# CIO-DIO48 48 TTL Level I/O & CIO-DIO48H 48 High Drive DIO
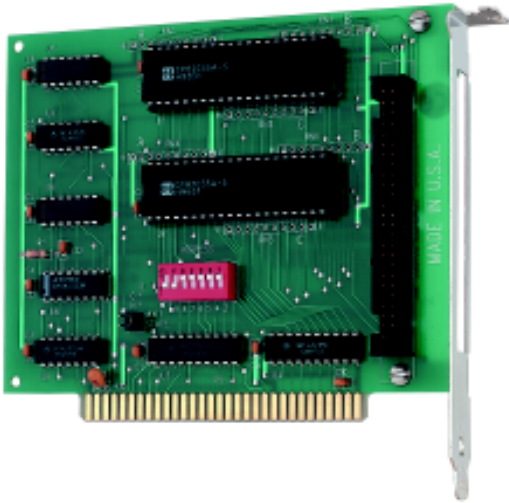
## FEATURES
**One 50 pin connector carries all 48 digital I/O lines plus power**

Control 48 devices or sense 48 contact closures from a single 1/2 size card in your PC. The CIO-DIO48 employs two 8255 parallel peripheral interface chips which are programmable in three modes; simple byte input or output, stobed bi-directional bus or strobed I/O. The 8255 is simple to program.

The CIO-DIO48H adds high drive and is fully 8255 mode 0 compliant. Software written for any DIO board employing 8255 chips or 8255 type registers will run without modification. High drive sources 15mA and sinks 64mA.

The CIO-DIO48 is one of a family of digital I/O boards which use the 50 pin connector. All the accessories, including screw terminal boards, electromechanical relay boards and solid state relay boards interface to the same connector, be it a 48, 96 or 192 point digital I/O board!
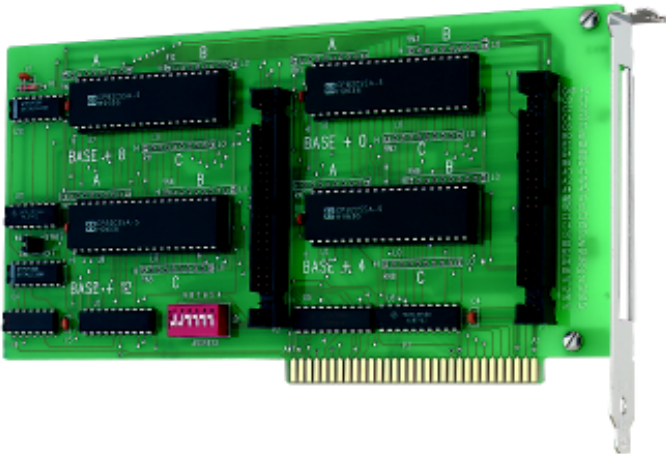
# CIO-DIO96 - 96 TTL Level I/O

## FEATURES
**96 TTL Digital I/O Lines**
**Each 50 pin connector carries 48 I/O plus power**

Sharing a standard connector pin-out with the CIO-DIO48 and CIO-DIO192, the CIO-DIO96 allows you to control 96 devices or sense contact closures from a single 2/3 size card in your personal computer.

Assemble a simple monitoring and alarm system. Control lights, motors, locks, heaters or virtually any device which can be turned on and off.

Use it with Control-CB, a complete software package for monitoring digital devices and graphing or logging events, or with Universal Library, a set of software drivers. The CIO-DIO96 is also easy to program directly from any language thats supports port I/O.

# CIO-DIO192 - 192 TTL Level I/O

## FEATURES
**192 TTL Digital I/O Lines**
**Each 50 pin connector carries 48 I/O plus power**

For very high density digital I/O problems, the CIO-DIO192 is the solution! Sharing a standard connector pin-out with the boards above, large numbers of electromechanical or solid state relays may be monitored and controlled from a single slot of your PC.
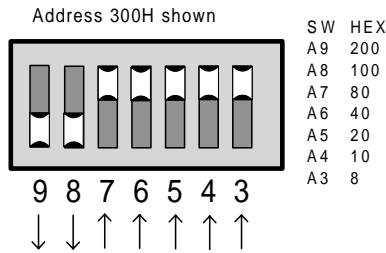
The CIO-DIO192 is easy to program and cable.
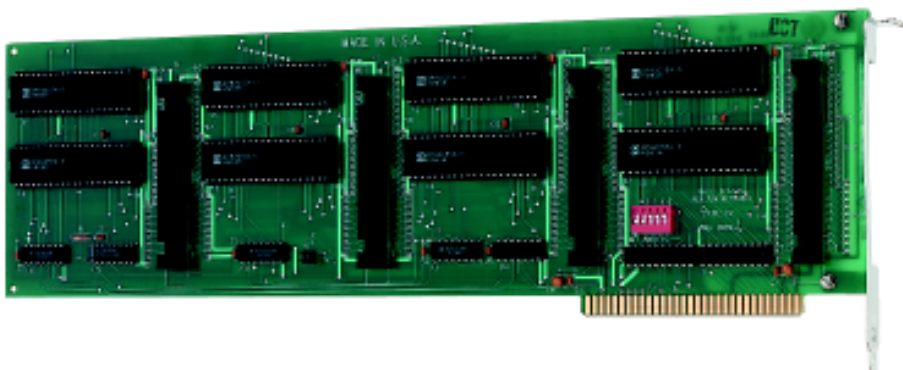
## BASE ADDRESS SWITCH

To program and control the DIO board, the personal computer writes to and reads from the I/O address assigned to the DIO board. Each DIO board 's address is set by selecting a base address via the base address switch.

The BASE address is set by switching inputs to a comparator. Each switch corresponds to one address line on the PC bus. Each switch represents one address weight and weights are added to determine a unique address.

Address 300H shown

| SW | HEX |
|----|-----|
| A9 | 200 |
| A8 | 100 |
| A7 | 80 |
| A6 | 40 |
| A5 | 20 |
| A4 | 10 |
| A3 | 8 |

9 8 7 6 5 4 3
↓ ↓ ↑ ↑ ↑ ↑ ↑

Each DIO board occupies several I/O addresses, all proceeding from the base address. The I/O register map shows how many addresses and their function for each board.

## CABLING & CONNECTION

Cabling to the CIO-DIO48, 96 and 192 is via standard 50 pin, 0.10 inch spacing IDC type ribbon cable connectors. Each cable carries 48 digital I/O lines, +5 volts and ground. The DIO48 has one, the DIO96 has two and the DIO192 has four connectors.

Cables are available in a variety of lengths. A screw terminal board, the CIO-TERM100, provides 100 standard 12 - 22 AWG screw terminals. The CIO-MINI50 provides 50 standard 12-22 AWG screw terminals. The CIO-SPADE50 provides terminals for 50 spade type connections.. The SSR-RACK24 mounts 24 solid state relays and the CIO-ERB24 mounts 24 electromechanical relays.
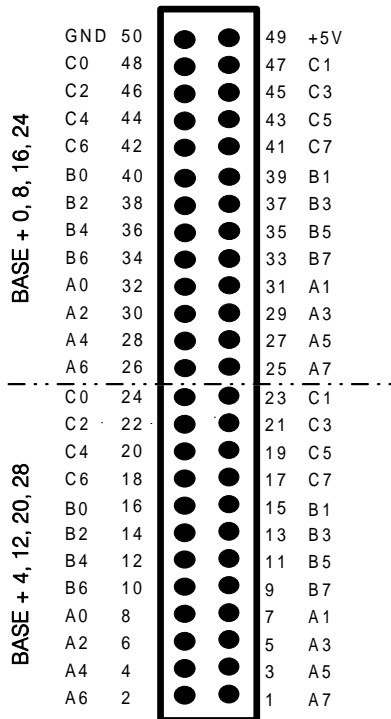
### VIEW FROM COMPONENT SIDE OF BOARD

Each connector carries 48 digital I/O lines. One 8255 on pins 1-24 and one on pins 25-48.

Each 8255 has 24 I/O lines. The chip is configured as 3 ports. Two ports, A & B, are 8 bits wide. Port C may be an 8 bit port or two 4 bit ports.

Individual ports may be configured as Input or Output and are written to and read from as a unit.

The address numbers shown here correspond to the initial address of the chip associated with the connector, in boards which have multiple connectors.

BASE + 0, 8, 16, 24

| | | |
|---|---|---|
| GND 50 | ● ● | 49 +5V |
| C0 48 | ● ● | 47 C1 |
| C2 46 | ● ● | 45 C3 |
| C4 44 | ● ● | 43 C5 |
| C6 42 | ● ● | 41 C7 |
| B0 40 | ● ● | 39 B1 |
| B2 38 | ● ● | 37 B3 |
| B4 36 | ● ● | 35 B5 |
| B6 34 | ● ● | 33 B7 |
| A0 32 | ● ● | 31 A1 |
| A2 30 | ● ● | 29 A3 |
| A4 28 | ● ● | 27 A5 |
| A6 26 | ● ● | 25 A7 |

BASE + 4, 12, 20, 28

| | | |
|---|---|---|
| C0 24 | ● ● | 23 C1 |
| C2 22 | ● ● | 21 C3 |
| C4 20 | ● ● | 19 C5 |
| C6 18 | ● ● | 17 C7 |
| B0 16 | ● ● | 15 B1 |
| B2 14 | ● ● | 13 B3 |
| B4 12 | ● ● | 11 B5 |
| B6 10 | ● ● | 9 B7 |
| A0 8 | ● ● | 7 A1 |
| A2 6 | ● ● | 5 A3 |
| A4 4 | ● ● | 3 A5 |
| A6 2 | ● ● | 1 A7 |

## I/O REGISTER MAP

The I/O registers of the **CIO-DIO48** occupy 8 I/O locations in the PC's I/O address space. The first, or BASE, address is fixed by the base address switch.

| | | | |
|---|---|---|---|
| BASE+0 | PORT A #1 | BASE+4 | PORT A #2 |
| BASE+1 | PORT B #1 | BASE+5 | PORT B #2 |
| BASE+2 | PORT C #1 | BASE+6 | PORT C #2 |
| BASE+3 | #1 CONTROL | BASE+7 | #2 CONTROL |

The I/O registers of the CIO-DIO96 occupy an additional 8 I/O locations for a total of 16 I/O locations.

| | | | |
|---|---|---|---|
| BASE+8 | PORT A #3 | BASE+12 | PORT A #4 |
| BASE+9 | PORT B #3 | BASE+13 | PORT B #4 |
| BASE+10 | PORT C #3 | BASE+14 | PORT C #4 |
| BASE+11 | #3 CONTROL | BASE+15 | #4 CONTROL |

The CIO-DIO192 has an additional 16 registers - BASE + 16 through BASE + 31. A total of 32 I/O locations.

| | | | |
|---|---|---|---|
| BASE+16 | PORT A #5 | BASE+20 | PORT A #6 |
| BASE+17 | PORT B #5 | BASE+21 | PORT B #6 |
| BASE+18 | PORT C #5 | BASE+22 | PORT C #6 |
| BASE+19 | #5 CONTROL | BASE+23 | #6 CONTROL |
| BASE+24 | PORT A #7 | BASE+28 | PORT A #8 |
| BASE+25 | PORT B #7 | BASE+29 | PORT B #8 |
| BASE+26 | PORT C #7 | BASE+30 | PORT C #8 |
| BASE+27 | #7 CONTROL | BASE+31 | #8 CONTROL |

## PROGRAMMING

The 8255 is easy to program. The following example is in BASIC but generalizes to all other languages.

```
BASE = &H300              'Set the base address of the 8255
OUT(BASE+3), &H92         'Set ports C to output, A&B input.
PORTA = INP(BASE + 0)     'Read data from port A
PORTB = INP(BASE + 1)     'Read data from port B
OUT(BASE+2), 1            'Write 1 to C. Bit 1 high, others low
```

Programming is via simple in and out statements but is even easier from the Universal Library, a complete DOS and Windows language programming library. Please see the data sheet.

## 82C55 DRIVE & HIGH DRIVE

The 82C55 can source or sink 2.5mA per I/O line. This is plenty of power for activating other chips, but not enough for LEDs or relays. High drive boards can source 15mA and sink 64mA. Enough for LEDs and many relays, including SSRs.

## ORDERING GUIDE

| | |
|---|---|
| 48 Bit digital I/O board | CIO-DIO48 |
| 48 Bit digital I/O high drive. | CIO-DIO48H |
| 96 Bit digital I/O board | CIO-DIO96 |
| 192 Bit digital I/O board | CIO-DIO192 |
| **Screw Terminal Boards** | |
| 4" X 4" 50, 12-22 AWG Screw Terminals | CIO-MINI50 |
| 16" X 4", 100, 12-22 AWG Screw Terminals | CIO-TERM100 |
| 16" X 4", 50 Spade Lug Terminals | CIO-SPADE50 |
| 17" X 4.5" 48 Solid State Relay Mounting Rack | SSR-RACK48 |
| 17" X 4.5" 24 Solid State Relay Mounting Rack | SSR-RACK24 |
| 48 Electromechanical relay accessory | CIO-ERB48 |
| 24 Electromechanical relay accessory | CIO-ERB24 |
| 2 foot, 50 conductor cable | C50FF-2 |
| Custom length, 50 conductor cable | C50FF-## |