

ELECRAFT® K3

HIGH-PERFORMANCE 160 – 6 METER TRANSCEIVER

INSTALLING CRYSTAL I.F. FILTERS

Rev A, October 15, 2007

Copyright © 2007, Elecraft, Inc.

All Rights Reserved

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.....	5
Installation Procedure	6
Enabling and Checking the Filters.....	9

Introduction

The K3 transceiver can accommodate up to five high-performance crystal I.F. filters of different bandwidths. This manual covers the installation of additional filters to your 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 support@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 1-Year Limited Warranty

This warranty is effective as of the date of first consumer purchase. 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.

What is covered: During the first year after date of purchase (or if shipped from factory, date product is shipped to customer), 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. 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 one to work on your K3 for any reason, be sure your soldering iron is ESD-safe with a 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. Soft cloth or clean, soft static dissipating pad to lay cabinet panels on to avoid scratching.
3. Small ruler to check screw lengths.

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, contract Elecraft for replacements (see *Customer Service and Support*, page 3).

Crystal Filter. There are two types of crystal filters, the standard 5-pole filter with discrete crystals and the enclosed 8-pole filters as shown in Figure 1. The installation process is the same for each type. Markings on the crystal will vary depending upon the bandwidth and type of filter.

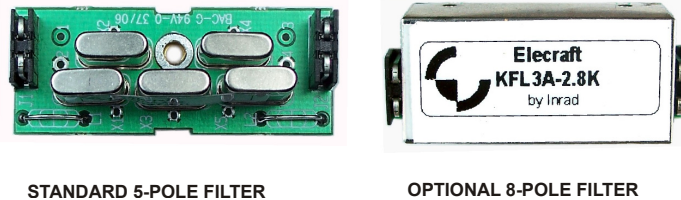


Figure 1. Filter Types.

In addition each filter is supplied with:



Screw, 4-40, 1/4" Zinc, one per filter.



Lock washer, #4, Inside Tooth, one per filter.

Installation Procedure

- Disconnect power and all cables from your K3.
- Remove the nine screws to free the top cover as shown in Figure 2. After the front edge of the cover is opened as shown in the figure, set the unit back on its bottom feet and lift the cover gently to reach the speaker wire connector. Unplug the speaker then set the top cover aside in a safe place.



1 REMOVE SCREWS HOLDING TOP COVER.



2 PLACE UNIT ON ITS SIDE FEET, THEN TIP FARTHER SO THE TOP COVER SWINGS OPEN FAR ENOUGH TO GRASP.

Figure 2. 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.

☐ Look at the filters you already have installed. They are located just behind the front panel shield (see Figure 3 showing two optional 8-pole filters installed). The filters must be installed in descending bandwidth order with the widest bandwidth toward the FL1 position and the narrowest bandwidth toward the FL5 position. You may need to move existing filters in order to preserve this order after installing the new filter(s). The bandwidth is marked on each filter in Hz except for the KFL3B-FM filter. That is the widest bandwidth filter available. If it is installed, it must be closest to the FL1 position. You can leave spaces blank to add filters later, provided you maintain the order of widest to narrowest bandwidth with the widest nearest FL1 position.

☐ Enter the following data on Table 1. You will need this information to set up your filters after reassembling your K3. Be sure you're following the rule described in the step above about the proper order for the filters.

- Enter the bandwidth in the row opposite the filter position where it will be installed.
- Enter the FREQ OFFSET shown on each filter. The optional 8-pole filters have no FREQ OFFSET marked on them. Enter a zero in the FREQ OFFSET column for those filters.

Table 1. Filters Installed.

POSITION	BANDWIDTH	FREQ OFFSET
FL1		
FL2		
FL3		
FL4		
FL5		

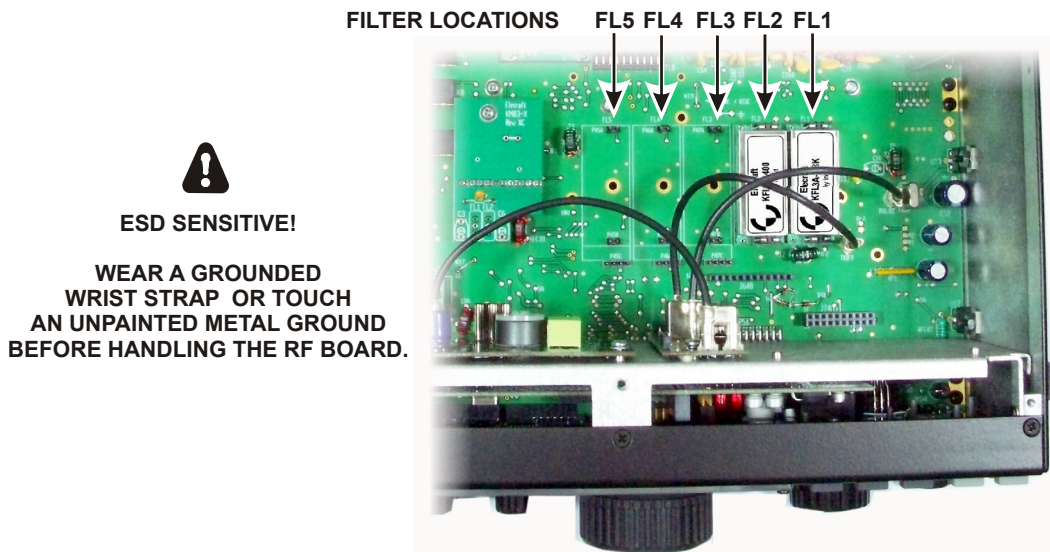


Figure 3. Crystal Filter Locations.

- Turn your K3 upside down and remove the bottom cover panel nearest the front to gain access to the screws that hold the filters in place. To free the bottom cover, remove the seven black pan head screws. Do not loosen the screws holding the feet.
- Remove the mounting screws and lock washers holding any existing filters that you need to move to maintain the order with the widest bandwidth filter closest to the FL1 position. The screw positions are shown in Figure 4.

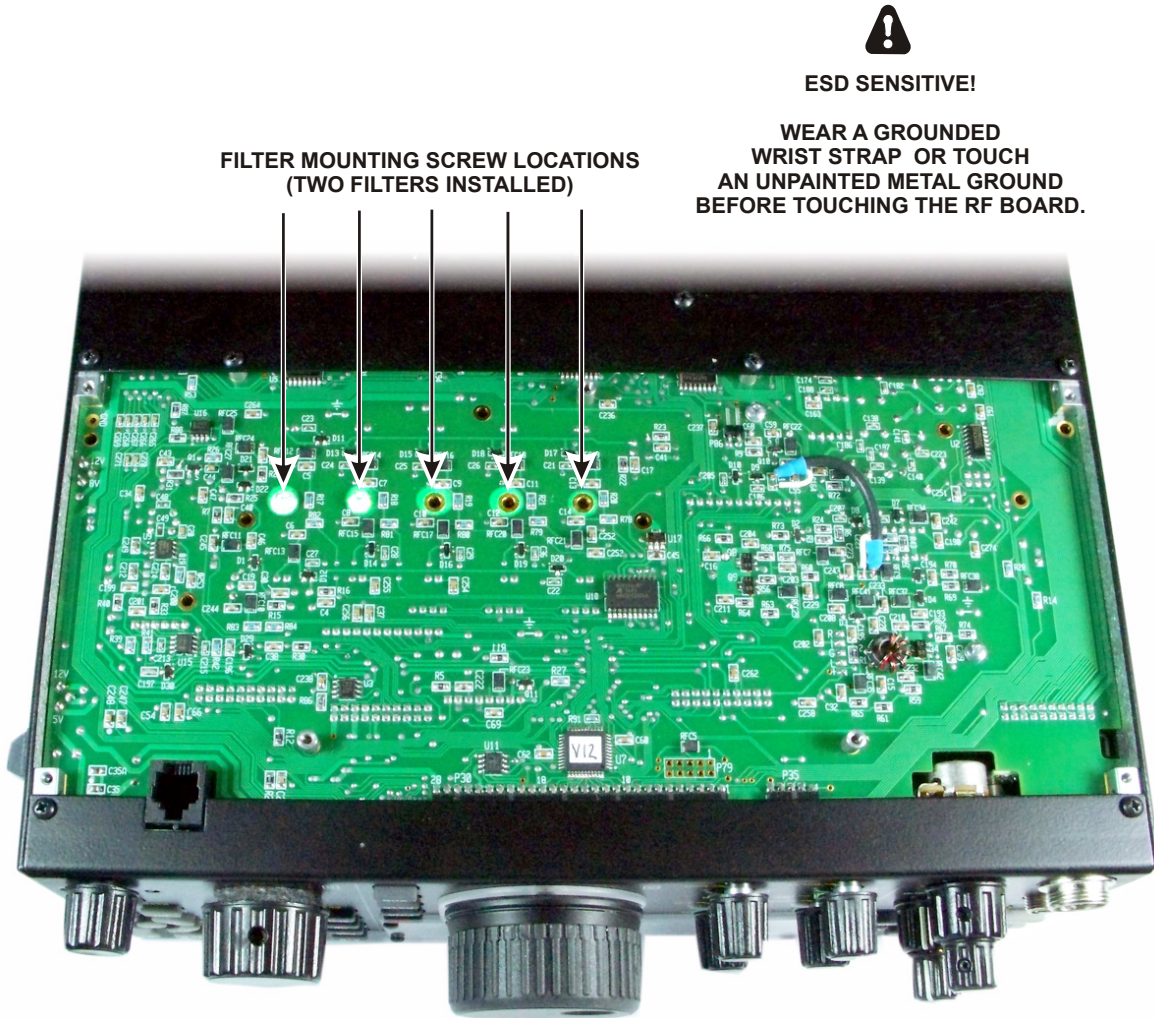


Figure 4. Filter Mounting Screw Locations.

- Turn your K3 right side up and remove any existing filters that need to be repositioned. The filters simply unplug once the mounting screws have been removed. There is a two-pin connector at each end. Grip each filter that must be removed lift up on each end gently, first one end then the other, until the connectors separate.
- Install the filters, including the new filter(s), in the proper. Refer to your list in Table 1. The filters only fit one way. If you put one in backwards, it will not fit within the outline on the RF board and the mounting stud will not line up with the screw hole in the board.

Turn the K3 upside down again and install the mounting screws and washers for each filter as shown in Figure 5.

⚠ CAUTION

1) Use screws no longer than 1/4" (6.4 mm), as specified, measured from the flat surface below the screw head to the end of the threaded shaft. Use your ruler to measure the screws before installing them. Longer screws may extend into the filter unit and destroy it.

2) Do not over-tighten the screws. Too much torque may pull the threaded bushing out of the bottom of the filter module.

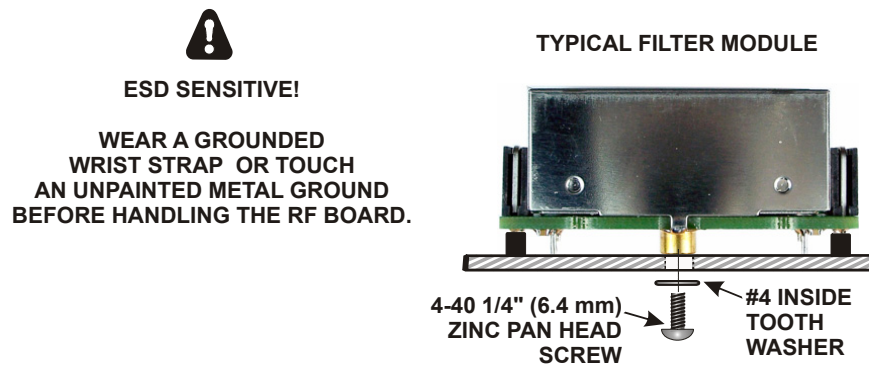


Figure 5. Installing Filter Mounting Screws.

Replace the bottom cover you removed earlier, using seven 4-40 3/16" black pan head screws. Be sure to replace all the screws securely, but do not over tighten them! Failure to replace 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.

Enabling and Checking the Filters

Connect power to your K3, turn to the *Crystal Filter Installation and Setup* section of your Owner's Manual and perform the following procedures to set up filters you have moved or newly installed. You will need the information you recorded in Table 1 to set up your filters.

- *Filter Bandwidth Setup*
- *Filter Center Frequency Setup*
- *Receive Filter Enables*
- *Filter Loss Compensation*
- *Transmit Filter Selection*

With the K3 right side up, plug the speaker wire into P25 on the KIO3 board at the left rear of the K3 as shown in Figure 6.

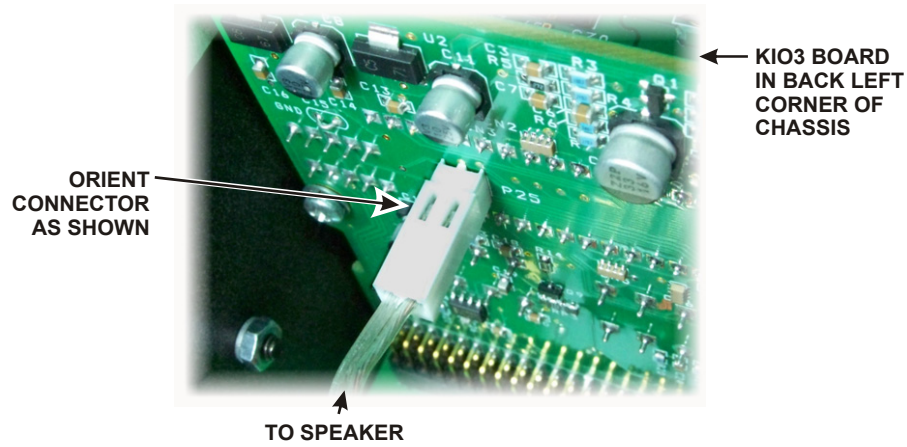


Figure 6. Connecting Speaker Cable.

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" black flat head screws you removed earlier.

That completes the installation of your new crystal I.F. filters.