

## SSH-8

High Performance Simultaneous Sample and Hold Accessories

### Functional Description

The SSH-8 is a family of high performance simultaneous sample and hold accessories for the DAS-1600/1400/1200 and DAS-1700/1800AO/HC/ST Series. The SSH-8 is designed to maintain the 12-bit accuracy of your DAS board while providing simultaneous sampling of the inputs. When coupled with a high-speed data acquisition board, such as the DAS-1800 Series, the SSH-8 and a DAS board form a high-performance signal analysis system. By sampling all inputs simultaneously, accurate time or phase analysis can be performed. Without an SSH-8, 8 inputs are typically sampled sequentially over a span of 25 to 80  $\mu$ seconds. With the SSH-8, all 8 inputs are sampled within 2 nseconds. This allows accurate comparisons in the time domain, greatly reducing the potential error when the inputs are compared to each other.

The SSH-8 is available in a selectable gain version (SSH-8/SG) and a fixed gain version (SSH-8/FG). The SSH-8/SG provides per-channel, switch selectable gains of 0.5, 5, 50, and 250, allowing input ranges from  $\pm 10V$  to  $\pm 40mV$ . The SSH-8/FG provides a fixed-gain setting of 0.5. The SSH-8/FG accepts analog inputs signals in the range of  $\pm 10V$  and provides  $\pm 5V$  outputs. Both versions provide 8 differential inputs at a maximum of  $\pm 10V$  and 8 single-ended  $\pm 5V$  outputs. Optional, per-channel plug-in Cauer filter modules minimize noise and aliasing effects.



The DAS-1600/1400/1200, DAS-1800ST, and DAS-1800AO Series accept 1 or 2 SSH-8 accessories for a total of 16 channels. The DAS-1800HC accommodates 8 SSH-8s for a total of 64 inputs. A 37-pin D-type connector is available for field wiring. The STC-SSH-8 is a direct plug-on screw terminal connector for the SSH-8. It provides labeled screw terminal connections for the 8 channels, with a ground connection for each channel and screw terminal connections for external power and trigger inputs. Alternatively, a custom cable can be designed. The SSH-8 is housed in a metal box to protect the circuitry as well as provide shielding. The boxes are suitable for placing on a table top or rack mounting two side by side in a 19 inch rack. The SSH-8 requires +5 Volt power. One SSH-8 without filters can be powered from the DAS board. Multiple SSH-8s, or one SSH-8 with 8 filters installed require an external +5 Volt power supply.

### SSH-8 Filters

In applications where aliasing errors are a concern, plug-in anti-aliasing filters can be installed on the SSH-8. The optional filter modules are single-channel, low-pass filters with adjustable cutoff frequencies. The filter type is an 8-pole switched-capacitor Cauer filter with a sharp rolloff. The filters provide a gain of 1.

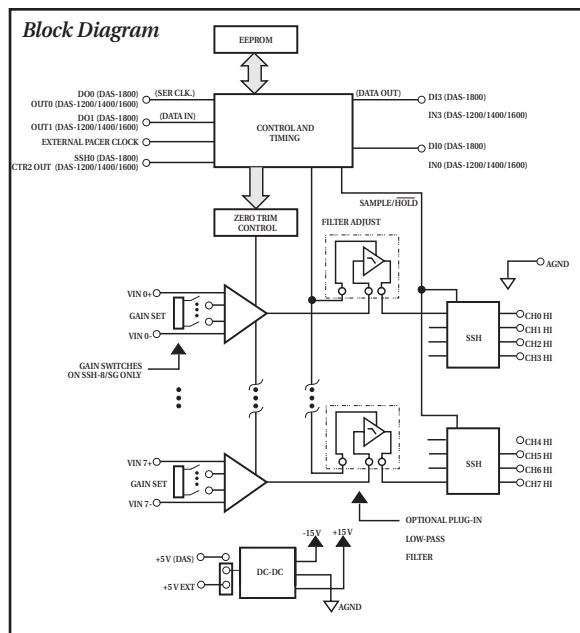
The filters use a common clock line for setting the cutoff frequency. The cutoff frequency range for the filters is first set by a series of capacitors on the filter board. Each filter is supplied with a variety of plug-in capacitors allowing the frequency to be set from 80Hz up to 50kHz using the SSH-FLT or 8Hz to 5kHz using the SSH-FLT/8-5k. The clock frequency can then be fine tuned via jumpers to set the cutoff frequency within a factor of 5 from the value set by the capacitors. For example, if the capacitors are chosen for a cutoff frequency of 10kHz using the SSH-FLT, the fine tuning can adjust the frequency in the range of 2kHz up to 10kHz.

### FEATURES

- 8 differential channels of simultaneous sample and hold
- Accessory for the DAS-1600/1400/1200, DAS-1800AO, DAS-1800ST and DAS-1800HC Series
- All channels sampled within 2 nseconds
- Fixed or switch selectable gains
- No potentiometers to adjust
- Onboard microprocessor and EEPROM to calibrate and maintain zero offset
- Optional per-channel plug-in Cauer filters (SSH-FLT)

### APPLICATIONS

- Signal analysis
- Vibration analysis
- Waveform analysis
- Product test

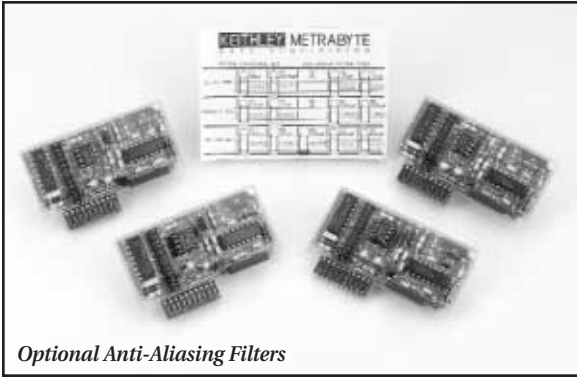


### QUESTIONS?

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# SSH-8



Optional Anti-Aliasing Filters

## Software

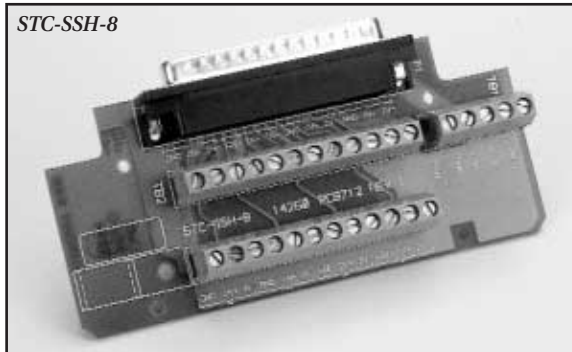
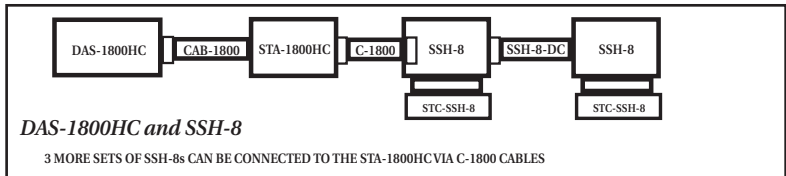
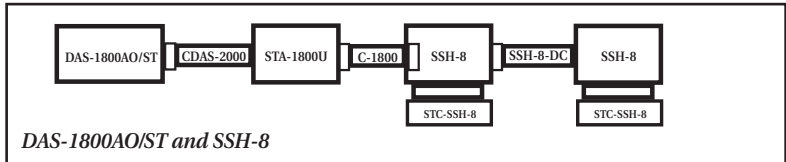
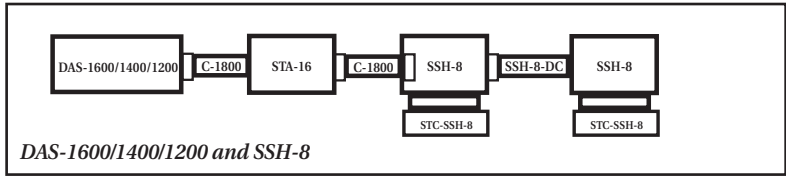
The SSH-8 does not require any special software for operation.

## Connector Pin Assignments

All user connections to the SSH-8 are made through a 37-pin female D-type connector.

VIN0+	37	19	LL GND
LL GND	36	18	VINO-
VIN1-	35	17	VIN1+
VIN2+	34	16	LL GND
LL GND	33	15	VIN2-
VIN3-	32	14	VIN3+
VIN4+	31	13	LL GND
LL GND	30	12	VIN4-
VIN5-	29	11	VIN5+
VIN6+	28	10	LL GND
LL GND	27	9	VIN6-
VIN7-	26	8	VIN7+
LL GND	25	7	LL GND
COM	24	6	EXT CLK IN
+5V EXT	23	5	COM
+5V EXT	22	4	COM
+5V EXT	21	3	COM
+5V EXT	20	2	COM
		1	COM

## Configuration Guide



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# SSH-8

## SPECIFICATIONS

### SSH-8

#### INPUTS

CHANNELS: 8 differential.  
 INPUT RANGE:  $\pm 10V$  nominal,  $\pm 11V$  max.  
 TEMPERATURE COEFFICIENT OF OFFSET:  $6\mu V/^{\circ}C$  typical.  
 OFFSET DRIFT:  $0.08\mu V$ /month.  
 OFFSET CURRENT:  $2pA$  typical,  $1nA$  maximum.  
 BIAS CURRENT:  $4pA$  typical,  $3nA$  maximum.  
 GAIN SET: 0.5 - SSH-8/FG; 0.5, 5, 50, 250 - SSH-8/SG.  
 GAIN ACCURACY: 0.025%.  
 LARGE SIGNAL BANDWIDTH ( $\pm 5.0V$  INPUT):  
 X0.5: 90kHz.  
 X5: 135kHz.  
 X50: 18kHz.  
 X250: 3.6kHz.  
 COMMON MODE REJECTION:  
 X0.5: 80dB.  
 X5: 90dB.  
 X50: 100dB.  
 X250: 100dB.

#### OUTPUTS

CHANNELS: 8 single-ended.  
 RANGE:  $\pm 5.0V$  nominal,  $\pm 6.0V$  maximum.  
 IMPEDANCE:  $0.3\Omega$  typical,  $0.5\Omega$  maximum.  
 DRIVE CURRENT:  $\pm 5mA$ .  
 ADDITIVE NOISE:  $150\mu V_{rms}$  typical. Sample skew at gain = 0.5.  
 CHANNELS 0 TO 3: 1ns.  
 CHANNELS 4 TO 7: 1ns.  
 CHANNELS 0 TO 7: 2ns.  
 TWO SSH-8 DAISY-CHAINED: 5ns.  
 HOLD DROOP:  $1\mu V/\mu s$  maximum.  
 POWER SUPPLY VOLTAGE:  $+5V \pm 5\%$ .

## POWER REQUIREMENTS

+5V: 600mA with no filters installed.  
 1100mA with 8 filters installed.  
 TEMPERATURE RANGE, RATED PERFORMANCE:  $0^{\circ}C$  to  $+45^{\circ}C$ .  
 TEMPERATURE RANGE, OPERATING PERFORMANCE:  $0^{\circ}C$  to  $+45^{\circ}C$ .  
 TEMPERATURE RANGE, STORAGE:  $0^{\circ}C$  to  $+45^{\circ}C$ .  
 RELATIVE HUMIDITY: 0 to 95% @  $60^{\circ}C$  noncondensing.  
 DIMENSIONS: 10.0in W  $\times$  2.6in H  $\times$  7.5in D (25.4cm  $\times$  6.6cm  $\times$  19cm).

## SSH-FLT FILTERS

TYPE: Cauer, 8 pole.  
 INPUT:  $\pm 5V$ .  
 OUTPUT:  $\pm 5V$ .

ORDER	DESCRIPTION
SSH-8/FG	High Performance, 8-Channel Simultaneous Sample and Hold Accessory with fixed gain of 0.5
SSH-8/SG	High Performance, 8-Channel Simultaneous Sample and Hold Accessory with selectable gains of 0.5, 5, 50, 250
OPTIONS	
STC-SSH-8	Screw Terminal Connector for the SSH-8
SSH-FLT	Plug-In Cauer Filter, 80Hz to 50kHz cutoff frequency (up to 8 per SSH-8)
SSH-FLT/8-5k	Plug-In Cauer Filter, 8Hz to 5kHz cutoff frequency (up to 8 per SSH-8)
SSH-8-DC	SSH-8 to SSH-8 Cable
C1800	STA-1800HC, STA-1800U or DAS-1600/1400/1200 Series to SSH-8 Cable
S1800	STA-1800HC, STA-1800U or DAS-1600/1400/1200 Series to SSH-8 Shielded Cable
MS-SSH-8	Hardware Manual and Calibration Software

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