

TETRIX® myRIO Programming Tools for *LabVIEW™*

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A downloadable PDF of the most recent version of this guide can be found at

<https://www.pitsco.com/TETRIX-myRIO-Control-Board-Adapter>.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

V1.0
02/18

Overview

This document provides guidance on installation of the TETRIX® myRIO programming tools for *LabVIEW™* to be used with the TETRIX MAX DC and Servo Motor Expansion Controllers, and it gives a brief overview of each virtual instrument (VI).

You must first have installed *LabVIEW* and configured your myRIO. Information for installing *LabVIEW* for myRIO is included with the myRIO hardware or can be accessed at www.ni.com/myrio. Please reference the instructions and resources included with myRIO for help on completing these items. After that has been done, the TETRIX myRIO programming VIs can be found at <https://www.pitsco.com/TETRIX-myRIO-Control-Board-Adapter>.

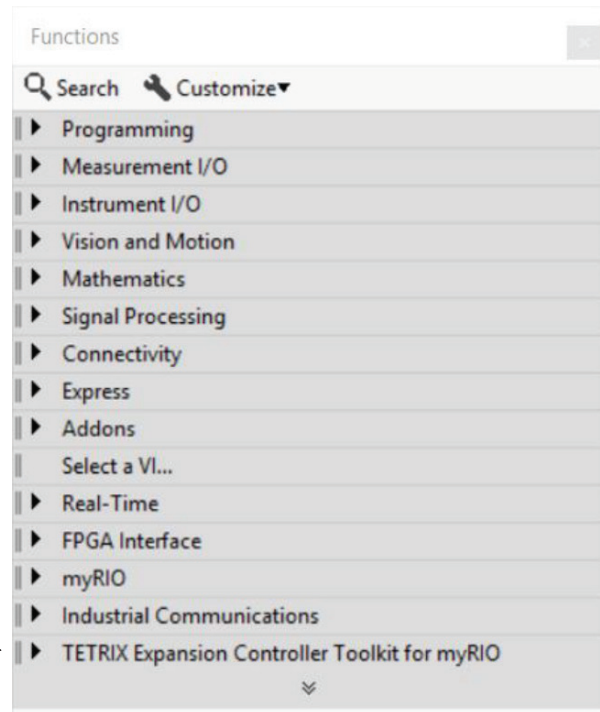
Preparing files

Download and unzip the file “TETRIX_LV_myRIO_ToolKit” to a folder on your computer. Open the folder and find the VI Package installer. There will be a version number at the end of the file name; however, the version number can change as new releases become available. Also included in the .zip file is a *LabVIEW* project with several code examples demonstrating how to use the VI tools using *LabVIEW* and myRIO to control TETRIX DC motors and servos. If you are new to *LabVIEW* and myRIO programming, it is recommended that you start with these examples.

Installing the programming tools

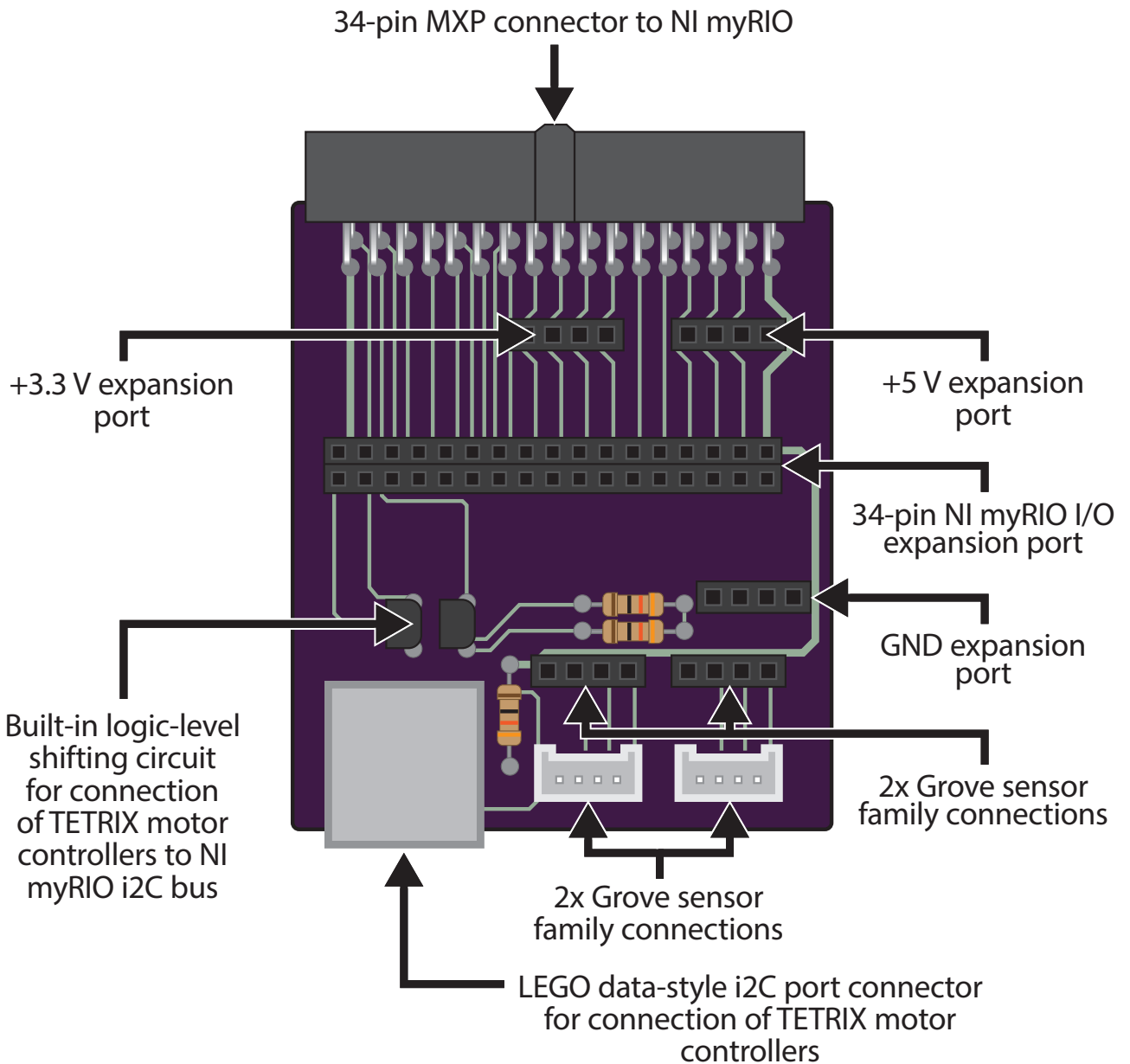
To begin installation, double-click the VI Package file. If you have not already installed the *VI Package Manager* software, you will be prompted to do so. Simply follow the prompts on the screen to guide you through the process. After the *VI Package Manager* software is installed, double-click the VI Package file once more to start the installation of the tools. Follow the prompts on the screen to complete the installation. After the installation is finished, the installed TETRIX myRIO programming VIs can be located on the *LabVIEW* functions palette.

Each of these VIs can be used to construct a *LabVIEW* program for controlling a TETRIX robot equipped with TETRIX DC and Servo Motor Expansion Controllers and myRIO. An adapter interface board developed by Pitsco and included in each WRO TETRIX myRIO bundled kit must be used to ensure proper connection and i2C communication between the TETRIX expansion motor controllers and the myRIO controller.



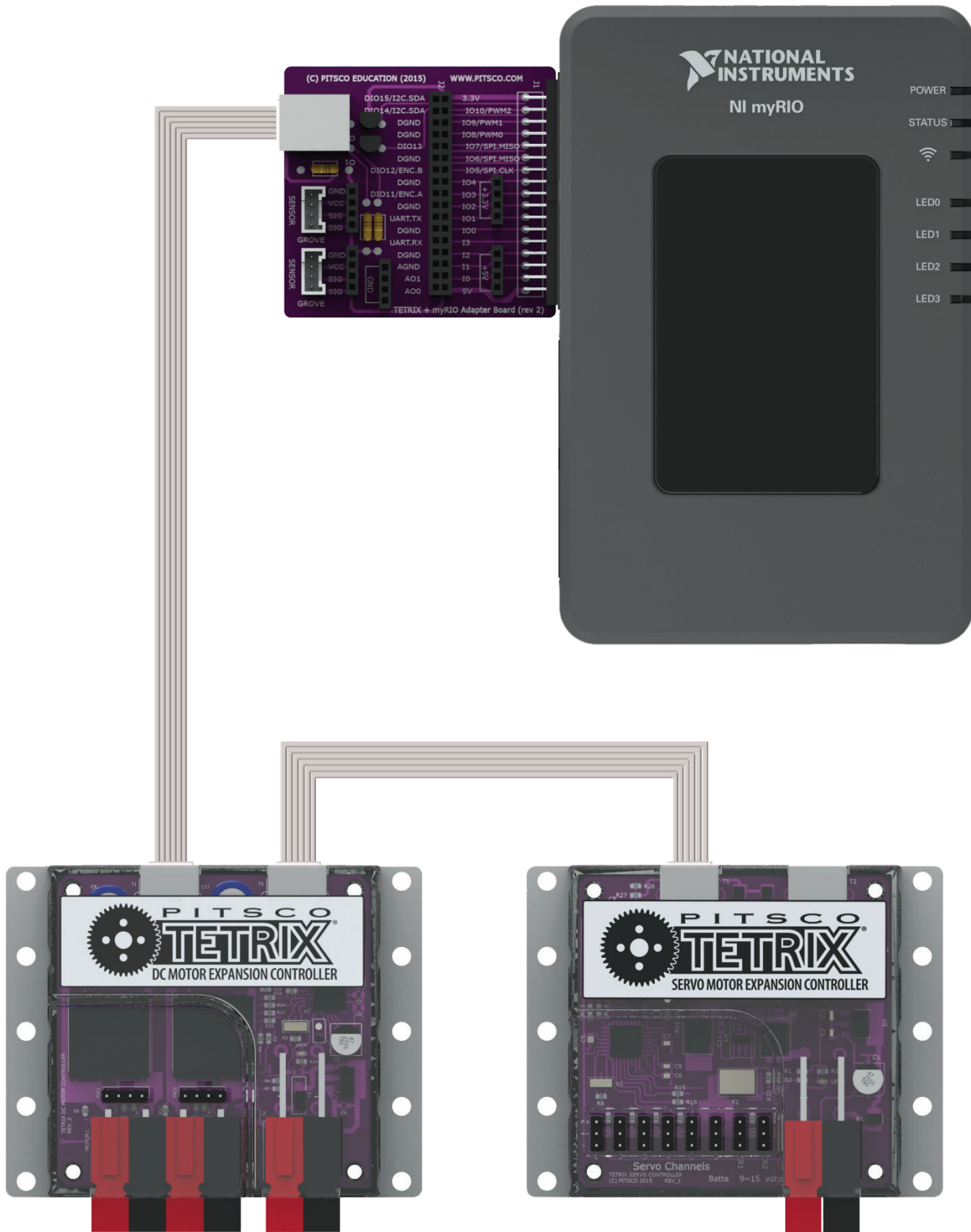
Connecting controllers

The TETRIX motor expansion controllers connect via the Pitsco adapter to the i2C bus of the myRIO controller. The motor controllers are connected in a daisy chain hookup with the first controller in the chain designated as Position 1. Subsequent controllers are set to Positions 2, 3, and 4. A maximum of four controllers can be connected in a single daisy chain to each myRIO MXP port.



The i2C connection cables are the LEGO® data-style cables, which are included with each motor controller. Power to the myRIO is fed from the open battery position terminals on the last controller box in the daisy chain. A DC-barrel-jack-to-terminal adapter is included in each WRO TETRIX myRIO bundled set.

To connect power, attach a red jumper wire between the positive terminals on the motor controller battery terminal strip and the DC barrel jack adapter, and then attach a black jumper wire between the negative terminals on the motor controller and DC barrel jack adapter. Plug the DC barrel jack into the myRIO power input port. This will provide battery power to the myRIO controller.



Typical hookup diagram. Multiple controllers may be daisy-chained together.

Overview of TETRIX myRIO VIs

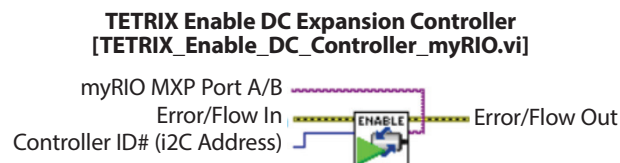
A VI is a programming tool in *LabVIEW* that models the appearance and function of a physical instrument. VIs can exist at multiple levels. Smaller VIs can be combined to create larger VIs. The following blocks are smaller VIs created specifically to access the TETRIX motor expansion controllers and will be used to create larger VIs that control your robots. The bullets are terminal inputs and outputs that define the parameters of the VI.

Section 1: DC Motor Expansion Controller VIs

TETRIX Enable DC Expansion Controller

Initializes and enables the DC motor expansion controller. Place this VI at the beginning of the program.

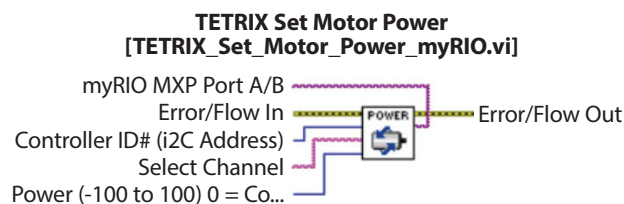
- **myRIO MXP Port A/B** – the myRIO MXP port to which the adapter board is connected
- **Error/Flow In** – program execution flow in from previous VI block
- **Error/Flow Out** – program execution flow out to next VI block
- **Controller ID#** – This is the ID#/i2C address of the expansion controller. Valid range is 1-120; however, 5 and 6 are reserved and cannot be used. The default ID# for the DC motor expansion controller is 1.



TETRIX Set Motor Power

Sets the motor power level parameter for the selected DC motor channel.

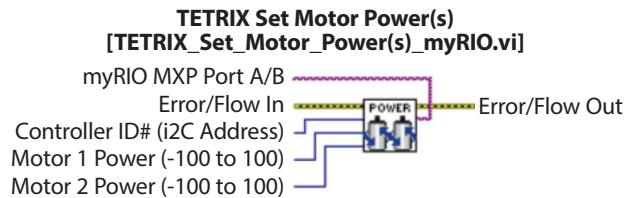
- **myRIO MXP Port A/B** – the myRIO MXP port to which the adapter board is connected
- **Error/Flow In** – program execution flow in from previous VI block
- **Error/Flow Out** – program execution flow out to next VI block
- **Controller ID#** – This is the ID#/i2C address of the expansion controller. Valid range is 1-120; however, 5 and 6 are reserved and cannot be used. The default ID# for the DC motor expansion controller is 1.
- **Select Channel** – This selects Motor 1 or Motor 2.
- **Power (-100 to 100)** – This sets the motor power level parameter for the selected channel. Range is -100 to 100. The +/- sign controls the direction of motor rotation. Setting the power level to 0 stops the motor in a coast mode. Setting the power level to 125 stops the motor in a braking mode.



TETRIX Set Motor Power(s)

Simultaneously sets the motor power level parameter for each DC motor channel.

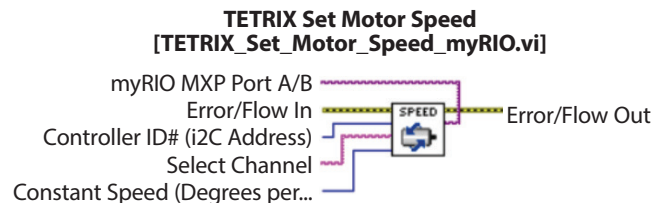
- **myRIO MXP Port A/B** – the myRIO MXP port to which the adapter board is connected
- **Error/Flow In** – program execution flow in from previous VI block
- **Error/Flow Out** – program execution flow out to next VI block
- **Controller ID#** – This is the ID#/i2C address of the expansion controller. Valid range is 1-120; however, 5 and 6 are reserved and cannot be used. The default ID# for the DC motor expansion controller is 1.
- **Motor 1 Power (-100 to 100)** – This sets the motor power level parameter for DC motor channel 1. Range is -100 to 100. The +/- sign controls the direction of motor rotation. Setting the power level to 0 stops the motor in a coast mode. Setting the power level to 125 stops the motor in a braking mode.
- **Motor 2 Power (-100 to 100)** – This sets the motor power level parameter for DC motor channel 2. Range is -100 to 100. The +/- sign controls the direction of motor rotation. Setting the power level to 0 stops the motor in a coast mode. Setting the power level to 125 stops the motor in a braking mode.



TETRIX Set Motor Speed

Sets the constant speed parameter for the selected DC motor channel. This VI uses the motor encoder to implement constant-speed PID control.

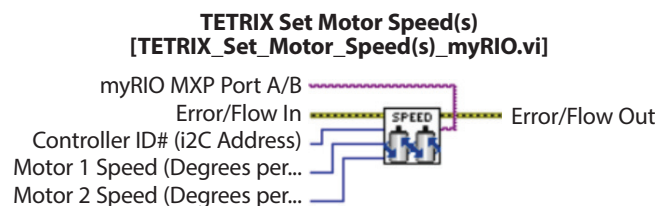
- **myRIO MXP Port A/B** – the myRIO MXP port to which the adapter board is connected
- **Error/Flow In** – program execution flow in from previous VI block
- **Error/Flow Out** – program execution flow out to next VI block
- **Controller ID#** – This is the ID#/i2C address of the expansion controller. Valid range is 1-120; however, 5 and 6 are reserved and cannot be used. The default ID# for the DC motor expansion controller is 1.
- **Select Channel** – This selects Motor 1 or Motor 2.
- **Constant Speed** – This sets the constant speed parameter for the selected channel. The constant speed parameter is set in degrees per second. The maximum speed that can be set depends on the type of rpm and gearing of the motor. For best constant-speed PID performance, a maximum speed setting of about 75% of the full motor rpm rating is recommended. For the TETRIX TorqueNADO™ motor, the maximum constant speed parameter is approximately 450 degrees per second.



TETRIX Set Motor Speed(s)

Simultaneously sets the constant speed parameter for each DC motor channel. This VI uses motor encoders to implement constant-speed PID control.

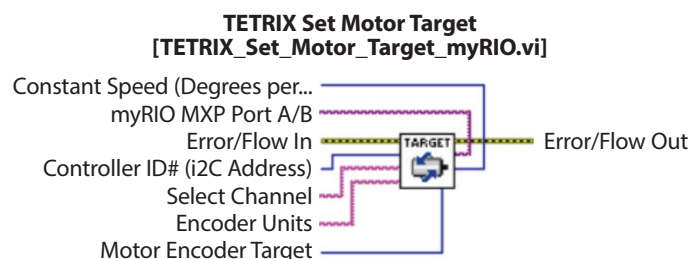
- **myRIO MXP Port A/B** – the myRIO MXP port to which the adapter board is connected
- **Error/Flow In** – program execution flow in from previous VI block
- **Error/Flow Out** – program execution flow out to next VI block
- **Controller ID#** – This is the ID#/i2C address of the expansion controller. Valid range is 1-120; however, 5 and 6 are reserved and cannot be used. The default ID# for the DC motor expansion controller is 1.
- **Motor 1 Speed** – This sets the constant speed parameter for motor channel 1. The constant speed parameter is set in degrees per second. The maximum speed that can be set depends on the type of rpm and gearing of the motor. For best constant-speed PID performance, a maximum speed setting of about 75% of the full motor rpm rating is recommended. For the TETRIX TorqueNADO motor, the maximum constant speed parameter is approximately 450 degrees per second.
- **Motor 2 Speed** – This sets the constant speed parameter for motor channel 2. The constant speed parameter is set in degrees per second. The maximum speed that can be set depends on the type of rpm and gearing of the motor. For best constant speed PID performance, a maximum speed setting of about 75% of the full motor rpm rating is recommended. For the TETRIX TorqueNADO motor, the maximum constant speed parameter is approximately 450 degrees per second.



TETRIX Set Motor Target

Sets the constant speed and encoder target parameters for the selected DC motor channel. This VI uses the motor encoder to implement constant velocity and position hold control.

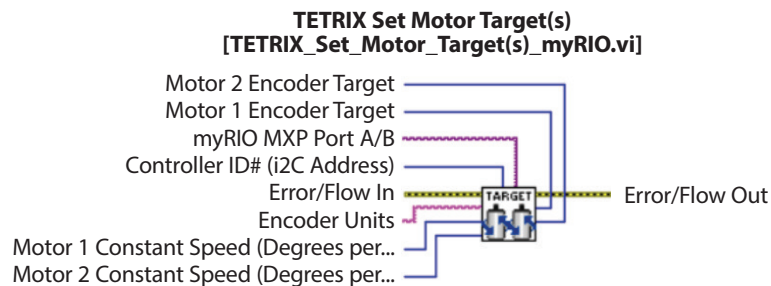
- **myRIO MXP Port A/B** – the myRIO MXP port to which the adapter board is connected
- **Error/Flow In** – program execution flow in from previous VI block
- **Error/Flow Out** – program execution flow out to next VI block
- **Controller ID#** – This is the ID#/i2C address of the expansion controller. Valid range is 1-120; however, 5 and 6 are reserved and cannot be used. The default ID# for the DC motor expansion controller is 1.
- **Select Channel** – This selects Motor 1 or Motor 2.
- **Encoder Units** – This sets the target units as either degrees or encoder counts. For the TETRIX TorqueNADO motor encoder, 1 encoder count is equal to 1/4 degree. When using encoder counts, 1,440 counts equal 360 degrees, or one full motor shaft revolution.
- **Constant Speed** – This sets the constant speed parameter for the selected channel while it is moving to the encoder target. The constant speed parameter is set in degrees per second. The maximum speed that can be set depends on the rpm of the motor being controlled. For best constant-speed PID performance, a maximum speed setting of about 75% of the full motor rpm rating is recommended. For the TETRIX TorqueNADO motor, the maximum constant speed parameter is approximately 450 degrees per second.
- **Motor Encoder Target** – This sets the targeting parameter for the DC motor channel. Depending on the encoder units selected, this parameter can be expressed in degrees or encoder counts.



TETRIX Set Motor Target(s)

Simultaneously sets the constant speed and encoder target parameters for each DC motor channel. This VI uses motor encoders to implement constant velocity and position hold control.

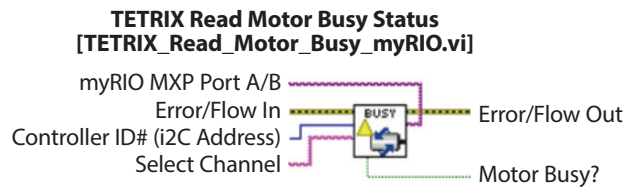
- **myRIO MXP Port A/B** – the myRIO MXP port to which the adapter board is connected
- **Error/Flow In** – program execution flow in from previous VI block
- **Error/Flow Out** – program execution flow out to next VI block
- **Controller ID#** – This is the ID#/i2C address of the expansion controller. Valid range is 1-120; however, 5 and 6 are reserved and cannot be used. The default ID# for the DC motor expansion controller is 1.
- **Encoder Units** – This sets the target units as either degrees or encoder counts. For the TETRIX TorqueNADO motor encoder, 1 encoder count is equal to 1/4 degree. When using encoder counts, 1,440 counts equal 360 degrees, or one full motor shaft revolution.
- **Motor 1 Constant Speed** – This the constant speed parameter for DC motor channel 1 while it is moving to the encoder target. The constant speed parameter is set in degrees per second. The maximum speed that can be set depends on the type of rpm and gearing of the motor. For best constant-speed PID performance, a maximum speed setting of about 75% of the full motor rpm rating is recommended. For the TETRIX TorqueNADO motor, the maximum constant speed parameter is approximately 450 degrees per second.
- **Motor 2 Constant Speed** – This sets the constant speed parameter for DC motor channel 2 while it is moving to the encoder target. The constant speed parameter is set in degrees per second. The maximum speed that can be set depends on the type of rpm and gearing of the motor. For best constant-speed PID performance, a maximum speed setting of about 75% of the full motor rpm rating is recommended. For the TETRIX TorqueNADO motor, the maximum constant speed parameter is approximately 450 degrees per second.
- **Motor 1 Encoder Target** – This sets the targeting parameter for DC motor channel 1. Depending on the encoder units selected, this parameter can be expressed in degrees or encoder counts.
- **Motor 2 Encoder Target** – This sets the targeting parameter for DC motor channel 2. Depending on the encoder units selected, this parameter can be expressed in degrees or encoder counts.



TETRIX Read Motor Busy Status

Returns the busy status of the selected DC motor channel.

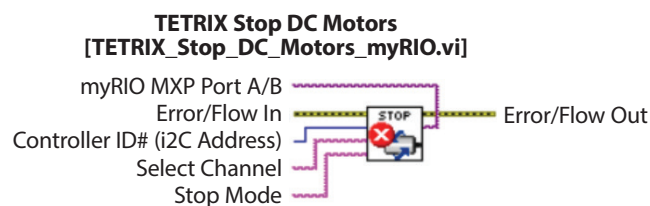
- **myRIO MXP Port A/B** – the myRIO MXP port to which the adapter board is connected
- **Error/Flow In** – program execution flow in from previous VI block
- **Error/Flow Out** – program execution flow out to next VI block
- **Controller ID#** – This is the ID#/i2C address of the expansion controller. Valid range is 1-120; however, 5 and 6 are reserved and cannot be used. The default ID# for the DC motor expansion controller is 1.
- **Select Channel** – This selects Motor 1, Motor 2, or both.
- **Motor Busy?** – When executing a position targeting function using PID, this VI returns true while the DC motor channel is in the process of moving to an encoder target. It returns false when the DC motor channel has reached its target and is holding position in a servo-like mode.



TETRIX Stop DC Motors

Stops the selected DC motor channel in either brake or coast mode.

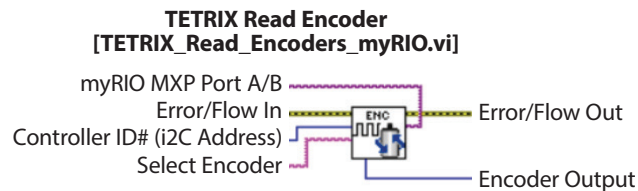
- **myRIO MXP Port A/B** – the myRIO MXP port to which the adapter board is connected
- **Error/Flow In** – program execution flow in from previous VI block
- **Error/Flow Out** – program execution flow out to next VI block
- **Controller ID#** – This is the ID#/i2C address of the expansion controller. Valid range is 1-120; however, 5 and 6 are reserved and cannot be used. The default ID# for the DC motor expansion controller is 1.
- **Select Channel** – This selects Motor 1, Motor 2, or both.
- **Stop Mode** – This selects “coast” for a freewheeling stop or “brake” for a hard stop.



TETRIX Read Encoder

Reads the position count of the selected encoder channel.

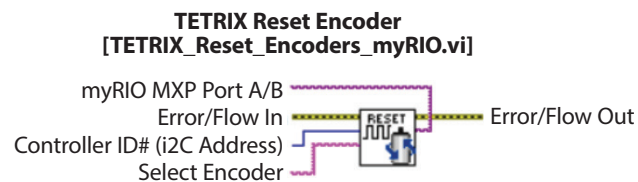
- **myRIO MXP Port A/B** – the myRIO MXP port to which the adapter board is connected
- **Error/Flow In** – program execution flow in from previous VI block
- **Error/Flow Out** – program execution flow out to next VI block
- **Controller ID#** – This is the ID#/i2C address of the expansion controller. Valid range is 1-120; however, 5 and 6 are reserved and cannot be used. The default ID# for the DC motor expansion controller is 1.
- **Select Encoder** – This selects Encoder 1 or Encoder 2.
- **Encoder Output** – This returns the selected encoder count output data. For TETRIX DC motors and encoders, 1 count is equal to 1/4 degree of motor shaft rotation. For example, 1,440 encoder counts equal 360 degrees of motor shaft rotation.



TETRIX Reset Encoder

Resets the selected encoder channel to zero count.

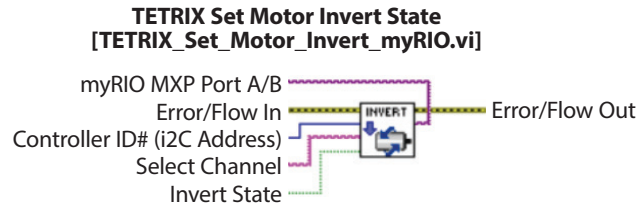
- **myRIO MXP Port A/B** – the myRIO MXP port to which the adapter board is connected
- **Error/Flow In** – program execution flow in from previous VI block
- **Error/Flow Out** – program execution flow out to next VI block
- **Controller ID#** – This is the ID#/i2C address of the expansion controller. Valid range is 1-120; however, 5 and 6 are reserved and cannot be used. The default ID# for the DC motor expansion controller is 1.
- **Select Encoder** – This selects Encoder 1 or Encoder 2.



TETRIX Set Motor Invert State

Inverts the rotation direction of the selected DC motor channel.

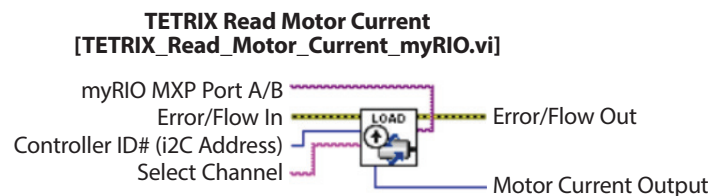
- **myRIO MXP Port A/B** – the myRIO MXP port to which the adapter board is connected
- **Error/Flow In** – program execution flow in from previous VI block
- **Error/Flow Out** – program execution flow out to next VI block
- **Controller ID#** – This is the ID#/i2C address of the expansion controller. Valid range is 1-120; however, 5 and 6 are reserved and cannot be used. The default ID# for the DC motor expansion controller is 1.
- **Select Channel** – This selects Motor 1 or Motor 2.
- **Invert State** – If set to true, all subsequent VI motor move parameters that follow will be inverted. If set to false, motor rotation is set to non-inverted (default).



TETRIX Read Motor Current

Returns the load current of the selected DC motor channel.

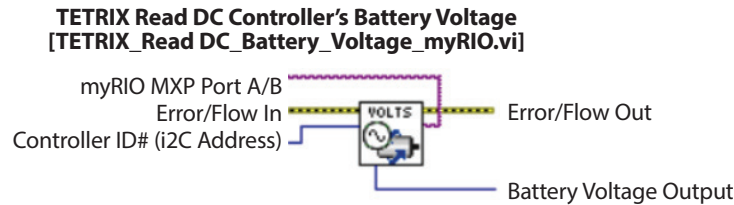
- **myRIO MXP Port A/B** – the myRIO MXP port to which the adapter board is connected
- **Error/Flow In** – program execution flow in from previous VI block
- **Error/Flow Out** – program execution flow out to next VI block
- **Controller ID#** – This is the ID#/i2C address of the expansion controller. Valid range is 1-120; however, 5 and 6 are reserved and cannot be used. The default ID# for the DC motor expansion controller is 1.
- **Select Channel** – This selects Motor 1 or Motor 2.
- **Motor Current Output** – This returns the load current in milliamps of the selected DC motor channel. For example, a value of 1,500 indicates a 1.5 amp motor load.



TETRIX Read DC Controller's Battery Voltage

Returns the battery pack voltage powering the expansion controller.

- **myRIO MXP Port A/B** – the myRIO MXP port to which the adapter board is connected
- **Error/Flow In** – program execution flow in from previous VI block
- **Error/Flow Out** – program execution flow out to next VI block
- **Controller ID#** – This is the ID#/i2C address of the expansion controller. Valid range is 1-120; however, 5 and 6 are reserved and cannot be used. The default ID# for the DC motor expansion controller is 1.
- **Battery Voltage Output** – This returns the battery pack voltage connected to the expansion controller. For example, a value of 1,268 indicates a battery voltage of 12.68 volts.

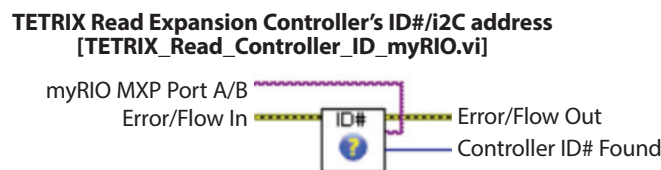


TETRIX Read Expansion Controller's ID#/i2C address

Returns the connected expansion controller's ID#/i2C address.

Important: Only the expansion controller being read may be connected to the myRIO. Multiple daisy-chained controllers may not be connected when attempting to read the ID#.

- **myRIO MXP Port A/B** – the myRIO MXP port to which the adapter board is connected
- **Error/Flow In** – program execution flow in from previous VI block
- **Error/Flow Out** – program execution flow out to next VI block
- **Controller ID# Found** – This returns the ID#/i2C address of the expansion controller.

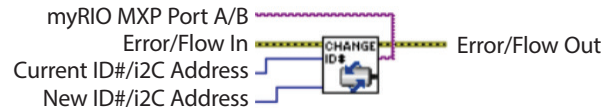


TETRIX Set DC Controller i2C address/ID#

Sets or changes the connected expansion controller's ID#/i2C address.

- **myRIO MXP Port A/B** – the myRIO MXP port to which the adapter board is connected
- **Error/Flow In** – program execution flow in from previous VI block
- **Error/Flow Out** – program execution flow out to next VI block
- **Current ID#/i2C Address** – the expansion controller's current ID#/i2C address
- **New ID#/i2C Address** – This is the new ID#/i2C address to be used by the expansion controller. Valid ID# range is 1-120 with 5 and 6 excluded. The new ID# becomes effective after a subsequent power off/on cycle.

TETRIX Set DC Controller i2C address/ID# [TETRIX_Set_DC_Controller_ID_i2C address_myRIO.vi]

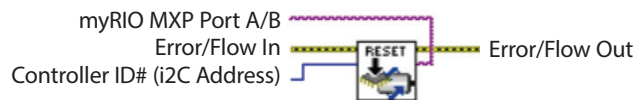


TETRIX Reset DC Expansion Controller

Enables a firmware reset of the expansion controller at the wired ID#/i2C address.

- **myRIO MXP Port A/B** – the myRIO MXP port to which the adapter board is connected
- **Error/Flow In** – program execution flow in from previous VI block
- **Error/Flow Out** – program execution flow out to next VI block
- **Controller ID#** – This is the ID#/i2C address of the expansion controller. Valid range is 1-120; however, 5 and 6 are reserved and cannot be used. The default ID# for the DC motor expansion controller is 1.

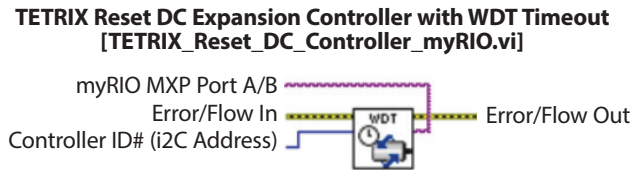
TETRIX Reset DC Expansion Controller [TETRIX_Reset_DC_Controller_myRIO.vi]



TETRIX Reset DC Expansion Controller with WDT Timeout

Triggers a watchdog time-out reset of the expansion controller at the wired ID#/i2C address. When called, the controller firmware will reset after 15 ms.

- **myRIO MXP Port A/B** – the myRIO MXP port to which the adapter board is connected
- **Error/Flow In** – program execution flow in from previous VI block
- **Error/Flow Out** – program execution flow out to next VI block
- **Controller ID#** – This is the ID#/i2C address of the expansion controller. Valid range is 1-120; however, 5 and 6 are reserved and cannot be used. The default ID# for the DC motor expansion controller is 1.

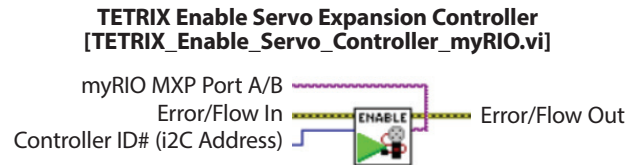


Section 2: Servo Motor Expansion Controller VIs

TETRIX Enable Servo Expansion Controller

Initializes and enables the servo motor expansion controller. Place this VI at the beginning of a program.

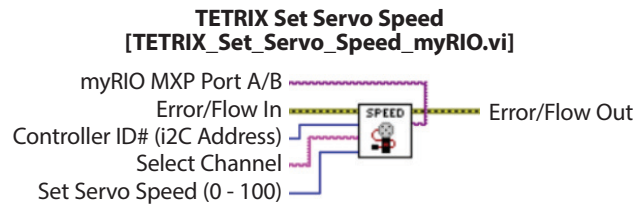
- **myRIO MXP Port A/B** – the myRIO MXP port to which the adapter board is connected
- **Error/Flow In** – program execution flow in from previous VI block
- **Error/Flow Out** – program execution flow out to next VI block
- **Controller ID#** – This is the ID#/i2C address of the expansion controller. Valid range is 1-120; however, 5 and 6 are reserved and cannot be used. The default ID# for the servo motor expansion controller is 2.



TETRIX Set Servo Speed

Sets the speed of a selected servo motor channel.

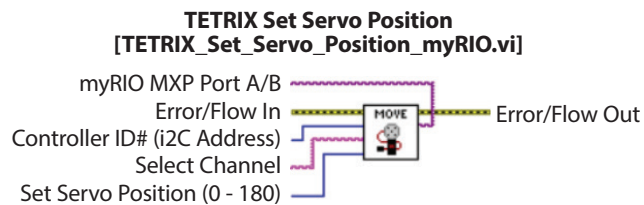
- **myRIO MXP Port A/B** – the myRIO MXP port to which the adapter board is connected
- **Error/Flow In** – program execution flow in from previous VI block
- **Error/Flow Out** – program execution flow out to next VI block
- **Controller ID#** – This is the ID#/i2C address of the expansion controller. Valid range is 1-120; however, 5 and 6 are reserved and cannot be used. The default ID# for the servo motor expansion controller is 2.
- **Select Channel** – This selects a servo motor channel 1-6 or all servos at once.
- **Set Servo Speed** – This sets the servo motor speed parameter of the selected servo channel. The speed range is 0 to 100 percent.



TETRIX Set Servo Position

Sets the angular position of a selected servo motor channel.

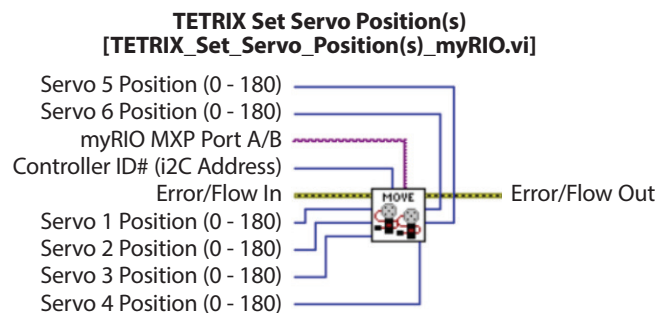
- **myRIO MXP Port A/B** – the myRIO MXP port to which the adapter board is connected
- **Error/Flow In** – program execution flow in from previous VI block
- **Error/Flow Out** – program execution flow out to next VI block
- **Controller ID#** – This is the ID#/i2C address of the expansion controller. Valid range is 1-120; however, 5 and 6 are reserved and cannot be used. The default ID# for the servo motor expansion controller is 2.
- **Select Channel** – This selects a servo motor channel 1-6 or all servos at once.
- **Set Servo Position** – This sets the angular servo motor position parameter of the selected servo channel. The position range is 0 to 180 degrees.



TETRIX Set Servo Position(s)

Simultaneously sets the angular position of each servo motor channel.

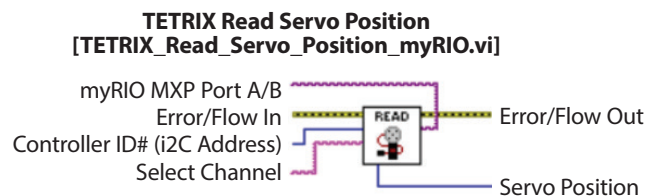
- **myRIO MXP Port A/B** – the myRIO MXP port to which the adapter board is connected
- **Error/Flow In** – program execution flow in from previous VI block
- **Error/Flow Out** – program execution flow out to next VI block
- **Controller ID#** – This is the ID#/i2C address of the expansion controller. Valid range is 1-120; however, 5 and 6 are reserved and cannot be used. The default ID# for the servo motor expansion controller is 2.
- **Servo 1 Position** – This sets the angular servo motor position parameter of servo motor channel 1. The position range is 0 to 180 degrees.
- **Servo 2 Position** – This sets the angular servo motor position parameter of servo motor channel 2. The position range is 0 to 180 degrees.
- **Servo 3 Position** – This sets the angular servo motor position parameter of servo motor channel 3. The position range is 0 to 180 degrees.
- **Servo 4 Position** – This sets the angular servo motor position parameter of servo motor channel 4. The position range is 0 to 180 degrees.
- **Servo 5 Position** – This sets the angular servo motor position parameter of servo motor channel 5. The position range is 0 to 180 degrees.
- **Servo 6 Position** – This sets the angular servo motor position parameter of servo motor channel 6. The position range is 0 to 180 degrees.



TETRIX Read Servo Position

Reads the angular position of the servo motor channels.

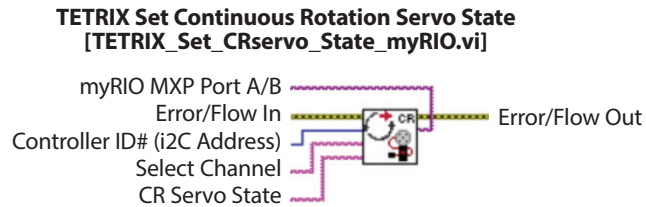
- **myRIO MXP Port A/B** – the myRIO MXP port to which the adapter board is connected
- **Error/Flow In** – program execution flow in from previous VI block
- **Error/Flow Out** – program execution flow out to next VI block
- **Controller ID#** – This is the ID#/i2C address of the expansion controller. Valid range is 1-120; however, 5 and 6 are reserved and cannot be used. The default ID# for the servo motor expansion controller is 2.
- **Select Channel** – This selects a servo motor channel 1-6.
- **Servo Position** – This returns the angular position of the selected servo motor channel. The value returned corresponds to the current commanded position of the servo motor between 0 and 180 degrees.



TETRIX Set Continuous Rotation Servo State

Sets the rotational motion of a continuous rotation (CR) servo.

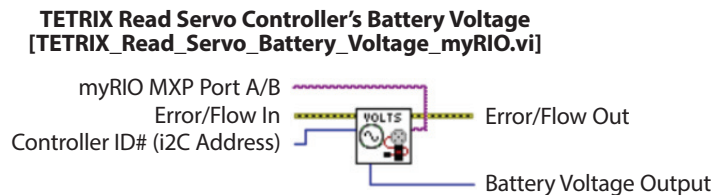
- **myRIO MXP Port A/B** – the myRIO MXP port to which the adapter board is connected
- **Error/Flow In** – program execution flow in from previous VI block
- **Error/Flow Out** – program execution flow out to next VI block
- **Controller ID#** – This is the ID#/i2C address of the expansion controller. Valid range is 1-120; however, 5 and 6 are reserved and cannot be used. The default ID# for the servo motor expansion controller is 2.
- **Select Channel** – This selects the CR servo motor channel CR1 or CR2.
- **CR Servo State** – This sets the operation state of the connected CR servo. CR servo states are forward, reverse, and stop.



TETRIX Read Servo Controller's Battery Voltage

Returns the battery pack voltage powering the expansion controller.

- **myRIO MXP Port A/B** – the myRIO MXP port to which the adapter board is connected
- **Error/Flow In** – program execution flow in from previous VI block
- **Error/Flow Out** – program execution flow out to next VI block
- **Controller ID#** – This is the ID#/i2C address of the expansion controller. Valid range is 1-120; however, 5 and 6 are reserved and cannot be used. The default ID# for the servo motor expansion controller is 2.
- **Battery Voltage Output** – This returns the battery pack voltage connected to the expansion controller. For example, a value of 1,268 indicates a battery voltage of 12.68 volts.



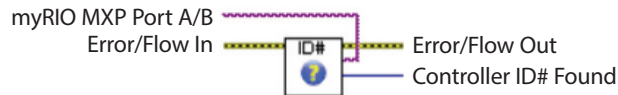
TETRIX Read Expansion Controller's ID#/i2C address

Returns the connected expansion controller's ID#/i2C address.

Important: Only the expansion controller being read may be connected to the myRIO. Multiple daisy-chained controllers may not be connected when attempting to read the ID#.

- **myRIO MXP Port A/B** – the myRIO MXP port to which the adapter board is connected
- **Error/Flow In** – program execution flow in from previous VI block
- **Error/Flow Out** – program execution flow out to next VI block
- **Controller ID# Found** – This returns the ID#/i2C address of the expansion controller.

TETRIX Read Expansion Controller's ID#/i2C address [TETRIX_Read_Controller_ID_myRIO.vi]

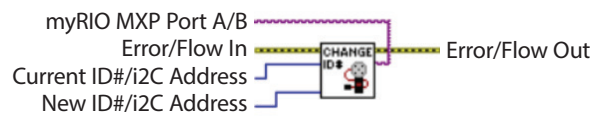


TETRIX Set the i2C address/ID# of Expansion Controller

Sets or changes the connected expansion controller's ID#/i2C address.

- **myRIO MXP Port A/B** – the myRIO MXP port to which the adapter board is connected
- **Error/Flow In** – program execution flow in from previous VI block
- **Error/Flow Out** – program execution flow out to next VI block
- **Current ID#/i2C Address** – the expansion controller's current ID#/i2C address
- **New ID#/i2C Address** – This is the new ID#/i2C address to be used by the expansion controller. Valid ID# range is 1-120 with 5 and 6 excluded. The new ID# becomes effective after a subsequent power off/on cycle.

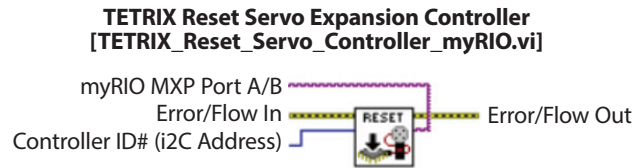
TETRIX Set the i2C address/ID# of Expansion Controller [TETRIX_Set_Servo_Controller_ID_i2C address_myRIO.vi]



TETRIX Reset Servo Expansion Controller

Enables a firmware reset of the expansion controller at the wired ID#/i2C address.

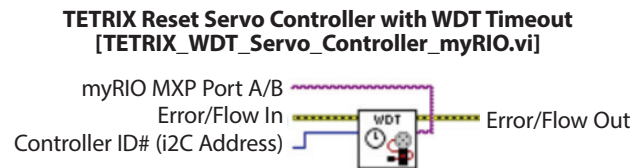
- **myRIO MXP Port A/B** – the myRIO MXP port to which the adapter board is connected
- **Error/Flow In** – program execution flow in from previous VI block
- **Error/Flow Out** – program execution flow out to next VI block
- **Controller ID#** – This is the ID#/i2C address of the expansion controller. Valid range is 1-120; however, 5 and 6 are reserved and cannot be used. The default ID# for the servo motor expansion controller is 2.



TETRIX Reset Servo Controller with WDT Timeout

Triggers a watchdog time-out reset of the expansion controller at the wired ID#/i2C address. When called, the controller firmware will reset after 15 ms.

- **myRIO MXP Port A/B** – the myRIO MXP port to which the adapter board is connected
- **Error/Flow In** – program execution flow in from previous VI block
- **Error/Flow Out** – program execution flow out to next VI block
- **Controller ID#** – This is the ID#/i2C address of the expansion controller. Valid range is 1-120; however, 5 and 6 are reserved and cannot be used. The default ID# for the servo motor expansion controller is 2.



Recommended DC and Servo Motors



TETRIX® MAX TorqueNADO™ Motor

44260

- Take your TETRIX® robots to the next level with a stronger 12-volt DC motor with 100 rpm and 700 oz-in. of torque.
- Designed with a built-in, high-resolution Hall effect encoder for precise motor control
- Based on user feedback and created specifically to withstand the stress of intense robotics competitions
- Compatible with all TETRIX MAX DC Motor Mounts, sold separately.

180-Degree Standard-Scale HS-485HB Servo Motor

39197

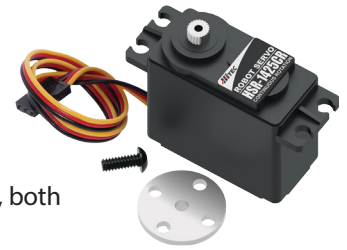
- Allows for exact positioning within a 180-degree range of motion
- Features Karbonite gears nearly four times as strong as nylon
- Features controllers capable of generating a pulse range from 600 usec to 2,400 usec
- Huge selection of compatible mounting brackets means you have a variety of attachment options.
- Combine with 41789, 39381, 39382, 39280, 39060, or 39064 to attach this servo motor to MAX structural and motion elements.
- Comes with servo horn



TETRIX® MAX Continuous Rotation Servo

39177

- Allows for continuous direction of movement, both forward and backward
- Features fully proportional forward and reverse speed control
- Designed with a wide neutral dead band to eliminate the creep that occurs in many other continuous rotation servos
- Huge selection of compatible mounting brackets means you have a variety of attachment options.
- Combine with 41789, 39381, 39382, 39280, 39060, or 39064 to attach this servo motor to MAX structural and motion elements.



Quarter-Scale HS-785HB Winch Servo Motor with Horn

39905

- For when you need a more powerful and durable servo motor that offers greater rotational range control
- Allows for exact positioning within a 1,260-degree range (3.5 rotations) of motion
- Features Karbonite gears nearly four times as strong as nylon
- Features stall torque of 183 oz-in.
- Combine with either the quarter-scale servo frame mounting bracket (39383) or the quarter-scale servo front mounting bracket (39380) to easily attach motor to MAX structural and motion elements.
- Comes with servo horn and nylon dual-wind pulley



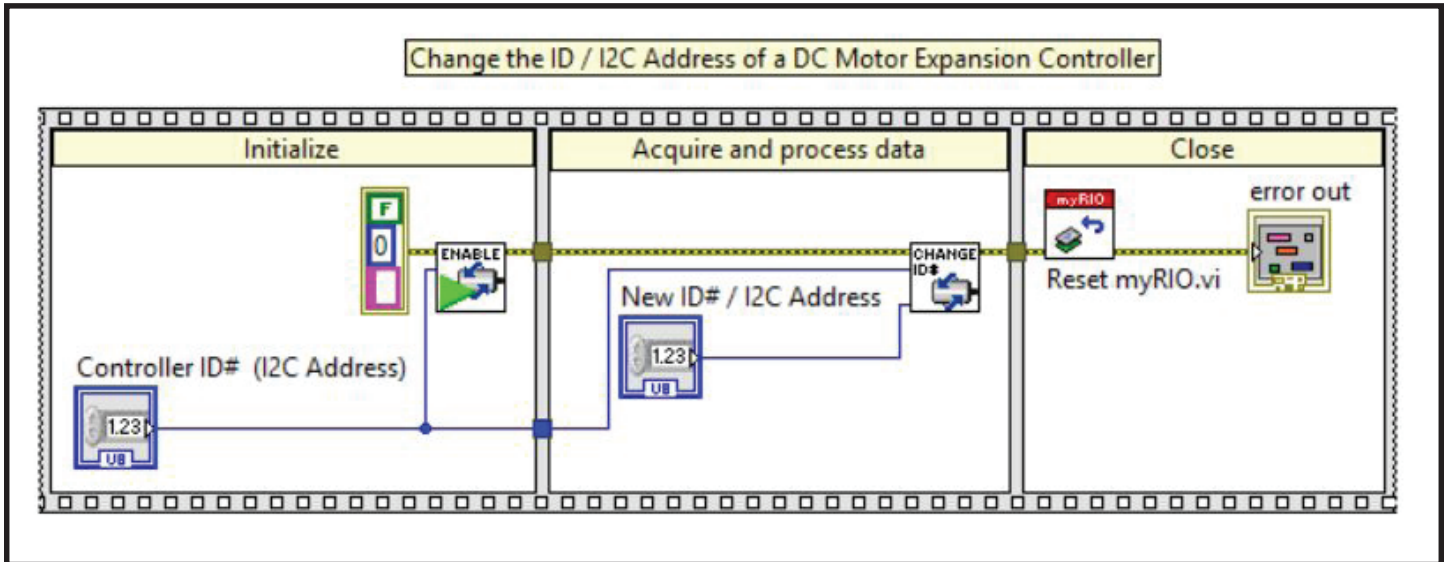
Quarter-Scale HS-755HB Servo Motor with Horn

39904

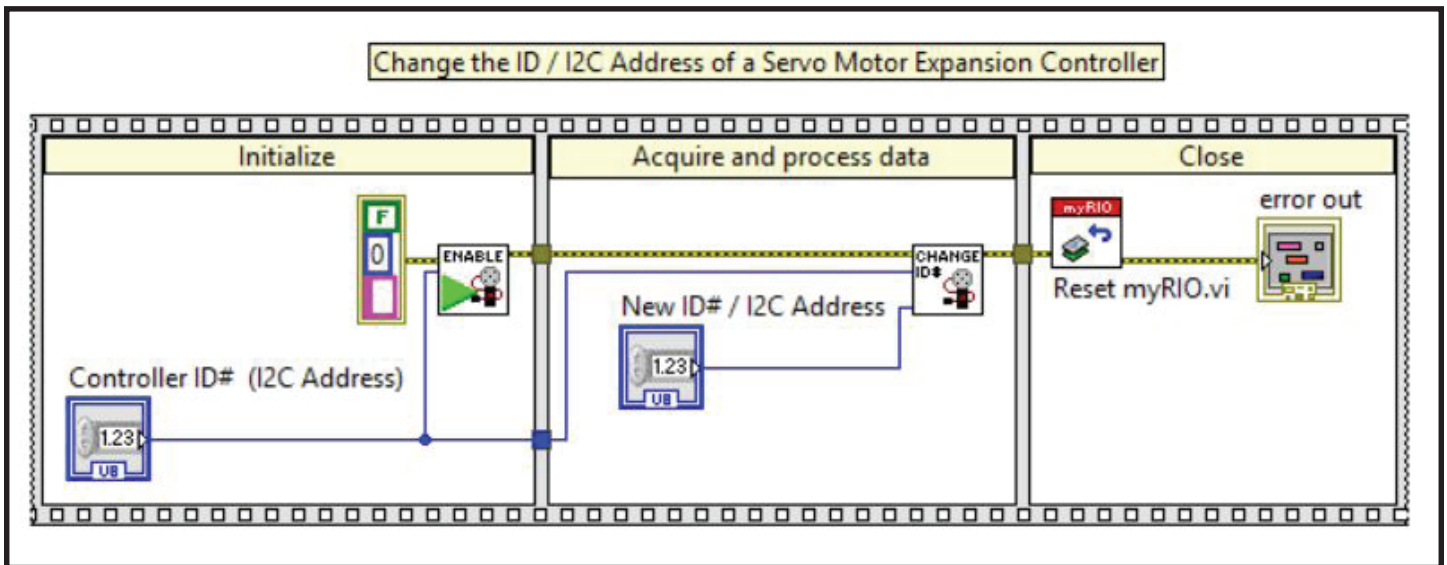
- For when you need a more powerful and durable servo motor that is precise
- Allows for exact positioning within a 180-degree range of motion
- Features Karbonite gears nearly four times as strong as nylon
- Features stall torque of 183 oz-in.
- Combine with either the quarter-scale servo frame mounting bracket (39383) or the quarter-scale servo front mounting bracket (39380) to easily attach motor to MAX structural and motion elements.
- Comes with servo horn



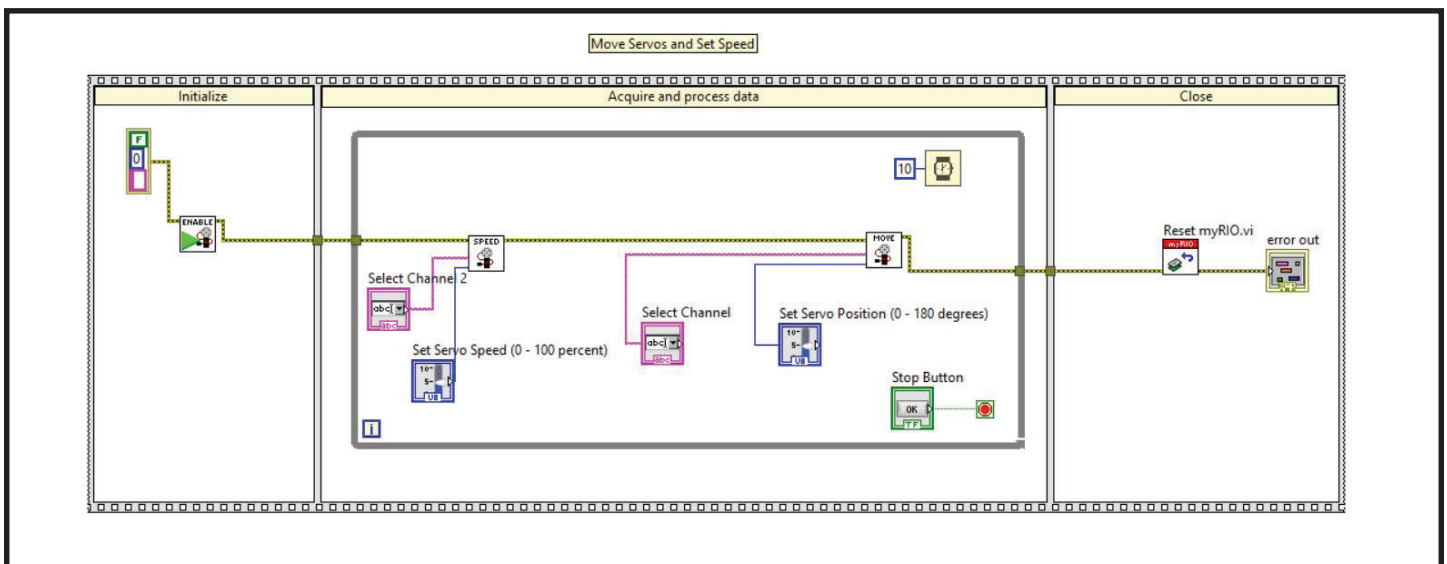
Change DC Expansion Controller ID Address



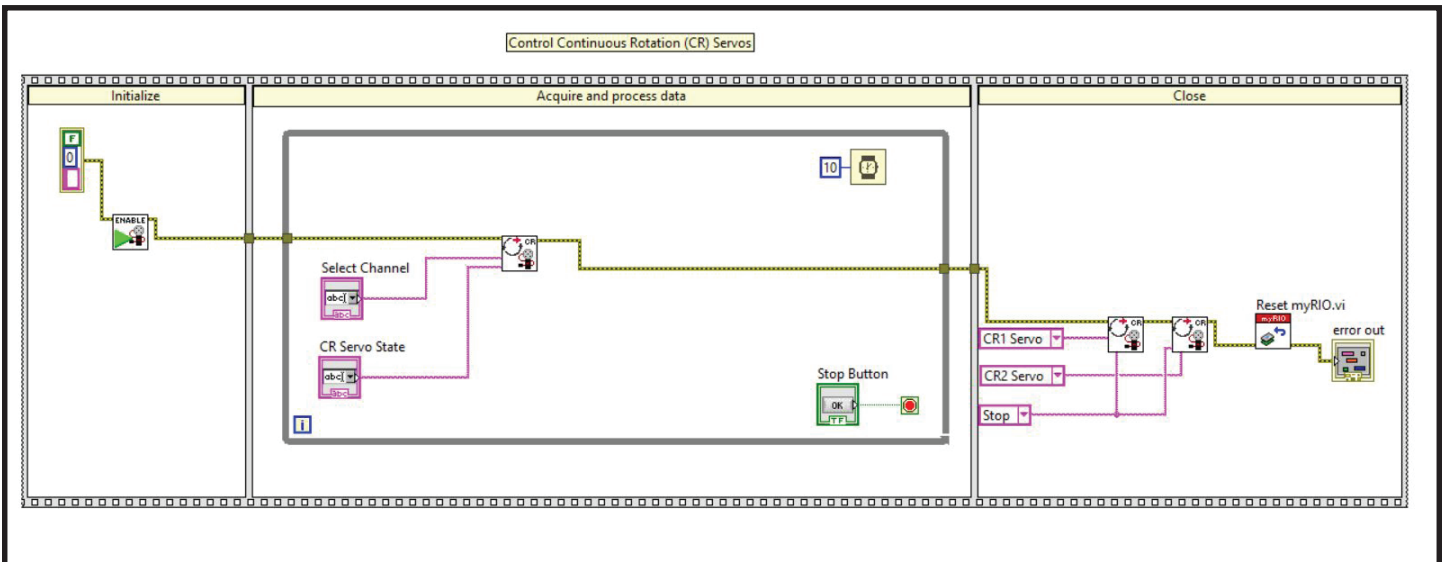
Change Servo Expansion Controller ID Address



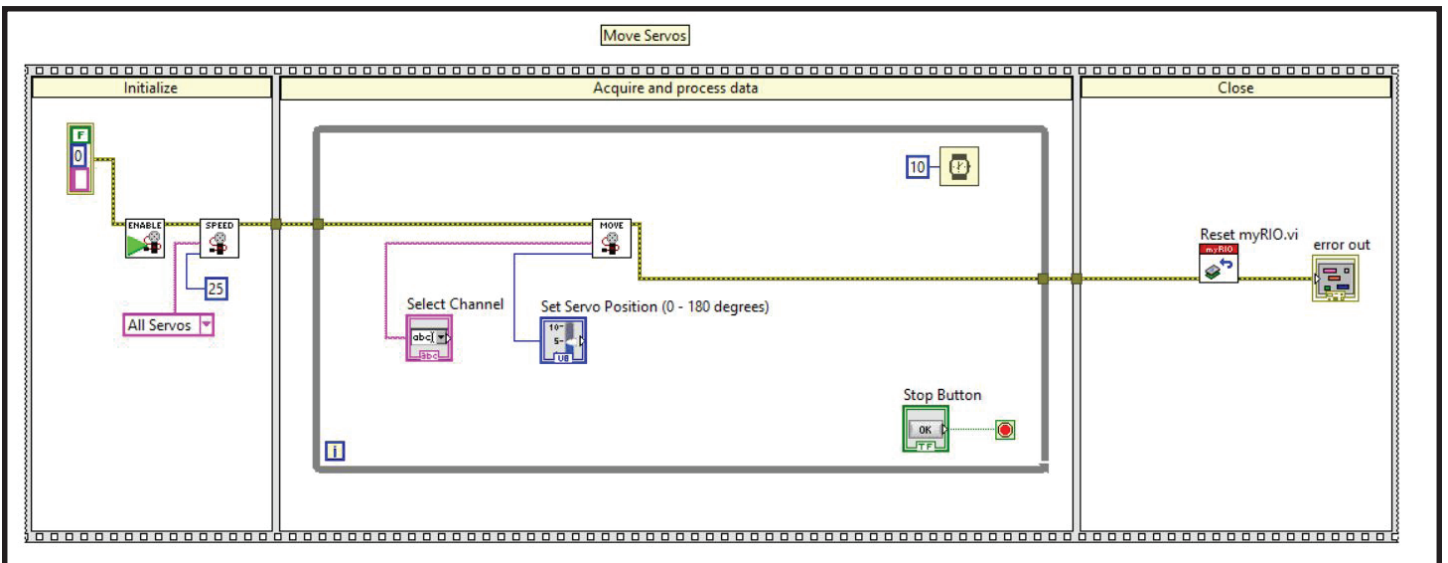
Move Servo and Set Speed



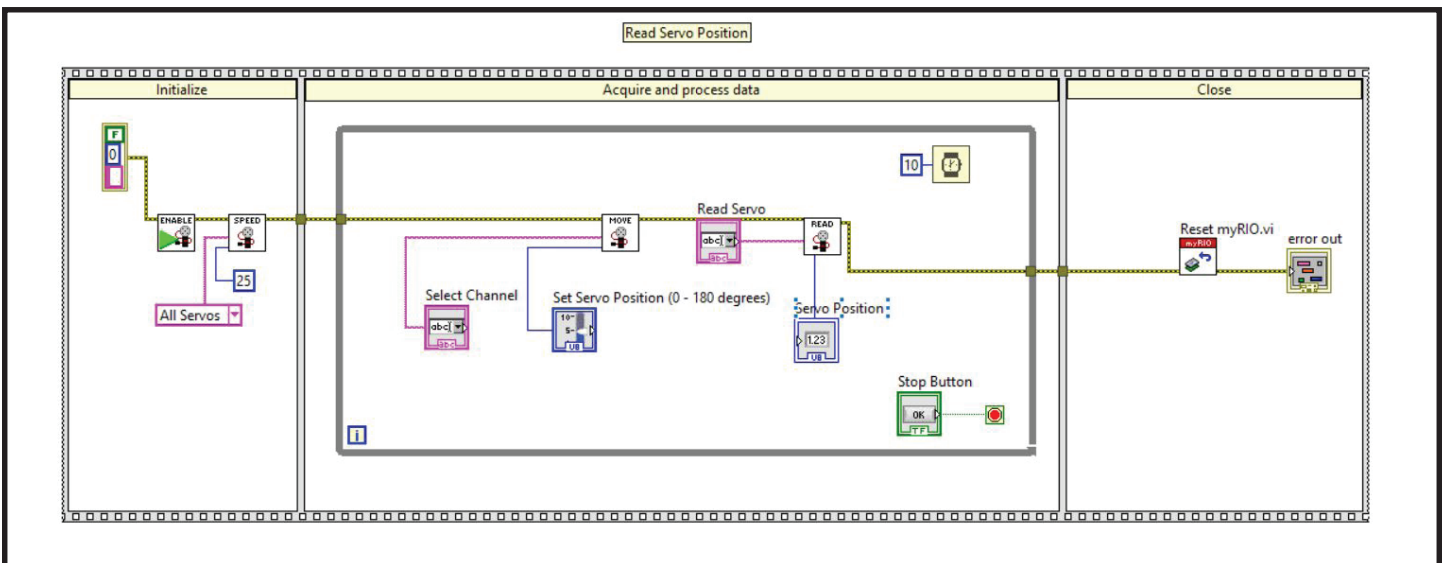
Run Continuous Rotation Servo



Move Servo



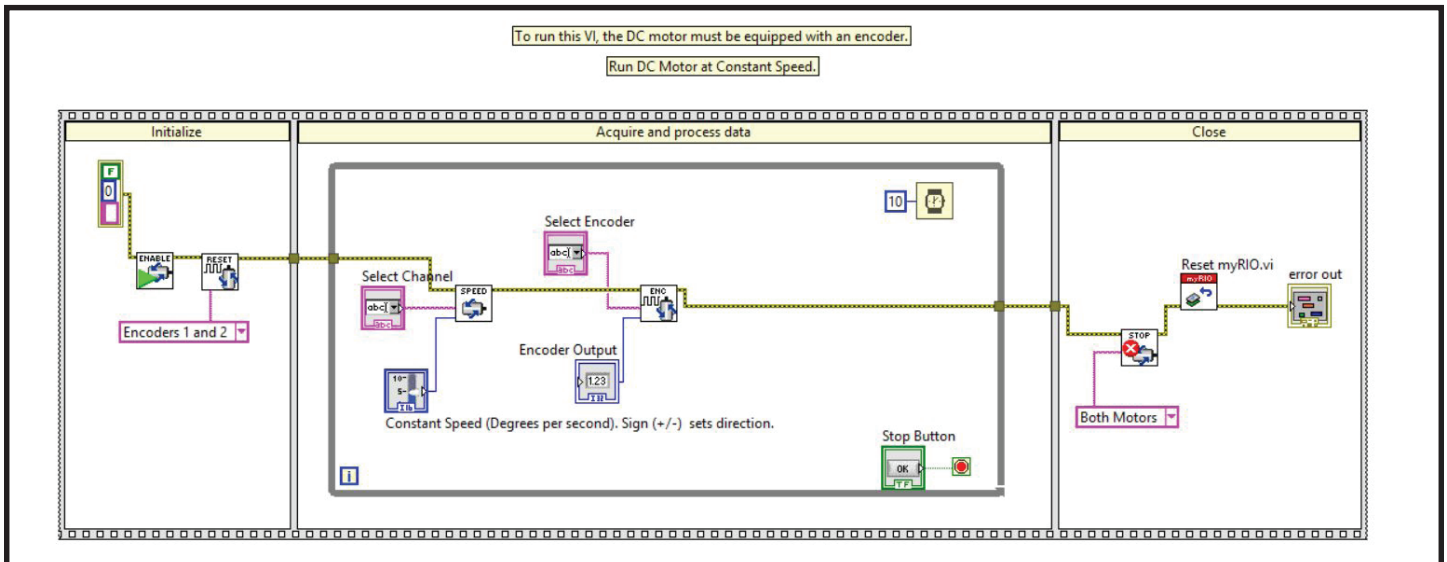
Read Servo Position



Run DC Motor Constant Speed

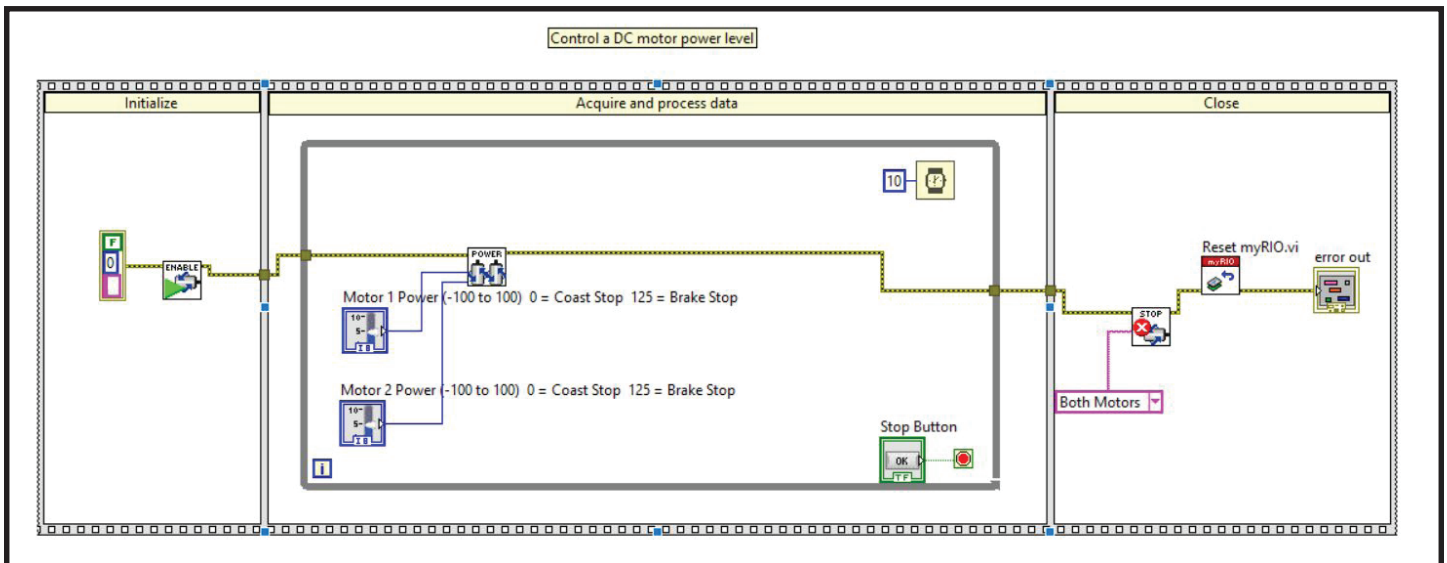
To run this VI, the DC motor must be equipped with an encoder.

Run DC Motor at Constant Speed.



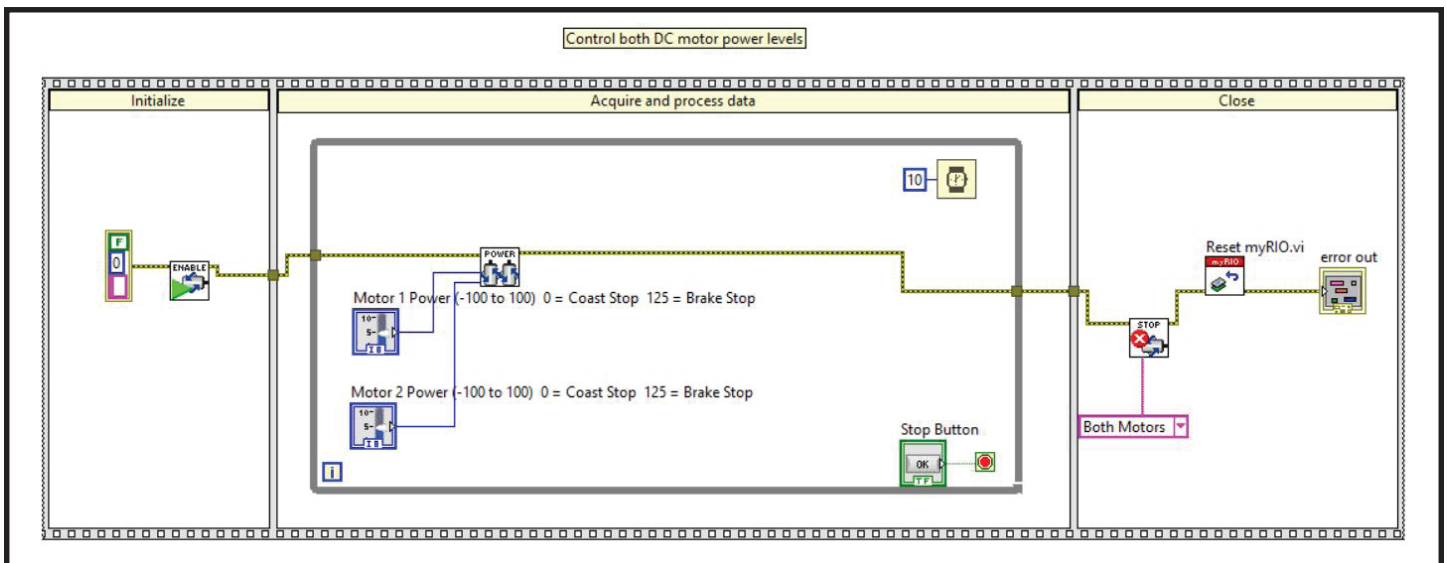
Run DC Motor Power

Control a DC motor power level

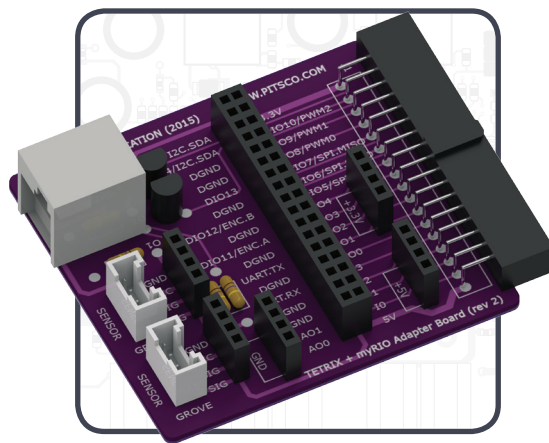


Run Both DC Motor Powers

Control both DC motor power levels



TETRIX® myRIO Programming Tools for *LabVIEW™*



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