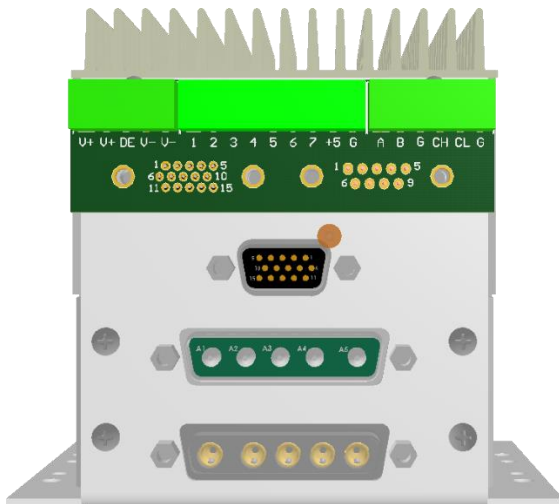
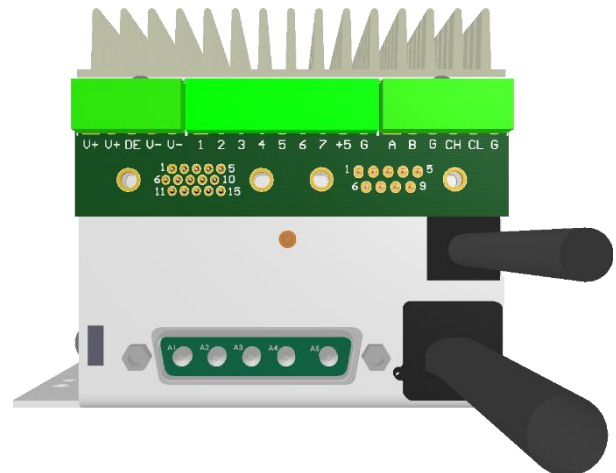


SilverNugget N3 X-series Breakout – QCI-BO-X3 & QCI-BO-X3A



QCI-N3-IX with QCI-BO-X3



QCI-N3-MX with QCI-BO-X3

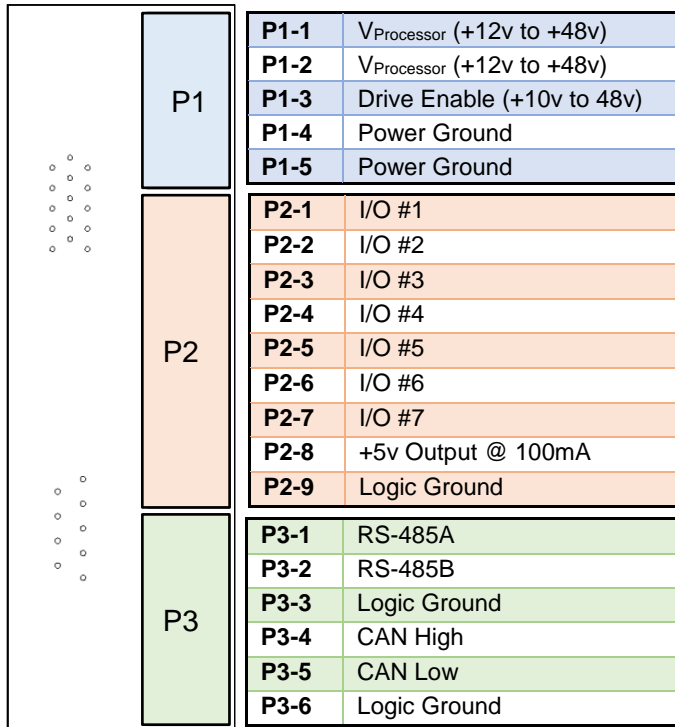
Product Overview

The QCI-BO-X3 and QCI-BO-X3A breakout boards are designed to interface with SilverNugget N3-IX and N3-MX X-series servo motor controllers. The breakout board breaks out the SilverNugget N3's processor power input, drive enable input, RS-485 communication lines, 7 LVTTTL digital/analog I/Os, local +5v supply, and CAN bus onto pluggable terminal connector blocks. For applications requiring only a few signals, the basic breakout board is a convenient way of directly accessing power, communication lines and I/O lines. Three plug terminals are included to secure wiring. The provided screws lock the breakout to the DB15HD connector.

Terminal Connector Wire Range: 16-28 AWG

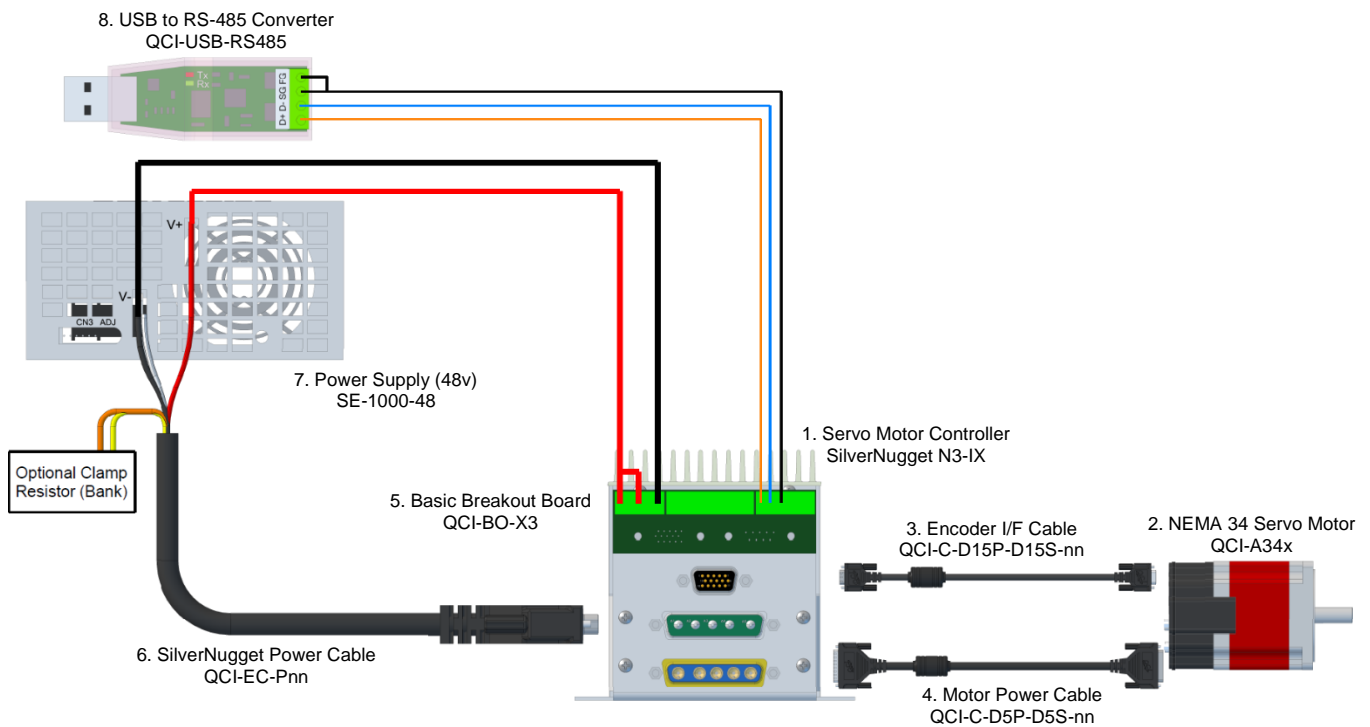
The QCI-BO-X3A adds an active filter that translates the SilverNugget servo controller's 0 to 3.3v PWM output on I/O #2 into a 0-5v analog output. Besides the special circuitry on I/O #2, the QCI-BO-X3A is the same as the QCI-BO-X3. Refer to the last page of this document for examples of how to use the QCI-BO-X3A analog output feature.

Pin-out Descriptions



How to Use

Typical SilverNugget N3-IX Setup



How to Use QCI-BO-X3A

Configure the PWO command to get duty cycle from lower or upper word of any register. As this word ranges from -32768 to 32767, the PWM output (I/O #2) duty cycle ranges from 0 to 100% at 3.3V. The QCI-BO-X3A filters this PWM output and amplifies it to 0-5V.

Note: PWO “Mode” parameter may have the following values:
Disable, High Word, Low Word

Use the following equation to determine the Register Value (R) for the desired X3A output voltage (Vo):

$$R = [(Vo - 2.5) / 2.5] * 32767$$

Example 1:

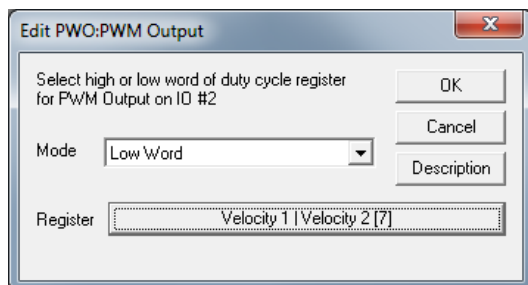
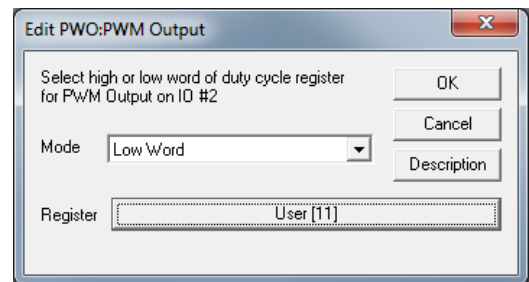
Desired analog output is 1.75 volts.

- 1) Configure PWO to get duty cycle from lower word of User Register 11.
- 2) Set Register 11 according to the following equation:

$$R = [(Vo - 2.5) / 2.5] * 32767$$

$$R = [(1.75 - 2.5) / 2.5] * 32767$$

$$R = -9830.1 \approx -9830$$



Example 2:

Output Analog Actual Velocity

All SilverLode servo systems store velocity in Register 7 [Velocity 1|Velocity 2]. Velocity 1 is the actual velocity filtered once. Velocity 2 is the actual velocity filtered twice. The above example uses Velocity 2. Velocity 2 is a signed 16-bit number where -32768 is -4000 RPM and +32767 is +4000 RPM. At zero speed, the output voltage will be 2.5 volts.

Example 3:

Using Analog Output for Torque

All SilverLode servo systems store torque in Register 9 [Control|Torque]. The lower word is the actual output torque on the motor shaft. Torque values of -30000 is -150% torque and +30000 is +150% torque. The minus and plus represents clockwise and counter clockwise torque. A value of 0 is zero torque.

