

MODULAR MULTI-CHANNEL SIGNAL CONDITIONERS



TYPICAL APPLICATIONS

- Modal Analysis
- In-Vehicle NVH Testing
- GVT / In-flight Testing
- Squeak & Rattle Testing
- STSF / NAH Testing
- Force-Limited Vibration Testing
- Operating Vibration Measurements
- Vibro-Acoustic Testing
- Acoustic Array Testing

SENSORS SUPPORTED

- All ICP[®] Conditioned Sensors
- Voltage Mode Sensors
- Condenser Microphones
- Charge-Mode Piezoelectric Sensors
- Variable Capacitance (DC) Sensors

BENEFITS

- Low cost / high performance alternative to integrated data acquisition ICP[®] sensor signal conditioning
- High density packaging enables large channel, in-vehicle testing
- Modular architecture is scalable and flexible for system growth
- Bank-switching capability expands effective channel count for the existing test system
- TEDS capability maximizes test setup efficiency
- Front panel LEDs indicate channel status
- Supports all IEPE sensors such as ICP[®] accelerometers, force sensors, pressure sensors, and ICP[®] condenser microphones
- Uses PCB and Agilent VXI standards for reliable, simplified multi-channel cabling

The PCB 440 Series of modular signal conditioners is a flexible, compact solution for acceleration, sound pressure, and force sensor signal conditioning. The modular architecture allows great flexibility and scalability for users who may add or change testing capabilities in the future. The system adds or varies capability by the selection of signal conditioning modules that conform to the PCB Group 440 series standard for form factor, power consumption, and digital communication. Chassis are offered in several different sizes, accommodating up to 8 signal conditioner modules. The chassis themselves can be linked together, further expanding the system's scalability. Please refer to the specification sheet for each individual module for performance information.

16 Channel ICP Input Modules (442 Family)

Each input module in the 442 family conditions 16 sensor signals. The constant current supplied for ICP[®] mode can be enabled or disabled on a channel-by-channel basis via the on-board selection switches. Disabling the constant current allows the use of voltage mode sensors (such as tachometers). Front panel LEDs indicate the channel's sensor status ('short', 'open', or 'good'). The input connection from the sensor is made with the standard PCB multi-channel ribbon cable and patch panel connection. The conditioned signal is output to either standard (multipin) connectors (Agilent VXI E1432 compatible), or to the Model 441A175 Bank Switch Module. Connections to other acquisition systems are made by choosing from a selection of standard cabling. Please contact The Modal Shop for more information on cabling options.

Available Features

Digital Communication: Enables communication to a mainframe chassis. Required for bank-switched output with a 441A175 module.

TEDS*: Enables communication with ICP[®] sensors equipped with TEDS* digital memory. Automates channel identification with standard Windows[®] software (included w/ 440 mainframes), as well as with LMS CADA-X and MTS I-DEAS.

Selectable Gain: Module capable of selectable gains of x1, x10, x100 via the Digital Communication interface. Set or auto-gain channels individually or globally. Latching or momentary overload detection is selectable for the overload LED.

Pre-filter: Module allows selectable 2-pole pre-filters set to 100 Hz, 500 Hz, 1 kHz, or 30 kHz for more effective ranging/resolution in your acquisition. Custom filter settings are available as an option.



442 Family 16 Channel ICP[®] Input Module

442 Family Option Availability

Model	Communication	TEDS	Selectable Gain	Pre-filter
442B116				
442B117	✓			
442B119	✓	✓		
442A121	✓		✓	
443A122	✓	✓	✓	
442A123	✓			✓
442A124	✓		✓	✓
442A125	✓	✓		✓
442A126	✓	✓	✓	✓

Bank Switch Output Module (441A175)

This module collects and outputs 16 signals at a time from the signal conditioners modules. Bank switching can be performed by computer control or manually from the front panel. The output connections are the standard Agilent E1432 VXI connectors. A BNC jack connection on the front panel outputs 1 of the 16 channels. This 'monitor' channel can be used for quick checks of signal levels and quality, selected via a front panel push button or computer control.



Model 441A175 Bank Switch

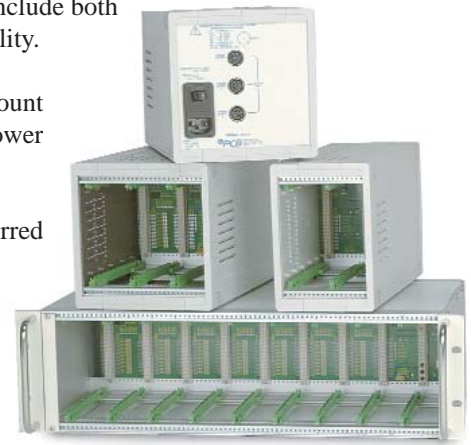
*TEDS (Transducer Electronic Data Sheet) sensors are capable of self-identification using existing two-wire cabling for IEPE sensors. TEDS sensors are functional with existing legacy ICP[®] Sensor Signal Conditioners. However, the self-identification capability is possible only when used with TEDS enabled signal conditioners or analyzers.

Chassis

A variety of chassis are available for a wide range of signal conditioning needs. Options include both the number of available slots for signal conditioning modules and communication capability.

The most compact solution consists of a two slot chassis, while the highest channel count applications require a nine slot chassis. In each case, a single slot is reserved for a power supply module, which services the chassis as well as the signal conditioning modules.

440 Series Chassis offer three levels of communication capability. The highest level, referred to as 'Master' capability, is offered in the 441A3x family. 'Master' communication capability provides an interface from a RS-232 host (Windows® PC or Linux) to the entire signal conditioning system. The next level, referred to as 'Slave' capability, is offered in Models 441A45 and 441A48. 'Slave' functionality allows communication from each module to the single chassis with 'Master' capability. A third level provides no communication capability. At least one chassis with 'Master' level capability is required for communication with a host computer.



Chassis Communication Capability

Model	Max Channel Count	Communication
441A33	32	Master
441A35	64	Master
441A38	128	Master
441A42	16	None
441A43	32	None
441A45	64	Slave
441A48	128	Slave

How to Configure Your System

- Step 1.** Determine the number of signal conditioning modules required for the application. Modules required = Total Channels / 16
- Step 2.** Determine the number of patch panels (070 family) and input cables (009F/009H family) required for the system. One of each is required for each signal conditioning module. The type of patch panel and cable is determined by your particular application.
- Step 3.** Determine the number of mainframe and/or standard chassis needed based on the total channel count. Refer to the table above for chassis channel count and communication.
- Step 4.** Select one power supply module for each mainframe or standard chassis. Model 441A101 powers the rack from an AC source. Model 441A102 offers portable low noise DC power.
- Step 5.** Determine the number of output cables (009S/009L family) required for the system. Four output cables are required for each signal conditioning module.
- Step 6.** Select sensors and sensor cables as best suited for your application.

Accessory Components

Patch panels and multi-conductor cables are key to organizing a large channel test. Acting as centralized hubs in collecting accelerometer and other sensor signals, patch panels (Model family 070) collect dozens of sensor cables and route them to the signal conditioners using PCB's standard 50 pin connector cables, families 009H or 009F. Signal conditioner outputs are connected directly to Agilent VXI E1432 modules via four 4-channel cables (Model 009S08). Output to other acquisition systems is via BNC plugs on the Model 009L05 cable.

Patch Panels



Model 070C21 16-channel Patch Panel IDC in, DB50 out



Model 070C29 16-channel Patch Panel IDC and BNC in, DB50 out

Multi-Pin Input Cable



Model 009Fxx (shows) or 009Hxx (shielded) DB50 to DB50 (xx denotes cable length)

Multi-Pin Output Cables



Model 009L05 VXI to 4-BNC



Model 009P05 2-VXI to DB50



Model 009S05 VXI to VXI



Transducers

- **Modal Array Accelerometers:** PCB Piezotronics offers a variety of ICP® accelerometers designed specifically for multi-channel applications, all of which are optionally equipped with TEDS.
- **288D01 Impedance Head:** This driving point sensor simultaneously measures both the input force and response motion at structural excitation points.
- **130 Series Array Microphones and Preamplifiers:** ICP® array microphones provide an extremely cost effective method for multi-channel sound pressure measurements.
- **377 Series Precision Condenser Microphones:** Make high precision acoustic measurements by coupling a prepolarized condenser microphone with a 426 series ICP® preamplifier.
- **Modally Tuned Impact Hammers:** Our patented hammer measures the input force to the structure, and eliminates hammer resonance from test results, reduces double impacts, and provides a hammer that naturally feels good.



Modal Test Accessories

- **USB-Powered ICP® Signal Conditioner:** Model 485B36 utilizes your PC's USB power to provide 2-channels of ICP signal conditioning with output to a sound card or other acquisition device.
- **ICP® Tachometer:** Eliminate special signal conditioning - the LaserTach™ powers from ICP just like an accelerometer.
- **ICP® Conditioning for Magnetic Tachometers:** The PulseDriver™ allows a traditional magnetic rotational speed pickup to be used with an ICP data acquisition channel.
- **Test Setup Manager:** Model 5020A automates the collection and integration of test setup data using customized Palm OS®/Windows® software. Synchronize barcoded information with TEDS data, and create Universal Files. Includes handheld barcode reader and cradle.
- **TEDS Sensor / Computer Interface Kit:** The 400A76 offers single mouse click read and write of TEDS data using your Windows PC. Model 400A76 supports more TEDS templates than any other available TEDS sensor interface kit.
- **Coordinate Digitization:** 5230XL series of three dimensional Sonic Digitizers helps quickly measure and create a file of x, y, z Cartesian coordinates, allowing for rapid geometry definition.
- **AirRide Isolators:** Models 8030S/8032S provide isolation and support of heavy structures during modal testing.
- **Shaker Stand:** Model 2050A lateral excitation stand provides a versatile means of adapting modal shakers for horizontal or skewed input.

Calibration Systems

- **9155C Accelerometer Calibration Workstation:** NIST traceable accelerometer calibration workstation for production style service.
- **9350C Precision Acoustic Calibration Workstation:** NIST traceable, automated system that features cost-effective calibration of 1/4", 1/2" and 1" microphone cartridges and mic/preamplifier pairs. The 9350C also performs conformance testing of microphone preamplifiers, pistonphones, and sound level calibrators.
- **9100C Portable Vibration Calibration System:** Ideal for field work requiring variable frequency and amplitude settings.
- **9963 Series Gravimetric Calibration Systems:** Utilizes gravity as a reference for calibration of accelerometers, force sensors and instrumented impact hammers.



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