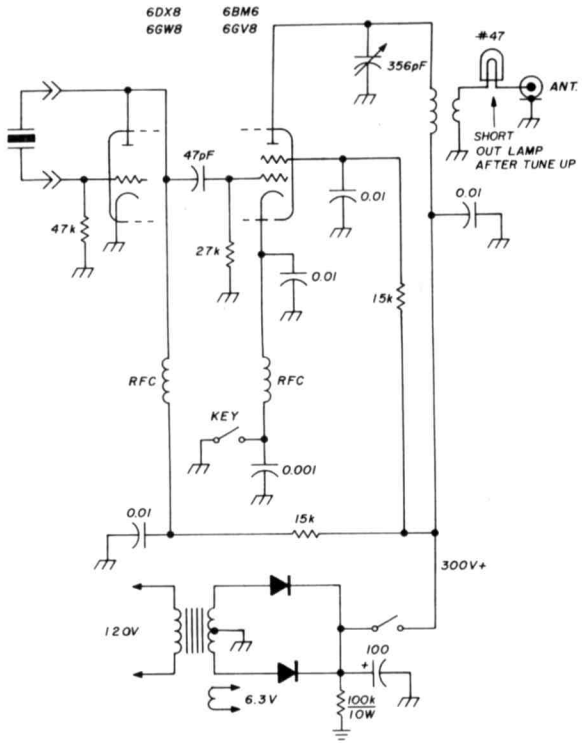


fig. 2. VK5EK's tongue-in-cheek reply to the modern QRP solid-state transmitter. Why use six expensive transistors and about 100 components when one tube and two diodes, plus a handful of flea-market components will do the job? Old-timers will certainly remember low-power transmitters of this general type. (Drawing adapted from *Amateur Radio* magazine, a publication of the Wireless Institute of Australia.)

communication in today's world is carried on by amplitude modulation. You don't believe me? Then just tune across the broadcast band or the many shortwave broadcast bands. All of these signals are amplitude modulated.

Banning amplitude-modulated signals from the Amateur bands might be a movement toward spectrum conservation, but it would further restrict the Amateur's knowledge in an important technology that forms a large portion of today's communication world. Plenty of space exists on 160, 10, and 6 meters for amplitude-modulation equipment, and it would be unwise to ban this basic form of intelligence transmission from the world of Amateur Radio.

a 5-band sloper antenna

Here's an antenna that works well on all bands. It was shown in *The Canadian Amateur* magazine[3] and designed by VE3CPU (**fig. 3**). Basically, it is one-half of a regular trap dipole antenna. A metal tower is used as a ground counterpoise. Only one trap is required, so a trap kit can be split with a friend who also wants to build this simple antenna. The antenna is fed with a coaxial line, the shield of which is grounded to the tower and the inner conductor is attached to the sloper wire.

VE3CPU points out that the antenna is quite directive on the higher-frequency bands, and swinging the bottom of the antenna about 90 degrees makes a big difference in signal strength at a distant location. He estimates the power gain over a dipole to be about 2.5 to 3.0 dB on 20, 15, or 10 meters.

As with all slopers and multi-band antennas, adjustment of the length of the tip section may be required to resonate the antenna at the design frequency on 80 meters.

radio-frequency interference (RFI)

RFI! It's hell if you have it. It can ruin your enjoyment of Amateur Radio by interfering with television and radio reception, disrupting communication circuits, causing false beats in electronic heart pacers, and by causing all other manner of equipment malfunction. Radio Amateurs are at once the cause and victim of RFI, as are CBers and all other users of electronic equipment.

Look at these numbers. In the United States in 1980 there were more than:

- 8,200 broadcast and fm stations
- 970 television stations
- 15,000,000 CB transmitters
- 360,000 Amateur Radio stations
- 210,000 aviation transmitters
- 7,800 radar transmitters
- 300,000 industrial radio transmitters
- 115,000 police and fire department radio transmitters
- 36,000,000 two-way portable radio transceivers plus millions of microwave ovens, X-ray machines, electric motors, light flashers and dimmers, welding machines, neon signs, diathermy machines, plastic formers, industrial welders, and so on.

And that's not all. Radio and television receivers themselves can cause objectionable RFI! The problem is that all radio receivers, transmitters, and pieces of electronic equipment are potential sources and victims of RFI. Anything run by electricity can cause RFI.

No wonder that electronic bedlam surrounds us, and it is a wonder that anybody can hear anything on the radio or see anything on television

considering the vast number of interference-generating devices in our environment.

the sources of RFI and the victim

Remember, all cases of RFI involve two things: the source of the interference and the victim of the interference. For a complete cure of RFI, the interference must be suppressed at the source and the victim (the receiver, stereo equipment, or whatever) must be protected, or otherwise modified in such a way as to reject the interference. This is a large order, and little is being done to solve the growing problem. Information about RFI and its cures is hard to come by, RFI sources are obscure, and a lot of misinformation compounds an otherwise complex problem.

the RFI investigator

In recent years a whole new industry has grown up, largely unknown to most Radio Amateurs: the investigation and suppression of RFI. Electromagnetic compatibility studies and control standards have been created, largely by the military, to safeguard their communications circuits. Courses are available on electromagnetic compatibility and a new career opportunity — that of RFI investigator — has opened up for select, knowledgeable individuals. The job of the investigator is to investigate RFI complaints, track the interference to its source and resolve the problem. Only a handful of RFI investigators are at work in the United States today.

One of the pioneers in this field is a Radio Amateur, Bill Nelson, WA6FQG, who is well known nationwide for his extensive work in RFI investigation, encompassing over two decades of experience. During his long career, WA6FQG has tracked down countless sources of RFI and has lectured to Amateur and CB clubs and conventions on the causes and cures of RFI. Bill is now a consultant to power utilities on RFI problems, including RFI suppression and training of RFI investigators.

Just recently Bill completed an all-inclusive handbook on RFI, which covers the subject in detail.* It is an indispensable reference for all Radio Amateurs, CBers, and the everyday citizen troubled by RFI.

I've personally known WA6FQG for many years and have been greatly interested in his career in this unique work. And I have helped him arrange his handbook and get it published. It's now ready — over 240 pages of valuable information dealing with all facts of RFI.

An advance copy of the *Interference Handbook* was sent to Barry Goldwater, K7UGA, (U.S. Senator from Arizona and Chairman, Senate Communications Subcommittee). After reading the book, Barry said, "This informative handbook covers the entire field of RFI from A to Z. It will be a tremendous help to me and my staff as we work on communications legislation in Congress. Thanks for your help in this matter."

Another accolade for the new *Interference Handbook* came from David Fogarty, Senior Vice President of Southern California Edison Company. He said, "Written by a power-company investigator with 33 years of experience, this book is a reliable guide to the causes and cures of power line interference . . . contains absorbing case histories."

So there you are. Perhaps this new handbook will help you with your RFI problems. As I said before, RFI is hell if you have it. And if you don't have it today, chances are you will have it tomorrow!

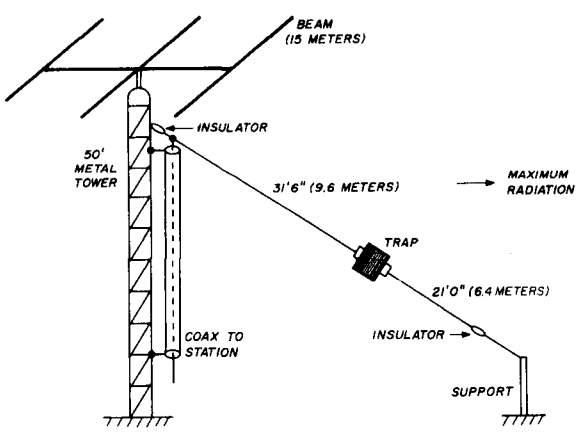


fig. 3. The 5-band sloper antenna of VE3CPU as described in reference 3. The antenna is used on bands between 10 and 80 meters. It is one-half of a regular trap dipole using a metal tower as a ground counterpoise. One trap dipole kit makes two antennas, so you can split a kit with a friend who also wants this antenna. Braid of coax is grounded to top and bottom of tower, and center conductor connects to the sloper wire.

*Interference Handbook, by William R. Nelson, WA6FQG; Editor William I. Orr, W6SAI; 247 pages; $8.95 plus $1.00 shipping — available from Ham Radio's Bookstore, Greenville, New Hampshire 03048.

references

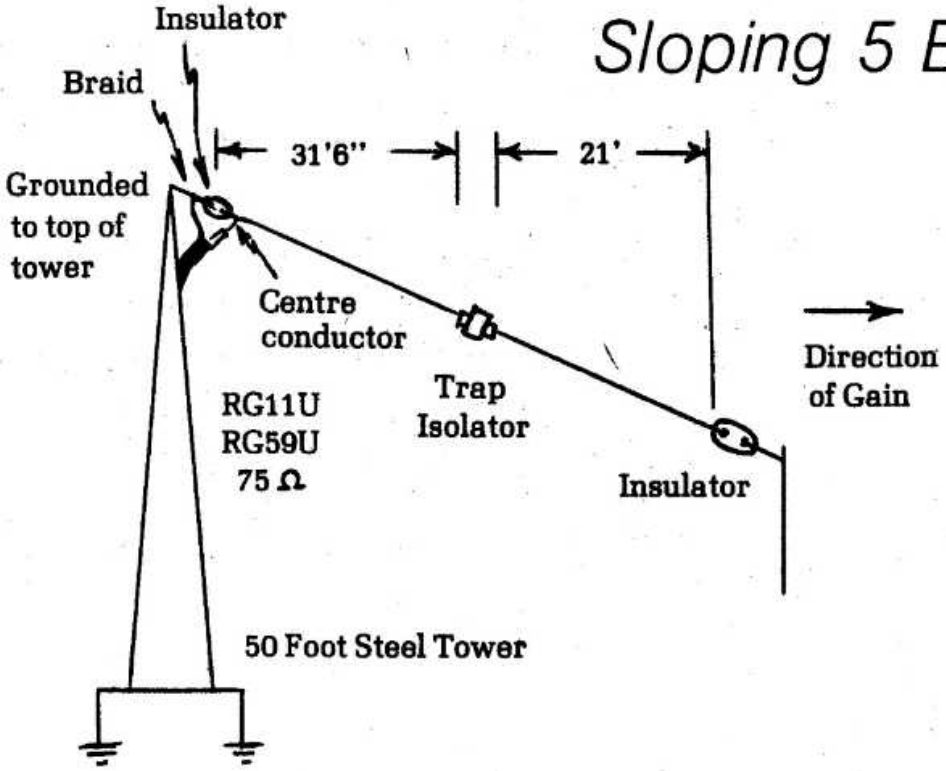
1. William I. Orr, W6SAI, *Radio Handbook*, 22nd edition, Editors & Engineers Division of Howard W. Sams Co., Indianapolis, Indiana.

2. *The Radio Amateur's Handbook*, 58th edition, American Radio Relay League, Newington, Connecticut.

3. *The Canadian Amateur*, Box 356, Kingston, Ontario K7L 4W2, Canada.

ham radio

Sloping 5 Band Antenna



How would you like a 65 foot antenna that works all bands and has gain on 20, 15, 10 metres? Well, if that's the case, this little fellow may be just what the doctor ordered.

Basically, it's one half of a regular trap dipole 80-10 metres using a metal tower as a ground counterpoise. Only one trap is required so you can split the trap kit with a friend who wants one also. 75 ohm coax is required, one side of which (braid) is connected to the top of the tower, the other side (centre) is used for connection to sloper.

Trimming may be required for best operation and SWR addicts may want to use a tuner, but from my own experience I coupled the antenna directly to the transmitter with good results.

DX worked on 40 metres was consistent, with decent reports; best contact was with OE6XG/A Abu Ail on 40 metres. Directivity is quite amazing and swinging the base (bottom) more than 90° makes quite a difference. Gain on 20, 15 and 10 metres seems to be on the level of 2.5 dB to 3.0 dB compared to a horizontal dipole at the same height.

Hope this antenna will fill some voids and make DXing more interesting for all.

Joe Adams VE3CPU