

# RA8GA Adjustable Gain PreAmp



## RA8GA Overview

The RA8GA was designed to acquire and digitize multi-channel data from a variety of analog voltage sources such as eye-trackers, amplifiers (including grass, axon, and WPI amplifiers), PH meters, and temperature sensors. The RA8GA digitizes up to eight channels at acquisition rates of 6, 12, or 25 kHz. All channels have a variable group gain setting of 10 Volts, 1 Volt, or 100 millivolts. The system has a bandwidth to DC, which allows users to acquire low frequency DC signals. In addition a two-pole low pass filter (12 dB per Octave) is set at 7.5 kHz.

## Power and Interface

The device is powered via the System 3 zBus (ZB1PS) and requires an interface to the PC. If the RA8GA is housed in one of several ZB1PS chassis in your system, ensure that it is connected in the interface loop according to the installation instructions: Gigabit, Optibit, or USB Interface.

## RA8GA Features

### Max Input Lights

The Active light flashes once a second when the preamplifier is not connected to a base station. It glows steady when it is properly connected.

The 10 V, 1 V, and 0.1 V lights indicate the current acceptable voltage range. If the signal input reaches -6 dB from the maximum input for the selected range, a clip warning light on the base station will be lit. On RX5 or RX7 processors the LED located next to the fiber optic input port serves as the clip warning light.

### Range Select Button

All channels use a group adjustable gain control i.e. all channels are either +/- 1 Volt, 10 Volts, or 0.1 Volt. A Range Selection button adjusts the gain setting among the following voltages: 0.1X gain = +/-10 Volts, 10X gain = +/- 100 milliVolts, 1.0 X gain = +/-1 volt. Press the button to scroll through the available

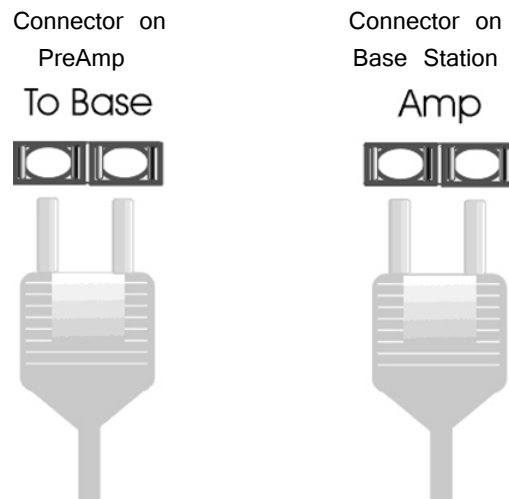
voltage ranges. Max input lights located to the left of the button, indicate the current selection.

## To Base

The To Base connector is used to connect the device to the base station (such as RA16BA, RX5, or RX7) using a fiber optic cable pair. One end of the fiber optic cable connects to the device using this connection pair and the other end connects to the input on the base station.

## Connecting the Base Station to the Preamplifiers

To make the connection, plug one end of the cable into one of the fiber optic connectors as shown below and connect the other end of the cable to the fiber optic port on the base station. Both ends of the cable are the same but the two sides of the connector are different. See the diagram below to determine the correct way to make the connection for each device.



## Analog Input

Each Preamp comes with eight channels of analog input. Each analog input uses 16-bit PCM parts for high quality signal conversion. See the technical specifications for a Pinout Diagram for the 25-pin Analog Input connector.

A PP16 patch panel can be used to simplify connection to the preamplifier's analog inputs. A ribbon cable can be connected from the RA8GA Analog I/O connector to the RA16 connector on the back of the PP16 allowing acquisition of signals via the first eight BNC connectors on the front of the PP16.

## RA8GA Gain Settings

Gain	Voltage	RPvdsEx Scale Factor
0.1	+/-10 V	1700
1.0	+/- 1 V	170
10.0	+/- 0.1 V	17

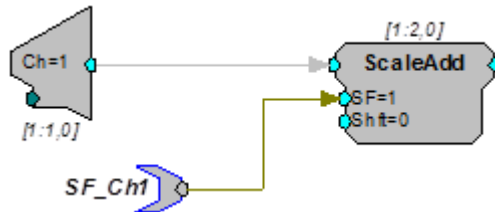
## Accounting for Gain Settings in RPvdsEx

The output from a RA8GA generates a floating-point value of between +/- 6 mVolts (i.e. the voltage value of the RA16PA). A scale factor must be used in order for the acquired signal to display the correct voltage. The scale factor for each gain setting is listed in the table above. The scale factor should be added after the channel input (AIn).

The following example shows a circuit segment that could be used to add the scale factor for a +/- 1 Volt range:



A parameter tag may be used to allow the scale factor of the channel input to be modified at run-time.

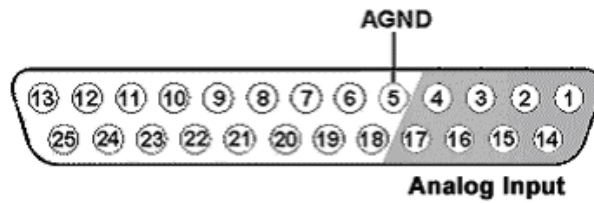


## RA8GA Technical Specifications

A/D	8-channels 16-bit PCM
Maximum Voltage In	Variable gain settings allow +/-10V, +/-1 V or +/- 100 mV
Frequency Response	DC - 7.5 kHz (2nd order 12 dB per octave)
S/N (typical)	70 dB (+/- 1 V 1000 kHz) at 1 V Gain Setting
THD (typical)	0.01%

<b>A/D Sample Rate</b>	6, 12, or 25 kHz
<b>Cross Talk</b>	< -70 dB (DC - Nyquist)
<b>Input Impedance</b>	10 kOhm
<b>Offset</b>	< 5 mV at +/- 10 V < 3 mV at +/- 1 V and +/- 100 mV

### Analog Input Pinout Diagram



Pin	Name	Description	Pin	Name	Description
1	A1	Analog Input Channels	14	A2	Analog Input Channels
2	A3		15	A4	
3	A5		16	A6	
4	A7		17	A8	
5	AGND	Ground	18	NA	Not Used
6	NA	Not Used	19		
7			20		
8			21		
9			22		
10			23		
11			24		
12			25		
13					