Looking for a good weekend project? If you like to operate on 160 and 80 meters, this one is tailored for you. It's simple to build, inexpensive, and can add years to the life of your rig.

Beverage Antennas

There's More To Them Than Meets The Eye

BY GARY R. NICHOLS*, KD9SV

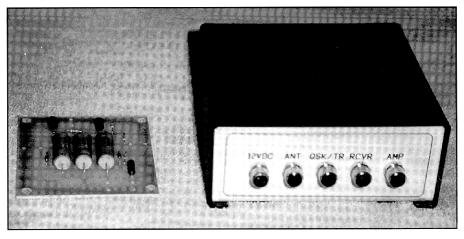
he "Beverage" antenna is probably the best DX antenna ever invented for use on the 80 and 160 meter amateur bands. The low noise and directive characteristics make it a must for the serious DXer on those bands, especially during low sunspot years.

There are, however, several real dangers to your transceiver which result from energy getting back into the radio through the auxiliary antenna input on the back panel of your transceiver. That input is "unprotected" on almost all makes of amateur radio equipment. How do you know if your rig is protected or not? That is a very good question. To answer that question, trace the receive or auxiliary antenna input on your schematic diagram starting from the back-panel phono jack. If that signal line does not go through a set of relay contacts (or transistor switch) which are either open during transmit or grounded, the auxiliary input during transmit is unprotected.

What happens during transmit is very similar to a public address system when the microphone gain is too high and feedback causes an ear-piercing squeal. Your front end is subject to "self destruct" from the feedback loop that occurs during transmit from excessive RF energy coupling back through the receive antenna. This can happen whether using loops, beverages, or whatever type of antenna you may be using. This is not a problem when receiving on your transmit antenna, since it is disconnected from the receiver section of the transceiver and protected by a T/R relay.

How likely you are to have this problem depends on both the distance the receive antenna is from your transmit antenna, and the power level being transmitted. Naturally, the higher the power the greater the danger.

John, K9UWA, got me interested in 160 meters several years ago, and I got "hooked" on working DX on that band. Without beverage or other low-noise-type antennas, working DX from the mid-west was a rare occurrence. However with good receiving antennas I have been able to do quite well, even this far from the coast. In fact, I was able to win Zone 4 in the 160 Meter SSB Contest in 1990, 1991, and 1992 in the single operator category. My transceiver is a Ten-Tec Corsair II, and my first experience with RF feedback showed up in several ways:



This view shows the completed board outside of a suitable cabinet. This is the rear of the cabinet showing the connecting jacks.

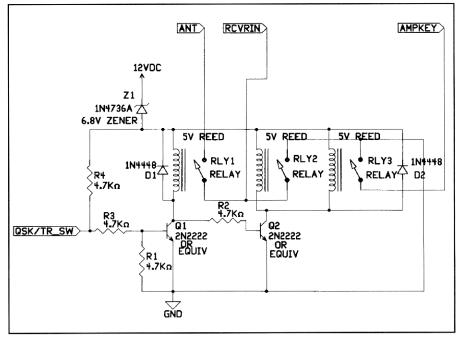


Fig. 1- Schematic diagram for the front-end saver.

*4100 Fahlsing Rd., Woodburn, IN 46797

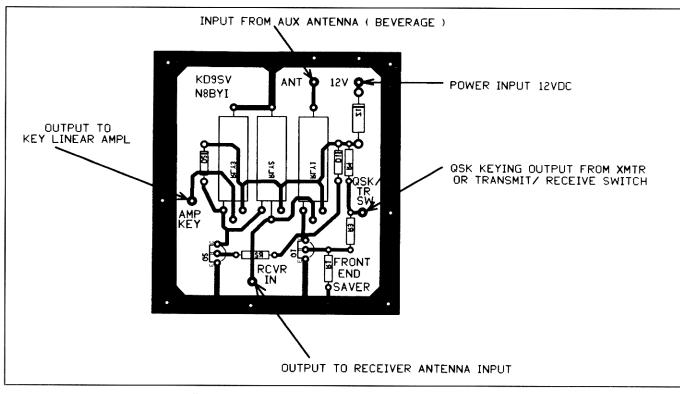


Fig. 2- Diagram of the PC board and parts layout shown full size.

- 1. It made the rig think it had high VSWR and tripped the power supply.
- 2. When on SSB on 1840, I was also reported to be loud on other frequencies in the band.
 3. The phantom VSWR effect causes diffi-
- culty in loading of my linear amplifier.

 4. Power output from the linear amplifier was
- Power output from the linear amplifier was reduced.

There may be other symptoms caused by this problem I am not aware of yet. However, if any of these symptoms occur, switching receive back to the transmit antenna will make the problem go away.

Now back to John, K9UWA. After burning up his ICOM 765 for the second time, John asked me to come up with something that would prevent it from happening again. I designed a simple circuit using two 5 VDC reed relays and two transistors that could be connected external to the radio and that would do the job. He also wanted a "bypass switch" that would enable switching out the protection circuit in the event of a relay failure during a contest. During a rearrangement of equipment the "bypass" switch accidentally got switched, and you guessed it—burn-out number three.

Not only is it a huge inconvenience to be without your rig for several weeks when you have to ship it back to the manufacturer for repair, but it can also be quite expensive.

Chuck, N8BYI, and I got together and designed a new, improved circuit that will work with any radio. It is QSK compatible and will key any linear amplifier that requires a pull-down, and all of the connections can be made without having to open up the radio. Only 12 VDC is required, and it is available on the rear panel of most modern transceivers.

How does the protection circuit work? It disconnects the receive antenna during transmit, shorts the antenna input to ground, provides a

Parts List

D1, D2—1N4448

Q1, Q2-2N2222

R1-4-4.7K

RLY1-3-SPST 5 volt reed relay

Z1-1N4736A, 6.8 volt

keying relay for a linear amplifier, and permits QSK operation with a non-QSK amplifier. In addition, it is easy to install, all connections are external to the rig, it requires only 12 VDC at 40 ma, replacement components are available at Radio Shack, and it prevents RF from entering the rig via AUX antenna input.

Conclusion

This small circuit can prevent RF from "smoking" the receiver front end of all transceivers. This includes most Ten-Tec, ICOM, Kenwood, and Yaesu rigs, and should be of particular interest to 80 and 160 meter operators

Editor's Note

The author advises us that this project is available in three forms from C&S Engineering, 9229 Goldenrod Dr., Fort Wayne, IN 46835 (219-485-1458). It is available as a kit (\$22.95), as a completed board (\$29.95), and as a finished unit in a cabinet (\$49.95).

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