



## Application Note #5483

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### Connecting a Glentek Omega Series Digital Amp

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#### **Introduction**

This application note describes the proper procedure to hook up and tune a Glentek Omega Series Digital Amplifier to a DMC-4000 controller. While this document details only the connection process for a DMC-4000, any Galil controller can be used to connect to this amplifier.

#### **Parts used:**

- Galil DMC-4000 controller
- Galil ICS-18015 15 pin D-sub interconnect board
- Galil ICS-18044 44 pin D-sub interconnect board
- Galiltools Software package
- Glentek Omega Series SMB 9808-1A-1 amplifier
- Glentek brushless servo motor – GMB3515-38-M
- Glentek “MotionMaestro” software – version 1.35

#### **Hardware Setup:**

Connect the Glentek Omega series amplifier and motor per manufacturer’s instructions. Check the model number to determine what voltage source to power the amplifier from. The model amplifier used in this example was powered by 110VAC.

Install the Glentek ‘MotionMaestro’ program onto your PC. Now connect the Glentek drive to the computer via the serial port. Only the three pins for transmit, receive, and ground are needed for connection as described in the manual as the drive does not require any hardware handshaking. Once you have plugged it in, start the ‘MotionMaestro’ program and have it connect to the amplifier. Select the “Communication” button from the top toolbar and select “Open..”. Select the COM port used to connect to the drive and the correct baud rate (115200) from the window. The timeout can be left at the standard value of 200ms. The figure below shows this process.

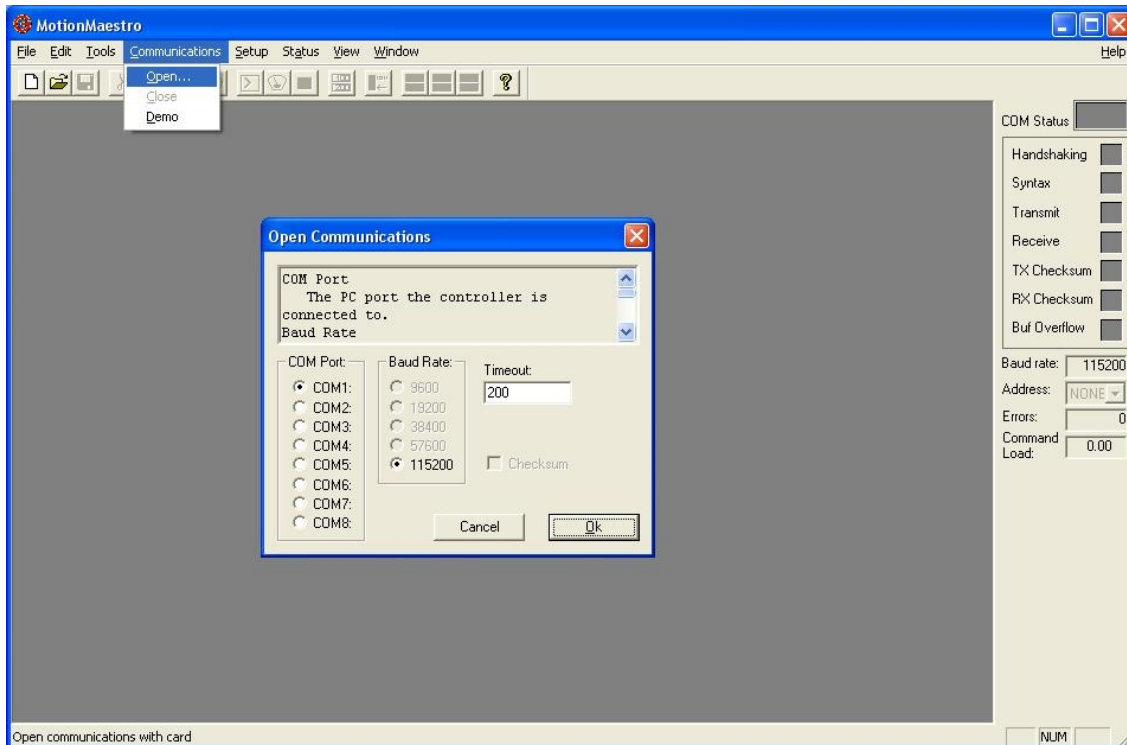


Figure 1: Connection window within the main window of the Glentek ‘MotionMaestro’ software

Once you have set these values, select OK. The Com Status light on the right hand of the main window should turn green and display the Com port in use to indicate that you successfully connected to the drive. Now set the motor parameters to the appropriate values for your motor by selecting “Setup” from the top toolbar and clicking on “Motor Parameters”. Change the values in the window that appear to the appropriate values for your motor. Complete any other initial setup of the amplifier according to the Glentek user manual.

### **Amplifier Enable Wiring:**

The Glentek amplifier operates at the 5V logic level. The DMC-4000 amp enable signal is field-configurable to be a low or high amp enable, as well as configured to 5V, 12V or 24V logic and to be either sourcing or sinking. The controller was left at the standard setup for other Galil controllers, which is 5V sourcing high amp enable signal.

The Glentek amp requires a HW Inhibit line to operate, which is configurable within the ‘MotionMaestro’ software. Go to the “Setup” toolbar and click on “Digital I/O”. Set the HW Inhibit signal to the opposite logic level of the amp enable signal coming from the controller. In this case, it would be set as active low.

### **Encoder Signal Wiring:**

The encoder lines are taken from the Controller I/O connector on the Glentek amplifier and are output to the DMC-4000. The encoder lines should be connected to the

appropriate axis D-sub connector. Figure 1 below illustrates these connections using an ICS-48015 to breakout the D-sub into screw terminals.

**Motor Command Signal Wiring:**

Connect the +/-10V motor command line MCMx from the DMC-4000 to the Signal 1+ line on the Glentek amplifier when operating in torque mode or velocity mode. Signal 1- does not need to be connected when using a single-ended motor command signal. If you are in position mode (Pulse Follower), hook up the amplifier as you would with a stepper drive. The wiring for these two configurations is illustrated in the images below. Note that the pin numbers in the figures below are associated with axis A, and will be different when connecting to a different axis.

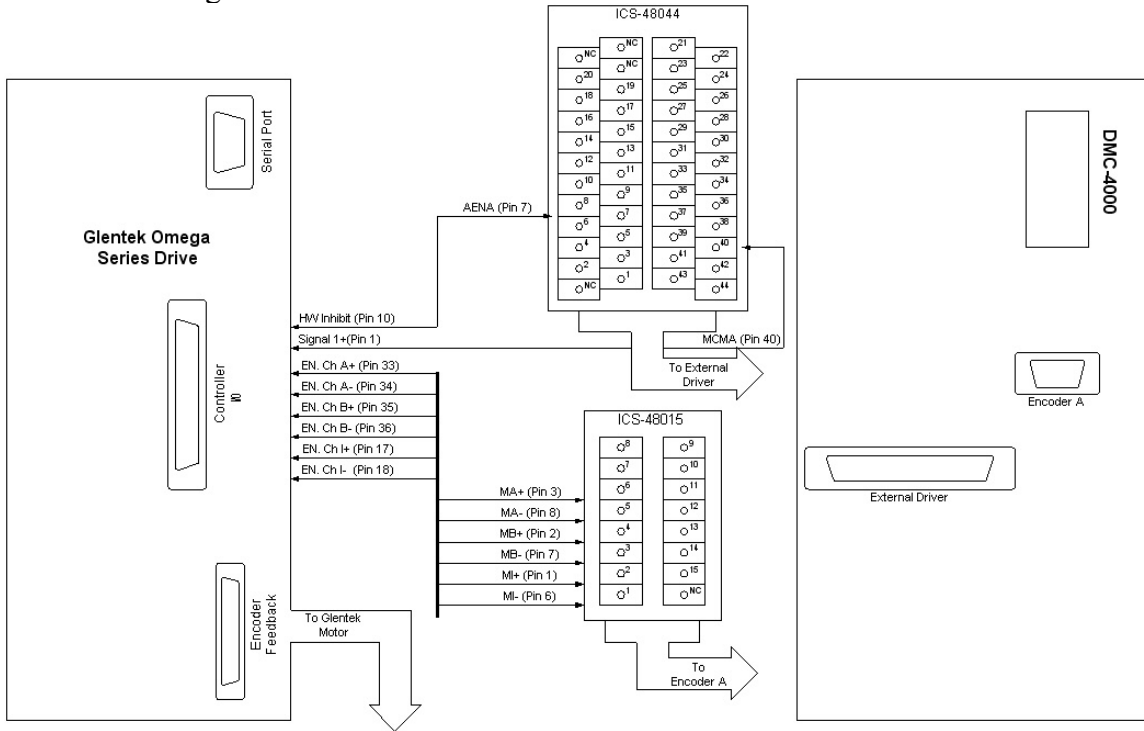


Figure 2: Wiring for torque/velocity mode drives

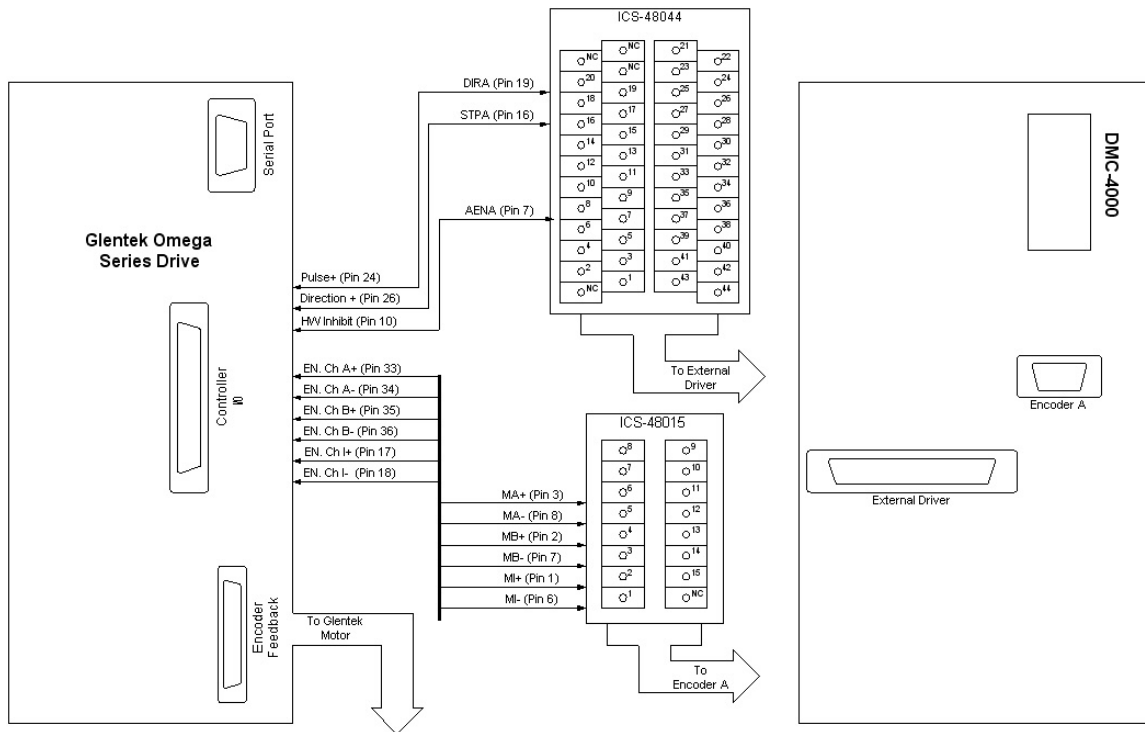


Figure 3: Wiring for position mode drives

### Performance Tuning:

The following section describes the process taken to properly tune the system when the amplifier is set in different modes of operation.

NOTE: All tuning parameters and processes are based on an un-loaded system in a noise-free environment that is powered by a standard US 110VAC power source. System response may vary drastically depending on environmental conditions, load, temperature, voltage, and internal amplifier gains.

### Torque Mode:

When the drive is in torque mode, the only loop it is closing is a current loop. This means that tuning for motor response is handled entirely by the controller. The current loop on the Glentek Omega series drive can be tuned for advanced performance, however. See the Glentek user manual section on ‘Current Loop Tuning’ for more information on parameters and auto-tuning the current loop of the drive.

Galil offers several different methods of automatic tuning to assist the user in achieving the best performance from their system. This includes tuning methods such as point-to-point tuning, Auto-Crossover tuning, and General Tuning. The Auto-crossover tuning in Galiltools delivered good results, but a manual tuning approach was used to in this example to tweak the tuning parameters. Please see our application note on manual tuning if you want more information on using this method of tuning at <http://www.galilmc.com/support/appnotes/optima/note3413.pdf>. The following were a typical set of values that achieved a good response.

KP90  
KD450  
KI8

**Velocity Mode:**

When the drive is in velocity mode, the drive is closing a loop around the motor command line in order to try and make the velocity more consistent. Follow the Glentek user manual guide to tuning the drive in velocity mode. Be sure to set the PID gains on the Galil controller to 0 while testing and tuning the Glentek drive. Once the drive is tuned properly, go through the manual tuning procedure for a Galil controller. The velocity mode drive can be tuned for good performance on the DMC-4000, though the method of tuning this type of amplifier is different than from a torque drive. Please contact an application engineer at [support@galilmc.com](mailto:support@galilmc.com) if you need assistance in tuning.

**Position Mode:**

The Pulse Follower mode on the Glentek amplifier is used if you want to run the motor in position mode. This is commanded with a step and direction signal from the DMC-4000. Follow the instructions in the Galil user manual for connecting stepper drives and motors in order to run in this mode. The Glentek user manual has instructions for tuning the response of the drive to the step train from the controller.