

## SPECIFICATION SHEET

# CMA4000i

## OPTICAL TEST SYSTEM

### Mainframe Specifications

Display	VGA LCD Display (21.3 cm (8.4 inch) color or 20.8 cm (8.2 inch) monochrome)	
Floppy Drive	3.5 inch	
Keyboard	Integral alpha-numeric, external keyboard (optional)	
I/O Ports	Standard: (2) RS-232 Serial, (1) Parallel, VGA, Mouse, and (1) PS/2 External Keyboard Port	
Hard Drive	2 Gigabytes (minimum)	
Dimensions (H x W x D)	24.1 x 34.3 x 9.5 cm (9.5 x 13.5 x 3.75 inches)	
Weight	4.9 kg (11.0 lbs.) Includes mainframe, battery and module	
Power		
Power Supply	Autoswitching 100-132 VAC, 47-63 Hz, 184-250 VAC, 47-63 Hz, 10-15 VDC	
Battery	(2) Sealed lead acid battery pack	
Battery Life	6 hours typical, depending on operating mode	
Recharge Time	1.5 - 2 hours	
Environmental		
Operation	AC Power	Battery
Temperature	0° C to 45° C (32° F to 122° F)	0° C to 40° C (32° F to 104° F)
Humidity	95% RH max., non-condensing	95% RH max., non-condensing
Maximum Altitude	15,240 meters (50,000 feet)	15,240 meters (50,000 feet)
Storage		
Temperature	-25° C to 60° C (-13° F to 140° F)	
Humidity	95% RH max., non-condensing	
Maximum Altitude	15,240 meters (50,000 feet)	

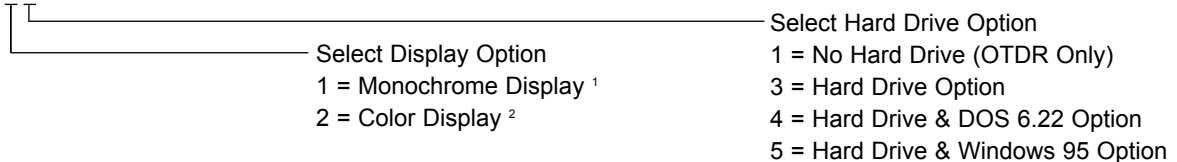
### Ordering Information

CMA4000i Includes:

Floppy drive, operator's manual, "Understanding OTDR" training manual, AC charger/adapter, two batteries, carry strap, protective display cover, serial data transfer kit and choice of AC power cord (select one from below)

### Mainframe Selection (required)

TD-14XXE



<sup>1</sup> Available for use with OTDR modules

<sup>2</sup> Color display required for use with OSA modules

### AC Power Cord Options

TD-11685	US/Japan AC power cord
TD-30358	European AC power cord
TD-30359	UK AC power cord
TD-30360	Swiss AC power cord
TD-30362	Australian AC power cord
TD-30361	Italian AC power cord



## OTDR Specifications

Module	4415	4425	4436	4439	4442	4453	4454	4456	4457	4473	4476	4498
<b>Center Wavelength</b>	1310 nm ±20 nm 1550 nm ±20 nm	1310 nm ±20 nm 1550 nm ±20 nm	1310 nm ±20 nm 1550 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 ±20 nm 1625 nm ±10 nm	1310 nm ±20 nm 1410 nm ±10 nm 1550 nm ±20 nm 1625 nm ±10 nm	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 ±20 nm	1550 nm ±20 nm 1625 nm ±10 nm	1550 nm ±20 nm 1625 nm ±10 nm	1550 nm ±20 nm
<b>Fiber Type</b>	Single-mode	Single-mode	Single-mode	Single-mode	Multimode	Single-mode	Single-mode	Multimode and Single-mode	Multimode and Single-mode	Single-mode	Single-mode	Single-mode
<b>Spectral Width (RMS)</b>	1310 nm: ≤10 nm 1550 nm: ≤10 nm	1310 nm: ≤10 nm 1550 nm: ≤10 nm	1310 nm: ≤10 nm 1550 nm: ≤10 nm	1310 nm: ≤10 nm 1550 nm: ≤15 nm	850 nm: ≤10 nm 1300 nm: ≤10 nm	1310 nm: ≤12 nm 1550 nm: ≤12 nm 1625 nm: ≤12 nm	1310 nm: ≤12 nm 1410 nm: ≤12 nm 1550 nm: ≤12 nm 1625 nm: ≤12 nm	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	1550 nm: ≤10 nm 1625 nm: ≤10 nm	1550 nm: ≤10 nm 1625 nm: ≤10 nm	1550 nm: ≤15 nm
<b>Dynamic Range<sup>1</sup></b>	1310 nm: 30 dB 1550 nm: 28 dB	1310 nm: 36 dB 1550 nm: 34 dB	1310 nm: 40 dB 1550 nm: 40 dB	1310 nm: 43 dB 1550 nm: 46 dB	850 nm: 23 dB 1300 nm: 26 dB	1310 nm: 40 dB 1550 nm: 40 dB 1625 nm: 40 dB	1310 nm: 36 dB 1410 nm: 36 dB 1550 nm: 36 dB 1625 nm: 36 dB	850 nm: 23 dB 1300 nm: 25 dB 1310 nm: 22 dB 1550 nm: 21 dB	850 nm: 22 dB 1300 nm: 24 dB 1310 nm: 33 dB 1550 nm: 31 dB	1550 nm: 34 dB 1625 nm: 36 dB	1550 nm: 40 dB 1625 nm: 40 dB	1550 nm: 50 dB
<b>Initial Reflective Deadzone<sup>2</sup></b>	1310 nm: 3 meters 1550 nm: 3 meters	1310 nm: 3 meters 1550 nm: 3 meters	1310 nm: 3.5 meters 1550 nm: 3.5 meters	1310 nm: 3 meters 1550 nm: 3.5 meters	850 nm: 3.5 meters 1300 nm: 3 meters	1310 nm: 3.5 meters 1550 nm: 3.5 meters 1625 nm: 3.5 meters	1310 nm: 3.5 meters 1410 nm: 3.5 meters 1550 nm: 3.5 meters 1625 nm: 3.5 meters	850 nm: 3.5 meters 1300 nm: 3.0 meters 1310 nm: 3 meters 1550 nm: 3 meters	850 nm: 4.5 meters 1300 nm: 4.5 meters 1310 nm: 4.0 meters 1550 nm: 3.5 meters	1550 nm: 4 meters 1625 nm: 4 meters	1550 nm: 4 meters 1625 nm: 4 meters	1550 nm: 4.5 meters
<b>Initial Non-Reflective Deadzone<sup>3</sup></b>	1310 nm: 10 meters 1550 nm: 12 meters	1310 nm: 10 meters 1550 nm: 12 meters	1310 nm: 6 meters 1550 nm: 6 meters	1310 nm: 10 meters 1550 nm: 10 meters	850 nm: 6.5 meters 1300 nm: 7 meters	1310 nm: 7.0 meters 1550 nm: 7.0 meters 1625 nm: 7.0 meters	1310 nm: 7.0 meters 1410 nm: 7.0 meters 1550 nm: 7.0 meters 1625 nm: 7.0 meters	850 nm: 6.5 meters 1300 nm: 7 meters 1310 nm: 10 meters 1550 nm: 12 meters	850 nm: 8 meters 1300 nm: 9 meters 1310 nm: 11 meters 1550 nm: 12 meters	1550 nm: 11 meters 1625 nm: 7 meters	1550 nm: 11 meters 1625 nm: 7 meters	1550 nm: 12 meters
<b>Linearity</b>	.04 dB/dB	.04 dB/dB	.04 dB/dB	.04 dB/dB	.04 dB/dB	.04 dB/dB	.04 dB/dB	.04 dB/dB	.04 dB/dB	.04 dB/dB	.04 dB/dB	.04 dB/dB
<b>Pulsewidth</b>	10 ns to 20 μs	10 ns to 20 μs	10 ns to 20 μs	10 ns to 30 μs	4 ns to 1 μs	10 ns to 20 μs	10 ns to 20 μs	4 ns to 10 μs <sup>4</sup>	4 ns to 20 μs <sup>4</sup>	10 ns to 20 μs	10 ns to 20 μs	10 ns to 30 μs
<b>Distance Resolution</b>	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	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	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	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	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	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
<b>Distance Sampling (range dependent)</b>	0.25, 0.5, 1, 2, 4, 8, 16 meters	0.25, 0.5, 1, 2, 4, 8, 16 meters	0.25, 0.5, 1, 2, 4, 8, 16 meters	0.25, 0.5, 1, 2, 4, 8, 16 meters	0.25, 0.5, 1, 2, 4, 8 meters	0.25, 0.5, 1, 2, 4, 8, 16 meters	0.25, 0.5, 1, 2, 4, 8, 16 meters	0.25, 0.5, 1, 2, 4, 8, 16 meters <sup>4</sup>	0.25, 0.5, 1, 2, 4, 8, 16 meters <sup>4</sup>	0.25, 0.5, 1, 2, 4, 8, 16 meters	0.25, 0.5, 1, 2, 4, 8, 16 meters	0.25, 0.5, 1, 2, 4, 8, 16 meters
<b>Distance Range Setting</b>	2/4/8/16/32/ 64/128/256 km	2/4/8/16/32/ 64/128/256 km	2/4/8/16/32/ 64/128/256 km	2/4/8/16/32/ 64/128/256 km	2/4/8/16/32/64 km	2/4/8/16/32/ 64/128/256 km	2/4/8/16/32/ 64/128/256 km	2/4/8/16/32/ 64/128/256 km <sup>4</sup>	2/4/8/16/32/ 64/128/256 km <sup>4</sup>	2/4/8/16/32/ 64/128/256 km	2/4/8/16/32/ 64/128/256 km	2/4/8/16/32/ 64/128/256 km
<b>Loss Resolution</b>	0.001 dB	0.001 dB	0.001 dB	0.001 dB	0.001 dB	0.001 dB	0.001 dB	0.001 dB	0.001 dB	0.001 dB	0.001 dB	0.001 dB

### Additional OTDR Specifications

Laser Safety	Meets CDRH Class 1 Requirements (Eye Safe) 21 CFR
Distance Accuracy	0.0025% of distance measurement ± distance resolution ± index uncertainty
Group Refractive Index Setting	1.400000 - 1.699999
Loss Modes	ORL, 2-point, 2-point LSA, dB/KM, dB/KM LSA, splice, dual splice loss, reflectance
Trace Compare Modes	4 Trace Overlay, Delta Trace Compare, Align, Stack
Data Acquisition	Real Time, Fast Scan, Medium Scan, Slow Scan, Timed Average (user selectable)
Information Output	Trace display, event table, integrated trace display with event information window, header page, measurement parameters, ASCII report, overlay template
Analysis	Automated high speed 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)
Stored Data Points	16,000
Language Capability	Dial-a-language (English, Chinese, Spanish, Portuguese, French, Russian, German, Italian, Swedish, Korean, Hungarian)
Mass Storage	Over 65,000 traces with hard drive. Up to 180 traces for a standard 8.89 cm (3.5 inch), 1.44 MB floppy disk. Up to 125 traces internal storage.

### OTDR/Source Connector Adapter Options

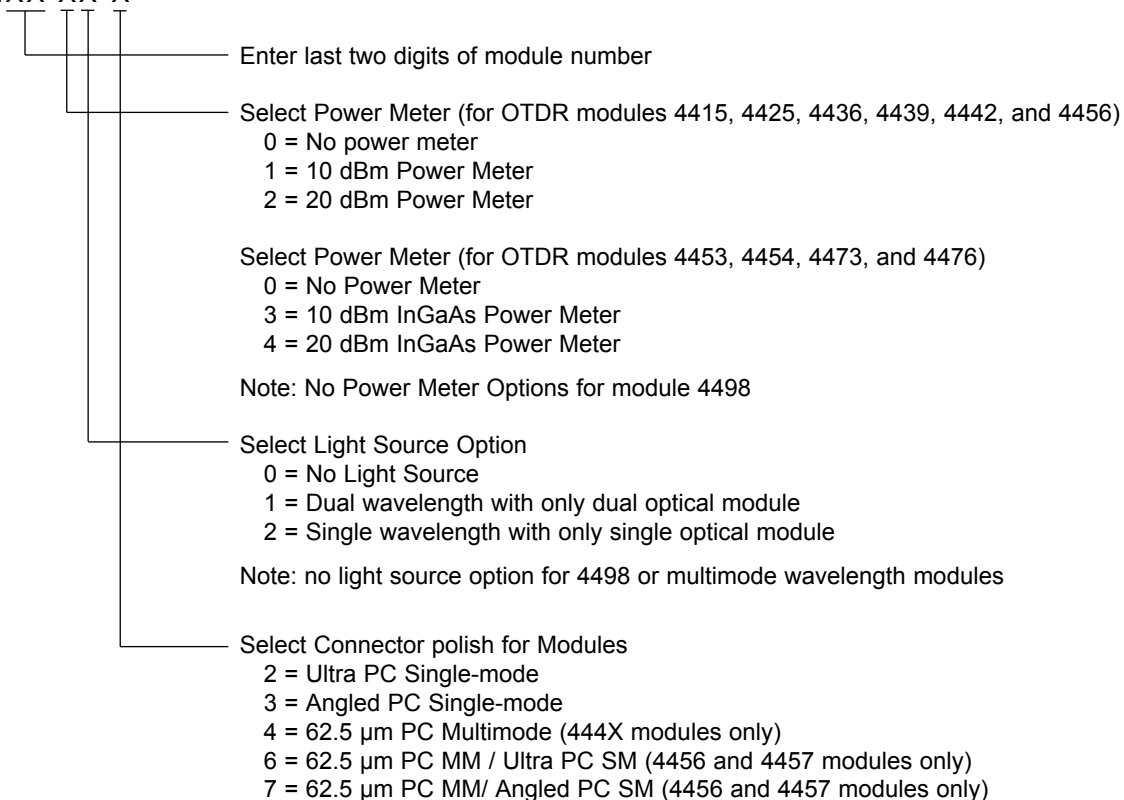
<i>Adapters for Ultra Polish</i>			
UC-130-15	DIN 47256	UC-130-40	Diamond HP HMS-10
UC-130-20	D4	UC-130-45	Diamond HMS-0
UC-130-25T	FC	UC-130-50	Diamond HMS-10/A
UC-130-30T	ST	UC-130-55A	SC
UC-130-35	SMA 905/906		
<i>Adapters for Angle Polish</i>			
UC-130-60	FC NTT	UC-130-70	DIN/HRL-10
UC-130-60A	FC Seiko Giken	UC-130-75	ST
UC-130-65	SC	UC-130-80	Diamond E-2000

### Notes

- <sup>1</sup> SNR=1 with up to 256k averages (Typical, subtract approximately 1.7 dB of range for 98% peak noise. Bellcore TR-TSY-000196 Issue 2).
- <sup>2</sup> Using Bellcore TR-TSY-000196 Issue (typical).
- <sup>3</sup> Deadzones measured on -45 dB reflections (typical).
- <sup>4</sup> Wavelength dependent.

## OTDR Module Ordering Information

Part Number TD-14MXX XX-X



VFL Module Available

VFL-XX (FC, SC, ST - fixed connectors)

## Optical Spectrum Analyzer (OSA) Specifications

Module	4791 NI	4792
Wavelength range	1520 - 1570 nm	1520 - 1620 nm
Wavelength accuracy	±20 pm (typical)	±20 pm (typical)
Resolution bandwidth	<0.05 nm	<0.05 nm
Power Range	+10 to -70 dBm per channel +20 to -60 dBm per channel *	+10 to -70 dBm per channel
Polarization dependence	<±0.25 dB	<±0.25 dB
Channel table	Automatically generated, up to 400 channels	Automatically generated, up to 400 channels
Return Loss	<35 dB	<35 dB
Cyclic Time	4 seconds maximum	4 seconds maximum
Stability	±0.2 dB per hour	±0.2 dB per hour
Power accuracy	±0.5 dB (23° C)	±0.5 dB (23° C)
Modes of Operation	Graph, Table and Drift Modes	
Acquisitions	Real Time, Average, Peak Hold and Channel Drift	
Language Capability	English	

\* Model 4791 only

## Multi-Test Functions

Single-mode Light Source (factory installed)	
Wavelengths	Same as OTDR
Output	-8 dBm (minimum)
Transmission Mode	CW, 2 KHz
Output Fiber	9/125 $\mu$ m SM fiber
Optical Connector	Same as OTDR
Stability	$\pm 0.2$ dB (8 hours)
Spectral Width	Same as OTDR
Safety	Same as OTDR

Power Meter (factory installed)	
Detector Type	2 mm Ge PIN photodiode or InGaAs photodiode <sup>3</sup>
Range	+10 to -55 dBm or +20 to -45 dBm with AM460 filter
Calibrated Wavelengths	850, 1310, 1410 <sup>2</sup> , 1550, 1625 nm <sup>3</sup>
Universal Connector	Yes (use AM-430-xx adapter caps)
Resolution	0.01 dB, 0.01% Watts
Store Reference Mode	Yes
Accuracy <sup>1</sup>	$\pm 4\%$ ( $\pm 0.18$ dB) @ +5 dBm to -50 dBm $\pm 8\%$ ( $\pm 0.36$ dB) @ +10 dBm to +5 dBm and @ -50 dBm to -55 dBm
Linearity	$\pm 0.04$ dB, +5 dBm to -50 dBm

Visual Fault Locator (field installed)	
Wavelength	650 $\pm 10$ nm
Output	0 dBm
Transmission Mode	CW or 2 Hz
Output Fiber	9/125 $\mu$ m, SM fiber
Safety	IEC 825 Class 2, FDA (21 CFR 1040.10 Class 2)

### Notes

<sup>1</sup> Specification applies to +10 dBm meter.

<sup>2</sup> Available with 1410 nm light source only

<sup>3</sup> Available with 1625 nm light source only

### Power Meter Connector Options

(select one when ordering power meter)

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-430-90A	SC
AM-430-45	FC	AM-430-95	E2000
AM-430-50	ST	AM-430-100	FDDI

### VFL Connector Options

FC, SC, ST - fixed connector

## Optional Accessories

(must be added as separate line item)

TD-400A	Hard case w/handle & wheels	TD-430	CMA serial transfer data kit
TD-401	Hard transit case	TD-435	Display cover
TD-410	Deluxe soft case	TD-30163	OTDR User's Manual
TD-415	Soft carry bag	TD-35992	OSA User's Manual
TD-405	Printer w/cable	TD-459US	US style keyboard
TD-420	Tripod	TD-459GE	German CE style keyboard
TD-309	Printer paper (5 rolls)	TD-459FR	French CE style keyboard
TD-409	Case of paper (25 rolls)	TD-459SP	Spanish CE style keyboard
TD-453	12V lead acid battery	TD-459IT	Italian CE style keyboard
TD-29621	12V DC power adapter		

## FiberConnect

*Bare Fiber Testing Adapters (Single-mode)*

### Ultra

FiberConnect-1-UFC  
FiberConnect-1-USC  
FiberConnect-1-UST

### Angled

FiberConnect-1-AFC  
FiberConnect-1-ASC



## Test Fiber Boxes (XXX-XXX = Connector Style)

FB-XXX-XXX-SM-300M	FB-XXX-XXX-M5-100M
FB-XXX-XXX-SM-1K0M	FB-XXX-XXX-M6-100M
FB-XXX-XXX-SM-5K0M	

### Standard fiber lengths

Single-mode (SM) - 300m, 1Km, and 5Km  
Multimode (MM) - 100m

### Standard Connectors (SM and MM)

UFC-UFC  
UST-UST  
USC-USC

Additional connector styles, combinations and lengths for the Fiber Test Boxes are available upon request.



## FS Series Microscopes

FS-200	Fiber Microscope with 200x optics
FS-200C	Fiber Microscope with 200x optics with coaxial illumination
FS-400C	Fiber Microscope with 400x optics with coaxial illumination



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NetTest develops, manufactures and markets advanced equipment and systems for the test and measurement of telecommunication, data communication and optical networks. We provide vendors, carriers, enterprises and research laboratories with the network testing solutions they need to troubleshoot and optimize performance in today's complex, hybrid networks and in those planned for tomorrow.

NetTest undertakes a continuous and intensive product development program to ensure that its instruments and systems perform to the highest technical standards. As a result, the specifications in this document are subject to change without notice.

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