

MR3000C

Vibration / Motion Measurement System

The MR3000C in Syscom's rugged RED BOX is a compact vibration / motion measurement system. As such it meets all user expectations in a state-of-the-art device and thus is a highly reliable and efficient tool for many applications in

Civil Engineering

- ☐ Industrial Vibrations
- ☐ Construction Site Monitoring
- ☐ Tunneling
- ☐ Truck and Rail Traffic
- ☐ Blasting Monitoring
- ☐ Model Verification

Earthquake Engineering

- ☐ Building Monitoring
- ☐ Monitoring of Structures (Dams, Bridges..)

Geology

- ☐ Soil Characterization

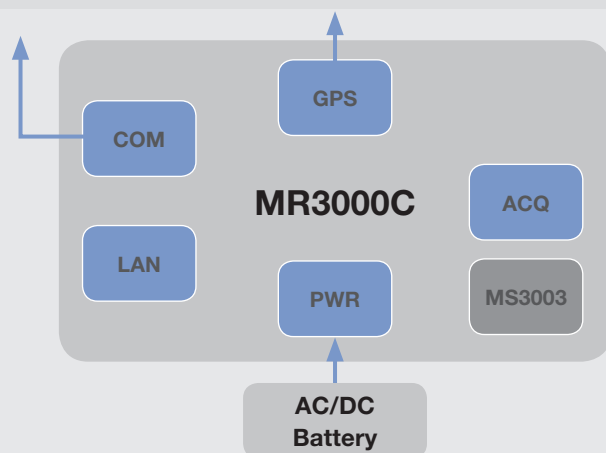
Earth Science

- ☐ Earthquake Monitoring (Seismic Intensity)

Major features are

- ☐ Compact unit containing sensor, digital recorder and communications
- ☐ ARM/DSP Technology with up to 32 GB Memory
- ☐ Integrated Web Server
- ☐ Precise timing (GPS or IEEE-1588 PTP)
- ☐ Low Power Consumption (1W typ.)
- ☐ Power over Ethernet (PoE)
- ☐ Wide dynamic range (132 dB)
- ☐ Sampling rates up to 2000 Sps

Technical Specification

MR3000C**Vibration/Motion Recorder**

Block Diagram MR3000C

**Technical Specifications MR3000C****Data Acquisition**

Principle	Dedicated 4 th order delta-sigma ADC per channel
Resolution	24 bit
Sampling-rate	50, 100, 200, 500, 800, 1'000, 2'000 sps, others on request
Number of channels	3, optional 6 with external sensors
Channel to channel skew	None – simultaneous sampling on all channels
Dynamic range	Typ. 130dB@250, 127dB@500 sps
Data Filter	FIR & IIR digital filters
Trigger Filter	Digital IIR filter: 0.5 - 15 Hz band-pass - default Optional: User defined FIR or IIR digital filters

Trigger and De-trigger

Principle	Level trigger or STA/LTA or combined
Channels	X,Y or Z axis, software- or external trigger
Trigger voting logic	Predefined AND or OR combinations, individual channel votes
Level trigger	0.003 to 100% full scale
STA / LTA	STA: 0,1 to 25s, LTA: to 250s, Ratio: 0,1 to 25, LTA latched/unlatched
De-trigger	In % of trigger
Smart Trigger / De-Trigger	Automatic adjustment of triggerlevel

Microprocessor**Recording**

Principle	Event recording (time history) or continuous data stream with on-line data compression
Header	Contains status information at time of trigger and event summary
Pre-event recording	1 - 100 seconds (in 1 sec steps)
Post-event recording	1 - 1'000 seconds (in 1 sec steps)
Max. recording time	Event recording: unlimited
Non volatile Memory	Internal nand flash (128 MByte) and removable SD card (up to 32 GByte)
Volatile Memory	Internal DDRAM (128 MByte)

Alarm triggers

Principle	Level trigger with unlimited signal. two levels (individually settable for each axis)
Channels	OR combination of all channels
Range	0.1 % to 100% full scale
Optional	Various alarm options, e.g. time and frequency weighted alarms

Clock

Primary Clock	1 ppm, this clock is disciplined by a GPS receiver to < 0.1 ppm accuracy
Secondary Clock	20 ppm (10 min/year) with Lithium back-up battery (> 5 years autonomy)
Time code receivers	GPS, NTP, IEEE 1588

Firmware

Principle	Multitasking OS environment with flash file system
Intelligent Alerting	System initiates communications or sends text message (SMS) when an event is detected or if the self-test feature detects a malfunction
User Interface	Easy to use command & control through integrated web server

Display

4 LED	Power Supply, Run/Self-test, Recording/Memory use, Warning/Error
LCD-Display	Status information, peak values of the last event, important settings, time and sync information

Power Supply

Battery	External lead-acid gel cell 9 Ah with Integrated Battery Charger: AC 90-264 V / 47-63 Hz
Supply Voltage	DC 10-36 V
Power consumption	< 1 W
Autonomy (with ext. battery)	Typ. 3 days, expandable with longer battery

I/O and Connectors

Type	Metallic self-latching push-pull connectors with positioning key (LEMO)
Sensors (external)	Differential input (0 ± 4 V), optional bipolar input (0 ± 4 V)
RS-232	Communication Modem or PC
Auxiliary	USB
Power	Metallic connector with protective GND
GPS	Connector for external GPS
LAN	Communication with PC or network Ethernet 100BaseT, 100BaseF or WiFi

Sensors (Internal)

MS3003+ Triaxial Velocitymeter

Principle	Active, electronically compensated geophone
Direction	3 orthogonal directions (tri-axial)
Measuring range	0.0035 to 115 mm/s (option: 0.00007 to 2.3 mm/s) 0.0001378 in/s to 4.528 in/s (option: 0.0000028 in/s to 0.09 in/s)
Frequency	range 1 to 315 Hz

MS3004+ Triaxial Accelerometer

Principle	Micro mechanical (MEMS), force balance accelerometer (FBA)
Direction	3 orthogonal directions
Measuring range	0.069 mg to 2 g
Frequency range	0 to 150 Hz

Ordering Information

		Product Codes
Vibration/Motion Measurement System	MR3000C with internal MS3003+ Velocitymeter	14.10.1003
	MR3000C with internal MS3004+ Accelerometer 2g	14.10.1004
	MR3000C for external triaxial sensor	14.10.1005
	MR3000C for 2 external triaxial sensors	14.10.1006
Battery Package	Battery package with AC/DC converter/charger 9AH	14.10.0001
Mounting Platform	Mounting platform for MR3000C with leveling bubble	13.00.0039
GPS timing	GPS receiver and antenna	
	- Timing accuracy better than 0.5 microsecond to UTC	
	Power consumption approx. 20 mA @ 12 V (GPS operating) with antenna	
Firmware Options	- Civil Engineering	
	- Strong Motion	

Dimensions

Housing	Aluminum, 120 x 180 x 100 mm
Weight	1.5 kg
Protection degree	IP 65 (splash-proof)

Regulations

Electrical Safety	In compliance with EN 50 081 and EN 50 082
EMI/RFI	In compliance with EN 61010
Environmental	In compliance with IEC 68-2
	Shock: 30 g/11 ms half-sine
	Heat: -20° up to +50°C
	Humidity: up to 100% rh
	Vibration: up to 5 g (operating)
Conformity	CE