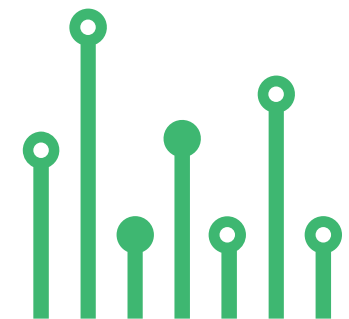


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MISCELLANEOUS



Voltage Attenuator



SKU: EL143578

Voltage Attenuator



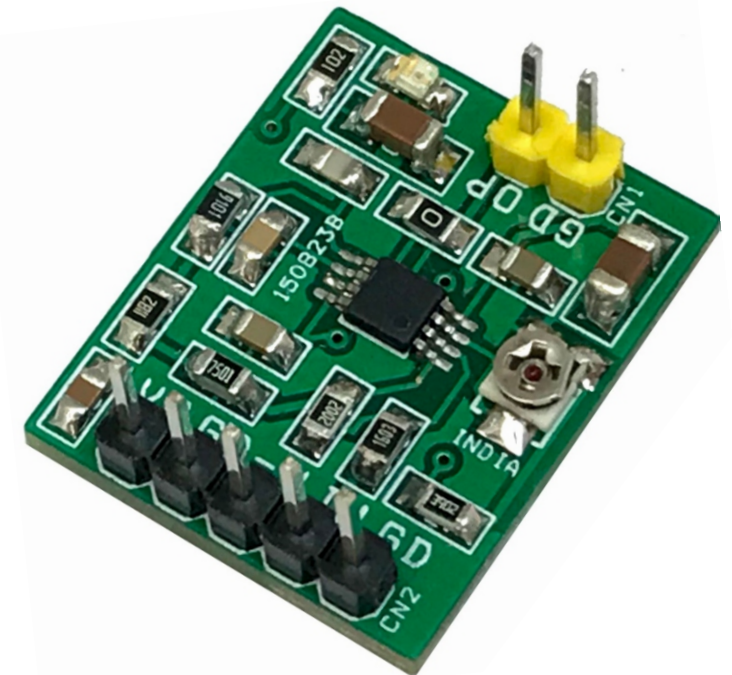
The project shown here converts bipolar $\pm 10\text{V}$ (Dual 10V) signal and provides a single-ended 0 to 5V signal. The circuit attenuates a $\pm 10\text{V}$, 10KHz bandwidth bipolar signal converts to a single-ended signal, and also filters it by a 3rd-order Butterworth filter to drive a single-ended analog-to-digital converter (ADC). The project was built using OPA2206 OPAMP which protects the input signal from overvoltage up to 40V beyond either supply. The board can be used for applications such as programable logic controllers (PLCs), low-power data acquisition systems (DAQs), and field instruments where high precision, low power, and signal fault protection are needed. OPA2206 is ideal for this application because of the high supply range, high DC precision (4-uV offset and 0.08-uV/C offset drift), and low power consumption (220uA quiescent current) that minimizes the thermal dissipation requirements. Because of the internal OVP topology, the device provides better DC and AC accuracy under normal operating conditions compared to passive external protection and results in a smaller system solution.



Info: PR1: Set a voltage of 2V at pin 3 of the chip using trimmer potentiometer Pr1.

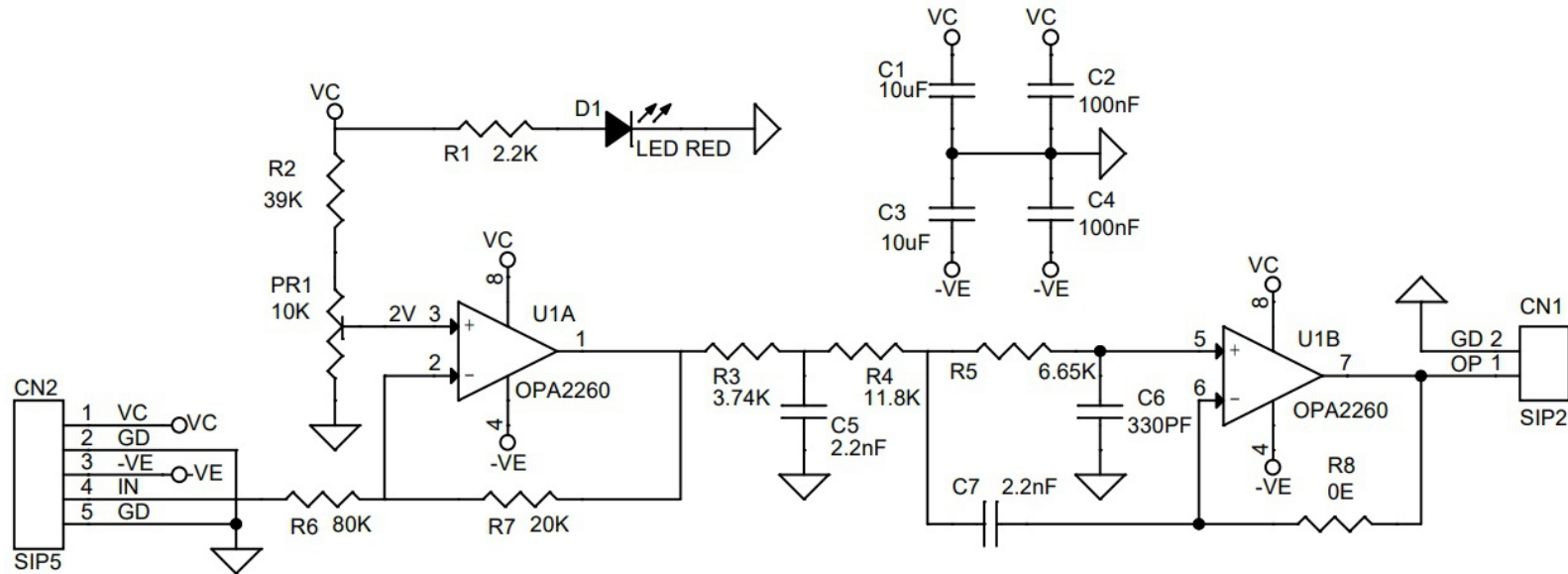
FEATURES

- Power Supply $\pm 12\text{V}$ DC (Dual 12V DC)
- Input signal range: $\pm 10\text{V}$
- Input signal frequency: up to 10 kHz
- 3rd-order Butterworth filter -3-dB frequency: 20 kHz
- Output voltage: 0 V to 5 V
- Trimmer Potentiometer to Adjust the Offset (
- Input protection: up to $\pm 52\text{V}$
- PCB Dimensions 22.38 X 18.26MM

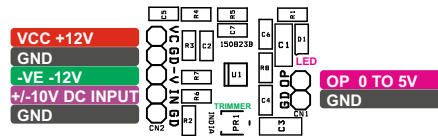


The first stage of the signal chain is an attenuator and level shifter. The input signal to this stage is bipolar $\pm 10\text{ V}$ that is attenuated to $\pm 2.5\text{ V}$, then is level-shifted so that the output is a single-ended, 0 V to 5 V signal. The feedback and gain resistors were selected as $20\text{ k}\Omega$ and $80\text{ k}\Omega$, respectively. Thus, the combined impedance is $100\text{ k}\Omega$, which lowers the input current to the signal chain and minimizes errors resulting from higher output impedance sensors. The second stage of the signal chain uses the second channel of the OPA2206 to create a 3rd-order Butterworth filter with a -3-dB response of 20 kHz . For more information on filter design, please refer to the datasheet.

Schematic



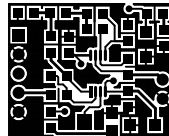
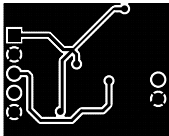
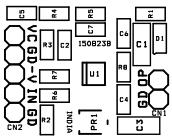
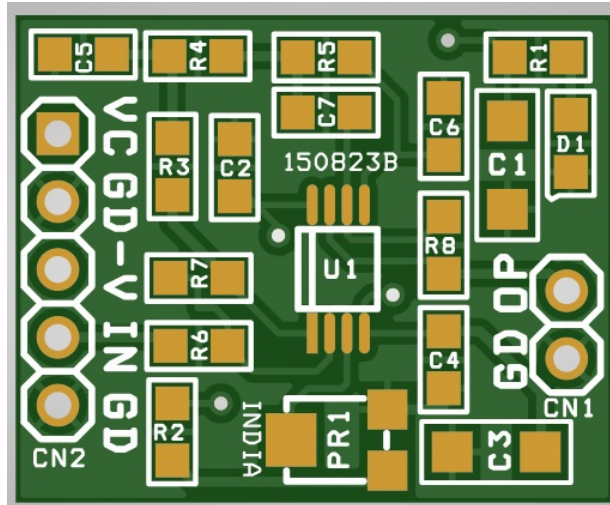
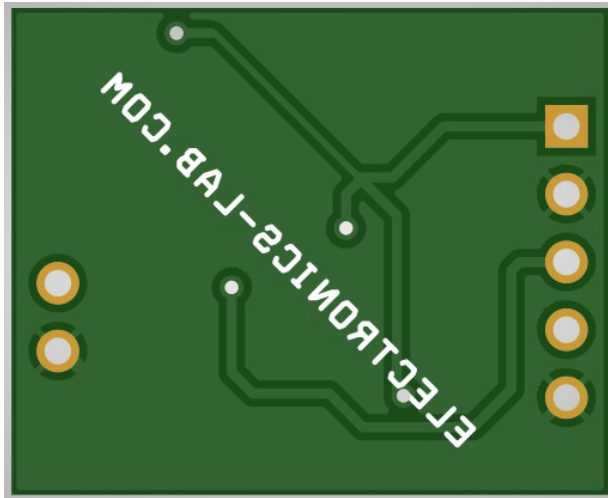
Connections



Connections

- CN1: Pin 1= Signal Output 0 to 5V, Pin 2 = GND
- CN2: Pin 1 = VC +12V, Pin 2 = GND, Pin 3 = -VE -12V, Pin 4 = +/-10V Signal Input, Pin 5 = GND
- D1: Power LED

PCB



SILK SCREEN TOP

BOTTOM LAYER

TOP LAYER

PCB DIMENSIONS 22.38 X 18.26MM

Parts List

BOM						
NO.	QNTY.	REF.	DESC.	MANUFACTURER	SUPPLIER	SUPPLIER PART NO
1	1	CN1	2 PIN MALE HEADER PITCH 2.54MM	WURTH	DIGIKEY	732-5315-ND
2	1	CN2	5 PIN MALE HEADER PITCH 2.54MM	WURTH	DIGIKEY	732-5318-ND
3	2	C1,C3	10uF/25V CERAMIC SMD SIZE 1206	YAGEO/MURATA	DIGIKEY	
4	2	C2,C4	100nF/50V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
5	2	C5,C7	2.2nF/50V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
6	1	C6	330PF/50V CERAMIC SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
7	1	D1	LED RED SMD SIZE 0805	LITE ON INC	DIGIKEY	160-1427-1-ND
8	1	PR1	10K TIMMER POTENTIOMETER SMD 3.65X3MM	TT ELECTRONICS	DIGIKEY	987-1694-1-ND
9	1	R1	2.2K 5% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
10	1	R2	39K 5% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
11	1	R3	3.74K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
12	1	R4	11.8K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
13	1	R5	6.65K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
14	1	R6	80K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
15	1	R7	20K 1% SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
16	1	R8	0E SMD SIZE 0805	YAGEO/MURATA	DIGIKEY	
17	1	U1	OPA2260 VSOP	TI	DIGIKEY	296-OPA2206ADGKTCT-ND

Notes



APP

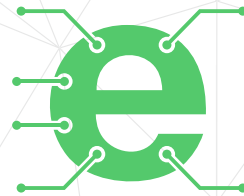
Android App

DOWNLOAD

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SCAN QR CODE





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