

Motor Control at the Canadian Light Source

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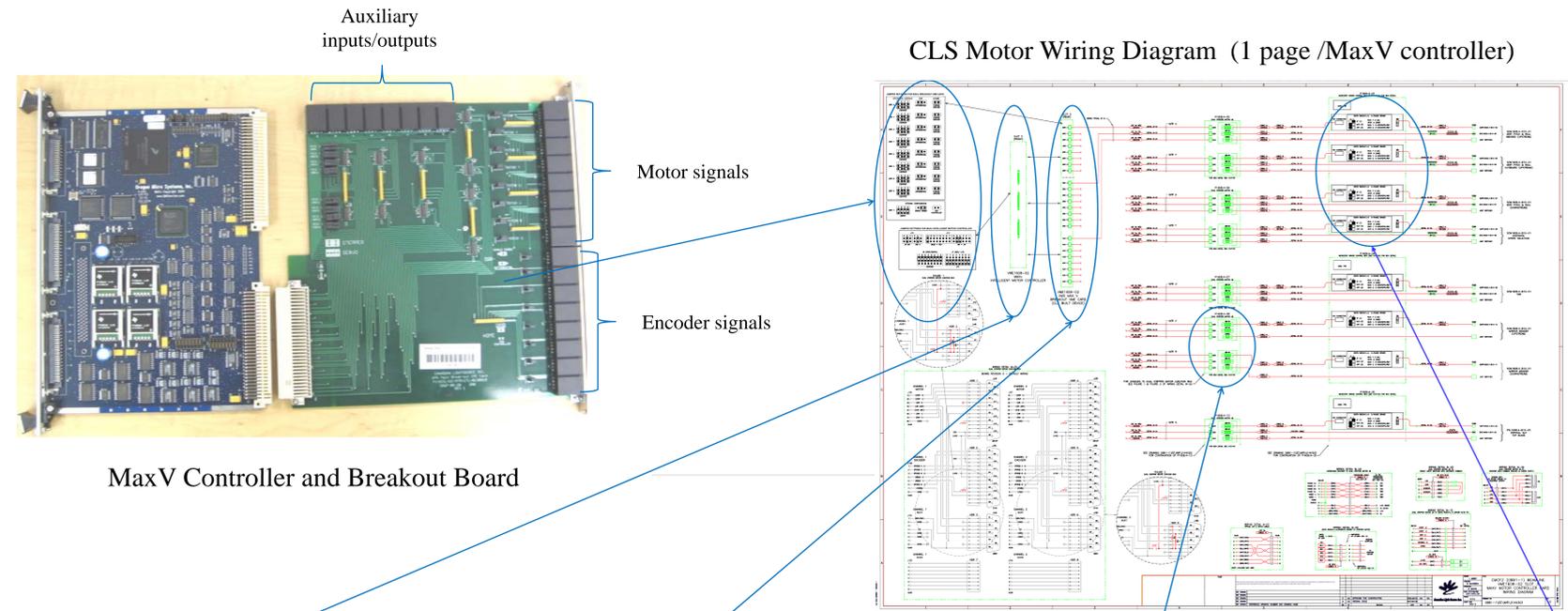
Design Criteria

The principle reason for the redesign of the CLS motor control system was to reduce the length of the higher current stepper motor cables connecting the motor drives to the stepper motors. Reducing the length of these cables reduces the amount of noise picked up in surrounding systems. A second reason was to reduce the construction and installation time of the motor control system. Cost and system maintenance were also other considerations in the system.

System Implementation

It was decided to design the motor control system around the Oregon Micro Systems MaxV VME64x card. The 8 channel stepper/servo motor control per card provided a cost effective control solution. Using the Weiner VME64x crate, 160 motor channels are available from one crate. CLSI designed a breakout board to bring out all the motor and encoder signals from the rear of the VME crate. RJ45 connectors and Cat5 cable were chosen because of low cost and ease of manufacture. Limit switch and motor enable status indications on the back of the breakout board have proven invaluable. In addition to the motor and encoder signals, all other auxiliary (analog and digital) signals from the MaxV are brought out using the auxiliary RJ45 on the top of the breakout board.

The Cat5 cables terminate at the CLSI designed Interface Box. The Interface box connects the signals for two motors from the breakout board to the motor/encoder/limit switches. Step, direction, and enable signals are passed through to the stepper motor drive. In the case of servo motors the difference signal is passed through to the servo amplifier. The Interface box has connections for two Heidenhain TTL length gauges. Other encoders can be used but an adapter cable is required. The Interface box was designed to easily be modified to accommodate any special encoder/limit switch situation or to make use of the auxiliary signals.



MaxV Controller

- 8 channels of motor control
- Encoders on all channels
- Stepper or Servo motor control (User selectable)



Breakout Board

- Limit switch indications on all channels
- Stepper /Servo motor selectable
- Cat5 (RJ45) connections to Breakout boards



Interface Box

- Connects Cat5 cables from Breakout board
- Connection to limit switches
- Interfaces with 2 motors
- Encoder inputs pin compatible with Heidenhain TTL length gauges
- User jumpers to set encoder direction and phasing
- All motor and encoder signals available for custom applications



Driver Box

- Use industry standard drive modules
- Installed close to motors