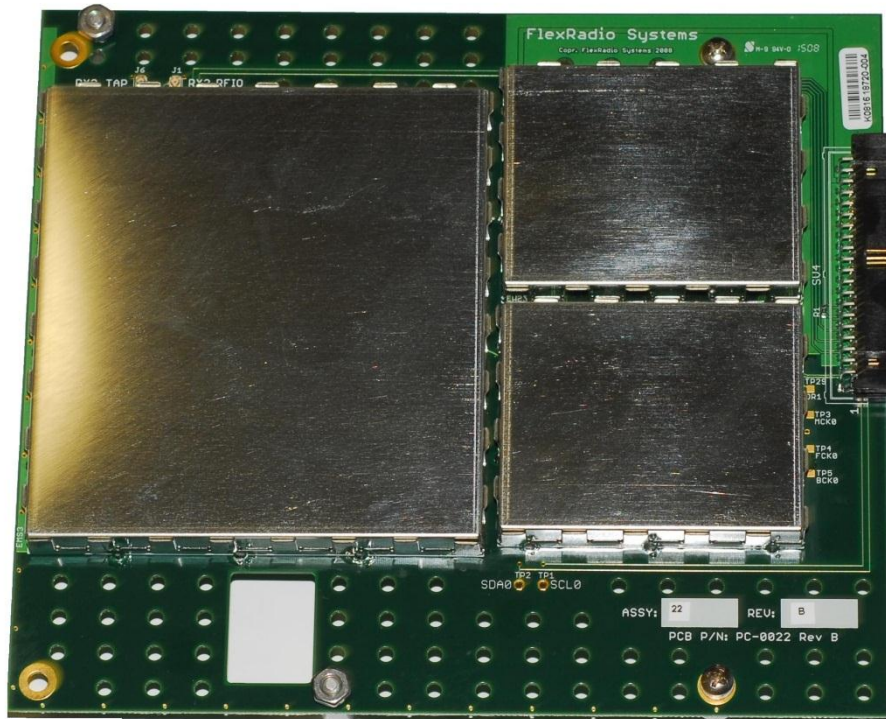# RX2 INSTALLATION GUIDE WITH CE UPDATE

Revised: August 15 2011

RX2 Installation Guide

Congratulations on your purchase of a second receiver (RX2) for the FLEX-5000. This will allow you to enjoy the wonderful world of diversity reception and SO2R in a single box.

You will need the following tools to complete the installation:

1. T-20 Torx driver
2. #1 and #2 Phillips screwdriver
3. 3/16" or smaller Flat blade screwdriver
4. 1/4" Hex Nut driver or a Pair of pliers
5. Side or wire cutters
6. Multimeter

The following steps will assist you in the installation and setup of the second receiver.

Before you start the installation of RX2, be sure to **UNPLUG** the power cord from the radio. NOT doing so can cause serious damage to the radio and void your warranty!

Prerequisites for Installing the RX2

The RX2 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 RX2 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.

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.

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Preparing the FLEX-5000 for RX2 Installation

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 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

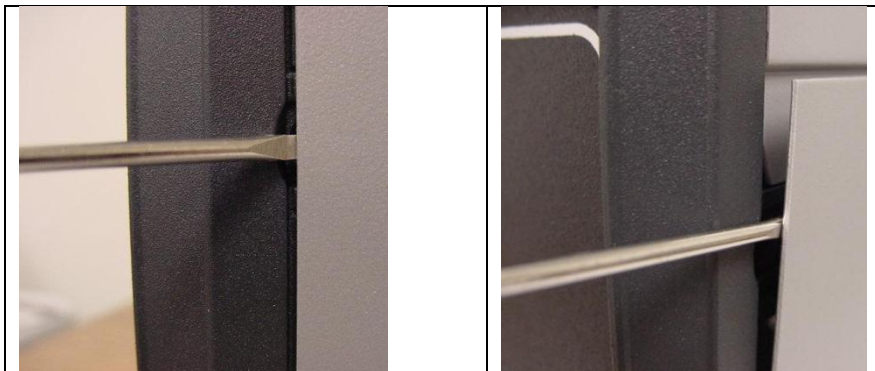b. Using the flat blade screwdriver GENTLY pry the side panels off the radio.

Figure 2a   Figure 2b

c. Set them aside for later reinstallation.

Remove the Top and Bottom Panels.

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

Figure 3

b. 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

c. **"ASSY 27" RFIO BOARDS ONLY:** Before installing RX2, check the assembly number on your RFIO board to see if the following test is required. If your RFIO board reads "ASSY 27", as shown in Figure 5, then you will need to check to see if the RX2 IN connector is shorted. If your board is NOT an "ASSY 27", then skip to Step "d" below.

NOTE: This test does not apply to any other ASSY number. If you do have ASSY 27, locate the RX2 IN BNC connector on the back of the radio. With your multimeter, check for a short circuit between the center conductor and the outer shield of the BNC connector. If a short is detected, then contact FlexRadio Systems Support for further instructions. **This short will NOT prevent you from installing the RX2 and calibrating it.**
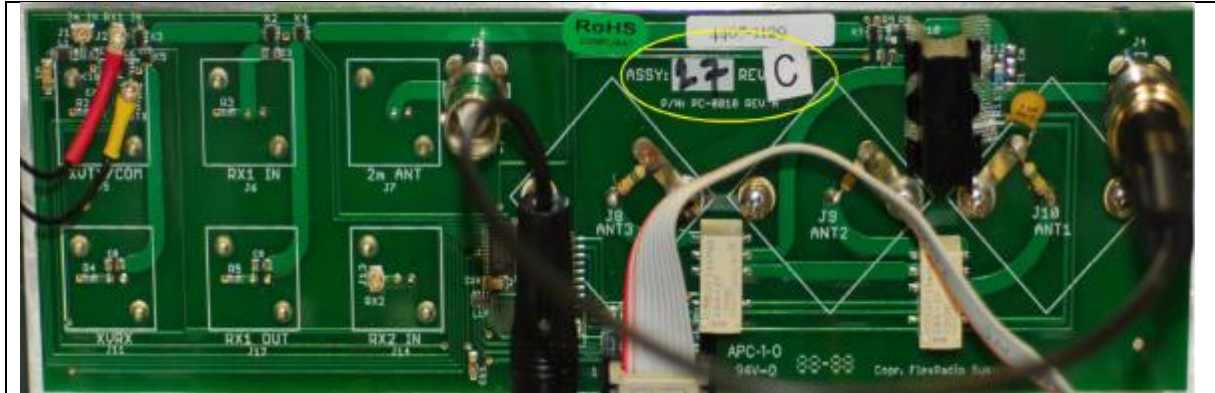
Figure 5

d. Carefully turn the radio over.

e. Repeat steps 'a' and 'b', above, to remove the bottom cover.

Remove the Fan Plate.

a. Using a #2 Phillips screwdriver, remove the four (4) Sheet Metal screws and washers holding the fan plate in place and set them aside for reinstallation later.

Figure 6

DO NOT REMOVE THE (4) SCREWS CLOSEST TO THE FAN!

b. Once the screws are removed, lift the fan plate up, from either side of the radio, just enough for you to reach in and GENTLY wiggle the fan power connector from side to side while lifting up to remove it.
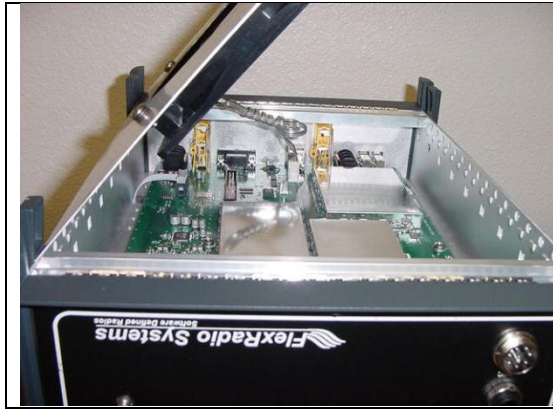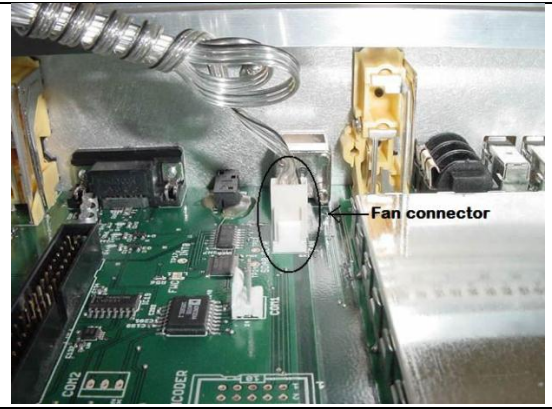

Figure 7a   Figure 7b

c. Set the fan assembly and screws aside for installation later.

Remove the Cross-Support Piece and Front Panel

Figure 8 – Cross Support

a. Using a # 1 Phillips screwdriver, carefully remove the (6) black screws holding the Front Panel in place. They are located at the top and bottom edges of the panel. Next, remove the nut securing the Front panel to the headphone jack. **Do NOT try removing the Front panel at this point.**

Figure 9 – Placement of the three (3) bottom screws. The other three (3) are at the top

b. Remove the nut on the Headphone connector. This will be tighter than finger tight. If you only have a pair of pliers available, I'd suggest protecting the area around the nut with tape of some kind in an attempt to prevent scratching the panel. If you have a pair of Needle Nose pliers that will fit into the two slots in the nut, this may be a better way to remove it.

c. Using the Torx screwdriver, remove the four (4) screws holding the cross-support in place.

Figure 10

d. Once the cross-support is loose, carefully remove. Be sure NOT to lose the screw rail! Keep the screws and cross-support together and set them aside for reassembly later.
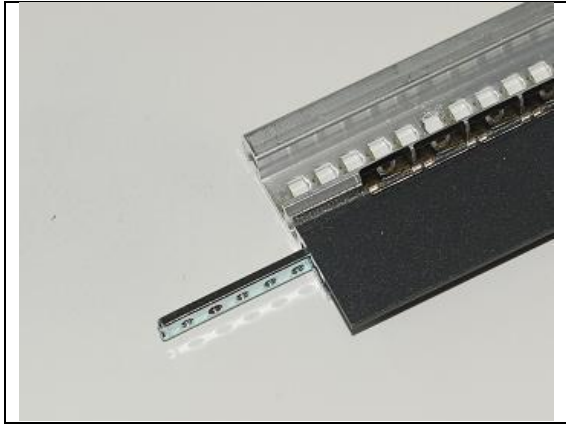

Figure 11 – Screw Rail

e. Unplug the 10-pin flat cable connector from the transceiver board as shown in the photos below. If the cable becomes detached from the front panel microphone connector, reinstall it. **NOTE: Some radios have 3 inch cables and some have 6 inch cables installed.** You may need to cut the zip tie holding the ferrite in order to position the board in place. **You may now remove the Front panel.** Set it aside for now.
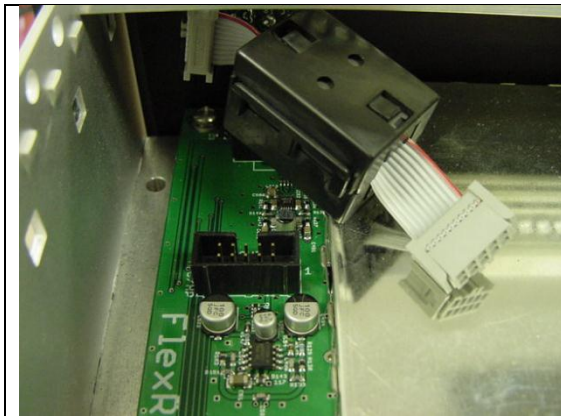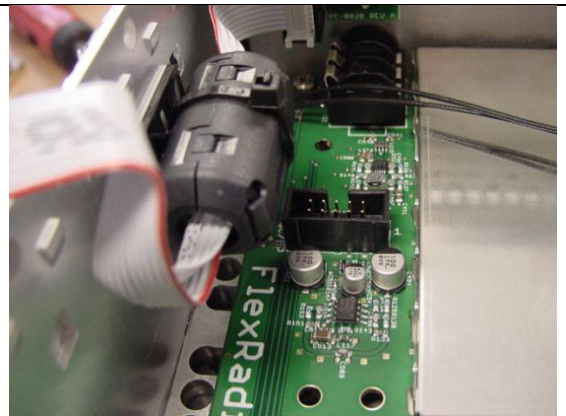

Figure 12a – 3 inch ribbon cable   Figure 12b – 6 inch ribbon cable

Preparing the Transceiver (HTRX) board

a. Using a #2 Phillips screw driver, remove the (4) screws and washers, indicated by yellow circles in Figure 13.
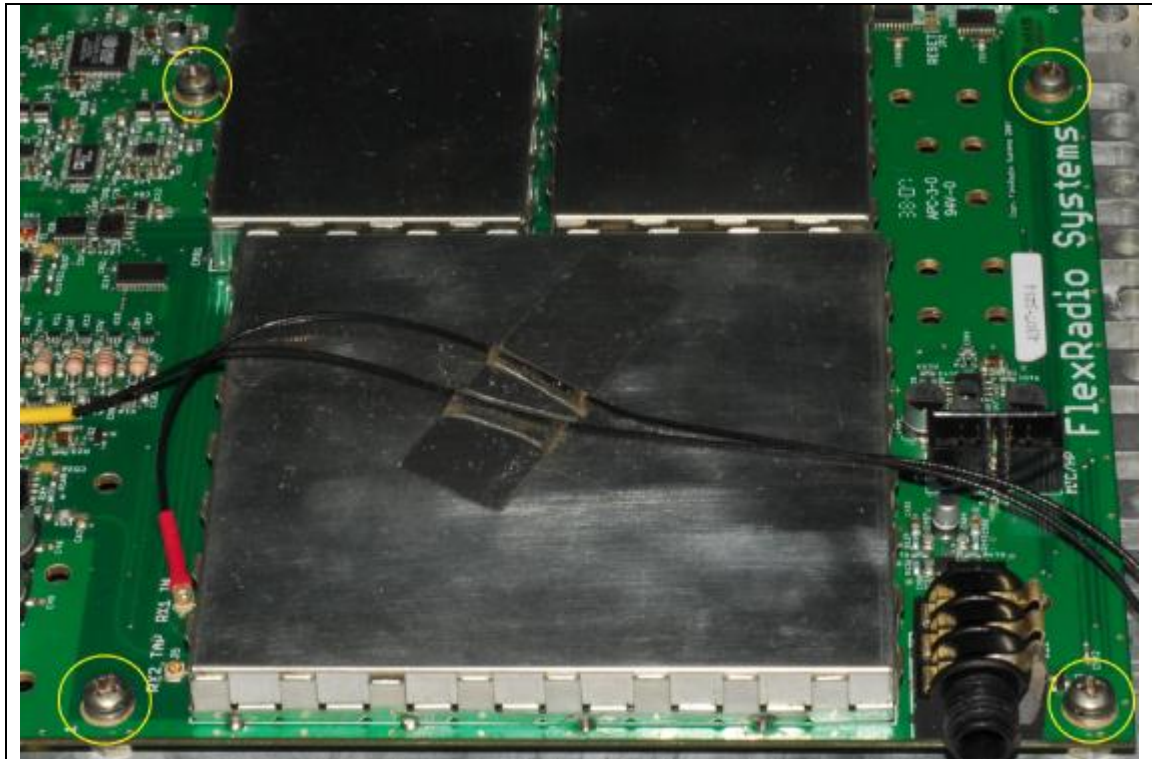

Figure 13

BE VERY CAREFUL NOT TO DROP A WASHER DOWN INTO THE RADIO! Some radios have slots instead of holes in the metal plate underneath the transceiver board allowing the washer(s) to drop through to the other side.

b. Set the screws and washers aside as you'll need them for the installation of the RX2.

c. In the parts kit, you'll find two very thin coaxial cables. Locate the short one.

d. Snap one end of the short coaxial cable on to connector, J5, on the transceiver board, labeled "RX2 TAP", Figure 13a. This is a delicate operation as the connector is near the front of the transceiver board and right next to the metal RF shield (box). The cable end will snap on once it's lined up properly. Something you might try is holding the cable, with one of your hands; a couple of inches from the cable end, and position it directly on top of the connector on the transceiver board. With your other hand, reach in and push straight down with your finger. It's a tight fit, so you'll need to make sure the two pieces are directly over each other and you push straight down. Several attempts may be required. Don't give up, it can be done! Once you have it connected, it would be a good idea to adjust the cable so it is pointed out away from the side of the metal RF shield on the transceiver board. If you don't do so, you'll have a hard time retrieving the cable later, see Figure 14b.
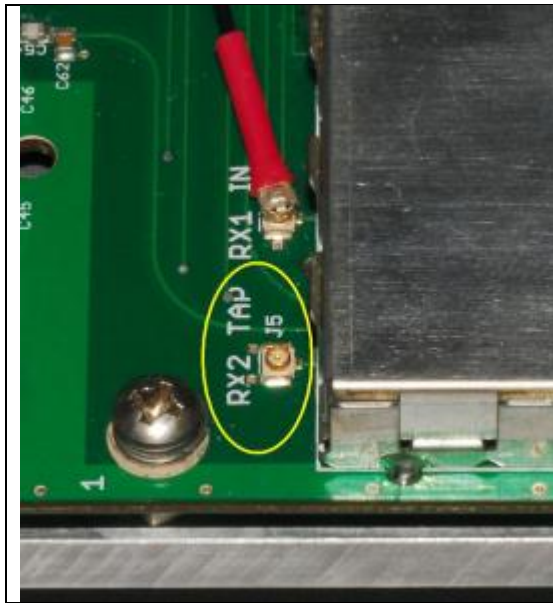
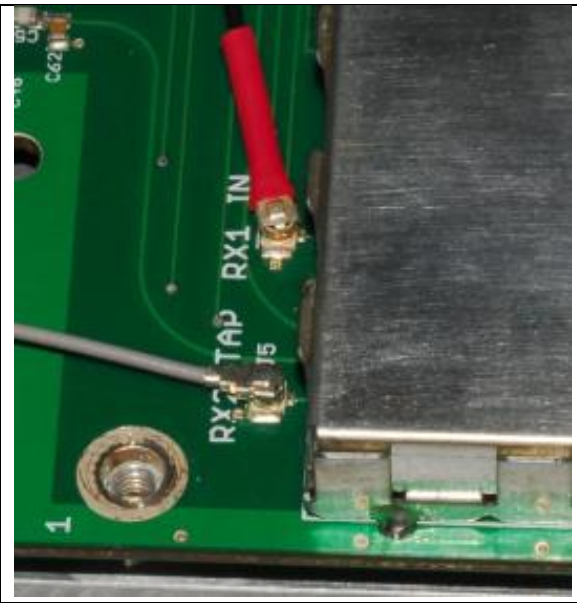Figure 14a   Figure 14b

Installing the RX2 in the FLEX-5000

Install the RX2 Board

a. In the parts kit, you'll find four (4) standoffs, four (4) flat washers and four (4) internal tooth lock washers. Install the flat washer, internal tooth washer and standoff in the four (4) mounting holes where you removed the four (4) screws. Refer to Figure 15 for assembly details.
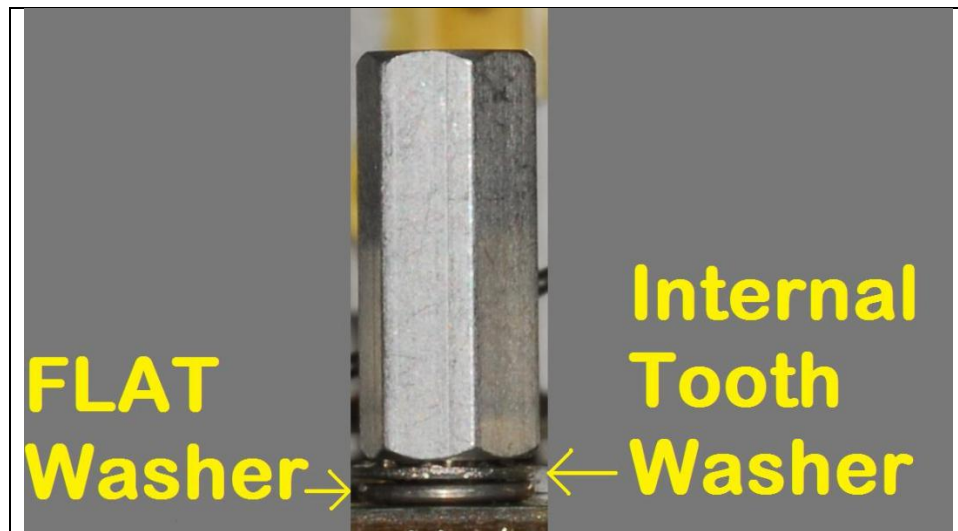

Figure 15

b. Carefully align the four (4) mounting holes on the RX2 with the four (4) standoffs you installed on the transceiver board.

c. Install the screw/washer stack, you removed from the transceiver board earlier, through the RX2 into the standoffs. Make sure the flat washer goes on first, then the internal tooth washer, then the screw. Tighten snugly but do not over tighten.

Install RX2 RF and Control Cables.

a. Attach the other end of the short coaxial cable, which you connected to J5 "RX2 TAP" on the transceiver board, to the connector J6 "RX2 TAP" on the RX2 board. It's located in the same place as on the transceiver board. See Figure 16 below.

b. Locate the long coaxial cable and connect one end to J1 "RX2 RFIO".
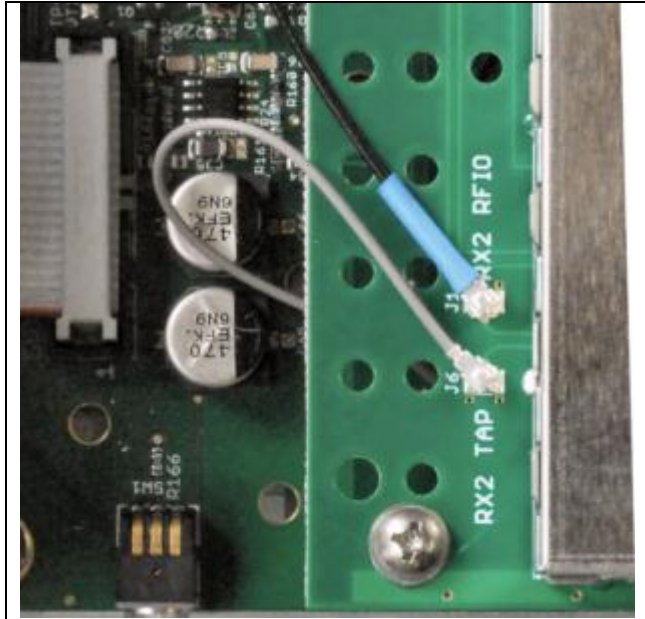

Figure 16

c. Feed the other end across the top of the metal box on the RX2 and down through to the other side. Pick a hole that is a couple of inches from the upper left corner where the other two cables are.

d. Locate the flat ribbon cable in the parts bag. Plug one end into the black connector, SV4, on the RX2 board, making sure the **red** stripe is on the left side. Fold the cable over, as shown in Figure 17, and plug it into SV4 "RX2 CONTROL" on the transceiver board.

Figure 17

e. Set the Front panel back on the radio and install the Front panel cable to the transceiver board through the opening, in RX2, above the connector. The Front panel goes on upside down so that the microphone connector is in the upper right corner. Remember! There are two different sizes of cables in use. Re-secure the ferrite with a cable tie that was provided, if that's the way it was before you disconnected the cable. Screw the nut back on the Headphone jack. Finger tight will be sufficient. This will help keep the Front panel in place for the next step.
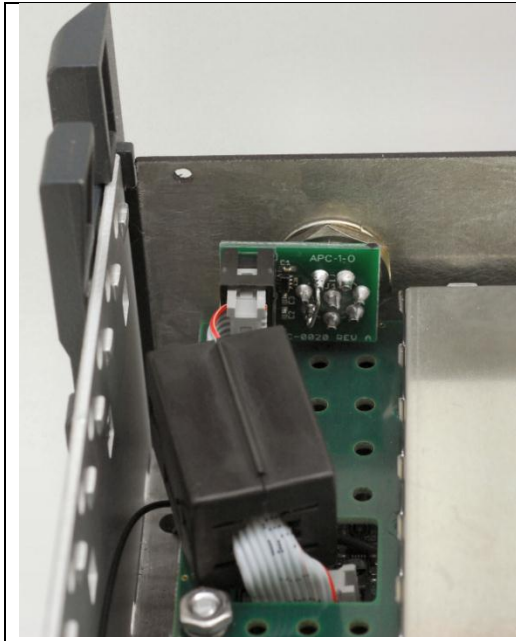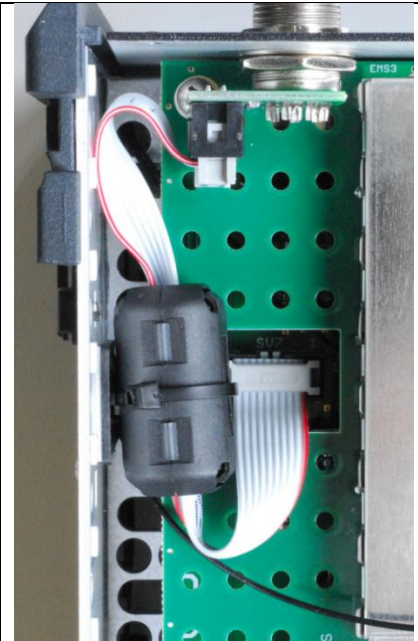
Figure 18a – 3 Inch ribbon cable

Figure 18b – 6 inch ribbon cable

f. Now carefully turn the radio over. Using a pair of side cutters, cut the cable tie closest to the hole you fed the coaxial cable through. Using one of the supplied cable ties, add the new cable to the previous two and reattach to the side of the radio. Do the same with the other cable tie.

g. Find the loose end of the long coaxial cable you fed through from the other side, and connect it to the RX2 connector on the HRFIO board on the rear panel as shown in the photos below. Note that there are two versions of the HRFIO board that have a slight difference in the RX2 connector location. It might make things easier if you temporarily removed the BNC connection in front of the HRFIO card. Once you have the coaxial connector connected, be sure to reinstall the BNC connector! Failure to do so will result in High SWR and NO power out.
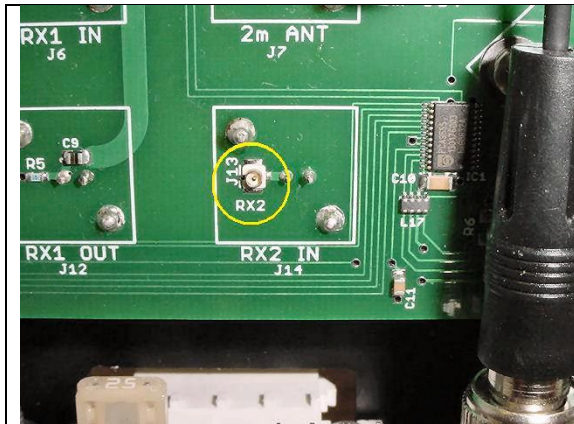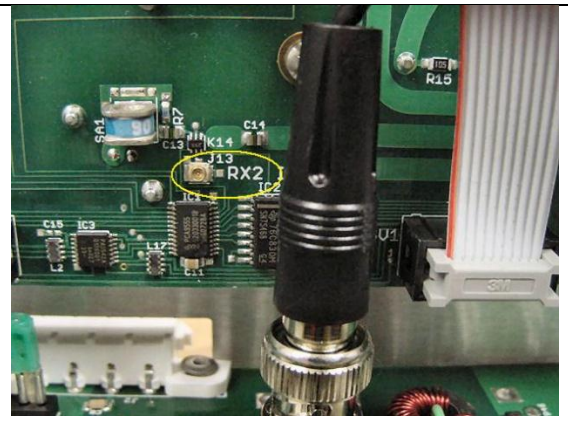

Figure 19a – HRFIO 27   Figure 19b – HRFIO 34

Install Reassemble the FLEX-5000

NOTE: The installation of finger stock is not required for FLEX-5000 owners in the United States where CE compliance is not required. For radios that do not need CE compliance, please ignore the instructions below that are applicable to the installation of finger stock. All other re-assembly steps are applicable.

Install Finger Stock on Top and Bottom Covers

a. Locate the top and bottom covers. Follow the directions that come with the stainless steel finger stock and install it on both sides of the two covers, as shown in Figure 20.
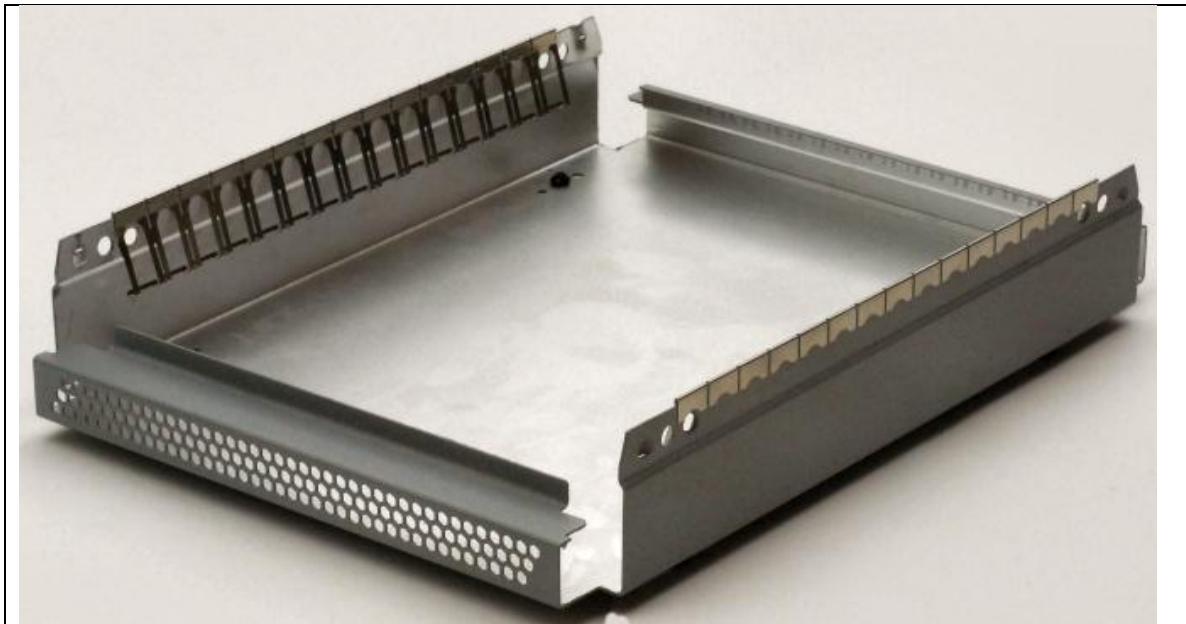

Figure 20

Remove the Side Support Pieces

a. Looking at the front of the radio, remove the two side support pieces. As shown in Figure 21, remove the LONG screw closest to the front of the radio. Leave the short screw in place. Do this to the top and bottom of both sides. Set the pieces aside.

Figure 21

b. Loosely install (3) of the black screws, to the top of the Front panel, to help hold it in place. Refer to Figure 9 above.

c. **Carefully** turn the radio over.

Install the cross-support.

a. Set the cross-support in place as shown in Figure 8 above.

b. Install the **short screws** as noted in Figure 21 above.

Install the Front Panel

a. Install the other three (3) black screws to hold the Front panel in place. Lightly tighten all six (6) black screws.

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Install Side Panel Finger Stock

a. With small blade screwdriver, or something like a Machinist's ruler, press the copper finger stock on to the sides of the radio. See Figures 22a and 22b.
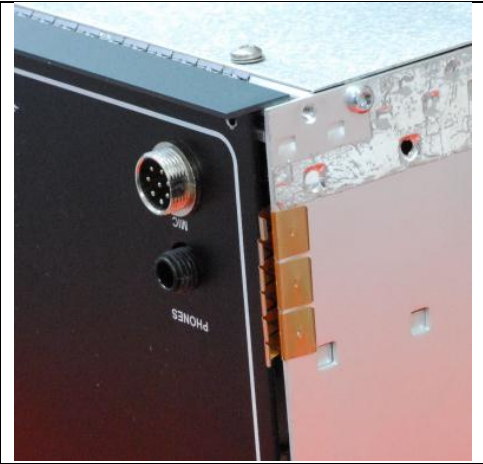
Figure 22a

Figure 22b

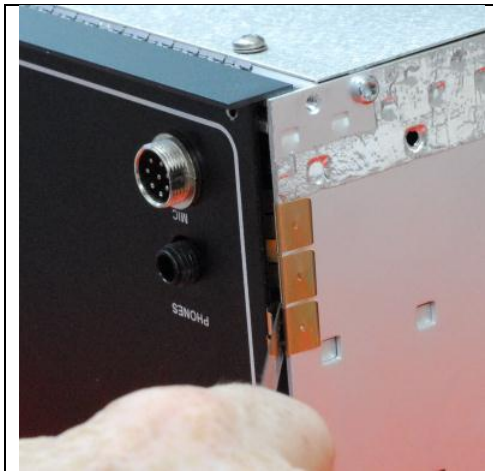b. Now push the "fingers" behind the front panel. See Figure 23

Figure 23

c. Install three (3) pieces of finger stock per side in the locations shown in Figure 24

Figure 24

Reinstall the Side Support Pieces.

a. Reinstall the dark gray side support pieces on the two (2) corners.

Repeat the process for the Back panel of the radio

a. Repeat the previous installation steps for the back panel

Install the Fan Plate.

a. Set one side of the Fan plate along the side of the radio with the fan power cord at the back of the radio. (See Figure 7a) The power connector is keyed, so it will only go on one way. If you look at the connector, you'll notice it has two vertical ribs on one side. Install the connector so that the white plastic piece, on the transceiver board, and the side of the fan with the ribs go together. **DO NOT CONNECT THE FAN POWER CABLE TO THE COM1 CONNECTOR THAT LOOKS VERY SIMILAR TO THE FAN POWER CONNECTOR.**
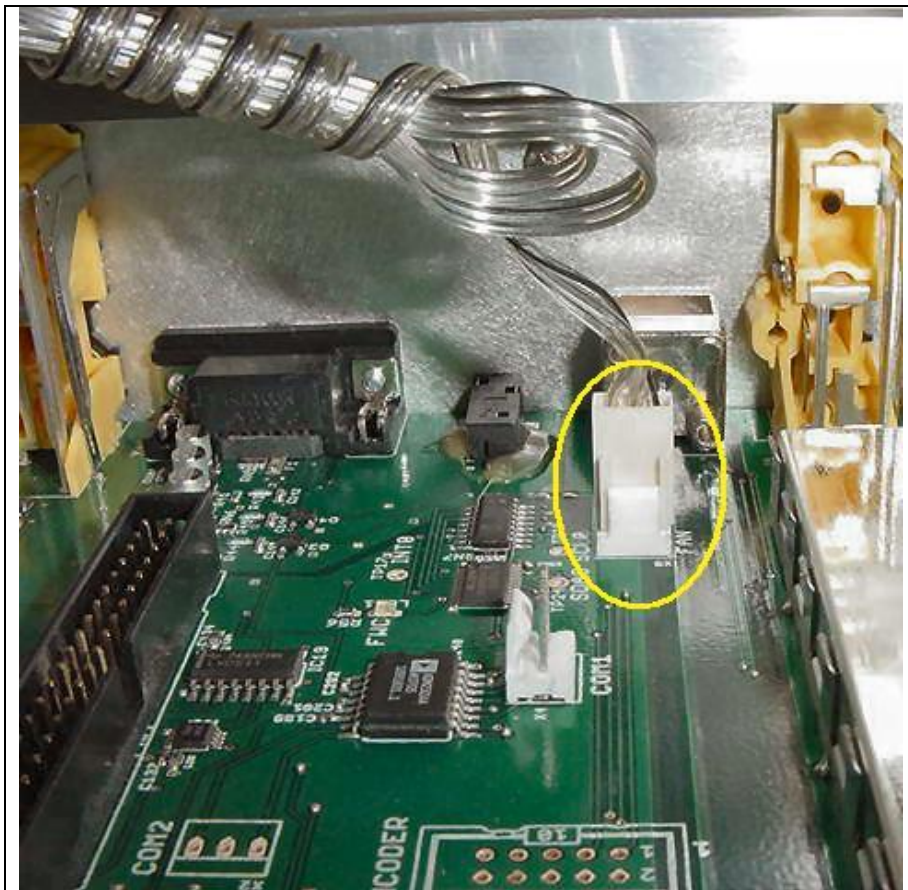

Figure 25

b. Install the four (4) sheet metal screws, you removed initially, to secure the Fan plate assembly. **DO NOT OVERTIGHTEN THE SCREWS OR YOU MAY STRIP THE THREADS.**

Install the Radio Covers

a. Install the top and bottom covers. The bottom cover has the vent holes facing forward. 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.

RX2 Calibration Procedure

WARNING: DON'T CONNECT ANY ANTENNAS YET!

Now that you have your RX2 installed, it is now time to calibrate it to your radio for optimum performance. You will need to execute the following procedure.

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 verify that PowerSDR recognizes the newly Installed RX2

a. Start PowerSDR.

b. If a firmware update is needed, PowerSDR will install it automatically

c. Select the "Setup" tab in the upper left of the PowerSDR screen.

c. Select the "General" tab.

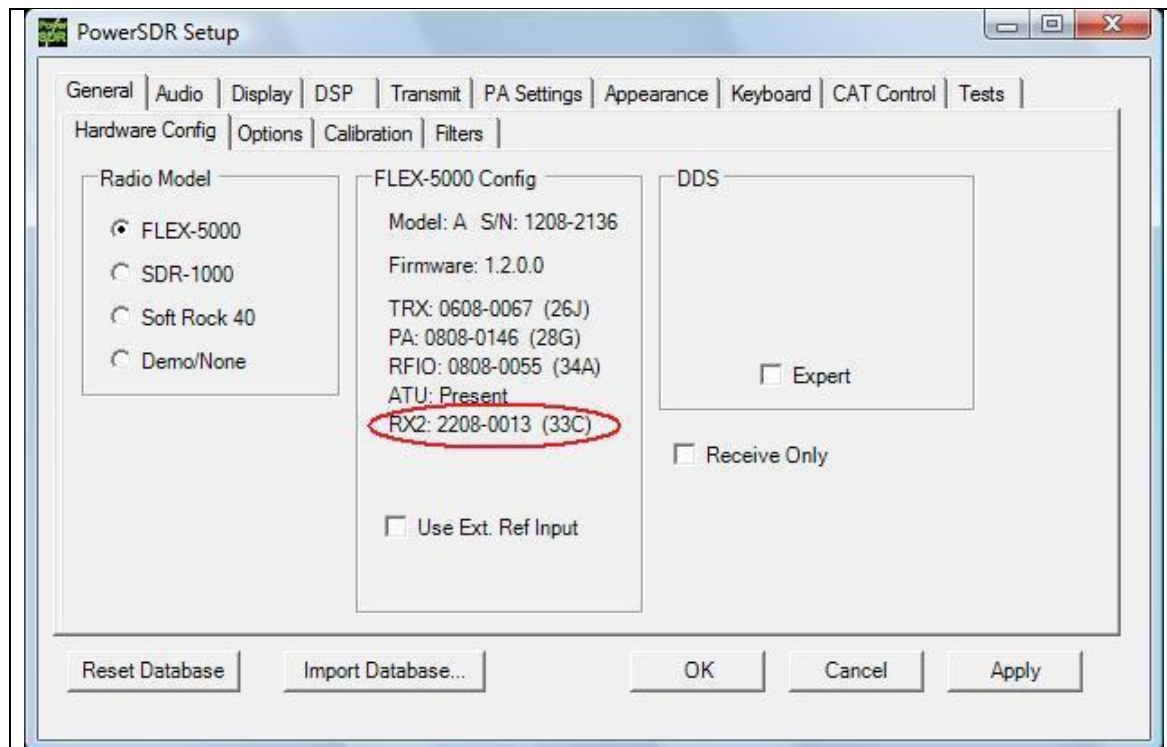d. In the "FLEX-5000 Config" section, make sure 'RX2' is present.

Figure 26

e. If it is not shown, make sure the 40 conductor flat ribbon cable is properly inserted.

Calibrate the RX2 module

a. Make sure PowerSDR is running (the Start button clicked)

b. Press 'CTRL+SHIFT+R' to bring up the RX2 Calibration screen.

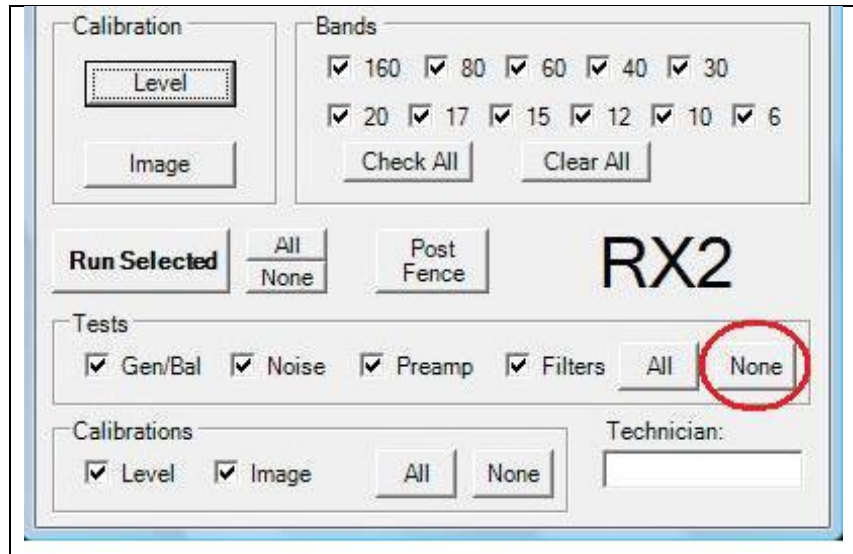c. In the section entitled "Tests", click on the "None" box.

Figure 27

d. Now click on the box entitled "Run Selected". This will start the calibration process and optimize it for your radio.
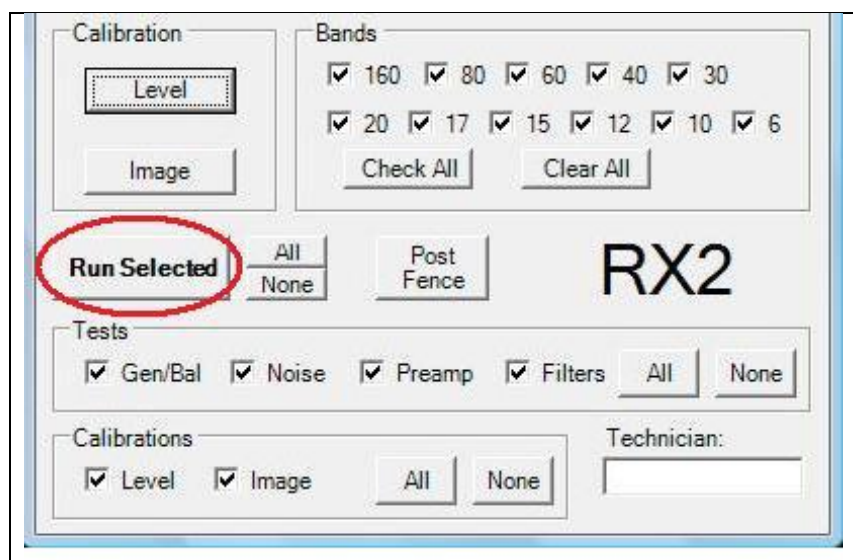

Figure 28

e. Wait for the calibrations routines to complete

f. Close the RX2 Calibration / Tests window.

g. Your RX2 is now ready to use.