

Model SC30

RMS-to-digital Signal Conditioner

User's Manual

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Warranty

RMS-to-digital Signal Conditioner

Converts the RMS value of an AC signal to a DC voltage

SC30

Features

- Two-channel-per-card packaging
- Up to 16 SC30 Conditioners can be inserted in a V710 Signal Conditioning Chassis
- Provides software-selectable input ranges of 20 mV, 200 mV, 2 V and 20 V
- Protected up to 300 V common-mode and normal-mode voltage
- Provides 10 V full-scale DC output
- Can be used with the V241 high-level mux module
- Supports software-selected calibration
- Optional 50/60 Hz band-pass filter

Typical Applications

- Voltage and current measurement of electrical generators and power distribution systems (using external voltage and current transformers)
- General-purpose measurement of AC voltages.

General Description *(Product specifications and descriptions subject to change without notice.)*

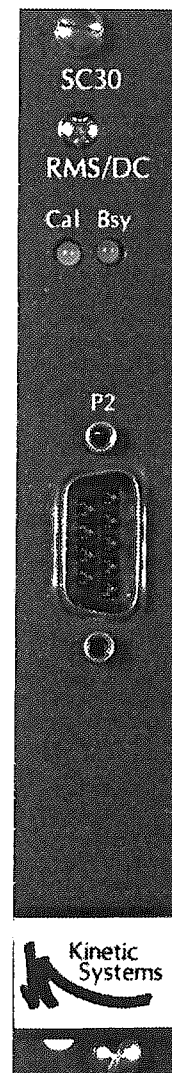
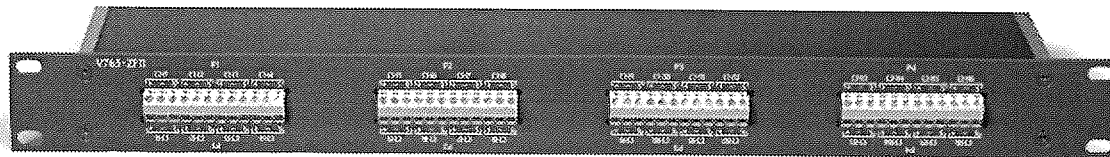
The SC30 is packaged in a 3U (5.25") high, 220 mm (8.7") deep, module. Up to 16 SC30 conditioners can be inserted into a single KineticSystems Model V710 active termination panel. The V710 has sixteen positions for 220 mm deep KineticSystems SC-series signal conditioning cards, one 220 mm deep position reserved for the SC15 Serial Controller and two 160 mm deep positions for Model SC10 and SC11 power supplies. In addition, analog output signals from the SC30 modules are routed via the V710 backplane to an analog interface card that is mounted to the rear of the V710 termination panel.

The SC30 is a two channel true RMS-to-DC converter with four software-selectable input amplitude ranges: 20mV, 200mV, 2V and 20V rms. The DC output for all ranges is 0 to 10 Volts. It provides a maximum error of $\pm 0.5\%$ of full-scale range with 50/60 Hz sine-wave inputs. In addition, the SC30 has input protection to $\pm 300V$ common-mode or differential-mode and an input frequency range of 20 Hz to 10 kHz. An optional band-pass filter is available with software selectable center frequencies of 50 or 60 Hz.

Setup and control of the SC30 are accomplished via a standard serial port connected to the Model SC15 Serial Controller. End-to-end channel calibration is accomplished in software by configuring the input relays on the SC30 to receive a user-supplied external reference via the calibration bus on the V710 backplane.

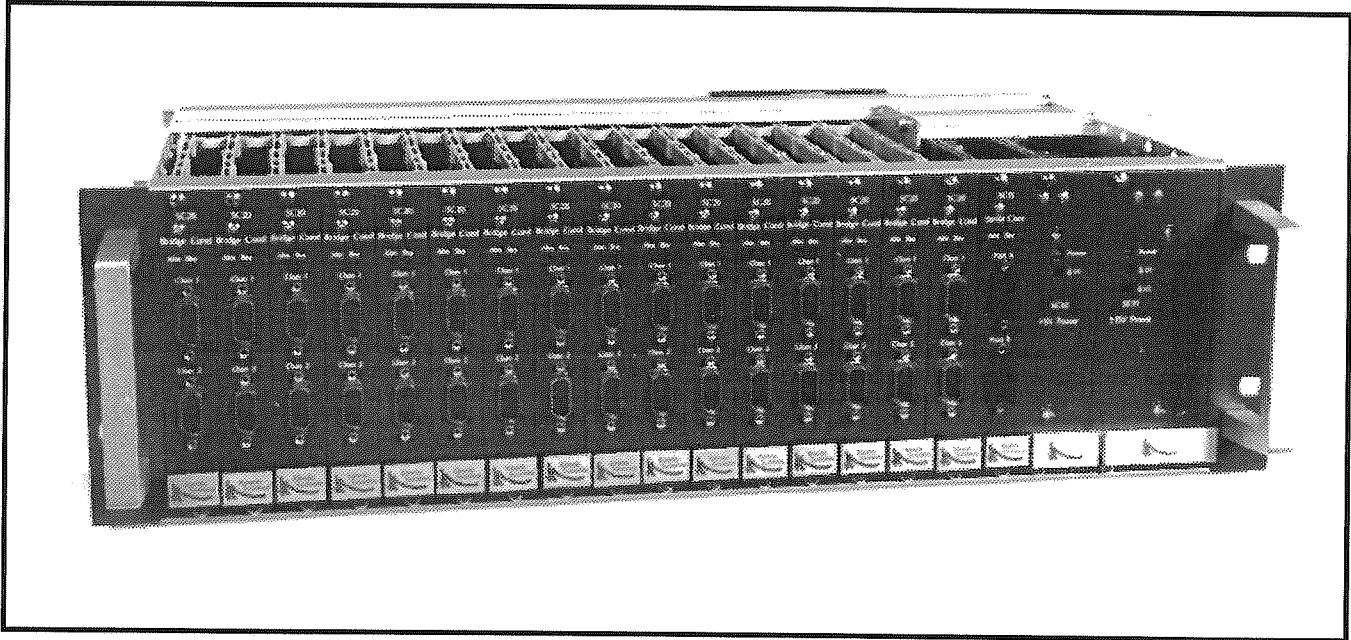
DC analog output signals from the SC30 modules are routed via the V710 termination panel backplane to an analog interface card that is mounted on the rear of the V710. Analog interface cards are used adapt the output signals to a pinout configuration that matches the type of multiplexer or ADC to be used. The SC17-S001 interface card routes the analog output signals to one 68-position SCSI 2 receptacle that has a pinout matching the input connector(s) on the V241 multiplexer module.

There is one 9-contact subminiature "D" RMS input connector mounted on the SC30 front panel. This connector serves both RMS channels. A 5856-Fxyz Cable can be used to connect each SC30 module to a V765-ZF11 Termination Panel. This panel, shown below, supports 16 RMS channels (8 SC30s).



SC30 shown full size

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



Ordering Information

Model SC30-AA11 RMS-to-DC Signal Conditioner

Related Products

- Model V710 Active Termination Panel
- Model 5856-Fxyz Cable—HDP-20 9P Subminiature D to 9S Subminiature D (for use with the V765 panel)
- Model V765-ZF11 Termination Panel (supports 16 channels and 8 SC30s)
- Model SC15-AA11 Serial Controller
- Model SC17-S001 Connector Adapter for V241 with Calibration Connector
- Model SC26-AA11 V710 Load Module (Required to maintain power supply regulation whenever 13 or less SC30 signal conditioning modules are installed in the V710 Active Termination Panel.)

- Model SC30-0001 50/60 Hz band-pass filter mezzanine card

Model SC30

UNPACKING AND INSTALLATION

At KineticSystems, static precautions are observed during production, test, and packaging of the modules. This includes using static proof mats and wrist straps. Please observe these same precautions whenever possible when unpacking and installing the modules. The SC30 is shipped in an anti-static bag within a foam packing container. Carefully remove the module from its static-proof bag.

Module Insertion

The SC30 is packaged in a 3U (5.25") high, 220mm (8.7") deep, module. Up to 16 SC30 conditioners can be inserted into a single KineticSystems Model V710 active termination panel. The V710 has sixteen positions for 220mm deep KineticSystems SC-series signal conditioning cards, one 220mm deep position reserved for the SC15 Serial Controller and two 160mm deep positions for Model SC10 and SC11 power supplies. In addition, analog output signals from the SC30 modules are routed via the V710 backplane to an analog interface card that is mounted to the rear of the V710 termination panel. Refer to the figure on the data sheet for inserting modules into their proper positions.

NOTE: A SC26 load module should be installed in the V710 active termination panel whenever there are thirteen or less SC30 signal conditioning cards installed. The load module is required to maintain regulation on the -15 volt output of the SC11 power supply. A minimum load of 550mA on the +15 volt power supply is required to maintain regulation of the -15 volt output.

FRONT PANEL INFORMATION

LEDs

The "Bsy" (Busy) LED is illuminated when the registers are being accessed.

The "Cal" (Calibration) LED is illuminated when calibration is enabled for either channel on the SC30. The channel 1 and channel 2 configuration registers (at addresses 00h and 40h respectively) can also be read to determine if calibration is enabled.

Front Panel Connector

There is one 9-contact subminiature "D" RMS input connector (AMP # 747840-6) mounted on the SC30 front panel. For a definition of the pins on this connector refer to Figure 2. When using an SC17-S001 analog interface card in conjunction with a V241 multiplexer module, SC30 DC outputs for channels 1-32 are available

Model SC30

on the 68 position SCSI 2 connector J1. The pinout of SC17-S001 connector J1 matches that of the V241 multiplexer module input connector(s).

SC30 INTRODUCTION

The SC30 is a two channel true RMS-to-DC converter with four (4) software selectable input amplitude ranges of 20mV, 200mV, 2V and 20V rms. It provides a maximum error of $\pm 0.5\%$ of full scale range (10V FSR) with 50/60Hz sine-wave inputs. In addition, the SC30 has input protection to $\pm 300V$ common-mode or differential-mode and an input frequency range of 20Hz to 10kHz. An optional band-pass filter is available with software selectable center frequencies of 50 or 60Hz. Frequency accuracy for the band-pass filter is $\pm 1\%$.

Setup and control of the SC30 are accomplished via a standard serial port connected to the Model SC15 Serial Controller.

End-to-end channel calibration is accomplished in software by configuring the input relays on the SC30 to receive a user supplied external reference via the calibration bus on the V710 backplane.

DC analog output signals from the SC30 modules are routed via the V710 termination panel backplane to an analog interface card that is mounted on the rear of the V710. Analog interface cards are used adapt the output signals to a pinout configuration that matches the type of multiplexer or ADC to be used. The SC17-S001 interface card routes the analog output signals to 1-68 position SCSI 2 receptacle that has a pinout matching the input connector(s) on the V241 multiplexer module.

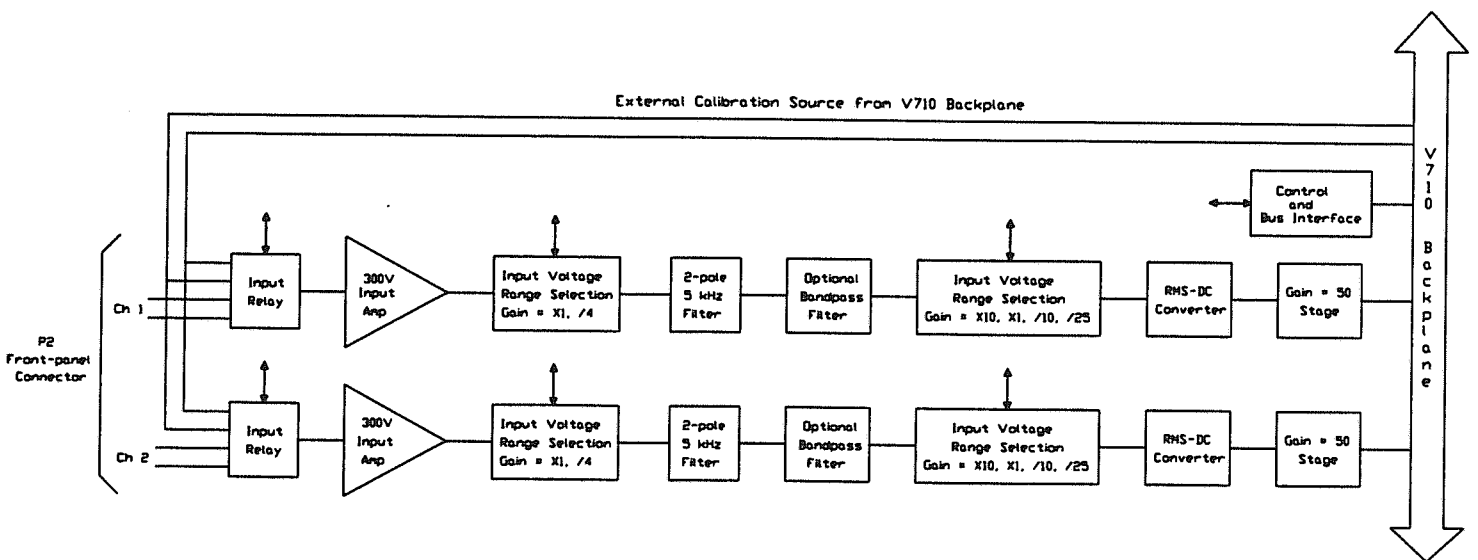


FIGURE 1 - SC30 2-Channel RMS-to-DC Converter

Model SC30

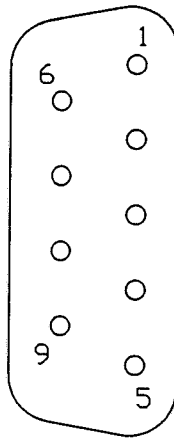


FIGURE 2 – SC30 Front Panel Connector

Front Panel Connector P2

Pin #	P2 Description
1	Channel 1 +
2	Channel 1 -
3	Channel 1 Shield
4	No Connection
5	Ground
6	No Connection
7	Channel 2 +
8	Channel 2 -
9	Channel 2 Shield

PROGRAMMING INFORMATION

The registers on the SC30 are accessed via an SC15 Serial Controller. This SC15 is responsible for managing communications between a host serial interface and the V710 chassis. The SC15 receives commands from the host serial interface. These commands are used to set up and monitor various features of the SC30 cards installed in the V710 backplane. The SC30, SC15 and the V710 backplane are implemented with an 8-bit address bus and an 8-bit data bus. All register addresses listed below are in hexadecimal. Refer to the SC15 Serial Controller instruction manual for additional programming information.

Channel 1 Configuration Register.....Address 00h

	7	6	5	4	3	2	1	0
Read/Write	Reserved	Reserved	Filter 1 Chan 1	Filter 0 Chan 1	Range 1 Chan 1	Range 0 Chan 1	Cal Gnd Chan 1	Cal En Chan 1

Reserved

Bits 7-6

These bits are reserved for future options. A READ operation to this register will return "0" for these bits following power-up. Setting these bits to "1" will have no effect on module operation.

Band-Pass Filter Chan 1

Bits 5-4

Bit 4 selects the band-pass filter center frequency and bit 5 selects filter enabled or filter bypassed as shown below. The SC30 will power-up with these bits set to "0" for filter bypassed mode.

Filter 1	Filter 0	
0	0	Filter bypassed
0	1	Filter bypassed
1	0	60Hz center frequency
1	1	50Hz center frequency

Range 1/Range 0 Chan 1 Bits 3 & 2

These bits select the channel 1 input voltage range by scaling the input as shown below.

Range 1	Range 0	
0	0	20mV range (Gain=500)
0	1	200mV range (Gain=50)
1	0	2V range (Gain=5)
1	1	20V range (Gain=0.5)

Cal Gnd Chan 1Bit 1

Setting this bit to “1” selects calibration ground for channel 1.

Cal En Chan 1.....Bit 0

Setting this bit to “1” enables calibration for channel 1 (connects channel 1 input to the calibration bus).

Channel 2 Configuration Register.....Address 40h

	7	6	5	4	3	2	1	0
Read/Write	Reserved	Reserved	Filter 1 Chan 2	Filter 0 Chan 2	Range 1 Chan 2	Range 0 Chan 2	Cal Gnd Chan 2	Cal En Chan 2

Reserved Bits 7-6

These bits are reserved for future options. A READ operation to this register will return “0” for these bits following power-up. Setting these bits to “1” will have no effect on module operation.

Band-Pass Filter Chan 2 Bits 5-4

Bit 4 selects the band-pass filter center frequency and bit 5 selects filter enabled or filter bypassed as shown below. The SC30 will power-up with these bits set to “0” for filter bypassed mode.

Filter 1	Filter 0	
0	0	Filter bypassed
0	1	Filter bypassed
1	0	60Hz center frequency
1	1	50Hz center frequency

Range 1/Range 0 Chan 2 Bits 3 & 2

These bits select the channel 2 input voltage range by scaling the input as shown below.

Range 1	Range 0	
0	0	20mV range (Gain=500)
0	1	200mV range (Gain=50)
1	0	2V range (Gain=5)
1	1	20V range (Gain=0.5)

Cal Gnd Chan 2Bit 1

Setting this bit to “1” selects calibration ground for channel 2.

Cal En Chan 2Bit 0

Setting this bit to “1” enables calibration for channel 2 (connects channel 2 input to the calibration bus).

ID Register.....Address C0h

	7	6	5	4	3	2	1	0
Read only	0	0	1	1	0	0	0	0

The ID register returns the model code 30h for SC30.