The PFI-9602 amplifier provides precise low-noise and wide bandwidth amplification to low-level voltage signals. The sharp, selective response of the filters provides alias protection for lower sampling rates. Outstanding channel-to-channel phase and amplitude match makes the PFI-9602 ideal for applications where time coherence between channels must be maintained.

The PFI-9602 is equipped with a fully programmable 6-pole, 6-zero low-pass filter and a distributed gain amplifier. The low-pass filters may operate either in a “flat” mode for maximally flat passband amplitude response with sharp roll-off or in a “pulse” mode for low phase distortion and optimized transient response. The “flat” mode provides passband characteristics nearly identical to a Butterworth filter while providing a much sharper roll-off. This mode provides optimal response for applications such as spectral analysis. The “pulse” mode has transient response similar to the Bessel filter yet provides superior amplitude characteristics. The “pulse” mode is ideal for time domain applications including transient (shock) measurements and waveform analysis.

The filter cutoff frequency may be programmed from 10 Hz to 100 kHz in over 200 steps. Gain is programmable from 1 to 3000 and is distributed around the filter to provide protection against large out-of-band energy or transients present in resonant sensors that could cause clipping before the filter, distorting the data. The optional current source accessory allows for direct connection to IEPE microphones or accelerometers.
### Input Characteristics:

**Type:**
Balanced differential input with programmable AC/DC coupling

**Input Impedance:** 10 MΩ || 3 pF per side

**Programmable AC Coupling Frequency:**
0.25 Hz (–3.01 dB)

**Max Level (AC + DC + Common Mode):**
±5 Vpk for f ≤ 127 kHz; ±5 Vpk x (127 kHz/f) for f > 127 kHz

**Protection:**
15 V continuous, 50 Vpk for 1 mS, 10% duty cycle

**Noise:**
- **RES OFF:** 12 nV per root Hz RTI at 1 kHz & gain ≥x100
- **RES ON:** 12 nV per root Hz RTI at 1 kHz & gain ≥x1000

**Drift:** 2 μV/°C, RTI

**CMRR:**
- **DC Coupled:** G ≥10, RES OFF; G ≥100 RES ON
  100 dB, DC to 1 kHz; 80 dB, 1 kHz to 10 kHz
- **AC Coupled:** G ≥10, RES OFF; G ≥100 RES ON
  80 dB, 50 Hz to 10 kHz

**Sensor MUTE Mode:**
Terminate unused channels or channels with faulty sensors in quietest state

### IEPE Input Option (Option I):
Requires PFI-IEPE-9602 Input Adapter Accessory

**Type:** AC-Coupled single-ended input

**Input Connectors:** 2 ea. Microdot (10-32) inputs

**Current Source:** 2.5 mA, nominal

**Current Source Compliance Voltage:** 22 V

**AC Coupling Frequency:** 0.5 Hz

### Amplifier:

**Programmable Gain:**
- x1, 3, 10, 30, 100, 300, 1000, 3000

**Out-Band Reserve:**
Gain is distributed around the filter to accommodate and remove out of band signals larger than the in-band signal of interest without signal clipping.

**Reserve Settings:** OFF (3) or ON (30)

**DC Accuracy:** 0.1%

**DC Temperature Coefficient:** ±0.001% /°C

**DC Linearity:**
0.01% re: Full-scale, relative to best straight line
The LP6F and LP6P 6-pole low-pass filters have the versatility to address applications in either the time or frequency domain. Simply program the filter characteristic to match your measurement requirements.

**Flat Mode Low-Pass Filters**

The LP6F Flat mode characteristic has a passband amplitude response nearly identical to the 6-pole Butterworth yet has much sharper roll-off characteristics. This makes the LP6F a good choice for spectral analysis or for anti-aliasing applications.

The LP6F may be used to effectively reduce resonant peaking of transducers while maximizing the useable bandwidth.

**Anti-Aliasing Applications**

When used for anti-aliasing applications, the LP6F provides more usable bandwidth for a given sampling frequency.

The input to output time delay of the LP6F and Butterworth are not constant versus frequency as a consequence of the nonlinear phase property of these filters. Filters with linear phase, such as the Precision LP6P, have linear phase and thus constant delay for all frequencies in the passband.

The LP6F may be used to effectively reduce resonant peaking of transducers while maximizing the useable bandwidth.

**Pulse Mode Low-Pass Filters**

For the time domain, the LP6P Pulse mode low-pass filter has the excellent transient response and phase linearity required for time domain applications such as transient (shock) measurements and time domain waveform analysis.

When compared to a 6-pole Bessel filter, the LP6P has similar pass-band characteristics yet has much sharper transition slope from passband to stopband.

**Flat/Pulse Low-Pass Filters**

The PFI-9602 has a flexible high performance 6-pole low-pass filter characteristic that can be optimized for time or frequency domain measurements.
Amp

Programmable LP6F or LP6P Low-Pass Filter

Overall Gain: x1, 3, 10, 100, 300, 1000, 3000
Programmable Fc’s = 10 Hz to 1.27 kHz in 10 Hz steps
2 kHz to 127 kHz in 1000 Hz steps

Auto Calibrate

Certifications

CE, EX European Union Hazardous Locations, ROHS
Safety Standards:
EN 61010-1
EMC Standards:
EN 61326-1
Hazardous Location Standards:
EN 60079-0 & EN 60079-15

Physical:
NI C Series Compatible
Input Connector: 9-pin D sub
Output Connector: 2 ea. SMB jack
Test Bus Connector: 2 ea. SMB jack
Weight: 6 oz.

Accessories

PFI-IEPE-9602 Input Adapter:
2 ea. Microdot Input Connectors supply 2.5 mA IEPE current source to connected sensor

CONN-IN-9D Mating Input Connector with metal backshell and crimp contacts

CONN-IN-9D-SC Mating Input Connector with metal backshell and solder cup contacts

CONN-IN-9D-SCT Mating Input Connector with metal backshell and screw terminal connections

CB-SMB/BNCM-L: SMB plug to BNC male cable; 
L = 0.5, 1, 3, 10 feet

CB-SMB/PIGTAIL-L:
SMB plug to prepped/tinned leads for NI screw terminal connections; L = 0.5, 1, 3, 10 feet

CB-16XSMB/DC37S-L:
16 SMB plug to DC37 sockets for connection to NI 9220; L = 1, 3 feet

CB-SMB/SMB-L:
SMB plug to SMB plug cable for bussing test input; 
L = 0.5, 1 feet

Ordering Information

PFI-9602-<I>
Option I: IEPE Current Source 
(Requires PFI-IEPE-9602 Adapter)
2-Channel Filter/Amplifier Module

PFI-IEPE-9602 Input Adapter Diagram

PFI-9602 Channel Block Diagram

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