

Electrical System

The MagnaTran 7™ electrical system complies with all CE specifications, RFI, EMI, ESD and SEMI S2-93. The board set includes communications, motion control, power control, and discrete I/O monitoring and control. Additionally, the electrical system provides all external connections for the robot including power and I/O.

The robot is comprised of five major circuit boards as follows:

- PC104 CPU (Supervisor Board)
- Personality Board (Motion Control Computer)
- T1/T2 Axis Driver Board
- Z Axis Driver Board (optional)
- I/O (Interface) Board

PC104 CPU (Supervisor) Board

The Supervisor (SUP) board is a 33 or 44MHz 386X based PC104 processor module. This embedded computer supports Brooks Automation robot specific application software. Upgrades to the firmware are performed through the interface board serial port onto a FLASH memory disk. The Supervisor board's primary function is user interface and general control. The Supervisor board is mounted and interfaced directly to the MCC.

Personality (Motion Control Computer) Board

The Motion Control Computer (MCC) board, a 60MHz DSP based motion control computer, governs the motion of the robot arms and provides access to time sensitive I/O functions; such as wafer sensing. The SUP board provides command information to the MCC and the MCC provides status and error information to the SUP board.

T1/T2 Axis Driver Board and Z Axis Driver Board

The T1/T2 Axis Driver Board (and Z-Axis Driver Board if equipped) provides power to the drive motors. Main power is supplied to the T1/T2 board which distributes this power to the T and Z drive circuitry. This board also provides logic and encoder power to the rest of the system. The T board has three glass fuses that provide special protection for power distribution.

I/O (Interface) Board

The MagnaTran™ 7 I/O board provides optically isolated serial port access, I/O access, status indicators, and some special function access. The board has a face plate with the appropriate labeling for user access.

The Interface Board is connected to the Personality Board via a 48 pin DIN connector which provides address, databus, and control lines.

Three types of Interface boards may be purchased with the MagnaTran 7: high side, low side and Brooks Automation Marathon Express.

High Side Interface Board

The high side interface provides general purpose digital Input and Output functions for use when high side sourcing logic is required. The discrete I/O interface is accessed by a 50 pin D-subminiature connector on the face plate. This connector provides 22 high side inputs and 20 high side outputs.

See [Figure 5-4](#) for a diagram of the high side circuit.

Low Side Interface Board

A low side switching board is available using active low signals instead of the CE compliant standard active high. See [Chapter 12: Attached Drawings](#) for the pin out of the connector and refer to [MISC I/O Communications on page 5-9](#) and [Discrete I/O Control \(DIO\) on page 6-45](#) for references on setup and descriptions of commands.

Connection of external devices to the MagnaTran 7 Robot for monitoring and control through discrete I/O lines is done through the 50 pin connector located on the I/O panel of the robot. The Low Side interface requires the input to be grounded to the switch state.

See [Figure 5-5](#) for a diagram of the low side circuit.

Marathon Express High Side Interface Board

The custom designed Interface for the Marathon Express Cluster Tool provides access to the serial communication ports through the same connector as the digital I/O portion. This connection from the robot is taken to an I/O distribution hub where signals are separated.

The discrete I/O interface is accessed by a 50 pin D-subminiature connector on

the face plate. This connector provides 20 optically isolated high side inputs and 20 optically isolated high side outputs designed to operate at +24VDC nominal. The 24 VDC operation is provided through the system.

The high side board has the following connectors:

POWER: Main Power Connector, on the face plate but not actually on the I/O board
CDM: Dedicated Control Display Module (CDM) port
SIO1: Main Serial Communications port, RS-232 or selectable RS-422
SIO2: Secondary RS-232 port
MISC IO: Discrete I/O Port

The high side board has the following indicators:

24V: Power on indicator
TX: SIO1 transmit, green indicator
RX: SIO1 receive, green indicator

The high side interface is designed to operate at +24VDC. This power may be supplied through the connector by the user. When supplied externally, full optical isolation is achieved. Optionally, the user may use the I/O interface without supplying power. The I/O board will automatically switch to internal power. Isolation will then be defeated.

Nominal current requirements for each input is 2mA each. Output current is nominal 200mA per pin.

The I/O board is also offered as a low side switching interface. See [Appendix F: Relay I/O Option on page 11-24](#) for a description of the low side board.

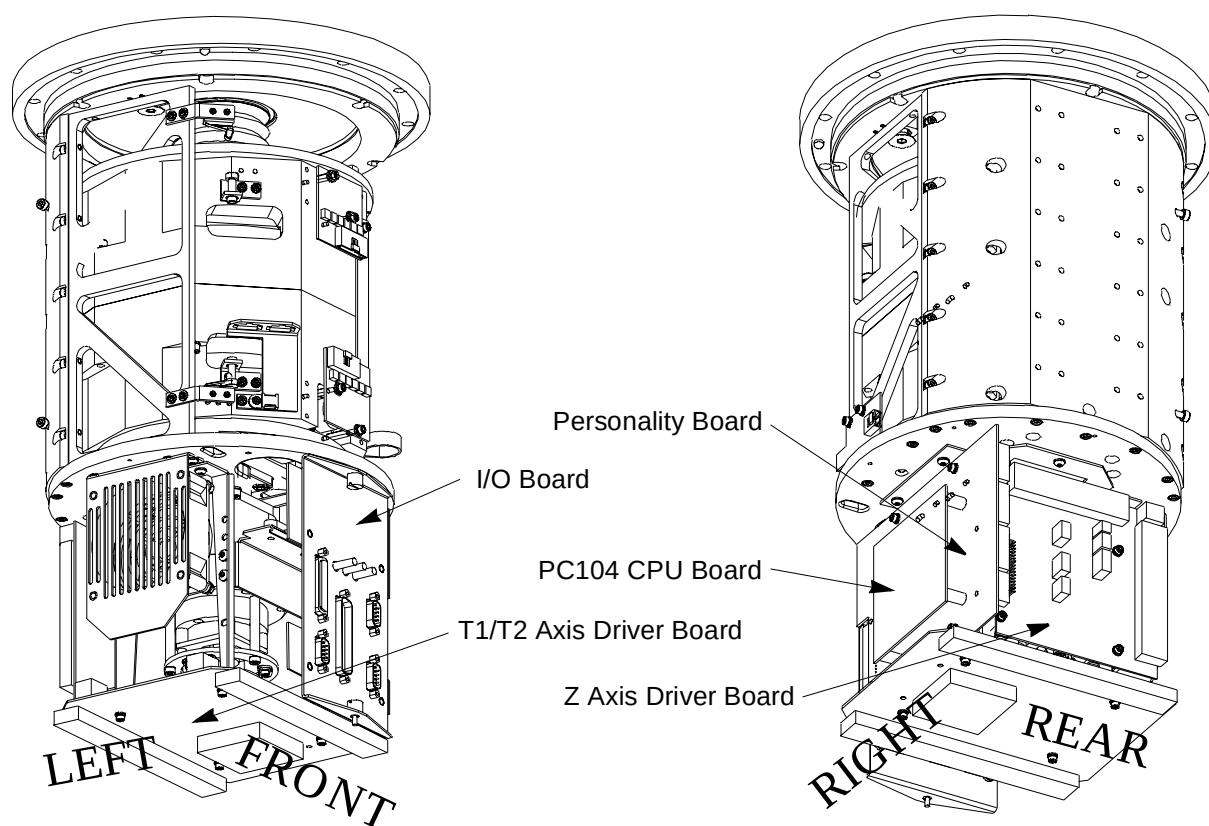


Figure 4-5: Printed Circuit Board Locations