

SC22 Bridge Signal Conditioner with Gain and Filtering

Adds bridge signal conditioning with gain to ADC modules

SC22

Features

- Two-channel-per-card packaging for maximum versatility
- Up to 16 SC22 Conditioners can be inserted in a V720 Active Termination Panel
- Used with the V213 or other ADC modules
- Accommodates 1, 2, or 4 active bridge arms
- Programmable gain from 1 to 2000
- Programmable 4-pole active filters with cutoff frequencies of 10, 50 and 500 Hz
- Programmable shunt calibration and bridge balance
- Programmable excitation from 0 to 10 V in 4.88 mv steps
- Excitation regulation and sensing per channel for maximum stability
- 10-wire transducer hookups can be accommodated
- Optional trifilar-wound transformer for excellent high-frequency CMRR
- Optional sample/hold amplifier per channel supports simultaneous sampling.

Typical Applications

- Acoustic and vibration measurements
- Rocket motor tests
- Automotive testing
- Tests using bridge-type sensors

General Description

Specifications contained within this data sheet are subject to change without notice.

The SC22 is a two-channel bridge signal conditioner with programmable gain and filtering. It is packaged in a 3U (5.25") high, 220 mm (8.7") deep module. It accommodates transducers that represent 1, 2 or 4 active arms of a bridge circuit. Up to 16 SC22 modules (32 channels) can be installed in a single V720 termination panel. Therefore, a V213 module can be used with a single chassis of SC22 bridge conditioners. Strain gages, RTDs and other bridge-type sensors can be accommodated.

Each SC22 channel includes programmable gain from 1 to 2000 with prefilter gains of 1, 10, 100 and 1000 as well as post filter gains of 1, 2, 5 and 10. Each channel also includes a programmable Butterworth filter with cutoff frequencies of 10, 50 and 500 Hz. Each filter can also be bypassed. End-to-end channel calibration is accomplished by software configuring the input multiplexer on an SC22 channel to receive a reference voltage from an SC15 Serial Controller or SC72 Ethernet Controller via the V720 backplane. Note that an SC15-AB11 or SC72-ZA11 Controller with Calibrator is required.

Sockets are provided for on-board bridge completion. High-precision 120 Ω , 350 Ω and 1000 Ω resistors are available for completion. Shunt calibration is activated under program control. Shunt calibration resistors can be plugged into the module to accommodate various bridge requirements. Bridge excitation is programmable from 0 to 10 V in 4.88 mv steps via a 12-bit DAC. The bridge excitation is non-isolated and balanced to ground (e.g., 10 V excitation is supplied to the legs of the bridge as +5 V and -5 V with respect to ground). Each SC22 channel contains a regulator for excitation, and individual remote sensing is provided for high excitation stability. The SC22 can be configured with an optional sample/hold amplifier per channel that supports simultaneous sampling.

For applications that exhibit high electrical noise an option is available that includes a trifilar-wound input transformer. This transformer provides excellent high-frequency common-mode rejection.

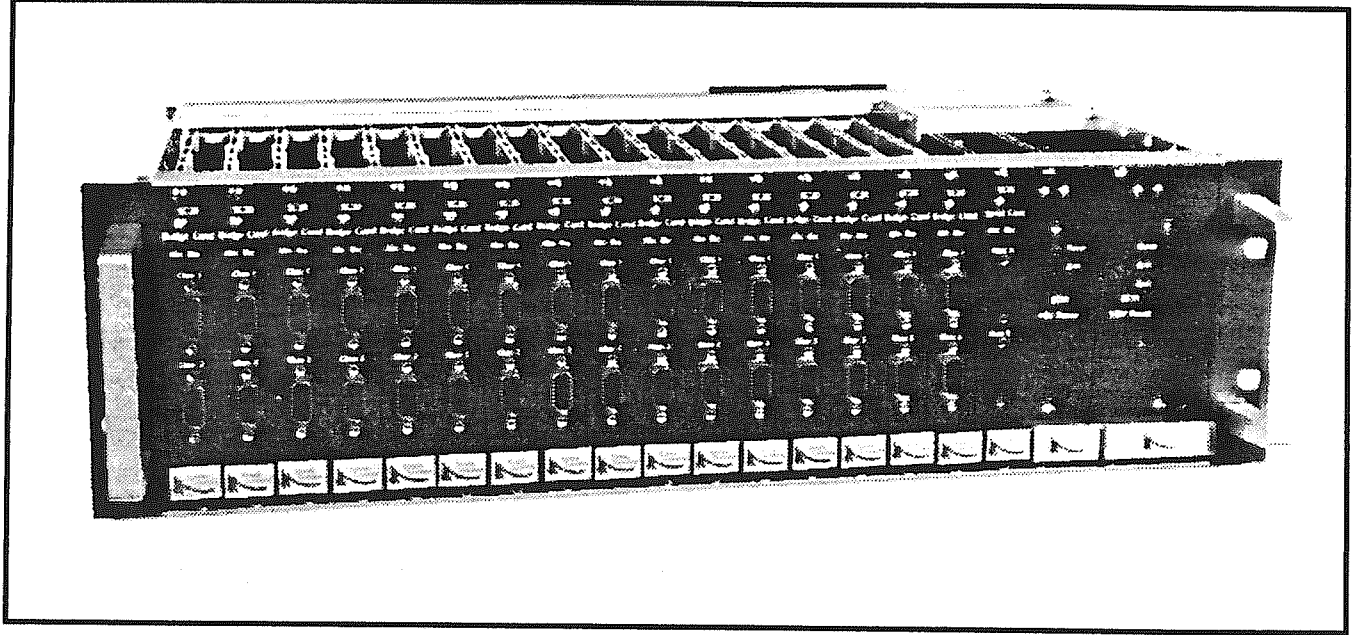
SC22 Bridge Signal Conditioner (Continued)

Connections are available to provide a full 10-wire bridge hookup. Each of the bridge channels is connected via a 15-contact "D" connector on the associated SC22 front panel. Setup and control of the SC22 are accomplished via a standard serial port on the SC15 Serial Controller module, or via an Ethernet connection with the SC72 Controller.

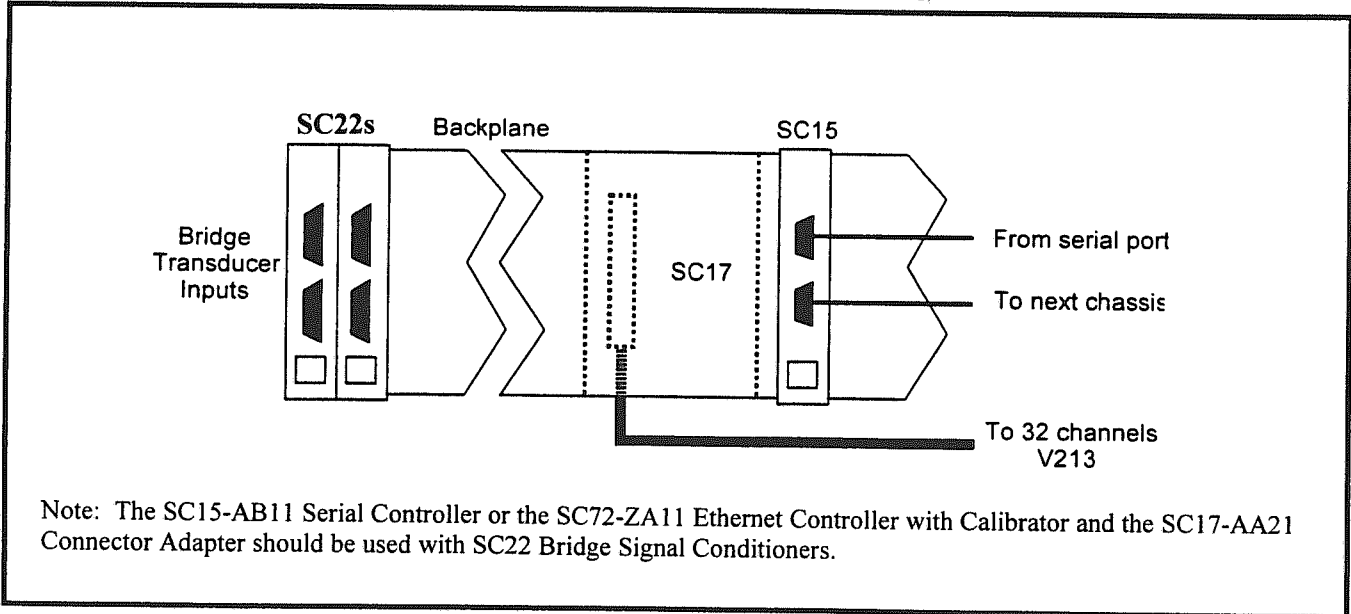
Specifications

Item	Specification																								
Inputs																									
Number of channels	2																								
Filter 3 dB Cutoff Frequency Selection	10, 50, 500 Hz and Bypass																								
Excitation	Independent excitation for each channel. Each channel provides \pm excitation and sense leads. Excitation voltages of 0 to 10 V are available in 4.88 mv steps. Open sense lines or an over-current condition will shut down the supply automatically and signal the error condition. Excitation calibration is also provided.																								
Line regulation	0.003 %V																								
Load regulation	.0025 V/mA																								
Temperature Coefficient	2 ppm/°C																								
Bridge Completion	Two channels of bridge completion are provided $\frac{1}{4}$ -, $\frac{1}{2}$ - and full-bridge configurations are supported. The completion resistors plug into the SC22 PC card. 120, 350 and 1000 ohm resistor kits are available.																								
Shunt Calibration	\pm shunt calibration is performed on each channel. The customer-supplied resistors are installed on the SC22 PC card. Switching is performed under software control.																								
Gain Selection	Prefilter gain: 1, 10, 100, 1000; postfilter gain: 1, 2, 5, 10; Maximum overall gain: 2000																								
Gain/Offset Accuracy SC22 Signal conditioner only, <ul style="list-style-type: none"> Referred to input (RTI) after automatic calibration, using an HP 3458A DVM to read SC22 output. 	<table border="1"> <thead> <tr> <th>Gain</th> <th>Accuracy</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>$\pm(1.2 \text{ mV} + 0.025\% \text{ of reading})$</td> </tr> <tr> <td>2</td> <td>$\pm(600 \text{ } \mu\text{V} + 0.025\% \text{ of reading})$</td> </tr> <tr> <td>5</td> <td>$\pm(250 \text{ } \mu\text{V} + 0.025\% \text{ of reading})$</td> </tr> <tr> <td>10</td> <td>$\pm(120 \text{ } \mu\text{V} + 0.025\% \text{ of reading})$</td> </tr> <tr> <td>20</td> <td>$\pm(60 \text{ } \mu\text{V} + 0.025\% \text{ of reading})$</td> </tr> <tr> <td>50</td> <td>$\pm(25 \text{ } \mu\text{V} + 0.025\% \text{ of reading})$</td> </tr> <tr> <td>100</td> <td>$\pm(13 \text{ } \mu\text{V} + 0.025\% \text{ of reading})$</td> </tr> <tr> <td>200</td> <td>$\pm(8 \text{ } \mu\text{V} + 0.025\% \text{ of reading})$</td> </tr> <tr> <td>500</td> <td>$\pm(5 \text{ } \mu\text{V} + 0.035\% \text{ of reading})$</td> </tr> <tr> <td>1000</td> <td>$\pm(5 \text{ } \mu\text{V} + 0.045\% \text{ of reading})$</td> </tr> <tr> <td>2000</td> <td>$\pm(5 \text{ } \mu\text{V} + 0.065\% \text{ of reading})$</td> </tr> </tbody> </table>	Gain	Accuracy	1	$\pm(1.2 \text{ mV} + 0.025\% \text{ of reading})$	2	$\pm(600 \text{ } \mu\text{V} + 0.025\% \text{ of reading})$	5	$\pm(250 \text{ } \mu\text{V} + 0.025\% \text{ of reading})$	10	$\pm(120 \text{ } \mu\text{V} + 0.025\% \text{ of reading})$	20	$\pm(60 \text{ } \mu\text{V} + 0.025\% \text{ of reading})$	50	$\pm(25 \text{ } \mu\text{V} + 0.025\% \text{ of reading})$	100	$\pm(13 \text{ } \mu\text{V} + 0.025\% \text{ of reading})$	200	$\pm(8 \text{ } \mu\text{V} + 0.025\% \text{ of reading})$	500	$\pm(5 \text{ } \mu\text{V} + 0.035\% \text{ of reading})$	1000	$\pm(5 \text{ } \mu\text{V} + 0.045\% \text{ of reading})$	2000	$\pm(5 \text{ } \mu\text{V} + 0.065\% \text{ of reading})$
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Gain Stability	20 ppm/°C																								
Offset Voltage Stability, RTI	4 $\mu\text{V}/^\circ\text{C}$ gain ≥ 1000																								
CMRR	-80 dB minimum, optional trifilar-wound inputs provide excellent RF rejection to 100 MHz																								
Bridge Balance	A 12-bit DAC provides the ability to remove bridge offsets of up to ± 70 mV with a 350 ohm bridge																								
Input Connector Type	15-contact DSUB socket-type connector (3-row type with the same shell size as a DE9S connector)																								

V720 Active Termination Panel (shown with 16 bridge conditioning modules)



Connections Between A V720 Termination Panel and a V213 ADC



Ordering Information

Model SC22-AA11	Bridge Signal Conditioner with Gain, Filtering and Trifilar Transformers
Model SC22-AB11	Bridge Signal Conditioner with Gain and Filtering
Model SC22-AC11	Bridge Signal Conditioner with Gain, Filtering, Trifilar Transformers and Simultaneous Sampling
Model SC22-AD11	Bridge Signal Conditioner with Gain, Filtering and Simultaneous Sampling
Model SC20-0002	120 Ohm Bridge Completion Resistor Kit (Three resistors per kit)
Model SC20-0003	350 Ohm Bridge Completion Resistor Kit (Three resistors per kit)
Model SC20-0004	1000 Ohm Bridge Completion Resistor Kit (Three resistors per kit)

Related Products

Model V720-AA11	Active Termination Panel
Model 5938-Z1A	Connector - 15 Contact "DSUB" (3-row), Pins
Model SC10-AA11	+5 V Power Supply
Model SC11-AA11	±15 V Power Supply
Model SC15-AB11	Serial Controller with Calibrator and Reference
Model SC17-AA21	Connector Adapter with Calibration Connector
Model SC26-AA11	V720 Load Module (Required to maintain power supply regulation whenever eight or less SC-Series signal conditioning modules are installed in the V720 Active Termination Panel.)
Model SC72-ZA11	Ethernet Embedded Controller with Calibrator and Reference

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