Low-Cost Digital I/O – 24 TTL Lines

6503 Family (DIO-24)

**Overview**

The PCI-6503 is a PCI plug-in board. The DAQCard-DIO-24 is a Type II PC Card (PCMCIA) for notebooks and other computers with a PCMCIA slot. The PC-DIO-24 is an ISA plug-in board. Each of these products uses a 24-bit programmable peripheral interface (PPI) to achieve 24 channels of digital I/O. In addition, each is Plug and Play compatible and does not require a separate card manager for configuration. Each interface works with a variety of operating systems, so you can develop applications that work across multiple platforms.

**Hardware**

**PPI**

These digital I/O cards use the 82C55 PPI. The PPI controls 24 bits of digital I/O and has three 8-bit ports (A, B, and C), which you can functionally program as either inputs or outputs. Ports A and B are always used for digital I/O, while port C can be configured for digital data I/O, control, status, or handshake signals. You can program the digital I/O card for unidirectional or bidirectional bus I/O and also for interrupt generation.

**Digital I/O Power-Up State Selection**

You can power the PCI-6503 and PC-DIO-24 digital I/O lines in a user-defined state — either up or down. Each line is connected to a 100 kΩ resistor and can be pulled high or low. The DAQCard-DIO-24 has 100 kΩ resistors that always pull high.

**PCI Bus Interface**

The PCI-6503 uses the MITE™ custom ASIC to interface the board to the PCI bus. This ASIC fully implements the PCI Local Bus Specification Revision 2.0.

**Digital I/O Connector**

The PCI-6503 and PC-DIO-24 have an onboard 50-pin ribbon cable connector. The DAQCard-DIO-24 has a 27-pin PCMCIA connector. The pin assignments are compatible with standard 24-channel I/O module mounting racks, such as the National Instruments SSR Series and ER-8, ER-16 accessories. The eight bits in Port A of the DIO-24 products are at PA7 through PA0 on the digital I/O connector. Ports B and C are at PB7 through PB0 and PC7 through PC0, respectively. Each port is assigned as either an input or output by the PPI. Power from the ISA, PCI, or PCMCIA bus is also available on pin 49 of the digital I/O connector.

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**Table 1. 6503 Family Specifications Overview**

<table>
<thead>
<tr>
<th>Family</th>
<th>Digital I/O</th>
<th>Transfer Rate</th>
<th>Range</th>
<th>Handshaking</th>
<th>Pattern I/O</th>
<th>Triggers</th>
</tr>
</thead>
<tbody>
<tr>
<td>6503</td>
<td>24</td>
<td>Static I/O</td>
<td>5 V/TTL</td>
<td>yes</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

*Table 1. 6503 Family Specifications Overview* (refer to page 331 for more detailed specifications)
Low-Cost Digital I/O – 24 TTL Lines

Figure 2. 6503 Family Hardware Block Diagram

Figure 1. 6503 Family I/O Connector

For detailed product specifications, refer to page 331.

Ordering Information

6503 Family
PCI-6503 .................................................... 777690-01
DAQCard-DIO-24 for Windows NT/98/95 .................................... 776912-01
Mac OS ....................................................... 776912-02
PC-DIO-24 (PnP) .......................................... 777368-01
PC-DIO-24 (with jumpers; includes DOS drivers)........ 777367-01

Iincludes NI-DAQ for Windows NT/98/95 on CD unless otherwise noted.
See page 228 for more details.

Example Configurations

<table>
<thead>
<tr>
<th>Family</th>
<th>DAQ Board</th>
<th>Cable (page 305-309)</th>
<th>Accessory (page 295-304)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6503</td>
<td>PCI-6503</td>
<td>N81 (18034-10)</td>
<td>CB-50LP (777101-01)</td>
</tr>
<tr>
<td></td>
<td>DAQCard-DIO-24</td>
<td>P9H767-50DF1 (776909-01)</td>
<td>CB-50LP (777101-01)</td>
</tr>
<tr>
<td></td>
<td>PC-DIO-24</td>
<td>N81 (18034-10)</td>
<td>CB-50LP (777101-01)</td>
</tr>
</tbody>
</table>

Refer to page 205 for more detailed cable and accessory options.
Specifications

Static Digital I/O (650x Families)

Digital I/O
Number of channels
6503 ................................................. 24
6507/8 .............................................. 96
Compatibility ..................................... 5V/TTL
Power-on state .................................. Input
Digital Logic Levels
Transfer rate
3 (1 word = 8 bits)
Maximum with NI-DAQ software ................. 50 kwords/s
Constant sustainable rate ....................... 1 to 10 kwords/s, typical
Handshaking ....................................... 2-wire
Data transfers .................................... Interrupts, programmed I/O

Bus interface
PCI, PXI, DAQCard, DAQPad, AT ........... Slave

Power Requirements

<table>
<thead>
<tr>
<th>Board</th>
<th>+5 VDC (±5%)</th>
<th>Power available at I/O connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>6503 and PO-6503</td>
<td>400 mA</td>
<td>+4.85 to +5.25 VDC, 1 A fused</td>
</tr>
<tr>
<td>DAQCard-DIO-24</td>
<td>15 mA</td>
<td>+4.65 to +5.25 VDC, 500 mA</td>
</tr>
<tr>
<td>PC-DIO-24</td>
<td>160 mA</td>
<td>+4.65 to +5.25 VDC, 1 A fused</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Board</th>
<th>+9 to +30 VDC</th>
<th>Power available at I/O connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAQPad-6507/8</td>
<td>150 mA at 12 VDC</td>
<td>+4.85 to +5.25 VDC, 1 A fused</td>
</tr>
</tbody>
</table>

Physical
Dimensions
- PCI-6503 ....................... 12.2 by 9.5 cm (4.8 by 3.7 in.)
- DAQCard-DIO-24 ......... Type II PC Card
- PC-DIO-24 ................. 11.7 by 10.6 cm (4.6 by 2.2 in.)
- PCI-DIO-96 .............. 13.7 by 10.7 cm (5.4 by 4.2 in.)
- PXI-6508 .......... 10 by 16.1 cm (3.9 by 6.3 in.)
- PC-DIO-96 .............. 16.5 by 9.9 cm (6.5 by 3.9 in.)
- DAQPad-6507/8 .......... 14.6 by 21.3 by 3.8 cm (5.8 by 8.4 by 1.5 in.)

I/O connector
- 6503, except DAQCard .......... 50-pin male
- DAQCard-DIO-24 ....... 25-pin female PCMCIA
- 6507/8, except PC-DIO-96 100-pin female 0.050 series D-type
- PC-DIO-96 .............. 100-pin male ribbon cable

Environment
Operating temperature ......................... 0 to 55 °C, DAQCard should not exceed 55 °C while in PCMCIA slot
Storage temperature ......................... -20 to 70 °C
Relative humidity ......................... 10% to 90% noncondensing

For information on static digital I/O in the VXI form factor refer to the VXI Catalogue.