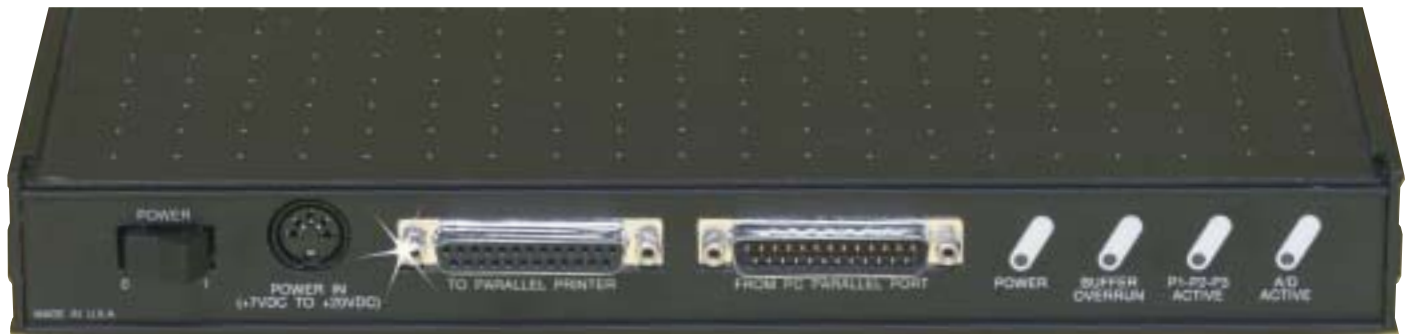


# Portable Data Acquisition Systems For Notebook and Desktop PCs



Basic Unit



Shown smaller than actual size.

- ✓ Links to Notebook or Desktop PCs via a Standard or Enhanced Parallel Port (EPP) or Optional PCMCIA Link
- ✓ Operable From ac Adapter, Optional Nickel-Cadmium Power Module, 12 V Car Battery, or Any 9 to 20 Vdc Source
- ✓ Analog Input:
  - 100 kHz, 16-bit A/D Converter
  - 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
  - Option and Expansion Cards for High-Voltage/Current, Thermocouples, RTDs, Strain Gages, Isolation, Filtering and Simultaneous Sample and Hold
  - 512-Location Scan Memory for User-defined Channel/gain Sequencing
  - Triggerable from Analog, Digital, or Software
- ✓ Two 12-bit Analog Outputs
- ✓ Digital I/O:
  - 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
- ✓ Software Support Includes:
  - DaqView, a Graphical Windows™ Data-logging Application
  - Visual Basic OMB-DAQBOOK Drivers
  - DOS & Windows Drivers

OMB-DAQBOOK portable data acquisition systems for notebook and desktop PCs offer 16-bit, 100 kHz data acquisition. The OMB-DAQBOOK models provide >700 Kbyte/s bidirectional data communication to the PC via an enhanced parallel port (EPP) or PCMCIA link interfaces. Operable from ac or dc power sources, OMB-DAQBOOK series products are ideal for a variety of portable, field, and benchtop applications.

The OMB-DAQBOOKs' high performance A/D conversion and 100 kHz sampling make them particularly useful for applications with high accuracy and speed requirements. Their extensive I/O and signal conditioning capabilities, and low cost per channel also make them an effective alternative to more expensive stand-alone data loggers, less portable strip-chart recorders, and less versatile dedicated handheld devices.

The OMB-DAQBOOKs are supplied with DaqView, a Windows-based data logging application that allows you to set up your acquisition applications and save acquired data directly to disk. The package includes thermocouple linearization for direct readout of temperatures when used with an OMB-DBK19 thermocouple card. The OMB-DAQBOOK products include drivers for Visual Basic, Quick Basic, C, and Pascal; they also include DOS drivers that are compatible with DAS-16, PIO-12, and CTM-05 boards. Several graphical analysis and control software packages also support the OMB-DAQBOOKs.

## PC Connections

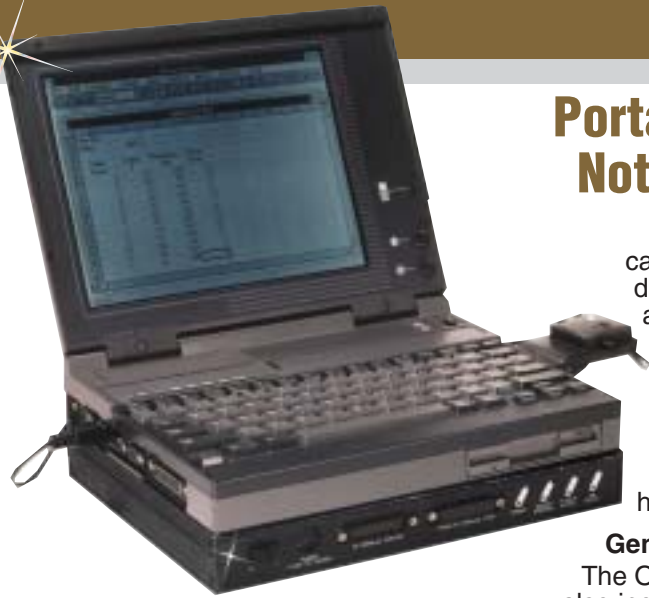
THE OMB-DAQBOOK-200 connects to PCs via an EPP (enhanced parallel port) connection that provides >700 Kbyte/s bidirectional data transfer, allowing for real-time storage of acquired data in the PCs memory or on its hard drive.

The OMB-DAQBOOKs also support the standard parallel port and provide a second standard parallel port for simultaneous connection of a parallel printer. Every OMB-DAQBOOK includes supplied software drivers that enable it to automatically route characters intended for a parallel printer to its own auxiliary parallel printer port.

An optional EPP/PCMCIA card and cable is also available, so that the unit may be linked to a type II PCMCIA slot in many laptop computers.



# Portable Data Acquisition Systems For Notebook and Desktop PCs



## Flexible Triggering

The OMB-DAQBOOKs 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 OMB-DAQBOOKs 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. They can also be triggered from a TTL-level digital input or from a command from the PC.

## High-Speed Digital Input

The OMB-DAQBOOK-200 units have the ability to scan 16 TTL-level digital inputs as part of the user-defined scan sequence. The units

can acquire the state of all 16 digital input lines within an analog scan sequence. The unit transfers 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 OMB-DAQBOOK-200 units also include 24 general-purpose digital I/O lines, programmable in 8-bit bytes as either inputs or outputs. Digital I/O capacity can be expanded up to 192 lines with the addition of expansion cards. The digital I/O lines can be accessed by the PC whenever the DAQBOOKs are not transferring data from the A/D converter. If an application requires digital inputs with critical timing, the units' 16 high-speed digital inputs should be used.

## Frequency/Pulse Input

The DAQBOOKs provide 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 the PC to read the accumulation even if it is scanning 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 DAQBOOKs' 5 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.

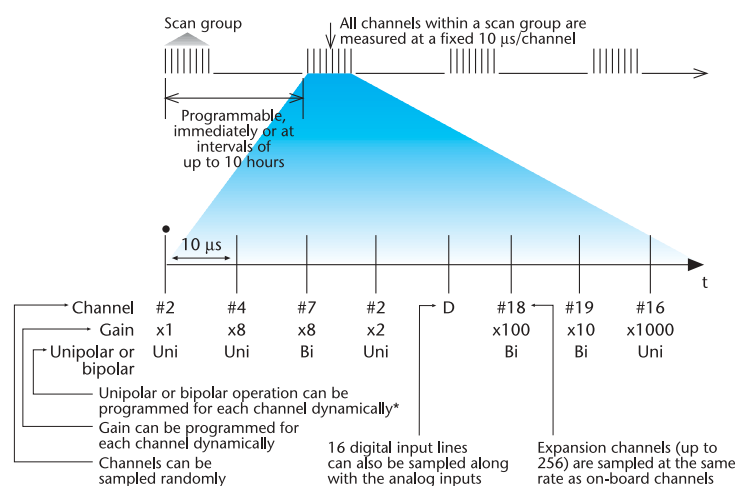
In the frequency-generation mode, the unit can generate a square wave of duty cycle from 0.0005% to 99%, with frequencies up to 1 MHz.

An external timebase can also be input to achieve other frequency outputs. Each of the DAQBOOKs' 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.

## Channel-Scanning Flexibility

The OMB-DAQBOOKs offer 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 OMB-DAQBOOK channels are scanned, including the 256 potential expansion channels, at 100 kHz (10  $\mu$ s/channel). 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.

## OMB-DAQBOOK Scanning Example



\* DAQBOOK-200 & 216 only



Model	DAQBOOK-200
<b>Analog input</b>	
A/D resolution	16 bit
No. of analog input channels	8 DE, 16 SE
Max. channel capacity	256
A/D speed <sup>‡</sup>	100 kHz
Unipolar/bipolar selection	software
Single/differential selection	software
Channel/gain sequencer depth	512
Built-in expansion card slot	N/A
<b>Analog output</b>	
No. of output channels	2
Resolution	12 bit
<b>High-speed digital inputs</b>	
No. of bits	16
Max. scan rate	100K words/s
<b>Programmable digital I/O</b>	
No. of programmable input/output lines	24
Max. channel capacity	192
<b>Fixed digital I/O</b>	4 in, 4 out**
<b>Programmable counter/timers</b>	
No. of channels	5
Max. frequency input	7 MHz
<b>Other counter inputs</b>	1 ch, 8 MHz**
<b>Computer interface</b>	
Standard parallel port	✓
Enhanced parallel port (EPP)	✓
Second parallel printer port	✓
Max. data throughput to PC <sup>‡</sup>	800 Kbytes/s
Optional PCMCIA	✓
<b>Software</b>	
DOS & Windows drivers	✓
Visual Basic VBX	✓
DaqView Software	✓
PostView Software	✓
Labtech Notebook compatible***	✓
SnapMaster compatible****	✓
DASYlab compatible	✓
<b>Power</b>	
ac adapter	included
Rechargeable battery module	optional
Current consumption @ 12 Vdc in	620 mA

\* Board only, does not include package or power supply. \*\* Accessible only if no analog expansion cards are in use; not accessible from DaqView, Labtech Notebook or SnapMaster. \*\*\*DOS only \*\*\*\*16-bit only

‡ OMB-DAQBOOKs used on non-EPP parallel ports provide maximum A/D rates of 30 to 50 kHz, system dependent.

## SOFTWARE

OMB-DAQBOOK 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.

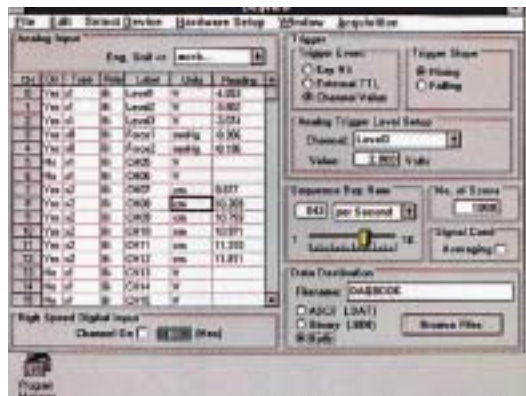
### DOS and Windows Drivers

Every OMB-DAQBOOK 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++. Windows support also includes a Visual Basic custom control that provides point-and-click control of OMB-DAQBOOK operations through Visual Basic's Properties and Methods.

### DaqView

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

DaqView for Windows



### Analog Input

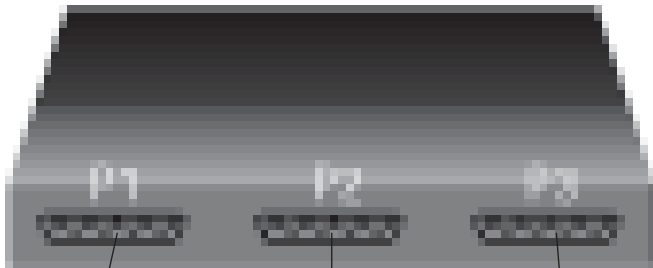
DaqView includes an Analog Input window for setting up the unit to acquire data to disk. DaqView's on-screen controls let you set parameters such as trigger source, trigger level, and number of scans, and also provides you with a channel-configuration spreadsheet for selecting and assigning labels and gains to each channel. Once you have configured a OMB-DAQBOOK 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 OMB-DAQBOOK. 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.

# Portable Data Acquisition Systems For Notebook and Desktop PCs

OMB-DAQBOOK-200

## SYSTEM PACKAGING

Front



P1  
Analog I/O  
DB37 Signal I/O  
Connector

P2  
Digital I/O  
DB37 Signal I/O  
Connector

P3  
Frequency I/O  
& High Speed  
Digital Input  
DB37 Signal I/O  
Connector

Back



Power  
Switch

Attaches to  
Parallel Printer

dc Power  
Input

Attaches to PCs  
standard or enhanced  
parallel port (EPP) or  
PCMCIA socket

Status  
Indicators

### Analog Output

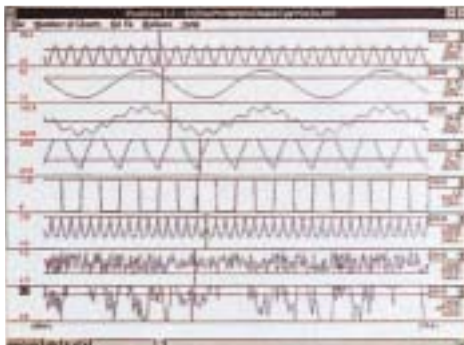
DaqView provides an analog output window for interactive control of the OMB-DAQBOOKS' two D/A converters. The window features a slider and a text entry field for each D/A converter, facilitating the setting of output voltage.

### Digital I/O

DaqView includes a digital I/O window that provides you with full interactive control of digital I/O on a DAQBOOK 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 OMB-DAQBOOK-200's five counter-timers.



PostView analysis software

### 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.



OMB-DAQBOOK shown with OMB-DBK30A rechargeable battery/excitation module, OMB-DBK41 ten-slot expansion enclosure, and OMB-DBK modules (See section H for OMB-DBK specifications)

# Portable Data Acquisition Systems For Notebook and Desktop PCs

## EXPANSION, SIGNAL CONDITIONING AND POWER OPTIONS (See Section H for detailed specification sheets)

The OMB-DAQBOOKs 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.

### Analog Input Expansion

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

Because the OMB-DAQBOOKs 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.

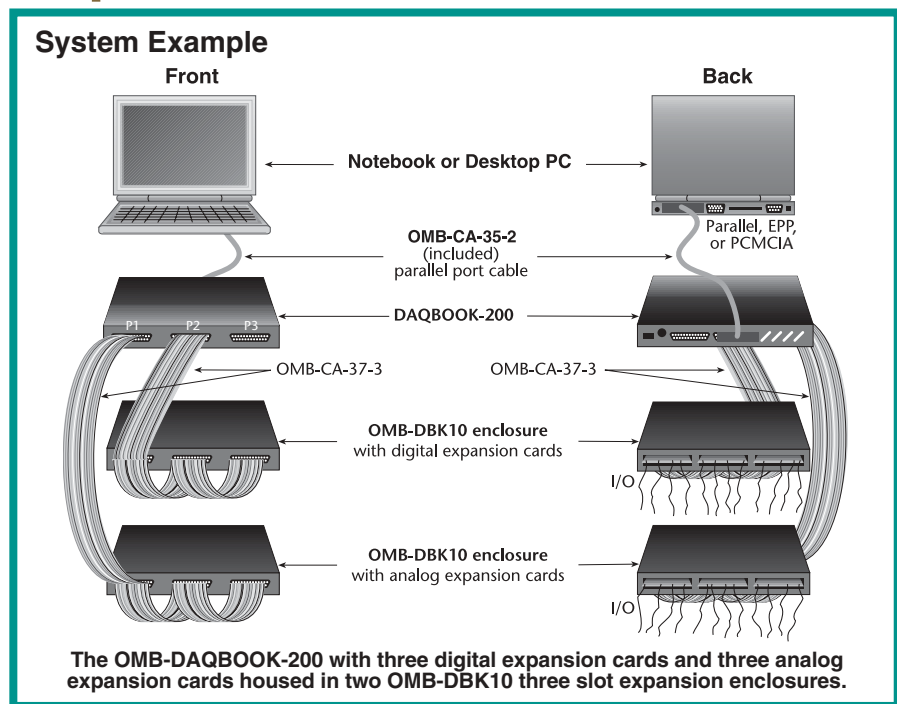
When equipped with analog input expansion cards, the OMB-DAQBOOK must be configured for 16 single-ended inputs. Each 16-channel expansion card in use consumes one of the OMB-DAQBOOK's on-board analog channels; consequently, a maximum of sixteen 16-channel cards can be accommodated, for a total of 256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

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

### 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 a OMB-CA-37-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, the compact 10-slot OMB-DBK41 analog expansion card enclosure is the preferred solution.

Multiple OMB-DBK41s can be used in tandem to cost-effectively house the number of analog input cards required to bring a OMB-DAQBOOK 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 OMB-DAQBOOK model features a built-in power supply of sufficient 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 built-in OMB-DAQBOOK 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. Like the OMB-DAQBOOKs, the OMB-DBK32A can be powered from an included ac adapter,

an optional OMB-DBK30A battery module, or from any +10 to +30 Vdc source, such as a car battery.

When installed in the OMB-DBK10 three-slot expansion enclosure, the OMB-DBK32 is attached via the OMB-CA-37-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. When used in conjunction with a DAQBOOK-112 or 216, the OMB-DBK32 can be installed into the DAQBOOKs' internal expansion slot.

### Digital I/O Expansion

The DAQBOOK-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 are powered from the built-in DAQBOOK power supply, and can be housed in the OMB-DBK10 three-slot expansion enclosure.

When using digital I/O expansion cards, make sure to use a OMB-CA-37-x cable and daisy chain the cards to the P2 digital I/O connector, rather than to the P1 analog I/O connector.

## Specifications

### GENERAL

**System Requirements:** 80386 CPU or better; bidirectional parallel port; Microsoft Windows with 8 MB RAM for DaqView software

**Power Consumption:**

DAQBOOK-200: 620 mA @ 12 Vdc;

**Operating Ambient:** 0 to 50°C; 0 to 95% RH, non-condensing

**Storage Temperature:** 0 to 70°C

**Dimensions:** 3.5 x 21.6 x 27.9 cm (1 $\frac{3}{8}$  x 8.5 x 11")

**Weight:** 2.5 kg (5 lb)

### A/D SPECIFICATIONS

**Type:** successive approximation

**Resolution:** DAQBOOK-200: 16-bit

**Conversion Time:** 8  $\mu$ s; on non-EPP systems, 30k-50k samples/s, system dependent

**Monotonicity:** no missing codes

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

**Zero Drift:**  $\pm 10$  ppm/°C max

**Gain Drift:**  $\pm 30$  ppm/°C max

### SAMPLE AND HOLD AMPLIFIER

**Acquisition Time:** 2  $\mu$ s

**Aperture Uncertainty:** 100 ps

### ANALOG OUTPUTS/DAQBOOK-200

**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

**Maximum Overvoltage:** 30 Vdc input current

**Differential:** 150 pA typ, 0.2  $\mu$ A max

**Single-ended:** 250 pA typ, 0.4  $\mu$ A max

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

**Gain Temp. Coefficient:** 3 ppm/°C typ

**Offset Temp. Coefficient:** 12  $\mu$ V/°C max

### TRIGGERING/DAQBOOK-200

#### 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/DAQBOOK-200

Randomly programmable for channel & gain; DAQBOOK-200 is also randomly programmable for unipolar/bipolar ranges

**Depth:** 512 location

**Channel to Channel Rate:** 10  $\mu$ s/channel, fixed

**Maximum Repeat Rate:** 100 kHz

**Minimum Repeat Rate:** 10 hours

**Expansion Channel Sample Rate:** same as on-board channels, 10  $\mu$ s/channel

### ANALOG OUTPUTS/DAQBOOK-200

**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

**Maximum Output Current:** 10 mA

### GENERAL PURPOSE DIGITAL I/O

#### DAQBOOK-200

**Channels:** 24 expandable up to 192

**Connector:** DB37 male, P2

**Device:** 82C55

#### Output Voltage Levels

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

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

#### Output Current

**Maximum Source Current:** 2.5 mA

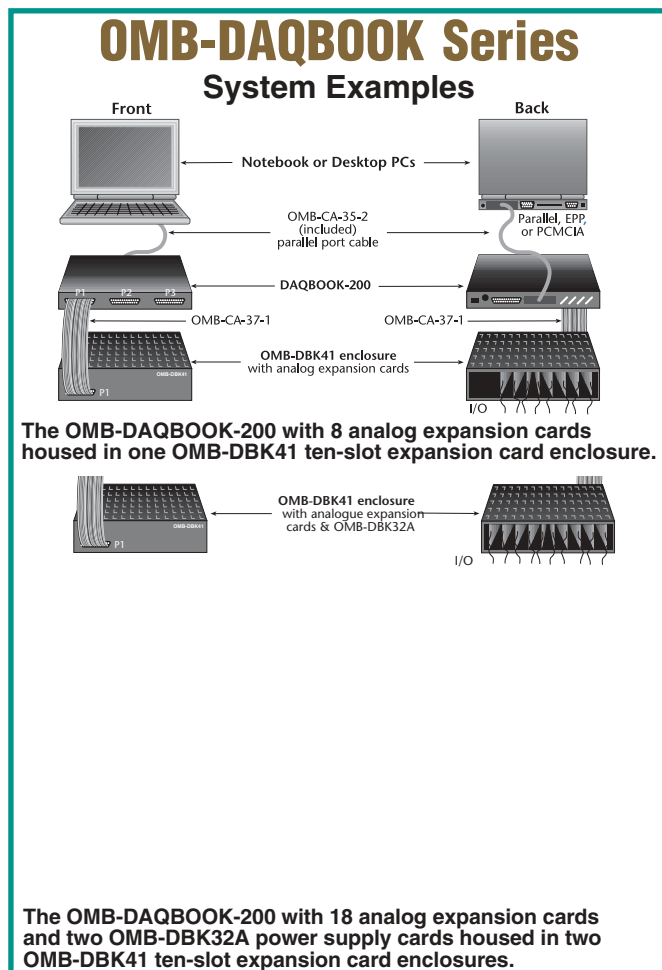
**Maximum Sink Current:** -2.5 mA

#### Input Voltage Levels

**Minimum Required "1" Voltage Level:** 2 V

**Maximum Allowed "0" Voltage Level:** 0.8 V

**Output Float Leakage Current:** 10  $\mu$ A



## HIGH-SPEED DIGITAL INPUTS

### DAQBOOK-200

Lines: 16

Connector: DB37 male, P3

Maximum Sampling Rate: 100 K 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/DAQBOOK-200

Channels: 5

Connector: DB37 male, P3

Frequency/Pulse Counting Mode: up or down, binary or BCD

Maximum Pulse Count: 80-bit binary (5 channels cascaded)

Maximum Input Rate: 7 MHz

Minimum High Pulse Width: 70 ns

Minimum 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

Maximum Output Frequency: 1 MHz

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

Output High Voltage:

2.4V min @ -200  $\mu$ A

Output Low Voltage:

0.4V max @ 3.2 mA

## To Order

(Specify Model Number)

Model No.	Description
OMB-DAQBOOK-200	16-bit 8/16-channel analog interface, high speed and programmable digital I/O, counter/timers, standard or enhanced parallel port

Each OMB-DAQBOOK unit is supplied with power cable, DOS and Windows driver software, DaqView and PostView software, and complete operator's manual. Parallel port cable ordered separately.

Ordering Example: OMB-DAQBOOK-200 unit with one OMB-DBK81 thermocouple input module, OMB-CA-37-1 cable and OMEGACARE<sup>SM</sup> 1 year extended warranty for the OMB-DAQBOOK-200 (adds 1 year to standard 1 year warranty),

## Accessories and Cables

**MOST POPULAR  
MODELS HIGHLIGHTED**

Model No.	Description
OMB-DBK1	16-connector BNC interface module
OMB-DBK2	Four-channel D/A voltage-output card
OMB-DBK4	Two-channel dynamic signal-input card
OMB-DBK5	Four-channel current-output card
OMB-DBK7	Four-channel frequency-input card
OMB-DBK8	Eight-channel high voltage input card
OMB-DBK9	Eight-channel RTD measurement card
OMB-DBK10	3-slot expansion card enclosure
OMB-DBK11A	Screw terminal card
OMB-DBK15	16-channel universal voltage/current input card
OMB-DBK16	2-channel strain gage input card
OMB-DBK17	4-channel simultaneous sample and hold card
OMB-DBK18	4-channel low pass filter card
OMB-DBK20	48-channel digital I/O card with screw terminal connectors
OMB-WBK20A	PCMCIA interface card and cable
OMB-DBK21	48-channel digital I/O card with DB37 male connectors
OMB-DBK23	24-Line optically isolated digital-input module
OMB-DBK24	24-Line optically isolated digital-output module
OMB-DBK25	8-channel relay-output card
OMB-DBK30A	Rechargeable battery/excitation module
OMB-DBK32A	Auxiliary power supply card
OMB-DBK40	BNC analog interface and cable
OMB-DBK41	10-slot expansion card enclosure
OMB-DBK42	16-slot multi-purpose isolated signal conditioning module
OMB-DBK43A	8-channel strain-gage module
OMB-DBK44	2-channel multi-purpose isolated signal conditioning card
OMB-DBK45	4-channel simultaneous sample and hold module with low-pass filter
OMB-DBK50	8-channel isolated high voltage-input modules
OMB-DBK51	8-channel isolated low voltage-input modules
OMB-DBK60	3-slot expansion module
OMB-DBK80	16-channel differential input voltage card
OMB-DBK81	7-channel thermocouple/mV input card
OMB-DBK82	14-channel thermocouple/mV input card
OMB-DBK83	14-channel thermocouple/mV input card with external screw terminal pod and 1 m cable
OMB-DBK84	14-channel thermocouple/mV input module
OMB-CA-132	6ft cables with mating mini-DIN 6 connector
OMB-CA-37-1	Expansion card cable, for single option expansion
OMB-CA-37-2	Expansion card cable, for two option expansion
OMB-CA-37-3	Expansion card cable, for three option expansion
OMB-CA-37-4	Expansion card cable, for four option expansion
OMB-CN-71	16-channel screw terminal connection block
OMB-CN-72	16-channel screw terminal connection block with cold-junction sensors





#### UNITED STATES

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1-800-TC-OMEGA  
Stamford, CT.

#### CANADA

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### • Flow and Level

Air Velocity Indicators, Doppler Flowmeters, Level Measurement, Magnetic Flowmeters, Mass Flowmeters, Pitot Tubes, Pumps, Rotameters, Turbine and Paddle Wheel Flowmeters, Ultrasonic Flowmeters, Valves, Variable Area Flowmeters, Vortex Shedding Flowmeters

### • pH and Conductivity

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### • Pressure, Strain and Force

Displacement Transducers, Dynamic Measurement Force Sensors, Instrumentation for Pressure and Strain Measurements, Load Cells, Pressure Gauges, Pressure Reference Section, Pressure Switches, Pressure Transducers, Proximity Transducers, Regulators, Strain Gages, Torque Transducers, Valves

### • Heaters

Band Heaters, Cartridge Heaters, Circulation Heaters, Comfort Heaters, Controllers, Meters and Switching Devices, Flexible Heaters, General Test and Measurement Instruments, Heater Hook-up Wire, Heating Cable Systems, Immersion Heaters, Process Air and Duct, Heaters, Radiant Heaters, Strip Heaters, Tubular Heaters