

Emergency-Stop Relay Board

rev 2

The Emergency-Stop board contains 32 relays which clamp valve command signals to analog ground so as to stop hydraulic valves from moving. When E-stop input signals are low, the relays are relaxed, valve signals are clamped to AGND, and the valves are stopped. When input signals are asserted high, the relays energize, allowing valve signals to pass directly through the board.

In order for the E-stop to be effective, your valves must not drift much with a zero command signal. The hydraulic valves themselves may need to be adjusted for zero drift when E-stopped. With HR Textron DDV Servovalves, this can be done by carefully turning the body of the valve under pressure while E-stopped. Since it can be difficult to adjust the valves exactly, a small amount of drift may be present in the valves even when the E-stop is energized.

The board is configurable so that one, two, or three inputs can be used to energize the relays.

The E-stop board has input connectors which are directly compatible with the Diamond Systems "Ruby-MM-1612" analog output card. The first input connector implements all 50 pins, the second input connector has the same pinout, but implements only the first 26 pins. Thus it requires that the ribbon cable be cut to accommodate a smaller 26pin IDC Connector.

The E-stop board is manufactured in PC-104 form factor for ease of integration onto PC-104 stacks, but it does not need to be plugged into a PC-104 bus. It is recommended that the bus headers not be populated, as this increases the length of the bus, possibly introducing signal reflections.

E-stop command signals are 5 Volt CMOS positive logic, which can come from a simplex fiber board, or other logic. The digital ground of this signal must be in common with the digital logic of the Estop board by contacting pin one of the DPWR connector. The Estop input signal pad is connector EIN, labeled with the letter "E". The board can also be configured for a second ("auxiliary") signal, also on this connector, labeled with the letter "A". The jumper "JAUX" must be removed in order to use this auxiliary input. The board can also be configured for a third signal, coming from connector "IN1" pin 32, it is DIO-0 of the Diamond Ruby card. This can be used as an EC interlock, so that the EC must have booted and asserted this signal before the Estop can be used. In order to use this signal, "JEC" must be installed. These three signals are inputs to an AND logic gate, so that the E-stop relays can be energized only when all three signals are true. The board should be pre-configured during manufacturing, and typically only one signal is used (using the jumper configurations above).

The board can be manufactured to use 5 Volt, 12 Volts or 24 volt relays. It can also be configured to provide its own 5V logic power regulator, or to use +5V from the "Ruby" card for its logic (see schematic for details) . External power must always be supplied for

energizing the relays. The Estop board consumes about 0.25 Amps maximum.

Note that on the relay power ("RPWR") connector the first (square) pad is -Volts, the second pad is +Volts. See the schematic for further questions about the pinout of this board.

On most connectors of the printed circuit board, pin one can be located by a square pad, this is not true of the large IDC headers. On these, the number "1" plus a white arrow is silkscreened next to pin 1.

The logic and driver transistor of this board are sensitive to static discharge, use static discharge precautions when handling.

PC/104 Standard 16-Bit Module

