USBPBP-S1 USB Programmable Single Channel Instrumentation Amplifier, and Band Pass Filter

- USB 2.0 compatible communication for setup and control
- Non-volatile configuration retains all settings through power cycles
- Does not need to be attached to a PC to operate
- AC/DC converter included for 115VAC or 220VAC power
- Optional 9 to 12V battery operation
- Compatible with any 12-, 16, or 24-bit A/D converter device
- Differential or single ended input with software selectable amplifier gains of 1 to 1000
- ± 10Vmax Signal Input and Output with input protection up to ±40V
- Filter rejection band attenuation up to -90dB
- Low Pass Filter available as 8-pole Butterworth, Bessel, elliptic(Cauer), or linear phase characteristic.
- Low Pass Software select any Corner Frequency (Fc) from 0.1 Hz to as high as 200 kHz (refer to filter characteristic specification for details)
- High Pass Filter available as 4-pole Butterworth or Bessel.
- High Pass Software select any Corner Frequency (Fc) from 10Hz to 1275Hz in HyN model (1100Hz to 41.5kHz in –HyE model)
- Use multiple USBPBP-S1 units for multi-channel applications
- Each USBPBP-S1 low pass filter can be used in dynamic tracking
- Windows 7/Vista/XP compatible menu setup software

Adaptable to most applications in the field, on the factory floor, or in the lab

The USBPBP-S1 stand alone USB controllable module provides a single channel of high and low-pass filtering and high-quality instrumentation amplifier for front-end signal conditioning compatible with all popular A/D converter devices.

The USBPBP-S1 is powered with 9 to 12VDC so it can be connected to a battery voltage source or the supplied 115-220VAC adapter may be used for operation with wall power anywhere in the world.

When programmed from the USB port, the USBPBP-S1 will remember all of the programmed properties between power cycles. Program once and operate as a stand-alone signal conditioner without having to reprogram for every use. This is perfect for turn-key applications.

It's easy to connect the USBPBP-S1 into the data collection system. Input and output signals can be routed through BNC connection or using the detachable screw terminal connectors. Optional SMA type adapters are also available.

Mix and match filter characteristics at will

Each USBPBP-S1 is factory configured with a wide choice of low pass filter characteristics. Choose from Butterworth, Bessel, elliptic(Cauer), or linear phase filters. High stop-band attenuation of -90dB is available. The high pass filter section choices are Butterworth or Bessel.

Protection from high input voltages

The USBPBP-S1 provides strong input protection and can withstand up to +/-40V at the analog signal input.

Amplify and then filter to improve signal

The USBPBP-S1 high-quality instrumentation amplifier provides software-selectable gain as well as differential inputs with high-common mode rejection. Gain can be set at 1, 2, 5, 10, 20, 50, 100, 200, 500 or 1000. Most A/D devices provide a gain amplifier stage. For applications where the target signal is imbedded in high voltage noise, the USBPBP-S1 gain can be set to 1 to filter the signal first and then amplify with the A/D converter gain. For all other applications it is recommended to amplify small voltage input signals before filtering to maximize the signal to noise ratio of the sampled signal. The USBPBP-S1 Instrumentation Amplifier provides an excellent common-mode rejection of 90 to 100 dB typical at high gains.

Software select any high and low pass corner frequency to create a customized Band Pass Filter

The corner frequency of each USBPBP-S1 filter is software controlled to select any corner frequency. The high pass filter can be set from 10Hz to 1275Hz. The high pass extended factory option can be set from 1100Hz to 41.5kHz, The low pass filter corner frequency selection is from 0.1Hz to the maximum frequency of each factory installed filter characteristic. Control the Butterworth filter up to 100kHz. Control the Bessel filter up to 66kHz. Control the Elliptic filter up to 50kHz and the high frequency Elliptic to 100kHz. Control the Linear Phase filter up to 200kHz. Each USBPBP-S1 module in a multi-channel data collection system can have a unique filter characteristic, a unique set of corner frequencies, and a unique amplification. Optionally, an external clock signal can be used to control the low pass corner frequency in tracking filter applications.

All Software is Included

The USBPBP-S1 comes with a complete menu-driven program.

SystemViewUSBPxx is a ready-made Windows NT,XP,Vista compatible application that uses a few simple mouse clicks to program the parameters of each USBPBP-S1 connected to the PC. Once selected, the desired parameters are set and saved to non-volatile memory in the USBPBP-S1 so that they are reapplied after every subsequent power up.

An ActiveX control is provided for custom software development. The COM interface of the ActiveX control can be integrated into any high level language application.

Ordering information

USBPBP-S1/L(xx)H(yz)

xx = low pass characteristic
y = high pass characteristic
z = high pass range

High Pass Range Options
Normal range   z = N
 Continuously tunable from 10Hz to 1275Hz
Extended range   z = E
 Continuously tunable from 1100Hz to 41.5kHz

High Pass Filter Options
4-pole Butterworth   y = B
4-pole Bessel   y = L

Low Pass Filter Options
Continuously tunable from 0.1Hz to maximum bandwidth
8-pole Butterworth 100kHz bandwidth   xx = B
 Stop band rejection 90dB Typ. Phase Match 0.9° @Fc/2 Typ.
8-pole Bessel 66kHz bandwidth   xx = L
 Stop band rejection 84dB Typ. Phase Match 1.0° @Fc/2 Typ.
8-pole Cauer Elliptic 50kHz bandwidth   xx = CE
 Stop band rejection 72dB Typ. Phase Match 2.5° Typ.
8-pole Cauer Elliptic 100kHz bandwidth   xx = HC
 Stop band rejection 90dB Typ. Phase Match 0.2° @Fc/2 Typ.
8-pole Linear Phase 100kHz bandwidth   xx = LP
 Stop band rejection 88dB Typ. Phase Match 1.0° @Fc/2 Typ.
8-pole Linear Phase 200kHz bandwidth   xx =H LP
 Stop band rejection 88dB Typ. Phase Match 1.0° @Fc/2 Typ.
Frequency control sources....1 internal or 1 external

Instrumentation Amplifier Section
Gain of 1, 2, 5, 10, 100, 200, 500, 1000 Software selectable
Gain Error ....<±.0.001dB @ 1kHz at gain of 1
Gain Tolerance ....@2-100   0.15%max
....@200-1000   0.3% max
CMRR.................................75dBmin, 86dB typ. at gain of 1
Common Mode Voltage ....+/-10V max

Input Voltage .... +/-10V max at gain of 1
Input Protection .... +/-40V max, with power off or on
Input Impedance .... 20MΩ differential (10MΩ each side to analog ground)
DC offset, Factory Adjusted..<±.0.01mV
DC offset vs. temperature.....<±20 µV/°C
DC offset, long term drift.......<±5 µV/Month
Output impedance.................<0.01 Ω

Channel to Channel Phase matching
End user phase match calibration by varying HPFc can result in channel to channel phase match as small as
.... 0.23° at target pass band frequency

Physical
Number of channels 1
Size   108mm(4.25")x83mm(3.25")x28mm(1.125")
Power consumption.............. 500mA at +9VDC
Operating temperature .... 0°C to 70°C

Software

SystemViewUSBPxx .... Windows 7/Vista/XP compatible

System Accessories

Connectors

USBPxx-S1/STA	Screw terminal adapter kit(one 2-lead STA and two 3-lead STA)
USBPxx-S1/SMAM	two BNC to SMA Male adapters
USBPxx-S1/SMAF	two BNC to SMA Female adapters

Power Adapters

P9V500MA	Universal to 9V DC 500mA
PAP-NA	Power Adapter Plug North America
PAP-EU	Power Adapter Plug Europe
PAP-AS	Power Adapter Plug Australia