

## SPECIFICATIONS

The Modular Test Toolkit (MTT) product family features the SunSet MTT as the industry's premium handheld platform for access network service installation, verification, and troubleshooting applications. The SunSet MTT offers a selection of over thirty five service modules to fit the particular needs you have. The Advanced Cable Maintenance (ACM) chassis offers a variety of powerful diagnostic measurements especially useful for troubleshooting physical layer problems found on the twisted-pair circuits that carry so many access network services.

### Modular Platform

Variety of Access Network Applications Supported. See individual Module Specification Sheets for further details.

E1	T3	Frame Relay
T1	Fibre Channel	Web Suite
ISDN BRI	GSM / GPRS	Gigabit Ethernet
ISDN PRI	ESCON	VoIP
Datacom	Detaptor: Bridge Tap Detect	Ethernet
DDS 4-wire	Impulse Noise	Internet Throughput
GR-303	Longitudinal Balance	ATM Throughput
SS7	DMM	ATM BERT
HSSI	Variable Optical Attenuator	ATM OAM Cell Response/Generation
CSU/NIU Emulation	Optical Loss Test	xTU-C & xTU-R Emulation
VF Dialing & Analysis (T1/E1)	Optical Light Source	ADSL2+ / ADSL
Pulse Mask Analysis (T1/E1/T3)	Optical Power Meter	SHDSL
VF TIMS	PSD Spectrum Analysis	HDSL2
Auto Test	Near End Crosstalk	SDSL
Load Coil Detection	Far End Crosstalk	IDSL
Cable Pair Detect	Insertion Loss	VDSL
TDR	OTDR	Optical Channel Monitor
SONET	SDH	VoIP

### Advanced Cable Maintenance Features (SSMTT-ACM-B)

#### TDR

Distance Range: Dependent on cable type and condition  
 15 ft to 24000 ft @ 22 AWG/3 m to 7200 m @ 0.6 mm  
 15 ft to 18000 ft @ 24 AWG/3 m to 5400 m @ 0.5 mm  
 15 ft to 12000 ft @ 26 AWG/3 m to 3600 m @ 0.4 mm  
 Automatic search to first fault  
 Accuracy:  $\pm 1\% \pm 5 \text{ nS}$ ; accuracy is dependent on  $V_p$  uncertainty and cursor resolution  
 Display Resolution: 0.6% of selected range



The SunSet MTT ACM chassis features a family of Plug-In Modules, providing a wide variety of testing capabilities for the Access Network

#### Test Signal

1/2 Square Wave if pulse width  $\leq 75 \text{ nS}$   
 1/2 Sine Wave if pulse width  $> 75 \text{ nS}$   
 Pulse Widths: 25 nS to 4  $\mu\text{S}$ , autoselect  
 Amplitude: Maximum  $10 V_{b-p}$  into  $100\Omega$ ,  $20 V_{b-p}$  into open circuit  
 Output Impedance:  $100\Omega$   
 $V_p$ : 0.4 to 0.99 in 0.01 increments

#### DC Voltage

Range: 300V Max  
 Accuracy:  $\pm 0.5\% \pm 10 \text{ mV}$

#### AC Voltage

Detector: True RMS  
 Range: 250 VAC Max  
 Accuracy:  $\pm 1\% \pm 20 \text{ mV @ } 20 \text{ Hz to } 1 \text{ kHz}$

#### Resistance

Range:  $1\Omega$  to  $100 \text{ M}\Omega$   
 Accuracy:  
 $\pm 1\% \pm 1\Omega$  from  $1\Omega$  to  $1 \text{ M}\Omega$   
 $\pm 2\%$  from  $> 1 \text{ M}\Omega$  to  $4 \text{ M}\Omega$   
 $\pm 5\%$  from  $> 4 \text{ M}\Omega$  to  $40 \text{ M}\Omega$   
 $\pm 10\%$  from  $> 40 \text{ M}\Omega$  to  $100 \text{ M}\Omega$

#### Capacitance

Range: 1 nF to 1  $\mu\text{F}$   
 Accuracy:  $\pm 2\% \pm 200 \text{ pF}$

#### Current

Load:  $430\Omega$   
 Range: 0 mA to 110 mA  
 Accuracy:  $\pm 2\% \pm 0.1 \text{ mA}$

#### Insertion Loss

Range: 0 to 90 dB  
 Accuracy:  $\pm 2 \text{ dB}$   
 Application:  
 Frequency response sweep up to 2208 kHz, including DMT carrier tones  
 Other discrete frequencies: 40 kHz, 82 kHz, 96 kHz, 150 kHz, 196 kHz, 260 kHz, 292 kHz, 392 kHz, 772 kHz, 1024 kHz

### **Background Power Spectral Density (PSD) Noise**

Mode: Term or Bridge  
Range: Calculated over noise bandwidths of 4.3125 kHz,  
from approximately 13 kHz to 2208 kHz  
Term: -26 to -140 dBm/Hz  
Bridge: 0 to -100 dBm/Hz

### **Background Noise**

Range: -100 dBm to +10 dBm  
Filters: E, F, G (per IEEE Std 743-1995)

### **Impulse Noise**

Threshold Range: +50 dBm to +100 dBm  
Dead Time Range: 100  $\mu$ S to 255 mS  
Max Count Range: 1 to 9999  
Timer: Settable from 1 to 999 minutes or continuous

### **Level Meter**

Frequency Range: 10 kHz to 2208 kHz  
Frequency Accuracy:  $\pm$  1%  
Level Range: -65 dBm to +10 dBm  
Level Accuracy:  $\pm$  1 dB

### **Longitudinal Balance**

Frequency: 40 kHz  
Range: 20 to 60 dB  
Accuracy:  $\pm$  2 dB

### **Near End Crosstalk (NEXT)**

Frequency: 13 kHz to 2208 kHz  
Range: 85 dB Max  
Accuracy:  $\pm$  2 dB

### **Far End Crosstalk (FEXT)**

Frequency: 13 kHz to 2208 kHz  
Range: 85 dB Max  
Accuracy:  $\pm$  2 dB

### **Transmitter**

Frequency Range: 10 kHz to 2208 kHz  
Frequency Resolution: 0.1 kHz  
Frequency Accuracy:  $\pm$  100 ppm  
Levels: -20, -10, 0, +10 dBm  
Level Accuracy:  $\pm$  1 dB  
Output Impedance: 100 $\Omega$  balanced

### **Receiver**

Measurement Method: FFT  
Frequency Range: 10 kHz to 2208 kHz  
Frequency Resolution: 0.1 kHz  
Power Spectral Density (PSD) Frequency Bands  
Centered on approximately 13, 17, 21, ... 2208 kHz  
Integer multiples of N x 4.3125 kHz (for N = 3 to 512)  
Level Range: -100 dBm to +10 dBm  
Level Resolution: 0.1 dB  
Level Accuracy:  $\pm$  1 dB  
Input Impedance: 100 $\Omega$  balanced

### **Other Measurements**

Auto Test: Single-ended  
Automated test for single-ended features  
Reports pass/fail/marginal status where applicable  
Load Coil Detector: Graphic and count  
Loop Resistance  
Insertion Loss "Detaptor": Bridge Tap Detect (Patented)  
Cable Pair Detect: Dual audible tones  
Signal-to-Noise  
ADSL Bit Rate Prediction

### **Connectors**

Dual RJ-45 or Dual 3-pin banana  
Serial Port: 8-DIN, RS-232C (V.24) DTE  
DC Power Jack

### **General**

Size: 4.5" (W) x 3.3" (H) x 11" (L) [11.4 cm x 8.3 cm x 28 cm]  
Weight: 3.5 lb [1.6 kg]  
Display: Backlit 240 x 320 dot STN indoor/outdoor Color  
screen; CFL Backlight  
LEDs: 20 bi-color  
Battery: Rechargeable, field replaceable NiMH pack  
Charger: Universal 100-240 VAC adapter with IEC connector  
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 85% noncondensing

## **ORDERING INFORMATION**

SSMT-ACM-B SunSet MTT with Advanced Cable Maintenance features. Includes a high resolution color display, Dual RJ45 connectors and the following: TDR, Background Noise, Insertion Loss, Signal-to-Noise, Impulse Noise, DMM, Load Coil Detector, NEXT and FEXT, Longitudinal Balance, Level Meter, Frequency Generator, Cable Pair Detect, and Loop Resistance. Includes Certificate of Calibration  
CLEI: TET1SUJEEA  
CPR: 774616  
[Recommended Cables are SS161 series].

SSMT-ACM-A Hardware option  
Replaces standard connectors with Dual 3-pin Banana Connectors [Recommended Cables are SA294 series].

### **Recommended Cables**

SS161 Cable, RJ-45 (m) to 3 Probe Clips, 6'  
SS161-HPU Cable, RJ-45 (m) to 2 Retractable bananas and ground clip, 1000V tolerance, 6'. Includes two detachable alligator clips.  
SA294-1 Cable, 3-pin banana to 2 retractable bananas and ground clip, 6'. Includes two detachable large alligator clips, 1000V Category II tolerance.  
SA294-2 Cable, 3-pin banana to 2 retractable bananas and ground clip, 6'. Includes two detachable small alligator clips, 300V Category II tolerance.  
SA294-3 Cable, 3-pin banana to 2 retractable bananas and ground clip, 6'. Includes two detachable bed-of-nails alligator clips, 300V Category II tolerance.

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