01™ SuperModified – Testing with RS485 <> USB

1. Preinstalled cables

The Supermodified controller comes with several wires soldered. By default the power and RS485 cables are soldered. I2C and legacy RC servo interface cables can also be soldered upon request. These are represented in the schematic below. Please note that the pre-soldered cables always have the illustrated colors.

ZERO ONE
MECHATRONICS

01™
SuperModified

Miniature Controller for DC Motors

"*The robotic rebirth of the hobby servo*"
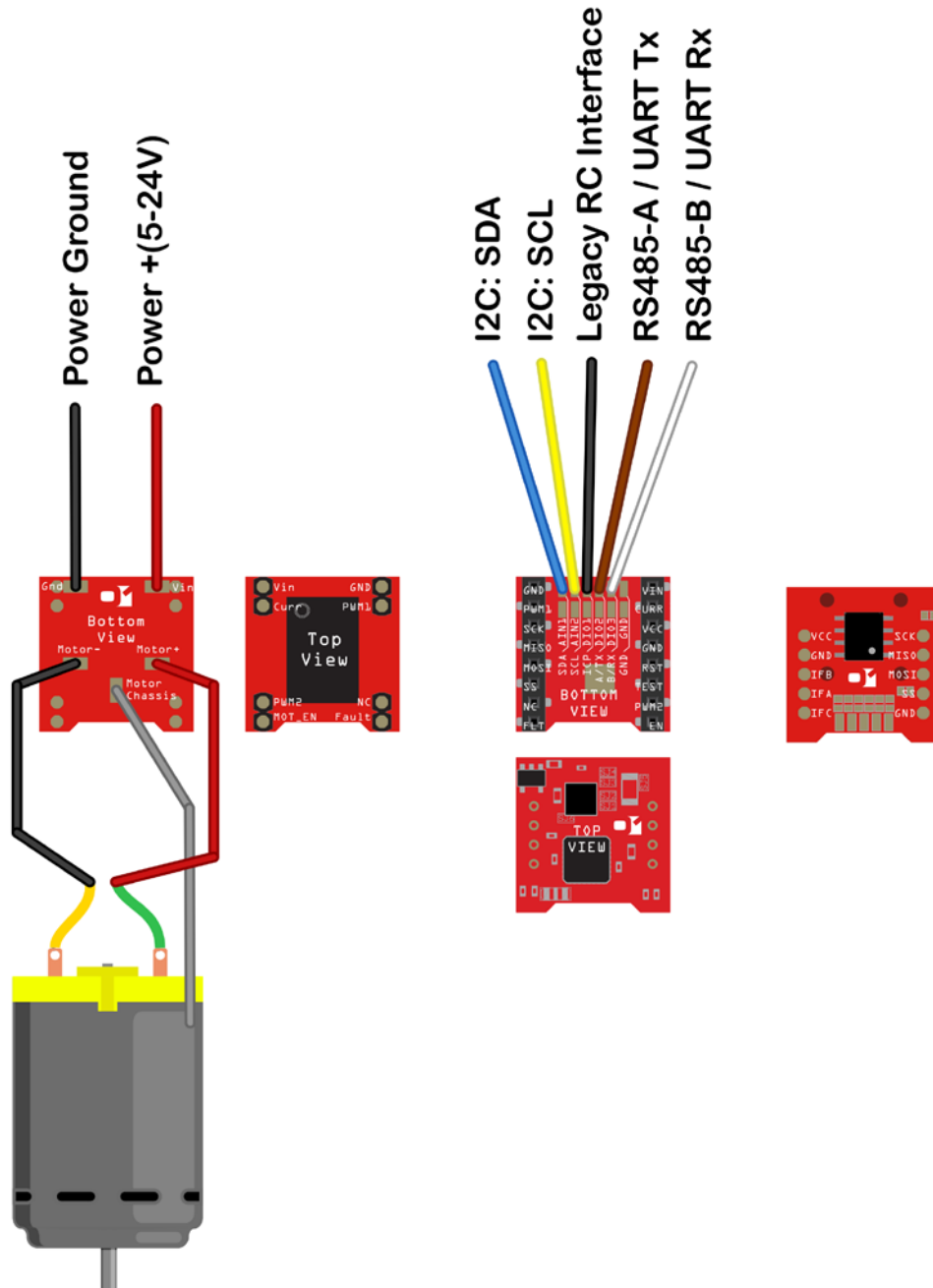

Testing with RS485<>USB

2. Prerequisites

- **Windows XP or later.**

- **FTDI VCP driver installed. This is the driver for the USB<>485 converter and it can be downloaded at:** http://www.ftdichip.com/Drivers/VCP.htm

- **Supermodified Commander installed. This is the stand alone application that communicates to the controllers. It can be downloaded at:** http://01mechatronics.com/sites/default/files/docs/Setup%20SMS%20v1.9.64-5000.zip

3. Connections

In total 4 connections from the Supermodified are needed for operation via RS485 and 5 connections for operation via UART.

3.1. RS485

The connections needed for RS485 operation are illustrated below:
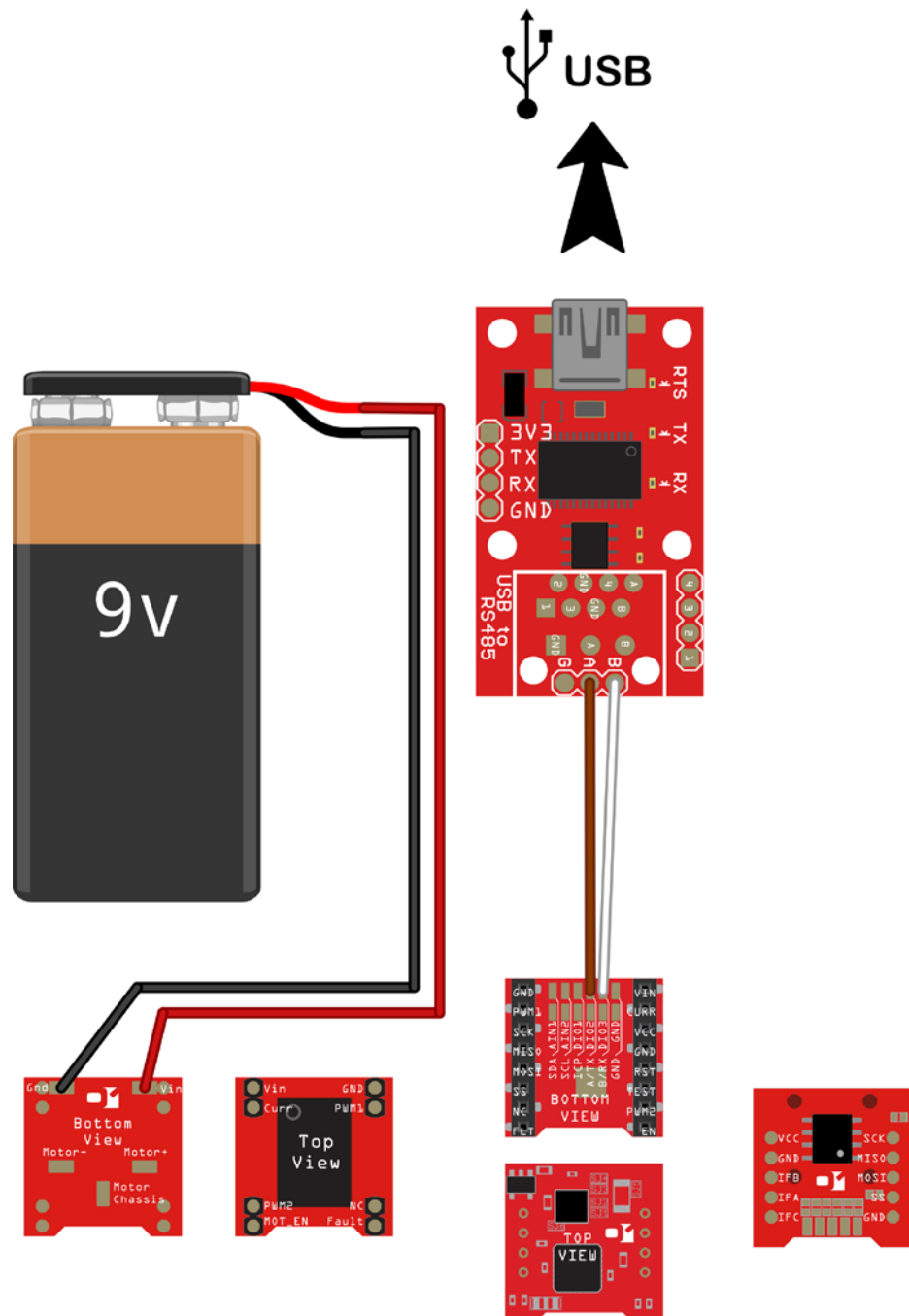
3.2. UART

The connections needed for UART operation are illustrated below:

Important Note: Because UART signals are referenced to ground it is necessary that there is a common ground between the RS485<>USB and the 01™ Supermodified controller. This can also be done by connecting the power ground to the USB<>RS485 converter.
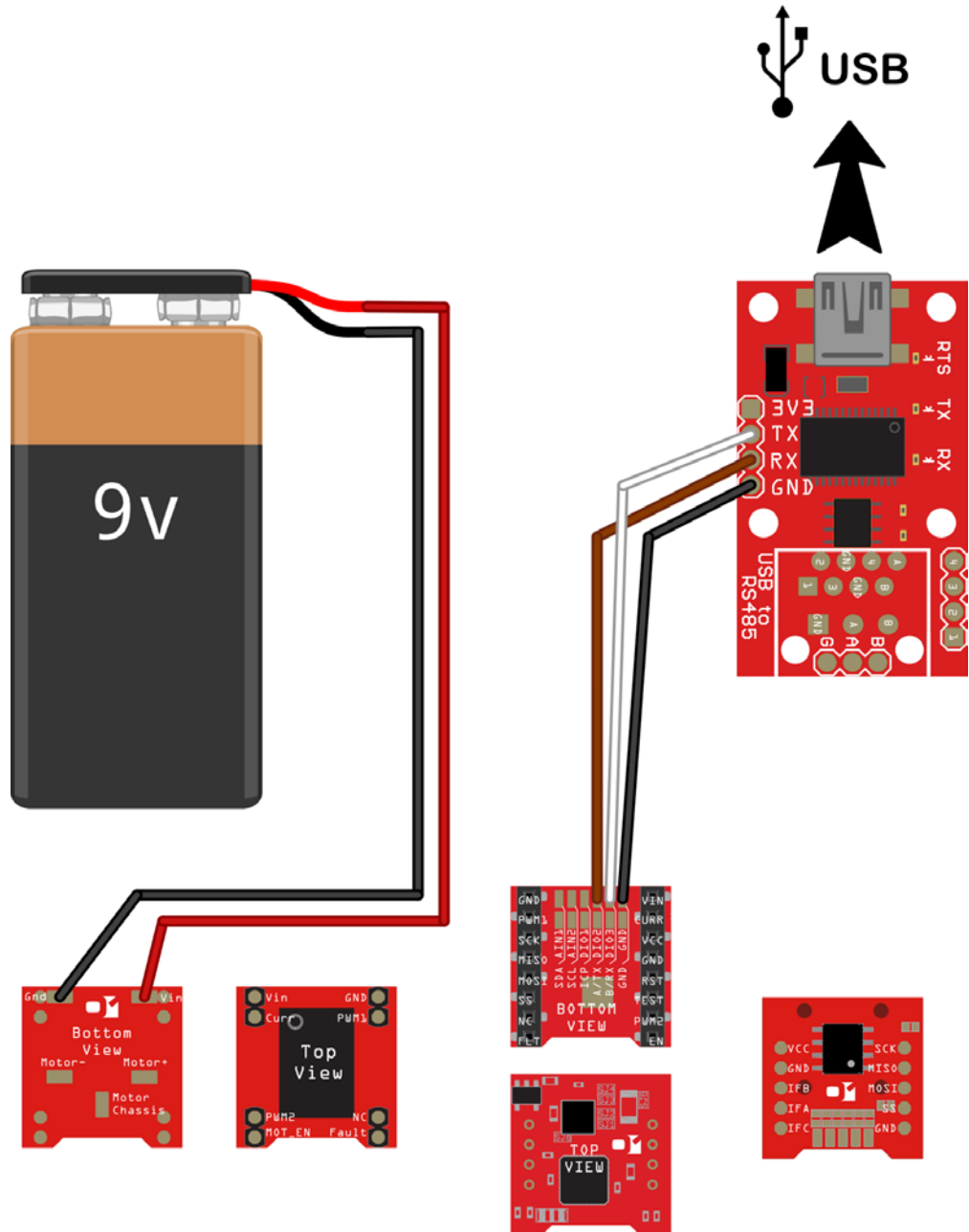
4. Testing with Supermodified Commander

After installing the drivers and making the necessary connections and before launching the 01^{TM} Supermodified commander, it is recommended to check at which COM port the USB<>485 converter resides. This can be seen at Control Panel -> Device Manager in any version of windows.
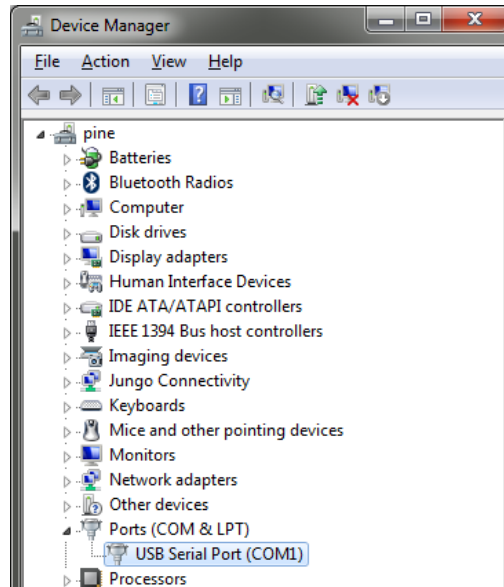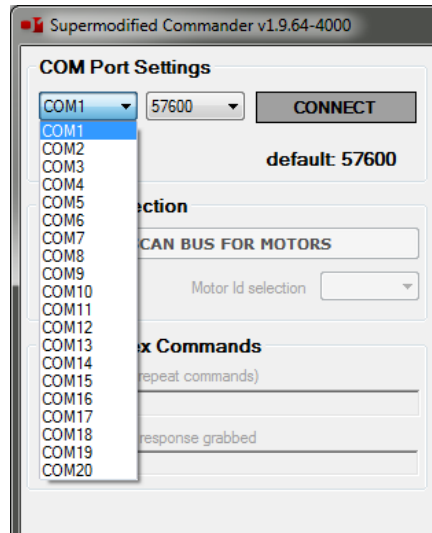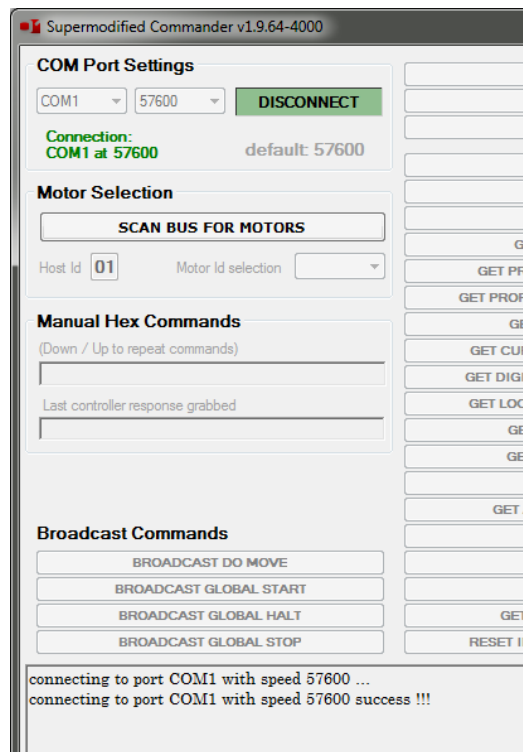

In this example the serial port is COM1.

Now it is time to launch the 01^{TM} Supermodified Commander. Upon launch this is what you should see:
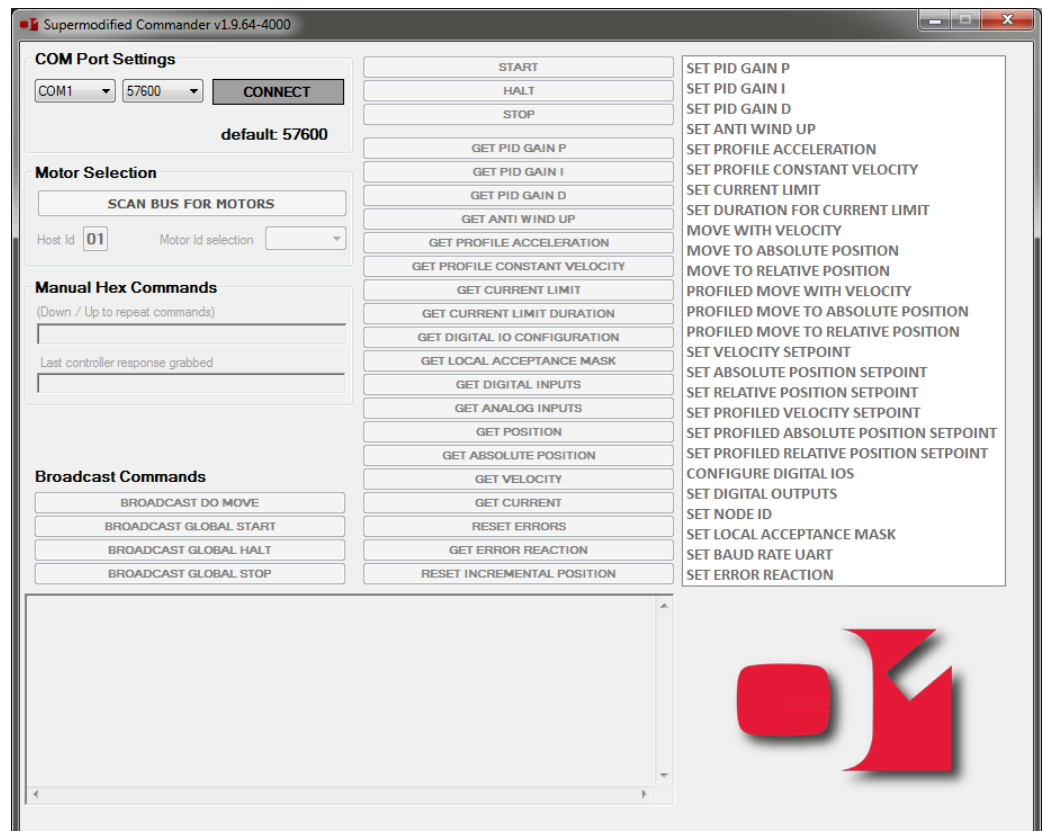
- The first thing to do is select the COM port that the USB<>485 converter is connected to. Just select the appropriate COM port from the combo box:


- Next hit the connect button. This is what you should see:

- After successful connection to the COM port scan the bus for 01^{TM} Supermodified controllers. Just hit the SCAN BUS FOR MOTORS button. The progress bar for bus querying appears.
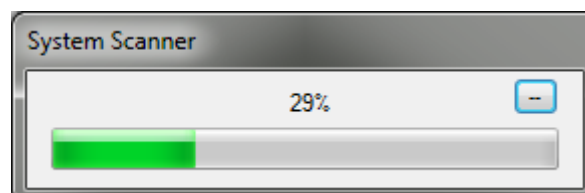
After the bus scan is complete the Motor Id selection combo box must contain the only node found on the bus, ie ID #4, which is the default setting for any new 01™ Supermodified controller.
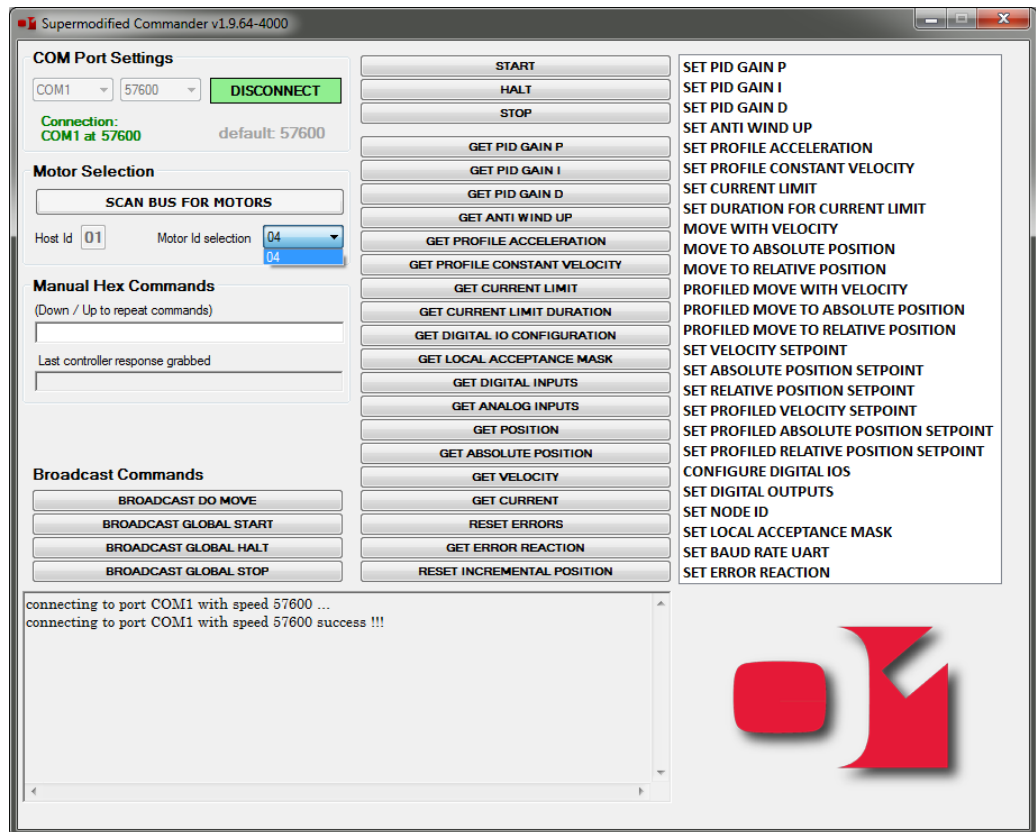

- Now it is time to try out some of the available commands. Before that, go ahead and check that the controller is currently not applying any force on the motor. Try to move the shaft of the motor and notice that it rotates freely. Now press the START button and notice at the bottom of the screen:
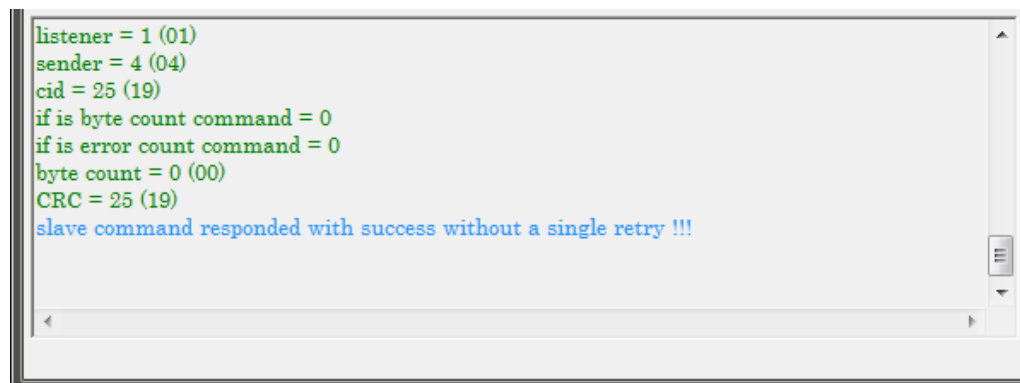
This is the console window and it has many useful information about communication warnings or errors etc. Now check the motor shaft again. You will notice that the controller is holding the shaft in position.

- Go ahead and test another command. For example an absolute position move. Just hit the MOVE TO ABSOLUTE POSITION text. An input window appears:
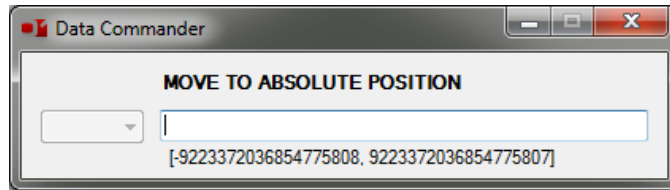
The base unit for the 01™ Supermodified controller is the encoder tick. The MagEnc utilizes an absolute encoder that has 32768 ticks per revolution. So in order to instruct the controller to do a full turn you can enter 32768 and hit enter. The motor performs a full turn.

- All commands utilize the encoder tick as a base unit. Thus velocities are in ticks/sec and accelerations in ticks/sec^2. You can now try any other command.

5. Warnings and errors

Try the STOP command and after that try any MOVE command. The motor does not move at all and at the console this message appears:


```
if is error count command = 1
byte count = 1 (01)
byte count data 0 is 20 (14)
···ERROR RESPOND RESULT (with the following different error codes and names)···
20 (int) - 14 (hex):
"INVALID COMMAND FOR MOTOR STATE"
CRC = 239 (EF)
slave command responded with success without a single retry !!!
```

The Supermodified has responded with an error code. You can see what exactly this means in the error code reference section of the Supermodified datasheet:

0x14	Invalid command for motor state	DO NOTHING	*Description:* The received command is invalid for the given motor state. ie the 01™ SuperModified controller is instructed to move the motor with a specific velocity prior to receiving a Start command (initialization and PID activation). The command is not executed. An error response is issued immediately. *Resolution:* Issue a Start command before attempting to issue movement commands.

If you try to execute any command after that it will fail with the same error code. This is because the Supermodified controller needs to be explicitly instructed to erase the error. There are many good reasons for this and some of them are related to safety.

So if you want to continue using the controller you must issue a RESET ERRORS command.

There are many more things you can do with the Supermodified commander, the most important being calibrating PID and adjusting configuration settings etc. These are covered in the Supermodified Configuration Guide.

6. Contents