SC21

Bridge Signal Conditioner with Gain and Filtering

The SC21 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 SC21 modules (32 channels) can be installed in a single V710 termination panel.

Adds bridge signal conditioning with gain to ADC modules

TYPICAL APPLICATIONS

Acoustic and vibration measurements

Rocket motor tests

Automotive testing

Tests using bridge-type sensors

FEATURES

- Two-channel-per-card packaging for maximum versatility
- Up to 16 SC21 Conditioners can be inserted in a V710 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 2-pole active filters with cutoff frequencies of 10, 50 and 500 Hz
- Programmable shunt calibration and bridge balance
- Programmable excitation with 0, 2.5, 5 or 10 V selection with excitation alarm
- 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

KineticSystems

GENERAL DESCRIPTION

The SC21 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 SC21 modules (32 channels) can be installed in a single V710 termination panel. Therefore, a V213 module can be used with a single chassis of SC21 bridge conditioners. Strain gages, RTDs and other bridge-type sensors can be accommodated.

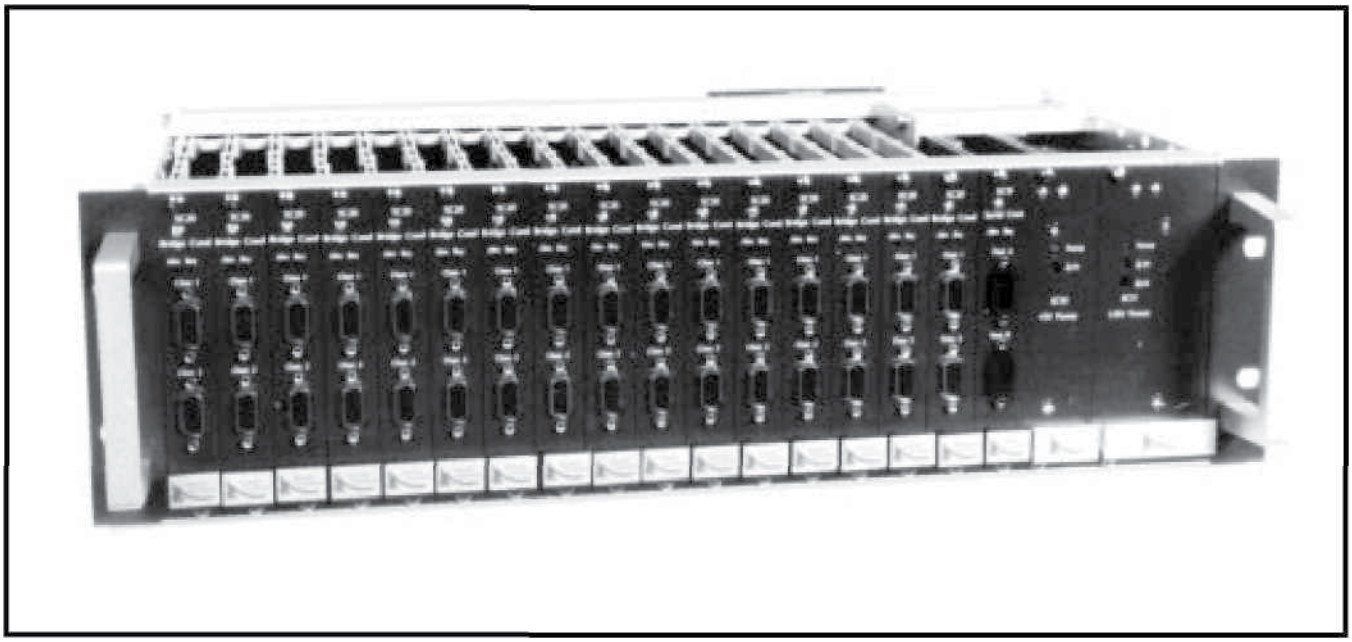
Each SC21 channel includes programmable gain from 1 to 2000 with prefilter gains of 1, 10, 100 and 1000 as well as post filter gains of 1, 2, 5 and 10. Each channel also includes a programmable Butterworth filter with cutoff frequencies of 10, 50 and 500 Hz. Each filter can also be bypassed. End-to-end channel calibration is accomplished by software configuring the input multiplexer on an SC21 channel to receive a reference voltage from the SC15 Serial Controller via the V710 backplane. Note that an SC15-AB11 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. 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, with 0, 2.5, 5 and 10 V selection. 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 SC21 channel contains a regulator for excitation, and individual remote sensing is provided for high excitation stability.

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.

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 SC21 front panel. Setup and control of the SC21 are accomplished via a standard serial port on the SC15 Serial Controller module.

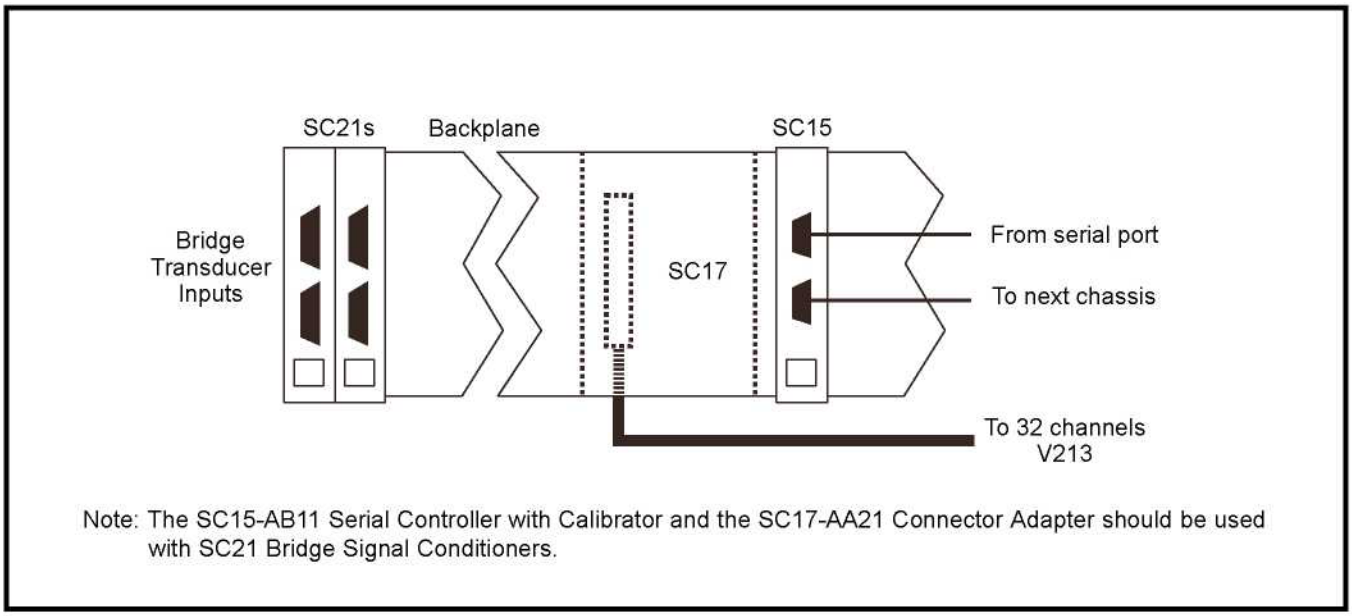
V710 Active Termination Panel (shown with 16 bridge conditioning modules)



Item	Specification
Inputs Number of channels	 2
Filter 3 dB Cutoff Frequency Selection	10, 50, 500 Hz and Bypass
Excitation Line regulation Load regulation Temperature Coefficient	Independent excitation for each channel. Each channel provides +/- excitation and sense leads. Excitation voltages of 0 V, 2.5 V, 5 V and 10 V are available. Open sense lines or an over-current condition will shut down the supply automatically and signal the error condition. Excitation calibration is also provided. 0.003 %/V 0.00025 V/mA 2 ppm/°C
Bridge Completion	Two channels of bridge completion are provided. 1/2-, 1/4- and full-bridge configurations are supported. The completion resistors plug into the SC21 PC card. 120, 350 and 1000 ohm resistor kits are available.

Shunt Calibration	+/- shunt calibration is performed on each channel. The customer-supplied resistors are installed on the SC21 PC card. Switching is performed under software control.
Gain Selection	Prefilter gain: 1, 10, 100, 1000; post filter gain: 1, 2, 5, 10; Maximum overall gain: 2000
Gain/Offset Accuracy, RTI	Gain Accuracy 1 ± (1.2 mV + 0.025% of reading) 2 ± (600 µV + 0.025% of reading) 5 ± (250 µV + 0.025% of reading) 10 ± (120 µV + 0.025% of reading) 20 ± (60 µV + 0.025% of reading) 50 ± (25 µV + 0.025% of reading) 100 ± (13 µV +0.025% of reading) 200 ± (8 µV + 0.025% of reading) 500 ± (5 µV +0.035% of reading) 1000 ± (5 µV +0.045% of reading) 2000 ± (5 µV + 0.065% of reading)
Gain Stability	20 ppm/°C
Offset Voltage Stability, RTI	4µV/°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)

Connections Between A V710 Termination Panel and a V213 ADC



Note: The SC15-AB11 Serial Controller with Calibrator and the SC17-AA21 Connector Adapter should be used with SC21 Bridge Signal Conditioners.

Related Products

Model V710-AA11	Active Termination Panel
Model 5938-Z1A	Connector - 15 Contact "DSUB" (3-row), Pins
Model SC10-AA11	+5 V Power Supply
Model SC 11 -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	V710 Load Module (Required to maintain power supply regulation whenever eight or less SC-series signal conditioning modules are installed in the V710 Active Termination Panel.)

ORDERING INFORMATION

MODEL	DESCRIPTION
SC21-AA11	Bridge Signal Conditioner with Gain, Filtering and Trifilar Transformers
SC21-AB11	Bridge Signal Conditioner with Gain and Filtering
SC20-0002	120 Ohm Bridge Completion Resistor Kit (Three resistors per kit)
SC20-0003	350 Ohm Bridge Completion Resistor Kit (Three resistors per kit)

Updated October 24, 2005

KineticSystems Company, LLC

900 N. State St.
Lockport, IL 60441-2200

Toll-Free (US and Canada):
phone 1-800-DATA NOW
1-800-328-2669

Direct:
phone +1-815-838-0005
fax +1-815-838-4424

Email:
mkt-info@kscorp.com

To find your local sales representative or distributor or to learn more about KineticSystems' products visit:

www.kscorp.com