

# **CONTROL OF MED INPUT/OUTPUT MODULES FROM OTHER LANGUAGES**

SOF-732-3

USER'S MANUAL

**DOC-149**

**Rev. 1.1**

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notes

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## CHAPTER 1 | DIG-704 INPUTS AND OUTPUTS

The DIG-704 driver controls when and how the outputs are turned on and when the inputs are read. The Dynamically Linked Library (DLL) **704IO.DLL** provides the user with the ability to talk to the DIG-704 driver. There are two functions contained in the 704IO.DLL that the user can call from within their program, **PortRead** and **PortWrite**.

The **704IO.DLL** needs to be placed in the appropriate folder so that the calling program can find it when necessary. The correct folder is operating system dependent:

Windows 98	C:\Windows\System
Windows 2000	C:\WINNT\System32
Windows XP	C:\Windows\System32
Windows 7 (32 & 64 bit)	C:\Windows\System32

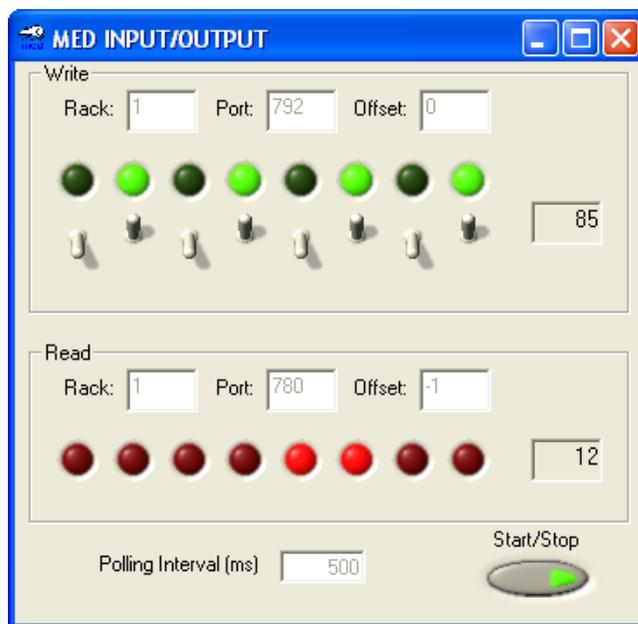
For Visual Basic 6.0 users the module **704IO.bas** is provided. Also an example project is provided demonstrating how to use the functions.

For Delphi users the header file **704IO.hed** is provided.

For C++ users the header file **704IO.h** and library **704IO.lib** is provided.

Each of the above files contains the PortRead and PortWrite function declarations, which need to be included with the desired program.

Figure 1 – Sample Program



## CHAPTER 2 | PORTREAD

### Visual Basic Declaration

Declare Function PortRead Lib "704IO.dll" (ByVal Rack As Integer, ByVal Port As Integer, ByVal Offset As Integer) As Integer

### Delphi Declaration

Function PortRead(Rack, Port, Offset : Integer) : Integer; stdcall; external '704IO.dll' name 'PortRead';

### C++ Declaration

Extern "C" short WINAPI EXPORT PortRead(short Rack, short Port, short Offset);

The PortRead function returns the value read from the specified Rack, Port, and Offset. It contains the following parameters:

**Rack:** Valid values 1 – 4

This is the Rack number that the input card is installed in. It is possible to have up to four DIG-704 PCI cards in the computer, and each DIG-704 PCI card is connected to its own Rack via a ribbon cable. Use MED Test to determine the appropriate Rack number for the input card. In most cases it will be 1. If MED Test does not provide the option of changing the Rack number, then it is Rack 1.

**Port:** Valid values 780 – 795

This is the Port number of the input card that needs to be read. The Port number for the input card is set using either a jumper or switch on the card itself.

SmartCtrl™ and Standard Input cards by default start at Port 780 and increment by one for each additional card. For example, the first SmartCtrl card would have an input Port of 780, the second SmartCtrl card would have an input Port of 781, etc.

SuperPort Input cards use a default Port value of 789. While it is possible to change the input Port on a SuperPort card it is recommended that it be left at the default value.

**Offset:** Valid values -1 – 254

This is the Offset number of the input card that needs to be read. On some cards (i.e. SuperPort Input cards) the Offset number is set by a jumper on the card itself.

SmartCtrl and Standard Input cards use an Offset value of -1. This value is hard coded and cannot be changed.

SuperPort Input cards by default start at Offset 0 and increment by 2 for each input card. Also each SuperPort Input card has two Offset values per card. This means that there are two input Bytes that can be read on every SuperPort Input card. For example the first SuperPort Input card would have an Offset value of 0 for the first Byte and 1 for the second Byte. The second SuperPort Input card would have an Offset value of 2 for the first Byte and 3 for the second Byte, etc.

The return value from the PortRead function is an Integer. A value of 0 means that all inputs were off and a value of 255 means that all inputs were on. The number indicates which inputs or Bits were on at the time the value was read:

Input #	Bit #
1	1
2	2
3	4
4	8
5	16
6	32
7	64
8	128

$$1 + 2 + 4 + 8 + 16 + 32 + 64 + 128 = 255$$

If more than one input is on at the time of the reading, then the values will be added together to come up with the resulting number. Example: 133 = 1 + 4 + 128 and means that inputs 1, 3, and 8 were on at the time of the reading.

**Example:** Value = PortRead(1, 780, -1)

Read the value from Rack 1, Port 780, Offset -1. (Note: The Rack, Port, and Offset values are the default values for the first SmartCtrl or Standard Input card.)

## CHAPTER 3 | PORTWRITE

### Visual Basic Declaration

Declare Sub PortWrite Lib "704IO.dll" (ByVal Rack As Integer, ByVal Port As Integer, ByVal Offset As Integer, ByVal Value As Integer)

### Delphi Declaration

Procedure PortWrite(Rack, Port, Offset, Value : Integer); stdcall; external '704IO.dll' name 'PortWrite';

### C++ Declaration

Extern "C" void WINAPI EXPORT PortWrite(short Rack, short Port, short Offset, short Value);

The PortWrite function writes the Value specified to the Rack, Port, and Offset provided. It contains the following parameters:

**Rack:** Valid values 1 – 4

This is the Rack number that the output card is installed in. It is possible to have up to 4 DIG-704 PCI cards inside the computer. Each DIG-704 PCI card is connected to its own Rack via a ribbon cable. Use MED Test to determine the appropriate Rack number for the output card. In most cases it will be 1. If MED Test does not provide the option of changing the Rack number, then it is Rack 1.

**Port:** Valid values 780 – 795

This is the Port number of the output card that needs to be written to. On some cards (i.e. SuperPort and Standard Output cards) the Port number is set using a jumper on the card itself.

Standard Output cards by default start at Port 780 and increment by one for each additional card. For example the first Standard Output card would have an output Port of 780, the second Standard Output card would have an output Port of 781, etc.

SmartCtrl cards use an output Port value of 792. This value is hard coded and cannot be changed.

SuperPort Output cards use a default Port value of 792. While it is possible to change the output Port on a SuperPort Output card it is recommended that it be left at the default value.

**Offset:** Valid values -1 – 254

This is the Offset number of the output card that needs to be written to. On some cards (i.e. SmartCtrl and SuperPort Output cards) the Offset number is set by a jumper or red switch on the card itself.

Standard Input cards use an Offset value of -1. This value is hard coded and cannot be changed.

There are four types of SmartCtrl cards (DIG-715, DIG-716, DIG-715A, and DIG-716B), however all of the cards work the same way when writing to them. By default SmartCtrl cards start at Offset 0 and increment by 2 for each card.

Two of the SmartCtrl cards (DIG-715 and DIG-716) only have one output Byte that can be written to. In this case the even Offset number is always used to address the card. For example the first SmartCtrl card would have an Offset value of 0, the second SmartCtrl card would have an Offset value of 2, etc.

Two of the SmartCtrl cards (DIG-715A and DIG-716B) have two output Bytes that can be written to. In this case two Offset numbers are used to address the desired Byte. For example the first SmartCtrl card would have an Offset value of 0 for the first Byte and 1 for the second Byte. The second SmartCtrl card would have an Offset value of 2 for the first Byte and 3 for the second Byte, etc.

SuperPort Output cards by default start at Offset 0 and increment by 2 for each output card. Also each SuperPort Output card has two Offset values per card. This means that there are two output Bytes that can be written to on every SuperPort Output card. For example the first SuperPort Output card would have an Offset value of 0 for the first Byte and 1 for the second Byte. The second SuperPort Output card would have an Offset value of 2 for the first Byte and 3 for the second Byte, etc.

**Value:** Valid values 0 – 255

This is the Value that is to be sent to the specified Rack, Port, and Offset. A Value of 0 would turn off all outputs and a Value of 255 would turn on all outputs. There are eight outputs available at each Port/Offset. To turn on an output you have to specify which Bit in the Byte to turn on:

Output #	Bit #
1	1
2	2
3	4
4	8
5	16
6	32
7	64
8	128

$$1 + 2 + 4 + 8 + 16 + 32 + 64 + 128 = 255$$

To turn on multiple outputs with one command just add the Bit values together and send that as the Value. Example:  $2 + 16 + 64 = 82$  and would result in outputs 2, 5, and 7 being turned on.

**Example:** PortWrite(1, 792, 0, 10)

Write the Value 10 to Rack 1, Port 792, Offset 0. This will result in outputs 2 and 4 being turned on. (Note: The Rack, Port, and Offset values are the default values for the first SmartCtrl or SuperPort Output card.)

## APPENDIX A | CONTACT INFORMATION

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

Visit our website at [www.med-associates.com](http://www.med-associates.com) for contact information.

For technical questions, email [support@med-associates.com](mailto:support@med-associates.com).