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Title: DSP Series Microcontroller Update
Bulletin #: DSP0006 Issue Date: June 24, 2003
Models Affected: DSP-3, DSP-30, DSP-4 Bulletin Revision: A
Production Range: 05/2001 through 06/2003 (serial# 0501xxxxx-0603xxxxx)

Description

Philips Semiconductors, maker of the microcontroller used in QSC DSP products, issued an errata on April 17, 2002 describing a problem with the 87LPC762 microcontroller. The problem occurs with microcontroller revisions B and E when pin 4 of the microcontroller is used as an external reset input. The Philips 87LPC762 has been used in the DSP-3, DSP-30 and DSP-4 in this way. If the internal timing is slightly off during reset, the device is not guaranteed to reset correctly. This problem has been corrected by a microcontroller code update which implements the internal reset function of the microcontroller.

Symptoms

The DSP unit will reset intermittently. This can be detected by an audio dropout or a temporary offline status displayed by Signal Manager or QSControl on a PC connected to the DSP unit. In some cases an audible popping can be heard through the speakers (see the DSP0007 service bulletin at http://www.qscaudio.com/support/technical_support/bulletins.htm).

Instructions

The 87LPC762 microcontroller is a one time programmable (OTP) device and therefore to correct the problem, it must be replaced.

Tools and materials required:

- #1 and #2 Philips screwdrivers
- 1/4" wrench
- Desoldering equipment or solder braid
- DIP IC removal tool
- Pre-programmed Philips Semiconductors 87LPC762 microcontroller (see Table 1)
- Soldering iron with fine tip and rosin-core solder (60/40 or 63/37 eutectic type)
- Small box with compartments for storing hardware during update

Test equipment required:

- Personal computer (PC) running Signal Manager software (available at www.qscaudio.com)
- RS-232 serial cable
- External power supply or QSC DataPort amplifier capable of supplying power for DSP-3 or DSP-4; power cord for DSP-30

CAUTION: Take appropriate antistatic precautions to guard against electrostatic discharge (ESD).

Procedure: Opening the DSP-3

1. If the DSP-3 is powered by an amplifier, first turn the amplifier off; then disconnect the DSP-3. Note that hot swapping or disconnecting the DSP-3 while the amplifier is on could cause a fuse inside the amplifier to blow. If the DSP-3 is powered remotely, unplug the external power. Disconnect all inputs and outputs and wait 10 minutes for internal voltages to bleed down.
2. On the back of the DSP-3, remove the four screws securing the cover.
3. Remove the four screws securing the board assembly to the chassis. Gently pull the two boards out of the chassis and pull them apart at the connector.
4. Continue to Step 5.

DSP Model	QSC part number for microcontroller
DSP-3	PD-000061-00
DSP-30	PD-000068-00
DSP-4	PD-000071-00

Table 1. DSP models and corresponding microcontroller part numbers.

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Procedure: Opening the DSP-30

1. Turn off the DSP-30 and disconnect the AC power cord. Disconnect all inputs and outputs and wait 10 minutes for internal voltages to bleed down.
2. On the top of the DSP-30, remove the twelve screws securing the cover.
3. Remove the seven screws securing the board assembly (green board) to the chassis. Also remove the eight small screws on the back, securing the XLR receptacles. Disconnect the two ribbon cables and power cable assembly and gently pull the board out of the chassis.
4. Continue to Step 5.



Figure 1. Locate the microcontroller on your specific DSP product.

Procedure: Opening the DSP-4

1. If the DSP-4 is powered by an amplifier, first turn the amplifier off; then disconnect the DSP-4. Note that hot swapping or disconnecting the DSP-4 while the amplifier is on could cause a fuse inside the amplifier to blow. If the DSP-4 is powered

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remotely, unplug the external power. Disconnect all inputs and outputs and wait 10 minutes for internal voltages to bleed down.

2. On the back of the DSP-4, remove the four screws securing the cover.
3. Remove the fourteen screws on the front of the unit. There are three different types of screws; sort accordingly. Gently pull the two boards out of the chassis. Remove the four spacers securing the two boards and pull them apart at the connector.
4. Continue to Step 5.

Procedure: Replacing the microcontroller

5. Locate the microcontroller (Figure 1). It is the only through-hole part on the DSP-3 or DSP-4 board and is located toward the middle of the DSP-30 board. The reference designator is U7.
6. Peel the label off of the microcontroller so that the markings on the chip are visible and check the very last letter of the third line. If this letter is B or E then proceed to step 7. Otherwise, no update is needed; proceed to step 9.
7. Desolder all twenty pins from the bottom side of the board and use the removal tool to lift the device from the board.
8. Install the new microcontroller labeled with the QSC part number (see Table 1) and V 1.2.3.

Procedure: Completing the update and testing

9. Reinstall the board assemblies and reattach the cover of the unit.
10. Power the DSP product and verify that the blue power LED lights.
11. Connect the straight-through RS-232 cable between the DSP and the PC.
12. Start Signal Manager and verify that the unit comes online. If Signal Manager does not show that the DSP is online in the status bar at the bottom of the window, check that the correct COM port is selected and that no other utility or software is using the same COM port.
13. Return the unit to use.

This bulletin is available for download from Service Bulletins page in the *Tech Support* section of the QSC Audio Web site:
http://www.qscaudio.com/support/technical_support/bulletins.htm

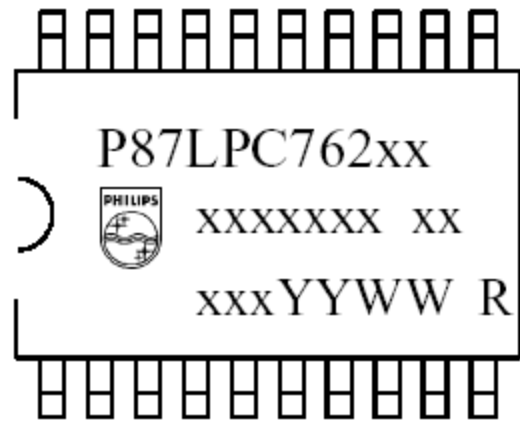


Figure 2. Top side markings of the microcontroller (SO 20 package shown). The last letter in the third line, field "R", refers to the device revision.

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 sites:	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