IMPORTANT WARRANTY INFORMATION! PLEASE READ

Return Policy on Kits When *Not* Purchased Directly From Vectronics: Before continuing any further with your VEC kit check with your Dealer about their return policy. If your Dealer allows returns, your kit must be returned *before* you begin construction.

Return Policy on Kits When Purchased Directly From Vectronics: Your VEC kit may be returned to the factory *in its pre-assembled condition only*. The reason for this stipulation is, once you begin installing and soldering parts, you essentially take over the role of the device's manufacturer. From this point on, neither Vectronics nor its dealers can reasonably be held accountable for the quality or the outcome of your work. Because of this, Vectronics cannot accept return of any kit-in-progress or completed work as a warranty item for any reason whatsoever. If you are a new or inexperienced kit builder, we urge you to read the manual carefully and determine whether or not you're ready to take on the job. If you wish to change your mind and return your kit, you may--but you must do it *before* you begin construction, and within ten (10) working days of the time it arrives.

Vectronics Warrants: Your kit contains each item specified in the parts list.

Missing Parts: If you determine, during your pre-construction inventory, that any part is missing, please contact Vectronics and we'll send the missing item to you free of charge. However, *before* you contact Vectronics, *please look carefully* to confirm you haven't misread the marking on one of the other items provided with the kit. Also, make certain an alternative part hasn't been substituted for the item you're missing. If a specific part is no longer available, or if Engineering has determined that an alternative component is more suitable, Vectronics reserves the right to make substitutions at any time. In most cases, these changes will be clearly noted in an addendum to the manual.

Defective Parts: Today's electronic parts are physically and electrically resilient, and defective components are rare. However, if you discover an item during your pre-construction inventory that's obviously broken or unserviceable, we'll replace it. Just return the part to Vectronics at the address below accompanied with an explanation. Upon receipt, we'll test it. If it's defective and appears unused, we'll ship you a new one right away at no charge.

Missing or Defective Parts After You Begin Assembly: Parts and materials lost or damaged *after construction begins* are not covered under the terms of this warranty. However, most parts supplied with VEC kits are relatively inexpensive and Vectronics can replace them for a reasonable charge. Simply contact the factory with a complete description. We'll process your order quickly and get you back on track.

Factory Repair After You Begin Assembly: *Kits-in progress and completed kits are specifically excluded from coverage by the Vectronics warranty*. However, as a service to customers, technicians are available to evaluate and repair malfunctioning kits for a minimum service fee of $18.00 (½ hour rate) plus $7.00 shipping and handling (prices subject to change). To qualify for repair service, your kit must be fully completed, unmodified, and the printed circuit board assembled using rosin-core solder. In the event your repair will require more than an hour to fix (or $36.00, subject to change), our technicians will contact you in advance by telephone before performing the work. Defective units should be shipped prepaid to:

Vectronics
300 Industrial Park Road
Starkville, MS 39759

When shipping, pack your kit well and include the minimum payment plus shipping and handling charges ($25.00 total). No work can be performed without pre-payment. Also, provide a valid UPS return address and a day time phone number where you may be reached.

INTRODUCTION

Now you can soup-up your 440 MHz receiver or scanner with a 16-dB boost. The VEC-1444K breathes new life into "deaf" receivers and marginal antenna systems. Unlike low-cost GaAsFET preamps, this kit uses a high-quality microwave-type bipolar transistor that features exceptional low-noise performance and good immunity from damaging electrostatic discharge. A high-Q LC-tuned input filter fights overload from out-of-band signals, and careful output matching ensures efficient energy transfer into your 50-ohm feedline. In addition to covering 440 MHz ham frequencies, the VEC-1444K can boost other frequencies in the 450-465 MHz commercial 2-way spectrum with only minor retuning. Although big in performance, these preamps are small in size (1" x 1-1/2"), and you can power them locally or remotely at the antenna with 9-14 volts dc.

TOOLS AND SUPPLIES

Construction Area: Kit construction requires a clean, smooth, and well-lighted area where you can easily organize and handle small parts without losing them. An inexpensive sheet of white poster board makes an excellent construction surface, while providing protection for the underlying table or desk. Well-diffused overhead lighting is a plus, and a supplemental high-intensity desk lamp will prove especially helpful for close-up work. Safety is an important consideration. Be sure to use a suitable high-temperature stand for your soldering iron, and keep the work area free of combustible clutter.

Universal Kit-building Tools: Although your particular kit may require additional items to complete, virtually all construction projects require a work area outfitted with the following tools and supplies:

- ☐ 30 to 60 Watt Soldering Iron
- ☐ High-temperature Iron Holder with Moist Cleaning Sponge
- ☐ Rosin-core Solder (thin wire-size preferred)
- ☐ Needle Nose Pliers or Surgical Hemostats
- ☐ Diagonal Cutters or "Nippy Cutters"
- ☐ Solder Sucker, Vacuum Pump, or Desoldering Braid
- ☐ Bright Desk Lamp
- ☐ Magnifying Glass

Special tool for this kit: Hex-head insulated tuning tool.

BEFORE YOU START BUILDING

Experience shows there are *four common mistakes* builders make. Avoid these, and your kit will probably work on the first try! Here's what they are:

1. **Installing the Wrong Part:** It always pays to double-check each step. A 1K and a 10K resistor may look *almost* the same, but they may act very differently in an electronic circuit! Same for capacitors--a device marked 102 (or .001 uF) may have very different operating characteristics from one marked 103 (or .01uF).
2. **Installing Parts Backwards:** Always check the polarity of electrolytic capacitors to make sure the positive (+) lead goes in the (+) hole on the circuit board. Transistors have a flat side or emitter tab to help you identify the correct mounting position. ICs have a notch or dot at one end indicating the correct direction of insertion. Diodes have a banded end indicating correct polarity. Always double-check--especially before applying power to the circuit!
3. **Faulty Solder Connections:** Inspect for cold-solder joints and solder bridges. Cold solder joints happen when you don't fully heat the connection--or when metallic corrosion and oxide contaminate a component lead or pad. Solder bridges form when a trail of excess solder shorts pads or tracks together (see Soldering Tips below).
4. **Omitting or Misreading a Part:** This is easier to do than you might think! Always double-check to make sure you completed each step in an assembly sequence.

Soldering Tips:

Cleanliness and good *heat distribution* are the two secrets of professional soldering. Before you install and solder each part, inspect leads or pins for oxidation. If the metal surface is dull, sand with fine emery paper until shiny. Also, clean the oxidation and excess solder from the soldering iron tip to ensure maximum heat transfer. Allow the tip of your iron to contact both the lead and pad for about one second (count "one-thousand-one") before feeding solder to the connection. Surfaces must become hot enough for solder to *flow smoothly*. Feed solder to the opposite side of the lead from your iron tip--solder will wick around the lead toward the tip, wetting all exposed surfaces. Apply solder sparingly, and do not touch solder directly to the hot iron tip to promote rapid melting.

Desoldering Tips:

If you make a mistake and need to remove a part, follow these instructions carefully! First, grasp the component with a pair of hemostats or needle-nose pliers. Heat the pad beneath the lead you intend to extract, and pull gently. The lead should come out. Repeat for the other lead. Solder may fill in behind the lead as you extract it--especially if you are working on a double-sided board with plate-through holes. Should this happen, try heating the pad again and inserting a common pin into the hole. Solder won't stick to the pin's chromium plating. When the pad cools, remove the pin and insert the correct component. For ICs or multi-pin parts, use desoldering braid to remove excess solder before attempting to extract the part. Alternatively, a low-cost vacuum-bulb or spring-loaded solder sucker may be used. Parts damaged or severely overheated during extraction should be replaced rather than reinstalled.

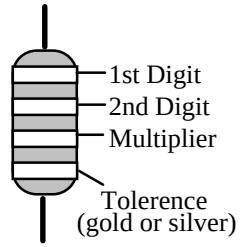
Work Habits:

Kit construction requires the ability to follow detailed instructions and, in many cases, to perform new and unfamiliar tasks. To avoid making needless mistakes, work for short periods when you're fresh and alert. Recreational construction projects are more informative and more fun when you take your time. Enjoy!

Sorting and Reading Resistors:

The electrical value of resistors is indicated by a color code (shown below). You don't have to memorize this code to work with resistors, but you do need to understand how it works:

Resistor Color Code



Black = 0 (tens)	Blue = 6
Brown = 1 (hundreds)	Violet = 7
Red = 2 (K)	Gray = 8
Orange = 3 (10K)	White = 9
Yellow = 4 (100K)	Silver = 10%
Green = 5 (1Meg)	Gold = 5%

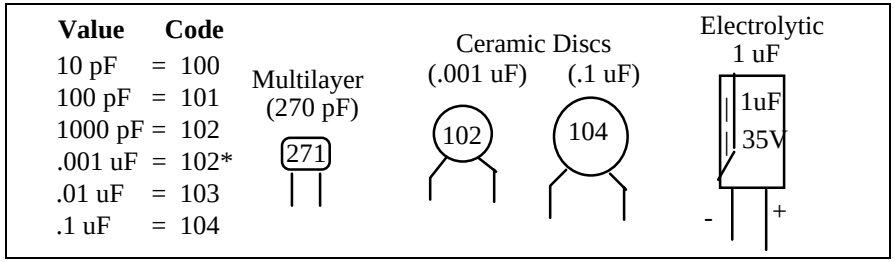
When you look at a resistor, check its multiplier code first. Any resistor with a black multiplier band falls between 10 and 99 ohms in value. Brown designates a value between 100 and 999 ohms. Red indicates a value from 1000 to 9999 ohms, which is also expressed as 1.0K to 9.9K. An orange multiplier band designates 10K to 99K, etc. To sort and inventory resistors, first separate them into groups by multiplier band (make a pile of 10s, 100s, Ks, 10Ks, etc.). Next, sort each group by specific value (1K, 2.2K, 4.7K, etc.). This procedure makes the inventory easier, and also makes locating specific parts more convenient later

on during construction. Some builders find it especially helpful to arrange resistors in ascending order along a strip of double-sided tape.

Some VEC kits may contain molded chokes which appear, at first glance, similar to resistors in both shape and band marking. However, a closer look will enable you to differentiate between the two--chokes are generally larger in diameter and fatter at the ends than resistors. When doing your inventory, separate out any chokes and consult the parts list for specific color-code information.

Reading Capacitors:

Unlike resistors, capacitors no longer use a color code for value identification. Instead, the value, or a 3-number code, is printed on the body.

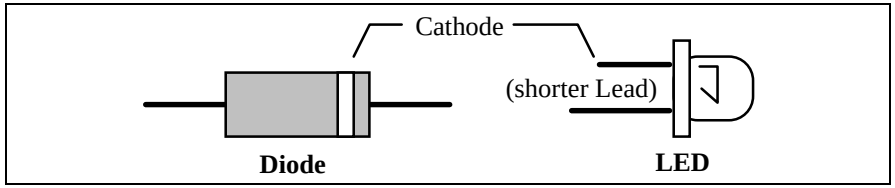


As with resistors, it's helpful to sort capacitors by type, and then to arrange them in ascending order of value. Small-value capacitors are characterized in pF (or pico-Farads), while larger values are labeled in uF (or micro-Farads). The transition from pF to uF occurs at 1000 pF (or .001 uF)*. Today, most monolithic and disc-ceramic capacitors are marked with a three-number code. The first two digits indicate a numerical value, while the last digit indicates a multiplier (same as resistors).

Electrolytic capacitors are always marked in uF. Electrolytics are polarized devices and must be oriented correctly during installation. If you become confused by markings on the case, remember the uncut negative lead is slightly shorter than the positive lead.

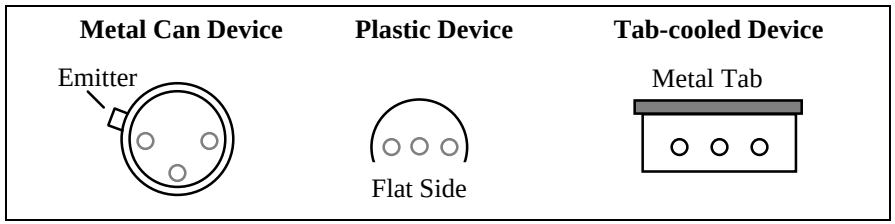
Diodes:

Diodes are also polarized devices that must be installed correctly. Always look for the banded or cathode end when installing, and follow instructions carefully.



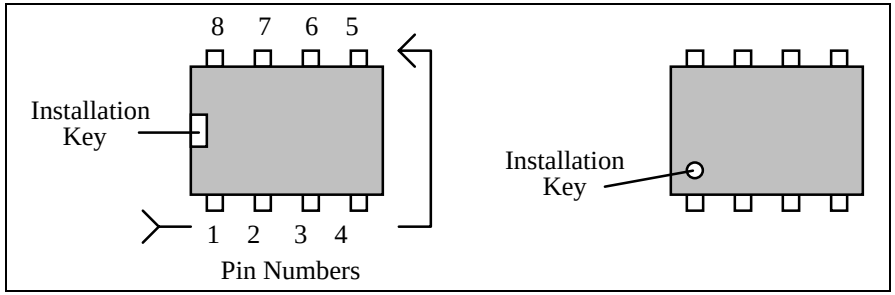
Transistors:

If transistors are installed incorrectly, damage may result when power is applied. Transistors in metal cases have a small tab near the emitter lead to identify correct positioning. Semiconductors housed in small plastic cases (TO-92) have an easily-identified flat side to identify mounting orientation. Many specialized diodes and low-current voltage regulators also use this type packaging. Larger plastic transistors and voltage regulators use a case backed with a prominent metal tab to dissipate heat (T-220). Here orientation is indicated by the positioning of the cooling tab.



Integrated Circuits:

Proper IC positioning is indicated by a dot or square marking located on one end of the device. A corresponding mark will be silk-screened on the PC board and printed on the kit's parts-placement diagram. To identify specific IC pin numbers for testing purposes, see the diagram below. Pin numbers always start at the keyed end of the case and progress counter-clockwise around the device, as shown:

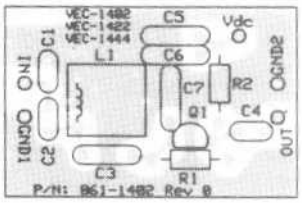


PARTS LIST

Your kit should contain all of the items listed below. Please go through the parts bag to identify and inventory each item on the checklist before you start building. If any parts are missing or damaged, refer to the warranty section of this manual for replacement instructions. If you can't positively identify an unfamiliar item in the bag on the basis of the information given, set it aside until all other items are checked off. You may then be able to identify it by process of elimination. Finally, your kit will go together more smoothly if parts are organized by type and arranged by value ahead of time. Use this inventory as an opportunity to sort and arrange parts so you can identify and find them quickly.

☑	Qty	Part Description	Designation	VEC P/N
☐	1	470Ω resistor (yellow-violet-brown)	R2	100-2470
☐	1	100KΩ resistor (brown-black-yellow)	R1	100-5100
☐	1	1.5 pF disc ceramic capacitor (1.5)	C2	200-00015-2
☐	1	220 pF disc ceramic capacitor (221)	C6	200-0220-1
☐	1	.1 uF disc ceramic capacitor (104)	C5	200-3100
☐	2	2.7 pF disc ceramic capacitor (2.7)	C3,C7	200-00027-2
☐	1	100 pF multilayer capacitor (101)	C4	220-0100
☐	1	2SC2498 or 2SC2570 transistor	Q1	306-2498
☐	1	length of #24 coil wire	L1	873-2422-0600
☐	1	PC board		861-VEC1402
☐	1	Owner's Manual		925-VEC1444K

PARTS PLACEMENT



STEP-BY-STEP ASSEMBLY

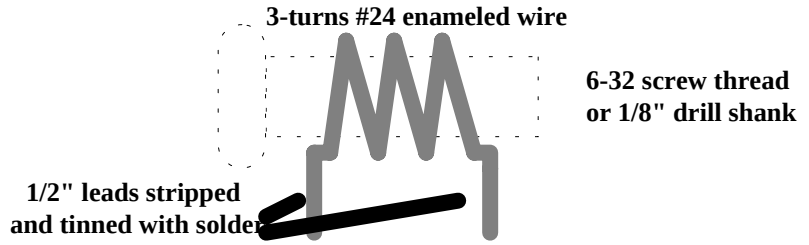
Before assembling your kit, please take time to read and understand the VEC kit warranty printed on the inside cover of this manual. Also, read through the assembly instructions to make sure the kit does not exceed your skill level. Once you begin construction, your kit will be non-returnable. Finally, if you haven't already done so, please verify that all parts listed in the inventory are included. If anything is missing or broken, refer to the warranty instructions for replacing missing or damaged parts.

Note that part designators, such as R1, C3, etc., appear on a silk-screened legend on the component-mounting side of the printed circuit board. This corresponds with the parts placement page in the manual. All parts will be inserted on the silk-screened side of the board. With the exception of Q1, none of the parts used in this preamp are polarized, so it makes no difference which way the part is inserted into the board. If you orient capacitors so their values face the board edges, you'll be able to read them easily when the kit is finished. If you have last-minute questions about what you need to build your kit, please refer back to the manual section entitled "Before You Begin". If you're ready to begin now, let's get started! The directions use two sets of check boxes. Check one box when a step is complete and use the other for double-checking your work before operation.

We'll begin construction by preparing coil L1. L1 determines the operating frequency of the preamp.

☐ ☐ 1. Locate a length of #24 enameled wire in the parts packet. In order to wind this wire into a coil, you'll also need a winding form (or mandrel). Either a 6-32 screw, or the shank of a #34 wire gauge (.111" drill bit), will serve this purpose. L1 should have an inside diameter of approximately .125" when completed.

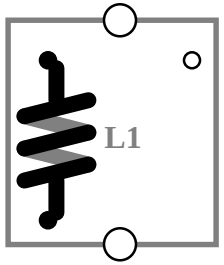
☐ ☐ 2. Carefully straighten a length of wire, removing all bends and kinks. While firmly holding one end, carefully wind three (3) full turns over the winding form--as shown below:



☐ ☐ 3. Remove the coil by sliding it off the drill shank, or by "unscrewing" it from the 6-32 threads. Shape as shown and trim leads to 1/2". Save any leftover wire for future use.

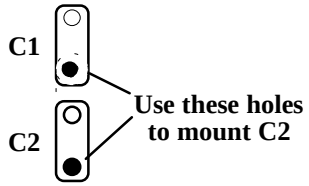
☐ ☐ 4. The #24 wire provided for this coil has "heat-strippable" enamel insulation which is formulated to melt at high temperatures. This should allow you to strip, clean, and "tin" each coil lead in a single operation (tinning means applying a thin coating of solder to the wire). To do this, hold your soldering iron tip against the lead end for several seconds while applying a small amount of solder. Eventually, the enamel insulation should begin breaking down, allowing solder to adhere to the wire. If your soldering iron doesn't generate enough heat to start this process, you may scrape the enamel away with an Exacto™ knife and tin the lead. Make sure both leads are clean and brightly tinned all the way around before attempting to install the coil.

☐ ☐ 5. Bend the coil leads so they align with the two L1 mounting holes shown below. Note that the silk-screen "footprint" provided for L1 depicts several extra holes. Those are for the 2-meter and 220 MHz versions of the preamp that use a shielded coil. For the 440 MHz version, you'll use only the two holes shown here. Solder L1 in place, and trim the excess leads using a sharp pair of electronic cutters (or "nippy cutters").



☐ ☐ 6. Locate ceramic disc capacitor C2 (1.5pF). The part is labeled "1.5".

☐ ☐ 7. Find the silk-screened footprint for capacitors "C1" and "C2" on the PC board. On the 440 MHz version of the kit, the mounting holes for C2 aren't wide enough to accommodate the disc's .25" lead spacing. To make C2 fit, you'll "borrow" one of C1's mounting holes--the one closest to C2. C1 isn't used in this version of the kit, and the two adjacent holes are connected together by the same trace underneath the board. Install C2 on the PC board as shown in the following diagram:



Important Note: For a UHF-type preamp, the bottom of each capacitor should be as close to the PC board as physically possible. This ensures that leads are kept short. Short leads reduce unwanted lead inductance which may detune or destabilize the preamp. However, when mounting capacitors, *DO NOT FORCE THEM INTO POSITION!* This could easily over-stress the leads and damage the part (especially true for multilayer capacitors). If a part doesn't insert easily, far better to remove it and re-form the leads than to force it!

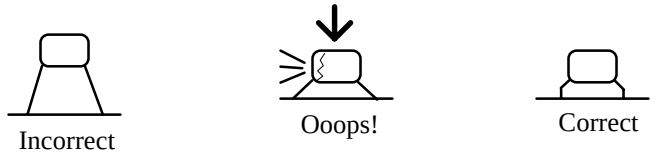
☐ ☐ 8. Once C2 is installed, carefully solder both leads in place--making sure each one is as short as possible. Use a pair of side-cutting electronic pliers to trim off excess lead length.

Now that you've got your feet wet, we'll abbreviate the instructions a bit! From this point on, when you read the directions "install" and "solder", this assumes each lead will be carefully formed, the part will be mounted as close to the board as possible, both leads will be soldered in place, the joint will be inspected, and any excess lead length will be trimmed off.

☐ ☐ 9. Locate capacitor C3, a 3 pF ceramic disc marked "3". Install and solder in place, taking care not to allow excess solder to flow into mounting holes on the adjacent pads.

☐ ☐ 10. Find capacitor C4, a 100-pF multilayer capacitor marked with the three-digit code "101".

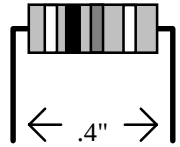
Important Note: Multilayer caps are actually state-of-the-art SMD type "chip" capacitors that have a lead spot-welded onto each end of the device. Multilayer caps have superior operating characteristics in RF circuits, but aren't as tough as discs because the lead welds may break when over-stressed. To avoid this problem, never use force to seat a multilayer cap on the PC board. If the spacing isn't right, pre-form the leads to the correct spacing instead!



☐ ☐ 11. Locate the silk screen footprint for C4 on the PC board, and install--observing the precaution for multilayer caps. Solder in place.

☐ ☐ 12. Find resistor R2 (470-ohms, 1/4-watt). The color code is yellow-violet-brown-gold.

☐ ☐ 13. Carefully bend the leads at right angles to the resistor body, as shown.

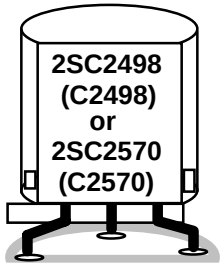


☐ ☐ 14. Install at R2 and solder in place, being careful not to allow excess solder to flow onto adjacent mounting pads.

☐ ☐ 15. Find and install C7 on the PC board. This is a 3 pF ceramic disc marked "3". Solder in place.

☐ ☐ 16. Find preamplifier transistor Q1, a special low-noise device designed especially for VHF and UHF amplifiers. Q1 will be marked with the designation 2SC2498 or 2SC2570.

Important Note: Q1 may be mounted one way only. When installing it, make sure the flat side of the transistor corresponds with the silk-screen footprint on the board. Form the two outside leads--as shown in the following diagram--for close seating to the pc board. Q1 should be mounted as close to the pc board as possible, since excess lead length will reduce circuit gain.



☐ ☐ 17. Find the 100K resistor R1 (brown-black-yellow-gold). Install and solder.

☐ ☐ 18. Verify that ALL leads for components Q1, R1, R2, C2, C3, C4 and C6 have been soldered and trimmed.

☐ ☐ 19. C6 is a 220 pF capacitor, marked "221". Install and solder.

☐ ☐ 20. C5 is a 0.1 uF disc capacitor, marked "104". Install and solder.

At this point, your kit is finished, and it's time to take a well-earned break! When you come back, be sure to give your work a close "quality control" inspection.

PC Board Inspection:

Before applying power to your kit, give it a thorough QC (quality control) inspection. This will help you find inadvertent assembly errors that might cause damage to sensitive parts. Follow this procedure:

☐ Compare parts locations against the parts-placement diagram. Was each part installed where it is supposed to be? Was the correct value used? Start at one side of the board and work your way across in an organized pattern.

☐ Inspect the solder side of the board for cold-solder joints and solder bridges between tracks or pads. Use a magnifying glass to obtain a clear view of the track area. If you suspect a solder bridge, hold the board in front of a bright light for a better view. All joints should be smooth and shiny, indicating good solder wetting and flow. Resolder any beaded or dull-appearing connections.

☐ Is transistor Q1 installed correctly?

Important Note: If you find a construction error and need to remove a part or two, it will be easier if you have the right tools. One very convenient item for

freeing soldered-in parts is a "solder sucker". This consists of a suction bulb or a spring loaded vacuum pump that draws molten solder away from the pad and lead. Alternatively, you may use a special copper braid called "solder wick". If you suspect you've damaged a component during removal, it's better to replace the part than risk reusing it!

Rosin solder flux can absorb moisture, which may create an eventual problem for VHF preamplifiers --especially when mast-mounted in a damp environment. If you wish, you may remove this flux using isopropyl alcohol (or 95% grain alcohol) and an old toothbrush. Apply a generous amount of alcohol with the toothbrush and scrub gently. Once the flux has fully dissolved, blot the bottom of the board dry with an untreated tissue. Give it a final alcohol wash, and allow to dry thoroughly.

Caution: alcohol is highly flammable and must be used with adequate ventilation! Use safety goggles, and avoid prolonged skin contact. It's also best to do this outdoors.

The VEC-1444K preamp may be installed inside a receiver, or mounted in a small external "project" enclosure with RF-type connectors mounted on each end. The length of bare-wire leads attaching connectors should be 1" or less. For longer connections (up to a couple of feet), use small flexible 50-ohm coaxial cable such as RG-174. The preamp must be powered from a 9-15 volt DC source during alignment.

TESTING AND ALIGNMENT

Alignment is easiest using a receiver that features a built-in signal-strength meter (an analog meter is generally better than a digital one for observing small changes in signal strength). If your receiver has no meter, you may still conduct the test by ear--or by viewing “noise” on the receiver's audio output signal with an oscilloscope.

The best way to align a UHF preamp is with a calibrated signal generator. However, it is also possible to align the VEC-1444K using off-air signals.

Generator Method:

Begin by connecting the output side of your preamp to a FM receiver equipped with a bar-graph or analog type S-meter. Connect the input side to your signal generator's output jack. Adjust the generator as follows:

- Frequency.....440 MHz (mid-band)
- Output Level .....Start at -90 to -100 dBm (weak signal)
- Modulation.....FM, 1 KHz tone at 3-5 KHz deviation

Power up the preamp, and adjust as follows:

☐ 1. Tune in the generator signal and adjust the generator output level for a ½ scale reading on the receiver S-meter.

☐ 2. Using a non-metallic tool or a toothpick, gently compress or spread the turns of coil L1 for best signal strength. Compressing the turns lowers the preamp's operating frequency, while spreading the turns raises the operating frequency.

☐ 3. Permanently stretch or compress the coil so its optimum setting will be retained.

Important Note: If you have access to a "Sinadder™", or SINAD type signal-to-noise meter, you may use this in place of the receiver's S-meter to find the optimal alignment point. Alternatively, if your receiver has no S-meter, you may view the receiver's audio output signal on an oscilloscope and adjust the preamp for minimum noise-ripple on the 1-khz sine wave. Simply connect the scope leads to the receiver's speaker terminals or to a plug inserted in the receiver's phone jack.

Off-air Method:

Set your preamp and receiver up, as described above, using an antenna in place of the signal generator.

☐ 1. Tune in a steady-but-weak signal. Distant repeaters are especially good because they transmit from a fixed location and remain "keyed up" during both sides of the conversation. If you have no S-meter, the signal *must have audible background hiss* for you to tell when it is getting stronger or weaker. Stronger signals have *less* background noise (or better "quieting"). Make sure the signal isn't fluctuating due to atmospheric conditions or passing aircraft.

☐ 2. Compress or spread coil L1 for maximum signal strength. When you find optimum signal strength, shape the coil permanently to retain that setting.

This completes alignment of your preamp.

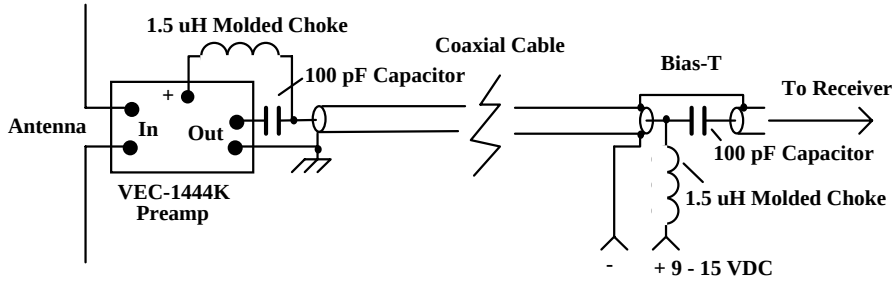
OPERATING INSTRUCTIONS

You may use the VEC-1444K with UHF receivers, scanners, or ham-radio transceivers operating in the 420 to 450 MHz range. It may be mounted internally in most receivers. Short runs of RG-174 cable should be used for the RF connections. The preamp requires a 9 -15 volt DC power source. This voltage is easily “borrowed” from your receiver.

Warning: The preamp must never be installed in-line with a transmitter or it will be severely damaged! When used in a transceiver, the VEC-1444K must be installed between the antenna switch (pin-diode or mechanical relay) and the radio's receiver circuitry.

When peaked for 440 MHz, the preamp delivers optimum performance across the entire amateur band. In addition, it provides useful gain on commercial frequencies through 470 MHz. In receive-only applications, you can remotely locate the VEC-1444K at your antenna site using a simple “bias tee”. The "bias-T" will provide DC power over the coax line to run the preamp without attenuating UHF signals. Many scanner listeners use 100 feet or more of poor-grade RG-58 or TV-type coax between the scanner and antenna, not realizing this cable has considerable loss (that’s why UHF-TV station run megawatts of power to deliver a clear picture to your home). Unlike TV broadcasters, police and radio amateurs may run only a few watts--transmitting weak signals that can get lost in the feedline before ever reaching your scanner. By mounting the preamp at your antenna, you boost weak signals *before* they enter the lossy cable. This allows previously noisy or unreadable signals to come in loud and clear!

You can make a simple bias-T using a couple inexpensive molded chokes and two capacitors (see the following diagram). You may also purchase one "ready-made" at many CATV supply houses. The "T" keeps RF energy isolated from your power supply, and simultaneously keeps DC voltage from entering into your receiver where it might do some damage.



Warning: Never reverse-install a bias-T so DC voltage is fed into your receiver's antenna terminals. Also, never reverse-polarize the supply voltage to your preamp (swap + and - leads). In both instances, damage may result!

TV Dx-ing: The VEC-1444K will provide useful gain to 550 MHz by modifying the size of coil L1. Experienced experimenters interested in weak signal reception on the lower UHF-TV channels may find that the 1444K is readily adaptable for this purpose.

IN CASE OF DIFFICULTY

Preamp Stops Amplifying:

A working preamp that fails "in-service" generally indicates a failure of transistor Q1. Other things that should be checked are the supply voltage and RF cable connections. If the preamp failed after being installed in a transceiver, it might be due to excessive transmitter RF “leaking” back into the preamplifier and damaging Q1.

Cannot Align or Test Preamp:

A newly constructed preamp that fails to work requires a careful recheck of all work. Low gain, or inability to properly tune the preamp may indicate damaged capacitors, an improperly wound coil, or parts in the wrong positions on the PC board. A preamp that operates intermittently may have poor solder connections, a problem with coax connections, or an intermittent connection to the power source. Instability, or self-oscillation, may be caused by RF-cable problems, or by excessive component lead lengths on the PC board.

Voltmeter Checks:

With 13.8 Vdc applied to the preamp, the collector voltage on Q1 should read approximately 9 V, and the base voltage at .76 V. These voltages are easily measured at the opposite ends of 100-k bias-resistor R1.

If technical assistance or factory repair is desired, please refer to the warranty instructions.

THEORY OF OPERATION AND SPECIFICATIONS

Operation:

Coil L1 and capacitors C2, C3 and C7 combine to form a tuned LC input filter and impedance matching network to Q1. Q1 is a high-gain "microwave" type transistor operated as a common-emitter amplifier. It is self-biased for minimum noise figure at 440 MHz, and normally exhibits a stage-gain of 14-16 dB. The output impedance of Q1 approximates that of 50 or 70-ohm line.

Specifications :

Tuning range .....420 to 450 MHz

-3dB bandwidth.....>25 MHz

Gain at 13.8 Vdc .....15 dB typical

Power requirement .....9 - 15 Vdc, 8 mA typical

Input/Output Impedance.....50 - 75 ohms, Unbalanced coaxial

SCHEMATIC: