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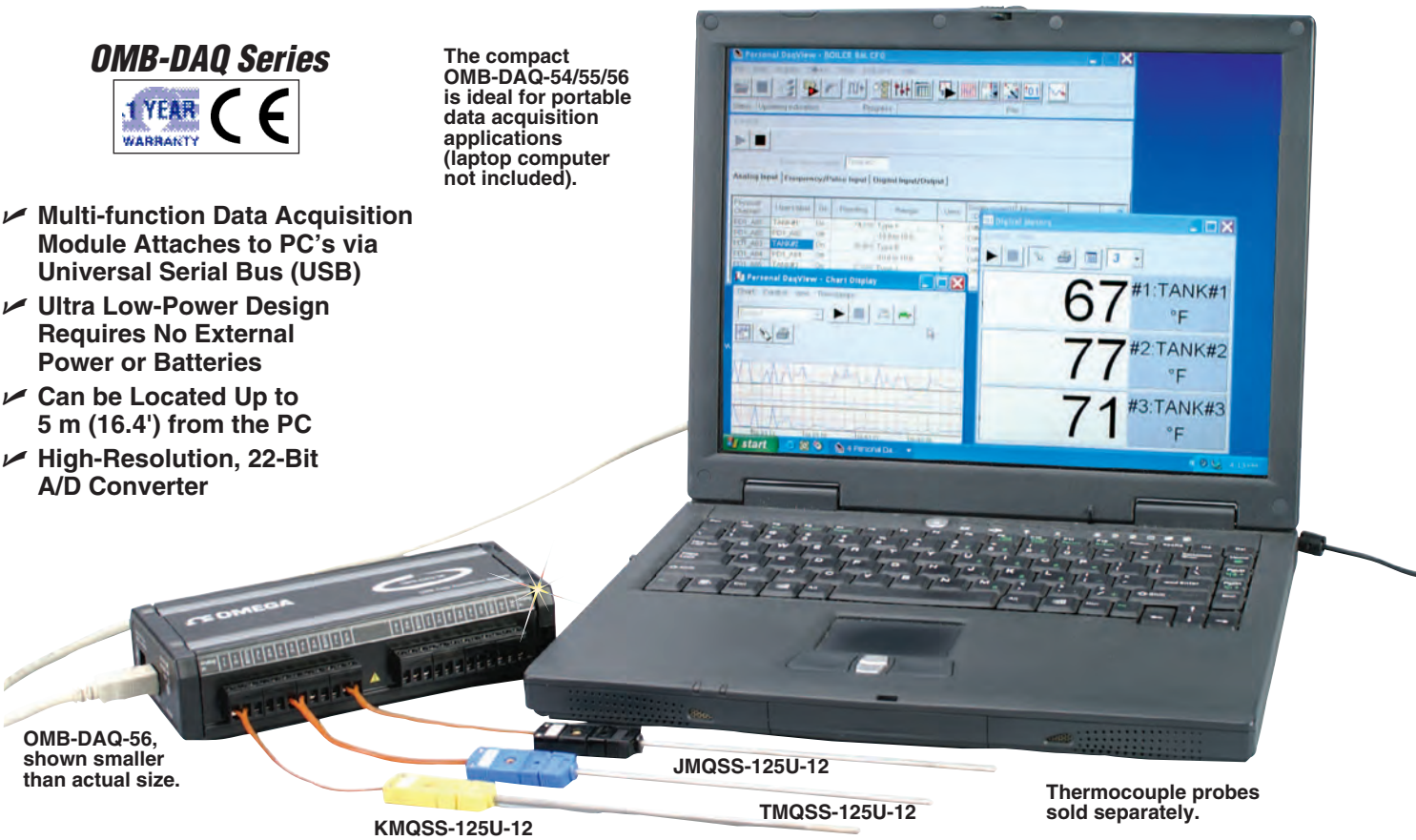
# Personal Daq USB Data Acquisition Modules

## OMB-DAQ Series

1 YEAR WARRANTY CE

The compact OMB-DAQ-54/55/56 is ideal for portable data acquisition applications (laptop computer not included).

- Multi-function Data Acquisition Module Attaches to PC's via Universal Serial Bus (USB)
- Ultra Low-Power Design Requires No External Power or Batteries
- Can be Located Up to 5 m (16.4') from the PC
- High-Resolution, 22-Bit A/D Converter




OMB-DAQ-56, shown smaller than actual size.

JMQSS-125U-12

TMQSS-125U-12

KMQSS-125U-12

Thermocouple probes sold separately.

- Built-In Cold Junction Compensation for Direct Thermocouple Measurements
- Frequency/Pulse/Duty-Cycle Measurements Up to 1 MHz*
- Convenient Removable Screw-Terminal Signal Connections
- 500 V Optical Isolation from PC for Safe and Noise-Free Measurements
- Programmable Inputs from ±31 mV to ±20V Full Scale
- Digital I/O Lines with Open Collector Output for Direct Drive Applications*
- Expandable Up to 80 Channels of Analog and Digital I/O*
- Up to 100 Modules Can be Attached to One PC Using USB Hubs, for a Total Capacity of 8000 Channels
- Digital Calibration—No Potentiometers or Adjustments Required

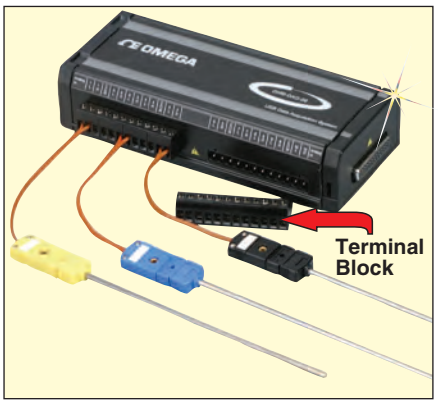
** The OMB-DAQ-54 does not have frequency, digital I/O or expansion capability.*

- Spreadsheet-Style Software for Setup, Acquisition, and Real-Time Display; PostView for Post-Acquisition Viewing
- Drivers for Visual Basic, Delphi, and C++ for Windows 95/98/2000/ME/XP/Vista, DASYLab, and LabVIEW

The OMB-DAQ-54, OMB-DAQ-55, and OMB-DAQ-56 Personal Daqs are full-featured data acquisition products that use the Universal Serial Bus (USB) built into almost every new PC. Designed for high accuracy and resolution, the 22-bit OMB-DAQ-54/55/56 data acquisition systems directly measure multiple channels of voltage, thermocouple, pulse, frequency, and digital I/O. A single cable to the PC provides high-speed operation and power to the OMB-DAQ-54/55/56. No additional batteries or power supplies are required, except when using bus-powered hubs.

The OMB-DAQ-54/55/56 modules are the first products in a new family of low-cost, USB-based products from OMEGA. Because of the strict power limitations of the USB, the modules incorporate special power-management circuitry to ensure adherence to USB specifications.

The OMB-DAQ-54/55/56 modules avoid many of the limitations of PC-card (PCMCIA) data acquisition devices and offer advantages over many PC plug-in data acquisition boards as well. The OMB-DAQ-54 data acquisition system offers 10 single-ended or 5 differential analog (up to ±20V full scale) or thermocouple input channels. The OMB-DAQ-55 offers 10 single-ended or 5 differential analog (up to ±20V full scale) or thermocouple input channels,16 programmable ranges, 500V optical isolation, 8 digital I/O lines, and 2 frequency/pulse/duty-cycle channels.




**OMB-DAQ-56, with removable terminal blocks for wiring sensors.**

The OMB-DAQ-56 offers twice the I/O capacity of the OMB-DAQ-55 in the same size package.

To simplify attachment of signals and transducers, the OMB-DAQ-54/55/56 modules feature convenient, removable screw-terminal input connections.

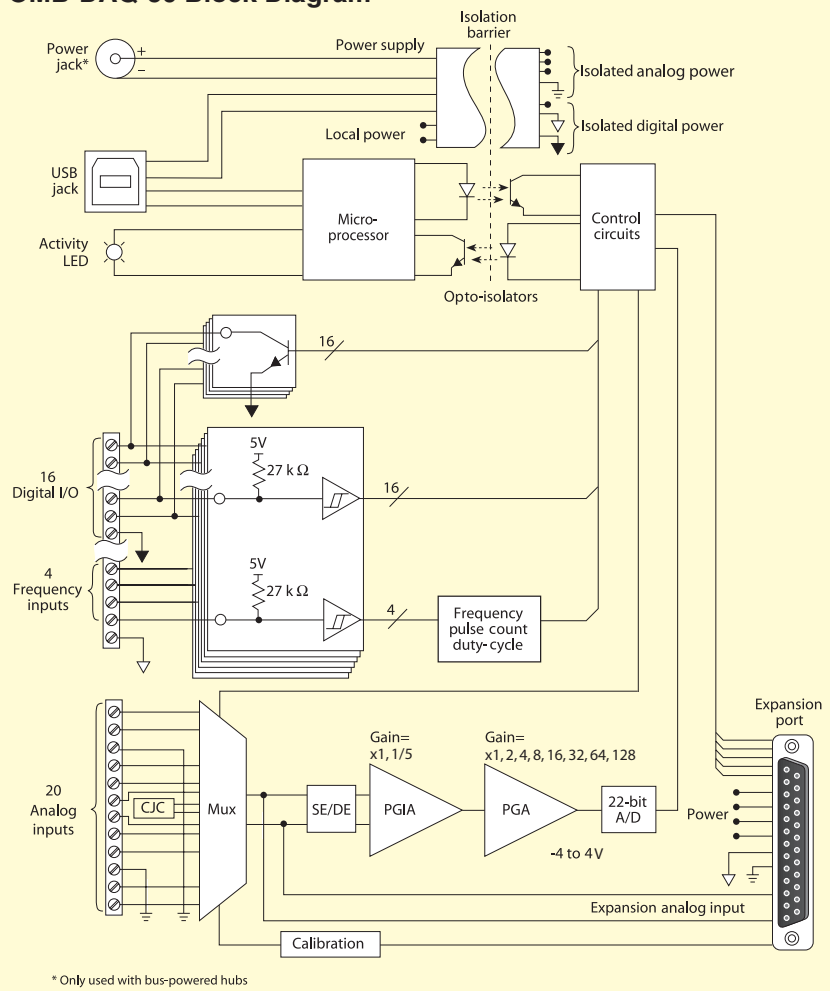
## SOFTWARE

The OMB-DAQ-54/55/56 modules are supplied with Personal DaqView, a Windows 98/2000/XP/Vista-based data logging application that lets the user set up acquisition applications and save acquired data directly to disk. Personal DaqView supports the use of more than one OMB-DAQ-54/55/56 module and also includes enhanced features such as overlapping charts and multiple display groups. The OMB-DAQ-54/55/56 modules are also shipped with PostView, a post-acquisition application that lets the user display acquired data previously saved to a file. Drivers for Visual Basic, Delphi, and C++ for Windows 98/2000/XP/Vista are included. In addition, drivers are available for icon-based software packages, such as DASYLab and LabVIEW.

## ABOUT USB — THE NEW PC CONNECTION

The Universal Serial Bus (USB) is a new standard for connecting PCs to peripheral devices such as printers, monitors, and modems. USB offers several advantages over conventional serial and parallel connections, including higher bandwidth (up to 12 Mbits/s) and the ability to provide power to the peripheral device.

### OMB-DAQ-56 Block Diagram




USB is ideal for data acquisition applications. Since USB connections supply power, only one cable is required to link the data acquisition device to the PC, which most likely has at least one USB port. In addition, the USB's high-speed data transfer (from the data acquisition device to the PC) allows for a real-time display of acquired data, eliminating the need for expensive memory in the acquisition device.

With the backing of Intel, Microsoft, and hundreds of other computer-related companies, USB is quickly becoming a universal standard.

## PERSONAL DAQ EXPANSION

The OMB-DAQ-55 and OMB-DAQ-56 can be easily expanded with one of two available snap-on expansion modules, bringing the total capacity to 60 analog or thermocouple channels, 32 digital I/O lines, and 4 frequency input channels. Furthermore, USB hubs can be used to create multi-unit systems containing up to 100 OMB-DAQ-55/56 modules attached to a single PC. Using this strategy, a multi-unit OMB-DAQ-55/56 system can provide up to 8000 analog and digital I/O lines. See the chart on the next page for available channel capacity. The OMB-DAQ-54 does not have expansion capability. The enhanced Personal DaqView software is required when using more than one OMB-DAQ-55/56 module.

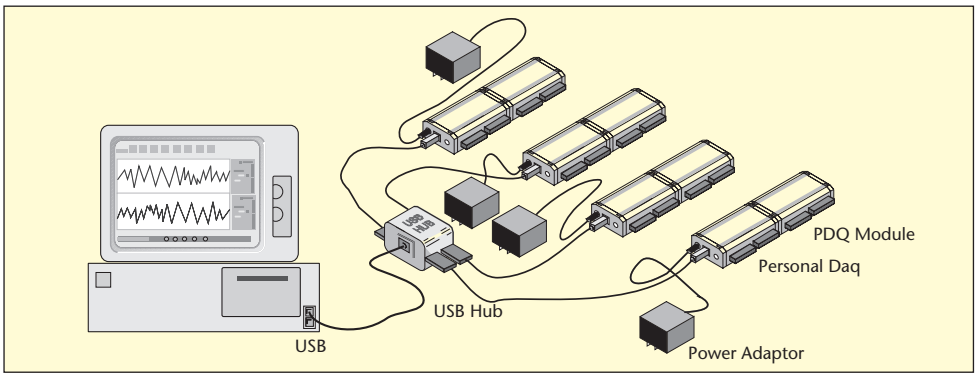


**OMB-CA-179-1 USB Cable.**



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### Connection to USB-Powered Hub

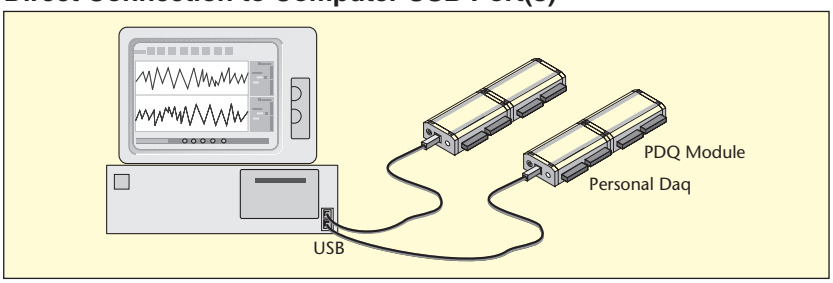



**Four OMB-DAQS (with optional OMB-PDQ modules) are connected to ports of a USB-powered hub, requiring an external power source.**

## EXAMPLE SYSTEMS

As a USB product, an OMB-DAQ-54/55/56 data acquisition system can be located up to 5 m (16.4') from the PC, residing close to the point of measurement for improved accuracy and reduced noise. If USB hubs are used as repeaters between USB cable segments, the OMB-DAQ-54/55/56 can be located up to 30 m (98.4') from the PC.

### Direct Connection to Computer USB Port(s)




**Two OMB-DAQS (with optional OMB-PDQ modules) are connected by cable to each of the computer's USB ports, requiring no external power source.**

### Speed vs. Resolution

| Measurement Duration | Max Sample Rate (Continous Calibration Disabled) | | | | Resolution (Bits RMS) (±4V) |
|---|---|---|---|---|---|
| | Voltage | | Thermocouple | | |
| | 1 Channel/Scan | 10 Channels/Scan | 1 Channel/Scan | 10 Channels/Scan | |
| 610 ms (50/60 Hz Rejection) | 1.6 Hz (625 ms) | 0.16 Hz (6.25 secs) | 1.5 Hz (667 ms) | 0.16 Hz (6.25 secs) | 22 |
| 12.5 ms (15 ms) | 66 Hz (128 ms) | 7.8 Hz (40 ms) | 25 Hz (167 ms) | 6 Hz | 15 |




**An OMB-DAQ-56, and an OMB-PDQ2, simply plug together for additional channel capacity.**

| OMB-DAQ and Expansion System Channel Capacities | | | |
|---|---|---|---|
| Product or System | Volts/TC Inputs* | Digital I/O | Freq/Pulse Inputs |
| **OMB-DAQ-54** | 5 DE, 10 SE | - | - |
| **OMB-DAQ-55** | 5 DE, 10 SE | 8 | 2 |
| **OMB-DAQ-56** | 10 DE, 20 SE | 16 | 4 |
| **OMB-PDQ1 Expansion Module** | 10 DE, 20 SE | 16 | - |
| **OMB-PDQ2 Expansion Module** | 20 DE, 40 SE | - | - |
| **OMB-DAQ-55 + OMB-PDQ1** | 15 DE, 30 SE | 24 | 2 |
| **OMB-DAQ-55 + OMB-PDQ2** | 25 DE, 50 SE | 8 | 2 |
| **OMB-DAQ-56 + OMB-PDQ1** | 20 DE, 40 SE | 32 | 4 |
| **OMB-DAQ-56 + OMB-PDQ2** | 30 DE, 60 SE | 16 | 4 |

## Specifications

### GENERAL

**Isolation:** 500V from PC

**Power Requirements:**
Powered from USB, or from external 6 to 16 Vdc when used with a bus-powered hub

**Environmental:**
0 to 50°C (0 to 122°F)
95% RH (non-condensing)

**Dimensions:**
92 W x 182 L x 45 mm H
(3.6 x 7.1 x 1.6")

### ANALOG SPECIFICATIONS

Each channel is configurable for single-ended or differential, volts, or thermocouple inputs

**OMB-DAQ-54 and OMB-DAQ-55:**
10 single-ended, 5 differential; volts or TC channels

**OMB-DAQ-56:**
20 single-ended, 10 differential; volts or TC channels

**Input Voltage Range:** Software-programmable on a per-channel basis

| Differential | Single-ended |
|---|---|
| -20 to 20V | -10 to 20V |
| -10 to 10V | -10 to 10V |
| -5 to 5V | -5 to 5V |
| -4 to 4V | -4 to 4V |
| -2.5 to 2.5V | -2.5 to 2.5V |
| -2 to 2V | -2 to 2V |
| -1.25 to 1.25V | -1.25 to 1.25V |
| -1 to V | -1 to 1V |
| -625 to 625 mV | -625 to 625 mV |
| -500 to 500 mV | -500 to 500 mV |
| -312 to 312 mV | -312 to 312 mV |
| -250 to 250 mV | -250 to 250 mV |
| -156 to 156 mV | -156 to 156 mV |
| -125 to 125 mV | -125 to 125 mV |
| -62 to 62 mV | -62 to 62 mV |
| -31 to 31 mV | -31 to 31 mV |

**Thermocouple Type and Temperature Ranges:**
- **J** = -100 to 700°C
- **K** = -200 to 1200°C
- **T** = -100 to 400°C
- **E** = -100 to 500°C
- **R** = -400 to 1400°C
- **S** = 400 to 1400°C
- **B** = 700 to 1400°C
- **N** = -100 to 700°C

**Thermocouple Accuracy:** In very slow mode, 22 bit resolution, includes cold junction compensation error
- **J** = ±1.1°C
- **K** = ±1.2°C
- **T** = ±1.1°C
- **E** = ±1.0°C
- **R** = ±2.5°C
- **S** = ±2.6°C
- **B** = ±3.3°C
- **N** = ±1.5°C

**Cold Junction Compensation Accuracy:** ±0.5°C

**Over-Voltage Protection:** ±45V relative to analog Lo

**AC Common Mode Rejection:** >120 dB @ 60 Hz (OMB-DAQ-55/56)

**Channel-to-Channel Crosstalk:** <-120 dB (DC to 100 Hz)

**Accuracy:**
- **OMB-DAQ-55/56:** 0.015% of reading +0.002% of range (exclusive of noise)
- **OMB-DAQ-54:** 0.015% of reading +0.004% of range (exclusive of noise)

**Input Resistance:** >10 M (SE), >20 M (DE)

**Bias Current:** <1 nA (0 to 35°C)

**Frequency Measurements (OMB-DAQ55/56 Only):**
- **OMB-DAQ-55:** 2 frequency/pulse input channels
- **OMB-DAQ-56:** 4 frequency/pulse input channels

**Operating Modes:** Pulse count (totalize), duty-cycle and frequency

**Frequency Response:** DC to 1 MHz

**Input Range:** ±15V absolute minimum, <1.3V (low), >3.8V (high)

**Pull-Up Resistor:** 27 K to 5V for switch or relay sensing

**Debouncing:** None, 0.8, 3.2 or 13 ms (software selectable)

**Totalize:** Up to $2^{32}$ counts/scan

**Frequency and Duty-Cycle Resolution:** 7 digits; actual resolution depends on scan rate. At 10 scans/s, resolution is 5 digits (10 ppm); at 1 scan/s, 6 digits (1 ppm).

### Digital I/O (OMB-DAQ55/56 Only)

Each I/O line is individually programmable as input or output and includes an open-collector driver with a 27 K pull-up resistor to 5V for output, with a Schmitt-trigger input buffer
- **OMB-DAQ-55:** 8 digital I/O lines
- **OMB-DAQ-56:** 16 digital I/O lines

### Input

**Voltage Range:** ±15V thresholds: <1.3V (low), >3.8V (high)

### Output

**Maximum Switch Voltage:** 0 to 15 Vdc (20V for <1 minute)

**Maximum Switch Current:** 150 mA/output continuous, 500 mA/output peak (<100 µs), 150 mA total continuous (per bank of 8 outputs)

**Output Resistance:** 10 max

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## To Order *Visit omega.com/omb-daq55 for Pricing and Details*

| Model No. | Description |
|---|---|
| **OMB-DAQ-54** | 10-channel, 22-bit data acquisition system |
| **OMB-DAQ-55** | 10-channel, 22-bit data acquisition system with frequency measurement and digital I/O |
| **OMB-DAQ-56** | 20-channel, 22-bit data acquisition system with frequency measurement and digital I/O |
| **OMB-PDQ1** | 20-channel analog and digital I/O expansion module for the OMB-DAQ-55 and OMB-DAQ-56 |
| **OMB-PDQ2** | 40-channel analog expansion module for the OMB-DAQ-55 and OMB-DAQ-56 |
| **OMB-CA-179-1** | USB cable, 1 m (3.2') |
| **OMB-CA-179-3** | USB cable, 3 m (9.8') |
| **OMB-CA-179-5** | USB cable, 5 m (16.4') |
| **OMB-CN-153-12** | Terminal block (spare) |

*Each unit is supplied with Personal DaqVIEW software; drivers for Visual Basic, C++ and Delphi for Windows, terminal block and a complete operator's manual on CD.*
***Ordering Example: OMB-DAQ-55** data acquisition system and **OCW-1** OMEGACARE℠ 1-year extended warranty adds 1 year to standard 1-year warranty for **OMB-DAQ-55** with **OMB-PDQ1** expansion module and **OCW-1** OMEGACARE℠ 1 year extended warranty adds 1 year to standard 1-year warranty and **OMB-CA-179-1** USB cable.*


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