DirectLOGIC Programming Examples

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DirectLOGIC Programming Examples Overview

NOTE: *The programming examples on the following pages are provided "as is" without a guarantee of any kind. This Chapter is provided by our technical support group to assist others. We do not guarantee the examples are suitable for a particular application, nor do we assume any responsibility for them in your application. Chapter 6 "Program Control" contains flowcharts that provide detailed steps needed to execute a pulse profile or System Functions command.*

The ***Direct***SOFT programming examples provided on the following pages are simple examples that are intended to assist you in the basics of loading and running various output pulse profiles. The examples are complete enough to load a profile, process the command and load the Parameter registers necessary to execute the profile. Two System Functions examples are also provided.

Load and Run a Pulse Profile example:
You will need to have a Trapezoid, S-Curve, Symmetrical S-Curve, Home Search or Free Form profile configured using the Configure I/O dialog. You will also need to have the appropriate Pulse Profile Table File Number (decimal) stored in V3000 for this example. You must turn C0 on to load and run the pulse profile. C2 controls the pulse output direction.

Dynamic Positioning/Positioning Plus Profile example:
You will need to have a Dynamic Positioning/Positioning Plus profile configured as Table File Number 1 using the Configure I/O dialog. You will also need to have the appropriate Target Pulse Count Position (signed decimal) stored in V3000 for this example. You must turn C0 on to initialize the settings. Then turn C2 on to Go to Position.

Dynamic Velocity Profile example:
You will need to have a Dynamic Velocity profile configured as Table File Number 1 using the Configure I/O dialog. You will also need to have the appropriate Target Velocity (signed decimal) stored in V3000 for this example. You must turn C0 on to initialize the settings and enable the output.

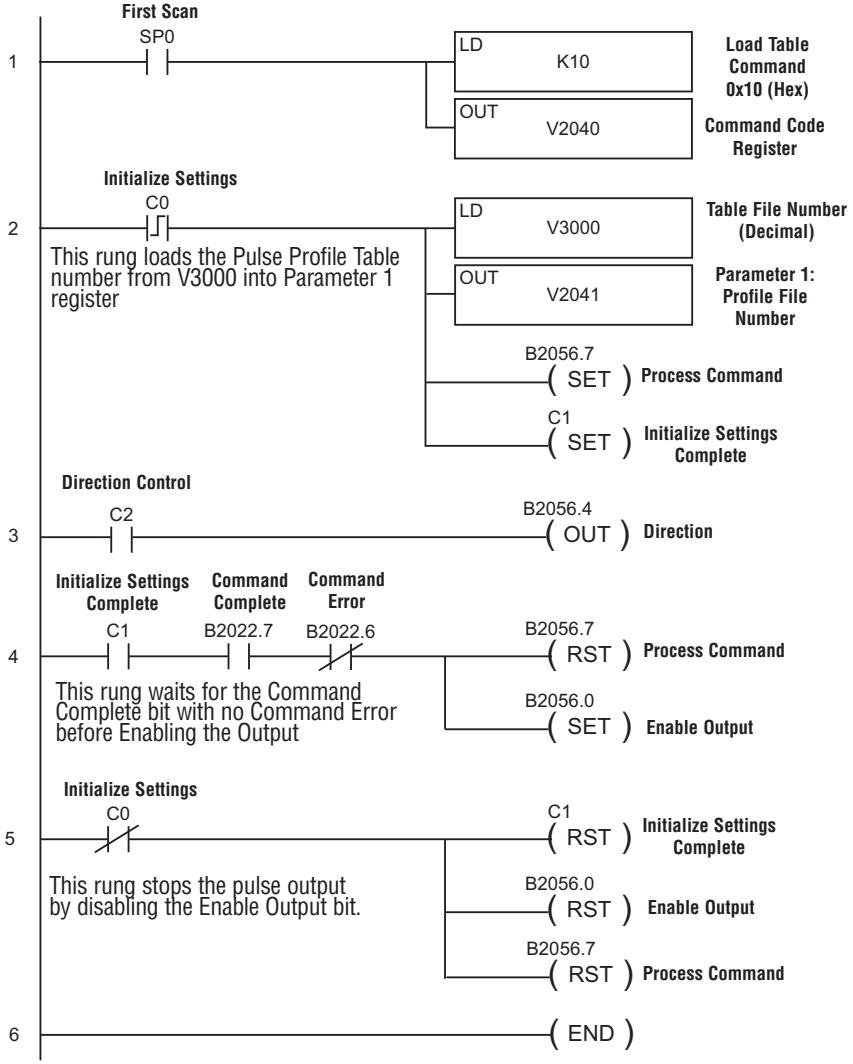
Velocity Mode, Run to Limit Mode and Run to Position Mode examples:
No CTRIO Pulse Profile Tables are necessary to execute these profiles, but the Outputs need to be configured for Step/Direction or CW/CCW using the Configure I/O dialog. All parameters are stored in memory as shown in the examples. You must turn C0 on to initialize the settings and to run the pulse profile. C2 controls the pulse output direction. For Run to Position Mode, Ch1 Inputs A & B must be configured for Quad Counter in CTRIO Workbench. The position from that encoder is used to stop the move.

Simulating Retentive Counter example:
This Systems Functions example uses the Write to Intelligent (WT) instruction to write the current count stored in the PLC's retentive memory to the CTRIO's current count register on a power cycle or a RUN-STOP-RUN PLC mode change. No permissive bits are required to be turned on in this example.

Reading CTRIO Internal Registers example:
This Systems Functions example uses the Write to Intelligent Module (WT) and Read from Intelligent Module (RD) instructions to read all of the CTRIO's internal registers every 900ms. You must turn C0 on to initialize the settings to perform the Read routine.

Load and Run a Pulse Profile

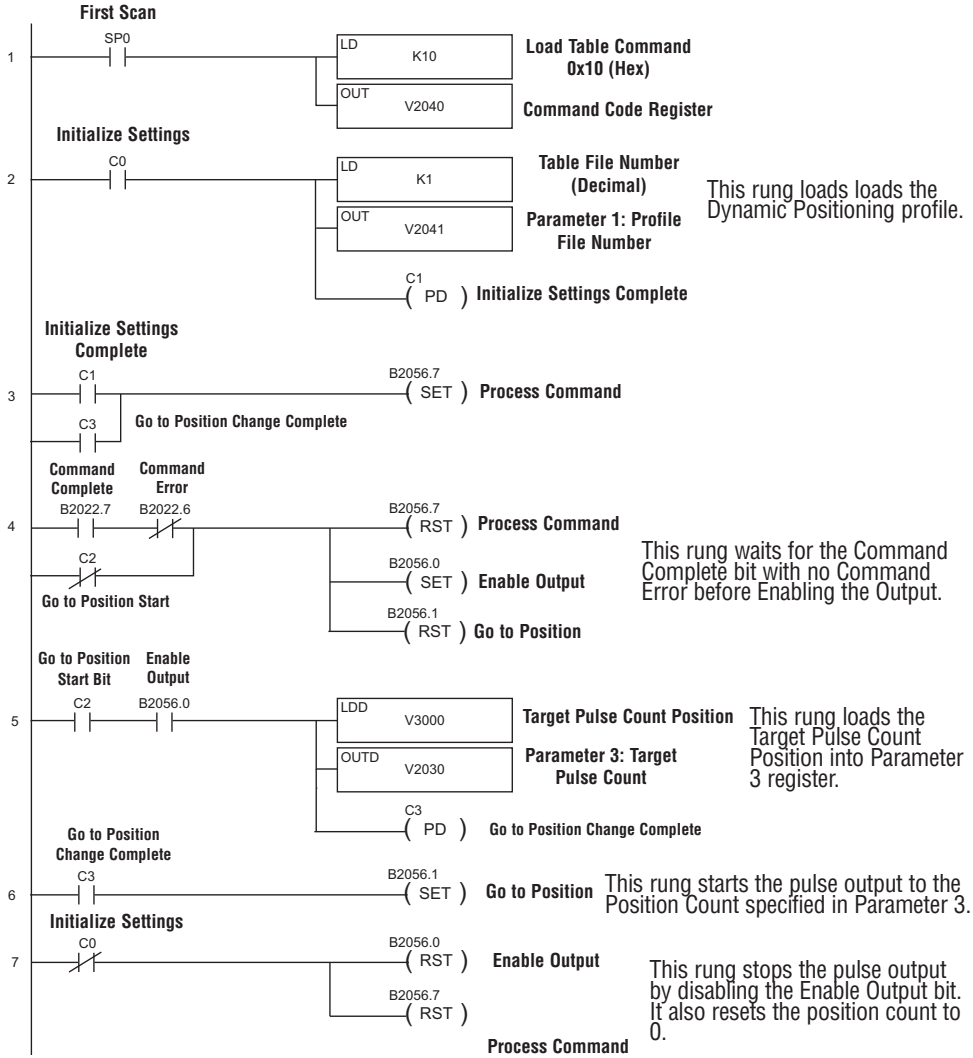
The following example program loads and executes a Pulse Profile that was created using CTRIO Workbench Pulse Profiles dialog . This example can be used for Trapezoid, S-Curve, Symmetrical S-Curve, Home Search and Free Form profiles (Home Search requires that CTRIO inputs C and/or D are configured for Limit Out 0 and/or Limit Out 2). The Pulse Profile number is stored in V3000 for this example. Turning on C0 will load and run the pulse profile.



Dynamic Positioning/Positioning Plus

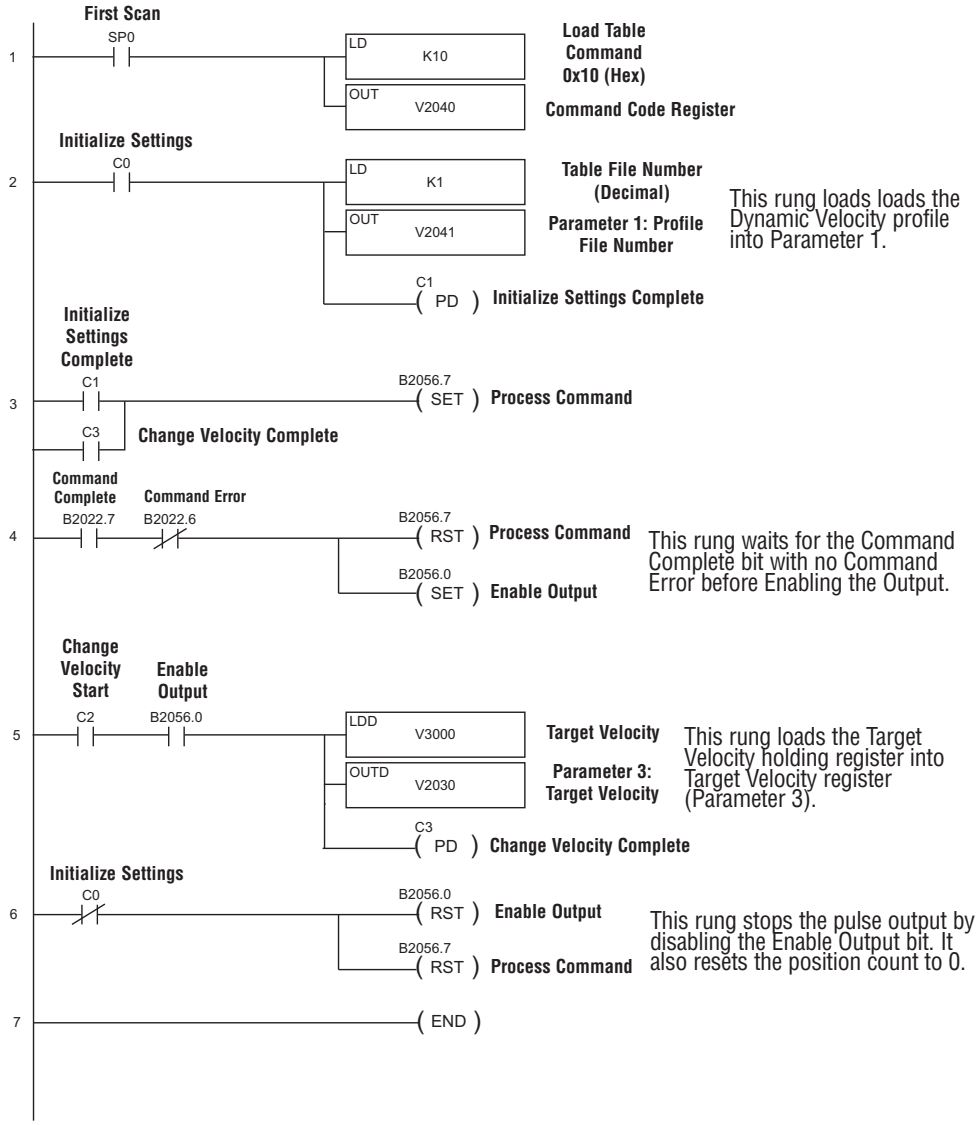
The following example program runs a Dynamic Positioning/Positioning Plus pulse profile. Turn on C0 to load the profile number and process the command. The first move starts at position count = 0. Turning on C2 will start the pulse output to position specified in Parameter 3.

The output will move in whichever direction is appropriate to reach the position specified in Parameter 3. To make additional moves, wait for the current move to complete, load a new value into the Target Pulse Count register and set the Go to Position bit. Subsequent moves are still referenced to the same 0 location as the first move. Clearing the Enable Output bit will disable output pulsing and reset the current position to 0.



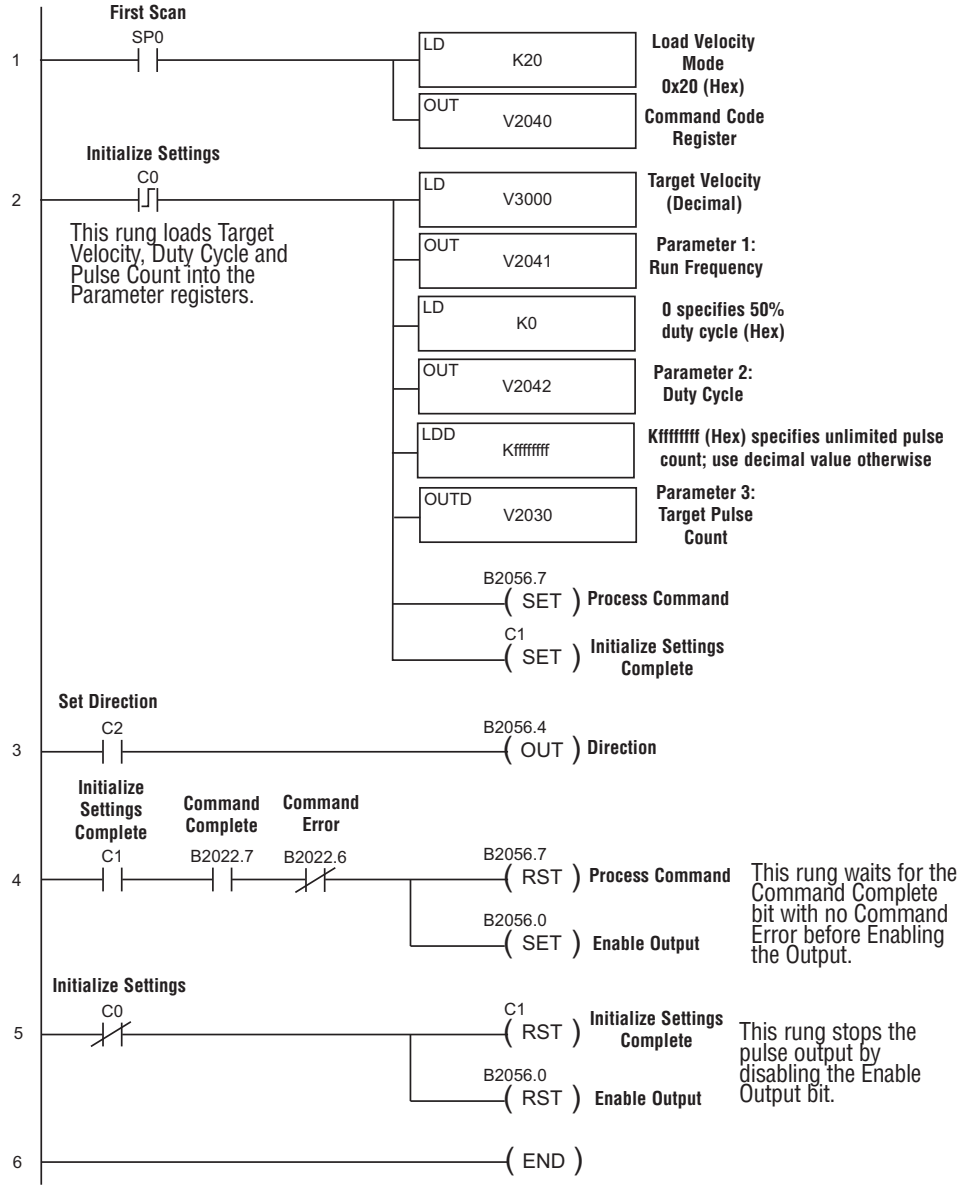
Dynamic Velocity

The following example program executes a Dynamic Velocity pulse profile. Turn C0 on to load the profile number, process the command and enable the output. The Target Velocity needs to be specified inV3000. The velocity can be changed "on the fly" by entering a different value into V3000. The sign of the value in the target velocity register controls the pulse output direction. Clearing the Output Enable bit will always suspend pulsing.



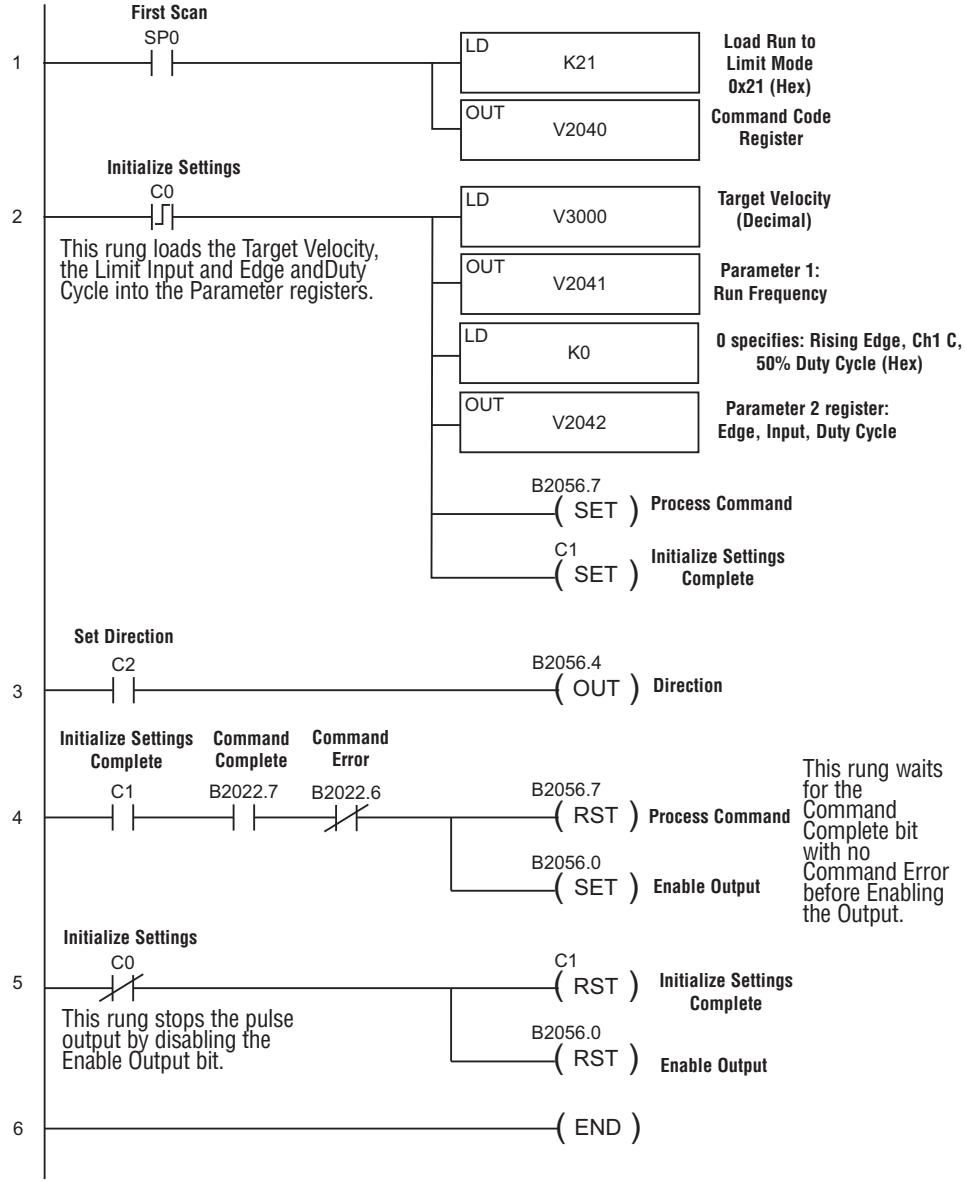
Velocity Mode

The following example program loads and executes a Velocity Mode pulse profile. For Parameter 3, a specific number of pulse output counts can be specified or if set to "ffffffff" Hex, the pulse output will remain ON at the specified Target Velocity until the output is disabled.



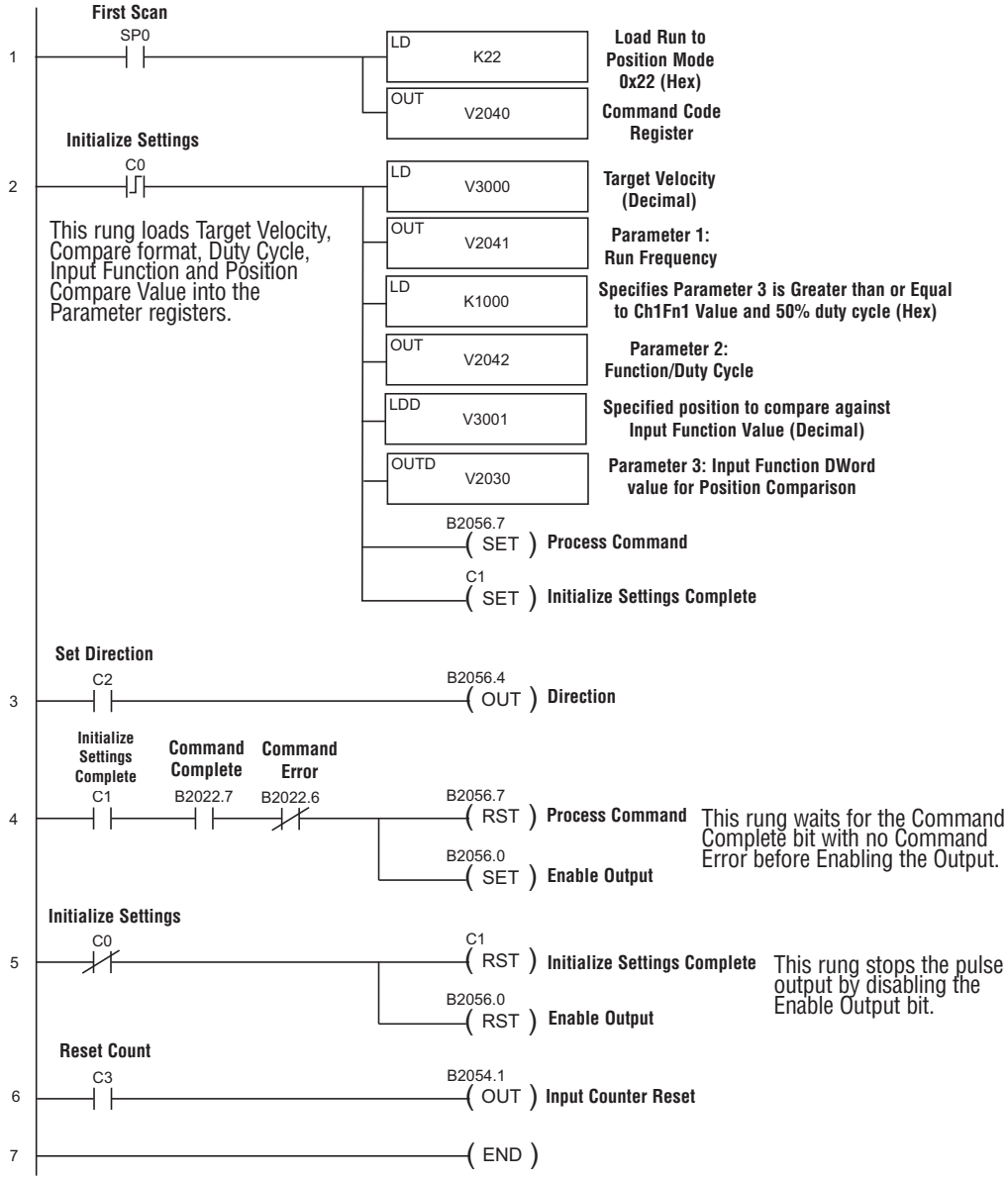
Run to Limit Mode

The following example program loads and executes a Run to Limit Mode pulse profile. Turn on C0 to run the profile. CTRIO input C or D must be assigned to Limit for this profile.



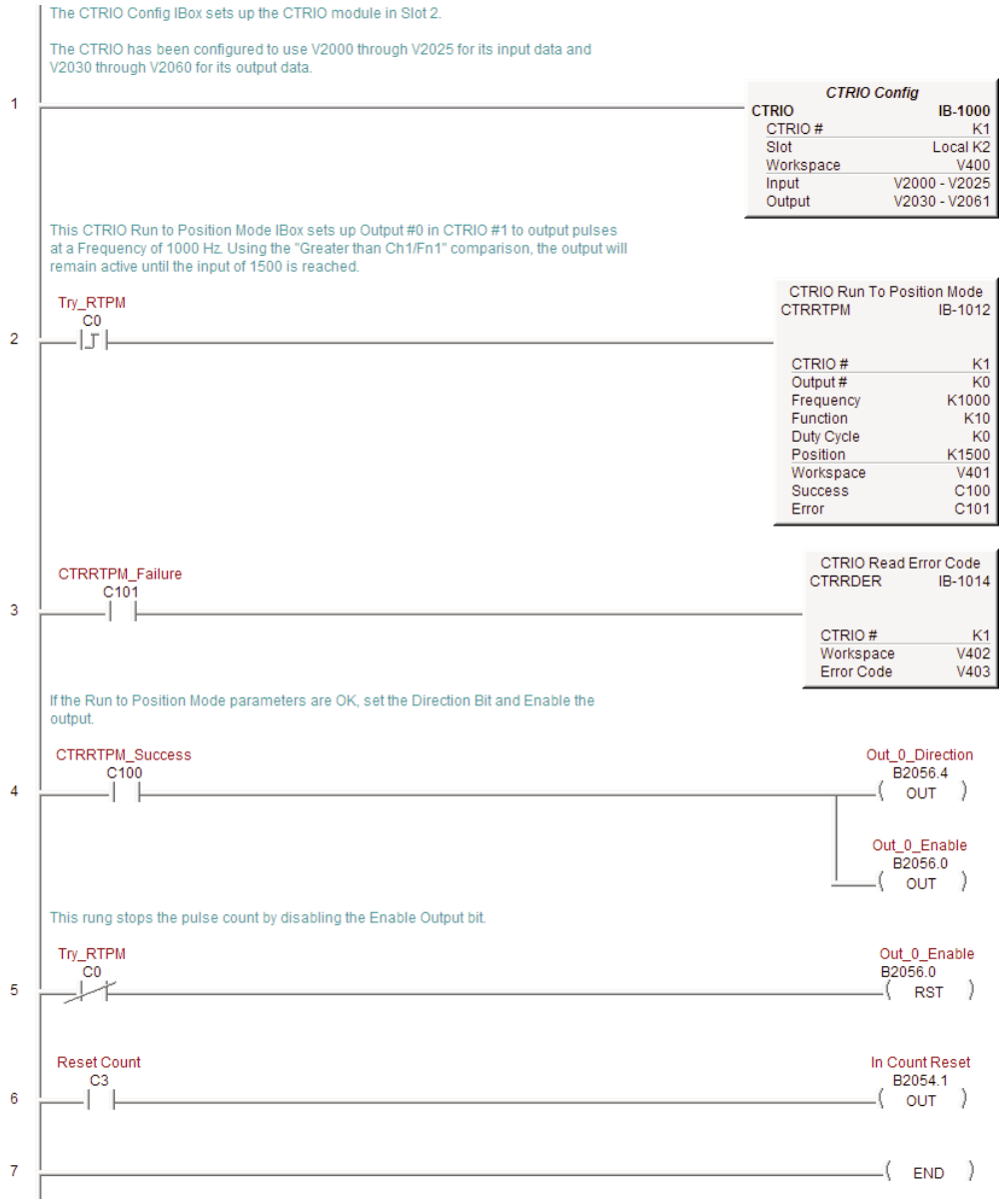
Run to Position Mode

The following example program loads and executes a Run to Position Mode pulse profile. Turn on C0 to run the pulse profile.



Run to Position Mode with DirectSOFT IBox Instructions

This is the equivalent ladder using IBox instructions in DirectSOFT to the ladder shown on the previous page.



System Functions Examples Overview

NOTE: *System Functions are supported only when the CTRIO module is installed in the same base as the* ***Direct****LOGIC CPU.*

The Systems Functions examples on the following pages use the ***Direct***LOGIC Write to Intelligent Module (WT) and/or Read from Intelligent Module (RD) instructions to write to or read from the CTRIO's internal registers.

Reading From CTRIO Internal Memory
Reading the CTRIO's internal memory consists of several steps. Step one is using the WT instruction to send a Systems Function's command to the CTRIO telling it to put its internal register values into the CTRIO's "shared RAM". Step two is processing the request for the internal register values using the Process Command bit. Step three is using the RD instruction to read the values from the CTRIO's "shared RAM" memory into PLC V-memory.

Steps 1 and 2: WT instruction and Process Command
PLC V-memory ==> CTRIO's Shared RAM
CTRIO's Shared RAM ==> Process Command to internal processor
CTRIO's Shared RAM <== Internal data values

Step3: RD instruction
PLC V-memory <== CTRIO's Shared RAM

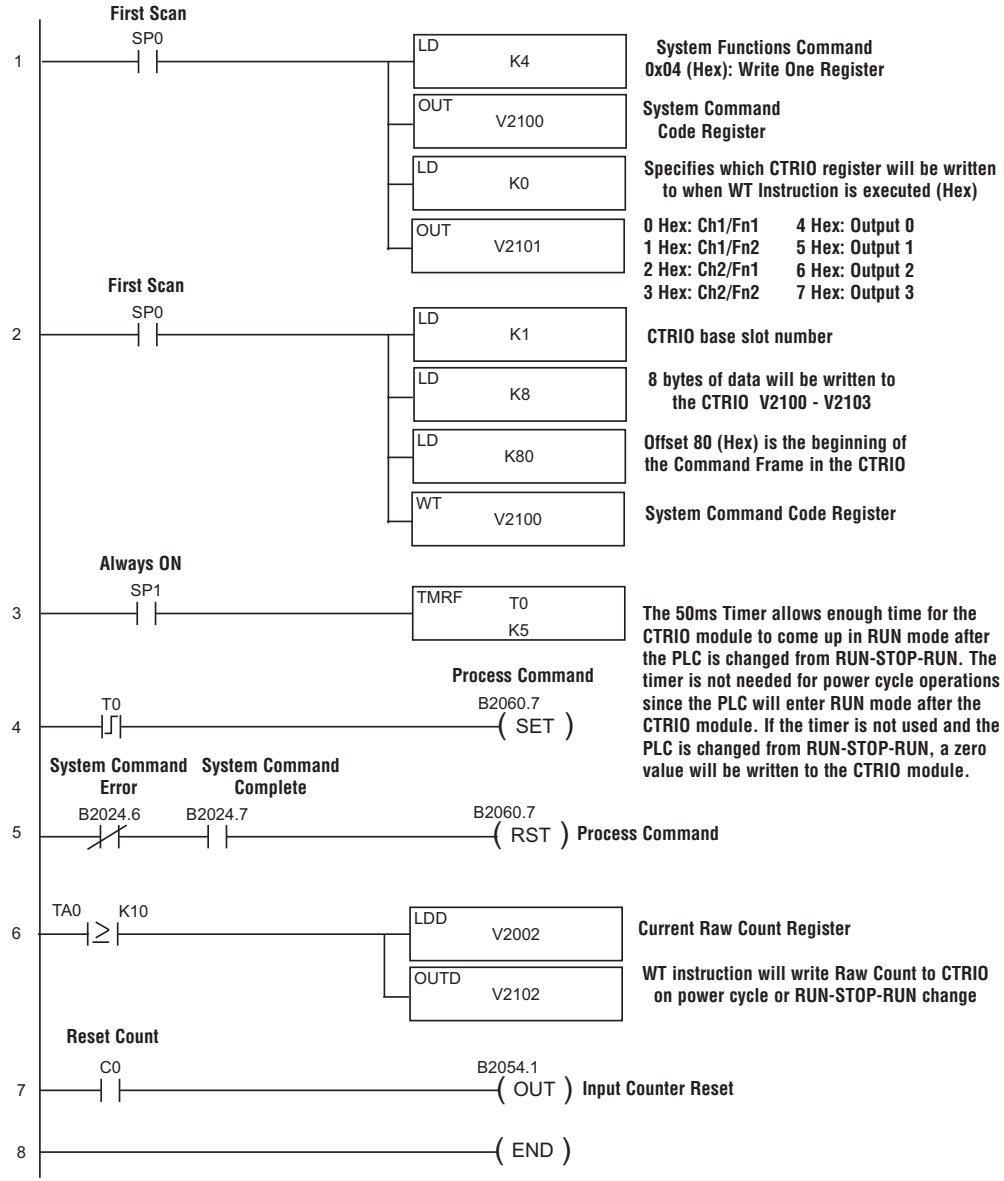
Writing to CTRIO Internal Memory
Writing to the CTRIO's internal registers is basically a two step process. Step one is using the WT instruction to send a System Function's command and the desired data values to the CTRIO's "Shared RAM". Step two is using the Process Command bit to tell the CTRIO to process the command and data values that are in the CTRIO's Shared RAM. This moves the data values from the Shared RAM into the CTRIO's internal registers.

Steps 1 and 2: WT instruction (command and data) and Process Command Bit:
PLC V-memory ==> CTRIO Shared RAM
CTRIO Shared RAM ==> Process Command to internal processor
CTRIO Shared RAM ==> internal data registers

NOTE: *This function is not available when the CTRIO module is installed in a EBC expansion base.*

Simulating Retentive Counter

The following Systems Functions example uses the Write to Intelligent (WT) instruction to write the current count stored in the PLC's retentive memory to the CTRIO's current count register on a power cycle or a RUN-STOP-RUN PLC mode change.



Reading CTRIO Internal Registers

The following Systems Functions example uses the Write to Intelligent Module (WT) and Read from Intelligent Module (RD) instructions to read all of the CTRIO's internal registers every 900ms and place the data starting at V2200.