Data Sheet

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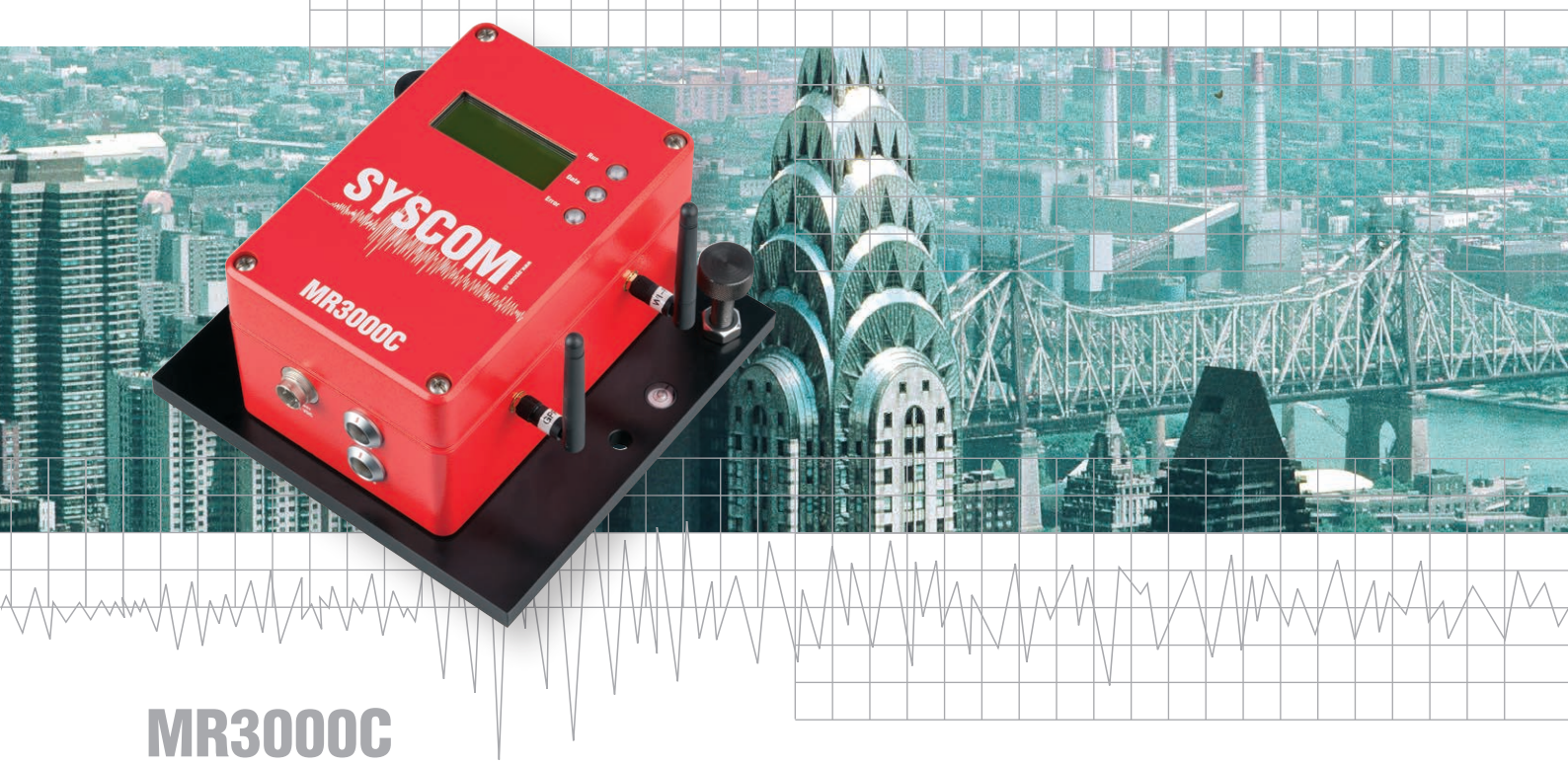

MR3000C
Vibration / Motion Measurement System

The MR3000C in SYSCOM's rugged RED BOX is a compact vibration/motion measurement system. As such it meets all user experctation 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)
- Continuous data stream in MiniSeed/SeedLink format

Major features are
- Compact unit containing sensor, digital recorder and communications
- ARM/DSP Technology
- Removable SD Card Memory
- Embedded Web Server for easy configuration and control
- Precise timing (GPS or IEEE-1588 PTP)
- Power over Ethernet (PoE)
- Wide dynamic range
- Wireless connectivity

SYSCOM Instruments

Technical Specifications MR3000C

Data Acquisition

Principle	4th order delta-sigma ADC per channel
Resolution	24 bit
Sampling-rate	50, 100, 200, 400, 500, 800, 1'000 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: to 250s, Ratio: 0,1 to 25, LTA latched/unlatched
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	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 or IEEE 1588 to < 0.1 ppm

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

Sensors (Internal)

Triaxial Velocitymeter (MS3003+)

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

	MS3004+	MS3006+
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. Micro mechanical (MEMS), force balance accelerometer (FBA)	
Hysteresis	None	
Dynamic range (100 Hz BW)	typ. 120 dB (±2g)	typ. 110 dB (±4g)
Noise (10 to 1000 Hz)	typ. 300 $ng_{rms}/\sqrt{Hz}$	typ. 900 $ng_{rms}/\sqrt{Hz}$
Noise (0.1 to 100 Hz)	typ. 3.3 μg_{rms}	typ. 11 μg_{rms}
Natural frequency	Frequency response DC to >1000 Hz	
Measuring range	±2 g standard, ±1 g	± 4 g standard, ± 2g
Non-Linearity	< 1 % of full scale	< 1.5 % of full scale
Scale factor temp. drift (±2g)	typ. <150ppm/°C	typ. <200ppm/°C
Zero point offset drift (±2g)	typ. <300µg/°C	typ. <400µg/°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)

Regulations

Electrical Safety	In compliance with EN 50 081 and EN 50 082
EMI/RFI	In compliance with EN 61010
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

Vibration/Motion Measurement System	MR3000C with internal MS3003+ Velocitymeter MR3000C with internal MS3004+ Accelerometer 1g or 2g 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 leveling bubble
GPS timing	GPS receiver and antenna
Carrying case	For MR3000C and battery package

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Syscom Instruments SA
Rue de l'Industrie 21
1450 Sainte-Croix
Switzerland
A member of the BARTEC Group

Phone +41 24 455 44 11
Fax +41 24 454 45 60
sales@syscom.ch
www.syscom.ch

SYSCOM Instruments