CTRIO WORKBENCH, MONITOR I/O

In This Chapter	
Using the Monitor I/O Dialog	8–2
Monitor I/O Error Codes	8–7

HAPTER

8

Using the Monitor I/O Dialog



NOTE: It is highly recommended to simulate your CTRIO Counter, Timer or Pulse Output Profile, etc., application using Monitor I/O before attempting to control the module from your controller program. Monitor I/O is extremely useful for debugging and the commissioning of a new system. Monitor I/O allows you to confirm proper configuration of the module, as well as field wiring and external device operation

The Monitor I/O dialog is accessible from the main Workbench dialog when the module is in Run Mode. On the main Workbench dialog, click the button labeled **Monitor I/O**.



After clicking on the **Monitor I/O** button, the dialog below (a) will appear if you have mapped the I/O in the CTRIO(2) module to the controller. Here you have the ability to



suspend CTRIO(2) module reads from the CPU/controller. Doing so will allow Monitor I/O to control the CTRIO(2) module without any control program intervention. With the output reads suspended, the Monitor I/O dialog allows you to simulate program control; for example, enabling a timer, resetting a counter, running a pulse profile or turning on an output configured for Raw mode, etc. When exiting Monitor I/O, you will be prompted (b) to re-enable the controller output reads.

The Monitor I/O dialog is divided into three functional areas: I/O Status & Input Functions,

Attention!	Attention!
Would you like to re-enable them?	Would you like me to suspend output reads?

Output Functions and **System Functions**. Just below the Windows title bar, you will see tabs to switch between the three functions, shown below. The functions are described on the pages that follow.

· · · · · · · · · · · · · · · · · · ·
Channel 2

I/O Status & Input Functions

I/O Status & Input Functions dialog includes all Input Function DWord Parameters (raw count/time, scaled count/time, etc.) and status bits passed from the CTRIO(2) module to the CPU (Capture Starting, Complete bits, etc.). The control bits that would be passed from the CPU to the CTRIO(2) are also included (Function enable bits, etc.).

The current status of each configured input and output is shown just below the **Input Status** and **Output Status** columns.

lonitor I/O			×		
I/O Status & Input Functions Outp	ut Functions System Functions				
Char	nel 1	Channel 2			
Input Status	Output Status	Input Status	Output Status		
ABCD	Out 0 Out 1	A B C D	Out 2 Out 3		
On On Off Off	Pulse:Active Discrete:Off	Off Off Off Off	Discrete:Off Discrete:On		
locut Fi	notione	Inter d Eventions			
Oued Counter	E des Tisses	I Input o	Unseufiguerd		
- Quad Counter	Eage Timer	Unconfigured	- Unconrigured		
Current Count 994	Last Time: 38				
	Timer: 38				
_	Cashard Clast				
	Captured Start				
At Reset Value Off	Capture Complete On				
	Enable Canture	1	1		
	I chable capture				
Reset Count					
			J		
CTRID read of RI C output	to is >> Supported // Click to enable		Dana		
UTHU read of PLU outputs is >> Suspended<< Lilok to enable.					
Last Error Code 0 - No error					

In the dialog panel above, the **Current Count** for Ch1/Fn1 **Quad Counter** is 994. The **Reset Count** button can be used to reset the count to the configured **Reset Value**.

For Ch1/Fn2, the **Edge Timer** is captured at 38us. The **Enable Capture** bit must be on prior to when the configured edge input occurs.

Note that **Output Status** - **Out 0** and **Out 3** - are **ON**. **Out 0** is configured for pulse output and **Out 3** is configured for a Raw discrete output. These outputs can be controlled from the Output Functions window.

Output Functions

The Monitor I/O Output Functions dialog includes all Output Function Word and DWord Parameters (file number, duty cycle, target position, etc.) and status bits passed from the CTRIO(2) module to the CPU (Output Enabled, Command Complete, etc.). The control bits that would be passed from the CPU to the CTRIO(2) are also included (Enable Output, Go to Position, Direction, etc).

Monitor I/O	ionitor T/D												
I/D Status & Input Function	ons Outp	ut Functions System Fu	nctions				Monitor I/O	-					×
Pulse (Step)		Pulse (Direction)	Discrete on Ch1/ Preset Mode	Fn1		1/0 Status & Input Function	s Out	out Functions System Functions				
Command		Command		Command		Command	Pulse (Step)		Pulse (Direction)	Discrete on Ch1/F Preset Mode *	n1	Raw	
Ux10 - Load Table	<u> </u>	1	¥	Ux10 - Load Table	•	1	Command		Command	Command		Command	
0x20 · Velocity Mode			0		0		0x10 · Load Table	۳	×	0x10 · Load Table	-		Y
0x21 - Hun to Limit Mod 0x22 - Run to Position M	e fode	Г	1	File Number 1	1		F	0	0	0x10 · Load Table 0x11 · Clear Table			0
	1	Г	1	Г	1		File Number 2	T	, T	0x12 · Initialize Table 0x13 · Add Table Entry			<u> </u>
	- Ē		- Ē		- T		í –	-1		0x14 - Edit Table Entry 0x15 - Edit Entry / Beloa	a	i i i i i i i i i i i i i i i i i i i	-7
							,	-7		0x16 - Initialize Table Or 0x22 Run to Resilien M	Reset	,	-f
Enable Output		Enable Output		Enable Outpu	t j		,	_	JJ.	0x99 · Write to ROM	loue	· · · · · · · · · · · · · · · · · · ·	
Goto Position		Gata Position		Goto Position			Enable Output		Enable Output	Enable Output		Enable Output	
Direction							Goto Position		Goto Position	Goto Position		Goto Position	
Process Comman	vd	Process Comma	nd	Process Comma	nd	Pr	Direction		Direction	Direction		Direction	
Output Enabled	D#			Output Enabled	D#	Output Er	Process Command		Process Command	Process Comman	d	Process Common	đ
Position Loaded	Off	Position Loaded		Position Loaded		Position L	Output Enabled	Off	Output Enabled	Output Enabled	Off	Output Enabled	Off
Output Active	Off	Output Active		Table Complete	On	Output Ac	Position Loaded	Off	Position Loaded	Position Loaded		Position Loaded	
Output Stalled	Off	Output Stalled					Output Active	Off	Gutput Active	Table Complete	On	Output Active	
Command Error	Off	Command Error		Command Error	Off	Command	Output Stalled	Off	Output Stalled				
Command Complete	Off	Command Complete		Command Complete	Off	Command	Command Error	Off	Command Error	Command Error	Off	Command Error	
							Command Complete	Off		Command Complete	Off		
CTRIO read of I	PLC outpu	its is >>Suspended<< Clic	< to enable	h			C 07010 1 (D	<u> </u>					
Last Error Code 0 - No error						ic outp	uts is 225 usperiue0<< Llick to enab	e.			one		
							Last Error Code 0 - No er	ror					
								_			_		

In the example above, Outputs 0 and 1 are configured for Pulse step and direction, Output 2 is configured to Preset mode assigned to Ch1/Fn1 (quad counter) and Output 3 is configured as Raw mode.

In the screen capture on the left, notice the pull down menu. The menus are context sensitive. They will change to display values that are appropriate to the CTRIO(2) module's configuration. Here you have access to all pulse profile commands. Command 0x10 will allow you to load any configured Pulse Profiles (Trapezoidal, S-Curve, Dynamic Positioning, etc.). In the screen capture on the right, you'll see we have selected Pulse Profile number 2 for this example.

To run a configured Pulse Profile, follow these steps:

- 1: Select Command code 10 (0x10).
- 2: Enter the desired Pulse Profile Number in the File Number field.
- 3: Click the **Process Command** button and confirm the **Command Complete** bit is ON. If the Command Error is **ON**, an explanation of the error will appear on the dialog status line. Then turn the **Process Command** button **OFF**.
- 4: Select the **Direction**; leaving the Direction button **OFF** selects forward, clicking the button **ON** selects the reverse direction.
- 5: Click on Enable Output to run the Pulse Profile. The Output Enabled and Output Active indicators will turn ON. When the profile is complete, the Output Active indicator will turn OFF.

Turning **OFF** the **Enable Output** during the profile run will terminate the pulse output. To run the profile again, turn **OFF** the **Enable Output** and then re-enable it. In the screen capture on the right on the previous page, notice the drop down menu. Here you have access to all of the Preset Table Commands. The Load Table Command (0x10) will allow you to load any configured Preset Tables. In the screen capture on the left, you'll see we have selected Preset Table number 1 for this example. Remember that Output 2 is assigned to Input Function Ch1/Fn1, which is configured as a Quad Counter Input.

To load a configured Preset Table for Output 2 to use based on Ch1/Fn1's count, follow the steps below:

- 1: Select Command code 10 (0x10).
- 2: Enter the desired Preset Table Number in the File Number field.
- 3: Click the Process Command button and confirm the Command Complete bit is ON. If the Command Error is ON, an explanation of the error will appear on the dialog status line. Then turn the **Process Command** button **OFF**.
- 4: Click on the **Enable Output** to allow the output to operate based on the Preset Table and current status of Ch1/Fn1 quad counter input.

As the encoder count on Ch1/Fn1 changes, the output 2 turns ON and OFF based on the entries in Preset Table number 1. Turning the Enable Output OFF while the Preset Table is being executed will disable the output.

Pulse (Step)	Pulse (Direction)	Discrete on Ch1/Fn1 Preset Mode *	Raw	
Command	Command	Command	Command	
0x20 · Velocity Mode		0x10 · Load Table		
0	0	0	0	
requency 1000		File Number 1		
Duty Cycle	i —	i — 1	i <u></u> i	
Step Count In-coccocco				
Enable Output	Enable Output	Enable Output	Enable Output	
Gata Position	Gioto Position	Gato Position	Gioto Position	
Direction	Direction	Direction	Direction	
Process Command	Process Command	Process Command	Process Command	
Output Enabled Of	Output Enabled	Output Enabled	n Output Enabled Off	
Position Loaded Of	Position Loaded	Position Loaded	Position Loaded	
Dutput Active Of	f Output Active	Table Complete 0	ff Output Active	
Output Stalled Of	f Output Stalled	Output Stalled	Output Stalled	
Command Error Of	Command Error	Command Error 01	ff Command Error	
Command Complete Of	Command Complete	Command Complete 0	ff Command Complete	

Pulse Output Command Codes 0x20, 0x21 and 0x22

Velocity mode (0x20) is shown in the example above. Based on which command is selected, different parameter fields, status bits and control bits will apply. No matter which one is selected, be sure to fill in the parameter fields with valid entries (refer to Chapter 9), and then Process the Command.

System Functions

The Systems Functions dialog allows you read from or write to the current input count and the current output pulse count under the following conditions:

- The current input count can be read from or written to if the input is configured for a Counter or Quad Counter. Timer values are not accessible.
- The current output pulse count can be read from or written to only if the pulse output is running Dynamic Velocity or Dynamic Positioning profiles.

DirectLogic Users

The reading from and writing to the CTRIO(2) module's internal registers is accomplished using the DirectLOGIC Read from Intelligent module (RD) and Write to Intelligent module (WT) instructions, respectively. Refer to Appendix B for Systems Functions ladder logic examples.

EBC, WinPLC, PBC, DEVNETS, MODBUS Users -

The Systems Functions dialog is available for use when connected to these interface devices, however, there is currently no way for the user control program to read from or write to the CTRIO(2) module internal registers.

Monitor I/O				×
1/0 Status & Input Functions Output	Functions Syst	em Functions		
SysCmd (Offset = 0x80 - 0x81) 0x01 - Read all registers 0x02 - Write all registers	Offset	Register	Value	
0x04 - Write one register 0x05 - Write reset value	0x82 - 0x85 0x86 - 0x89	Ch 1 / Fn 1 Ch 1 / Fn 2	0	
	0x8A - 0x8D 0x8E - 0x91	Ch 2 / Fn 1 Ch 2 / Fn 2	0	
Process SysCmd	0x92 - 0x95	Output 0	2766	
SysCmd Error Off SysCmd Complete Off	0x96 - 0x99	Output 1	0	
	0x9A - 0x9D	Output 2	0	
	0x9E - 0xA1	Output 3	0	
CTRIO read of PLC outputs	is >>Suspended<	< Click to enable.		Done
Last Error Code 0 - No error				

Monitor I/O Error Codes

The appropriate error code listed below will be displayed on the Monitor I/O Status Bar when an error occurs.



Error Code	Description
0	No error
100	Specified command code is unknown or unsupported
101	File number not found in file system
102	File type is incorrect for specified output function
103	Profile type is unknown
104	Specified input is not configured as a limit on this output
105	Specified limit input edge is out of range
106	Specified input function is unconfigured or invalid
107	Specified input function number is out of range
108	Specified preset function is invalid
109	Preset table is full
110	Specified table entry number is out of range
111	Specified register number is out of range
112	Specified register is in unconfigured input or output



Status bar