



ELECRRAFT® KXAT100

100 Watt AUTOMATIC ANTENNA TUNER

INSTALLATION INSTRUCTIONS

Revision A, January 6, 2014
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Introduction

This manual will guide you through the installation of a KXAT100 antenna tuning unit (ATU) into your assembled KXAT100 amplifier.

The KXAT100 antenna tuning unit (ATU) fits inside the KXPA100 enclosure.

We're confident that you'll find the installation an easy process. The KXAT100 consists of a single fully-assembled printed circuit board. Only a few hand tools are needed to assemble your kit (see page *Tools Required for Assembly* on page 4).

⚠ The KXAT100 printed circuit board is shipped in ESD-safe bubble wrap. Do not handle it without first taking the ESD precautions listed on page 5.

Should you have difficulty, you'll have our full support via phone and e-mail. In addition, we hope you'll join our growing and enthusiastic community of owner/builders via the Elecraft reflector.

Complete operating instructions for the KXAT100 can be found in the Owner's Manual.

Customer Service and Support

Technical Assistance

You can send e-mail to kx3support@elecraft.com and we will respond quickly – typically the same day Monday through Friday. If you need replacement parts, send an e-mail to parts@elecraft.com. Telephone assistance is available from 9 A.M. to 5 P.M. Pacific time (weekdays only) at 831-763-4211. 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

If necessary, you may return your Elecraft product to us for repair or alignment. (Note: We offer unlimited email and phone support, 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 turnaround 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 1-Year Limited Warranty

This warranty is effective as of the date of first consumer purchase (or if shipped from the factory, the date the product is shipped to the 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 at time of order to ensure 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 us for warranty repair; we pay shipping to return the repaired equipment to you by UPS ground service or equivalent to the continental USA and Canada. For Alaska, Hawaii, and other destinations outside the U.S. and Canada, actual return shipping cost is paid by the 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, battery leakage or corrosion, 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.

Tools Required for Assembly

1. ESD Protection (see *Preventing Electrostatic Discharge Damage*, pg 5)
2. #0 and #1 size Phillips screwdrivers. To avoid damaging screws and nuts, a power screwdriver is *not* recommended. Always use the screwdriver that best fits the screw in each step.
3. Needle-nose pliers, 4" to 6" is ideal.
4. Soft cloth or clean, soft static dissipating pad to lay cabinet panels on to avoid scratching.

Preventing Electrostatic Discharge Damage

Sensitive components may be damaged by Electrostatic Discharge (ESD) simply by touching them or a circuit board containing them unless you take specific steps to prevent such damage. Damage may occur with static discharges far too little for you to notice.

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

Parts which are especially ESD-sensitive are identified in the parts list and in the assembly procedures.

We strongly recommend you take the following anti-static precautions (listed in order of importance) to ensure there is no voltage difference between the components and any object that touches them:

- Leave ESD-sensitive parts in their anti-static packaging until you install them. The packaging may be a special plastic bag that allow static charges to flow harmlessly over their surface, or a component's leads may be inserted in conductive foam that keep them at the same potential.
- Wear a conductive wrist strap with a series 1-megohm resistor that will constantly drain off any static charge that accumulates on your body. 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.

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 live circuits with any part of your body.

- Use a grounded anti-static mat on your work bench (see below).
- If you pick up a pc (printed circuit) board that was not placed on an anti-static mat or in an anti-static package, first touch a ground plane connection on the board such as a connector shell or mounting point.
- If you use a soldering iron to work on a circuit board, be sure your iron has an ESD-safe grounded tip tied to the same common ground used by your mat and wrist strap.

Choosing an Anti-Static Mat

An anti-static mat must bleed off any charge that comes in contact with it at a rate slow enough to avoid a shock or short circuit hazard but fast enough to ensure dangerous charges cannot accumulate. Typically, a mat will have a resistance of up to 1 Gigaohm (10^9 ohms). Testing a mat requires specialized equipment, so we recommend that you choose an anti-static mat that comes with published resistance specifications and clean it as recommended by the manufacturer. Testing has shown that many inexpensive mats that do not specify their resistance have resistance values much too high to provide adequate protection, even after they were cleaned and treated with special anti-static mat solutions.

Suitable anti-static table mats are available from many sources including:

- U-line (Model 12743 specified at 10^7 ohms)
- Desco (Model 66164, specified at 10^6 to 10^8 ohms)
- 3M™ Portable Service Kit (Model 8505 or 8507, specified at 10^6 to 10^9 ohms)

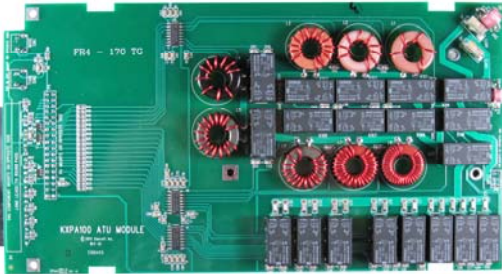

Unpacking and Inventory

⚠ CAUTION


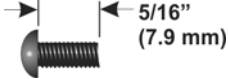

Do not handle the circuit board or touch components and boards inside the KXPA100 without anti-static protection! Doing so may damage sensitive components. See *Preventing Electrostatic Discharge Damage* on page 5 for important information.

Before starting, check to be sure that you have the parts listed below.

KXAT100 Core Assembly Box E850594

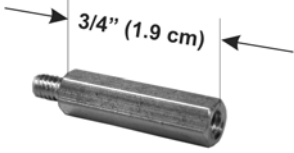


ILLUSTRATION	DESCRIPTION	QTY.	ELECRAFT PART NO.
	KXPA100 ATU PCB Assy	1	E850572
	KXPA100 Front Panel for ATU	1	E850596

KXPA100 SO239 TMP Cable 4" Envelope E850584

ILLUSTRATION	DESCRIPTION	QTY.	ELECRAFT PART NO.
	SO239 Connector with 4" (10.2 cm) cable and TMP connector	1	E850600
	Screw, Pan Head, Black 4-40, 5/16" (7.9 mm)	4	E700294
	Nut, 4-40 with captive star washer	4	E700191

(Continued on next page)

KXAT100 Hardware Envelope E850601

ILLUSTRATION	DESCRIPTION	QTY.	ELECRAFT PART NO.
	M-F Standoff, 4-40 3/4" (1.9 cm)	4	E700293
	Switch Cap	2	E980250
	Lock Washer, Split Ring, #4	4	E700010

Assembly Procedure

⚠ IMPORTANT ASSEMBLY INFORMATION

- **Check off the steps as you finish each one.** Skipping a step is easy to do without taking a moment to be certain that you completed the previous step. This can result in serious damage to your KXPA100 or, at a minimum, having to disassemble it to correct the mistake.
- **Start all the screws in an assembly before tightening.** When mounting parts with multiple screws or adjacent parts that fit together, start all the screws in the threads before tightening any of them. If you find that a screw is binding, loosen the other screws to free it, and then re-tighten.
- **Ensure all screws are tight but do not over-tighten.** Do not attempt to turn screws and nuts beyond the point at which the lock washer is compressed. Screws without lock washers should be tightened only until you feel significant resistance to further turning. Do not attempt to turn screws or nuts 1/4 turn beyond “tight”.
- **Threads can be easily stripped** if too much force is applied when tightening screws. Use the correct size hand tool and apply only moderate torque. Do not use a power screwdriver!
- **Do not adjust the turns on any toroids.** The position of the turns on the cores of many toroids has been adjusted at the factory to produce exactly the inductance needed for the circuit to work properly. Any attempt to adjust their position or to make a coil look “nicer” may seriously degrade circuit performance.
- **Remember your ESD protection.** Failure to observe ESD precautions may result in your KXPA100 not operating at all, or operating but not meeting normal factory performance specifications due to damaged components. See *Preventing Electrostatic Discharge Damage* on pg 5.
- **Handle Printed Circuit (PC) Boards by their Edges.** Avoid unnecessary mechanical stress on any pc board components by careless handling.

Disconnect all cables from your KXPA100 and place it upside down, resting on the heat sink fins, on your work table.

⚠ All of the screws that you will remove are identical and interchangeable. Also, they are the same length as the screws you got with the KXAT100. Take care to save all of them and the other hardware you remove to reassemble the amplifier.

Remove the four corner feet. Each foot is held in place with six screws, spacers and lock washers. Remove three screws, spacers and lock washers on the side as shown in Figure 1 and slide the foot off of the other three screws, spacers and lock washers at the end panel.

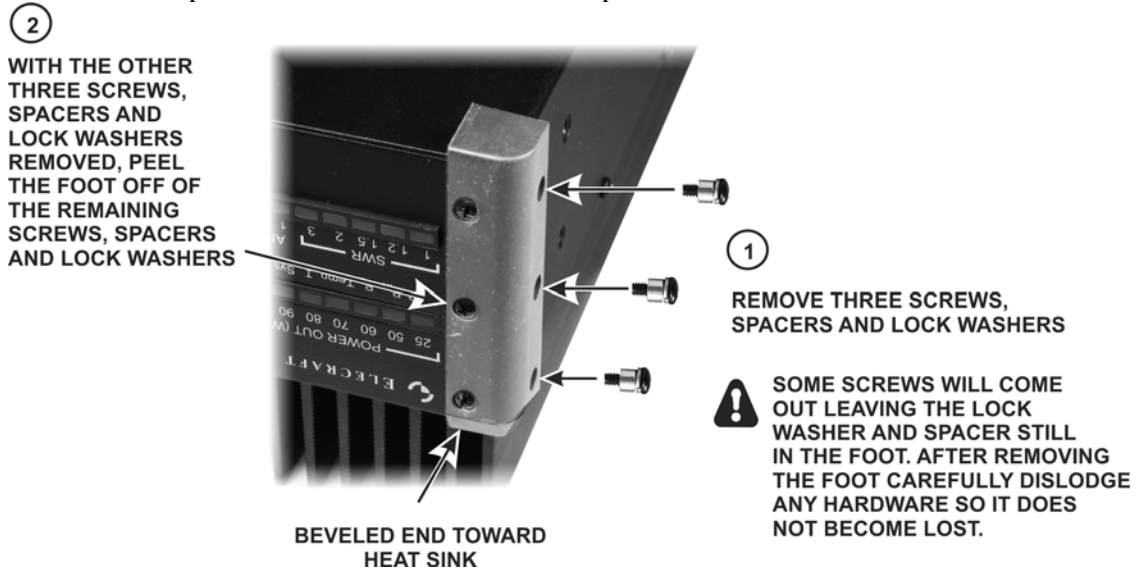


Figure 1. Removing the Feet.

Remove the six screws, lock washers and spacers to free the front panel and lift it off. Take care not to lose the lock washers or spacers on each screw. Set the panel aside. It will be replaced with a new front panel later.

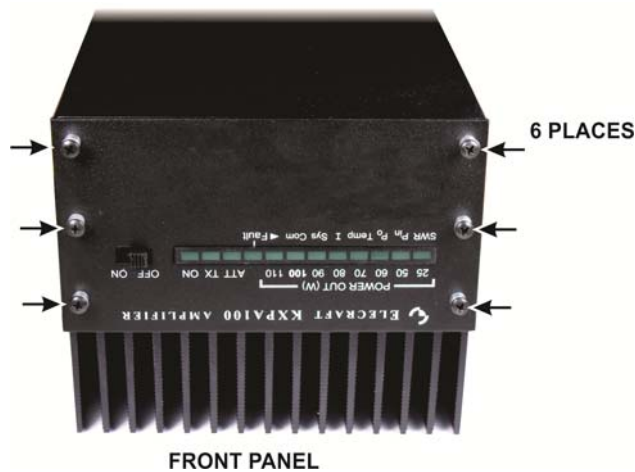


Figure 2. Removing the Front Panel.

- On the rear panel, remove the nut holding the RS232 (PC) connector as shown in Figure 3.

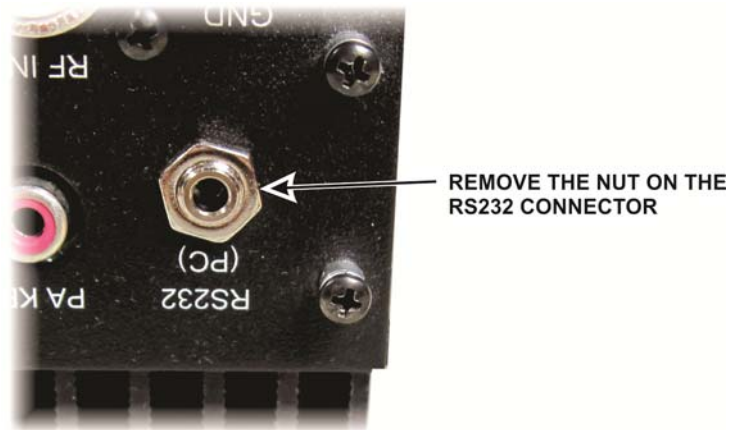


Figure 3. Removing the RS232 Connector Nut.

- Remove the six screws, lock washers and spacers on the rear panel as shown in Figure 4. The rear panel will be held in place by the coaxial cables to the SO-239 connectors.



Figure 4. Removing the Rear Panel.

☐ Carefully unplug the coaxial connectors as shown in Figure 5. The TMP connectors are a friction fit and will pull straight up. Use your needle nose pliers to grip the metal connectors if space is too tight to reach them with your fingers.

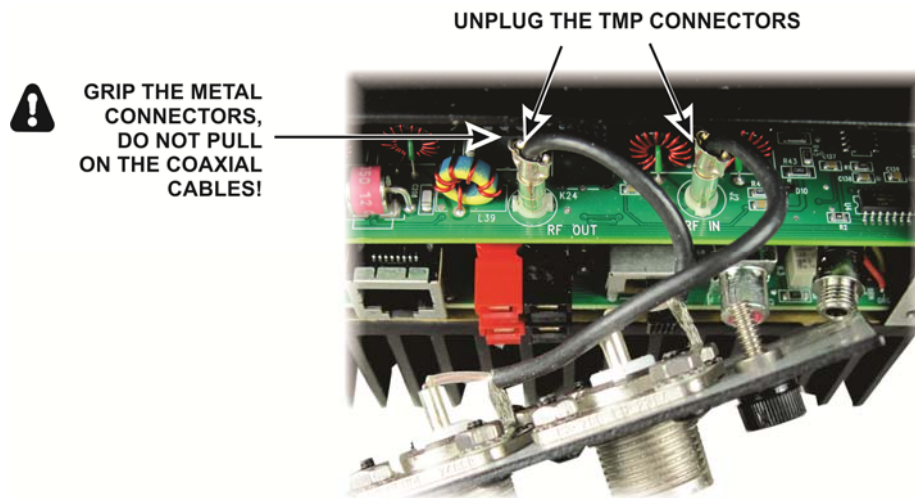


Figure 5. Unplugging the TMP Connectors.

☐ Remove the four screws from each side of the bottom U-cover as shown in Figure 6 and lift it straight up off of the KXPA100.

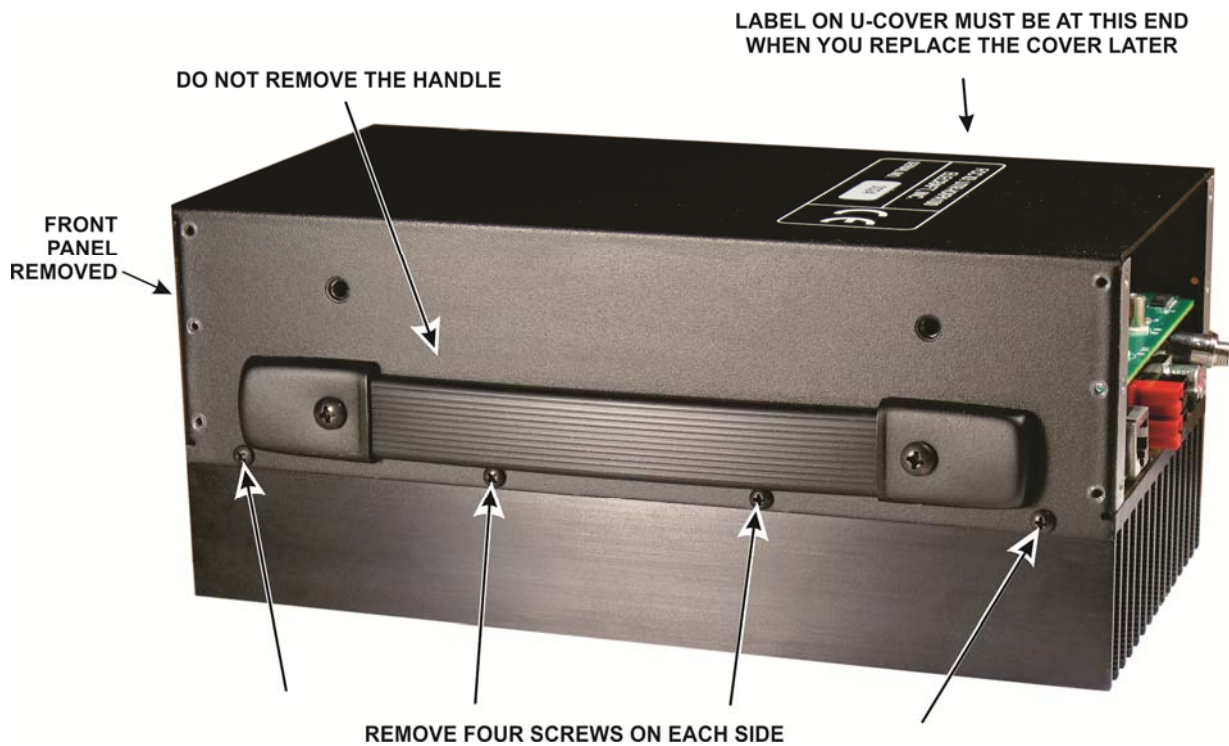


Figure 6. Removing the Bottom Cover

□ The KXPA100 circuits are contained on two pc boards: the power amplifier (PA) module mounted on the heat sink and the low pass filter (LPF) module mounted on standoffs above the PA module. Remove the four screws and lock washers holding the LPF module to the standoffs and replace them with standoffs and lock washers as shown in Figure 7.

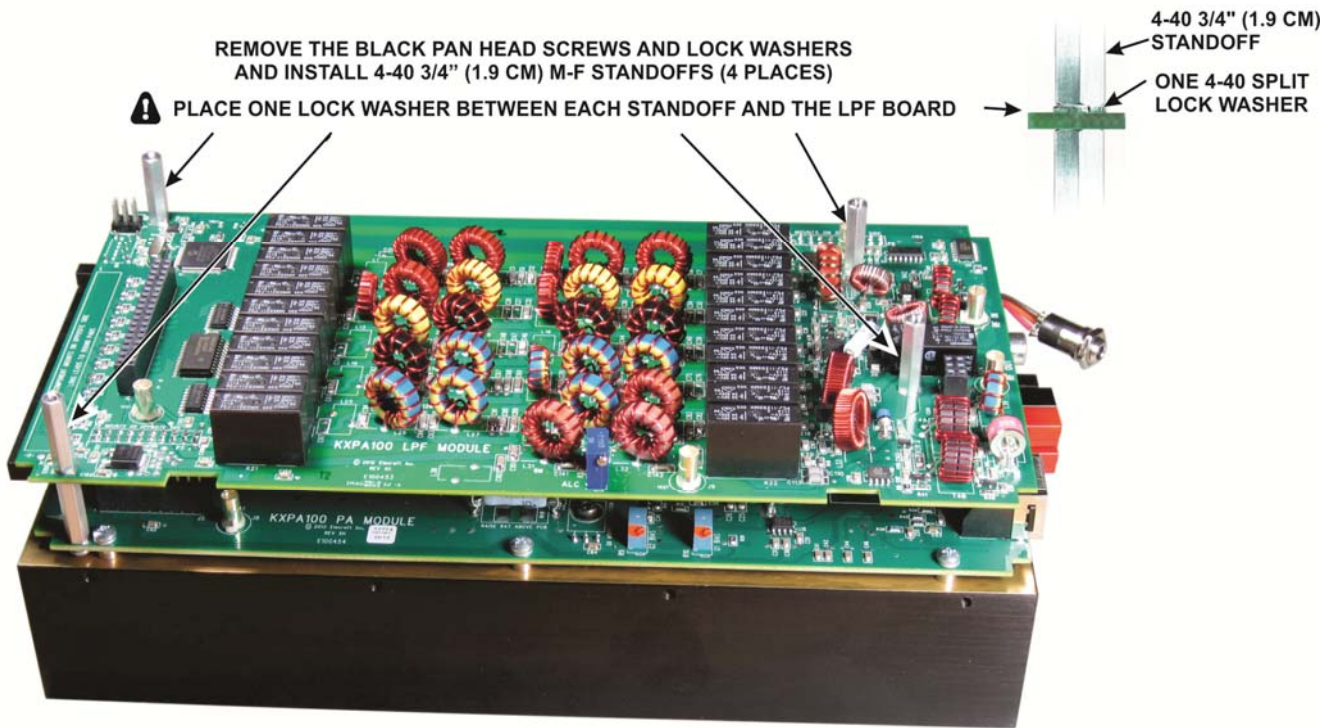


Figure 7. Installing Standoffs for the ATU Module.

□ Taking ESD precautions, remove the KXAT100 ATU module pc board from its packaging. Place it on the standoffs you just installed so that the two plugs on the ATU module mate with their corresponding sockets on the LPF module as shown in Figure 8. Be sure that both connectors are properly aligned so all of their pins engage.

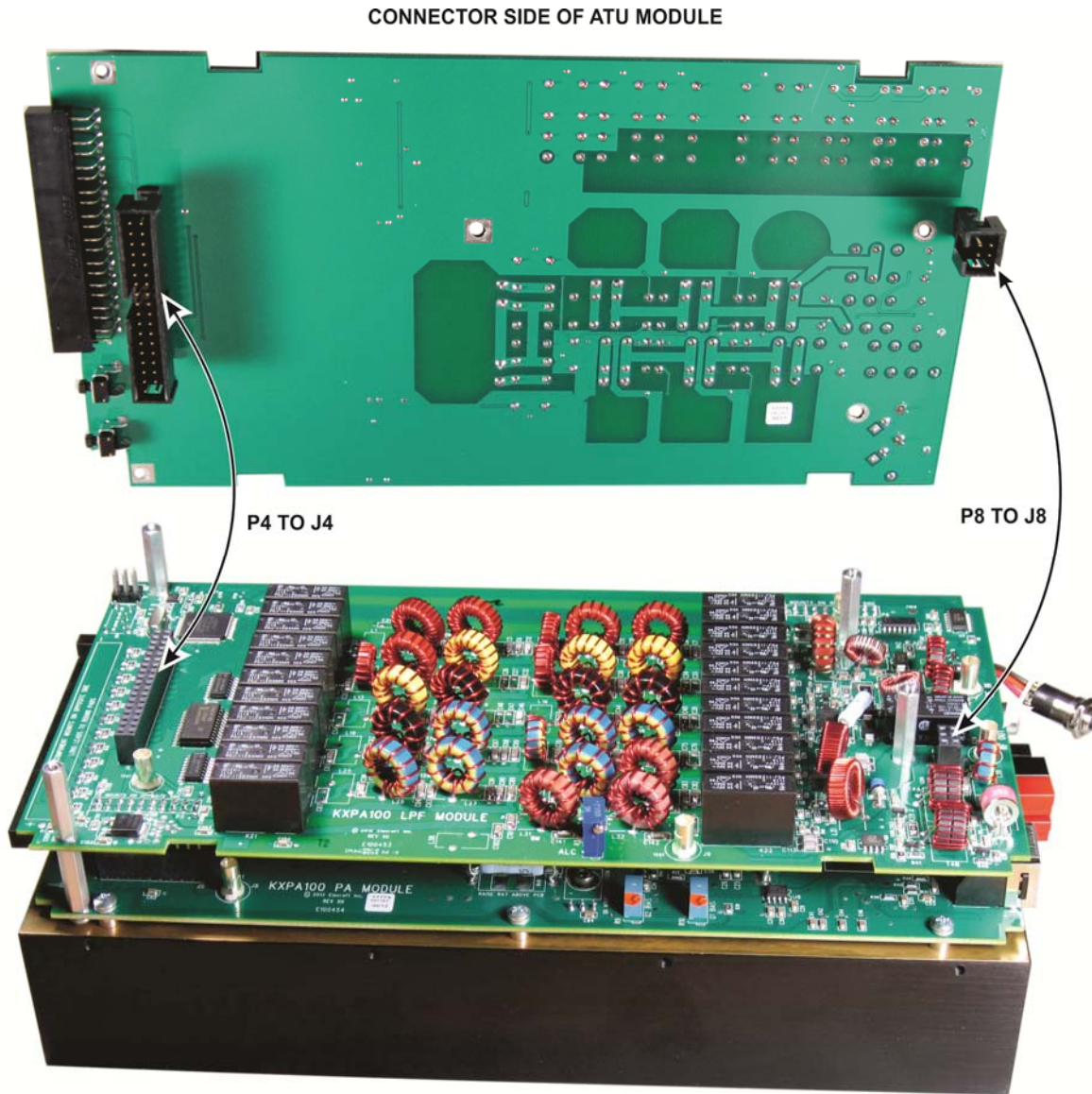


Figure 8. Mating the ATU Module with the LPF Module.

Secure the ATU module pc board to the four standoffs using the screws and lock washers you removed earlier as shown in Figure 13. Note that there is a hole near the center of the ATU module that is not used.

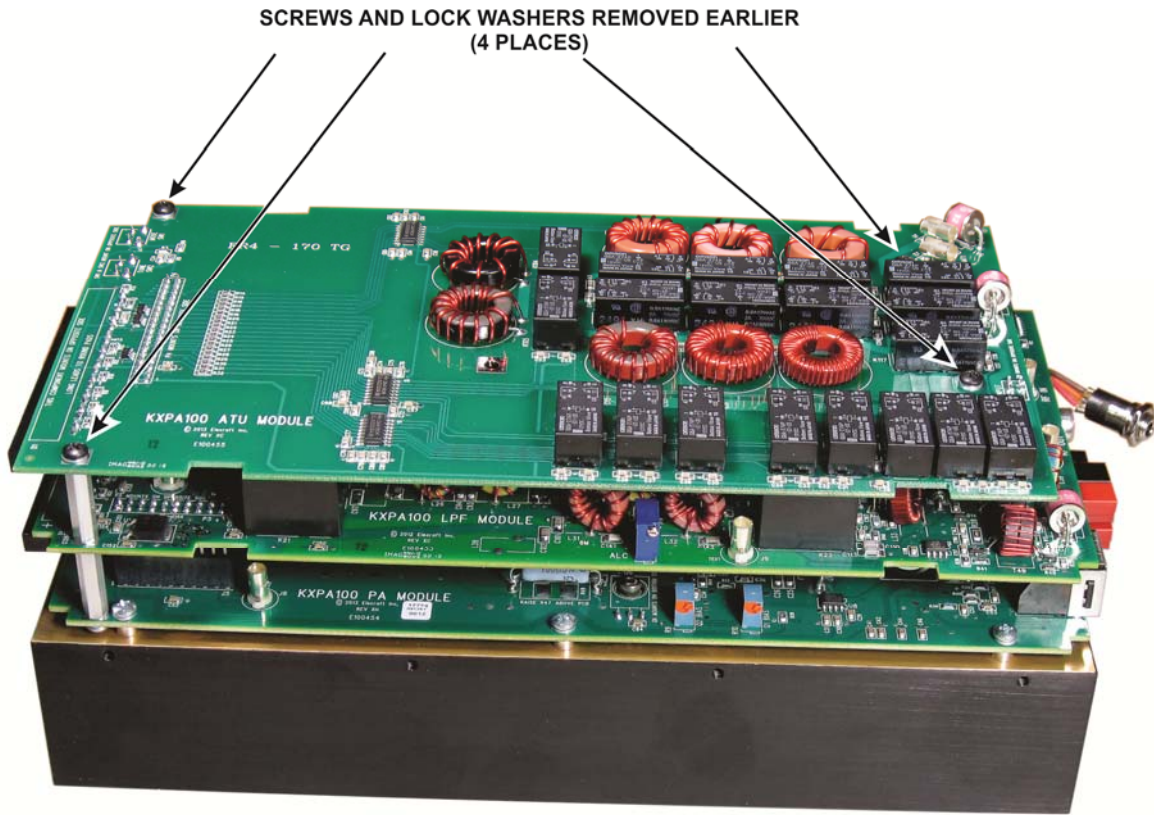


Figure 9. Securing the ATU Module to the Standoffs.

Press the black switch caps on the MODE and TUNE switches next to the LEDs on the ATU module (see Figure 10). Do not press hard. They are a simple friction fit.

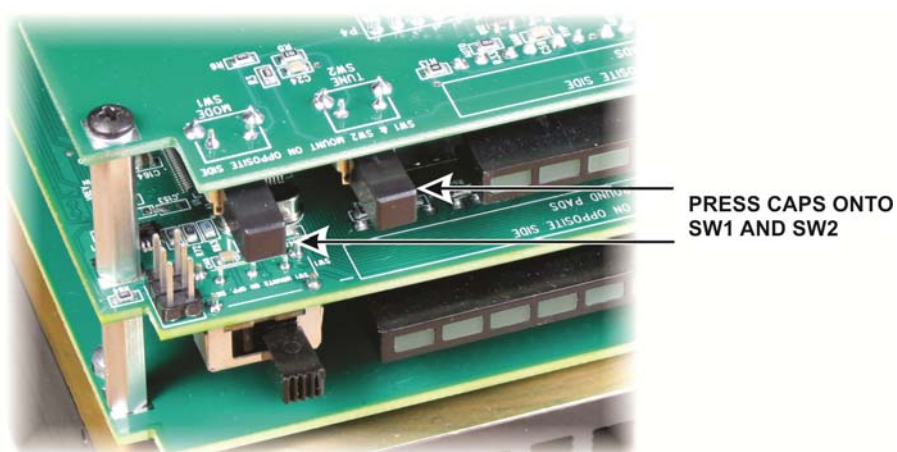


Figure 10. Installing Switch Caps on ATU Module.

On the rear panel that you removed earlier, remove the hole plug from the ANT 2 opening. The plug has small parts that latch it against the inside surface of the rear panel. Squeeze them so they will slip through the opening to release the plug.

Locate the envelope containing the SO-239 connector with a 4" (10.2 cm) and install it in the ANT 2 opening on the rear panel as shown in Figure 11.

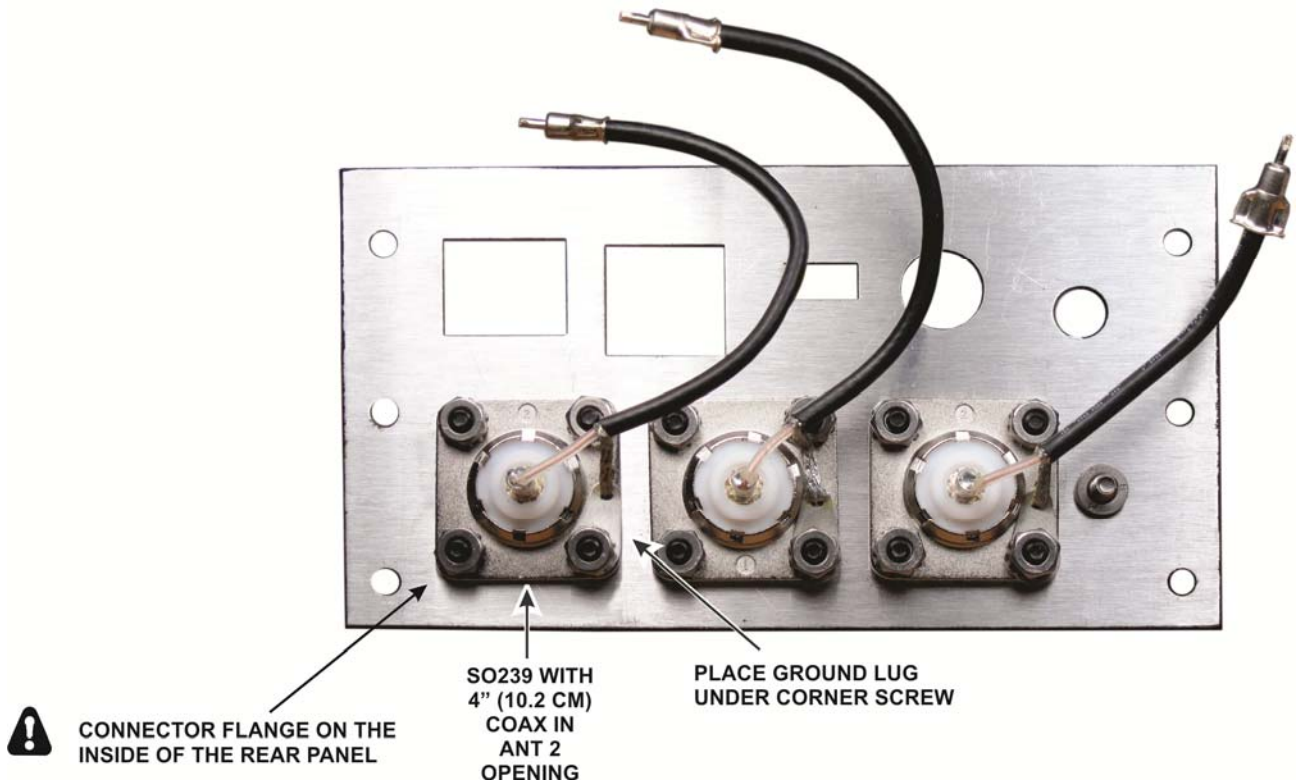


Figure 11. Installing the ANT 2 Connector in the Rear Panel.

Connect the cables with the TMP connectors on the rear panel to the LPF and ATU module pc boards as shown in Figure 12.

⚠ CAUTION

Failure to properly connect the cables may result in damage to your KXPA100.

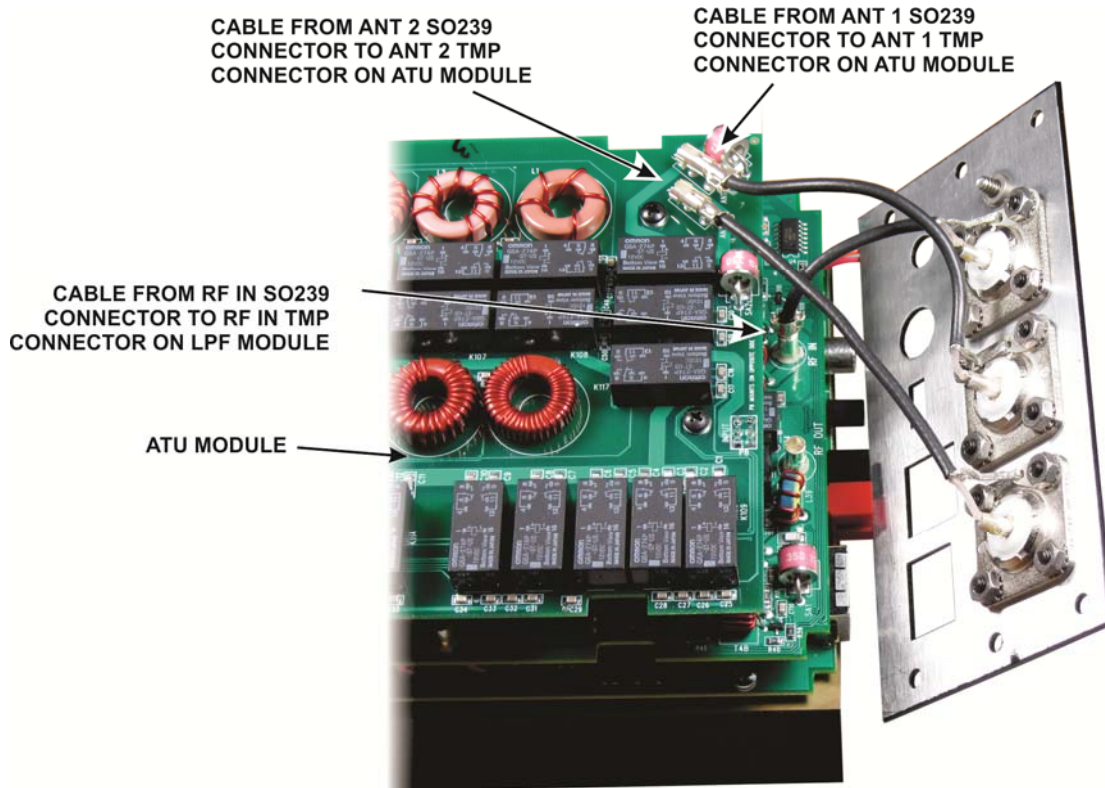


Figure 12. Connecting Rear Panel Cables to the LPF and ATU PC Boards.

Pass the small jack through the hole marked RS232 (PC) on the rear panel and secure it with the hex nut your removed earlier (see Figure 13).

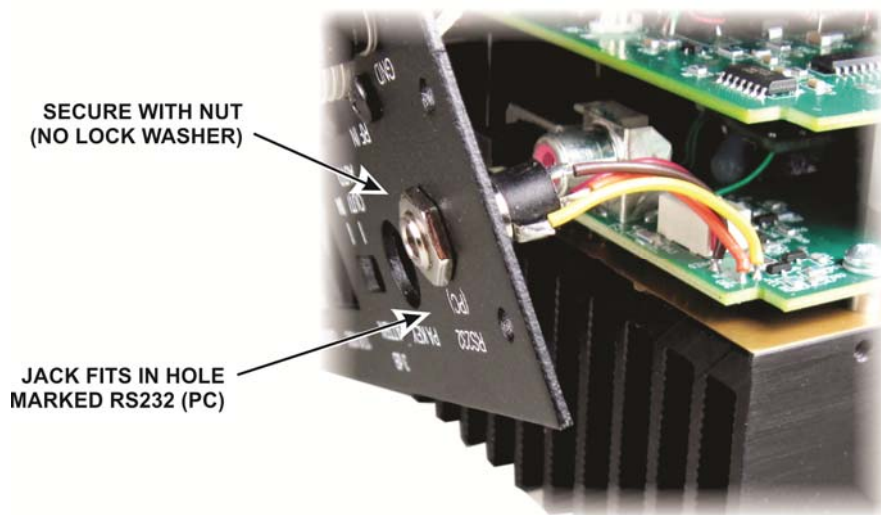


Figure 13. Mounting the RS232 Connector in the Rear Panel.

⚠ CAUTION

When replacing the bottom U-cover in the next step, be sure it is oriented with the lettering toward the rear panel as shown in Figure 6. Reversing the orientation will cause the threaded bushings for the handle to strike the circuit boards.

- Replace the bottom U-cover so the end with the label nearest the rear panel (the correct orientation is shown in Figure 6).
- Secure the bottom cover with eight screws, four on each side as shown in Figure 6. Do not use lock washers under these screws.
- Position the rear panel so the Control, 13.8 VDC, PA Key connectors and the 3 dB ATTEN switch pass through the openings in the panel as shown in Figure 14. Tuck the cables to the SO-239 connectors in the space between the circuit board and the cover as needed. Secure the panel with six screws, spacers and lock washers as shown.

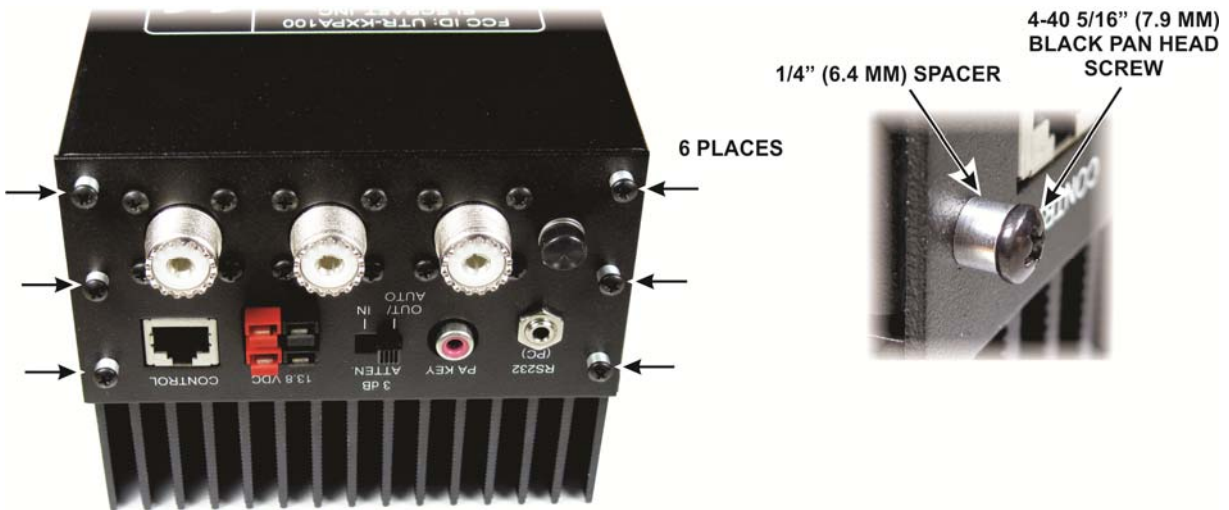


Figure 14. Mounting the Rear Panel.

- Unwrap the new front panel. The inside surface should be clean bare metal. It was taped to avoid overspray during painting. Remove any tape still present. If a large area is taped, you can break it away near one corner using a blunt tool that fits through a screw hole as shown in Figure 15 and then peel it off of the panel.



Figure 15. Removing Tape from the Front Panel.

Position the front panel so the LEDs, OFF/ON switch, TUNE and MODE buttons fit through the openings. Secure it with screws, lock washers and spacers that you removed from the original front panel. (see Figure 16).

⚠ Start securing the front panel with screws, lock washers and spacers in the opposite corners of the front panel and check to ensure the TUNE and MODE switches move freely. They only move a small amount when pressed but you should feel a definite movement. If necessary, loosen the hardware at one corner and adjust the front panel position slightly. When you are satisfied, install the remaining screws, lock washers and spacers. If you failed to install the lock washers under each standoff as shown in Figure 7 on page 11, the two rows of LEDs will be too close together to fit in the openings. In that case you must disassemble the unit and install the lock washers as shown in Figure 7 on page 11.

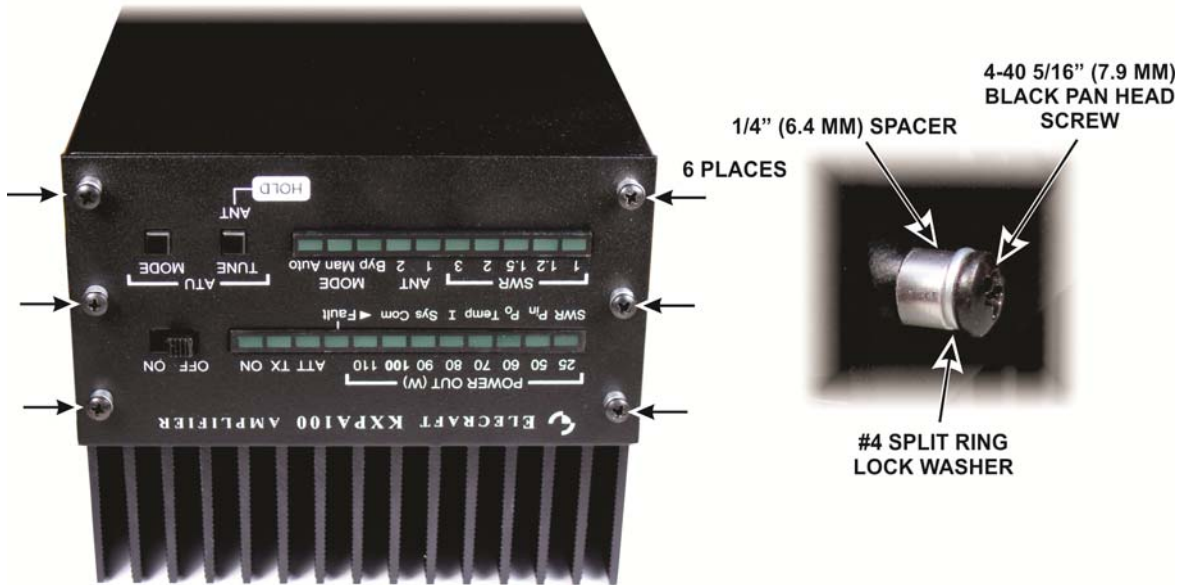


Figure 16. Installing the New Front Panel.

Replace the corner feet. Press each foot over the three screws, spacers and lock washers on the end panel, and then replace the three screws, spacers and lock washers through the remaining holes into the side panel (see Figure 1 on page 8).

That completes the installation of the KXAT100 Antenna Tuner module in your KXAT100 Amplifier. Complete operating instructions are included in your KXPA100 Owner's manual.