**Personal Daq/50 Series**

**USB Data Acquisition Modules**

Models /54, /55, & /56

**Features**

- Multifunction data acquisition modules attach to PCs via Universal Serial Bus (USB 1.1 & 2.0 compatible)
- Ultra low-power design requires no external power or batteries
- Can be located up to 5 meters (16.4 feet) from the PC
- High-resolution, 22-bit A/D converter offers reading rates from 1 to 80 Hz
- Built-in cold-junction compensation for direct thermocouple measurements
- Frequency/pulse, or duty-cycle measurements up to 1 MHz*
- Convenient removable screw-terminal signal connections
- 500V 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 Personal Daq modules can be attached to one PC using USB hubs, for a total capacity of 8,000 channels
- Digital calibration—no potentiometers or adjustments required

**Software**

- **Personal DaqView Out-of-the-Box**
  spreadsheet-style software for setup, acquisition, and real-time display
- PostView included for post-acquisition data viewing
- Support for Visual Basic®, C/C++, DASYLab®, and NI LabVIEW®

**Supported Operating Systems:**
- Windows 2000®, Windows Vista® x86 (32-bit), and Windows XP®

Designed for high accuracy and resolution, the 22-bit Personal Daq data acquisition systems directly measure multiple channels of voltage, thermocouples, pulse, frequency, and digital I/O*. A single cable to the PC provides high-speed communication and power to the Personal Daq. No additional batteries or power supplies are required in most applications**.

The Personal Daq modules are a family of low-cost, USB-based products from IOtech. Because of the strict power limitations of the USB, the modules incorporate special power-management circuitry to ensure adherence to USB specifications.

The Personal Daqs avoid many of the limitations of PC-Card (PCMCIA) data acquisition devices. The Personal Daq/54 data acquisition system offers 10 single-ended or 5 differential analog (up to ±20V full scale), or thermocouple input channels. The Personal 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, eight digital I/O lines, and two frequency/pulse/duty-cycle channels. The Personal Daq/56 offers twice the I/O capacity of the Personal Daq/55, in the same size package.

To simplify attachment of signals and transducers, the Personal Daq modules feature convenient, removable screw-terminal input connections.

* The Personal Daq/54 does not have frequency, digital I/O, or expansion capability
** In rare instances an external power source is required when PC-supplied power is inadequate
Software
The Personal Daqs are supplied with Personal DaqView, IOtech’s Windows®-based data logging application that allows you to set up your acquisition applications and save acquired data directly to disk. The Personal Daqs are also shipped with PostView, a post-acquisition application that permits you to display acquired data previously saved to a file. Drivers for Visual Basic® and C/C++ for Windows® 2000/XP/Vista (32-bit) are also included. In addition, drivers are available for icon-based software packages, such as DASYLab® and NI LabVIEW®.
Personal Daq Expansion

Both the Personal Daq/55 and the Personal Daq/56 can be easily expanded with one of two available snap-on expansion modules, bringing the total capacity up 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 Personal Daq modules attached to a single PC. Using this strategy, a multi-unit Personal Daq system can provide up to 8,192 analog and digital I/O lines.

See the chart to the right for available channel capacity.

Note: No expansion available for Personal Daq/54.

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### Personal Daq and Expansion System Channel Capacities

<table>
<thead>
<tr>
<th>Product or System</th>
<th>Volts/TC Inputs*</th>
<th>Digital I/O</th>
<th>Freq/Pulse Inputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Daq/54</td>
<td>5 DE, 10 SE</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Personal Daq/55</td>
<td>5 DE, 10 SE</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Personal Daq/56</td>
<td>10 DE, 20 SE</td>
<td>16</td>
<td>4</td>
</tr>
<tr>
<td>PDQ1 Expansion Module</td>
<td>10 DE, 20 SE</td>
<td>16</td>
<td>—</td>
</tr>
<tr>
<td>PDQ2 Expansion Module</td>
<td>20 DE, 40 SE</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Personal Daq/55 + PDQ1</td>
<td>15 DE, 30 SE</td>
<td>24</td>
<td>2</td>
</tr>
<tr>
<td>Personal Daq/55 + PDQ2</td>
<td>25 DE, 50 SE</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Personal Daq/56 + PDQ1</td>
<td>20 DE, 40 SE</td>
<td>32</td>
<td>4</td>
</tr>
<tr>
<td>Personal Daq/56 + PDQ2</td>
<td>30 DE, 60 SE</td>
<td>16</td>
<td>4</td>
</tr>
</tbody>
</table>

* TC inputs are differential only

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**PDQ10**

**DIN-rail Mounting Adapter**

The PDQ10 allows one Personal Daq or PDQ module to be DIN-rail mounted. The Personal Daq or PDQ module simply snaps into the PDQ10.

**PDQ12**

**USB Extender Cable**

Each PDQ12 adds 16 ft. to the length of your USB cable. Since the extender cable cannot provide adequate power, a TR-2U will be required for the Personal Daq/50 Series.
Example Systems

As a USB product, the Personal Daq data acquisition system can be located up to five meters (16.4 feet) from the PC, allowing it to reside close to the point of measurement for improved accuracy and reduced noise. If USB hubs or USB-powered extension cables are used as repeaters between USB cable segments, the Personal Daq can be located up to 30 meters (98.4 feet) from the PC.

Direct Connection to Computer USB Port(s)

Two Personal Daqs (with optional PDQ modules) are connected by cable to each of the computer’s USB ports, requiring no external power source.

Connection to Powered USB-Hub

Four Personal Daqs (with optional PDQ modules) are connected to ports of a USB hub, requiring an external power source.
Personal DaqView
Out-of-the-Box Software

Personal DaqView*, IOtech’s included Out-of-the-Box graphical data acquisition software, is an easy-to-use yet powerful application. It allows users to configure a test, and display or record data within minutes, without programming. Together with included PostView post-acquisition viewer software, Personal DaqView offers the most functionality of any included software of its kind.

Personal DaqView lets the user:
1. Select one of any Personal Daqs connected to the system
2. Set up, configure and display analog, frequency, counter, and digital I/O channels in real time
3. Easily and quickly configure acquisition parameters such as trigger events, stop events, and acquisition scan rates
4. Acquire analog, frequency, and digital I/O channels to disk in real time
5. View real-time analog, frequency, and digital I/O using extensive charting and metering displays
6. View acquisition status at a glance, including triggered time/date, acquisition progress, as well as acquisition destination file

The Analog Input screen allows the user to:
1. Easily configure analog input channels such as voltage and temperature measurements
2. View channels through both a physical channel description or a user-defined channel description
3. Select the minimum measurement duration for a channel on a per-channel basis
4. Display real-time readings of active or enabled channels
5. Apply scale and offset for real-time mX+b operation
6. Have the spreadsheet automatically “grow” as more channels are added to the system

* Supported Operating Systems: Windows 2000®, Windows Vista® x86 (32-bit), and Windows XP®
Custom Real-Time Displays

Personal DaqView allows the creation of customized real-time displays using built-in display options, including digital, dial meter, bar graph, and strip chart displays. No programming is required — simply point, click, and drag desired display options to create a custom screen.

Dial Meter

Personal DaqView allows up to 32 channels to be shown in a dial display format. Each dial indicates instantaneous levels, as well as peak hold and trends.

Strip Chart

Display up to 16 smooth-scrolling strip charts of data, all of which scroll at the same rate, and define a full-scale range for each individual channel, as well as adjust the scroll rate to 14 different speeds.

The Digital Input/Output screen allows the user to:

1. Read the current state of all digital input channels
2. Manually set the state of each digital output channel
3. Set the default power-up state for each digital output channel

The Frequency/Pulse Input screen allows the user to:

1. Easily configure counter channels as frequency, pulse counting, totalized, or duty cycle inputs
2. View channels through both a physical channel description or a user-defined channel description
3. Set counter input signal debounce, input frequency range, and counter edge sensitivity on a per-channel basis
4. Display active or enabled frequency/counter channels in real time
5. Apply scale and offset values for real-time mX+b operation
Personal DaqView

Out-of-the-Box Software

Chart

Personal DaqView software provides advanced charting capabilities, including multiple traces per chart, multiple chart groups, and support for up to 100 Personal Daq devices attached to one PC.

- Allows display groups to be created for customized viewing
- Supports up to 100 Personal Daq devices

XL Integration

XL integration allows Personal DaqView to execute seamlessly from within Microsoft® Excel’s tool palette. Acquired measurements are inserted directly into an Excel® spreadsheet in real time.

- Allows formula creation on acquired data
- Provides control of acquisition from spreadsheet

Personal DaqView provides display of multiple channels in one chart

Personal DaqView allows display of collected data with Excel and software package charts
**Specifications**

### General

**Note:** No expansion available for Personal Daq/54.

#### Isolation

500V from PC

#### Power Requirements

- Powered from USB, or from an optional external +6 to +16 VDC when PC cannot provide adequate power

#### Environment

0 to 50 °C, 0 to 95% RH, non-condensing; relatively still air environment recommended for thermocouple measurements

#### AC Common Mode Rejection

- **Personal Daq/54:** Greater than 100 dB at 50/60 Hz
- **Personal Daq/55, /56:** Greater than 120 dB at 50/60 Hz

#### Channel-to-Channel Crosstalk

-50 dB (analog COM)

#### Accuracy

0.02% of reading, +0.004% of range (exclusive of noise)

#### Input Offset Voltage

- **Personal Daq/54:** <30 µV
- **Personal Daq/55, /56:** <20 µV

#### Input Resistance

10 MΩ (SE), 20 MΩ (DE)

#### Cold-Junction Accuracy

10 MΩ (SE), 20 MΩ (DE)

#### Input Impedance

10 MΩ (SE), 20 MΩ (DE)

#### Frequency Response

-120 dB

#### Over-Voltage Protection

±45V relative to analog COM

#### Common Mode Rejection

Personal Daq/54: 100 dB @ 60 Hz

#### Channel-to-Channel Crosstalk

-100 dB @ 60 Hz

#### Input Impedance

10 MΩ (SE), 20 MΩ (DE)

#### Bias Current

<1 nA (0 to 35 °C)

#### Gain Accuracy

0.01% (after calibration, 15˚ to 35 °C), 5 ppm/°C gain drift

#### Gain Accuracy

0.01% (after calibration, 15˚ to 35 °C), 5 ppm/°C gain drift

#### Input Voltage Range

<table>
<thead>
<tr>
<th>Range</th>
<th>Single-Ended</th>
</tr>
</thead>
<tbody>
<tr>
<td>-20V to +20V</td>
<td>-10V to +20V</td>
</tr>
<tr>
<td>-10V to +10V</td>
<td>-10V to +10V</td>
</tr>
<tr>
<td>-5V to +5V</td>
<td>-5V to +5V</td>
</tr>
<tr>
<td>-4V to +4V</td>
<td>-4V to +4V</td>
</tr>
<tr>
<td>-2.5V to +2.5V</td>
<td>-2.5V to +2.5V</td>
</tr>
<tr>
<td>-2V to +2V</td>
<td>-2V to +2V</td>
</tr>
<tr>
<td>-1.25V to +1.25V</td>
<td>-1.25V to +1.25V</td>
</tr>
<tr>
<td>-1V to +1V</td>
<td>-1V to +1V</td>
</tr>
<tr>
<td>-625 mV to +625 mV</td>
<td>-625 mV to +625 mV</td>
</tr>
<tr>
<td>-500 mV to +500 mV</td>
<td>-500 mV to +500 mV</td>
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<tr>
<td>-312 mV to +312 mV</td>
<td>-312 mV to +312 mV</td>
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<tr>
<td>-250 mV to +250 mV</td>
<td>-250 mV to +250 mV</td>
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<tr>
<td>-156 mV to +156 mV</td>
<td>-156 mV to +156 mV</td>
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<tr>
<td>-125 mV to +125 mV</td>
<td>-125 mV to +125 mV</td>
</tr>
<tr>
<td>-62 mV to +62 mV</td>
<td>-62 mV to +62 mV</td>
</tr>
<tr>
<td>-31 mV to +31 mV</td>
<td>-31 mV to +31 mV</td>
</tr>
</tbody>
</table>

### Analog Specifications

- Each channel is configurable for single-ended or differential, volts or thermocouple inputs.
- **Personal Daq/54, /55:** 10 single-ended, 5 differential; volts or TC channels
- **Personal Daq/56:** 20 single-ended, 10 differential; volts or TC channels
- **Input Voltage Range:** Software programmable on a per-channel basis
- **Thermocouple Type:** J, K, T, E, R, S, B, N14G, & N28G
- **Thermocouple Accuracy (°C)**
  - J: ±0.7 °C (15 to 35 °C)
  - K: ±1.0 °C (15 to 35 °C)
  - T: ±1.2 °C (15 to 35 °C)
  - E: ±1.1 °C (15 to 35 °C)
  - R: ±1.1 °C (15 to 35 °C)
  - S: ±2.6 °C (15 to 35 °C)
  - B: ±3.3 °C (15 to 35 °C)
  - N: ±1.5 °C (15 to 35 °C)

### Frequency Measurements

- **Personal Daq/55:** 2 frequency/pulse input channels
- **Personal Daq/56:** 4 frequency/pulse input channels

#### Operating Modes

Pulse count, totalize, duty-cycle, and frequency

#### Frequency Response

DC to 1 MHz

#### Input Range

±13V, Schmitt-trigger inputs, ±1.3V (low), ±3.8V (high)

#### Pull-Up Resistor

27k Ohm to +5V for switch or relay sensing

#### De-bouncing

None, 0.8, 3.2, or 13 mS;

Totalize: Up to 2^32 counts/scan

### Digital I/O

- **Personal Daq/55:** 8 digital I/O lines
- **Personal Daq/56:** 16 digital I/O lines

Each I/O line is individually programmable as input or output.

#### Over-Voltage Protection

±20V for up to 0.1 minute

#### Debouncing

None, 0.8, 3.2, or 13 mS.

Totalize: Up to 2^32 counts/scan

### Frequency & 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).

### Frequency Measurements

<table>
<thead>
<tr>
<th>/55 and /56 only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Daq/55: 2 frequency/pulse input channels</td>
</tr>
<tr>
<td>Personal Daq/56: 4 frequency/pulse input channels</td>
</tr>
<tr>
<td>Operating Modes: Pulse count, totalize, duty-cycle, and frequency</td>
</tr>
<tr>
<td>Frequency Response: DC to 1 MHz</td>
</tr>
<tr>
<td>Input Range: ±13V, Schmitt-trigger inputs, ±1.3V (low), ±3.8V (high)</td>
</tr>
<tr>
<td>Pull-Up Resistor: 27k Ohm to +5V for switch or relay sensing</td>
</tr>
<tr>
<td>De-bouncing: None, 0.8, 3.2, or 13 mS; Totalize: Up to 2^32 counts/scan</td>
</tr>
<tr>
<td>Frequency &amp; 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).</td>
</tr>
</tbody>
</table>

### Measurement Speed

<table>
<thead>
<tr>
<th>/55 and /56 only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Each I/O line is individually programmable as input or output</td>
</tr>
</tbody>
</table>

#### Over-Voltage Protection

±20V for up to 0.1 minute

#### Output Voltage Range

0 to +15V

#### Thresholds

-1.3V (low), ±3.8V (high)

#### Maximum Sink Current

150 mA per output, 500 mA out-to-out with no external pull-up resistor

#### Measurement Speed

- Channels can be programmed to be scanned in any order.

#### Outputs may be changed arbitrarily at any time under program control.
## Personal Daq/50 Series
### Ordering Information

<table>
<thead>
<tr>
<th>Description</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>22-bit data acquisition system including Personal DaqView and PostView software; support for Visual Basic®, C/C++, DASYLab®, and NI LabVIEW®</td>
<td>Personal Daq/54, Personal Daq/55, Personal Daq/56</td>
</tr>
<tr>
<td>Expansion module, with 20 volts/TC inputs and 16 digital I/O</td>
<td>PDQ1</td>
</tr>
<tr>
<td>Expansion module, with 40 volts/TC inputs</td>
<td>PDQ2</td>
</tr>
<tr>
<td>DIN-rail mounting adapter for Personal Daq</td>
<td>PDQ0</td>
</tr>
<tr>
<td>Powered 4-port USB hub with one USB cable</td>
<td>PDQ11</td>
</tr>
<tr>
<td>USB-powered extension cable, 16 ft.</td>
<td>PDQ12</td>
</tr>
</tbody>
</table>

### Accessories & Cables

<table>
<thead>
<tr>
<th>Description</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB cable, 1 meter</td>
<td>CA-179-1</td>
</tr>
<tr>
<td>USB cable, 3 meters</td>
<td>CA-179-3</td>
</tr>
<tr>
<td>USB cable, 5 meters</td>
<td>CA-179-5</td>
</tr>
<tr>
<td>Terminal block</td>
<td>CN-153-12</td>
</tr>
<tr>
<td>External power supply, 90 to 264 VAC; requires additional cable</td>
<td>TR-2U</td>
</tr>
<tr>
<td>USA version</td>
<td>CA-1</td>
</tr>
<tr>
<td>European version</td>
<td>CA-216</td>
</tr>
</tbody>
</table>

### Thermocouples

| E-type thermocouple wire, fiberglass (0 °C to 482 °C, 32 °F to 900 °F) 1 m | 745690-E001 |
| E-type thermocouple wire, fiberglass (0 °C to 482 °C, 32 °F to 900 °F) 2 m | 745690-E002 |
| J-type thermocouple wire, fiberglass (0 °C to 482 °C, 32 °F to 900 °F) 1 m | 745690-J001 |
| J-type thermocouple wire, fiberglass (0 °C to 482 °C, 32 °F to 900 °F) 2 m | 745690-J002 |
| K-type thermocouple wire, fiberglass (0 °C to 482 °C, 32 °F to 900 °F) 1 m | 745690-K001 |
| K-type thermocouple wire, fiberglass (0 °C to 482 °C, 32 °F to 900 °F) 2 m | 745690-K002 |
| T-type thermocouple wire, fiberglass (0 °C to 260 °C, 32 °F to 500 °F) 1 m | 745690-T001 |
| T-type thermocouple wire, fiberglass (0 °C to 260 °C, 32 °F to 500 °F) 2 m | 745690-T002 |

### Software

<table>
<thead>
<tr>
<th>Description</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Icon-based data acquisition, graphics, control, &amp; analysis with Personal Daq driver</td>
<td>DASYLab</td>
</tr>
</tbody>
</table>

Measurement Computing (508) 946-5100 info@mccdaq.com mccdaq.com