

408UL SPECIFICATIONS

CMXL CENTRAL UNIT

HUMAN COMPUTER INTERFACE (HCI)

Workstations	Laptop or desktop with high-resolution CRT or flat screen monitors. Medium range Workstations are available for small configurations and more powerful ones for larger configurations can be provided.
Maximum number of stations	5
Maximum number of monitors per station	3
Software	Fully integrated application software, with distributed resources within the entire acquisition network and object oriented database Operating system : Unix™ X-window system : X11™ Window environment : MOTIF™ The software can be remotely controlled using commercial communication means

PERFORMANCES

Processing capabilities	<ul style="list-style-type: none"> - Correlation before or after stack - Vertical or Diversity stack - Spike editing : zeroing or clipping - Alternate or simultaneous dual-source operation - Slip-sweep
Processing power (real time) per module	10,000 Ch @ 2 ms (2,000 Ch per LCI/LMP Pair)

SYSTEM ARCHITECTURE

Easily expandable using several parallel modules connected to a single set of tape drives and plotters.

Maximum number of channels	Unlimited
Maximum number of lines	Unlimited
Start of acquisition (from T ₀)	< 20 μs
Maximum record length	99 s @ 2 ms (500 ch) 49 s @ 2 ms (2000 ch)

Maximum acquisition length	27 s @ 2 ms (2000 ch) 60 channels between LAUs
----------------------------	---

Sampling skew	True synchronous sampling
Gain setting	G1600 full scale = 1600 mV RMS

	G1600	G400	G100	G50	G25
Cable only	✓	✓	✓	N/A	N/A
RF only	N/A	✓	✓	✓	✓
Combined	N/A	✓	✓	N/A	N/A

Play-back and monitoring

- Versatile hard copy output on plotter
- Fixed gain, linear gain, normalization or AGC
- Low-cut filter from 10 Hz to F_N in 1-Hz steps
- High-cut filter from 30 Hz to F_N in 1-Hz steps
- Notch filter from 30 Hz to F_N in 1-Hz steps
- Time and trace sequential display
- Single trace monitoring

Real-time links with SQC-Pro & SGA for QC analysis



Ahead of the CurveSM

TAPE DRIVES

Drive and Media	Up to 6 drives (simultaneous and or alternate mode)
Format	SEG-D demultiplexed, 4 byte per sample (SEG-D, Rev. 2)
CD 490E (single or dual drive)	
Media	36 track IBM 3490-E type ½" cartridge
Format	IBM 36 track 3490E interchange
Maximum trace length	64 s @ 2 ms or equivalent
CD 590 (single or dual drive)	
Media	128 track IBM 3590 type ½" cartridge
Format	IBM 128 track 3590 interchange
Maximum trace length	64 s @ 2 ms or equivalent
IBM 3580 LTO ultrium H11	
3592 (single or dual drive)	
Media	IBM 3592 cartridge (18P7534)
Capacity	60 GB or 300 GB

PHYSICAL SPECIFICATIONS

CMXL (RACKABLE)

Operating voltage	110V - 220 VAC 50/60 Hz
Power consumption	100 W with 1 LCI & 1 LMP 200 W with 5 LCI & 5 LMP
Environmental	
Humidity	20-80% non-condensing
Operating temperature	0° to 40° C (*)
Storage temperature	- 40° to +70° C
Dimensions & weights (without rack)	
Size (HxWxD)	355x480x560 mm (14x18.9x22 in)
Weight	23.9 kg (52.7 lbs)

(*) Overall system limited by peripheral equipment

TAPE DRIVES

CD 490E	
Operating Voltage	110 V - 220 VAC 50/60 Hz
Power Consumption	Single drive : 150 W Dual drive : 300 W Idle : 120 W
Environmental	
Operating temperature	10° to 40° C
Storage temperature (without tape)	-40° to +60° C
Humidity	20-80 % non-condensing
Dimensions and weight	
Size with lid (HxWxD)	332x332x590 mm (13.1x13.1x23.2 in)
Weight	24 kg (single drive) (52.9 lbs) 35 kg (dual drive) (77.2 lbs)
CD 590	
Operating Voltage	100 V - 220 V AC 50/60 Hz
Power consumption	Single drive : 170 W Dual drive : 340 W
Environmental	
Operating temperature	10 to 40° C
Storage temperature (without tape)	0° to 50° C
Humidity	20-80% non condensing
Dimensions & weight	
Size with lid (HxWxD)	360x370x695 mm (14.2x14.6x27.4 in)
Weight	28.5 kg (Single drive) (62.8 lbs) 41.5 kg (Dual drive) (91.5 lbs)

GROUND EQUIPMENT FOR CABLE TELEMETRY

FDU

GENERAL

Functions	data transmission with CRC control 24 bits A/D conversion D/A conversion with programmable bit stream
Input Impedance	
Differential Mode	20 k Ω // 77 nF
Common Mode	105 k Ω
Full Scale Input Levels	
@ G1600	1.6 V RMS
@ G400	400 mV RMS
Offset	0 (digitally zeroed)
Max. Common Mode Voltage	\pm 10 V
Crosstalk	> 130 dB
Low Cut Filter	None
High Cut Filter	0.8 FN (linear or minimum phase)
Stop Band Attenuation	> 120 dB (above Nyquist)
Sample Rates	4, 2, 1, 0.5, 0.25 ms
Word Size	24 bits
Time Standard	True synchronous system
Interval between FDU's	up to 110 m with ST cable up to 90 m with WPSR cable

PERFORMANCES (*)

Noise (3-200 Hz)	
@ G1600	620 nV RMS
@ G400	170 nV RMS
Instant Dynamic Range	130 dB
System Dynamic Range	140 dB
Distortion	-110 dB
Gain Accuracy	< 0.1%
Phase Accuracy	20 μ s
CMRR	110 dB

PHYSICAL

Material	Polyurethane & Polyamide
Dimensions and Weights	
Size	300x75x85 mm (11.8x3x3.3 in)
Weights	
ST+	0.415 Kg (0.9 lbs)
	2.890 Kg with 55 m cable (6.4 lbs)
WPSR	0.490 Kg (1.1 lbs)
	5.440 Kg with 55 m cable (12 lbs)
Power	
Operating Power Voltage	27 to 50 V DC
Power Consumption	140 mW
Environmental	
Operating Temperatures	-40° to +70°C
Storage Temperatures	-40° to +70°C
Water Depth	15 m (for wpsr) 1 m (for ST+)

(*) typical @ 2 ms sample rate and 25°C

LAUL

GENERAL

Functions	FDU's and line management, data transmission with error recovery and temporary storage 48 V line power supply Tests
Tests capabilities	Power supply Data transmission Field tests (resistance, tilt, Leakage, noise, CMRR) Instrument tests (noise, distortion, phase, gain, CMRR)
Memory	4 Mb local buffer for non-real time mode transmission

PHYSICAL

Material	Aluminium or Stainless steel
Dimensions and Weights	
Size	224x93x108 mm (8.8x3.7x4.3 in)
Weights	2.400 Kg/3.700 Kg (5.3 lbs/8.2 lbs)
Power	
Operating Power Voltage	10.5 to 15 VDC, 2 battery connectors, to allow uninterrupted operation during battery replacement
Power Consumption	3.4 W (idle : 420 mW)
Environmental	
Operating Temperatures	-40° to +70°C
Storage Temperatures	-40° to +70°C
Water Depth	15 m

LAUX

GENERAL

Functions	data transmission and routing (transverse) with error recovery and temporary storage 48 V line power generation Tests
Tests capabilities	Power supply Data transmission Field tests (resistance, tilt, leakage, noise, CMRR) Instrument tests (noise, distortion, phase, gain, CMRR)
Memory	4 Mb local buffer for non-real time mode transmission
Interval between LAUX's on transverse	up to 300 m with ST+ cable up to 250 m with WPSR cable up to 400 m with WPSRLR cable

PERFORMANCES (*)

Maximum number of FDU's between LAU's depends on the interval between FDU's and on the sample rate.

	110 m ⁽¹⁾	90 m	70 m	55 m	30 m
4 ms	34	38	42	48	60 ⁽²⁾
2 ms	34	38	42	48	60 ⁽²⁾
1 ms	34	38	42	48	60 ⁽²⁾
0.5 ms	34	38	42	48	48 ⁽²⁾
0.25 ms	32 ⁽²⁾	32 ⁽²⁾	32 ⁽²⁾	32 ⁽²⁾	32 ⁽²⁾

(1) ST+ cable only

(2) Maximum processing capacity of LAUX/LAUL

Line Data rate	1,000 ch@ 2 ms each side of a LAUX
Transverse Data rate	2,000 ch@ 2 ms 8,000 ch@ 2 ms with fast transverse

PHYSICAL

Material Aluminium

Dimensions and Weights

Size 312x242x137 mm (12.3x9.5x5.4 in)

Weights 5.500 Kg (12.1 lbs)

Power

Operating Power Voltage 10.5 to 15 VDC, 2 battery connectors,
to allow uninterrupted operation during
battery replacement

Power Consumption 5.7 W (idle : 320 mW)

Environmental

Operating Temperatures -40° to +70° C

Storage Temperatures -40° to +70° C

Water Depth 15 m

(*) typical @ 2 ms sample rate and 25°C

DETOUR MANAGEMENT

Passive Links (standard FDU's)	Software controlled	
Cable extension Link (with Cable Extension Interface Unit)	Maximum length	400 m
Optic fiber Link	Maximum range	2 Km
WRU	Typical range	3 Km
	Frequency	2.3-2.52 and 5.607-5.838 GHz
Transmit power	100 mW	
Power supply	12 V DC	
Operating temperature	-40° to +70° C	
Dimensions (HxWxD)(*)	217x217x240 mm (8.5x8.5x9.4 in)	
Weight(*)	8.250 Kg (18.15 lbs)	
Laser Link	Maximum range	1 Km
	Laser wave length	785 nm
	Beam diameter at aperture	50 mm
	Transmit beam diameter at 1 km	2,5 m
Typical output power	10 mW	
Power supply	12V DC (110 V AC or 220 V AC converter)	
Operating temperature	-30° C to +50° C	
Dimensions (HxWxL)(*)	394x330x610 mm (15.4x13x24 in)	
Weight(*)	16 Kg (35 lbs)	

LRU

GENERAL

Radio Functions	Communication with another LRU for data transmission with error recovery and temporary storage
Cable Functions	full LAUX capabilities
Tests capabilities	Power supply Radio data transmission Cable data transmission Field tests Instrument tests
Antenna spectrum monitoring capability	
Radio setup	Pocket terminal connection capability
Memory	4Mb local buffer for non-real time transmission mode
Interval between LRU's or LRU and LAUX on transverse	Up to 300 m with ST+ cable Up to 250 m with WPSR Up to 400 m with WPSRLR

(*) without antenna and tripod
 (**) the number of channels increases proportionally with the ratio :
 (shot cycle time) / (acquisition time).
 (***) the sub-band 218-219 MHz may not be available for licensing.

RADIO PERFORMANCES

Radio link between LRU's
 (Typical propagation condition, bit error rate better than 10⁻⁶, 8 m (26 feet) antenna mast, Yagi type antenna)
 - 16 km (10 miles) up to 240 Channels (**) @2ms sample rate real time retrieval.
 - 24 km (15 miles) up to 60 Channels (**) @2ms sample rate real time retrieval.

RF Characteristics :

RF Frequencies	USA use : limited to 216 MHz to 220 MHz (***) Canadian use : limited to 217 MHz to 220 MHz (***) , restricted to remote areas Other countries : in respect with local regulation Overall capability : 215 MHz to 250 MHz RF power management ; 6W nominal
RF Output Power	
RF Output Impedance	50 Ω
FCC Emission Designators	200KD1D and 800KD1D

CABLE PERFORMANCES

(Typical @ 2 ms sample rate and 25° C)

Maximum number of FDU's per LRU :

- 120 with up to 30 m interval
- 96 with up to 55 m interval
- 80 with up to 75 m interval

Maximum number of FDU's between LRU's or between LRU and LAU :

- 60 with up to 30 m interval
- 48 with up to 55 m interval
- 40 with up to 75 m interval

PHYSICAL

Material	Aluminium
Dimension and Weights	
Size	380x380x225 mm (14.9x14.9x8.8 in)
Weights	12.6 kg (27.8 lbs)
Power	
Operating Power Voltage	10.5 to 15 VDC, 2 battery connectors, to allow uninterrupted operation during battery replacement
Power consumption	Master : 23 W Slave : 80 W when retrieving Sleep : 1.2 W
Operating Temperatures	-40° C to 70° C
Storage Temperatures	-40° C to 70° C
Water Depth	1.5 m

TESTING EQUIPMENT

LT408

GENERAL

Pocket terminal to be connected to LAUL, LAUX or LRU to perform the following tests :

On line look on line
 power supply
 data transmission
 field tests (resistance, tilt, leakage,
 noise, CMRR) instrument tests (noise,
 distortion, phase, gain, CMRR)

On transverse look on transverse
 power supply
 data transmission

PHYSICAL

Dimensions and Weight
 Size 236x128x43 mm (9.3x5x1.7 in)
 Weight 1.2 Kg (with cable) (2.6 lbs)
 Environmental
 Operating temperatures -30° to +60°C
 Storage temperatures -30° to +70°C
 Weatherproof 5 – 90% humidity
 Power
 Operating Power Voltage 10.5 to 15 V DC
 Internal battery recharged by LAU or LRU

TMS408

GENERAL

Standard PC connected to a Test and Maintenance Unit (TMU408).

Tests of LAU's
 Test of the processor
 Tests of power function on each port
 Transmission/Reception tests on each port
 In local loop mode
 With short cables
 With standard cables
 Test of long duration transmission on each port
 Control of the switchings
 Functional control of each port
 Control of the local internal clock
 Measurement of the power consumption
 Tests of FDU's
 Calibration (saved on EEPROM)
 Continuity test of the Link
 Long duration transmission test
 Polarity test
 Test of the functioning LED's
 Measurement of the power consumption
 Instrument tests Internal and external Noise/Offset
 Response to a sinusoidal signal
 Internal and external CMRR
 Internal and external resistance
 Internal voltage reference
 Sensor leakage
 Impulse on external resistance

PHYSICAL (TMU408)

Dimensions and Weight
 Size 370x400x220 mm (14.6x15.7x3.7 in)
 Weight 9 kg (19.8 lbs)
 Environmental
 Operating temperatures +10° to +35°C
 Storage temperatures -40° to +60°C
 Weatherproof 5 – 90% humidity
 Power
 Operating Power Voltage 110-220 VAC
 Power Consumption 60 W

QUICK TESTER

GENERAL

Power voltage and transmission tests on cables

PHYSICAL

Dimensions and Weight
 Size 60x60x190 mm (2.4x2.4x7.5 in)
 Weight 0.445 Kg (1 lbs)
 Environmental
 Operating temperatures -40° to +70°C
 Storage temperatures -40° to +70°C
 Weatherproof 5 – 90% humidity
 Power
 Operating Power Voltage 27 to 50 V DC
 Power Consumption 200 mW max.

CT 408

GENERAL

Line and transverse cable compliance with the input/output specifications of the 408UL field electronics

PHYSICAL

Dimensions and Weight
 Size 270x245x175 mm (10.6x9.6x6.9 in)
 Weight 3.85 kg (8.6 lbs)
 Environmental
 Operating temperatures -30° to +60°C
 Storage temperatures -30° to +70°C
 Weatherproof 1 m (when closed)
 Power
 Operating Power Voltage 12 V
 Power Consumption 600 mW during tests