MED-PC® VI USER'S MANUAL

RESEARCH CONTROL & DATA ACQUISITION SOFTWARE
SOF-737
USER'S MANUAL

DOC-335
Rev. 1.0

notes

Table of Contents

CHAPTER 1 | OVERVIEW

The SOF-737 MED-PC® software package contains four separate applications: MED Test, the Hardware Configuration Utility, Trans and MED-PC®.

MED Test: MED Test helps verify hardware functionality independently of MED-PC®. This includes an interface card test, Programmable Audio Generator (ANL-926) test, and tests for SmartCtrl™ interface modules, Standard modules, SuperPort™, OmniCard modules and more.

Hardware Configuration Utility (HCU): The HCU is used to build a configuration file that informs MED-PC® how many boxes are connected, how many inputs and outputs are available to each box, and how are they identified. The utility includes on-screen guides that walk the user step by step through the set-up procedure.

Trans: Trans is used to compile MedState Notation™ (MSN) procedures into DLL files that may be executed by MED-PC®. Trans also serves as a text editor for writing MSN procedures and includes a detailed help file related to MSN programming.

MED-PC®: MED-PC® is the runtime or operating system in which MSN procedures are executed. It allows for the use of up to 16 test chambers with up to one million data elements per chamber. A single test chamber may have up to 80 inputs and 80 outputs.

General Computer Environment

MED-PC® systems require a PC running Windows 7 64 bit (or later) with at least one USB slot if using a DIG-705 or a full height PCI slot for a or a full height PCI-Express slot for a DIG-704.

To use the new OmniCard hardware with MED-PC VI a DIG-705 USB must be used.

CHAPTER 2 | SOFTWARE INSTALLATION

If the computer was purchased as part of a complete MED-PC® system from MED Associates, the driver and software installation was completed at the factory, please proceed to **Chapter 3, Hardware Setup**. If the computer was not purchased from MED Associates as part of a system, or MED-PC® is being reinstalled for another reason, follow the instructions below to install the drivers and software.

Before beginning the software installation, please phone, fax or e-mail MED Associates with the registration information in order to receive the software installation password. This password will be necessary during the software installation process.

Insert the MED-PC® USB stick into a USB slot and at the welcome screen click **Install MED-PC VI**. If the install does not auto-start, navigate to the USB stick in Windows Explorer and double click "Autorun.exe" and click **Install MED-PC VI** at the welcome screen. Successful installation of each component will be indicated by a green check mark, a red X will indicate an unsuccessful installation. When prompted enter the user name, company name and software installation password. When the installation completes, click **Finish**.

Once MED-PC® is installed please install any other MED Associates, Inc. software that is going to be used in a similar manner.

CHAPTER 3 | QUICK START GUIDE

New systems purchased from MED Associates will have the required software installed on the PC, the DIG-705 USB card installed in the interface cabinet, the hardware connections will be pre-configured and include instructions for completing the hardware setup. Please refer to the included instructions to complete the hardware set up.

The quick start steps should be performed after MED-PC® and any other related software has been installed, please see **Chapter 2, Software Installation**.

The following quick start guide is designed to get the user up and running using a single interface cabinet (rack) and OmniCard modules, where each OmniCard module is assigned to an individual chamber.   For more involved installations please see **Chapter 6, Advanced Installations**. Before proceeding, please refer to the documentation included with the interface cabinet and OmniCard modules to ensure the hardware is connected properly, and that the OmniCard modules have the correct address and offset settings.

DIG-705 USB Connection

Connect the DIG-705 USB to any available USB port on the computer.

Hardware Configuration

In order to use MED-PC® it is necessary to complete the hardware configuration. The **Hardware Configuration Utility (HCU)** may be accessed at any time when adding or removing hardware to or from a system.

If the computer was purchased from MED Associates, Inc. as part of a system, the hardware configuration has already been completed. The **Hardware Summary** may be viewed or printed to review the current settings. Do not change the number of boxes or specific input and output definitions unless additional boxes or different interface cards have been added to the interface.

Setting Rack Size

Upon opening the HCU, the screen presents a view of the interface cabinet (Figure 3-1). Click **Adjust Rack Size** to set the appropriate rack size being used, 8 or 17 slots (DIG-704 only). This sets the number of locations available for use with different interface cards, not including the slots used by the Decode card or power switch locations.

If a DIG-705, SG-7000 series interface cabinet and OmniCard modules are being used, then the HCU will automatically detect the cards in the interface cabinet, set the rack size, and pre-populate the screen.

Figure 3-1 - Hardware Configuration – Adjust Rack Size
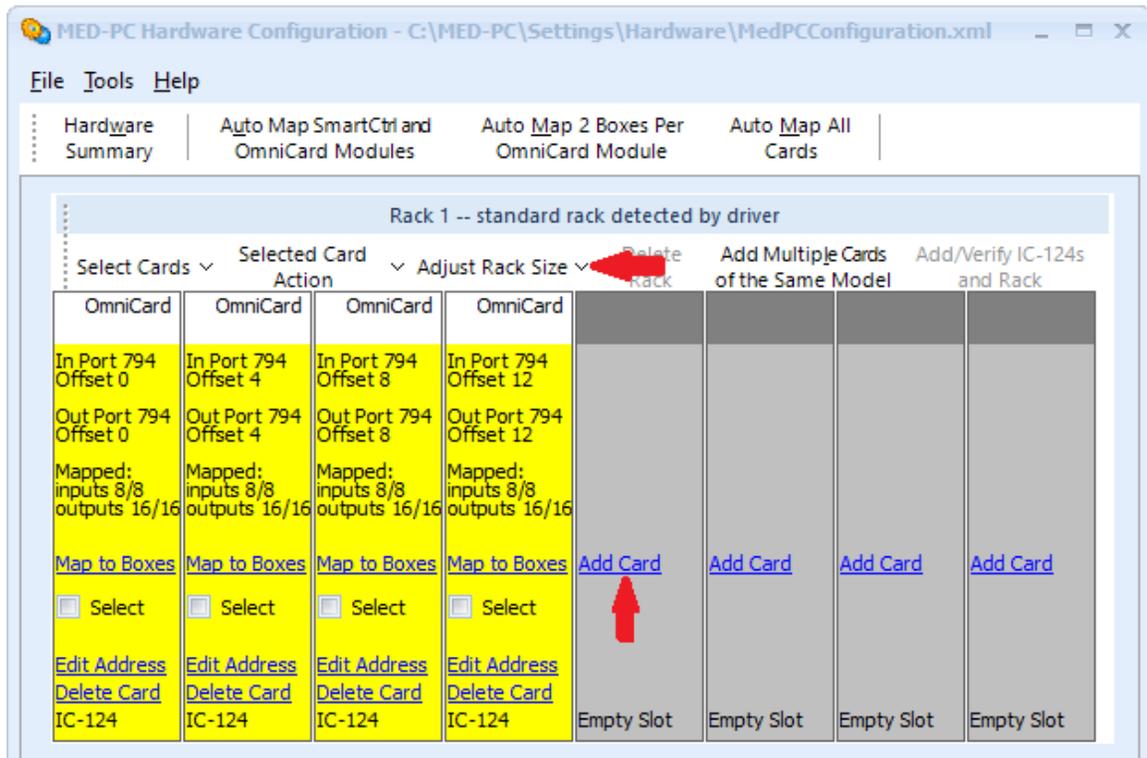
Adding OmniCard Modules

OmniCard modules may be added to the hardware configuration one at a time or in groups. To add a single card click **Add Card** (Figure 3-1) in the desired card location to open the **Add Card** window (Figure 3-2). Select the desired card and the Input Port, Output Port and Offset information will be automatically populated. Click **OK** to add the card to the rack. Repeat these steps until all desired cards have been added.

Figure 3-2 - Add Card Window
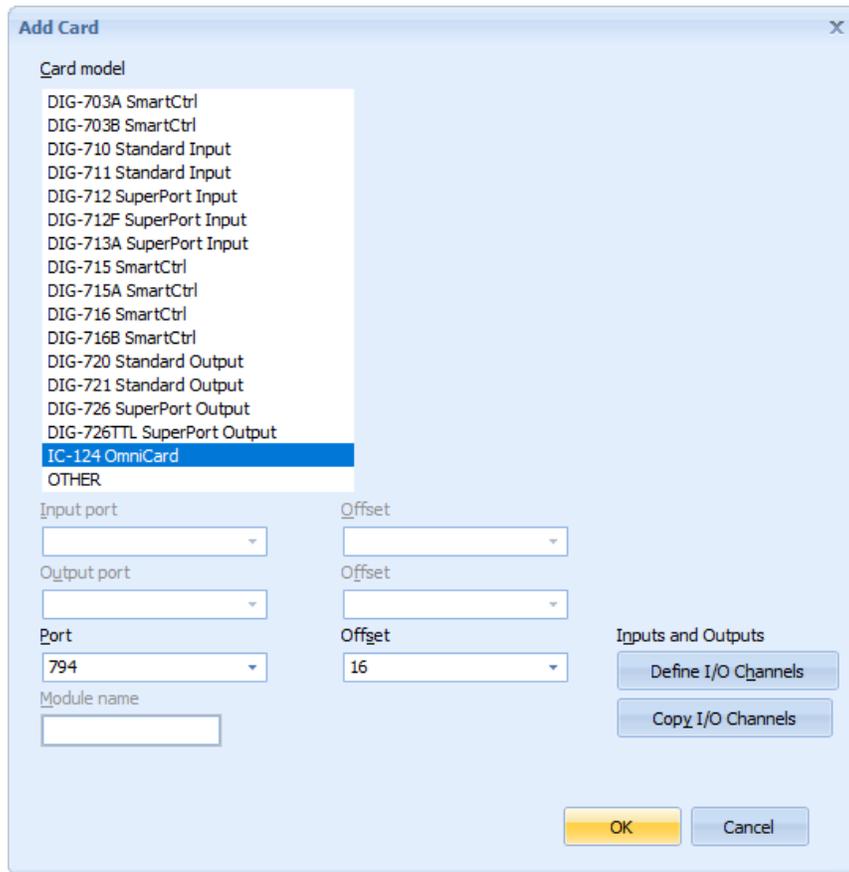
To insert multiple cards of the same type at the same time, click **Add Multiple Cards of the Same Model** (Figure 3-1) to open the **Add Multiple Cards of the Same Model** window. Use the drop-down menus to select the card model and number of cards to add (Figure 3-3) and click **OK** to add the cards to the rack.

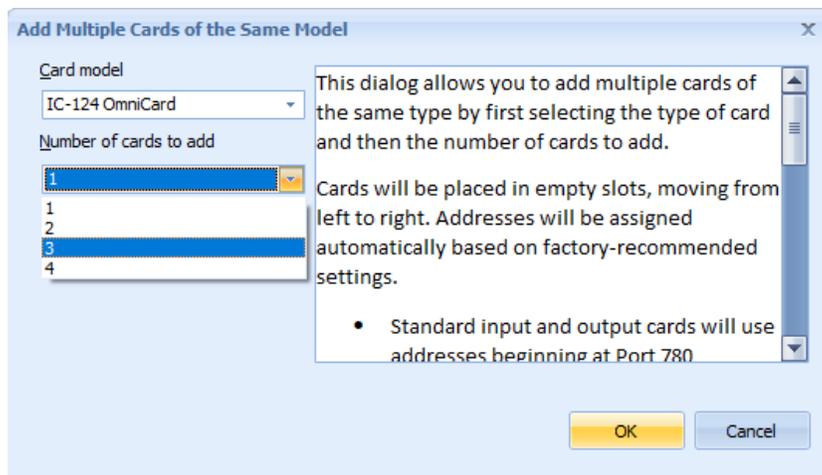*Figure 3-3 - Add Multiple Cards of the Same Model*

Figure 3-4 - HCU With Four OmniCard Modules
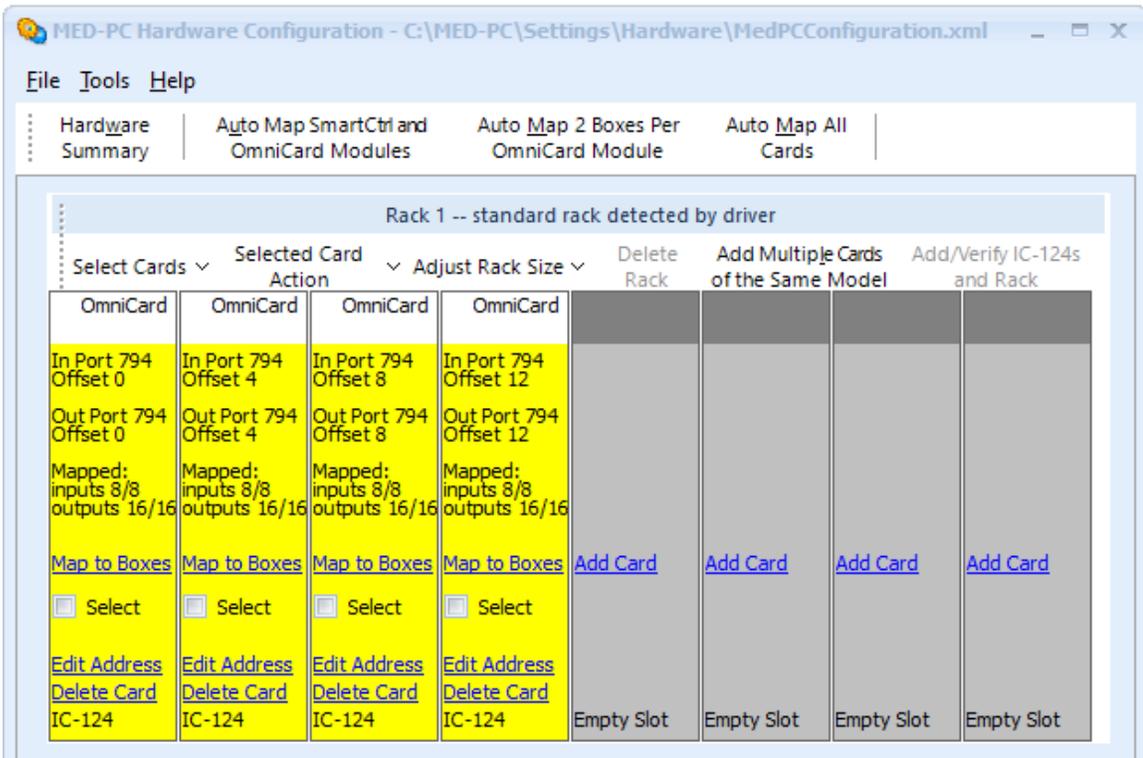
When adding cards to the rack, keep in mind that the card mapping steps to follow will be easier to perform if like cards are grouped together in the rack.

When adding a single card (Figure 3-2), the **Other** option in the Add Card window is used to add cards that are not listed, such as the ANL-926 Programmable Audio Generator.

With OmniCard modules the 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 **Edit Address** (Figure 3-4) on each card to adjust the port and offset values to match the physical switch/jumper settings on the card.

The OmniCard module has the unique ability to have each I/O be either an input or output. By default, all I/O's will be an input. To change this first click on **Edit Address** and then on **Define I/O Channels** (Figure 3-5).

Figure 3-5 - Edit Address
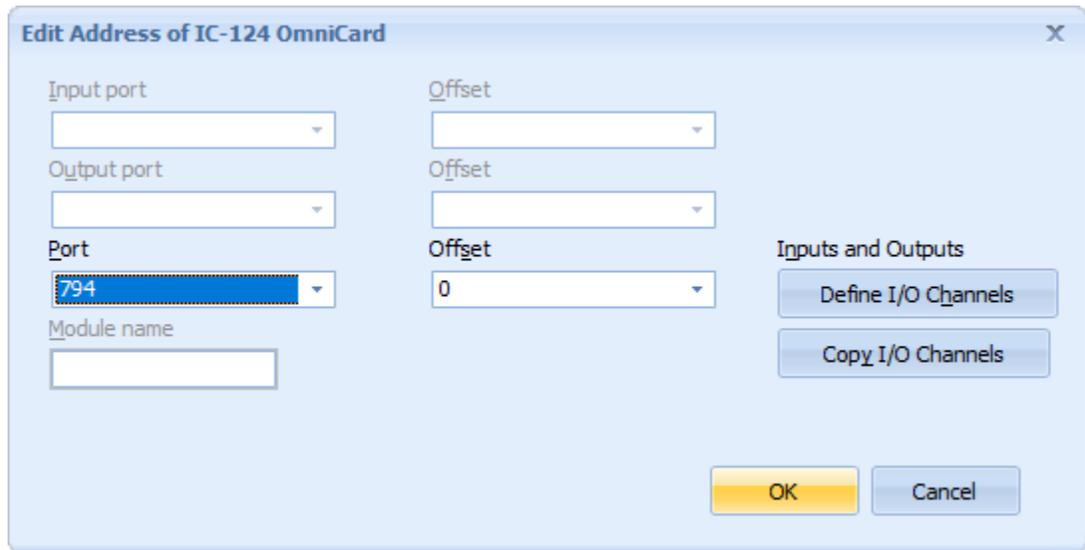
To change an I/O to Output just select the appropriate radio button or click on the button that says **All Outputs** to change all the I/Os in that column.

Figure 3-6 – Configure I/O Channels
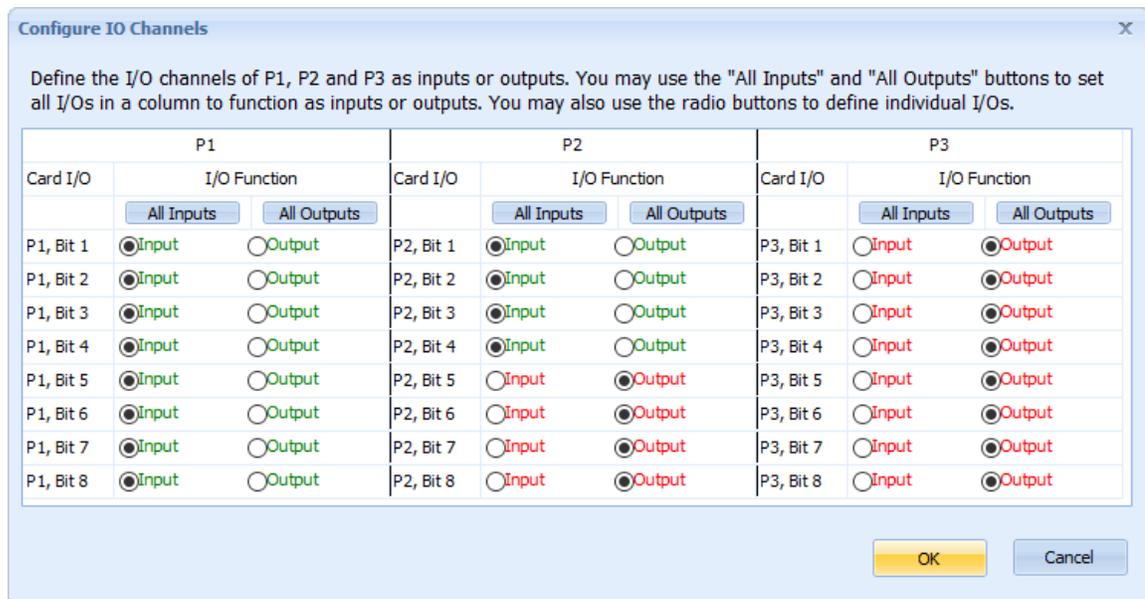
Once the inputs and outputs are all set the configuration can be copied to the other cards by clicking on the button that says **Copy I/O Channels** (Figure 3-5).

Card Mapping

After the cards have been added to the rack, their inputs and outputs need to be mapped to the chambers. Interface cards may be assigned to individual chambers, or inputs and outputs may be spread across different chambers. See **Chapter 6, Alternative Installations** for mapping inputs or outputs across multiple chambers.

Click the **Auto Map SmartCtrl and OmniCard Modules** button (Figure 3-4) or click **Tools > Auto Map SmartCtrl and OmniCard Module…** to open the **SmartCtrl or OmniCard Auto Mapping** window (Figure 3-7) and see how the cards will be allocated across the chambers. Click **OK** to map the cards and the **Hardware Summary** (Figure 3-8) will open so that the inputs and outputs may be reviewed. Click the **Close** button to exit the Hardware Summary. Close the HCU and select **Yes** when prompted to save the hardware configuration.
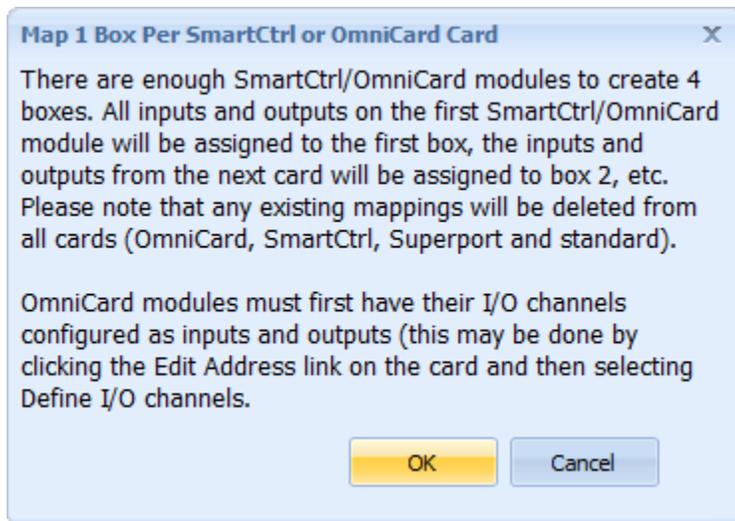
Figure 3-7 - Auto Mapping

Figure 3-8 - Hardware Summary

		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.

Temporal Resolution

The recommended Temporal Resolution is 10 milliseconds (ms). All timed values will be based on a multiple of the value of the Temporal Resolution. To set the Temporal Resolution click **Tools > Temporal Resolution…** and select the 1 ms or 10 ms radio button.

After selecting the Temporal Resolution (Figure 3-9), click **OK** to continue and exit the HCU, click **Yes** to save the changes if prompted.

Figure 3-9 - Temporal Resolution
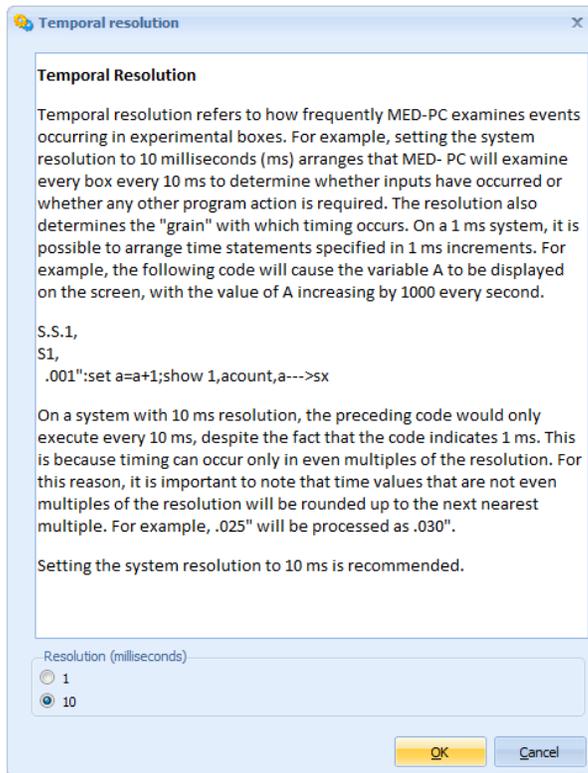
Multiple Hardware Configurations

It is possible to save multiple hardware configurations for use under different circumstances or by different users. After completing the hardware configuration steps outlined above, click **File > Save As…** and provide a meaningful file name for the hardware configuration.

Hardware Summary

The hardware configuration summary (Figure 3-8) may be viewed or printed at any time by clicking the **Hardware Summary** button or by clicking **Tools > Hardware Summary…** A printed summary is available by clicking the **Print** button in the hardware summary screen or by clicking **File > Print Hardware Summary**.

Data File Options

In previous versions of MED-PC® the data file options were handled from within the Hardware Configuration Utility. The data file options are now set from within MED-PC® VI itself.

The recommend data file options are shown in Figure 3-10. Access the data file options in MED-PC® by clicking **Data > File Options…**These options and the different data file formats are explained in detail in **Chapter 7, Data File Formats**.

Figure 3-10 - Data File Options
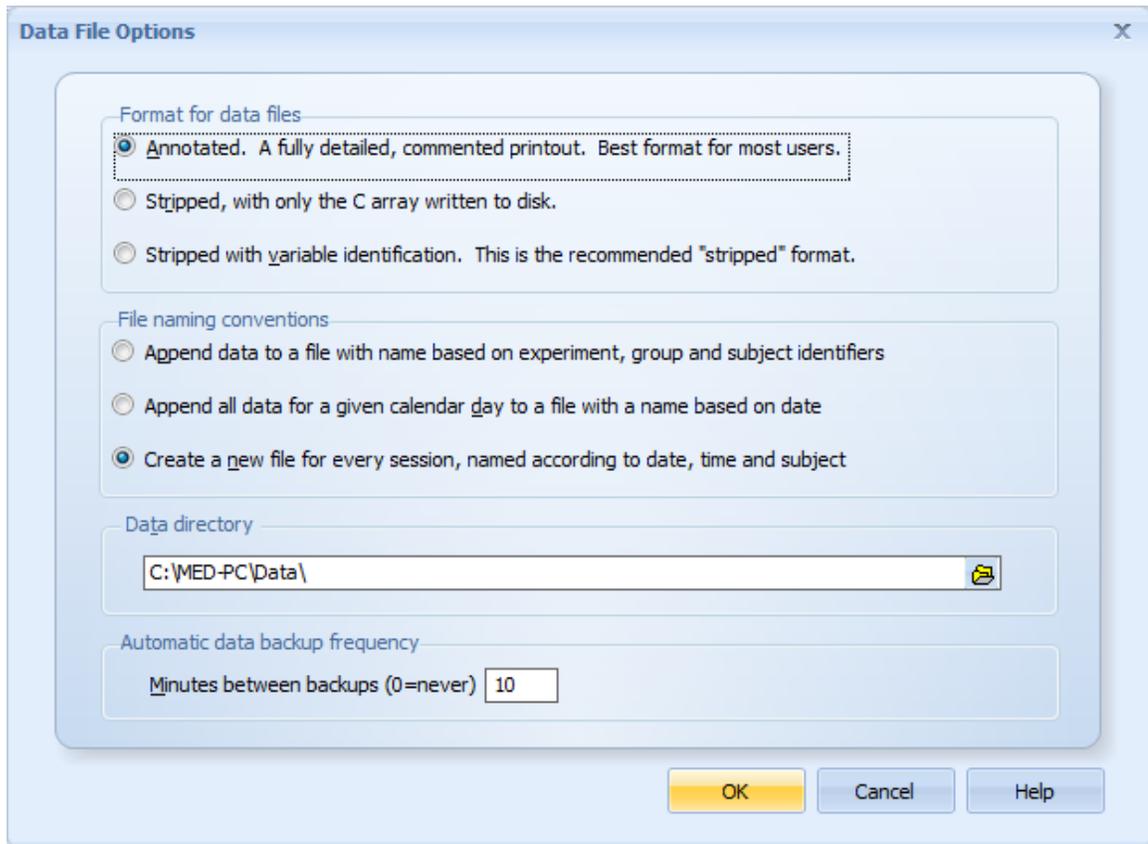
MED-PC®, the rack and OmniCard modules are now ready to use. For more advanced options and sharing inputs and outputs across multiple chambers see **Chapter 6, Advanced Installations**.

CHAPTER 4 | RUNNING A MED-PC® PROCEDURE

This chapter is designed to be an introduction to some of the features of the MED-PC® interface. More in-depth information is available via the on-screen help which is accessed by clicking **Help > Help for MED-PC**, pressing the **F1** key or clicking the **Help** (question mark) toolbar button.

Before a procedure may be executed in MED-PC®, it must be compiled in Trans. If a compiled procedure does not yet exist, please refer to **DOC-301, MED-PC® Programmer's Manual** for an overview of MedState Notation and follow the steps in Tutorial #1 to create a procedure and compile it in Trans.

To use an existing procedure from a previous version of MED-PC®, copy the *filename*.mpc file to the "C:\MED-PC\MPC" folder and compile it in Trans.

Loading a Procedure Using the Experiment Loading Wizard

In MED-PC® click the Wizard button (Figure 4-1) or click **Sessions > Wizard for Loading Boxes** and the Experiment Loading Wizard will appear (Figure 4-2). Select the box(es) to load and click **Next**.

Figure 4-1 - Experiment Loading Wizard Button

Figure 4-2 - MED-PC® Experiment Loading Wizard
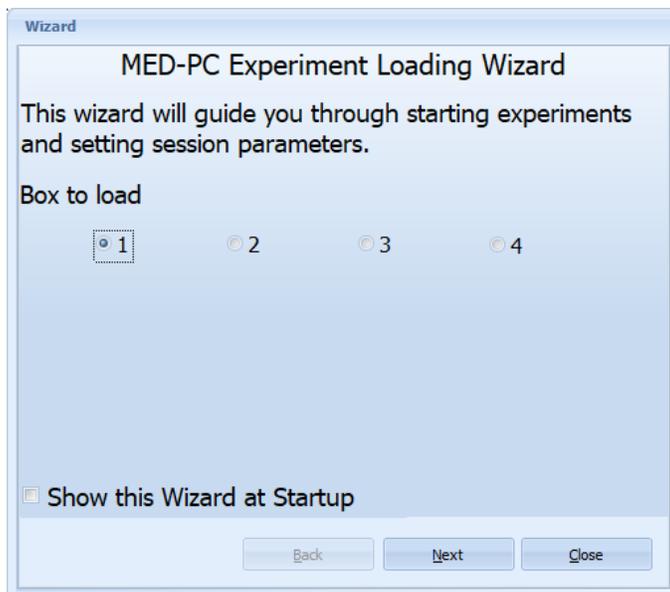
Select the procedure to load (Figure 4-3) and click **Next**.

If there are compiled MedState Notation (MSN) programs ready to run in the MPC folder, the Experiment Loading Wizard will automatically start when MED-PC® is opened. To disable this feature, in the **Start Boxes** screen (Figure 4-2) clear the check box in the lower left corner of the screen.

Figure 4-3 - Select Procedure to Load
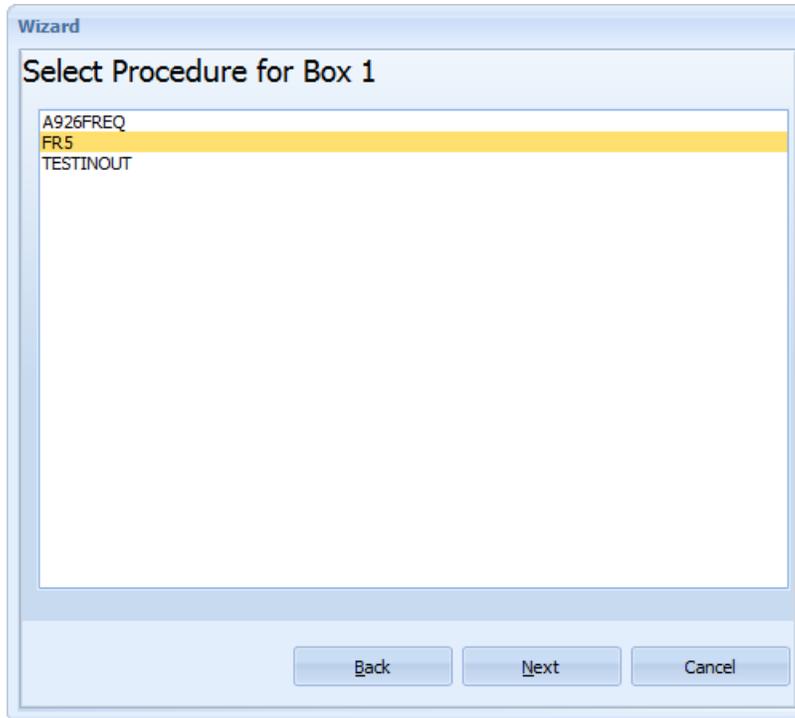
Enter any desired procedure information (Figure 4-4) and click **Load**.

Figure 4-4 - Procedure Information Screen

At this point if the procedure employs any control variables via VAR_ALIAS commands, the session parameters screen (Figure 4-5) will open allowing for adjustment to the control variables. Click **Accept Parameters** when ready to proceed.

Figure 4-5 - Session Parameter Adjustments Screen

To issue a start signal to the currently loaded box(es) and exit the wizard, tick the check box next to each desired loaded box and click **Finish**. The wizard will close and the MED-PC® runtime screen (Figure 4-7) will be displayed.

To issue a start signal to the currently loaded box(es) and then load additional boxes, tick the check box next to each desired loaded box and click the **Load another box** button. The selected boxes will begin to run and the Experiment Loading Wizard will begin again starting with the image in Figure 4-2.

To load more boxes without starting the currently loaded boxes, click the **Load another box** button and step through the wizard again.

Figure 4-6 - Start Boxes Screen
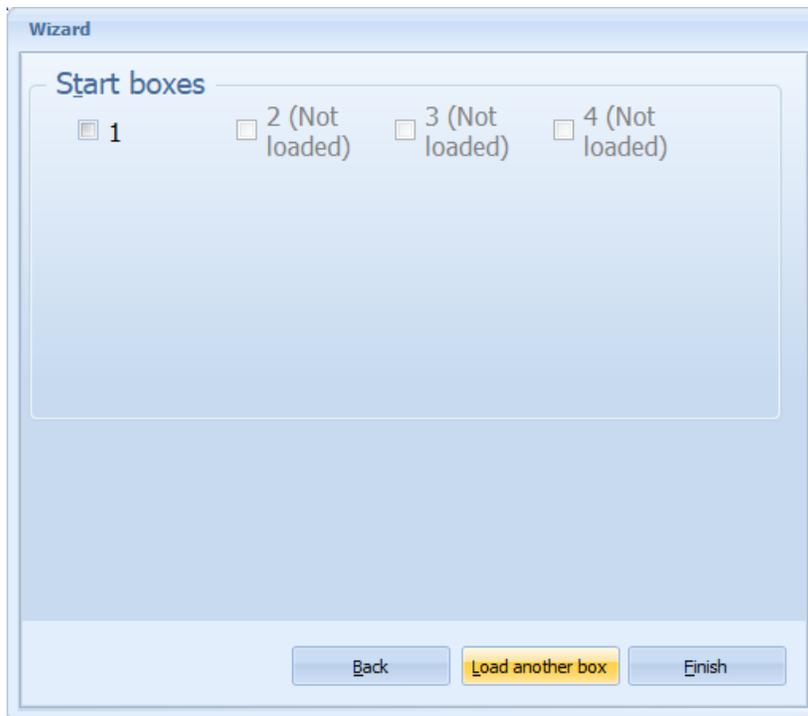
Figure 4-7 - MED-PC® Runtime Screen
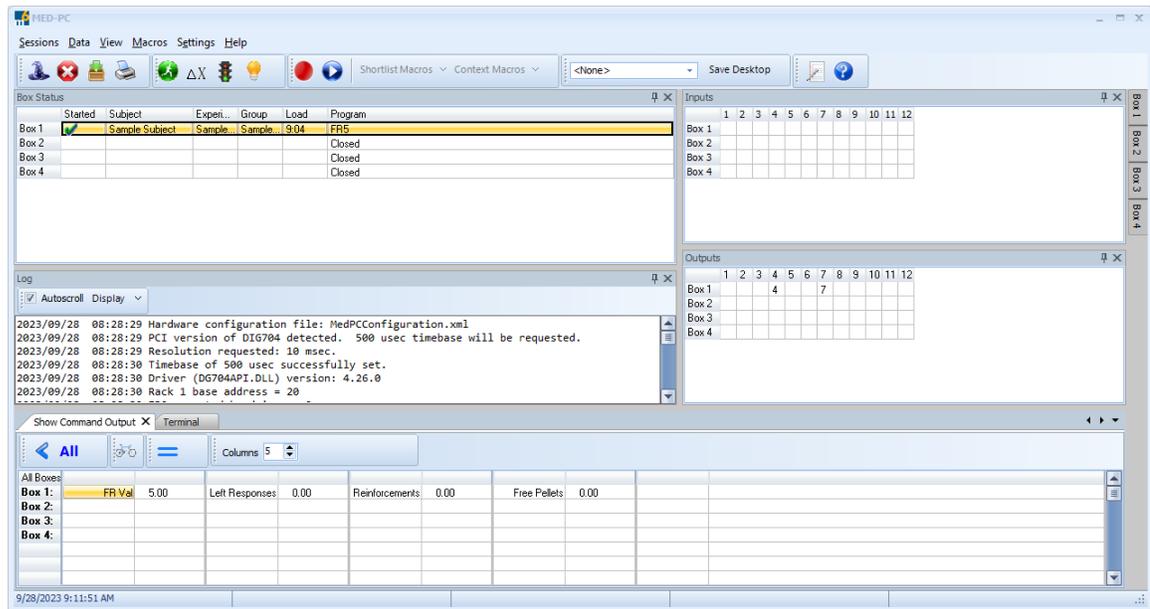
Loading a Procedure Manually

To load one or more boxes, click **Sessions > Load Box…**, type **Ctrl+O**, or click the **Load Box** icon (Figure 4-8) from the toolbar to open the **Load Box** screen.

Figure 4-8 - Load Box Icon

In the Load Box screen (Figure 4-9) select the box(es) to load using the check boxes in the **Load?** column, select the procedure to load from the Procedure dropdown and add any desired subject and experiment information and comments.

Figure 4-9 - Load Box Screen
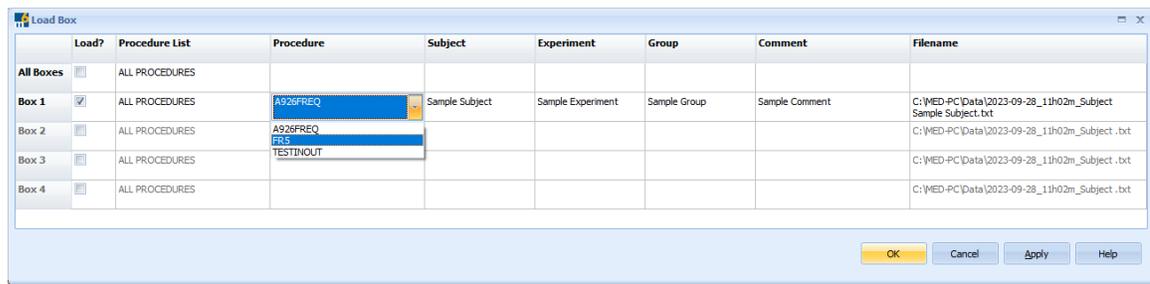
Clicking **Apply** will load the procedure(s) into the selected box(es) and keep the Load Box screen open to load other boxes. Clicking **OK** will load the procedures and then close the Load Box screen.

Issuing a Start Command

The fastest way to issue a start command to a single loaded box is to select the box in the Box Status window and click the **Issue Start Signal to Selected Box** button in the tool bar (Figure 4-10). Please note, not all MedState Notation programs require or accept a Start command.

Figure 4-10 - Issue Start Signal to Selected Box
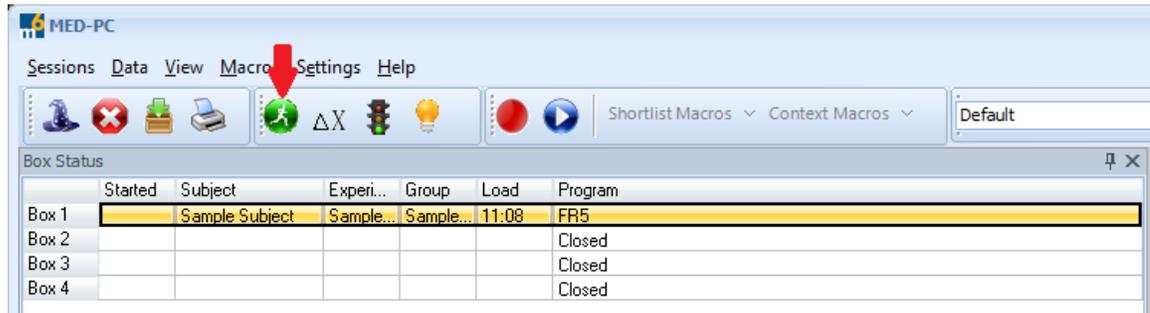
A single box may also be started by clicking the corresponding box slide out tab (red arrow, Figure 4-11) to reveal that box's activity screen, and then clicking the **Issue Start Signal to Selected Box** button (blue arrow, Figure 4-11) in that box's toolbar.

Figure 4-11 - Slide Out Box Activity Screen
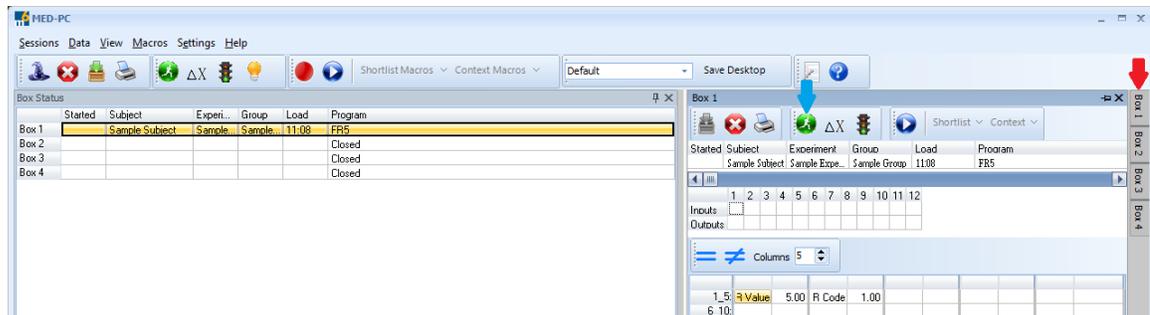
Single or multiple boxes may be started at the same time by clicking **Sessions > Signals (Start, #K, #R)…** or by clicking the **Send K, R or Start Signal** button in the toolbar (Figure 4-12) to open the **Send Signals to Boxes** screen in Figure 4-13.

Figure 4-12 - Send K, R, or Start Signal Button

Use the radio buttons and check boxes to select the type of signal to send, which box(es) to send the signal to and then click **Apply** to send the signal and keep the Send Signals to Boxes screen open or click **OK** to send the signal and close the Send Signals to Boxes screen. When sending a simulated response (#R) or K pulse, use the drop downs to set which input number the response is simulating, or which K pulse is being issued.

Figure 4-13 - Send Signals to Boxes
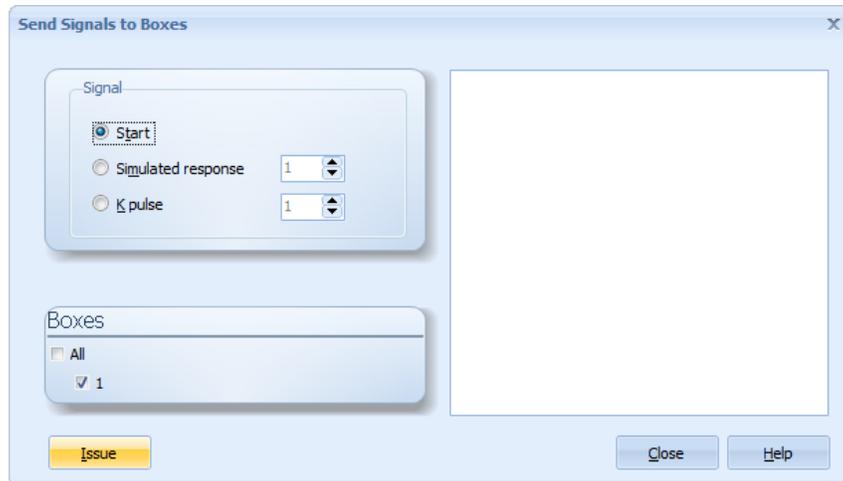
Stopping a Procedure

If a procedure needs to be stopped manually click **Sessions > Stop Box…** or click the **Stop** button. In the **Stop Boxes** window select whether to save or abandon the data, click which box(es) to stop and click **OK**. See Figure 4-14.

Figure 4-14 - MED-PC® Stop Button and Stop Boxes Window
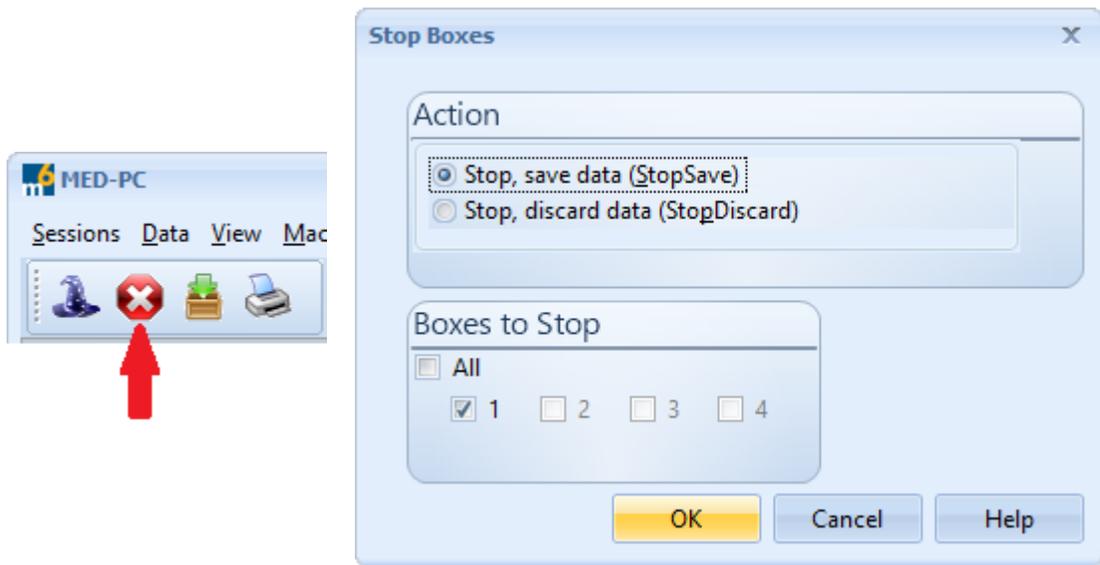
CHAPTER 5 | USER INTERFACE

Sessions Menu

	Load Box – Ctrl+O	Opens the Load Box window to select and load procedures into boxes and enter session information.
	Modify Identifiers	Opens the Modify Session Identifiers window to enter or alter session information such as the subject, experiment, group and add comments.
	Wizard for Loading Boxes	Opens the Experiment Loading Wizard to walk the user through loading procedures into boxes and begin a session.
	Stop Box	Opens the Stop Boxes window to stop a procedure in one or more boxes.
ΔX	**Change Variables – Ctrl+A**	Opens the Change Variables screen to modify procedure variable and array values.
	Signals (Start, #K, #R)	Opens the Send Signals to Boxes screen to issue start commands or send simulated responses and K pulses to selected boxes.
	Outputs	Opens the Outputs screen to turn outputs on or off, lock outputs on or off or turn an output on for a specified duration.
	Beep When All Sessions Are Finished	When all sessions in all boxes are completed the computer will issue a tone.
	Shut Off Beeping	Turns off the sessions ended tone.
	Exit	Exits MED-PC®
	Exit When All Sessions Are Finished	Closes MED-PC® when all sessions finish running.

Data Menu

	Print – Ctrl+P	Opens the Boxes to Print screen. From here it is possible to print the data as it stands from any currently running box.
	Form Feed	Sends a form feed command to the default printer.
	Printer Selection	Opens the Printer Selection screen to set the default printer.

Printout Settings   Opens the printer settings screen to set default printout settings.

File Options   Opens the Data File Options screen to select the data file format, naming convention, data directory location and automatic backup time interval.

View Menu

    Desktops   Click to save the current desktop layout, delete a desktop view or switch to a saved desktop view. The Desktop dropdown on the toolbar may also be used to switch between saved desktops.

    Float Box Panels   By default the box panels are pinned to the right side of the screen (red arrow, Figure 4-11). When using one monitor this menu lets the user float the box panels outside the main MED-PC® interface. When using two monitors the box panels may be assigned to a single monitor or split across the two monitors.

    Pin Box Panels to Right   Closes and pins the box panels to the right side of the screen. Hover over or click a box panel tab to open that box's panel.

    Place Box Panels into Notebook   Presents the box panels in a tabbed notebook format on the right side of the screen.

    Panel Visibility   Lets the user select which panels are visible.

    Display Log   Opens the log dialog screen to enable opening other log files, printing log files and searching within log files.

    Reset Error Indicator   Clears the error warning in the status bar at the bottom of the MED-PC® run time screen.

    State Sets   Opens the active state within each stateset screen to view the state that each stateset is currently in for the selected box.

    System Performance   Presents information about MED-PC® cycle times.

Macros Menu

    Play Macro – F5   Opens the macro selection screen to select and run a macro.

    Record Macro – F6   Click to begin recording a new macro.

    Insert Macro Playback Delay   Inserts a user specified delay in the macro playback. The delay is in milliseconds.

	Editor	Opens the macro editor to create a new macro or edit an existing macro.
	Stop Recording – F6	Enabled while recording a macro, select to stop macro recording.
	Assign Macros to Shortcut Key Combinations	Opens the Macro Shortcut Assignment window to assign macros to keyboard shortcuts.
	Configure Macro Shortlist Button	Opens the Configure Macro Shortlist Button screen to add or remove macros to or from the Shortlist Macros dropdown list on the toolbar.
	Configure Context-Dependent Macros	Opens the Configure Context Dependent Macros screen to assign macros to a program. When that program is loaded, the assigned macros are now available in the Context Macros dropdown list on the toolbar.

Settings Menu

	Edit Procedure List	Used to create a list of procedures that will be displayed when loading boxes. Each Windows user can create their own list as a way to display only the procedures that are of interest to them.
	Autohide Box Panel Toolbars	Hides the box panel toolbars when not in use. The toolbars automatically appear when the mouse is placed over either the status area of the box panel or over the bottom grid where show command output is displayed.
	Enable Tooltips	Turn tooltips on or off.
	Hardware Configuration	Opens the hardware configuration utility.

Help Menu

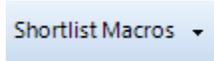| | **Help for MED-PC – F1** | Opens the MED-PC® help screen. The on-screen MED-PC® help covers more topics in greater detail. |
| | **Help for Trans** | Opens the Trans help screen. The on-screen Trans help covers more topics in greater detail. |

| **About** | Provides the MED-PC® version, build and release number information as well as copyright information. |

Other Toolbar Buttons

The following buttons are not included in the menu items discussed above.

	Issue Start Signal to Selected Box	Sends a start command to the box currently selected in the Box Status window or the active floating box panel.
Shortlist Macros ▾	**Macros Shortlist**	A dropdown list of macros that have been assigned to the macro shortlist.
Context Macros ▾	**Context Macros List**	If a loaded procedure has macros assigned to it, these macros will be available via this dropdown list.
Default ▾	**Desktop Dropdown List**	A dropdown list of available saved desktops.
Save Desktop	**Save Desktop**	Opens a window to save the current desktop layout.
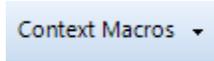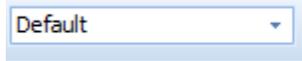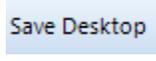
Inputs and Outputs Panels

The Inputs and Outputs panels allow the user to simulate inputs and outputs through MED-PC®. To simulate an input or output, double click in the square (red arrow, Figure 5-1) under the desired input or output number, in the row of the desired chamber. This feature is helpful when writing and debugging MedState Notation (MSN) code.

Inputs happen momentarily and outputs must be double clicked again to be turned off.

Figure 5-1 - Inputs and Outputs Panels

Double click the input or output number in the top row to affect that numbered input/output in all chambers.

Right click the input number in the top row, or individual input box, to simulate a level mode input. See the user's manual for the type of input card being used for more information on level versus toggle mode inputs.

Show Command Output Panel

The Show Command Output panel, Figure 5-2, displays the information represented by the SHOW commands in the MSN code. Figure 5-3 explains the controls in the Show Command Output panel.

Figure 5-2 - Show Command Output Panel
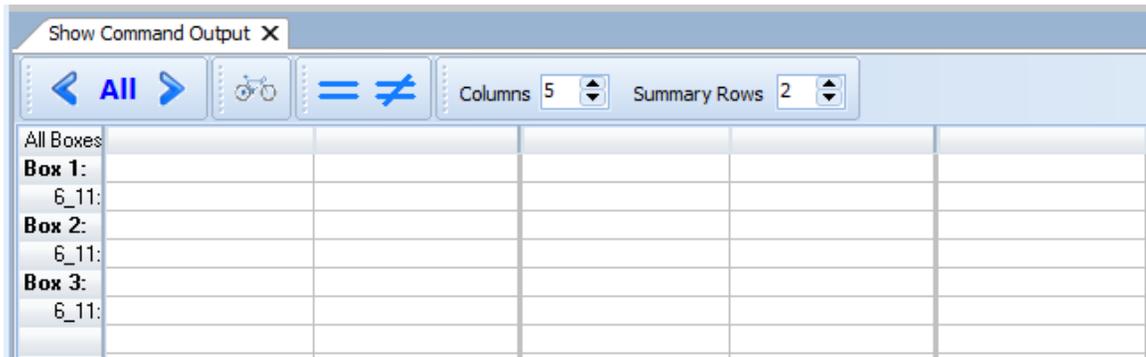
Figure 5-3 - Show Command Output Options

	Cycles through the box displays in decreasing (<) or increasing (>) order. Clicking **All** will display all of the boxes.
	Automatically cycles through all running boxes until pressed again.
	Pressing = will adjust all columns to an equal width. Pressing ≠ adjusts the columns to fit their largest content.
	Increases or decreases the number of columns displayed. Type in the desired number of columns or use the up and down arrows to set the number of columns.
	Increases or decreases the number of show rows displayed for each box. 1 – 40 rows are available per box.
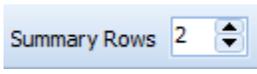
Box Panel Tabs

Box panels allow the user to interact directly with one selected box (chamber) at a time. By default, the box panels are pinned to the upper right corner of the user interface, see Figure 5-4. Hovering over a box's tab will temporarily slide open the selected box's panel to reveal that

box's status panel, inputs and outputs panel, show command output panel and toolbar, see Figure 5-5.

Figure 5-4 - Pinned Box Panel Tabs
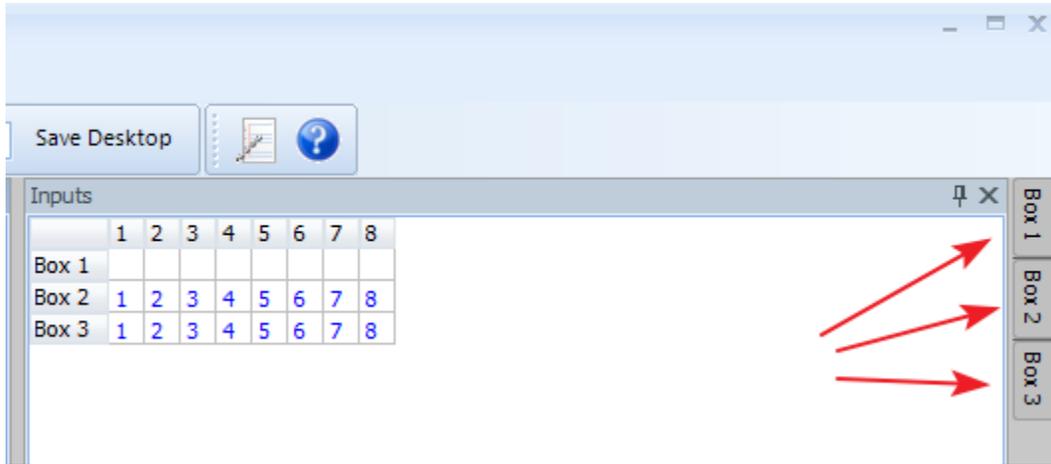
Figure 5-5 - Box One's Panel
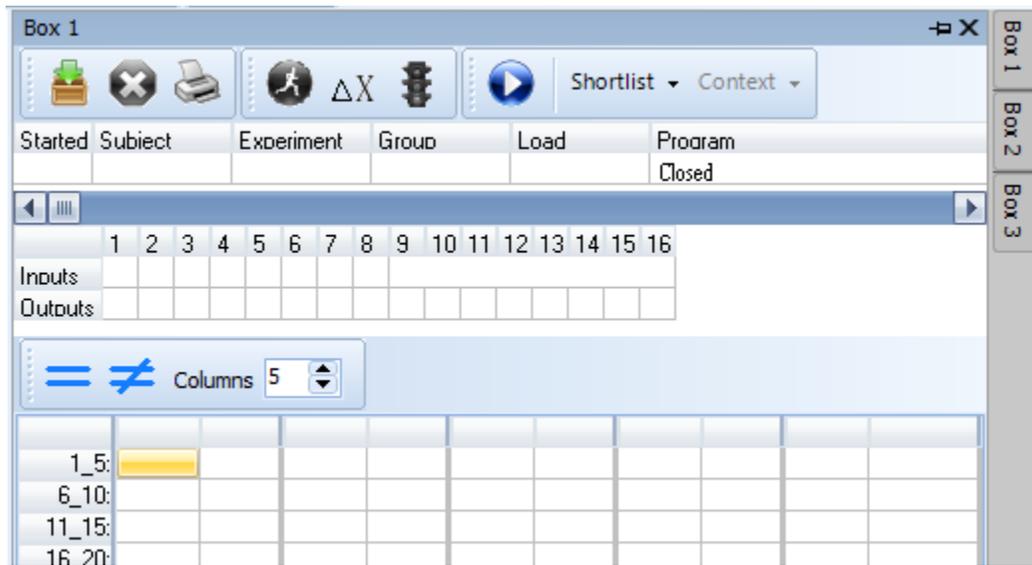
Once the cursor is removed from the box's panel or tab, the panel will slide closed. To open a box's panel and keep it open, click on the desired box's panel tab. To close the panel after clicking it open, hover over, or click on another box's panel tab.

Docking Panels

The MED-PC® user interface contains customizable panels. Each panel can be resized, repositioned and some panels can be designated to float outside the main user interface. The red bars in Figure 5-6 indicate the resizing bars. Click and drag any of these bars to resize the individual panels.

Figure 5-6 - Panel Resize Bars
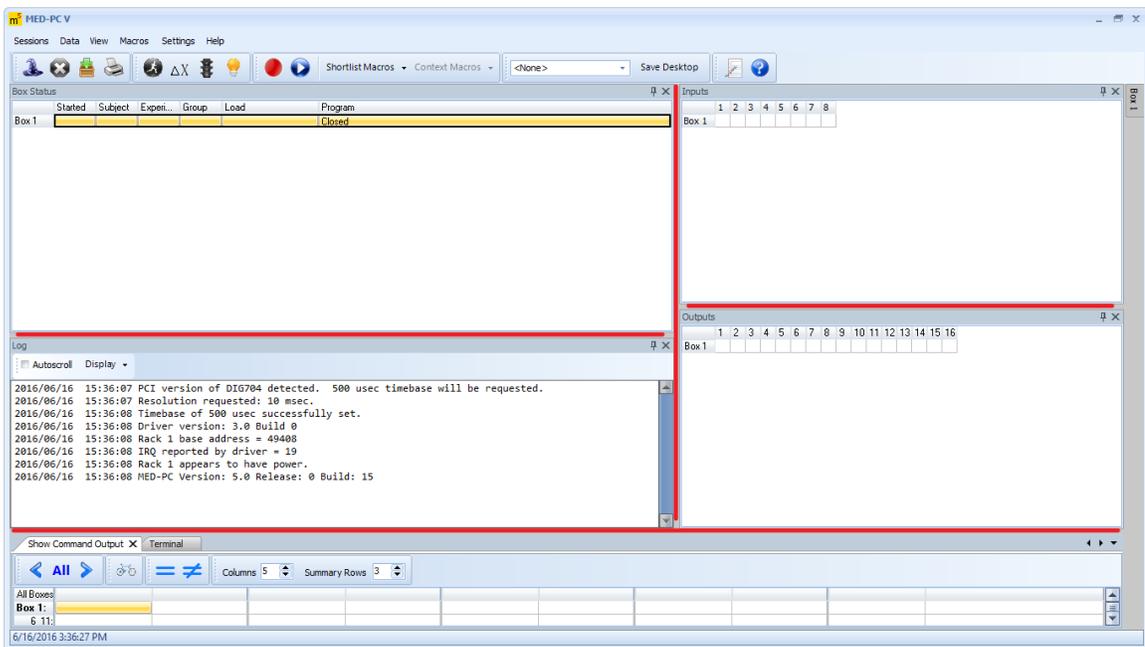
Each panel in the interface may also be repositioned by clicking and holding on the panel's title bar and dragging the panel to a new location. When the panel begins to move "guide points" will appear at the top, bottom, left and right edges of the screen. Guide points will also appear in the panel in which the mouse pointer is located. These guide points indicate where the panel will be positioned if the mouse pointer is released over that particular guide point.

Figure 5-7 - Guide Point for Panel Placement
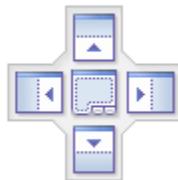
In Figure 5-8 the Outputs panel title bar has been clicked and held while the mouse has been moved up to the Box Status panel window. The edge of screen guide points, circled in red in Figure 5-8, would pin the Outputs panel to the top, bottom, right or left of the screen. While it is not displayed in the image, the mouse is actually positioned over the bottom guide point, red arrow Figure 5-8, and the shaded area indicates where the panel will be positioned.

Figure 5-8 - Panel Locating Guide Points
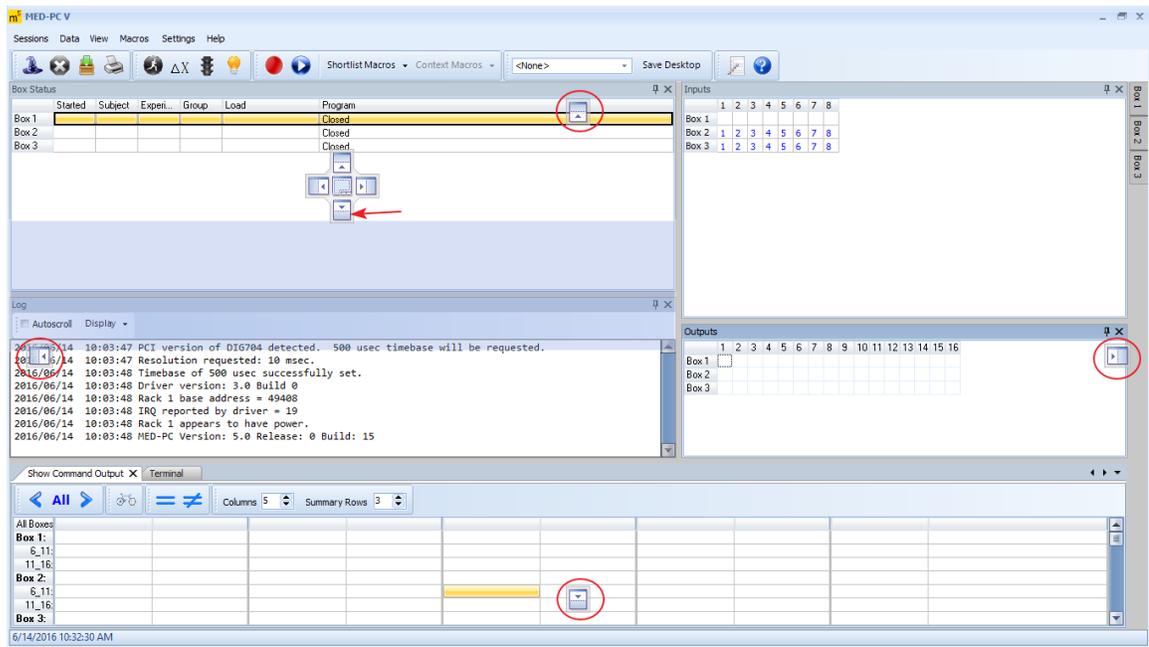
Notice in Figure 5-9 that the Outputs panel is now located under the Box Status panel as indicated by the shaded area in Figure 5-8 before the mouse was released.

Figure 5-9 - Repositioned Outputs Panel
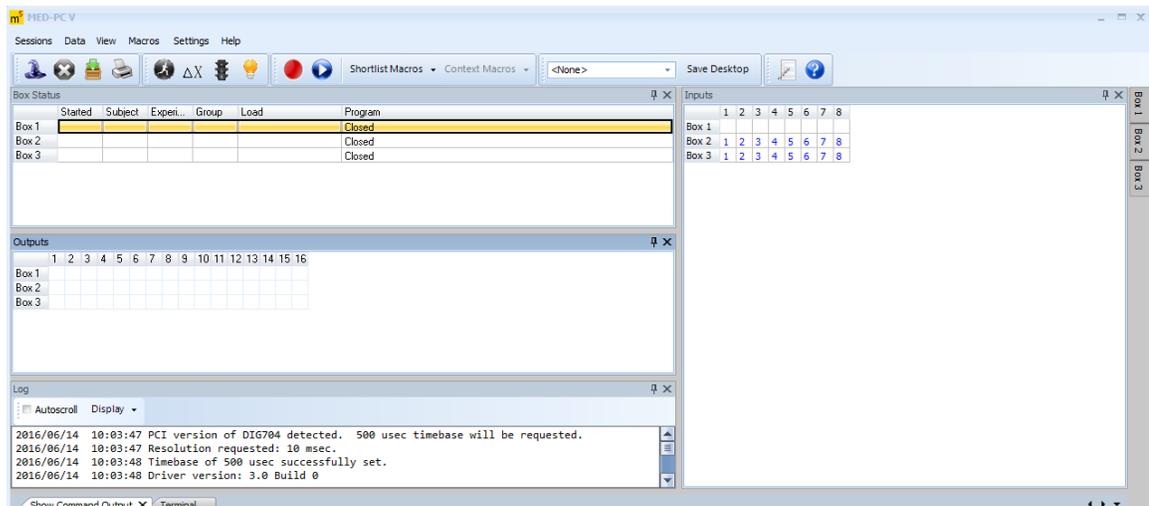
CHAPTER 6 | ALTERNATIVE INSTALLATIONS

It is not uncommon for a MED-PC® system to use more than just OmniCard modules. This section will describe how to set up a MED-PC® system that uses a SuperPort card in addition to OmniCard modules. It will also explain how to allocate inputs across multiple chambers. For this example, we will use 3 IC-124 OmniCard modules, 1 assigned to each chamber, and 1 DIG-713A SuperPort input card, sharing its inputs across the 3 chambers.

When using different card types, the input/output mapping steps to follow are easier to perform if identical card types are grouped together in the rack. For this reason, we will add the 3 IC-124 OmniCard modules, and then add the DIG-713A SuperPort card.

As explained in **Chapter 3 Adding OmniCard Modules**, click **Add Multiple Cards of the Same Model**, Select IC-124 OmniCard from the **Card Model** drop down list, select 3 from the **Number of Cards to Add** drop down and click the **OK** button.

Click on **Edit Address** and then on **Define I/O Channels** and set the number of inputs to be 8 and the number of outputs to be 16 (Figure 3-6 – Configure I/O Channels).

To automatically assign all inputs and outputs in sequential order for the IC-124s, click the **Auto Map SmartCtrl and OmniCard Modules** button (Figure 3-4) or click **Tools > Auto Map SmartCtrl and OmniCard Module…** Click the **OK** button to accept the auto-map, review the hardware summary that opens, and click the **Close** button.

In the fourth slot of the rack click the **Add Card** link, select DIG-713A SuperPort Input from the card model list and click the **OK** button to accept the default input port and offset values.

At this point there are two approaches that can be used for mapping the DIG-713A's inputs. To start, click the **Auto Map All Cards** button or click **Tools > Auto Map All Cards…** to open the **Rapid Input/Output Mapping for All Modules** window. Select 3 for the number of boxes (chambers) being used from the drop down and the HCU will, by default, evenly distribute (if possible) the available inputs and outputs across all of the boxes, see Figure 6-1. Click **OK** to accept the default, sequentially allocated inputs and outputs and open the **Hardware Summary** screen in Figure 6-2.

Figure 6-1 - Rapid Input/Output Mapping
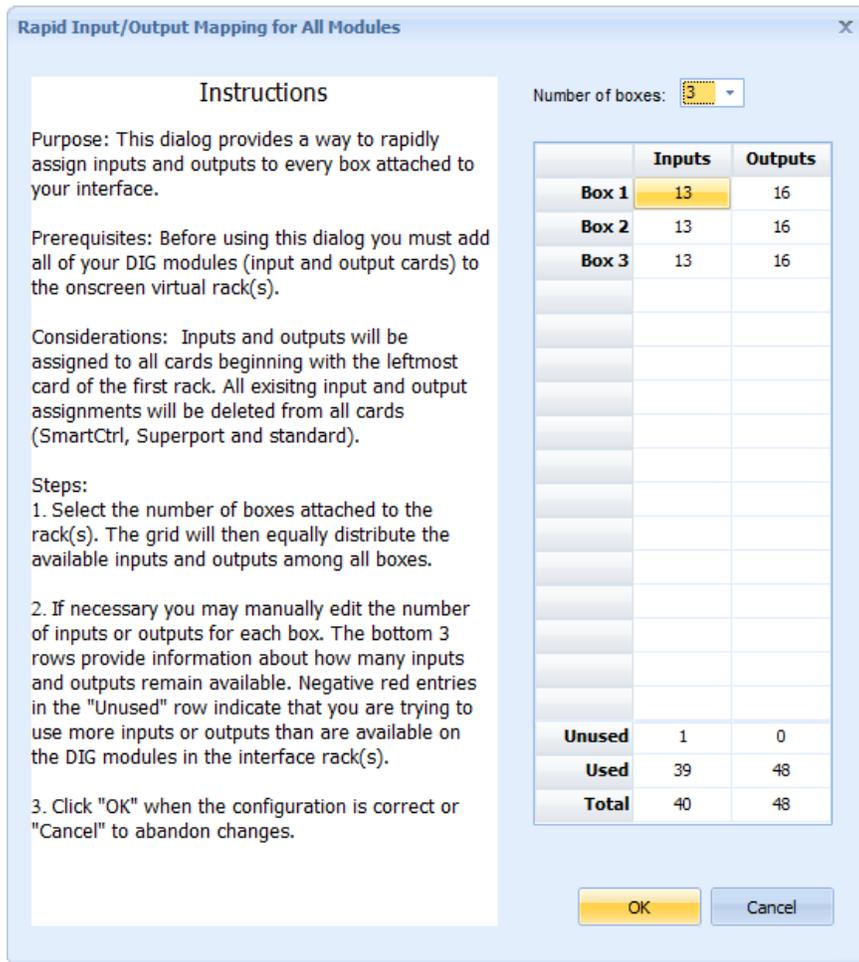
Review the Hardware Summary screen carefully as this approach will assign the inputs and outputs in sequential order, and this is not the desired result for this example. Notice in Figure 6-2 that inputs 9 – 13 in box 1 are actually inputs 1 – 5 from the second OmniCard module, not inputs from the DIG-713A.

If this Hardware Summary was what we desired, we would click **Close** to close the summary and then close the HCU and select **Yes** when prompted to save the hardware configuration.

Figure 6-2 - Hardware Summary Using Auto Map All Cards

	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 1
	2	1	IC-124	794	0	P1, Bit 2	2	1	IC-124	794	1	P2, Bit 2
	3	1	IC-124	794	0	P1, Bit 3	3	1	IC-124	794	1	P2, Bit 3
	4	1	IC-124	794	0	P1, Bit 4	4	1	IC-124	794	1	P2, Bit 4
	5	1	IC-124	794	0	P1, Bit 5	5	1	IC-124	794	1	P2, Bit 5
	6	1	IC-124	794	0	P1, Bit 6	6	1	IC-124	794	1	P2, Bit 6
	7	1	IC-124	794	0	P1, Bit 7	7	1	IC-124	794	1	P2, Bit 7
	8	1	IC-124	794	0	P1, Bit 8	8	1	IC-124	794	1	P2, Bit 8
	9	1	IC-124	794	4	P1, Bit 1	9	1	IC-124	794	2	P3, Bit 1
	10	1	IC-124	794	4	P1, Bit 2	10	1	IC-124	794	2	P3, Bit 2
	11	1	IC-124	794	4	P1, Bit 3	11	1	IC-124	794	2	P3, Bit 3
	12	1	IC-124	794	4	P1, Bit 4	12	1	IC-124	794	2	P3, Bit 4
	13	1	IC-124	794	4	P1, Bit 5	13	1	IC-124	794	2	P3, Bit 5
							14	1	IC-124	794	2	P3, Bit 6
							15	1	IC-124	794	2	P3, Bit 7
							16	1	IC-124	794	2	P3, Bit 8
Box 2												
	1	1	IC-124	794	4	P1, Bit 6	1	1	IC-124	794	5	P2, Bit 1
	2	1	IC-124	794	4	P1, Bit 7	2	1	IC-124	794	5	P2, Bit 2
	3	1	IC-124	794	4	P1, Bit 8	3	1	IC-124	794	5	P2, Bit 3
	4	1	IC-124	794	8	P1, Bit 1	4	1	IC-124	794	5	P2, Bit 4
	5	1	IC-124	794	8	P1, Bit 2	5	1	IC-124	794	5	P2, Bit 5
	6	1	IC-124	794	8	P1, Bit 3	6	1	IC-124	794	5	P2, Bit 6
	7	1	IC-124	794	8	P1, Bit 4	7	1	IC-124	794	5	P2, Bit 7
	8	1	IC-124	794	8	P1, Bit 5	8	1	IC-124	794	5	P2, Bit 8
	9	1	IC-124	794	8	P1, Bit 6	9	1	IC-124	794	6	P3, Bit 1
	10	1	IC-124	794	8	P1, Bit 7	10	1	IC-124	794	6	P3, Bit 2

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

However, the default assignments are not the desired result of sharing the DIG-713A's inputs across the 3 chambers, so we will use the second approach to assigning inputs and outputs after closing the summary.

After auto-assigning the three OmniCard modules to boxes 1 – 3 using the **Auto Map SmartCtrl and OmniCard Modules** button as described above, click the **Map to Boxes** link on the DIG-713A SuperPort input card (Figure 6-3) to open the **Map to Boxes** screen (Figure 6-4) to manually assign the DIG-713A's inputs across the different chambers.

Figure 6-3 - Three IC-124 and one DIG-713A Cards Installed
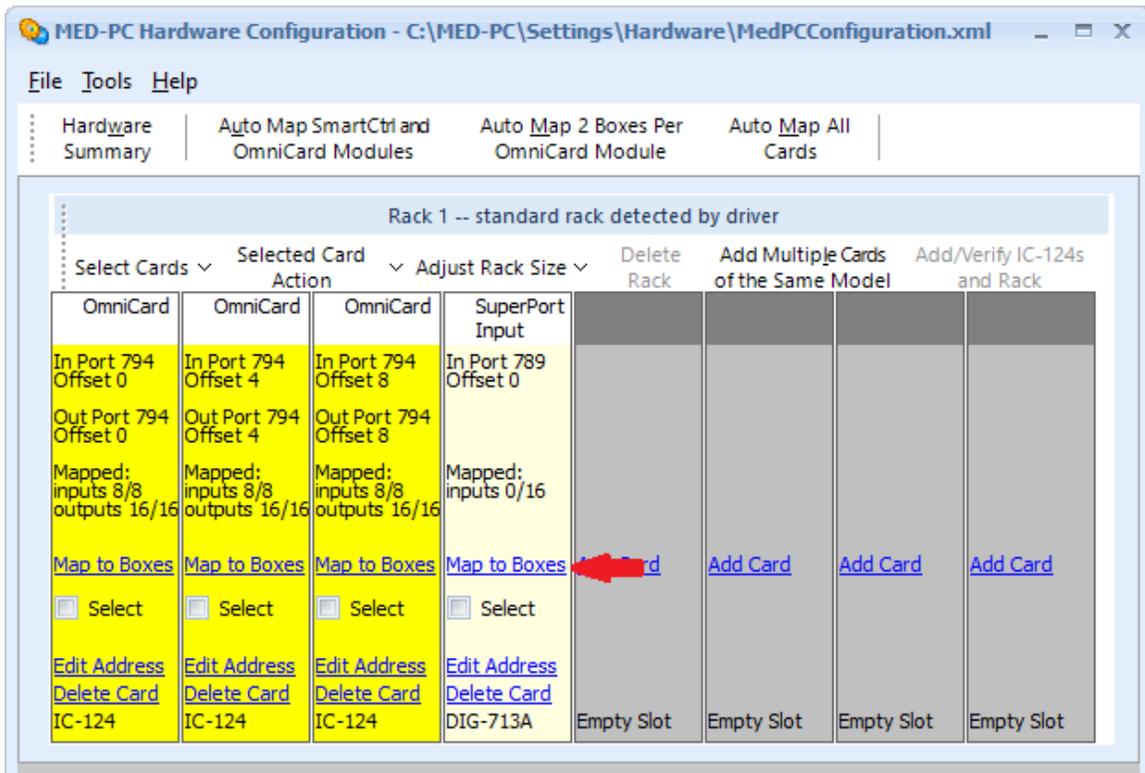
Figure 6-4 - Map to Boxes Window
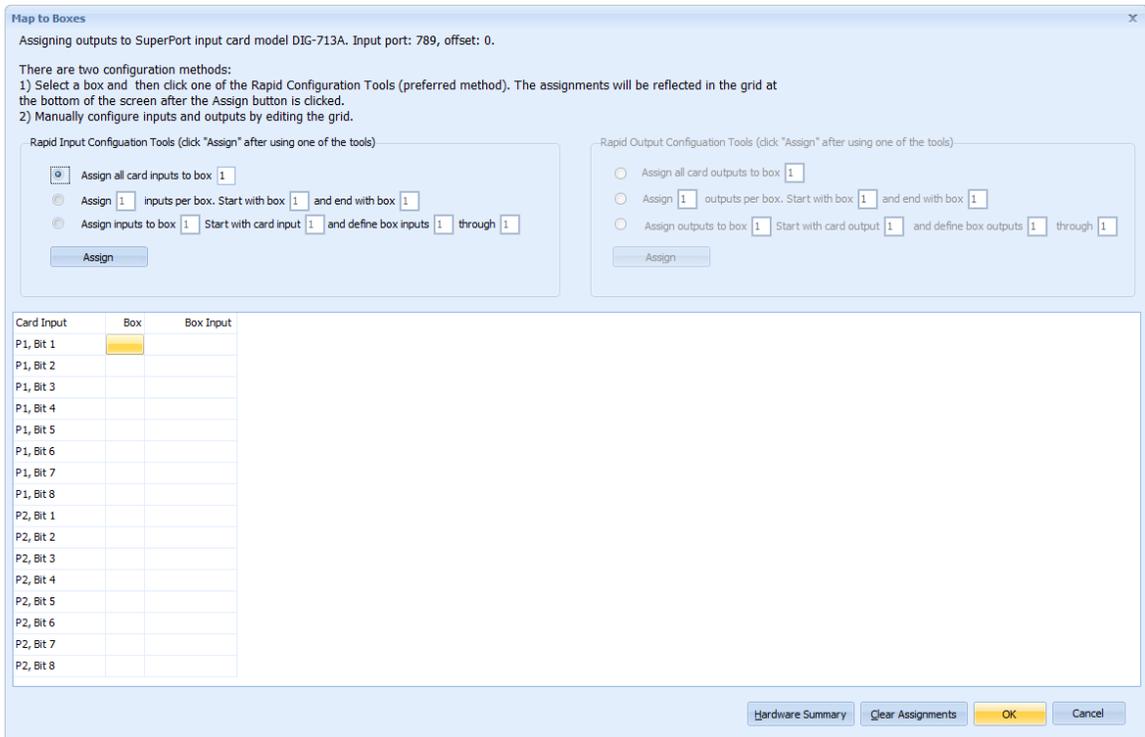
The left three radio buttons in the Map to Boxes screen handle assigning inputs, the right three radio buttons assign the outputs.

The DIG-713A has 16 inputs, and for this example we will assign five inputs to each of the three chambers. These will become inputs 9 -13 for each chamber. Click the second radio button and enter **Assign 5 inputs per box. Start with box 1 and end with box 3** and click the **Assign** button, see Figure 6-5.

Figure 6-5 - Assigning Inputs to Chambers
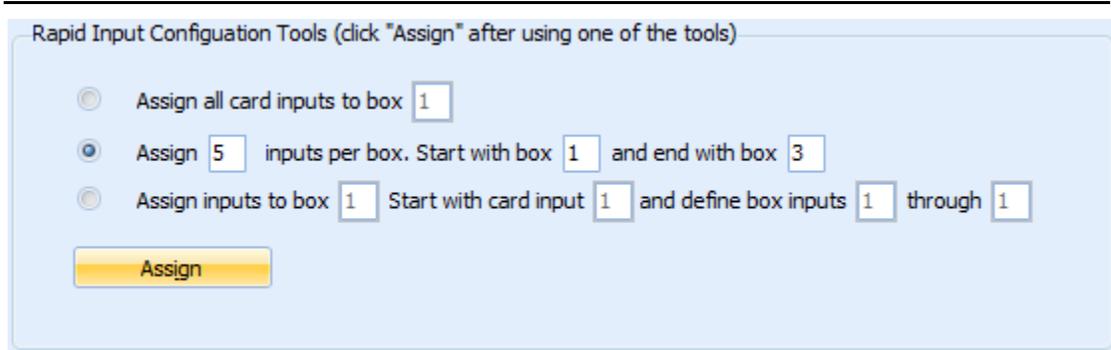
Figure 6-7 shows two images of the lower portion of the Map to Boxes screen. At this point, the left image illustrates how the inputs on the DIG-713A have been allocated, which is incorrect. The **Card Input - #** column represents the DIG-713A's inputs, the center **Box** column displays which box the input has been assigned to, and the right-hand **Box Input** column represents which input number (box input number) the DIG-713A's input has been assigned to. If the **OK** button were pushed at this point, the HCU would generate a report informing the user that there are conflicts with the input/output assignments, see Figure 6-6.

Figure 6-6 - Input/Output Conflict Report
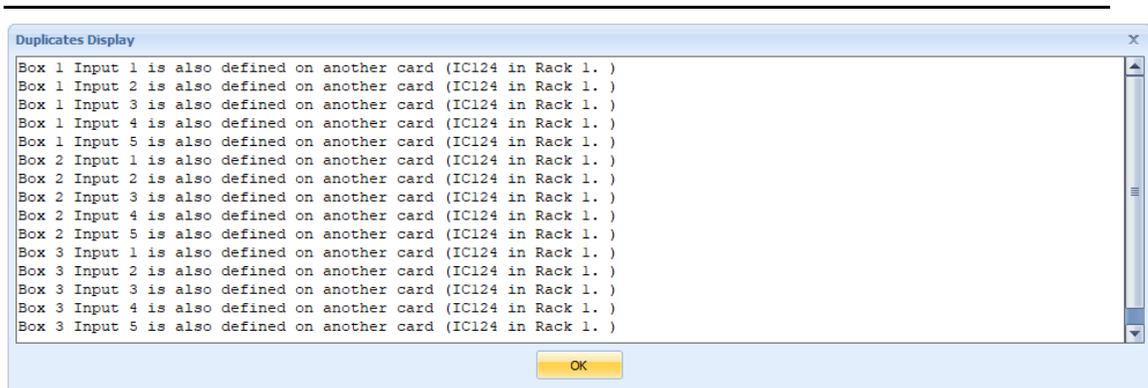
The Box Inputs need to be adjusted to reflect the correct Box Input number being used in each box. Click on each Box Input number and update to the correct value, 9-13, and then click **OK** in the bottom right to save the changes. See the right-hand image in Figure 6-7.

Figure 6-7 - Updating Box Input Numbers

Click the **Hardware Summary** button to review that the changes have been made, see Figure 6-8. Click **Close** and then exit the HCU and click **Yes** to save the changes if prompted.

Figure 6-8 - Updated Inputs for Box 1

		Inputs			
Box Input	Rack	Model	Port	Offset	Card I/O
Box 1					
1	1	IC-124	794	0	P1, Bit 1
2	1	IC-124	794	0	P1, Bit 2
3	1	IC-124	794	0	P1, Bit 3
4	1	IC-124	794	0	P1, Bit 4
5	1	IC-124	794	0	P1, Bit 5
6	1	IC-124	794	0	P1, Bit 6
7	1	IC-124	794	0	P1, Bit 7
8	1	IC-124	794	0	P1, Bit 8
9	1	DIG-713A	789	0	P1, Bit 1
10	1	DIG-713A	789	0	P1, Bit 2
11	1	DIG-713A	789	0	P1, Bit 3
12	1	DIG-713A	789	0	P1, Bit 4
13	1	DIG-713A	789	0	P1, Bit 5

Additional Racks

When running multiple racks, it is necessary to determine which card is connected to which rack. The following examples will illustrate how to do this using MED Test. For assistance with MED Test please see **DOC-200, MED Test**.

DIG-705 USB Cards

In MED Test open the DIG-705 Interface Card test window by clicking **Misc Modules** > **DIG-705 Interface Card** or by pressing **Shift+F5**. The screen shown in Figure 6-9 will appear.

Figure 6-9 – DIG-705 Interface Card Test Window in MED Test

The **Identify** button when clicked will cause the IN LED on the DIG-705 to flash. Click **Stop Identify** to stop the flashing.

It is possible to change the order of the DIG-705s and racks by dragging and dropping the DIG-705 in the list until it is in the desired order.

When Rack 1 is determined, it is suggested that the rack be labeled Rack 1. Repeat this process for each additional rack.

DIG-704 PCI Cards

Follow the steps in **Chapter 3, Quick Start Guide** to size the rack and add SmartCtrl cards, or the steps above to add different types of cards.

In MED Test open the SmartCtrl test window by clicking **SmartCtrl** > **DIG-716B / DIG-703B** or by pressing **Ctrl+F9**. The screen shown in Figure 6-10 will appear. The first parameter on the left labeled **Rack** determines which PCI Card/Rack MED Test will "talk" to.

Figure 6-10 - SmartCtrl Card Test Window in MED Test
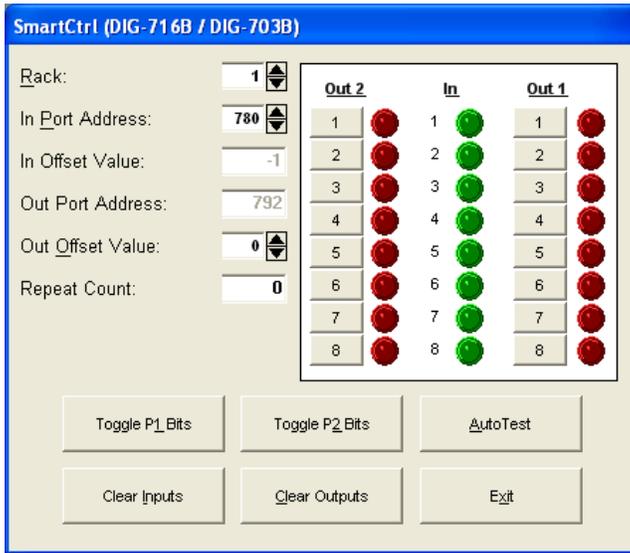
If the recommended default settings were used, the first SmartCtrl card in the rack will be set to Port Address 780, Out Offset Value 0, and will be connected to chamber (box) one. Starting with Rack 1, turn on an output that is known to be connected to an output device in chamber one. When the output is turned on in MED Test, the corresponding red output light on SmartCtrl card number 1 will turn on and in box number 1 the output device will be activated. Triggering an input in box 1 would turn on the corresponding green input light on SmartCtrl number 1, and in MED Test the green input light would illuminate, and the Repeat Count would increment.

When Rack 1 is determined, it is suggested that the rack and both ends of the ribbon cable be labeled Rack 1. Repeat this process for each additional rack.

CHAPTER 7 |DATA FILE OPTIONS

This section expands on the data file options presented in the **Data File Options** section of Chapter 3 and provides examples of each format. The sample data files below were generated using the same procedure and similar approach to triggering inputs.

Formats For Data Files

Annotated Data File

It is recommended that the default **Annotated** option be used. Annotated data files contain all pertinent experiment information and all data variables by default. See the sample data file below. The data variables displayed, number of columns and printing format may all be adjusted via the MedState Notation (MSN) program used to run the experiment. See **DOC-301, MED-PC Programmer's Manual** for more information on MSN.

Sample Annotated Data File

```
File: C:\MED-PC\DATA\!FORMAT.1
Start Date:  5/6/16
End Date:  5/6/16
Subject: 35F
Experiment: 5CTRL
Group: 2
Box: 3
Start Time: 22:06:43
End Time: 22:07:41
MSN: TEMP
A:      5.000
B:      3.000
D:      1.000
E:      0.000
F:      0.000
G:      0.000
H:      0.000
I:     18.000
J:      0.000
K:      0.000
L:      0.000
M:      0.000
N:      0.000
O:      0.000
P:      0.000
Q:      0.000
R:      0.000
S:      0.000
T:     22.000
U:      0.000
V:      0.000
W:      0.000
X:      5.000
Y:      0.000
Z:      0.000
C:
     0:      5.100      7.100     10.100      5.100      7.100
     5:      0.200     12.100      3.100      5.100      5.100
    10:      6.100      0.200     13.100     10.100     11.100
    15:      8.100      7.100      0.200
```

Stripped, C Array Only

This format produces a data set with no simple variables and only the C array, if it contains any data. If the C Array is empty, only the header information will be presented. The last three lines of the data set would be 0, 1, 0 to indicate no simple variables and one array with no data elements.

Sample Stripped, C Array Only Data File

```
5               --Month box was loaded
06              --Day box was loaded
16              --Year box was loaded
5               --Month session ended
06              --Date session ended
16              --Year session ended
35F             --Subject
5CTRL           --Experiment
2               --Group
3               --Box
22              --Hour when box was loaded.(24-Hour format)
25              --Minutes when box was loaded
34              --Seconds when box was loaded
22              --Hour when session ended
25              --Minutes when session ended
38              --Seconds when session ended
0               --Total number of simple variables
1               --There was 1 array declared in the MPC procedure
18              --1st Array has 18 elements
5.1             --Begin 1st Array C.  Element C(0)
7.1             --Element C(1)
10.1            --Element C(2)
5.1             --Element C(3)
7.1             --Element C(4)
0.2             --Element C(5)
12.1            --Element C(6)
3.1             --Element C(7)
5.1             --Element C(8)
5.1             --Element C(9)
6.1             --Element C(10)
0.2             --Element C(11)
13.1            --Element C(12)
10.1            --Element C(13)
11.1            --Element C(14)
8.1             --Element C(15)
7.1             --Element C(16)
0.2             --Element C(17)
\Test Procedure - Simulated R
```

Stripped, With Variable Identification

This format provides the same information as the Stripped, C Array Only format, with the added features of maintaining alphabetical order of variables and arrays and identifying the number of elements assigned to each variable. Therefore, simple variables are always associated with one element, while arrays may contain from 1 to 1,000,000 elements. Unlike the simple stripped format, it is not necessary to have access to the .MPC code that produced the data set in order to match variable letters to data elements.

Sample Stripped With Variable Identification Data File

```
5        --Month box was loaded
06       --Day box was loaded
98       --Year box was loaded
5        --Month session ended
06       --Date session ended
98       --Year session ended
35F      --Subject
5CTRL    --Experiment
2        --Group
3        --Box
22       --Hour when box was loaded.(24-Hour format)
28       --Minutes when box was loaded
12       --Seconds when box was loaded
22       --Hour when session ended
28       --Minutes when session ended
16       --Seconds when session ended
25       --Total number of simple variables
1        --There is 1 Array declared in MPC Procedure
.3       --.3 is a "Marker Number" only (Data analysis
            programs may use this value to identify the
            start of variable identification.)
1        --A has 1 Element (was a simple variable)
1        --B has 1 Element (was a simple variable)
18       --C was an Array with 18 elements
1        --D has 1 Element (was a simple variable)
1        --E has 1 Element (was a simple variable)
1        --F has 1 Element (was a simple variable)
1        --G has 1 Element (was a simple variable)
1        --H has 1 Element (was a simple variable)
1        --I has 1 Element (was a simple variable)
1        --J has 1 Element (was a simple variable)
1        --K has 1 Element (was a simple variable)
1        --L has 1 Element (was a simple variable)
1        --M has 1 Element (was a simple variable)
1        --N has 1 Element (was a simple variable)
1        --O has 1 Element (was a simple variable)
1        --P has 1 Element (was a simple variable)
1        --Q has 1 Element (was a simple variable)
1        --R has 1 Element (was a simple variable)
1        --S has 1 Element (was a simple variable)
1        --T has 1 Element (was a simple variable)
1        --U has 1 Element (was a simple variable)
1        --V has 1 Element (was a simple variable)
1        --W has 1 Element (was a simple variable)
1        --X has 1 Element (was a simple variable)
1        --Y has 1 Element (was a simple variable)
1        --Z has 1 Element (was a simple variable)
5        --Variable A has a value of 5
3        --Variable B has a value of 3
5.1      --Begin Array "C". Element C(0)
7.1      --Element C(1)
10.1     --Element C(2)
5.1      --Element C(3)
7.1      --Element C(4)
0.2      --Element C(5)
12.1     --Element C(6)
3.1      --Element C(7)
5.1      --Element C(8)
5.1      --Element C(9)
6.1      --Element C(10)
0.2      --Element C(11)
13.1     --Element C(12)
10.1     --Element C(13)
11.1     --Element C(14)
8.1      --Element C(15)
7.1      --Element C(16)
0.2      --Element C(17)
1        --Variable D has a value of 1
0        --Variable E has a value of 0
```

```
0          --Variable F has a value of 0
0          --Variable G has a value of 0
0          --Variable H has a value of 0
18         --Variable I has a value of 18
0          --Variable J has a value of 0
0          --Variable K has a value of 0
0          --Variable L has a value of 0
0          --Variable M has a value of 0
0          --Variable N has a value of 0
0          --Variable O has a value of 0
0          --Variable P has a value of 0
0          --Variable Q has a value of 0
0          --Variable R has a value of 0
0          --Variable S has a value of 0
22         --Variable T has a value of 22
0          --Variable U has a value of 0
0          --Variable V has a value of 0
0          --Variable W has a value of 0
5          --Variable X has a value of 5
0          --Variable Y has a value of 0
0          --Variable Z has a value of 0
\Test Procedure - Simulated R
```

File Naming Conventions

Append data to a file with name based on experiment, group and subject identifiers

If this option is selected, be sure to complete one or more of the identifier fields when opening a session, otherwise, all data will be saved to a file named "Subject_Experiment_Group.txt".

Append all data for a given calendar day to a file with name based on date

This selection will base the file name on the date the session was opened, not necessarily on the date the session is closed or when the data is written. A session opened on April 18, 2016 will result in a data file named "2016-04-18.txt".

Create new file for every session, named according to date, time and subject

This selection will base the file name on information entered at the time the session was opened. It is much more specific than either previous selection and will result in a single file for each animal, each day. The file name for an animal with subject ID, "A235m" run at 10:30 AM on April 18, 2016 will be "2016-04-18_10h30m_Subject A235m.txt".

Data Directory

The default data directory for storing session data is "C:\MED-PC\Data", it is recommended that this data directory not be changed.

Automatic Data Backup Frequency

MED-PC® will automatically save data while a session is open. The data will be saved to "C:\MED-PC\Backups" with a file name based on the date, time, subject, and box that the experiment is running in. These files are not intended as permanent data and any backup files that are greater than 7 days old are automatically deleted by MED-PC®. The recommended save

frequency is 10 minutes. This will retain most of the data, especially in long sessions, in the event of an unexpected computer failure. Frequencies less than 10 minutes may degrade the performance of other functions, such as screen updates, depending on the speed and resources of the computer. If a backup file is not desired, set the frequency value to 0.

After the data file options have been set, click **OK** to exit the Data File Options screen and return to MED-PC®.

CHAPTER 8 | INSTALLING MED-PC® IN EMULATION MODE

Emulation mode enables the user to develop MSN programs without being connected to the interface hardware. Emulation mode may be enabled during the installation of MED-PC®, or after installation using a **Command Line Option**.

To install MED-PC® in emulation mode, insert the MED-PC® CD and when the main screen appears click I**nstall in Hardware Emulation mode** (Figure 8-1) to begin the installation.

Figure 8-1 – MED-PC® Installation Screen
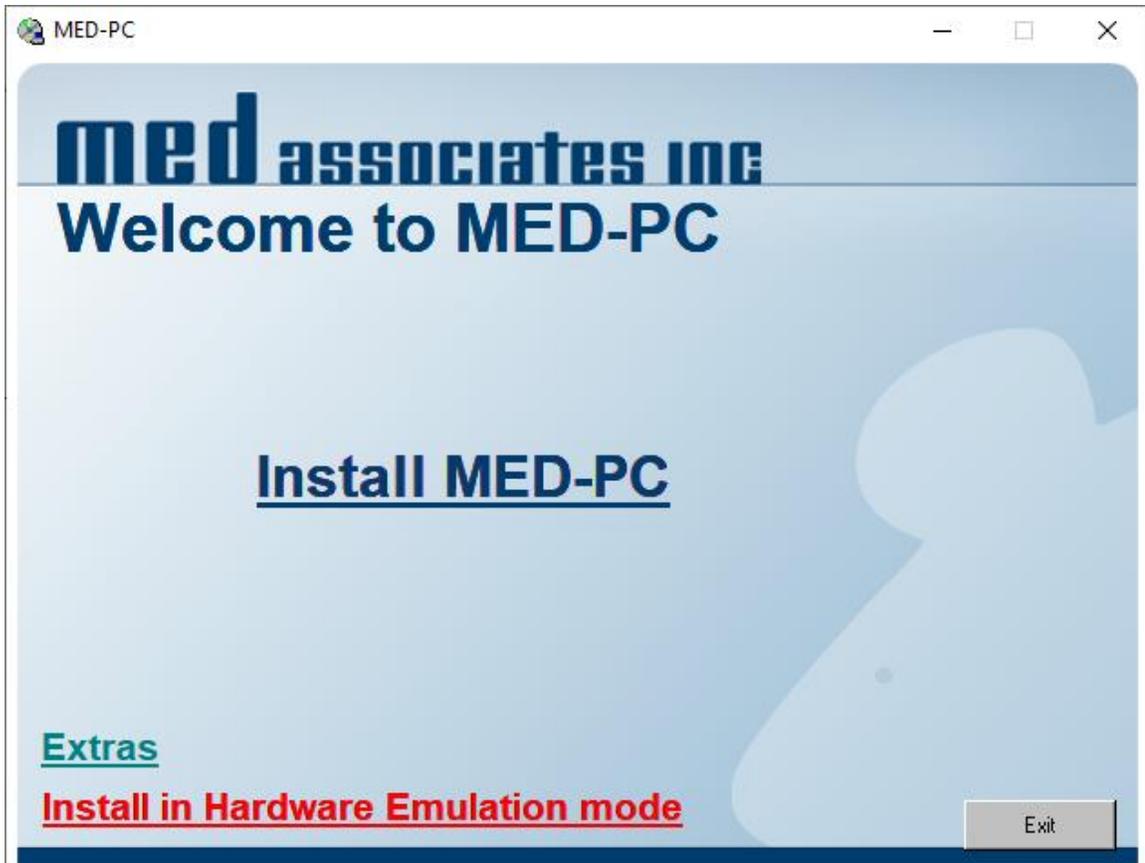
When the installation is complete, a shortcut for starting MED-PC® in Emulation Mode will be placed on the desktop (Figure 8-2).

Figure 8-2 - MED-PC® Emulation Mode Desktop Shortcut
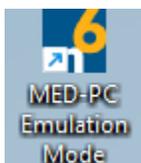
CHAPTER 9 | COMMAND LINE OPTIONS

Command line options allow the user to instruct MED-PC® to start under specified conditions or launch a macro upon opening. Multiple desktop shortcut icons for launching MED-PC®, each with its own special properties, may be used. Note however, only one instance of MED-PC® may be launched at a time.

Command Line Start Up Options

There are three options for starting MED-PC® under specific conditions:

> /E: Start MED-PC® in emulation mode.
>
> /I: Force MED-PC® to start and assume an interface cabinet is connected and powered up.
>
> /INSTALL="name_of_config_file.xml": Start MED-PC® using the specified hardware configuration file.

Note: For the /INSTALL command to function, there must be no white spaces around the "=" sign.

Emulation Mode Example

Begin by creating a desktop shortcut. In Windows Explorer navigate to C:\MED-PC, right-click on the MPCLoader.exe file (it may only say MPCLoader), select **Send To** and click **Desktop (create shortcut)**. See Figure 9-1.

Figure 9-1 - Creating a Desktop Shortcut Icon
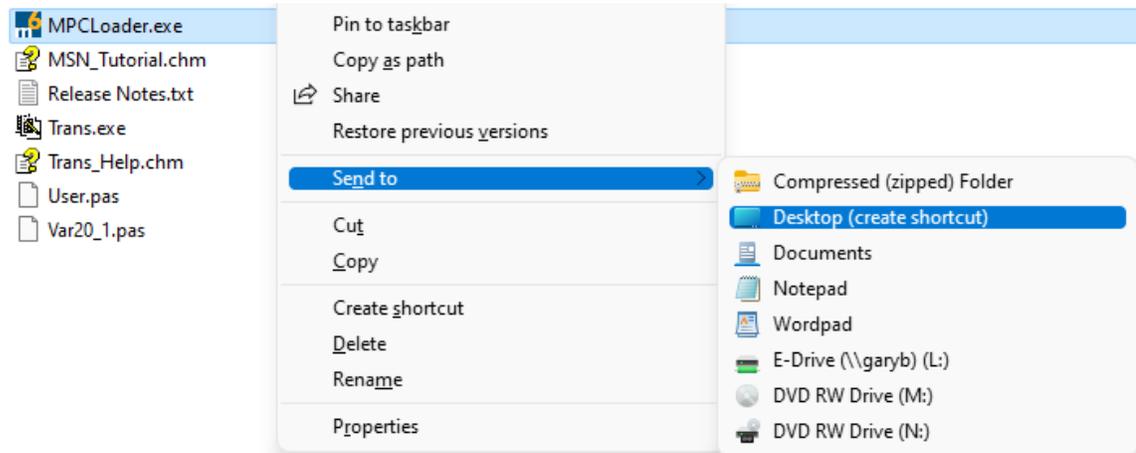
Return to the desktop, right click on the MPCLoader - Shortcut icon, select **Rename** and give the icon a distinct name such as MED-PC – Emulation Mode and click the Enter key. Right click on the icon again and select **Properties** to open the Shortcut Properties screen. On the Shortcut tab, add a space and then /E to the end of the target, see Figure 9-2. Click **OK** to save the change and exit the properties screen. Double-click the newly created MED-PC – Emulation

Mode icon to start MED-PC® in emulation mode when the computer is not connected to the interface cabinet.

Figure 9-2 - Modify the Shortcut Target
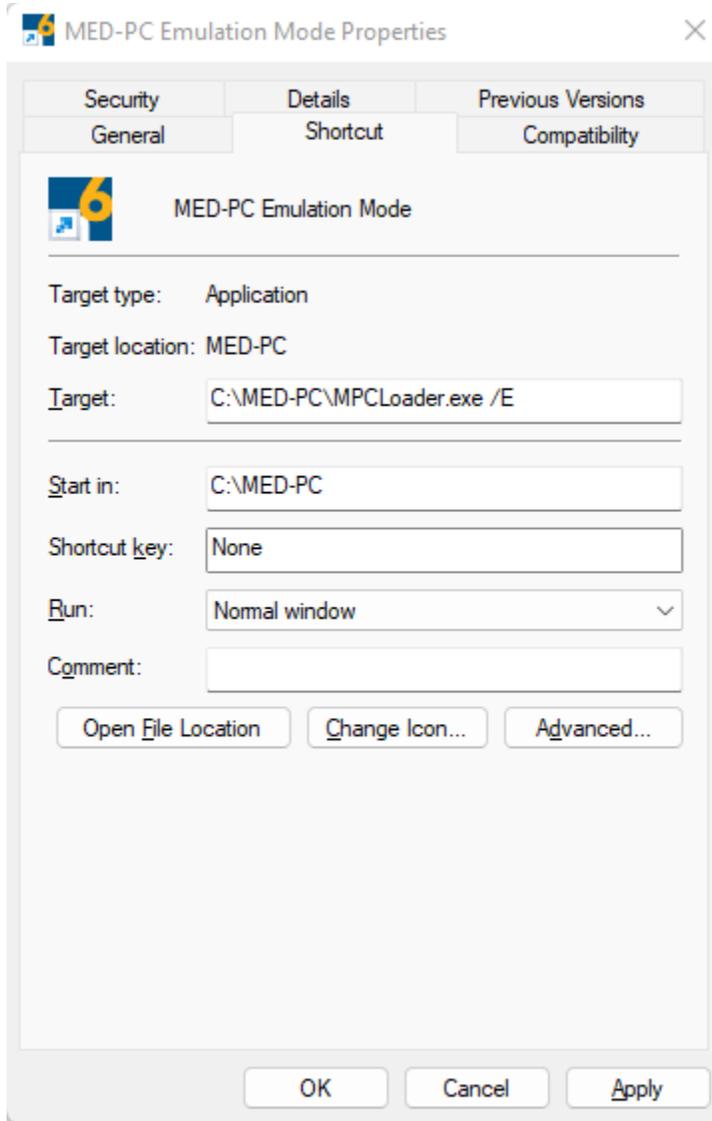
Alternate Configuration File Example

Create a desktop icon as outlined in the **Emulation Mode Example** above. In the Target window add the /INSTALL command and the name of the .xml configuration file. In the example in Figure 9-3 the name of the alternate configuration file is "6BoxSetUp.xml".

Figure 9-3 - /INSTALL Command Line Option Example
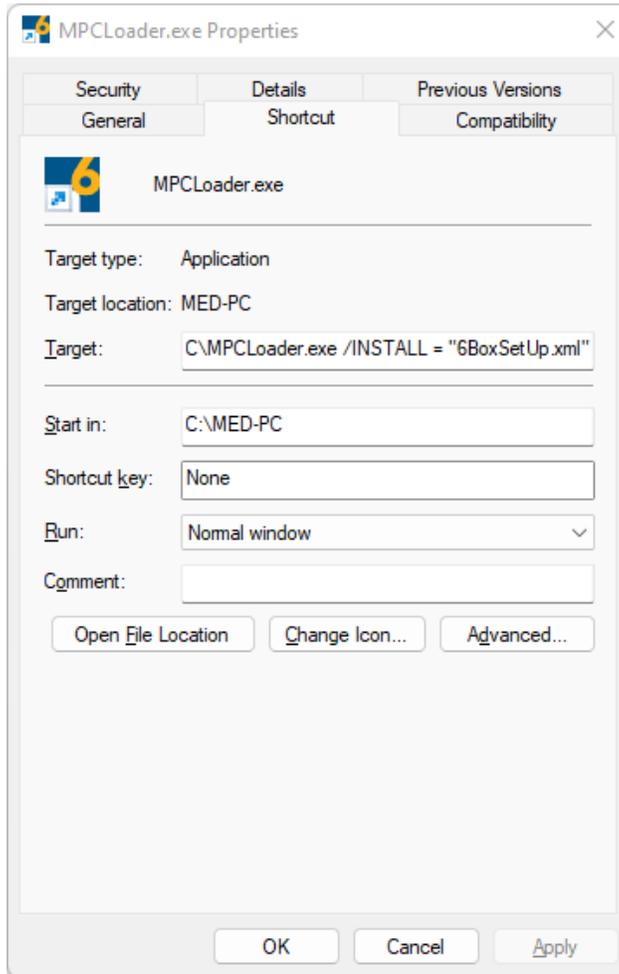
Command Line Macro Options

MED-PC® may be instructed to run a macro as soon as it loads by adding the macro path and name to the end of the Target, similar to the start-up options described above. Follow the steps above to create a desktop icon with a distinctive name and add the path and name of the macro to the end of the Target.

By default, macros are stored in C:\MED-PC\Macro.   Assume we have a macro called SampleMacro.MAC, to the end of the target we would add a space and "C:\MED-PC\Macro\SampleMacro.MAC" (quotes are required) to the end of the target to have MED-PC® run the SampleMacro.MAC as soon as it loads.

CHAPTER 10 | TERMINAL COMMANDS

The terminal commands in Table 1 allow the user to enter MED-PC® commands directly into the terminal window. These terminal commands perform the same functions as the button and menus within the user interface.

Table 1 - Terminal Commands

Command	Description	Arguments	Example	Notes
C	Change Variable Value	C;Var/Arr Element/Alias/Equated Var;NewValue;Boxes	C;A;10;1-2	Set A to 10 in Boxes 1 & 2
CLS	Clear Screen			
CO	Session Comment	CO;Boxes	CO;3;The rat seems agitated	Appends remark about rat to Box 3 session comments
G	Gets Variable Value	G;Var/Arr Elements/Alias/Equated Var;Boxes	G;A(5);1-2	Displays value of A(5) in Boxes 1 & 2
K	Issues Keyboard (K-Pulse) Signal	K;K Number;Boxes	K;10;1	Send K10 to Box 1
L	Loads One Box	L;Box;Subj;Expt;Grp;Pgm (no extension)	L;2;101;3; 2;FrTrain	Load Box 2, Subject 101, Experiment 3, Group 2, Program FrTrain
LOFF	Turns Off Locked On Output	LOFF;Output;Boxes	LOFF;3;1-2	Turn Off Locked On Output 3 in Boxes 1 & 2
LON	Locks On Output	LON;Output;Boxes	LON;2;A	Lock On Output 2 in All Boxes
M	Plays Macro	M;Macro Name (.mac extension and file path optional)	M;Macro1	Play Macro1
OFF	Turns Off Output	OFF;Output;Boxes	OFF;3;1-2	Turn Off Output 3 in Boxes 1 & 2
ON	Turns On Output	ON;Output;Boxes	ON;2;A	Turn On Output 2 in All Boxes
P	Prints Box	P;Boxes	P;1	Print Box 1
R	Issues Simulated Response	R;Response Number;Boxes	R;1;4	Send R1 to Box 4
RESET	Resets the error indicator			

S	Issues Start Command	S;Boxes	S;3	Start Box 3
STD	Stops Box and Discards Data	STD;Boxes	STD;1-3	Stops and discards data in Boxes 1, 2, & 3
STS	Stops Box and Saves Data to Disk	STS;Boxes	STS;A	Stops and saves data for all Boxes

Box numbers may be specified individually, as a comma separated list (e.g., 1,3,5), expressed as a range (e.g., 3-7), or all boxes may be selected with A.

Pressing the up and down arrows will recall the last 100 commands.

Pressing ? will display the help for all commands. Pressing ?COMMAND NAME (e.g., ?C) will display the help for that command.

CHAPTER 11 | CONTACT INFORMATION

MED-PC® is already being used in more laboratories around the world than any comparable product; however, it is always being improved and comments on how it might be enhanced further are welcome.

Please contact MED Associates, Inc. for information regarding any of our products.

Visit our website at www.med-associates.com for contact information.

For technical questions, call 802-527-2343 or email support@med-associates.com.