New Standard For Options Sections

Regular text indicates outline requirements.

Bold text indicates specific information for Unidex 100 PB24 Interface option.

I. Generic Statement
(i. e., Please refer to section I of hardware manual for safety considerations, preliminary troubleshooting, and customer service information.)

II. Product Specific Documents
   A. Operating environment for the option
      Same as basic system.

   B. Operation of the option
      1. Necessary connections to the outside world
         The INT option can interface to one or two Opto 22 PB8, PB16, or PB24 mounting racks. The mounting rack(s) can house a variety of Opto 22 digital I/O modules. Consult Opto 22 documentation for descriptions of I/O modules. This connection is made via a 50 pin ribbon cable. This cable has a 50 pin connector on one end which plugs into a mating locking header (P2 or P3) on the INT option board. The other end of the cable has a 50 pin card-edge connector on it and plugs onto the 50 contact card-edge connector on the mounting rack.

      2. Programming
         The INT option board is programmed from the front end of the Unidex 100 using port variables (PV:). This option is a read/write board. The default extension bus beginning address is 0xE000 although, via DIP switch SW1, this can be changed:

         | ADDRESS | SW1 |
         |---------|-----|
         |         | 1   | 2   | 3   | 4   |
         | 0xE000  | on  | on  | on  | on  |
         | 0xE010  | off | on  | on  | on  |
         | 0xE020  | on  | off | on  | on  |
         | 0xE030  | off | off | on  | on  |
         | 0xE040  | on  | on  | off | on  |
         | 0xE050  | off | on  | off | on  |
         | 0xE060  | on  | off | off | on  |
         | 0xE070  | off | off | off | on  |
         | 0xE080  | on  | on  | on  | off |
         | 0xE090  | off | on  | on  | off |
         | 0xE0A0  | on  | off | on  | off |
0xE0B0  off  off  on  off
0xE0C0  on  on  off  off
0xE0D0  off  on  off  off
0xE0E0  on  off  off  off
0xE0F0  off  off  off  off

The option itself has three locations which can be addressed. These are as follows:

0xE0x0 - 1st mounting rack
0xE0x1 - 2nd mounting rack
0xE0x2 - reset latch

Note that 0xE0x2 is a special location. The INT interface board incorporates a latch circuit that guarantees all outputs will go to an inactive state upon a system reset or power up condition. Before data can be output to either mounting rack, a write function, using any data must be performed to 0xE0x2 to bring the outputs out of this latched inactive state.

Inputs, however can be read without the reset latch being cleared. Also data can be written to the output latches before the reset latch is cleared but will not appear at the mounting rack until the write is performed to 0xE0x2.

Addresses 0xE0x0 and 0xE0x1 are used for communicating with the modules installed on the Opto 22 mounting rack(s) connected to the INT interface. Via jumper selections, each group of eight I/O points can be configured as inputs or outputs.

Examples: 1.) On a PB24, modules 0-7 could be configured as inputs with modules 8-23 configured as outputs.

2.) On a PB24, modules 0-7 and modules 16-23 could be configured as outputs with modules 8-15 configured as inputs.

Writing data to outputs is performed as follows:

PV:0xE000 = 0x5555555 ;turns on every other output ;starting with module 0.
3. A list of fuse locations and their ratings
   Fusing is provided on the Opto 22 mounting rack. Refer to
   mounting rack documentation.

4. Power requirements
   5V, which is obtained through ribbon cable from the U100
   control board. The mounting rack can utilize this 5V which is
   provided to it through the 50 pin ribbon cable. It also has a
   connection point for an external power supply. If an external
   power supply is used, connection to the U100 power supply
   must be removed via a jumper on the mounting rack. refer to
   mounting rack documentation for further details.

5. Jumper location with standard and non-standard configurations
   (Refer to the attached "U100 PB24 Interface Ass'y")

6. LED location with operational description
   N/A

7. Pin assignments on connectors with brief operational description
   (Refer to the attached OPTO22 "PB24" Connection drawing)

8. Operating parameters of pins
   All pins are 5V logic signals except for +/-12V power supply
   lines which appear on (but are not used) connector P1 (64 pin
   DIN) on thumbwheel interface board.

9. Testpoints and description of functions
   N/A

D. Error messages with typical fault conditions and corrective measures if
   applicable
   N/A

E. Restrictions/Limitations
   (i.e., field installable?/Used with other options?/etc.)
   Can be field installed, however requires option wiring ES12363-2 if
   this is the only option or ES12363-3 if two options are going to be
   used. Unidex 100 control board can mount 2 option boards
Note: When writing data to the INT option, bits that are configured as inputs are not affected and do not need to be masked out of the data being written.

Reading data from the inputs is accomplished as follows:

`BV:1=PV:0xE000 ;reads data from modules 0-23`

Note that the above statement can be used to read inputs as well as the programmed state of the outputs. If all modules were configured to be inputs, this statement would reflect the 24 bit input data. If all modules were configured to be outputs this statement would reflect the data that was most recently written to the outputs via a port variable. If the 24 modules were divided as inputs and outputs the above statement would reflect the appropriate combination of input data and programmed output data.

Also it is important to consider that mathematical and logical functions can be performed on output data since it can be read back. The following example illustrates this exquisite feature:

`PV:0xE001=PV:0xE001 AND 0x0000FF`

The above statement turns off the upper sixteen bits of the PB24 interface not disturbing any of the lower eight bits.

C. Option definition

1. Option location

The U100 INT option board mounts to the U100 control board with four 4-40 x 3/4" standoffs. The male stud end screws into the U100 metalwork female stud, through mounting holes in the control board. Two 4-40 x 1/2" screws go through holes in the DIN connector on the option board and screw into the female end of the standoffs. Two 4-40 x 1/4" screws go through mounting holes on the option board and screw into the female end of the standoffs.

2. Board layout indicating chip location and fundamental description of chips (Refer to the attached "U100 PB24 Interface Ass'y")
MODULE 23  1 —— 1  2 —— 26 SIGNAL COMMON
MODULE 22  2 —— 3  4 —— 27 SIGNAL COMMON
MODULE 21  3 —— 5  6 —— 28 SIGNAL COMMON
MODULE 20  4 —— 7  8 —— 29 SIGNAL COMMON
MODULE 19  5 —— 9  10 —— 30 SIGNAL COMMON
MODULE 18  6 —— 11  12 —— 31 SIGNAL COMMON
MODULE 17  7 —— 13  14 —— 32 SIGNAL COMMON
MODULE 16  8 —— 15  16 —— 33 SIGNAL COMMON
MODULE 15  9 —— 17  18 —— 34 SIGNAL COMMON
MODULE 14 10 —— 19  20 —— 35 SIGNAL COMMON
MODULE 13 11 —— 21  22 —— 36 SIGNAL COMMON
MODULE 12 12 —— 23  24 —— 37 SIGNAL COMMON
MODULE 11 13 —— 25  26 —— 38 SIGNAL COMMON
MODULE 10 14 —— 27  28 —— 39 SIGNAL COMMON
MODULE 9   15 —— 29  30 —— 40 SIGNAL COMMON
MODULE 8   16 —— 31  32 —— 41 SIGNAL COMMON
MODULE 7   17 —— 33  34 —— 42 SIGNAL COMMON
MODULE 6   18 —— 35  36 —— 43 SIGNAL COMMON
MODULE 5   19 —— 37  38 —— 44 SIGNAL COMMON
MODULE 4   20 —— 39  40 —— 45 SIGNAL COMMON
MODULE 3   21 —— 41  42 —— 46 SIGNAL COMMON
MODULE 2   22 —— 43  44 —— 47 SIGNAL COMMON
MODULE 1   23 —— 45  46 —— 48 SIGNAL COMMON
MODULE 0   24 —— 47  48 —— 49 SIGNAL COMMON
+5 Volts  25 —— 49  50 —— 50 SIGNAL COMMON

50 PIN Dual Row Socket
(P2,P3 of INT option)

OPT022 "PB24" CONNECTION
On U100 Opto 22 PB24 Interface Board (690D1479), switches and jumpers are to be set as follows.

**SWITCH SW1**

<table>
<thead>
<tr>
<th>Switches</th>
<th>Extension Bus Address (HEX)</th>
<th>Extension Bus Address (DEC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON ON ON ON</td>
<td>0xE000</td>
<td>57344 (default)</td>
</tr>
<tr>
<td>ON ON ON OFF</td>
<td>0xE010</td>
<td>57360</td>
</tr>
<tr>
<td>ON ON OFF ON</td>
<td>0xE020</td>
<td>57376</td>
</tr>
<tr>
<td>ON ON OFF OFF</td>
<td>0xE030</td>
<td>57392</td>
</tr>
<tr>
<td>ON OFF ON ON</td>
<td>0xE040</td>
<td>57408</td>
</tr>
<tr>
<td>ON OFF ON OFF</td>
<td>0xE050</td>
<td>57424</td>
</tr>
<tr>
<td>ON OFF OFF ON</td>
<td>0xE060</td>
<td>57440</td>
</tr>
<tr>
<td>ON OFF OFF OFF</td>
<td>0xE070</td>
<td>57456</td>
</tr>
<tr>
<td>OFF ON ON ON</td>
<td>0xE080</td>
<td>57472</td>
</tr>
<tr>
<td>OFF ON ON OFF</td>
<td>0xE090</td>
<td>57488</td>
</tr>
<tr>
<td>OFF ON OFF ON</td>
<td>0xE0A0</td>
<td>57504</td>
</tr>
<tr>
<td>OFF ON OFF OFF</td>
<td>0xE0B0</td>
<td>57520</td>
</tr>
<tr>
<td>OFF OFF ON ON</td>
<td>0xE0C0</td>
<td>57536</td>
</tr>
<tr>
<td>OFF OFF ON OFF</td>
<td>0xE0D0</td>
<td>57552</td>
</tr>
<tr>
<td>OFF OFF OFF ON</td>
<td>0xE0E0</td>
<td>57568</td>
</tr>
<tr>
<td>OFF OFF OFF OFF</td>
<td>0xE0F0</td>
<td>57584</td>
</tr>
</tbody>
</table>

Active polarity of module 0 interrupts:
Active low:

JP13 - 1-2 IN, 2-3 OUT (must be active low)

Interrupt on module 0 of port 1:
Disable:

JP14 - 1-2 IN, 2-3 OUT (default)

Enable:

JP14 - 1-2 OUT, 2-3 IN

Interrupt on module 0 of port 2:
Disable:

JP15 - 1-2 IN, 2-3 OUT (default)

Enable:

JP15 - 1-2 OUT, 2-3 IN

Port 1, low byte:
Output:

JP7 - 1-2 IN, 2-3 OUT
JP8 - 1-2 IN, 2-3 OUT

Input:

JP7 - 1-2 OUT, 2-3 IN (default)
JP8 - 1-2 OUT, 2-3 IN (default)
Port 1, mid byte:
  Output:
    JP9 - 1-2 IN, 2-3 OUT
    JP10 - 1-2 IN, 2-3 OUT
  Input:
    JP9 - 1-2 OUT, 2-3 IN (default)
    JP10 - 1-2 OUT, 2-3 IN (default)

Port 1, high byte:
  Output:
    JP11 - 1-2 IN, 2-3 OUT
    JP12 - 1-2 IN, 2-3 OUT
  Input:
    JP11 - 1-2 OUT, 2-3 IN (default)
    JP12 - 1-2 OUT, 2-3 IN (default)

Port 2, low byte:
  Output:
    JP1 - 1-2 IN, 2-3 OUT
    JP2 - 1-2 IN, 2-3 OUT
  Input:
    JP1 - 1-2 OUT, 2-3 IN (default)
    JP2 - 1-2 OUT, 2-3 IN (default)

Port 2, mid byte:
  Output:
    JP3 - 1-2 IN, 2-3 OUT
    JP4 - 1-2 IN, 2-3 OUT
  Input:
    JP3 - 1-2 OUT, 2-3 IN (default)
    JP4 - 1-2 OUT, 2-3 IN (default)

Port 2, high byte:
  Output:
    JP5 - 1-2 IN, 2-3 OUT
    JP6 - 1-2 IN, 2-3 OUT
  Input:
    JP5 - 1-2 OUT, 2-3 IN (default)
    JP6 - 1-2 OUT, 2-3 IN (default)