ICE High Level Overview

Integrated Control Electronics (ICE) is a digitally controlled array of low-noise, high bandwidth electronics for controlling the lasers and associated electronics in complex experiments. Each ICE Cube contains up to eight individual ICE boards that provide specific functionality such as four channels of temperature control or current control and laser servo. Additionally, each ICE Cube contains on Master Board for interfacing between individual ICE boards via an external serial interface. Communication with the Master Board is done using human-readable ASCII command via either TTL Serial or USB Serial (see Overview of ICE Commands for details). The Master Board communicates to individual ICE boards via an I2C bus architecture (in binary). A schematic of this architecture is shown below in figure ##.

figure ##.

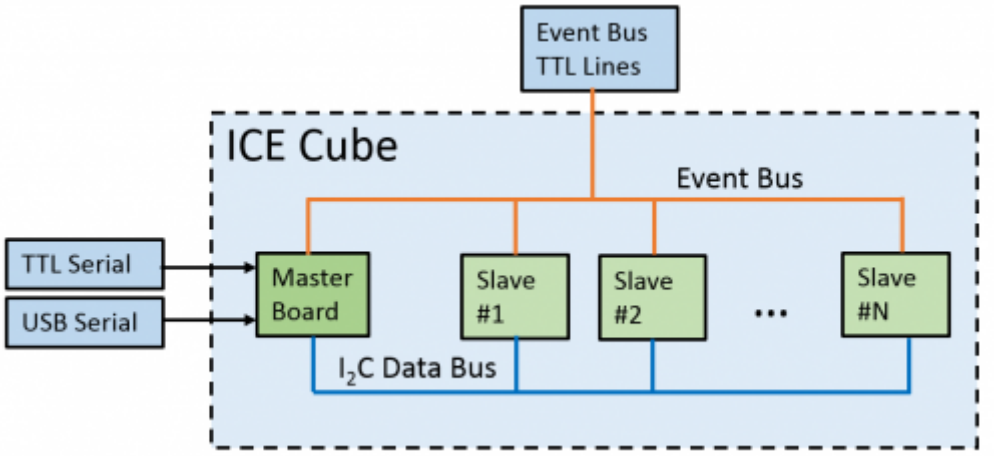

Fig. ##: Schematic overview of ICE Box.

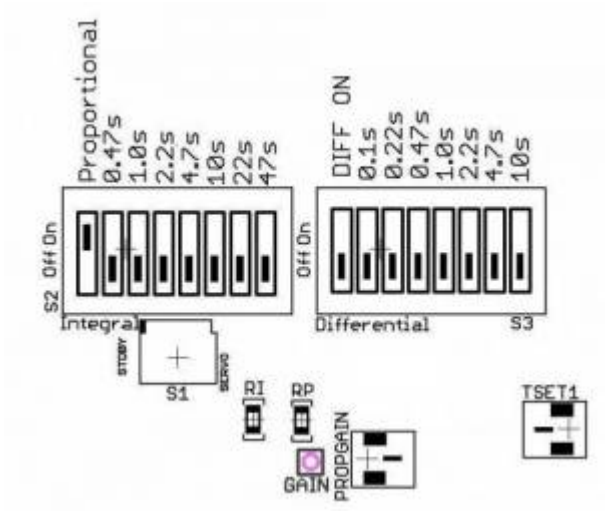

Fig. ##: Side Panel Adjustment of Poles for D2-105

If you remove the right side panel on the Laser Controller, for each stage of temperature control, you will see the panel shown in figure ##. The set of click switches labeled “Integral” control the PI (ω_1) pole. Clicking the first switch, labeled “proportional,” into the on position removes the integral gain. If the “proportional” switch is in the off position, then the sum of the times for all switches in the on position gives the RC time-constant for the PI pole. For example, if the 2nd (0.47s) switch and the 4th (2.2s) switch are in the on position (and the rest off), then the time constant is 2.7s and ω_1 = 1/2.7s =

0.37 Hz.