

MONITORING TIMES

Published To Provide Information and Enjoyment To Those Who Monitor The Radio Spectrum

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ANTENNAS FOR LISTENING... An Introduction

Shortwave The 2-30 MHz portion of the radio spectrum is the most intriguing, complex, and widely-monitored frequency range. Worldwide propagation by ionospheric reflections means that weak signals may be heard for thousands of miles.

The simplest antenna for shortwave monitoring consists of a single length of wire, either insulated or bare (insulation is transparent to radio waves), running high, free and clear of metallic obstructions or nearby wiring, for a length of 25-150 feet (see figure 1).

Although height above ground is a consideration, 15-20 feet is usually adequate. Additionally, it is unimportant whether the antenna wire is straight, zig-zagged or even wrapped around the eaves of a house. All of these configurations will bring in signals.

The important things to remember are sufficient length and height, clearance from metallic masses (sheet metal roofing and siding), and isolation from power lines (do not run over or parallel to them).

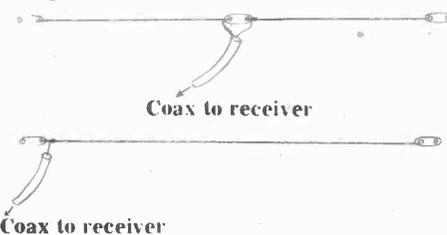


Figure 1A: Center fed and end fed wire antennas

Feedline While many listeners find it satisfactory to simply connect the end of the wire antenna to the screw terminal on the back of the receiver, the use of coaxial cable is recommended. This will reduce electrical interference from household wiring picked up by the lead-in. The coax is run from the receiver up to the end, center, or even off-center, of the elevated antenna.

The coax may be any type for shortwave listening: RG-58/U (under 100 feet), RG-59/U (home TV type), RG-6/U (cable TV) or even miniature RG-174/U (under 50 feet). Large-diameter coax (RG-8/U or RG-11/U) is necessary only when excessively large runs are anticipated (hundreds of feet). Do not use shielded hi-fi audio cable as a substitute for coax. Its capacitive losses will attenuate signals, and its inadequate shielding at radio

frequencies is vulnerable to electrical interference.

Do not be concerned with impedance matching; although most receivers are designed for greatest efficiency at 50 ohms, no practical antenna system is capable of providing a uniform 50-ohm match over the entire shortwave spectrum. Leave matching to a tuner if necessary.

VLF ANTENNAS At very low frequencies (below the AM broadcast band) the receiving antenna may be a long wire, short tuned vertical, tuned loop or active whip. For casual reception, a 75-150 foot wire is adequate. Curiously, an insulated wire antenna may lie on the ground or may be buried several inches under the soil for low frequency reception! The primary reason is that although signal strengths are somewhat lower, electrical noise interference is radically reduced. The signal to noise ratio is thus improved, resulting in apparently louder signals.



Figure 2: A tunable preselector helps front-end shortwave receiver selectivity

Preselectors Since single-signal reception is our goal, any reduction of interference is desirable. While modern shortwave receivers are plenty sensitive, strong off-frequency signals often leak through the selective tuning circuitry, appearing throughout the tuning ranges of the receiver. A good preselector, connected between the receiver and the antenna, will reduce or even eliminate this annoyance (see figure 2).

Preamplifiers Modern shortwave receivers are sensitive; outside antennas capture plenty of signal voltage. Preamplifiers are unnecessary in the vast majority of applications. At shortwave frequencies, atmospheric noise (background static) is stronger than internally-generated noise in the receiver, so any amplification of signals will be accompanied by a corresponding increase in at-

mospheric noise. Thus, the only thing that will be accomplished will be a higher reading of the s-meter; the intelligence of the signal probably will not be any better.

Another disadvantage in using a preamplifier is that strong signals will also be amplified, creating worse problems for the receiver's selectivity. External tuning (preselection) is mandatory with a preamplifier unless you enjoy hearing signals from all over the spectrum simultaneously!

ACTIVE ANTENNAS If you don't have room for a full-size wire antenna, then an active antenna may be for you. Essentially, an active antenna is nothing more than a short antenna coupled to a preamplifier so that the receiver "sees" the same signal strength that it would from a much larger antenna.

Indoor active antennas may be satisfactory if no other form of larger antenna is possible. In many cases, their performance is quite satisfactory. Their primary disadvantage is that they are vulnerable to indoor electrical noise and signal pickup may be restricted by metallic surfaces.

Outside active antennas, on the other hand, may be located in a favorable position where performance may equal, or even outperform a longer wire antenna. Their primary disadvantage is cost, complexity, and the possibility of destruction by weather, or corrosion or lightning.

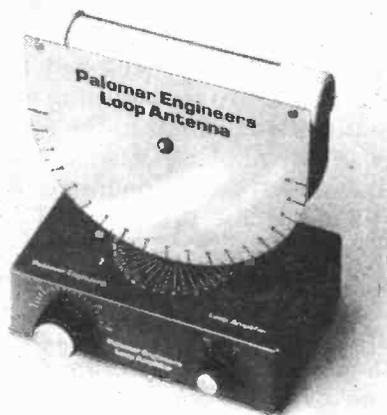


Figure 3: An amplified loop antenna for directional long and shortwave reception

Loop Antennas One variation of the active antenna is the loop, a bidirectional amplified indoor antenna which may be quite effective at the lower frequencies (see figure 3). Its rotability makes it possible to adjust it for minimum noise or maximum signal.

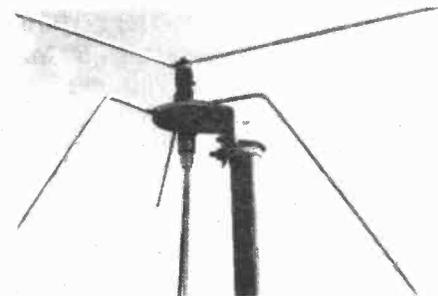


Figure 5: The discone, an inexpensive broadband antenna for VHF/UHF reception

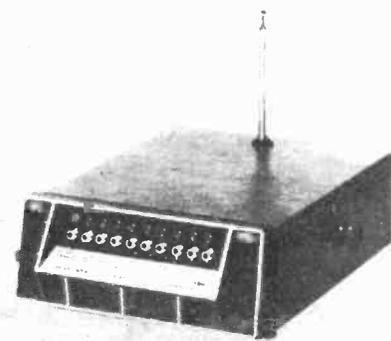


Figure 4: Built-on whips provide local reception

VHF/UHF The 30-300 MHz frequency spread is officially designated as "VHF" (very high frequency); whereas 300-3000 MHz is called "UHF" (ultra high frequency). For practical applications, these ranges are further subdivided: 30-50 MHz (VHF low band) 150-174 MHz (VHF high band), 450-512 MHz (UHF) and 806-960 MHz (microwave mobile or simply the "800 MHz band").

Mobile antennas for these frequency ranges are invariably vertical; thus, so are base station and scanner monitoring antennas as well.

The simplest antenna for scanner reception is the little whip which came with your scanner (as shown in figure 4). It is adequate for local reception. But to widen your listening horizons, a better antenna is necessary (refer to figure 5).

See ANTENNAS ... Page 3

A Personal Note Of Thanks

Reaction from our thousands of readers to the first issue of Monitoring Times was overwhelming. The volumes of mail which poured into Grove Enterprises following publication were heartwarming.

I would personally like to take this opportunity to say "Thank you" for your encouragement and appreciation.

FROM THE EDITOR

TO CHARGE OR NOT TO CHARGE...

Our original intention was to offer our readers a free subscription to MONITORING TIMES, paid for by advertisers. We discovered quite rapidly, however, that getting money from advertisers during a recession is not the easiest thing to do! Besides, advertising space rapidly filled up space which could be used for informational articles and columns.

A large number of your letters have indicated that you would rather pay a reasonable subscription fee for MONITORING TIMES, thus assuring a maximum of content. This certainly would be much easier for us; the time spent badgering prospective advertisers for their support could be better spent gathering, assembling and writing informative material for you to read.

Consequently, this will be the last free issue of MONITORING TIMES. A very modest subscription fee is being asked of our readers. Additional benefits of paid subscription will include first or second-class mailing for prompt and dependable delivery, expanded content for more information and stimulating reading, and even provide a meager royalty for qualified contributing authors!

Subjects coming up in future editions include: pirate broadcasters, spy numbers stations, satellite communications, signals from space, underground communications, bugging and surveillance and many, many more.

And, of course, regular columns will inform you about new products and how well they work,



BOB GROVE

frequencies you can hear for intrigue and excitement, clubs you can join which cater to your interests, publications to extend your knowledge of the radio spectrum, schedules of worldwide broadcasters of particular interest, and much, much more.

And, as a special bonus for our charter subscribers, you may receive up to 18 issues of MONITORING TIMES for the low early-subscribers rate of only \$7.00 per year!

Advertising will be kept to a minimum, informing you of products of particular interest to listeners. In just one issue we have grown 50%; with your support we expect to continue our growth.

Be sure not to miss a single issue of MONITORING TIMES; fill out your subscription blank on page 11 now and send it in!

Tuning In On Teletype

While most shortwave listeners concentrate on voice or Morse code transmissions, a world of fascination exists in copying other modes, too. One of these is radioteletype.

Up until recent years, the only way to monitor these FSK (frequency shift keying) transmissions was with noisy, cumbersome mechanical printers. The venerable models 15 and 28 Teletype Corporation printers were coveted by the thousands. Used in combination with surplus or home-brew demodulators, the familiar "tickety-tickety" printed miles of paper messages.

News broadcasts, weather bulletins, stock market reports, diplomatic correspondence, ship to shore messages and many other printed communications have been monitored by the countless thousands with these ancient mechanical monsters.

Now, solid-state technology has produced tiny readers which need only be plugged into the earphone or speaker jack of a receiver to reveal the text of these mysterious-sounding "diddly-diddly" transmissions. Used in conjunction with a reliable RTTY frequency directory, an inexpensive RTTY reader can sit by the hour, faithfully reproducing text across its fluorescent or LED digital display.

As a bonus, the better of these units also feature automatic Morse decoding as well...speeds of up to 80 words per minute are tracked and displayed on the

screen!

One of the most popular of these miniature models is the inexpensive Mini-Reader from Kantronics (note new reduced price in Grove Enterprises product section). Simply plug the unit into the audio output of your receiver, adjust the tuning dial of the receiver until the indicator lamp flickers and watch the radio-teletype or Morse code message form across the screen! Although readers will work with nearly any receiver with a BFO (CW/SSB mode), drift-free stability is important. Readers will not work with scanners.

Morse and RTTY readers take a few minutes familiarization. While CW (continuous wave or Morse code) messages are easily interpreted by the readers, RTTY is a little more complex. It may come in speeds of 60, 67, 75 or 100 words per minute; normal or reversed mark/space; wide or narrow shift. Consequently, initial tuning of the signal is somewhat hunt-and-peck.

A few minutes intensive trial and error will usually result in readable copy; however, after a while the listener will develop a sixth sense for more rapid tune-in!

Not all FSK signals can be received with conventional readers. Some senders utilize encryption techniques to preserve the privacy of their communications.

In future articles, we will take a closer look at Morse/RTTY readers and how they work.

Viewpoint

(NOTE: Letters are chosen on the basis of importance to our readers. Dissenting views on issues are welcome. Because of the volume of mail, no postal replies unless correspondence includes a self-addressed stamped envelope.)

Gentlemen:

The legal loophole disclosed in your article on Page 3: "Section 605: CAN I TALK ABOUT WHAT I HEARD?", raises the possibility of other potential loopholes in 605 which would open the door to very interesting new exploitations of SW Monitoring!

I have in mind the large number of independent amateur crypto groups who would like to join forces in the decryption of real traffic, but are either not entirely aware of the ready availability of short wave intercepts provided by the "Numbers Spy Stations" which you mention, or else are intimidated by Section 605, which you also discussed in the first issue.

The proliferation of home computers (PET, APPLE,

TRS-80, etc.) has given these amateur analysts a decryption power far surpassing that which was available to the WWII professionals. In addition there is now readily available to amateurs a significant body of literature on cryptanalysis.

Remembering that many of these "Spy" stations are operating illegally, (no call signs given) and are transmitting information detrimental to the security of the USA, is it conceivable that under these conditions they still enjoy the protection of Section 605?

Furthermore, since these messages are encrypted, any allegation that they are of a point-to-point nature is presumptuous, and based at most on the mere absence of knowledge. That is, the identity of the intended recipient(s) can only be disclosed in the decrypted text, if at all. And, of course, any real "spy" message would not reveal the identity of the intended recipients, anyway; so a determination of who can NOT be told of the

message contents is impossible!

Thus we are led to the obvious implication that the application of Section 605 to encrypted, subversive traffic is unworkable!

Would you like to join hands with amateur cryptoanalysts and provide a column in MONITORING TIMES relating what decryption methods have NOT worked on what "spy" transmissions? Or, better still, what methods have worked? No need to reveal message contents.

Very truly yours,
Charles W. Johnson

A very thought-provoking letter, Charles. How about it, readers? Anyone want to spy on the spies?

Dear Bob:

Received copy of Monitoring Times with interest. Concerning Listeners Log (A) Radio Free Granada is not a clandestine station. (B) The frequency of 150 MHz for TRANSIT is only approximate. I have it direct from the group that the frequency is 149.988 MHz. A USSR navigation satellite

does use 150.000 MHz; others use 149.91, 149.94, 149.97 and 150.03 MHz.

DW, Kent, OH

Thanks, DW. Corrections and additions to our files are always appreciated.

Dear Bob:

Just had to drop you a note and tell you how much I enjoyed the premier edition of The Monitoring Times.

The other area which I have to praise is your products and service. Your organization bespeaks of a custom in American business which has been lost. I am speaking of courtesy, promptness and quality. The products which you are marketing are some of the finest I have seen anywhere, and the specialization will keep me a dedicated Grove customer. I certainly am anxious to get my hands on a Scanverter.

CB, Dearborn Heights, MI

Thanks for a very flattering letter. We do try very hard to offer quality at an affordable price. We look forward to serving you and our many friends for years to come.

ANTENNAS... from page 1

Outdoor mast-mounted antennas may be omni-directional (equally responsive to signals from all directions) or directional. Most scanner antennas are of the omni-directional variety.

In choosing an antenna it is important to determine what frequency bands are of greatest interest to you. If high band only is your listening quarry, then don't spend extra money for an all-band antenna. A simple ground plane antenna is very effective for single band reception.

For maximum performance, an antenna with "gain" is necessary. Gain means improved sensitivity over a simple dipole at the frequency of interest. A half-wave dipole is used as a reference. Any antenna which brings in signals stronger than those from a half-wave dipole is said to have gain.

Directional "beam" antennas generally come in two varieties: Yagis and log periodics. The Yagi is very narrow band, operating over a relatively narrow swath (typically 2-4 MHz) of frequencies. Gain of 10-12 dB is possible with only 3 or 4 elements.

The log periodic, on the other hand, may operate over an 8:1 or greater frequency range with gains of approximately 8-10 dB readily attainable. Thus, a Yagi would be chosen for a specific frequency requirement, but a log periodic would be used for wide-band applications. A high performance log periodic is shown in figure 6.

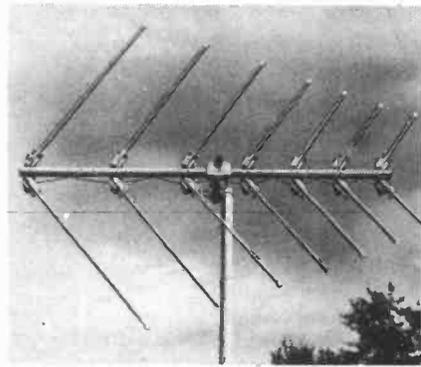


Figure 6: The popular Scanner Beam for maximum range

Since a directional antenna favors a particular spot on the horizon, a rotator is recommended unless the listener is interested primarily in that direction. Local signals will still be heard off the sides and back of the beam.

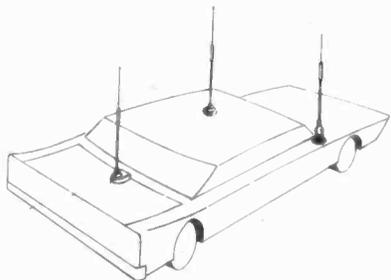


Figure 7: Trunk lid, roof top, and cowl mount...common locations for mobile antennas

Mobile Antennas For mobile monitoring, the center of the roof of the vehicle is the best spot to mount a scanner antenna (see figure 7). Next, try the rear trunk lid, then the front cowl.

At VHF and UHF it makes lit-

tle difference whether the antenna is mechanically or magnetically held in place. Mechanical mounting is for security only.

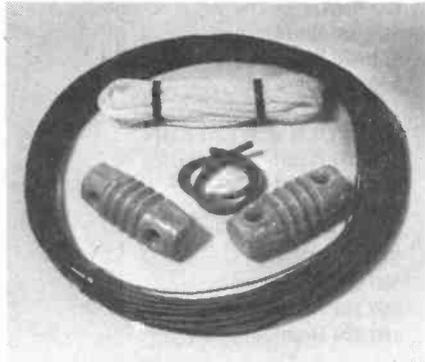


Figure 1B: The popular Grove Enterprises Skywire can be configured to a variety of installations

Coaxial Cable At these higher frequencies, choice of coaxial cable is a vital consideration. Using the wrong cable can mean the difference between loud signals and none at all!

For runs in excess of 25 feet, do not use RG-58/U (CB mobile coax). Always use low-loss foam-dielectric RG-59/U, RG-8/U, RG-8/X or RG-11/U. Spool ends of RG-6/U are often available economically from cable TV companies and makes excellent VHF/UHF transmission line. It is difficult to connect, however, and may be more trouble than it is worth.

Impedance of the cable is of no consequence for scanner listening! While 50 ohms is nominally correct, no scanner or antenna maintains a constant 50 ohm impedance throughout its tuning range. Thus, either 50 or 75 ohm cable is equally acceptable. As a matter of fact, 75 ohm cable is usually less lossy than 50 ohm cable, yet many articles and books blindly repeat each other, perpetuating the myth that 50 ohm cable is mandatory and TV coax won't work. The reverse may be more nearly true!

GROUNDING At Shortwave frequencies and lower, a good electrical ground is important. It will generally reduce electrical interference from electrical power lines and may (especially at the lower frequencies) improve signal strength somewhat.

The best ground is an 8-foot pipe driven into moist soil, located as close to the receiver as physically possible. A ground wire which must wind its way some fifty feet to a nail driven into dry sand is not a ground at all!

If an ideal ground is not possible, try a cold water pipe. A combination of several pipes, conduits and grounds may be possible. Experiment by connecting and disconnecting the ground to your shortwave receiver while listening to various frequency ranges to determine its effectiveness.

A ground is not necessary for scanners except for shock hazard protection. At these high frequencies electrical power line interference is rarely a problem.

Lightning Protection Any outside object is vulnerable to lightning, especially if it is higher than other nearby objects. An antenna is a prime candidate and many

hobbyists have learned a lesson the hard way!

Commercial broadcast stations use elaborate lightning protection devices and techniques, often capable of sustaining direct hits without serious damage. Unfortunately, such measures are beyond the means of hobbyists. Still, a few precautions may avoid tragic consequences.

First, always disconnect your antenna download from your radio equipment when not in use. Better yet, connect it instead directly to your ground wire.

Install a lightning arrestor between the transmission line and receiver. While these will not protect equipment from a direct hit, they will help immunize the equipment from nearby strokes.

Transient suppressors for the AC power line are also recommended. Modern solid state equipment is susceptible to burnout from power line spikes which often surge through our lines. These devices are normally located at the same outlet as the receivers (or ancillary equipment).

With these introductory facts in mind, erect your antenna. Remember: An antenna should be as high as practical, free of nearby massive obstructions and away from power lines. Coaxial cable should be chosen carefully, long enough only to connect the antenna to the receiver. A good ground is recommended.

Coming In May

Along with our regular departments and features, our next issue will review the Fox programmable scanner, the AEA Morse/RTTY reader, and two communications textbooks from McGraw-Hill. And, as a special feature, we will have a guest column by Robert Horvitz, art editor of the *CoEvolution Quarterly*, and *Below 30 MHz* editor in the *RCMA Newsletter*, and a profile of Robert Leary of Akron, Ohio, an avid listener.

The Dream Machine

One of the most important aspects of a manufacturing effort is the research and development of new products. Many companies seem to do this blindly, offering what they think the public should have, not what the buyers want.

We are vitally interested in your wishes. What products would you like to see on the marketplace? A shortwave converter for your scanner? A wide-range panoramic receiver? An 800 MHz scanner converter? A communications satellite converter? A direction finder for shortwave signals?

Our best ideas often come from our customers and readers. Who knows, perhaps your dream may become a future product!



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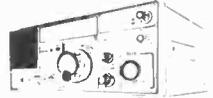
SWL-DX HEADQUARTERS

EEB Has It All!!!

•RECEIVERS: Drake Kenwood McKay Dymek Panasonic Sony Yaesu
•CW-RTTY READERS: AEA HAL Info-Tech Kantronics
•ANTENNAS: McKay Dymek R.H. Jones MFJ Palomar
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SAVE \$70

•General coverage 15-30 MHz
•All mode AM, CW, SSB, FM
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FRG7700	\$549	SALE \$479
FRG-7	\$339	SALE \$289

This SALE good til 1 June 1982.

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The answer for the serious BCB DXer. Rotates to null out that local station and open the airwave to those DX stations you didn't know were there.



One loop amp required \$77.50
Choose 1 or more loops for your favorite band(s) \$59.95 ea.

Runs on 9V battery supplied FREE.

Now enjoy the rest of the bands. The international short wave broadcast bands only occupy 11% of the 2-30MHz spectrum 89% is generally not listened to by the SWLer because the signals are not the spoken word. With a stable CW/SSB receiver you can read many of these signals heard in that 89% of the spectrum previously passed up.

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The Ultimate in Morse, CW, and Teletype reception. Fill your TV screen* with never ending printed information from around the world. CW-RTTY-ASCII. News services converted to video.



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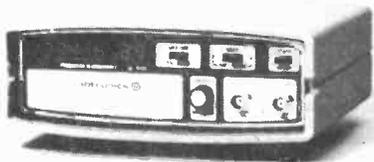
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Product Review

SABTRONICS 1GHZ FREQUENCY COUNTER

One of the handiest pieces of test equipment for the technician's or experimenter's workshop is a frequency counter. By sampling and actually counting the pulses per unit time, a frequency counter will display the actual frequency of oscillators, signal generators, transmitters or other sources of RF.

One of the newest counters on the market is the Sabtronics 8000B. High sensitivity is a drawing card, and the 8000B claims sensitivity of 30 millivolts through 1000 MHz.

The time base reference is supplied by a 10 kHz crystal oscillator; an optional high-stability TCXO (temperature compensated crystal oscillator) is available for critical applications.

Input impedance is nominally 50 ohms, convenient for virtually all RF applications from 10-1000 MHz. A separate high impedance (1 megohm/100 pF) input is provided for audio and low frequency RF (10 Hz-100 MHz).

A stability of ± 2 parts per million is accompanied by a temperature stability of ± 1 part per million from 0-40° Celsius.

An optional AC adaptor to power the 8000B is available from Sabtronics, or the user may wish to use 4 NICAD cells for total portability.

OUR TEST: A quick peak inside the high-impact cabinet revealed an exceptionally clean and neat circuit board layout. Copper paths were sharp and crisp showing careful design and etching. All components are wave soldered to the glass/epoxy PC board.

The display is composed of 9 0.4" LED digits, visible for many feet away from the test bench. Gating times permit resolution of 0.1, 1.0 and 10 seconds resulting in display accuracies of 0.1, 1.0 and 10 Hz.

Jitter suppression is excellent, making reliable readings easy. Two front-panel BNC connectors allow the user the choice of either high or low frequency inputs for the RF source under measurement.

We confirmed the sensitivity claim with our Hewlett-Packard lab signal generator, measuring 30 millivolt sensitivity well past 900 MHz! A spokesman at the factory says that the 8000B is actually capable of continued sensitivity above 1000 MHz, but in an "overrange" condition and not recommended.

At this writing, the 8000B lists for \$239 and the company is expanding into a dealer program to supplement its mail-order business.

For further information, write: Sabtronics International, 5708 N. 50th St., Tampa, FL 33610.

(NOTE: Contributions are welcome. Please confine listings to unusual or com-

Listeners Log

prehensive regional or agency entries. Accuracy is important. Do not submit casual

intercepts like WWV, CB, TV Channel 6 or your local taxi service!)

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Edwards/Vandenberg AFB
callsign: Abnormal one zero
(All frequencies kHz, SSB)
3163 9213.5 4486 10510 4760
10660 5700 10804 5822 13218
7706.5 15021 9029 17428
(Thanks to Steve Handler, Deerfield, IL)

MFA, East Berlin RTTY news
English; anti-American
(also crypto number groups)
19390 kHz 425 Hz shift/66 WPM
1545 UTC
(Thanks: Tom Harrington, Reynoldsburg, OH)

Railroad Communications
All frequencies MHz

CHESSIE
160.230 Road
160.320 Road
160.530 Yard
161.160 Yard
161.460 Yard

CONRAIL
160.800 Road
161.070 Road
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NORFOLK & WESTERN
161.190 Road
161.250 Road
160.440 Road

SOUTHERN
160.950 Road
160.245 Road
160.830 Road

SEABOARD COASTLINE
160.590 Road
161.100 Road

LOUISVILLE & NASHVILLE
161.370 Road
161.520 Road

UNION PACIFIC
160.740 Road
160.680 Yard
161.025 Maintenance

C P RAIL
161.475 Road
161.115 Yard

BURLINGTON NORTHERN
161.160 Road

WESTERN PACIFIC
160.260 Dispatcher
160.380 Road
161.460 Road Repeater
161.475 Road Repeater

GREEN BAY AND WESTERN
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161.070 Yard

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161.160 Yard
156.600 Coast Guard
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US Army Ft. Hood/Gray Field, TX
All frequencies MHz

32.100 Gray Army Air Control Tower
32.300 Gray Army Air Field
34.300 Fort Hood Range Control
36.300 Fort Hood Range Control
37.000 Fort Hood Military Police
37.910 Fort Hood Military Police
38.300 Lifesaver-military evacuation helicopter
38.700 Fort Hood Army Air Control Tower
40.930 Fort Hood Army Air Control Tower
41.500 Fort Hood Army Air Base

42.150 Fort Hood Army Air Base
45.000 Fort Hood Military Police
46.750 Gray Army Air Base
49.700 Army at Fort Hood
49.800 Army at Fort Hood
75.000 Army at Gray Air Feild
118.000 Army at Fort Hood
118.600 Army at Fort Hood
118.950 Army at Fort Hood
119.650 Army at Fort Hood
121.700 Army at Fort Hood
124.550 Army at Fort Hood
126.200 Army at Fort Hood
133.850 Army at Fort Hood
134.100 Army at Fort Hood
148.010 MARS at Fort Hood (143.990 input)

148.825 Darnell Army Hospital Ambulance
155.280 Temple V.A. Hospital pager
155.340 Temple V.A. Hospital pager
163.440 Army at Fort Hood-maintenance
163.560 Army at Fort Hood-maintenance
164.100 Army at Fort Hood-maintenance
165.085 Provost Marshal's Office at Fort Hood
165.160 Provost Marshal's Office at Fort Hood
165.300 Temple V.A. Hospital pager
165.185 Moving vans at Fort Hood
173.510 Fort Hood Tank Firing Control
(Thanks Ronnie Whitten, Killeen, TX)

TIDEWATER, VA area frequencies
All frequencies MHz
Safety

Ambulance to hospital 155.400
Paramedics 468.175/hospital 463.175
POLICE 39.540
453.800 TECAP (Areawide mutual aid)

Southside (includes all cities below)

Fire 154.295 (mutual aid)

Chesapeake
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155.730 Ch. 1 154.415
155.130 Ch. 2

Norfolk
POLICE FIRE
156.210 Ch. 1 154.190
155.640 Ch. 2 154.235
Fireground

155.310 Ch. 3
155.790 Ch. 4 Traffic
154.755 Ch. 5 Detectives

Portsmouth
POLICE FIRE
460.025 154.445
460.100
460.300

Suffolk
POLICE FIRE
155.190 154.385 Base
154.070 Mobile

Va. Beach
POLICE FIRE
158.850 Ch. 1 154.370
158.790 Ch. 2

Peninsula (includes all cities and counties below) 154.265 -
Mutual aid fire for York County & James City County

Hampton
POLICE FIRE
453.900 Ch. 1 46.06
453.750 Ch. 2
453.050 Ch. 4
155.550 Ch. 5 Sheriff

Newport News
POLICE FIRE
453.650 Ch. 1 154.130
453.600 Ch. 3
159.090 Sheriff

Poquoson
FIRE
154.340

James City County & Williamsburg
POLICE FIRE
460.050 154.145 Wmbg.
154.355 JCC

York County
POLICE FIRE
453.150 154.400

Others
Gloucester County
FIRE
154.310

Isle of Wight
POLICE FIRE
159.210 33.800

Langley AFB
POLICE FIRE
163.5125 173.5875
163.4875

Aircraft	Tower	Approach	Departure
Airport	120.8	118.9	125.2
Norfolk	118.7	125.7	124.9
Patrick Henry	125.1	126.7	Norf.
Langley AFB	124.3	Norf.	Norf.
Navy Norfolk	126.2	119.6	Norf.

(Thanks: K.B. Johnson, Readers may send correspondence to him at PO Box 7461, Hampton, VA 23666)

INTERNATIONAL BROADCASTING

All frequencies kHz
Voice of Israel (English)
9815 11640 15585
@ 0000 0100 0200 UTC
Deutsche Welle (West Germany)
6040 6085 6145 9545 9565
9590 11865 15105 @0100-0150
5960 6185 9545 9690 11705
@ 0500-0050

HAVANA, CUBA
11760 @0300-0600 9525 @0630-0800

SPAIN
9630 11880 @0000-0200 0530-0630

RADIO SWEDEN INTERNATIONAL
17840 (upper sideband) @0230-0257
(Thanks: Ralf Muuster, Decatur, GA)

RADIODIFUSAO PORTUGAL
11925 9575 @0000-0530
15290 17830 @0200-0300

VOICE OF YEREVAN, ARMENIA
15100 @0350-0358

RADIO ARGENTINA
11710 @0100-0130
(Thanks: Craig Rocha, San Diego, CA)

Introducing the first no crystal hand-held scanner. The Bearcat® 100.



Now you can have the one scanner you've always wanted—a no crystal, fully synthesized hand-held scanner. The incredible, new, Bearcat 100.

Push button programming.

The new Bearcat 100 works just like the full size, no crystal Bearcat Scanners. Push button controls tune in all police calls, fire calls, weather warnings, and emergency information broadcasts, the split second they happen. Automatically.

All the features you want.

16 channels for storing

frequencies. 8 band coverage—including high, low, UHF and "T" public service bands; both the 70 cm and 2 meter amateur bands; plus, for the first time ever, both the military and federal government land mobile bands. Both automatic and manual search, lockout, scan delay, direct

channel access. Even a liquid crystal display. Flexible antenna, earphone, AC adapter/battery charger and carry case are included.

Your Bearcat Dealer wants to hand you an earful.

See your Bearcat Dealer now for a demonstration of the amazing, new Bearcat 100. Get complete information about the world's one and only hand-held, no crystal scanner.

BEARCAT® SCANNERS

Electra Electra Company
Division of Masco Corp. of Indiana
300 East County Line Road
Cumberland, Indiana 46229
International Business Office
Suite 102, 1828 Swift
North Kansas City, Missouri 64116

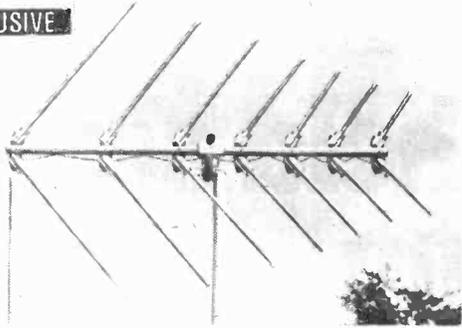
SALE!

ANTENNAS and ACC

A GROVE EXCLUSIVE

(Reg. \$49⁹⁵)

SCANNER BEAM ANT-1



\$39⁹⁵

plus \$3 UPS

SAVE \$10⁰⁰!

The only beam antenna designed exclusively for scanner reception. SCANNER BEAM allows you to "pin-point" those distant transmitter locations for improved signal interception.

Gain as high as 8 dB over other outside monitor antennas, plus an additional 15 dB front-to-back ratio! Continuous-coverage reception from 108-512 MHz. It will also receive 30-50 MHz.

SCANNER beam is a rugged, seven-element, log-periodic dipole array, featuring all-aluminum construction and low-loss ABS insulators.

Only 51" long x 42" wide. Just snap the elements into their lock positions and mount the antenna on your mast or rotator.

SCANNER BEAM will work equally well with low-loss 50 or 75 ohm coaxial cable such as our CBL-1 assembly. Impedance-matching transformer, weather boot, universal offset mount and full instructions included. 5 pounds shipping weight.

Coaxial Cable Assembly recommended with ANT-1.

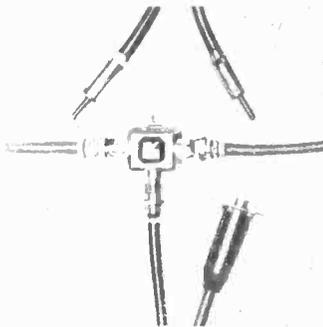
ANTENNA/RECEIVER MULTI-COUPLER CPL-1

A GROVE EXCLUSIVE

(Reg. \$18⁹⁵)

\$16⁹⁵

plus \$1⁵⁰ UPS



SAVE

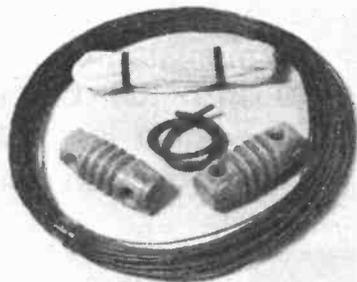
\$2.00!

SCANNER LISTENERS! Increase the capability of your monitoring post by feeding two scanners from one antenna lead-in. Combine two rooftop antennas into one down lead. Split a single antenna lead-in into separate band for feeding receivers with different frequency ranges. 30-960 MHz. Useable from 1-1000 MHz. Complete with dual receiver harness, antenna adapter, extra connectors and instructions. Shipping wt. 10 oz.

SKYWIRE® ALL-WAVE ANTENNA KIT ANT-2

\$6⁵⁰ (Reg. \$8⁰⁰) plus \$1⁵⁰ UPS

SAVE \$1.50!



Developed for optimum 10 kHz-30 MHz reception. Enormous capture area brings in worldwide listening loud and clear! The antenna kit consists of 100 feet of flexible, stranded, insulated wire; two glazed-porcelain strain insulators; window feed-through tubing; weatherproof support cord and complete instructions. Shipping wt. 1 lb.

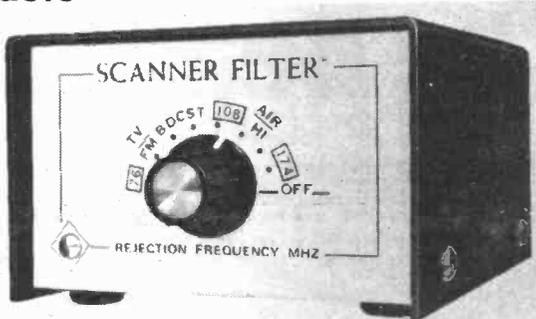
SCANNER FILTER While Supply Lasts

\$29⁹⁵ (Reg. 39⁹⁵)

plus \$1⁵⁰ UPS

SAVE

\$10.00!



Finally, an effective interference filter for scanner receivers! Tune out TV and FM broadcast interference. Eliminate images. Avoid desensitizing and front-end overload.

No longer will aircraft signals come bursting through on police and fire channels. Repeaters will stop paralyzing your high-band reception. High-band images on UHF will disappear.

The SCANNER FILTER is ideal for use with outside antennas.

Merely plug your existing antenna into the filter and plug the filter into your scanner. It's that simple, and it works!

A frequency-calibrated dial (76-174 MHz) allows you to select the frequency causing the interference problem; a highly-selective notch filter does the rest! Approx. 3 1/2" W x 2" H x 4 1/2" D. Shipping wt. 13 oz.

**WE SHIP WITHIN 48 HOURS
TOLL FREE ORDER DESK
1-800-438-8155 (Continental US)
North Carolina Customers Call Collect
704-837-2216**

THE POWER ANT ANT-4

\$69⁹⁵

plus \$2⁰⁰ UPS

includes FREE

AC ADAPTOR

VHF/UHF Variable

Preamp And

Active Antenna



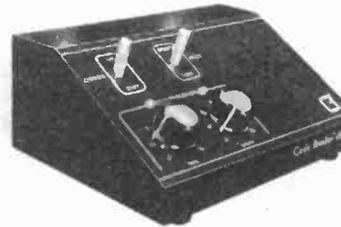
A GROVE EXCLUSIVE

THE POWER ANT is an exciting new breakthrough in antenna design; an electronic marvel that not only amplifies signal strength but also allows the user to increase or decrease this same signal strength and thereby "control" the signal level of incoming frequencies.

Extend the little whip to its full 18" and realize top signal reception over all scanner bands, or to favor reception on UHF or microwave mobile, collapse the whip to 7" or 4" respectively.

(Not recommended in metro area when used with an external antenna) Results with THE POWER ANT are truly impressive: gain of 25 dB on low band, 15 dB at UHF, 10 dB on the 800 MHz band, even 8 dB at 900 MHz! And all of this with low noise (1.8 dB nominal). Simply plug THE POWER ANT into 12 VDC and listen as those remote lower-powered units come alive. 2 3/4" H x 3 1/2" W x 5" D. Shipping weight 28 oz.

CODE BREAKER DSC-2



\$89⁹⁵

\$97⁹⁵

with AC Adaptor plus \$2⁰⁰ UPS

A GROVE EXCLUSIVE

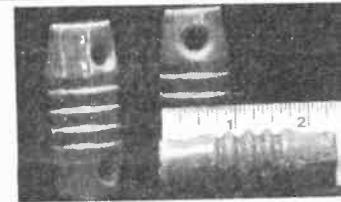
The Grove Enterprises CODE BREAKER is the most advanced speech inversion decoder available on the market today. It includes not only a self-contained speaker, but an adjustable 800-4000 HZ audio notch filter as well.

Designed to operated on 12 VDC, this compact, cost unit makes an ideal addition for mobile or base stations monitoring posts.

The CODE BREAKER plugs into the external speaker jack of your receiver. During normal unscrambled voice transmissions the unit is left off, acting as a quality extension speaker. When speech inversion is detected, the CODE BREAKER is switched on and automatically adjusted for clear speech reception.

When used with a shortwave communication receiver, the notch filter can remove heterodyne interference from adjacent frequency signals or may be used as a CW/RTTY tone processor. Approx. 7" W x 3" H x 5" D; Shipping wt. 37 oz.

Special Clearance Porcelain Antenna Insulators



Highest quality US-made insulators. Ideal for homebrew wire antenna systems. Length 2 1/2", diameter 3/8" plus \$1⁰⁰ shipping (free shipping with any order); 10/ \$2⁵⁰ plus \$1⁵⁰ shipping (free shipping with any other order); 100/ \$20⁰⁰ (plus \$4⁵⁰ shipping). **WHILE SUPPLY LASTS.**

KANTRONICS MINI-READER

NEW RFI SHIELDED MODEL NOW!

RDR-1 \$289⁹⁵

plus \$3⁵⁰ UPS Includes World Press Services, AC adapter, display stand.



Read the latest teletype news before the newspapers and broadcasters report it! Check the stock market and weather reports, monitor ship-to-ship messages, government transmissions.

One of the most flexible digital accessories ever invented! - It's: •A radioteletype reader (60, 67, 75, 100 words per minute...any shift!) •A Morse reader (3-80 words per minute, automatic speed control just!) •A digital 24 hour clock (displays hours, minutes and seconds!) •A frequency counter (DC-79 kHz code practice display (plug in a key and watch what you say!) •An ASCII reader (100 or 300 baud) A Morse speed indicator (displays received code speed timer (measures lapsed time up to 24 hours.)

Simply plug the Minireader into the external speaker jack of your shortwave receiver, adjust the receiver tuning dial until the LED on the reader blink "ready" signal, and watch the RTTY or CW messages write across ten brilliant fluorescent characters! Designed to work from any 8 to 12 VDC at 240 mA source. Includes accessory plugs for your receiver. Instructions and liberal warranty included. Approx. 5 1/4" W x 3 5/8" H x 1 1/4" D. Shpg. wt. 3 1/2 lbs.

GROVE TO SPEAK AT HAMFESTS

Bob Grove, president of Grove Enterprises and editor/publisher of Monitoring Times, is once again making the rounds at hamfests as a featured forum speaker.

Addressing large crowds on his favorite subject: "Listening intrigue... outside the ham bands", Grove has drawn enthusiastic response. Discussed in the forum are spies, clandestine and pirate broadcasters, federal government and military communications, aeronautical and maritime radio, satellite monitoring and other technical and practical topics.

At press time, two more hamfests have slated Grove as a featured speaker: Atlanta, GA (Saturday, June 12) and Oak Ridge, TN (Saturday, April 3, Oak

Ham Beacons On Shortwave

The recent World Administrative Radio Conference (WARC-79) authorized three new amateur radio bands for U.S. hams. Since official permission to use these new bands has not yet been released in the U.S., interested amateurs have been securing temporary licensing from the FCC as experimental stations.

The new 10, 18, and 24 MHz bands have recently been the center of automatic beacons, and even some QSO's (two-way contacts) between American hams. One of these pioneer experimenters, Bob Haviland W4MB (experimental call sign KK2XJM) has released a tentative schedule of his propagation beacon transmissions for 1982.

Frequencies chosen for the test transmissions are 10140, 18108 and 24930 kHz with 30 watts effective radiated power (ERP). Hours of operation are normally continuous Friday through Sunday (0000-2400 UTC).

The tentative rotating schedule is shown here:

March 12	10140
March 19	18108
March 26	24930
April 2	10140
April 9	18108
April 16	24930
April 23	10140
April 30	18108
May 7	24930

Bob is presently using a modified SBE33 transceiver and a Hustler vertical trap antenna. He has an application on file with the FCC to allow CW and two-way communications with other hams, both in-band and cross-band, with power to 300 watts.

Listeners-in may hear Bob talking with N4DR (KK2XGH) of Silver Spring, MD, Sunday evenings at 0000 UTC.

For more information, contact Bob Haviland at 2100 S. Nova Rd., Box 45, Daytona Beach, FL 32019.

Ridge Civic Center). Others are pending.

Hamfests are excellent places to learn more about radio and interested readers are encouraged to attend. Low admission prices are available at the door; advance registration is not necessary.

CLUB NEWS

In an effort to acquaint you with the various clubs which cater to your interests, we will highlight different listening clubs each issue.

This month we are pleased to introduce a wide-spectrum umbrella organization which serves as a clearing house for many clubs: ANARC, the Association of North American Radio Clubs.

ANARC is a confederation of long wave, short wave, scanner, TV/FM, utilities and broadcast listeners clubs nationwide. Since 1964 ANARC had dedicated its efforts to strengthening the services offered by its associated members.

The official organ of ANARC is the ANARC Newsletter, featuring profiles of associated clubs, conventions, meetings, reviews of equipment and publications.

Additionally, ANARC supports the efforts of HAP, the Handicapped Aid Program, an active nucleus of physically handicapped listening hobbyists.

For a sample copy of the ANARC Newsletter and more information about its associated clubs, send 50 cents to ANARC Newsletter, 1500 Bunbury Drive, North Whittier, CA 90601.

In future issues we will present more club news of interest to our readers. Club officers are invited to send information and glossy photos of their activities to MONITORING TIMES, Brasstown, NC 28902.

Nuclear Disaster Simulation In Florida

The St. Lucie Nuclear Plant, Hutchinson Island, Florida, was the scene of a simulated disaster February 10th and 11th.

Testing "REP"—the Florida Plan for Nuclear Power Facilities -- was the responsibility of Florida Power and Light Company. Frequencies most commonly reported were:

- 37.70 FPL Units
- 39.10 Primary Florida Disaster Preparedness Net
- 39.18 Secondary Net Frequency
- 155.925 Local Government "Radiation Control" Units
- 451.125 FPL Damage Control Teams in Nuclear Plant

Thanks to reader Ken Steinhoff for this interesting report.

UNIVERSAL ELECTRONICS SHORTWAVE AND RTTY EQUIPMENT

NRD-515 Receiver and Memory Unit



PLL Digital VFO
Digital tuning
Up-Conversion
24 Channel memory
Unit-(Option)
NRD-515 \$1399.00 NDH Memory \$249.00 Speaker \$44.95

Continuous coverage -
all modes 100Khz-30Mhz
Bandpass tuning
All solid-state
Modular Construction

— SONY ICF-2001 —

Direct-access digital key-touch tuning with programmable bandscan and memory. Dual conversion, quartz crystal, phase-locked loop frequency synthesis for all bands. LCD digital display, 5 step signal strength indicator.

List \$349.95 Now \$304.95

— NEW —

AEA-RO code and RTTY reader with 32 character fluorescent display .29 in. high. Copies morse, baudot RTTY, ASCII RTTY from 60 thru 100 WPM and 110-300 Baud ASCII. Ideal for beginners.

List \$299.00 Now \$284.95

— NEW —

HAL COMMUNICATIONS portable RTTY/CW terminal — 5 inch display built into 12 3/4 x 11 x 5 in. cabinet. Separate keyboard with transmit buffer.

List \$995.00 Now \$939.95

— INFO-TECH —

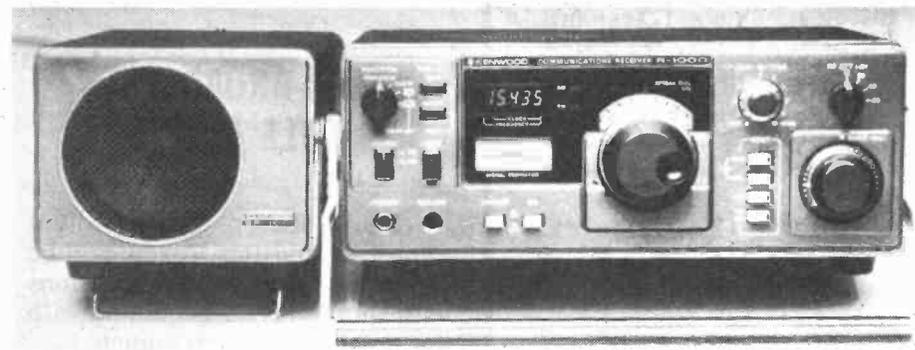
RTTY/CW/ASCII converter for video or hard copy. Excellent performance at a reasonable price.

List \$595.00 Now \$549.95

Shipping Additional On All Items

We Ship UPS-COD, cash or certified check, MC-Visa.

Write to Dept. A 1280 Aida Dr. Reynoldsburg (Columbus), Oh. 43068



General Coverage Receivers Now Available From Grove Enterprises

Because of the large numbers of requests, Grove Enterprises now offers a full line of popular general coverage communications receivers.

While nearly any make and model may be specially ordered, Grove has decided to concentrate on five popular models: Sony ICF-2001, Kenwood R-600 and R-1000, Yaesu FRG-7700 and JRC NRD-515. Best of all, these receivers will be offered at substantial discounts from suggested retail prices!

We urge our readers to check with our advertisers for price and availability of these and other receivers and accessories, or call Grove Enterprises toll free at 1-800-438-8155.

This month we will take a closer look at an excellent entry-level receiver for the hobbyist, the Sony ICF-2001 (See page 8).



And now, from the authors of the famous **Federal Frequency Directory, Radio Communications Guide, Confidential Frequency List, SPEEDX Utility Guide, Communications Monitoring, and Behind the Dial**

The New SHORTWAVE FREQUENCY DIRECTORY!

These combined private files and exhaustive listings of communicating agencies has produced the most comprehensive collection of shortwave listings ever published -- thousands of frequencies and hundreds of users worldwide, conveniently grouped by agency. Most are voice; some CW and RTTY are included.

Many of these listings have never before been published. A sampling of contents of the new **SHORTWAVE FREQUENCY DIRECTORY** includes:

MILITARY (Air Force, Navy, Coast Guard, Army, CAP, NORAD, SAC, TAC, MARS, FEMA)

GOVERNMENT (FCC, State Dept., Embassies, Energy Dept., NOAA)

INTRIGUE (Smugglers, spies, beacons, scrambled speech, poachers, and trawlers)

SCIENTIFIC/INDUSTRIAL (Astrophysical observatories, oil nets, Firestone)

BROADCASTING (Pirates, clandestines, international allocations, feeders)

SPACE (NASA, Shuttle support nets, USSR, Republic of China)

AIRCRAFT (FAA network, overseas flights, VOLMET, contractors, foreign)

SHIPS (ATT High Seas, coastal stations, marker beacons, weather, Ice Patrol)

PERSONAL (Ham, CB, AM-SAT, Russian satellite, radio control)

FIXED (Common carriers, Canadian network, Guantanamo/US telephone)

SAFETY (Red Cross, INTERPOL, disaster, emergency)

All these and more in a handy, spiral-bound, 8½" x 11" reference volume. Available April, 1982.

BONUS! SPECIAL EARLY DISCOUNT! All orders received before April 1, 1982, may reserve as many copies as desired for only \$10.95 each (plus UPS shipping)! A savings of \$2 below the regular price of \$12.95. But you must act now; April 1st, all prices will go up to \$12.95.

To order your copy of the exciting new **SHORTWAVE FREQUENCY DIRECTORY**, send \$10.95 plus \$1.50 shipping to: Grove Enterprises, 140 Dog Branch Road, Brasstown, NC 28902; or call toll-free 1-800-438-8155.



New Dual-Band Interference Filter From Grove Enterprises

Following in the footsteps of the enormously-successful FTR-2 SCANNER FILTER, Grove Enterprises has announced their new SCANNER FILTER III. As well as the 76-174 MHz range, the 400-512 MHz band is also included in the new FTR-3. Now, metropolitan listeners may simultaneously reject high band and UHF images which plague scanning receivers.

Perhaps the best news of all, the new dual-band SCANNER FILTER III will be offered at no increase in price! An improvement in assembly efficiency has reduced cost in labor, thus permitting even more flexibility than before at the same price! (FTR-3, \$39.95 plus \$2.00 UPS shipping).

For those scanner listeners who do not need UHF filtering, a limited quantity of high band FTR-2 SCANNER FILTERS is being offered at a final clearance price of only \$29.95 (see Grove Enterprises ad).

NASA BROADCASTS SHUTTLE MISSIONS

The Johnson Space Flight Center at Houston, Texas, will be broadcasting all communications with shuttle crews beginning with the scheduled March launch.

Also transmitted will be public affairs commentary and press briefings. The frequency used for the transmissions will be 171.15 MHz, currently allocated for NASA and commonly used at several installations as a repeater output.

Thanks to Ed Lentz of Pasadena, California, for this timely tip.

Tip Of The Month

One of our readers came up with a nifty discovery. For those of you using built-on whip antennas which came with your scanner, image interference from aircraft, hams, mobile telephones, etc. can be removed simply by plugging an external notch filter like Scanner Filter into the external antenna jack! The whip may be left in place and the filter tuned normally. If the little whip is the kind which plugs into the rear Motorola jack, simply plug it into the filter instead, and plug the filter into the antenna jack. Thanks for that anonymous tip!

Call For Authors

Commencing with the May/June (next) issue, **MONITORING TIMES** will feature articles written by qualified experts in the field of communications. If you have a flair for writing and feel that you have something to say which would be of interest to our readers, we would like to hear from you.

Articles should be timely, informative, grammatically sound and snappy. Accompanying illustrations or sharp black and white glossies are welcome. Keep word count to about 500-1000.

Do not send your manuscript

until advised to do so; do send an outline of your prospective article and a brief resume of your professional qualifications. If your article is accepted for publication, you will receive a stipend of \$25 and a free subscription to **MONITORING TIMES**, as well as the personal satisfaction of knowing that your article will be read by tens of thousands of admiring fans!

Address all inquiries to: **MONITORING TIMES**, Editorial Department, Brasstown, NC 28902.

Shortwave Equipment Review

Larry Brookwell of the International Dxr's Club of San Diego announces the availability of the 1982 Supplements to his Shortwave Hobby Equipment Review 1981. Supplement "A" covers receivers -- contemporary, pre-transistor, military surplus and European. Supplement "B" evaluates accessories, active antennas and "Projects on the Front Burner". The 3rd Supplement, Random Ramblings, consists of non-technical articles, rumors, gossip and off-beat but pertinent material plus a bit of humor.

The "Review 1981" plus the Supplements offer the only comprehensive coverage of hobby equipment on the market. Prices are: "Review" 1st class to USA/Can/Mex, \$6.40; Supplements at \$2.75 each, \$5.45 for two and \$8.15 for all three. SD-DXC, 1826 Cypress St., San Diego, CA 92154-1154.



Who Was That Lady?

To all of you who were puzzled by the identity of the young lady pictured on page 4 of the January/February issue, she is one of the busy staff of Radio Netherlands not Glenn Hauser as reader Dave Maxfield queried! How about a picture, Glenn, so that our readers can see what you look like?

Technical Topics

(Note: Questions sent in by readers are chosen for general interest. Because of the volume of mail, no postal replies unless questions are accompanied by a self-addressed, stamped envelope.)

Q. I have an Antenna Specialists rooftop antenna connected to my Bearcat 300 with RG-8U cable. Signals are still weak; how come? (EB, Hillsboro, OH)

A. Sounds as though you have good equipment, but check all connections. Make sure your connectors on the cable are secure, uncorroded and your cable is fresh, low-loss type. With an ohmmeter, check to be sure you have continuity from end to end of the cable, of the center conductor, and of the outside shield, but that there is no reading between the shield and center conductor. If everything is connected properly and the scanner is in first class shape, you just may be expecting too much action in a remote location.

Q. Why is there no TV channel 1? (JH, Philadelphia, PA)

A. There was, years ago. Channel 1 (48-54 MHz) is now part of low band and the six-meter ham band.

Q. What is the lowest frequency that radio waves can use? (JH, Philadelphia, PA)

A. Any alternating electrical current is capable of radiating. For control purposes, the allocatable spectrum usually begins at about 10 kHz, although US Navy Project ELF emissions communicate worldwide at 76 Hz!

Q. Where can I get a manual for an Allied SX-190 receiver? (Alexander Johnson, R#2 Box 34, Hinckley, MN 55037)

A. Good question. Can any of our readers help Alexander?

Q. How can I get my Kenwood R-1000 to receive 300 MHz? (RF, Bismarck, ND)

A. Only with an external frequency converter. A number of manufacturers advertise in ham magazines.

ACCESSORIES

SIGNA MATCH TUN-2



\$99⁹⁵

plus \$2⁰⁰ UPS

A GROVE EXCLUSIVE

SIGNA/MATCH—the most advanced general coverage antenna tuner/preselector available for the serious radio enthusiast.

This state-of-the-art frequency-selective tuner is designed to optimize matching between your antenna and receiver or ANY frequency between 10 kHz and 30 MHz! It will reduce, and in many cases remove, receiver intermodulation, images and front-end overload. Background noise is reduced. VLF signals you never dreamed were there come roaring in loud and clear.

Front panel switches allow instant selection between two antennas and between two receivers (or two antenna inputs to one receiver). Signa Match is NOT an amplifier; it requires no power supply.

The SIGNA/MATCH works with end-fed wire or center-fed dipole antennas. 7"Wx3"Hx5"D; shipping wt. 34 oz.

COMMUNICATIONS HEADSET



Only \$22⁹⁵

plus \$1⁵⁰ UPS

Top quality headset from Telex. Designed for serious shortwave and VHF/UHF monitoring. We provide an adaptor plug so that the headset will fit not only normal 1/4" phone jacks, but 3.5 mm (1/8") miniature jacks found on many scanning and shortwave receivers as well.

Specifications: dual dynamic transducers, 3-200 ohm impedance, 12 oz., 5-foot flexible cord, 1/4" plug with miniature adaptor included. Shipping wt. 1 lb.

ORDER BY PHONE TOLL FREE!

1-800-438-8155

to place your order of \$15.00 or more.

ORDERING INFORMATION

By phone (charge card or COD only)

1. Call 1-800-438-8155
2. Give your name, street address for UPS and phone number.
3. Read your Mastercard or VISA number (or say COD). Please note: COD orders must be paid by cash or money order when driver delivers your package.
4. Give stock numbers and names of items you wish to order.

By mail

1. PRINT CLEARLY your name, street address for UPS, city, state, zip code and phone number.
2. PRINT CLEARLY the stock numbers and names of items you wish.
3. Enclose money order, bank draft, personal check, Mastercard or VISA number (be sure to include expiration date) or write COD (\$2⁰⁰ service charge). Please note: COD orders must be paid by cash or money order when driver delivers your package. DO NOT MAIL CASH!
4. Mail to Grove Enterprises, 140 Dog Branch Road, Brasstown, NC 28902.

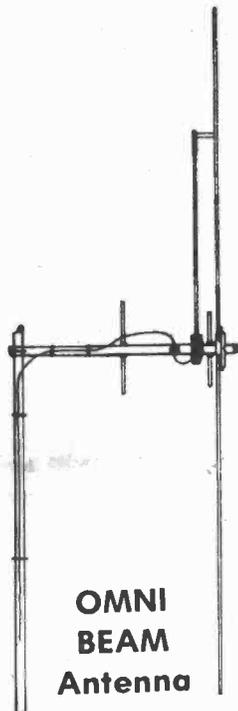
Calculating post office delivery (UPS not available)

Add up the total weight of your purchases (listed beside each description of products). Ask your post office the cost to ship from zip code 28902 to your area, stating how you want package shipped (parcel post, priority or bookrate if entire shipment is books). Be sure to ask for insurance charges to cover your purchase. Send us a check for the total shipping, insurance and purchase price of your products.

FOREIGN ORDERS: Follow above instructions and send a bank check to US FUNDS.

*GENERAL INFORMATION CALL 704-837-2216

Save \$5⁰⁰
Reg. \$39⁹⁵

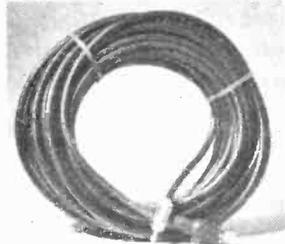


OMNI BEAM Antenna

An ideal low-cost, high-performance outside scanner antenna. Frequency range: 30-54, 108-174, 406-512 and 806-960 MHz. Includes 65 feet of low-loss RG 59U cable, all connectors and weather boot. Vertical element spread-8 ft. Shipping wt., 4 1/4 lbs.

ANT-5 \$34⁹⁵

plus \$3⁰⁰ UPS



Coaxial Cable Assembly CBL-1

Reg. \$16⁹⁵

\$12⁹⁵

plus \$2⁰⁰ UPS
SAVE \$4.00

65-feet of low-loss, foam-dielectric, copper-shielded RG-59U is terminated in a standard F-59 connector to match the antenna balun transformer (weather boot included); the other end is a standard Motorola antenna plug for your scanner jack. Shipping wt., 29 oz.

BOOK SHOP



FINAL CLEARANCE PRICE \$10.95 while supply lasts.

FEDERAL FREQUENCY DIRECTORY, by Robert Grove. 268 pages, 8 1/2 x 11. A massive information source of 100,000 frequencies, agencies, and locations of active U.S. Federal Government Communication assignments in the 2-420 MHz spectrum. This has become "the bible" for all serious communications monitors. The information as accurate as the official federal government computer files from which the information was received as "unclassified" under the freedom of information act. This fast-selling publication is the most comprehensive, accurate list of U.S. federal communications stations ever released. In extensive use at government installations and military bases, the FEDERAL FREQUENCY DIRECTORY is an absolute must for shortwave and scanner monitoring stations. Shpg. wt. 27 oz.



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WORLD PRESS SERVICES FREQUENCIES, by Thomas Harrington, (2nd Edition.) 72 pages, 8 1/2 x 11. An up to date comprehensive manual covering the field of radioteletype news monitoring. Contains three different master lists of worldwide radio teletype frequencies used for transmitting news services in the English language, plus all needed information on antennas, receivers, terminal units, monitors and how-to-receive hints. Master lists include: Transmission times, frequency, shift and speed, service (AP, UPI, TASS, REUTERS and other,) location and reception ratings. Highly recommended for all those interested in RTTY monitoring. BOK-5 WORLD PRESS SERVICES FREQUENCIES: \$5.95 plus shipping.



SOUNDS OF SHORTWAVE, by Robert Grove. One of our fastest-selling catalog items, this

lively 60-minute cassette features dozens of off-the-air recordings of those strange sounds, finally identified for you! Learn how to recognize facsimile, teletype, multiplex, jamming, "spy" numbers transmissions, slow-scan television, telemetry, beacons, frequency sweepers, interval signals and many more. BONUS! Side two features helpful advice in selecting the best receiver...suggests tests you can quickly perform to determine the quality of a receiver before you buy!...design your own antenna and get the best results the first time...choose useful accessories to enhance your listening effectiveness. TAP-1, \$5.95 shpg. wt. 7 oz. SPECIAL! \$3.50 when ordered with any purchase.



WORLD RADIO TV HANDBOOK (1982 EDITION), approx. 600 pages, 6x9. The World Radio TV Handbook has an international reputation as the standard reference for broadcast listeners. Shortwave, longwave, FM and TV stations worldwide are all listed for your immediate retrieval. Schedules, frequencies, programs, languages and even musical scores of interval signals are carefully and accurately presented. Additionally, the WRTVH provides beam headings, addresses of broadcasters, band plans, frequency allocations and articles of interest written by world-reknown authorities on the subject of international broadcast reception. Shpg. wt. 30 oz. BOK-3 \$16.50.



HOW TO BUILD HIDDEN, LIMITED-SPACE ANTENNAS THAT WORK, by Robert J. Traister, WB4KTC. 308 pages, TAB 6x9. Here's help for hams, SWLs or anyone with a receiver or transmitter, but no place for large, conventional antenna arrays. A hands-on, how-to-do-book that shows the way to building your own hidden-space antenna that may work just as well as its larger counterpart. Special projects and solutions for apartment and high-rise dwellers are discussed, along with antennas for 2-meter VHF systems. Projects include a suspended multi-band vertical, a window antenna and an attic dipole; how to devise antennas from existing structures-downspouts, fences, TV antennas or window screens. Shpg. wt. 18 oz. BOK-8, \$9.95



This all-new expanded 4th Edition of this popular book has 120 pages of hard-to-find data of interest to all scanner users, including station locations, call signs and coded identifications, code names used for specific frequencies, info on surveillance and "bugs," scramblers, the UHF aero band (225 to 400 MHz), info on federal station monitoring in the 1930s, pictures of federal QSL cards. This edition also lists frequencies used by many major government contractors from the private sector—especially those working in aerospace, avionics, electronics, missiles, ordinance, aviation, shipbuilding, scientific research, etc.

BOK - 11 10 oz. \$9.95



HOME-BREW HF/VHF ANTENNA HANDBOOK, by William Hood. 210X pages, TAB 6x9. The author, a 25 year veteran in radio, holds an amateur Extra Class license and a First Class Radio Telephone license. Here is a book in down-to-earth talk that includes everything you wanted to know about antennas. Instant full-wave, half-wave and quarter-wave long-wires, half-wave dipoles, phased and directional antennas. Make buy and use dummy antennas, SWR meters, dip wave meters, impedance bridges and more! Shpg. wt. 13 oz. BOK-10, HOMEBREW HF/VHF ANTENNA HANDBOOK: \$6.95.



HOW TO TUNE THE SECRET SHORTWAVE SPECTRUM, by Harry L. Helms. 182 pages, TAB, 6x9. Have you ever wondered what coded messages used by spies sound like? What about those clandestine transmitters in Cuba and Asia? If your curiosity is peaked by the subject of unusual signals, this is the book for you. Take a tour through the entire world's secret SWL broadcast spectrum; pirate broadcasting in Europe and the U.S., espionage activity, mystery beacons, long-delayed echoes, diplomatic and military channels, space communications. Learn where these transmitters come from, who controls them and how you can tune it all in. Shpg. wt. 13 oz. BOK-6, \$6.95



THE COMPLETE SHORTWAVE LISTENER'S HANDBOOK, by Bennett and Harry L. Helms (2nd Edition) 306 pages, TAB, 6x9. This comprehensive volume is designed to acquaint you with the basics of shortwave listening. It covers receivers, antennas, frequencies, radio wave propagation, harmonics, how to keep a log book and how to prepare and send reception reports. Even the experienced SWL will discover this volume to contain fascinating and rewarding reading. Shpg. wt. 18 oz. BOK-7 \$10.95



THE COMPLETE ACTION GUIDE TO SCANNERS & MONITORS, by Louis A. Smith, II. 256 pages, TAB 6x9. A thorough, down-to-earth handbook on public service band monitoring practices and accessories. Explains frequency locations - scramblers - speakers - antennas - pocket models and more. Rules and regulations are stressed to help you understand the law in your monitoring. This information-packed book has all the answers on scanners and monitors plus how to use them. Find out how to read spec's on available scanner receivers so you will know which ones offer the features you need. Shpg. wt. 18 oz. BOK 9, \$9.95

NEW! Worldwide RTTY Frequency List. See description on Page 8, BOK-12 \$11.95
SHORTWAVE FREQUENCY DIRECTORY - See description on Page 10, BOK-13 \$10.95 - Pre-Publication Price - Reg. \$12.95
Book shipping charges VIA UPS - \$1.50 for first book - plus \$1.00 for each additional book. See Ordering Information at left.

GROVE ENTERPRISES, INC.



BRASSTOWN, NORTH CAROLINA 28902



ORDER NOW SALE ENDS APRIL 30, 1982

Transmitting With Scanner Beam

Our ever-popular Scanner Beam continues to draw praise from the communications industry. An unexpected boost in applications has resulted from the report by several radio amateurs that the directional antenna, designed primarily for 108-512 MHz scanner reception, also works well as a transmitting antenna on the 144-148, 220-225 and 20-450 MHz ham frequencies!

To verify these field reports, a 1-watt walkie-talkie was used as a test unit. With the built-on 1/4-wave whip, a repeater some twenty miles distant could be occasionally keyed up, but reception of the little unit was so weak that copy was noisy and unreliable.

Connecting the hand-held transceiver to the Scanner Beam, the repeater was brought up faithfully every time the button was pressed and reports indicated the signal was at full quieting!

Needless to say, the discovery has caused a flurry of interest among VHF/UHF users, both in the amateur and industrial/government circles.

One intriguing suggestion was to establish fixed Scanner Beam positions at remote sites aimed at headquarters base stations. Out-of-range portable and mobile radios could be connected to them for reliable check-ins and emergency use.

The small balun transformer included with the Scanner Beam

should be capable of handling up to 25 watts of transmitting power without the need of substituting a larger transformer.

Many thanks to those of you whose experiments lead to new applications for this fine antenna!



225-400 MHz SCANNER CONVERTER

A converter which will allow complete coverage of the 225-400 MHz military/federal government aircraft band when used with a standard aircraft band scanner has been announced by Grove Enterprises.

The unique SCANVERTER makes it possible for scanner listeners to hear NASA space shuttle radio links to Earth, military air tactical war games, Coast Guard search and rescue missions, FLEETSATCOM military satellites, Federal government agencies in flight and more.

An exclusive Grove Enterprises development called "bandstacking" allows the entire 175 MHz-wide UHF aircraft band to be compressed into the 118-136 MHz range tunable on any scanner capable of standard aircraft reception. No tuning or adjustments are necessary with the fully-automatic converter.

Reception for hundreds of miles is possible with the use of an outside antenna. Additional features of SCANVERTER include:

- High sensitivity, low noise microstripline circuit

- All metal cabinet for superior shielding

- Frequency conversion chart printed on the cabinet

- Double balanced mixer for reduced images

- Multiple pole filter suppresses out-of-band interference

- Crystal oscillator provides high stability

- Zener diode voltage regulation limits drift

- Powered by convenient 12 VDC

A handy list of active nationwide UHF aircraft channels is included; SCANVERTER comes complete with power cord, interconnect cable and full instructions.

SCANVERTER CVR-1, \$99.95 (plus \$2 shipping) from Grove Enterprises, Brasstown, NC 28902.



SONY

Sony ICF 2001

Microprocessors are making tremendous inroads in all phases of consumer electronics. An outstanding example is the popular ICF 2001 receiver from Sony.

Although designed primarily for casual listening, the cassette recorder-size receiver is an outstanding performer. Most apparent at the user's first glance is the total absence of tuning knobs. All frequency control functions are provided by a microprocessor-controlled frequency synthesizer. Similar to programmable scanners, the 2001 is controlled by a keyboard.

Frequency range of the little unit is 150 kHz - 30 MHz (AM/SSB/CW) and 76-108 MHz (FM).

The 150 kHz - 30 MHz range is accomplished by a dual conversion superheterodyne circuit featuring up-conversion (66.35 MHz primary and 10.7 MHz secondary). Single conversion is used for FM band reception. Field effect transistors are used in the RF signal path as an effort to reduce intermodulation, crossmodulation and spurious signal generation. Sensitivity is specified as one microvolt (nominal) on short-wave. A three-position RF gain switch is used to reduce strong-signal overload.

LET'S TRY IT OUT: Tuning the ICF 2001 takes some getting used to! A pair of "up/down" keys control the frequency excursion: By pressing a "fast" key, the speed of frequency change is increased. This key actually controls either 1 kHz or 10 kHz tuning increments (100 kHz or 200 kHz on FM). When a signal is intercepted and the operator removes his fingers from the keyboard, he may fine-tune with a thumbwheel control (actually a BFO control). Since it is calibrated, frequency accuracy is good to 1 kHz or better.

Another carryover from the scanner field is a search function. Upper and lower search limits are programmable. With the crowded conditions in the short-wave spectrum, it doesn't take long for the 2001 to find a signal!

Relative signal strength is indicated by a 5-step LED light bar. Another thumbwheel serves as an antenna peaking control to optimize reception.

A custom crystal filter provides -6 and -60 dB points at 6 and 17.5 kHz (2.0:1 shape factor).

Separate base and treble controls allow custom contouring of 1.6 watts of audio to a 4 inch internal speaker. Sound is quite good (subjective judgement!) for such a small package.

A programmable sleep timer circuit allows up to 90 minutes

playing time before the receiver shuts itself down automatically.

The ICF 2001 may be operated from internal batteries (only 9 continuous hours of playing life!) or AC (adaptor included).

A HANDS-ON EVALUATION: Frankly, we were impressed. The little Sony provides surprising performance for so small a package at such a reasonable price.

One outstanding feature which should be appreciated by virtually every consumer is the memory function. Six discrete frequencies in either the 150 kHz - 30 MHz or FM broadcast range may be programmed into memory and recalled at the press of a button. Perhaps your favorite listening fare is Voice of America or Radio Moscow; simply enter the appropriate frequencies for the stations of your interest into the 6 memory channels. They may then be called up in any order by pressing the appropriate buttons.

Sony boldly advertises, "If it's on the air, you can hear it!". They could be right! We were astounded at the sensitivity of this receiver. Clearly, world wide reception with clear fidelity and stable frequency settings are routine with this receiver.

An earphone for private listening, shoulder strap for portability, a wire antenna to increase signal strengths if you have the room, a listening handbook and full instructions accompany the unit.

NEW RTTY FREQUENCY GUIDE —BRAND NEW!—

Serious RTTY hunters: the 7th edition of the famous LIST OF RADIOTELETYPE STATIONS IN FREQUENCY ORDER by Joerg Kliengenfuss is now available!

The Kliengenfuss RTTY lists have gained an international reputation for comprehensive, up-to-date accuracy. His previous lists have been used as a basis for books by other authors.

The new, expanded edition includes such international radioteletype services as news agencies, weather broadcasts, military communications, embassies and telegrams.

Over 2000 frequencies, 3-30 MHz, logged over the past few months are identified by locations, agency, call sign and schedule.

A handy introductory section explains abbreviations encountered during reception. Fifty pages, 8-1/2" x 11". \$11.95 plus \$1.50 shipping (shipping free with any other book order) from Grove Enterprises, Brasstown, N.C. 28902.

**DATONG
ELECTRONICS
LIMITED**

**MODEL FL1
FREQUENCY-AGILE
AUDIO FILTER**

Fully automatic search/lock/track operation for notching out unwanted whistles.
Selectable bandpass or band-reject modes.
Bandwidth smoothly variable from 20Hz to 1000 Hz
Center frequency smoothly variable from 280 to 3000 Hz
Built-in 2 watt power output stage

\$149⁹⁵

**MODEL VLF
V.L.F. RECEIVING
ADAPTOR**

Overall length only 3 metres yet gives signal-to-noise ratios comparable to full size conventional antennas in the 200kHz to 30MHz range.
The response is broadband and no tuning or adjustment is required when changing frequency, therefore ideal for mounting in remote positions e.g. 10ft attic, roof or chimney.
Dipole configuration gives choice of polarisation plus useful directivity and eliminates need for ground plane or earth connection.

\$54⁹⁵

AR Technical Products Corp.
P. O. Box 62, Birmingham, Michigan 48012

Listening In On Ham Repeaters

The two-meter ham band is a busy part of the spectrum in metropolitan areas, and all modern scanners cover the entire range.

Hams utilize simplex (single frequency operation) and repeaters (input and output separated by 600 kHz difference).

Some channels like 146.52 MHz simplex and repeater pairs like 146.34 MHz (input) / 146.94 MHz (output) are common, while others are more obscure.

We would like to thank the South Eastern Repeater Association for sharing the following list with Monitoring Times readers.

NORTH CAROLINA REPEATERS

TWO METERS

AHOSKIE	WB4YNF	144.53	145.13	PA
AHOSKIE	WA4ZGQ	146.31	146.91	A
ALBEMARLE	WA4LBT	146.385	146.985	PA
ANSON MT/NEWTN	W04LFC	144.85	145.45	D
ASHEBORO	W04A1B	147.855	147.255	PA
ASHVILLE	WA4QCO	146.235	146.835	A
ASHVL/MT PISGAH	WA4BVM	146.16	146.76	A
ASHVL/SPIVEY MT	WA4KNI	146.31	146.91	A
BENSON	WR4ARL	147.87	147.27	N PA
BOONE	WA4KOB	147.96	147.36	A
BURVARD	N4DJB	147.735	147.135	A
BURGAW	K4LYZ	146.34	146.94	N A
BURLINGTON	WR4AY	146.07	146.67	N
BURLINGTON	W4VGZ	146.475	147.075	D EA
BURLINGTON	WA4HBO	147.675	147.075	D EA
BURNSVILLE	WA4LLR	147.975	147.375	A
CARTHAGE	WA4NIW	147.84	147.24	EA
CHARLOTTE	W4BFB	144.63	145.23	PA
CHARLOTTE	WB4HTR	144.75	145.35	N
CHARLOTTE	WR4A4E	146.34	146.94	N A
CHARLOTTE	WR4A4F	146.46	147.06	N A
CHARLOTTE	WB4KPF	147.615	147.015	PA
CHARLOTTE	WB4KOH	147.99	147.39	PA
CHRYVL/BKRS MT	WB4UDS	144.55	145.15	A
CONCORD/KANNAP.	K4CEB	146.055	146.655	A
DUNN	WB4FXM	146.10	146.70	A
DURHAM	WA4A4T	146.22	146.82	N A
DURHAM	WA4BFT	146.34	146.94	N A
EDEEN	WA4ACP	147.84	147.24	N
EDEEN/STONEVILLE	WA4OQB	147.99	147.39	N
ELIZABETH CITY	WA4VTV	146.46	147.06	N A
ELIZABETH TOWN	N4DHW	146.175	146.775	N
ERWIN	WR4A4L	146.43	147.03	N
FAYETTEVILLE	WR4ANN	146.31	146.91	A
FAYETTEVILLE	W4LPL	147.93	147.33	D
FISHER PEAK	W04MOP	144.73	145.33	D
FOREST CITY	W4TMT	146.07	146.67	N A
FOREST CITY	WA4BKU	147.84	147.24	N
FRANKLIN	WB4YAD	147.84	147.24	N
FRANKLIN	N4AC	147.96	147.36	D
GAST/SPCR MT	W4REW	147.72	147.12	D A
GASTONIA	K4ZFD	146.205	146.805	N
GASTONIA	W04KMP	147.87	147.27	N
GOLDSBORO	K4CYP	146.25	146.85	A
GREENSBORO	N4AZM	144.65	145.25	A
GREENSBORO	K4SNI	146.01	146.61	A
GREENSBORO	WR4ADD	146.16	146.76	A
GREENSBORO	W04IPZ	147.63	147.03	D A
GREENSBORO	WR4AUA	147.765	147.165	N
GREENSBORO	WR4ANL	147.81	147.21	N
GREENSBORO	W4AMC	147.96	147.36	N
GREENSVL/ESTN NC	W4GDF	147.69	147.09	N
GRIFFON	W4NBR	146.085	146.685	D
GRIFFON	WR4ABP	146.16	146.76	D
HENDERSONVILLE	WB4YAD	146.04	146.64	L
HICKORY/BRT. MT	N4ACM	146.25	146.85	N
HIGH POINT	WR4XO	144.51	145.11	N C
HIGH POINT	K4A0HP	146.265	146.865	PA
HIGH POINT	K4AZA	146.40	147.00	LA

HIGH POINT	K4AZA	147.60	147.00	LA
HILLSBOROUGH	WA4WTX	147.825	147.225	A
HILLSVILLE	W04BTS	147.975	147.375	N A
HNOSNVL/PINCK MT	WA4KNI	144.67	145.27	N
HOPE MILLE	WB4TRW	146.445	147.045	D
JACKSONVILLE	W04FVO	146.40	147.00	PA
JACKSONVILLE	WR4ATW	147.90	147.30	N
KINGS MTN	WB4GXY	146.37	146.97	D
LAKE TOXAWAY	WR4AGH	147.795	147.195	D
LAURINBURG	K4QWK	146.025	146.625	N
LENOIR	KN4K	147.93	147.33	N
LEVEL CROSS/GBD	K4VUV	146.19	146.79	N
LEXINGTON	K4IZM	146.31	146.91	PA
LILLINGTON	WA4FKI	144.87	145.47	N
LINCOLNTON	W04FLY	144.85	145.45	N
LUMBERTON	K04PI	147.855	147.255	N RC
LUMBERTON	WR4BDO	147.96	147.36	D
MACO	WA4LED	147.66	147.06	N
MANTED	W4PCN	146.34	146.94	PA
MARION	WB4UCF	147.855	147.255	N P
MARION/OLD FORT	KA4DEC	147.705	147.105	N
MONROE	K4BGU	147.30	147.90	N
MONROE	K4JCK	147.705	147.105	A
MORGANTON	K4RP	147.75	147.15	N
MT AIRY	WA4ZAS	146.37	146.97	EA
MT AIRY	WA4COK	147.78	147.18	N
N. WILKESBORO	K4ITL	144.77	145.37	D
NEW BERN	W04JMS	146.01	146.61	A
NEWPORT	K4GRW	144.85	145.45	A
NEWTON	N4AVV	144.83	145.43	N P
OXFORD	WA4JCS	147.90	147.30	N CPA
RALEIGH	N4BEA	144.67	145.27	A
RALEIGH	N4BFX	144.89	145.49	PA
RALEIGH	W4DOW	146.04	146.64	A
RALEIGH	K4BWC	146.13	146.73	D
RALEIGH	K4ITL	146.28	146.88	D
RALEIGH	K4ITL	147.75	147.15	D PA
RALEIGH	K4YFT	146.25	146.85	D
REIDSVILLE	K4PUV	147.63	147.03	D
ROANKE RAPIDS	WB4PZA	146.22	146.82	D
ROARING GAP	WB4ZOB	146.445	147.045	D L
ROCKINGHAM	WA4ULA	146.355	146.955	N
ROCKY MOUNT	WB4WAA	147.72	147.12	A
SALISBURY	W4EXU	146.13	146.73	A
SANFORD	WB4EJL	147.78	147.18	N A
SHELBY	W04DJJ	146.28	146.88	D
SHELBY	W04JA	147.945	147.345	D A
SIMPSONVILLE	WA4PPV	144.79	145.39	N P
SMITHFIELD	WR4BBD	146.37	146.97	A
SMITHFIELD	K04YU	147.99	147.39	N P
SPRING LAKE	WR4BCA	146.115	146.715	N
STATESVILLE	A140	146.085	146.685	D PA
TUCKASEGEE	W80MV	147.90	147.30	N
UNION CROSS	WA4RWB	147.915	147.315	A
WADESBORO	W4USH	146.235	146.835	N
WASHINGTON	WB4GMI	146.205	146.805	N
WAYNESVILLE	N4SM	147.87	147.27	PA
WILLIAMSTON	WA4TKJ	144.81	145.41	N
WILMINGTON	WR4AVF	146.13	146.73	D
WILMINGTON	WR4AHL	146.22	146.82	D
WIN-SAL/SAUTN MT	WB4KQN	144.79	145.39	L
WINSTON-SALEM	WA4GIC	146.04	146.64	D A

220 MHZ

ASHVILLE	NC4N	223.00	224.60	A
ASHVL/MT PISGAH	WA4BVM	223.34	223.94	A
CHARLOTTE	WB4KPF	223.08	224.68	LA
CHRYVL/BKRS MT	WB4UDS	223.20	224.80	D
FAYETTEVILLE	W4EHF	222.42	224.02	D
GREENSBORO	K240	223.22	224.82	N RL
HICKORY	WR4ACM	222.42	224.02	N
HIGH POINT	K4AZA	222.32	223.92	LA
HILLSBOROUGH	WA4WTX	222.34	223.94	L
LINWOOD	KA4HEV	222.38	223.98	N
LOCUST	WA4ZIA	222.40	224.00	N
MORGANTON	WB4PML	223.36	224.96	N
RALEIGH	WA4PEN	223.04	224.64	N
ROCKY MOUNT	KA4DAP	222.36	223.96	N
SALISBURY	W4FXU	223.16	224.76	N
STATESVILLE	WA4WRS	222.70	224.30	N
SYLVA	KA4V	223.34	224.94	N
WINSTON-SALEM	WB4UGV	222.44	224.04	N C
WINSTON-SALEM	WA4YHM	223.04	224.64	N
WINSTON-SALEM	WA4GIC	223.10	224.70	D R
WSTFLO/SAUTN MT	W4RXG	223.28	224.88	N

440 MHZ

ASHVL/MT PISGAH	WA4COS	449.90	444.90	N
CHARLOTTE	WR4ALD	449.85	444.85	N
GREENSBORO	WB4HZI	449.90	444.90	N
HIGH POINT	K4AZA	447.90	442.90	L
HILLSBOROUGH	WA4WTX	449.10	444.10	N
LYNWOOD	KA4HEV	449.45	444.45	N P
SALISBURY	W4EXU	449.70	444.70	C

SIX METERS

CARY	WR4AVP	52.35	53.35	N
HENDERSONVILLE	WB4YAO	52.01	53.01	N
HENDERSONVILLE	WB4YAO	52.525	52.525	RB
HICKORY	WR4ACM	52.47	53.47	N
HIGH POINT	K4AZA	52.15	53.15	L
HILLSBOROUGH	WA4WTX	52.525	52.525	RB
HONOLULU	K4GRW	52.01	53.01	P
RALEIGH	K4ITL	52.05	53.05	N

SOUTH CAROLINA REPEATERS

TWO METERS

AIKEN	N4ADM	147.90	147.30	N
ANDERSON/LOCAL	WR4AIO	146.37	146.97	PA
ANDSN/SASFRAS MT	WR4AIO	146.19	146.79	N
BAMBERG	W04DFP	144.73	145.33	N
BEAUFORT	WR4	146.01	146.61	N
BLAIRSVILLE(GA)	WA4EZN	147.69	147.09	O LEA
CAROLINOS	WR4ABK	147.78	147.18	N
CHARLESTON	K4LWS	146.06	146.66	N
CHARLESTON	K4ILT	146.16	146.76	N PA
CHARLESTON	W4IVE	146.34	146.94	N T
CHARLESTON	WR4BCP	147.87	147.27	O A
CHERSEA	KB4GY	146.01	146.61	D
CHERAW	W04HEH	147.735	147.135	D
COLUMBIA	N4EDY	146.07	146.67	N
COLUMBIA	WB4OCB	146.16	146.76	N
COLUMBIA	K4LNU	146.34	146.94	N
COLUMBIA	K4AVU	147.81	147.21	N
COLUMBIA	N4CZR	147.84	147.24	O
COLUMBIA	WB4VLU	147.93	147.33	O
COLUMBIA	K4LNU	147.96	147.36	A
OILTON/PEE DEE	NN4N	146.145	146.745	N
FLORENCE	W4ULH	146.25	146.85	N
FLORENCE	WA4ISM	146.37	146.97	PA
GASTON/COL.	WB4NEP	144.61	145.21	EA
GOOSE CREEK	W4NAT	147.78	147.18	N
GREENVILLE	WA4ZT	146.10	146.70	A
GREENVILLE	WR4	147.675	147.075	N PA
GREENWOOD	WB4UGA	147.765	147.165	PA
GREER	W4TQO	146.34	146.94	N
GRNVLE/CSRS HO	W4NYK	146.01	146.61	PA
GRNVLE/PARIS MT	W4NYK	146.22	146.82	PA
HARTWELL(GA)	KY4T	146.895	146.295	D
HODGES/GREENWOOD	KB4YF	144.53	145.13	N
LANCASTER	W4PAX	146.10	146.70	N
LANCASTER	WB4BGF	147.84	147.24	N
LAURENS	WA4UZA	146.25	146.85	N A
LEXINGTON	WR4AGK	147.255	146.855	N
LONG MT	WA4URJ	147.87	147.27	N
LYMAN	KS4I	147.885	147.285	N
MARION	W4YLT	146.40	147.00	EA
MONCKS CORNER	WA4ODK	147.75	147.15	N A
MYRTLE BEACH	W04JMT	146.01	146.61	N
MYRTLE BEACH	WA4YEE	147.72	147.12	N
MYRTLE BEACH, N	WA4YJR	147.63	147.03	D PA
N. AUGUSTA	K4FKJ	146.13	146.73	N
N. AUGUSTA	WR4ALS	147.72	147.12	N
NORTHWEST SECT.	W4GZL	144.51	145.11	D P
ORANBURG	WR4AQY	147.69	147.09	N A
PICKENS	WB4YXZ	146.40	147.00	N
ROCK HILL	WR4	144.71	145.31	N
ROCK HILL	WC4ABD	146.43	147.03	PA
SAVANNAH(GA)	W4HBB	146.28	146.88	N
SAVANNAH(GA)	W4HBB	146.37	146.97	A
SIMPSONVILLE	W04BJY	146.13	146.73	N
SIMPSONVILLE	WA4SDT	147.75	147.15	N R
SIMPSONVILLE	K4JLA	147.69	147.09	N PA
SPARTANBURG	WR4AUV	146.19	146.79	N
SUMMERVILLE	WB4LET	147.87	147.27	N EA
SUMTER	WR4ADI	146.04	146.64	N
SUMTER	WA4UMU	147.615	147.015	A
TOCDOA(GA)	W04DIP	147.93	147.33	N
WEST BROW(GA)	K4CEV	147.81	147.21	N
WHITE HALL	WR4AQL	146.31	146.91	N

220 MHZ

COLUMBIA	N4EDY	223.30	223.90	D
FASLEY/SASFRS MT	KJ4X	222.46	224.06	N
PICKENS	WB4QHF	222.54	224.14	N

440 MHZ

CHARLESTON	N4SC	449.10	444.509	N T
COLUMBIA	KC4YI	449.10	444.10	N
ROCK HILL	KA4RFA	442.25	447.25	D

RICHMOND	WR4ACW	146.28	146.88	N PA
RICHMOND	W4ZA	146.34	146.94	T
RICHMOND	WA4ECM	147.66	147.06	N
RIPPLEMEADE	K4TUE	146.31	146.91	
ROANOKE	WB400J	146.145	146.745	N L
ROANOKE	WR4AHT	146.34	146.94	N AD
ROANOKE/POOR MT	W4CA	146.385	146.985	L
SALEM	W4POL	146.28	146.88	N
SOUTH BOSTON	WR4AYU	146.46	147.06	D O
STAUNTN/AFTON MT	W4PNT	147.675	147.075	N LR
STAUNTON	WA4ZBP	146.25	146.85	
STAUNTON	W4WRN	147.645	147.045	N
STERLING	WA4TXE	146.115	146.715	M
SUFFOLK	WR4AKS	146.40	147.00	N PA
TAZEWELL	WD40ZE	147.75	147.15	N
VIRGINIA BEACH	WA4KXV	146.37	146.97	A
VIRGINIA BEACH	WA4SBC	147.645	147.045	N
WARRENTON	WB4FJT	147.765	147.165	M
WAYNESBORO	W4BLD	147.63	147.03	
WILLIAMSBURG	W4NTG	146.07	146.67	N
WINCHESTER	W4RKC	146.22	146.82	O EA
WOODBIDGE	WB4FOR	147.84	147.24	M A
WYTHVL/SAND MT	WA4EMS	146.175	146.775	

220 MHZ				
ALEXANDRIA	WA4CCF	223.22	224.82	M
DAN/WHT OAK	K4DAK	223.16	224.76	N
FAIRFAX	K4GCM	222.34	223.94	D
FALLS CHURCH	N4CHP	222.22	223.82	M
GALAX	WA4DFH	222.74	224.34	
LYNCHBURG	WB4DBB	223.34	224.94	C
SUFFOLK	WA4JUD	222.34	223.94	N C

440 MHZ				
ALEXANDRIA	WR4AAG	439.25	426.27	M V
ALEXANDRIA	W4HFH	449.60	444.60	M
ANNANDALE	WR4AOG	444.85	449.85	M PL
ARLINGTON	K8ZDA	449.00	444.00	M L
CHARLOTTESVILLE	WA4TFZ	449.25	444.25	
COVINGTON	WB4CAV	447.25	442.25	N
FAIRFAX	K4JYF	444.75	449.75	D
FALLS CHURCH	WB8CRK	449.45	444.45	M L
FINCASTLE	W4WIC	448.75	443.75	
LEXNGTN/COLE MT	K4POD	449.15	444.15	N
LYNCHBURG	WB4DBB	449.35	444.35	L
LYNCHBURG	K4HEX	449.50	444.50	N RB
MANASSAS	WD4JCE	444.225	449.225	M L
PETERSBURG	K4ARD	449.50	444.50	
PETERSBURG	K4ARD	449.85	444.85	
PORTSMOUTH	K4MLY	449.25	444.25	N
ROANOKE	WR4AFE	447.75	442.75	N
ROANOKE/POOR MT	W4CA	442.50	447.50	N C
SOUTH BOSTON	WB4YWH	447.25	442.25	N C
STAUNTON	W4WRN	449.95	444.95	N C
TYSONS CORNER	WB6GUS	448.50	443.50	M
VIRGINIA BEACH	WA4KXV	449.95	444.95	
WAYNESBORO	W4BLD	449.30	444.30	PA
WAYNSBR/AFTON MT	W4BLD	449.05	444.05	
WOODBIDGE	WB4FOR	444.90	449.90	M

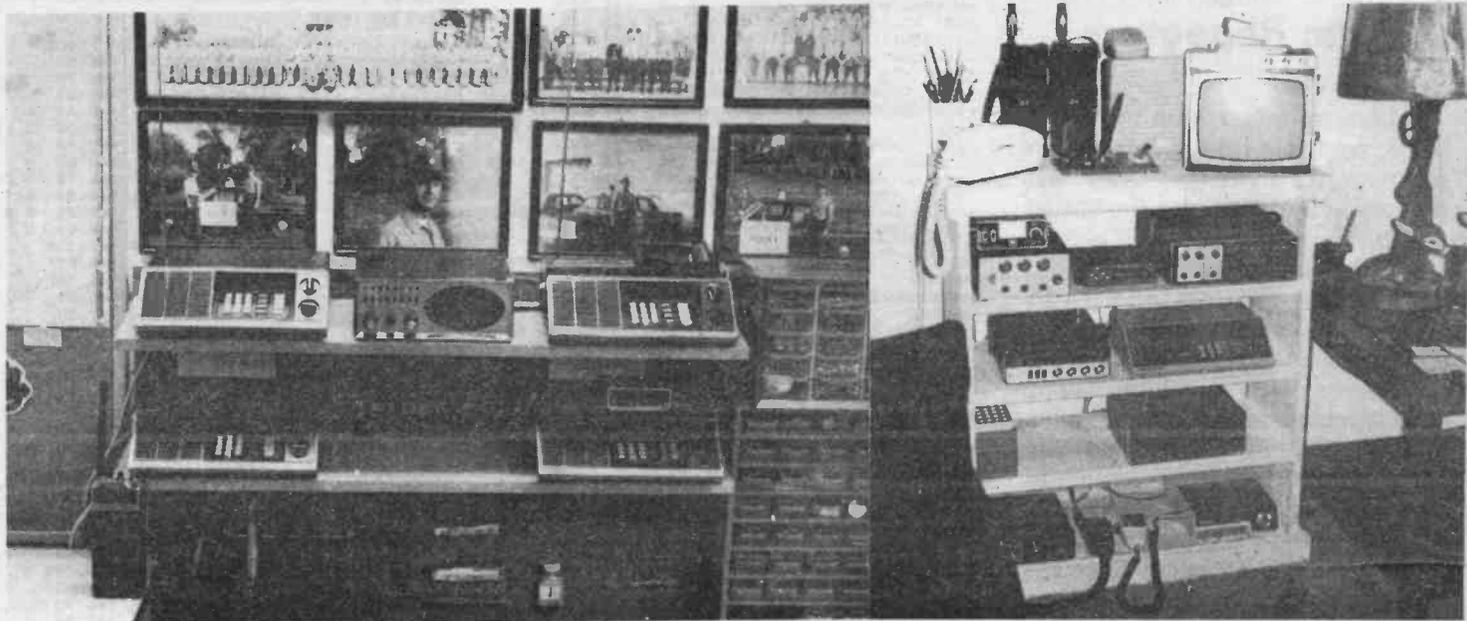
SIX METERS				
ABINGTON	WR4ATJ	52.01	53.01	M L
ALEXANDRIA	WA4CCF	52.13	53.13	M P
DANVILLE(OCC)	WB4GJG	52.13	53.13	
FAIRFAX	KA4DCS	52.58	52.48	M
LEXNGTN/COLE MT	K4POD	52.01	53.01	N L
LYNCHBURG	WB4DBB	52.15	53.15	
NORFOLK	W4NV	53.525	52.525	N
NORTN/HIGH KB	K4LSP	52.01	53.01	
SOUTH BOSTON	WB4YWH	52.07	53.07	N C

WEST VIRGINIA REPEATERS

TWO METERS				
ALDERSON	WRBAKZ	146.13	146.73	N
BECKLEY	WB8PDP	144.77	145.37	N LA
BECKLEY	K8RO	146.34	146.94	D O
BKLY/FLAT TOP MT	K8BO	146.25	146.85	O A
BLUEFIELD	WB8MOP	144.89	145.49	A
BLUEFIELD	WB8OGV	146.415	147.015	D PA
BOLT MT	WB8LVH	144.57	145.17	N L
BRIDGEPORT	WRBABC	147.705	147.105	N EA
BRIDGEPORT	K8VNO	147.72	147.12	EAL
BUCKHANNON	K8WYH	146.25	146.85	N
CHARLESTON	WRBAER	146.22	146.82	N
CHARLESTON	WB8COV	146.28	146.88	N
CLARKSBURG	WB8ZVS	146.22	146.82	D A
COAL MTN	WB8KAD	146.12	146.72	N A
COTTAGEVILLE	WRBAKV	146.31	145.91	N
OUNBAR	K8VKI	147.72	147.12	
ELKINS	WRBAOH	146.04	146.64	N
FAIRMONT	WB8JM	146.31	146.91	D
FRANKLIN	W8RUA	147.945	147.345	
GRAFTON	K8VNO	147.975	147.375	O L
HUNTINGTON	WB8EZR	146.04	146.64	N
HUNTINGTON	WRBAGH	146.16	146.76	N A
HUNTINGTON	K8BBKX	147.90	147.30	N
KINGSTON/LICK KB	WB8FG	144.87	145.47	
LEON	WB8NMT	147.78	147.18	N
LOGAN	WB8ZLR	146.09	147.11	N
LOGAN	WRBADD	146.37	146.97	N
MADISON	K8BJYR	146.06	147.06	N TA
MARTINSBURG	WB8VUZ	147.855	147.255	N
MCMECHEN	WB8ULB	146.31	146.91	
MCMECHEN	N8CFX	147.75	147.15	
MORGANTOWN	K8BLG	144.83	145.43	
MORGANTOWN	WB8YZT	146.085	147.955	N
MORGANTOWN	WB8CUL	146.16	146.76	
MULLENS	WRBAKX	147.63	147.03	N LA
NEW MARTINSVILLE	WR8ABY	146.34	146.94	N
OAK HILL	WB8GH	146.19	146.79	A
PARKERSBURG	WB8AXY	146.37	146.97	PA
PARKERSBURG	WB8AXY	147.96	147.36	
PARSONS	K8VNO	144.73	145.33	PA
PIE HORSE MT	N8APH	144.67	145.27	N A
PRINCETON	WB8NRK	146.46	147.06	A
RAVENSWOOD	WB8USO	146.07	146.67	D
RAVENSWOOD	WB8USO	146.10	146.70	R
RICHWOOD	K8VKB	146.34	146.94	
SCOTT DEPOT	K8SLI	147.87	147.27	N A
SPENCER	WB8SAK	146.01	146.61	N
ST ALBANS	WB8GDY	146.40	147.00	
TERRA ALTA	WB8PHU	147.60	147.00	PA
WEIRTON	K8BJN	146.34	146.94	
WELCH	WB8SXZ	144.85	145.45	D
WHEELING	WB8YFX	144.59	145.19	N
WHEELING	WB8JDH	146.16	146.76	N

220 MHZ				
HUNTINGTON	K8BBKX	222.54	224.14	N

440 MHZ				
KINGSTON/LICK KB	K8BEMX	449.80	444.80	N
MORGANTOWN	WB8CUL	449.80	444.80	



Tal Blackburn's monitoring post.

Dan Carter's scanner setup.

The Monitoring Post

This month we are pleased to feature the monitoring posts of two of our readers, Dan Carter and Tal Blackburn. Both are into scanner monitoring as you can see from the accompanying photos. Dan seems to

favor Bearcat, while Tal has quite a mix! Behind Dan's radios are several pictures of his father who lost his life three years ago while on duty as a law enforcement officer. Thanks, Dan and Tal, for shar-

ing these photos of your monitoring posts. We would be happy to receive good black and white glossy photos from more of you to feature in THE MONITORING POST.

Stock Exchange

As a special service to our subscribers, MONITORING TIMES will publish each month short, non-commercial classified ads. Cost of this service is \$.10 a word; payment must accompany the ad for publication. All merchandise must be related to the listening hobby.

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FOR SALE

Ten Tec Triton II 80-10 meter transceiver, solid state. Excellent condition with base power microphone. \$250. Gessy 20-R 12VDC/20A power supply for Triton, \$65. Both \$295 plus shipping. Tempo S-1 2 meter synthesized handi-talkie, new color with telescopic whip, ducky, charger; \$195. Opt. electronics 7000 550 MHz 7-digit frequency counter, NICADS, charger; \$125 includes shipping. Bob Grove WA4PYQ, 140 Dog Branch Rd, Brasstown, NC 28902.

SWAP

Zenith military receivers, R110/GRC; 27-38 and 38-56 MHz. Have squelch and four frequency presets. Want BC-210. Gary Sorrells, 207 Goldmont St., Black Mountain, NC 28711

WANTED

Power speaker (Motorola type); 15 watt output. Bob Abdizadeh, 2924 Windsor Place, Blue Springs, MO 64015

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A Message To Advertisers

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