



OmniCtrl™

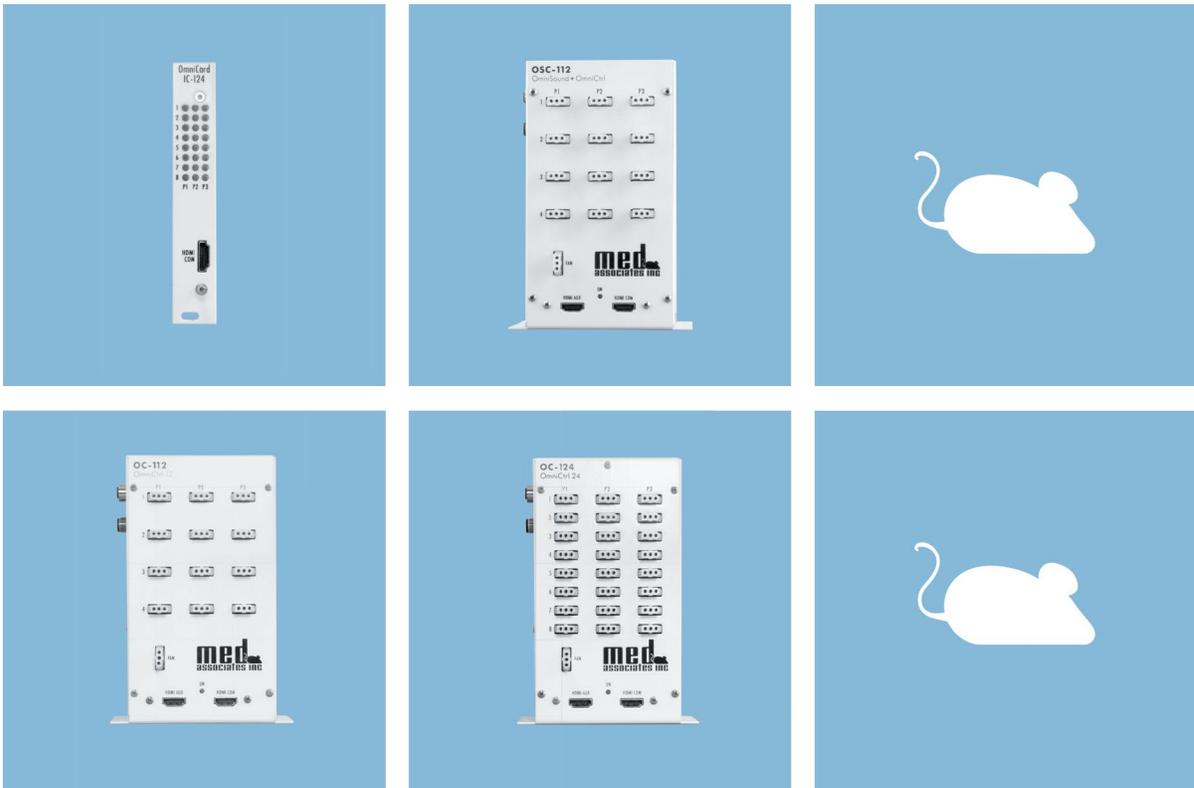
Power and Control Interface System

IC-124 / OC-112 / OC-124 / OSC-112 / SG-505 / SG-28V-TTL

USER'S MANUAL

DOC-334

Rev. 2.1



Med Associates recommends reading this manual prior to operating these products.

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CHAPTER 1 INTRODUCTION

The OmniCtrl System

Omni Control or OmniCtrl™ systems create a modular structure where interface cards directed with set protocols connect to behavior testing environments (or chambers) to provide consistent conditions and data collection for behavioral experiments.

MedState Notation™ and Med-PC®

MedState Notation (MSN) is the language used to control protocols in Med-PC. The language is designed to be easy to use and learn, natural in its application, and versatile in its utility. The installation package for Med-PC includes many example procedures. More procedures are widely available in the MedState Notation community. Med Associates is happy to help troubleshoot and assist with new protocols. Med Associates also sells more than thirty popular protocols and can be contracted to write custom code. Call Med Associates Support for assistance (see Contact Information p.31). <https://med-associates.com/product-category/software-all/protocols/>

The OmniCtrl System introduces a line of convenient operational features. To manage these features, we have created Med-PC 6. Med-PC allows for up to sixteen independently operated chambers.

System Power (28 Volt Direct Current)

Environment components manufactured by Med Associates are powered and controlled by connection panels and run on 28 VDC. Connection panels, in turn, are powered by power interface cabinets (PIC) intended to provide system power to support a certain number of devices. For convenience, Med Associates also sells combined power interface cabinets and control interface cabinets. The number of chambers a power and control interface cabinet (PCIC) is intended to support is the same as its control card capacity. For example, the SG-7316 is a full-size PCIC capable of holding up to sixteen control cards and is designed to provide 28 V with 20 Amps (A), enough for sixteen connection panels at 1.25 A each. The SG-505 PIC provides 28 V with 10 A power where needed for connection panel operation but does not power control cards. The SG-7108 control interface cabinet (CIC) powers control cards but does not provide 28 V for connection panel operating power.

System Control (data)

To fully utilize the OmniCtrl IC-124 interface card features, an SG-7000 series or newer interface cabinet with a DIG-705 interface decode card is needed. The DIG-705 card coordinates the control of operations data to and from interface cards. The purpose of the interface card is to keep a flexible connection between this central controller system and up to twenty-four powered inputs or outputs of its connection panels.

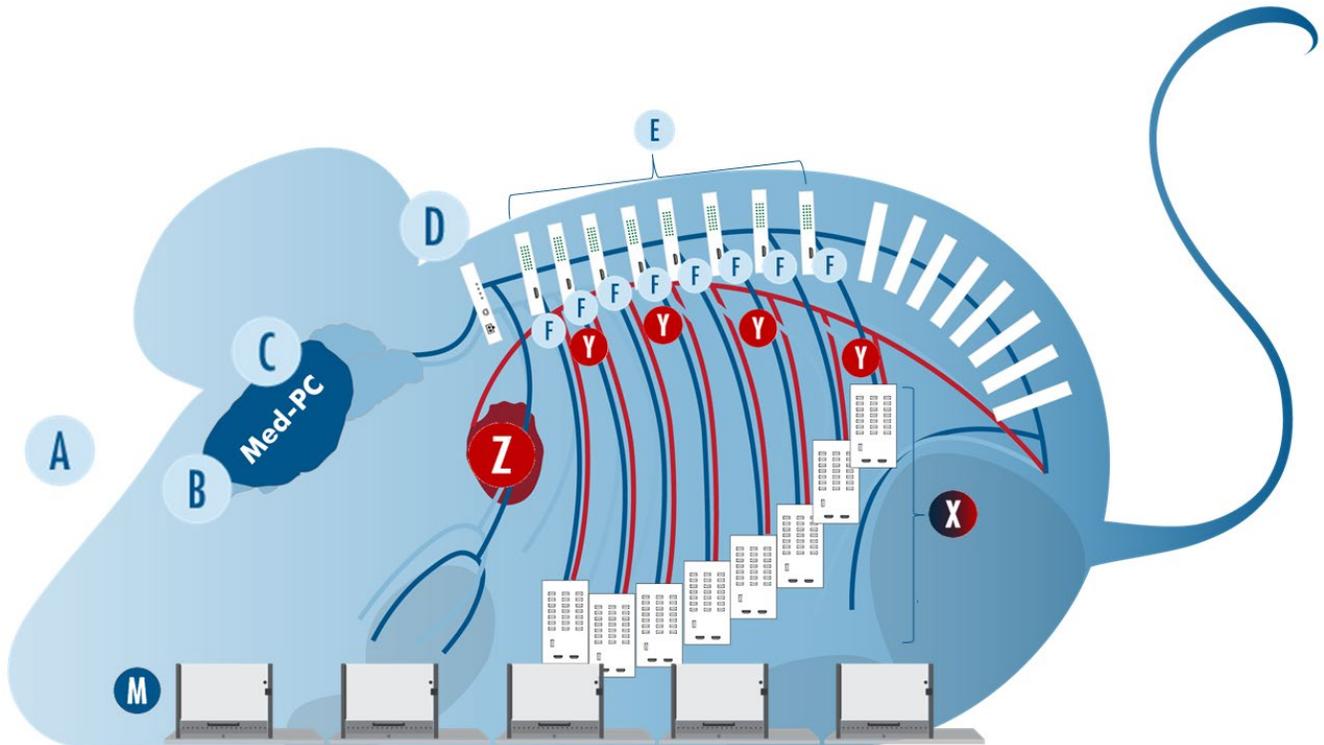
OC- Omni Connection Panel

The OmniCtrl connection panel differs from previous Med Associates connection panels in that its ports are not pre-wired as data in or out. The OC-112 OmniCtrl 12 I/O connection Panel has twelve connections. They can be any combination of outputs and inputs, providing a versatile setup. IC-124 interface cards allow the efficient control of up to two 12 I/O connection panels in series.

The OmniCtrl connections are arrayed in 3 Port (P) groups of 4 I/Os or bits, twelve in total. Specific panel devices have more connections. For example, for expanded configurations, the OC-124 Omni double connection Panel has two connection bundles and a 24 I/O capacity. The OSC-112 Omni Sound and Connection Panel has a 12 I/O connection panel and a fully programmable sound amplifier.

For more information on Med-PC 6 or OmniSound™, see their respective user manuals, DOC-335 and DOC-336, published on the Med Associates website at www.med-associates.com/resources/manuals/.

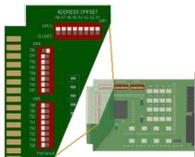
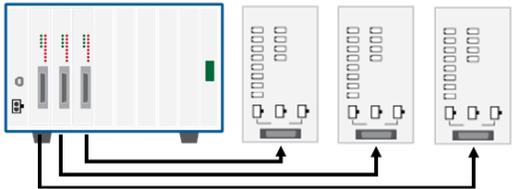
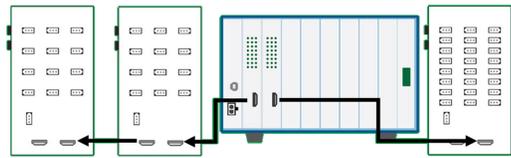
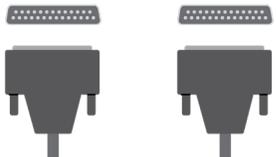
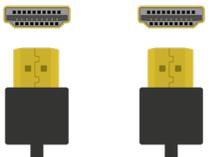
FIGURE 1.1 THE ANATOMY OF THE OMNICTRL SYSTEM



System Power and System Control operate on separate line channels throughout the system.

- A** Your experimental protocols are the environments that the OmniCtrl™ system attempts to navigate.
- B** MedState Notation is how the system interprets the procedure into intentions and foci.
- C** Med-PC is the software that translates the set intention into action and coordinates the receipt of data from foci.
- D** The decode card receives action instructions and data connections from Med-PC and splits the signal to the different interface cards.
- E** The interface cards follow action instructions and organize the incoming signals into a data stream via the peripheral control lines.
- F** The control lines carry instructions and data to and from the connection panels.
- M** The operant equipment performs the instructions as controlled and driven by the power system.
- X** The connection panels act as energy and data nodes where control and power are sourced for all peripherals.
- Y** Power lines relay the energy to drive peripheral devices.
- Z** The system power supply drives energy to all nodes to be used as required.

TABLE 1.1– COMPARING SMARTCTRL AND OMNICTRL

	SUPERPORT/SMARTCTRL (PREVIOUS SYSTEMS)	OMNICTRL
Experimental Protocol	Design your protocol according to your experimental needs	The same as always, a versatile system for versatile applications
Med-PC	Med-PC 6 <i>or older</i>	Med-PC 6 <i>or newer</i>
Decode Card	DIG-705 USB Interface Decode card <i>or older</i> (DIG-700, DIG-704...)	DIG-705 USB Interface Decode card <i>or newer</i>
Interface or Input Cards	DIG-716 4 Input 8 Output DIG-716B 8 Input 16 Output ANL-926 Sound control DIG-712 16 TTL Input DIG-713A 16 Input DIG-726 16 Output DIG-726-TTL-G 16 TTL Output	IC-124 24 I/O Interface card ANL-928 Sound control (only)
Card Power Requirement	A mix of 28 V fed from the back of the cabinet to decode card and 5 V cards.	5 V fed directly to the backplane of the card cabinet. It frees up one of the power ports and lowers electrical requirements for data signals.
Card Addressing	Manual addressing 	Self-addressing 
Toggle or Level Mode	Controlled by card DIP switches, which must be set physically to make changes between protocols	Set by call out in MSN protocol. Reverts to standard operation between protocols automatically.
Port Types	<i>Fixed</i> as inputs or outputs at the manufacturer level. <i>It cannot be changed.</i>	They automatically work as either inputs or outputs. The user configures a setup in the Med-PC configuration utility.
Data Daisy Chain	Not available; direct connections only. 	2 connection panels 24 I/Os 
Data Connection	DB-25 to DB-25 cable 28 Volts 	HDMI to HDMI (fully pinned) cable 5 Volts 

	SUPERPORT/SMARTCTRL (PREVIOUS SYSTEMS)	OMNICTRL
Interface Cabinet	SG-7000 series <i>or older</i>	SG-7000 series <i>or newer</i>
Power Connection	M12 to 2-pin Molex cable (M/F) & 2-pin Molex to 2-pin Molex cables (M/M) 	5-pin M12 to 5-pin M12 cable (M/M)
Power Daisy Chain	Variable based on connected items three max (1 direct, two chained) 2.5 A shared among all chained connection panels	Two max (1 direct, one chained) not dependent on connected items. 1.25 A dedicated to each of the two connection panels
Connection Panel	SG-716 4 Input 8 Output Molex SG-716B 8 Input 16 Output SG-726-TTL 16 BNC Output SG-215D3 8 Passive 3-pin Molex SG-215D4 16 Input 16 Output 3-pin Molex	OC-112 12 I/O Molex OC-124 24 I/O Molex OSC-112 12 I/O Molex + Sound Amp OC-112-TTL (TBA 12 I/O TTL)
Peripheral Equipment	Connects to all Med Input or Med Output style connections, from levers and nose-pokes to syringe pumps and pellet feeders.	Connects to all Med Input or Med Output style connections and HDMI COM and AUX style connections.

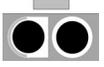
TABLE 1.2 – SG-7000 SERIES POWER AND CONTROL INTERFACE CABINET OPTIONS

MODEL	SG-505	SG-7108	SG-7308	SG-7316
Number of Cards	0	8	8	16
Dimensions (in)	7.5 x 3.1 x 9.4	9.5 x 6 x 11.7	9.5 x 6 x 11.7	16.7 x 6 x 11.7
Dimensions (cm)	19.1 x 7.9 x 23.9	24.1 x 15.2 x 29.7	24.1 x 15.2 x 29.7	42.4 x 15.2 x 29.7
Voltage Supplied	+28 VDC	±5 , ±15 VDC	±5, ±15, +28 VDC	±5, ±15, +28 VDC
Max Current (A)	10	1	10	20
Interface Type	Power	Control	Power & Control	Power & Control
Spare Fuse Part#	HAR-FUSE-3A-SB-MINI	HAR-FUSE-1-MINI	HAR-FUSE-4A-SB-MINI	HAR-FUSE-8A-SB-MINI

TABLE 1.3 – CABLES FROM CONNECTION PANELS TO COMPONENTS

	CONNECTOR A	LENGTH	CONNECTOR B
SG-216A	 3-pin MedConnect (F*)	1.5'/45.7 cm	3-pin MedConnect (M*) 
SG-216A-2	 3-pin MedConnect (F*)	2'/61 cm	3-pin MedConnect (M*) 
SG-216A-3	 3-pin MedConnect (F*)	3'/91.4 cm	3-pin MedConnect (M*) 
SG-216A-6	 3-pin MedConnect (F*)	6'/1.8 m	3-pin MedConnect (M*) 
SG-216A-10	 3-pin MedConnect (F*)	9'/3 m	3-pin MedConnect (M*) 
SG-216A-15	 3-pin MedConnect (F*)	15'/4.6 m	3-pin MedConnect (M*) 
SG-216A-20	 3-pin MedConnect (F*)	20'/6.1 m	3-pin MedConnect (M*) 
SG-216B3	 3-pin MedConnect (F*)	0.5'/15.3 cm	2-pin MedPower (M*) 
SG-216B4	 2-pin MedPower (F*)	0.5'/15.3 cm	3-pin MedConnect (M*) 
SG-216C	 3-pin MedConnect (F*)	1'/30.5 cm	3-pin MedConnect (M*) (x2) 
SG-216C1	  3-pin MedConnect (F*) (x2)	1'/30.5 cm	3-pin MedConnect (M*) 
SG-218A	 3-pin MedConnect (F*)	1.5'/45.7 cm	3-pin MedConnect (F*) 
SG-218A-6	 3-pin MedConnect (F*)	6'/1.8 m	3-pin MedConnect (F*) 
SG-218A-10	 3-pin MedConnect (F*)	10'/3.05 m	3-pin MedConnect (F*) 
SG-222	 3-pin Molex MedConnect (F*)	2.5'/76.2 cm	3-pin Microfit Molex (F*) 
SG-222-6	 3-pin Molex MedConnect (F*)	6'/1.8 m	3-pin Microfit Molex (F*) 
SG-222-10	 3-pin Molex MedConnect (F*)	10'/3.05 m	3-pin Microfit Molex (F*) 
SG-224A	  3-pin Molex MedConnect (F*) (x2)	2.5'/76.2 cm	6-pin Microfit Molex (F*) 

TABLE 1.4 – CABLES FROM POWER AND CONTROL CABINETS TO A CONNECTION PANEL

	CONNECTOR A		LENGTH	CONNECTOR B	
CAB-HDMI-10		HDMI	10'/3m	HDMI	
CAB-HDMI-30		HDMI	30'/9m	HDMI	
CAB-HDMI-RA-1M		Right angle HDMI	36"/1m	Standard HDMI	
CAB-M12-4FM-3M		M12 OmniPower (M)	9'/3m	M12 OmniPower (F)	
CAB-M12-4FM-10M		M12 OmniPower (M)	30'/10m	M12 OmniPower (F)	
SG-210CP-M12-4F		M12 OmniPower (F)	1'/0.3m	2-pin MedPower (M)	
SG-210CP-M12-4M		M12 OmniPower (M)	1'/0.3m	2-pin MedPower (M)	
SG-210CP-MF		2-pin MedPower (F)	25'/8m	2-pin MedPower (M)	
SG-210CP-Y		2-pin MedPower (F)	1'/0.3m	2-pin MedPower (M) (x2)	 
SG-210CP-2		2-pin MedPower (F)	2'/0.6m	2-pin MedPower (F)	
SG-210CP-8		2-pin MedPower (F)	8'/2.5m	2-pin MedPower (F)	
SG-210CP-25		2-pin MedPower (F)	25'/8m	2-pin MedPower (F)	
SG-210CP-50		2-pin MedPower (F)	50'/15 m	2-pin MedPower (F)	
SG-210CP-75		2-pin MedPower (F)	75'/23m	2-pin MedPower (F)	
SG-216B5		2-pin MedPower (M)	0.5'/15.3cm	3-pin MedConnect (F*)	

*Table 1.3 and 1.4: Contrary to some intuition, the female Molex connector has external pins. Gender is the housing of the connector, not the pins. The female connector houses the male pins inserted into the female pins on the male connector.

CHAPTER 2 GETTING SET-UP

OmniCtrl modules map a convenient path for one computer to **connect to** and **collect data from** up to sixteen individually mechanized behavior boxes. The operating computer connects via USB to the interface decode card in the interface cabinet. The IC-124 OmniCtrl interface card is connected and controlled via the interface cabinet. The IC-124 connects with connection panels such as OC-112, OC-124, and OSC-112 through an HDMI-style connector.

Hot Swapping

The first step to the fastest, safest, and Med Associates-supported method for removing or adding cards or removing or adding control panel peripherals (e.g., MedTouch, OSC-112, etc.) is to turn off the Power and Control Interface Cabinet. If the system is powered when cards or devices are changed (hot-swapped), it can cause severe damage to the system. Switch off PCIC before making changes to the system setup (see page 30).

Decode card Integration

The OmniCtrl system requires an interface and decode card to communicate with the computer and Med-PC. The DIG-705 interface and decode card, inserted into the control interface cabinet, connect to the controlling computer via a USB-A to USB-B cable (CAB-USB-AM-BM-10). To maintain the short latency expected of Med Associates interfaces, it is recommended to connect the USB cable directly to a high-speed serial port (USB 2.0 or better) on the computer and not rely on cable extensions or USB “hub” devices.

SmartCtrl and SuperPort output cards require 28 V power and a shared ground to operate the control connection. SmartCtrl and SuperPort cards also require a 2-pin Molex power connection via the port just below the main USB port (see Figure 2.3 I) on the DIG-705. This is supplied by connecting an SG-210CP-2 cord through an SG-210CP-M12-4M from an M12 power port on the back of the cabinet. The 28 V power cord is unnecessary when only using OmniCtrl or SuperPort input cards.

Power connectivity

The Power Interface cabinet (PIC) is powered through a standard wall outlet configured as either 120 V / 60 Hz or 230 V / 50 Hz in the style of outlet connector for your location. A grounded outlet plug must be used like the one provided with the system, and that plug must be seated in a fully grounded outlet and not fed through a power strip or extension cable that does not have a grounding line. Electromagnetic interference (EMI) is filtered away from the unit using the grounding line. Therefore, a lack of grounding can cause unexpected damage or dysfunction.

Connection panels are powered through an M12 power connector connecting to the PCIC's back. To connect the M12 power connector, orient the plug to match the pins of the receiving port and insert until the threaded collar comes into contact with the port threads. Turn the collar until it engages with the threads and bring it to thumb tight against the panel. When the panel is first powered, the green light at the bottom of the faceplate will flash initially quickly, then slowly, alternating on and off once per second. When “Control” is correctly connected (see Connection Panel Connectivity p.17) the flashing green light will change to a constant state. Due to the capacity of power that can be held in the connection panel, the light may remain flashing after the panel is disconnected from power till sufficient power has been drained from the panel capacitors.

A connection panel directly connected from the power source can “daisy chain” or pass the power to **one** additional connection panel. This reduces the number of power lines needed from the power cabinet. Each of the M12 power supply ports of the PIC can power up to two powered connection panels. A 30’ power connection cable (CAB-M12-4FM-10M) is supplied with the first of two connection panels and a 9’ power cable (CAB-M12-4FM-3M) for each daisy chain. A full cabinet for sixteen chambers adequately supplied will have eight 30’ power cables and eight 9’ daisy chain power cables.

Supplemental Power Supply (SG-505)

The IC-124 can operate two control panels through daisy chaining control. As previously mentioned, PCICs such as the SG-7308 and SG-7316 are built to power the same number of connection panels as the number of cards you can insert, one-to-one. The user of an SG-7308 can control 16 boxes but only power eight without supplemental power provided by the SG-505.

Another consideration is that the OmniCtrl design partitions the power and control portions of operation from each other. In SmartCtrl, the control and power were tethered together, and any additional power would need to share a grounding line. Shared grounding is not required with OmniCtrl unless SmartCtrl cards are used in the same cabinet. This opens new options for system composition.

Sometimes, configurations of high-draw components exceed the electrical capacity of a connection panel. The SG-505 Supplemental Power supply can provide power to components that do not require control input to relieve draw from the connection panel.

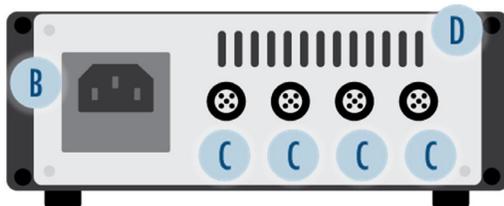
FIGURE 2.1 SG-505 SUPPLEMENTAL POWER SUPPLY



A Power Switch – Toggles On (I) and Off (O) power to connected devices illuminates when receiving power.

B Outlet power input – The grounded outlet power plug varies by location. It accepts 100 to 230 VAC and 50-60 Hz.

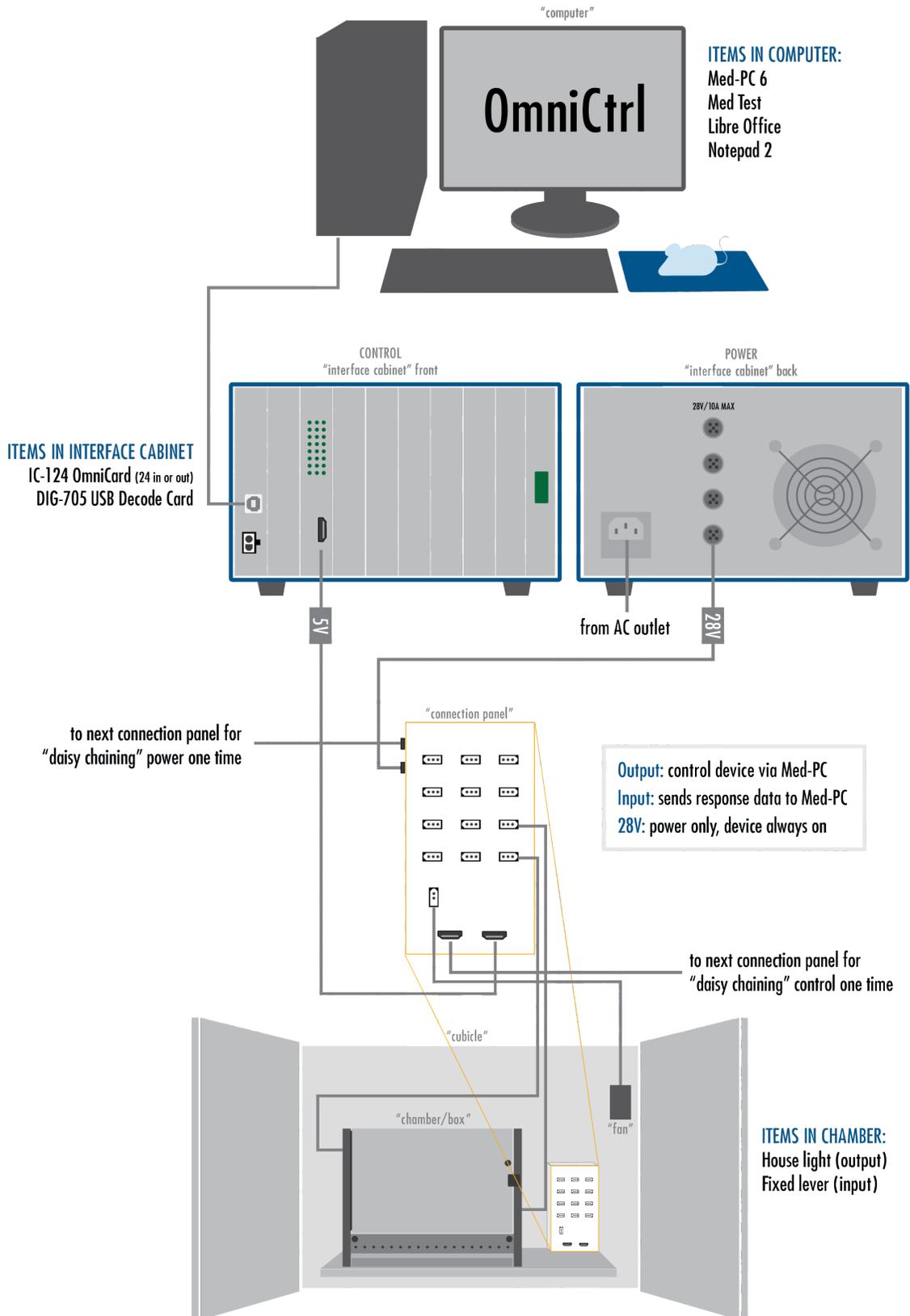
The 3 A slow blow fuse installation location is below the plug site.



C M12 OmniPower Male 28 VDC power ports 2.5 A each

D Venting for heat dispersion – Clear obstruction for at least 4 inches around vents to allow air to circulate to lower maintenance costs and increase product lifespan.

FIGURE 2.2 – OVERALL SYSTEM CONNECTIONS AND COMPONENTS



Card Insertion or Removal

To avoid damaging equipment, be sure to turn off the interface cabinet power before inserting or removing any cards in the CIC or connecting and/or unplugging peripheral devices. Unplugging cabinets when inserting or removing cards is also best to lower the risk of electric shock.

Cards are anchored to the cabinet by a screw at the bottom of the faceplate (sometimes a second at the top) that can be removed with a standard #1 Phillips head screwdriver (see Figure 2.3 J). Six-pointed “Torx” screws such as between the card type label (Figure 2.3 D) and the indicator lights (Figure 2.3 E) are used for structural assembly and are not intended to be loosened.

Cards must be installed face up, displaying the text on the face panel readable from the front of the cabinets. IC-124 cards have a handle on the bottom of the face panel to assist in removing and inserting. Be sure to use the handle (Figure 2.6 G) Avoid using other leverage points whenever possible. Only touch the edges of any card; do not touch the components, as they can be damaged by static electricity (ESD). Ensure both top and bottom edges are inserted into their plastic slides to guide them into proper seating.

The DIG-705 should be inserted in the leftmost card slot. Ensure all DIP switches on IC-124 cards are in the factory default OFF position. This enables automatic addressing based on the card's position in the control Interface cabinet.

FIGURE 2.3 – PCIC SET UP



- A The PCIC power switch should be turned off before inserting or removing cards.
- B The interface decode card should be inserted in the leftmost slot of the PCIC.
- C IC-124 and other interface cards should be inserted in the order of the boxes they control.
- D The part number and/or card-type label is located at the top of the card.
- E LED indicator lights show I/O activity on the card
- F IC-124 HDMI COM port to connection panel HDMI COM port
- G Insertion handle
- H USB type B port for connection to computer USB type A port
- I 2-pin Molex (female) connector for 28V power and ground for SmartCtrl generation and older interface cards
- J Card anchor point for securing cards to the cabinet

FIGURE 2.4 WIRING OMNI CONTROL DAISY CHAIN

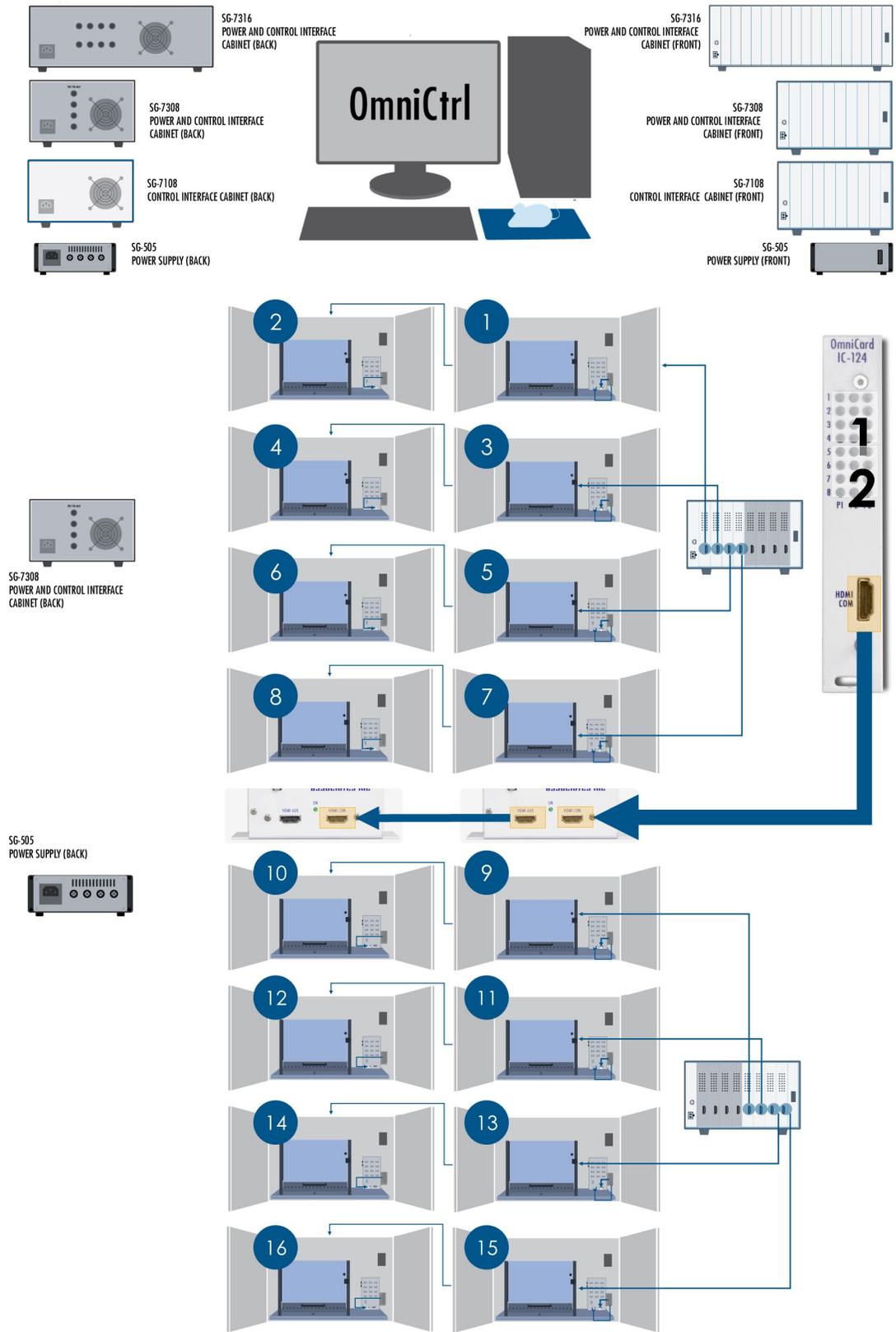


FIGURE 2.5 WIRING OMNI POWER DAISY CHAIN

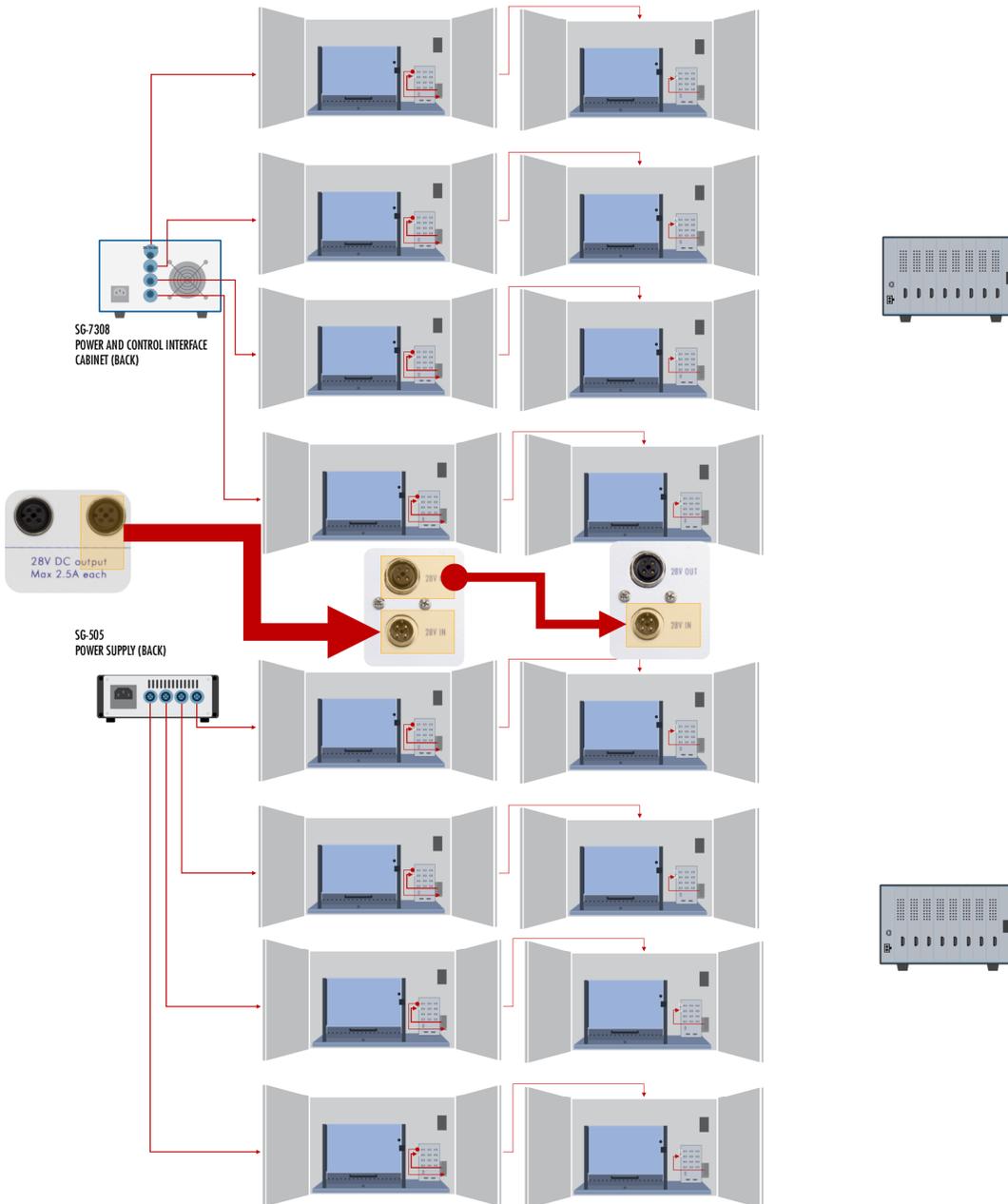
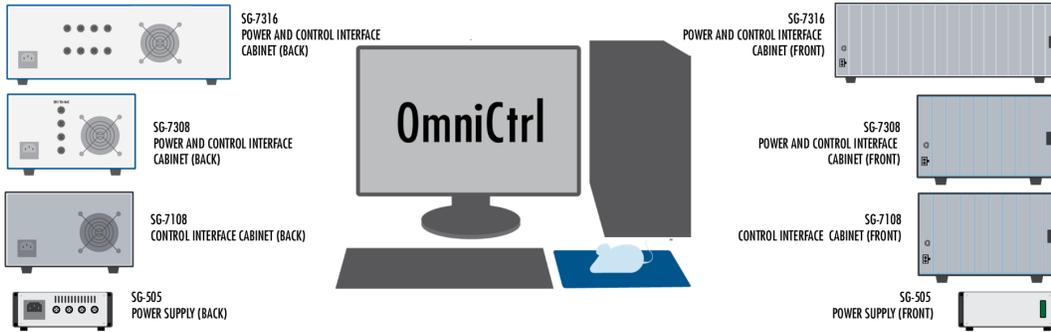
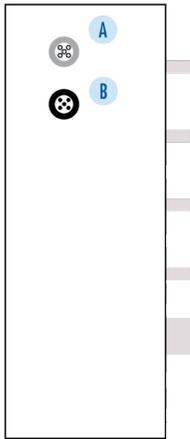
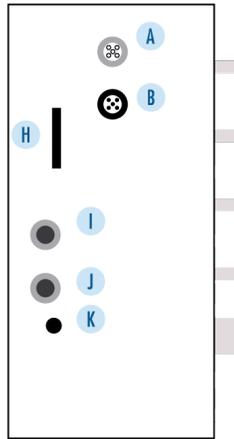


FIGURE 2.6– OMNI CONNECTION PANEL TYPES AND DIAGRAM

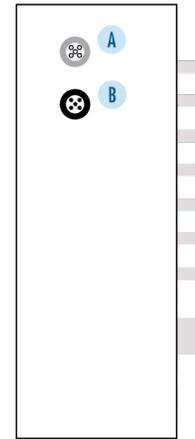
- A** 28V out
- E** Status light
- I** Audio output channel 1 (1/4")
- B** 28V in
- F** AUX connects with the following connection panel
- J** Audio output channel 2 (1/4")
- C** Connection panel 1
- G** COM connects with the interface card or previous panel
- K** Audio line out (1/8")
- D** Fan output
- H** SD card port
- L** Connection panel 2



OC-112



OSC-112



OC-124

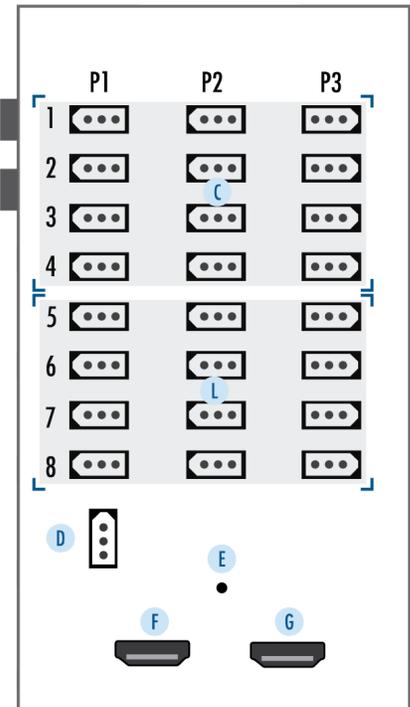
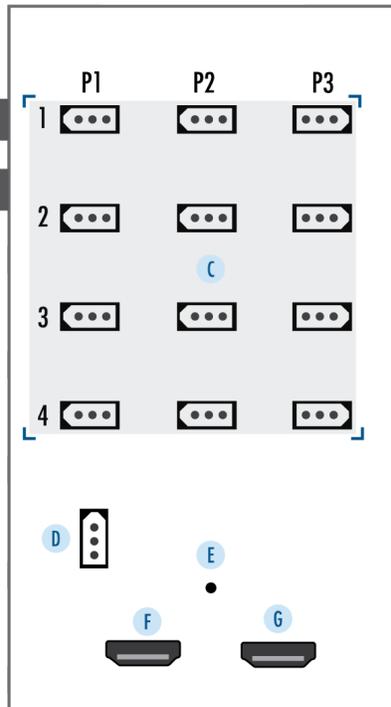
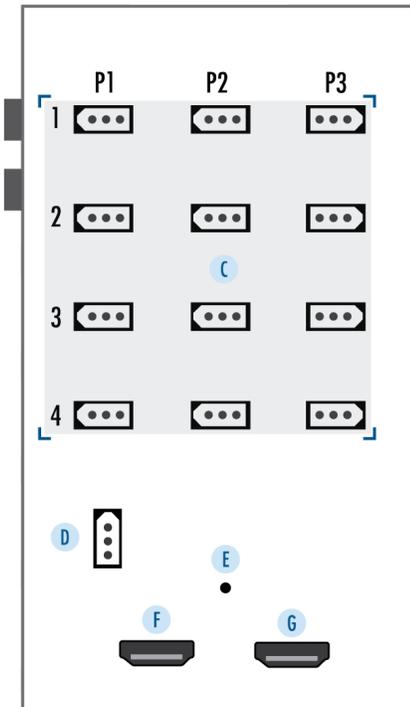
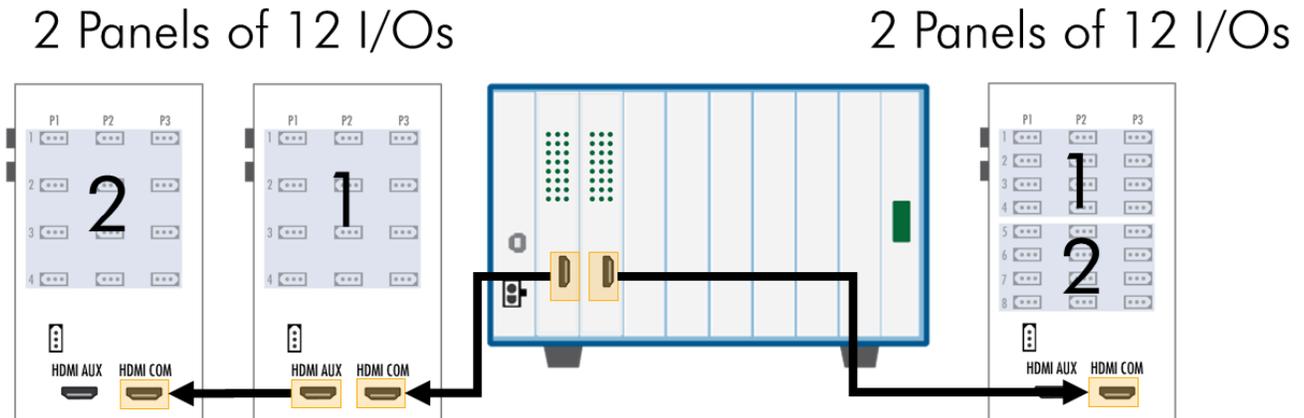


FIGURE 2.7– VALID IC-124 CONTROL CONNECTION



HDMI Connector

It is important to use cables from Med Associates for consistent system performance. While the OmniCtrl devices use HDMI cables for their data connection, they do not use the HDMI communication protocol, and not all HDMI cables will work. The cables provided by Med Associates are tested to ensure proper function with the OmniCtrl devices. Specifications on the cables tested for carrying the IC-124 signal are listed in Table 1.4 – Cables from power and control cabinets to a connection panel.

Connection Panel Connectivity

28 Volts powered connection panels, including OC-112, OC-124, and OSC-112, are controlled by the IC-124 interface module using HDMI connections. Control signal for a device downstream from the control interface always enters through the COM port and, if chained on, exits through the AUX port. IC-124 cards can recognize up to four devices connected by daisy chaining panels, but only the first twenty-four powered I/Os in a chain can communicate with the card.

The ON LED is located on a connection panel between and slightly above the HDMI AUX and the HDMI COM ports (see Figure 2.6 Label E). The ON LED will remain off if the panel is not receiving power. When a connection panel is correctly connected to the control interface and powered to 28 V, the green ON LED will be lit solidly. Before communicating with the control interface, a powered connection panel will flash the ON LED in a one-second on to one-second off pattern. If the panel receives less than 28 V power, the ON LED will flash rapidly until the internally stored electrical energy is depleted. Specific communication errors will enable a slow blink of the LED, such as three seconds on to one second off, or other patterns. If a connection panel is flashing in an irregular pattern or a pattern different than an even one second on / one second off, contact Med Associates support, as the panel will not normally communicate till this is resolved.

Med Test

The OmniCtrl system operates with Med-PC 6, following MedState Notation (MSN) coding language. Through Med-PC 6, the system conducts operations and interfaces with experimental setups, providing comprehensive control and data acquisition capabilities.

Med Test is a test utility intended to check if the system components are working and connected properly without running a protocol or troubleshooting code. It is supplied with Med-PC and other software applications from Med Associates. With the interface cabinet “On” and components connected to the PC, the Med Test Utility can be opened at the address listed below if installed using default settings or by searching Med-Test in the Windows Search bar. <C:\Program Files\MED Associates\MED Test\MEDTest.exe>

Depending on your computer’s security settings, User Account Control may ask for permission to let Med Test make changes to your system; it will be necessary to answer “yes.” Communication issues with the system due to bad connections at the USB port, a turned-off system, or out-of-date and/or incorrectly installed drivers will display the error “Cannot Find Rack 1.” For help with this, see Missing Peripherals p.30.

If hardware, software, and drivers are correctly installed, the software will open, and there will be no error messages. Use the “Misc Modules” menu to select the “DIG-705 interface card.” A window similar to that shown in Figure 2.8 will open. From here, you can see all auto-identifying connected cards (A, B, C) and interface cabinets (D), monitor different measures of system performance (E, F, G, H, I, J), and see what connection panels are connected to the cards (K). To stimulate outputs and observe return signals on inputs, double-click on a card (B or C).

More information on Med Test can be found in the SOF-MED-TEST Med Test user manual DOC-200 published on the Med-Associates website at <https://med-associates.com/resources/manuals/>.

FIGURE 2.8 – DIG 705 INTERFACE DECODE CARD WINDOW IN MED TEST

A Decode Interface Card/Control Interface Cabinet Identity

B Inserted Control Cards Slot 1, Slot 2, Slot 3...

C Control Interface Cabinet Type

D 5 Volt “Digital” power supply (read by DIG-705)

E +15 Volt “Analog” power supply (read by DIG-705)

F -15 Volt “Analog” power supply (read by DIG-705)

G DIG-705 28 Volt port reading

H Cabinet Temperature (Fahrenheit)

I Cabinet Temperature (Celsius)

J Connection panels attached to Control Card

K Closes the window

RACK #	Interface Cabinet Name	Firmware Version
DIG-705 1	SG-7308	2.00

Temperature: 73.18 F / 22.88 C

Cabinet Type: SG-7X08 Short cabinet with 8 spaces for cards

Voltages: 5V (4.91), +15V (15.43), -15V (-15.38), 28V (0)

IC-124	IC-124	IC-124
In Port 794 Offset 0	In Port 794 Offset 4	In Port 794 Offset 8
Out Port 794 Offset 0	Out Port 794 Offset 4	Out Port 794 Offset 8
Auto Configured: Yes	Auto Configured: Yes	Auto Configured: Yes
Attached: OC-112 OC-112	Attached: OC-124	Attached: OC-112 MED Touch
Firmware Version: 1.03	Firmware Version: 1.03	Firmware Version: 1.03

Med Control Connector

Med Associates connection panels are connected to devices in the chamber by the Med Operate ports (usually) using SG-224A cables. Instead of Med Inputs or Med Outputs as seen on earlier generation SmartCtrl and SuperPort connection panels, the Omni connection panels introduce Med Operate I/Os (Input/Outputs). The OmniCtrl interface will determine the device's orientation and send or receive signals as appropriate in a "plug and play" fashion. Inputs and Outputs register differently on the IC-124 interface card, and Med-PC requires a port to be designated as part of the protocol before it can be used (see I/O Configuration p.21).

Med Operate connectors adhere to a consistent pin-out. Med-PC sends active-low operate signals. This means that the signal is active when the voltage drops to the Ground wire on the Operate line (see Figure 2.9 - The pinout of Standard Med Control connectors).

The connected device usually operates until the Operate signal stops, meaning power returns to the Operate pin (2). This reduces latency in operation and helps confirm connection integrity. Still, care must be taken if damage is done to the Operate pin line, as a short between this line and the Ground pin (1) will trigger the device.

Med Inputs can handle signals less than three amps at 28 VDC, with the intent of short burst signals. Constant signals should moderate amperage to reduce strain on the circuits. If you have questions about your application, contact Med Associates support. See Chapter 6, Safety, Fail-safes, and Repair: Contact Information p. 31. We happily share our best advice.

FIGURE 2.9 - THE PINOUT OF STANDARD MED CONTROL CONNECTORS

MedOPERATE		Control Panel connections	Combined connection
1	Output Ground (28 Volt to Ground)	Green	
2	Operate Active low (+28 Volts)	Blue	
3	Unit Power +28 Volts DC	Orange	
MedINPUT (or Universal MedConnect)		Control Panel connections	Microfit connection
4	Ground	Black	
5	Signal Line Active low (+28 Volts)	White	
6	Unit Power+28 Volts DC	Red	

CHAPTER 3 GETTING STARTED

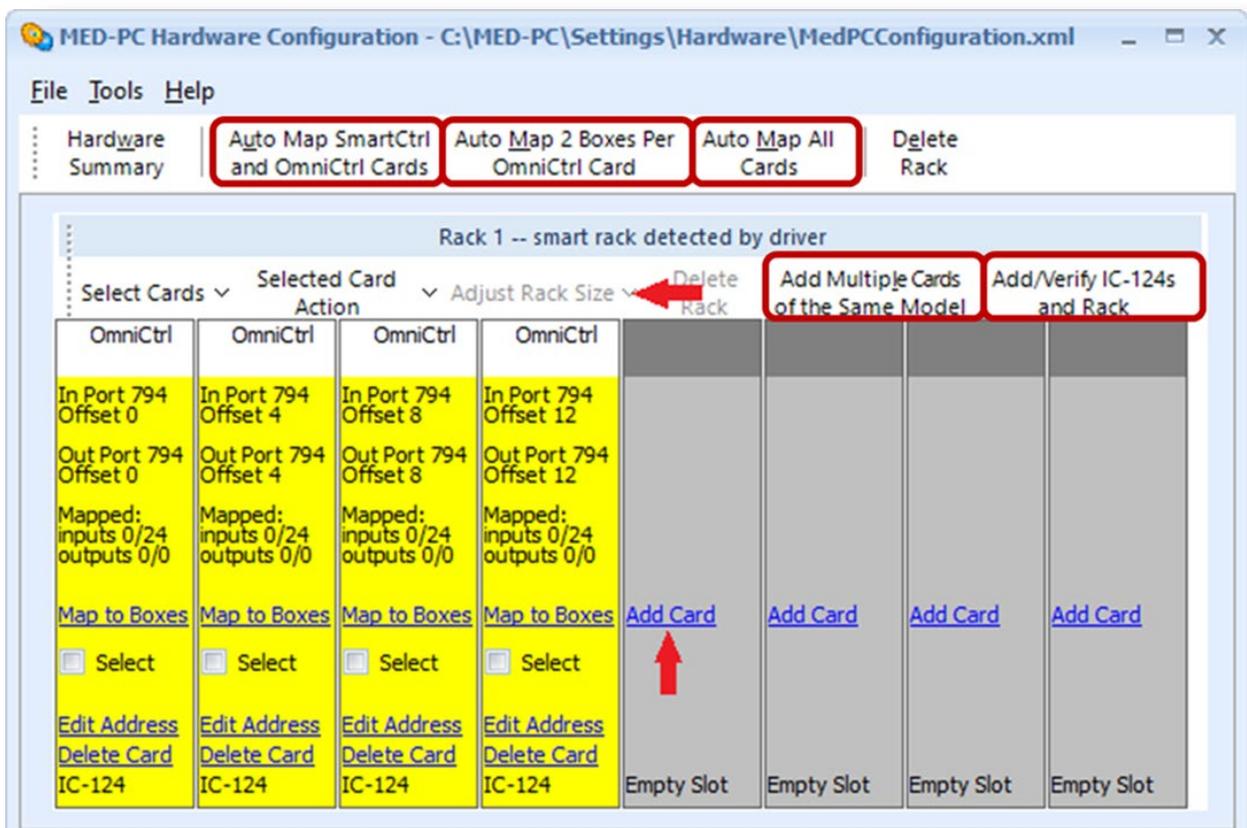
Much of the hardware configuration has already been completed if the computer was purchased from Med Associates as part of a system. The hardware summary may be viewed or printed to review the current settings. The end user will not need to change the number of boxes or specific input and output definitions unless additional CICs (racks) or new interface cards (IC) are added to the system. Run the configuration utility from the Windows Start menu and press the appropriate Auto Map button to see the I/O configuration and confirm the orientation. One can use the following steps to set up the configuration if needed.

This getting started guide is designed to get the user up and running using OmniCtrl cards and a single CIC, with each card assigned to one or two control panels. It is reproduced with minimal changes and many abridgments from the Med Associates Manual DOC-335 Med-PC 6 User's Manual, available at www.med-associates.com/resources/manuals. For these and more advanced installation and operation instructions, especially when installing multiple card types together, such as SmartCtrl or SuperPort cards, we recommend referencing DOC-335.

Hardware Configuration

The Hardware Configuration Application (HCA) may be accessed anytime when adding hardware to or removing it from a system. OmniCtrl cards map themselves automatically, so this utility will be used chiefly for confirmation with OmniCtrl users. If errors are present in the card mapping, they can be corrected here. Still, errors in OmniCtrl card mapping may indicate other technical failures, and the user should contact Med Associates support.

FIGURE 3.1 HARDWARE CONFIGURATION APPLICATION



Upon opening the HCA, the screen presents a view of the interface cabinet (see Figure 3.1 Hardware Configuration Application). An essential feature of this utility that is different from other versions of Med-PC configuration utilities users may be familiar with is the "Auto Map" Feature. Systems set up with all OmniCtrl cards can either be set by the "AutoMap SmartCtrl and OmniCtrl cards" (for one test chamber per interface card) or "Auto Map 2 Boxes Per OmniCtrl card" (for grouping two environments per interface card). Most other configurations will be set by selecting the "Auto Map All Cards" option. When hardware configurations are changed, this step needs to be applied again (see I/O configuration below).

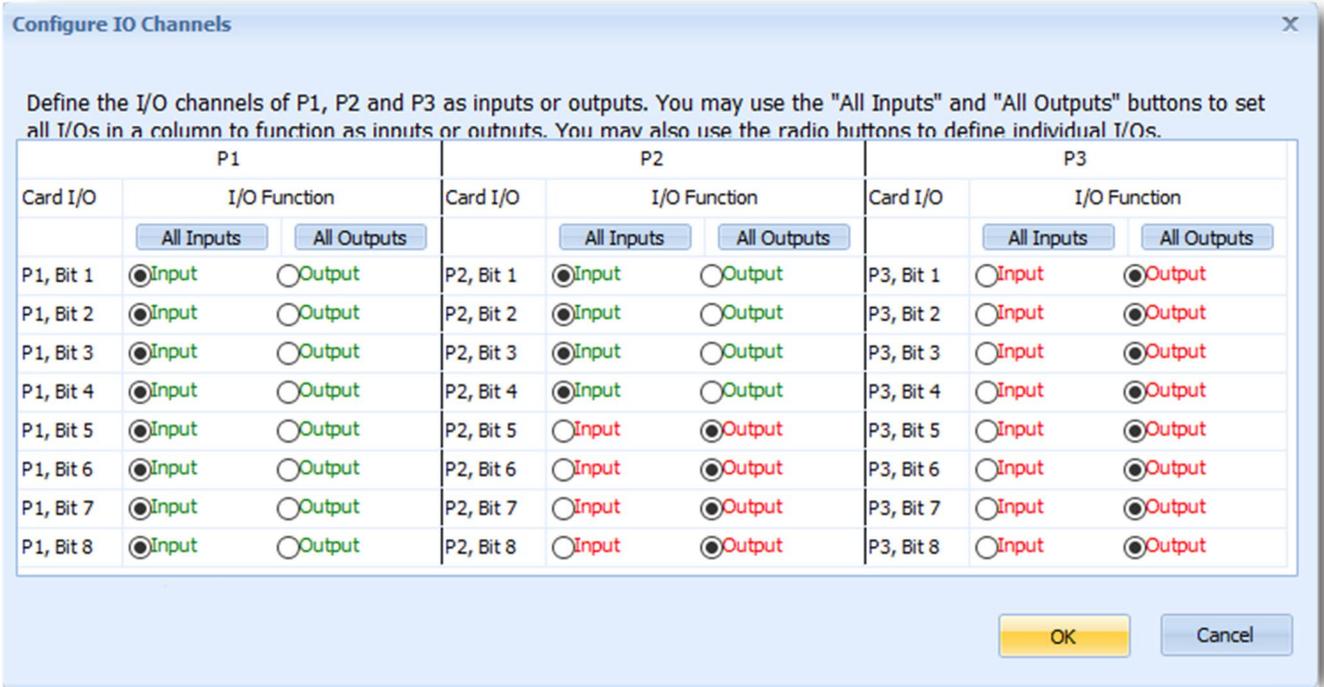
Important other links to note are the "Adjust Rack Size" to manually set the rack size of 8 or 16 interface card slots and the "Add Card" to open the "Add Card" window to manually configure the card and the I/O port and offset information. Click "OK" to close these setting windows and add the configured changes. To insert multiple cards of the same type with the same configuration, click the "Add Multiple Cards of the Same Model" link. Notice that setup windows have a dialogue to help understand the options when setting up different configurations.

Automatic port and offset settings are assigned sequentially based on the card's physical location in the rack. If the desired port and offset settings differ from this convention, click the "Edit Address" link at the bottom of a card slot to adjust the port and offset values to match the card's physical switch/jumper settings (see Chapter 4, Table 4.1 and Table 4.2).

I/O Configuration

Automatic I/O settings default all I/Os to Inputs. If the test chambers have output devices, from the "Hardware Configuration" window, toggle the checkboxes for every card you wish to set the Outputs on and click the "Edit Address" link. This will raise the "Edit Address of IC-124 OmniCtrl" window. If you wish to Copy I/O configurations from another previously set up card, you may choose the "Copy I/O Channels" button. Otherwise, select the "Define I/O Channels" button. This will raise the "Configure I/O Channels" window.

FIGURE 3.2 CONFIGURE I/O CHANNELS



The “Configure I/O Channels” window (see Figure 3.2) presents the I/O configurations to match the connection panel layout (see Figure 2.6– Omni connection panel types and diagram). In the Med-PC 6 Hardware Configuration Application “Configure IO Channels” dialog, for each port (P1, P2, and P3), “Top” Bits 1-4 make up the first connection panel, and “bottom” bits 5-8 make up the second panel. Choose which inputs to set to outputs and toggle the radio buttons at those coordinates.

When set to “Output,” the “Input Output” text color changes to red. When set to “Input,” the text color is green. Click the “OK” button to save these changes.

Choose which I/Os to set to Outputs and toggle the radio buttons at those coordinates. The configuration in Figure 3.2 defines the second half of the I/O connectors on the control panel (P2 5-8, P3 1-8) as Outputs. Figure 3.2 has set the first half (P1 1-8, P2 1-4) of the control panel I/O connectors to Inputs.

After the cards have been configured, from the “Hardware Configuration” window, click the “Auto Map SmartCtrl and OmniCtrl Cards” or, if appropriate, “Auto Map 2 Boxes per OmniCtrl Card” button. Alternatively, through the “Tools” menu, choose “Auto Map SmartCtrl and OmniCtrl Cards” or “Auto Map 2 Boxes per OmniCtrl Card”; this will raise the appropriate Auto Mapping window. A brief description will open of how many cards will be mapped to how many chambers. Select “OK” to map the cards and view the allocation of ports across the chambers in the “Hardware Summary” window (see Figure 3.3). Select the Close button to exit the Hardware Summary. To save your changes, close the HCA and select “Yes” when prompted to save the hardware configuration.

FIGURE 3.3 HARDWARE SUMMARY WINDOW

		Inputs					Outputs					
	Box Input	Rack	Model	Port	Offset	Card I/O	Box Output	Rack	Model	Port	Offset	Card I/O
Box 1	1	1	IC-124	794	0	P1, Bit 1	1	1	IC-124	794	1	P2, Bit 5
	2	1	IC-124	794	0	P1, Bit 2	2	1	IC-124	794	1	P2, Bit 6
	3	1	IC-124	794	0	P1, Bit 3	3	1	IC-124	794	1	P2, Bit 7
	4	1	IC-124	794	0	P1, Bit 4	4	1	IC-124	794	1	P2, Bit 8
	5	1	IC-124	794	0	P1, Bit 5	5	1	IC-124	794	2	P3, Bit 1
	6	1	IC-124	794	0	P1, Bit 6	6	1	IC-124	794	2	P3, Bit 2
	7	1	IC-124	794	0	P1, Bit 7	7	1	IC-124	794	2	P3, Bit 3
	8	1	IC-124	794	0	P1, Bit 8	8	1	IC-124	794	2	P3, Bit 4
	9	1	IC-124	794	1	P2, Bit 1	9	1	IC-124	794	2	P3, Bit 5
	10	1	IC-124	794	1	P2, Bit 2	10	1	IC-124	794	2	P3, Bit 6
	11	1	IC-124	794	1	P2, Bit 3	11	1	IC-124	794	2	P3, Bit 7
	12	1	IC-124	794	1	P2, Bit 4	12	1	IC-124	794	2	P3, Bit 8
Box 2	1	1	IC-124	794	4	P1, Bit 1	1	1	IC-124	794	5	P2, Bit 5
	2	1	IC-124	794	4	P1, Bit 2	2	1	IC-124	794	5	P2, Bit 6
	3	1	IC-124	794	4	P1, Bit 3	3	1	IC-124	794	5	P2, Bit 7

Note: An offset of "-1" indicates not applicable; there is no corresponding jumper setting.

Med-PC

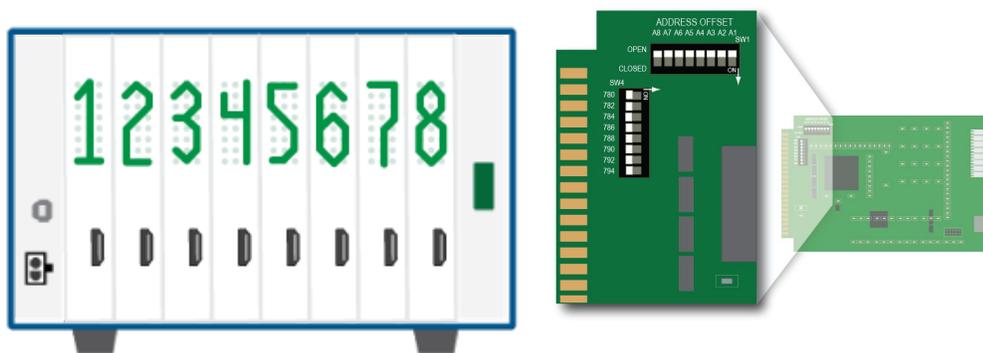
After hardware configuration, your system is set to be operated by Med-PC. OmniCtrl cards and connection panels are not designed to be run by Med-PC versions older than Med-PC 6. Brief instructions for operation and requirements for installation of Med-PC software can be found in Chapter 5 Software.

CHAPTER 4 SPECIAL INSTRUCTIONS

Port Address and Offset Configuration

The IC-124, when used in an SG-7000 series interface cabinet, has self-addressing capabilities, enabling automatic configuration (see Chapter 3). When received from Med Associates, the IC-124 address and offset DIP switches should all be OFF. If the switches are OFF, the IC-124 is assigned the appropriate address and offset within the system when the SG-7000 series cabinet is turned on. As it does so, the cards count off their assigned number in the light display on the front of the card. These values align themselves based on card positioning within the cabinet. If a card is manually addressed, it will count off its position number in red lights instead of green.

FIGURE 4.1 IC-124 DIP-SWITCHES IN THE “OFF” POSITION ALLOW SELF-ADDRESSING



Manually addressing an IC-124 card is designed to be a rare application. If the user finds their application requires it, a call to Med Associates support (see p. 31) may lead to more efficient solutions. It can be done.

Knowing how to avoid duplicating addresses and mirroring cards when addressing manually is essential. Below in Example 4.1, an IC-124 in slot three is manually set with the DIP switches to card two. The address is set to 794 and the offset to 4 (A2 switch ON). In Table 4.2 and Table 4.3 the DIP switches are referenced for manual OmniCtrl card addresses and those of other card models.

When a manually addressed IC-124 card starts up, it counts off its position number, not its addressed number, in red lights on the front of the card. One can confirm the correct address and offset in Med Test by checking the card data (Figure 2.5 Items B, C). SmartCtrl cards (DIG-716 or 716B) or SuperPort Cards (DIG-713A or 726) still need manual configuration. Please reference their user manuals for more detailed information on those systems. For reference and comparison, those DIP-switch settings are also present in Chapter 4 Table 4.2 and Table 4.3.

EXAMPLE 4.1 IC-124 IS MANUALLY ADDRESSED AS CARD# 2 AND INSERTED IN SLOT 3

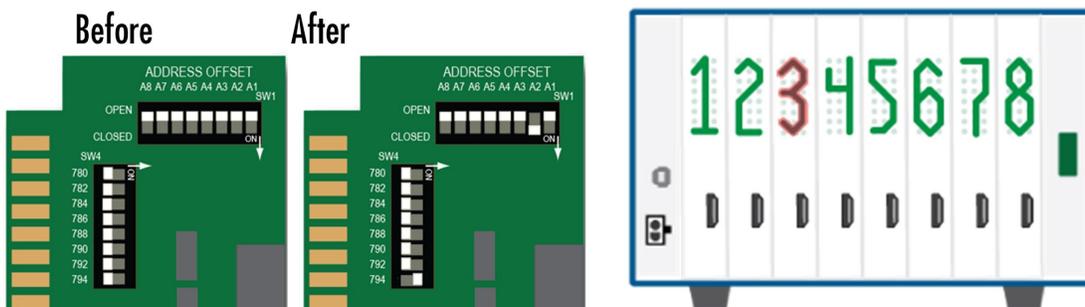


TABLE 4.1 OFFSET JUMPER SETTINGS (CHECK CARD LISTINGS FOR VALUES)

OFFSET VALUE	OFFSET JUMPERS/ DIP SWITCH SETTINGS	BINARY COUNTING
0	NONE	0000 0000
2	A1	0000 0001
4	A2	0000 0010
6	A1 + A2	0000 0011
8	A3	0000 0100
10	A1 + A3	0000 0101
12	A2 + A3	0000 0011
14	A1 + A2 + A3	0000 0111
16	A4	0000 1000
18	A1 + A4	0000 1001
20	A2 + A4	0000 1010
22	A1 + A2 + A4	0000 1011
24	A3 + A4	0000 1100
26	A1 + A3 + A4	0000 1101
28	A2 + A3 + A4	0000 1110
30	A1 + A2 + A3 + A4	0000 1111
36	A1 + A5	0001 0001
40	A1 + A2 + A5	0001 0011
44	A1 + A3 + A5	0001 0101
48	A1 + A2 + A3 + A5	0001 0111
52	A1 + A4 + A5	0001 1001
56	A1 + A2 + A4 + A5	0001 1011
60	A1 + A3 + A4 + A5	0001 1101

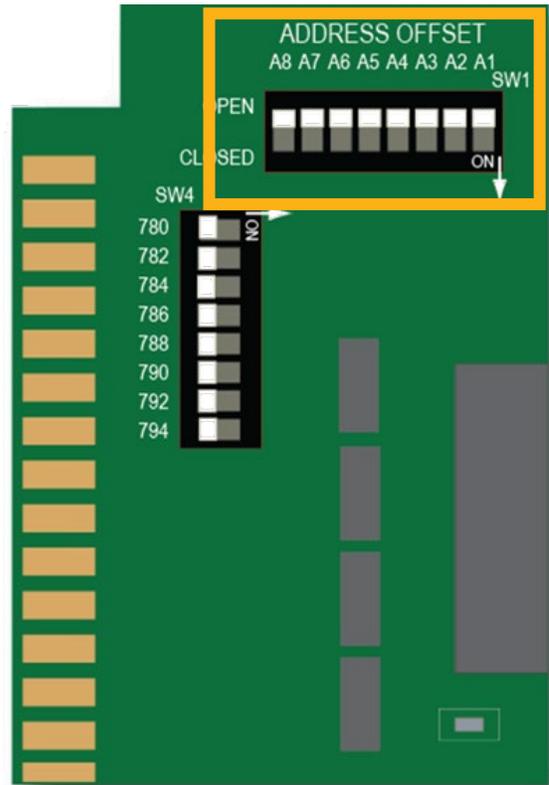


TABLE 4.2 OMNICTRL AND SUPERPORT I/O PORT AND OFFSET VALUES

CARD #	OmniCard™		SuperPort™ INPUT		SuperPort™ OUTPUT	
	I/O PORT*	I/O OFFSET	INPUT PORT**	INPUT OFFSET	OUTPUT PORT***	OUTPUT OFFSET
1	794 & 795	0	789	0	792 & 793	0
2	794 & 795	4	789	2	792 & 793	2
3	794 & 795	8	789	4	792 & 793	4
4	794 & 795	12	789	6	792 & 793	6
5	794 & 795	16	789	8	792 & 793	8
6	794 & 795	20	789	10	792 & 793	10
7	794 & 795	24	789	12	792 & 793	12
8	794 & 795	28	789	14	792 & 793	14
9	794 & 795	32	789	16	792 & 793	16
10	794 & 795	36	789	18	792 & 793	18
11	794 & 795	40	789	20	792 & 793	20
12	794 & 795	44	789	22	792 & 793	22
13	794 & 795	48	789	24	792 & 793	24
14	794 & 795	52	789	26	792 & 793	26
15	794 & 795	56	789	28	792 & 793	28
16	794 & 795	60	789	30	792 & 793	30

TABLE 4.3 OMNICTRL AND SMARTCTRL I/O PORT AND OFFSET VALUES

CARD #	OmniCard™		SmartCtrl™ INPUT		SmartCtrl™ OUTPUT	
	I/O PORT*	I/O OFFSET	INPUT PORT	INPUT OFFSET	OUTPUT PORT***	OUTPUT OFFSET
1	794 & 795	0	780	-1	792	0
2	794 & 795	4	781	-1	792	2
3	794 & 795	8	782	-1	792	4
4	794 & 795	12	783	-1	792	6
5	794 & 795	16	784	-1	792	8
6	794 & 795	20	785	-1	792	10
7	794 & 795	24	786	-1	792	12
8	794 & 795	28	787	-1	792	14
9	794 & 795	32	788	-1	792	16
10	794 & 795	36	789	-1	792	18
11	794 & 795	40	790	-1	792	20
12	794 & 795	44	791	-1	792	22
13	794 & 795	48	792	-1	792	24
14	794 & 795	52	793	-1	792	26
15	794 & 795	56	794	-1	792	28
16	794 & 795	60	795	-1	792	30

*The Input and Output port settings are hard-coded to 794 & 795 for OmniCtrl cards. When configuring the hardware, only port 794 needs to be entered.

**The Input port settings are hard-coded to 789 for SuperPort cards.

*** The Output port settings are hard-coded to 792 for SmartCtrl and 792 & 793 for SuperPort cards. When configuring the hardware, only port 792 needs to be entered.

Toggle versus Level Input and Normal versus Inverted Polarity

The default operation of a MedConnect I/O is “Active Low,” meaning that the active signal is when the power on the Operate or Signal line drops to the ground wire (see Figure 2.9). Further, it defaults to an all-or-nothing pulse signal. These default properties of the connection operation are termed Normal Polarity and Toggle Input Mode.

The toggle input mode captures a single input event, regardless of duration. In contrast, the level input mode continuously detects inputs as long as they are sustained.

Normal polarity responds to inputs when the switch contact is closed. Inverted polarity mode triggers inputs when the switch contact is open, catering to various experimental requirements.

Med-PC now controls Toggle vs. Level and Normal Polarity vs. Inverted Polarity for IC-124 cards. When initiated, the PCIC and Med-PC set all inputs to “Toggle” and “Normal Polarity” modes.

When needed, Toggle/Level and Normal/Invert are controlled programmatically, not by DIP switches as done in the past. When the cabinet turns on or Med-PC loads a program into a box, the cards default to “Toggle” and “Normal” modes. The settings can be switched for testing in MedTest with the buttons next to the port number and an open IC-124 GUI window. If the program requires the inputs to be in Level or Inverted Mode, then that program needs to use those functions in the MSN protocol (Procedures and Parameters for Med-PC p.28).

Adding TTL outputs to existing systems

The first parameter to consider when adding TTL inputs or outputs to an existing system is the number of connections you need to make with Med-PC. The SG-28-TTL-IN and SG-28-TTL-OUT, respectively, allow direct connections between a TTL input or TTL output and a control panel I/O. Each terminates in a micromolex slip connector on the connection panel side (sold with an SG-222 cable to connect to the control panel I/O) and a standard female BNC connection on the TTL side.

FIGURE 4.1 SG-28-TTL-OUT AND SG-28-TTL-IN



Converter boxes like the SG-230R or SG-230RC for inputs or the SG-231 for outputs can also achieve a small number of connections through a standard MedConnect port. They require additional power sources but are equipped with multiple connection types (such as direct wire connect screw terminals).

We also have solutions for connecting to third-party systems, such as Noldus, Colbourn, Neurolynx, and others.

If you need to make a larger number of Inputs or Outputs via TTL, the OmniCtrl TTL Panel (OC-112-TTL) will interface directly with the IC-124 like an OC-112. A DIG-713A SuperPort TTL Input card or DIG-726TTL-G SuperPort TTL Output card and passive connection panel with appropriate ports may be another solution. Currently, available options for multiple TTL connections vary greatly by application. We encourage users seeking to solve specific TTL challenges to contact Med Associates' Sales or Support team. We will be happy to help you find solutions.

CHAPTER 5 SOFTWARE

OmniCtrl components require Med-PC 6 version or newer to run. The most significant user experience differences are in the Med-PC configuration utility, without which several key instructions for component operation are missing.

Upgraded license packages are available for legacy users of Med-PC 5. Your purchase of Med-PC 6 comes with one year of software maintenance, and Med-PC 5, purchased within one year of its release, will be upgraded to versions released within that maintenance period.

For more complete information on installing and operating Med-PC, read or download the Med-PC 6 User's Manual DOC-353 from www.med-associates.com/resources/manuals/.

Migrating from Med-PC 5 to Med-PC 6

For those who used Med-PC versions 4 or 5 and are upgrading to Med-PC 6 to run OmniCtrl equipment, many settings will be migrated automatically. For those who wish to follow the process and check for completeness, we have included the following guide for migrating your files, protocols, macros, and data to the new software version.

- I. Install Med-PC 6 using the installation media provided.
- II. Run the Med-PC Hardware configuration application for Med-PC 6.
 - A. Add input and output cards to the onscreen representation of an interface rack until it matches the actual physical rack.
 - B. Map the input and output cards to boxes (chambers) as desired.
 - C. Save the hardware configuration and exit the utility.
 - D. For more information on creating hardware configuration files, please see the Med-PC® User's manual, DOC-335.
- III. Copy any custom code from the old "Med-PC (IV)\User.PAS" file into the new "Med-PC\User.PAS" file:
 - A. Copy any HED and BOD files listed in the old "User.PAS" to the new "User.PAS."
 1. Open the old "User.Pas" and the new "User.Pas" files in a text editor (Example: Notepad).
 2. Copy any HED files under the <{"Place \$I Filename.HED files here."}> section.
 3. Copy any BOD files listed under the <{"Place \$I Filename.BOD files here."}> section.
 - B. Copy the HED and BOD files from the old "Med-PC (IV or V)" folder into the new "Med-PC" folder.
 - C. Copy any User created custom routines that are not contained in the previously mentioned HED and BOD files from the old "User.Pas" file into the new "User.Pas" file.
- IV. Copy any custom code from the old <Med-PC (IV)\Backproc.PAS> file into the new <Med-PC\Backproc.PAS> file.
- V. Copy any MSN programs that are still being used from the old "Med-PC (IV)\MPC" folder into the new "Med-PC\MPC" folder.
- VI. Copy any Macros that are still being used from the old "Med-PC (IV)\Macro" folder into the new "Med-PC\Macro" folder.
- VII. Translate the MSN programs using Trans.
 - A. Running an MSN protocol in Med-PC must first be translated from human-readable text into an a .MPC file and then into machine-readable protocols for Med-PC. To do this, open the Trans utility. You will find this file in the Med-PC folder in a standard installation.
 - B. In Trans, open the file with your code or create a new file to code directly into the Trans window. You can do this by either clicking the Open Folder icon in the quick access toolbar or through the File menu with the Open option. Navigate to the file in the navigator window, select it, and press the "Open" button on the bottom right.
 - C. When the file is opened in Trans, the comment code is **Green**, state sets are indicated in **Blue**, and the standard code is **Black**.

- D. Translate and compile - use the "Translation" menu to choose "Make" singly as needed or "Batch Translate!" to convert all the protocols open. You can also run these options from the Batch Translation window (open from the "Window" menu). Compilation errors can be reviewed in the Results window (open from the "Window" menu).
- VIII. Start Med-PC and review/select the desired options for saving data files by clicking (Data | File Options...).

TABLE 5.1 MINIMUM INSTALLATION AND SYSTEM REQUIREMENTS FOR MEDTEST & MED-PC 6

	RECOMMENDED MINIMUM REQUIREMENTS
Operating System	Windows 10 64-bit or later
Processor, Graphics Display, and RAM	Minimum to run OS
Hard Disk Space	>600 MB (approximate installation size for Med-PC Med Test and Med Drivers)
Hardware	USB 2.0 or faster serial port

Med-PC / MSN programs

For detailed information, refer to the DOC-335 Med-PC 6 User’s Manual and DOC-301 Med-PC Programmer’s Manual.

If the installation media that came with the OmniCtrl system has been installed on the computer, example MedState Notation code examples can be found at: <C:\Med-PC\MPC\>

Procedures and Parameters for Med-PC

For parameters needed to control OmniSound devices, reference DOC-336 OmniSound User’s Manual.

For a complete reference of syntax, see DOC-301 Med-PC Programmer’s Manual. Table 5.2 Med-PC Procedures lists some stand-out commands added to MedState Notation for Med-PC 6.

These functions are for IC-124 cards with a DIG-705 only; using them on an older card will have no effect. Therefore, they can be used with older systems set manually with DIP switches without issue.

TABLE 5.2 MED-PC PROCEDURES

COMMAND	INPUTSTOLEVEL
<i>Usage</i>	INPUT: INPUTSTOLEVEL P1, P2, ..., Pn ---> NEXT
<i>Description</i>	When Med-PC is started, or a program is finished running in a box, all inputs assigned to that box with the hardware configuration application are set back to the default setting of Toggle Mode. If a program needs an input to be in Level Mode, then that program must use the INPUTSTOLEVEL command.
<i>Parameters</i>	P1, P2, Pn, where n is a port number declared in the Hardware Configuration Utility that the current program uses.
<i>Example</i>	S.S.1, S1, 0.01": INPUTSTOLEVEL 1,2,3,4,5,6,7,8 ---> S2

COMMAND	INPUTSTOINVERT
<i>Usage</i>	INPUT: INPUTSTOINVERT P1, P2, ..., Pn ---> NEXT
<i>Description</i>	When Med-PC is started or a program is finished running in a box, all inputs assigned to that box with the hardware configuration application are returned to the default Normal Mode setting. If a program needs input in Invert Mode, it must use the INPUTSTOINVERT command.
<i>Parameters</i>	P ₁ , P ₂ , P _n , where n is a whole port number declared in the hardware configuration application, and the current program uses between 1 and 80.
<i>Example</i>	<p>S.S.1, S1, 0.01": INPUTSTOINVERT 1,2,3,4,5,6,7,8 ---> S2</p>

CHAPTER 6 SAFETY, FAIL-SAFES, AND REPAIR

Missing Peripherals

Device self-registration is a function of OmniCtrl cards when used in SG-7000 series control interface cabinets with a DIG-705 or later decode interface card. SG-6000 series control interface cabinets do not register devices or automatically address cards.

If peripheral devices do not show as connected in MedTest, this is often due to missed registration. If the system is powered when cards or devices are changed (hot-swapped), it can cause severe damage. Hot-swapping more often causes the hardware to lose the needed registration with the central controller.

As mentioned earlier, the first step to the fastest, safest, and Med Associates-supported method for removing or adding cards or removing or adding control panel peripherals (e.g., MedTouch, OSC-112, etc.) is to turn off the PCIC. In the event of a missed registry, systems may not recognize components, or the system may shut down. If the system is not damaged, restarting the PCIC can usually rectify this issue. Sometimes, it is also necessary to restart Med-PC. If issues caused by hot-swapping are not fixed by rebooting the system, it will be required to send the PCIC and possibly other components to Med Associates for repair (See Contact Information p.31)

Troubleshooting connections

The OmniCtrl system assists the user by providing many types of feedback to confirm connections and their quality.

At the connection panel, the green LED near the COM port steadily illuminates when power and control are detected. When power is insufficient to run the system, the light goes out or flashes rapidly. When control is not detected, the light flashes alternating every second.

The IC-124 shows twenty-four face panel lights indicating connected I/O panel signals.

- If a signal is sent to a connection panel, but the panel is not connected to receive it, the corresponding LED will signal red.
- If the output device is connected, the corresponding port LED will signal yellow-orange.
- If a signal comes into a port from an input, the corresponding port LED will turn green in time with the signal.
- If an intended output signal responds green, there is likely a short between the signal and the ground line on the Med Operate I/O in the device or the panel.

If the system is powered when cards or devices are changed, it can damage the system, but more often causes loss of needed hardware registration with the central controller. "Live swapping" hardware can be successful sometimes, but in the event of a missed registry, systems may not recognize components, or the system may shut down. If the system is not damaged, this issue can usually be easily rectified by restarting the PCIC. Sometimes, it is also necessary to restart Med-PC or MedTest. In short, the fastest, safest, and Med Associates-supported method is to turn off the PCIC before removing or adding cards.

Cleaning

Do not submerge any portion of the device in liquid. Clean the device case using a soft cloth dampened with water and detergent. The device case is usually aluminum or plastic polymer. Should fluids enter the device's internals, disconnect the power and invert the device to drain. Set the device in a warm, dry area to air dry thoroughly before restoring power.



**DO NOT
AUTOCLAVE**



**DO NOT
SUBMERGE**

Warranty & Repair

This device is protected under a limited manufacturer warranty for two years from purchase.

Med Associates continues to support and repair products outside the warranty period indefinitely. For a fee, we will repair our products as long as we are logistically able. We are proud to continue to support instruments manufactured in our opening production line from 1972.

If you want further information about this device, its parts and accessories, or integration with your application, please contact Med Associates Support.

Contact Information

Please get in touch with Med Associates, Inc. for information regarding any of our products.

Med Associates Support can answer technical questions on weekdays between 8:00 a.m. and 4:30 p.m. ET by phone at 1-802-527-2343 or by email at support@med-associates.com. We look forward to collaborating with you.

This and other manuals are available on our website.

Visit <https://med-associates.com/resources/manuals/> or use your device to follow the QR code link held by the rat on the back cover of this manual.

Visit our website at www.med-associates.com. For pricing inquiries, email sales@med-associates.com.

DOCUMENTS REFERENCED OR RELATED TEXTS

Med Associates Manuals

- DOC-011 R4.7 ANL-926 Programmable Audio Generator Manual
- DOC-013 R1.4 SmartCtrl Interface Modules
- DOC-029 R2.5 SOF-732-2 Wave File Player
- DOC-114 R1.7 DIG-703A DIG-703B USB Interface System
- DOC-149 R1.1 SOF-732-3 Control of Med Input and Output Modules from other languages.
- DOC-200 R2.2 Med Test User’s Manual
- DOC-301 R1.3 SOF-737 Med-PC Programmer’s Manual
- DOC-303 R1.0 SOF-736 Med PC V User’s Manual
- DOC-324 R2.1 DIG-726 SuperPort™ Output Card Pinout
- DOC-327 R1.0 SG-7XXX Interface Cabinets
- DOC-335 R1.0 SOF-738 Med-PC 6 User’s Manual
- DOC-336 R1.0 Omni Sound Devices Manual

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