3M Dynatel 965DSP Specs
Provided by www.AAATesters.com

Dynatel™ 900 Series

Subscriber Loop Test Sets

Optimal performance is a test you can't afford to fail.

Optimal loop performance is a key competitive advantage. Keep it with the hand-held Dynatel™ 900 Series Test Sets.

To meet the demands for enhanced customer services, such as fast Internet and data access, video on demand and video conferencing, local loop providers are deploying technologies such as HDSL, ADSL and SDSL sometimes over Category 5 (CAT 5) twisted-pair copper cable to provide higher speed and greater bandwidth networks. As these new technologies migrate into the local loop, the ability to quickly and accurately analyze and troubleshoot the local loop cable has become even more critical.

Now more than ever, optimal loop performance is a key competitive advantage in retaining and gaining new customers for enhanced services. Rugged, reliable and portable, Dynatel 900 Series Subscriber Loop Test Sets can help your enterprise maintain peak performance with the right mix of functions—from loop diagnostic routines to fault locating, transmission testing and combination test/terminal capabilities.

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945DSP Subscriber Loop Tester

The Dynatel 945DSP Subscriber Loop Tester is the entry-level model in 3M's powerful Dynatel 900 Series of microprocessor-controlled subscriber loop test sets. The fully integrated 945DSP performs a wide range of voice band tests to analyze twisted-pair problems for full-featured POTS testing. It is capable of making accurate resistance readings in the presence of a foreign voltage and can store and dial up to 10 individual numbers for active line testing. The test set can be ordered in either C Message Weighting or Psophometric Filter versions for circuit noise measurements, depending upon local requirements.

The 945DSP Subscriber Loop Tester is user-friendly and features an icon-based display of test results for simple interpretations. The weather-resistant 945DSP test set is housed in a lightweight case for easy handling and comes with a quick instruction card to make the 945DSP even easier to operate.

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965DSP Subscriber Loop Analyzer

The Dynatel 965DSP Subscriber Loop Analyzer is a microprocessor-controlled integrated test set that provides full-featured POTS, fundamental ISDN testing and full media testing for DSL-specific circuits. The 965DSP Subscriber Loop Analyzer performs fault location and repair verification on twisted-pair and quad cable (utilizing capacitance bridge, resistance bridge and Time Domain Reflectometer functions).

In addition, the 965DSP Subscriber Loop Analyzer executes a full range of individual tests and automatic test routines to categorize and sectionalize potential problems. The Dynatel 965DSP Subscriber Loop Analyzer is weather-resistant and housed in a lightweight, ergonomically designed case for portability and easy handling.

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965DSP/SA Subscriber Loop Analyzer

The Dynatel™ 965DSP/SA Subscriber Loop Analyzer delivers all of the multi-function capabilities of the Dynatel 965DSP and provides a Spectrum Analyzer and E, F and G noise-weighted filters. The Spectrum Analyzer enables the operator to view the wideband (10 kHz to 1.8 MHz) spectrum and identify spectral interferers such as noise generated by other services.

The 965DSP/SA Subscriber Loop Analyzer's E, F and G noise-weighted filters perform tests to determine metallic noise in ISDN/IDSL, HDSL and ADSL services. Sources for noise can include in-band circuit or switching noise from network equipment, as well as cross-talk components of other service types appearing on nearby pairs. Tests determine the metallic noise on a pair by terminating the pair with its characteristic impedance and measuring the differential noise appearing across the conductors.

Wideband Noise Measurement Capabilities

Service	Filter	Frequency Range
ISDN/IDSL	E	1 kHz – 50 kHz
HDSL	F	4.9 kHz – 245 kHz
ADSL	G	20 kHz – 1.1 MHz

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1332 Far End Device

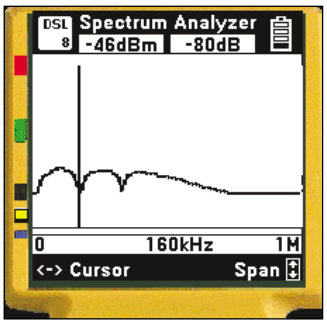
Designed to provide remote controlled far end testing assistance during subscriber loop testing, the 3M™ 1332 Far End Device (FED) is the perfect companion to the Dynatel 965DSP family of subscriber loop analyzers. The FED enhances technician productivity by connecting to the far end of a cable pair to enable diagnostic testing from the near end using DTMF signaling from the 965DSP and 965DSP/SA test sets.

3M Dynatel 965DSP and 965DSP/SA Subscriber Loop Analyzers

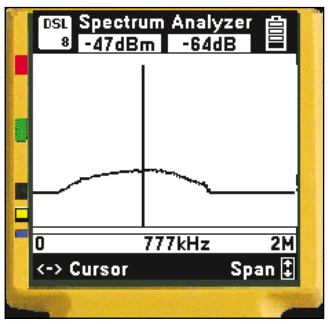
Measurements Supported by Autotest Function	Inactive Pair w/o FED		Inactive Pair w/FED		Active Pair	Wideband w/FED	
	Basic	Full	Basic	Full	w/o FED	Basic	Full
Volts	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ohms	Yes	Yes	Yes	Yes	No	Yes	Yes
Opens	Yes	Yes	Yes	Yes	No	Yes	Yes
Longitudinal balance	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sweep loss	No	No	No	Yes	No	No	Yes
Single tone loss	No	No	Yes	No	Yes	Yes	No
Loop resistance	No	No	No	Yes	No	Yes	Yes
Resistance balance	No	No	No	No	No	No	Yes
Load coils	No	Yes	No	Yes	No	Yes	Yes
Loop current	No	No	No	No	Yes	No	No
Noise	No	No	No	No	Yes	No	No
Power influence	No	No	No	No	Yes	No	No
Capacitive balance	No	No	No	No	No	Yes	Yes
Slope	No	No	No	Yes	No	No	No

Wideband Spectrum Analyzer

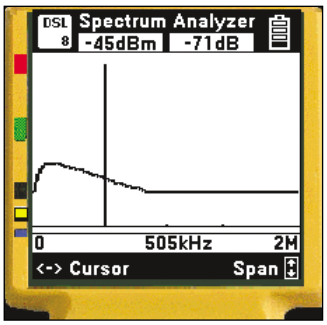
Sample Screens



ISDN 2BIQ Cross-talk



T1 Cross-talk



ADSL Downstream Cross-talk

Wideband Auto Test

Inactive & Wideband Loss Frequencies

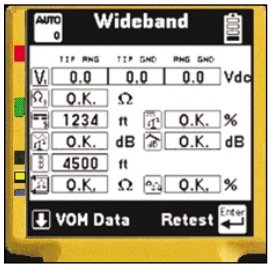
Service Type	Single Frequency (kHz)	Sweep Frequency (kHz)
POTS	1004 (Hz)	404, 804, 1004, 1204, 1404, 1604, 1804, 2004, 2804, 3004 (Hz)
56 kB	28	20, 28, 32, 40, 48, 82
64 kB	32	20, 28, 32, 40, 48, 82
ISDN	40	20, 28, 32, 40, 48, 60, 70, 82
HDSL	196	20, 30, 50, 70, 90, 110, 130, 196, 400
T1	772	200, 400, 500, 700, 772, 1024
E1	1024	200, 400, 500, 700, 772, 1024
ADSL	138 1100	20, 30, 50, 69, 90 110, 138, 276, 400, 600, 800, 1000, 1100

Wideband Test (with FED)

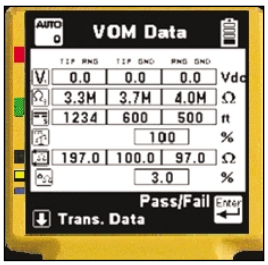
Test	Basic	Full	Pass/Fail
Vdc	Yes	Yes	No
Ohms	Yes	Yes	Yes
Opens	Yes	Yes	Yes
Capacitive balance	Yes	Yes	Yes
Longitudinal balance	Yes	Yes	Yes
Sweep loss	No	Yes	Yes
Single tone loss	Yes	No	Yes
Loop resistance	Yes	No	Yes
Loop ohms	No	Yes	Yes
Resistive balance	No	Yes	Yes
Load coil	Yes	Yes	No

Wideband Auto Test Results

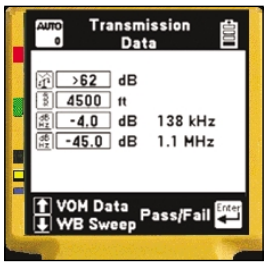
Sample Screens



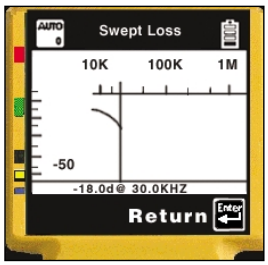
Pass/Fail



Numeric Value



Transmission



Graphic View of Slope

3M™ Dynatel™ 945DSP Subscriber Loop Tester

Electrical Specifications

Main Functions	Range	Resolution	Accuracy	Test leads
Voltage (AC)	0 to 75 V 75 to 250 V	1 V 1 V	± 1 V ± 3 V	R-T, R-G, T-G R-T, R-G, T-G
Voltage (DC)	0 to ± 100 V ± 100 to ± 350 V	1 V 1 V	± 1 V ± 3 V	R-T, R-G, T-G R-T, R-G, T-G
Loop Current (DC)	0 to ±110 mA	1 mA	± 2 mA	R-T (Zin = 430 Ω)
Loop Resistance (DC)	0 to 999 Ω	1 Ω	± 5 Ω or 3%	R-T, R-G, T-G
Leakage Resistance and Insulation Soak	1 KΩ to 9.9 KΩ 10 KΩ to 99.9 KΩ 100 KΩ to 999 KΩ 1 MΩ to 9.9 MΩ 10 MΩ to 30 MΩ	10 Ω 100 Ω 1 KΩ 100 KΩ 1 MΩ	± 3% ± 3% ± 3% ± 3% ± 10%	R-T, R-G, T-G R-T, R-G, T-G R-T, R-G, T-G R-T, R-G, T-G R-T, R-G, T-G
Ground Resistance	0 to 50 Ω	1 Ω	+3 Ω	
Loop loss	-50 to +10 dBm 200 to 5000 Hz	1 dB	± 1 dB	R-T (Zin = 600 Ω)
Circuit Noise with C-message weighting Psophometric Filter*	 0 to 60 dBrnc 0 to 60 dBrnp	 1 dB 1 dB	 ± 2 dB ± 2 dB	 R-T (Zin = 600 Ω) R-T (Zin = 600 Ω)
Power Influence with C-message weighting Psophometric Filter*	 40 to 100 dBrnc 40 to 100 dBrnp	 1 dB 1 dB	 ± 2 dB ± 2 dB	 R & T-G (Zin = 100 KΩ) R & T-G (Zin = 100 KΩ)
Opens	0 to 9,999 ft. 10,000 to 99,999 ft. (0 to 9,999 m) (10,000 to 30,000 m)	1 ft. 100 ft. (1 m) (100 m)	± 20 ft. ± 5% ± 5% (± 6 m, ± 5%) (± 5%)	Ring, Tip, Mutual
Frequency during loss, single frequency only	200 to 5000 Hz	1 Hz	± 3 Hz	R-T
Longitudinal balance	0 to 65 dB	1 dB	± 2 dB	T, R-G

Output	Frequency	Amplitude	Attachment	Remarks
ID tone	577.5 Hz	8 Vpp	R-T	Squarewave, interrupted
Precision tone	404,1004, 2804 Hz	0 ± 0.5 dBm	R-T	600 Ω source sinewave

Physical Specifications

Size H x W x D in. (cm)	7.5 x 4 x 1.5 (19 x 10.2 x 3.8)
Net weight lbs. (kg)	1 (0.5) with battery and soft case
Shipping weight lbs. (kg)	1.5 (0.7)
Display size in. (cm)	2.25 x 1.25 (5.7 x 3.2)

Environmental Specifications

Operating temperature	0° to 140°F (-18° to 60°C)
Storage temperature	-40° to 140°F (-40° to 60°C)
Humidity	0 to 95%
Vibration	Random 3-axis vibration at 12.5 Grms for 20 minutes
Rain proof/splash proof	Meets UL50, Rain test
EMI/EMC/Safety	Meets FCC part 15, Class A: Digital Devices for the US EN55022 (radiated emissions), EN55024-2 (electrostatic discharge), EN55024-3 (radiated immunity), EN55024-4 (transient immunity) and IEC1010 (product safety) for Europe

General Specifications

Batteries	4 – Disposable Alkaline (AA or LR6) but will accept user provided Ni-Cad or NiMH batteries with user provided external charger
Dialing	DTMF and Pulse Dialing – 10 Number Storage
Battery life	Alkaline: Up to 25 hours continuous, dependent on temperature and use of backlight.
Display	Graphical LCD with universal icons
Test leads	Removable red, black and green leads; 5 ft. (1.5 m)
Over voltage protection	450 Vdc, 250 Vac. Between any leads to protect the internal circuit
Keypad	Field-rugged, waterproof membrane keypad
Function keys	V (voltage), mA (loop current/ground resistance), Ω (resistance/soak test), OPENS, TONE, DB, AUTO Cal. Two non-testing function keys are '*' and '#'

Note: * Psophometric filter is available as a special order.
Routine calibration is not recommended or required.

3M™ Dynatel™ 965DSP Subscriber Loop Analyzer (A, B & SA)

Electrical Specifications

Main Functions	Range	Resolution	Accuracy
Voltage (DC)	0 to 99.9 V 100 to 300 V	0.1 V 1 V	1% ± 0.5 V 3%
Voltage (AC)	0 to 99.9 V 100 to 250 V	0.1 V 1 V	1% ± 0.5 V 3%
Current	0 to 59.9 mA 60 to 110 mA	0.1 mA 0.1 mA	1% ± 0.3 mA 2%
Resistance (DC) and Soak Test With CO voltage	0 to 9999 Ω 0 to 9999 Ω 10 k to 99.9 kΩ 100 k to 999 kΩ 1 M to 9.9 MΩ 10 M to 99 MΩ 100 M to 990 MΩ	1 Ω 1 Ω 0.1 kΩ 1 kΩ 0.1 MΩ 1 MΩ 10 MΩ	1% ± 5 Ω 1% ± 50 Ω 1% 3% 3% 5% 10%
Opens (no noise)	0 to 3,000 ft. (0 to 1000 m) 3,000 to 10,000 ft. (1 km to 3 km) 10,000 to 50,000 ft. (3 km to 15 km) 50,000 to 100,000 ft. (15 km to 30 km)	1 ft. (1 m) 1 ft. (1 m) 10 ft. (10 m) 100 ft. (100 m)	1% ± 3 ft. (1 m) 3% 5% 10%
RFL			
Fault range	0 to 20 MΩ	—	—
Resistance to fault (no noise)	0 to 99.99 Ω RTS 100 to 999.9 Ω RTS 1 kΩ to 7 kΩ RTS	0.01 Ω 0.1 Ω 1.0 Ω	0.1% of RTS ± 0.01 Ω 0.2% of RTS ± 0.01 Ω 1.0% of RTS ± 0.01 Ω
Loss (& frequency) With 600 Ω Zin	-40 to +10 dBm, 200 to 3000 Hz -40 to +10 dBm, 3000 to 9995 Hz -40 to +10 dBm, 10 k to 19.9 kHz	0.1 dB, 1 Hz 0.1 dB, 5 Hz 1 dB, 10 Hz	0.5 dB, 2 Hz 0.5 dB, 10 Hz 1 dB, 20 Hz
With 135 Ω Zin	-50 to +2 dBm, 20 k to 1200 kHz	0.1 dB, kHz	2 dB, 1%
Noise metallic 600 Ω Zin	0 to 50 dBrnc (-90 to -40 dBm0p)	1 dB	2 dB
Noise to ground	40 to 100 dBrnc (-50 to 10 dBm0p)	1 dB	2 dB
Longitudinal balance	0 to 85 dB	1 dB	2 dB
Tone output			
ID	200 to 1000 Hz, fixed level	1 Hz	1%
Precision – 600 Ω Zout	200 to 9999 Hz, -20 to +1 dBm 10 k to 19.99 kHz, -20 to +1 dBm	1 Hz, 0.1 dB 1 Hz, 0.1 dB	1% Hz, 0.2 dB 2% Hz, 1 dB
Wideband – 135 Ω Zout	20 k to 1200 kHz, 0 dBm	1 kHz	1 dB
Dial mode	DTMF, Pulse	Standard	Standard
TDR			
Under typical conditions a 500 ft. bridge tap can be seen at 18,000 ft. on a 20,000 ft. 24 AWG cable. (150 m bridge tap at 5500 m on a 6000 m 0.5 mm cable).	100, 200, 500, 1,000, 2,000, 5,000, 10,000, 20,000, 30,000 ft. (30, 60, 150, 300, 600, 1,500, 3,000, 6,000, 10,000 m)	1 ft. (1 m)	0.6% range
Pulse width	5 nS, 34 nS, 235 nS, 1600 nS	Fixed values	—
Velocity input	0.50 to 0.99 (150 to 299 m/µs)	0.01 (1 m/µs)	—
Modes	Single trace, dual trace, differential, memory, crosstalk, peak	—	—
Auto tests	Same specifications as full tests	See above	See above
SA Functions (ISDN/IDSL, HDSL, ADSL)			
ISDN			
Link test	Active/inactive	—	—
Error test (US & Canada only)	Near-end & far-end block errors	1 error	1 error
DSL			
Loss (& frequency) With 100 Ω or 135 Ω Zin	-75 to +5 dBm, 20 kHz to 1200 kHz	0.1 dB	1 dB
Noise (with E, F & G filters)			
Metallic with100 Ω/135 Ω Zin	+10/+20/+30 to +90 dBrn	1 dB	2 dB
Longitudinal with 10 kΩ Zin	+40/+50/+60 to +120 dBrn	1 dB	2 dB
Wideband Spectrum Analyzer			
Range	10 kHz to 1.8 MHz		
5 Spans	from 120 kHz to 2 MHz		
Dynamic range	-90 to +10 dBm		
Frequency resolution	1% of span		
Input impedance	135 Ω		

3M™ Dynatel™ 965DSP Subscriber Loop Analyzer (A, B & SA) (cont.)

Physical Specifications		Environmental Specifications	
Size H x W x D in. (cm)	10.3 x 4.7 x 3.2 (25 x 10 x 6)	Operating temperature	0° to 140°F (-18° to 60°C)
Net weight lbs. (kg)	4.3 (1.95) with battery and soft case	Storage temperature	-40° to 165°F (-40° to 75°C)
Shipping weight lbs. (kg)	7.8 (3.54)	Humidity	0 to 95%, non-condensing
Material	GE Xenoy		

Accessories	
Test leads	U.S. – 5 ft. (1.5 m) test leads with 2 mm gold-plated banana plugs on one end and chrome-plated alligator clips on other end (black/red, blue/yellow, green) European – 5 ft. (1.5 m) test leads with 2 mm gold-plated banana plugs on one end and 4 mm gold-plated banana plugs on other end (black/red, blue/yellow, green)
RFL strap	U.S. – 1.5 ft. (0.5 m) with alligator clips on ends European – 1.5 ft. (0.5 m) with banana plugs on ends
AC/DC battery charger	100-250 Vac (50/60 Hz) input; 12 Vdc (1 A) output. For charging only. Do not operate when using charger.
Soft case	Heavy-duty fabric case for unit and test leads
Battery holder	Plastic holder for 6 AA (LR6) batteries
Battery pack	Custom 1.5 amp-hour nickel metal hydride

Toolbox Functions	Range	Resolution	Accuracy
Load coil count	0 to 5	1	±1
Ohms/distance calculator	0 to 9999 Ω 0 to 99999 ft. (0 to 30 km)	0.01 Ω 1 ft. (0.1 m)	— —
Caller ID (U.S. & Canada only) Carrier level	Date, time, number, name -4 to -32 dBm	— 1 dBm	— 2 dBm
Self-calibrate	Pass/fail		
Loop resistance	0 to 99.9 Ω 100 to 999.9 Ω 1000 to 7000 Ω	0.01 Ω 0.1 Ω 1 Ω	0.1% ± 0.01 Ω 0.2% ± 0.01 Ω 1.0% ± 0.01 Ω
Resistance difference	0 to 99.99 Ω	0.01 Ω	1% of loop resistance ± 0.01 Ω
Ground resistance	5 to 500 Ω	1 Ω	1% ± 1 Ω
K-Test Loop resistance Fault ratio Resistance to fault (no noise)	 0 to 7K Ω (Fault Res_1) > twice (Fault Res_2) 0 to 99 Ω 100 to 999 Ω 1K Ω to 3.5K Ω	 — — 0.01 Ω 0.1 Ω 1 Ω	 — — 5% 5% 5%
Stored results (Autotest and TDR)	100 results of each, minimum		
Ringers	0.0 to 4.0 0 to 2000 nF	0.1 Ω 10 nF	

General Specifications	
Ruggedness	Survives 5 ft. (1.5 m) drop in soft case
Water-resistance	Splashproof; may be used in light to moderate rain
Standards	Meets FCC part 15, class A: Digital Devices for the US, and EN55022 (radiated emissions), EN55024-2 (electrostatic discharge), EN55024-3 (radiated immunity) EN55024-4 (transient immunity) and IEC1010 (product safety) for Europe. Built to ISO9001 certification for manufacturing facilities. Built to Bellcore (Telcordia Technologies) TSY000078 manufacturing methods. Meets UL50 Rain Test.
Language	English and multi-languages
Units	Feet or meters, Fahrenheit or Celsius, dBrnC or dBm0p, m/uS or Vp
Battery life	Rechargeable battery pack, 12 hours typical usage (no backlight), 4 hours typical (with backlight); typical usage defined as 30 minutes on, 30 minutes off
Charging time	Minimum 2.5 hours from low to full
Keypad	24-key membrane keypad with tactile feedback
Display in. (cm)	2.5 x 2.5 (74 x 74), 192 by 192 pixel resolution, backlight

Note: Routine calibration is not recommended or required.

Pass the test with Dynatel.

The call for enhanced customer services is placing increasing demands on local loop providers and their networks. Today, optimal loop performance is crucial, and the ability to quickly and accurately analyze and troubleshoot local loop cable is now a key competitive advantage. From loop diagnostic routines to fault locating, transmission testing and combination test/terminal capabilities, Dynatel™ 900 Series Subscriber Loop Test Sets from 3M can help you make the most of your network.

Ordering Information

To order, call 1-800-426-8688 and specify the appropriate Subscriber Loop Test Set; the 945DSP, 965DSP or 965DSP/SA. You may order the Far End Device accessory for the 965DSP and 965DSP/SA separately. For further information, please contact your local 3M Sales Representative.

Kit Contents for Subscriber Loop Test Products

Product	945DSP	965DSP	965DSP/SA
Analyzer	•	•	•
Conductor strap		•	•
Wire gauge		•	•
Self-test circuit board		•	•
Alkaline battery holder		•	•
Nickel metal hydride battery pack		•	•
AC adapter		•	•
Specified batteries	4 alkaline AA		
Specified test cables	•	•	•
Instruction manual	•	•	•

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