

# CANTERBURY SEISMIC

INSTRUMENTS

## CUSP-3 Series Strong Motion Accelerographs

### Applications

- Free-field networks
- Dense arrays
- Aftershock studies
- Strong motion monitoring
- Structural monitoring
- Construction monitoring

### Features

- Intuitive yet powerful user interface
- Up to 3 triaxial sensors up to 500m apart
- High performance triggering and recording
- Large storage capacity
- Flexible communications
- Highly Internet integrated
- Low operation and deployment costs



# CUSP-3 Specifications

Sensors																											
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800Hz	400Hz (post Σ-Δ decimation)																										
16-bit S-A A/D	24-bit Σ-Δ A/D																										
Data Signal Processing																											
Filtering	FIR digital anti-alias filter/decimator Linear phase																										
Measurement Bandwidth	40 or 80Hz																										
Recorded dynamic range	108dB (80 Hz BW) 108dB (50 Hz BW)																										
Processor																											
Type	Low power x86 or ARM9 based																										
OS	Multi-tasking real-time Linux based																										
Timing																											
Type	Low power GPS (standard) NTP network timing Backup real-time clock																										
Accuracy	Better than 400us of UTC with GPS lock 10ms NTP timing (typical) 50ppm with backup real-time clock (NB this is not the sampling time-base)																										
Communications																											
Type	SSL-HTTP web server, FTP, Telnet, SSH, SFTP, RSYNC Email/FTP/SFTP transfer-on-event LAN, Dial-up server and client, Serial link, Cellular modem, WiFi																										
Protocol	TCP-IP, PPP																										
Data integrity	Password control to access instrument configuration and data areas with multiple data and administrator accounts SSL/SSH encryption																										
Features	Remote configuration of all parameters including IP number, Instrument setting, Power management etc Data retrieval Diagnostics																										
Triggering																											
Type	STA/LTA <AND> or <OR> absolute level detection Remote manual trigger from web interface Remote trigger transmission/reception to/from multiple array management systems (e.g. CUSP-HUB systems) Remote trigger transmission/reception to/from one other CUSP-3 series or CUSP-M instrument for, e.g., structural monitoring																										
Pre-trigger filter options	<table border="1"> <tbody> <tr> <td>0.1 Hz high-pass</td> <td>0.1 – 5 Hz band-pass</td> </tr> <tr> <td>1 Hz high-pass</td> <td>0.1 – 10 Hz band-pass</td> </tr> <tr> <td>5 Hz low-pass</td> <td>1 – 5 Hz band-pass</td> </tr> <tr> <td>10 Hz low-pass</td> <td>1 – 10 Hz band-pass</td> </tr> </tbody> </table>	0.1 Hz high-pass	0.1 – 5 Hz band-pass	1 Hz high-pass	0.1 – 10 Hz band-pass	5 Hz low-pass	1 – 5 Hz band-pass	10 Hz low-pass	1 – 10 Hz band-pass																		
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STA/LTA	Independent trigger and dettrigger thresholds on each channel Selectable <AND> or <OR> triggering on each channel Thresholds adjustable from 1.1:1 to 200:1 LTA lock-on-trigger for 5–60 seconds 0.3 to 500 s term lengths																										
Absolute level	Independent thresholds on each channel Selectable <AND> or <OR> triggering on each channel Level from 0.1mg to 3 g in 0.1mg steps																										
Pre-event length	10 to 120 seconds in 1-second steps																										
Post even length	10 to 120 seconds in 1-second steps																										
Storage																											
Type	Wear-leveling FLASH disk Unique record file names indicating time and instrument, PGA, and trigger duration																										
Storage time	> 3 days @ 200 samples/s (1GB card) > 16 days @ 200 samples/s (4GB card) No upper limit – depends of FLASH disc size																										
Power																											
Supply voltage	10.5 – 18.0V DC																										
Power consumption	6 W typical 10W max, 2.5W max for low power variant																										
Supply monitoring	User adjustable low voltage shut-down and auto re-power on resumption of power																										
User Interface																											
Type	Web browser based Fully interactive Platform independent Linux/Windows/Mac Can be configured / interrogated remotely from any Internet connected PC Secure SSL-encrypted Apache web server																										
Sensor Options																											
Sensors	Up to two external sensors Acceleration, wind or displacement options																										
Environmental / Casing																											
Protection	IP67 waterproof case																										
Temperature range	-10 – +50°C standard																										
Humidity	0 to 100% (non condensing)																										
Mounting	Three feet and a central lock-down bolt																										
Contact Details																											
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Due to continuous product development, CSI reserves the right to change these and any specifications at any time without notice.