

SAFETY IS OUR PRIORITY

**BARTEC** SYSCOM

# MR3000SB

## Structures & Buildings



The MR3000SB is a dedicated seismic monitoring system for structures and buildings. Its compactness with all must-have features already integrated makes it an ideal motion recorder for any type of structures, tailor-made for buildings.

Up to 32 MR3000SB can be interconnected in a daisy-chain network.

### Applications

#### Strong motion

- Buildings
- Historical Monuments
- Hospitals
- Tunnels
- Skyscrapers
- Arenas
- Airports
- Bridges

## MR3000SB Structures & Buildings Monitoring System

The MR3000SB seismic monitoring system is the most advanced, integrated and reliable monitoring system for structures and buildings, able to automatically detect, record and process any strong motion vibrations that might affect the structure. A daisy-chain network (Fiber Optic or Ethernet Copper cable) coupled with latest data retrieval capabilities, make the MR3000SB the easiest to use and most versatile instrument available on the market.

The all-in-one Red Box with internal battery, AC/DC and terminals already integrated provides all the necessary features for easy installation without any additional part. Command & control access through an embedded web server provides self-explanatory interface for system set-up and control.

The optional kit with 3 configurable relay outputs (alarm 1, alarm 2, device error) can be directly connected to any external alarming devices and used as an earthquake early warning system. A common logic system, for a typical 3-station network, will ensure highest reliability and avoid spurious activation of the warning system.

### Major features

- Compact unit containing sensor, recorder, battery and communication
- Daisy-chain Fiber Optic or Ethernet Copper type cable
- Internal AC/DC converter
- Embedded Web server for easy configuration and control
- Optional GPS timing
- Industrial cable glands and internal terminals (no additional junction box needed)
- Easy installation and minimal maintenance

### Panel mount possibilities



FO stand-alone



LAN RJ45 stand-alone



kit FO daisy-chain



kit LAN daisy-chain



FO and kit LAN daisy-chain

### Technical specifications

#### Data acquisition

<b>General principle</b>	4 <sup>th</sup> order delta-sigma ADC per channel
<b>Resolution</b>	24 bits
<b>Sampling-rate</b>	50, 100, 200, 400, 500, 800, 1000, 2000 sps
<b>Number of channels</b>	3
<b>Channel to channel skew</b>	None, simultaneous sampling on all channels
<b>Data Filter</b>	Anti-aliasing filters
<b>Trigger Filter</b>	Digital IIR filter: 0.5 – 15 Hz band-pass (Strong Motion Applications)

#### Trigger and de-trigger

<b>Principle</b>	Level trigger or STA/LTA or automatic adjustment of trigger level
<b>Trigger voting logic</b>	Predefined AND or OR combinations, individual channel votes
<b>Trigger level</b>	0.1 mg to 4 g
<b>STA / LTA</b>	STA: 0.1 to 25s, LTA: 1 to 250s, ratio 0.1:25
<b>Smart Trigger / De-Trigger</b>	Automatic adjustment of trigger level

#### Microprocessor

##### Recording

<b>Principle</b>	Event recording (time history), continuous time recording or manually triggered
<b>Header</b>	Contains status information at time of trigger and event summary
<b>Pre-event recording</b>	1-30 s (in 1 second steps)
<b>Post-event recording</b>	1-100 s (in 1 second steps)
<b>Max. recording time</b>	Unlimited
<b>Memory Removable</b>	SD flash card (4GB)

##### Timing

<b>System clock</b>	1ppm, could be disciplined by NTP or GPS (optional)
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##### Data / User Interface

<b>Web interface</b>	Easy to use command & control through embedded web server
<b>Intelligent Alerting</b>	System initiates communications and sends e-mail when an event is recorded
<b>FTP Built-in</b>	FTP client to push data to an FTP-server
<b>API</b>	Application programming interface REST with extended functions available

##### Alarm triggers

<b>Principle</b>	Two alarm levels independently settable as threshold levels or user-defined curves, with various notification options (individually settable for each axis)
<b>Alarm level range</b>	0.1 % to 100% full scale
<b>User-defined alarm</b>	Thresholds and frequencies individually settable for each axis
<b>System status</b>	3 LEDs Run, Recording, Warning/Error. Internal LCD with status info and important settings

##### Network capabilities

<b>Common trigger and common alarm</b>	Configurable with AND/OR logic, for every device within the same network
<b>Sync. in LAN network</b>	Typically 1 ms with NTP protocol
<b>Max. number of MR3000SB</b>	32, in Master/Slave configuration
<b>Remote control</b>	VPN, DDNS

##### Power Supply

<b>Power supply</b>	100 - 240 V AC, 50 - 60 Hz, internal AC/DC. Optional DC power 10-36 V DC
<b>Internal battery</b>	12 V, 12 Ah
<b>Consumption</b>	4 W (with charged battery), 25 W (AC max. and battery in charge)
<b>Battery autonomy</b>	Typical 60 hours in stand-alone mode

## I/O (glands and connectors)

<b>Power</b>	M16 cable gland 4-11mm / Terminals on the AC/DC
<b>Kit Relays (3)</b>	On request, M16 cable gland 7-11mm / Terminals
<b>Kit daisy-chain LAN</b>	On request, RJ45 panel mount
<b>Kit daisy-chain FO</b>	On request, M20 cable gland 6-13mm / ST connectors
<b>Kit GPS</b>	On request, connector and GPS antenna with 5 m cable for time synchronization

## LAN cables

<b>Fiber Optic type</b>	Multimode OM2 fiber with wavelength 1300 nm, 50/125 µm, Rx/Tx
<b>Ethernet Copper type</b>	Cat 5e, <100m

## Relays kit

<b>Configuration</b>	3 output configurable relays, No/Nc
<b>Current</b>	2 A, 30 V DC

## Acceleration sensor

<b>Principle</b>	Micro-machined capacity MEMS accelerometer
<b>Hysteresis</b>	None
<b>Noise (10 to 1000 Hz)</b>	Typ. 7 µg/√Hz
<b>Frequency range</b>	DC to 600 Hz
<b>Dynamic range</b>	Typ. 100 dB @ 200 sps
<b>Measuring range</b>	±4 g
<b>Sensitivity</b>	1.25 V/g differential
<b>Scale factor error</b>	< 1 %
<b>Mounting</b>	Horizontal, vertical or ceiling (horizontally mounted on the ceiling), to be specified when ordering
<b>Self test</b>	Test-pulse, configurable

## Housing

<b>Dimensions</b>	330 x 230 x 110 mm
<b>Weight</b>	9.5 Kg
<b>Protection degree</b>	IP67, temporary static immersion in water

## Environmental

<b>Shock</b>	30 g/11 ms half-sine
<b>Heat</b>	-20 °C to +50°C
<b>Humidity</b>	up to 100% RH

## Regulations

<b>EMC</b>	IEC 61326-1
<b>Electrical safety</b>	IEC 61010
<b>Conformity</b>	CE
<b>Origin</b>	Swiss Made

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## Other applications

- Strong-motion monitoring
- Tunnels
- Bridges
- Airports
- Big structures (stadiums, towers, ...)
- Historical monuments
- Malls

## Syscom Cloud Software (SCS)

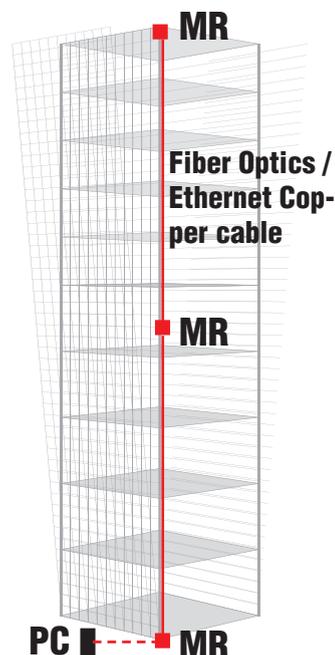
The MR3000SB can be connected to the Syscom Cloud Software (SCS) in order to simply visualize the data recorded and manage different projects.

The main features of the SCS include:

- plug & play M2M communications
- management by projects
- different access levels (administrator, read/write, view only)
- visualization of events/background monitoring
- comparison with reference standards
- automatic reporting

Please visit [scs.bartec-syscom.com](http://scs.bartec-syscom.com) for more information.

**SCS**  
[scs.bartec-syscom.com](http://scs.bartec-syscom.com)



## Building typical instrumentation

MR: MR3000SB

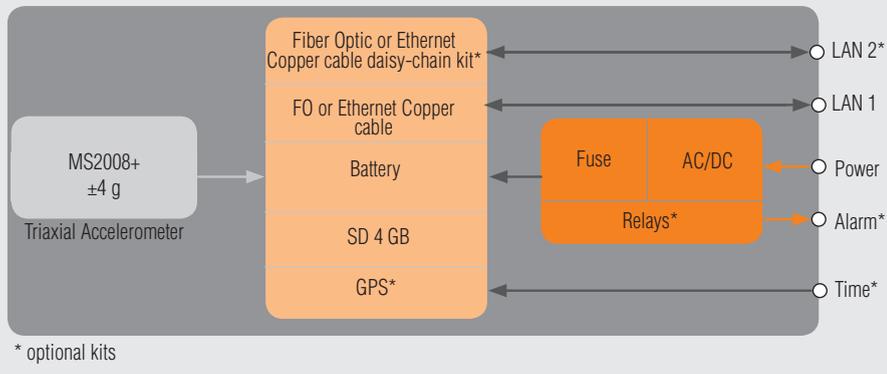
PC: Personal computer or switch with internet access.

## Minimal recommended building instrumentation

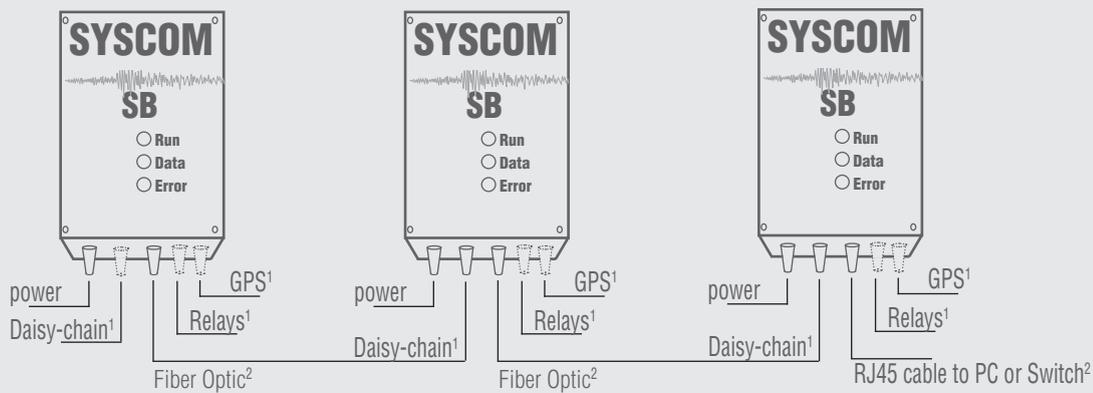
- 1 MR3000SB at the building top-floor
- 1 MR3000SB at the building mid-floor
- 1 MR3000SB at the building basement
- All instrumentation connected through Fiber Optics or Ethernet Copper cable in a daisy-chain network.
- MR3000SB recorder can operate as a stand-alone system if needed.

Contact SYSCOM Instruments SA for a complete review of your installation.

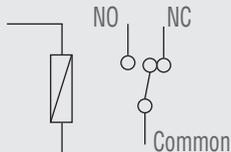
## Block diagramm MR3000SB



## Wiring diagram



### Relays¹



Fiber Optic 1300 nm, 50/125 µm, Rx/Tx, OM2  
 Ethernet Cat 5e, <100m  
 Relays¹ 3 alarm relays  
 Power 100-240 V AC 50-60 Hz

¹ kit on request

² Fiber Optic or Ethernet Copper cables

## Ordering information

MR3000SB main unit with internal triaxial accelerometer containing: internal battery, internal AC/DC converter, 4 GB Memory, Embedded server for configuration and control with master/slave settings for Ethernet network	Part Number	Fiber Optic configuration	RJ45 Copper configuration	Horizontal mounted	Vertical mounted	Ceiling mounted
MR3000SB ±4g, horizontal mounted, AC 100-240 V AC, 1 LAN and 1 fiber optic	MR3000SB-2008I-H4-LF-AC-X-X	x	x	x		
MR3000SB ±4g, vertical mounted, AC 100-240 V AC, 1 LAN and 1 fiber optic	MR3000SB-2008I-V4-LF-AC-X-X	x	x		x	
MR3000SB ±4g, ceiling mounted, AC 100-240 V AC, 1 LAN and 1 fiber optic	MR3000SB-2008I-C4-LF-AC-X-X	x	x			x
MR3000SB ±4g, horizontal mounted, DC 10-36 V DC, 1 LAN and 1 fiber optic	MR3000SB-2008I-H4-LF-DC-X-X	x	x			
MR3000SB ±4g, horizontal mounted, AC 100-240 V AC, 1 LAN	MR3000SB-2008I-H4-L-AC-X-X		x	x		
MR3000SB ±4g, horizontal mounted, AC 100-240 V AC, 1 fiber optic	MR3000SB-2008I-H4-F-AC-X-X	x		x		
MR3000SB ±4g, horizontal mounted, AC 100-240 V AC, 2 LAN, 3 relays	MR3000SB-2008I-H4-LL-AC-R-X		2 LAN	x		
MR3000SB ±4g, vertical mounted, AC 100-240 V AC, 2 FO, GPS compatibility*	MR3000SB-2008I-V4-FF-AC-X-G	2 FO			x	
MR3000SB ±4g, horizontal mounted, AC 100-240 V AC, 2 FO, 3 relays, GPS compatibility*	MR3000SB-2008I-H4-FF-AC-R-G	2 FO		x		
KIT GPS for one MR3000SB (5m cable, connectors, GPS)	12110201					
MRs network Master/Slave firmware option**	88010003					
Mounting platform in PE-HD black with mounting screws and bolts	13000048					
IP66 plug for KIT LAN with X meter cable. Please specify length in -X meters, in standard 3m.*	81000585-X					

\*To be ordered at the time of purchase

\*\*Master MR to be specified at purchase time, 1 MR master per network