

## EN-017 - Connecting the ModIO to the DC-03V3 DigiSpeed™

The ModIO contains an interface for driving the DigiSpeed range of isolated voltage generators. The isolated voltage generated is suitable for controlling VFD's DC motor controllers and the like through their 0-10Vdc or similar control input.

It should be noted that this control voltage is NOT suitable for real time servo motor driver control.

This engineering note describes how to wire up the DigiSpeed to the ModIO, configure the ModIO and Setup Mach3 to allow Mach3 to control the spindle speed over a Modbus interface.

DC-03 DigiSpeed-GX is designed to interface between controllers and motor controllers that are capable of producing a PWM signal with a base frequency between 5Hz and 100Hz.

In addition to the information in this Engineering note consult the following for additional information;

1. DigiSpeed-DC-03 user manual,
2. ModIO manual and
3. Mach3 User Manual.

The DigiSpeed-DC-03 is connected to the Modio as shown in Illustration 1. Use the table below to identify the connector pin outs.

ModIO J1	ModIO J15	Signal	DigiSpeed DC-03V3
J1-1 +5V	J15-6 +5V	+5V supply	J1-2 +5V
J1-4 Gnd	J15-1 Gnd	GND (0 VDC)	J1-6 Gnd
J1-11 DOut2	J15-4 DOut2	Enable	J1-4 Relay 1
J1-12 DOut3	J15-3 DOut3	Direction	J1-3 Relay 2
J1-14 DOut4	J15-2 DOut4	PWM	J1-5 Signal

Table 1: DigiSpeed DC-03 Connection

### ModIO DigiSpeed Module

The ModIO contains a module for controlling DigiSpeed controllers. This module when configured and enabled provides the following functionality.

1. Produce a 5Hz base frequency PWM output signal on DOut4,
2. Produce a Direction control signal on DOut 3,
3. Produce an Enable control signal on DOut2.

There are two methods for connecting the DigiSpeed to the ModIO. These are via J15 or J1. This

Engineering note shows the preferred method of using J15. When using J15, the ModIO generates negative logic signals, that is, when the signal is at 5V, the signal is deemed to be off. If you wish to use Positive logic, you will need to connect to the corresponding open collector outputs on J1.

There are a number of registers that are involved with setting up the DigiSpeed Module and controlling the outputs when running. The registers and their description is detailed below.

Address	Name	Bit7/15	Bit6/14	Bit5/13	Bit4/12	Bit3/11	Bit2/10	Bit1/9	Bit0/8
106<15-8>	Config2	-	-	-	-	-	-	-	-
106<7-0>	Config2	DSOFF	PEROFF-	KBOFF-	-	UHSE2	UHSE1	UENC2	UENC1
1040<15-8>	DOut	-	-	-	-	-	-	-	-
1040<7-0>	DOut	DOut7	DOut6	DOut5	DOut4	DOut3	DOut2	DOut1	DOut0
1041<15-8>	SSpeed	-	-	-	-	-	-	B10	B9
1041<7-0>	SSpeed	B7	B6	B5	B4	B3	B2	B1	B0

Table 2: ModIO Registers associated with DigiSpeed Interface

## ModIO Configuration

To use the DigiSpeed module in the ModIO, it need to be enabled. This is done by clearing **bit 7 (DSOFF)** in register **106, Config2**.

### Notes:

- Once the register is cleared by writing 0 to it, the ModIO must be reset for the configuration to take affect.
- The ModIO Hex switch must NOT be in position 0, as position 0 instructs the ModIO to use a default configuration, ignoring any configuration settings in the configuration registers.

Once bit 7 of register 106 is cleared and the ModIO is reset, the LEDs for Dout 2, 3, and 4 will be lit. This is because the DigiSpeed module is expecting to drive negative logic from the 6-pin connector J15.

When the DigiSpeed Module is enable, the ModIO outputs D2-D4 are no longer used as standard discrete I/O outputs and have the following functionality.

Register	Name	ModIO Output
1040-3	Enable	J15-2
1040-2	Direction	J15-3
1040-4	PWM signal	J15-4
1041	PWM Ratio	

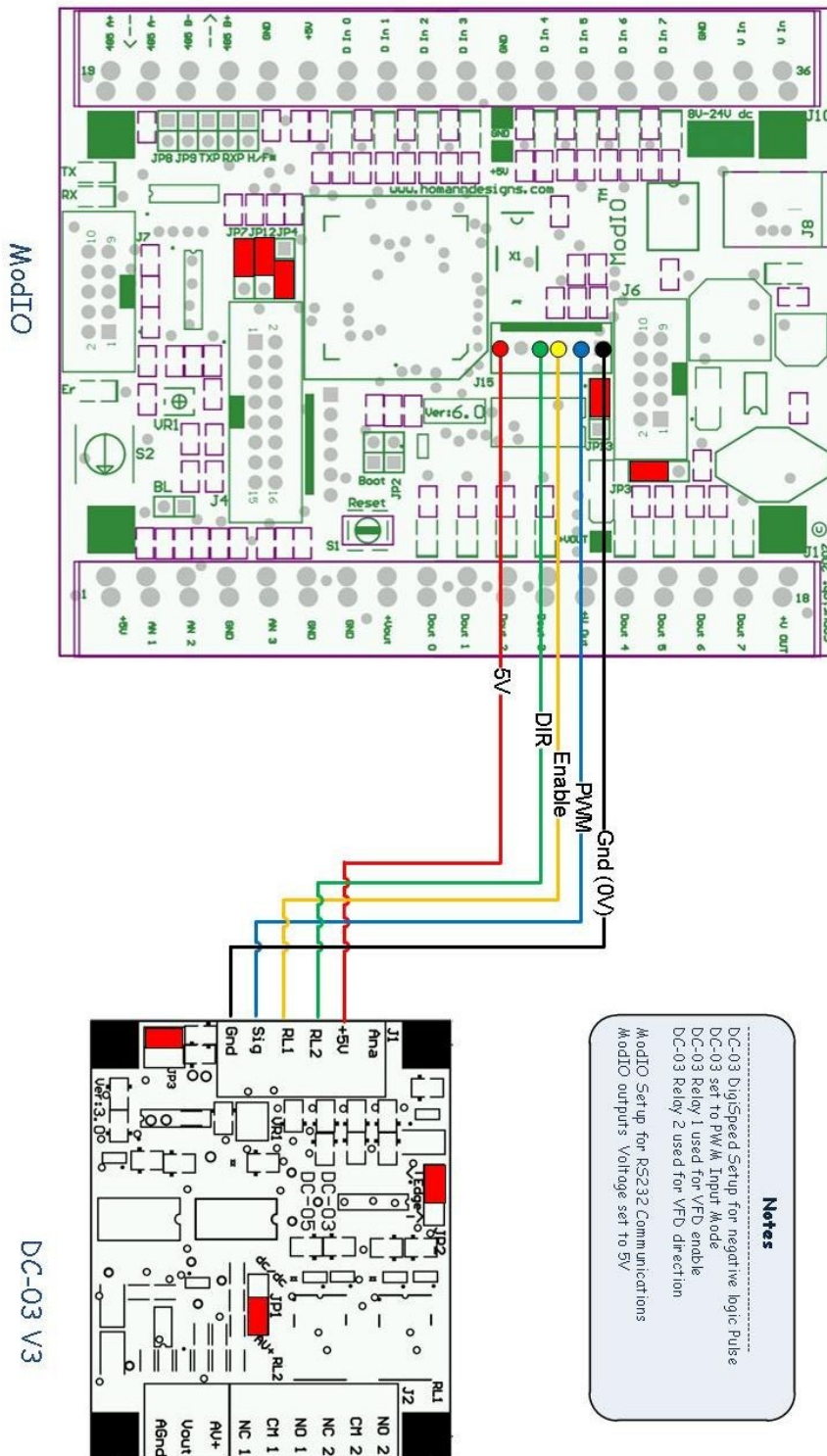


Illustration 1: ModIO to DC-03V3 hookup.

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