# 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 μseconds. 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 ±10V to ±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 ±10V and provides ±5V outputs. Both versions provide 8 differential inputs at a maximum of ±10V and 8 single-ended ±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.
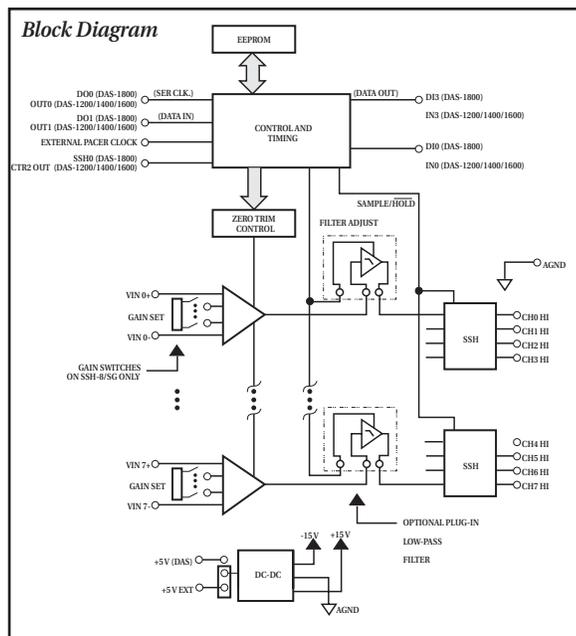
The filters use a common clock line for setting the cutoff frequency. The cutoff frequency range for the filters is first set by a series of capacitors on the filter board. Each filter is supplied with a variety of plug-in capacitors allowing the frequency to be set from 80Hz up to 50kHz using the SSH-FLT 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**

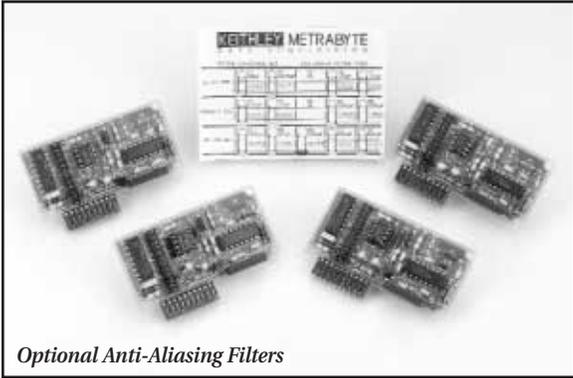- **Waveform analysis**

- **Product test**

**QUESTIONS?**

**1-800-552-1115** **(U.S. only)**

Call toll free for technical assistance, product support or ordering information, or visit our website at **www.keithley.com**.



*Block Diagram*

# SSH-8



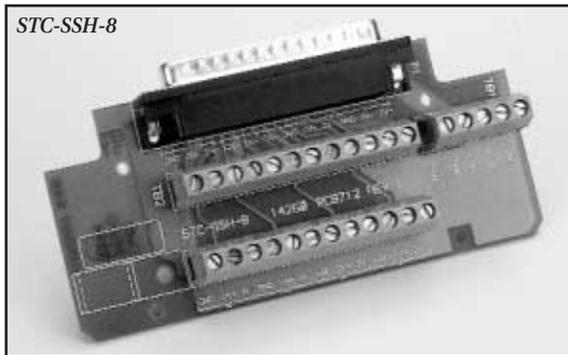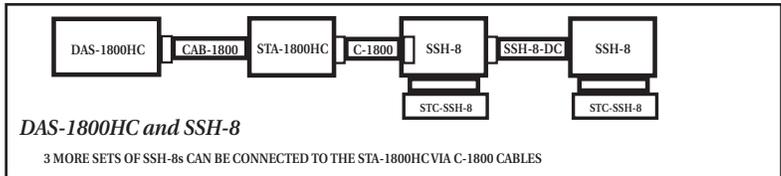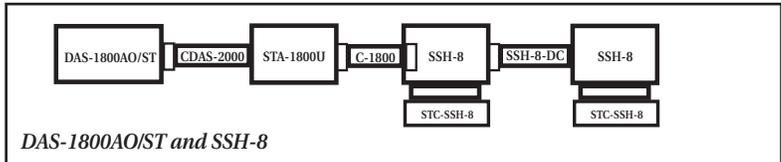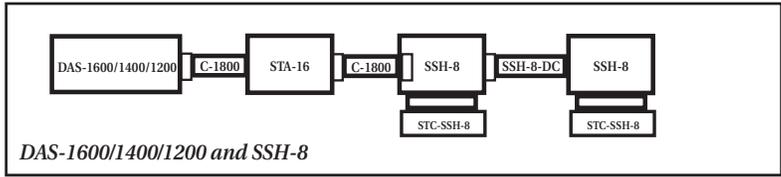*Optional Anti-Aliasing Filters*

## 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 |
| +5 V EXT | 23 | 5 | COM |
| +5 V EXT | 22 | 4 | COM |
| +5 V EXT | 21 | 3 | COM |
| +5 V EXT | 20 | 2 | COM |
| | | 1 | COM |

## Configuration Guide

DAS-1600/1400/1200 — C-1800 — STA-16 — C-1800 — SSH-8 — SSH-8-DC — SSH-8
STC-SSH-8 ... STC-SSH-8

*DAS-1600/1400/1200 and SSH-8*

DAS-1800AO/ST — CDAS-2000 — STA-1800U — C-1800 — SSH-8 — SSH-8-DC — SSH-8
STC-SSH-8 ... STC-SSH-8

*DAS-1800AO/ST and SSH-8*

DAS-1800HC — CAB-1800 — STA-1800HC — C-1800 — SSH-8 — SSH-8-DC — SSH-8
STC-SSH-8 ... STC-SSH-8

*DAS-1800HC and SSH-8*

3 MORE SETS OF SSH-8s CAN BE CONNECTED TO THE STA-1800HC VIA C-1800 CABLES

*STC-SSH-8*

# SSH-8

## SPECIFICATIONS
### SSH-8

### INPUTS

**CHANNELS:** 8 differential.

**INPUT RANGE:** ±10V nominal, ±11V max.

**TEMPERATURE COEFFICIENT OF OFFSET:** 6µV/°C typical.

**OFFSET DRIFT:** 0.08µV/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 (±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:** ±5.0V nominal, ±6.0V maximum.

**IMPEDANCE:** 0.3Ω typical, 0.5Ω maximum.

**DRIVE CURRENT:** ±5mA.

**ADDITIVE NOISE:** 150µVrms 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:** 1µV/µs maximum.

**POWER SUPPLY VOLTAGE:** +5V ± 5%.

## POWER REQUIREMENTS

**+5V:** 600mA with no filters installed.
1100mA with 8 filters installed.

**TEMPERATURE RANGE, RATED PERFORMANCE:** 0°C to +45°C.

**TEMPERATURE RANGE, OPERATING PERFORMANCE:** 0°C to +45°C.

**TEMPERATURE RANGE, STORAGE:** 0°C to +45°C.

**RELATIVE HUMIDITY:** 0 to 95% @ 60°C noncondensing.

**DIMENSIONS:** 10.0in W × 2.6in H × 7.5in D (25.4cm × 6.6cm × 19cm).

## SSH-FLT FILTERS

**TYPE:** Cauer, 8 pole.

**INPUT:** ±5V.

**OUTPUT:** ±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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