INTRODUCTION

General Information: This nifty little transmitter will send your favorite tunes with you--throughout the house or out in the yard. Wish your Walkman™ had a CD player? No problem! Connect the VEC-1292K to your stereo's CD player and broadcast it to where you are. Can't pick up that distant FM station down in your basement shop? Simple! Connect the VEC-1292K to your stereo's FM tuner (the one with the big antenna), and rebroadcast the program on a clear channel. Thanks to the transmitter's specialized IC, you get true stereo with outstanding signal quality--just like FM radio stations generate from their studios. The uses are endless!

Circuitry: The VEC-1292K uses a sophisticated IC containing all of the circuitry needed for a miniature FM broadcast station. The audio stages, multiplex-stereo modulator, and transmitter RF section are all there--on one chip! The transmitter's sub-carrier oscillator is crystal controlled for rock-steady stereo lock-up on receivers. A channel balance control ensures perfect symmetry. It's even pre-emphasized for the 75 uS US-broadcast standard. The IC has everything you need to put a broadcast-quality stereo signal on the air in your own home. Operating frequency is internally adjustable, and a tuned output network matches the transmitter to a built-in collapsible antenna.

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. Diffused overhead lighting is a plus, and a supplemental high-intensity desk lamp is especially helpful for close-up work. Safety is always important! Use a suitable high-temperature stand for your soldering iron, and keep the work area free of clutter.

Universal Kit-building Tools: No special tools are required to complete this kit beyond common items normally used for bench construction. We recommend the following:

- ☐ Soldering iron (grounded-tip and temperature-controlled preferred)
- ☐ High-temperature iron holder with cleaning sponge
- ☐ Solder, 60/40 or 37/63 with rosin or "no-clean" flux (.031" dia. is good size).
- ☐ Needle nose pliers or surgical hemostats

- ☐ Diagonal cutters or "nippy cutters"
- ☐ Solder sucker (squeeze or vacuum pump type), or desoldering braid
- ☐ Bright desk lamp
- ☐ Magnifying glass
- ☐ Insulated tuning tool set

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. ICs have a notch or dot at one end indicating the correct direction of insertion. 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 solder 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. 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. Keep a damp sponge handy to wipe your soldering tip on. This removes excess solder, and

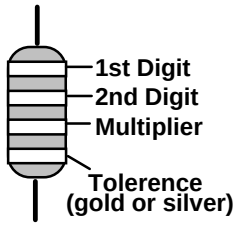
keeps the tip properly tinned. If the iron is going to sit idling for long periods, wipe the tip, add some fresh solder, and unplug the iron.

Desoldering Tips: If you make a mistake and need to remove a part, follow these instructions carefully! First, grasp the component with hemostats, needle-nose pliers, or your fingers. 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 multiple-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 project 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:

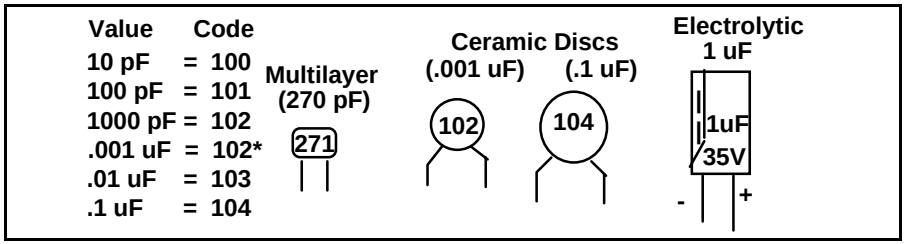
Resistor Color Code



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 inventory resistors, first separate them into groups by multiplier band (make a pile of 10s, 100s, 1Ks, 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.

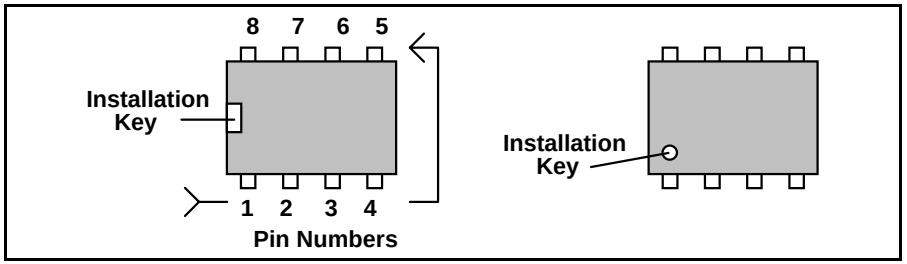
Reading Capacitors: Unlike resistors, capacitors no longer use a color code for value identification. Instead, the value, or a 3-number code, is printed on the body.



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.

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 begin at "1" at the keyed end of the case and progress along the device, as shown:



PARTS LIST

Your kit should contain all of the parts listed below. Please identify and inventory each item on the checklist before you start building. If any parts are missing or damaged, refer to the manual's warranty section for replacement

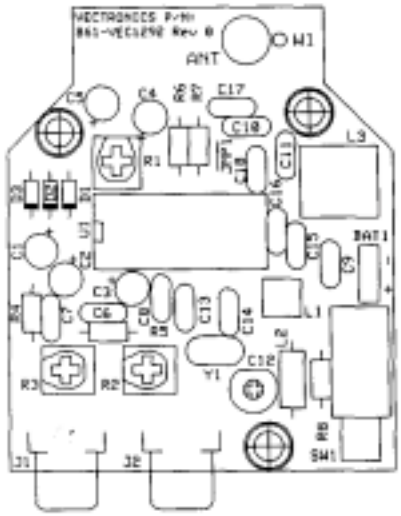
instructions. If you can't positively identify an unfamiliar item on the basis of the information given, set it aside until all other items are checked off. You may then be able to identify it by process of elimination. Finally, your kit will go together more smoothly if parts are organized by type and 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	470 ohm resistor (yellow-violet-brown)	R8	100-2470
☐	1	4.7K ohm resistor (yellow-violet-red)	R6	100-3470
☐	2	75K ohm resistor (violet-green-orange)	R4,R5	100-4750
☐	1	150K ohm resistor (brown-green-yellow)	R7	100-5150
☐	2	1K trimpot (102)	R2,R3	135-3100
☐	1	100K trimpot (104)	R1	135-5100
☐	2	10 pF multilayer capacitor (10 or 100)	C13,C14	220-0010
☐	2	15 pF multilayer capacitor (15 or 150)	C15,C16	220-0015
☐	1	22 pF multilayer capacitor (22 or 220)	C18*	220-0022
☐	1	27 pF multilayer capacitor (27 or 270)	C18*	220-0027
☐	1	33 pF multilayer capacitor (33 or 330)	C18*	220-0033
☐	1	220 pF multilayer capacitor (221)	C17	220-0270
☐	6	.001 uF multilayer capacitor (102)	C6-C11	220-1100
☐	2	10 uF electrolytic capacitor	C3,C4	270-5100-1
☐	2	22 uF electrolytic capacitor	C1,C2	270-5220-1
☐	1	100 uF electrolytic capacitor	C5	270-6100-1
☐	1	50 pF trimmer capacitor	C12	280-0050
☐	1	.089 uH variable inductor	L3	402-2706S
☐	1	1 uH molded choke	L2	401-3100
☐	1	6" piece of magnet wire	for L1	874-2422
☐	3	1N4148 diode	D1-D3	300-4148
☐	1	BA1404 FM transmitter IC	U1	325-1404
☐	1	38 kHz crystal (small cylinder, 2 leads)	Y1	405-0038
☐	1	Miniature power switch, DPDT	SW1	504-2022
☐	2	RCA jack	J1,J2	600-0011
☐	1	18 pin socket	for U1	625-0018
☐	1	9V battery snap		730-3005
☐	1	2" piece of insulated wire		871-24*xx*-0300
☐	1	Telescoping antenna		758-1120
☐	1	12mm metric screw		675-0012
☐	1	Metric nut		706-3560
☐	1	VEC-1292 printed circuit board		862-VEC1292

*One of these three values will be selected for use at C18--depending on desired frequency range.

PARTS PLACEMENT

PARTS PLACEMENT



STEP-BY-STEP ASSEMBLY INSTRUCTIONS

In these instructions, when you see the term *install*, this means to locate, identify, and insert the part into its mounting holes on the PC board. This includes pre-bending or straightening leads as needed so force is not required to seat the part. Once a component is mounted, bend each lead over to hold it in place. Use sharp side-cutters to clip off excess lead length before soldering. Make sure trimmed leads don't touch other pads and tracks, or a short circuit may result:

The term *solder* means to solder the part's leads in place, and to inspect both (or all) solder connections for flaws or solder bridges. Nip off excess protruding leads with a sharp pair of side cutters.

This kit has 5 fixed-value resistors. Mount these now, starting with the smallest value and moving to the largest. Before mounting each one, carefully bend both leads close to the resistor body to form right-angles, as shown in the following diagram:

☐ ☐ 1. Find a 470 ohm resistor (yellow-violet-brown). Install at R8 and solder.

☐ ☐ 2. Find a 4.7K ohm resistor (yellow-violet-red). Install at R6 and solder.

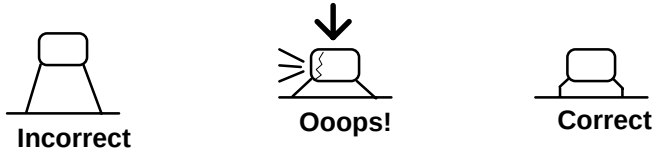
Locate the two 75K ohm resistors (violet-green-orange).

☐ ☐ 3. Install a 75K at R4 and solder.

☐ ☐ 4. Install a 75K at R5 and solder.

☐ ☐ 5. Find the 150K ohm resistor (brown-green-yellow). Install at R7.

Next, install the kit's 12 multilayer capacitors. Avoid using force or excessive heat when installing these. If the spacing isn't right, pre-form leads to the correct spacing before inserting into the PC board.



Locate two (2) 10 pF multilayer capacitors (marked 10 or 100).

☐ ☐ 6. Install a 10 pF at C13.

☐ ☐ 7. Install a 10 pF at C14.

Locate two (2) 15 pF multilayer capacitors (15 or 150).

☐ ☐ 8. Install a 15 pF at C15.

☐ ☐ 9. Install a 15 pF at C16.

The next capacitor determines the frequency-tuning range of your FM transmitter. For the low end of the band, or 88-94 MHz, find the 33 pF capacitor (33 or 330). For the middle portion of the band, or 95-102 MHz, find the 27 pF capacitor (27 or 270). For 102 MHz and up, use the 22 pF capacitor (22 or 220).

☐ ☐ 10. Install the capacitor you've selected at C18 and solder.

☐ ☐ 11. Find a 220 pF multilayer capacitor (221). Install at C17 and solder.

Locate six (6) .001 uF multilayer capacitors (102).

☐ ☐ 12. Install a .001 uF at C6 and solder.

☐ ☐ 13. Install a .001 uF at C7 and solder.

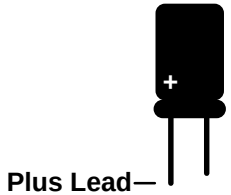
☐ ☐ 14. Install a .001 uF at C8 and solder.

☐ ☐ 15. Install a .001 uF at C9 and solder.

☐ ☐ 16. Install a .001 uF at C10 and solder.

☐ ☐ 17. Install a .001 uF at C11 and solder.

The last 5 fixed-value capacitors in your kit are electrolytic. *Electrolytic caps are polarized and must be installed the correct way in order to work.* Each capacitor's plus (+) mounting hole is marked on both the circuit board and parts placement diagram. If the markings on the capacitor body are unclear, the plus (+) lead is always the longer of the two.



Locate the two (2) 10 uF electrolytic capacitors.

☐ ☐ 18. Install a 10 uF at C3 and solder.

☐ ☐ 19. Install a 10 uF at C4 and solder.

Locate the two (2) 22 uF electrolytic capacitors.

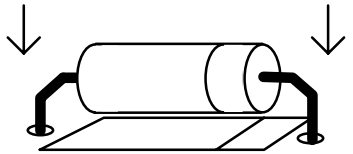
☐ ☐ 20. Install a 22 uF at C1 and solder.

☐ ☐ 21. Install a 22 uF at C2 and solder.

☐ ☐ 22. Find the 100 uF electrolytic capacitor. Install at C5 and solder.

This completes fixed capacitor installation. Before moving on, *check each electrolytic for correct polarity.*

Locate the three (3) 1N4148 diodes (glass body). Like electrolytics, diodes are polarized devices that must be installed correctly. Always look for the banded end when installing.



☐ ☐ 23. Install a 1N4148 at D1 and solder.

☐ ☐ 24. Install a 1N4148 at D2 and solder.

☐ ☐ 25. Install a 1N4148 at D3 and solder.

There are three small trimpots in your kit. Find the two (2) 1K trimpots (marked 102).

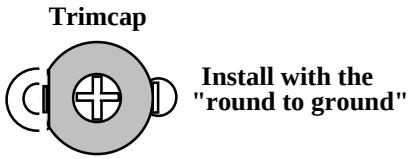
When installing these, make sure they remain seated firmly against the board during soldering.

☐ ☐ 26. Install a 1K pot (102) R2 and solder.

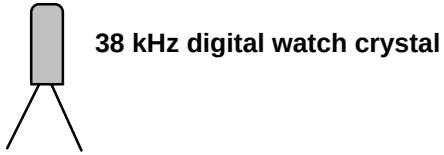
☐ ☐ 27. Install a 1K pot (102) R3 and solder.

☐ ☐ 28. Find the remaining 100K trimpot (marked 104). Install at R1 and solder.

☐ ☐ 29. Find the 50 pF trimcap (orange, screwdriver adjust). Install at C12 with the flat side toward L1 and solder.



Locate the 38 kHz crystal. This is a small metal tube-shaped package with two leads protruding from one end.



☐ ☐ 30. Install the 38 kHz crystal at Y1.

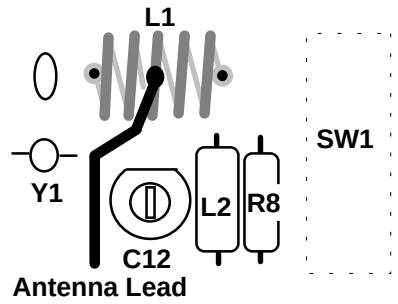
Locate the .089 uH slug-tuned coil (red plastic coil form, metal shield can). Before installing, make sure the coil's two pins and shield-can tabs are straight.

☐ ☐ 31. Position the .089 uH coil over the silkscreen legend for L3 and insert carefully. Bend the two shield-can tabs over and solder in place. Solder the two wire pins in place.

☐ ☐ 32. Find the 1 uH molded choke (brown-black-gold-silver). Install at L2 and solder.

The transmitter's output coil, L1, is a small 5-turn air-wound inductor. Use a 10-32 screw shaft to make this coil. Ensure there are five complete turns on the coil. After forming the coil, position as shown in the following:

Note: **Separate the turns evenly so the coil fits between the two mounting holes.**



☐ ☐ 33. Install the 5-turn coil at L1 and solder.

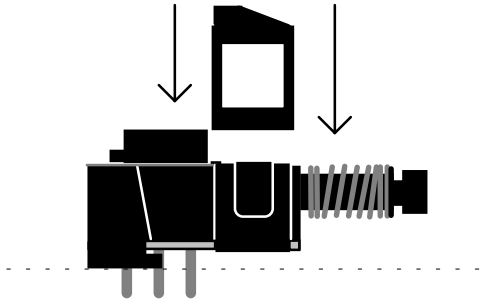
L1 requires the addition of a center tap. If your coil has enamel insulation, locate the center turn and scrape a patch of insulation off with a hobby knife to expose the copper beneath. If the coil has tin plating, disregard this instruction and solder directly to the plating.

☐ ☐ 34. Get the 2" length of insulated wire and strip 1/4" of insulation from both ends (if necessary).

☐ ☐ 35. Tack-solder one end of the insulated wire to the middle turn of L1.

☐ ☐ 36. Place the other end of the insulated into W1 and solder.

Your kit contains a miniature DPDT switch. Some versions require installation of a plastic clip-on support at the front of the switch body. This piece relieves stress on the pins and ensures level seating. If your parts kit contains this piece, install as shown:

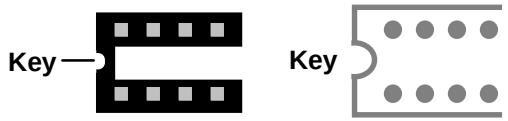


Once the switch is prepared for installation:

☐ ☐ 37. Install the DPDT mini power switch at SW1

The Stereo Transmitter ICs in your kit will be installed using a IC socket. Like the IC itself, the socket is keyed at one end to indicate proper positioning.

During installation, orient the socket so the notch corresponds to the key on the PC layout.



When installing sockets, make sure all pins enter the mounting holes and appear on the opposite side of the PC board (it's easy to fold one or more under the socket). Also, when soldering, make sure the socket remains flat against the board surface.

☐ ☐ 38. Find a 18 pin IC socket. Orient to U1, install, and solder all pins.

Next, align the BA-1404 IC with the socket, matching its key with the socket key. When you install, press in slowly--making sure *all* pins go into the socket holes and none fold over under the device.

Locate the 9-V battery snap clip, and note the red+ lead and black- lead.

☐ ☐ 39. Install the red lead at (+) on the PC board and solder.

☐ ☐ 40. Install the black lead at (-) on the PC board and solder.

Locate the two (2) RCA jacks. When installing, make sure all tabs are firmly seated in place and the jack is level prior to soldering.

☐ ☐ 41. Install a RCA jack at J1.

☐ ☐ 42. Install a RCA jack at J2.

☐ ☐ 43. Locate the 12mm meter screw and nut. Place the screw through the ant hole (from the solder side of the PCB) and tighten with the nut.

☐ ☐ 44. Install the antenna by threading it onto the screw.

This concludes wiring of your VEC-1292 FM Stereo Transmitter Kit. Before moving on to the next section, perform a thorough QC (quality control) inspection. This will uncover any assembly errors that might prevent it from working properly--or that could damage sensitive parts when you apply power. Follow this procedure:

1. Compare parts locations with 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.
2. 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

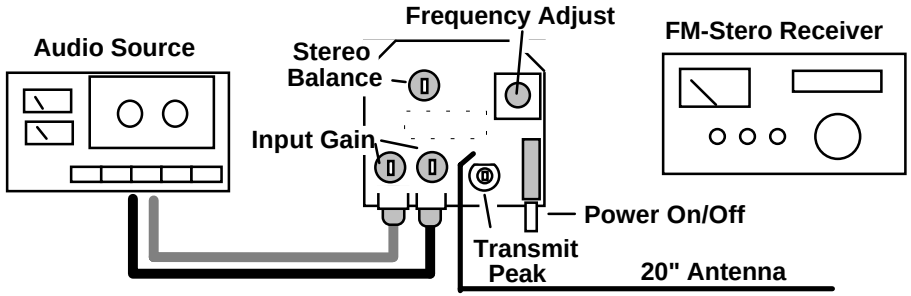
track area. If you suspect a solder bridge, hold the board in front of a bright light for a better view. All joints should be smooth and shiny, indicating good solder wetting and flow. Resolder any beaded or dull-appearing connections. Also, check the front-panel jacks, switches, and connectors for defective solder connections.

3. Finally, check electrolytic capacitors and diodes for correct polarity. Does the plus (+) polarity symbol on the part agree with the pictorial and with the pattern on the PC board? Is the banded end of each diode positioned correctly? Were all ICs installed correctly?

Be sure to correct all errors before moving on.

TESTING AND ALIGNMENT

To set up your FM transmitter, you'll need a line-level stereo-audio source such as a tape cassette or CD player. You'll also need a FM stereo receiver--preferably one with digital frequency readout--to monitor the transmitter's signal. Your kit has five internal controls that optimize its operation. No sophisticated test equipment is required to make these adjustments. The set-up for alignment is shown in the following diagram:



To begin alignment:

- Set all three transmitter potentiometers at mid-range (R1, R2, R3).
- Confirm the power switch is *Off* (button out).
- Install a fresh 9V alkaline battery on the battery clip.
- Turn the power switch on.
- Turn on the FM receiver and tune to locate the transmitter's un-modulated signal.

If you are unable to find the signal, your kit may be transmitting "out-of-band". Using an insulated tuning tool, adjust L3 until the signal is picked up (listen near the low-frequency end of the FM band if C18 is 33 pF, and near the high end if it's 22 pF).

If you still can't locate the signal, review assembly instructions and look for an assembly error. If you do locate it, proceed as follows:

- Activate your audio source and listen for modulation on the FM receiver.
- Adjust *Gain* controls R2, R3 for volume levels *slightly below* average off-air signals.

Be sure to make your trimpot settings *equal* for both channels (we'll adjust the transmitter for channel balance next). Note that commercial FM stations use

sophisticated audio limiters to boost their average modulation level. Your transmitter doesn't have this feature, so it's best to set the gain trimpots for modulation that's slightly below commercial broadcast levels to prevent over-modulation. Once a modulation level is set, adjust for channel balance. You may find it helpful to wear stereo headphones for this particular adjustment:

- Listen to the signal on your FM receiver. Is the signal undistorted and clear?
- Look at your FM-receiver's stereo pilot--is it "locked up" to a stereo signal?
- Switch between mono and stereo--is there audible channel separation?
- Set the FM receiver's balance control to its center position.
- Adjust the transmitter's balance (R1) for equal volume from both channels.

If you don't have a good FM stereo monitor receiver or a well-balanced audio source available, you may simply set the transmitter balance trimpot to its mid-point. In most cases, this will yield satisfactory results.

If you have a specific transmitter operating frequency in mind, a FM receiver with digital frequency readout will help you set the transmitter's oscillator accurately (simply tune to that channel). If you merely wish to find a clear channel, tune around for a good one that falls within the tuning range of the transmitter's oscillator. Note that the FCC assigns FM channels for 200 kHz spacing, starting 100 kHz above the band edge. Channel numbers progress from 88.1, 88.3, etc up to 107.9 MHz. You may find it beneficial to comply with this standard, since some low-cost synthesized FM receivers tune in 200 kHz steps.

Begin the frequency-setting procedure by tuning your FM receiver to the desired channel.

- Using an insulated tuning tool, adjust L3 until your transmitter is on frequency.

If you have a discriminator indicator (or tuning meter) on your stereo receiver, use this when fine-tuning L3. If this feature isn't available, set L3 for least-distorted audio--making sure the receiver's stereo pilot illuminates. This indicates the FM receiver is locked onto the transmitter's stereo sub-carrier. Note that some frequency drift is normal for simple L/C tuned oscillator circuits, so you should expect some variation in transmit frequency over time.

To adjust the transmitter's output peaking control, use your FM receiver's signal-strength meter. If the meter deflects full scale during this operation, remove the receiver's antenna to reduce sensitivity.

- Using an insulated tuning tool, set C12 for maximum meter deflection.

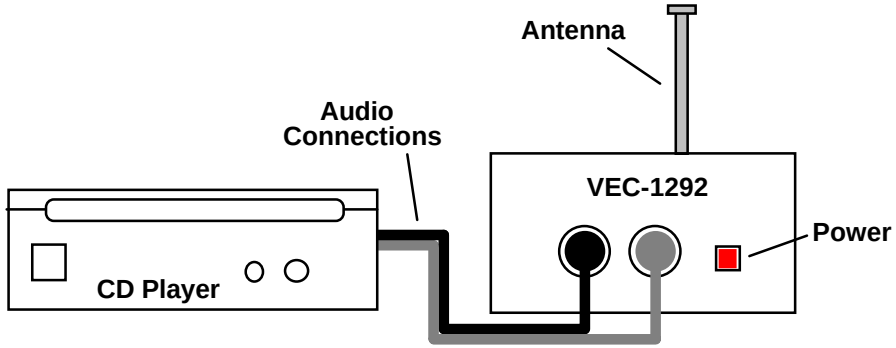
This completes alignment of your transmitter. Note that readjustment of the transmitter's gain controls R2, R3 may be necessary if you substitute an audio source with significantly higher or lower output level. Always re-check your modulation level against a commercial station when connecting to a new audio source.

Important Warning: As the builder and operator of this transmitter circuit, *you are solely responsible for its legal use*. Please note that connecting a transmitter of this type to a full-sized outdoor FM band antenna for the purpose of "neighborhood broadcasting" constitutes a clear violation of FCC Rules under Part 95. It is also a violation of FCC rules to cause willful or harmful interference to the normal reception of commercial FM broadcast signals. *Verctronics cannot be held responsible for the misuse or illicit modification of this product*.

If you have purchased the matching case for your VEC-1292K, now is a good time to install it.

OPERATING INSTRUCTIONS

Once your VEC-1292K is set up, its operation is relatively simple. A typical set-up is illustrated below:



Power: Press the unit's power switch "in" to activate the transmitter. Press to the "out" position to turn the transmitter off. Always check the switch before storing to ensure that the unit wasn't inadvertently left "on".

Audio Connections: Accepts standard RCA type stereo patch cords.

Audio Levels: Accepts industry-standard accessory audio levels (100 mVrms to 1 Vrms).

Antenna: Extend, only as needed, to provide adequate reception. The antenna need not be extended fully for the unit to operate.

Battery: Use a 9V flat-pack alkaline-type battery. Check periodically for battery condition.

Frequency: To change operating frequency or adjust modulation level, refer to the *Testing and Alignment* section of this manual for detailed instructions.

Sudden changes in temperature or excessive heating of the case may cause a shift in the transmitter operating frequency. To avoid excessive frequency drift, avoid operating in direct sunlight. Also, avoid operation on local in-use FM broadcast channels, as your transmitter may cause "harmful interference" to normal reception in violation of FCC rules.

IN CASE OF DIFFICULTY

Before seeking outside assistance, check below for a possible solution:

Does not turn on: Check battery condition, snap clip, and power leads. Also, make sure lead polarity is correct (red to +, black to GND). Make sure power switch is "on".

Drifts off Frequency: Check battery condition. Also, check to see if the unit is exposed to direct sunlight--or near heating/cooling source such as a radiator or air conditioner.

High audio level, distortion: Check gain settings and output rating of audio source. Transmitter may be over-modulated.

Low audio level: Check gain settings and output rating of audio source. Transmitter may be under-modulated. Note that "microphone level" signals aren't sufficiently powerful to modulate the transmitter.

Operation off frequency: Unit may have been bumped or jolted causing movement to the tuning slug in L3. Readjust.

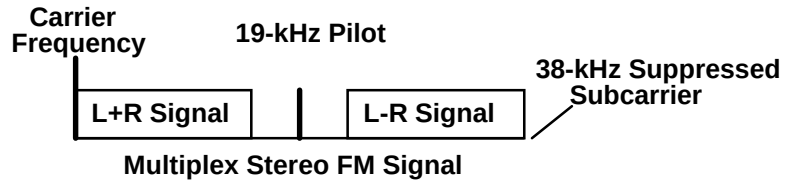
Weak signal: Check condition and extension of antenna. Re-tune C12 if needed.

No Stereo: Check your program source--is it in stereo? Also, confirm your receiver is indicating stereo signal "lock-up". Transmitter (or receiver) may have drifted off frequency causing the stereo detector to unlock.

If this check fails to uncover the problem, repeat the "QC" check one more time. Service records show that, for most malfunctioning kits, outright component failure is relatively rare. In most cases, the culprit is a misplaced part, reverse-polarized capacitor, improperly installed IC, or a faulty solder connection. If, despite your best effort, you cannot solve the problem, kit repair services are available through Vectronics. See the warranty on the inside front cover for complete instructions.

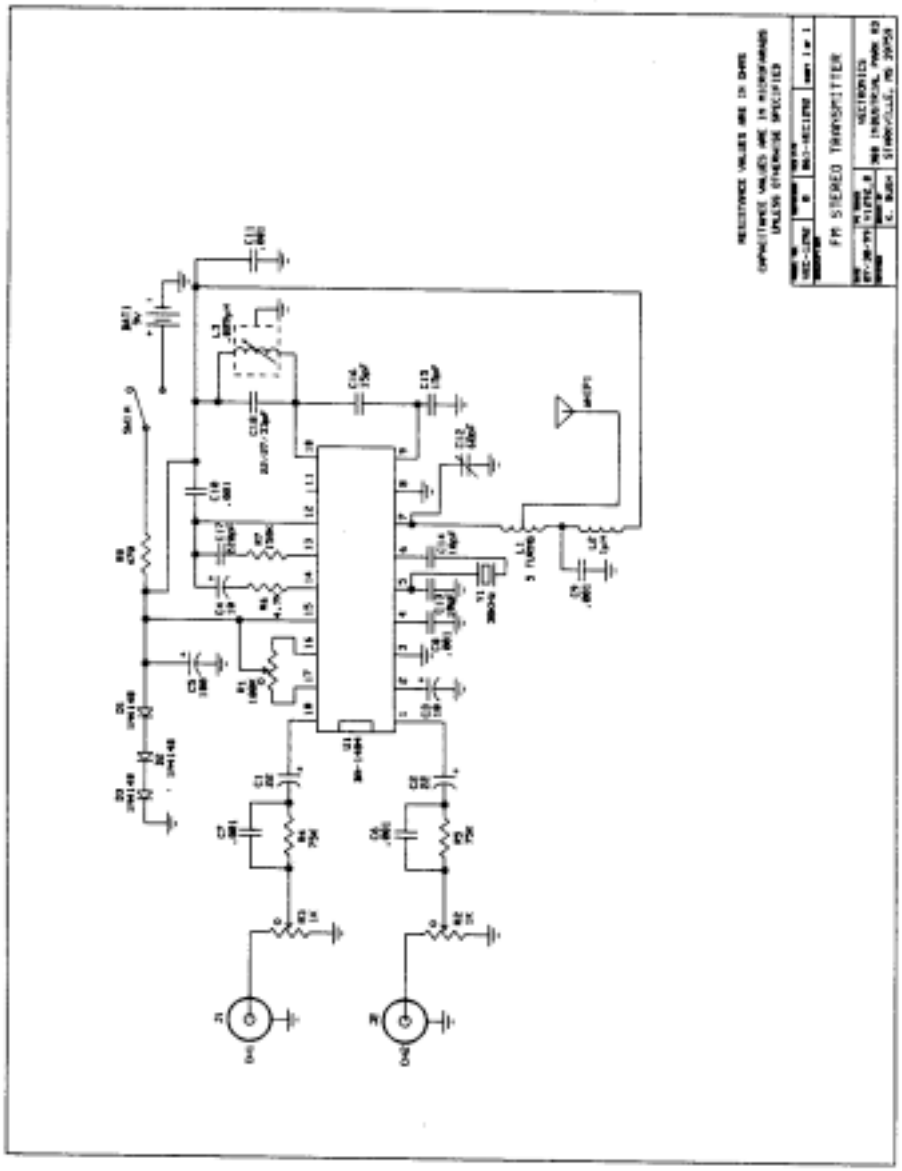
THEORY OF OPERATION

The BA1404 transmitter IC contains a number of specialized circuits for generating the on-air FM stereo signal. Independent left and right audio inputs are pre-emphasized for 75 uS (US standard) and buffered through identical amplifiers. The L and R signals are then fed into the multiplexer section, along with 38 kHz LO from crystal-controlled oscillator Y1. Here, the two audio channels are combined to produce a monaural-compatible L+R signal. Samples are also subtracted to generate a second L-R difference signal. The difference signal is superimposed over the LO in a balanced modulator circuit to generate a 38 kHz suppressed-carrier DSB signal. Unmodulated 38 kHz LO is also sampled through a frequency-divider stage to generate a 19 kHz stereo-pilot signal.



A L/C-tuned VHF-range oscillator generates the transmitter's primary carrier signal. This stage is user-adjustable to cover the 88-108 MHz band. To generate a multiplex stereo signal, the IC's FM modulator stage superimposes the L+R audio signal, the 19 kHz stereo pilot, and the 38 kHz DSB L-R signal onto the fundamental carrier. This signal is then fed through a buffer/low-level amplifier connected to the transmitter's RF output network.

SCHEMATIC



ENCLOSURE

To install your transmitter in the VEC-1292KC matching enclosure follow these instructions ***(read all instructions before beginning ... take your time)***:

1. Find the front panel decal and rear panel decal; separate using scissors. Be sure to leave excess decal material around the edges. Put the front panel decal on first. This is done by: **a.)** Remove all debris and oil from the chassis. **b.)** Remove the crack and peel to expose the adhesive. **c.)** Place the decal on the front panel without securing it completely. **d.)** Gently rub the alignment circles with your finger--if the circles are centered in the enclosure holes (also check the corner alignment marks) secure the decal by rubbing and removing all air bubbles. **e.)** If the alignment circles are not centered, adjust the decal accordingly then secure. **f.)** Use a penknife, or small Exacto™ knife, to cut away the unused edges and cut out the component holes *(cut from the description side).* **g.)** Repeat this procedure for the rear panel using the corner alignment marks.
2. Next, install the two L-brackets on the chassis using two of the 3/16" screws. The longer side of the L-bracket must be connected to the chassis using the two holes centered on each edge of the enclosure. Refer to the diagram on the next page for location and orientation.
3. Install the three 1/2" mounting screws next. Insert the screws, from the bottom, through the three holes in the chassis.
4. Place the three 3/16" round spacers on the mounting screws.
5. Now insert the PC board. This must be done by: **a.)** Insert the front of the PC board at an angle so the controls enter their respective holes. **b.)** Push down on the rear of the board. Make sure the mounting screws align with the mounting holes in the PC board before pushing.
6. Use the three hex nuts to secure the PC board. Be certain all appropriate components are centered with the enclosure holes before tightening.
7. Find the switch cap. Align the switch cap with SW1 and push it on. If it is difficult to push on, then rotate it 90° and try again.
8. Locate the piece of double-sided tape. This is to be used for holding the 9-volt battery clip in place. Locate a place on the underside of the top cover where the battery will not interfere with any components. Peel off the backing of the tape and stick it to the chosen location.
9. The top should be installed next. Use the two remaining 3/16" screws for securing the top to the L-brackets. Make sure the L-brackets are aligned properly.
10. Place the small round bushing into the hole on the top of the box. Press the bushing down until it snaps in. Then slide the antenna through the hole and screw onto the ANT screw until tight.
11. Finally, place the four rubber feet on the bottom of the enclosure at the corners.