Digital UV PWM command with Copley

Introduction

Controllers that perform external commutation receive feedback information directly from the motor (bypassing the amplifier) and command just two lines of Digital UV PWM current command to the amplifier. The amplifier generates the W current.

Delta Tau, Galil, and PMD can be used in Digital UV PWM current command mode to drive Copley digital amplifiers. The advantage of Digital UV PWM command vs. direct H-bridge control is the increased current loop bandwidth, field oriented control for more torque, and space vector modulation for higher speeds, all provided by the Copley amplifier.

Galil

With a command value of zero both PWM outputs will have 50% duty cycle.

The PWM frequency was measured to be 23k Hz and produced 0Amps at zero command current.

The command Lines used in Galil for test:

BAX "Initialize"
BMX "Set Counts/Electrical Cycle"
BSX 3,700 "Set 3V magnitude for 700ms wiggle time"
SHX "On"
PR "4000 relative distance"
BGX "Begin Move"
TPX "Tell Position"

–Provided by Galil Applications Engineering

Delta Tau

Tested with UMAC system with ACC-24E2 (PWM output)

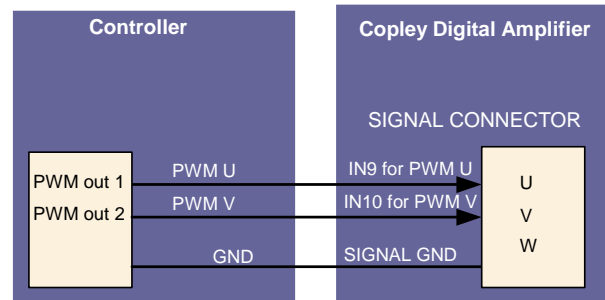With a command value of zero both PWM outputs will have 50% duty cycle.

The PWM frequency was measured to be 10k Hz and produced 0 Amps at zero command current.

UMAC Pin10 and Pin11 tested with Ix29 and Ix79 adjustments.

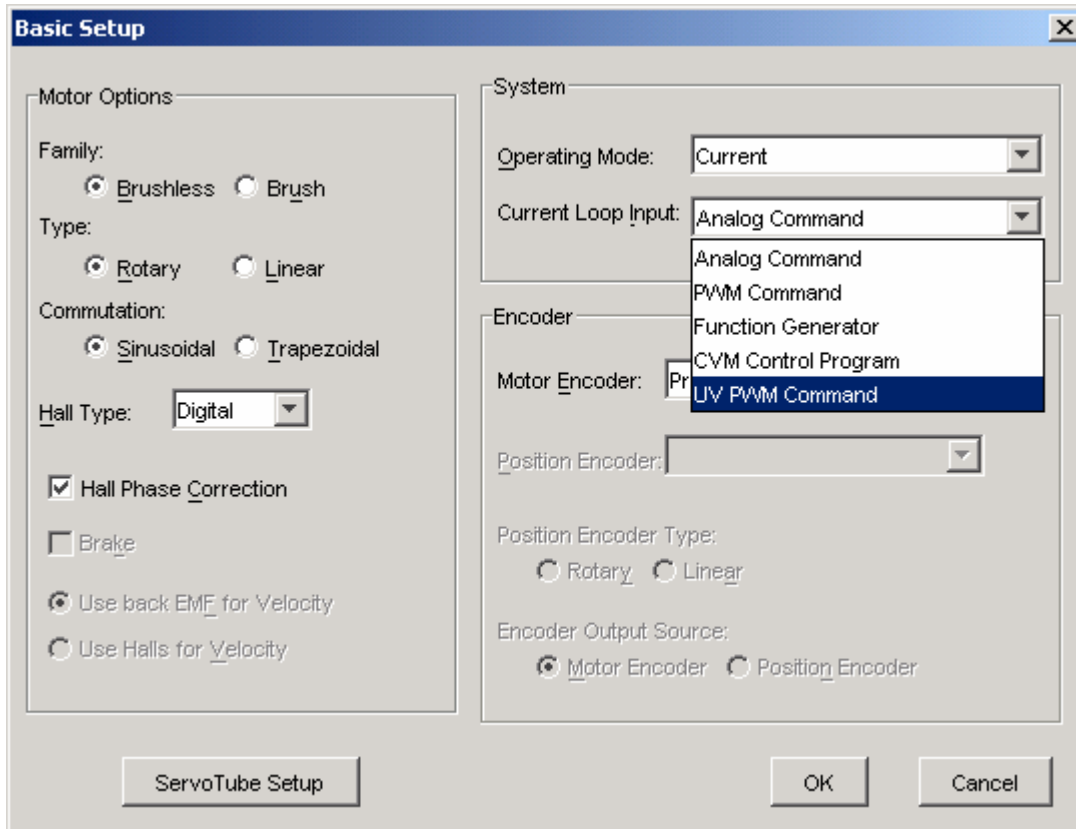*–Provided by Delta Tau Distributor*

Digital UV Connections

The control board can output 2 50% PWM signals for commanding U V currents in the Copley amplifier. The Copley will generate the W current.
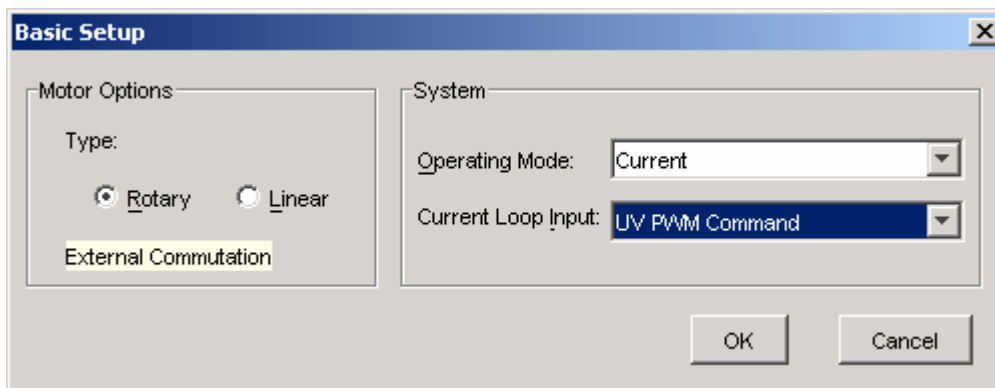

Copley Digital Amplifiers

Copley Digital CANopen amplifiers can also operate in Digital UV PWM current command mode. Use the Xenus (AC powered) and Accelnet (DC powered). CME2 V4.0 b7 and firmware 4.16 or greater.

Copley does manufacture the 7xx9AC, a direct H-Bridge amplifier for use with PMAC2 direct H-Bridge control. However, due to the low current loop bandwidth produced by the PMAC2, Copley does not recommend the use of direct H-Bride control in most applications. Copley does recommend the use of the PMAC2 for Digital UV PWM current command mode with Copley Digital amplifiers for high current loop bandwidths (typically 3k Hz).
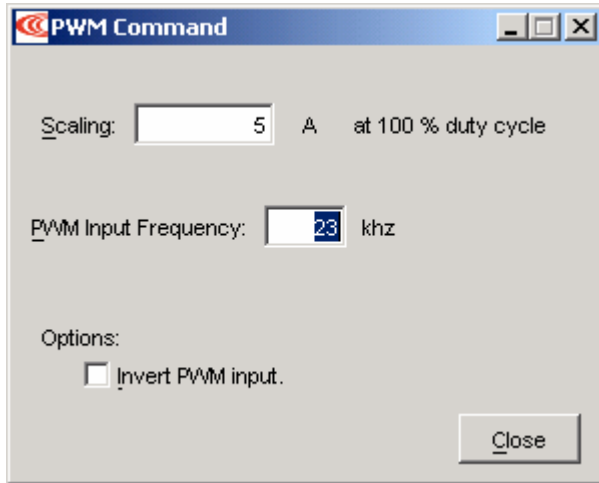
CME2 Software

Basic Set-up Screen:

Select in this order: Brushless, Rotary or Linear, Current Mode, then UV PWM Command. The screen will then reduce to the essential selections:
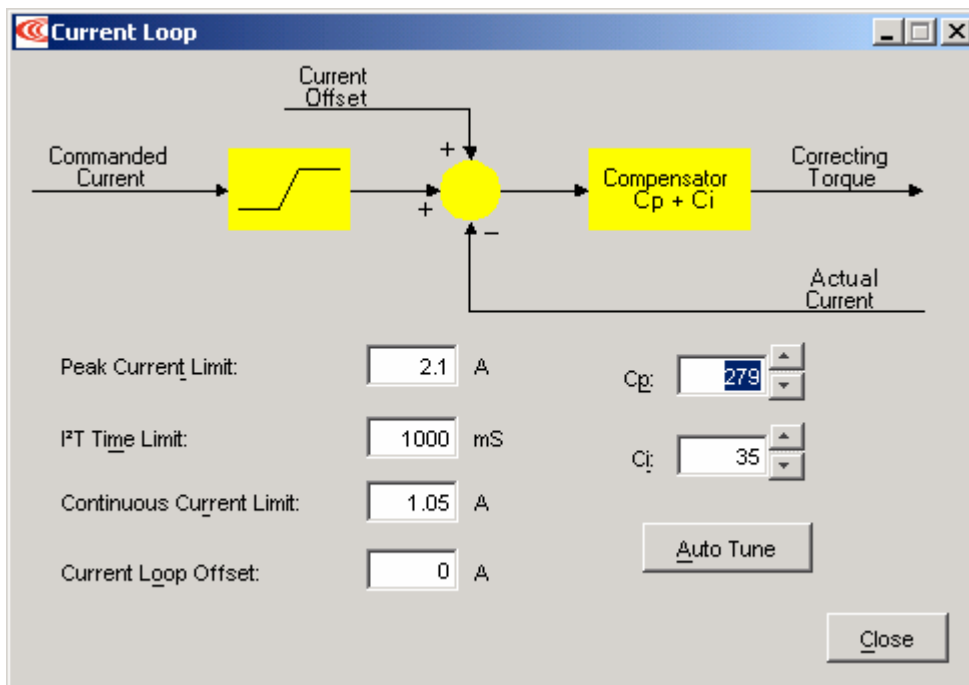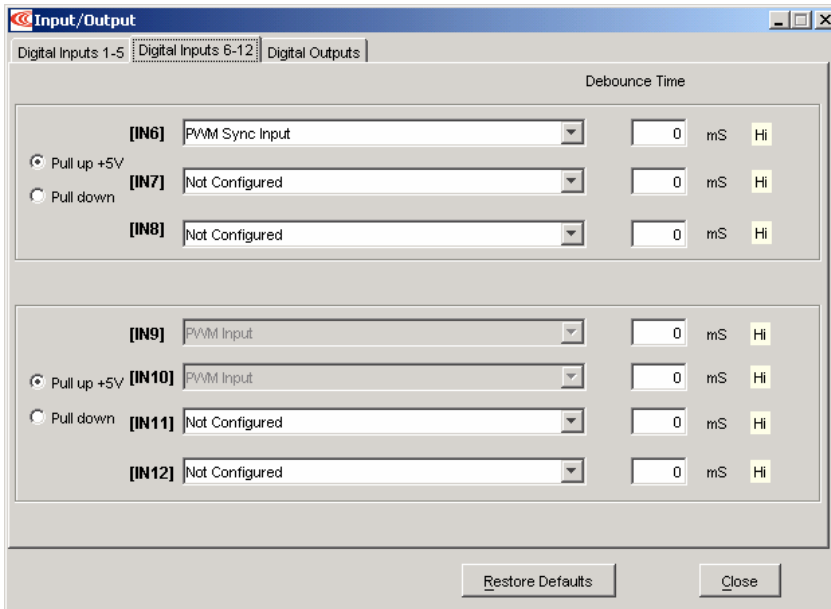
PWM Command Screen

Select the current desired at full scale command. Also, verify the 50% command frequency with an oscilloscope and enter the correct value. If the frequency is off by a few Hz then the zero command "50%" will produce an offset and not 0amps as expected.

Current Loop

Set current limits and adjust gain. The scope can be used to tune the current loop if auto tuning has a problem with the motor.

Input / Output screen

IN9 and IN10 are used for U and V PWM commands.

Tools/Manual Phase

Manual phasing is not required but can be used to verify that the amplifier can output a current vector and when spun, the motor should move.

Enable, change rate and current, press FWD or REV.