^{20}-1, 2^{23}-1, 1100 (FOX, 2-in-8, Yellow, Idle, User Patterns)
- User Programmed Patterns: 10 ea patterns up to 2048 bits long, alphanumeric name up to 10 characters for each pattern

Test Pattern Inversion
Auto Configure to received signal, line coding, test pattern
Fractional E1: Any arbitrary combination of 1 to 31 channels. Nx64k format. Autoconfigure to active channels. Requires SW311.

Measurements
G.821 and general errors: Bit error, bit err rate, errored seconds, %errored seconds, severely errored seconds, %severely errored seconds, error-free seconds, %error-free seconds, available seconds, unavailable seconds, synch loss seconds, degraded minutes
DS3: Frame loss seconds, loss of signal seconds, BPV, BPV rate, Frame-bit error, Frame-bit error rate, P-bit error, C-bit error, FEBE, available seconds, errored seconds, %errored seconds, severely errored seconds, %severely errored seconds, error-free seconds, %error-free seconds, unavailable seconds, degraded minutes, AIS seconds, yellow alarm seconds, frequency, max frequency, min frequency, peak voltage (V), power (dBm)
DS2: F-bit error, frame loss seconds, AIS seconds, Yellow Alarm seconds
DS1: BPV, BPV rate, Frame-bit error, Frame-bit error rate, CRC-6 block error, CRC-6 block error rate, out of frame count, change of frame alignment count, errored seconds, %errored seconds, severely errored seconds, %severely errored seconds, error-free seconds, available seconds, degraded minutes, unavailable seconds, frequency, AIS seconds, loss of frame seconds, loss of signal seconds, yellow alarm seconds, low density seconds, excess zeroes seconds, max frequency, min frequency, +1-peak voltage frame slip, +1-wander peak level
E1: Code violation (BPV), code violation rate, FAS error, FAS error rate, MFAS error, MFAS error rate, CRC error, CRC error rate, errored seconds, %errored seconds, severely errored seconds, %severely errored seconds, error-free seconds, available seconds, degraded minutes, unavailable seconds, AIS seconds, loss of frame seconds, loss of signal seconds, FAS alarm seconds, MFAS alarm seconds, peak voltage (V), frequency, max frequency, min frequency, + wander, - wander, peak level (dB), clockslip

Other Measurements
View Received Data
View T1 data in binary, hex, ASCII formats
Displays data in bytes by timeslot
Displays 8 timeslots per display page
Capture & store 256 consecutive timeslots as test pattern, 10 patterns

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

Bridge Tap
Automated transmission and measurement of 21 different patterns to identify possible bridge taps at some point on a T1 line

Quick Test I and II
2 programmable automated loopback tests that save time when performing standardized acceptance tests
10 character alphanumeric ticket name
Automatically loopback a CSU or NIU device; automatically drop the loopback at conclusion of test
Automatically print results at conclusion of test
Specify 5 independent test patterns, run each pattern for 1 to 999 min
Operate in single-run or continuous-run mode

Protection Switch Timing
Measure the duration a switch or multiplexer takes to perform the protective switching function

Loopbacks
Loopback Control, In-band
CSU, NIU, 100000
Loopback Control, ESF-Facility Datalink
10 programmable user codes, 1 to 32 bits each

Remote Control (SW302)
To VT100 terminal or PC running terminal emulation
Status table provides current & historical information on test sets' LEDs
Uses test set's serial port, 8-pin MINI DIN connector, RS232C
Serial port cannot be connected to printer during remote control operation

Westell PM NIU and MSS (SW303)
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 for all accumulated data
Reset performance registers
Read data over ramp line
Perform maintenance switch function for Westell and Teltrend
Automated looping of Westell and Teltrend line and central office repeaters: SF and ESF modes supported
Arm, loop up/down, loopback query, sequential loopback, power loop query, span power up/down, unblocking
Requires SW310

Fractional T1 (SW311)
Error measurements, channel configuration verification
Nx64 kbps, Nx56 kbps, N=1 to 24
Sequential, alternating, or random channels
Set Tx and Rx channels independently
Auto scan and auto configure to any FT1 order for active channels
Selectable idle channel code, 7F or FF hex
Requires SW310

ESF and SLC-96 Datalink send and Receive (SW312)
ESF Datalink
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 Datalink
Send and receive message
WP1, WP1B, NOTE formats
Alarms, switch-to-protect, far end loop
To Telcordia TR-TSY-000008 specifications, modes I and III
SLC-96 FEND loop
Requires SW310

CSU/NI Emulation (SW313)
Graphical indication of signal status
Simultaneous display of T1 line measurements
Automatic generation of AIS
Loopbacks
  Responds to remote loopback commands, in-band and out-of-band (ESF datalink T1.403)
  Establish Line and payload loopback from keypad
Requires SW310

Voice Frequency Capability (SW320)
General: Talk/listen with volume control, 24 channel signaling bit display, control signaling bits, view channel data, μ/A law to DS3 or DS1/E1 ports
Specify trunk type: E&M, ground/loop start, FXO, FXS, user defined
Specify supervision on idle channels
Basic Transmission Impairment Measurements: Level, frequency, C-message noise, C-notched noise, 3 kHz flat filter noise, signal to noise with 1004 Hz tone. Generate 50 to 3950 Hz ±1 Hz, 1 Hz steps, +3 to -60 dBm, 1 dB steps. Requires SW321.
Addressing
  DTMF/MF/DP dialing, programmable dial number up to 32 digits, 10 stored numbers, programmable transmit level -5 to -25 dBm
  MF/DTMF dialing: Specify dial period, silent period from 50 ms to 999 ms
  DP dialing: Specify %break from 40 to 60, interdigit period from 200 ms to 900 ms
  Measure MF/DTMF high/low frequency, level, twist, digital time, interdigital time
  Measure DP pulses per second, %break
Requires SW322

ISDN PRI Call Setup and Analysis (SW323)
D-channel message monitor
Filter type: Call reference, caller number, called number
Voice and data call setup and receive
Talk/listen for voice calls
56k, 64k data rates
Data patterns: 2047, 511, 127, 63, All 1s, All 0s, or 8-bit user pattern
Programmable called and caller numbers, B-channel number, NSF code, NSF type
NT, TE emulation
Programmable D-channel number
AT&T 5ESS and Northern Telecom DMS-100 compatible
On-screen table for optional call feature programming
Requires SW310

GENERAL

SW options upgradeable via software in-field cartridge replacement
Printer: Print every 2 to 99 minutes, print at end of measurement, print on error/alarm events, print screen alphanumerics
Size: 4 x 2.4 x 10.5" [10.5 x 6 x 27 cm]
Weight: 2.8 lb [1.3 kg]
SS300e chassis only
  Built-in NiMH rechargeable battery pack
  Battery operating time: 90 min nominal. AC operation with 100 to 240 VAC, 50/60 Hz universal charger.
Operating temperature: 32˚F to 122˚F [0˚C to 50˚C]
Storage temperature: -4˚F to 158˚F [-20˚C to 70˚C]
Humidity: 5% to 90% noncondensing

ORDERING INFORMATION

Test Set

SS300e	SunSet T3 Chassis Includes SunSet T3 Chassis, 100 VAC to 240 VAC Universal Battery Charger, 6-cell NiMH battery, SunSet T3 User's Manual, SunSet T3 Field Manual, Software Cartridge, Instrument Stand. Software Cartridge includes basic T3 testing operations.

Software Options

SW301	DS3 FEAC Provides control and analysis of the DS3 FEAC data link in C-bit parity framing format.
SW302	Remote Control Allows menu-driven remote control of basic test functions using a dumb terminal or personal computer equipped with VT100 terminal emulation software. Includes printer cable and null modem adapter.
SW303	Maintenance Switch, Performance Monitoring NIU, RAMP, Looping Repeaters. Provides menu-driven support for the Westell & Teltrend looping repeaters, Maintenance Switch, and Performance Monitoring NIU, including the RAMP feature. Requires SW310.

SW310	DS1 Testing Provides DS1 test capability through the bantam jacks on the set. Also provides DS1 drop & insert test capability through the WECO 560-style jacks on the set. DS1 capabilities include a broad variety of test patterns, DS1 NIU & CSU loopback operations, basic DS1 measurements, view received data, quick test, bridge tap test.
SW311	Fractional T1 Requires SW310
SW312	ESF and SLC-96 Datalink Send and Receive Requires SW310
SW313	CSU/NIU Emulation Requires SW310
SW320	DS0 Drop/Insert Provides voice frequency talk/listen/tone. Requires SW310.
SW321	VF Level, Freq, & Noise Measurement Requires SW310 and SW320
SW322	MF/DTMF/DP Dialing, Decoding, and Analysis Requires SW310 and SW320
SW323	ISDN PRI Call Setup & Analysis Requires SW310
SW324	E1 Test Capability From a DS3, drop and insert an E1 signal through the test sets' DS1 bantam jacks, or test an E1 signal directly through the DS1 bantam jacks. Requires the SS300e chassis. Includes Fractional E1.
SW2501	1 Mb Software Replacement Cartridge Specify model and serial number.

Accessories

SS101	Carrying Case
SS104	Cigarette Lighter Battery Charger
SS105	Repeater Extender
SS106	Single Bantam to Single 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 (m), 6'
SS111	Dual Bantam to 15-pin D Connector Cable (f), 6'
SS112	Dual Bantam to 8-position Modular Plug Cable Fits RJ-48 jacks per ANSI T1.403, 6'. Used for NIUs (smart jacks).
SS115	DIN-8 to RS232C Printer Cable Replacement printer cable for earlier serial printers such as SS118.
SS115D	DIN-8 to DB-9 Printer Cable Included when SW302 or SS118B/C is ordered.
SS116	Instrument Stand
SS117A	Printer Paper, 5 rolls, for SS118B/C
SS118B	High Capacity Thermal Printer. With internal rechargeable battery. Includes cable (SS115B) for connection to SunSet &110 VAC charger.
SS118C	High Capacity Thermal Printer. With internal rechargeable battery. Includes cable (SS115B) for connection to SunSet & 220 VAC charger.
SS121B	SunSet AC Charger, 220 VAC, 50/60 Cycle. Provides continuous operation from 220 VAC source. Provides 0.6A output at 12 VDC. Charges battery. 2-stage operation for fast recharge then slow trickle charge. 3-prong IEC connector. For SS300 chassis only.
SS122	Null Modem Adapter Replacement null modem adapter for earlier serial printers such as SS118.
SS122B	Null Modem Adapter DTE to DCE conversion, DB-9 to DB-9. Included with SW302
SS123A	SunSet Jacket Provides additional weather protection for SunSets. Rugged padded synthetic fabric.
SS123C	SunSet Jacket, Large - Provides additional weather protection for SunSets. Only for use with SS143B (SS123B included)
SS128A	120V/12V 1.2A SunSet Charger For USA and Canada. Provides continuous operation from 120 VAC source. Provides 1.2A output at 12 VDC. Charges battery. 2-stage operation for fast recharge then slow trickle charge. For SS300 chassis only.
SS128B	110V/12V 1.2A SunSet Charger For Taiwan and Korea. Provides continuous operation from 110 VAC source. Provides 1.2A output at 12 VDC. Charges battery. 2-stage operation for fast recharge then slow trickle charge. For SS300 chassis only.
SS132	Two Single Bantams to 4-position Modular Plug Cable. Used for downloading performance monitoring information from a Westell NIU at the front panel jack without disrupting service.
SS138D	SunSet AC Charger, 100 to 240 VAC, 50/60 Hz input, 15 VDC @ 2A output. For SS300e chassis only.
SS139	6-cell NiMH Battery Pack 7.2 VDC, 1.8 Ahr. For SS300e chassis only. Requires factory installation.
SS143B	SunSet Rubber Holster
SS212	Conversion cable, BNC (m) 75Ω to bantam 120Ω, 6'
SS300W	SunSet T3 Extended Warranty. Extends standard 1 yr warranty period to 3 yr. Excludes battery and accessories, which are warranted for 1 yr
SS302	WECO 440A to WECO 440A (miniature style) Coaxial Cable, 6', fits in 560A jack
SS303	WECO 440A to BNC Coaxial Cable, 6'
SS304	WECO 440A (mini) to 358A (large) Coaxial Cable, 6'
SS305	SunSet T3 User's Manual
SS309	SunSet T3 Training Tape, English (specify SS309K for Korean)
SS315	BNC to WECO 358A Cable, 6'

Note: Specifications subject to change without notice.

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

www.sunrisetelecom.com