



FIELD ENGINEERING BULLETIN

March 27, 2002

Orban Models: 2200, 6200, 6200S, 8200, 8282, 9200

Replacing SSM2017 Op-Amps

Purpose:

Due to the elimination of the SSM2017 by its manufacturer, Orban has had to choose a replacement for this part. The currently available products are Analog Devices AD622, AD620, AMP-02, and the Burr-Brown INA111. These devices all line up pin-for-pin with the SSM2017, and have substantially the same specifications of the SSM2017. However, because of slightly different operating characteristics, it is necessary to change some resistors on the circuit board associated with the device.

It is recommended that on stereo units, both channels be retrofitted with this kit, even if only one channel has undergone a failure. This will insure that the gain structure of the two channels will be essentially similar.

Units Affected:

OPTIMOD-AM Model 9200; OPTIMOD-FM Models 8200 and 2200; OPTIMOD-TV Model 8282; and OPTIMOD Model 6200 and 6200S.

PLEASE NOTE: Installation of the following modifications can affect the ability of the units to function correctly under reduced input level conditions. Inputs below -10 dBu may result in insufficient levels for correct operation of the processor.

If the unit must be operated with a reduced input level, some form of external amplification may be necessary in order to provide sufficient input level to the OPTIMOD for it to function correctly.

Before you begin: Please read these instructions fully. It is assumed that the reader is experienced in standard printed circuit board and surface-mount component repair techniques. If you do not feel comfortable performing the retrofit, either arrange for the replacement to be done locally by an experienced service person, or contact Orban Customer Service for further information. Keep this bulletin with your manual for future reference.

Replacement Kit, Orban Part # 24030.300.01

NOTE: You will need one kit for each IC you are replacing.

Contents:

Quantity 1 Op-Amp consisting of one of the following; Analog Devices AD622, AD620, AMP-02, or Burr-Brown INA111 (all are Orban Part # 24030.000.01)

Quantity 1 Resistor, Surface mount (for 9200), 174 ohm (Orban Part # 20122.174.01)

Quantity 1 Resistor, ¼ watt, metal film 1% (for 2200, 6200, 6200S, 8200, and 8282), 174 ohm (color code brown-violet-yellow-black-brown, Orban Part # 20040.174.01)

Quantity 1 Resistor, ¼ watt, metal film 1% (for 2200, 6200, 6200S, 8200, and 8282), 220 ohm (color code red-red-black-black-brown, Orban Part # 20040.220.01)

Quantity 1 Instructions, this Field Engineering Bulletin, Orban Part # 95384.000.01

Tools Required:

Phillips Screwdriver, #1 blade

Fine-tip, medium wattage soldering iron, tip temperature at least 700 degrees.

(for 9200, two soldering irons are recommended)

Rosin-core electrical solder, 20-22 gauge

Close-work magnifying lens

Small pair of needle-nose pliers

Solder removal tool, either vacuum-pneumatic, or wick-type absorbent

Anti-static wrist strap (for safety grounding)

Small pair of wire-cutters

Important!

Perform the installation under static control conditions. Simply walking across a rug can generate a static charge of 20,000 volts. This is the spark or shock you may have felt when touching a doorknob or some other conductive item. A much smaller static discharge is likely to completely destroy one or more of the CMOS semiconductors employed in the OPTIMOD. Static damage will not be covered under warranty.

There are many common sources of static. Most involve some type of friction between two dissimilar materials. Some examples are combing your hair, sliding across a seat cover or rolling a cart across the floor. Since the threshold of human perception for a static discharge is 3000 volts, many damaging discharges will not even be noticed.

Basic damage prevention consists of minimizing generation, discharging any accumulated static charge on your body or workstation and preventing that discharge from being sent to or through an electronic component. A static wriststrap (grounded through a protective resistor) and a static safe workbench with a conductive surface should be used. This will prevent any buildup of damaging static.

Preparing the Unit for Servicing

FOR MODELS 2200, 6200, 6200S AND 9200:

- A. Disconnect the power from the unit. Also, disconnect all audio inputs and outputs, any composite outputs, and remote interface connections.
- B. If your unit is mounted in an equipment rack, remove it from the equipment rack, and place it on an anti-static workbench.
- C. Using a small Phillips screwdriver, remove the screws that secure the top cover. Reserve these screws for reassembly. Do NOT remove the circuit board from the chassis. Skip to the “Performing the Modification” section applicable to your unit.

FOR MODELS 8200 AND 8282:

- A. Disconnect the power from the unit. Also disconnect all audio inputs and outputs, any composite outputs, and remote interface connections.
- B. Note that it is NOT necessary to remove your 8200 or 8282 from the equipment rack to perform these modifications.
- C. Using a small Phillips screwdriver, open the front panel by removing the six screws around the perimeter that hold the panel in place. Remove the analog I/O circuit board. Position the board into a secure and anti-static work area which will allow access to both sides of the board. Skip to the "Performing the Modification" section applicable to your unit.

Performing the Modification

FOR 9200:

- A. Locate the input op-amp, IC 300, and resistor R303 (see the schematic drawing on page 6-32 in the Urban 9200 Operating Manual). Note the orientation of the notch or dot on the IC.
- B. Remove the IC from its socket by lifting it upward with the needle-nose pliers. Discard this component.
- C. Using two soldering irons, place one on each side of resistor R303. Allow a few moments for the heat to melt the solder until it flows.
- D. CAREFULLY lift the soldering irons up simultaneously. The resistor should come up with the irons. Discard the old resistor.
- E. Remove the new surface-mount resistor from its package. Apply a small amount of solder onto one of the surface mount pads on the circuit board.
- F. Using the needle-nose, hold the new surface mount resistor in place on the circuit board against the small amount of solder on the pad. Heat the solder until it flows, and allow the end of the resistor to penetrate the solder.
- G. Quickly position the resistor until it is properly lined up on the board. Remove the heat and allow the solder to harden.
- H. Solder the other side of the resistor in place.
- I. Orient the IC such that the notch (or dot) on the IC is pointing towards the rear of the card, in the same position as the IC that was removed in step B above. Insert the new IC into the socket, taking care not to bend any pins.
- J. Test your OPTIMOD by applying audio to the input and insuring it arrives at the output.
- K. Replace the top cover and secure by re-installing the screws previously removed. Your OPTIMOD is now ready to be put back into service.

FOR 8200/8282:

There are two methods of retrofitting available for the 8200 and 8282 products. One method is to remove the existing resistors on the circuit boards, and replace them with new resistors. The other method consists of tack-soldering a new resistor across each of the existing resistors on the circuit board.

In deciding which method to use, it should be remembered that removing and replacing the existing resistors, while time-consuming and more difficult, will provide a longer-lasting and more permanent modification. Both methods are discussed in this Bulletin.

For resistor replacement:

- A. Locate input IC 3 and IC 15, and their associated resistors, R226 and R205 (see the schematic drawing on page 6-64 of the Orban 8200 Owner's Manual or page 6-51 of the Orban 8282 Owner's Manual). Note the orientation of the notch or dot on the IC.
- B. Remove IC 3 and IC 15 from their sockets by lifting it upward with the needle-nose pliers. Discard these components.
- C. Remove resistors R226 and R205 by clipping the leads at the bodies of the resistors. Discard the resistor bodies.
- D. Carefully apply heat to each lead with the soldering iron on the solder side of the circuit board. Grasp the lead with the needle-nose pliers from the component side of the board. When the solder flows, gently pull the lead up and out of the board hole. **CAUTION:** do not force the lead to come loose by applying to much "pull" on the lead as you extract it. Also, do not overheat the solder side of the board by leaving the iron on too long. This runs the risk of damaging the trace on the circuit board. Once the leads are free, discard them.
- E. Remove any remaining solder by means of either the vacuum-tool method, or by wicking up the solder from the solder side of the board.
- F. Insert a 174-ohm resistor (one is provided in each kit) onto the circuit board and gently bend the leads outward on the solder side of the board. Solder the leads to the board, and then clip off any excess lead.
- G. Orient the ICs such that the notch or dot on each IC is pointing towards the front of the card, in the same orientation as the ICs that were removed in step B above. Insert a new IC into each socket, taking care not to bend any pins.
- H. Test your OPTIMOD by re-inserting the circuit board into its position in the chassis, running audio through it, and insuring that audio arrives at the outputs.
- I. Re-install the front panel by re-inserting the six screws around the perimeter. Your OPTIMOD is now ready to be put back into service.

For resistor modification:

- A. Locate input IC 3 and IC 15, and their associated resistors, R226 and R205. Note the orientation of the notch or dot on the ICs
- B. Remove IC 3 and IC 15 from their sockets by lifting them upward with the needle-nose pliers. Discard these components.
- C. Prepare the supplied 220 ohm resistors by bending the leads to form a 90° angle to the resistor's bodies. Trim the leads to approximately 3/16" (5 mm), and lightly tin them with a small amount of solder.
- D. Carefully tack-solder the 220 ohm resistor across the existing resistor R205. Be careful not to use excessive solder, or overheat either component.
- E. Perform the same operation as above for R226.
- F. Orient the ICs such that the notch on each IC is pointing towards the front of the card, in the same orientation as the ICs that were removed in step B above. Insert a new IC into each socket, taking care not to bend any pins.
- G. Test your OPTIMOD by re-inserting the circuit board into its position in the chassis, running audio through it, and insuring that audio arrives at the outputs.
- H. Re-install the front panel by re-inserting the six screws around the perimeter. Your OPTIMOD is now ready to be put back into service.

FOR 2200/6200:

As with the 8200/8282 series, there are two methods of retrofitting available for the 2200 and 6200 products. One method is to remove the existing resistors on the circuit boards, and replace them with new resistors. The other method consists of tack-soldering a new resistor across each of the existing resistors on the circuit board.

In deciding which method to use, it should be remembered that removing and replacing the existing resistors, while time-consuming and more difficult, will provide a longer-lasting and more permanent modification. Both methods are discussed in this Bulletin.

For resistor replacement:

- A. Locate input IC 300 and IC 308 (on the 2200) or IC 300 and IC 310 (on the 6200), and their associated resistors: R303 and R319 (on the 2200), or R303 and R322 (on the 6200). See page 6-39 of the Orban 2200 Operating Manual or page 6-34 of the Orban 6200 Operating Manual. Note the orientation of the notch or dot on the ICs.
- B. Remove the two ICs from their sockets by lifting them upward with the needle-nose pliers. Discard these components.
- C. Prepare the supplied 174 ohm resistors by bending the leads to form a 90° angle to the resistor's bodies. Trim the leads to approximately 1/8" (3mm), and lightly tin them with a small amount of solder.
- D. Remove each existing resistor by first applying heat to one lead and gently pulling up on the resistor with the needle-nose pliers. Repeat this process on the second lead of the resistor. Be careful not to overheat the board by leaving the iron on too long. Discard both of the removed resistors.
- E. Remove any remaining solder by means of either the vacuum-tool method, or by wicking up the solder from the board.
- F. Insert the replacement resistors into the circuit board holes. Be certain that the resistor leads are short enough that they do not contact the chassis. Carefully solder each lead onto the board. Avoid melting excess solder onto the board.
- G. Orient the ICs such that the notch or dot on each IC is pointing towards the rear panel of the unit, in the same position as the ICs that were removed in step B above. Insert a new IC into each socket, taking care not to bend any pins.
- H. Test your OPTIMOD by running audio through it, and insuring that audio arrives at the outputs.
- I. Re-install the top cover by re-inserting the screws around the perimeter. Your OPTIMOD is now ready to be put back into service.

For resistor modification:

- A. Locate input IC 300 and IC 308 (on the 2200) or IC 300 and IC 310 (on the 6200), and their associated resistors: R303 and R319 (on the 2200), or R303 and R322 (on the 6200). See page 6-39 of the Orban 2200 Operating Manual or page 6-34 of the Orban 6200 Operating Manual. Note the orientation of the notch or dot on the ICs.
- B. Remove the two ICs from their sockets by lifting them upward with the needle-nose pliers. Discard these components.
- C. Prepare the supplied 220 ohm resistors by bending the leads to form a 90° angle to the resistor's bodies. Trim the leads to approximately 3/16" (5 mm), and lightly tin them with a small amount of solder.
- D. Carefully tack-solder the 220 ohm resistors across the existing resistors. Be careful not to use excessive solder, or overheat either component.
- E. Orient the ICs such that the notch on each IC is pointing towards the rear panel of the unit, in the same position as the ICs that were removed in step B above. Insert a new IC into each socket, taking care not to bend any pins.
- F. Test your OPTIMOD by running audio through it, and insuring that audio arrives at the outputs.
- G. Re-install the top cover by re-inserting the screws around the perimeter. Your OPTIMOD is now ready to be put back into service

