Solutions

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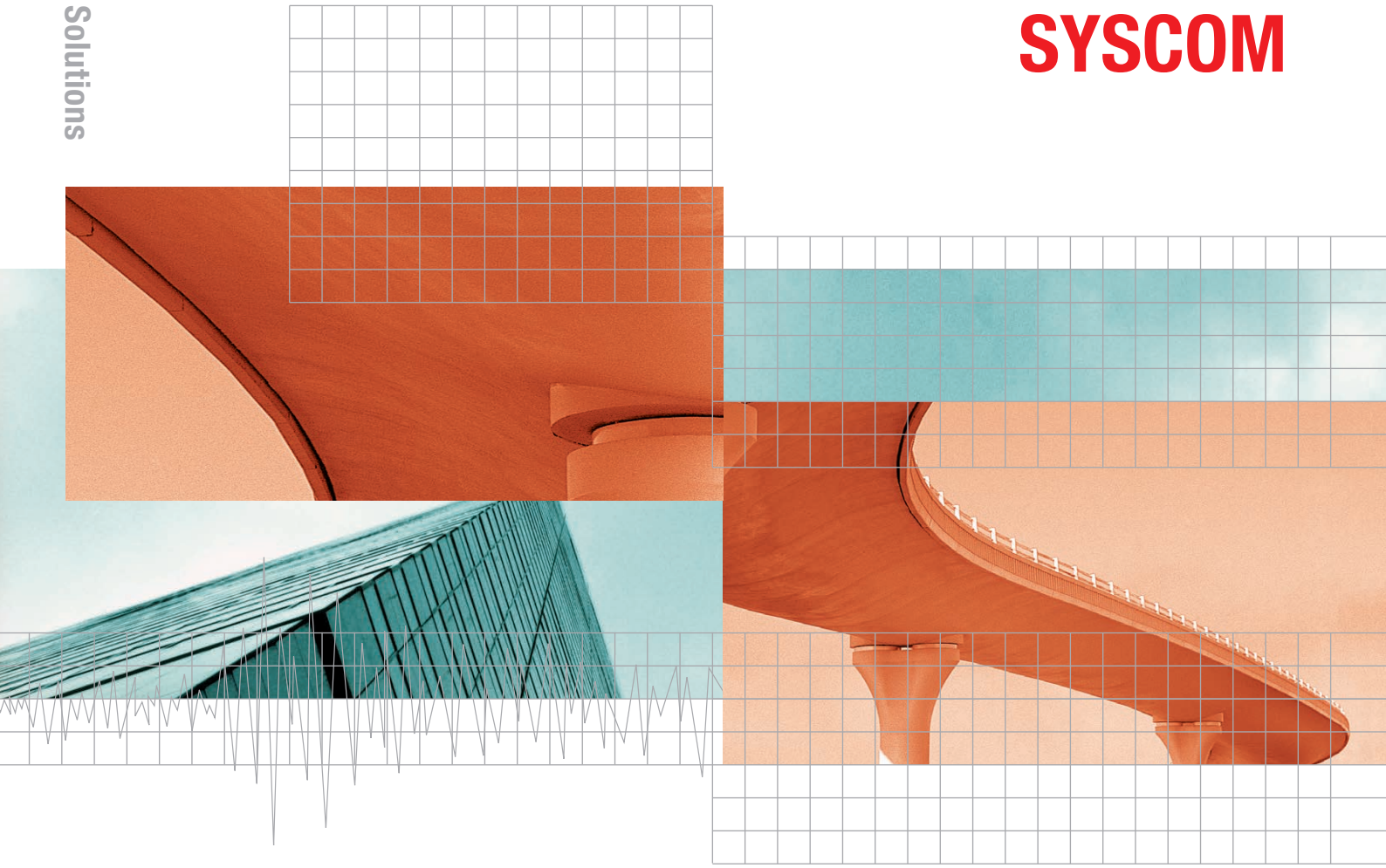

MR2002-BMS
Seismic Building Monitoring System

The MR2002-BMS Seismic Building Monitoring System provides a complete earthquake monitoring network. Typical installations include a daisy-chain network of, two, three or more stations: top, (midfloor) and foundation of the building. Larger networks up to 8 stations utilize Syscom's MR2002 accelerographs with an 'NCC in a box' Network Controller.

- High reliability, minimal maintenance system
- Easy installation using low cost cable
- Remote control and data retrieval via modem or internet options
- Automatic event alerting and self-test
- Internal triaxial MEMS accelerometer
- True acceleration data without corrections
- Digital interconnection minimizes noise
- Common timing and common triggering
- VIEW2002 comprehensive analysis software

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A Pleasure to Measure.

Solutions

Technical Specification

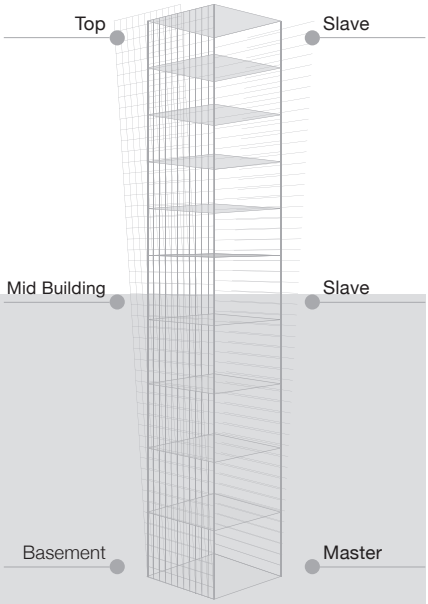
Seismic Building Monitoring System MR2002-BMS

MS 2002+ Triaxial Accelerometer (mounted inside MR2002-BMS)

Principle	MEMS capacitive accelerometer
Dynamic range (RMS)	> 84 dB (0 to 50 Hz)
Frequency response	linear 0 to 150 Hz (accuracy ±1%)
Cross-axis sensitivity	0.030 V/g
Non-linearity	< 0.5% of full scale
Hysteresis	none
Shock survival	6000 g (0.5 ms half sine)
Vibration survival	20 g RMS (random noise 20-500 Hz, 30 minutes)
Offset (at 0 g)	2.5 V
Noise	typical 10 µV/√Hz
Measuring range	±1 g, ±2 g, ±5 g
Temperature sensitivity	< 400 ppm/°C
Current consumption	typical 6 mA @ 5V, 4 mA @ -5V

Data Acquistition

Principle	Linear track & hold A/D-Converter, analog filtering
Resolution	16 bit
Number of channels	3 (X, Y, Z) data channels
Sampling-rate	200 samples per second per channel
Dynamic range	96 dB (RMS)
Analog Filters	6 Pole Butterworth low-pass, -3 dB @ 50 Hz 120 dB/decade (anti-alias filter) 0.5 - 15 Hz band-pass-pass (trigger filter)
Recording Trigger	
Principle	Level trigger
Channels	X, Y or Z axis, software- or external trigger, logical AND or OR combinations
Range	0.1% to 50% full scale



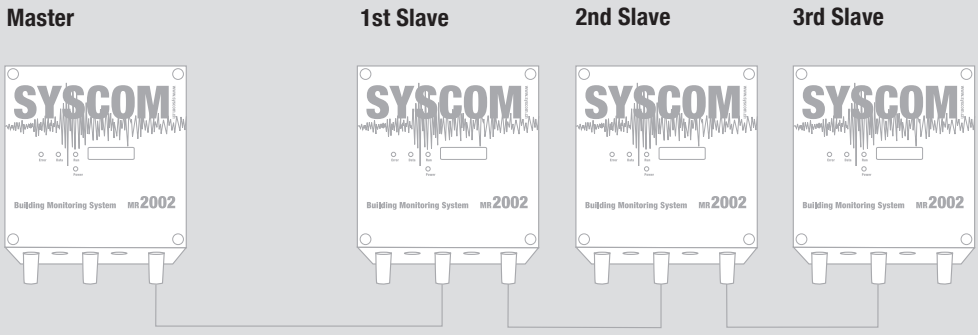
Recording

Principle	Triggered recording of waveform with online data compression
Header	Contains status information at time of trigger
Pre-event recording	1 - 30 seconds (in 1 second steps)
Post-event recording	1 - 90 seconds (in 1 second steps)
Maximum recording time	Event recording: unlimited, split into files of 1-255 seconds length
Storage media	2 MBytes SRAM with backup battery
Organization	Selectable flat (stop when full) or ring-buffer (new recordings overwrite oldest)
Recording capacity	Approximately 72 minutes of event data at 200 sps/channel

Alarms

Principle	Peak Ground Acceleration: PGA alarm: threshold trigger with unlimited (DC- 50 Hz) or band-pass filtered (0.5 – 15 Hz) signal. 2 levels individually settable for each axis Seismic Intensity Alarm: CAV (Cumulative Absolute Velocity) based alarm threshold
Channels	OR combination of the 3 axis
Range	0.1 % to 100% full scale

Up to 4 MRs, Daisy Chain Network



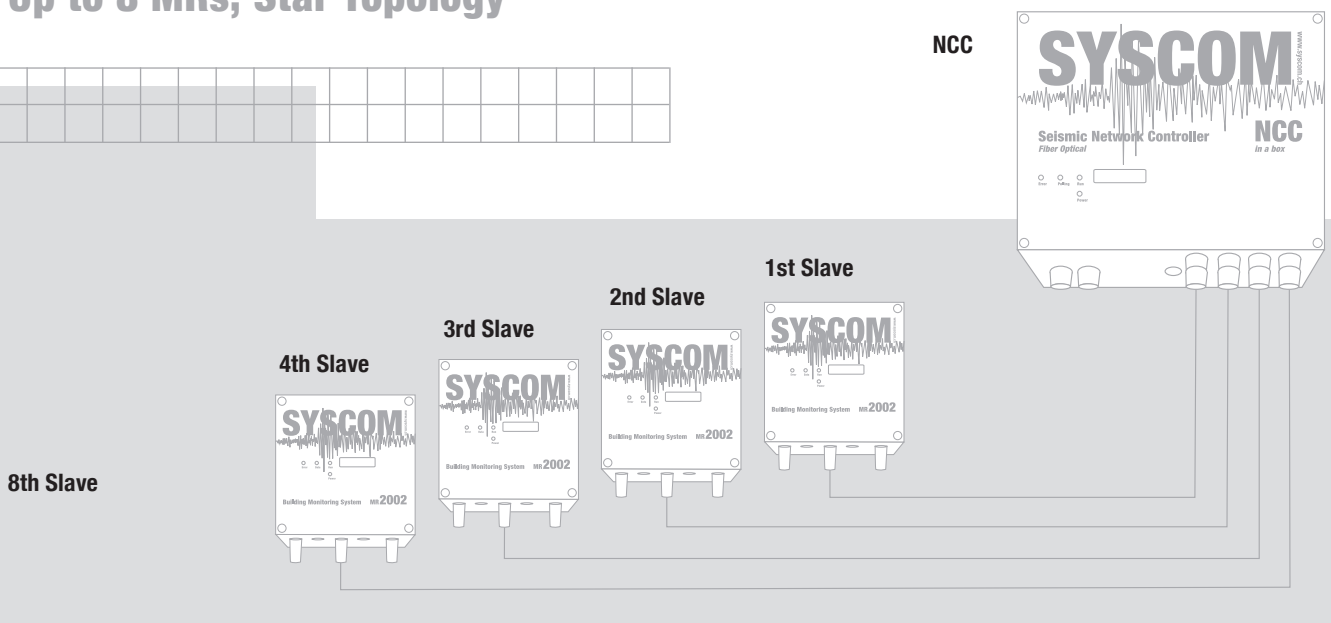
User Interface

4 LEDs	Power supply Run/Self-test Recording/Memory use Warning/Error
LC-Display	Status information, Peak values of the last event, Important settings, Time and synchronization information
Firmware	Multitasking environment, simultaneous data acquisition and communication (data download or parameter setting)
Communication interface	RS-232 up to 115200 Baud, with full handshake
Parameter setting:	Packetized protocol with check-sum and three level password
- File transfer	XMODEM/YMODEM 1K
- Firmware upgrade	Download via RS-232
- Intelligent alerting	Optional, Modem dial-up or send SMS message (optional)
Auto diagnostics	Continuous monitoring of all important functions Fully comprehensive self-test
PC-Software	WINCOM software for setup, on-line monitoring, data retrieval, self-test, editing and analysis/ASCII file conversion Software
Communication	directly to the RS-232 port via modem or cellular link (GSM) via Internet/LAN

Timing

Accuracy	- Internal clock 20 ppm (10 min/year) with > 5 years autonomy (backup battery) - GPS (optional)

Up to 8 MRs, Star Topology



Power

Internal	Lead-acid gel cell 7 Ah (internal charger)
External	9-36 V DC, external AC/DC converter 90-240 VAC, 50/60 Hz, including power cord
Power consumption	approximately 100 mA @ 12 V
Autonomy	approximately 48 hours with internal battery

Connectivity

RS-232 Port	Internal service port (Sub-D 9P) for configuration & data retrieval, 3m cable included
Alarm Relays	3 x AC 230 V/3A switching relays for status output (user selectable), Internal pluggable terminal block
Interconnection	RS-422 - daisy-chain connection set (optional) Internal removable terminal blocks – wire to board plug connection

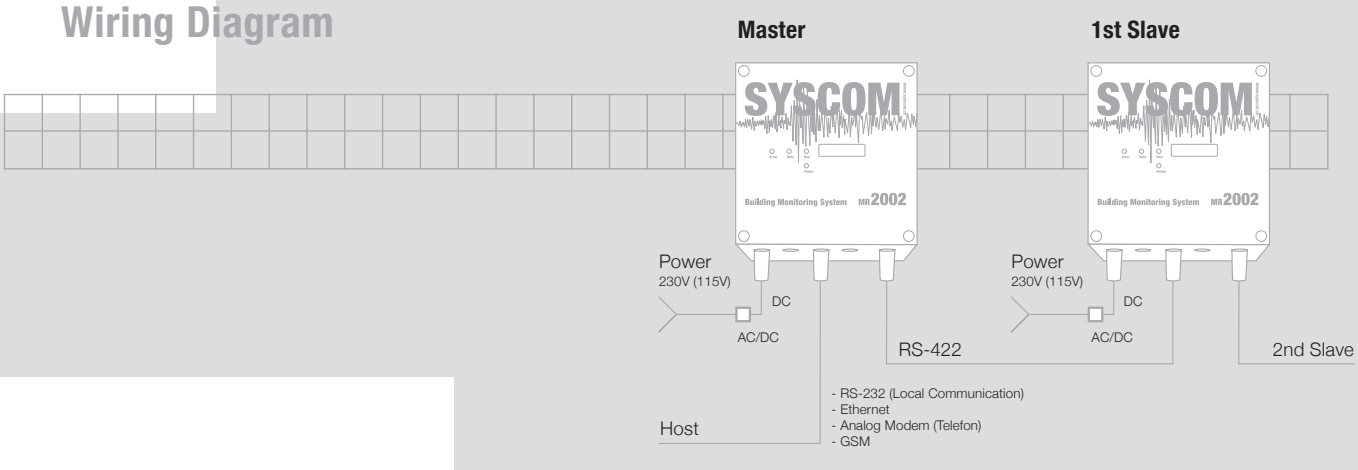
Dimensions

Housing	Stainless steel, 267 x 255 x 131 mm (10.51 x 10.04 x 5.16 inches)
Weight	Standard: 7 kg (15.4 lbs)
Protection degree	IP 67 (brief immersion)

Compliance with Standards

Electrical Security	Compliance with EN 61010
RMI/RFI	Compliance with EN 50 081 and EN 50 082
Environmental Conformity	Compliance with IEC 68-2 shock: 30 g/11 ms half-sine Operating temperature range: -20° up to +50°C Humidity: up to 100% relative h Vibration: up to 5 g (operating)

Wiring Diagram



MR2002-BMS-e/74700081/05.2005

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