CTRIO WORKBENCH, MONITOR I/O

CHAPTER

8

In This Chapter...

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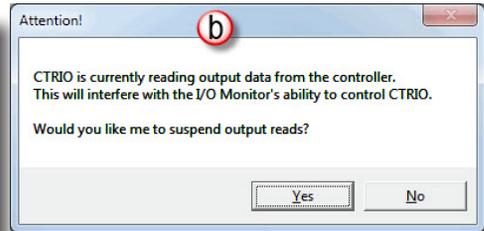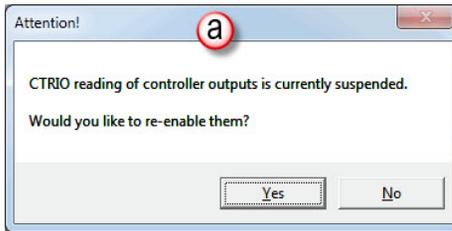
The Monitor I/O dialog is accessible from the main Workbench dialog when the module is in Run Mode. On the main Workbench dialog, click the button labeled **Monitor I/O**.
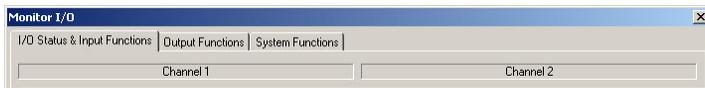
☑ DL
☑ Win
☑ NI

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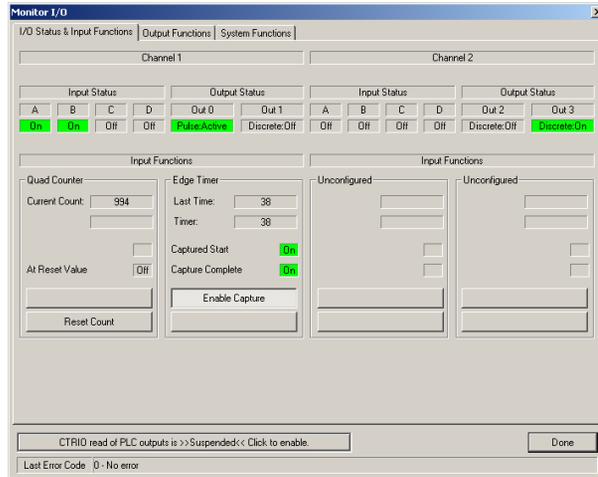
Output Functions and **System Functions**. Just below the Windows title bar, you will see tabs to switch between the three functions, shown below. The functions are described on the pages that follow.

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.
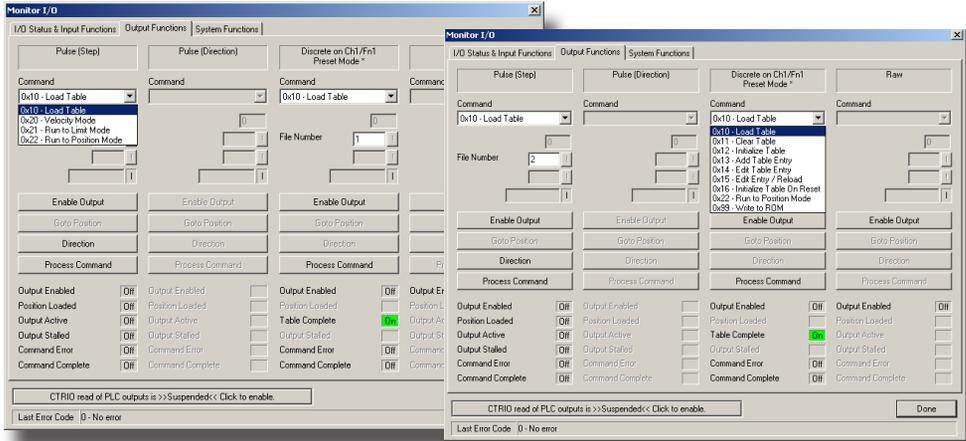

In the dialog panel above, the **Current Count** for Ch1/Fn1 **Quad Counter** is 994. The **Reset Count** button can be used to reset the count to the configured **Reset Value**.

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.

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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).

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.

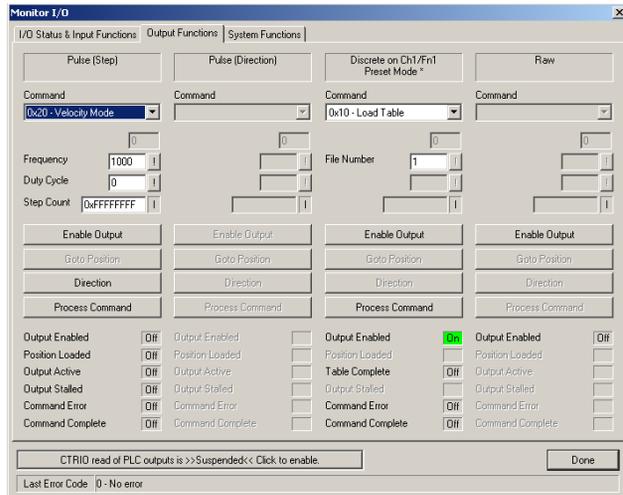To run a configured Pulse Profile, follow these steps:

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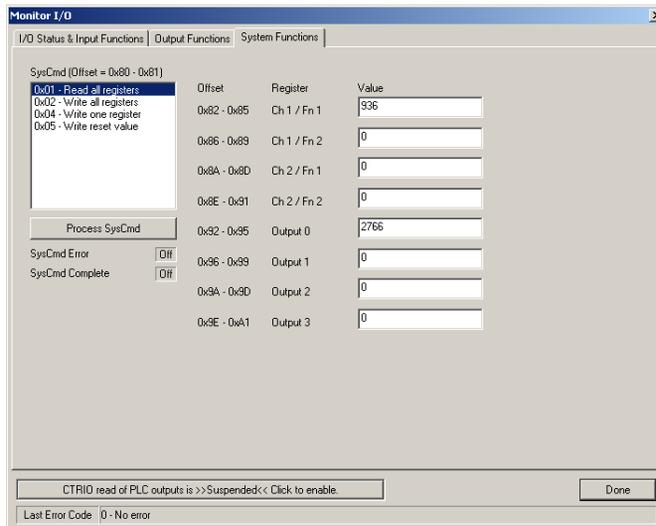
- The current input count can be read from or written to if the input is configured for a Counter or Quad Counter. Timer values are not accessible.
- The current output pulse count can be read from or written to only if the pulse output is running Dynamic Velocity or Dynamic Positioning profiles.

*Direct*Logic 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.
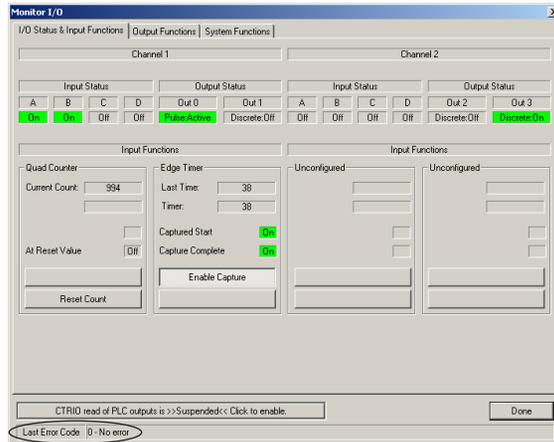
Monitor I/O Error Codes

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

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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

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