



Precision 28000 Signal Conditioning System

The standard for the world's most discriminating test labs



The **Precision 28000 Signal Conditioning System** provides all the flexibility you need to manage your test measurements.

The Precision 28000 makes it easy to manage a test with hundreds of channels and a mix of programmable transducers. Choose bridge, charge, IEPE w/TEDS, voltage (filter amplifier), strain, thermocouple, RTD/potentiometer, frequency, or other transducers. Customize the 28000 for high-speed transient applications, static applications, or a combination of both.

The 28000 employs a graphical user interface (GUI) and a collection of algorithms to help you manage your measurements. The GUI provides control panels for configuration setup, operation and test. The 28000 can also be controlled as a server on an Ethernet network.

The built-in test hardware and software (optional) provide quick go/no-go measurements which can be run before each test, and rigorous factory acceptance tests to assure you that the 28000 meets your most stringent requirements for critical applications. It won't be long before these tests earn a permanent place in your maintenance routine. And since they are traceable to NIST, they eliminate the need for off-site calibration.

In every phase of your tests—record keeping, installation, design, set-up, operation, maintenance and upgrading—the Precision 28000 offers ways to help you save time and money over the life of the system.

Applications

Aerospace

- Structural Vibration
- Rocket Engine Test
- Aerodynamics - Wind Tunnels

Aircraft Engines

- Aircraft Engine and APU Test
- Component Test

Energy

- Gas, Wind and Steam Turbines
- Nuclear
- Oil and Gas
- Hydro-electric

Transportation

- Automotive
- Trucks and Busses
- Rail

Marine

- Underwater Acoustics
- Navy Surface Ships
- Submarines
- Commercial Shipbuilding

Shock

- Weapons and Ordnance
- Survivability/Lethality

System Benefits

- Manage hundreds of channels with a mix of sensors
- Friendly system setup via local or remote GUI and Ethernet network interface
- Assure system integrity before performing measurements
- Reduce life-cycle costs
- Automated factory acceptance and go/no-go tests verify performance
- Upgrade and expand as equipment and requirements change
- Count on unsurpassed performance and reliability

Transducer Conditioning

- Resistive bridge
- Static and dynamic strain
- RTD/potentiometer
- Thermocouple
- Pressure
- Load cells
- Frequency to Voltage
- Charge
- Voltage
- Integral Electronics Piezoelectric (IEPE) w/TEDS Accelerometers



PRECISION FILTERS, INC.
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Salient Features

Transducer Conditioning

- Mix up to 256 channels of fully programmable transducer conditioners in a single system.
- Condition charge, bridge, voltage, F-to-V, IEPE w/TEDS, dynamic strain, RTD/potentiometer, and thermo-couple.
- Choose from 4, 6, or 8-pole programmable filters—greater than 100 dB/octave and cutoffs from 1 Hz to 204.6 kHz.
- Up to 700 kHz amplifier bandwidth.

System Control

- Graphical User Interface (GUI) for system control.
- Intelligent gain and system scaling algorithms.
- Ethernet network interface.
- Easily manage hundreds of channels with a mix of sensors in one system.
- Control up to eight systems with one PC controller.

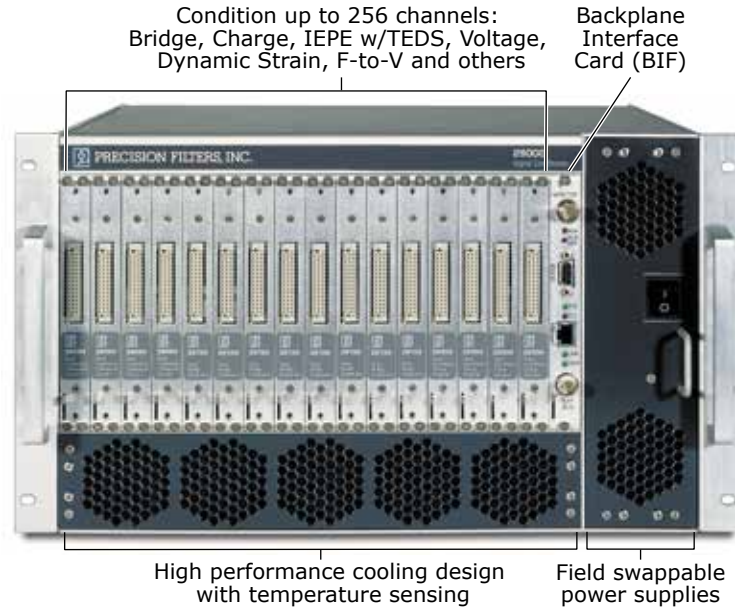
System Integrity

- Verify system performance with self-tests traceable to NIST while reducing life-cycle costs and eliminating the need for off-site calibration.
- Go/No-Go tests with diagnostics to be used before performing measurements.
- Test input and output monitor busses.
- Check transducer health, cabling and connections with verification techniques tailored to each transducer type.
- Built-in temperature and power supply monitoring with alarms.

System Flexibility

- Upgrade and expand equipment as requirements change.
- Customizable with field choice of I/O adapters, and output adapter modules to provide multiple buffered outputs per channel, RMS-to-DC converters, and other functions.
- Designed for high speed transient applications, static applications, or a combination of both.
- Stand-alone or remote operation.

28000 System Mainframe



28016-M3 16-slot chassis uses 10.5 inches of rack space.

Three mainframes are available for the 28000 system. For larger channel count configurations, the 28016 provides sixteen slots for signal conditioner cards. The 28008 8-slot chassis is more suitable for moderate channel count configurations. The 28004 4-slot chassis is ideal for small channel count systems where portability is important.

All 28000 mainframes accept field replaceable, low-noise AC power supplies to provide clean power to the signal conditioner cards. Binding posts at the rear panel are provided for connecting circuit and chassis grounds. Internal monitoring and reporting of system power supply levels is supported by the 28000 system architecture. System temperature monitoring is provided and an audible alarm is sounded should the internal chassis temperature exceed factory limits or should a cooling fan operate out of specification.

Cards are inserted/ejected through the front of the 28000 system. Most analog input and output signal interfacing is at the rear panel of the 28000 chassis. The rear panels of the mainframes have cutouts to allow low-level signal input cables to be mated directly to the conditioner cards for optimal signal-to-noise performance. Cables are attached to the rear panel using screw

locks. Cards may be inserted and removed from the system without disconnecting cables at the rear panel.

The 28000 chassis with the M3 output option supports two and four channel card outputs with integrated 50-pin D-shell connectors at the rear panel. The M5 output option provides a 26-pin D-shell connector per slot at the rear panel to support all 28000 signal conditioning card outputs including the 28316C 16 channel card.

Precision Filters offers a wide variety of connector and cabling options in order to seamlessly integrate the 28000 into an existing cabling environment. Adapters to convert multi-pin connectors to BNC type are available as well as rugged cable assemblies and connector panels. Auxiliary output modules may be added to several 28000 cards to supply additional buffered outputs per channel with a variety of connector options.

The 28000 mainframes are equipped with TEST and MONITOR analog busses that allow the user to insert test signals to any conditioner input and monitor any signal conditioner output without disconnecting signal cables. Additionally, the TEST and MONITOR busses are used by the 28000 Test Subsystem for Factory Acceptance and Go/No-Go Tests.



28008-M3/M5 compact 8-slot chassis requires 5.25 inches of rack space.



28004-M3/M5 portable 4-slot chassis only requires 3.5 inches of rack space.

Power Supplies

Field replaceable, low-noise AC power supplies provide clean power to the signal conditioning cards. The 28000 system supports internal monitoring and reporting of power supply voltage levels. Internal temperature and fan operations are also monitored, sounding an alarm if conditions are out of specified limits.

Power supplies are available for 120 VAC, 220 VAC, 240 VAC and 100 VAC line voltage requirements.

All 28000 systems are configured with the proper power supply and fuse(s) for your country when shipped from the factory, unless other requirements are specified.

Power Supplies for 28016 Mainframes

- 28016-ACPS-1:** 120 VAC Power Supply
- 28016-ACPS-2:** 220 VAC Power Supply
- 28016-ACPS-3:** 240 VAC Power Supply
- 28016-ACPS-4:** 100 VAC Power Supply

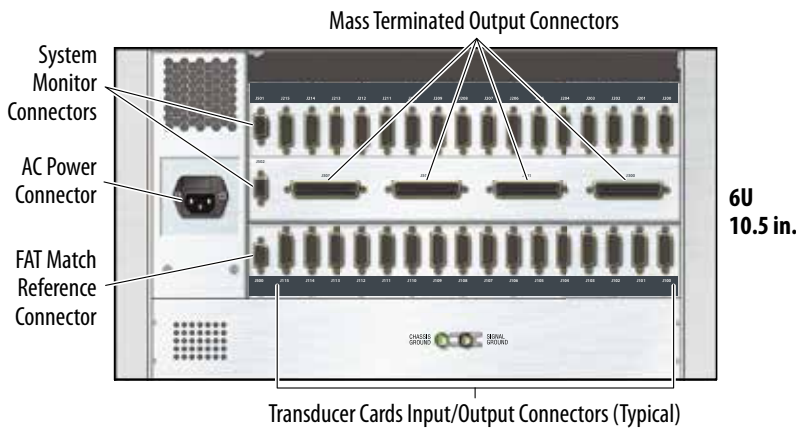
Power Supplies for 28008 Mainframes

- 28008-ACPS-1:** 120 VAC Power Supply
- 28008-ACPS-2:** 220 VAC Power Supply
- 28008-ACPS-3:** 240 VAC Power Supply
- 28008-ACPS-4:** 100 VAC Power Supply

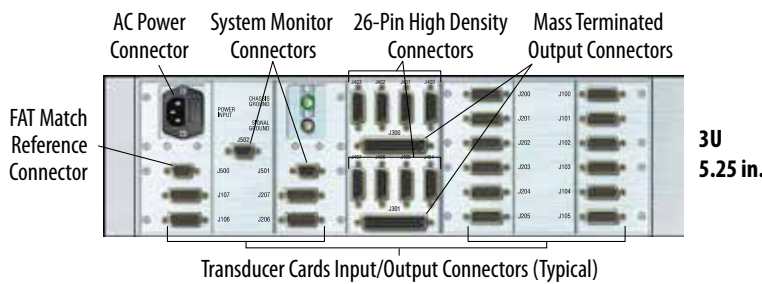
Power Supplies for 28004 Mainframes

- 28004-ACPS-1:** 115 VAC
(operating range of 104 to 126 VAC)
- 28004-ACPS-2:** 230 VAC
(operating range of 207 to 253 VAC)

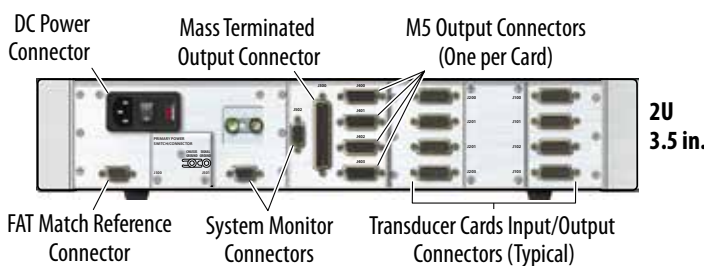
Mainframe Rear Panels



28016-M3 Rear Panel



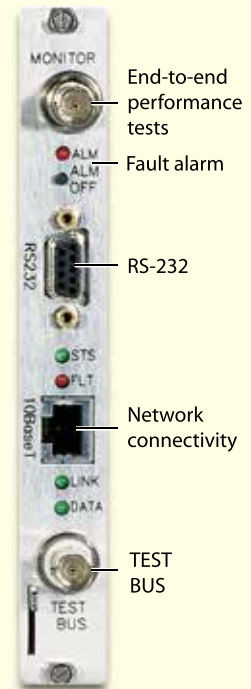
28008-M3/M5 Rear Panel



28004-M3/M5 Rear Panel

Backplane Interface Card (BIF)

The 28000-BIF1-T backplane interface card (BIF) provides communication and control support to the 28000 system. The Graphical User Interface (GUI) control program is included with the BIF. Option F provides Factory Acceptance Test (FAT) and Go/No-Go Test (GNG) hardware and GUI software support for all 28000 transducer conditioning cards.



Control to the 28000 system is by either the supplied GUI or via a remote connection using high-level commands over an Ethernet interface. The RS-232 serial interface supports control of the system from the GUI software operating on a Windows compatible PC. Up to eight 28000 systems can be operated from a single controller.

An alarm indicator on the BIF front panel identifies system problems such as an over-temperature condition, a cooling fan failure, or faulty power supply voltages. The BIF front panel TEST BUS connector provides a means to connect an external test signal to the system's test bus. The front panel BNC MONITOR connector may be used with a scope or other measurement device for viewing the output of a selected channel. The rear panel OUTPUT MONITOR connector is intended for use by the 28000-4A-TEST test subsystem DVM. System status and communication status LEDs are located on the front panel.



Backplane Interface Card (BIF) is installed in a dedicated card slot in the 28000 mainframe.

28000 Conditioner and Amplifier Cards

The Precision **28000 Signal Conditioning System** provides up to 256 channels of fully programmable transducer conditioning. Condition a mix of Charge, IEPE w/TEDS, Bridge, Dynamic Strain, Voltage, F-to-V, and others.

Dual Mode Current/Voltage Excitation Conditioners

Precision's **28144, 28124 and 28114 Quad Channel Conditioners** provide the versatility to condition a wide variety of constant voltage excited sensors including full bridges and sensors that require precise bridge completion. Use the balanced constant current excitation technology to perform 2 or 4-wire dynamic or static strain gage measurements. Choose the full-featured high performance 28144 card, the 28124 card for multiple filtered/wideband outputs or the 28114 for the best value. Both cards feature real time sensor health monitor of excitation, resistance and leakage.

Bridge Conditioners

Where applications call for high performance, high-channel density bridge conditioning, the **28108 and 28118 Octal Filter/Amplifiers with Constant Voltage Excitation** deliver low-noise and DC stability for either AC or DC bridge-based sensor or low-level voltage measurements. Stable and accurate balanced constant voltage excitation with remote sense is individually regulated and programmable per channel. Low-noise and low-drift amplification is distributed before and after the low-pass filter, providing protection against out-of-band noise. FLAT/PULSE low-pass filter technology with outstanding channel-to-channel matching for correlation measurements. The 28108 provides low noise, high CMRR performance with gain settings from x1/16 to x8,192 and 255 unique cutoff frequencies. The lower cost 28118 has gain settings from x1/16 to x1,024 with five programmable cutoff frequencies.

Dynamic Strain Conditioner

28458 Octal Dynamic Strain Conditioner is equipped with Precision's Balanced Constant Current technology so measurements of dynamic strain are much less susceptible to EMI pickup and lead resistance desensitization that plague single-ended constant current topologies. The 28458 features Precision's "on-the-fly" measurement of transducer resistance, excitation and leakage resistance, alerting the operator immediately to an out-of-tolerance condition. Detection of sensor open or short condition are also monitored and reported. AC dither test current allows evaluation of true sensor plus cable frequency response. Fully programmable PULSE/ FLAT filters with distributed gain for out-of-band noise protection.



Auxiliary output connector on the front panel allows for custom output adapter modules and is standard on many 28000 conditioning cards.

Conditioner and Amplifier Card Selection Guide

Card	Type	Channels/ Card	Application Transducer	Interface	Excitation
28144	AC/DC Voltage, Bridge, Static Strain, Dynamic Strain	4	Static or dynamic strain, pressure, RTD, load, accel, AC/DC filter/amp, any bridge type sensor	Prog. Bridge Completion, Shunt Cal, 2/4 Wire Const Current	Constant Voltage: 0 to 20.475 V; Balanced Constant Current: 0 to 20.475 mA; Balanced
28114	AC/DC Voltage, Bridge, Static Strain, Dynamic Strain	4	Static or dynamic strain, pressure, RTD, load, accel, AC/DC filter/amp, any bridge type sensor	Prog. Bridge Completion, Shunt Cal, 2/4 Wire Const Current	Constant Voltage: 0 to 20.475 V; Balanced Constant Current: 0 to 20.475 mA; Balanced
28124	AC/DC Voltage, Bridge, Static Strain, Dynamic Strain	4	Static or dynamic strain, pressure, RTD, load, accel, AC/DC filter/amp, any bridge type sensor	Prog. Bridge Completion, Shunt Cal, 2/4 Wire Const Current	Constant Voltage: 0 to 20.475 V; Balanced Constant Current: 0 to 20.475 mA; Balanced
28108	AC/DC Voltage, Bridge, Static Strain	8	Static strain, pressure, RTD, load, accel, AC/DC filter/amp, any bridge type sensor	2 to 6-wire w/ shield	Constant Voltage: 0 to 20.475 V
28118	AC/DC Voltage, Bridge, Static Strain	8	Static strain, pressure, RTD, load, accel, AC/DC filter/amp, any bridge type sensor	2 to 6-wire w/ shield	Constant Voltage: 0 to 20.475 V
28458	AC Voltage, Dynamic Strain	8	Dynamic strain, AC/DC filter/amp	2-wire w/ shield	Balanced Constant Current: 0, 5, 10, 15, 20 mA
28608B	AC/DC Voltage	8	Low-Level AC or DC amps and LP, HP or BP filtering	2-wire w/ shield	N/A
28618	AC/DC Voltage	8	Low-Level AC or DC amps and LP, HP or BP filtering	2-wire w/ shield	N/A
28612	AC/DC Voltage	2	Low-Level AC or DC amps and LP, HP or BP filtering	2-wire w/ shield	N/A
28524	Freq. to Voltage, Pulse Rate Conditioner	4	Frequency counter, pulse rate, flow rate, Hall effect sensors	2-Wire w/Shield	N/A
28908	IEPE (GND or ISO), CVLD, In-Line Preamp	8	IEPE Sensor, CVLD current output sensor, External Preamp Power, AC voltage	5-wire (+/- Signal, +/- Preamp Pwr, Sensor Cal) w/ shield	IEPE: 0, 4, 8, 12 mA; CVLD: 10, 15, 20 V; Preamp Power
28918	IEPE (GND or ISO), CVLD, In-Line Preamp	8	IEPE Sensor, CVLD current output sensor, External Preamp Power, AC voltage	5-wire (+/- Signal, +/- Preamp Pwr, Sensor Cal) w/ shield	IEPE: 0, 4, 8, 12 mA; CVLD: 10, 15, 20 V; Preamp Power
28304	SE Charge, IEPE (GND or ISO) w/ Long Distance TEDS	4	Piezoelectric or IEPE Sensor, Remote Charge Converter, AC Voltage	2-wire coaxial on Combo-D	IEPE Current: 0, 4, 8, 12 mA
28324	SE Charge, IEPE (GND or ISO) w/ Long Distance TEDS	4	Piezoelectric or IEPE Sensor, Remote Charge Converter, AC Voltage	2-wire coaxial on Combo-D	IEPE Current: 0, 4, 8, 12 mA
28316C	IEPE (GND or ISO) w/ Long Distance TEDS	16	IEPE Sensor with TEDS (optional), AC voltage	2-wire w/ shield	IEPE Current: 0, 2, 4, 8 mA
28302B	SE or Differential Charge, IEPE or Velocity Coil Input	2	Piezoelectric or IEPE Sensor, Velocity Coil, AC Voltage	2-wire coaxial or 3-wire LEMO	IEPE Current: 8.5 mA

Conditioners for Shock and Vibration

28304 and 28324 Quad Dual-Mode Charge Amplifier

support either Charge or IEPE type sensors. The 28304 features versatile 4- or 8-pole filtered bandwidth up to 204.6 kHz while the economical 28324 provides 4-pole filtered bandwidth to 30 kHz. Both cards have the T-Insertion that can be used as an "Electronic Tap-Test" to verify all accelerometer channels quickly and easily from the convenience of the control room and LDTEDS™ technology to communicate with TED capable sensors out to a distance of 1500 feet.

28302B Dual Vibration Amplifier is designed to condition signals from rotating machinery. The card accepts inputs from single-ended or differential piezoelectric accelerometers, IEPE accelerometers, or remote velocity sensors. AC outputs are provided for acceleration, velocity and displacement. A DC output for acceleration, velocity or displacement is also provided. A fully programmable 12-pole band-pass filter is provided to eliminate unwanted noise.

28316C Isolated IEPE Accelerometer Conditioner with Long Distance TEDS™

provides 16 channels of precision signal conditioning for IEPE (Integrated Electronic Piezoelectric) accelerometers or remote charge converters (RCC's). The 28316C card is equipped with Precision Filters' long-distance TEDS (LDTEDS) technology that extends communication with TEDS equipped sensors to 1500 feet.

Voltage Conditioners

28608B and 28618 Octal Programmable Filter/ Amplifier cards are ideal for conditioning low-level voltage inputs in front of high-resolution digital data acquisition systems. Low-pass, high-pass and band-pass configurations are available. Programmable pre- and post-filter amplifiers provide an overall gain of x8192.

28612 Dual 3MHz Filter/Amplifier provides low noise amplification and precisely controlled 6-pole PULSE/FLAT low-pass filtering with programmable cutoffs as high as 3.15 MHz. Gain is programmable from x1 to x1000.

Other Conditioners

28208 Octal Thermocouple Conditioner

provides eight channels of conditioning for thermocouples or other DC and AC voltage inputs. The 28208 consists of a low-drift programmable differential pre-amplifier, a 3-pole programmable filter and a programmable post-amplifier. A rugged remote isothermal block with digital temperature sensor provides the reference junction temperature for hardware correction.

28524 Quad Frequency-to-Voltage Converter Module provides conditioning for pulse, rate and frequency transducers, giving a voltage output proportional to input frequency or rate. Distorted inputs such as signals with ringing, crossover or harmonic distortion are handled with programmable trigger threshold and trigger hold-off time.

28908 and 28918 Octal Acoustic Filter/Amp conditions IEPE, CVLD, In-Line Pre-Amps and Voltage signals and is particularly suited for making underwater acoustics noise and vibration measurements, especially in high magnetic field environments.

Conditioner and Amplifier Card Selection Guide

Card	Bandwidth	Gain	Filter	Cutoff Frequencies	Outputs
28144	500 kHz	x1/16 to x8192 w/ 0.05% resolution	4, 8-poles; PULSE/FLAT LP or BP	FLAT: 2 Hz to 204.6 kHz PULSE: 1 Hz to 102.3 kHz	Single-ended w/ ground reference
28114	190 kHz	x1/16 to x1024 w/ 0.05% resolution	4-poles; PULSE/FLAT LP	FX02: 300, 1k, 3k, 10k, 30 kHz	Single-ended w/ ground reference
28124	250 kHz	x1/16 to x8192 w/ 0.05% resolution	4-poles; PULSE/FLAT LP	FLAT: 2 Hz to 204.6 kHz PULSE: 1 Hz to 102.3 kHz	(3) Buffered Prog WB/Filtered SE Outputs per channel w/ ground reference
28108	100 kHz	x1/16 to x8192 w/ 0.05% resolution	4-poles; PULSE/FLAT LP	FLAT: 2 Hz to 204.6 kHz PULSE: 1 Hz to 102.3 kHz	Single-ended or Differential (Opt. T)
28118	190 kHz	x1/16 to x1024 w/ 0.05% resolution	4-poles; PULSE/FLAT LP	FX02: 300, 1k, 3k, 10k, 30 kHz	Single-ended or Differential (Opt. T)
28458	190 kHz	x1/16 to x1024 w/ 0.05% resolution	4-poles; PULSE/FLAT LP	FX02: 300, 1k, 3k, 10k, 30 kHz	(2) Buffered Single-Ended Outputs per Channel
28608B	500 kHz	x1/16 to x8192 w/ 0.05% resolution	4, 8-poles; PULSE/FLAT LP or BP	FLAT: 2 Hz to 204.6 kHz PULSE: 1 Hz to 102.3 kHz	Single-ended w/ ground reference
28618	190 kHz	x1/16 to x1024 w/ 0.05% resolution	4-poles; PULSE/FLAT LP	FX02: 300, 1k, 3k, 10k, 30 kHz	Single-ended w/ ground reference
28612	3.15 MHz	x1 to x1000	6-poles; PULSE/FLAT LP	5 kHz to 315 kHz 350 kHz to 3.15 MHz	Single-ended
28524	1 Hz to 50 kHz	Input Range 10 mV to 100 V	Band-Pass	1 Hz to 50 kHz, Programmable	Single-ended Vout w/ ground reference; Single-ended Pulse output
28908	1 Hz to 500 kHz	x1/16 to x8192 w/ 0.05% resolution	4, 8-poles; PULSE/FLAT LP or B	FLAT: 2 Hz to 204.6 kHz PULSE: 1 Hz to 102.3 kHz	(2) Buffered Single-ended Outputs per Channel
28918	1.2 Hz to 190 kHz	x1/16 to x1024 w/ 0.05% resolution	4-poles; PULSE/FLAT LP	FX02: 300, 1k, 3k, 10k, 30 kHz	(2) Buffered Single-ended Outputs per Channel
28304	0.25 Hz to 450 kHz	x1/16 to x8192 w/ 0.05% resolution	4, 8-poles; PULSE/FLAT LP or BP	FLAT: 2 Hz to 204.6 kHz PULSE: 1 Hz to 102.3 kHz	(2) Buffered Single-ended Outputs per Channel
28324	0.5 Hz to 170 kHz	x1/16 to x1024 w/ 0.05% resolution	4-poles; PULSE/FLAT LP	FX02: 300, 1k, 3k, 10k, 30 kHz	(2) Buffered Single-ended Outputs per Channel
28316C	0.25 Hz to 140 kHz	x1 to x512 w/ 0.1% resolution	4-poles; Time Delay or Butterworth	FX02: 300, 1k, 3k, 10k, 30 kHz	(2) Buffered Single-ended Outputs per Channel
28302B	0.3 Hz to 20 kHz	PE: 1 to 200 pC/g IEPE: 0.1 to 200 mV/g	6-pole HP, 6-Pole LP	HP: 0.3, 3, 10, 30, 100 Hz LP: 50 Hz to 12.75 kHz in 50 Hz steps PULSE: 1 Hz to 102.3 kHz	(2) Accel, (2) Velocity, (1) Displacement, (1) DC, (1) Alarm

28000 System Filter Characteristics

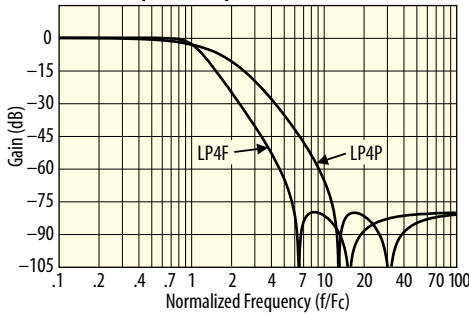
You want your analog data to come clean before digital conversion.

The 28000 System has a variety of high performance filter characteristics available for HP, LP or BP Precision filtering.

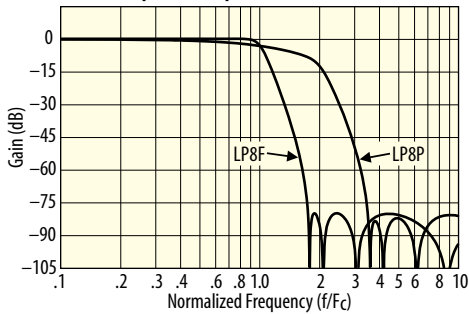
Flat/Pulse Low-Pass Filters

Our new choice of LP4FP 4-pole or LP8FP 8-pole flat/pulse low-pass filters provide the user with the versatility to address applications in either the time or frequency domain and are available on many 28000 card models. Frequencies can range as high as 204.6 kHz with fixed frequency choices for economy.

LP4F and LP4P Amplitude Response



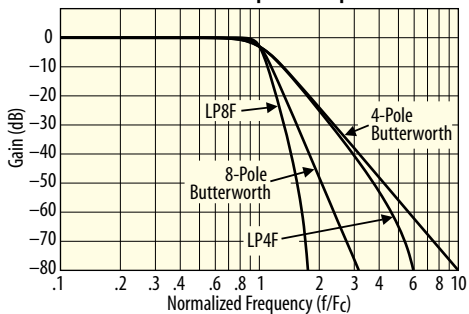
LP8F and LP8P Amplitude Response



Flat Mode Low-Pass Filters

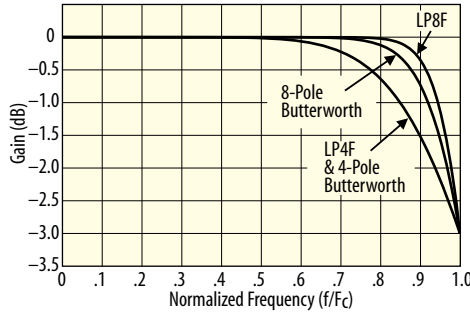
Precision LP4F and LP8F "flat" mode characteristics are specified to have outstanding passband flatness equivalent to the Butterworth yet deliver very sharp roll-off characteristics.

LP4F and LP8F vs Butterworth Amplitude Response



The LP4F and LP8F are a good choice as an anti-aliasing filter and for applications such as spectral analysis. The LP8F has zero passband ripple and over 100 dB/octave attenuation slope.

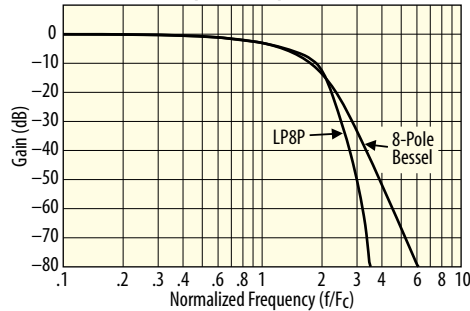
LP4F and LP8F vs Butterworth Passband Response



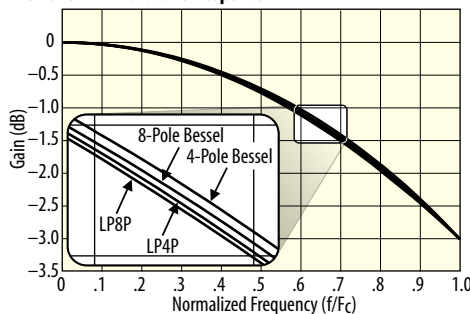
Pulse Mode Low-Pass Filters

For the time domain, there are the LP4P and LP8P "pulse" mode low-pass filters. These filters have excellent transient response and phase linearity making them ideal filters for time domain applications including transient (shock) measurements and time domain waveform analysis ... all with roll-off characteristics superior to their Bessel filter counterparts.

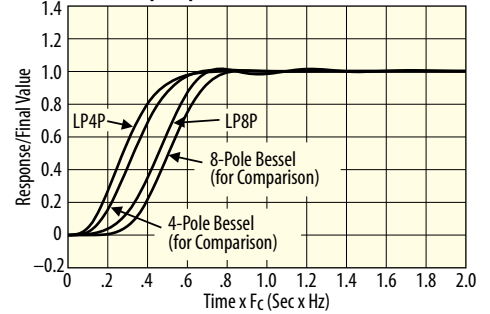
LP8P vs 8-Pole Bessel Amplitude Response



LP8P and LP4P Passband Response



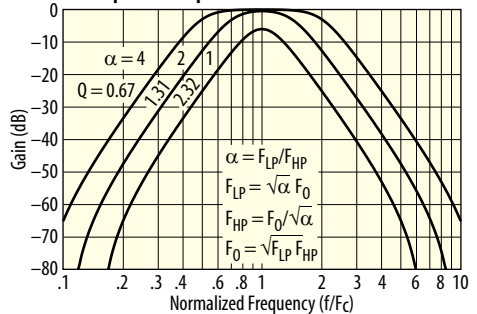
LP8P and LP4P Step Response



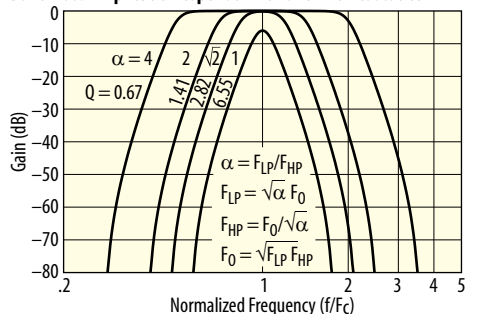
High-Pass and Band-Pass Filters

For high-pass filtering, we offer the HP4F 4-pole and HP8F 8-pole characteristics. For band-pass filtering, choose the HP4F/LP4FP band-pass characteristic to provide programmable bandwidth and center frequency filters. For more selective band-pass filtering, cascade an HP8F with an LP8F.

Band-Pass Amplitude Response HP4F and LP4F Cascaded



Band-Pass Amplitude Response HP8F and LP8F Cascaded



Traditional Filters

Of course, we offer the traditional filter types such as Butterworth and Bessel characteristics ... just ask!

In any case, we deliver to you a tightly controlled filter with phase match better than 1 degree and usually better than 0.5 degrees.

Test Subsystem & Accessories

Test Subsystem

The performance verification of test instruments is a critical part of insuring data integrity of any measurement system. The 28000-4A-TEST test subsystem and the 28000-BIF1-FT card provide a complete suite of tests that may be run on the instrument "in-place" without removing the system from the equipment rack. The tests check out all critical system specifications, are NIST traceable and are the same manufacturing tests that are run at the factory. Three levels of test are provided. Pre-Test Verify and Diagnostics are used to confirm that all elements of the Test System are functional. The Factory Acceptance Test (FAT) does a complete parametric performance checkout of the conditioner. Parameters



Test Subsystem with 28008-M3 installed in optional transit case.

such as common mode rejection ratio, noise, offset, gain, frequency response, amplitude match and phase match are tested to original specifications. For a quick checkout of the equipment prior to a test run, the Go/No-Go test may be run to measure system performance of the current programmed setup.

Accessories

Output Adapter Modules



Several 28000 conditioner cards incorporate an auxiliary output connector at the front panel to support the use of output modules. A variety of output modules are available to provide additional buffered outputs per channel, different connector types, filtering, RMS-to-DC conversion, or other functions.

Input and Output Connector Adapters

Connector adapters are available for several conditioner cards (including the 27304) to provide either coaxial BNC or twinaxial BNC I/O connections or high density wire terminal adapters, rather than the multipin connectors that are standard on the cards.



Mating Connectors

Mating connectors are available for all system I/O connections, including the input and output connectors for conditioner cards, for the frames' 50-pin output connectors, and for the backplane interface card connector. Mating connectors include high quality gold plated machined contacts for long life and are available in both crimp-pin and solder-cup styles.

Rack Mount Slide Kits

Slide mount kits for both the 28008 and 28016 frames are available for installing the chassis in standard 19" rack systems.



Cables and Connector Panels

Precision Filters offers a wide range of cables to meet application requirements. A comprehensive set of input and output signal cables is available. Also, custom interconnection systems can be designed using bulkhead mounted BNC panels such as the PNL-32BNCBH-1U together with a wide selection of bulkhead cables. System cables available include RS-232 cables for control of the 28000 system and cables for the 28000-4A-TEST test subsystem.

Extender Cards

Extender cards provide access to the signal conditioner cards for routine maintenance.

Transit Case

Transit cases are available from Precision Filters for the 28000. This family of transit cases assures safe transport of your valuable equipment.



System Control

The 28000 system is controlled by the PF Graphical User Interface (GUI) operating on a Windows compatible PC controller or over the network using the built-in 28000-LCS interactive command line interpreter. The PC controller communicates with the 28000 frames via the backplane interface card. A single PC controller can support up to eight 28000 systems. Both the GUI control software and the 28000-LCS interpreter are included with each 28000 system.

PF Graphical User Interface

The PF Graphical User Interface (GUI) control software provides an easy-to-use spreadsheet-style environment with well-organized menus and point and click ease of use. All system functions are controlled by the GUI, from configuration, set-up and operations through pre-test verify and diagnostics, FAT and Go/No-Go tests. The GUI's display and control panels are customizable to the application or user preference. Selectable security settings control access to the system and movement between various system functions protecting critical programmed system parameters.

On power-up, the GUI automatically configures the system to control the exact set of signal conditioner cards installed in the 28000 frames. The GUI incorporates a collection of algorithms to automate tedious setup tasks. Based on user input, the GUI apportions gain in each channel to provide best signal-to-noise ratio while minimizing the chance of an overload occurring on out-of-band signals. Databases allow the user to import TEDS capable transducer information including type, sensitivity, last calibration date and serial number.

28000-LCS Interpreter

The resident 28000-LCS program is an interactive command line interpreter that allows the 28000 system to be controlled on an Ethernet network. During operation, the system status and commands pass between the host computer and the 28000 system via a TCP/IP connection. The 28000-LCS is a straightforward method for controlling the 28000 system since status messages and commands are readable sequences of ASCII characters.

28000 General Specifications

General Characteristics

28004-M3/M5 4-Slot Mainframe

Size:

3.5 H (2U) x 19 W x 20 D inches for standard RETMA rack installation

Weight: 17.25 lb. (net)

Power Supply Weight: 11.25 lb. (net)

28008-M3/M5 8-Slot Mainframe

Size:

5.25 H (3U) x 19 W x 19 D inches for standard RETMA rack installation

Weight: 17 lb. (net)

Power Supply Weight: 15 lb. (net)

28016-M3 and 28016-M5 16-Slot Mainframes

Size:

10.5 H (6U) x 19 W x 20 D inches for standard RETMA rack installation

Weight: 30 lb. (net)

Power Supply Weight: 18 lb. (net)

Backplane Interface Module (BIF)

28000-BIF1-T and 28000-BIF1-FT Size:
6.6 x 17.5 x 0.75 inches

28000-BIF1-T and 28000-BIF1-FT Weight:
1.5 lb. (net)

28000 Conditioner Cards

28000 Conditioner Card Size:
6.6 x 17.5 x 0.75 inches

28000 Conditioner Card Weight:
1.5 lb. (net) typical

Temperature and Humidity

Operating Temperature:
0° C (32° F) to 40° C (104° F)

Storage Temperature:
-20° C (-4°) to 70° C (158° F)

Relative Humidity:
Less than 90% non-condensing

Precision PF-1U-FA Multi-Channel Programmable Filter/Amplifier System



Exceptional desktop performance.

Ideal for conditioning low-level voltage inputs in front of high-resolution digital data acquisition systems. Fully programmable 8-channel and 16-channel configurations are available, both offering a choice of either 4 or 8-pole low-pass filters with programmable gain.

High Density Programmable Switch Systems

Computer controlled analog signal switching replaces tedious manual patch panels.



Precision 4164 64x64 Switch Matrix System



Precision 464kB Switch Matrix System

Precision switch systems are reliable solid-state switch matrix systems, providing computer-controlled connection between inputs and outputs signals. Configure the 464kB with up to 256 inputs and 256 outputs, all in a single mainframe, or choose the compact 4164 system with 64 inputs and 64 outputs. Save time and reduce errors on test system setup. Download switch configurations from the host computer over the network. Built-in self-test with fault diagnostics.

Typical 28000 System Components

Basic 28000 System

28000 Mainframe:

Choose either 1 28004-M3/M5, 1 28008-M3/M5, 1 28016-M3 or 1 28016-M5

One Power Supply:

1 per system with the correct input voltage for your country

One Backplane Interface Card without Option F:

28000-BIF1-T

One or more 28000 Conditioning Cards

28000 System with Optional Automated End-to-End Performance Test

28000 Test Subsystem

Adding option F to the 28000-BIF1-FT interface card and the 28000-4A-TEST Test System enable a complete suite of tests that run on the 28000 instrument "in-place" without removing the system from the equipment rack. The Factory Acceptance Tests check out all critical system specifications, are NIST traceable and are the same manufacturing tests that are run at the factory. For a quick checkout of the equipment prior to a test, run the Go/No-Go test to measure system performance of the current programmed setup.

One Backplane Interface Card with Option F:
28000-BIF-FT

One 28000 Test Sub-System: 28000-4A-TEST



28004-M3/M5 4-slot mainframe



28008-M3/M5 8-slot mainframe



28016-M3 16-slot mainframe