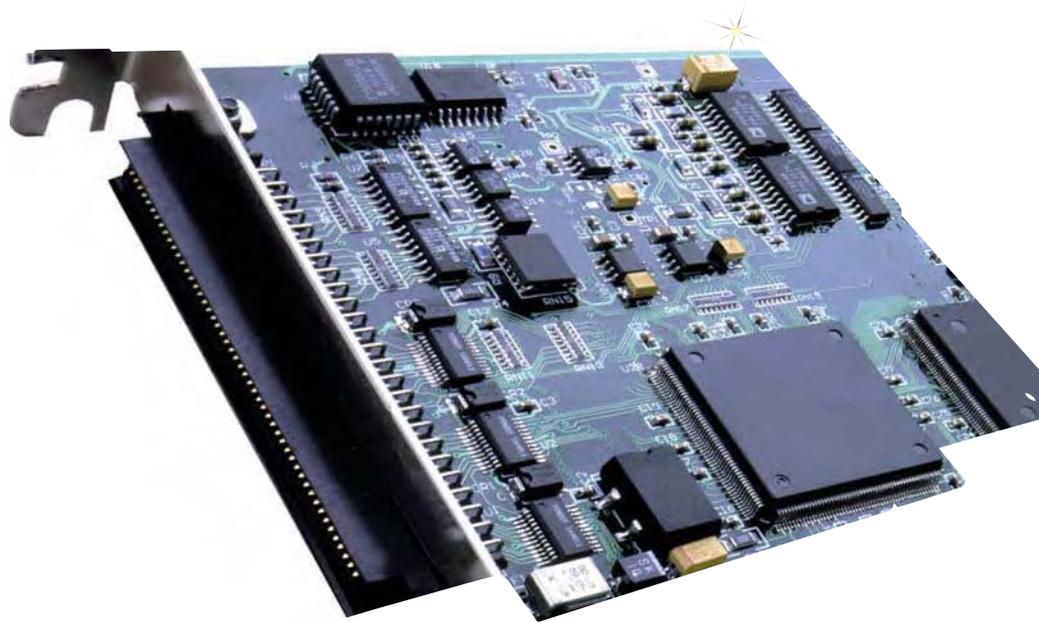


# High-Performance PCI-Based Data Acquisition Boards

## OMB-DAQBOARD-2000 Series

Starts at  
**£234**



OMB-DAQBOARD-2000, £458,  
shown smaller than actual size.

- ✓ 5 Models Available
- ✓ 16-Bit, 200 kHz A/D Converter
- ✓ 8 Differential or 16 Single-Ended Analogue Inputs (Software Selectable per Channel)
- ✓ Expandable Up to 256 Analogue Input Channels, While Maintaining 200 kHz (5  $\mu$ s per Channel) Scan Rate
- ✓ Up to 4 Boards Can be Installed into One PC for Up to 1024 Analogue Input Channels
- ✓ 100% Digital Calibration
- ✓ 512-Location Channel/Gain FIFO, Capable of Scanning All Channels, Including 256 Analogue Expansion Channels and Digital/Counter Channels, at 5  $\mu$ s per Channel
- ✓ DMA Bus Mastering for Synchronous Analogue I/O, Digital I/O, and Counter Inputs
- ✓ Trigger Modes Include Analogue, Digital, and Software, with <5  $\mu$ s Latency
- ✓ Virtually Infinite Pre-Trigger Buffer
- ✓ Up to Four 16-Bit, 100 kHz Analogue Outputs with Infinite Continuous Waveform Output Capability
- ✓ 40 Digital I/O Lines, Can be Scanned Synchronously or Asynchronously with Analogue Inputs
- ✓ Digital I/O is Expandable Up to 272 Lines, Including Optional Isolation and Relay Closure
- ✓ 4 Counter/Pulse Input Channels Can be Scanned Synchronously or Asynchronously with Analogue Inputs
- ✓ 2 Timer/Pulse Output Channels
- ✓ Signal Conditioning and Expansion Options for Thermocouples, Strain Gauges, Accelerometers, Isolation, and RTDs—Over 30 Options in All
- ✓ Includes DaqView Windows Software; DaqX API Library, Drivers for Visual Basic, C++, and Delphi for Windows 95 and Higher; C++ for Linux; DASyLab, TestPoint, and LabVIEW

*OMEGACARE<sup>SM</sup> extended warranty programme is available for models shown on this page. Ask your sales representative for full details when placing an order. OMEGACARE<sup>SM</sup> covers parts, labour and equivalent loan unit.*

**OMB-DAQBOARD-2000 Series Selection Chart**

Feature	OMB-DAQBOARD Models I/O				
	2001	2000	2005	2004	2002
Analogue Inputs (P1) (16 bit/200 kHz)	16	16	16	-	-
Analogue Outputs (P3) 16 bit/100 kHz)	4	2	-	4	-
Digital I/O (P2, P3)	40	40	40	40	40
Freq./pulse I/O (P3)	6	6	6	6	6-

The OMB-DAQBOARD-2000 Series sets the price/performance benchmark for high-speed, multifunction plug-and-play data acquisition for PCI bus computers. The hardware design offers all the features normally found on significantly more expensive boards, including 16-bit, 200 kHz A/D; 100% digital calibration; bus mastering, two or four 16-bit, 100 kHz A/D converters; 40 digital I/O lines; 4 counters; and 2 timers.

The OMB-DAQBOARD-2000 Series is supported by a growing family of over 30 signal conditioning and expansion options, offering signal conditioning for thermocouples, RTDs, accelerometers, isolation, high voltage, strain gauges, and much more. Up to 528 channels of analogue and digital I/O can be accessed with one OMB-DAQBOARD-2000, while maintaining the 5  $\mu$ s per channel update rate. Up to 4 OMB-DAQBOARD-2000s can be installed into one PC.

The OMB-DAQBOARD-2000 has more extensive software capabilities than most other boards, with comprehensive drivers for nearly every programming environment supported by Windows 95 and higher. Included in this list are Visual Basic, C++, Delphi, TestPoint, LabVIEW, and DASyLab, and C++ for Linux. Also included is a suite of DaqView software options for setup, acquisition, display, and analysis of acquired data—no programming required.

### Synchronous I/O for High-Speed Applications

The OMB-DAQBOARD-2000 Series sets a new standard with its ability to make analogue measurements, read digital inputs, and read counter inputs, while synchronously generating up to 4 analogue outputs and/or a 16-bit digital pattern output. Most other boards require CPU interaction to access I/O other than analogue input, making it impossible to generate time-critical analogue waveforms or digital patterns. With the OMB-DAQBOARD-2000 Series, the true power of PCI-based PCs can be unleashed.

The same synchronous features of the OMB-DAQBOARD-2000 extend to its family of OMB-DBK signal conditioning and expansion options. Up to 256 analogue input channels and 272 (P2 only) digital I/O channels can also be accessed synchronously to one another, with precise and deterministic channel-to-channel timing. Up to 4 OMB-DAQBOARD-2000s can be installed in one PC, quadrupling the channel capacity to over 1000 analogue input channels, 1000 digital I/O channels, and 16 high-speed analogue output channels.

### Signal I/O

One 100-pin connector on the OMB-DAQBOARD-2000 Series provides access to all the input and output signals. Unlike other multifunction boards that require multiple PC slots, the OMB-DAQBOARD-2000 Series accommodates all I/O using one cable and has only one PCI slot.

The 100-pin OMB-DAQBOARD/2000 Series I/O connector, P4, is logically divided into 3 subports: P1, P2, and

P3. P1, the analogue input port, contains all of the analogue input channels, as well as the sequencer control signals for accessing external analogue input options. All analogue expansion options attach to the P1 port. P2, the general purpose digital I/O port, can be used directly to control and monitor 24 digital I/O lines. P2 can also function as the digital I/O expansion port, whereby the 24 lines are exclusively used to control external digital OMB-DBK expansion options, for up to 256 lines of digital input or output. P3 contains an additional 16-bit digital I/O port, as well as the counter inputs, timer outputs, and analogue outputs. Several options are available to provide easy user access to all of the I/O signals on P4.

### Analogue Input (P1)

The OMB-DAQBOARD-2000 Series has a 16-bit, 200 kHz A/D coupled with 16 single-ended or 8 differential analogue inputs. Thirteen software-programmable ranges provide inputs from  $\pm 10$  V to  $\pm 156$  mV full scale. Each channel can be software configured for a different range, as well as for single-ended or differential and unipolar or bipolar inputs. Beyond the 16 built-in analogue inputs, the user can expand the OMB-DAQBOARD-2000 Series up to 256 analogue inputs using external OMB-DBK signal conditioning and expansion options. As with the on-board channels, expansion channels are scanned at the same 5  $\mu$ s/channel rate (200 kHz), and most are software programmable for range. There is no speed penalty for scanning expansion channels versus built-in channels. The OMB-DBK expansion options offer a wide variety of signal measurements, including thermocouples, RTDs, strain gauges, accelerometers, high voltage, isolation, current, and much more.

## Scanning

The OMB-DAQBOARD-2000 Series has an on-board scan sequencer that permits the user to select any combination of up to 512 channel/range combinations. The sequencer scans all channels contained in the sequence at the fastest rate of 5  $\mu$ s/channel, thereby minimizing the time-skew from channel-to-channel. The user can also set the time between scan groups, from 0 to 6 hours. In addition to scanning analogue inputs, the sequencer can scan digital inputs and counter inputs.

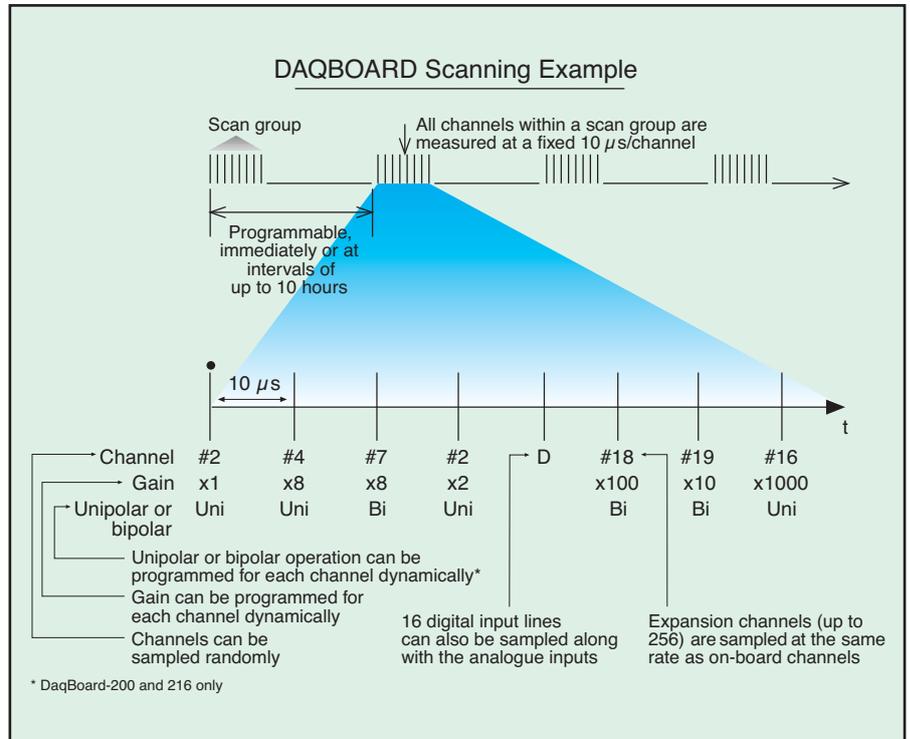
## Channel-Scanning Flexibility

The OMB-DAQBOARD-2000 Series offers a 512-location scan sequencer that allows the user 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-DAQBOARD-2000 Series channels, including the 528 potential expansion channels, are scanned at 200 kHz (5  $\mu$ s/channel). In addition, the digital and frequency inputs can be scanned by using the same scan sequence employed for analogue inputs, enabling the time correlation of acquired digital data to acquired analogue data. The OMB-DAQBOARD-2000 Series permits each scan group, which can contain up to 512 channel/gain combinations, to be repeated immediately or at a programmable interval of up to 6 hours. Within each scan group, consecutive channels are measured at a fixed 5  $\mu$ s/channel rate.

## Bus Mastering DMA

The OMB-DAQBOARD-2000 Series supports bus mastering DMA, which allows analogue and digital/counter input data, as well as analogue and digital output data, to flow between the PC and the OMB-DAQBOARD-2000 Series without consuming valuable CPU time.

The driver supplied with the OMB-DAQBOARD-2000, as well as all other third-party software support such as TestPoint, LabVIEW, and



DASyLab, automatically use bus mastering DMA to efficiently conduct I/O from the PC to the OMB-DAQBOARD-2000.

## Triggering

Triggering can be the most critical aspect of a data acquisition application. The OMB-DAQBOARD-2000 Series supports a full complement of trigger modes to accommodate any measurement situation.

## Hardware Analogue Trigger

Many data acquisition boards claim analogue triggering, but rely on the PC to take readings and make a decision, which leads to uncertain and potentially long latencies. The OMB-DAQBOARD-2000 Series uses true analogue triggering, whereby the trigger level programmed by the user sets an analogue DAC, which is then compared in hardware to the analogue input level on the selected channel. The result is analogue trigger latency that is guaranteed to be less than 5  $\mu$ s, significantly shorter than that of most data acquisition boards.

Any analogue channel can be selected as the trigger channel, including built-in or expansion channels. The

user can program both the trigger level and the edge (rising or falling).

## Digital and Pattern Triggering (P1)

A separate digital trigger input line is provided, allowing TTL-level triggering, again with latencies guaranteed to be less than 5  $\mu$ s. Both the logic levels (1 or 0) and the edge (rising or falling) can be programmed for the discrete digital trigger input.

## Software-Based Triggering

Software-based triggering differs from the modes described above because the readings—analogue, digital, or counter—are interrogated by the PC to detect the trigger event, not in the hardware as described above. The advantage of this mode is to permit triggering based on more complex situations, such as on a specific temperature, which was derived from the acquisition of at least 2 analogue measurements, plus the calculation of the measured temperature using linearisation algorithms.

The OMB-DAQBOARD-2000 Series also supports digital pattern triggering, whereby the user can designate any of the digital input ports as the trigger port. The programmed digital pattern, including the ability to mask or ignore specific bits, is then compared to the actual input until a match is detected, after which the sequencer begins the scan sequence. Triggering can also be programmed to occur when one of the counters reaches, exceeds, or is within a programmed level. Any of the built-in counter/totalizer channels can be programmed as a trigger source. Normally software-based triggering results in long latencies from the time that a trigger condition is detected until the actual capturing of data commences. However, the OMB-DAQBOARD-2000 Series circumvents this undesirable phenomenon by use of pre-trigger data. Specifically, when software-based triggering is employed and the PC detects that a trigger condition has occurred (which may be thousands of readings later than the actual occurrence of the signal), the OMB-DAQBOARD-2000 driver automatically looks back to the location in memory where the actual trigger-causing measurement occurred. The acquired data that are presented to the user actually begin at the point where the trigger-causing measurement occurs. The latency in this mode is equal to one scan cycle.

### Stop Trigger

Any of the software trigger modes described above can also be used to stop an acquisition. Thus an acquisition can be programmed to begin on one event, such as a temperature level, and then can stop on another event, such as a digital pattern.

### Pre- and Post-Triggering Modes

6 modes of pre- and post-triggering are supported, providing a wide variety of options to accommodate any measurement requirement.

With pre-trigger, the user must employ software-based triggering to initiate an acquisition.

*No pre-trigger, post-trigger stop event.* This, the simplest of modes, acquires data upon receipt of the trigger, and stops acquiring upon receipt of the stop-trigger event.

*Fixed pre-trigger with post-trigger stop event.* In this mode, the user specifies the number of pre-trigger readings to be acquired, after which acquisition continues until a stop-trigger event occurs.

*No pre-trigger, infinite post-trigger.* No pre-trigger data are acquired in this mode. Instead, data are acquired beginning with the trigger event, and are terminated when the operator issues a command to halt the acquisition.

*Fixed pre-trigger with infinite post-trigger.* The user specifies the amount of pre-trigger data to acquire, after which the system continues to acquire data until the program issues a command to halt acquisition.

*Variable pre-trigger with post-trigger stop event (driver support only).* Unlike the previous pre-trigger modes, this mode does not have to satisfy the pre-trigger number of readings before recognizing the trigger event. Thus the number of pre-trigger readings acquired is variable and dependent on the time of the trigger event relative to the start. In this mode, data continue to be acquired until the stop-trigger event is detected.

*Variable pre-trigger with infinite post-trigger (driver support only).* This is similar to the mode described above, except that the acquisition is terminated upon receipt of a command from the program to halt the acquisition.

### Calibration

Every range on the OMB-DAQBOARD-2000 Series is calibrated from the factory using a digital calibration method. This method works by storing a correction factor for each range on the OMB-DAQBOARD-2000 Series at the time of calibration. Whenever a particular range is selected, the

appropriate calibration constant is automatically applied to a compensating DAC, thereby calibrating the specific range. The result is that readings generated by the A/D are already calibrated, and do not require additional processing. This is significantly better than other boards that merely adjust the readings in software after they are transferred to the PC. That method has the disadvantage of reducing the dynamic range of the A/D, and can adversely affect the speed by which the PC can obtain a calibrated reading. The OMB-DAQBOARD-2000 Series also has a USERCAL mode, whereby the user can adjust the calibration of the board in his or her system, without destroying the factory calibration supplied with the board. This is accomplished by having 2 distinct calibration tables in the OMB-DAQBOARD-2000 Series on-board EPROM, one that contains the factory calibration, and the other that is available for user calibration.

### Analogue Output (P3) OMB-DAQBOARD-2000, -2001, and -2004 Only

Two or four 16-bit, 100 kHz analogue output channels are built into the OMB DAQBOARD-2000 Series, with an output from  $-10$  V to  $10$  V. These outputs are entirely separate from the D/As which are used to determine analogue trigger level (some data acquisition board suppliers confusingly refer to trigger D/As as if they are available to the user). With bus mastering DMA, each D/A output can continuously output a waveform, which can be read from PC RAM or a file on the hard disk. In addition, a program can asynchronously output a value to either of the D/As for non-waveform applications, presuming that the D/A is not already being used in the waveform output mode.

Additional low-speed D/A channels can be added to the OMB-DAQBOARD-2000 through the use of the OMB-DBK2 analogue output option card. When used to generate waveforms, the D/As can be clocked in several different modes. Each D/A can be separately selected to be clocked from one of the sources described below.

**Asynchronous Internal Clock** The on-board programmable clock can generate updates ranging from 1.5 Hz to 100 kHz, independent of any acquisition rate.

**Synchronous Internal Clock** The rate of analogue output update can be synchronized to the acquisition rate derived from 100 kHz to once every 5.96 hours.

**Asynchronous External Clock** A user-supplied external input clock can be used to pace the D/A, entirely independent of analogue inputs.

**Synchronous External Clock** A user-supplied external input clock can pace both the D/A and the analogue input.

### Digital Pattern Generation (P3)

The OMB-DAQBOARD-2000 Series supports digital pattern generation via bus mastering DMA on the 16-bit high-speed digital I/O port. Like analogue output, the digital pattern can be read from PC RAM or a file on the hard disk. Digital pattern generation is clocked in the same 4 modes as analogue output (when digital pattern generation is used, one of the analogue output channels is limited to asynchronous output mode).

### Digital Inputs and Outputs (P2, P3)

Forty TTL-level digital I/O lines are included in the OMB-DAQBOARD-2000 Series. They are divided into three 8-bit ports (P2) and one 16-bit port (P3).

The P2 ports can be programmed in 8-bit groups as either input or output. The 16-bit P3 port can be programmed as all inputs or all outputs. Ports programmed as



OMB-DBK200, £26, shown smaller actual size.

inputs can be part of the scan group and scanned along with other analogue and digital input channels, or can be asynchronously accessed via the PC at any time, including when a scanned acquisition is occurring. In addition, the P2 ports can be expanded up to 256 digital I/O lines using external OMB-DBK digital options. These options are available as TTL-level I/O, relay output, or optically isolated input and output. Whenever expansion digital I/O is attached to the OMB-DAQBOARD-2000 Series, the P2 I/O lines are no longer user programmable, but are used to communicate with the digital expansion options.

### Counter Inputs (P3)

Four 16-bit counters are built into the OMB-DAQBOARD-2000, each capable of counting up to 65,536 TTL-level transitions. Each of the 4 counters will accept frequency inputs up to 10 MHz. The counters can also be cascaded, allowing over 4 billion counts to be accumulated. As with all other inputs to the OMB-DAQBOARD-2000 Series, the counter inputs can be read asynchronously under program control, or synchronously as part of an analogue and digital scan group.

### Timer Outputs (P3)

Two 16-bit timer outputs are built into the OMB-DAQBOARD-2000, each capable of generating different square waves with a programmable frequency range from 16 Hz to 1 MHz.

### Multiple OMB-DAQBOARD-2000s Per PC

All of the features described for the OMB-DAQBOARD-2000 can be replicated with up to

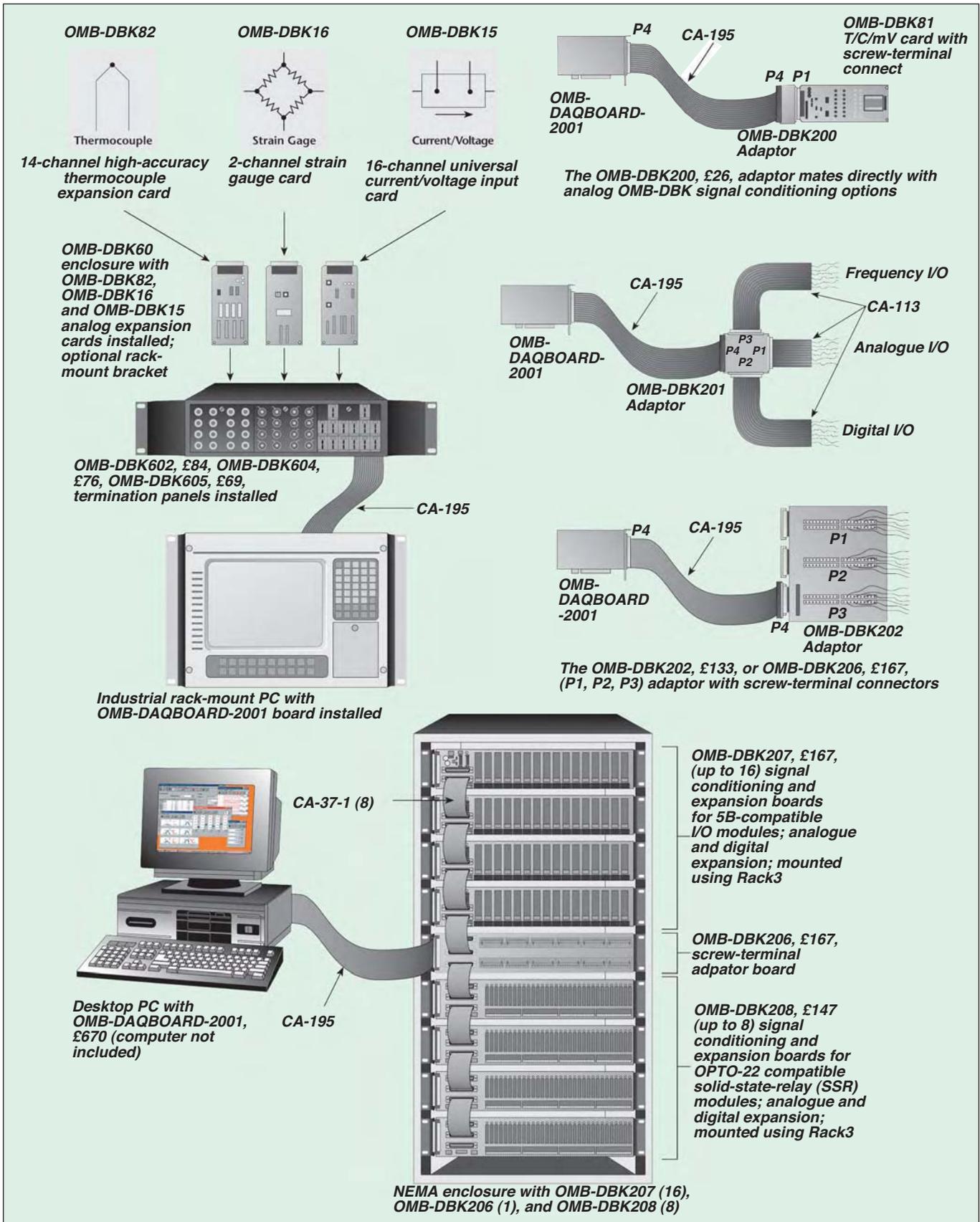
4 OMB-DAQBOARD-2000s installed in the same PC.

Each OMB-DAQBOARD-2000 has a serial number for identification, and a user-selected name can be assigned to each board for easy program documentation. Thus, with 4 boards installed along with OMB-DBK expansion options, over 1000 analogue input channels and over 1000 digital I/O channels could be accessed from one PC. When multiple boards are installed, all boards can be operated synchronously. The OMB-DAQBOARD-2000 Series provides all I/O signals on one 100-pin connector. The following adaptor options make it easy for the user to attach signals and expansion options to the OMB-DAQBOARD-2000 Series.

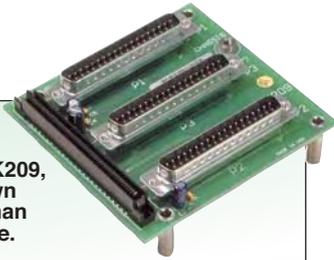
### OMB-DBK200 Adaptor Board

Suitable exclusively for analogue-signal expansion, the OMB-DBK200 adaptor board contains one 100-pin connector that connects to the OMB-DAQBOARD-2000 Series via the OMB-CA-195 cable, and one female DB37 connector that mates directly with the P1 port of any of the OMB-DBK analogue signal conditioning and expansion options. This is the most convenient way to add analogue expansion options if access to the OMB-DAQBOARD-2000 Series digital I/O or frequency signals is not required. Access to P1 analogue signals is also possible via included female-mating solder-lug connectors or optional OMB-CA-37-x or OMB-CA-37-xT expansion cables.

## System Configuration Examples



OMB-DBK209, £40, shown smaller than actual size.



OMB-DBK209, £40, shown smaller than actual size.

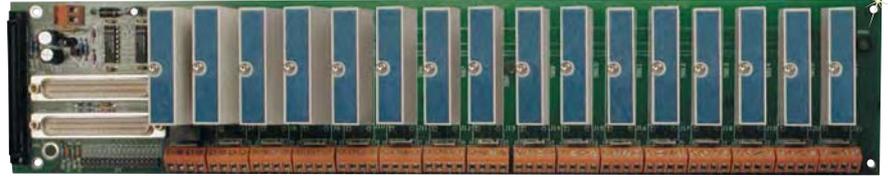


### OMB-DBK201 and OMB-DBK209 Adaptor Boards

For both analogue and digital expansion, the OMB-DBK201 adaptor board mates with the OMB-DAQBOARD-2000 Series via a 1 m (3') OMB-CA-195 cable. The OMB-DBK209 provides 3 male DB37 connectors, divided into P1 analogue input, P2 digital I/O, and P3 analogue output and counter/timer I/O. Each port on the OMB-DBK201 connects to OMB-DBK expansion options via an optional OMB-CA-37-x or OMB-CA-37-xT expansion cable. Alternatively, users can solder wires to the included DB37 female-mating solder-lug connectors, or custom make their own cables that are terminated with a female DB37. An optional 1.8 m (6') cable is available that contains a mating female DB37 connector at one end, and is unterminated at the other end (OMB-CA-113). The OMB-DBK209 is identical in function to the OMB-DBK201 but is snap-track (DIN-rail), and rack-mountable with optional mounting kits.

### OMB-DBK202 and OMB-DBK203 Screw-Terminal Adaptor Board

The OMB-DBK202 screw-terminal board provides convenient screw-terminal access to all signals from the OMB-DAQBOARD-2000 Series. Divided into 3 ports (P1, P2, and P3), the OMB-DBK202 also provides another way to access signals. There are male DB37 connectors on P1 and P2, and an adaptor cable (OMB-CA-60) can be used to connect to the P3 header for connection to DBK signal conditioning and expansion options.



OMB-DBK207, £167, shown smaller than actual size

Mounting holes in the OMB-DBK202 permit it to be easily screw-mounted into a user-provided enclosure. The OMB-DBK203 is identical to the OMB-DBK202, except that it is housed in a shielded metal enclosure, which easily mounts to other OMB-DBK signal conditioning and expansion modules. Optional fastener panels are available for attaching other OMB-DBK modules.

OMB-CA-195 cable, and each port (P1, P2, and P3) connects to DBK signal conditioning and expansion options via optional OMB-CA-37-x cable(s). The standard OMB-DBK206 can be panel mounted, but it also is DIN-rail mountable and rack-mountable with optional mounting kits.

### OMB-DBK207 and OMB-DBK207/CJC Multiplexing Isolated Analogue Input Board

The OMB-DBK207 provides sockets for 16 channels of isolated analogue input when populated with industry-standard 5B-style or compatible signal conditioning modules. Each channel features screw terminals and sockets for current conversion resistors (supplied with 5B current input modules). The OMB-DBK207/CJC features added cold-junction compensation per channel for thermocouple-based measurements.

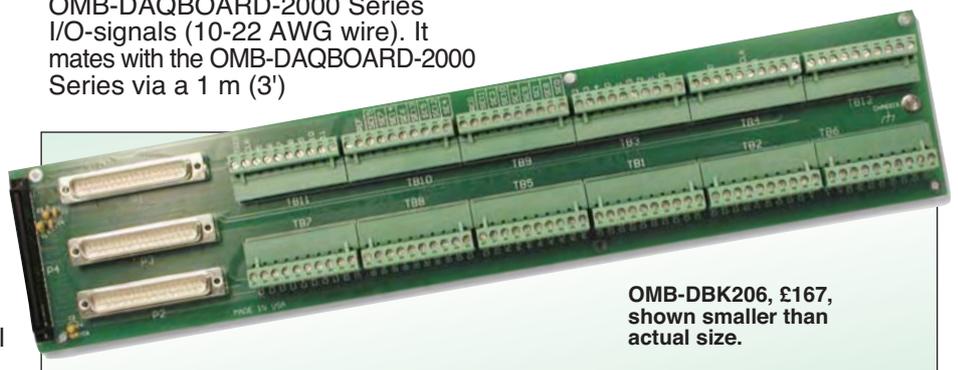


OMB-DBK202, £134, and OMB-DBK203, £200, shown smaller than actual size.

### OMB-DBK206 Screw-Terminal Adaptor Board

Similar in function to the OMB-DBK202, but designed for mounting in 19-inch enclosures, the OMB-DBK206 features three vertically mounted straight male DB37 connectors for analogue and digital channel expansion (P1 analogue I/O, P2 digital I/O, and P3 digital and counter-timer, plus analogue output). Two rows of removable screw terminals provide convenient access to all OMB-DAQBOARD-2000 Series I/O-signals (10-22 AWG wire). It mates with the OMB-DAQBOARD-2000 Series via a 1 m (3')

Multiplexing is built-in, allowing up to 16 OMB-DBK207 boards to be directly connected to one OMB-DAQBOARD-2000 Series board for a total signal capacity of 256 isolated analogue inputs. The 100-pin P4 connector on the OMB-DBK207 attaches directly to the OMB-DAQBOARD-2000 (via OMB-CA-195 cable). Two DB37 connectors permit daisy chaining to other OMB-DBK207 boards, and to any of the other OMB-DBK analogue signal conditioning boards and modules. The OMB-DBK207/CJC and the OMB-DBK207 can be rack or snap-track mounted with optional mounting kits.



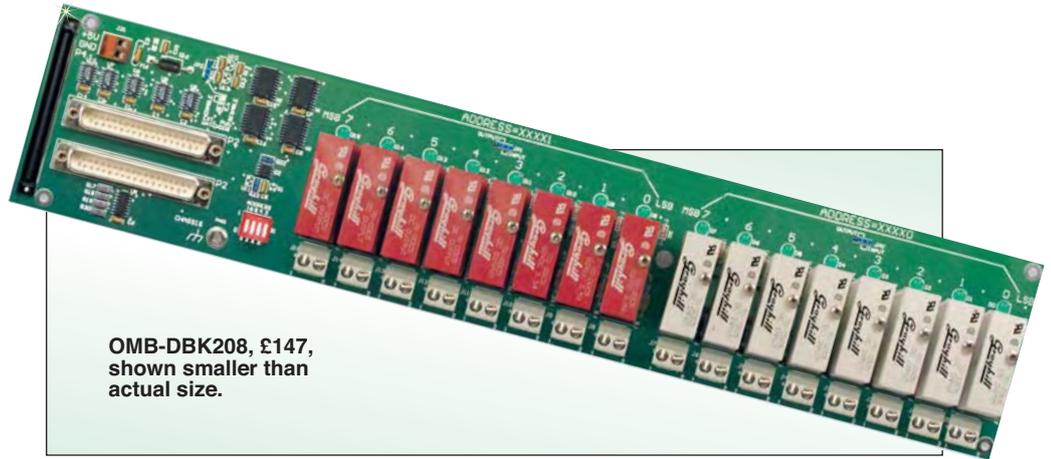
OMB-DBK206, £167, shown smaller than actual size.

## OMB-DBK208 Multiplexing – Isolated Digital I/O Board

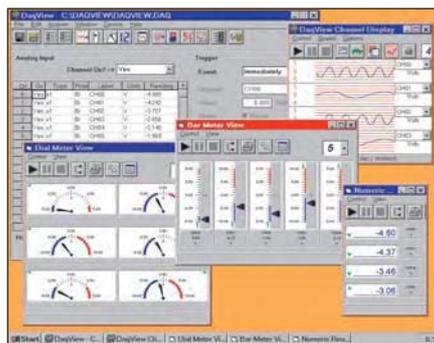
The OMB-DBK208 provides sockets for 16 channels of isolated digital I/O when populated with industry-standard Opto-22 style or compatible solid-state-relay modules. Each socket also features screw terminals and an LED to indicate logic status. The 16 digital I/O can be jumper configured as either inputs or outputs in 8-channel groups.

Multiplexing is built-in, allowing up to 16 OMB-DBK208 boards to be connected to one OMB-DAQBOARD-2000 Series board, for a total signal capacity of 256 isolated digital I/O channels. On-board logic ensures that outputs are disabled during power-up and by a CPU reset. Also included is the ability to choose whether outputs are “off” or in the “last known state” when loss of external power occurs.

The 100-pin P4 connector on the OMB-DBK208 attaches directly to a OMB-DAQBOARD/2000 Series board (via OMB-CA-195 cable), while 2 DB37 connectors permit daisy chaining to other OMB-DBK208 boards and to any of the other OMB-DBK digital boards and modules.



OMB-DBK208, £147, shown smaller than actual size.



### DAQVIEW Software

The DAQVIEW software allows the user to verify signal connections, acquire and save data to disk, and graphically view real-time data within moments of installing a system. Easily set up all hardware, acquisition, and display parameters without programming, via a simple, spreadsheet-style screen. The software is a full-feature acquisition and display application that provides all the functionality needed for many data logging applications.

Accuracy**	
One Year, 0 to 35°C (% Reading + % Range)	
Voltage Range*	Absolute
0 to 10 V	0.015 + 0.005
0 to 5 V	0.015 + 0.005
0 to 2.5 V	0.015 + 0.005
0 to 1.25 V	0.015 + 0.008
0 to 0.625 V	0.015 + 0.008
0 to 0.3125 V	0.015 + 0.008
-10 to 10 V	0.015 + 0.005
-5 to 5 V	0.015 + 0.005
-2.5 to 2.5 V	0.015 + 0.005
-1.25 to 1.25 V	0.015 + 0.005
-0.625 to 0.625 V	0.015 + 0.008
-0.3125 to 0.3125 V	0.015 + 0.008
-0.156 to 0.156 V	0.02 + 0.008

\* Specifications assume differential-input single-channel scan, 200 kHz scan rate, unfiltered.

\*\* Accuracy specification is exclusive of noise.

## Specifications

### GENERAL (ALL BOARDS)

#### Power Consumption

(per Board): 3.5 W (up to 10 W with external accessories)

#### Power Available for External Signal Conditioning and Expansion Options:

5 V @ 1 A (all boards); ±15 V @ 75 mA each (except for 2002)

#### Operating Temperature:

0 to 60°C (32 to 140°F)

#### Vibration: MIL STD 810E

**Signal I/O Connector:** 100-pin high-density edge-type carries all analogue and digital I/O signals

#### Dimensions:

165 W x 15 D x 108 mm H (6.5 x 0.6 x 4.2")

### ANALOGUE INPUTS

#### (2000, 2001 and 2005) Channels:

16 single-ended or 8 differential, programmable on a per-channel basis as single-ended or differential and unipolar or bipolar

**Expansion:** Up to 256 channels per board (4 boards per PC), without degradation in maximum channel-to-channel scan rate (5 µs/channel)

**Bandwidth:** 500 kHz

**Settling Time:** 5 µs to 1 LSB for full scale step

**Maximum Input Voltage:** ±11 V relative to analogue common

**Overvoltage Protection:** ±35 V

**Ranges:** Software or sequencer selectable on a per-channel basis

### A/D SPECIFICATIONS (2000, 2001 and 2005)

**Type:** Successive approximation

**Resolution:** 16-bit

**Conversion Time:** 5 µs

**Maximum Sample Rate:** 200 kHz

**Non-Linearity (Integral):** ±1 LSB

**Non-Linearity (Differential):**

No missing codes

## INPUT SEQUENCER

(2000, 2001, 2002, 2004 and 2005)

Analogue, digital and counter inputs can be scanned synchronously, based on either an internal programmable timer or an external clock source. Analogue and digital outputs can be synchronised to either of these clocks.

**Scan Clock Sources:** 2

1. Internal, programmable from 5  $\mu$ s to 5.96 hours in 5  $\mu$ s steps
2. External, TTL-level input up to 200 kHz max

### Programmable Parameters

**per Scan:** Channel (random order), gain, unipolar/bipolar

**Depth:** 512 location

### On-Board Channel-to-Channel

**Scan Rate:** 5 or 10  $\mu$ s per channel, programmable

**Expansion Channel Scan Rate:**

5 or 10  $\mu$ s per channel, programmable

## EXTERNAL ACQUISITION SCAN CLOCK INPUT

(2000, 2001 and 2005)

**Maximum Rate:**

200 kHz

**Clock Signal Range:** 0 to 5 V

**Minimum Pulse Width:**

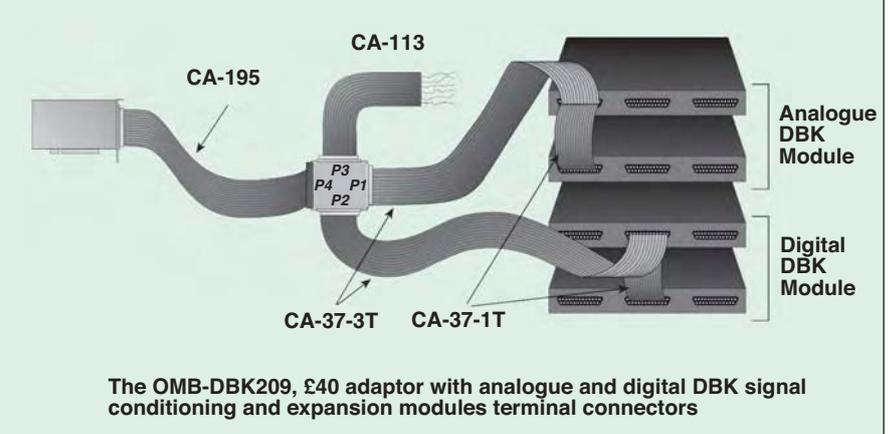
50 ns high, 50 ns low

## Triggering

**Trigger Sources:** 6, individually selectable for starting and stopping an acquisition. Stop acquisition can occur on a different trigger source than start acquisition, and can be triggered via modes 2, 4, 5 or 6. Pre-trigger is supported with fixed or variable pre-trigger periods.

1. Single-channel analogue hardware trigger latency: 5  $\mu$ s max (2000, 2001 and 2005)
2. Single-channel analogue software trigger latency: one scan period max (2000, 2001 and 2005)
3. Single-channel digital trigger latency: 5  $\mu$ s max (2000, 2001, 2002, 2004 and 2005)
4. Digital pattern triggering latency: one scan period max (2000, 2001, 2002, 2004 and 2005)
5. Counter/totaliser triggering (2000, 2001, 2002, 2004 and 2005) latency: one scan period, max (all boards)
6. Software triggering (all boards) trigger can be initiated under program control.

## OMB-DAQBOARD-2001



## ANALOGUE OUTPUTS

(2000, 2001 and 2004)

The 2 or 4 analogue output channels are updated synchronously relative to scanned inputs, and clocked from either an internal on-board clock or an external clock source. Analog outputs can be updated asynchronously, independent of any other scanning in the system. Bus mastering DMA provides CPU and system-independent data transfers, ensuring accurate outputs independent of other system activities. Streaming from disk or memory is supported, allowing continuous, nearly infinite-length, waveform outputs (limited only by available PC system resources).

**Channels:** 2 (2000); 4 (2001 and 2004)

**Resolution:** 16-bit

**Output Voltage Range:**  $\pm 10$  V

**Clock Sources:** 4, programmable

1. On-board D/A clock, independent of scanning input clock
2. On-board scanning input clock (2000, 2001 & 2004 only)
3. External D/A input clock, independent of external scanning input clock
4. External scanning input clock (2000, 2001 and 2004 only)

## DIGITAL I/O

(2000, 2001, 2002, 2004 and 2005)

**Channels:** 40, expandable up to 208 with OMB-DBK options

**Input Scanning Modes:**

- 2, programmable
1. Asynchronous, under program control at any time
2. Synchronous with input scanning

**Ports:** 3 x 8-bit (82C55 emulation), and 1 x 16-bit; each port is software programmable as input or output

**Input Characteristics:**

100  $\approx$  series, 20 pF to common

**I/O Levels:** TTL

**Sampling/Update Rate:** 200 kHz max

**Output Characteristics:**

Output 12 mA per pin, 200 mA total continuous (per bank of 40 outputs)

## Pattern Generation Output

(2000, 2001, 2002, 2004 and 2005)  
The P3 16-bit digital I/O port can be configured for 16-bit pattern generation. The pattern can be updated synchronously with an acquisition.

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## COUNTER

(2000, 2001, 2002, 2004 and 2005)

Counter inputs can be scanned synchronously along with analogue and digital scanned inputs, based either on internal programmable timer or an external clock source. Counter can also be read asynchronously.

**Channels:** 4 x 16-bit; cascadable as 2 x 32-bit

**Frequency Measurement Rate:**

10 MHz max

**Trigger Level:** TTL

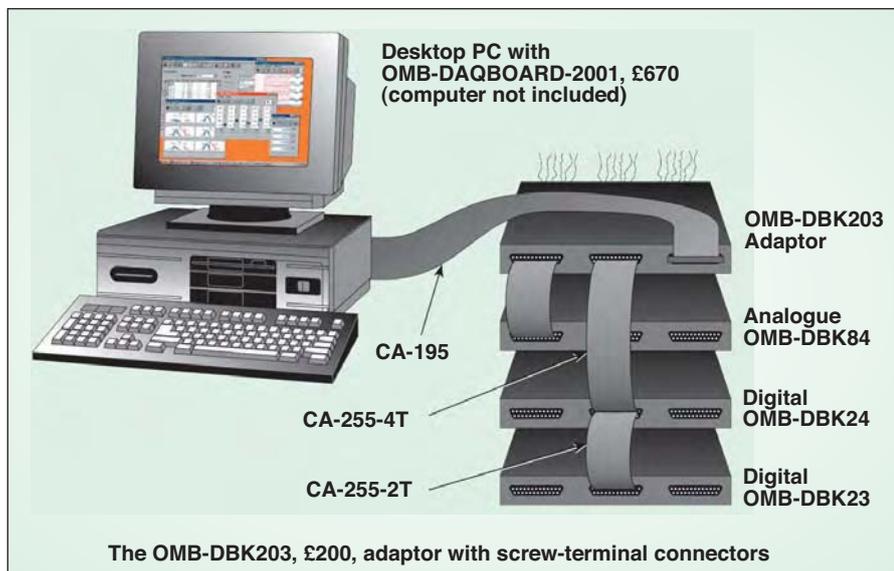
## FREQUENCY/PULSE GENERATORS

(2000, 2001, 2002, 2004 and 2005)

**Channels:** 2 x 16-bit

**Output:** 1 MHz base rate divided by 1 to 65,535 (programmable)

OMB-DAQBOARD-2001, £670,  
shown smaller than actual size.



**ALL MODELS AVAILABLE FOR FAST DELIVERY!**

To Order (Specify Model Number)		
Model No.	Price	Description
OMB-DAQBOARD-2001	£670	16-bit, 2000 kHz data acquisition board for the PCI-bus with 16 analogue inputs, 40 digital I/O, 6 counter/timers, 2 frequency generators and 4 analogue waveform outputs
OMB-DAQBOARD-2000	468	Same as OMB-DAQBOARD-2001 but with only 2 analogue outputs
OMB-DAQBOARD-2005	401	Same as OMB-DAQBOARD-2001 but with no analogue outputs
OMB-DAQBOARD-2004	500	Same as OMB-DAQBOARD-2001 with analogue output and digital I/O only (no analogue inputs)
OMB-DAQBOARD-2002	234	Same as OMB-DAQBOARD-2001 with digital I/O only (no analogue I/O)

## Accessories

Model No.	Price	Description
OMB-DBK200	£26	Adaptor board for analogue I/O (P1 port)
OMB-DBK202	133	Screw terminal adaptor board, P1, P2, P3
OMB-DBK203	200	Screw terminal adaptor board, P1, P2, P3, with enclosure
OMB-DBK206	167	Screw terminal adaptor board
OMB-DBK207	167	Signal conditioning board
OMB-DBK207/CJC	268	Signal conditioning board with CJC
OMB-DBK208	147	Solid state relay board
OMB-DBK209	40	DIN rail-mount adaptor board for P1, P2, P3 ports
OMB-CA-195	53	100-conductor expansion 0.9 m (3') cable
OMB-CA-195-6	60	100-conductor expansion 1.8 m (6') cable

All OMB-DAQBOARD-2000s include a CD-ROM with all documentation, including operator's manual, DaqView Windows Software, DAQX API library for Windows 95/98/2000/ME/NT for C++, Visual Basic and Delphi, and drivers for LabVIEW, TestPoint and DASYLab.

**Ordering Example:** OMB-DAQBOARD-2001, data acquisition board, OMB-DBK200, adaptor board, OMB-DBK11A\*, screw terminal panel, OMB-CA-195, cable, and OMEGACARE 1-year extended warranty for OMB-DAQBOARD-2001 (adds 1 year to standard 1-year warranty), £670 + 26 + 127 + 53 + 67 = £943.

\*Refer to section H (signal conditioners) of the OMEGA® Complete Data Acquisition and Computer Interface Handbook and Encyclopedia® for details on all the OMB-DBK expansion options that are available for use with the OMB-DAQBOARD-2000 Series.