DCC/DCE Printed Circuit Board Replacement

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1 Intent & Scope

This document describes the procedures for replacing circuit boards in a DCC or DCE. The circuit boards in a DCC or DCE include;

PCC – Process Control Card (1)

MCC – Master Control Card (0 or 1)

SCC – Station Control Card (0, 1 or 2)

PCI – Peripheral Card Interface (0 or 1)

This document describes procedures for replacing SCC1, SCC2, MCC and PCI circuit boards, as well as the power supply, front panel, fans and battery.

2 Description

The number of optional configurations for DCCs and DCEs may make it impractical to maintain readily available complete spare replacement units for each DCC or DCE that is in a facility. In cases where a DCC or DCE circuit board is damaged (for example due to lightening strikes) the on site technical support personnel can save down time and the expense of shipping units back to the factory by replacing a damaged board with a good one. This document describes the procedures that should be followed in replacing these boards.

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WARNING

Circuit board components are highly susceptible to damage from static electricity. When removing or installing circuit boards in a DCC or DCE ideally you should wear a grounding strap and carry your work out on a grounded conductive pad. In handling the circuit boards if possible only the board edges should be touched.

ALTERNATE PRECAUTIONS

If a grounding system is not available you can leave the power supply connected but turned off, this will maintain a grounding connection to the case. When an individual touches the case any static electric build up will be discharged. Periodically touch the case while you are working. Reuse the static bag to store the replaced parts and try if possible to handle pc boards by the board edges only.

3 Tools required

The following tools are required to replace or add curcuit boards in a DCC or DCE:

1/4" nut driver (or 1/4"socket)

3/16" nut driver (or 3/16" socket)

#1 Phillips screwdriver

Robertson #1 (preferable) or 3/16" slotted screwdriver (If you are removing the power supply you will require a short handled screwdriver)

Robertson #0 (to remove black insulator from Quad connector on MCC board)

Blue locktite #242

4 Replacement Procedures

4.1 Removing the Top Cover

Before any curcuit boards can be added or replaced it is necessary to remove the top cover.

4.1.1 Remove the eight thumbscrews holding the two fan filters in place, then remove the fan filters to expose the recessed flat head black Phillips screws. When reassembling the fan filters the corrugated ribs face outwards and align vertically on the front plate.

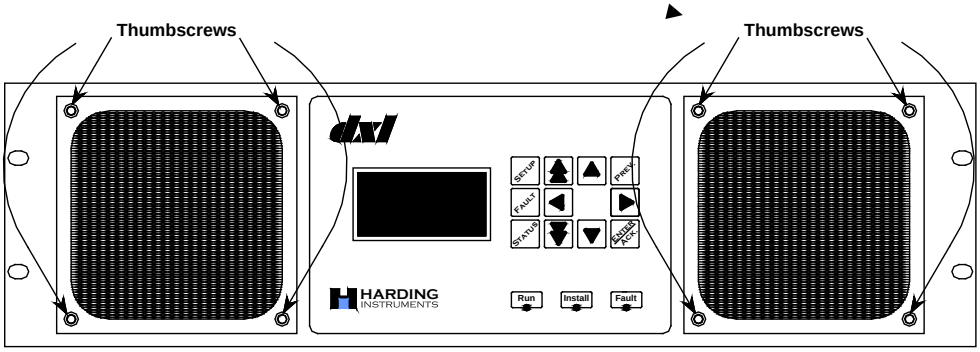


Figure 1 Fan Filters and Eight Thumbscrews

4.1.2 Using a #1 Phillips screwdriver remove the eight #6-32 x 1/4″ recessed flat head black Phillips screws that attach the top cover to the front plate (4 along the top and two on each side).

4.1.3 Using a #1 Roberson or a 3/16″ flat screwdriver remove the ten #6-32 x 1/4″ Robertson slot screws with #6 internal tooth washers from the sides of the enclosure (5 screws on each side, 3 along the bottom and 2 at the back). See Figure 2.

4.1.4 Slide the top cover back and lift it off the unit.

4.1.5 After replacing curcuit boards you will need to replace the top cover, just reverse the steps outlined above.

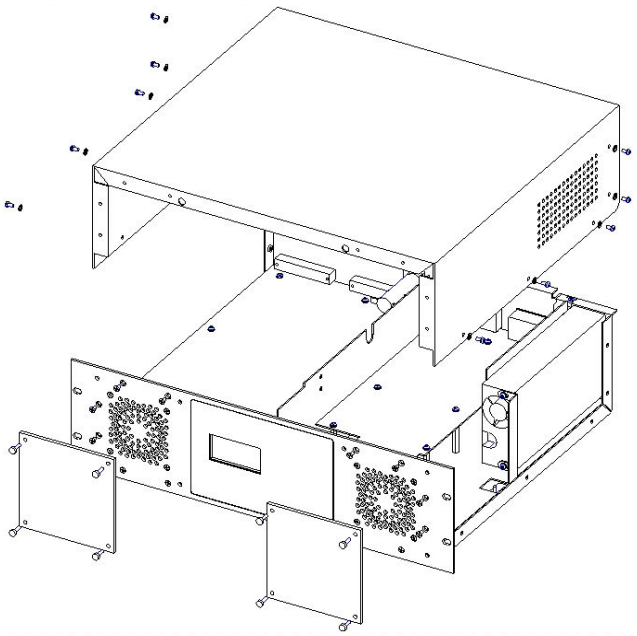


Figure 2 Removing the Top Cover

4.2 Removing/Replacing the top SCC (SCC2)

If the DCC or DCE contains two SCCs the top SCC (SCC2) is mounted on M-F standoffs that hold the bottom SCC (SCC1) in place. If the unit contains only one SCC these standoffs will not be present and SCC1 will be held in place using #6-32 1/4" Robertson slot screws.

4.2.1 Remove the top cover following the steps outlined in Section 4.1.

4.2.2 Using a #1 Phillips or a 3/16" flat screwdriver disconnect the green ground wire at the SCC by removing the #6-32 x 1/4" Phillip slot screw and internal lock washer from the bracket on the pc board.

4.2.3 Disconnect the power connector to the SCC board (connector CN 10 for an SCC 400 and CN 7 for an SCC 300).

4.2.4 Unplug the ribbon cable that runs from the middle connector on the PCC (CN 41) to the SCC at the PCC board. Then feed the cable through the slot in the divider plate.

4.2.5 Using the 3/16" nutdriver emove the two #4-40 female screw locks holding the DB-37 connector to the back plate. (An SCC-300 has two additional #4-40 female screw locks for the DB-25 connector that need to be removed.) When replacing the screw locks you should apply blue locktite. (See Figure 3)

4.2.6 Remove the six 6-32 x 1/4" Robertson slot screws and #6 internal toothed washers on the circuit board that attach the board to the six standoffs.

4.2.7 The board should now be free, slide it foreward to clear the DB connector cutouts, tilt the outside edge of the board up and remove it from the unit.

4.2.8 If present, remove the 1.5" length of plastic grommet strip along the curcuit board edge, and place the strip in the same location on the replacement board i.e. centered at the power connector.

4.2.9 To install the replacement SCC2 reverse the order of carrying out the above steps starting at step 4.2.7.

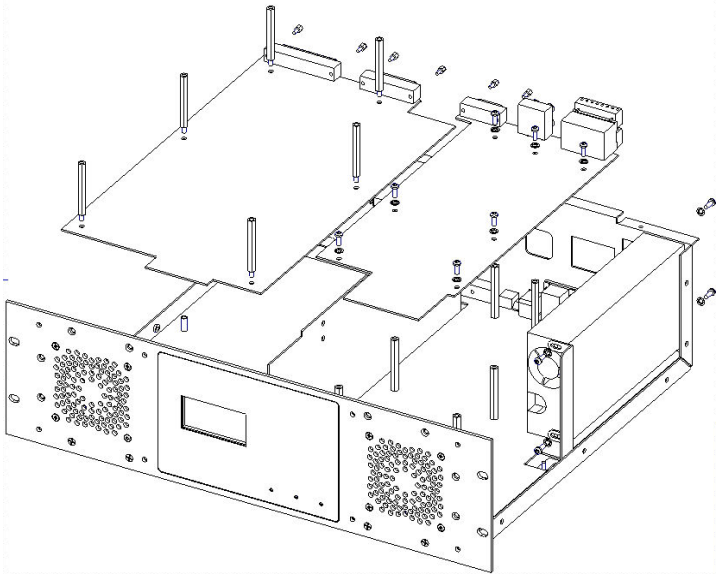


Figure 3 View showing standoffs on PCC and SCC1

The following partial diagram of the PCC (Process Contol Card) shows the location of the connectors on the curcuit board.

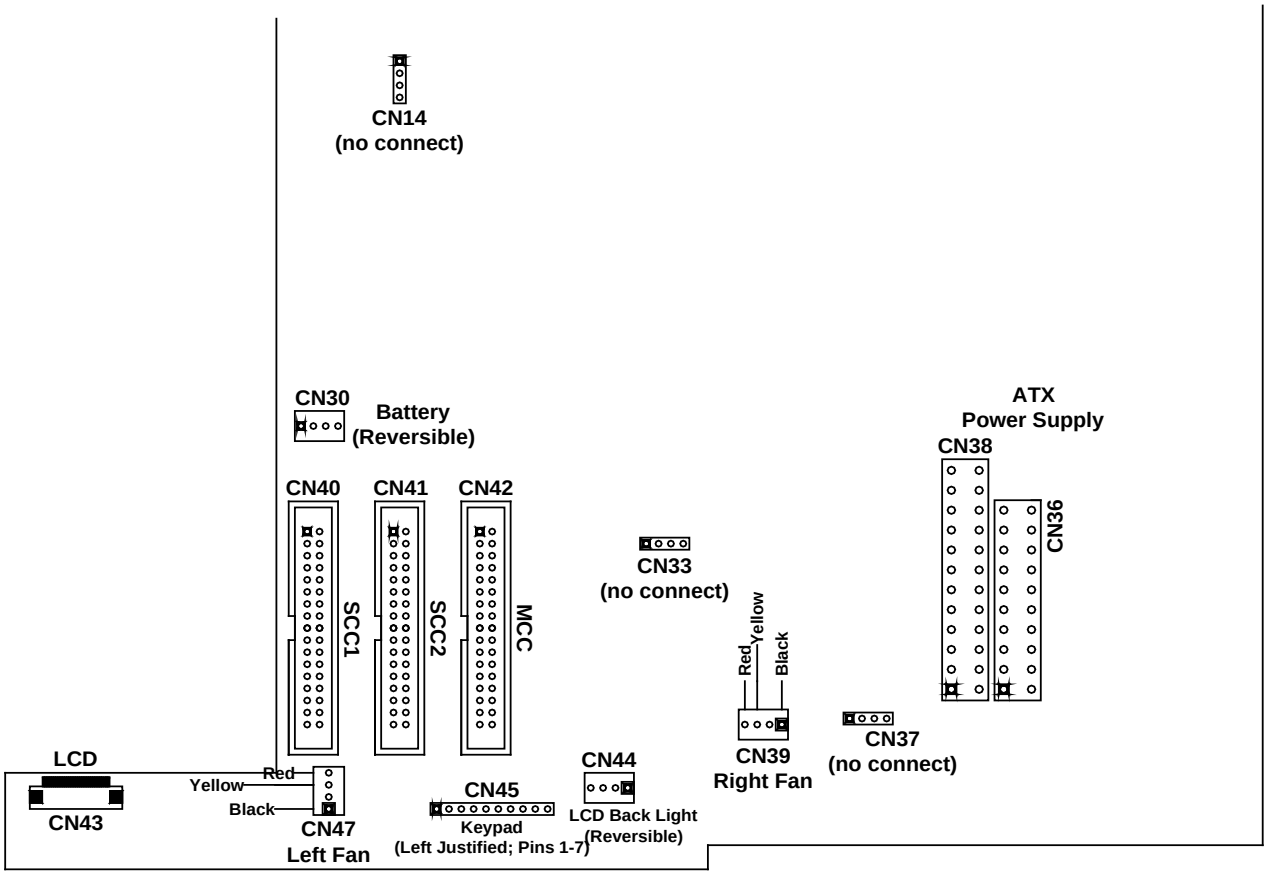


Figure 4 View showing connector locations on the PCC

4.3 Removing/Replacing the bottom SCC (SCC1)

If the bottom SCC needs to be replaced the top SCC must be removed first, just follow the directions outlined in Section 4.2 to remove the top SCC. If there is only one SCC it will be located in the bottom position.

4.3.1 Using a 1/4″ nut driver remove the six #6-32 2″ M-F standoffs. (If the unit has only one SCC card then the M-F standoffs will have been replaced with #6-32 x 1/4" Robertson slot screws and #6 internal toothed washers.)

4.3.2 Using a #1 Phillips or a 3/16″ flat screwdriver disconnect the green ground wire at the SCC by removing the #6-32 x 1/4″ Phillips slot screw and internal lock washer from the bracket on the pc board.

4.3.3 Disconnect the power connector to the SCC board (connector CN 10 for an SCC 400 and CN 7 for an SCC 300).

4.3.4 Unplug the ribbon connector that runs from the left connector (CN 40) on the PCC (when viewed from the front of the DCC) to SCC1 at the PCC board and feed the cable through the slot in the divider plate.

4.3.5 Using a 3/16″ nut driver remove the two #4-40 female screw locks holding the 37-pin DB connector to the back plate. (An SCC-300 has two additional #4-40 female screw locks for the DB-25 connector that needs to be removed.). When replacing the screw locks you should apply blue locktite.

4.3.6 The board should now be free, slide it forward to clear the DB connector cutouts, tilt the outside edge of the board up and remove it from the unit.

4.3.7 To install the replacement SCC1 reverse the order of carrying out the above steps starting at 4.3.6.

4.4 Removing/Replacing the MCC

The MCC is the top pc board on the right hand side of the unit (when viewing from the front).

4.4.1 Remove the top cover following the directions given in Section 4.1.

4.4.2 Using a #1 Roberson or a 3/16" flat screwdriver disconnect the green ground wire at the MCC by removing the #6-32 x 1/4" Phillips slot screw and internal tooth washer from the bracket on the pc board.

4.4.3 Unplug the power connector at the MCC board (CN 5).

4.4.4 Unplug the ribbon connector that runs from CN 42 the right connector (when viewed from the front) on the PCC to the MCC.

4.4.5 Using a 3/16" nut driver remove the two #4-40 female screw locks holding the DB-15 connector to the back plate. When replacing the screw locks you should apply blue locktite.

4.4.6 Unplug the depluggable terminals from the status input/output connector blocks.

4.4.7 Using a #1 Robertson or a 3/16" flat screwdriver remove the seven #6-32 x 1/4" Robertson slot screws and the seven #6 internal tooth washers on the pc board that attach the pc board to the seven standoffs.

4.4.8 The board should now be free, slide it forward to clear the DB connector cutouts lift the front of the card up to clear the power wiring and remove it from the unit.

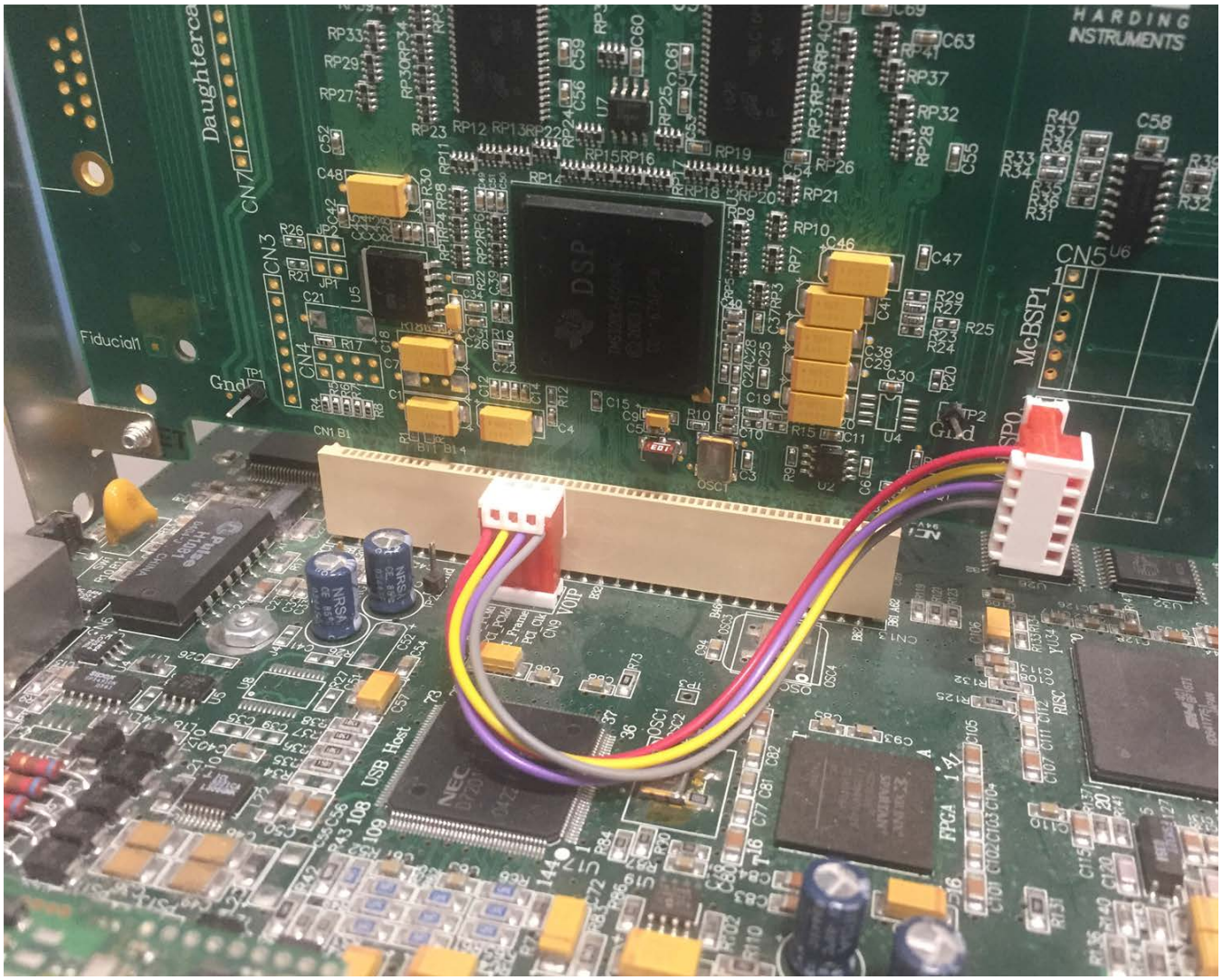
4.4.9 Use a #0 Robertson screw driver to remove the black insulator from the Quad phono jack connector on the MCC. (It is only necessary to remove and reuse this insulator if you are replacing the MCC board.)

4.4.10 Reverse the above steps to install a replacement MCC.

4.5 Removing/Replacing the PCI Card

4.5.1 Remove the top cover following the directions given in Section 4.1.

4.5.2 A 4-wire cable connects the PCI card to CN9 on the PCC Card. Unplug the MTA 1X4 connector on this cable from CN9 on the PCC Card. When replacing the PCI card plug the MTA 1X4 connector into CN9 with pin 4 of the connector (Red Wire) connected to pin 1 of CN9. The photograph below shows the proper orientation of the cable,



4.5.3 Using a #1 Roberson or a 3/16" flat screwdriver remove the #6-32 x 1/4" Robertson slot screw holding the stainless steel strap to the back of the case.

4.5.4 The board should now be free to lift up and remove.

4.5.5 Reverse the above steps to install a replacement PCI Card.

4.5.6 Replace the top cover following the directions outlined in Section 4.2

4.6 Removing/Replacing the Front Panel

4.6.1 Remove the top cover following the directions given in Section 4.1.

4.6.2 Remove the four black head Phillips screws attaching the front plate to the base plate.

4.6.3 Disconnect the LCD cable from the PCC. To disconnect the LCD cable prop the front of the base plate up with a 2 inch block to give the cable more freedom of movement. At the connector slide the locking tab foreword (toward the front of the unit) and then slide the cable forward to free the connector. When reconnecting the cable pull the locking tab foreward to ensure the connector is open, then slide the cable end into the connector then push the locking tab back until it clicks into place.

4.6.4 Disconnect the two fan connectors (CN47 and CN39), the keypad connector (CN45) and the Back Light connector (CN44). Note that when reconnecting the front plate the 7 pin Keypad cable should be left justified when connected to CN45. (See Figure 4)

4.6.5 To reconnect the front plate (or install a new one) just reverse the previous four steps.

4.7 Removing/Replacing the Power Supply

4.7.1 Remove the top cover following direction outlined in Section 4.1

4.7.2 Remove the SCC 2 following directions outline in Section 4.2.

4.7.3 Disconnect the power supply connectors on SCC 1, MCC and on the PCC board.

4.7.4 Using a #1 Roberson or a 3/16″ flat screwdriver remove the two #6-32″ x 1/4″ Robertson slot screws holding the power supply to the back bracket and the two #6-32 x 1/4″ Robertson slot screws holding the power supply to the back plate.

4.7.5 Using a 1/4″ nut driver or 1/4″ socket loosen the #6-32 nut that holds the power supply bracket in place. Slide the bracket toward the front of the unit and remove the power supply.

4.7.6 To install a new power supply just reverse the previous 5 steps.

4.8 Removing/Replacing the PCC

Replacing the PCC circuit board requires that you remove all the other pc boards in the DCC, remove the front panel, remove the divider plate and the power supply.

4.8.1 Remove the top cover following the directions outlined in Section 4.1

4.8.2 Remove the SCC 2 curcuit board following the directions outlined in Section 4.2

4.8.3 Remove the SCC1 circuit board following the directions outline in Section 4.3

4.8.4 Remove the MCC circuit board following the directions outlined in Section 4.4

4.8.5 Using a #1 Phillips or a 3/16″ flat screwdriver disconnect the green ground wire at the PCC by removing the #6-32 x 1/4″ Phillips slot screw and internal lock washer from the bracket on the pc board.

4.8.6 Remove any circuit board in the PCI slot following the directions given in Section 4.5.

4.8.7 Remove the front plate following the directions outlined in Section 4.6.

4.8.8 Disconnect the power supply connection to the PCC (CN 36 on the PCC circuit board) by pressing the connector lock and pulling the connector up. Remove the power supply following the directions outlined in Section 4.7.

4.8.9 Using a 1/4″ nut driver or 1/4″ socket remove the three #6-32 hex nuts and three #6 internal tooth washers holding the divider plate in place. Remove the divider plate.

4.8.10 Using a 3/16″ nut driver remove the four (six if the PCC supports copper CEPT trunk)) #4-40 female screw locks holding the two (three) DB-9 connectors to the back plate. (A copper digital audio trunk will have a DB-9 connector, while a fiber digital audio trunk will have two ST connectors.) When replacing the screw locks you should apply blue locktite.

4.8.11 Using a 1/4″ nut driver or 1/4″ socket remove the seven #6-32-2″ MF standoffs holding the PCC board in place. For assemblies without an MCC the standoffs will have been replaced with seven #6-32″ x 1/4″ Robertson slot screws.

4.8.12 Using a #1 Roberson or a 3/16″ flat screwdriver remove the six (thirteen if the DCC or DCE has no MCC card) #6-32″ x 1/4″ Robertson slot screws and six (thirteen) #6 internal tooth washers holding the PCC board in place. When installing the replacement PCC do not initially tighten the screws until the front plate is installed, make sure the LEDS align properly with the front plate before tightening the screws.

4.8.13 The PCC board should now be free, slide it back and remove it from the base plate.

4.8.14 Reverse the above steps to install a PCC.

4.9 Removing/Replacing Fans

The units contain two fans that are attached to the front plate. If a fan is not working properly it should be replaced.

4.9.1 Remove the top cover following the directions outlined in Section 4.1

4.9.2 Disconnect the fan cable connector at the PCC (CN 39 for right fan and CN 47 for the left fan).

4.9.3 Using a #1 Phillips screwdriver remove the four black self-tapping Phillips screws that attach the fan to the front plate.

4.9.4 To reinstall a fan reverse the order of the above steps

4.10 Testing and Replacing Backup Battery

The Alkaline AA backup battery should be replaced every year.

4.10.1 To remove the battery use a slotted screw driver to turn the battery cap holder 90 degrees until it is in a horizontal position.

4.10.2 The battery should be inserted with the positive terminal facing outward i.e. the cap should make contact with the positive terminal of the battery. Press the screw cap in and turn the holder cap 90 degrees to a vertical position.

4.11 Cleaning the Fan Filters

The two fan filters should be cleaned on a regular basis (once every three months). If the units are in a dusty environment the fans should be cleaned more often.

4.11.1 Use the four thumbscrews to remove a fan filter. You can use an air hose or reversed vacuum cleaner to blow out from the back side of the filter any dust that has accumulated. If the deposits are sticky you should wash the filter in warm soapy water and let it dry thoroughly before reinstalling.

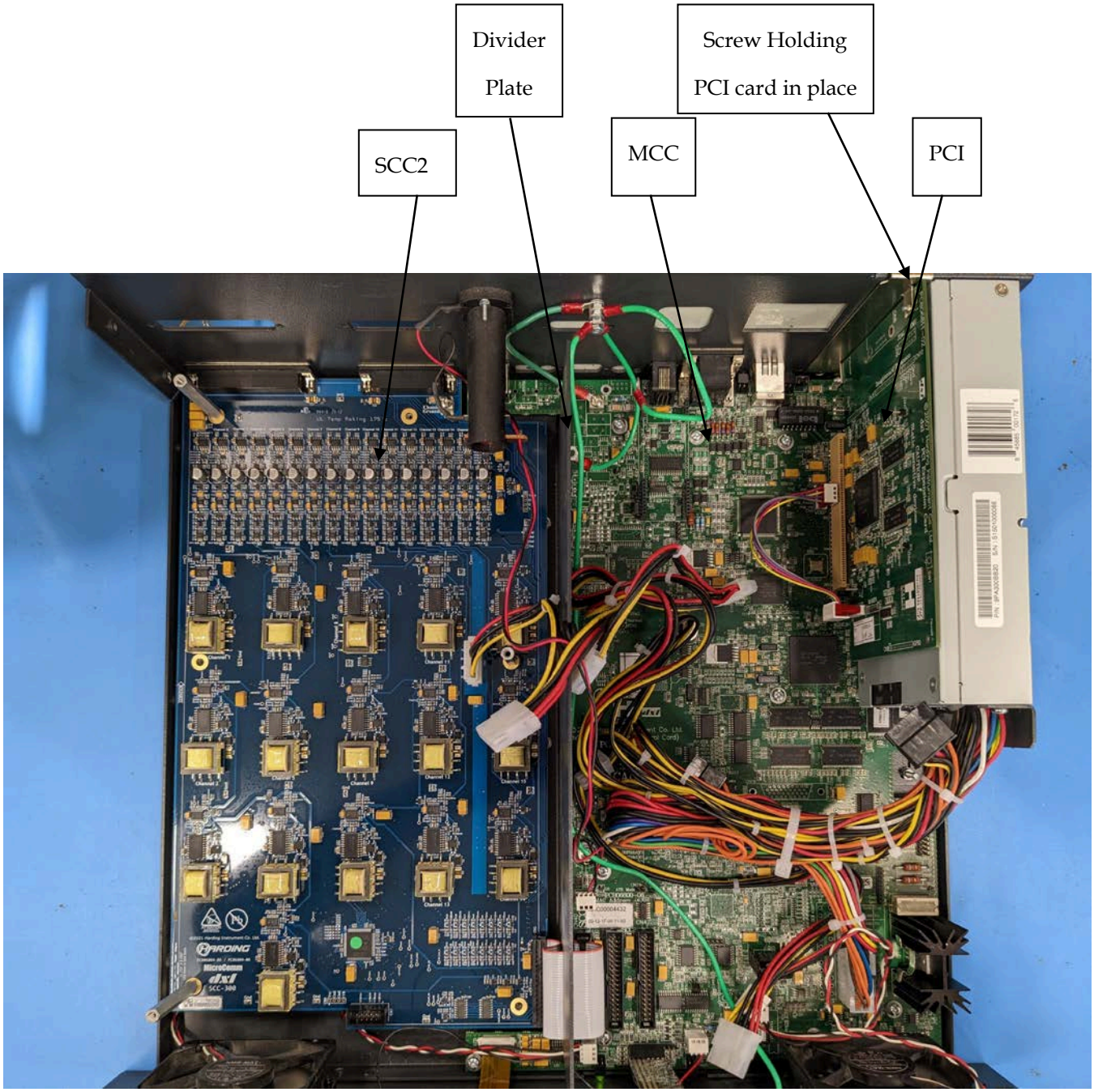


Figure 5 Top view of DCC