EXPERIMENTER'S WORKSHOP

BUILD A 225-400 MHZ BEAM

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For the avid experimenters who enjoy experimenting with antennas, I have an interesting home-brew project to share with you.

I developed an interest in this type of experimentation back when I built my first crystal set. Now that I am a licensed "ham" my interest lies in all types of communications, especially utility transmissions. To those of us who cannot afford to buy one of the better commercial antennas like the Grove Scanner Beam, this project is appealing. I only have about $16.00 invested in my antenna and yet have a reasonably good, inexpensive 225-400 MHz beam.

My reception of military aircraft has increased at least 30% over that from my previous ground plane; I am located about 75 miles from the nearest military installation. I now monitor "LOBO Base" (Cherry Point, NC, Marine Air Station) approximately 260 miles from my monitoring post.

The antenna is only 20 feet above the ground; I plan to raise the antenna another 20 feet, and add a mast-mounted pre-amp. This should give me optimum reception.

I use a Grove Scanverter into a Bearcat 220 scanner, a sensitive combination.

I cannot emphasize enough to use a low-loss coax like the RG-6/U; it is available from Radio Shack by the foot and from Grove Enterprises.

For construction of the beam I used 3/4" by 80" aluminum tubing from an old camping tent support frame. Conduit can be used, but it is much heavier.

For the elements I used the aluminum wire available from Radio Shack; it is very easy to work with. If you happen to have an old CB "droopy" ground plane antenna or TV antenna lying around, these can supply rigid elements.

For the insulator on the driven element, I glued two 1/4-inch-thick pieces of plexiglass together with "Super Glue." Two holes are drilled in the edges of two opposite sides of the plexiglass (see diagram). These two holes are for inserting the driven elements.

The size of the holes depends on the size of your element rods. They should be drilled .005 to .010 under the size of the rods you are using to allow for a tight fit. The depth of the two holes is 3/4 inch.

The driven element is in two pieces, each 9 inches long. The plexiglass insulator is 4 inches square. Two small holes are drilled in the middle of the insulator for attaching the insulator to the boom.

A small hole is drilled in one end of each driven element; attach the center conductor of the coax to one screw, and the shield braid to the other screw.

Mounting of all elements (with the exception of the driven element) may be made by drilling holes through the boom. Be sure they are on exactly opposite sides and about .010 under the size of the elements you are using. After all elements are inserted, take an ice pick or punch and crimp the edge of each hole to prevent movement of the elements.

Don't forget to mount the antenna in a vertical plane (elements pointed up and down as shown in the illustration). The shorter elements are in the forward direction, facing the signal.

If anyone has any suggestions for the improvement of the beam, or any experiences with it, I would like

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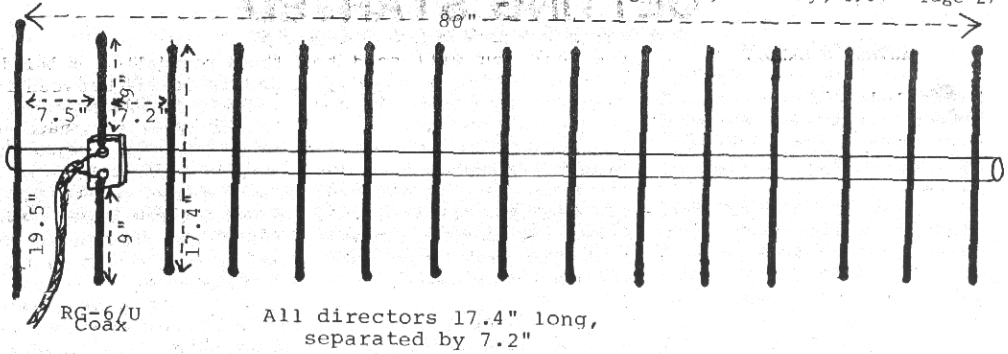


225-400 MHZ BEAM ANTENNA

RECEIVER PROTECTION FROM TRANSMITTER OVERLOAD

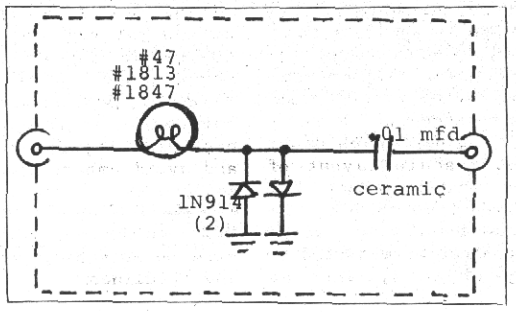
A MT reader passed on to us this interesting circuit designed to protect the delicate solid-state preamplifier in your shortwave receiver from burnout when a nearby transmitter is activated.

The circuitry is built into a small aluminum mini box using appropriate connectors for your shortwave antenna circuit.

HOW DOES IT WORK?

Basically, the circuit utilizes three stages of protection. First, the two cross-polarized diodes limit low levels of RF. Secondly, high RF levels cause the bulb filament to glow, then burn out, opening the circuit from further signal passage.

The capacitor isolates the antenna circuit from any DC or low frequency line voltage components which might be present.



TECHNICAL TOPICS

Q I have a need for a small wireless FM microphone. Do you know where I can purchase them?

Mike Mehrdad
Columbia, MO

A License free FM (88-108 MHz) wireless microphones are widely available from mail order specialty houses and Radio Shack, whose toy 60-2109 ($6.95) and tie-clip 33-1076 ($19.95) work quite well considering their low cost.

Surveillance type "bugs" are also available at considerably greater cost from specialty manufacturers like AID (Ft. Lauderdale), Bell and Howell, KEL, Tracer and others. They advertise in law enforcement magazines.

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Q Our local police department is switching to computer aided dispatch; all I hear is the beep of the code. Will my scanner become obsolete?

Christopher Smallman
Liverpool, NY

A You are probably listening to the Syracuse UHF police channels. They use a Motorola MODAT system, a simple, minimal keyboard which the arriving officer presses to signal his ten-code reply rather than use a longer voice transmission at his descretion.

No, your scanner won't become obsolete; voice is also used on those channels!

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Q On December 12, 1983 I heard the VOA at 1900 UTC on 21485 kHz ID, "This is WTOP" which is a Washington, DC commercial broadcaster on 1500 kHz. Is there an explanation?

Matthew Williams
W. Henrietta, NY

A I called the VOA program director's office who, in turn, checked both the producer's and engineer's logs for that time. None showed that ID.

What probably happened *was a "cross-patch", an* accidental selection of audio feed from WTOP rather than from the normal source of station ID.

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Q While listening to low band on my scanner, I sometimes hear a woman's voice give the call letters "KCA712 Boston" on several frequencies at once, usually repeated every half hour. Can someone explain *these transmissions?*

RWL
Stoneham, MA

A The FCC requires licensees of two-way radio stations to announce their callsigns on a periodic basis. In your example, KCA712 is licensed to the Massachusetts Bay Transit Authority on 44.46 MHz. The fact that you are hearing it at several places at once on your scanner may be attributed to two possible causes: you may be located close enough to one of their 500 Watt transmitters for your scanner to be overloaded by the signal; or you may be experiencing "intermodulation," whereby their signal is "mixing" with other local signals, producing spurious emissions on other frequencies which are received by your scanner.

Changing antennas may help; usually, the use of the small attachable whip provided with your scanner is recommended to keep signal levels down to a reasonable level. If you must use an outside antenna, a directional beam pointed away from the powerful transmitter will help--if you can find one! Since the interference is received only every half hour, you may prefer to live with the minor inconvenience.

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Q While listening to our local ambulance service on 155.400 MHz, I hear them use coded expressions like "C code," "R code," and so on. What do they mean?

BGF
Hallowell, MN

A Most agencies use some type of encoding for voice transmissions. This is done for two reasons: privacy and speed. It is understandable that with the vast numbers of hobbyists listening in, many agencies feel sensitive about divulging openly their business so they assign alpha-numberic designators to common situations. The most famous of these is "10-4", meaning "O.K." or "message received."

Many different ten *codes, and other voice codes* as well, are used throughout the western world. The APCO code and Sheriffs' Association code are among the most *widely accepted.*

Contact the local service who uses the code in question; many agencies will cheerfully supply you with a *copy of the code as an effort* toward good public relations! If not, a local hobby radio store will probably have a copy on file. *And finally,* a number of hobby monitoring publications print these lists within their pages.

BEHIND THE DIALS from p. 24

stiff feel resulted in a number of accidental double-strike entries.

Backlighted keys will be invaluable during night-time programming. Wider frequency coverage (30-50, 138-174 and 406-512 MHz) makes the 260 very attractive.

While the scan rate is adequate, search speed is much slower than on previous models.

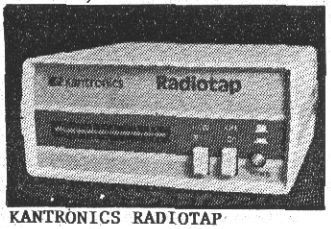
Tight squelch operation is dependable with excellent sensitivity to marginal signal strengths.

Audio clarity is quite good; the speaker is front mounted and audio circuitry is voice tapered.

While some multiplex whine and AC hum were barely audible, none interfered with reception.

The compact styling, businesslike appearance and high performance of the new BC-260 will make it appealing to serious mobile monitors of the land mobile services.

(BC-260 $399.95 suggested retail; widely discounted)



KANTRONICS RADIOTAP

The age of computerization of listening has arrived. Like it or not, digital techniques have invaded the analog art of radio.

Actually, digital communications have been with us for a long, long time. Morse code is really a digital technique with its two states, on and off. Radioteletype similarly shares its information with a mark/space pair.

Recognizing the possibilities of enhancing communications, several manufacturers have come to the front with RTTY/MORSE readers employing digital technology.

Most recent, and very affordable, is the "Radiotap" from Kantronics (Dept. MT, 1202 E. 23rd St., Lawrence, KS 66044). Compact and extremely user-friendly (as the computer linguists say), the inexpensive interface is presently designed to permit a marriage between your general coverage receiver and a Commodore VIC-20 or 64 personal computer.

Total keyboard control permits the listener to quickly type up the mode of interest: M for Morse, R for RTTY, A for ASCII and so on. Simple? You bet. Even bit inversion may be automatically decoded as every possible bit combination is scrambled by the computer, scrolling in front of the viewer in a manner that permits him to visually choose the corrected text.

An unusual "scope" feature allows the measurement of signal timing, permitting the user to custom-adjust the baud rate for non-standard values.

OUR TEST: Connected to our Kenwood TS-430S transceiver and a Commodore 64 (borrowed from Electra for a test of their new Compuscan!) we proceeded to tune in a CW (continuous wave; Morse code) signal.

Immediately, the Radiotap latched on, displaying perfect copy on the Grove MNTR-1 video monitor. Similar results were forthcoming with RTTY.

The Radiotap also has a built-in filter allowing selection of either CW or RTTY for interference reduction on crowded bands.

Our conclusion was that the little unit provided good performance and was extremely simple to use with its accompanying ROM cartridge.

(Kantronics Radiotap, $199.95)

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Q Many frequencies I would like to hear on VHF high band and UHF are listed as having four decimal places (163.4125, etc.); programmable scanners only accept 3 decimal places. What gives?

DC
Portland, ME

A When you enter "163.4125" into most programmable scanners, the circuitry will automatically round off your entry to the *nearest* 5 kHz (163.410 *or* 163.415 MHz). Since this is only 2.5 kHz away from the actual transmitting frequency, it is totally within the *"passband" (receivable* channel width) of any scanning receiver. While it would be possible to manufacture a more expensive scanner which *would allow the four-place* frequency entry, there would be no detectable difference in signal reception.

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to hear from you.

PARTS LIST

1 3/4" *OD* x 80" *aluminum* tubing
1 2"x4" block of plexiglass or other suitable insulator
1 75 ohm TV *balun*
enough aluminum stock for thirteen elements, 17.4" long