FCT SERVICE NOTE
SN06071117a

Class C Service information enclosed.

Date: July 5th, 2006

Subject: VCT Detector Routing Board Connection Inspection & Troubleshooting Details (For 2006 style Plenum)

Effectivity: VCT (7.x systems, 32 and 64 Slice)

Details: Several New VCT Installs during the 2nd and 3rd qtr of 2006 have reported, "Rail Temperature out of range". This error message 260132914 indicates the Rail / Detector is too cold.

Purpose: This document includes a new inspection procedure for new installs (Section 1), troubleshooting steps if you experience the problem (Section 2), and a functional diagram of the circuitry.

Additional Documentation: Reference Service note SN-06051009A "VCT Detector Plenum Update" for part numbers.

Wed Jun 21 14:51:53 2006 Error: 260132914
Host: orp Process: orp_subsys
File: ThermalManager.cxx Line: 2071
Wed Jun 21 14:51:52 2006
Host : Das Ermes # : 260132914
Exception Class : Secondary Severity : Sec/Soft
File : ThermalManager.cxx Line# : 2071
Function : No System Function Reported
Scan Type : None/Unknown Scan: 81/201/0

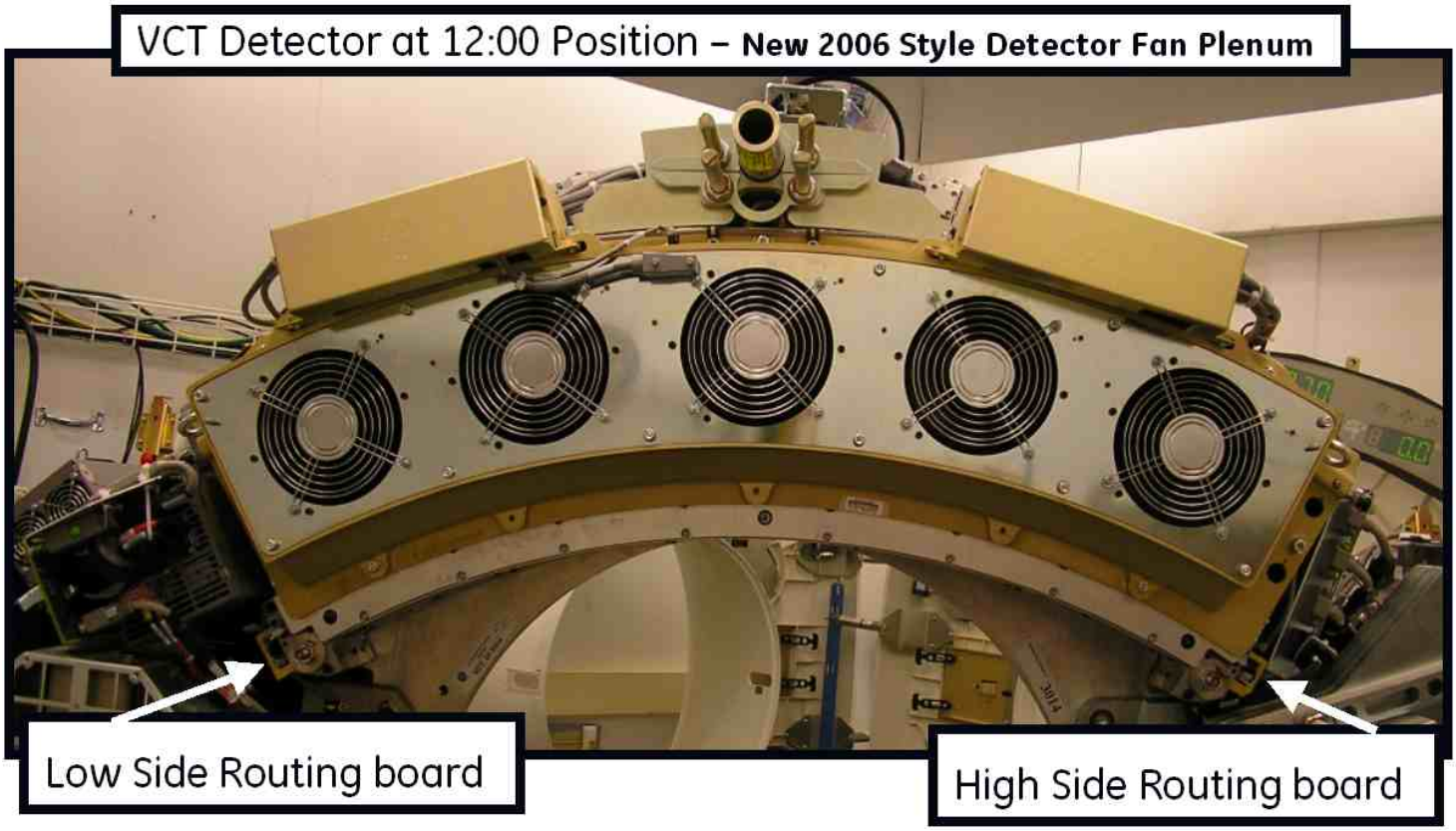
Rail Temperature Out Of Range
Sensor: Rail Low Channel
Temperature: 3640
Average A/D Temperature: 0
Limits: 3650, 3950
++
Fri Jul 7 07:36:01 2006 Error: 244653
Host: gect02 Process: fwmgr
File: fwmgr_events.c Line: 11634
Function: No system function reported
Scan Type: Not scanning Scan: 0/0/0
Scan Seq Id: 0 Host Querying Detector Temperature Status: StateFlag:2 curTemp:2900, leftTemp:2660
rightTemp:2970 Time:0

A leading cause of the above error message is a loose J2 connection at the Low or High side Detector Routing boards, see **Figure 1**. Primarily this issue is seen on the Low side Routing board but a loose connection could also be seen on the High Side Routing board J2 connection. The failure mode seen recently on installs has the J2 connection opening up which simulates the Open thermostat.

Heater Theory: The Detector Heater Design has 48-volt power routed through the two Thermostats (over temp safety switches on each side). The Thermostat should only open up when the surface temperature of the detector reaches 45

degree C. If the Thermostat circuit opens, the 48-volt power is removed from the Detector heating strips to avoid hardware damage.

Figure 1 - VCT 64 Detector Full View



Recommended Service Action:

1) **Effective until October 1st, 2006: On every install, perform a Visual inspection of the Routing Board J2 connection, following the steps detailed in Section 1.**

2) **If Trouble Shooting is required for a Cold Detector issue follow the steps detailed in Section 2.**

Section 1. Visual inspection of the J2 Routing Board connection (effective until 4th Qtr 2006):

Note: Removing the J2 connector is **NOT** recommended unless a problem is suspected. Every time the J2 connector is reinserted, the pin-to-socket connection will loosen. If the connection has to be removed always visually, inspect the pins for damage. A small tool may be used to pinch the sides of the socket together for a tighter fit.

Visually inspect the J2 connection at both the Low and High side Detector Routing boards, see **Figure 5 & 6** for J2 locations. Primarily this issue is seen on the Low side Routing board (48v Power Supply side) but a loose connection could also be seen on the High Side Routing board (ORP side) J2 connection.

Visual Checks:

1) Check to make sure the J2 connector is physically latched into place, see **Figure 2, 3, 4, 5 & 6** for details.
2) Check for any connector discoloration, a yellow/brown color could indicate a problem, the use of a small mirror may be helpful. See figure 7 for example of discoloration.

Figure 2 - Low Channel J2 Connector

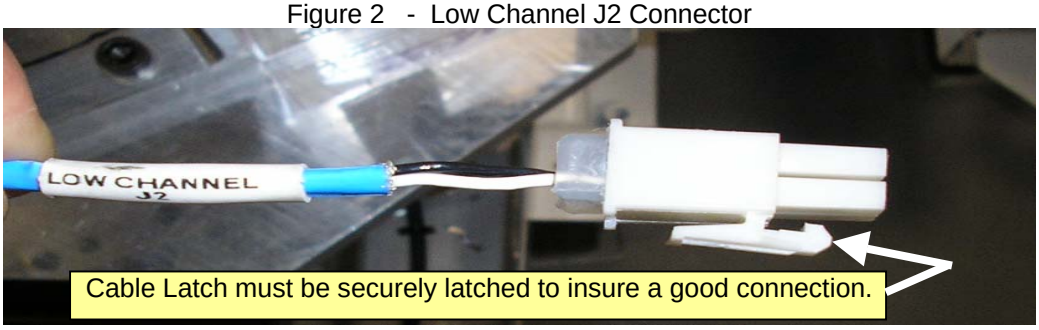


Figure 3 J2 Latched in Place

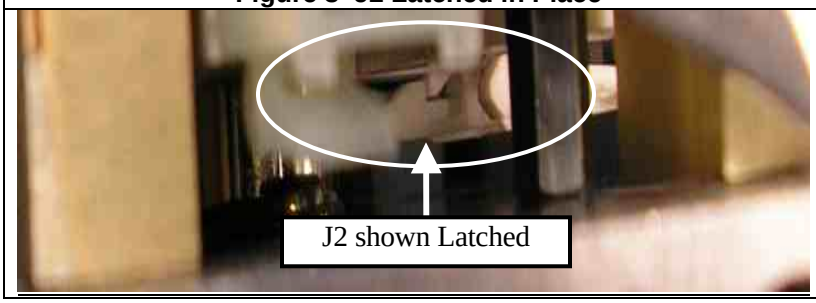
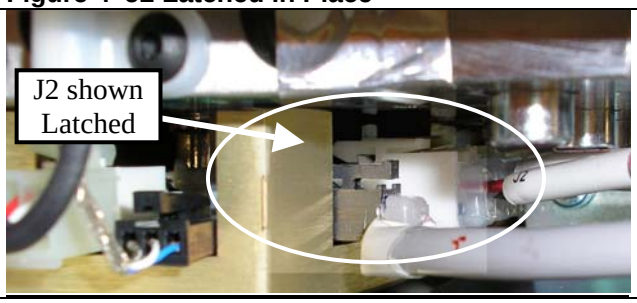


Figure 4 J2 Latched in Place



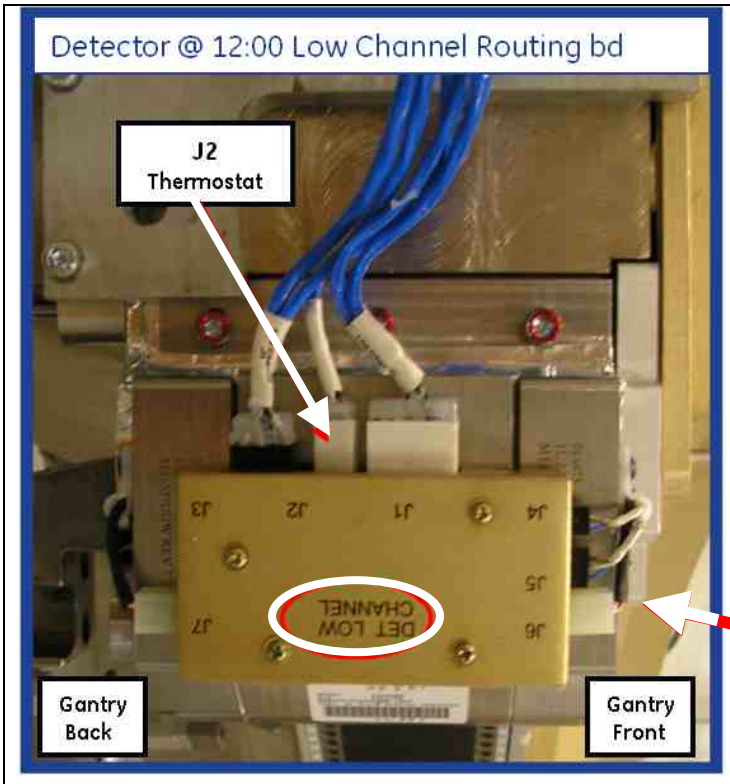


Figure 5 - LOW CHANNEL SIDE

LINE OF SIGHT TO J2

Using a flash light verify the Molex connector Latch is in place. The Latch is shown in Figure 2 – Mate-n-Lok Molex Connector.

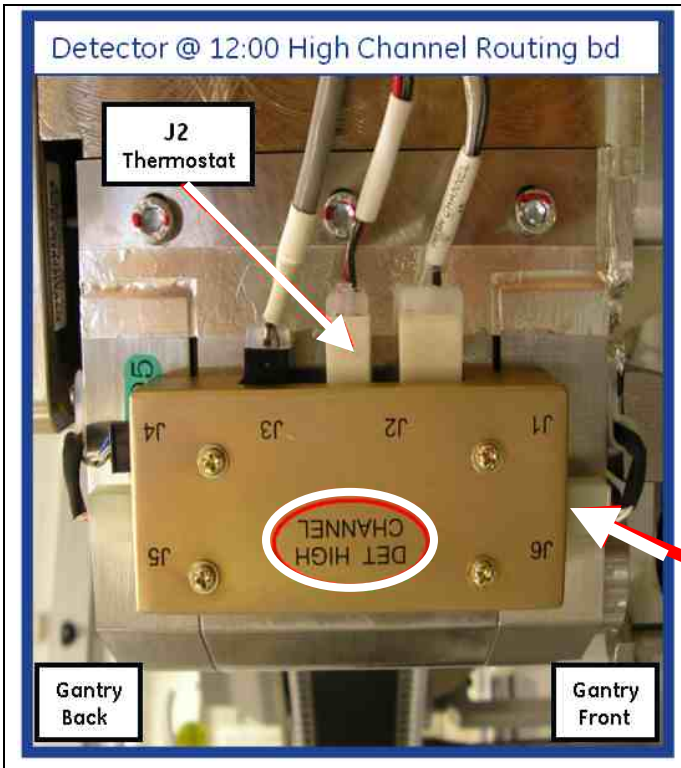


Figure 6 - HIGH CHANNEL SIDE

LINE OF SIGHT TO J2

Using a flash light you can verify the Molex connector Latch is in place. The Latch is shown in Figure 2 – Mate-n-Lok Molex connector.

Detector Temperature Out of Range -Trouble Shooting Steps:

Detector Thermostat Heater Theory: The Detector Heater Design is to have all 48 volt power routed through the two Thermostat (over temp sensors one on each side). The Thermostat should only open up when the surface temperature of the detector is 45 degree C. If the Thermostat circuit opens up the 48 volt power is safely removed from the Detector heating strips. The failure mode seen recently on installs has the J2 connection opening up which simulates the Open thermostat.

How to Trouble Shoot: the following two errors “Rail Temperature Out Of Range Error: 260132914 or “Host Querying Detector Temperature Status Error: 244653”

1) Turn off power to gantry
2) Pull DHC (Detector Heater Control) board connector J1 and measure between pins 1 and 14. This should measure a short (approximately Zero ohms) for the Low Channel Routing board. A higher resistance indicates potential arcing has occurred.
3) Measure DHC J1 between pins 4 and 17. This should also measure a short (approximately Zero ohms) for the High Channel Routing board. A higher resistance indicates potential arcing has occurred.

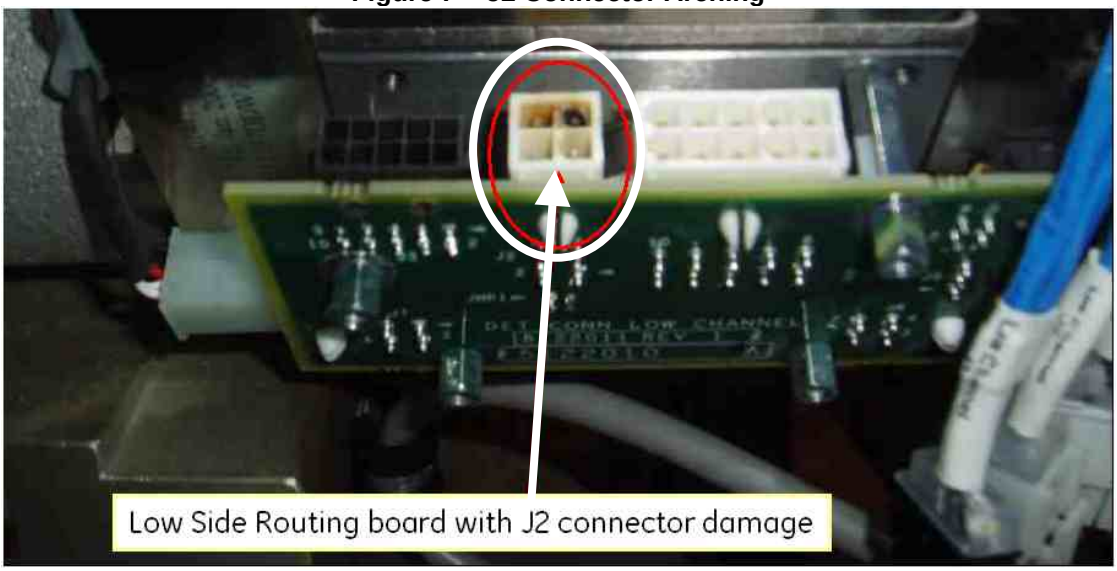
If a High resistance is measured, check the J2 connection on the routing board showing a high resistance. See Figure 7 for example of connector damage. If this is seen replace the Routing Harness and Routing board, see service note SN-06051009A for part numbers.

Verification Step: Monitor the detector rail temperature from a Unix shell. Do not run this Command (vdasTool) during patient scanning because it may abort the scan.

/usr/g/GEfirm
vdasTool
> 81 (Detector Temp)
> 1
>20 (timing between readings in seconds)

Watch the last three sets of numbers (i.e. 320031993201) 3200, 3199, 3201
When the system is working correctly, the Detector Rail Temperature will increase and report to the screen every 20 seconds until the Detector reaches approximately 3800 (38 degree C).

Figure 7 - J2 Connector Arching



The VCT Detector Heater Control (2006 Style) drawing has been included in this Service Note as a reference. See the next page.

Steve Merritt
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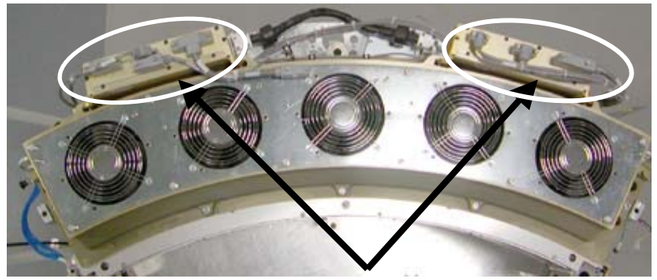
VCT Detector Heater Control (2006 Style)



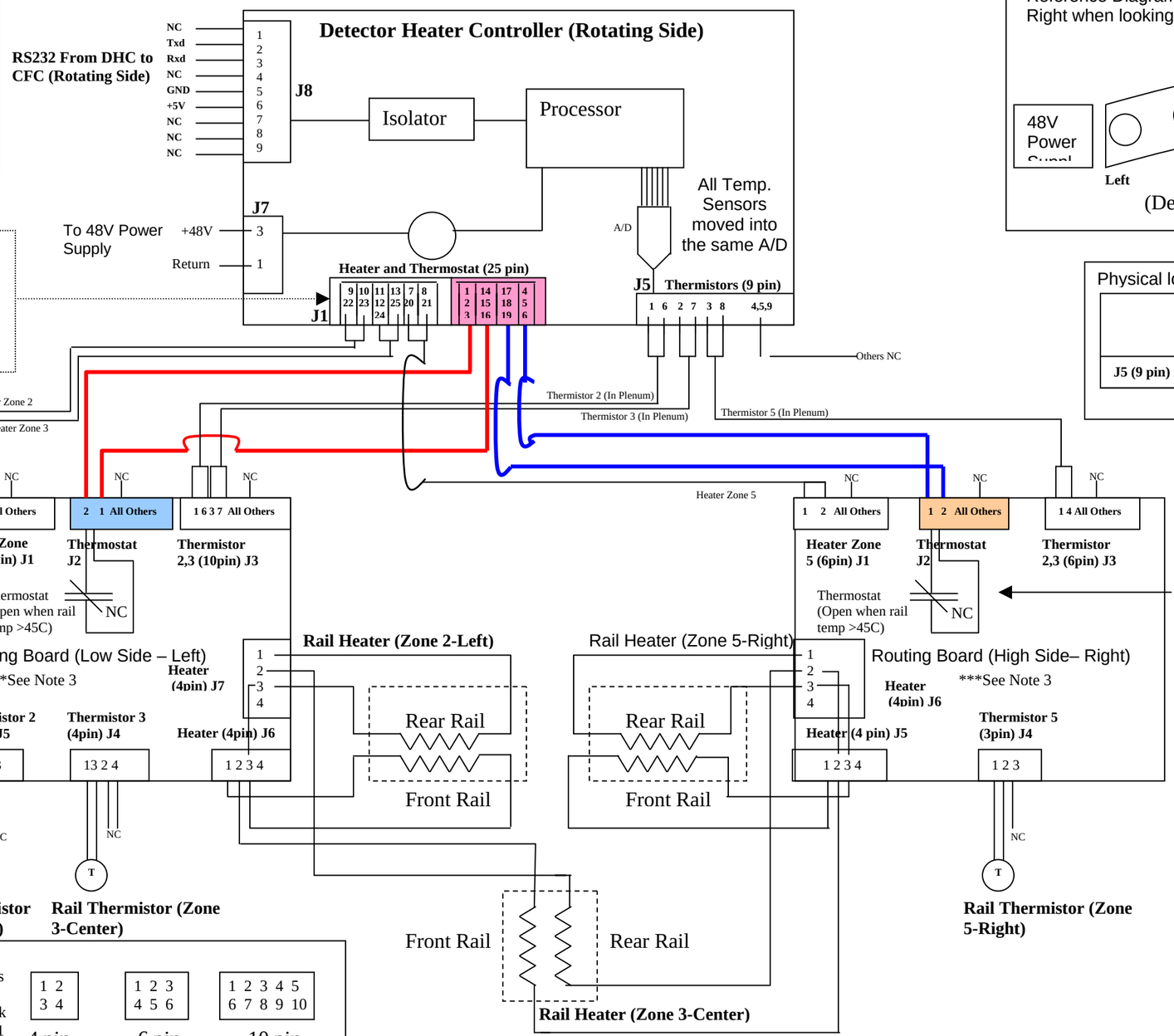
2006 Style: Sub-D connector style for all CFC and DHC cables

Rail Heater Resistances:

Low side left routing board (input side):
J1 Pin 1,3 is 50-62 ohm (DHC J1 Pins 9,10)
J1 Pin 2,4 is 20-24 ohm (DHC J1 Pins 11,13)
Low side left routing board (Output side):
J7 Pin 1,3 is about 27 ohm (Left Rear)
J6 Pin 1,3 is about 27 ohm (Left Front)
J7 Pin 2 to J6 Pin 2 is 20-24 ohm (Center)
Must have high side board connected to read center zones.

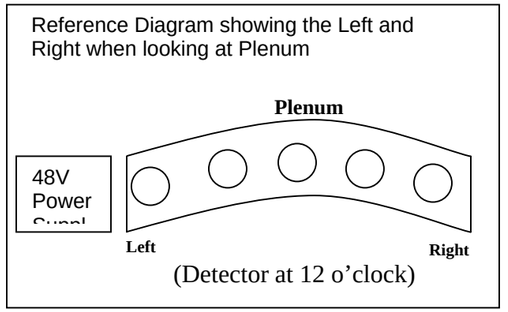
High side right routing board (input side):
J1 Pin 1,2 is 50-62 ohm (DHC J1 Pins 7,8)
High side right routing board (output side):
J6 Pin 1,3 is about 27 ohm (Right Rear)
J5 Pin 1,3 is about 27 ohm (Right Front)

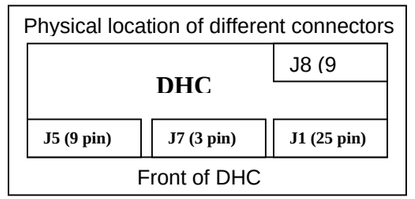
Note 1:
Multiple Connector pins grouped on the board and cable connector for higher current capacity through the connector.



Note 2:
Thermostat is part of the routing board assembly. Thermostat is used as an over temperature switch.

Note 4:
Thermostat is part of the routing board assembly. Thermostat is used as an over temperature switch.





***Note 3 Routing Board Connectors**
Connector Pinout examples for 4, 6, and 10 pin connectors on Routing boards.
NOTE: The pin labeling on the routing board for the black connectors is wrong. Use this diagram for reference. Pin 1 is correct on the board, the rest of the pins follow this order.