

# ELECRAFT® K3

## HIGH-PERFORMANCE 160 – 6 METER TRANSCEIVER

### KXV3A INTERFACE OPTION INSTALLATION INSTRUCTIONS

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# Contents

Introduction.....	3
Customer Service and Support.....	3
Technical Assistance.....	3
Repair / Alignment Service.....	3
Preventing Electrostatic Discharge Damage.....	4
How ESD Damage Occurs.....	4
Preventing ESD Damage.....	4
Preparing for Installation.....	5
Tools Required.....	5
Parts Included.....	6
Installation Procedure.....	6
Removing the Top Cover.....	6
Removing the KRX3 Subreceiver Module.....	7
Removing the Bottom Covers and KIO3 Board.....	8
Installing the KXV3A Board.....	9
Reinstalling the KIO3 Board.....	13
Reinstalling the KRX3 Subreceiver Module.....	14
Replacing the Top Cover.....	15
Enabling the KXV3A Module.....	15

# Introduction

The KXV3A Interface provides a separate receive antenna input and output, an input and output for use with an external transverter, and a buffered i.f. output. These inputs and outputs are via rear-panel BNC connectors. The KXV3A also contains internal connectors to provide an antenna input and output for the K144XV two-meter option module that mounts inside the K3. Complete details for using the KXV3A are included in your K3 Owner's manual. This manual covers the installation of the KXV3A Interface option in your K3 transceiver.

Only a few basic hand tools are needed (see page 5) to perform the installation. No soldering or wiring is required.

## Customer Service and Support

### *Technical Assistance*

You can send e-mail to [k3support@elecraft.com](mailto:k3support@elecraft.com) and we will respond quickly - typically the same day Monday through Friday. Telephone assistance is available from 9 A.M. to 5 P.M. Pacific time (weekdays only) at 831-662-8345. Please use e-mail rather than calling when possible since this gives us a written record of the details of your problem and allows us to handle a larger number of requests each day.

### *Repair / Alignment Service (We want to make sure everyone succeeds!)*

If necessary, you may return your Elecraft product to us for repair or alignment. (Note: We offer unlimited email and phone support to get your kit running, so please try that route first as we can usually help you find the problem quickly.)

**IMPORTANT: You must contact Elecraft before mailing your product** to obtain authorization for the return, what address to ship it to and current information on repair fees and turn around times. (Frequently we can determine the cause of your problem and save you the trouble of shipping it back to us.) Our repair location is different from our factory location in Aptos. We will give you the address to ship your kit to at the time of repair authorization. *Packages shipped to Aptos without authorization will incur an additional shipping charge for reshipment from Aptos to our repair depot.*

## Elecraft's 1-Year Limited Warranty

This warranty is effective as of the date of first consumer purchase (or if shipped from factory, date product is shipped to customer). It covers both our kits and fully assembled products. For kits, before requesting warranty service, you should fully complete the assembly, carefully following all instructions in the manual.

**Who is covered:** This warranty covers the original owner of the Elecraft product as disclosed to Elecraft at the time of order. Elecraft products transferred by the purchaser to a third party, either by sale, gift or other method, who is not disclosed to Elecraft at the time of original order, are not covered by this warranty. If the Elecraft product is being bought indirectly for a third party, the third party's name and address must be provided to Elecraft at time of order to insure warranty coverage.

**What is covered:** During the first year after date of purchase, Elecraft will replace defective or missing parts free of charge (post-paid). We will also correct any malfunction to kits or assembled units caused by defective parts and materials. Purchaser pays inbound shipping to Elecraft for warranty repair, Elecraft will pay shipping to return the repaired equipment to you by UPS ground service or equivalent to the continental USA and Canada. Alaska, Hawaii and outside U.S. and Canada actual return shipping cost paid by owner.

**What is not covered:** This warranty does not cover correction of kit assembly errors. It also does not cover misalignment; repair of damage caused by misuse, negligence, or builder modifications; or any performance malfunctions involving non-Elecraft accessory equipment. The use of acid-core solder, water-soluble flux solder, or any corrosive or conductive flux or solvent will void this warranty in its entirety. Also not covered is reimbursement for loss of use, inconvenience, customer assembly or alignment time, or cost of unauthorized service.

**Limitation of incidental or consequential damages:** This warranty does not extend to non-Elecraft equipment or components used in conjunction with our products. Any such repair or replacement is the responsibility of the customer. Elecraft will not be liable for any special, indirect, incidental or consequential damages, including but not limited to any loss of business or profits.

## Preventing Electrostatic Discharge Damage

There is no climate or work location where the components of your K3 are safe from Electrostatic Discharge (ESD) unless you take specific steps to prevent such damage. Many of the components in your K3 can be damaged by static discharges of only a few volts: far too little for you to notice. It is those low-voltage but destructive discharges that easily happen anywhere and under virtually any environmental conditions.

ESD damage may not be apparent at first. The damaged components may not fail completely. Instead, the damage may result in below-normal performance for an extended period of time before you experience a total failure.

### How ESD Damage Occurs

Whenever an object containing a static charge touches a circuit in your K3, current will rush into the circuit until the components reach the same voltage as the source of the static charge. If the voltage or current that passes through a component during that brief period exceeds its normal operating specifications, it may be damaged or destroyed.

### Preventing ESD Damage

ESD damage cannot occur if there is no voltage difference between the components in your K3 and any object that touches them. That is how anti-static packaging works. Anti-static bags allow the static charge to flow over their surface, so that any part of the bag that touches the components inside are all at the same potential at all times. Anti-static foam keeps the leads of sensitive components at the same potential.

At your work bench, avoiding a dangerous voltage is achieved most easily by tying everything together and connecting them to a common mains safety ground. This includes your K3, individual boards or other sensitive components as well as everything they may touch at the work table.

Inexpensive static dissipating work mats are readily-available that will steadily and safely drain off any charges built up on parts or circuit boards placed on them. They are supplied with a lead that connects the mat to the common workbench ground. Also, metal cabinets on test equipment used on the bench should be tied together and connected to the common ground.

Most importantly, you must have a way of continuously draining off any static charges that occur on your body. Such charges are easy to create, even while sitting quietly at the work bench. Moving your feet on the floor, shifting position in your chair or even moving your arms so that clothing rubs against itself can produce destructive static charges. You can discharge yourself by touching an unpainted metal ground, but that will last only until you move in a way that produces a new static charge. The safest technique is to wear a grounded wrist strap with a series 1-megohm resistor that continuously drains off any charges. Such wrist straps are readily-available and inexpensive.

### **WARNING**

**DO NOT attach a ground directly to yourself without a current-limiting resistor as this poses a serious shock hazard. A wrist strap must include a 1-megohm resistor to limit the current flow. If you choose to touch an unpainted, metal ground to discharge yourself, do it only when you are not touching any live circuits with your other hand or any part of your body.**

We strongly recommend you take the following anti-static precautions (listed in order of importance) to avoid trouble:

- Leave ESD-sensitive parts in their anti-static packaging until you install them. The packaging may be a special plastic bag or the component's leads may be inserted in conductive foam. Parts which are especially ESD-sensitive are identified in the parts list and in the assembly procedures.
- Wear a conductive wrist strap with a series 1-megohm resistor. If you do not have a wrist strap, touch a ground briefly before touching any sensitive parts to discharge your body. Do this frequently while you are working. You can collect a destructive static charge on your body just sitting at the work bench. **DO NOT attach a ground directly to yourself as this poses a serious shock hazard.**
- Use a grounded anti-static mat on your work bench.
- If you choose to use a soldering iron to work on your K3 for any reason, be sure your iron has an ESD-safe grounded tip tied to the same common ground used by your mat or wrist strap.

## Preparing for Installation

### Tools Required







1. #0 and #1 size Phillips screwdrivers. To avoid damaging screws and nuts, a power screwdriver is *not* recommended. Use the screwdriver that best fits the screw in each step.
2. Wrench to remove jack screw nuts on the K3 back panel. 3/16" nut driver recommended.
3. Small diagonal cutters.
4. Small needle-nose pliers or tweezers to position small parts.
5. Soft cloth or clean, soft static dissipating pad to lay cabinet panels on to avoid scratching.

The following tools are strongly recommended:

1. ESD wrist strap.
2. Static dissipating work pad.

## Parts Included

The following parts should be included in your kit. Check to ensure you have them all. If any parts are damaged or missing, contact Elecraft for replacements (see *Customer Service and Support*, page 3).

ILLUSTRATION	DESCRIPTION	QTY.	ELECRAFT PART NO.
	KXV3A Printed Circuit Board Assembly <b>⚠ ESD Sensitive.</b>	1	E850244
	XV3 Connector Panel	1	E100224SS
	KXV3A TMP Cable Assembly	1	E850292
	Screw, 4-40, 1/2" (13 mm)	2	E700030
	Lockwasher, 4-40, inside tooth	2	E700010
	Nut, 4-40	2	E700011

## Installation Procedure

**⚠ SPECIAL NOTE FOR K3 KIT BUILDERS:** If you were directed here by the K3 Kit Assembly Manual to install your KXV3A Module, inventory the parts in this kit against the list under *Parts Included* on page 6 then begin installation at the step indicated on page 9.

### Removing the Top Cover

Disconnect power and all cables from your K3.

Remove the nine screws to free the top cover as shown in Figure 1. After the cover is open, lift it gently to reach the speaker wire connector. Unplug the speaker then set the top cover aside in a safe place.

**⚠ Whenever you remove screws from a panel, if one screw seems too tight to loosen without damaging it, first loosen the other screws then try again. Sometimes one screw binds in its hole when the other screws are tightened.**

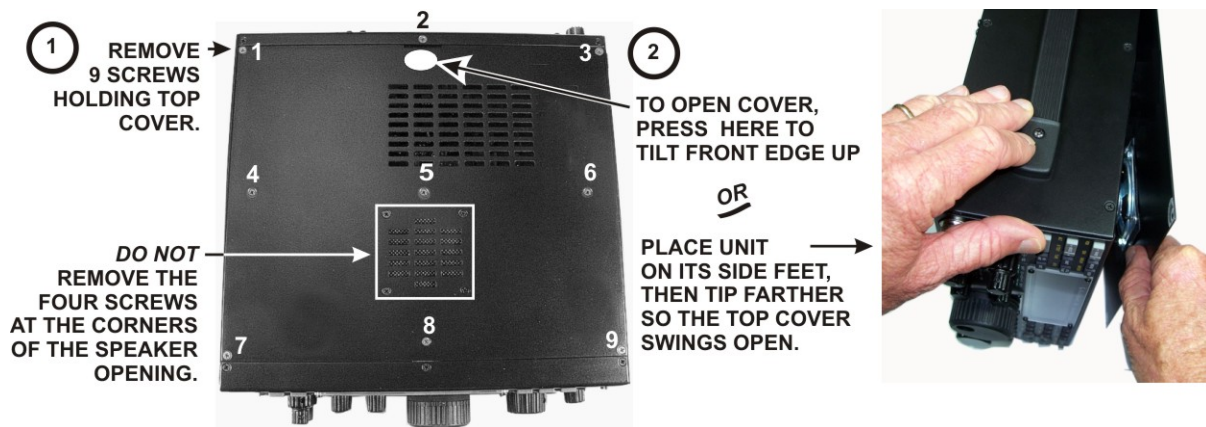


Figure 1. Removing K3 Top Cover.

**⚠ CAUTION:** Touch an unpainted metal ground or wear a grounded wrist strap before touching components or circuit boards inside the K3. See *Preventing ESD Damage* on page 4 for more information.

## Removing the KRX3 Subreceiver Module

If your K3 is equipped with the optional KRX3 Subreceiver, you must remove the subreceiver module to install the KXV3A. The KRX3 subreceiver module is the “L” shaped metal enclosure (see Figure 2). Remove the subreceiver module as follows:

- Remove the chassis stiffener bar that runs across the top of the K3 chassis and is attached to the side panels. If the KPA3 is installed, the stiffener will be attached to the KPA3 shield by two screws. These screws may have nuts and lock washers or they may thread into permanently-attached PEM nuts on the stiffener bar.
- Remove the two 1-1/2” (38 mm) screws and lock washers shown in Figure 2. These screws extend all the way through the KRX3 module and secure it to standoffs mounted on the main RF board that fills the bottom of the K3.

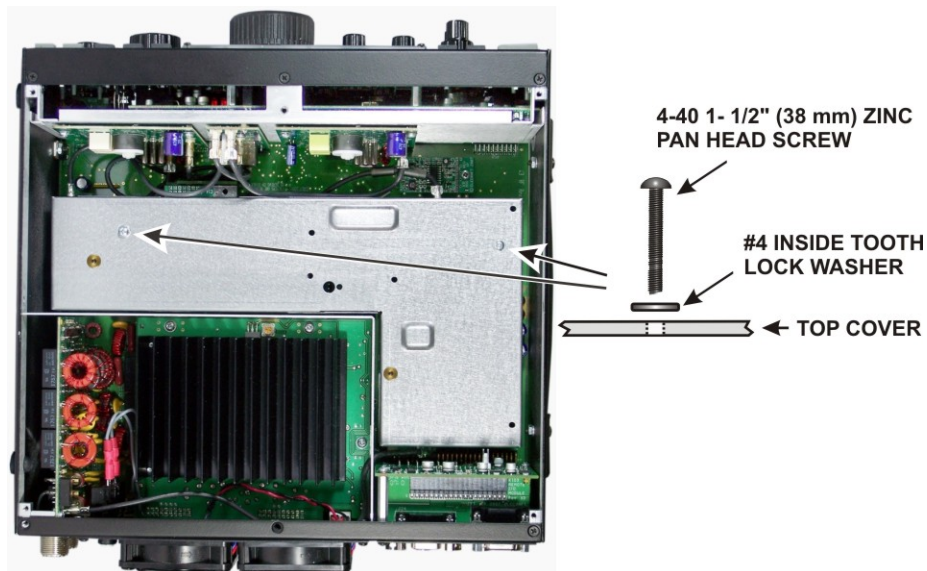


Figure 2. Removing the KRX3 Module.

**⚠ In the following steps you will handle small TMP coaxial connectors. These are friction-fit connectors shown in Figure 3. Handle the connectors by the grips as shown. Do not pull on the coaxial cable.**



Figure 3. TMP Cable Connectors.

- Hold the KRX3 module by the two brass knurled nuts on the top, and lift it straight up to gain access to the small TMP coaxial connectors plugged into the module. There are two along the front. There may be one at the back as well, depending upon the options installed. As you lift the KRX3 module, it will unplug from two small interface circuit boards. One is at the front and the other is at the rear. These small boards may come out with the module or they may remain attached to the K3 main RF board.
- Unplug the TMP coaxial cables leading to the KRX3 module, then lift the module free and set it aside.
- Locate the two small interface circuit boards, remove them and put them in a safe place.

## Removing the Bottom Covers and KIO3 Board

**⚠ If you are replacing a previously-installed KXV3 with the KXV3A, you will not need to remove the bottom covers and install a new TMP cable or cut jumpers W1 and W2 as described in the following steps. Simply remove the existing KXV3 board and replace it with the KXV3A using the existing TMP cable.**

- Remove the Remote I/O module from the KIO3 Board at the rear of the K3 as shown in Figure 4.

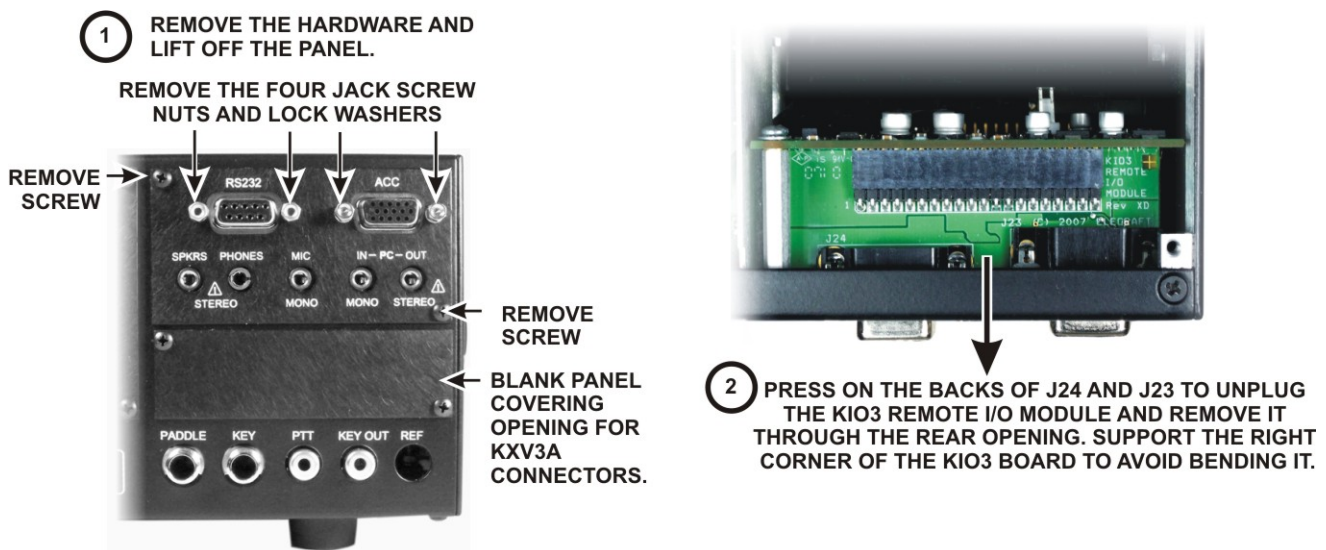


Figure 4. Removing the Remote I/O Module.

- Tilt the top of the KIO3 Main board toward the front panel gently so the standoff at the top clears the lip on the rear panel, then use the standoff at the top to lift up on the board while rocking it from side to side to unplug the connector.
- Remove the blank panel covering the space for the KXV3A module (see Figure 4). This panel will not be replaced.
- Turn the K3 upside down and remove the bottom covers (see Figure 5).

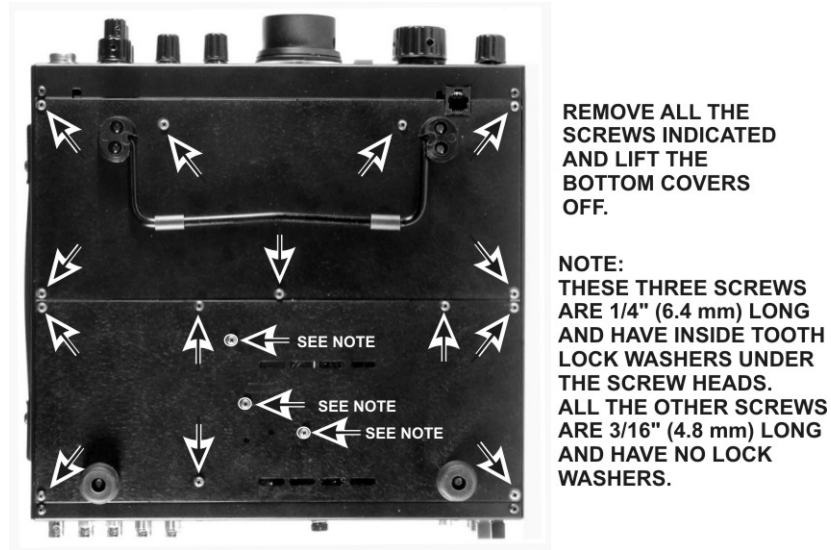


Figure 5. Removing the Bottom Covers.

## Installing the KXV3A Board

**⚠ SPECIAL NOTE TO KIT BUILDERS:** If you were directed here to install your KXV3A module as part of the overall kit assembly, begin with the following step.

- Remove jumpers W1 and W2. The jumpers may be wires plugged into connector J66, or they may be wire jumpers soldered to pads on the RF board (see Figure 6). If soldered to the board, take care not to lose any pieces of wire inside the K3. No more than 1/8" (3mm) of lead length should be left to avoid the possibility of shorting to a nearby circuit. *Take care to identify the correct jumpers. Do not cut nearby jumpers W20 or W21!*

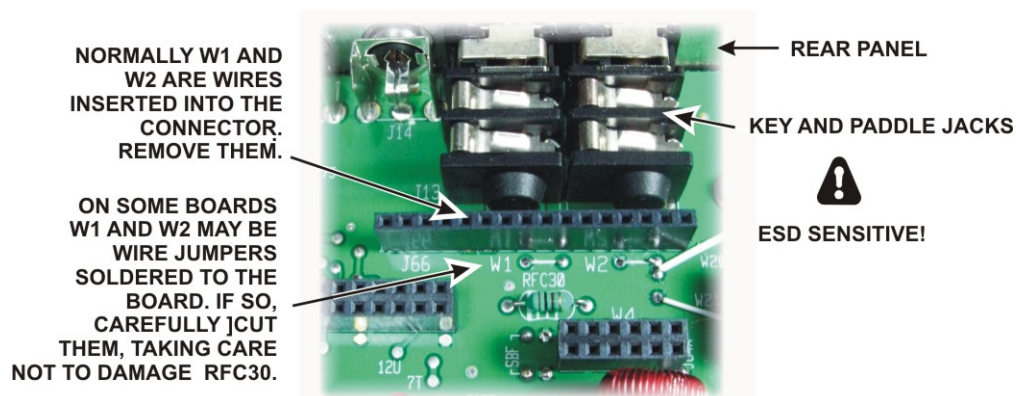


Figure 6. Removing Jumpers W1 and W2.

- ☐ Inspect the white connector at the end of the TMP cable. The side nearest the connector holes must be smooth and flat. Use your diagonal cutters or a hobby knife to cut away any bumps or ridges (see Figure 7).



Figure 7. Preparing TMP Cable for Installation.

**⚠ CAUTION:** The KXV3A board is ESD sensitive. Wear a grounded wrist strap or touch an unpainted metal ground before handling it.

- ☐ Remove the KXV3A board assembly from its packaging. If the black panel is mounted on the assembly, remove it. Set the screws and washers aside to be installed later.
- ☐ Fit the TMP coaxial connector onto J87 on the KXV3A board assembly (see Figure 8).
- ☐ Thread the square connector on the TMP cable through the gap between Q3 and the side of the RF board, then plug the KXV3A board assembly into J66 on the RF board with the BNC connectors facing out through the rear panel (see Figure 8). The pins will just clear the top of J66 when the BNC connectors are up against the top of the opening in the rear panel.

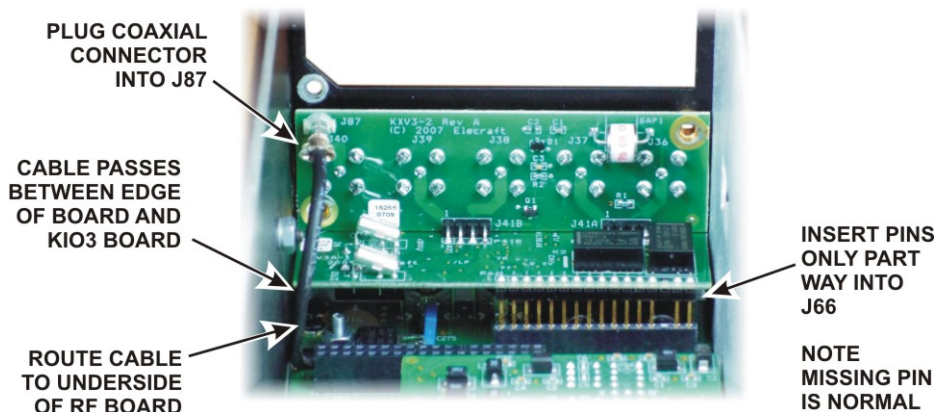


Figure 8. Mounting KXV3A Board.

- ☐ Push the connector pins into J66 only as far as needed so the holes in the KXV3A connector bushings are aligned with the holes in the back panel as shown. These connectors do not fully mate and the bushings hold the board away from the rear panel.

**⚠** As you install components and reassemble your K3, be sure all the screws are in place and secure, but do not over tighten them. Failure to tighten all screws may result in poor shielding of sensitive components, resulting in possible noise or birdies in the receiver as well as other difficult-to-trace problems.

Mount the KXV3A rear panel over the BNC connectors using two 4-40 1/2" (13mm) black pan head screws through the corner holes with #4 inside tooth lock washers and 4-32 nuts on the inside as shown in Figure 9. Do not fully tighten the nuts yet.

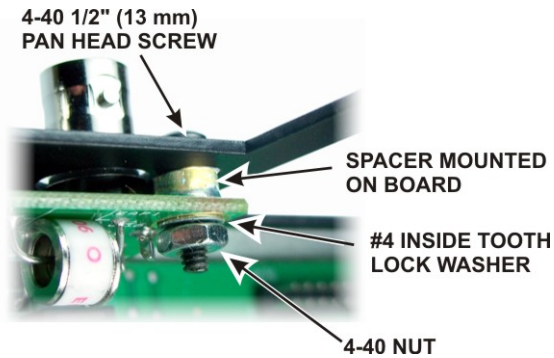


Figure 9. Mounting Hardware.

Adjust the depth the KXV3A board connector mates J66 on the RF board so the KXV3A connector panel is parallel with the back panel. The pins on the KXV3A board connector do not go all the way into J66 as shown in Figure 10.

  
ESD SENSITIVE!

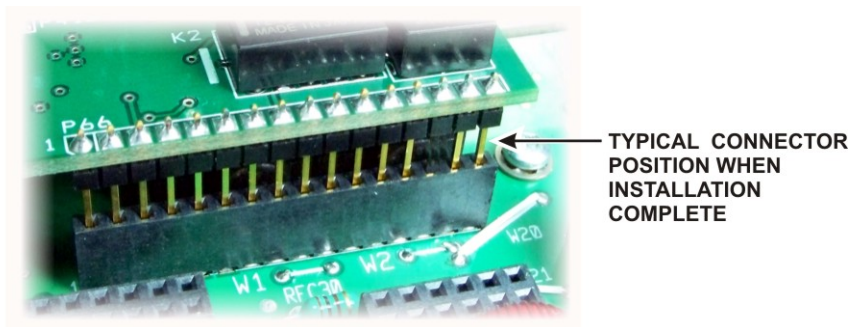


Figure 10. Typical Connector Fit.

Tighten the screws and nuts holding the KXV3A to the back panel that you installed earlier (See Figure 9)

□ Route the coaxial cable from the KXV3A board to connector P86 on the bottom of the RF board as shown in Figure 11. Mate the connector to P86 as shown. If the connector does not appear to fit, check to make sure there are no plastic ridges on the side toward the RF board (see Figure 7).

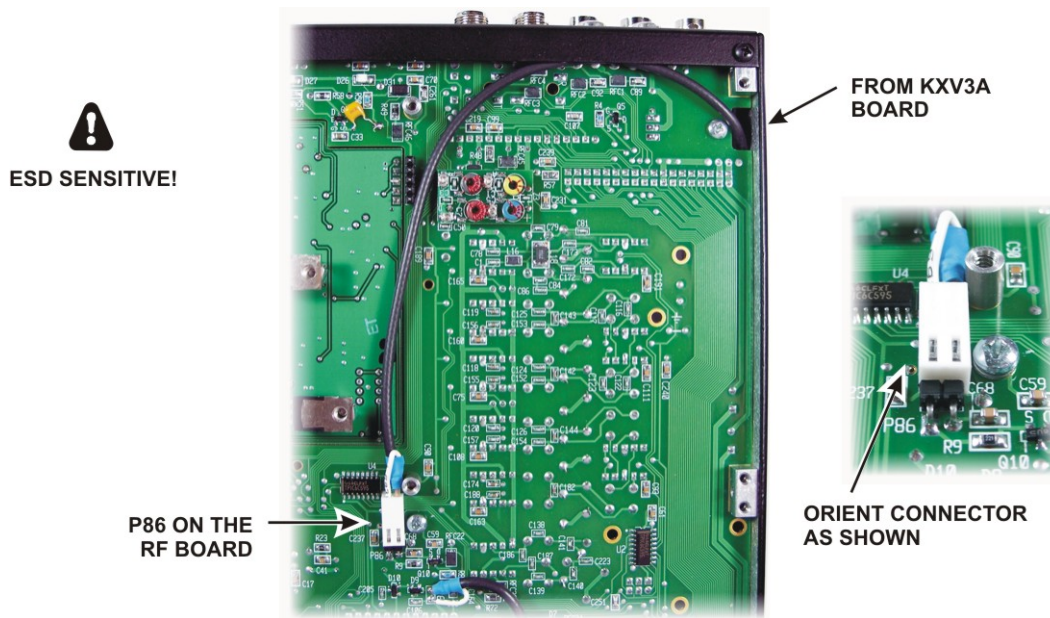


Figure 11. Routing KXV3A Cable to P86.

**⚠ SPECIAL NOTE TO KIT BUILDERS:** If you were directed here to install your KXV3A module as part of the overall kit assembly, installation of the KXV3A module is complete. Return to the K3 Kit Assembly Manual where you left off.

## Reinstalling the KIO3 Board

☐ Replace both bottom covers using the 4-40 black pan head screws you removed earlier. Note that three locations take the 4-40 1/4" (6.4 mm) black pan head screws with lock washers as shown in Figure 5, while the remainder are 4-40 3/16" (4.8 mm) screws. Be sure to replace these screws in the correct locations. Make sure all the screws are secure, but do not over tighten them/

### CAUTION!

**Failure to replace the three 1/4" (6.4 mm) screws with their lock washers in the locations shown in Figure 5 may destroy power transistors in your K3!**

☐ Check the KIO3 board and ensure the screws holding the two standoffs are tight. Also check to ensure the connector on the Audio I/O daughter board is fully mated with J91 on the KIO3 Main board (see Figure 12).

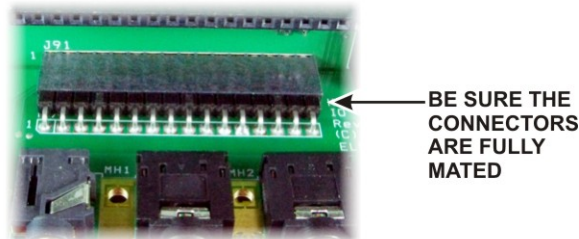


Figure 12. Check KIO3 Audio I/O Board Mating.

☐ Replace the KIO3 Main Board with the Audio I/O daughter board attached in the K3 as shown in Figure 13. The Audio I/O board fits just over the KXV3A board assembly and the TMP cable passes through the space between the edge of the KXV3A board and the KIO3 board. Ensure the KIO3 connectors are fully mated so the standoffs line up with the holes in the rear panel.

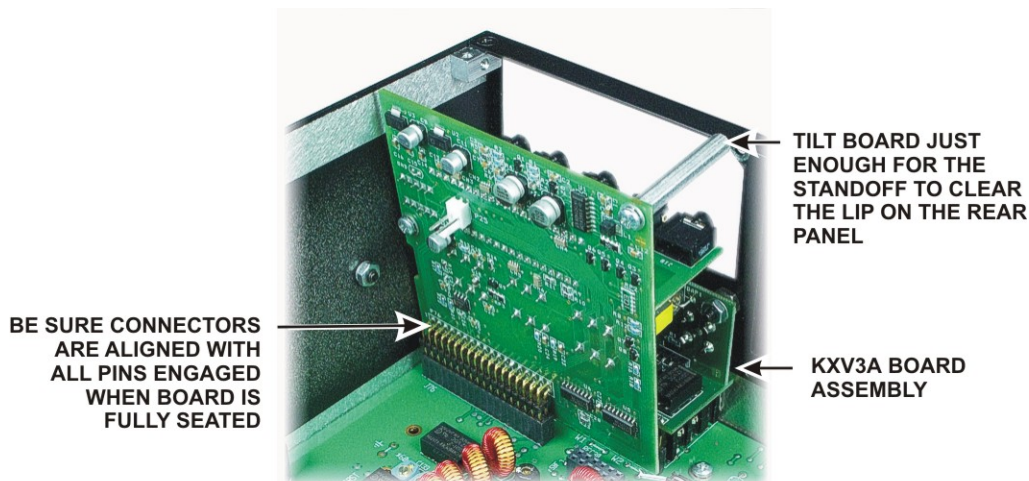


Figure 13. Installing KIO3 Main Board.

Install the KIO3 Digital I/O daughter board as shown in Figure 14. Be careful to support the KIO3 main board as shown while pressing the daughter board in place.

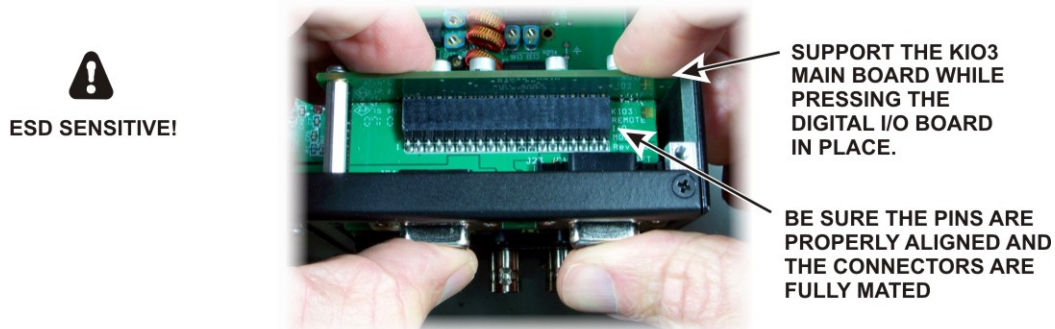


Figure 14. Installing the KIO3 Digital I/O Board.

Install the KIO3 rear panel as shown in Figure 15.

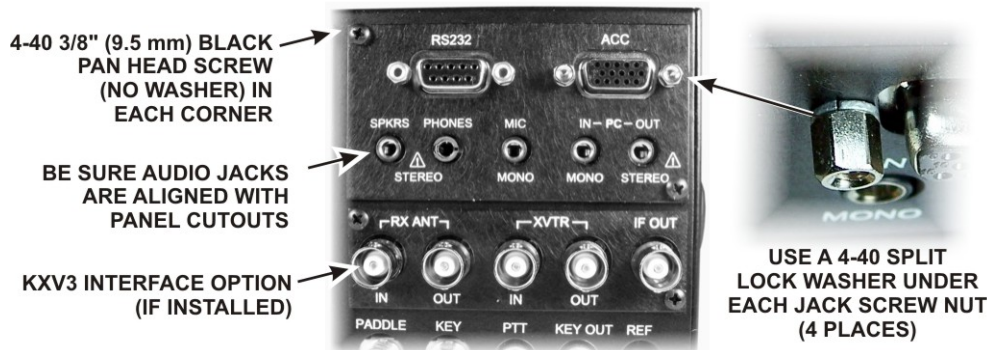


Figure 15. Mounting the KIO3 Rear Panel.

## Reinstalling the KRX3 Subreceiver Module

If your K3 does not have a KRX3 subreceiver, go directly to *Replacing the Top Cover* on page 15.

If your K3 is equipped with the KRX3 Subreceiver, turn to your *KRX3 Subreceiver Installation and Operation* manual, *Installing the KRX3 Subreceiver Module* section to replace the KRX3 module. Be especially careful to do the following as described in that procedure:

- Be sure the cover on battery BT1 on the K3 RF board is in place. The cover is essential to avoid shorting the battery. The outer rim of the battery is the positive terminal, and may come in contact with the grounded bottom of the KRX3 enclosure if the cover is not in place.
- Be sure all the TMP cables are properly connected or your K3 will not operate properly.
- Be sure the TMP cable to J85 on the subreceiver module is routed as shown to prevent signal leakage between the KRX3 and the K3 main receiver.

## Replacing the Top Cover

- Hold the top cover above the K3, route the speaker wire under the stiffener bar and plug it into P25 on the KIO3 board at the left rear of the K3 as shown in Figure 16.

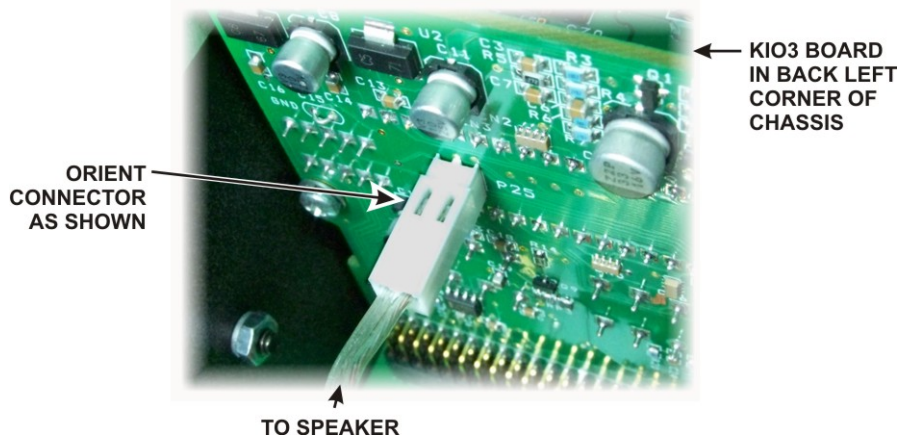


Figure 16. Connecting Speaker Cable.

- Position the top cover on the K3. Note that the tab on the back center goes under the rear lip of the K3 rear panel. Secure the top cover with the nine 4-40 3/16" (4.8 mm) black flat head screws you removed earlier.

### **⚠ REPLACE ALL THE SCREWS!**

**The K3's chassis has excellent rigidity despite its light weight. The screws that hold the top cover in place are an important part of the structural design. Please be sure to replace all the screws and verify they are tight whenever you replace the cover or other panels**

## Enabling the KXV3A Module

**⚠ Your KXV3A will not operate correctly until the following steps are completed!**

- Reconnect power to your K3 and turn it on.
- Refer to your Owner's manual and enable the KXV3A as described under *Configuration, Option Module Enables*.

- Perform the Transmitter Gain Calibration as follows. **This is essential for your KXV3A to operate properly with a transverter or any equipment using the RF output.**

If you do not have a computer, perform the manual *Milliwatt TX Gain Calibration* procedure in the *Calibration Procedures, Transmitter Gain* section of your Owner's manual.

If you have a Windows, Linux or Macintosh computer with an RS232 interface and cable, and an internet connection, perform the automated TX Gain calibration using the K3 Utility program as follows:

- Ensure you have the Elecraft K3 Utility Ver. 1.1.12.29 or later on your computer. The utility is available for downloading from the Elecraft web site: [www.elecraft.com](http://www.elecraft.com)
- Connect your computer to your K3's RS232 port and start the K3 Utility program.
- Click on the K3 Utility "Configuration" tab, "Calibrate Transmitter Gain..." and follow the instructions to perform the 1 Milliwatt Transmitter Gain Calibration procedure.

That completes the installation of the KXV3A interface in your K3 transceiver.