# PowerDAQ Processor Based Data Acquisition Boards for the PCI Bus

**NEW** ™

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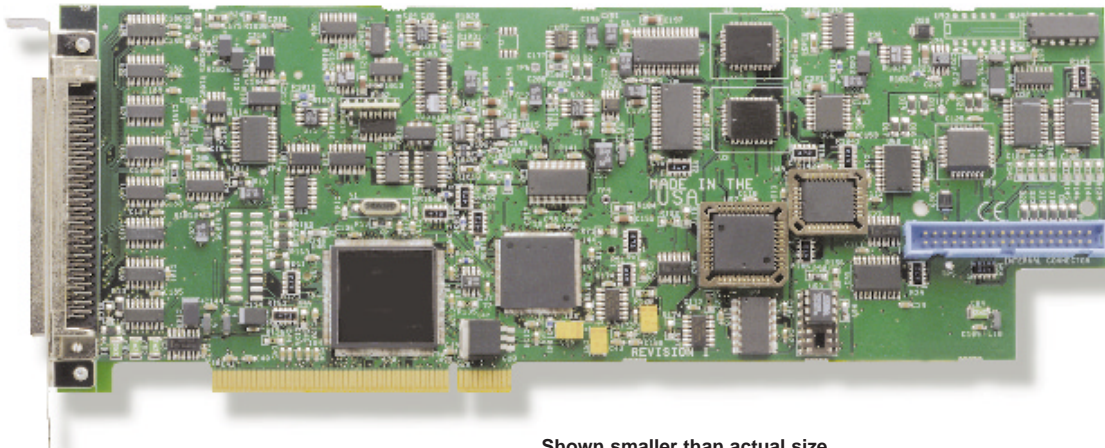


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## Basic Unit
# $895

- ✔ **16 Single Ended/ 8 Differential A/D Inputs or 64 Single Ended/ 32 Differential A/D Inputs**
- ✔ **330 KHz, 1.25 MHz 12-bit Resolution**
- ✔ **250 KHz 16-bit Resolution**
- ✔ **Programmable Gain 1, 10, 100, 1000 or 1, 2, 4, 8**
- ✔ **2, 12-bit, 200 kHz D/A's WaveForm Quality**
- ✔ **8 Digital Input (Which Can Generate Interrupts) 8 Digital Output**
- ✔ **3, 16-bit User-Dedicated Counter/Timers**
- ✔ **Simultaneous A/D, D/A, DIO, Counter/Timer Subsystems Operation**
- ✔ **Bus Mastering DMA**
- ✔ **Extensive Clocking and Triggering for A/D and D/A**
- ✔ **No Jumpers or Switches**
- ✔ **Auto Calibration**

PowerDAQ is the next generation multifunction analog and digital I/O board for the PCI bus. The PowerDAQ boards have been developed with new "clean" 32-bit drivers for Windows95 and Windows NT, hence no legacy code.

The PowerDAQ series is designed around a "processor based" 24-bit 66 MHz Motorola 56301 PCI DSP interface. This design allows the user to offload the host CPU data acquisition functions to the onboard DSP thus giving the user the power of two CPUs in one PC.

Each PowerDAQ multifunction board is comprised of four subsystems, Analog Input, Analog Output, Digital I/O and Counter/Timers. PowerDAQ technology allows all the subsystems to run simultaneously and/or independently with one or multiple boards in the same PC. You can start and stop multiple subsystems as required. The PowerDAQ-based boards all feature extensive hardware and software triggering. Data transfer methods include slave mode and bus mastering operation.

Several different models of the PowerDAQ boards are available. The models differ in resolution, speed, input range and number of channels.

### Software
The PowerDAQ includes a comprehensive software suite provided at no additional charge. The suite consists of a menu driven quick start application for quick and easy operation without programming, a software development kit (SDK) for custom user program creation under Windows 95/98/NT and software drivers for a large variety of off-the-shelf applications. The quick start application provides data collection, graphical display of the data, and datalogging in a format compatible with most spreadsheets and other post acquisition software packages.

The PowerDAQ SDK supports Visual C++, Visual Basic and Delphi.

PowerDAQ Boards are also compatible with a variety of off-the-shelf data acquisition application programs.   The drivers for the following packages are provided at no charge.

| Model Number | A/D Resolution | Speed | Channels (SE/Diff) | Gains | Price |
|---|---|---|---|---|---|
| PD-MF-16-330/12L | 12 bits | 330kHz | 16/8 | 1,10,100,1000 | **$895** |
| PD-MF-16-330/12H | 12 bits | 330kHz | 16/8 | 1,2,4,8 | **895** |
| PD-MF-64-330/12L | 12 bits | 330kHz | 64/32 | 1,10,100,1000 | **1,395** |
| PD-MF-64-330/12H | 12 bits | 330kHz | 64/32 | 1,2,4,8 | **1,395** |
| PD-MF-16-1M/12L | 12 bits | 1.25 MHz | 16/8 | 1,10,100,1000 | **1,650** |
| PD-MF-16-1M/12H | 12 bits | 1.25 MHz | 16/8 | 1,2,4,8 | **1,650** |
| PD-MF-64-1M/12L | 12 bits | 1.25 MHz | 64/32 | 1,10,100,1000 | **2,495** |
| PD-MF-64-1M/12H | 12 bits | 1.25 MHz | 64/32 | 1,2,4,8 | **2,495** |
| PD-MF-16-250/16L | 16 bits | 250kHz | 16/8 | 1,10,100,1000 | **1,650** |
| PD-MF-16-250/16H | 16 bits | 250kHz | 16/8 | 1,2,4,8 | **1,650** |
| PD-MF-64-250/16L | 16 bits | 250kHz | 64/32 | 1,10,100,1000 | **2,395** |
| PD-MF-64-250/16H | 16 bits | 250kHz | 64/32 | 1,2,4,8 | **2,395** |

### Third Party Drivers for:
**HP VEE***
**TestPoint***
**LabVIEW for Windows***
**LabWindows/CVI***
**Dasylab***
*\* Call for Availability*

### Accessory Racks and Screw Terminals
The PowerDAQ boards can connect to a variety of stand-alone or 19" rack-mount accessory panels. A complete range of cables and options are available.

### Isolated Thermocouple Input Rack
The PD-TCR16-x is a 16 channel isolated thermocouple rack which can be connected to any PowerDAQ board. The thermocouple rack supports measurement from J or K thermocouples.

For 16 channels of measurement, the PowerDAQ boards may be connected directly to the PD-TCR16-x via a PD-CBL-96 (96-way pinless 1 meter cable). For more than 16 channels, the PD-5BCONN interface panel should be used(see diagram).

### Features of the PD-TCR16
• Support Type J (Iron-Constantan) or Type K (CHROMEGA®-ALOMEGA®) direct input connection
• CJC on each channel
• Laser wafer trimmed to 1°C calibration accuracy
• Individual channel isolation to 1000 V
• Type J input: 0 to 600°C
• Type K input: 0 to 1000°C
• Up to 64 Non multiplexed inputs per system

### Signal Conditioning Interface Panels
The PD-5BCONN and PD-7BCONN signal conditioning interface panels provide easy connection to up to four signal conditioning racks. The PD-5BCONN connects to OMEGA's OM5 signal conditioning racks and the PD-TCR16-x isolated thermocouple input rack. The PD-7BCONN connects to OMEGA's OM7 signal conditioning racks.

### Screw Terminals
Two screw terminal boards are available, the PD-STP-9616 connects to 16 channel PowerDAQ boards and the PD-STB-96 connects to boards with 64 channels. Use the PD-CBL-96 1-meter cable to connect from the PowerDAQ J1 analog connector to the PD-STP J1 connector. Use the PD-CBL-37 ribbon cable set to PD-STP J2 connector.

### BNC Analog Connection Panel
The PD-BNC-16 offers all analog input connections using BNC type connectors for the 16 channel boards. The PD-BNC-16 supports single ended or differential input(via jumper selection). Silk screened component open locations for building RC filters and voltage dividers are also supplied. The PD-BNC-16 panel connects to the 16 channel PowerDAQ boards using the PD-CBL-96 cable. The PD-BNC can be rack mounted using the PD-19RACK option.
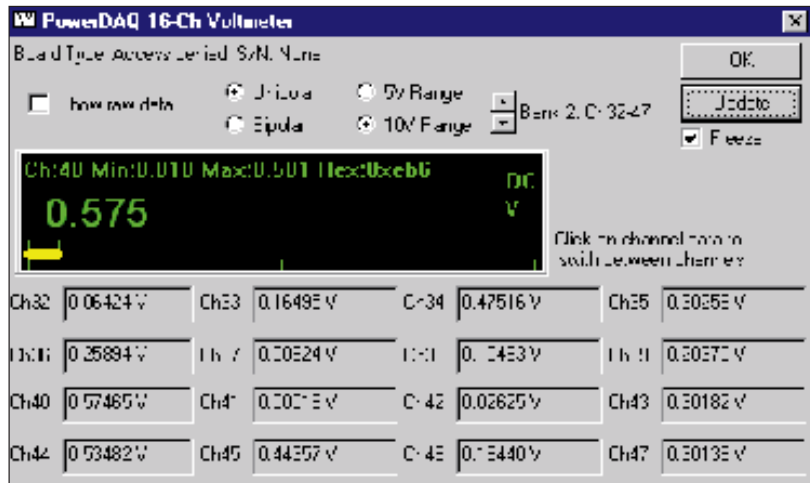


**Voltmeter screen shown**

## Specifications
### ANALOG INPUT
**Number of Channels:** 16 or 64 single-ended, 8 or 32 differential

**Resolution:**
**PD-MF-xx-330/12x:** 12 bits
**PD-MF-x-1M/12x:** 12 bits
**PD-MF-xx-250/16x:** 16 bits

**Max Sample Rate:**
**PD-MF-xx-330/12x:** 330 kS/S
**PD-MF-x-1M/12x:** 1.25 MS/S
**PD-MF-xx-250/16x:** 250 kS/S

**Onboard FIFO:** 1K FIFO, upgradable to 16K or 32K

**Input Ranges:** 0-10 V, ±10 V, 0-5 V, ±5 V (software selectable)

**Programmable Gains:**
L Versions = 1, 10, 100, 1000;
H Versions = 1, 2, 4, 8
(software selectable)

**Max Working Voltage (signal plus common mode):**
**PD-MF-xx-330/12x:** -10 V to 10 V
**PD-MF-x-1M/12x:** -11 V to 11 V
**PD-MF-xx-250/16x:** -11 V to 11 V

**Input Overvoltage:** -35 V to +55V continuous, powered or unpowered

**Integral Linearity:**
**PD-MF-xx-330/12x:** ±0.5 LSB typical
**PD-MF-x-1M/12x:** ±0.3 LSB typical
**PD-MF-xx-250/16x:** ±2 LSB typical

**Relative Accuracy:**
**PD-MF-xx-330/12x:**
±0.5 LSB typical, averaged
**PD-MF-x-1M/12x:**
±0.3 LSB typical, averaged
**PD-MF-xx-250/16x:**
±2 LSB typical, averaged

**Gain Error after calibration(G=1):**
**PD-MF-xx-330/12x:** ±0.05%
**PD-MF-x-1M/12x:** ±0.03%
**PD-MF-xx-250/16x:** ±0.01%

**Input Impedance:**
**PD-MF-xx-330/12x:** 10G Ω Typical
**PD-MF-x-1M/12x:**
10M Ω typical, ±5%
**PD-MF-xx-250/16x:**
10M Ω typical, ±5%
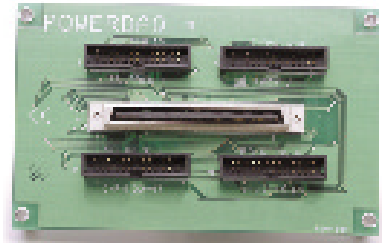
**Input Bias Current:** ±200 pA typical

**Input Offset Current:** ±100 pA typical

**Triggering Modes:** Normal, Post, Pre and About Trigger



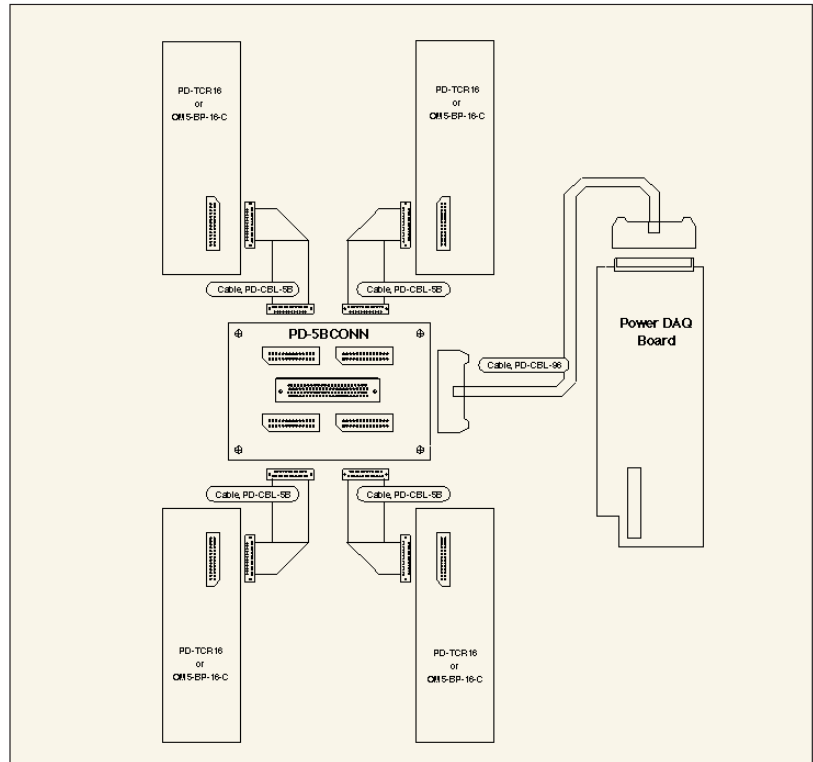**PD-7BCONN Interface Panel**



**PD-5BCONN Interface Panel**



**PD-STP Screw Terminal Panels**

## Connecting to Four OM5 Backplanes or Four PD-TCR16 Thermocouple Racks

## ANALOG OUTPUT
**Number of Channels:**
**Resolution:** 12 bit
**Max Update Rate:** 200kS/S
**Range:** -10V to 10V fixed
**Data Transfer:** DMA

## DIGITAL I/O
**Input Bits:** 8
**Input High:** Vih ≥3.6V
**Input Low:** Vil ≤ 1.4V
**Input Leakage Current:**
Iin = ±0.1µA
**Input Protection:** 0 - 7 V
**Output Bits:** 8
**Output High:** Voh ≥ 3.94 V

**Output Low:** Vol ≤ 0.1V
**Max Output Current:** 25 mA per line, 75 mA for 8 lines
**Compatibility:** TTL
**Power On State:** Low

## TIMING I/O
**Number of Counter/Timers:** 3 available to user
**Resolution:** 16 bits
**Frequency Scaler:** 10 MHz
**Input Low:** $V_{IL}$ =0.8 Vmax; $I_{IL}$ = -0.2 µA max
**Input High:** $V_{IH}$ =2.0 Vmax; $I_{IH}$ = -20 µA max
**Output Current:**
$I_{OH}$=24 mA, $I_{OL}$ =48 mA

**Compatibility:** 8254

## GENERAL
**Connector 1:**
96-way high-density "pinless" connector
**Connector 2:**
36-pin header connector (male)
**Operating Environ.:** 0 to 70°C
**Power Requirements:**
1A @ 5V, 50 mA @ ±12V
**Dimensions:**
11 x 3.8" (279 x 98 mm)

### To Order (Specify Model Number)

| Model Number | Price | Description |
|---|---|---|
| PD-MF-16-330/12L | $895 | 16/8 Channel 12 bit 330KHz PowerDAQ Board with gains of 1,10,100,1000 |
| PD-MF-16-330/12H | 895 | 16/8 Channel 12 bit 330KHz PowerDAQ Board with gains of 1,2,4,8 |
| PD-MF-64-330/12L | 1395 | 64/32 Channel 12 bit 330KHz PowerDAQ Board with gains of 1,10,100,1000 |
| PD-MF-64-330/12H | 1395 | 64/32 Channel 12 bit 330KHz PowerDAQ Board with gains of 1,2,4,8 |
| PD-MF-16-1M/12L | 1650 | 16/8 Channel 12 bit 1.25 MHz PowerDAQ Board with gains of 1,10,100,1000 |
| PD-MF-16-1M/12H | 1650 | 16/8 Channel 12 bit 1.25 MHz PowerDAQ Board with gains of 1,2,4,8 |
| PD-MF-64-1M/12L | 2495 | 64/32 Channel 12 bit 1.25 MHz PowerDAQ Board with gains of 1,10,100,1000 |
| PD-MF-64-1M/12H | 2495 | 64/32 Channel 12 bit 1.25 MHz PowerDAQ Board with gains of 1,2,4,8 |
| PD-MF-16-250/16L | 1650 | 16/8 Channel 16 bit 250 KHz PowerDAQ Board with gains of 1,10,100,1000 |
| PD-MF-16-250/16H | 1650 | 16/8 Channel 16 bit 250 KHz PowerDAQ Board with gains of 1,2,4,8 |
| PD-MF-64-250/16L | 2395 | 64/32 Channel 16 bit 250 KHz PowerDAQ Board with gains of 1,10,100,1000 |
| PD-MF-64-250/16H | 2395 | 64/32 Channel 16 bit 250 KHz PowerDAQ Board with gains of 1,2,4,8 |

*All PoweDAQ boards include a user's manual, Quick Start application and driver software*
**Ordering Example: PD-MF-16-330/12L** *PowerDAQ board,* **PD-STP-96**16 *screw terminal panel,* **PD-CBL-96** *analog I/O cable and* **PD-CBL-37** *digital I/O cable: $895 + 155 + 95 + 55 = $1200.*

### Accessories

| Model Number | Price | Description |
|---|---|---|
| PD-TCR16-J | $995 | 16 channel isolated thermocouple input rack for J T/C |
| PD-TCR16-K | 995 | 16 channel isolated thermocouple input rack for K T/C |
| PD-STP-96 | 225 | Screw terminal panel with 96-pin and 37 pin connector for 64 channel boards, requires PD-CBL-96 for analog connection and PD-CBL-37 for digital connection |
| PD-STP-9616 | 155 | Screw terminal panel with 96-pin and 37 pin connector for 16 channel boards, requires PD-CBL-96 for analog connection and PD-CBL-37 for digital connection |
| PD-5BCONN | 95 | Connects to four OM5 signal conditioning backplanes or PD-TCR16-x isolated thermocouple input racks, requires a PD-CBL-96 cable to connect to PowerDAQ and one PD-CBL-5B to connect to each backplanes or rack |
| PD-7BCONN | 95 | Connects four OM7 backplanes to PowerDAQ board, requires a PD-CBL-7B cable between PD-7BCONN and OM7-BP. Also requires PD-CBL-96 cable |
| PD-BNC-16 | 350 | BNC analog connection panel for 16 channel PowerDAQ boards, requires PD-CBL-96 cable |
| PD-CBL-96 | 95 | 96-way "pinless" 1 meter round shielded cable |
| PD-CBL-37 | 55 | DIO cable set, consists of 37 D-sub cable and internal cable with mounting bracket, 1 meter length |
| PD-CBL-5B | 25 | 18" ribbon cable, connects PD-5BCONN to OM5 backplane and PD-TCR16 thermocouple rack |
| PD-CBL-7B | 35 | 18" ribbon cable, connects PD-5BCONN to OM7 backplane |
| PD-19RACK | 55 | 19" rackmount for PD-STP-96, PD-STP-9616, PD-5BCONN, PD-7BCONN, and PD-BNC-16 |
| PD-19RACKW | 150 | Wide 19" rackmount for PD-TCR16-x |