

**ULTRALOW POWER
24-BIT STRONG MOTION
DATA RECORDER**
Model SMR4000-X



20 Channel Configuration

The PMD SMR4000 is a *rugged, ultra low power, high-performance, versatile 24-bit resolution modular multi-channel strong motion recording system*. The modular design allows channels to be added in groups of four up to 24 channels. The four-channel unit can include an internal force balanced accelerometer (FBX series). The eight-channel unit can include internal FBA and rotational seismometer to record all six degrees of freedom (6 DOF). The multi-channel units (12 to 24 channels) are suitable for large structure monitoring and include differential sensor inputs to allow long sensor runs in noisy building environments. Multiple sensor inputs are easily connected via Euro Block style connections thru environmentally sealed cable grips.

All models include GPS timing, and “smart” timing software. Data sampling is precisely synchronized with the internal time so all channels have the exact number of samples within all time periods. Re-indexing of data is never required.

All models include a PC-104 “back-end” which allows for a wide range of options and peripherals such as hard disks, Ethernet cards, and wireless LAN cards. The PC-104 uses a standard operating system (DOS or Windows), which enables the user to add analysis, custom triggering, or other software features. This allows flexibility for future uses of data, further eliminating the risk of obsolescence.

SMR4000 SPECIFICATIONS:

INPUT CHANNELS

Type:	Single-Ended or Differential
Data Channels:	3 + 1 ¹ ; optional up to 24
State-of-Health 4 th Channel:	24-bit resolution
Gain:	Software programmable: 1,2,4,8,16,32,64
Differential Input Signal Range:	Software programmable: ± 2.5 , ± 10 V
Overvoltage Protection	± 40 V
Input Impedance	Data inputs: ± 2.5 V – 1M Ω ; ± 10 V – 26k Ω State-of-health input: 1M Ω
Analog Anti-Aliasing Filter:	>100 dB @ primary sampling rate
Dynamic Range: (rms noise to full scale)	>132 dB @ 100 sps

DIGITIZER

Type:	24-bit delta-sigma converter in each channel
Sampling Rates:	0.1, 1, 10, 20, 40, 80, 100, 200, 500, 1000, 2000 4000 sps
Digital Filter (@ output Nyquist):	>130 dB @ 200 sps (FIR or optional IIR)
Phase	Linear within the passband
Digital Signal Processor:	TMS320VC5409
Static RAM Buffer:	Standard: 4MB expandable to 16MB, opt. To 64MB

TIMING SYSTEM

Type:	True Real Time™ PLL controlled, GPS-referenced
Maximum Accuracy (Software Selectable):	<1 μ sec
Crystal Oscillator	Standard: 25ppm; Optional TCXO 1 ppm/year
Crystal Frequency Correction Resolution	0.016 ppm
GPS Duty Cycle (Software Selectable):	Once every 18 hrs to achieve <1msec accuracy
GPS Receiver (integral with antenna):	Miniature; external; connects via a cable up to 30m

EVENT DETECTORS

Type:	STA/LTA, Level, up to 6 independent detectors in frequency domain
Pre-filter	Up to 6 passbands
Pre-event data buffer	up to 90 seconds (@ 100 sps)
Post-event buffer	User configured – no limitations
Trigger channels	May be controlled by one, several or all 6 detectors associated with any physical or virtual acquisition channel
Calibration	5V square wave (others optional)

¹ Fourth channel may be used as state-of-health channel or function as fully featured data channel

Specifications subject to change without notice

SMR4000 SPECIFICATIONS (Con't):

POWER

Voltage:	6 – 16 Vdc
Overvoltage protection:	±60 V
Power consumption (12 channels, 100sps):	4 ch ~1W, 12 ch ~2W (Display off, PC and GPS cycled)

USER INTERFACE (12 CHANNEL AND ABOVE)

Display Type:	Backlit 320x200 graphic LCD display, opt. TFT color 640x480 VGA
Keypad:	12 (numerical + function) keys
Full PC keyboard:	Optional
User Control:	Menu-driven; state-of-health messaging
Data display:	Up to 3 channels simultaneously in real time
Master Computer	Fully PC Compatible, single-board, PC/104 586 CPU
Remote PC:	RS232 com2 port

MASS STORAGE

Flash Disk	128Mb optional miniature or optional hard disk 8 Gb
Disk Compatibility:	Any PC
Temperature Range:	-30 to +50°C (built-in automatic heater for disks)
Data Formats:	Mini-SEED w/Steim-2 compression up to x6 CSS 3.0: long integer; separate data description in ASCII, free stand- ing conversion programs to other formats available.

COMMUNICATION

Dial-up Telephone Line Access	RS232 com2 port; optional internal modem; Automatic PC dial up communication software included
Ethernet	Optional LAN card

ENVIRONMENTAL PARAMETERS

Housing	Painted Steel, optional stainless steel
Waterproofing	NEMA 6
Operating Temperature Range	-30 to +50°C
Humidity	100%
Storage Temperature Range	-40 to +60°C
Size (12 to 24 channel);(4 to 8 channels)	10"x12"x6"; 9.84"x 7.87"x5.91"
Weight	16 lb typ. (24ch stainless); 8.5lb typ (4 ch w/ sensor)

EXTERNAL CONNECTORS

Power	MS Circular
Data, sensor power/calibration	MS cable grips to Euro style internal terminal block
LAN or Serial port	MS Circular or DB9
GPS	MS Circular

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CONNECTORS: MAIN PANEL

To PC Keyboard	PS/2 Mini-DIN
To external PC	RS232 (DB9)