Service Bulletin

Title:	**Four-Channel Amp Turn-on Instability**
Bulletin #:	PLC0005 Issue Date: March 30, 2001
Models Affected:	Four-channel CX & DCA Bulletin Revision: A
Production Range:	04/1998–02/2001 (serial # 0498xxxxx–0201xxxxx)

Description

Some four-channel CX and DCA amplifiers produced between April 1998 (initial production) and February 2001 have exhibited random instability problems on one or more channels when they are turned on.

The instability problems are rooted in two circuits:

- The bridge-mono feed signal, controlled by PNP transistors Q36 (for Channels 1 and 2) and Q436 (for Channels 3 and 4), sometimes generates high-frequency oscillation through the op amps when bridged mono mode is selected.
- The high impedances around the gain stage of the op amps (U2:1, U6:1, U402:1, and U406:1) sometimes cause one or more of the operational transconductance amplifiers (in the LM13600 IC) to oscillate when the clip limiter function is on.

Only amplifiers with date code prefixes (the first four digits of the serial number) within the range of 0498 through 0201 are affected. Amplifiers outside this range are not affected.

Symptoms

The instabilities may randomly appear on one or more channels that are in bridged mono and/or have their clip limiters enabled after the amplifier comes out of turn-on muting. An affected channel will hang up, and it will also draw more current, causing its heatsink to get warm. Its clip and signal LEDs will light, even if there is no signal at the input.

Instructions

Tools and materials required:

- Soldering iron with fine tip (recommended range 25 to 60 W)
- Rosin-core solder (60/40 or 63/37 eutectic type), 0.015" or 0.4 mm dia.
- Long-nose pliers
- #1 and #2 Phillips screwdrivers
- Small diagonal cutters
- Desoldering equipment or solder braid
- General-purpose tweezers
- Ohmmeter

Parts kit:

- Two 68 pF 100V capacitors (QSC part number CA-068001-10)
- Four 0.0027 µF 100V SMT 0805 type capacitors (QSC part number CA-227001-30)

Figure 1. Removing the display board.

Procedure: disassembly

1. Disconnect the amplifier from AC and wait at least 10 minutes for internal voltages to bleed down. Turn the amplifier upside down and remove the chassis's bottom cover.
2. The area where you will install the new components is under the ribbon cable to the display board. Removing the display board from the front panel will give you more room to work in.

   The display board, which holds the LEDs and gain controls, is attached to the front panel with three Phillips screws. Remove the screws and detach the board from the front panel (see Figure 1). Lay the board back upon the input module to keep the ribbon cable out of the way (see Figure 2).
3. Locate SMT resistors R19, R127, R419, and R527 (see Figure 3). On top of and in parallel with each resistor, install a 0.0027 µF capacitor.

   Install each capacitor by melting a small amount of extra solder onto one end of its resistor. Hold the capacitor with

tweezers and stack it on top of the resistor, setting one end into the melted solder. Hold the capacitor in place as you take the soldering iron away. Once the solder hardens, solder the resistor and capacitor together at the other end, too. After that solder junction hardens, touch up the first solder junction if it needs it. Don't use too much solder, or else you might create bridges or short circuits.

Use an ohmmeter to check your work. The resistance across each capacitor should be 100Ω.

4. The two 68 pF capacitors will each install into a pair of vias (through-holes). Locate the vias shown in Figure 3. Trim the capacitor leads so they are long enough to span between the vias but short enough to not short-circuit to the chassis underneath.

   Insert and solder the capacitors in the vias. Figure 4 shows the finished job.

5. Reinstall the display board.

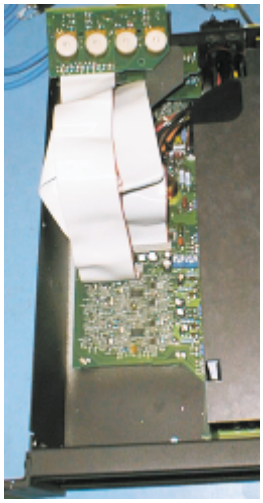

Figure 2. Moving the display board and ribbon cable out of the way.

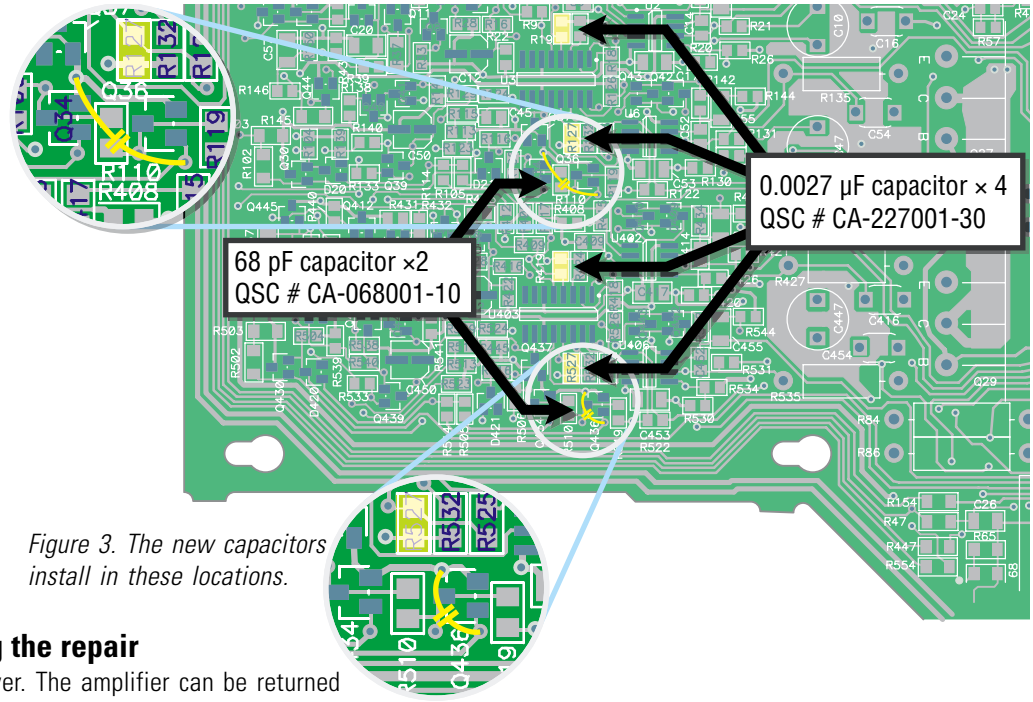

Figure 3. The new capacitors install in these locations.

Procedure: Finishing the repair

1. Re-install the top cover. The amplifier can be returned to use.

Contact information

If you need any further information regarding this service procedure, please contact QSC Technical Services at the addresses or numbers below.

Telephone:
1-800-772-2834 (within USA only)
+1 714-957-7150

Fax:
+1 714-754-6173

E-mail:
tech_support@qscaudio.com

Web site:
www.qscaudio.com (product info/support)
www.qscstore.com (on-line accessory and replacement component sales)

Postal and parcel address:
QSC Audio Products, Inc.
Technical Services Group
1665 MacArthur Blvd.
Costa Mesa, CA 92626 USA

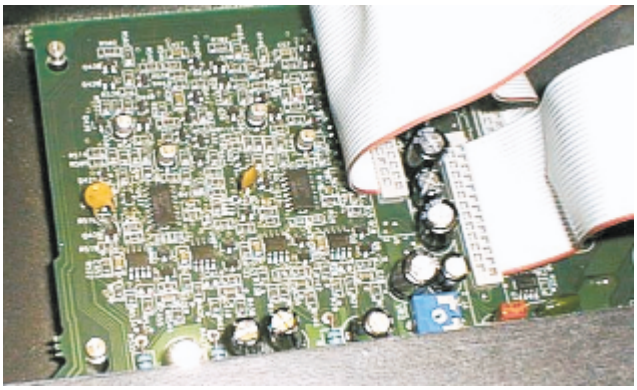

Figure 4. The main circuit board with the new capacitors installed.