

# ProLiant 6500 Pentium II Xeon Troubleshooting Guideline

Version 1.0 – 12/02/98

## Check List

1. ProLiant 6500 Pentium II Xeon minimum system requirements have been met (see Appendix A).
2. Refer to the ProLiant 6500 Pentium II Xeon “Maintenance and Service Guide”, and “Setup and Install Guide”.
3. Check and record Status Indicators, Switch Settings, Interlock LED's and Thermal Violations.
4. Trouble-Shooting Flowchart

## Status Indictors:

- **Integrated Management Display (IMD): Liquid Crystal Display (LCD)**  
Located on front of system, used to monitor progress during POST and to display cautions and critical error messages.
- **POWER-ON LED:**  
Located on the front panel beside power switch. This indicator is on when the +5V output comes up when the power supply is turned on.
- **POWER SUPPLY LEDs:**  
Located on rear of unit next to AC power input.

## Power Supply LED Table

<b>Top LED</b> (Status)	Green	No fault detected in this power supply
	Green/Amber flashing	Power supply failed to restart after a prolonged fault
	Green flashing	Power supply will start within 20 seconds or software shutdown (software shutdown mode won't restart unless power switch is cycled).
	Amber flashing	Failed self test
	Amber	Fault detected in this power supply
	Off	System in standby mode or interlock(s) disabled
<b>Bottom LED</b> (AC Power)	Green	AC power is connected to this power supply
	Off	No AC power connected to this supply

Table 1 –1: Power supplies LEDs indictor definitions

- **VOLTAGE LEVEL LEDs:**

On the I/O Board:  
(front corner close to power connectors P1 and P2)

On the Fan Controller Board:  
(along the front edge)

Aux 5v	CR527	CR4
+12v	CR526	CR2
+5v	CR525	CR3
+3.3v	CR523	
-5v	CR522	
-12v	CR521	

NOTE: If any of the voltages are missing on the System I/O board, the system will not come out of reset (won't boot)

The voltage level LEDs are an indication that the voltage rail is present when ON (green). The Aux 5v should be present all the time the power cord is plugged in and connected to facility power.

- **INTERLOCK LEDs:**

Interlock circuitry exists to pinpoint missing or unseated processor, memory and peripherals board. (NOTE: Chassis panels are not connected to interlocks). Status of these interlocks is indicated with seven LEDs on the system board and a general interlock LED on the fan controller board. To view them, removed the side panel for a tower or top panel for a rack. These seven orange LEDs are located along the front edge of the system board in front of the PCI slots and just behind the IDE ribbon cable connector (E3) – just below the memory board. The general Interlock LED (CR1) on the front of the fan controller board, located just in front of fan 3, when lit represents that an open interlock exists. The other seven LEDs on the system board then can be used to pinpoint the sub-assembly at fault. See Table 1 – 2.

## System Board Interlock LEDs

Memory (CR560)	CPU4 (CR559)	CPU3 (CR558)	CPU2 (CR557)	CPU1 (CR556)	I/O (CR555)	Misc. (CR554)	Fault of Interlock
OFF	OFF	OFF	OFF	OFF	OFF	OFF	No interlock error
OFF	OFF	OFF	OFF	OFF	OFF	ON	Miscellaneous Cable Or Power Switch Cable
OFF	OFF	OFF	OFF	OFF	ON	ON	Peripheral board I/O
OFF	OFF	OFF	OFF	ON	ON	ON	Processor 1
OFF	OFF	OFF	ON	ON	ON	ON	Processor 2
OFF	OFF	ON	ON	ON	ON	ON	Processor 3
OFF	ON	ON	ON	ON	ON	ON	Processor 4
ON	ON	ON	ON	ON	ON	ON	Memory board

NOTE: Only the left-most illuminated LED in any given row can provide a valid indication of error. After ensuring that the server is powered down and power cables are disconnected from all power supplies, reseal the device associated with the left-most illuminated LED.

### Table 1 – 2: Interlock Fault LEDs

- **PORT 84 LEDs:**

Early systems had Port 84 LEDs on the Standard Peripheral Board. On later systems, to view Port 84 board must be installed. If using an ISA Port 84 card, install it in the only ISA slot 1. If a PCI Port 84 card is being used, it must be installed in either slot 5 or slot 6 (the primary/compatibility PCI bus).

**CAUTION:** Be aware that whenever power is applied to the system (power cord plugged in), even when the power switch is OFF, there is +5v power on inside the system. The AUX 5V power is ON anytime the power supply is plugged in and the LED on the Fan Control Board should also be ON to indicate its presence. This should also provide power for the IMD, which should also be ON.

## SYSTEM BOARD SWITCHES:

### PROCESSOR BUS/ CORE FREQUENCY SWITCHES: (SW2 and SW3)

For location of the Core Frequency Switch (SW2 and SW3), see the hood label under the top access panel of the server.

**Table 1 – 3: PROCESSOR BUS/ CORE SWITCHES**

Bus /Core Ratio	SW2	SW2	SW2	SW2
	Position 1	Position 2	Position 3	Position 4
400MHz	ON	ON	OFF	ON
450MHz	OFF	ON	OFF	ON
500MHz	ON	ON	OFF	OFF

ON = Closed

NOTE: SW2 applies to processors 1 and 2; SW3 applies to processors 3 and 4. The OFF position indicates a switch is open.

NOTE: Compaq makes no representation or warranty that processors which operate at any of the speeds shown will be available at any time. Therefore, processor core speeds shown are not necessarily representative of future processors.

Table 1- 4: DEBUG SWITCH (SW4)

NOTE: These switches are for DEBUG purposes ONLY. Their function should NOT be communicated to persons outside of COMPAQ.

		DEFAULT Setting
Switch Position and Function	ON	OFF
Position 1 – Hot Spare Boot	Disabled	Enabled
Position 2 – *** Interlock	Over-ride	Normal
ON = Closed		

\*\*\* NOTE: Caution should be used when setting this switch to other than the Default setting. Doing so could possibly damage components in the server (i.e. processors, etc.).

### RESET SWITCH (SW6)

The Reset Switch (SW6) is a momentary switch that will de-assert the Power Good signal and reset the entire system similar to the reset that occurs when cold booting the machine.

## STANDARD PERIPHERAL BOARD SWITCHES:

**Table 1 - 5**

### Maintenance Configuration Switch Functions (SW1)

Switch	Function	Default
S1	On-board Video Disable	OFF
S2	Configuration Lock	OFF
S3	Rack Mount Configuration	ON
S4	Diskette Boot Override	OFF
S5	Boot Password Disable	OFF
S6	Clear Configuration Contents	OFF

NOTE: The "ON" position activates the function.

## TEMPERATURE VIOLATIONS

There are three thermal zones in the ProLiant 6500 Pentium II Xeon server:

- PII Xeon Processor area
- SCSI Hard drive backplane area
- Fan Controller Board area

There are two types of active thermal sensors used in this server. The following table provides a description of each type of sensor, location, type of thermal event it monitors, and who sets the trip point.

Sensor Device	Location	Thermal Event	Who Sets Trip Point
TC620	Fan Controller Board	TEMPCAUTION 39 C	Set by a Resistor (S/W can not change)
TC620	Fan Controller Board	TEMPSHUTDOWN 46 C	Set by a Resistor (S/W can not change)
LM75 (National Semiconductor)	Fan Controller Board	TEMPSHUTDOWN 47 C	<a href="#">ROM@POST</a>
LM75	SCSI Backplane	TEMPCAUTION 51 C	ROM @POST
LM75	System I/O Board near CPU1	TEMPSHUTDOWN 64 C	<a href="#">ROM@POST</a>

- The TC620 and LM75 sensors on the Fan Controller Board monitor ambient temperatures around the fans and the board. The TC620 trip points are hard-coded by a resistor value. Its trip point can not be changed by the software.
- The LM75 on the SCSI backplane monitors the air temperature generated by the heat from the SCSI hard drives.
- The LM75 on the System I/O Board monitors temperatures around the Xeon Processors.

A TEMPCAUTION thermal event causes an interrupt to occur at the CPU. If the correct Compaq Health Drivers are loaded, this will cause the following events to occur:

1. All fans are set to maximum CFM, (Cubic Feet / Minute).
2. An entry is logged in the Integrated Management Log
3. A message is sent to the Integrated Management Display
4. An entry in Compaq Insight Manager Alarm Log is logged
5. A possible graceful shutdown of the server is performed

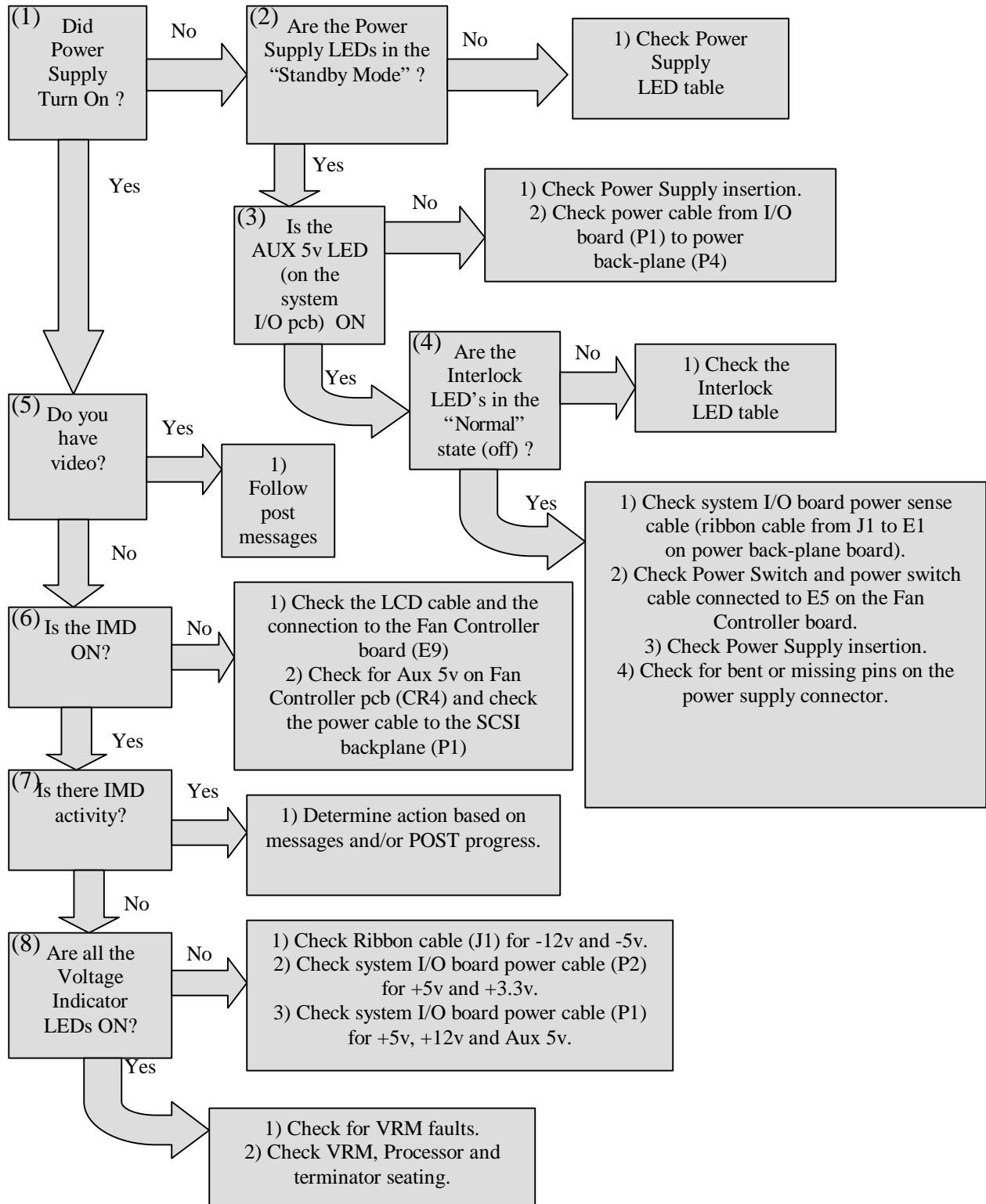
A TEMPSHUTDOWN causes the server's power supplies to shutdown immediately and bypasses the System ROM and Health drivers completely.

The System ROM at POST and the Health drivers can read current temperatures, and set pre-programmed trip points that will cause a CPU interrupt to occur on the LM75s. The trip points have been determined from testing and are based on what temperatures the subsystems may fail. These temperature values are programmed in the System ROM and Health drivers.

## TROUBLE-SHOOTING

On the next page is a basic trouble-shooting flowchart for the ProLiant 6500 Pentium II Xeon system. This flowchart is to assist in determining the cause of a system either not powering up, or one that powers up but won't boot (complete POST). Follow the flowchart to determine appropriate actions based on the symptoms observed. The flowchart will also refer to tables indicating the state of a particular sub-system based on the status of certain LEDs. Immediately after the trouble-shooting flowchart are the flow chart's decision boxes in a textual form with more details.

# ProLiant 6500 Pentium II Xeon Trouble-Shooting Flowchart



## FLOWCHART DECISION BOXES

### 1) Did the POWER SUPPLY turn ON?

Did the Power-ON LED on the front panel turn on? Did the power supply fans and system fans turn on (Visually see them spinning or hear them)? Are both power supply status LEDs on (solid green). See Table 1 – 1. Also see Appendix B for normal power up sequence.

**NO:** Reason for power supply not to turn ON:

- Interlock problems (board/cable connection problems)
- Power Supply Problems (bad supply, supply insertion)
- Input power bad
- Broken connection between the System I/O board and the Power Backplane via the power cables (sense cables).

Go to decision box 2.

**YES:** Power supply turned ON, Interlock and power seems to be ok. Go to decision box 5.

### 2) Are the POWER SUPPLY status LEDs in Standby mode (bottom LED solid green, top LED off)?

**NO:** If either of the power supply status LEDs isn't in this state, then check the power supply LED table to determine its state (Table 1 – 1). From that, there should be an indication of where the problem is. If the top power supply LED flashes green and then briefly flashes amber and then goes back to flashing green, that is also a pretty good indication that a power cable is not connected properly or the power supply is crowbarred.

**YES:** The power supply appears to not have been told to turn on, so the problem should be the power supply not fully inserted (and/or bent pins on its connector), the power cables between the power backplane (P4, P3 & E1) and the system board (P1, P2 & J1) are not properly connected, or there is some type of interlock problem. Go to decision box 3.

### 3) Is the AUX 5V LED ON (on system I/O board)?

Is AUX 5V LED (CR527) on the System board ON? (NOTE: There are two AUX 5V LEDs, one on the Fan Controller Board and one on the System I/O Board. If the IMD is ON the AUX 5v for the Fan Controller Board must be ON, but that doesn't guarantee that the AUX 5V on the I/O board is present). The Aux 5v is the power source for the interlock LEDs. If that power source isn't there, the interlock LEDs won't light to indicate interlock problems. That is also an indication that there is a problem other than interlocks that is keeping the power supply from turning on.

**NO:** This is an indication that the Interlock LEDs aren't applicable and that the Power Supply or a connection to it is bad.

- Check power supply insertion and for missing/bent pins on power supply.
- Check the connection of the System I/O Board power cable (P1) to the Power Backplane Board (P4).
- Check for possible shorts to the Aux 5v.

**YES:** Interlock power is good, indicates the interlock LEDs can be used, go to decision box 4.

### 4) Are the Interlock LEDs in the "Normal" (off) state?

Normal state (on System I/O board) is when the Aux 5v LED (CR527) is ON and all seven System Interlock LEDs (CR554, CR555, CR556, CR557, CR558, CR559, & CR560) are OFF. Normal state (on Fan Controller board) is when the Aux 5v LED (CR4) is ON and the Interlock LED (CR1) is OFF.

**NO:** The General Interlock LED (CR1 located on Fan Controller board) when ON indicates that an interlock violation exists. Check the seven interlock LEDs on the system board. (Refer to the Interlock Table 1 - 2). This should give you some indication who's at fault. Reseat the board, processor or cable identified by the interlock LEDs.

**YES:** If all Interlock LEDs are OFF (no indication of interlock problems) then check the following:

- Check the System I/O board power sense cable (ribbon cable from J1 to E1 on the power back-plane board).
- Check the power switch and power switch cable connected to the Fan Controller board. (E5)
- Check power supply insertion and for missing/bent pins on power supplies.
- Check Processor and VRM seating.

**5) Is there video on the monitor?**

On the video monitor, does any graphics or text appear?

**YES:** If video is present, then follow any messages that are displayed on the screen (i.e. post errors, etc.).

**NO:** If monitor is connected and no video is present, go to the next decision box (6).

**6) Is the IMD on?**

Is there something displayed on the IMD and the backlight ON?

**NO:** The IMD is not properly connected or not working. Check the following:

- Check the LCD cable and its connection between the IMD and the Fan Controller board (E9).
- Check for Aux 5v on the Fan Controller board (CR4)
- Check the power cable connection between the SCSI backplane (P1) and the power backplane board (P5)

**YES:** If the IMD is on, it can provide useful information about the progress of the system during post. Go to the next decision box (7).

**7) Is there IMD activity?**

IMD activity is defined by the IMD resetting and/or new messages being displayed. If the only thing displayed is from an earlier message, then that doesn't qualify as activity. Old information on the IMD will remain as long as power to the IMD is there. The old messages "go away" when the IMD is reset during normal boot process. Error logs don't "go away" only the displayed messages.

**YES:** If there is IMD activity, the progress through post can provide valuable information to where possible problems are. Also error messages and alerts are displayed.

**NO:** If there is no IMD activity (it doesn't reset or display POST progress), that is an indication that the system is possibly not coming out of reset and that the processor(s) aren't executing code. (Note: The checking the CD-ROM drive for constant flashing Activity LED as an indication of being held in Reset). Go to decision box 8 to continue zeroing in on possible problems.



**8) Are all the Voltage Indicator LEDs ON?**

Voltage Indicator LEDs are located on the System board next to the power cables connectors P1 and P2. Refer to Table 1 - 2

**NO:** If any of the voltage indicators LEDs are not ON, check the following for possible sources:

- For +12v (CR526), +5v (CR525) or Aux 5v (CR527) check System I/O board power cable between P1 and P4 on the power backplane board.
- For +3.3v (CR523) or +5v (CR525) check System I/O board power cable between P2 and P3 on the power backplane board.
- For -5v (CR522) or -12v (CR521) check the power sense ribbon cable between J1 and E1 on the power backplane.
- Check the power supply pins for missing/bent pins.

**YES:** If all the voltage indicator LEDs are ON then the system may not be booting due to bad VRM or processor. To determine who is at fault you may have to swap in a known good processor or VRM.

## Appendix A

### **PROLIANT 6500 Pentium II Xeon Minimum Configuration:**

Refer to Quickfind's Proliant 6500 Pentium II Xeon "Maintenance and Service Guide",

- 1.) Processors
  - A minimum of one Processor needs to be installed in one the processor slots along with a VRM (power module) for the socket. Unpopulated processor slots **must** have a termination card installed for proper bus termination. No VRM's are necessary for these slots.
- 2.) Power Supply
  - At least one supply must be installed.
- 3.) Fans
  - At least one Processor (fan 1 or fan 2) and one I/O fan (fan 3 or fan 4) must be installed.
- 4.) Memory
  - Minimum of 128MB. At least four (50ns or 60ns) buffered EDO DIMM's must be installed in a single bank.
- 5) Standard Peripheral Board
  - The Standard Peripheral Board must be installed

## Appendix B:

### **OBSERVATIONS OF A TYPICAL POWER UP SEQUENCE**

Under normal conditions, the following power-up sequence should be typical  
(note: the power supply LEDs are located on back of the unit next to the AC power input):

- Unit is turned off and disconnected from any power source (power cord unplugged)
  - Both power supply LEDs are OFF (clear)
  - Integrated Management Display (IMD) is OFF (dark) - {this is the LCD on the front of unit}

The typical power supply power-up sequence would be:

- Good facility power applied to unit (unit still turned off)
  - Top LED OFF (clear) and Bottom LED ON (solid green)
  - IMD turns on and displays model and firmware information
- Power switch turned ON
  - Top power supply LED begins flashing (green) and Bottom LED ON (solid green)
  - This is the indication that the power switch is on and the power supply is in a power on delay mode
  - No change in the IMD
- When power-on delay is up, unit turns on
  - Top Power Supply LED will momentarily flash yellow then both LEDs should stay green, Top power supply LED ON (solid green) and bottom LED on (solid green)
  - Power-On LED comes ON (on the front of the unit)
  - IMD resets and then starts initialization sequence (refer to Appendix more details on the IMD initialization sequence)

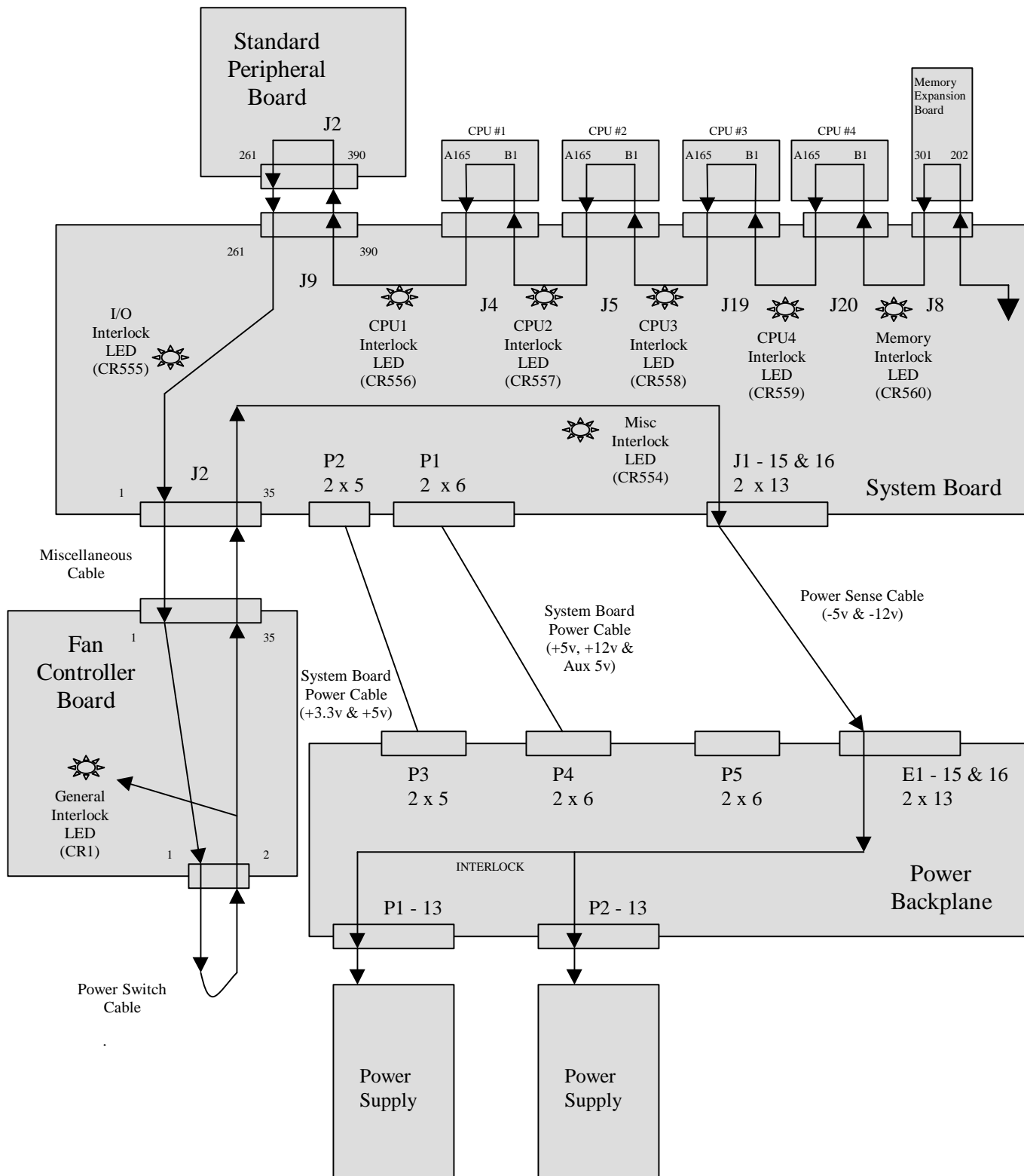
- All the fans begin spinning, (a green LED on each of the fan assemblies should turn on)
- After a few seconds, the fan controller will turn off the redundant fans (ones closest to the front of the unit, 1 for each zone). Note that a turned off fan may still spin due to the air being forced through it by the other fans. Typically the redundant fans being turned off is most notable by the change in sound.
  - The green LED for each of the fans should remain ON (even the fans turned off by the fan controller)
  - Only if there is a fan failure should the green LED turn OFF and the red LED turn ON
  - The IMD will continue to display the initialization sequence progress

**IMD (Integrated Management Display) or the LCD**

- 1) The IMD is off (dark) unless AC power is applied to the power supply and the +5v AUX is on.
- 2) When it comes up, it displays:
  - COMPAQ LCD
  - MODEL # 56022
  - LCD FIRMWARE 1.9
- 3) When AC power is first applied and it comes up, the buttons have no effect on the display. The system will have to be powered up first.
- 4) When the system is powered on, the IMD will start its initialization sequence. The LCD screen will be cleared, it will display the model # and the LCD firmware revision and then the bottom line will have "MAIN MENU". The other 3 lines will begin displaying the initialization sequence:
  - System Init.
  - PCI Auto Cfg.
  - Video
  - Memory Test
  - Memory Init.
  - Floppy Drive
  - Option ROMs
  - SCSI Devices
  - F1 Prompt
- 5) A rotating line will appear by each of the above prompts to indicate that section of post is being executed. When post completes that section, the rotating line will be replaced by a check mark.
- 6) If the display is not "messed" with, when the system is powered down, the display will indicate: System Powered OFF

The above sequence is for a system with minimal hardware under normal operation.

# Appendix C: Pocono Proliant 6500 Xeon Interlock Chain Block Diagram



## **Miscellaneous Notes:**

If power cable (2 x 6, +5, +12, and Aux 5v) is not connected to SCSI backplane/fan controller board, system will power up and start booting, but it hangs after displaying Processor information. Port 84 code will be D4.