

NOTICE

The drivers and utilities for Octagon products, previously provided on a CD, are now in a self-extracting zip file located at the Octagon Systems web site on the product-specific page. Download this file to a separate directory on your hard drive, then double click on it to extract the files. All references in this manual to files and directories on the CD now refer to files in the Utilities zip file.

5664 SNAP[®] I/O card

Copyright

Copyright 1998—Octagon Systems Corporation. All rights reserved. The contents of this document and the specifications herein may change without notice.

Trademarks

Octagon Systems Corporation[®] the Octagon logo, and Micro PC are trademarks of Octagon Systems Corporation. SNAP[®] I/O is a registered trademark of Opto 22. Windows[®] and Windows[®] NT are registered trademarks of Microsoft Corporation.

Notice to user

The information contained in this document is believed to be correct. However, Octagon assumes no responsibility for any of the circuits described herein, conveys no license under any patent or other right and makes no representations that the circuits are free from patent infringement. Octagon makes no representation or warranty that such applications will be suitable for the use specified without further testing or modification.



OCTAGON SYSTEMS[®]

Doc. 5048 Rev. 1298
Tech. Support: 303-426-4521
Web site: www.octagonsystems.com

≡ Description

The 5664 card interfaces directly to Opto 22 SNAP-B series racks, which utilize the many SNAP I/O analog and digital modules available. The 5664 connects up to two, 16-position racks, for a total of 64 analog or 64 digital I/O points. Both analog and digital modules can be combined on the same rack. Up to two 5664 cards can be installed in an Octagon system.

The 5664 measures 4.5 x 4.9 inches and uses one slot of the Micro PC card cage. It is compatible with all Micro PC Control cards except the 508x Microcontrollers, and the 5012A, 6012, and 6024 cards. Also, the 5664 is electrically compatible with CPU boards that have ISA connectors.

≡ Major features

SNAP I/O racks

The 5664 can interface with up to two SNAP-B series racks. The SNAP I/O racks interface to the 5664 via the SNAP interface assembly.

SNAP I/O modules

SNAP I/O isolation modules are required when driving or receiving signals from high voltage and/or high current devices. Optical isolation eliminates ground loops and significantly reduces the chance of noise invading the control system. Refer to Table 6, *Supported Opto 22 SNAP I/O modules*.

Digital I/O modules

Digital I/O modules are available in all standard configurations, which include low, medium, and high voltage/high current AC and DC input and output modules.

Analog I/O modules

Analog I/O modules are available in all standard configurations, which include thermocouples, current loop, RTD, and voltage inputs. Output modules include voltage and current outputs.

Access indication

The 5664 has one LED indicator that flashes briefly whenever the 5664 card is accessed. There are several types of both read and write accesses that take place on the 5664, e.g., access to registers, access to ports connected to J1 and J2, etc. Access to any of these on-board devices or locations causes the LED indicator to flash.

≡ Equipment

You will need the following equipment (or equivalent):

- 5664 SNAP I/O card
- 1 SNAP interface assembly (p/n 5385) per SNAP rack
 - 1 CMA-80-24 cable (p/n 5049)
 - 1 SNAP interface board (p/n 5070) includes:
 - Necessary mounting hardware:
 - one 6-32 x 5/8" standoff
 - one # 6 nylon washer
 - one 6-32 x 3/8" screw
- Opto 22 SNAP-B racks (2 max.)
- Opto 22 SNAP I/O analog and digital modules. Refer to Table 6, *Supported Opto 22 SNAP I/O modules*
- Micro PC control card (386 CPU minimum)
- Micro PC Card Cage (52xx)
- Power Supply or Module (51xx or 71xx)

≡ Installation

1. Refer to the 5664 and SNAP interface board diagrams for connector locations.

Note The 5664 will not work with the 508x Microcontrollers, or the 5012A, 6012, and 6024 CPU cards.

WARNING!

The 5664 contains static sensitive CMOS components. The greatest danger occurs when the card is plugged into a card cage. The 5664 becomes charged by the user and the static discharges to the backplane from the pin closest to the card connector. If that pin happens to be an input pin, even TTL inputs may be damaged. Do the following to avoid damaging your card and its components:

- Ground yourself before handling the 5664 card.
- Disconnect power before removing or inserting the 5664 card.

WARNING!

Before attaching the SNAP interface board to the SNAP-B rack, make sure the silkscreen on the SNAP interface board **faces up**.

2. Thread the 6-32 x 5/8" standoff into the SNAP-B rack. With the silkscreen of the SNAP interface board facing up, attach P2 of the SNAP interface board to the SNAP-B rack connector.
3. Secure the SNAP interface board to the SNAP-B rack using the nylon washer and 6-32 x 3/8" screw.
4. Attach the CMA-80-24 cable to P1 of the SNAP interface board and then to either J1 or J2 of the 5664. Repeat for an additional SNAP-B rack.
5. Attach the SNAP I/O modules directly onto the SNAP-B rack.
6. Power to the SNAP-B racks **must** be supplied via the SNAP-B rack power connectors. Refer to the diagram below.

Figure 3 SNAP interface board and SNAP I/O modules attached to the SNAP-B series rack

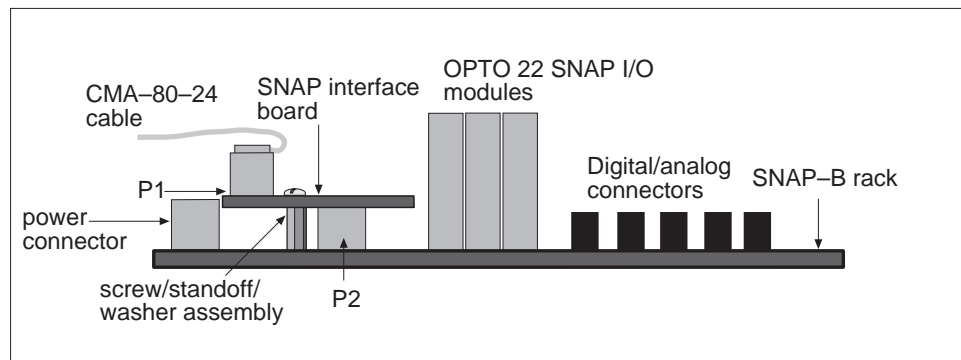
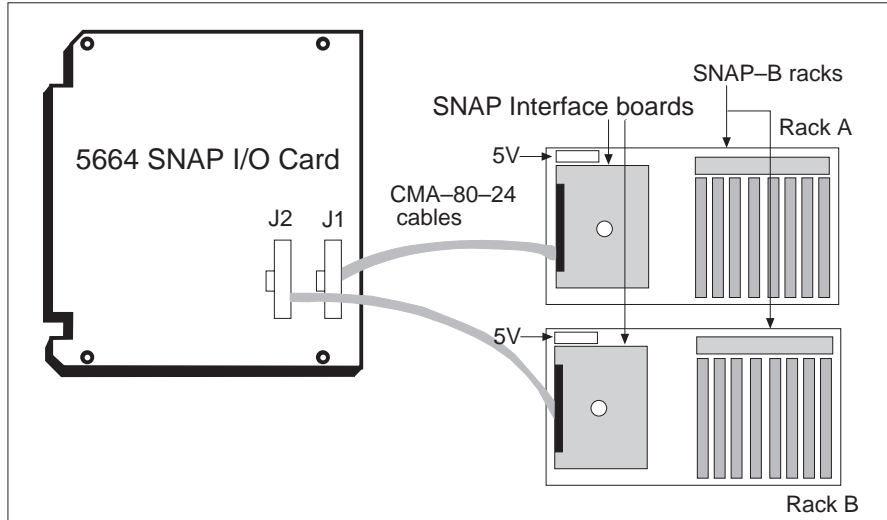


Figure 4 Typical 5664 board and SNAP rack configuration



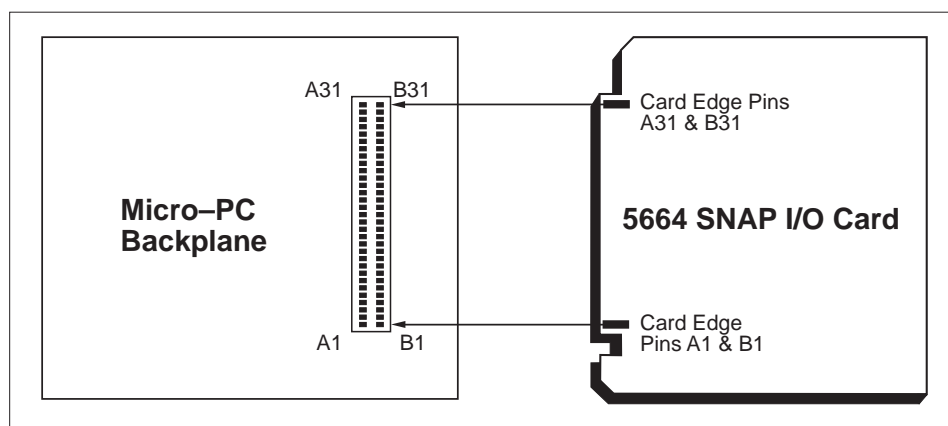
Installing the 5664 into a card cage

Correctly position the 5664 in the card cage. The V_{CC} and ground signals must match those on the backplane. The figure below shows the relative position of the 5664 as it is installed in the card cage.

1. Verify the base address and IRQ settings are correct for your application. Refer to Table 1 and Table 2.
2. Make sure power to the card cage is OFF.
3. Slide the 5664 into the card cage. The components on the card should face to the left or up depending on the type of card cage.

Note The mated connector height of the CMA-80-24 cable is 1" from the cable connector to the 5664 card edge. Therefore, install the 5664 in the far left slot in the card cage. Use of the other slots will take two slot spaces.

Figure 5 Edge connector orientation



IRQ / base address

The 5664 is configured at the factory to operate in most systems without any jumper changes.

Jumper block W1 routes the 5664 interrupt outputs to any of the IRQ bus lines. The default for W1 is IRQ7.

Table 1: W1: IRQ select

IRQ	Function
IRQ3	W1(1-2)
IRQ4	W1(1-3)
IRQ5	W1(5-6)
IRQ7*	W1(7-9)
IRQ9	W1(9-10)
None	W1(No jumpers)

* = default pins jumpered

"None" can be used for systems with Digital I/O only.

Jumper block W2 defines the base address. As shipped, the base address is 100h (256d), which is jumper configuration W2[1-2, 5-6, 7-8, 9-10]. If there is another card in your system with a base address of 100h (256d), you must use a different base address for the 5664 or the other expansion card. To change the base address, change the jumper connections in block W2.

Table 2: W2: Base address select

Pins jumpered [1-2]	Pins jumpered [3-4]	Pins jumpered [5-6]	Pins jumpered [7-8]	Pins jumpered [9-10]	Base address (decimal)	Base address (hex)	Potential conflicts
On	Off	On	On	On	256	100h	
On	Off	On	On	Off	288	120h	
On	Off	On	Off	On	320	140h	
On	Off	On	Off	Off	352	160h	
On	Off	Off	On	On	384	180h	
On	Off	Off	On	Off	416	1A0h	
On	Off	Off	Off	On	448	1C0h	
On	Off	Off	Off	Off	480	1E0h	1F0h-1FFh (Hard drive)
Off	On	On	On	On	512	200h	
Off	On	On	On	Off	544	220h	
Off	On	On	Off	On	576	240h	
Off	On	On	Off	Off	608	260h	
Off	On	Off	On	On	640	280h	278h-27Fh (LPT2)
Off	On	Off	On	Off	672	2A0h	
Off	On	Off	Off	On	704	2C0h	
Off	On	Off	Off	Off	736	2E0h	2F8h-2FFh (COM2)
Off	Off	On	On	On	768	300h	
Off	Off	On	On	Off	800	320h	
Off	Off	On	Off	On	832	340h	
Off	Off	On	Off	Off	864	360h	378h-37Fh (LPT1)
Off	Off	Off	On	On	896	380h	
Off	Off	Off	On	Off	928	3A0h	
Off	Off	Off	Off	On	960	3C0h	
Off	Off	Off	Off	Off	992	3E0h	3F0h-3F7h (Floppy) 3F8h-3FFh (COM1)

≡ Accessing SNAP I/O modules

Software

Software drivers for DOS are included on the 5664 Utility disk. These drivers allow easy control of the SNAP I/O modules. Refer to the README.TXT file on the 5664 Utility disk for more information. Programming examples are in C, CAMBASIC, and QuickBASIC.

≡ Troubleshooting

If you have difficulty getting your system to work properly, check the power module and jumper configurations. Incrementally remove other I/O cards from the system to eliminate possible conflicts.

If you change the base address or IRQ jumpers and the system is still not working correctly, return the 5664 to the default jumper positions.

The 5664 has one LED indicator that flashes briefly whenever the 5664 card is accessed. There are several types of both read and write accesses that take place on the 5664, i.e., access to registers, access to ports connected to J1 and J2, etc. Access to any of these on-board devices or locations causes the LED indicator to flash.

≡ Technical specifications

Power requirements

5V \pm 0.25V when measured at the connector pins.
150mA max. continuous. The power module ripple should be less than 50 mV.

Environmental

Operating temperature, -40° to 85° C
Operating humidity, 5 to 95% RH, condensing

Size

5664 measures 4.5" x 4.9" x .6" (1" with connectors mated)
SNAP interface board measures 1.75" x 3.25" x 1" (p/n 5070)

Table 3 *J1 and J2: SNAP I/O interfaces*

Pin	Function	Pin	Function	Pin	Function	Pin	Function
1	PAD0	2	Gnd	41	PAD20	42	Gnd
3	PAD1	4	Gnd	43	PAD21	44	Gnd
5	PAD2	6	Gnd	45	PAD22	46	Gnd
7	PAD3	8	Gnd	47	PAD23	48	Gnd
9	PAD4	10	Gnd	49	PAD24	50	Gnd
11	PAD5	12	Gnd	51	PAD25	52	Gnd
13	PAD6	14	Gnd	53	PAD26	54	Gnd
15	PAD7	16	Gnd	55	PAD27	56	Gnd
17	PAD8	18	Gnd	57	PAD28	58	Gnd
19	PAD9	20	Gnd	59	PAD29	60	Gnd
21	PAD10	22	Gnd	61	PAD30	62	Gnd
23	PAD11	24	Gnd	63	PAD31	64	Gnd
25	PAD12	26	Gnd	65	NC	66	Gnd
27	PAD13	28	Gnd	67	NC	68	Gnd
29	PAD14	30	Gnd	69	SERP_0	70	Gnd
31	PAD15	32	Gnd	71	SERM_0	72	Gnd
33	PAD16	34	Gnd	73	NC	74	Gnd
35	PAD17	36	Gnd	75	NC	76	Gnd
37	PAD18	38	Gnd	77	NC	78	NC
39	PAD19	40	Gnd	79	NC	80	NC

Table 4 I/O map

EZ I/O	Base Address	Rack	Module
EZ I/O 1	Base + 00h		
J1, I/O 0–7	Base + 00h	Rack 1	0 + 1
J1, I/O 8–15	Base + 01h	Rack 1	2 + 3
J1, I/O 16–23	Base + 02h	Rack 1	4 + 5
EZ I/O 1 control	Base + 03h	—	—
EZ I/O 2	Base + 04h		
J2, I/O 0–7	Base + 04h	Rack 2	0 + 1
J2, I/O 8–15	Base + 05h	Rack 2	2 + 3
J2, I/O 16–23	Base + 06h	Rack 2	4 + 5
EZ I/O 2 control	Base + 07h	—	—
EZ I/O 3	Base + 08h		
J1, I/O 24–31	Base + 08h	Rack 1	6 + 7
J2, I/O 24–31	Base + 09h	Rack 2	6 + 7
Baud rate setup	Base + 0Ah	See EZ I/O table 3	
EZ I/O 3 control	Base + 0Bh	—	—
UART1 16550	Base + 10h	Rack 1	Analog
UART2	Base + 18h	Rack 2	Analog

Note See the 5664 Utility disk for information on how to use the I/O map table.

Table 5 EZ I/O 3 Port C (baud rate setup)

Bit	Description
0	
1	Rack 1 baud divisor; 4 = 9600 baud
2	
3	
4	Rack 2 baud divisor; 4 = 9600 baud
5	
6	Rack 1 IRQ status
7	Rack 2 IRQ status

Table 6 Supported Opto 22 SNAP I/O modules

Module	Description
SNAP-ICTD	ICTD input
SNAP-AITM2	Thermocouple/millivolt input
SNAP-AIRTD	RTD input (100, 120 NT)
SNAP-AIV	SNAP voltage input
SNAP-AIMA	SNAP current input
SNAP-AITM	Thermocouple/millivolt input (J,K)
SNAP-OUT	Generic output
SNAP-AOA-3	Current output
SNAP-AOV-4	0 to +5 voltage output
SNAP-AOV-5	0 to +10 voltage output
SNAP-AOV-6	-5 to +5 voltage output
SNAP-AOV-7	-10 to +10 voltage output
SNAP-OUT	Dual current output
SNAP-AOA-23	Dual current output
SNAP-AOV-24	Dual 0 to +5 voltage output
SNAP-AOV-25	Dual 0 to +10 voltage output
SNAP-AOV-26	Dual -5 to +5 voltage output
SNAP-AOV-27	Dual -10 to +10 voltage output

Table 7 Supported Opto 22 SNAP I/O racks

Rack	Description
SNAP-B8M	8-module rack
SNAP-B12M*	12-module rack
SNAP-B16M*	16-module rack
SNAP-B8MC	8-module rack with extra terminal block for field wiring
SNAP-B8MC-P	8-module rack with extra terminal block for field wiring, pluggable
SNAP-B12MC*	12-module rack with extra terminal block for field wiring
SNAP-B12MC-P*	12-module rack with extra terminal block for field wiring, pluggable
SNAP-B16MC*	16-module rack with extra terminal block for field wiring
SNAP-B16MC-P*	16-module rack with extra terminal block for field wiring, pluggable

* = For "B Series" racks that accommodate more than 8 modules, positions 8 and above are analog only.

Note You can add new modules via an INT 17 call during the initialization of your software. See the 5664 Utility disk for programming examples.

Note For updated listings of SNAP I/O modules, refer to Opto 22's web site at www.opto22.com.

Table 8 Micro PC bus "A" pinout

Pin	Description	Signal	Pin	Description	Signal
A1	I/O CH CK*	I	A17	A14	O
A2	D7	I/O	A18	A13	O
A3	D6	I/O	A19	A12	O
A4	D5	I/O	A20	A11	O
A5	D4	I/O	A21	A10	O
A6	D3	I/O	A22	A9	O
A7	D2	I/O	A23	A8	O
A8	D1	I/O	A24	A7	O
A9	D0	I/O	A25	A6	O
A10	I/O CH RDY	I	A26	A5	O
A11	AEN	O	A27	A4	O
A12	A19	O	A28	A3	O
A13	A18	O	A29	A2	O
A14	A17	O	A30	A1	O
A15	A16	O	A31	A0	O
A16	A15	O			

* = active low

Table 9 Micro PC bus "B" pinout

Pin	Description	Signal	Pin	Description	Signal
B1	Gnd	I	B17	DACK1*	O
B2	RESET	O	B18	DRQ1	I
B3	+5V	I	B19	DACK0*	O
B4	IRQ9	I	B20	CLOCK	O
B5	NC	Not used	B21	IRQ7	I
B6	DRQ2	I	B22	IRQ6	I
B7	-12V	Not used	B23	IRQ5	I
B8	Reserved	Not used	B24	IRQ4	I
B9	+12V	Not used	B25	IRQ3	I
B10	Analog Gnd	Not used	B26	DACK2*	I
B11	MEMW*	O	B27	T/C	I
B12	MEMR*	O	B28	ALE	O
B13	IOW*	O	B29	Aux +5V	Not used
B14	IOR*	O	B30	OSC	O
B15	DACK3*	O	B31	Gnd	I
B16	DRQ3	I			

* = active low