



4-channel Transient Strain SCP

Overview

The VT1511A 4-channel Transient Strain SCP provides 4 channels of strain measurements. It provides strain completion circuitry and excitation voltages, a programmable filter, and sample and hold circuitry. The sample and hold inputs sample all four channels simultaneously to reduce the skew introduced by scanning.

The low-pass filter on each sample and hold channel is a 6th order Bessel active RC filter used to provide alias protection and noise reduction. The filter cutoff frequencies are 1 kHz, 500 Hz, 250 Hz, 100 Hz, and 15 Hz. The SCP can be wired for measuring excitation voltages at the bridge connection (remote sense) or locally (terminal module). Excitation voltages of 0 V, 1 V, 2 V, 5 V, or 10 V are available on each channel. The SCP provides a voltage gain of 0.5, 8, 64, or 512 for each channel. This SCP takes two adjacent slots in the VXI module.

Use the VT1511A with the following VXI modules:

Model	Description
VT1413C	64-channel Scanning A/D Converter
VT1415A	Algorithmic Closed Loop Controller
VT1419A	Multifunction Measurement and Control Module
VT1422A	Remote Channel Multifunction DAC

Specifications

These specifications for the VT1511A reflect the combined performance of the scanning A/D and the VT1511A SCP.

Measurement Ranges

dc Volts: ± 8 V Full-scale

Input Characteristics

Maximum input voltage (normal mode plus common mode):

Operating: $< \pm 8$ V peak
 Damage level: $> \pm 42$ V peak

Maximum common mode voltage:

Operating: $< \pm 16$ V peak
 Damage level: $> \pm 42$ V peak

Common mode rejection (0 Hz to 60 Hz):

x0.5 gain: > 60 dB
 x8 gain: > 78 dB
 x64 gain: > 100 dB
 x512 gain: > 100 dB

Input impedance: > 100 M Ω

Maximum Tare Cal Offset

Maximum tare cal offset depends on A/D range and SCP gain.

Gain	Maximum Offset
x0.5	$\pm 25\%$ of full-scale
x8	± 90 mV
x64	± 95 mV
x512	± 95 mV

Features

Use with VT1413C/VT1415A/
VT1419A/VT1422A

Four Sample and Hold/Strain
Channels

Four Channels of Programmable
Excitation Voltages

Bridge Excitation Voltage of
1 V, 2 V, 5 V or 10 V

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Filter Characteristics (6-pole Bessel filter)

Normal mode rejection:

15 Hz Filter:

15 Hz: -3 dB
50 Hz: >33 dB
60 Hz: >43 dB

100 Hz Filter:

100 Hz: -3 dB
400 Hz: >43 dB

250 Hz Filter:

250 Hz: -3 dB
1000 Hz: >43 dB

500 Hz Filter:

500 Hz: -3 dB
2000 Hz: >43 dB

1000 Hz Filter:

1000 Hz: -3 dB
4000 Hz: >43 dB

Sample Time Skew Between Channels

Because the low-pass filter precedes the sample and hold, the interchannel sample time skew is primarily determined by the matching of the filter propagation delay times. The table below lists the propagation delay for a step function input (measured at 50% of the final value) for each filter setting, as well as the matching between channels programmed to the same filter setting.

Bandwidth	Step propagation delay (nominal)	Delay matching (\pm from nominal)
1 kHz:	427.5 μ s	10 μ s
500 Hz:	854.9 μ s	20 μ s
250 Hz:	1.710 μ s	40 μ s
100 Hz:	4.275 ms	100 μ s
15 Hz:	28.50 ms	670 μ s

Maximum Filter Overshoot: < 1% of input step size

Measurement Accuracy dc Voltage

For autorange, add 0.05% of reading for input voltages >4 V.

Accuracy Gain x0.5

Range \pm FS	Linearity % of Reading:	Offset Error:	Noise 3 σ :
125 mV:	0.02	488 μ V	1.5 μ V
0.5 mV:	0.02	488 μ V	1.5 μ V
2.0 V:	0.02	488 μ V	1.5 μ V
8.0 V:	0.02	488 μ V	1.5 μ V

Temperature Coefficients: add tempco error to above table

Gain: 10 ppm/ $^{\circ}$ C (after *CAL)
Offset: 0 - 30 $^{\circ}$ C: 0 μ V/ $^{\circ}$ C
30 - 55 $^{\circ}$ C: 0.75 μ V/ $^{\circ}$ C

Accuracy Gain x8

Range \pm FS	Linearity % of Reading:	Offset Error:	Noise 3 σ :
7.8 mV:	0.02	30.5 μ V	95 μ V
31.25 mV:	0.02	30.5 μ V	95 μ V
125 mV:	0.02	30.5 μ V	95 μ V
0.5 V:	0.02	30.5 μ V	95 μ V

Temperature Coefficients: add tempco error to above table

Gain: 10 ppm/ $^{\circ}$ C (after *CAL)
Offset: 0 - 30 $^{\circ}$ C: 0 μ V/ $^{\circ}$ C
30 - 55 $^{\circ}$ C: 0.75 μ V/ $^{\circ}$ C

Accuracy Gain x64

Range \pm FS	Linearity % of Reading:	Offset Error:	Noise 3 σ :
3.9 mV:	0.02	15 μ V	12 μ V
15.6 mV:	0.02	15 μ V	12 μ V
62.5 mV:	0.02	15 μ V	12 μ V

Temperature Coefficients: add tempco error to above table

Gain: 10 ppm/ $^{\circ}$ C (after *CAL)
Offset: 0 - 40 $^{\circ}$ C: 0.14 μ V/ $^{\circ}$ C
40 - 55 $^{\circ}$ C: 0.38 μ V/ $^{\circ}$ C

Accuracy Gain x512

Range \pm FS	Linearity % of Reading:	Offset Error:	Noise 3 σ :
7.81 mV:	0.04	15 μ V	2 μ V

Temperature Coefficients: add tempco error to above table

Gain: 10 ppm/ $^{\circ}$ C (after *CAL)
Offset: 0 - 40 $^{\circ}$ C: 0.14 μ V/ $^{\circ}$ C
40 - 55 $^{\circ}$ C: 0.38 μ V/ $^{\circ}$ C

Current Requirements (Amps)

5 V max **24 V max -24 V max**
0.55 0.145 0.143

Ordering Information

VT1511A

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