**GeoSIG**
swiss made to measure

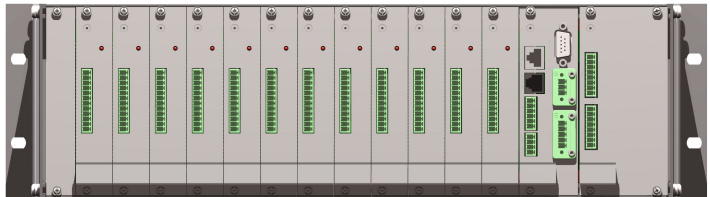# CR-6^{plus} Multichannel Central Recording System

Features

- ❏ **Unlimited number of channels by combining modular (12 x 3) 36 channel modules**
- ❏ **137 dB dynamic range**
- ❏ **Individual 24-bit $\Delta-\Sigma$ ADC per channel**
- ❏ **Up to 500 sps adjustable sampling rate**
- ❏ **Recording on microSD cards**
- ❏ **USB interface for external storage and communication devices**
- ❏ **Continuous and trigger based recording**
- ❏ **Simultaneous data streaming to several clients**
- ❏ **Wired Ethernet, optional enhanced connectivity via external landline modems, 3G cellular devices, satellite links and serial links**
- ❏ **TCXO time base with GPS or NTP synchronisation**
- ❏ **Configuration and status monitoring via Web Interface compatible with Smartphones/Tablets**
- ❏ **Simple and secure communication over internet or intranet with full remote management**
- ❏ **Optionally available as drop-in replacement for CR-4 Digitiser**
- ❏ **Connection of sensor cables on terminals**
- ❏ **Optional alarm output with up to 4 independent relays flexibly configurable for different types of events**
- ❏ **Extremely compact and modular**

Applications

- ❏ **Structural Health and Response Monitoring**
- ❏ **Earthquake and Seismic Monitoring**
- ❏ **Ambient Vibration Testing**
- ❏ **Induced Vibration Monitoring and Notification**
- ❏ **Building Code Compliant Instrumentation**
- ❏ **Seismic Alarm and Safe Shutdown**
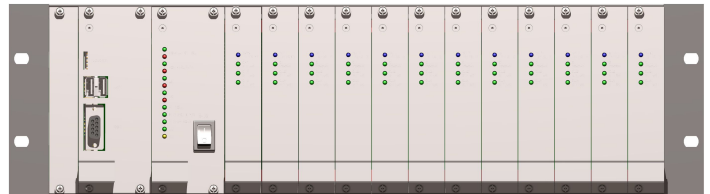
Front View

Rear View

Outline

CR-6plus is a modern multichannel central monitoring and recording system including a high performance data handling module, providing an extremely flexible 24 Bit multichannel recorder.

Its design is based on years of experience in creating solutions for earthquake, seismic, structural, dynamic and static monitoring.

Its modular architecture and industry standard interfaces offer high versatility, easy expansion, upgradeability, and long term availability of spare parts.

Connection of the sensor cables is extremely easy and fast with the versatile cable screw terminal design. All inputs and outputs of the CR-6plus are protected with a field proven over voltage protection (OVP) system.

Data from acceleration, velocity, displacement, strain, meteorological or any other type of sensors can be monitored and recorded with superior data quality.

The CR-6plus continuously monitors the real-time data, which can be recorded based on event detection and continuously. The continuous ring buffer size, the pre-event and post-event time, trigger thresholds and many other parameters are fully user configurable.

In addition to the real-time display of the measured data from each channel the system can provide statistical data such as mean, max, min, and peak values.

CR-6plus can optionally compare the monitored data to four fully independent alarm trigger criteria and provide relay outputs.

GeoDAS, a proven data acquisition and evaluation package developed by GeoSIG, complements CR-6plus providing a highly flexible user-friendly capabilities, and graphical, analytical and reporting tools with automation.

ISO 9001 REGISTERED FIRM

Overview

CR-6plus is a 19'' rack module consisting of Slot-in Modules (SiMs) inserted into vertical slots.

Each CR-6plus rack is expandable up to 36 channels and by combining several CR-6plus systems, hundreds of channels can be monitored.

System parameters of the CR-6plus are stored in the non-volatile system memory to allow automatic recovery.

Sensors

The CR-6plus offers the most flexible sensor connectivity options to cater for the needs of any measuring requirement. Any type of sensor complying with the CR-6plus signal input specifications can be connected on the conveniently available screw terminals.

CR-6plus Rack

Configuration:	Base SiM modules:
	- CR-6-SBC data handling SiM
	  ARM Cortex A8, 800 MHz
	  128 MB Flash, 128 MB RAM
	- CR-6-OVPB over voltage protection SiM
	- CR-6-WDB system watchdog SiM
	Channel SiM modules:
	- CR-6-DS digitiser SiM
	- CR-6-OVPS sensor interface SiM

Channels:	up to 36 channels

Digitiser SiM

Configuration:	CR-6-DS Mounted at the front of the CR-6plus Rack up to 12 SiMs per one Rack
Channels:	3 channels per SiM
A/D Converter:	24 Bit $\Delta-\Sigma$ per channel with analog and digital FIR anti-aliasing filters
Dynamic range:	146 dB (per bin @ 1 Hz rel. full scale rms) 137 dB @ 50 sps
Sampling Rate:	Up to 500 SPS
Bandwidth:	40% of Sampling Rate

Sensor Interface SiM

Configuration:	CR-6-OVPS Mounted at the back of the CR-6plus Rack up to 12 SiMs per one Rack
Channels:	3 channels per SiM
Input Signal:	10 VDC differential 2.5 VDC ± 2.5 VDC single ended 0 - 20 mA current loop
Sensor Power:	12, ±12 or 24 VDC

Data Recording

Type:	Continuous and/or event based

Triggering

Type	Level or STA/LTA trigger
Pre-event-Time:	1 to 720 seconds, typical
Post-event-Time:	1 to 7200 seconds, typical
Trigger filtering:	User configurable lowpass, highpass or bandpass

Data Stream

Protocol:	GSBU, SeedLink (Earthworm compatible)

Storage Memory

Size and Type:	8 GByte removable microSD Card, Higher capacity available on request Large USB storage available on request FAT32 or EXT4 formatted
Management:	Intelligent management of memory card capacity using policies as per file type and ring buffer capacity specification.
Recording format:	miniSEED, optionally with extended information encapsulated into blockette 2000.

Power

DC Power:	12 VDC
AC Power:	Available on request, AC/DC adaptor with 230 VAC / 50 Hz or 115 VAC / 60 Hz.
Consumption:	typically 15 W with 36 channels excluding the consumption of the connected sensors
Solar Panels:	Available on request.
External battery:	Available on request, 24 to 100 Ah with battery protection in case of low battery condition with automatic restart after power is restored.

Self-Test

User-configurable periodical sensor test and periodical state of health (SOH) report based on comprehensive test of instrument, which can be requested at any time.

Time Base

Internal:	Intelligent Adaptive Real Time Clock (IARTC)
External:	NTP or GPS
Std. TCXO accuracy:	±0.5 ppm (15 s/year) @ +25 °C ±2.5 ppm (75 s/year) @ -10 to +50 °C Higher accuracy available on request
Accuracy after learn:	< ± 0.5 ppm (15 s/year or 2 ms/h)
Accuracy with NTP:	< ± 4 ms typical, assuming reasonable access to NTP servers

Communication Channel

Standard:	Ethernet TCP/IP
Optional:	Internal landline modem External GSM modem External Satellite modem External GPRS modem External UMTS/3G modem

User Interface

An intuitive web interface is available for easy configuration with any web browser. Alternatively the configuration file in XML format can be edited on site through the instrument console, exchanged by replacing the memory card, remotely from a server or through SSH. Even if the configuration file can be manually edited at any time, a tool is provided to edit it securely.

Network based link allows the user optionally to interact with the unit over the Internet, from anywhere around the world.

Alarm (Optional SiM)

Alarms:	4 independent relay contacts for trigger alarm and/or error (NO and NC contacts available)
Relay Hold-On:	1 to 60 seconds (User programmable)
Contacts:	Suitable for a low voltage control. In case large loads must be switched then external relays should be implemented.
Max voltage:	125 V / 250 mA

Environment / Housing

Operational temperature:	-20 °C to +70 °C
Storage temperature:	-40 °C to +85 °C
Humidity:	0 % to 100 % (non condensing)
Rack Dimensions:	19'' rack, 3 HU, 350 mm depth
Housing:	Various fixed or portable housings available on request
Protection:	Housings with variable protection available on request