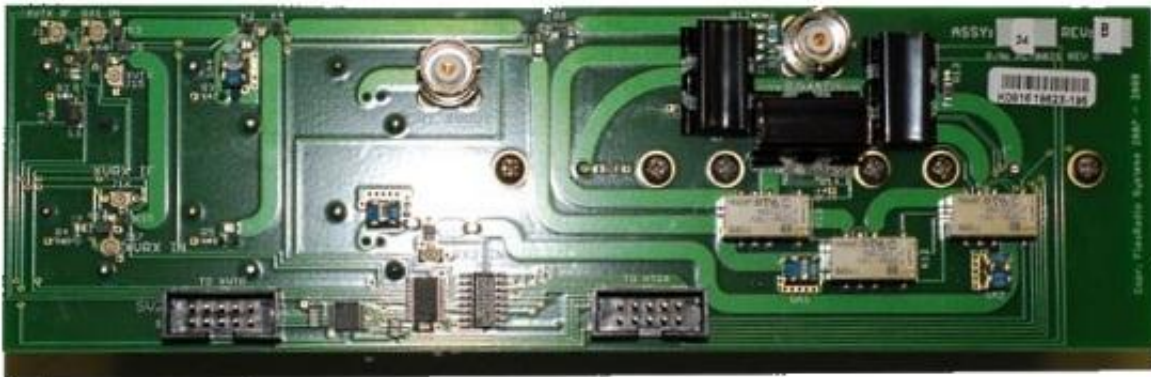


FLEX-5000A RFIO BOARD INSTALLATION INSTRUCTIONS

RFIO Board Revision 34A and above

August 15, 2011



RFIO Board Installation Guide

Congratulations on the purchase of the RFIO Board Revision 34. This upgraded RF switching matrix will allow you to fully utilize the capabilities of your FLEX-5000 with the RX2 and FLEX-VU5K module.

You will need the following materials to complete the installation:

- One (1) FLEX-5000 RFIO board (Assembly 34, Rev. B or higher)
- One (1) #1 Phillips screwdriver
- One (1) 9/16" or 14mm deep well socket or nut driver
- One (1) Small wire cutters

Required Software

The most current version of PowerSDR v2.x.x

Prerequisites for Installing the RFIO Board

The RFIO-34 board is designated as a user or field installable upgrade only if the FLEX-VU5K (V/U module) is NOT previously installed. If a FLEX-VU5K is installed in your FLEX-5000, then you must return it to an authorized FlexRadio Systems Service Center for installation. Installation charges are applicable.

Before starting, remember to observe proper ESD (electrostatic discharge) procedures before attempting the installation of the FLEX-5000 RFIO board in order to prevent damage that may occur from static charges that can build up on your body or work surfaces. This is especially a concern during the winter months or in climates where the relative humidity can be very low.

Preparing the FLEX-5000 for RFIO Board installation

Remove the FLEX-5000 from the Operating Position

- a. Turn off the Power to the FLEX-5000 and remove the power connector and all other connecting cables.
- b. Place the FLEX-5000 on a flat, well lit working surface.

Remove the Side Panels.

In addition to the instructions below, you may refer to the KB article, [How to Remove and Install the FLEX-5000A Top and Side Panels](http://kc.flex-radio.com/KnowledgebaseArticle50382.aspx) as a supplementary resource for removing the covers of the FLEX-5000A. (<http://kc.flex-radio.com/KnowledgebaseArticle50382.aspx>)

a. If you look closely at the side rails you'll notice little indentations in them. This is to allow you to remove the side panels.

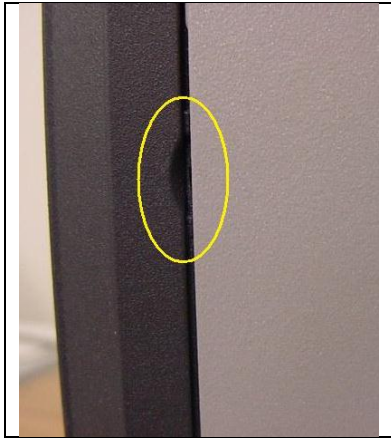


Figure 1

b. Using a flat blade screwdriver GENTLY pry the side panels off the radio.



Figure 2a

Figure 2b

c. Set them aside for later reinstallation.

Remove the Top Panel

- Using the T-20 Torx driver, remove the four (4) screws fastening the top cover to the chassis.



Figure 3

- Using your hands, place your thumbs on the dark grey side support pieces and using your fingers grip the lip of the panel and flex it out slightly, while lifting up. You may need to push down with your thumbs for added assistance. Once it 'pops' loose, do the same to the other side.



Figure 4a



Figure 4b

Installing the RFIO-34 Board in the FLEX-5000

Remove Existing RFIO Board

The RFIO board is mounted on the back panel of the FLEX-5000. It is easily identified as the small rectangular board that has the BNC and SO-239 connectors attached to it protruding through the back panel. It also has two (2) or more mini coax cables, one coax jumper (with BNC connectors) and one (1) 10-pin rectangular ribbon cable connector attached to it. The RFIO board shown below is the RFIO-27 board, which will be removed and replaced with the RFIO-34 board.

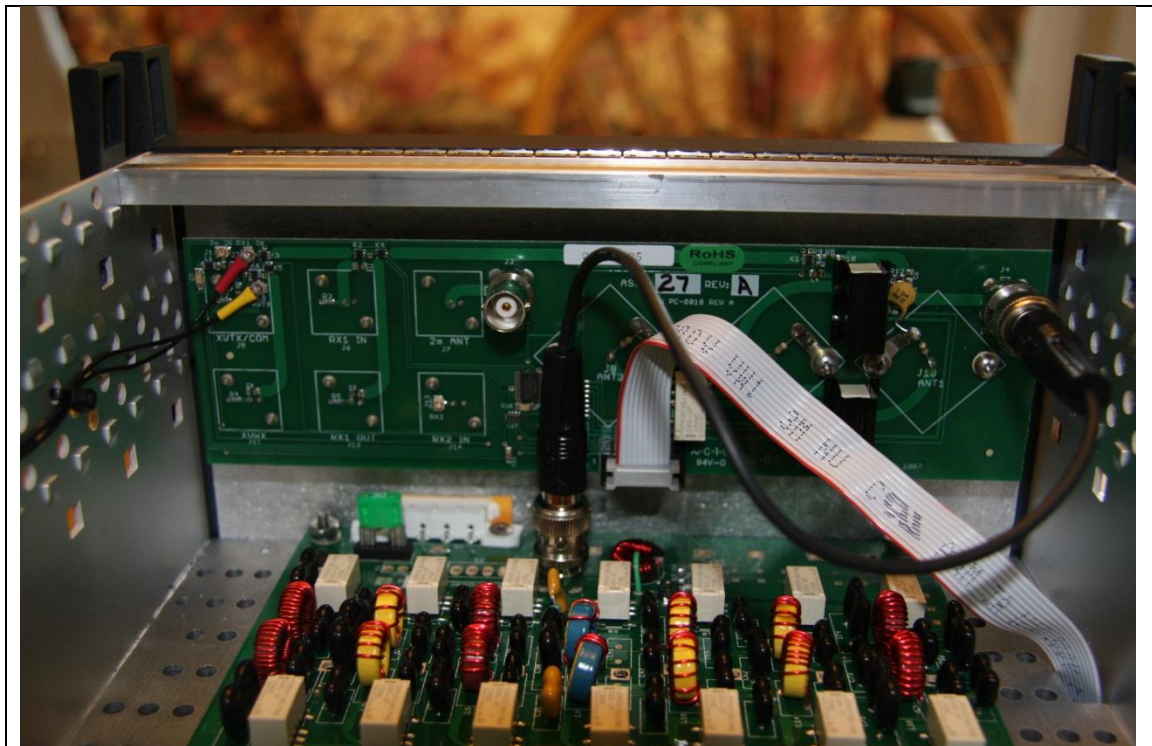


Figure 5 – RFIO-27 board shown installed.

a. Remove the coax jumper from the “PA OUT” BNC female connector on the 100 watt PA board (mounted on the aluminum heat sink) and the “PA/ATU” BNC female connector on the RFIO board. Set aside for reconnection later.

NOTE: In the picture above, the ATU is not installed. If your FLEX-5000 has the ATU installed, there are two (2) coax connections and one (1) control ribbon cable from the ATU. Disconnect all of these cables and remove the ATU before proceeding. Refer to the ATU installation guide if you have any concerns how the cables are reconnected.

b. Unplug the 10-pin rectangular ribbon cable connector from the “TO HTRX” connector on the RFIO board and set it aside out of the way.

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c. Remove the two (2) mini coax cables from the RFIO board. Note their positions on the RFIO board; they are connected to RX1 IN and XVTX respectively. You may need to label them if the mini coax jumpers do not have different color heat shrink on them like the ones shown below. You may have to remove one of the tie wraps that are used to support the mini coax cables. Once disconnected, set them aside and out of the way. See Figure 6 below for a close up picture of the mini coax cables before they have been removed.

NOTE: If you have the RX2 already installed, there will be a third mini coax cable that must be removed from the RX2 IN (J13) mini coax connector on the HRFIO board. This connector is shown in the bottom right hand side of Figure 6, but there is no mini coax cable connected.

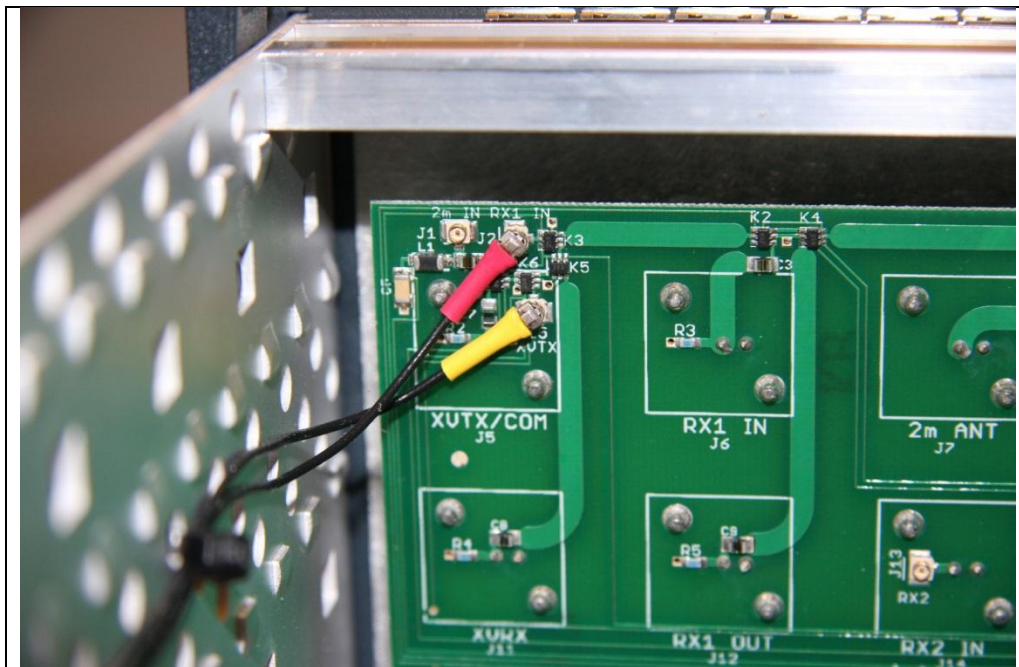


Figure 6

d. Using the 9/16" or 14mm deep well socket or nut driver, remove the retaining nuts and lock washers from the BNC male connectors on the outside back panel of the FLEX-5000. Retain the BNC retaining nuts and lock washers for reassembly.

e. Place your hand on the backside of the RFIO board to prevent it from falling after completing step f below.

f. Using a #1 Phillips screwdriver remove the six (6) Phillips head screws and lock washers on either side of the SO-239 connectors on the outside back panel of the FLEX-5000. Retain the screws and lock washers for reassembly. See Figure 7 below. In this picture the retaining nuts from the six (6) BNC connectors have been removed, but the six (6) Phillips head screws on either side of the SO-239 connectors have not.



Figure 7

g. Gently remove the RFIO board from the back of the radio and place to the side.

Installation of RFIO-34 Board

The RFIO-34 board is physically mounted on the back panel of the FLEX-5000 in exactly the same way the RFIO-27 board was mounted. A picture of the RFIO-34 board is shown below in Figure 8.

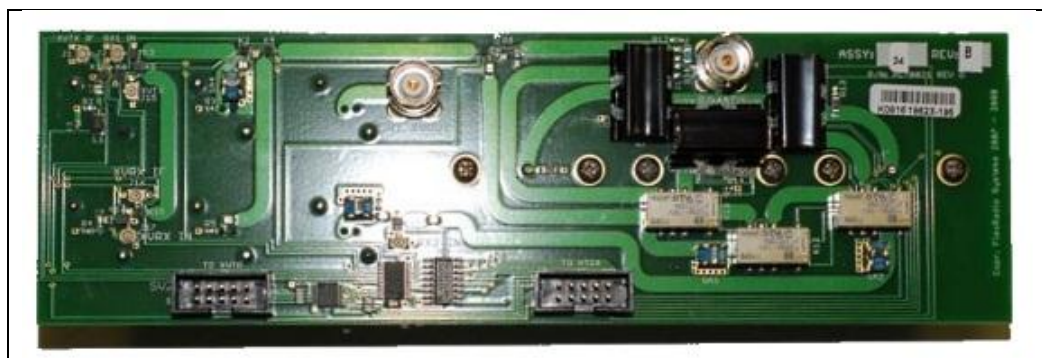


Figure 8

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a. Before physically mounting the RFIO-34 board onto the FLEX-5000 back panel, connect the mini coax cable to the RX1 In (J2) mini coax connector and the other mini coax cable to the ATUX (J15) mini coax connector. Make sure that the correct mini coax cables are connected to the proper connectors, as they should have been labeled in a previous installation step. See Figure 9 below showing the two (2) mini coax cables connected to the RFIO-34 board.

NOTE: If you have the RX2 installed, you will need to reconnect the mini coax cable from the RX2 to the RX2 IN (J13) mini coax connector. This connector is located in between the two ribbon cable connectors at the bottom of the board above the two vertically mounted ICs. That mini coax cable is not shown in Figure 9 below.

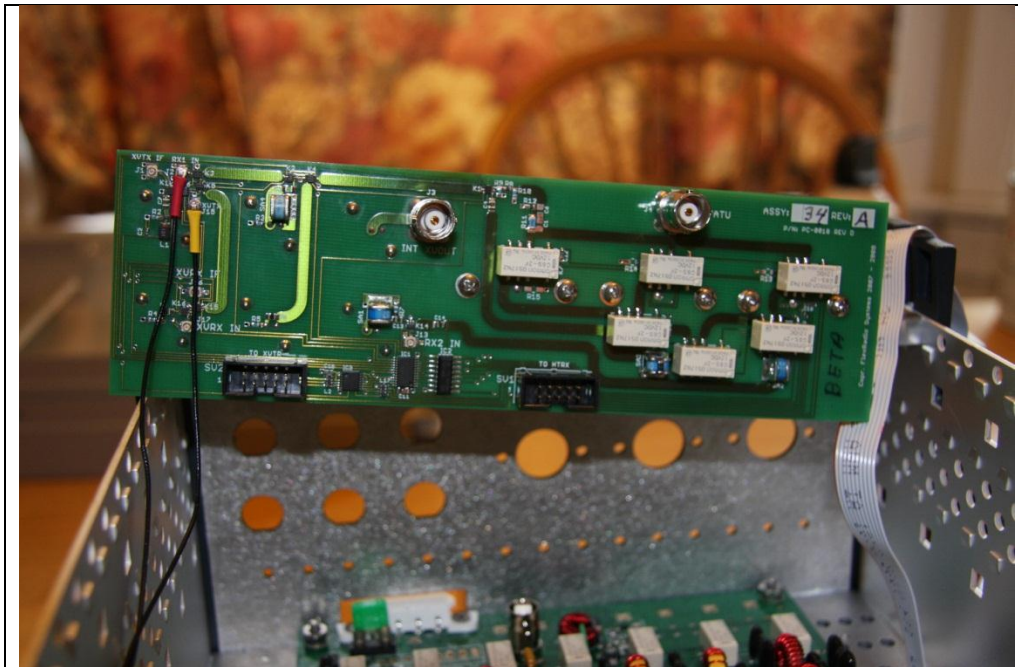


Figure 9

b. Connect the 10-pin rectangular ribbon cable connector to the RFIO-34 board into the “TO HTRX” (SV1) connector. This is a pinned connector and can only be inserted in one way. Note that the red edge of the ribbon cable is on the left had side of the connector. See Figure 10 below.

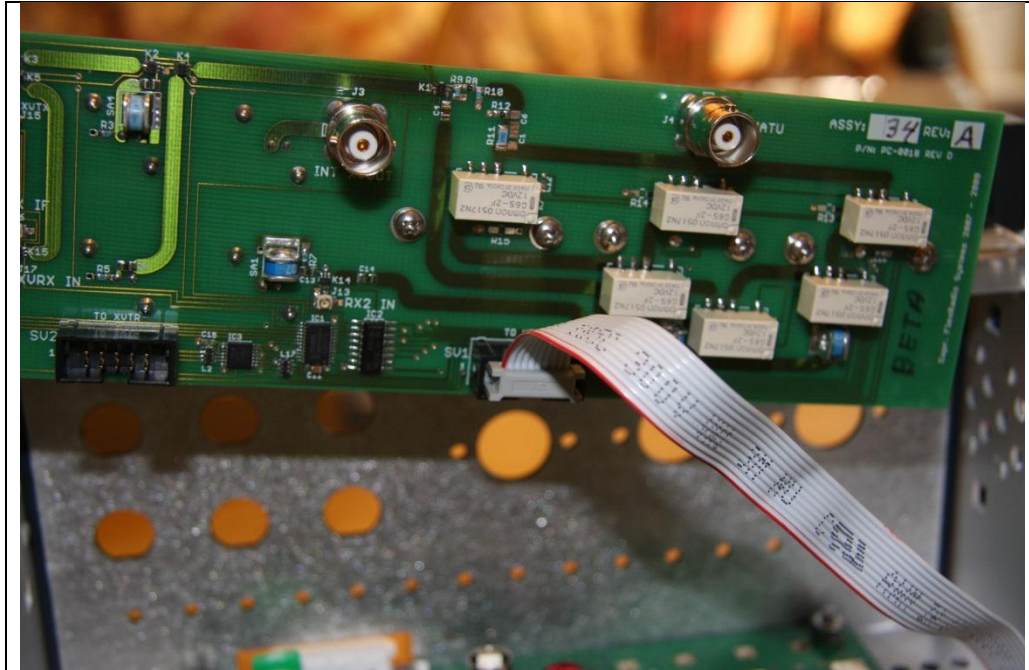


Figure 10

c. Gently inset the RFIO-34 board through the back panel of the FLEX-5000 from the inside aligning it with the BNC and SO-239 connectors.

d. Being careful not to cross thread the BNC connector, slip on a lock washer and a retaining nut on the “RX1 IN” BNC connector and hand tighten in order to hold the RFIO-34 board in place while installing the remaining BNC retaining nuts.

e. Install the six (6) Phillips head screws and lock washers on either side of the SO-239 connectors. Install the screws so they are all the way screwed in, but not tight.

f. Install the remaining lock washers and retaining nuts on the remaining BNC connectors. Tighten by hand the BNC retaining nuts at this time.

g. Make sure the RFIO-34 board is properly aligned. Using a #1 Phillips screwdriver, tighten snugly the mounting screws for ANT1-3. **Do not over tighten.**

h. Using the 9/16” or 14mm deep well socket or nut driver hand tighten the remaining retaining nuts on the BNC connectors. **Do not over tighten.**

i. Once all of the screws and retain nuts have been tightened, check each one for snugness since tightening the other connectors can make previously install retaining nuts and screws loose. **Again, do not over tighten.**

j. Visually inspect the mini coax cables and 10-pin ribbon cable to make sure they have not come loose during the mounting of the RFIO-34 board.



k. Install the coax jumper from the “PA OUT” BNC female connector on the 100 watt PA board (mounted on the aluminum heat sink) to the “PA/ATU” BNC female connector on the top right hand side of the RFIO-34 board.

NOTE: If you have the ATU installed, reinstall the ATU. Refer to the FLEX-5000 AUT installation guide for more details.

Replace the Top and Side Covers

- a. Install the top cover. The top cover has the vent holes facing backwards towards the rear of the FLEX-5000. Gently press them on and screw them down.
- b. Install the side panels by gently pressing them into place.

Return the FLEX-5000 to the Operating Position

- a. Return the FLEX-5000 to its operating position
- b. Install the power connector and all other connecting cables.

Install the latest version of PowerSDR

- a. Download PowerSDR (v2.0.22 minimum) from the FlexRadio Systems web site (www.flexradio.com)
- b. Run the PowerSDR Integrated Installer to ensure that the latest Firewire drivers and firmware are installed to your PC

Install latest Firmware and Register the RFIO with the FLEX-5000 EEPROM

Before using your FLEX-5000, you must update the FLEX-5000's EEPROM with the new assembly and revision number or PowerSDR will generate an error and the radio will not be usable.

- a. Start PowerSDR. When starting up PowerSDR after installing the RFIO-34 board you may receive an error that the RFIO board is missing or damaged. This is an expected error message since the FLEX-5000 EEPROM has not been updated. You can safely ignore this error at this point of the installation.
- b. If a firmware update is needed, PowerSDR will install it automatically.
- c. Close PowerSDR
- d. Updating the FLEX-5000 EEPROM is done using a special EEPROM updater program specifically for the RFIO-34 board that is available for download from the FlexRadio Systems web site. Use the following URL to download the RFIO-34 EEPROM Updater (34B) <http://support.flex-radio.com/Downloads.aspx?id=233>

WARNING: DO *NOT* RUN THIS UPDATER IF YOU DO NOT HAVE A RFIO-34 BOARD INSTALLED. IT CAN POTENTIALLY DAMAGE YOUR RADIO AND VOID THE WARRANTY.

e. Download the RFIO-34 EEPROM Updated from the FlexRadio Systems web site to a folder on your PC that is connected to the FLEX-5000

f. Turn on the FLEX-5000, but do not start PowerSDR 2.x

g. Double left click on the RFIO-34 EEPROM Updater application (FLEX-5000_RFIO_Update_Rev34.exe)

h. You may receive a Security Warning screen indicating that the publisher of the program cannot be identified. Left click on the Run button to continue. See Figure 11 below.

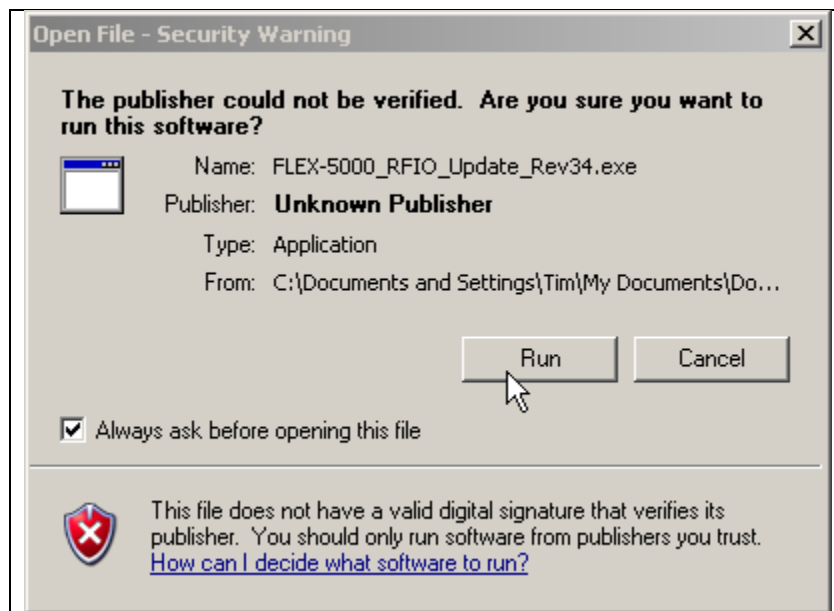


Figure 11

i. A Windows Command window will be displayed immediately followed by the Update Successful dialog box. Left click on the OK button. See Figure 12 below



Figure 12

j. Reboot your FLEX-5000 by turning off the power and then restarting it.



Verification that the RFIO-34 Board is Recognized by PowerSDR

When starting up PowerSDR after installing the RFIO-34 board and updating the EEPROM, if you receive an error that the RFIO-34 board is missing or damaged, then PowerSDR is not recognizing the new RFIO-34 board. **DO NOT USE THE RADIO UNTIL THIS ERROR CONDITION IS RESOLVED.**

THERE ARE SEVERAL POSSIBLE PROBLEMS.

- There was an assembly/revision number mismatch and PowerSDR does not properly recognize the new RFIO-34 board
- There was a reassembly error and the 10-pin rectangular ribbon cable connector is not properly seated in the "TO HTRX" (SV1) connector
- The RFIO-34 board is malfunctioning

The most common problem is that there is a mismatch between what PowerSDR "thinks" is installed and the actual board that is installed. The first step in troubleshooting this error is to verify that PowerSDR has properly recognized the new RFIO-34 board. Use the following procedure for RFIO verification.

- a. Start PowerSDR. Ignore any errors that may appear regarding the RFIO board by clicking on OK and continuing.
- b. Right click on Setup in the PowerSDR menu bar.
- c. Right click on General->Hardware Config tab.
- e. In the FLEX-5000 Config section, verify that the new RFIO-34 board number in parentheses () matches the ASSY and REV of the new board and is not in red. You should see "(34B)" next to the RFIO serial number if PowerSDR is properly recognizing the RFIO board.

If this information is not correct for your new RFIO-34 board, please contact FlexRadio Systems Support at support@flex-radio.com for corrective action.