

OVEN CONTROLLER

The Oven Control System is comprised of one DI (Digital Input /Output) board, a back-plane board, and one or more AI (Analog Input) boards. One AI board controls up to 32 process loops. Each additional AI board increases the number of control loops by 32. The Oven Control System controls the temperature of the cells, drives the conveyor and rail drive motors, and drives various logic signals through the I/O board.

The Oven Control System receives all of its instructions from the computer by a serial interface.

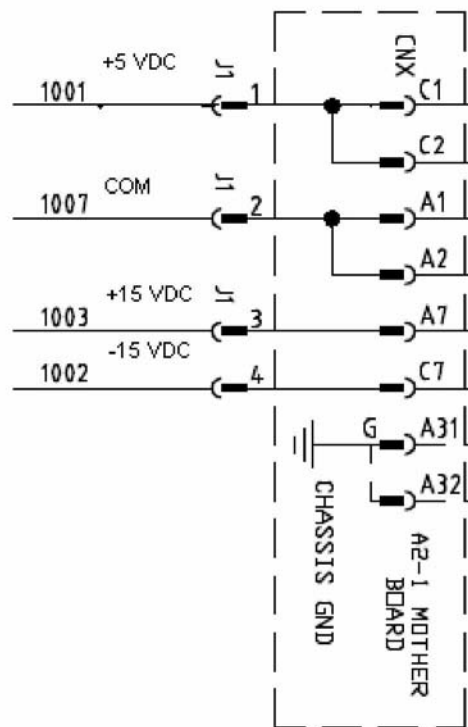
NOTE: DI OR AI BOARDS SHOULD NEVER BE INSERTED OR REMOVED WITH POWER APPLIED TO THE VITRONICS CONTROL SYSTEM!

Test procedure for D.C. input voltage:

The power requirements for the Vitronics Control System, with one AI board, is:

- +5.0 VDC @ 2 Amps max (+5.0 to +5.10 VDC)
- +15 VDC @ 0.1 Amps max (+12 to +15 VDC)
- 15 VDC @ 0.1 Amps max (+15 to -15 VDC)

- Shut off circuit breaker F55 supplying 120 VAC power to A1 board.
- Remove DI and AI boards from Vitronics Control System.
- ⇒ Reactivate 120 VAC power to DC power supply. Using a DC Voltmeter, measure the DC voltages at the backplane connector:



ADDRESSING DIP SWITCHES ON DI BOARD

Currently, only dip switch #4 is utilized for 50 or 60 Hz operation. All others are reserved for future use on the XPM3. For 60 Hz, dip switch #4 is in the **Off** position, and for 50 Hz operation, dip switch #4 is in the **On** position.



ADDRESSING LINKS ON AI BOARD

The AI board contains two series of jumpers, combinations of which dictate the address of the AI board. The following table identifies the required jumper settings for the first two AI boards in a system:

Board number	Channels	Jumpers set
1	1 to 32	JU1 and JU11
2	33 to 64	JU2 and JU10

CONTROLLER STATUS

Upon power up the AI board's status lights should be in the following states:

- ⇒ Green light: On, steady.
- ⇒ Orange light: On, flashing at approximately once per second.
- ⇒ If the status lights are not in the above states check the +5 VDC at the terminal block mounted on the motherboard.

RS-232 Serial Communication check

Make sure that the RS-232 cable connections from the PC to the controller are correct.

The communication baud rate on the PC oven software is set to 38,400 baud and should never be changed without consulting the factory.

Verify that the 9 pin d-sub connector is firmly connected on the back of the PC.

Verify that the RS-232 cable to the controller is connected firmly into connector P2 on the front the oven controller (DI board) and not plugged into connector P1 on the front of the oven controller (DI board).

RS-232 Serial Communication check - continued

Connector P1 on the oven controller (top most connector) is an RS-232 programming port used for updating the program application stored in the flash memory of the oven controller.

Connector P2 on the oven controller (second connector from the top) is used for RS-232 communications with the PC.

Check that the run toggle switch on the front of the oven controller (DI board) is in the up position and that the top green run LED is on. Refer to sheet 46 on schematic 4215700 for wire connections and an LED layout of the oven controller (DI board).

The COM2 RXD and COM2 TXD LEDs on the front of the oven controller indicate RS-232 communication activity between the PC and the oven controller.

COM2 RXD is a green LED and flashes as the PC sends data to the oven controller.

COM2 TXD is a red LED and flashes as the oven controller sends response data to the PC.

Verify that the COM2 RXD green LED is flashing to indicate that the PC is sending commands to the oven controller. If the LED is not flashing then verify that the PC oven software is running and sending data by observing the modem icon on the screen.

Using an Ohm meter check the continuity of the communications cable. The pin assignments are as follows:

- DB-9 Pin #2 (RX of PC) to DI Board P2-1 (TX of VCS)
- DB-9 Pin #3 (TX of PC) to DI Board P2-2 (RX of VCS)
- DB-9 Pin #5 (SG of PC) to DI Board P2-5 (SG)
- DB-9 Pin #4 (DTR of PC) to DI Board P2-3 (used for programming mode only on P1)
- DB-9 Pin #6 (DSR of PC) to DI Board P2-4 (used for programming mode only on P1)

If the COM2 RXD green LED is flashing to indicate that the PC is sending commands and the COM2 TXD red LED is not flashing then the oven controller is not responding to the commands sent by the PC.

Important Note: If the run toggle switch on the oven controller is set in the down position the oven controller will **not** automatically run the application stored in its flash memory on power up and will not respond to any commands sent by the PC.

Momentarily press the small red reset button on the front of the oven controller with the run toggle switch on the front of the oven controller (DI board) set in the up position. This restarts the oven controller application, assuming that there is a valid application loaded in the oven controller. When the oven controller starts running an application all of the green LEDs on the front are on initially and all of the red LEDs are off until there is communication activity on the oven controller communication ports.

In the rare case that the 3 green and 3 red communication status LEDs on the front of the oven controller flash on and off approximately every 2 seconds in sync then the oven controller may be experiencing a run time error or other unforeseen error from invalid or possibly corrupt data. To clear this type of error perform the following:

- Shut off power to the oven controller by switching off F55.
- Remove the DI board from the rack.
- Remove the battery from the DI board for a few seconds to clear all of the RAM on the board.
- Re-install the battery.
- Re-install the DI board in the rack.
- Switch F55 back on.

The communication status LEDs should not be flashing at this point other than the COM2 RXD green LED if the PC oven software is running and attempting to communicate with the oven controller.

Through the PC oven software download the oven configuration to the oven controller since the configuration was lost when the battery was disconnected. The PC oven software normally displays a pop up dialog when it detects that the oven controller is not configured.

A further test is to use an oscilloscope or volt meter to look at the voltages at P2-1 (TX) and P2-2 (RX). The signal should switch between a positive value (+5 VDC to +10 VDC) and a negative value (-5 VDC to -10 VDC). The signal should be free from noise greater than +/- 0.2 VDC.

Noisy communication lines can be corrected by grounding the shield of the communication line, as well as moving the communication link away from any high voltage sources (especially running parallel to the communications lines).

CONTROLLER OUTPUTS (INPUT/OUTPUT BOARD)

The Input/Output board provides the ability to switch 120 VAC power through interposing relays. The oven controller controls the output status of the Input/Output board. As a diagnostic tool, the Input/Output board outputs may be manually activated one at a time.

