Chapter 1

Getting Started

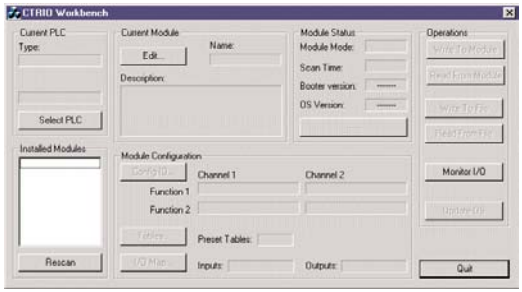
General Information about the CTRIO Module

The Counter I/O (CTRIO) module is designed to accept high-speed pulse-type input signals and provide discrete 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. This means that on-board outputs respond in approximately 300µs to 2ms.

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 state-of-the-art Windows-based CPU module, or PC-based control strategies.

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 may 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.

Applications:

- cut to length
- piece counting
- positioning a flying punch
- PLS - programmable limit switch (glueing application)
- stepper control
- valve control

Specifications

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

Inputs	
Primary Inputs	4 pts sink/source 100K Hz Max
Secondary Inputs	4 pts, high speed, for Reset, Inhibit, or Capture
Minimum Pulse Width	5 µsec
Input Voltage Range	9-30VDC
Maximum Voltage	30VDC
Input Voltage Protection	Zener Clamped at 33VDC
Rated Input Current	8mA typical 12mA maximum
Minimum ON Voltage	9.0VDC
Maximum OFF Voltage	3.0VDC
Minimum ON Current	5.0mA (9VDC required to guarantee ON state)
Maximum OFF Current	3.0mA
OFF to ON Response	Less than 3 µsec
ON to OFF Response	Less than 3 µsec

Specifications (cont'd)

CTRIO Output Specifications	
Outputs	4 pts, independently isolated, current sourcing or sinking (open collector)
Pulse output control	2 channels, 20Hz - 25kHz, pulse and direction or cw/ccw pulses
Voltage range	5VDC - 36VDC
Maximum voltage	36VDC
Output clamp voltage	60VDC
Maximum load current	1.0A
Maximum load voltage	36VDC
Maximum leakage current	100µA
Inrush current	5A for 20ms
OFF to ON response	less than 3µsec
ON to OFF response	less than 3µsec
ON state V drop	< 0.3V
External power supply	for loop power only, not required for internal module function*
Overcurrent protection	15A max
Thermal shutdown	Tjunction = 150°C
Overtemperature reset	Tjunction = 130°C
Target position range	+/- 2.1 billion (31 bits + sign bit)
Duty cycle range	0.1% to 99.9% in 0.1% increments

*** User supplied 5VDC power source required for most stepper drive configurations**

Specifications (cont'd)

Resources	
Counter/Timer	Four (2 per 4 input channel group)
Resource Options	1X, 2X, or 4X Quadrature, Up or Down Counter
Timer Resolution	1 µsec
Counter Range	2.1 billion

LED Descriptions			
OK	Module OK	**0**	Out 0
ER	User Program Error	**1**	Out 1
C1	Ch 1 A Status / Pulses	**2**	Out 2
CTR2	Ch 2 A Status / Pulses	**3**	Out 3

LED Definitions		
OK	**ER**	**Description**
ON	OFF	All is well - RUN Mode
ON	ON	205 Base Power is Out of +5 Range
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
C1 or CTR2		**Based on Configuration of Input A**
Blinking 7 times per second		A is Configured as Counter and is Changing
Following State of Input		A is not Configured as Counter
Output LEDs 0 - 3 Follow Actual Output State		