



SCS-814 / SCS-815

Butterworth or Bessel 8-Channel Amplifier and Low-Pass Filter Module for the SCS-800 Signal Conditioning System

Features

- Butterworth or Bessel 6 pole filter
- 8 amplifiers/filters per module
- Independent corner frequency selector
- Independent gain control
- Programmable A/D clock output
- $\pm 10V$ input and output
- Uni-polar to Bi-polar (0 to $5 V > \pm 2.5V$)
- Automatic DC offset compensation
- Offset guaranteed $< 2mV @ G = 1$
- Differential output, drives up to 30 meter output cable
- Onboard channel and module multiplexers
- Input cable shield drive

Introduction

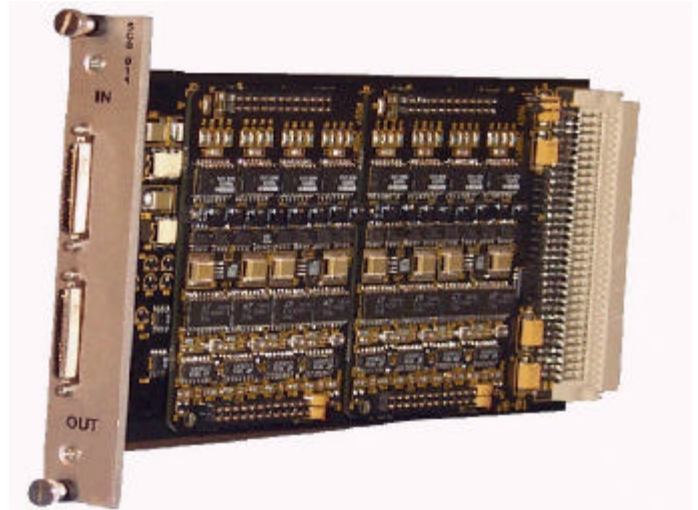
The SCS-814 provides 8 programmable channels of Butterworth low-pass filtering and high-quality instrumentation amplifiers for front-end signal conditioning of low level signals, while the SCS-815 offers the same performance with a linear phase Bessel filter.

Each filter channel is tunable to any corner frequency, under software control, for the entire bandwidth of 0.5Hz to 50kHz. Coupling may be either AC or DC, and is software selectable for the entire module. Alternatively, the corner frequency of each filter can be controlled for tracking applications with a selection of one of 4 external clocks.

High-quality instrumentation amplifiers on each channel provide software-selectable gain as well as differential inputs with 90 dB common mode rejection. Channels are independently programmable for gain settings of 1, 2, 5, 10, 20, 50, 100, 200, 500 or 1000.

Uni-polar to Bi-polar offset extends the range of the A/D converter by shifting 0 to 5 volt signals to be bi-polar ± 2.5 volt output. This output can then be amplified to provide full-scale A/D input signals.

DC Offset. The module features automatic DC offset compensation provides a total DC offset (RTI) of 2 mV.



Input

The SCS-814 has eight separate differential inputs, which may be DC or AC coupled to the instrumentation amplifier. The amplifier has an input voltage range of $\pm 10V$ and is protected to $\pm 40V$. A common mode shield drive amplifier protects input signals.

Output

A proprietary DC transformer™ circuit provides true differential signal outputs. This circuit allows for use of single ended inputs on the A/D converter, which doubles the number of A/D channels while guaranteeing that common-mode noise will not effect the signal.

The SCS-800 provides two multiplexing methods for bringing outputs to a data acquisition host:

All output signals can be time-multiplexed onto one set of analog output lines via the SCS-814's front-panel output connector, or can be time-multiplexed with all other module outputs via output connector on the SCS-804 System Controller Module. This method provides channel multiplexing, or channel and module multiplexing.

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Filter Specifications

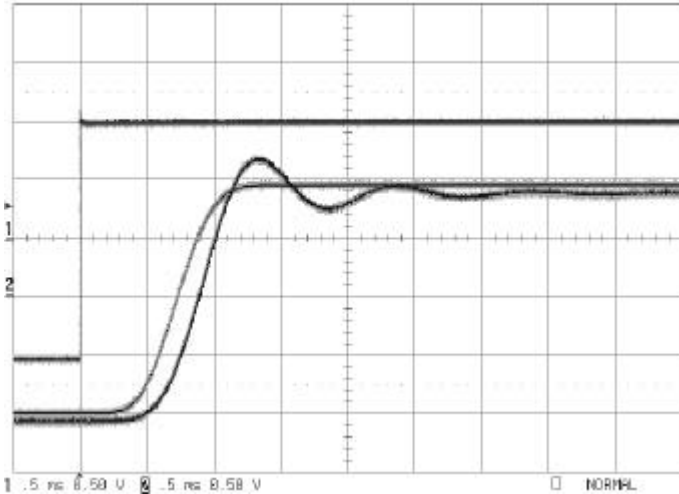
	Cutoff Frequency	Passband Performance	Transition Slope	Total Wideband Noise
6-Pole Butterworth	1 Hz - 50 kHz	+0.1dB, -0.1dB max	120 dB per decade	530 μ V _{RMS} typ
6-Pole Bessel	1 Hz - 50 kHz	+0.1dB, -0.1dB max, droop is per classical response and -0.2dB @ 0.3F _c , -1dB @ 0.6F _c , -2dB @ 0.83F _c	90 dB per decade	530 μ V _{RMS} typ

Filter Type Selection

The selection of the filter module depends upon the type of data analysis that is to be performed.

The Butterworth filter has a flat frequency response in the pass band, and a relatively fast cutoff. It has significant delay distortion especially near the cutoff frequency. Its' time domain step response has significant overshoot.

The Bessel filter has linear phase response and nearly no overshoot in the step response. The filter rolloff in the frequency domain is very slow compared to the Butterworth filter, and has droop over the passband starting as low as 1/10th of the cutoff frequency.



Step Response

The Bessel response is the smooth trace with no overshoot, the Butterworth response is the trace with significant overshoot.

For more information, contact Alligator Technologies or your local Alligator Distributor

Specifications

Coupling

AC cutoff..... 0.03Hz typical

Input

Voltage range..... ± 10 V
 Common mode rejection... 80dB min, 92dB typ
 Noise (RTI @G=1)..... 30 η V per Hz
 Coupling..... AC or DC
 Impedance..... 2M Ω /20pF
 Protection..... ± 40 V
 Bias current..... ± 2 pA typ, ± 100 pA max

Offset

Voltage..... ± 0.1 mV typ, ± 1.0 mV max
 Current..... ± 1 pA typ, ± 100 pA max

Gain

Steps..... 1,2,5,10,20,50,100,200,500, 1000
 Accuracy..... 0.5%

Output

Impedance..... 10 Ω
 Voltage Range..... ± 10 V

General

Temperature, operating... 0°C to 55°C
 Temperature, storage..... -25°C to 85°C
 Humidity..... 0% to 95% non-condensing

Multiplexer

Minimum switching time... 100 μ S
 Settling time (controller card specification)..... 10 μ S to 0.1%

Connector

Input and output..... Amp 787096-1
 Latch..... Amp 787003-3

Mating Connector

Input and output..... Amp 787131-1
 Backshell..... Amp 787133-1

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