Digital I/O – 96 TTL Lines

6507 and 6508 Families (DIO-96)

6507 Family
DAQPad-6507 for USB
6508 Family
PCI-DIO-96
PXI-6508
DAQPad-6508 for USB
PC-DIO-96

Digital I/O
96 (5V/TTL) lines in 8-bit ports
Unidirectional and bidirectional I/O
2-wire handshake capability
User-defined power-up states (PC, DAQPad, PXI)

NI-DAQ Software
Windows NT/98/95
Mac OS*
USB devises for Windows 98 only (refer to page 200 for other operating systems)
*Not for all hardware

Application Software
LabVIEW
BridgeVIEW
LabWindows/CVI
Lookout
ComponentWorks
VirtualBench

Solutions
BCD-compatible panel meters and test equipment
Interface to parallel digital I/O peripherals
Electromechanical and solid-state relays
Monitoring and control of switches, actuators, annunciators, fans, lights, motors

Family	Digital I/O	Transfer Rate	Range	Handshaking	Pattern I/O	Triggers
6507/8	96	Static I/O	5 V/TTL	✓	–	–

Table 1. 6507/8 Family Specifications Overview (refer to page 331 for more detailed specifications)

Overview

The DIO-96, 6507, and 6508 are 96-bit parallel digital I/O devices for computers with PCI, PXI/CompactPCI, ISA, and the universal serial bus (USB). They are available with either NI-DAQ driver software for Windows NT/98/95 or Mac OS (PCI only). These digital I/O devices use four 24-bit programmable peripheral interfaces (PPIs). Each PPI can be further divided into three 8-bit ports. The DIO-96, 6507, and 6508 are very flexible when interfacing to peripherals or other computers. The boards can operate in either a unidirectional or bidirectional mode, and handshake with peripheral equipment.

Hardware

PPI

There are four 82C55A PPIs. Each 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 you can configure Port C for digital data I/O, control, status, or handshake signals. You can program the digital I/O boards for unidirectional or bidirectional I/O.

Digital I/O Power-Up State Selection

You can power-up the PC-DIO-96, PXI-6508, and DAQPad-650x 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 PCI-DIO-96 has 100 kΩ resistors that always pull high.

PCI Bus Interface

The PCI-DIO-96 and PXI-6508 uses the MITE custom ASIC to interface the board to the PCI or PXI bus. This ASIC fully implements the PCI Local Bus Specification Revision 2.0.

The PCI bus, which is platform independent, is used in IBM-compatible PCs, Power Macintosh computers, and others. You can use the same PCI-DIO-96 on a PC or Power Macintosh computer with platform-specific driver software.

Digital I/O Connector

For the PCI-DIO-96, PXI-6508, PC-DIO-96, and DAQPad-6508,all digital I/O takes place through a 100-pin cable connector shown in Figure 1. For convenient and compact signal connection, the DAQPad-6507 has on-board screw terminals for all I/O signals and strain relief for ruggedized wiring. The DAQPad-6507 does not need additional cables or external termination accessories. The eight bits in Port A of each PPI are at xPA7 through xPA0 on the digital I/O connector, where x represents A, B, C, or D, depending on which PPI is used to transfer the digital data. Ports B and C are at xPB7 through xPB0

Digital I/O – 96 TTL Lines

APC7	1	51	CPC7
BPC7	2	52	DPC7
APC6	3	53	CPC6
BPC6	4	54	DPC6
APC5	5	55	CPC5
BPC5	6	56	DPC5
APC4	7	57	CPC4
BPC4	8	58	DPC4
APC3	9	59	CPC3
BPC3	10	60	DPC3
APC2	11	61	CPC2
BPC2	12	62	DPC2
APC1	13	63	CPC1
BPC1	14	64	DPC1
APC0	15	65	CPC0
BPC0	16	66	DPC0
APB7	17	67	CPB7
BPB7	18	68	DPB7
APB6	19	69	CPB6
BPB6	20	70	DPB6
APB5	21	71	CPB5
BPB5	22	72	DPB5
APB4	23	73	CPB4
BPB4	24	74	DPB4
APB3	25	75	CPB3
BPB3	26	76	DPB3
APB2	27	77	CPB2
BPB2	28	78	DPB2
APB1	29	79	CPB1
BPB1	30	80	DPB1
APB0	31	81	CPB0
BPB0	32	82	DPB0
APA7	33	83	CPA7
BPA7	34	84	DPA7
APA6	35	85	CPA6
BPA6	36	86	DPA6
APA5	37	87	CPA5
BPA5	38	88	DPA5
APA4	39	89	CPA4
BPA4	40	90	DPA4
APA3	41	91	CPA3
BPA3	42	92	DPA3
APA2	43	93	CPA2
BPA2	44	94	DPA2
APA1	45	95	CPA1
BPA1	46	96	DPA1
APA0	47	97	CPA0
BPA0	48	98	DPA0
+5 V	49	99	+5 V
GND	50	100	GND

Figure 1. 6508 Family I/O Connector

and xPC7 through xPC0, respectively. Each port is assigned as either an input or output port by the PPI. Power from the computer I/O channel is also available on pins 49 and 99 of the digital I/O connector. Cable adapter boards convert the 100-pin connector to forms compatible with solid-state relays, electromechanical relays, and optical isolation boards.

USB Connectors

The DAQPad-6507 and DAQPad-6508 are cabled to your USB-equipped computer via a standard USB cable. The USB cable uses a USB B-type connector for the device and a USB A-type connector for the computer.

DAQPad-6507 and 6508 Power

The DAQPad-6507 and 6508 are powered by the USB bus, the optional BP-1 battery pack, or by any 9 to 30 VDC supply. With the AC-to-DC adapter unit included, you can power the DAQPad-650x from any standard AC source. If you are using several USB devices, or drawing more than 50 mA from the onboard 5 V supply, we recommend that you use the AC to DC adapter or BP-1 battery pack. A charger unit is included with the BP-1.

For detailed product specifications, refer to page 331.

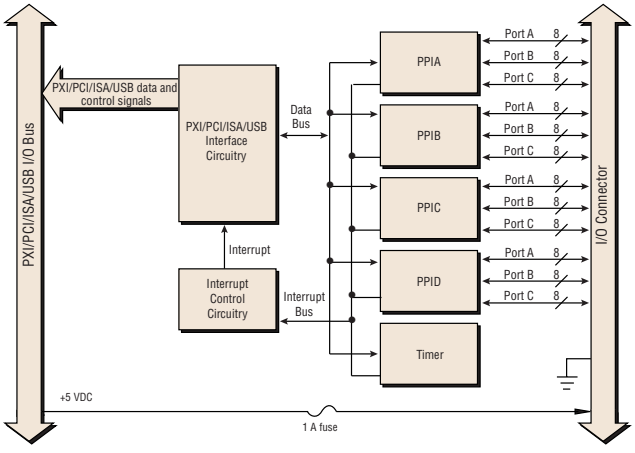

Figure 2. 6507/8 Family Hardware Block Diagram

Ordering Information

PCI-DIO-96 and NI-DAQ for
Windows NT/98/95 777387-01
Mac OS..... 777098-01
PXI-6508 777598-01
PC-DIO-96 (Plug and Play).....777271-01
PC-DIO-96 (with jumpers) 777418-01
Includes NI-DAQ for DOS
DAQPad-6507 with built-in screw terminals
U.S. 120 VAC.....777405-01
Universal Euro 240 VAC.....777405-04
United Kingdom 240 VAC 777405-06
Japanese 120 VAC.....777405-07
DAQPad-6508 with 100-pin I/O connector
U.S. 120 VAC.....777661-01
Universal Euro 240 VAC.....777661-04
United Kingdom 240 VAC 777661-06
Japanese 120 VAC.....777661-07
BP-1, Rechargeable battery pack
120 VAC charger 776896-01
230 VAC charger 776896-31

Includes NI-DAQ for Windows NT/98/95 on CD unless otherwise noted.

See page 228 for more details. All DAQPad kits include 1 meter USB cable.

Example Configurations

Family	DAQ Board	Accessory (page 295-304)
6507	DAQPad-6507	Built-in screw terminals
6508	PCI-DIO-96	CB-100; includes R1005050 cable (777812-01)
	PXI-6508	CB-100; includes R1005050 cable (777812-01)
	DAQPad-6508	CB-100; includes R1005050 cable (777812-01)
	PC-DIO-96	CB-100; includes NB5 cable (776455-02)

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

Level	Minimum	Maximum
Input low voltage	-0.3 V	0.8 V
Input high voltage	2.2 V	5.3 V
Output low voltage (I_{out} = 2.5 mA)	–	0.4 V
Output high voltage (I_{out} = 2.5 mA)	3.7 V	–

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

Board	+5 VDC (±5%)	Power available at I/O connector
6507/8 and PCI-6503	400 mA	+4.65 to +5.25 VDC, 1 A fused
DAQCard-DIO-24	15 mA	+4.65 to +5.25 VDC, 500 mA
PC-DIO-24	160 mA	+4.65 to +5.25 VDC, 1 A fused

Board	+9 to +30 VDC	Power available at I/O connector
DAQPad-6507/8	150 mA at 12 VDC typical; 1 A max	+4.65 to +5.25 VDC, 1 A fused

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 4.2 in.)
- PCI-DIO-96 ..... 13.7 by 10.7 cm (5.4 by 4.2 in.)
- PXI-6508 ..... 10 by 16 cm (3.9 by 6.3 in.)
- PC-DIO-96 ..... 16.5 by 9.9 cm (6.3 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.