

# INTRODUCTION TO THE CTRIO MODULE

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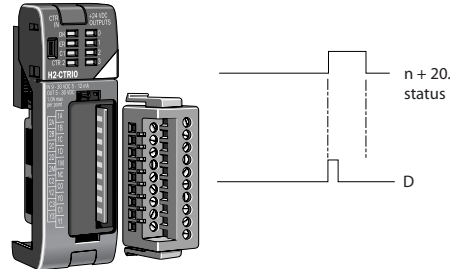
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## General Information about the CTRIO Module

The Counter I/O (CTRIO) module is designed to accept high-speed pulse-type input signals and provide discrete or pulse outputs for monitoring, alarm, or control functions. The CTRIO module offers great flexibility for applications which call for precise counting or timing, based on input events.

The CTRIO module has its own microprocessor and operates asynchronously with respect to the CPU. The response time of on-board outputs is based on the module's scan time, not the CPU's scan time.

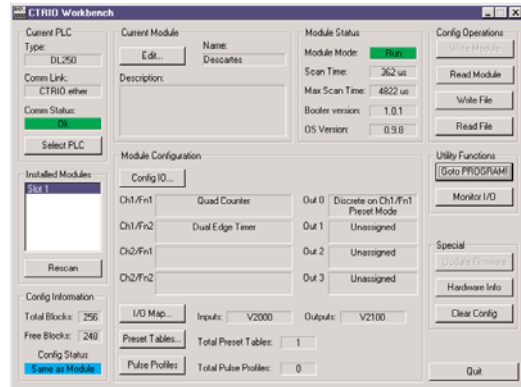


### CTRIO Workbench

All scaling and configuration is done via a software utility, eliminating the need for ladder programming to set up the module. The software utility is called CTRIO Workbench. The use of CTRIO Workbench is explained in Chapter 3.

### Supported CPUs

You can use the CTRIO module with conventional CPUs (D2-240 or D2-250), our Windows-based WinPLC CPU module, or PC-based control strategies using the H2-EBC interface module.



The CTRIO module plugs into any I/O slot of any DirectLogic 205 base except slot 0 (slot 0 is available for the CTRIO module when using the WinPLC CPU). Slot 0 is the I/O slot adjacent to the CPU. Multiple CTRIO modules can reside in the same base provided that the power supply is adequate. CTRIO modules can be placed in secondary local bases connected via ERM-to-EBC.

The CTRIO module is designed to work with incremental encoders or other field devices that generate pulses or edges.

### Typical Counter Applications:

- cut to length
- piece counting
- positioning (e.g. flying punch)
- PLS - programmable limit switch replacement (e.g. gluing application)
- stepper motor drive control
- valve control
- rate monitoring for speed and/or flow

# Specifications

General	
<b>Module Type</b>	Intelligent
<b>Modules Per Base</b>	Limited only by power consumption
<b>I/O Points Used</b>	None, I/O map directly in PLC V-memory or PC control access
<b>Field Wiring Connector</b>	Standard removable terminal block
<b>Internal Power Consumption</b>	400mA Max at +5V from 205 Base Power Supply Maximum of 6 Watts (All I/O in ON State at Max Voltage/Current)
<b>Operating Environment</b>	32°F to 140°F (0°C to 60°C), Humidity (non-condensing) 5% to 95%
<b>Manufacturer</b>	Host Automation Products, LLC
<b>Isolation</b>	2500V I/O to Logic, 1000V among Input Channels and All Outputs

Inputs	
<b>Primary Inputs</b>	4 pts sink/source 100K Hz Max
<b>Secondary Inputs</b>	4 pts, high speed, for Reset, Inhibit, or Capture
<b>Minimum Pulse Width</b>	5 $\mu$ sec
<b>Input Voltage Range</b>	9-30VDC
<b>Maximum Voltage</b>	30VDC
<b>Input Voltage Protection</b>	Zener Clamped at 33VDC
<b>Rated Input Current</b>	8mA typical 12mA maximum
<b>Minimum ON Voltage</b>	9.0VDC
<b>Maximum OFF Voltage</b>	2.0VDC
<b>Minimum ON Current</b>	5.0mA (9VDC required to guarantee ON state)
<b>Maximum OFF Current</b>	2.0mA
<b>OFF to ON Response</b>	Less than 3 $\mu$ sec
<b>ON to OFF Response</b>	Less than 3 $\mu$ sec

## Specifications (cont'd)

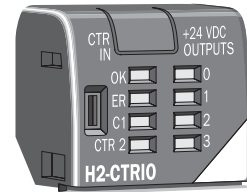
<b>CTRIO Output Specifications</b>	
<b>Outputs</b>	4 pts, independently isolated, current sourcing or sinking (open collector)
<b>Pulse output control</b>	2 channels, 20Hz - 25kHz (per channel), pulse and direction or cw/ccw pulses
<b>Voltage range</b>	5VDC - 36VDC
<b>Maximum voltage</b>	36VDC
<b>Output clamp voltage</b>	60VDC
<b>Maximum load current</b>	1.0A
<b>Maximum load voltage</b>	36VDC
<b>Maximum leakage current</b>	100 $\mu$ A
<b>Inrush current</b>	5A for 20ms
<b>OFF to ON response</b>	less than 3 $\mu$ sec
<b>ON to OFF response</b>	less than 3 $\mu$ sec
<b>ON state V drop</b>	$\leq 0.5V$
<b>External power supply</b>	for loop power only, not required for internal module function*
<b>Overcurrent protection</b>	15A max
<b>Thermal shutdown</b>	Tjunction = 150°C
<b>Overtemperature reset</b>	Tjunction = 130°C
<b>Target position range</b>	- 2.1 billion to + 2.1 billion (31 bits + sign bit)
<b>Duty cycle range</b>	1% to 99% in 1% increments (default = 50%)
<b>Configurable Presets</b> a) single b) multiple	a) each output can be assigned one preset, or b) each output can be assigned one table of presets, one table can contain max. 128 presets, max. predefined tables = 255

\* User supplied power source required for stepper drive configurations

## Specifications (cont'd)

Resources	
<b>Counter/Timer</b>	Four (2 per 4 input channel group)
<b>Resource Options</b>	1X, 2X, or 4X Quadrature, Up or Down Counter, Edge Timer, Dual Edge Timer, Input Pulse Catch
<b>Timer Resolution</b>	1 $\mu$ sec
<b>Counter Range</b>	$\pm$ 2.1 billion (32 bit + sign bit)

LED Descriptions			
<b>OK</b>	Module OK	<b>0</b>	Out 0
<b>ER</b>	User Program Error	<b>1</b>	Out 1
<b>1A</b> (C1 on older modules)	Ch 1 A Status / Pulses	<b>2</b>	Out 2
<b>2A</b> (CTR2 on older modules)	Ch 2 A Status / Pulses	<b>3</b>	Out 3



LED Definitions		
OK	ER	Description
ON	OFF	All is well - RUN Mode
ON	ON	205 Base Power Fault
Blinking	Blinking	Boot Mode - Used for Field OS Upgrades
Blinking	OFF	Program Mode
OFF	Blinking	Module Self-diagnostic Failure
OFF	ON	Module Error Due to Watchdog Timeout
OFF	OFF	No Power to Module
<b>1 A or 2A</b> (C1 or CTR2 on older modules)		<b>Based on Configuration of Input A</b>
Blinking 7 times per second		A is Configured as Counter and is Changing
Following State of Input		A is not Configured as Counter
<b>Output LEDs 0 - 3 Follow Actual Output State</b>		