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SAFETY IS OUR PRIORITY

MR3000C

Vibration & Motion Measurement System

APPLICATIONS

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)
Continuous data stream in MiniSeed/SeedLink format

DATASHEET : MR3000C

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

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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 expectation in a state-of-the-art device and thus is a highly reliable and efficient tool for many applications.

Major features are

- Compact unit containing sensor, digital recorder and communication
- ARM/DSP Technology
- Removable SD Card Memory
- Embedded Web Server for easy configuration and control
- Precise timing (GPS)
- Power over Ethernet (PoE)
- Wide dynamic range
- Wireless connectivity

MR3000C with GPRS

Technical specifications

Data acquisition

Principle	4th order delta-sigma ADC per channel
Resolution	24 bit
Sampling-rate	50, 100, 200, 400, 500, 800, 1'000, 2'000 sps, others on request
Number of channels	3
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 (Strong Motion Applications) Others on request

Trigger and de-trigger

Principle	Level trigger or STA/LTA or combined
Trigger voting logic	Predefined AND or OR combinations, individual channel votes
Level trigger	0.003 to 100% full scale
STA / LTA (Strong Motion)	STA: 0,1 to 25s, LTA: 1 to 250s, Ratio: 0,1 to 25.
Smart Trigger / De-Trigger	Automatic adjustment of trigger level

Microprocessor

Recording principle	Event recording (time history), continuous time recording or manually triggered
Header	Contains status information at time of trigger and event summary
Pre-event recording	1 - 30 seconds (in 1 sec steps)
Post-event recording	1 - 100 seconds (in 1 sec steps)
Max. recording time	Event recording: unlimited
Non volatile Memory	Internal and flash and removable SD card

Alarm triggers principle

Alarm triggers principle	Multiple level triggers with various notification options (individually settable for each axis)
Range	0.1 % to 100% full scale

Precision timing

System Clock	1 ppm, this clock is disciplined by GPS, NTP

Data / user interface

Intelligent Alerting	System initiates communications or sends text message (SMS) or e-mail when an event is detected
Web Interface	Easy to use command & control through embedded web server
FTP	Built-in FTP client to push data to an FTP-server

Display

3 LED	Run, Recording, Warning/Error
LCD-Display	Status information, important settings.

Wireless Communication

WiFi	IEEE 802.11b/g/n compliant
Mobile Network (option)	Multi-Band UMTS / HSDPA / WCDMA / GSM / GPRS / EDGE

Power Supply

Supply Voltage	9 - 13.5VDC or 48V PoE
Power Consumption (W/O wireless communication)	2 W (velocitymeter) 3 W (accelerometer)

I/O and Connectors

Type	Metallic self-latching push-pull connectors with positioning key (LEMO)
Power	Metallic connector with protective GND
GPS	Connector for external GPS
LAN / PoE	Communication with PC or network - Ethernet 100BaseT

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Sensors (Internal)

Triaxial Velocitymeter

Type	Velocity sensor with linearized frequency response A3HV 315/1 (triaxial) (according to DIN 45669)
Principle	Geophone
Measuring range full scale	± 100 mm/s
Frequency range	1 - 350 Hz (linear ±10% frequency response)
Case-to-coil motion	4 mm p-p
Dynamic range	> 130 dB
Linearity / Phase	According to DIN 45669 (class 1)
Cross axis sensitivity	According to DIN 45669 (<5%)

Triaxial Accelerometer

Principle	The sensing element is an analog force feedback accelerometer featuring a variable capacitance, silicon bulk-micro machined acceleration sensor (MEMS) and a custom low-power mixed-signal integrated circuit (ASIC). The MEMS/ASIC custom design forms a DC coupled analog servo accelerometer.
Hysteresis	None
Dynamic range (100 Hz BW)	typ. 110 dB (±4g)
Noise (10 to 1000 Hz)	typ. 900 $ng_{rms}/\sqrt{Hz}$
Noise (0.1 to 100 Hz)	typ. 11 μg_{rms}
Natural frequency	Frequence response DC to > 1000 Hz
Measuring range	±4 g standard, ±2 g
Non-linearity	< 1.5 % of full scale
Scale factor temp. drift (±4g)	typ. <100 ppm/°C
Zero point offset drift (±4g)	typ. <600 µg/°C
Orientation	Triaxial, horizontal (floor) mounting or vertical (wall mounting)
Self test	Test-pulse
Cross axis rejection	>40 dB

Dimensions

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

Regulation

Electrical Safety	In compliance with IEC 61010
EMI/RFI	In compliance with EN 61000
Environmental	Shock: 30 g/11 ms half-sine Heat: -20° up to +70°C Humidity: up to 100% RH Vibration: up to 5 g (operating)
Conformity	CE

Ordering Information (please refer to last page)

Measurement System	MR3000C with internal MS3003+ Velocitymeter MR3000C with internal MS3006+ Accelerometer 2g or 4g
Power supply	External battery package with integrated AC/DC converter/charger External AC/DC converter
Mounting Platform	Mounting platform for MR3000C with levelling bubble
GPS timing	GPS receiver and antenna
Carrying case	For MR3000C and battery package

Standard carrying case with cables, MR3000C and batterypack

MR3000C with GPRS

SYSCOM Instruments SA
Rue de l'Industrie 21
1450 Sainte-Croix
SWITZERLAND

T. +41 (0) 24 455 44 11
F. +41 (0) 24 454 45 60

www.syscom.ch
info@syscom.ch

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Ordering information :

MR3000C main unit A - B - C - D - E - F - G

MR3000C - 4GB Memory - 3 channels - WiFi - Ethernet connectivity - Embedded web server for configuration and control - 3m Ethernet cable

COMPLETE KITS	Part number	Main unit	Battery pack[3] with internal AC/DC & cable[4] to MR	External AC/ DC converter	Carrying case
			14100007[3] 81000527[4]	87000268	74710101

MR3000C main unit with internal triaxial velocity sensor :

CE Basic Int Set (velocity)	93106007	A	x	x	x
CE Standard Set (velocity)	93106009	B	x	x	x
CE Mini Basic Set (velocity)	93106005	A			
CE Mini Standard Set (velocity)	93106006	B			

MR3000C main unit with connector for external sensors (without sensors) :

CE Basic Ext Set, for external velocity sensor MS2003+	93106008	C	x	x	x
CE Basic Ext Set, for external acceleration sensor MS2005+	93106018	D	x	x	x
CE Classic Set, for external velocity sensor MS2003+	93106010	E	x	x	x

MR3000C main unit with internal triaxial acceleration sensor :

CE Basic Int Set MS3006+ (MS type to be specified with PO)	93106026	F	x	x	x
CE Standard Set MS3006+ (MS type to be specified with PO)	93106027	G	x	x	x

MAIN UNITS	Part number	Main unit	GPRS board EU[1]/USA[2]	Mounting platform
			93100003[1] 93100005[2]	13000039[5] 13000047[6]

MR3000C units :

MR3000C, with internal velocity sensor	14101007	A		x[5]
MR3000C, with internal velocity sensor and GPRS board	14101015	B	x	x[5]
MR3000C, config for external velocity sensor	14101019	C		
MR3000C, config for external acceleration sensor	14101026	D		
MR3000C, config for external velocity sensor, with GPRS board	14101005	E	x	
MR3000C, with internal acceleration sensor	14101018	F		x[6]
MR3000C, with internal acceleration sensor and GPRS board	14101017	G	x	x[6]
MR3000C, network master firmware option, for 1x MR3000C	88010003	-		