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Test & Measurement

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Complimentary Reference Material

This PDF has been made available as a complimentary service for you to assist in evaluating this model for your testing requirements.

TMG offers a wide range of test equipment solutions, from renting short to long term, buying refurbished and purchasing new. Financing options, such as Financial Rental, and Leasing are also available on application.

TMG will assist if you are unsure whether this model will suit your requirements.

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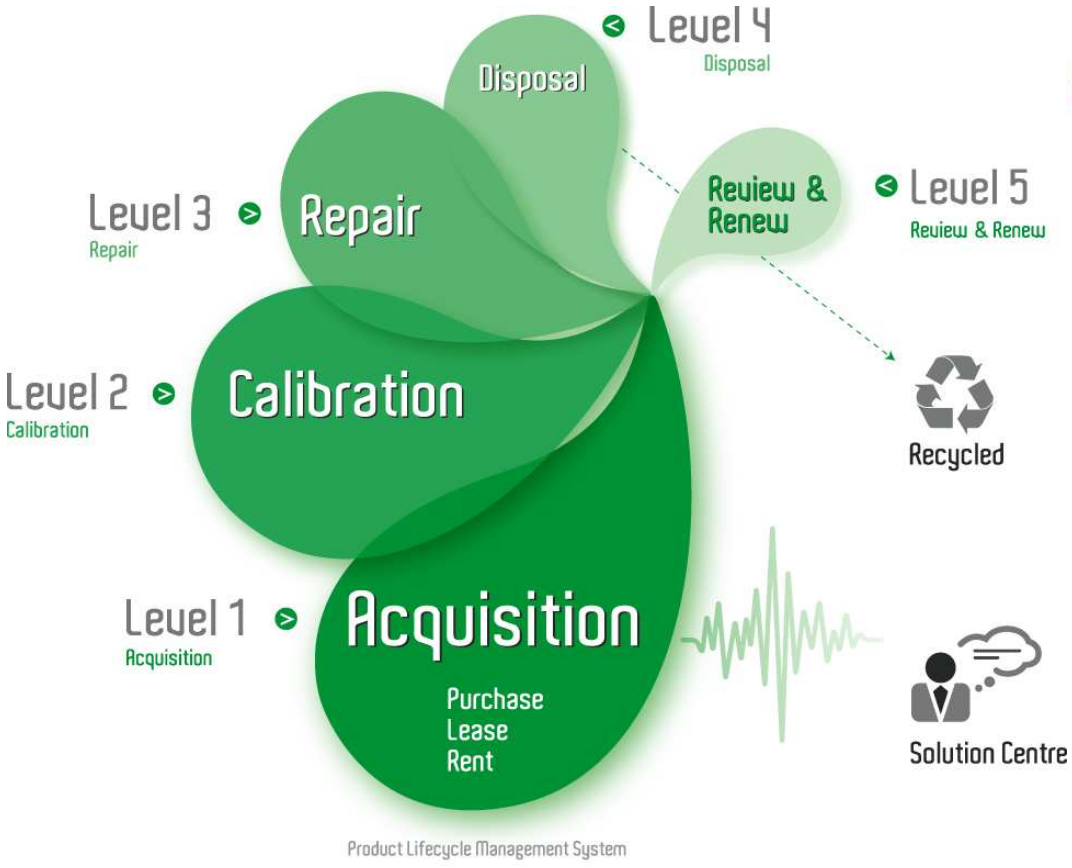


CMA4000 SPECIFICATIONS

CMA4000 Specifications

Display	VGA LCD Display (8.4" color or 8.2" monochrome)
Mass Storage	Up to 125 traces internal storage. Over 65,000 traces with optional hard drive. Up to 180 traces for a standard 3.5 inch, 1.44 MB floppy disk. Floppy disk drive comes standard
Stored Data Points	up to 16,000
Group Refractive Index Setting	1.400000 - 1.699999
Loss Modes	ORL, 2-point, 2-point LSA, dB/KM, dB/KM LSA, splice, reflectance
Trace Compare Modes	Overlay, Delta Trace Compare, Align
Data Acquisition	Real Time, Fast Scan, Medium Scan, Slow Scan, Timed Average (user selectable)
Information Output	Trace display, FAS event table, integrated trace display with event information window, header page, measurement parameters, ASCII report
Analysis	High speed integrated fiber analysis
Vertical Scale Settings	0.125/0.25/0.5/1/2/4/8 dB (module dependent)
Horizontal Scale Settings	0.001 km/div. to 0.448 km/div @ 2 km; 0.001 km/div. to 57.304 km/div. @ 256 km (IOR = 1.5)
I/O Ports	Standard: Integral alpha-numeric keyboard, (2) RS-232 Serial, (1) Parallel, VGA, Mouse, External Keyboard Port
Language Capability	English standard (others per request and may require hard drive option)
Physical Dimensions & Weight	9.5" H x 13.5" W x 3.75" D (24.1 x 34.3 x 9.5 cm) / 11.0 lbs. (4.9 kg) Includes mainframe, battery and one module
Power	
Power Supply	Autoswitching 92-132 VAC, 47-63 Hz [weight 1.7 lbs. (.77 kg)] 184-264 VAC, 47-63 Hz
Battery	Sealed Lead Acid Battery Pack [weight 1.4 lbs (0.63 kg)]
Battery Life	up to 9 hours maximum per battery, depending on operating mode
Recharge Time	1.5 - 2 hours

Environmental

	AC Power	Battery
Operation:		
Temperature	0ºC to 45ºC (32ºF to 122ºF)	0ºC to 40ºC (32ºF to 104ºF)
Humidity	95% RH max., non-condensing	95% RH max., non-condensing
Maximum Altitude	50,000 feet	50,000 feet

Storage:	
Temperature	-25ºC to 60ºC (-13ºF to 140ºF)
Humidity	95% RH max., non-condensing
Maximum Altitude	50,000 feet

Optical Module Specifications [All measurements made using FC/SPC connectors at 25°C (77°F)]

Models	4415	4414	4413
Center Wavelength	1310 nm ± 20 nm 1550 nm ± 30 nm	1550 nm ± 30 nm	1310 nm ± 20 nm
Fiber Type	Singlemode 9/125µ	Singlemode 9/125µ	Singlemode 9/125µ
Spectral Width (RMS)	1310 nm: ≤ 10 nm 1550 nm: ≤ 10 nm	1550 nm: ≤ 10 nm	1310 nm: ≤ 10 nm
Dynamic Range[1] (SNR = 1)	1310 nm: 30 dB 1550 nm: 28 dB	1550 nm: 28 dB	1310 nm: 30 dB
Initial Reflective Deadzone[2]	1310 nm: 3 meters (typical) 1550 nm: 3 meters (typical)	1550 nm: 3 meters (typical)	1310 nm: 3 meters (typical)
Initial Non-Reflective Deadzone[2]	1310 nm: 10 meters (typical) 1550 nm: 12 meters (typical)	1550 nm: 12 meters (typical)	1310 nm: 10 meters (typical)
Pulsewidth	10 ns to 10µs		
Distance Resolution	0.0001 km; 0.1 meters; 0.001 kft, 1 ft, 0.0001 mi		
Distance Sampling	0.25, 0.5, 1, 2, 4, 8, 16 meters (range dependent)		
Distance Accuracy	0.0025% of distance measurement ± distance resolution ± index uncertainty		
Distance Range Setting	2/4/8/16/32/64/128/256 km		
Loss Resolution	0.001 dB		
Laser Safety	Meets CDRH Class 1 Requirements (Eye Safe) 21 CFR		

Models	4425	4424	4423
Center Wavelength	1310 nm ± 20 nm 1550 nm ± 20 nm	1550 nm ± 20 nm	1310 nm ± 20 nm
Fiber Type	Singlemode 9/125µ	Singlemode 9/125µ	Singlemode 9/125µ
Spectral Width (RMS)	1310 nm: ≤ 10 nm 1550 nm: ≤ 10 nm	1550 nm: ≤ 10 nm	1310 nm: ≤ 10 nm
Dynamic Range[1] (SNR = 1)	1310 nm: 36 dB 1550 nm: 34 dB	1550 nm: 34 dB	1310 nm: 36 dB
Initial Reflective Deadzone[2]	1310 nm: 3 meters (typical) 1550 nm: 3 meters (typical)	1550 nm: 3 meters (typical)	1310 nm: 3 meters (typical)
Initial Non-Reflective Deadzone[2]	1310 nm: 10 meters (typical) 1550 nm: 12 meters (typical)	1550 nm: 12 meters (typical)	1310 nm: 10 meters (typical)
Pulsewidth	10 ns to 10µs		
Distance Resolution	0.0001 km; 0.1 meters; 0.001 kft, 1 ft, 0.0001 mi		
Distance Sampling	0.25, 0.5, 1, 2, 4, 8, 16 meters (range dependent)		
Distance Accuracy	0.0025% of distance measurement ± distance resolution ± index uncertainty		
Distance Range Setting	2/4/8/16/32/64/128/256 km		
Loss Resolution	0.001 dB		
Laser Safety	Meets CDRH Class 1 Requirements (Eye Safe) 21 CFR		

Models	4438	4436	4534
Center Wavelength	1550 nm ± 20 nm	1310 nm ± 20 nm 1550 nm ± 20 nm	1550 nm ± 20 nm
Fiber Type	Singlemode	Singlemode 9/125µ	Singlemode 9/125µ
Spectral Width (RMS)	≤15 nm	1310 nm: ≤ 10 nm 1550 nm: ≤ 10 nm	1550 nm: ≤ 10 nm
Dynamic Range[1] (SNR = 1)	46.0 dB	1310 nm: 40 dB 1550 nm: 40 dB	1550 nm: 40 dB
Initial Reflective Deadzone[2]	3 meters	1310 nm: 3.5 meters (typical) 1550 nm: 3.5 meters (typical)	1550 nm: 3.5 meters (typical)
Initial Non-Reflective Deadzone[2]	5 meters	1310 nm: 6 meters (typical) 1550 nm: 6 meters (typical)	1550 nm: 6 meters (typical)
Pulsewidth		10 ns to 20µs (wavelength dependent)	
Distance Resolution	0.0001 km; 0.1 meters; 0.001 kft, 1 ft, 0.001 mi		
Distance Sampling	0.25, 0.5, 1, 2, 4, 8, 16 meters (range dependent)		
Distance Accuracy	0.0025% of distance measurement ± distance resolution ± index uncertainty		
Distance Range Setting	2/4/8/16/32/64/128/256 km		
Loss Resolution	0.001 dB		
Laser Safety	Meets CDRH Class 1 Requirements (Eye Safe) 21 CFR		

Notes:
1. Subtract approximately 2 dB of range to 98% peak noise. Bellcore TR-TSY-000196 Issue 2
2. Using Bellcore TR-TSY-000196 Issue 2. Deadzones measured on -45 dB reflections.

Models	4442	4441	4440
Center Wavelength	850 nm ± 20 nm 1300 nm ± 20 nm	1300 nm ± 20 nm	850 nm ± 20 nm
Fiber Type	Multimode	Multimode	Multimode
Spectral Width (RMS)	850 nm: ≤ 10 nm 1300 nm: ≤ 10 nm	1300 nm: ≤ 10 nm	850 nm: ≤ 10 nm
Dynamic Range[1] (SNR = 1)	850 nm: 23 dB 1300 nm: 26 dB	1300 nm: 26 dB	850 nm: 23 dB
Initial Reflective Deadzone[2]	850 nm: 3.5 meters (typical) 1300 nm: 3 meters (typical)	1300 nm: 3 meters (typical)	850 nm: 3.5 meters (typical)
Initial Non-Reflective Deadzone[2]	850 nm: 6.5 meters (typical) 1300 nm: 7 meters (typical)	1300 nm: 7 meters (typical)	850 nm: 6.5 meters (typical)
Pulsewidth	4 ns to 1µs (wavelength dependent)		
Distance Resolution	0.0001 km; 0.1 meters; 0.001 kft, 1 ft, 0.0001 mi		
Distance Sampling	0.25, 0.5, 1, 2, 4, 8 meters (range dependent)		
Distance Accuracy	0.0025% of distance measurement ± distance resolution ± index uncertainty		
Distance Range Setting	2/4/8/16/32/64 km		
Loss Resolution	0.001 dB		
Laser Safety	Meets CDRH Class 1 Requirements (Eye Safe) 21 CFR		

Models	4456	4457
Center Wavelength	850 nm ± 20 nm 1300 nm ± 20 nm 1310 nm ± 20 nm 1550 nm ± 20 nm	850 nm ± 20 nm 1300 nm ± 20 nm 1310 nm ± 20 nm 1550 nm ± 30 nm
Fiber Type	Multimode and Singlemode	Multimode and Singlemode
Spectral Width (RMS)	850 nm: ≤ 10 nm 1300 nm: ≤ 10 nm 1310 nm: ≤ 10 nm 1550 nm: ≤ 10 nm	850 nm: ≤ 10 nm 1300 nm: ≤ 10 nm 1310 nm: ≤ 10 nm 1550 nm: ≤ 10 nm
Dynamic Range[1] (SNR = 1)	850 nm: 23 dB 1300 nm: 26 dB 1310 nm: 21.5 dB 1550 nm: 21 dB	850 nm: 21 dB 1300 nm: 24 dB 1310 nm: 32 dB 1550 nm: 30 dB
Initial Reflective Deadzone[2]	850 nm: 3.5 meters (typical) 1300 nm: 2.5 meters (typical) 1310 nm: 3 meters (typical) 1550 nm: 3 meters (typical)	850 nm: 3.5 meters (typical) 1300 nm: 2.5 meters (typical) 1310 nm: 3 meters (typical) 1550 nm: 3 meters (typical)
Initial Non-Reflective Deadzone[2]	850 nm: 6.5 meters (typical) 1300 nm: 7 meters (typical) 1310 nm: 10 meters (typical) 1550 nm: 12 meters (typical)	850 nm: 6.5 meters (typical) 1300 nm: 7 meters (typical) 1310 nm: 15 meters (typical) 1550 nm: 20 meters (typical)
Pulsewidth	4 ns to 10 µs (wavelength dependent)	4 ns to 10 µs (wavelength dependent)
Distance Resolution	0.0001 km; 0.1 meters; 0.001 kft, 1 ft, 0.0001 mi	0.0001 km; 0.1 meters; 0.001 kft, 1 ft, 0.0001 mi
Distance Sampling	0.25, 0.5, 1, 2, 4, 8, 16 meters (range dependent)	0.25, 0.5, 1, 2, 4, 8, 16 meters (range dependent)
Distance Accuracy	0.0025% of distance measurement ± distance resolution ± index uncertainty	0.0025% of distance measurement ± distance resolution ± index uncertainty
Distance Range Setting	2/4/8/16/32/64/128/256 km (wavelength dependent)	2/4/8/16/32/64/128/256 km (wavelength dependent)
Loss Resolution	0.001 dB	0.001 dB
Laser Safety	Meets CDRH Class 1 Requirements (Eye Safe) 21 CFR	Meets CDRH Class 1 Requirements (Eye Safe) 21 CFR

Notes:
1. Subtract approximately 2 dB of range to 98% peak noise. Bellcore TR-TSY-000196 Issue 2
2. Using Bellcore TR-TSY-000196 Issue 2. Deadzones measured on -45 dB reflections.

Models	4461	4462
Center Wavelength	1240 nm ± 6 nm	1240 nm ± 6 nm 1310 nm ± 20 nm
Fiber Type	Singlemode	Singlemode
Spectral Width (RMS)	1240 nm: ≤ 15 nm	1240 nm: ≤ 15 nm 1310 nm: ≤ 15 nm
Dynamic Range[1] (SNR = 1)	1240 nm: 36 dB	1240 nm: 34 dB 1310 nm: 34 dB
Initial Reflective Deadzone[2]	1240 nm: 3 meters (typical)	1240 nm: 3 meters (typical) 1310 nm: 3 meters (typical)
Initial Non-Reflective Deadzone[2]	1240 nm: 10 meters (typical)	1240 nm: 10 meters (typical) 1310 nm: 10 meters (typical)
Pulsewidth		
Distance Resolution	0.0001 km; 0.1 meters; 0.001 kft, 1 ft, 0.0001 mi	0.0001 km; 0.1 meters; 0.001 kft, 1 ft, 0.0001 mi
Distance Sampling	0.25, 0.5, 1, 2, 4, 8, 16 meters (range dependent)	0.25, 0.5, 1, 2, 4, 8, 16 meters (range dependent)
Distance Accuracy	0.0025% of distance measurement ± distance resolution ± index uncertainty	0.0025% of distance measurement ± distance resolution ± index uncertainty
Distance Range Setting	2/4/8/16/32/64/128/256 km	2/4/8/16/32/64/128/256 km
Loss Resolution	0.001 dB	0.001 dB
Laser Safety	Meets CDRH Class 1 Requirements (Eye Safe) 21 CFR	Meets CDRH Class 1 Requirements (Eye Safe) 21 CFR

Models	4463	4464
Center Wavelength	1240 nm ± 6 nm 1550 nm ± 20 nm	1240 nm ± 6 nm 1625 nm ± 10 nm
Fiber Type	Singlemode	Singlemode
Spectral Width (RMS)	1240 nm: ≤ 15 nm 1550 nm: ≤ 15 nm	1240 nm: ≤ 15 nm 1625 nm: ≤ 15 nm
Dynamic Range[1] (SNR = 1)	1240 nm: 36 dB 1550 nm: 34 dB	1240 nm: 36 dB 1625 nm: 36 dB
Initial Reflective Deadzone[2]	1240 nm: 3 meters (typical) 1550 nm: 3 meters (typical)	1240 nm: 3 meters (typical) 1625 nm: 3.5 meters (typical)
Initial Non-Reflective Deadzone[2]	1240 nm: 10 meters (typical) 1550 nm: 12 meters (typical)	1240 nm: 10 meters (typical) 1625 nm: 15 meters (typical)
Pulsewidth		
Distance Resolution	0.0001 km; 0.1 meters; 0.001 kft, 1 ft, 0.0001 mi	0.0001 km; 0.1 meters; 0.001 kft, 1 ft, 0.0001 mi
Distance Sampling	0.25, 0.5, 1, 2, 4, 8, 16 meters (range dependent)	0.25, 0.5, 1, 2, 4, 8, 16 meters (range dependent)
Distance Accuracy	0.0025% of distance measurement ± distance resolution ± index uncertainty	0.0025% of distance measurement ± distance resolution ± index uncertainty
Distance Range Setting	2/4/8/16/32/64/128/256 km	2/4/8/16/32/64/128/256 km
Loss Resolution	0.001 dB	0.001 dB
Laser Safety	Meets CDRH Class 1 Requirements (Eye Safe) 21 CFR	Meets CDRH Class 1 Requirements (Eye Safe) 21 CFR

Models	4471	4472
Center Wavelength	1625 nm ± 10 nm	1310 nm ± 20 nm 1625 nm ± 10 nm
Fiber Type	Singlemode	Singlemode
Spectral Width (RMS)	1625 nm: ≤ 10 nm	1310 nm: ≤ 10 nm 1625 nm: ≤ 10 nm
Dynamic Range[1] (SNR = 1)	1625 nm: 36 dB	1310 nm: 36 dB 1625 nm: 36 dB
Initial Reflective Deadzone[2]	1625 nm: 4 meters (typical)	1310 nm: 3 meters (typical) 1625 nm: 4 meters (typical)
Initial Non-Reflective Deadzone[2]	1625 nm: 12 meters (typical)	1310 nm: 10 meters (typical) 1625 nm: 12 meters (typical)
Pulsewidth		
Distance Resolution	0.0001 km; 0.1 meters; 0.001 kft, 1 ft, 0.0001 mi	0.0001 km; 0.1 meters; 0.001 kft, 1 ft, 0.0001 mi
Distance Sampling	0.25, 0.5, 1, 2, 4, 8, 16 meters (range dependent)	0.25, 0.5, 1, 2, 4, 8, 16 meters (range dependent)
Distance Accuracy	0.0025% of distance measurement ± distance resolution ± index uncertainty	0.0025% of distance measurement ± distance resolution ± index uncertainty
Distance Range Setting	2/4/8/16/32/64/128/256 km	2/4/8/16/32/64/128/256 km
Loss Resolution	0.001 dB	0.001 dB
Laser Safety	Meets CDRH Class 1 Requirements (Eye Safe) 21 CFR	Meets CDRH Class 1 Requirements (Eye Safe) 21 CFR

Models	4473
Center Wavelength	1550 nm ± 20 nm
	1625 nm ± 10 nm
Fiber Type	Singlemode
Spectral Width (RMS)	1550 nm: ≤ 10 nm
	1625 nm: ≤ 10 nm
Dynamic Range[1]	1550 nm: 34 dB
(SNR = 1)	1625 nm: 36 dB
Initial Reflective Deadzone[2]	1550 nm: 4 meters (typical)
	1625 nm: 4 meters (typical)
Initial Non-Reflective Deadzone[2]	1550 nm: 12 meters (typical)
	1625 nm: 12 meters (typical)
Pulsewidth	
Distance Resolution	0.0001 km; 0.1 meters; 0.001 kft, 1 ft, 0.0001 mi
Distance Sampling	0.25, 0.5, 1, 2, 4, 8, 16 meters (range dependent)
Distance Accuracy	0.0025% of distance measurement ± distance resolution ± index uncertainty
Distance Range Setting	2/4/8/16/32/64/128/256 km
Loss Resolution	0.001 dB
Laser Safety	Meets CDRH Class 1 Requirements (Eye Safe) 21 CFR

Notes:
1. Subtract approximately 2 dB of range to 98% peak noise. Bellcore TR-TSY-000196 Issue 2
2. Using Bellcore TR-TSY-000196 Issue 2. Deadzones measured on -45 dB reflections.

Multi-Test Functions

Dual Source (441X and 442X optics only; factory installed)

Wavelength	1310/1550 ± 20 nm (except 4457 module 1550 ± 30 nm)
Output	-10 dBm (typical)
Transmission Mode	CW, 1 KHz and 2 KHz
Output Fiber	9/125µm SM fiber
Optical Connector	Same as OTDR
Modes of Operation	CW, 1 KHz and 2 KHz
Stability	± 0.2 dB (8 hours)
Spectral Width	Same as OTDR
Safety	Same as OTDR

Optical Meter (factory installed) +20 dBm meter option available

Detector Type	2 mm Ge PIN photodiode
Wavelength	800 - 1800 nm
Range	+10 to -55 dBm or +20 to -45 dBm with AM460 filter
Calibrated Wavelengths	3 total: 850, 1310, 1550
Universal Connector	Yes (use AM-430-xx adapter caps)
Resolution	0.01 dB, dBm, 0.01% Watts
Store Reference Mode	Yes
Accuracy[1]	± 4% (± 0.18 dB) @ +5 dBm to -50 dBm
	± 8% (± 0.36 dB) @ + 10 dBm to +5 dBm and
	@ -50 dBm to -55 dBm
Linearity	± 0.04 dB, +5 dBm to -50 dBm

Visual Fault Locator (field installed)

Wavelength	635 ± 10 nm
Output	0 dBm
Transmission Mode	CW or 2 Hz
Output Fiber	9/125µm, SM fiber
Optical Connector	FC, SC, ST - fixed connector
Safety	IEC 825 Class 2, FDA (21 CFR 1040. 10 class 2)

Note:
1. Specification applies to +10 dBm meter not to +20 dBm meter.

CMA4000 Optional Accessories (must be added as separate line item):

TD-400	Hard transit case	TD-459US	US style keyboard
TD-410	Deluxe soft case	TD-459GE	German CE style keyboard
TD-415	Soft carry bag	TD-459FR	French CE style keyboard
TD-405	Printer w/cable	TD-459SP	Spanish CE style keyboard
TD-309	Printer paper (5 rolls/pack)	TD-459IT	Italian CE style keyboard
TD-409	Case of paper (5 packs/case)	TD-30163	Additional User's Manual
TD-453	12 v lead acid battery	TD-30162	Additional Training Manual
TD-29621	12 v DC power adapter	TD-30711	Parallel cable - DB25M to DB25M
TD-30710	Serial cable DB9F to DB9F (null)	TD-30712	Serial cable DB9F to DB9M (straight)

CMA4000 Mainframe:

Control Unit: P/N TD-14XXX PC-based modular platform

Standard Accessories:

- 8-inch VGA LCD display
- Multi-tasking operating system
- User's & Training Manuals
- 1 VGA port
- Internal memory (up to 140 traces)
- 1 carry strap
- AC adapter/charger
- AC line cord (choose style - see below)
- 2 serial ports
- 1 parallel port
- 1 mouse port
- 1 PS/2 keyboard port
- 12 v rechargeable battery (qty 2)
- Floppy drive
- Built-in keyboard

AC Power Cord Options:

TD-11685	US power cord	TD-30362	Australian power cord
TD-30358	Euro power cord	TD-30359	UK power cord
TD-30361	Italian power cord	TD-30360	Swiss power cord

OTDR/Source Connector Adapter:

Adapters for PC and Ultra Polish:

UC-130-10	Biconic	UC-130-35	SMA 905/906
UC-130-15	DIN 47256	UC-130-40	Diamond HP HMS-10
UC-130-20	D4	UC-130-45	Diamond HP HMS-0
UC-130-25	FC	UC-130-50	Diamond HP-HMS-10/A
UC-130-30	ST	UC-130-55	SC

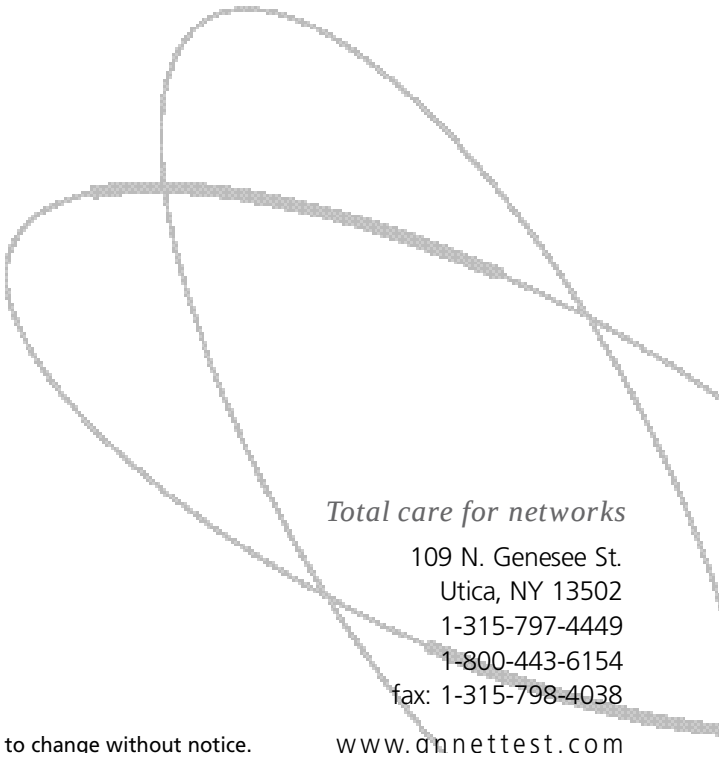
Adapters for Angle Polish:

UC-130-60	FC NTT	UC-130-70	DIN/HRL-10
UC-130-60A	FC Seiko Giken	UC-130-75	ST
UC-130-65	SC	UC-130-80	Diamond E-2000

Meter Connector Adapter (select one when ordering power meter):

AM-430-10	Biconic	AM-430-50	ST
AM-430-15	D4	AM-430-75	VFO/PFO
AM-430-20	SMA 906	AM-430-85	DIN
AM-430-25	Diamond GFS-3	AM-430-90	SC
AM-430-45	FC	AM-430-100	FDDI

Our equipment is constantly being improved. Hence, specifications are subject to change without notice.



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