Bringing Up A New ICS Installation
Troubleshooting Guide

For new systems that have been bench tested at the factory, but do not work at the job site, use the following steps to verify proper installation and make the system operational. These steps are listed in the order that they should be checked.

I. POWER & POWER SUPPLY BOARD #408103

The Power Supply board requires connection to potentials called "Constant 12 Volts DC", "Organ Rectifier Positive", "Common Negative" (which serves as both Constant & Rectifier negatives), and to power switch contacts which must be closed to turn on and run the system. Optional connections include: the crescendo shoe (via a modular connector), analog to digital converter (A/D) inputs, up to six (6) DC control outputs, and MIDI I/O cables via standard "DIN" type recepticals. See section V. for normal operation of the LED indicators.

A. Verify Constant 12V on the Power Supply board's power connector (located between the maintenance switch and MIDI Connectors).
   1. If a Peterson Console AC Control System (CACC) is used, verify that the Power Supply board's Constant 12 Volts DC terminal is properly and securely connected to the CACC's terminal #9 and the Common Negative terminal marked "Neg/Com" is connected to the CACC's terminal #7.
   2. If a Class II DC transformer is used for the constant voltage, verify that it is in an unswitched outlet.

B. Verify that the maintenance switch is "on" (slid away from the power connector).

C. Make sure the switch terminals labeled "SW1" & "SW2" (2 pins of the power connector, closest to the MIDI connectors) are shorted/closed via an external switch or jumper.

D. Be sure the "DC Out 1" terminal is on as indicated by the LED closest to crescendo shoe jack being illuminated.
   1. If not, remove the wire from this terminal and cycle the power to see if it comes back, which would indicate that the UDN2987 driver IC had been shut down due to an overload on the pin.
      a. If the LED comes back on now, see if the pin is connected to an Ethernet Intercept (part number 408126) and determine the total number of Ethernet hubs connected. If there are more than 3 hubs connected, it is too great a load. Wire the Ethernet Intercept spares to Organ Rectifier Positive and Negative instead of this switch output.
   2. If a CACC is used, verify proper and secure connection to the CACC terminals #6 and #8.
   3. If a cube relay or other method is used to close the switch contacts, verify its connection/operation.

E. Verify that the organ rectifier is within the range of 11-18VDC and does not have excessive ripple. Measure ripple using a multi-meter set to AC. If the DC voltage minus the ripple (AC) voltage is 9V or less, the ripple is excessive. If there are separate organ rectifiers in the console and chambers, be sure to verify all of them.

F. Verify that hubs are powered by Ethernet Intercept boards or by Class II transformers plugged into switched outlets only. That will allow hubs to be automatically reset after any powerline interruption.

II. CPU BOARD #408101

This is the system's main processing board. It requires the system's Power Supply board to be on (providing 5V & 12V). The /CS0 program jumper must be in the position closest to the edge of the board. The CDU, Floppy Drive, Ethernet and RS-232 connections are all optional. This board will work without any of these. However, the Ethernet connection is required to play the organ and operate the combination action. The CDU permits visual feedback and changing of levels, menus, etc. See section V. for normal operation of the LED indicators. If the CPU board is suspected to be defective, check the following:

A. Are any of the LEDs on the CPU board illuminated?
   1. If not, be sure the CPU board and Power Supply board are fully plugged into the back plane.
   2. Review Section I. Power.

B. Is the green "Status" LED illuminated?
   1. If not, is the red "Error" LED on?
      a. If yes, is there an error message on the CDU?
         1. If yes, write down the entire error message and contact the Peterson factory for assistance. There are two types of error messages:
            a. Fatal Error. There will be a string of 64 numbers and letters covering 4 lines.

b. System Error. There will be 2 numbers on the 2nd and 3rd lines and the software sub-system name on the fourth line.

2. If the green "Status" LED is on, do the LEDs next to the CDU cable blink periodically (once per second)?
   a. If yes, go to Section III.
3. If the Ethernet cable is plugged in, is there a green LED on constantly next to it?
   a. If not, go to Section VI.
4. Does the yellow LED next to the Ethernet cable blink with key and/or piston presses and/or with stop changes?
   a. If not, go to Section VI.

III. CDU (Control Display Unit) # 408115

The CDU is the user interface that displays system information on the vacuum flourescent display and allows control of various functions and menus using the buttons and knob. If the whole system or the CDU are reported as being dead; check the following:

A. Does the CDU display "Peterson Electro-Musical.... " when the power is first applied?
   1. If not:
      a. Verify that both ends of the CDU cable are firmly inserted.
      b. Verify whether there are any LED indicators lit on the CPU board. If not, go back to Section I. Power.
      c. Remove the CDU's back cover. Measure voltage across the large electrolytic capacitor. This voltage must be greater than 9VDC and is typically 2V less than the applicable organ rectifier voltage. If not, suspect a defective CPU board, cable or CDU assembly.

   2. If yes, does it stay on this initial "Peterson" screen rather than changing to the normal operating display ("Home Screen) after a few seconds? If yes, then check the following:
      a. Is the green "Status" LED on the CPU Board on? If not go to Section II. CPU Board.
      b. Do the LEDs next to the CDU cable on the CPU board blink periodically?
         i. If not, the CPU board may be defective.
         ii. If yes, does the LED next to the cable at the CDU blink?
            iia. If yes, then the CDU is likely to be defective.
            iib. If not, the CDU cable is likely to be defective.

B. If the CDU display goes through the "Peterson" screen, the "Builder's Marquis" screen and makes it to the "Home screen", but the knobs and buttons do not work, check the following:
   1. Is the green "Status" LED on the CPU board on?
      a. If not, go to Section II. CPU board.
      b. If yes, does the organ play and/or combination action work?
         i. If yes, continue down to #2.a & 2.b below.
         ii. If not, go to Section II. CPU board.
   2. Does the LED next to the cable at the CDU blink when the knob or buttons are activated?
      a. If not, the problem is likely a defective CDU assembly.
      b. If yes, does the LED next to the cable at the CPU board blink when the knob or buttons are activated?
         i. If not, the problem is likely the CDU cable.
         ii. If yes, the problem is likely the CPU board (particularly the line driver or DUART circuits).
            a. Check the IC chip marked "U20". Is it an XR68C192 with a "BC" in the lower left corner or a SCN68681? If so, contact the factory for a replacement with different manufacturer's part numbers.

IV. SATELLITE MICRO BOARD #408110 (and address switches)

A. Verify the proper and secure connection of organ rectifier power to the end screw terminals of each Satellite Card Cage.

B. Verify proper operation of the 'Common' LED indicators in Section V., subsection E.

1. If the LEDs do not operate properly, verify 5VDC on the Satellite Micro board by measuring positive on the top left pin of the "BDM" 6 pin connector marked "J3" and with the negative on the top (negative side) of the large gray electrolytic capacitor.

2. Verify the state of the ‘reset’ line by measuring positive at the center pin marked "RST" of the connector labeled "JP1" and with the negative on the top (negative side) of the large gray electrolytic capacitor. The reading should be approximately +5VDC.

C. Verify that each cage's Satellite Micro address switch (DIP switch group) is set to its assigned address per the supplied wiring chart.
1. Be sure none are set all off.
2. Be sure none are duplicated.

V. CAGE/ BOARD LED INDICATOR PATTERNS

A. Ethernet (yellow & green LEDs next to the data cable on Satellite Micro boards and the Main CPU board)
1. Green - On continuously.
2. Yellow - Off but blinks on with any change.

B. Input Boards (LEDs on Satellite Micro board in line with any Input boards)
1. Green - On continuously.
2. Yellow - Off continuously.

C. Stop Action Controller Boards (LEDs on Satellite Micro board in line with SAC board)
1. Green - On continuously.
2. Yellow - On continuously.

D. Standard and Hi Current Driver boards (LEDs on Satellite Micro board in line with Output boards)
1. Green - Off but blinks on when any change activity applies to ANY driver board in that cage.
2. Yellow - Off but blinks on when any change activity applies to ANY driver board in that cage.

E. Satellite Cage Common (opposite end of data cable)
1. Red
a. Original satellite boards - On solid.
b. Later satellite boards - Off, except if fuse is open, then on solid.
c. Latest satellite boards - Blinks on power up, then off, except if fuse is open, then on solid.
2. Yellow - Normally on, indicates processor running.

F. Power Supply Board
1. Green - Constant - On when both the constant supply and organ rectifier voltages are present.
2. Yellow - Switched Organ - On when the constant supply voltage is present and On/Off switch is closed.
3. Red - Alarm - Indicates fault or operation by timer (not implemented at this time).
4. Yellow - Rectifier Control Output 1 - On when #2 is on.
5-9. Yellow - DC Control Outputs 2-6 - Software assigned controls.
10. Yellow - MIDI In - Blinks with changed data if MIDI is on.
11. Yellow - MIDI Seq Out - Blinks with changed data if MIDI is on.
12. Yellow - MIDI Instr. Out - Blinks with changed data if MIDI is on.

G. CPU Board
1. Red - Error - Normally off.
2. Green - Status - Normally on.
3. Yellow - Future use.
4. Green - CDU Rx Data - Blinks when data is received.
5. Green - CDU Tx Data - Blinks when data is sent.
6. Red - Test- Future use.
7. Yellow - Floppy Changed Data - Not used with USB systems.
8. Green - Floppy Rx Data - Not used with USB systems.
9. Green - Floppy Tx Data - Not used with USB systems.
10. Yellow - Ethernet Link - Blinks when data is sent/received.
11. Green - Ethernet LAN - On when connected to a hub or Satellite Micro.

VI. DATA CABLES/ ETHERNET SWITCHES (Hubs)/ SWITCH (Hub) INDICATORS

A. Cables
1. If a cable tester is available, test any suspect cables.
2. Were any of the cables terminated by the customer? If so, verify the color code order and/ or try re-terminating.

B. Ethernet Switch (or hub)
1. Verify that the hub’s Class II transformer is plugged into a switched outlet or that it gets its power from a

Peterson Ethernet Intercept board # 408126.

a. If powered from an Ethernet Intercept board, verify that ~9VDC is present on the power terminals to the switch or hub.

b. If powered from a Class II transformer, verify that there's ~9VDC present at the DC plug.

2. Try swapping with another hub.

C. Switch (Hub) Indicators

1. There is typically one indicator per port. These will be off when no cables are attached.

2. On units that have a cable connected, the indicator should be on continuously when there is no data changing. If not:

a. Be sure the cable is connected at both ends.

b. Try plugging into another port.

c. Try temporarily plugging the other end of the cable into a different Satellite Cage.

d. If an Ethernet Intercept board is in line, try bypassing that board.

3. When data is changing (keying activity, etc.), these indicators should blink off momentarily. If not:

a. Try activating inputs from various boards/cages (keys, piston, stops).

b. Try swapping Satellite Micro boards (be sure to change their address switches).