

# Elecraft K3

## Installing the KSYN3 Synthesizer Board Stiffener

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This modification adds a plate to stiffen the KSYN3 synthesizer board to reduce the effects of mechanical vibration on the KSYN3 voltage-controlled oscillator (VCO). Such vibrations may occur in rare cases when the internal speaker is used at very high volume or with certain sidetone frequencies.







If your K3 is equipped with the KRX3 subreceiver it will have two KSYN3 synthesizers. Both boards should be modified if the user chooses to make this modification.

The modification may require removing a leaded resistor and replacing a surface mount resistor on the KSYN3 board. Detailed instructions for doing this without special SMD handling tools are included. Also, you will need a temperature controlled ESD-safe soldering iron with a fine tip and fine rosin core solder and a DMM for making resistance measurements.

### Does My K3 Have This Modification?

To check your K3, remove the top cover and inspect the KSYN3 board(s) mounted on the front panel shield (see Figure 2 on page 2). Boards containing the modification will have a large metal plate mounted on them as shown in Figure 7 on page 6.

### Parts Included

Photo	Description	Quantity	Part Number
	Stiffener Plate with Self-Adhesive Backing <b>⚠ Caution: Do not remove the protective paper cover from the adhesive until instructed to do so.</b>	1	E850398
	Resistor SMD, 56K ohm (strip with spares)	1	E850400
	Screw, Pan Head, Zn, 4-40 1/2" (12 mm)	2	E700196
	Screw, Pan Head, Zn, 4-40 3/8" (9.5 mm)	1	E700036
	Nut, 4-40	1	E700011
	Lock Washer, #4, Inside Tooth	3	E700010
	Lock Washer, 4-40, Split	2	E700004

## Removing the KSYN3 Board(s)

- ☐ Remove the K3 top cover as shown in Figure 1.

**⚠ CAUTION:** 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.

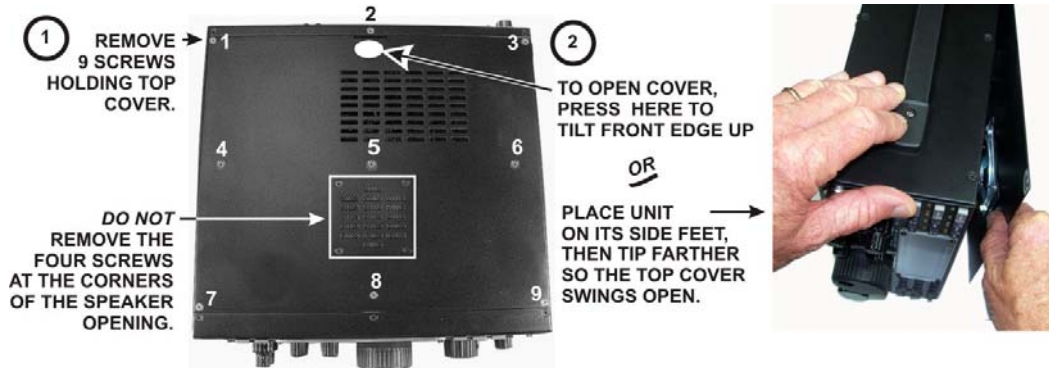


Figure 1. Removing the Top Cover.

**⚠ CAUTION:** Touch an unpainted metal ground or wear a grounded wrist strap before touching components or circuit boards inside the K3.

- ☐ If you are mounting the stiffener on the main KSYN3 board (see Figure 2) and the K144XV 2-meter option is installed, refer to your K144XV manual and remove the chassis stiffener that runs across the top of the K3 and the K144XV module.
- ☐ Remove the KSYN3 board(s) to be modified (see Figure 2). Each board plugs into the RF board on bottom of the K3 and is held in place with two screws at the top. Loosen the screws and tip the boards to remove the split lock washers. Unplug the TMP coaxial cables as you lift each board out. The TMP connectors are held by friction. Pull only on the metal ears of the TMP plug. Do not pull on the coaxial cables.

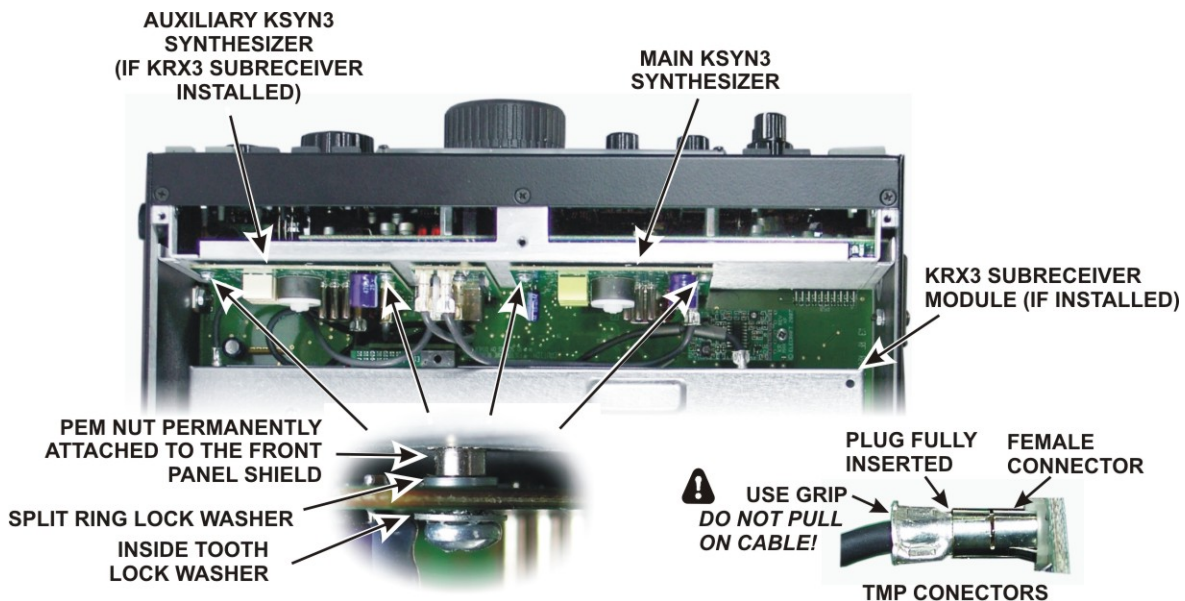


Figure 2. Removing the KSYN3 Boards.

## Preparing the KSYN3 Board for Mounting the Stiffener

- Check the front of the KSYN3 board for the leaded 180K (first three colors: brown, gray, yellow) resistor shown in Figure 3. Not all KSYN3 boards have this resistor. If present, de-solder and remove it. The metal stiffener will attach to the front of the pc board covering this area with a thin layer of tape for insulation.

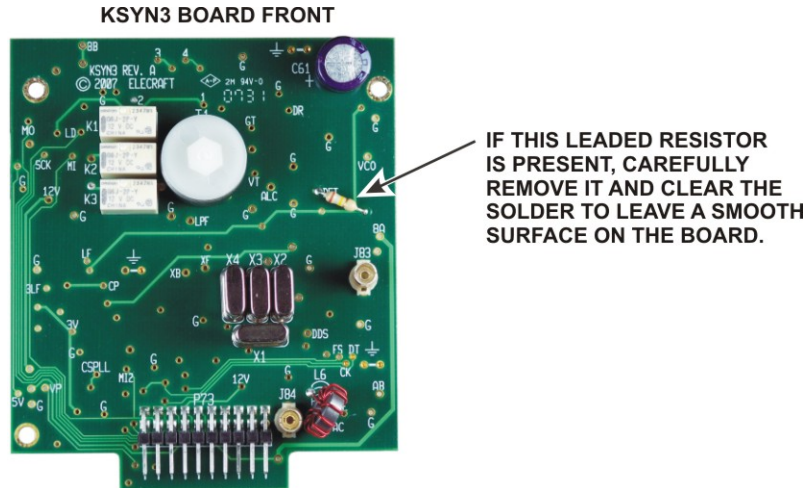


Figure 3. Removing the 180K Ohm Leaded Resistor.

- Check the entire front of the board for leads penetrating from the back, solder with sharp edges, etc., that may penetrate the thin adhesive on the stiffener and cause a short when it is installed.

**⚠ CAUTION:** Failure to remove all sharp points may destroy the KSYN3 board. The adhesive on the stiffener is only about 10 mils thick. Even if a sharp point or lead doesn't penetrate it immediately, the adhesive may slowly compress allowing the point to short to the stiffener later. Once in place, the stiffener cannot be removed.

- Use your DMM to check the resistance across R10 on the back of the KSYN3 board (see Figure 4). If the resistance across R10 is near 56 K ohms, skip the next step; you do not need to replace R10.

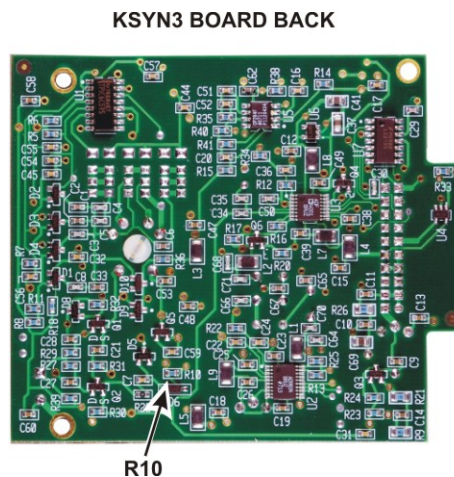


Figure 4. Locating R10.

□ If the resistance across R10 is close to 80 K ohms it must be replaced with the 56 K SMD resistor provided. If you do not have SMD handling tools, one recommended method using common tools is shown in Figure 5.

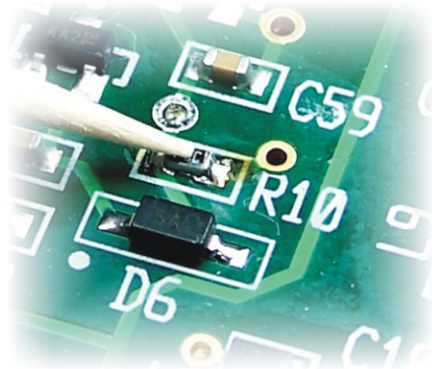
- ① CUT DIRECTLY THROUGH THE CENTER OF THE EXISTING R10 WITH SHARP DIAGONAL CUTTERS.



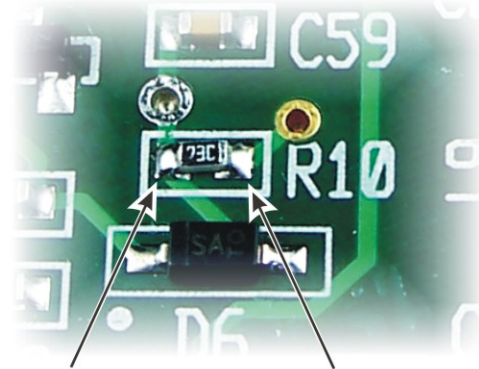
- ② USE A SOLDER SUCKER OR BRAID TO REMOVE THE ENDS OF THE OLD RESISTOR AND EXCESS SOLDER. BE SURE THERE IS NOTHING SHORTING ACROSS THE GAP BETWEEN THE PADS.



- ③ HOLD THE NEW R10 ON THE PADS AND TOUCH A WET SOLDERING IRON TO ONE END TO TACK IT IN PLACE. AN ORDINARY WOODEN TOOTH PICK HOLDS R10 HERE.



- ④ WITH R10 NOW FIXED IN PLACE, SOLDER THE OTHER END AND THEN GO BACK TO THE FIRST END TO CLEAN IT UP AS NEEDED.



- ⑤ CHECK TO ENSURE THE RESISTANCE ACROSS THE NEWLY-INSTALLED R10 IS ABOUT 56 K OHMS.

Figure 5. Replacing the SMD Resistor without Special Tools.

## Mounting the Stiffener on the KSYN3 Board

Place the three screws through the holes in the board and lay the assembly on your work table as shown in Figure 6. The three screws will act as guides to ensure the stiffener is positioned correctly. Place the longer 1/2" (12 mm) screws in the top holes and the shorter 3/8" (9.5 mm) screw in the lower hole.

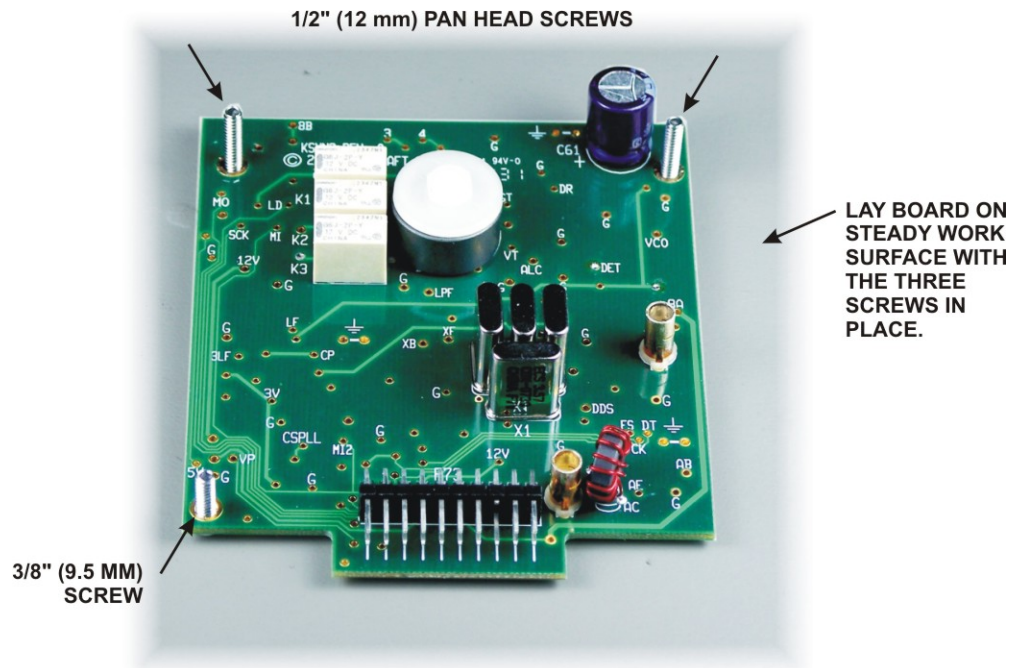


Figure 6. KSYN3 Board Ready for Stiffener.

**⚠ CAUTION:** The adhesive behind the paper on the stiffener easily loosens and folds. Once folded on itself it's almost impossible to flatten it properly again, leaving an area of weak bond between the KSYN3 board and the stiffener. The adhesive does not allow you to adjust the position of the stiffener once you've touched it to the pc board. That's why the screws are used as guides to ensure proper alignment on the first try.

Check the three screw holes through the paper and adhesive backing on the stiffener. If necessary, use a sharp tool to open and clear the holes so the screws can pass through easily. Work from the adhesive side to avoid pulling the adhesive tape away from the stiffener.

Remove the paper covering from the adhesive on the stiffener, taking care not to pull the adhesive off of the stiffener. Be sure to remove all the paper covering.

☐ Carefully place the stiffener on screws to ensure the holes are aligned with the adhesive side down as shown in Figure 7. Gently squeeze the KSYN3 board and stiffener together to ensure the tape bonds over the full area of the board and then remove the two 1/2" (12 mm) screws from the top holes.

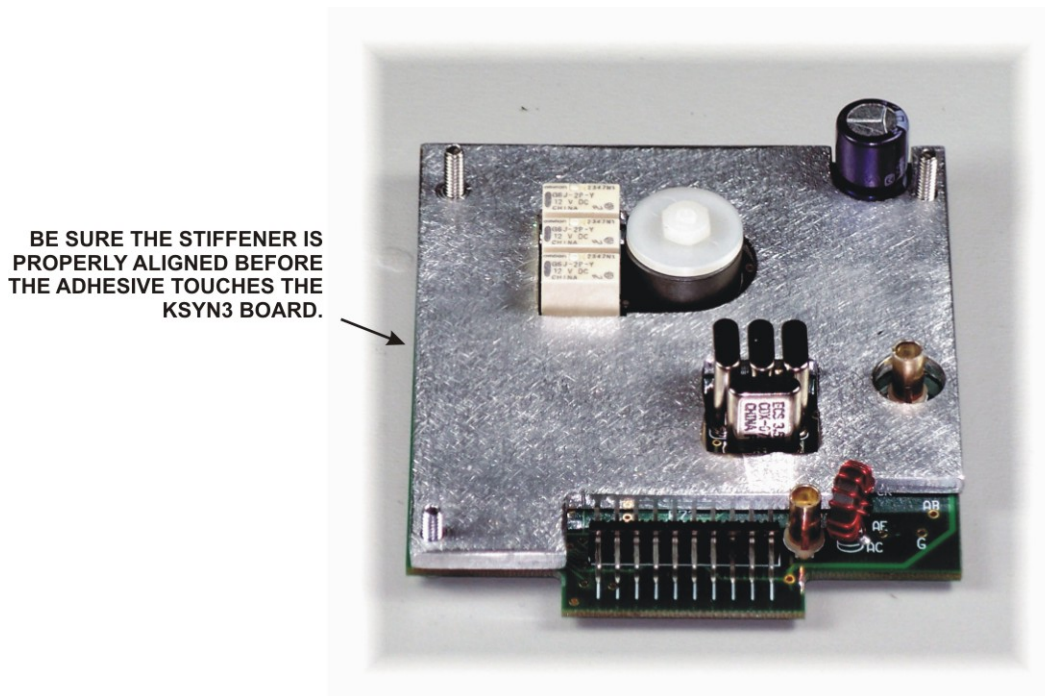


Figure 7. Stiffener Mounted on KSYN3 Board.

☐ Place a nut and inside tooth lock washer on the 3/8" (9.6 mm) screw in the bottom hole as shown in Figure 8. This screw and nut supports the adhesive, ensuring the stiffener is held securely against the KSYN3 board. Do not use a lock washer under the head of the screw to ensure sufficient clearance between the screw head and the front panel shield when the KSYN3 board is installed.

**⚠ CAUTION:** Tighten the nut only until it slightly compresses the teeth on the lock washer. Do not over tighten to avoid compressing the adhesive.

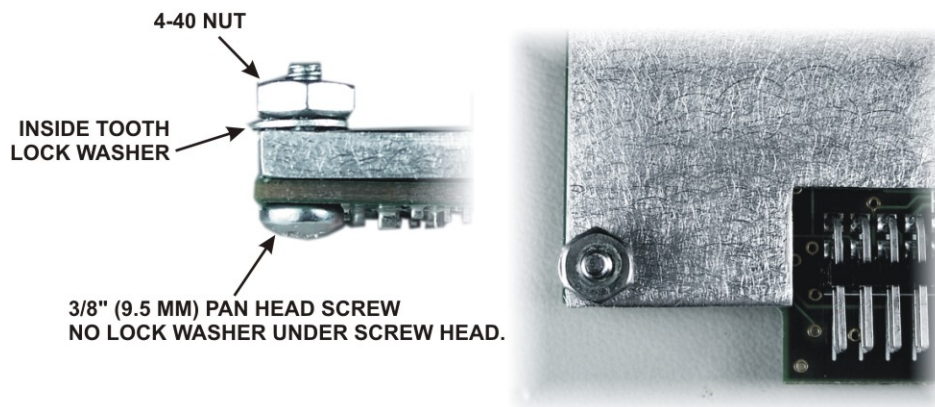


Figure 8. Fasteners on the Bottom Corner of the KSYN3 Board.

## Reassembling the K3

□ Replace the KSYN3 board(s) in the K3, ensuring all the pins of the multi-pin connectors mate properly with the connectors on the RF board. Secure the KSYN3 assemblies to the front panel shield with the hardware shown in Figure 9 at each top corner. Note that a split ring lock washer is used between the board and the front panel shield. This washer is required to ensure proper spacing between the KSYN3 board and the shield. If your K3 did not have washers installed here, washers are included with his mod kit. Do not use inside tooth lock washers behind the board. They are large enough to short out to nearby traces and solder pads on the KSYN3 board. **Only tighten the screws until the split ring lock washers are compressed. Do not over-tighten!**

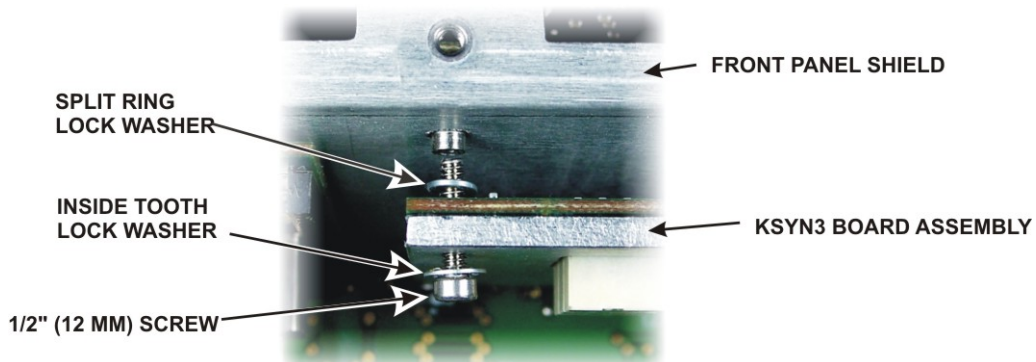


Figure 9. KSYN3 Assembly Mounting Hardware.

□ Reconnect the TMP cables to the KSYN3 board(s) as shown in Figure 10. Ensure all the cables are properly seated.

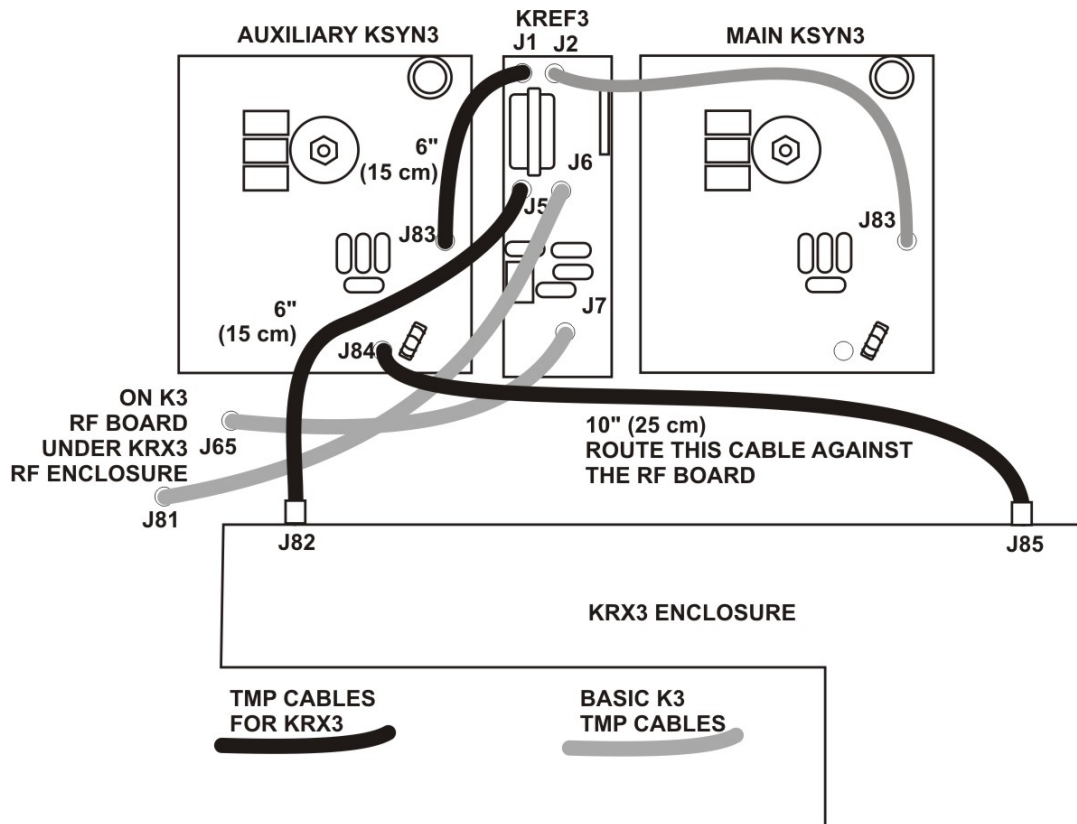


Figure 10. TMP Cable Connections

If you removed the optional K144XV module earlier, replace it and reattach the cables as shown under *Installing the K144XV Module in the K3* in your K144XV 2-Meter Option Installation and Operation manual.

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 11. If the K144XV module is installed, the cable connector will fit under the stiffener bar at the dimple in the top of the K144XV module.

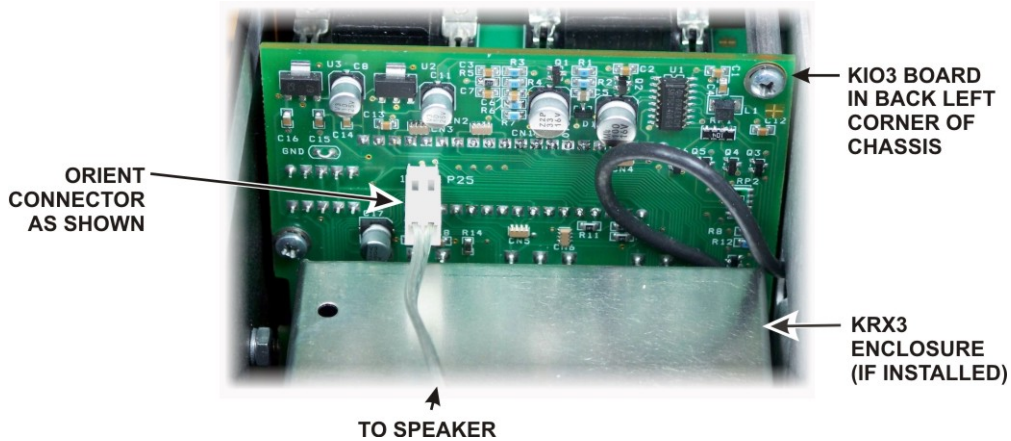


Figure 11. Connecting Speaker Cable.

Replace the nine flat head screws shown in Figure 1.

**⚠ IMPORTANT: The cabinet screws are essential for the K3 shielding to work properly. Leaving one loose may result in unwanted birdies in the receiver and other hard-to-troubleshoot problems.**

After the K3 has operated long enough for the internal temperature to stabilize (typically about 15 minutes) perform the synthesizer calibration procedure (on both synthesizers if the subreceiver is installed) as described under *Calibration Procedures* in your K3 Owner's manual. If you have the KRX3 Subreceiver option installed, be sure to do the calibration procedure for both the main and subreceivers.

**This completes your KSYN3 Synthesizer Stiffener Installation.**