



4-Channel Charge Amplifier
Low-Noise Fixed-Gain with integrated ADC and Data Processing

Features

- Aluminum-Casing: 165 x 104 x 40 mm
- Pulse Response independent of Detector Capacitance (up to 20 nF)
- For Pulses up to 200 Hz Repetition Rate
- Output of Data via galvanically isolated RS-232 Interface

Applications

- 4-Quadrant Photodiodes
- Ionization Cells
- Capacitive Beam Pickups
- Amplitude and Beam Position Monitoring

The A759-001 is a 4-channel low-noise charge amplifier with integrated 14-bit ADC. It offers high gain, low noise and data conversion in a compact housing. The A759-001 is designed for pulsed charge signals with a repetition rate of 100 Hz. The 4 charge amplifiers are provided with pole-zero compensation.

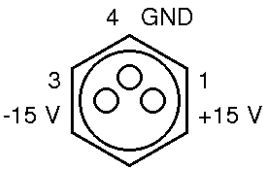
They are synchronously sampled and digitized in respect to an external Trigger. Standard SMA inputs, BNC and serial D-Sub-9 outputs provide convenient connections. Pulses of both positive and negative value can be processed. A linear regulated power supply is available as an accessory.

Characteristics	
Gain of any Channel	5×10^{11} V/C
Channel-to-Channel Gain Consistency	$\pm 0.1\%$
ADC Calibration Factor	3800 Counts / 10 pC $\pm 1\%$
Unipolar resolution	13 Bit
Rise Time (10% to 90%)	120 μ s
Input Charge Noise (with open input)	10 fC peak-peak
Input Voltage Noise (typ.)	6 nV/ $\sqrt{\text{Hz}}$ @ 1 kHz
Max. Input Charge (for linear amplification)	20 pC peak
Max. recommended Source Capacitance	20 nF (for linear amplification)
Non-Linearity	< 0.1%

Characteristics	
Output Voltage Range	10 V _{peak} (>1 kΩ Load, both positive or negative pulses are possible)
Monitor Output Impedance	100 Ω
Trigger Output Impedance	1 kΩ
Trigger Input	TTL compatible, optoisolated, recommended High Voltage 3 V _p min., Pulse Width 1 μs min.
Data Output	RS-232, optoisolated, 115200 Baud with 8N1, no handshake, female D-Sub-9 connector, Pin 2 TxD, Pin 5 Data Ground, all other are not connected.
Power Supply Voltage	± 15 V
Power Supply Current	+85 / -20 mA typ. (no signal)
Case	Anodized Aluminum
Weight	500 g
Storage Temperature	-20 .. +80 °C
Operating Temperature	10 .. 40 °C

All characteristics are for ±15 V power supply and 25 °C ambient temperature.

Absolute Maximum Ratings	
Input Voltage	±12 V
Power Supply Voltage	± 20 V

Connections	
Inputs Q1 to Q4	SMA Connector
Monitor Output	BNC Connector
Trigger Input, Trigger Output	BNC Connector
RS-232	D-Sub-9, female
Power Supply	 <p>M8 Connector Pin 1 = +15V Positive Supply Pin 3 = -15V Negative Supply Pin 4 = Ground</p>

Functional Description

The A759-001 contains four independent and separately shielded analog charge amplifiers. By means of a four position select switch, the output of any one of them can be monitored.

A charge pulse at the input is transformed to an output pulse with its pulse height directly proportional to the input charge content, independent of input pulse length (for 500 ns to 20 μ s) or shape.

The peak of the four channels is simultaneous sampled and digitized. The input trigger pulse must be synchronous to the input charge pulse, to ensure sampling at the maximum of the output pulse. A polarity switch is provided to select the rising or falling edge of the trigger signal. The trigger output can be used to confirm correct timing. It is high during sampling of the output peak.

The peak is sampled 8 times and averaged. The pre-trigger baseline is also sampled 32 times and averaged. The output data is the difference between average of peak and baseline, so any DC drift is suppressed.

The result is transmitted as ASCII text via the galvanically isolated RS-232 serial interface.

For each input trigger pulse one line of text with following format is transmitted:

Q1=Saaaaa;Q2=Sbbbbbb;Q3=Scccccc;Q4=Sddddd;/f/cr

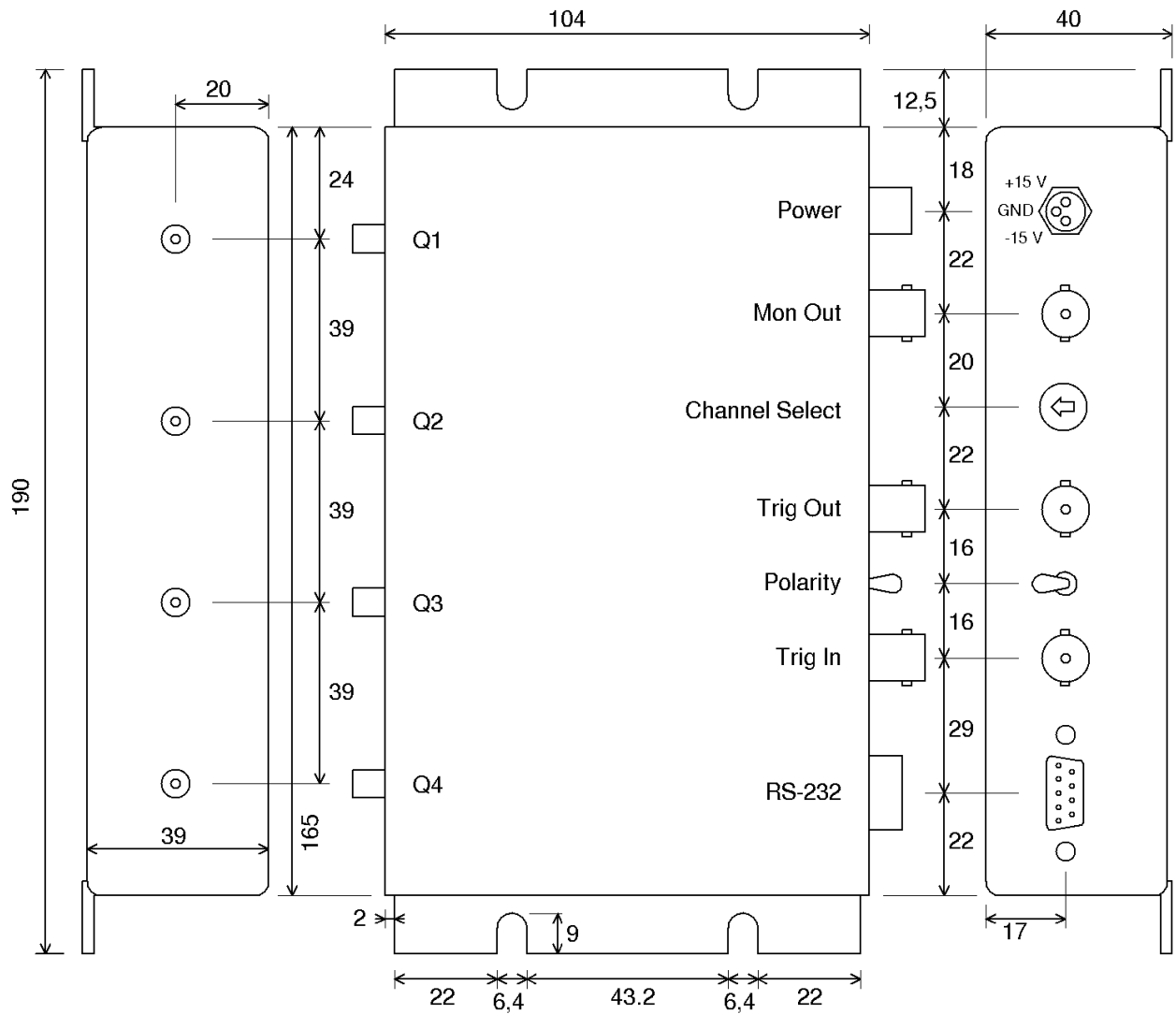
(/cr und /lf are for carriage return and line feed, S is the sign and aaaaa and so on are the 5 digit decimal values of the respective conversion, the sign is always + or -, the zero is +)

For example: Q1=+00008;Q2=-00007;Q3=+00000;Q4=-00005;

The values are ADC-Counts, the maximum unipolar pulse (about 10 Vp at analog monitor output) resembles 8192 counts.

The amplifier is non-inverting, so positive charge gives positive numbers, and negative charge gives negative numbers.

Dimensions



A759-001 Dimensions are in mm

Power Supply is a female 3-pin industry standard M8-connector.