8400 HD Field Installation Instructions

Introduction

The 8400 HD ("High Definition Digital Radio") option's output is designed to feed streaming, netcasting, and digital radio channels, with particular emphasis on the iBiquity® High Definition Radio system (formerly known as "IBOC"—"In-Band On-Channel") approved for use in the United States.

The 8400 HD option consists of two circuit boards that are installed in your 8400 above the existing DSP and input/output boards. The added DSP board implements the digital-channel look-ahead limiter and other miscellaneous signal processing functions. The digital-channel input/output board adds an AES/EBU output, an AES/EBU sync input, and left and right analog outputs. The analog outputs can be configured to emit the 8400's low-latency monitor signal or to emit the signal that is processed for the HD digital channel.

When equipped with the 8400 HD module, 8400 uses its standard input (analog or digital) to provide two outputs. Each output has similar audio texture, automatically following the preset(s) that you select, but each output is optimally processed to suit the service.

Please refer to the latest 8400 User Manual for complete technical and operating details for 8400 HD.

This kit contains:

1	Installation Instructions (this document)
1	Circuit Board, 8400HD DSP (with 1 DSP chip)
1	Circuit Board, 8400HD I/O
1	Four-Connector Ribbon Cable
5	Standoffs, 4-40 x 3/16" x 1.50" (may be an assembly of 2 pcs. each)
1	CD ROM: 8400 User Manual, 8400 update- and PC Remote software

For units with serial numbers below 204225-006 (or unspecified), this kit also includes:

1	Standard DSP board (with eight DSP chips)

If your Standard DSP board needs to be updated, you will replace it with the new board and return the outdated board for credit. If no update is necessary, please return the unused DSP board for credit.

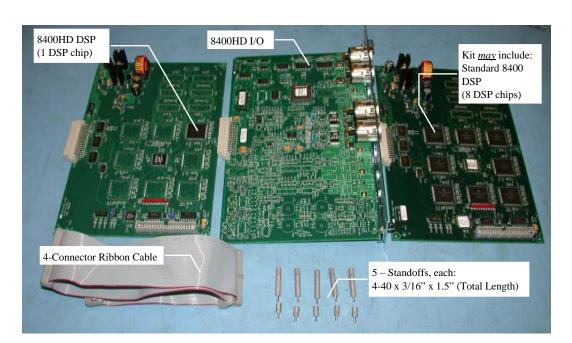*Please save all packing materials for reuse to return the DSP board.*

8400HD DSP
(1 DSP chip)

8400HD I/O

Kit _may_ include:
Standard 8400
DSP
(8 DSP chips)

4-Connector Ribbon Cable

5 – Standoffs, each:
4-40 x 3/16" x 1.5" (Total Length)

Figure 1: Kit Contents

Tools you will need:

#1 Phillips Screwdriver

3/16" Hex Nut driver (pliers will suffice)

8400 HD Field Installation Instructions

You must upgrade to 8400 software version 3.0 or higher and verify proper function before installing the new boards.

1. Install 8400 Software version 3.0 or higher

Prior to installing the new hardware, you must to update 8400 software to version 3.0 or higher to support the new HD accessory. Follow the software installation instructions included with the software updater:

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Setup8400_x-y_update.exe
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Where x-y is the version to which you are updating.

Although 8400 update software is provided on the included CD-ROM for convenience, we highly recommend using the most current 8400 software, which is always available from the Orban FTP site:

ftp.orban.com

Verify proper 8400 operation prior to continuing with installation. In the unlikely event that you encounter problems with the update, discontinue installation, and please contact Orban Technical Support:

phone:	+1 510 351-3500
fax:	+1 510 351 0500
email:	custserv@orban.com

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 OPTIMOD-FM. 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 work station and preventing that discharge from being sent to or through an electronic component. A static grounding strap (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.

2. Prepare for hardware installation

A) Disconnect power and all audio inputs and outputs, any composite outputs, and remote interface connections.

B) If your 8400 is mounted in an equipment rack, remove it from the rack and place it on an anti-static workbench.

C) Using a #1 Phillips screwdriver, remove the screws that secure the top cover. Reserve these screws for reassembly.

D) Remove the top cover, and familiarize yourself with the appearance and location of the following boards (*Figure 2*):
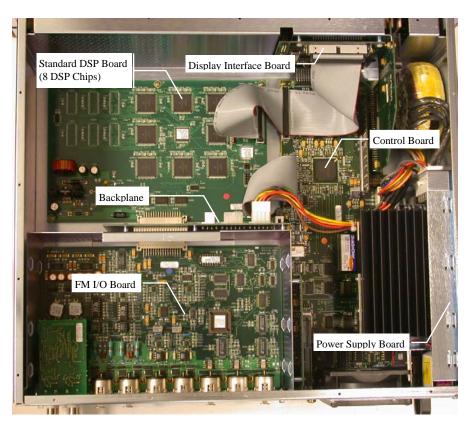

Figure 2: Circuit Board Locator

E) *Carefully* remove the Three-Connector Ribbon Cable.

Avoid bending any circuit boards when disconnecting or re-connecting the cable; it is possible to damage the fragile traces of multi-layer boards through excessive bending. If one hand is used to support the board on both sides of the connector with thumb and forefinger, the other hand can be used to wiggle the connectors apart by pulling on the ribbon cable from alternate sides of the connector until it is worked free, gently disconnecting it from the board.

We recommend disconnecting the cable in the following order:

a) Standard DSP board.

b) Display Interface board.

c) Control board.

> You will no longer need this three-connector cable since it will be replaced with the new four-connector ribbon cable included in your kit.

F) Remove the power connector from the backplane.

This multicolored cable attaches to J1 of the backplane. Make sure to release the retaining clip located on the underside of the connector as you disconnect it. Disconnecting this cable will allow more room to work during later steps.

G) Remove and reserve five Phillips-head screws from the Standard DSP board.

3. For serial numbers below 204225-006, check Standard DSP board

[Skip this step if your serial number is 204225-006 or higher.]

A) If the programming version on your Standard DSP board is 44077.100.01, you must exchange it with the supplied updated DSP board. See *Figure 3* for an example of an outdated DSP board.

> The difference between the two DSP versions is firmware programming only. There are no hardware differences between the two boards.
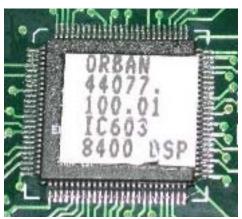

Figure 3: Standard DSP Board (outdated example shown)

B) If the programming version is 44077.300.01, your DSP board is up to date; there is no need to exchange the board. Skip to step 4 on page 7.

C) Carefully remove the outdated Standard DSP board. Reserve this board for return to Orban.

D) Carefully install the updated Standard DSP board. Verify that you are installing the DSP board with eight DSP chips in this step. Make sure that its connector fully seats into the mating connector on the Backplane. The board is installed correctly when the mounting holes of the board are aligned with the chassis mounting points.

Because the updated board is shipped with its jumpers pre-configured for installation with the HD DSP board, no change should be necessary. However, we recommend that you follow the next step to verify correct positioning.

4. Configure jumpers on Standard DSP board

A) Configure jumper J505 as shown in *Figure 4*. If pins 3-4 have a jumper link, remove it.

If you wish to keep the unused jumper link, you can safely stow the link on *one pin only* so that no connection is made to the adjacent pin.

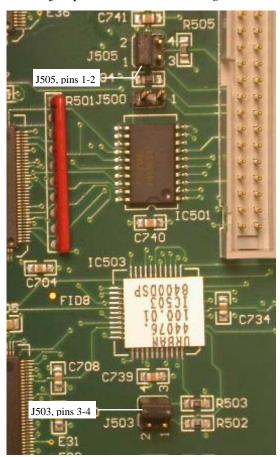B) Verify configuration of jumper J503 as shown in *Figure 4*.

Figure 4: Jumper Positions, Component Locations: Standard DSP board

5. Install standoffs

Install the five standoffs in place of the five Phillips-head screws just removed. Using either a 3/16" hex nut driver (or pliers), tighten the standoffs so that they are snug, but *do not over tighten.*

6. Attach Four-Connector Ribbon Cable to Standard DSP board

Notice that the Four-Connector Ribbon Cable has a short- and long end. The

short end of this cable will be attached to the Standard DSP board in this step only. You will complete the remaining connections later, in step 8.

> The "short end" refers to the end of the cable where the connectors are closest together.

A) Gently attach the short end of the Four-Connector Ribbon Cable to the Standard DSP board. Make sure that the red stripe of the cable is nearest to the front panel of the 8400, and the next connector on the cable has its sockets facing the DSP board (this will connect to the HD DSP board).

Avoid bending the Standard DSP board when attaching the cable: it is possible to damage the fragile traces of multi-layer boards through excessive bending. Support the back side of the board with your fingers and apply force with your thumbs in a clamp-like fashion when installing the cable connectors.

B) Do not attach any other ribbon cable connectors yet.

7. Install the new HD DSP board

A) Attach the HD DSP board to its mating connector on the Backplane. The HD DSP board mounting holes should align with the five standoffs protruding from the Standard DSP board.

B) Secure the HD DSP board to the standoffs with the five screws reserved from step (2.G) on page on page 6.

8. Complete installation of Four-Connector Ribbon Cable

A) Support the underside of the HD DSP board with one hand to prevent the board from bending while gently attaching the second connector of the Ribbon Cable to the HD DSP board (see *Figure 5*).

Figure 5: Attaching Ribbon Cable to HD DSP board

B) Attach the long end of the Ribbon Cable to its mating connector on the Display Interface board.

IMPORTANT!

⚠ ***While it is possible to attach the Ribbon Cable with its connectors in a different order, doing so may result in changing the bus length, which may cause unexpected errors. Therefore, use the connector ordering as described in these instructions.***

The Ribbon Cable connector is keyed so that the cable can only be installed one way—the red stripe of the cable is nearest to the Power Supply board.

C) Attach the remaining connector of the Ribbon Cable to its mating connector on the Control board.

This connector is also keyed so that the cable can only be installed one way. This will cause the Ribbon Cable to be twisted as shown in *Figure 6*.

Figure 6: Ribbon Cable Attached with Normal Twist

D) Reattach the multicolor power connector to connector J1 on the Backplane.

9. Install the new HD I/O board

A) Turn your 8400 so you are facing its rear panel.

B) Remove and reserve the six Phillips-head screws securing the rear-panel blank plate.

This blank plate is located above the 8400 FM I/O board. You may dispose of, or retain, this blank plate as you wish.

C) Carefully slide the 8400HD I/O board between the guide slots until the board is fully seated into its mating connector.

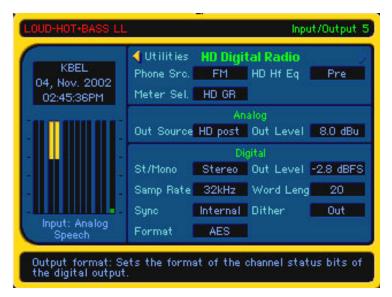D) Secure the 8400HD I/O board using the six screws reserved in step (B).

Figure 7: I/O Screen #5

10. Test the installation.

Before replacing the top cover, test the installation to verify that the 8400 is properly recognizing the new circuit boards that you just added.

A) Apply power to 8400. During the boot-up process, observe the front-panel power LED. If the LED blinks RED, immediately disconnect power from 8400. Then carefully review all steps of these instructions without skipping steps. Normal operation is indicated when the LED shows steady GREEN color.

B) Following boot-up of the 8400, navigate to Input/Output screen #5, which will look similar to the image in *Figure 7* above.

If this screen is not available, then either 8400 software Version 3.0 (or higher) has not been installed correctly or there is a problem with the upgrade. Carefully review all instructions without skipping steps. If the 8400 still does not display this screen, please contact Orban Customer Support (see below).

C) If the front panel power LED indicates normal operation and the 8400 displays I/O screen #5, you may replace your 8400's top cover using the screws reserved from step (2.C) on page 5. This concludes the hardware upgrade process.

D) Please refer to 8400 Operating Manual (available on the supplied CD ROM) for 8400 HD operating details.

11. Return DSP board to Orban.

[Skip this step if you did not receive an updated DSP board with your kit.]

The updated DSP board that you received was issued on a *Return Materials Authorization* (RMA) from Orban. To avoid being billed for the cost of this board, you must return either the unused updated Standard DSP board or your outdated Standard DSP board.

A) Using the packing materials that you received the Standard DSP board, re-pack the return DSP board.

B) Supplied with the DSP board is a pre-paid, UPS return shipping label. Please affix this label on the outside of the box for return to Orban.

C) Present the sealed package to any authorized UPS shipping agent.

Thank You!

If you experience any problems with this update process, or have any other 8400 questions, please contact Orban Customer Service:

phone: +1 510 351-3500

email: custserv@orban.com

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