

IR104 Relay / Optoisolator PC/104 Board User Manual

Revised 5-07

1. I/O ADDRESS SELECTION

IR104 occupies 8 addresses in I/O memory, of which 6 are used. The address is selected with jumpers JP1 and JP2. The pins listed under each jumper block are the pins that must be shorted with a jumper for the In position. On each jumper block, pin 1 is on the left and pin 3 is on the right. Note that on JP1, pins 1 and 2 are used, but pin 3 is never used. On JP2, pins 2 and 3 are used, but pin 1 is never used.

Address		JP1	JP2
Hex	Decimal	pins 1 and 2	pins 2 and 3
240	576	Out	Out
260	608	Out	In
280	640	In	Out
300	768	In	In

2. I/O MAP

Base +	Write Function	Read Function
0	Relays 1-8	Read back value
1	Relays 9-16	Read back value
2	Relays 17-20	Read back value
3	--	--
4	--	Opto inputs 1-8
5	--	Opto inputs 9-16
6	--	Opto inputs 17-20
7	--	--

3. REGISTER BIT ASSIGNMENTS

Addr	Operation	D7	D6	D5	D4	D3	D2	D1	D0
0	Read/Write	RLY8	RLY7	RLY6	RLY5	RLY4	RLY3	RLY2	RLY1
1	Read/Write	RLY16	RLY15	RLY14	RLY13	RLY12	RLY11	RLY10	RLY9
2	Read/Write	0	0	0	0	RLY20	RLY19	RLY18	RLY17
3		X	X	X	X	X	X	X	X
4	Read only	IN8	IN7	IN6	IN5	IN4	IN3	IN2	IN1
5	Read only	IN16	IN15	IN14	IN13	IN12	IN11	IN10	IN9
6	Read only	0	0	0	0	IN20	IN19	IN18	IN17
7		X	X	X	X	X	X	X	X

Definitions:

Rly1 – Rly20 Relay outputs; 1 = on, 0 = Off
In1 – In20 Optoisolator inputs; 1 = off, 0 = on
X Bit not used
0 Bit reads back as a 0

4. I/O HEADER PINOUTS

Optocoupler inputs

Optocouplers are accessed through a 2x20 pin header **CN3** at the top of the board. Pin 1 is on the left. There is no difference between the A and B connection, since the inputs are not polarity sensitive.

In 1 A	1	2	In 1 B
In 2 A	3	4	In 2 B
In 3 A	5	6	In 3 B
In 4 A	7	8	In 4 B
In 5 A	9	10	In 5 B
In 6 A	11	12	In 6 B
In 7 A	13	14	In 7 B
In 8 A	15	16	In 8 B
In 9 A	17	18	In 9 B
In 10 A	19	20	In 10 B
In 11 A	21	22	In 11 B
In 12 A	23	24	In 12 B
In 13 A	25	26	In 13 B
In 14 A	27	28	In 14 B
In 15 A	29	30	In 15 B
In 16 A	31	32	In 16 B
In 17 A	33	34	In 17 B
In 18 A	35	36	In 18 B
In 19 A	37	38	In 19 B
In 20 A	39	40	In 20 B

Relay outputs

Relays are on 1x20 detachable screw terminal headers. **CN1** on the left side of the board handles relays 1 – 10, while **CN2** on the right side handles relays 11 – 20. The relay numbers are marked next to each relay so you can identify each relay and its associated screw terminals. Pin 1 on **CN2** is on the bottom, i.e. **CN2** pinout is reversed with respect to **CN1**. The drawings below indicate the pinouts according to their actual board orientation. There is no difference between the A and B connection, since the relays are not polarity sensitive. All connections are NO, normally open.

	CN1	CN2	
Relay 1 A	1	20	Relay 20 B
Relay 1 B	2	19	Relay 20 A
Relay 2 A	3	18	Relay 19 B
Relay 2 B	4	17	Relay 19 A
Relay 3 A	5	16	Relay 18 B
Relay 3 B	6	15	Relay 18 A
Relay 4 A	7	14	Relay 17 B
Relay 4 B	8	13	Relay 17 A
Relay 5 A	9	12	Relay 16 B
Relay 5 B	10	11	Relay 16 A
Relay 6 A	11	10	Relay 15 B
Relay 6 B	12	9	Relay 15 A
Relay 7 A	13	8	Relay 14 B
Relay 7 B	14	7	Relay 14 A
Relay 8 A	15	6	Relay 13 B
Relay 8 B	16	5	Relay 13 A
Relay 9 A	17	4	Relay 12 B
Relay 9 B	18	3	Relay 12 A
Relay 10 A	19	2	Relay 11 B
Relay 10 B	20	1	Relay 11 A

5. PROGRAMMING EXAMPLES

Example 1: Turn on a relay

Current state of relays 1 – 8 is relays 1-4 on, relays 5-8 off.
Turn relay 8 on:

Current data value at Base + 0 is 00001111 = 15

To turn on relay 8, we need to set bit 7 to 1.

Relay 8 = bit 7 = 10000000 = 128

New data value = 128 OR 15 = 143 (10001111)

Write 143 to Base + 0 to turn on relay 8 and keep relays 1-4 on, 5-7 off.

Example 2: Turn off a relay

Current state of relays 1 – 8 is relays 1-4 and 8 on, relays 5-7 off.
Turn relay 3 off:

Current data value at Base + 0 is 10001111 = 143

To turn off relay 3, we need to clear bit 2.

Relay 3 = bit 2 = 00000100 = 4

New data value = 143 AND NOT(4) = 139 (10001011)

Write 139 to Base + 0 to turn off relay 3 and keep relays 1, 2, 4, and 8 on, 5, 6, and 7 off.