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INPUT & OUTPUT MODULES
AD 694SH

- 4 Input Channels
- 4 Independent Analog Output Channels
- Integrated Voltage Excitation, and Signal Conditioning
- ± 10 Volts Full Scale (Input & Output) (Up to ± 210 Volts)
- Computer Controlled:
  Gains from 1 to 4000,
  Sensor Excitation
  Programmable 8-pole Filter
  VCAL & Shunt CAL
  Auto Balance & Auto Zero
- Increased Balance Range
- Remote Sense for Excitation
- Full Differential Inputs
- Simultaneous Sample & Hold
- Unipolar Excitation
- Input Protection
- D-Subminiature (37) Pin Connector Kit



AD 694SH
Optim Part NBR - PL2356

Optim' s four channel AD 694SH Input & Analog Output Signal Conditioning Modules are the most versatile modules available supporting a wide range of active and passive transducers, with an optional Input Resistor Network allowing up to ± 210 Volts Full Scale on Input.

As an added value, the AD 694SH can also be used as a Signal Conditioner with balanced analog outputs (the output is after the filter & gain and before the ADC). The AD 694SH has identical signal conditioning & filtering characteristics to Optim's AD 684SH-1 modules. This on-board, integrated, Signal Conditioning satisfies requirements for Strain Gages, Pressure Transducers, Displacement Transducers, DC LVDT's and Load Cells.

As a Signal Conditioner the AD 694SH's outputs can support real-time simulator servo controllers, control stands, scopes, chart recorders & other monitoring channels.

The flexibility of the AD 694SH module is due to its computer controlled functionality. Computer controlled functions provide quicker setups during installation and completely eliminate the chance of error caused by misplaced jumper settings.

The computer controlled features provided by the AD 694SH module include selections for gains up to 4,000:1, voltage calibration, shunt cal, filtering, Auto Balance, Auto Zero, Signal Conditioning, and Constant Voltage Excitation.

TYPICAL MEASUREMENT APPLICATIONS

- ☐ AC Operated Sensors
- ☑ **Acceleration**
- ☑ **Analog Voltage**
- ☐ Angular Displacement
- ☑ **Capacitive Sensors**
- ☐ Charge Mode Transducers
- ☑ **Current Sensors**
- ☑ **Conditioned Signal Measurements**
- ☐ Digital Bit Stream Inputs
- ☑ **Displacement**
- ☑ **Distance**
- ☑ **Engine Performance Monitoring**
- ☑ **Excitation (Unipolar)**
- ☐ Excitation (Bipolar)
- ☑ **Flow Meters**
- ☑ **Force Transducers**
- ☑ **Frequency (Using InLine F to V)**
- ☐ Humidity
- ☐ Integral Electronics Sensors (IES)
- ☐ IRIG-B Time/Date Synchronization
- ☑ **Level Sensors**
- ☑ **Load Cells**
- ☐ LVDT's (AC)
- ☑ **LVDT's (DC)**
- ☐ Moisture Content
- ☐ Monitoring Switch Closures
- ☐ Period
- ☐ Piezoelectric Sensors
- ☑ **Position Transducers**
- ☑ **Power**
- ☑ **Pressure**
- ☐ Pulse Encoders
- ☐ Pulse Sensors
- ☐ Rate
- ☑ **Resistive Sensors**
- ☐ Rotary Transformer Torque Cell
- ☐ Rotational Speed Comparison
- ☐ RTD's
- ☐ RVDT's
- ☐ Speed Sensors
- ☑ **Strain Gages 1/4 Bridge**
- ☑ **Strain Gages 1/2 Bridge**
- ☑ **Strain Gages Full Bridge**
- ☑ **String Pots**
- ☐ System Synchronization with External IRIG Devices
- ☐ Temperature Measurements E,J,K & T Type TC's (Centigrade & Fahrenheit)
- ☐ Thermistors
- ☐ Time/Data Correlation (IRIG)
- ☑ **Torque Sensors**
- ☐ Totalizer
- ☑ **Velocity**
- ☐ Vibrating Wire Gages: Strain Gages, Load Cells & Bolts, Pressure Transducers, Stressmeters, Jointmeters, Crackmeters, Temperature
- ☑ **Voltage Measurements**
- ☐ Voltage Source

ANALOG OUTPUT APPLICATIONS

- ☑ **Analog Output**
- ☑ **DAC Playback with DAC 5416**
- ☑ **Controller Test Stands**
- ☑ **Real-Time Monitoring**
- ☑ **Signal Conditioning for External Devices such as Simulator Servo Controllers**

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AD 694SH
Specifications & Accessories

Optim Part NBR - PL2356

INPUT	
Number of input channels	4 channels/module
Input impedance	> 100 MOhms
Full-scale input voltage	± 10 V
(Optional Input Resistor Network)	± 210 V
Input protection	± 50 V continuous, brief surges to 1000 V
Common mode range	± 10 V
Common mode rejection (DC to 60 Hz)	> 80 dB (gains 1 to 8) > 96 dB (gains 10 to 80) > 105 dB (gains 100 to 4000)
Input noise	0.2 µV p-p at 0.1 to 10 Hz
Offset (RTO)	< 5 mV + 2 µV x gain
Offset tempco (RTI)	30 µV/°C (gains 1 to 8), 3 µV/°C (gains 10 to 80), 0.3 µV/°C (gains 100 to 800), 0.15 µV/°C (gains 1000 to 4000)
GAIN	
Gain steps	1, 2, 4, 8, 10, 20, 40, 80, 100, 200, 400, 800, 1000, 2000, 4000
Gain accuracy	250 ppm (gains 1 to 80) 500 ppm (gains 10 to 800) 750 ppm (gains 1000 to 2000) 1000 ppm (gain of 4000)
Gain stability	100 ppm/year
Gain tempco	6 ppm/°C
Gain nonlinearity	100 ppm
Max bandwidth	20 KHz (-3 dB) (gains 1 to 80) 10 KHz (-3 dB) (gains 100 to 800) 1 KHz (-3 dB) (gains 1000 to 4000)
Slew rate	.7 V/µS
Settling time	28 µS to 0.01% (gains 1 to 80) 140 µS to 0.01% (gain 100 to 800) 1300 µS to 0.01% (gain 1000 to 4000)

BALANCE	
Gains 1, 10, 100, 1000	50%
Gains 2, 20, 200, 2000	100%
Gains 4, 40, 400, 4000	200%
Gains 8, 80, 800	400%
FILTER	
Type	8-pole Butterworth
Frequency	Computer controlled 1.69 Hz - 20 KHz (other ranges special)
Rolloff	48 dB/octave
Passband	0.1 dB
Stopband	86 dB
Frequency accuracy	2% of computer setting
Gain accuracy	150 ppm
Offset (RTO)	< 5 mV
Offset tempco	60 µV/°C
Distortion	150 ppm
Nonlinearity	300 ppm
Noise (RTO)	300 µVRMS
SAMPLE & HOLD	
Supported	Droop 25 mV/Sec
OUTPUT	
Number of output channels	4 channels/module
Voltage Range	±10V (DC Single Ended)
Output impedance	600 Ohms
EXCITATION	
Type	Constant voltage with ± sense, unipolar
Settings	Computer controlled +10, +5, +2, 0 volts
Accuracy	400 ppm
Output tempco	25 ppm/°C
RCAL Type (field changeable)	Resistor shunt, computer controlled, 100 KΩ
VCAL Type	Voltage substitution, four voltages internal/external & balance
CONNECTOR	
Type of connector	D-Subminiature 37-Pin

STB 684/120	
Four Channel Standard Terminal Junction Box	Optim Part NBR
Connector for AD 684SH-1 / AD 694SH Module	PL2333
Full, 1/2, and 1/4 (120 Ohm) Bridge Completion	
Includes External Shunt Cal	
Includes 10ft (3m) Interconnecting Cable	
Stand Alone or DIN Rail Mounting	

STB 684/350	
Four Channel Standard Terminal Junction Box	Optim Part NBR
Connector for AD 684SH-1 / AD 694SH Module	PL2334
Full, 1/2, and 1/4 (350 Ohm) Bridge Completion	
Includes External Shunt Cal	
Includes 10ft (3m) Interconnecting Cable	
Stand Alone or DIN Rail Mounting	

CABLE AD694 ANALOG OUT	
AD 694SH 37 Pin conversion cable to 4 BNC's KC39-30 (3ft (0.9m))	Optim Part NBR
plus cables to 4 BNC's BENDIX PT01A-10-6S(SR) (2ft (0.6m))	7900021

FtoV-01	
In-Line Frequency to Voltage Converter	Optim Part NBR
Provides F to V Conversion for One Channel	PL2578-01
Input Frequency Range from 0Hz to 1kHz	
Includes Adapter Connectors & Cables	

FtoV-05	
In-Line Frequency to Voltage Converter	Optim Part NBR
Provides F to V Conversion for One Channel	PL2578-05
Input Frequency Range from 0Hz to 5kHz	
Includes Adapter Connectors & Cables	

FtoV-25	
In-Line Frequency to Voltage Converter	Optim Part NBR
Provides F to V Conversion for One Channel	PL2578-25
Input Frequency Range from 0Hz to 25kHz	
Includes Adapter Connectors & Cables	



Standard Terminal Blocks (STB)

In-Line Frequency to Voltage Module



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