

## Vectronics VEC-813/814 2-Meter FM Intermod Filter

### GENERAL INFORMATION

The VEC-813 HT Filter and the VEC-814 Mobile Filter are especially designed to eliminate squeaks, squawks, bleeps, and other strange noises caused by intermodulation distortion. These "*phantom signals*" are caused by unwanted mixing between ham-band signals and out-of-band traffic from pagers, public-service repeaters, aircraft, and other powerful sources. Intermod signal are not only annoying, in many congested areas they can render your sensitive wide-band radio useless!

The only cure for intermod is to get rid of the out-of-band signals that cause it. Your Intermod Filter uses three high-Q bandpass sections plus two low-pass L-sections to form a razor-sharp network. This knock-out combination passes signals falling within the two meter band, while attenuating out-of-band interference. Attenuation of unwanted commercial FM signals approaches -50 dB in most cases, and that's the difference between extremely strong and completely gone! When the filter is engaged, intermod vanishes. During transmit, RF sensing automatically switches the filter off-line.

The VEC-813 HT version comes with BNC connectors and is self-powered from a internal 9-volt battery. The VEC-814 Mobile version uses standard SO-239 connectors and runs on external 12-VDC. Both models uses state-of-the-art surface-mount construction and special high-Q porcelain chip capacitors to ensure top performance. Both are housed in a RF-tight case with an On/Off switch and power LED. The mobile version uses a standard 2.1mm x 5.5 mm DC plug.

### VEC-813 INSTALLATION

Before attempting to use the VEC-813 on your HT, you must install a 9-volt battery. To do this, remove the two case screws, slip the battery into its spring holder, and install the snap-clip lead connector. Use a premium-quality Alkaline-type battery for best results. You may then plug the VEC-813 directly into your HT's BNC antenna connector.

**Important:** The filter's by-pass switching circuit draws power whenever the VEC-813's power switch is turned on. For longest battery life, be sure to turn the unit off when not in use--and whenever intermod conditions do not require using the filter to copy stations. If your 9-volt battery should run down while the unit is turned on, the VEC-813 will automatically default to its "pass-through" mode, and no damage will result.

**Important:** A 50-mW or greater transmit signal is needed to activate the unit's automatic by-pass switching. Do not exceed a transmitter RF output power of 50 Watts, or damage may result. If using an external HT amplifier, install the VEC-813 *between* the HT and amplifier.

## VEC-814 INSTALLATION

The VEC-814 may be powered directly from your automotive or 13.5-VDC AC station power source. Install a standard 2.1 mm x 5.5 mm coaxial-type DC power plug on the supply line with (+) connected to the center and (-) connected to the barrel. A plug is supplied with the unit, and extras may be obtained from Radio Shack or other electronic supply houses. Use standard PL-259 coaxial connectors on the radio and antenna side of the filter.

**Important: Be sure to observe the *Radio* and *Antenna* markings when installing the filter. If you reverse these connections, the filter's RF-sensing circuit will not work properly and damage to filter components may result! Also, do not use with transceivers where RF output power rating exceed 50-60 Watts.**

The VEC-814 will draw a small amount of power to operate the by-pass switching and RF sensing circuits whenever the unit is switched on. Be sure to switch the unit off when not in use. Also, the insertion attenuation of the filter is approximately 6-8 dB, and in-band signals will be attenuated by this amount whenever it is turned on. While this will not affect reception in most signal areas, it may degrade reception of very weak signals. A good rule-of-thumb when operating mobile is to leave the VEC-814 off *unless you need it*.

If power is accidentally removed from you unit while in operation, there is no danger to your transmitter or to the filter -- the VEC-814 will default to the "pass-through" mode on both transmit and receive.

## IN CASE OF TROUBLE

Your Intermod Filter is protected by one-year. If anything goes wrong during the first year, we'll replace or repair your unit at no charge. However, before contacting the factory, please check for the symptoms listed below. These are simple difficulties you can fix yourself.

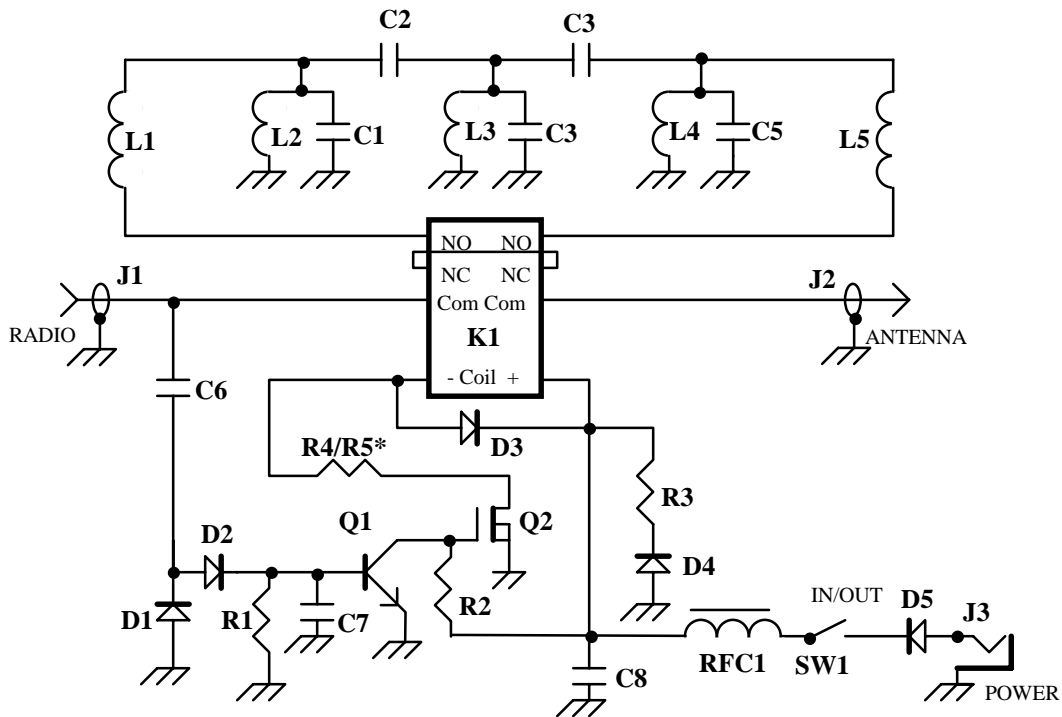
Filter fails to turn on: Check the power source. For VEC-813, check battery condition. For VEC-814, check condition of power plug and power source.

Filter fails to disengage during transmit: For VEC-813, is HT power setting on ultra-low power? For VEC-814, are *Radio* and *Antenna* connectors reversed?

**PARTS LIST: VEC-813/814**

<b>Designator</b>	<b>Description</b>	<b>P/N</b>
C1,C3,C5	100 pF(100A SMD)	200S-0100-1
C2, C4	2.7 pF (100A SMD)	200S-00027-1
C6	22 pF (0805 SMD)	200S-0022
C7	.001 uF (0805 SMD)	200S-1010-1
C8	.01 (0805 SMD)	200S-1110
D1,D2,D3	CMPD914 (SOT-23 SMD)	300S-0914
D4	LED, 3mm, Red	320-1002
D5	CMR1-02 (SMB SMD)	300S-4001
J1 (VEC-813)	UG1104A/U or equiv. (male BNC)	610-1018
J1 (VEC-814)	SO-239 (UHF)	610-2005
J2 (VEC-813)	UG1094 or UG-290 or equiv.(female BNC)	610-1016
J2 (VEC-814)	SO-239 (UHF)	610-2005
J3	2.1mm DC coaxial jack	601-6021
K1	6V DPDT relay	408-2044
L1, L5	8 turns	403-2408
L2,L3,L4	1 ½ turns	403-2401
Q1	MMBT3904 (SOT-23 SMD)	305-3904-SM
Q2	2N7002 (SOT-23 SMD)	305-7002-SM
R1,R2	10K (1206 SMD)	100S-4100
R3	3.3K (1206 SMD)	100S-3330
R4	330 (1206 SMD)	100S-2330
R5	330 (1206 SMD) 9V version only	100S-2330
RFC1	1 uH (1812 SMD)	401S-0100
SW1	DPDT Power Switch	504-2022

## SCHEMATIC



## TECHNICAL ASSISTANCE

If you have any problem with this unit first check the appropriate section of this manual. If the manual does not reference your problem or your problem is not solved by reading the manual you may call VECTRONICS at 601-323-5800. You will be best helped if you have your unit, manual and all information on your station handy so you can answer any questions the technicians may ask.

You can also send questions by mail to VECTRONICS, 1007 HWY 25 South, Starkville, MS 39759 or by Fax to 601-323-6551. Send a complete description of your problem, an explanation of exactly how you are using your unit, and a complete description of your station.