

# Data Acquisition Boards For Desktop PCs



**\$1095**  
Basic System



Shown smaller than actual size.

The DAQBOARD is no longer available. Please see the OMB-DAQBOARD-2000 as a substitute or contact sales

- ✓ 16-bit A/D
- ✓ 100K Reading/sec Real-time Storage-to-Disk
- ✓ 8 Differential- or 16 Single-Ended Inputs, Expandable to 256
- ✓ X1, 2, 4, or 8 Programmable Gain (Other Gains Available with Option Cards)
- ✓ Expansion Cards for High Voltage/current, Strain Gage, Thermocouple, Isolation, Filtering and Simultaneous Sample and Hold
- ✓ 512-location Scan Memory for User-Defined Channel/Gain Sequencing
- ✓ Analog, Digital, or Software Trigger
- ✓ Two 12-bit Analog Outputs, 100 kHz via On-board DMA or FIFO
- ✓ 24 General-Purpose Digital I/O Lines, Expandable to 192
- ✓ 16 High-speed Digital-Input Lines, Scannable at up to 100 kHz
- ✓ Five Programmable 16-bit Counter/timers

The DAQBOARD family of data acquisition boards offers more signal conditioning choices than any comparable product, while also providing high-speed performance and low price. These ISA-bus boards offer 10  $\mu$ sec per-channel, 16-bit measurement capacity over their 16 analog input channels and maintain the same performance when expanded up to 256 channels. Moreover, both the boards' 16 built-in and 256 expansion channels can each be programmed for a different, dynamically selectable gain. This means that a single DAQBOARD can measure various signal types, from thermocouples to strain-gages, while maintaining the 10  $\mu$ sec per-channel rate. Most other data acquisition boards suffer significant speed and performance declines when equipped with expansion channels, because their on-board sequencing supports only built-in channels.

The DAQBOARD family's 256-channel expansion capacity includes low-cost, compact signal conditioning boards for measuring temperature, voltage, and strain, as well as boards for performing isolation, low-pass filtering, and simultaneous sample and hold. These boards can be housed in similarly inexpensive and compact three- or ten-slot enclosures.

## FLEXIBLE TRIGGERING

The DAQBOARDS offer an array of both analog and digital triggering capabilities. For example, the units permit you to trigger on the analog input level from any one channel, and also allow you to program the slope and polarity of the trigger level. Because the DAQBOARDS feature a hardware-based trigger, they minimize trigger latency to less than 10  $\mu$ s. In contrast, most plug-in boards that employ software-polling triggers have typical trigger-to-A/D conversion latencies of 100  $\mu$ s or more. The DAQBOARDS can also be triggered from a TTL-level digital input or from a command from the PC. Pre-trigger data can be collected using any analog channel as the triggering event.

# DAQBOARD Series



## ANALOG INPUT

The DAQBOARDS' built-in analog input capability permits them to measure 8 channels in a differential input mode, or 16 channels in a single-ended mode. Their on-board programmable gain instrumentation amplifiers can be dynamically set to x1, 2, 4, or 8. Other gains can be obtained via expansion cards. The DAQBOARDS A/D converter scans selected channels at a constant 10  $\mu$ s/channel rate, minimizing the time skew between consecutive channels. The time between the start of each scan sequence can be programmed to start immediately or at intervals up to 12 hours. The OMB-DBK expansion cards permit each DAQBOARD to be expanded up to 256 channels while maintaining its 10  $\mu$ s per channel rate. (For applications that require simultaneous sampling of multiple channels, see OMB-DBK17).

## ANALOG OUTPUT

Each DAQBOARD has two 12-bit D/A converters that allow you to generate voltages of 0 to +5 V. In addition, with a bipolar external reference, output voltages between -10 Vdc and +10 Vdc may be obtained. One D/A converter is internally wired to the analog trigger comparator, and can be software programmed to act as either the trigger-level setting, or the second analog output channel. The DAQBOARDS' analog outputs can be programmed whenever the DAQBOARDS are not transferring A/D data.

## HIGH-SPEED DIGITAL INPUT

The DAQBOARD-200 has the ability to scan 16 TTL-level digital inputs as part of the user-defined scan sequence. Thus, the units can acquire the state of all 16 high-speed digital input lines within an analog scan sequence. The DAQBOARDS transfer the acquired digital word to the PC within the same data stream as the acquired analog data, eliminating the need for special data handling by the software.

## GENERAL-PURPOSE DIGITAL I/O

The DAQBOARD-200 includes 24 general-purpose digital I/O lines, programmable in 8-bit groups as either inputs or outputs. Digital I/O capacity can be expanded up to 192 lines with the addition of optional expansion cards. The digital I/O lines can be accessed by the PC whenever the DAQBOARDS are not transferring data from the A/D converter. If an application requires digital inputs with critical timing, the unit's 16 high-speed digital inputs should be used.

## FREQUENCY/PULSE INPUT

The DAQBOARD-200 provides five 16-bit counter/timers, which can be programmed for a wide variety of functions. For frequency measuring applications, each channel can count frequency inputs up to 7 MHz, with programmable gate time from 1  $\mu$ s to 655 seconds. If expansion beyond the 16-bit capacity of a single channel is required, the units permit channels to be cascaded via software. Also, each channel can be configured for pulse-counting or totalizing applications—wherein the number of

received pulses is accumulated, permitting pulse accumulation concurrently with the measurement of analog input channels. The units also permit the width of a digital input pulse to be measured on each channel, with resolution to 1  $\mu$ s.

## PULSE/FREQUENCY OUTPUT

In pulse/frequency output modes, the DAQBOARD-200's five counter-timer channels can each be independently programmed to perform one of several functions. In the pulse generation mode, a single pulse of programmable width can be generated from dc to 500 kHz. In the frequency-generation mode, the DAQBOARDS can generate a square wave of duty cycle from 0.0005% to 99%, with frequencies up to 1 MHz.

An external timebase can also be input to achieve other frequency outputs. Each of the DAQBOARDS' counter-timer channels has a one-shot output mode that can generate a pulse output in response to a hardware or software trigger input. The pulse begins at a programmable delay from 1  $\mu$ s to 655 seconds after receipt of the trigger.

## SOFTWARE

DAQBOARD products support a wide variety of software options, providing you with a diverse selection of software packages in which to develop your data acquisition system.

## DOS and Windows Drivers

Every OMB-DAQBOARD product is supplied with drivers that enable you to develop your own applications under either DOS or Windows. The units' DOS drivers are compatible with QuickBASIC, C, and Pascal; the Windows drivers are compatible with Visual Basic, Visual C, and C++.

## DAQVIEW

All DAQBOARD data acquisition systems include DAQVIEW, a Microsoft Windows data logging and control application that provides a "no-programming required" interface to all DAQBOARD features.

## Analog Input

DAQVIEW includes an Analog Input window for setting up the unit to acquire data to disk. DAQVIEW's on-screen controls let you set parameters such as trigger source, trigger level, and number of scans, and also provides you with a channel-configuration spreadsheet for selecting and assigning labels and gains to each channel. Once you have configured a DAQBOARD and armed it for acquisition, a strip chart window can be opened to display channel data trends in real time. DAQVIEW also enables you to easily access option boards connected to a DAQBOARD. DAQVIEW lets you specify the data format of your output files as binary, ASCII, or both. The ASCII format is compatible with many spreadsheets and graphical analysis programs. You can also use DAQVIEW's mX+b facility to scale and offset readings on a per-channel basis.

## Analog Output

DAQVIEW provides an analog output window for interactive control of the DAQBOARD's two D/A converters. The window features a slider and a text entry field for each D/A converter, facilitating the setting of output voltage.



# Data Acquisition Boards for Desktop PCs

## Digital I/O

DaqView includes a digital I/O window that provides you with full interactive control of digital I/O on a DAQBOARD P2 connector and up to four attached option cards. The window allows you to independently configure each port as either an input or output.

## Counter-Timer Window

DAQVIEW includes a counter-timer window that provides frequency measurement, totalizing, and pulse-train generation applications for the DAQBOARD-200's five counter-timers.

## PostView

This post-acquisition waveform viewing program provides strip-chart recorder-like graphical displays for reviewing large amounts of previously acquired data. Users can display up to 16 channels of data that have been collected and saved to a file by DAQVIEW. Using the program's intuitive on-screen controls, you can expand, contract, and auto-scale waveforms as well as scroll in either direction.

The program also lets you employ the mouse to place markers for extracting time and magnitude data from any point in the waveform. Multiple applications of PostView can be launched simultaneously to view several data files concurrently.

## EXPANSION, SIGNAL CONDITIONING AND POWER OPTIONS

The DAQBOARDS can be easily expanded beyond their built-in channel capacity via our wide ranging OMB-DBK Series of expansion, signal conditioning, and power supply cards. (See Section H for details and specifications for all OMB-DBK cards.)

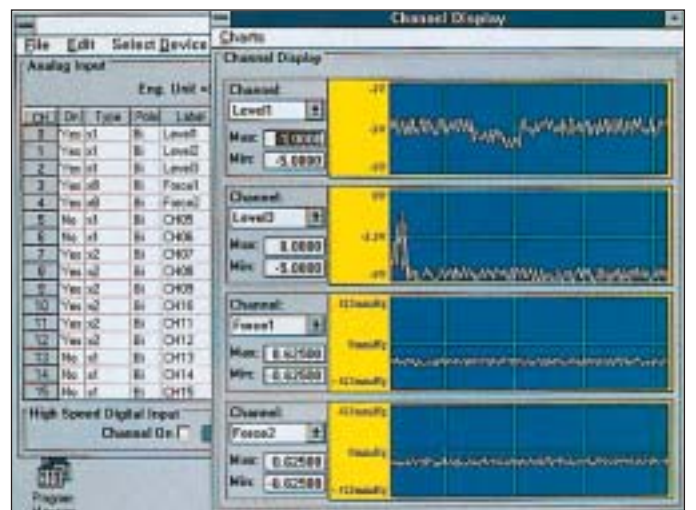
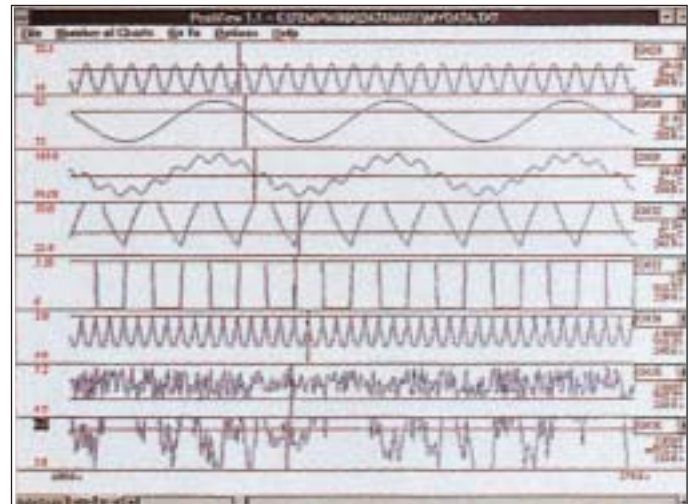
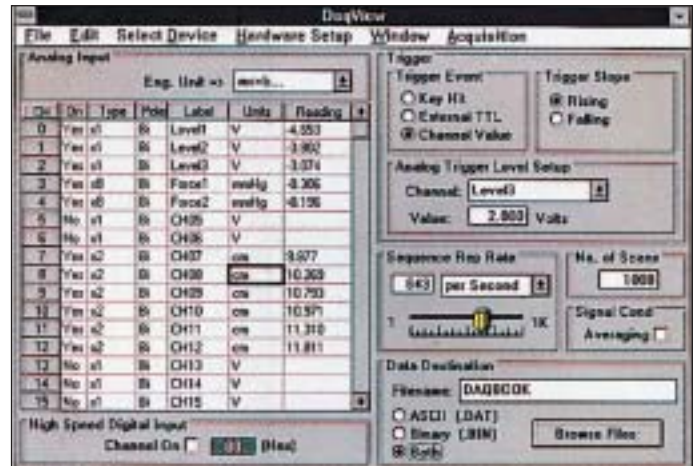
### Analog Input Expansion

All OMB-DBK Series analog expansion cards are designed to daisy-chain to the P1 analog connector found on all DAQBOARD models.

Because the DAQBOARDS feature an on-board channel/gain sequencer, they can directly address up to 256 channels, enabling the scanning of all expansion channels at the same 10  $\mu$ s rate as on-board channels.

When equipped with analog input expansion cards, the DAQBOARD must be configured for 16 single-ended inputs. Each 16-channel expansion card in use consumes one of the DAQBOARD's on-board analog channels; consequently, a maximum of sixteen 16-channel cards can be accommodated, for a total of 256 channels. OMB-DBK Series cards with only 2 or 4 channels can share the same DAQBOARD base channel to maintain the 256 channel maximum.

When analog expansion cards are in use, unused DAQBOARD base channels are available to measure input signals. (The OMB-DBK11A screw terminal card provides convenient access to the DAQBOARD base channels.)



# DAQBOARD Series

## Analog Input Card Housing

You can house the OMB-DBK analog input expansion cards in a variety of ways. Your choice will depend on the number of cards required by your system.

If your application requires six or fewer cards, the slim 3-slot OMB-DBK10 expansion card enclosure is a good choice. The OMB-DBK10 requires an OMB-CA-131-x cable for daisy chaining the analog expansion cards. The OMB-DBK10 enclosures can easily be stacked together.

If your application requires more than 6 expansion cards or if you want to allow for future system expansion, the compact 10-slot OMB-DBK41 analog expansion card enclosure is the preferred solution.

Multiple OMB-DBK41s can be daisy-chained to cost-effectively house the number of analog input cards required to bring a DAQBOARD system up to its maximum expansion capacity of 256 channels. Also, because it features an analog backplane for connecting the expansion cards, the OMB-DBK41 obviates a long daisy-chain cable.

## Powering Analog Cards

Every DAQBOARD model has the capacity to power several analog expansion cards. However, if the number of cards in your application requires more power than can be obtained from the power supply, the OMB-DBK32A power supply card is available to meet your system's power needs.

The OMB-DBK32A attaches directly to the P1 analog expansion bus and supplies power to all analog expansion cards. The

OMB-DBK32A can be powered from an included ac adapter, or from any +10 to +30 Vdc source.

When installed in the OMB-DBK10 three-slot expansion enclosure, the OMB-DBK32A is attached via the OMB-CA-131-x cable. If used with the OMB-DBK41 ten-slot expansion card enclosure, it simply installs into one of the analog expansion slots on the unit's backplane.

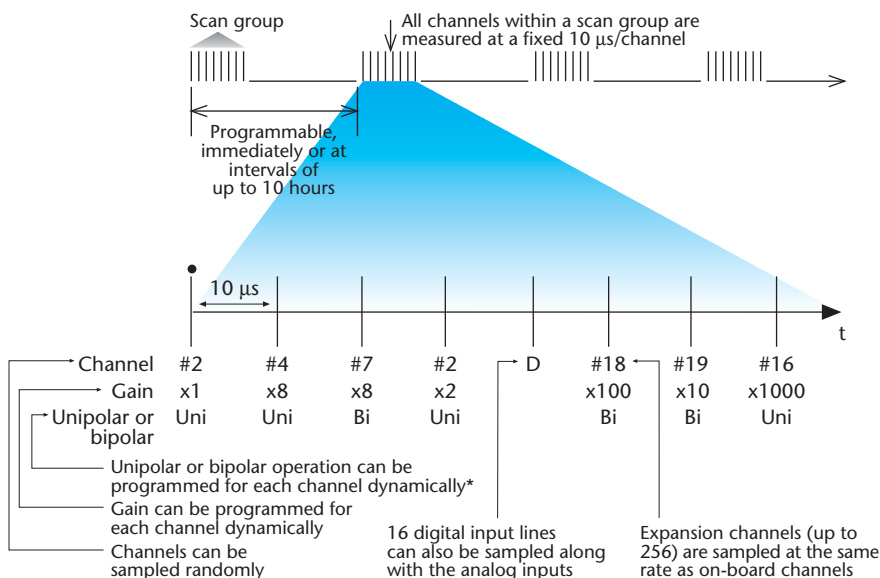
## Digital I/O Expansion

The DAQBOARD-200 features a P2 connector equipped with 24 digital I/O channels. You can expand these models' digital I/O capacity up to 192 channels via the use of OMB-DBK series digital I/O cards. These cards can be housed in the OMB-DBK10 three-slot expansion enclosure. (See Section H for details and specifications for all OMB-DBK cards.)

## CHANNEL-SCANNING FLEXIBILITY

The DAQBOARD offers a 512-location scan sequencer that allows you to select each channel and associated input amplifier gain at random. The sequencer circuitry circumvents a major limitation encountered with many plug-in data acquisition boards—a drastic reduction in the scan rate for external expansion channels. All DAQBOARD channels are scanned, including the 256 potential expansion channels, at 100 kHz (10  $\mu$ s/channel), via on-board FIFO or directly from the PC via DMA. In addition, the 16 digital inputs can be scanned using the same scan sequence employed for analog inputs, enabling the time correlation of acquired digital data to acquired analog data. The units permit each scan group, which can contain up to 512 channel/gain combinations, to be repeated immediately or at programmable intervals of up to 10 hours. Within each scan group, consecutive channels are measured at a fixed 10  $\mu$ s/channel rate.

### DAQBOARD Scanning Example



\* DaqBoard-200 & 216 only

# Data Acquisition Boards for Desktop PCs

## Specifications

### GENERAL

#### DAQBOARD-200, 216

#### Power Consumption:

200: 1550 mA @ 5 Vdc;  
216: 1500 mA @ 5 Vdc

#### Operating Temperature:

0 to 50°C

#### Storage Temperature:

0 to 70°C

**Humidity:** 0 to 95% RH,  
non-condensing

### A/D SPECIFICATIONS

**Type:** Successive  
approximation

**Resolution:** 200, 216: 16-bit

**Conversion Time:** 8  $\mu$ s

**Linearity:**  $\pm 1$  bit

#### 16-BIT DAQBOARD-200, 216

**Channels:** 16 single-ended,  
8 differential, expandable up to  
256 differential; single-  
ended/differential operation is  
software programmable

**Connector:** DB37 male, P1

**Resolution:** 16-bits

**Ranges:** unipolar/bipolar operation  
is software programmable on a  
per-channel basis

**Unipolar:** 0 to 10 V, 0 to 5 V,  
0 to 2.5 V, 0 to 1.25 V

**Bipolar:** 0 to  $\pm 5$  V, 0 to  $\pm 2.5$  V,  
0 to  $\pm 0.125$  V, 0 to  $\pm 0.625$  V

**Max Overvoltage:** 30 Vdc

**Input Impedance:** 100 M $\Omega$

### TRIGGERING

#### DAQBOARD-200, 216

#### Analog Trigger

**Programmable Level Range:**  
0 to  $\pm 5$  V

**Trigger to A/D Latency:** 10  $\mu$ s max

#### Digital Trigger

**Logic Level Range:** 0.8 V low,  
2.2 V high

**Trigger to A/D Latency:** 10  $\mu$ s max

#### Software Trigger

**Trigger to A/D Latency:**

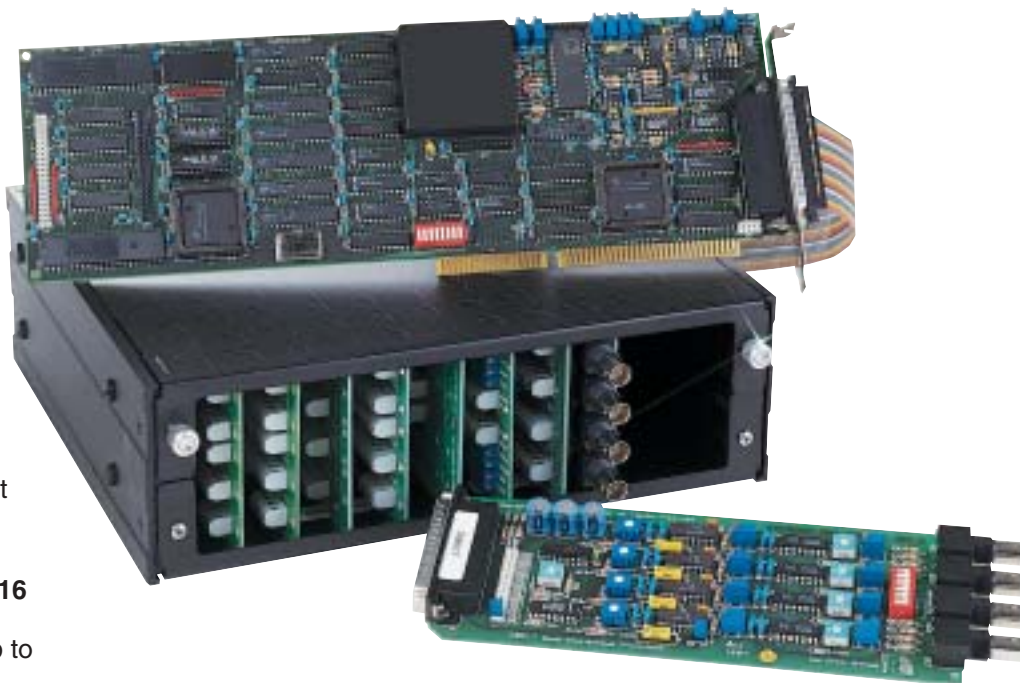
Dependent  
on PC speed

**Pre-Trigger:** up to 65,536 scans

### SEQUENCER

#### DAQBOARD-200, 216

Randomly programmable for  
channel & gain; DAQBOARD-200 is  
also randomly programmable for  
unipolar/bipolar ranges and single-  
ended/differential modes



DAQBOARD shown with OMB-DBK41 expansion enclosure and OMB-DBK cards. (See section H for OMB-DBK specifications)

**Depth:** 512 location

#### Channel to Channel Rate:

10  $\mu$ s/channel, fixed

#### Expansion Channel Sample Rate:

same as on-board channels,  
10  $\mu$ s/channel

### ANALOG OUTPUTS

#### DAQBOARD-200, 216

**Channels:** 2

**Connector:** DB37 male, P1

**Resolution:** 12-bits

**Voltage Ranges:** 0 to 5 Vdc with  
built-in reference; 0 up to  $\pm 10$  Vdc  
with external reference

**Max Output Current:** 10 mA

### GENERAL PURPOSE DIGITAL I/O DAQBOARD-200

**Channels:** 24 expandable up to 192

#### Ordering Example:

Qty	Description	Price
1	DAQBOARD-200 16-bit board with digital I/O	\$1295
1	OMB-DBK10 Three slot expansion card enclosure	195
3	OMB-DBK81 7-channel thermocouple input expansion cards @ 495	1485
1	OMB-CA-131-3 Cable from DAQBOARD to OMB-DBK10	65
<b>Total Cost:</b>		<b>\$3040</b>

### To Order (Specify Model Number)

Model No.	Price	Description
DAQBOARD-200	1295	16-bit 16-channel analog input, 2-channel analog output, 16 high speed digital inputs, 24 general purpose digital I/O, 5 counter/timers
DAQBOARD-216	1095	16-bit, 16-channel analog inputs and 2 analog outputs



# DAQBOARD Series

**Connector:** DB37 male, P2

**Device:** 82C55

**Output Voltage Levels**

**Min "1" Voltage:** 3.0 @ 2.5 mA sourcing

**Max "0" Voltage:** 0.4 @ 2.5 mA sinking

**Output Current**

**Max Source Current:** 2.5 mA

**Max Sink Current:** -2.5 mA

**Input Voltage Levels**

**Min Required "1" Voltage**

**Level:** 2 V

**Max Allowed "0" Voltage**

**Level:** 0.8 V

**Output Float Leakage Current:**

10  $\mu$ A

**HIGH-SPEED DIGITAL INPUTS  
DAQBOARD-200**

**Lines:** 16

**Connector:** DB37 male, P3

**Max Sampling Rate:**

100K words/s

**Input Low Voltage:** 0.8 V max

**Input High Voltage:** 2 V min

**Input Low Current:** 10 nA

**Input High Current:** -10  $\mu$ A

**COUNTER/TIMER  
DAQBOARD-200**

**Channels:** 5

**Connector:** DB37 male, P3

**Frequency/Pulse Counting**

**Mode:** up or down, binary or BCD

**Max Pulse Count:**

80-bit binary (5 channels cascaded)

**Max Input Rate:** 7 MHz

**Min High Pulse Width:** 70 ns

**Min Low Pulse Width:** 70 ns

**On-board Time Base:** 1 MHz

**Input Low Voltage:** 0.8 V max

**Input High Voltage:** 2.2 V min

**Input Low Current:** 10  $\mu$ A max

**Input High Current:** -10  $\mu$ A max

**Frequency/Pulse Generating  
Mode**

**Max Output Frequency:** 1 MHz

**Duty Cycle:** variable between limits of approximately 0.0015% and 99.99%

**Output High Voltage:**

2.4 V min @ -200  $\mu$ A

**Output Low Voltage:**

0.4 V max @ 3.2 mA

**MOST POPULAR MODELS HIGHLIGHTED**

**Accessories and Cables (See Section H for details and specifications)**

Model No.	Price	Description
OMB-DBK1	\$419	16-connector BNC interface module
OMB-DBK2	629	Four-channel D/A voltage-output card
OMB-DBK4	939	Two-channel dynamic signal-input card
OMB-DBK5	519	Four-channel current-output card
OMB-DBK7	729	Four-channel frequency-input card
OMB-DBK8	729	Eight-channel high voltage input card
OMB-DBK9	519	Eight-channel RTD measurement card
OMB-DBK10	209	3-slot expansion card enclosure
OMB-DBK11A	3329	Screw terminal card
OMB-DBK15	629	16-channel universal voltage/current input card
OMB-DBK16	629	2-channel strain gage input card
OMB-DBK17	595	4-channel simultaneous sample and hold card
OMB-DBK18	595	4-channel low pass filter card
OMB-DBK20	195	48-channel digital I/O card with screw terminal connectors
OMB-DBK21	195	48-channel digital I/O card with DB37 male connectors
OMB-DBK23	495	24-Line optically isolated digital-input module
OMB-DBK24	495	24-Line optically isolated digital-output module
OMB-DBK25	519	8-channel relay-output card
OMB-DBK30A	595	Rechargeable battery/excitation module
OMB-DBK32A	595	Auxiliary power supply card (See "Calculating System Power Requirements Chart")
OMB-DBK40	419	BNC analog interface and cable
OMB-DBK41	839	10-slot expansion card enclosure
OMB-DBK42	939	16-slot multi-purpose isolated signal conditioning module
OMB-DBK43A	2495	8-channel strain-gage module
OMB-DBK45	795	4-channel simultaneous sample and hold module with low-pass filter
OMB-DBK44	295	2-channel multi-purpose isolated signal conditioning card
OMB-DBK50	1995	8-channel isolated high voltage-input modules
OMB-DBK51	2079	8-channel isolated low voltage-input modules
OMB-DBK53	595	16-channel programmable low-gain analog-input module
OMB-DBK54	595	16-channel programmable high-gain analog-input module
OMB-DBK60	629	3-slot expansion module with selectable field terminations
OMB-DBK80	519	16-channel differential input voltage card
OMB-DBK81	519	7-channel thermocouple/mV input card
OMB-DBK82	839	14-channel thermocouple/mV input card
OMB-DBK83	939	14-channel thermocouple/mV input card with external screw terminal pod and 1 m (3 ft) cable
OMB-DBK84	1039	14-channel thermocouple/mV input module
OMB-CA-131-1	45	Expansion card cable, for single option expansion
OMB-CA-131-2	55	Expansion card cable, for two option expansion
OMB-CA-131-3	65	Expansion card cable, for three option expansion
OMB-CA-131-4	75	Expansion card cable, for four option expansion
OMB-CA-113	51	Ribbon cable with female DB37 connector
OMB-CA-60	51	Adaptor cable, converts digital I/O and counter ports from DAQBOARD to 37-pin D connector that mounts on rear of PC; one cable required for each port

Each DAQBOARD unit is supplied with DOS and Windows driver software, DaqView and PostView software, and complete operator's manual.

The DAQBOARD is no longer available. Please see the OMB-DAQBOARD-2000 as a substitute or contact sales



#### UNITED STATES

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