



# Grove Catalog and Buyer's Guide

February 1989 - April 30, 1989

Business Hours 9-5 EST Monday-Friday

*Prices, Availability and Specifications Subject to Change (see page 3)*



# ROVE ENTERPRISES, INC.

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*Receiving and Monitoring Equipment, Accessories and Publications  
Publisher of Monitoring Times*

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## **WE'RE NOT MOURNING THE DEATH OF SERVICE — WE'RE KEEPING IT ALIVE AND WELL**

Our own experiences and those reported by our growing numbers of satisfied customers indicate that service is becoming a thing of the past. WE REFUSE — to let this time-honored tradition die.

Our products are selected from a bewildering array in the electronics marketplace. We carefully evaluate samples for quality of workmanship, features most often requested by customers and reliability of the manufacturer. When you place an order with us we will ship it out within twenty-four hours (usually twelve). If an item is on back order, we will tell you then — not in three weeks when you call us to find out why your order hasn't arrived. We won't process your charge card or cash your check until your order has been shipped.

Since many items are supplied by other companies, we are sometimes caught in unexpected back order situations. Occasionally our suppliers tell us something has been shipped and, after we pass that information to you, we find out the supplier had not made the shipment or the quality is so poor we won't accept it. We will notify you when this happens and hope that you will understand that we aren't lying to you — we have been caught in the middle and are doing everything possible to get your order to you.

Be sure to read our guarantee — it will answer any questions you may have from shipping damage to defective equipment. It isn't often that equipment is defective, but when it occurs we will see that you are satisfied.

If you are satisfied with our service, please tell your friends. If you aren't satisfied please call or write to us. If we aren't satisfying you, we want to correct the problem.

Thank you,

Bob & Judy Grove

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P.O. BOX 98 • BRASSTOWN, NORTH CAROLINA 28902 • (704) 837-9200

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# Grove's Customer Satisfaction Guarantee

## RETURN AUTHORIZATIONS

"I THOUGHT I WOULD LIKE IT, BUT I DON'T" — Simply call our toll-free line (1-800-438-8155) within 15 days of shipping date and request a return authorization number. Place the RA number prominently on the outside of the shipping carton to expedite your return. Upon receipt of the product in original packaging and new condition (please be sure to double box items which were shipped to you in that form and don't put tape or write on the outside of display box); we will refund your money, less shipping, or give you credit toward another product — your choice. Be sure to include the authorization number as a 10% restocking charge must be assessed for products returned without authorization. Special order items cannot be returned.

"I RECEIVED A DAMAGED PACKAGE" — If you see that the package is damaged when delivered, ask the UPS driver to wait while you open the box and inspect the contents. If it is damaged, refuse the package and call us on our toll-free line (1-800-438-8155) to advise of the problem. If the package is left on your doorstep and you discover that it is damaged, call your local UPS office and ask them to pick it up. Be sure to keep the packing box. Then call us and we will see that a replacement is shipped.

## DEFECTIVE MERCHANDISE

If any merchandise proves to be defective within thirty days of shipping, call our toll-free line (1-800-438-8155) to receive a return authorization number. We will issue a call tag for UPS to pick up the package from your address at no cost to you. When we receive the unit here we will check it out and if it is defective we will replace it with a new unit at no cost to you. If the unit is not defective, we will call to give you the choice of a refund or return of the equipment with an explanation as to why you may have thought it was defective. If merchandise becomes defective after thirty days please see the individual warranties below.

## CHANGES IN PRICES, SPECIFICATIONS AND AVAILABILITY

If there is a price increase over \$5 from the amount you have shown on your order, you will be notified before shipment. If the increase is under \$5 you will be sent a statement of amount due with your merchandise. If there is a price decrease you will be sent a refund check.

Specifications are subject to change without notice. Manufacturers frequently make minor changes during production to improve performance.

Due to demand and availability, we occasionally have to drop a product from our catalog. All available items on your order will be shipped and a refund will be sent for the item which is no longer available. If the discontinued item is tied in with the other equipment you have ordered we will contact you to be sure you want the order shipped.

## Manufacturers' Warranties

### GROVE ENTERPRISES, INC.

All equipment manufactured by Grove Enterprises, Inc. is warranted against manufacturing defects for a period of one year under normal use by the purchaser, providing that no modifications or field repairs have been attempted.

If any equipment should fail after the initial thirty day warranty (above) Grove shall repair or replace that defective equipment upon its postpaid return. Please call our toll-free number (1-800-438-8155) to receive a return authorization number. The use of this number will expedite its repair and should appear in bold letters as ("RA 111") on the outside of the package. The warranty does not cover hazard to person or associated equipment or property. Your warranty is considered to be in effect from the date of shipment to you. Violations of the warranty clause will automatically void the warranty and services or repairs will be charged to the owner.

Service outside of the one year warranty will be charged at the cost of parts, labor, and return shipping. Payment for repairs must be received before the repaired unit can be returned.

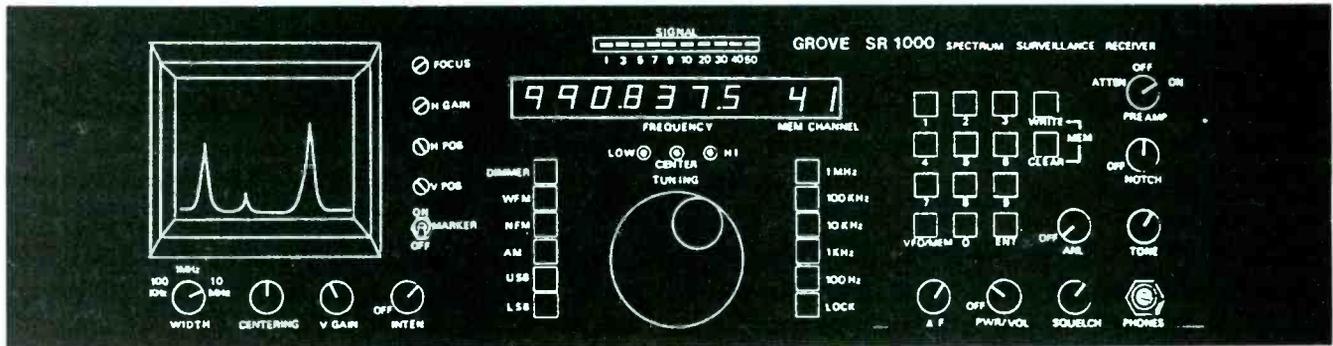
### WARRANTIES BY ICOM, UNIDEN, KENWOOD, ETC.

If any equipment should fail after the initial thirty day warranty (above) please call our toll-free line (1-800-438-8155) for the name, address and phone number of the service center nearest you.



COMING SOON!

# GROVE INTRODUCES THE SR1000 SPECTRUM SURVEILLANCE RECEIVER!



How would you like to own one powerful, wide-frequency-coverage receiver that encompasses the ranges of separate shortwave and scanning receivers? What if that receiver could also display the spectrum visually, showing all the signals on the band on a special screen?

And what if that powerful receiver were capable of listening to all modes — AM wide and narrow FM, SSB, CW — and even RTTY, FAX or packet with available accessories? And for super-efficient monitoring, wouldn't it be nice to have the option of adding computer control?

It certainly would be handy to have at least 1000 memory channels to store all of those frequencies uncovered by your receiving laboratory, but even specialized government and tactical military receivers — that don't have all of these features — cost \$10,000-\$50,000. Is such a receiver possible at an affordable price?

Designed and built in the United States of America, the new Grove SR-1000 professional grade, spectrum surveillance receiver offers signal intercept power previously undreamed of for under \$3000! Right now, a limited number of SR1000s are being hand assembled and field tested; full production is expected in May.

Continuous 100 kHz-1000 MHz, no-gap frequency coverage with all-mode detection assures reception of ship to shore, air to ground, domestic and international broadcasting, public safety and business communications, news and weather transmissions, military and government communications, ham and CB, even surreptitious listening devices — virtually everything in its spectrum!

High capacity memory stores frequency and mode of up to 1024 channels, while a 3" graphic display alerts you immediately as your target appears on the screen — anywhere within 10 megahertz of radio spectrum! No waiting for sluggish scan or search; zero in on those unknowns as they transmit!

Tune in that signal perfectly with the aid of an LED center-frequency indicator and RIT clarifier. Built-in preamplifier boosts weak signals while squelch, ANL, notch filter, AF gain and tone controls assure maximum signal enhancement. Recorder audio output and activator jacks control your tape recorder to preserve important transmissions.

But the enormous capability of the SR1000 doesn't stop there. An optional RS232C expansion interface will be available shortly, giving you total computer control of your SR1000!



## SPECIFICATIONS AND SPECIAL FEATURES

**Frequency range:** 100 kHz-1000 MHz  
**Frequency display:** 7 digit LED, 100 Hz readout, time base ref.  
**Tuning method:** phase locked loop frequency synthesis  
**Frequency control:** rotary dial, direct-entry keypad  
**Tuning increments:** select 100 Hz, 1 kHz, 10 kHz, 1 MHz  
**Frequency resolution:** Infinite with RIT control  
**Center frequency indicator:** LED  
**Memory:** 1024 channels store frequency, mode; internal backup  
**Memory access:** tuning dial rotation; keypad entry  
**Memory default:** previous settings displayed at turn-on  
**Modes:** WBFM, NBFM, AM, USB/CW, and LSB/RTTY  
**Time base stability:** +/- 1 ppm after warmup, 0-40° C, non-oven  
**Survivable temperature range:** -20 to +50° C  
**Sensitivity:** 0.5 uV @ 12 dB SINAD (NBFM mode)  
**Preamplifier/attenuator:** +10 dB, bypass, -10 dB  
**IF scheme:** up-conversion superheterodyne  
**IF output:** 10.7 MHz, 10 MHz bandwidth, BNC connector  
**Selectivity:** 180 kHz WBFM, 15 kHz NBFM, 6 kHz AM, 2.4 kHz SSB; wide/narrow option  
**Spurious signal rejection:** 60 dB or better  
**Display dynamic range:** 50 dB or better  
**Third order intermod susceptibility:** +20 dB or better  
**Spectrum display:** 3" LCD  
**Spectrum display calibration:** center marker switch  
**Spectrum display dynamic range:** 50 dB logarithmic  
**Spectrum dispersion:** selectable 100 kHz, 1MHz, 10 MHz  
**Signal strength indicator:** LED bar graph

**Interference controls:** ANL, squelch, notch, tone  
**Audio output power:** 6 W max. (1 watt @ 10% THD)  
**Tape recorder output:** 1 V @ 600 ohms (nom.); remote activator  
**Speaker:** internal 4", 8 ohms  
**Audio jacks:** 1/4" headphones, 1/8" (3.5 mm) speaker, 8 ohms  
**AGC timing:** 20 ms attack, 25 decay AM, 500 ms decays SSB  
**Power requirements:** 12 VDC  
**Antenna input impedance:** 50 ohms nominal  
**Antenna connectors:** S0239 (30 MHz BNC) 30 MHz; may be combined  
**Cabinet and panel:** heavy gauge aluminum  
**Measurements:** 17" x 5 1/4"H x 13"D  
**Weight:** 20 pounds (approx.)  
**Warranty:** one year, parts and labor

## OPTIONAL ACCESSORIES

RS232C expansion interface  
 19" rack mount kit  
 1000-2000 MHz frequency converter  
 AC power supply  
 35 kHz FM filter  
 4 kHz AM filter  
 1.8 kHz SSB filter  
 1 kHz RTTY/cw filter

*\*Please call for final specifications, pricing, and availability.*

## THE SONY SW1S MIGHTY MICRO!

### FINALLY, A POCKET SHORTWAVE PORTABLE WITH HIGH PERFORMANCE!

James Bond fans will love it and so will discriminating worldband listeners who want compact convenience. The SW1S is hardly larger than a cassette tape and weighs a mere 7-1/2 ounces, yet it incredibly boasts an LCD digital frequency readout, fully synthesized tuning, total 150 kHz-30 MHz AM frequency coverage in 5 kHz increments, a 24 hour digital clock, keypad tuning, ten scannable memory channels, nighttime display illumination, and even a sleep/alarm timer!

But that's not all. It comes equipped with FM stereo reception (and teeny earphones to boot!), an elevation foot for tabletop stability, a power safety switch to prevent accidental turn-on while transporting, a universal 100-240 volt automatically-adjusting AC power supply with worldwide adaptor plug, and a sturdy case.

Yet there's more--much more: Tucked into the compact carrying case is a sophisticated active antenna designed to provide worldwide reception anywhere without the need of a cumbersome outside antenna! The convenient control module has an on/off switch to preserve battery life, while a selectable filter and attenuator reduce strong signal overload.

And if you do have room for a wire antenna, simply reel it out of its retractable capsule accessory, another professional touch included only with this Sony receiving system.

You will sense the professional engineering which goes into your SW1S, from the advanced surface mount technology of its microcircuits to the positive action of its pushbuttons.

*"The SW1's performance is superior to that of any other micro-portable. Its sensitivity, selectivity and freedom from overloading and other troubles are well above the norm for portables, regardless of size." ... Larry Magne, as quoted in Monitoring Times*



Order RCV5

**\$279<sup>00</sup>**

\$5 UPS \$10 US Parcel Post \$15 Air Parcel Post



# Choosing a Shortwave Receiver

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P.O. Box 98, Brasstown, NC 28902 (Phone 704-837-9200)

Choosing a shortwave receiver for your personal use is a lot like choosing a car. You must first decide what basic service you need, then shop for the best buy.

Looking for a good portable? The Sony ICF2010 or the Sangean ATS808 copy is probably the best choice. Featuring keyboard entry of frequencies as well as a tuning dial, the radio offers sensitivity and a choice of wide or narrow selectivity. In addition to 100 kHz-30 MHz continuous coverage, the 2010 also offers 118-136 MHz aircraft and 88-108 Mhz FM broadcast reception.

The 2010's synchronous detection enhances shortwave reception; single sideband signals are also quite satisfactory. Battery life is much improved over its predecessors and it comes with an AC adaptor.

For low cost at reasonable performance, try the Sangean ATS-803A. Continuous 150 kHz-30 MHz AM and SSB reception are offered along with FM broadcast and wide or narrow selectivity. An AC adaptor is included.

If you want pocket portability, forget high quality; the two don't mix. The characteristics of greatest importance to listeners are those which are most commonly compromised in low-cost radios: frequency stability, dial accuracy, selectivity and overload immunity. In spite of this caveat, the new Sony SW1 is an excellent performer for a pocket portable.

For the serious listener the ICOM R71A, Kenwood R5000 and JRC NRD525 head the list. The Yaesu FRG-8800 and Kenwood R-2000 are very good general purpose receivers although they, as well as Sony and Panasonic products, suffer from strong signal overload when used with outdoor antennas.

The Grove TUN3 MiniTuner (see "Preselectors") will eliminate overload interference problems and is a recommended accessory for use with all low and moderate cost receivers.

## SHORTWAVE ANTENNAS AND ACCESSORIES

While it is true that any length of wire will pick up signals, a well planned antenna installation will pick them up better. The greatest efficiency of an antenna occurs when its electrical

length matches that of the incoming radio wave (resonance). For a given length this only occurs at one frequency and related multiples. It is the job of the antenna designer to come up with the best combination of characteristics for wide frequency coverage.

The "bigger the better" concept has its limitations. Once an antenna is large enough to hear signals above the noise generated by the receiver's own circuitry, further strength is unnecessary. For most applications, 20-75 feet is plenty long enough; in fact, doubling the length of a matched antenna will improve signals by only 3 decibels—half an S unit and barely discernible.

Impedance matching (standing wave ratio-SWR) may be important for transmitting, but is of virtually no concern in receiving. While a perfect match between an antenna and receiver will deliver the greatest signal strength, the background atmospheric noise (hiss and static) will increase proportionately. The net result will be a higher S-meter reading, but no better signal readability above the noise.

A wire antenna may be thick or thin, made of any metal, insulated or uninsulated, stranded or solid; it will hear all signals the same. Choose your wire for strength, solderability and corrosion resistance.

An antenna should be as high as possible and away from large metal surfaces and electrical power lines to avoid electrical noise pickup and shock hazard. Indoor antennas often pick up noise from household appliances, although loop antennas may be rotated for minimum interference.

## RECOMMENDED ANTENNAS

For shortwave reception, it's hard to beat an elevated dipole. In actual field tests the low-cost Grove Skywire (ANT-2) repeatedly equalled or outperformed any other receiving antenna on the market including expensive trap dipoles.

Trap dipoles are designed to work best on certain ranges like the broadcast or ham bands, often compromising the remaining frequency ranges. Why buy a general coverage receiver, then reduce

its capability with a frequency-restricting antenna?

For medium and longwave reception, the operator may wish to disconnect the ground side of the feedline, thus allowing the feedline to become part of the antenna for added length and improved low frequency signal strengths.

Active antennas are nothing more than short vertical elements attached to an amplifier to approximate the signal levels delivered by a full-size antenna. Untuned amplifiers are vulnerable to strong signal overload because of limited dynamic range. This produces gain compression (apparent lack of sensitivity) and intermodulation ("intermod"—the mixing of signal frequencies heard as spurious signals throughout the listening range).

Some active antennas, including the Grove Hidden Antenna system, overcome this shortcoming by including a preselector which selects the desired frequency and attenuates all others.

Because of their indoor location, complexity, vulnerabilities and cost, active antennas should be chosen only when adequate outdoor antennas are not possible.

## FEEDLINE

A wire run from your receiver to a nearby tree may produce excellent reception, but it is susceptible to electrical noise pickup; use coaxial cable for your antenna lead-in. For reception below 30 MHz, virtually any well-shielded coax like RG-58/U, RG-59/U, RG-6/U or RG-8/U is satisfactory for runs up to at least 100 feet.

## PREAMPLIFIERS

If an antenna intercepts enough signal voltage to overcome losses and noises in the receiving system, no amount of amplification will make the signal easier to copy, just louder — along with louder background noise!

Directional antennas concentrate incoming energy (called "gain") while rejecting noise from other directions for better signal-to-noise ratio. A large capture area ("aperture") overcomes poor receiver sensitivity (high internal noise) by providing greater signal levels.



## The Top 100 Shortwave Frequencies

*An introduction to shortwave listening from Grove Enterprises and Monitoring Times.*

Nowhere in the radio spectrum is found as much intrigue as on shortwave. The following frequencies (in kHz) list voice utilities (two-way communicators) using upper sideband (USB) and AM broadcasters best heard in the early evening hours.

### UTILITIES

2670	U.S. Coast Guard
4063	Mississippi River barges
4069.2	Ship working channel
4087.8	Mississippi River barges
4112.6	Ship calling channel
4125	Ship calling channel
4143.6	Mississippi River barges
4413.4	Ship working channel
4419.4	Ship working channel
4467.5	Civil Air Patrol
4517	Air Force MARS
4593.5	Air Force MARS
4637.5	Offshore petroleum
4670	"Spy numbers" broadcasts
4742	"Spy numbers" broadcasts
5015	Army Corp of Engineers
5320	U.S. Coast Guard
5598	International airlines
5616	International airlines
5680	U.S. Coast Guard
5692	U.S. Coast Guard air/ground
5696	U.S. Coast Guard air/ground
5703	Tactical Air Command
5812	"Spy numbers" broadcasts
6506.4	U.S. Coast Guard ships
6518.8	Inland waterways
6521.9	Mississippi River barges
6577	International airlines
6586	International airlines
6604	Flight weather
6673	NOAA hurricane hunters
6683	Andrews AFB, VIP
6697	U.S. Navy
6705	U.S. Air Force air/ground
6723	U.S. Navy
6738	U.S. Air Force air/ground
6753	Canadian Air Force
6761	Strategic Air Command
6802	"Spy numbers" broadcast
6927	Andrews AFB, VIP
8291.1	Ship to shore, Pacific
8418	"Spy numbers" broadcast
8740.6	Ship to shore
8778	U.S. Navy
8784	Ship to shore, Pacific
8805.7	Ship to shore

8808.8	Ship to shore
8825	International airlines
8846	International airlines
8879	International airlines
8891	International airlines
8921	International airlines
8972	U.S. Navy, Atlantic
8984	U.S. Coast Guard, air/ground
8989	U.S. Air Force, air/ground
8993	U.S. Air Force, air/ground
9014	U.S. Air Force, air/ground
9027	U.S. Air Force, air/ground
10493	FEMA, emergency net
10780	NASA air/ground
11176	U.S. Air Force, air/ground
11182	Scott Air Force Base, air/gnd
11200	RAF, flight weather
11233	Canadian Air Force air/ground
11234	RAF, air ground
11243	Strategic Air Command
11246	U.S. Air Force, air/ground
11282	International airlines
11538	U.S. Navy, Mars
12429.2	Ship to shore
13113.2	U.S. Coast Guard marine weather
13181	U.S. Navy
13201	U.S. Air Force air/ground
13215	U.S. Air Force air/ground
13241	U.S. Air Force air/ground
13270	Flying weather
13282	Flight weather
13306	International airlines
13354	NOAA, hurricane hunters

### INTERNATIONAL BROADCASTERS

*(Schedules subject to change)*

4765	Cuba
5960	Canada
6025	Romania
6085	Germany
6125	Spain
6175	England
7115	Bulgaria
7165	USSR
7300	Albania
7325	England
7355	USA
9360	Spain
9630	Spain
9755	Canada

### TIME SIGNALS

#### WWV CHU

5000	3330
10000	7335
15000	14670

Modern receivers have excellent sensitivity when used with outdoor antennas. While an untuned preamplifier like the Grove PRE-3 can improve signal strengths when used with a short (under five feet) indoor antenna like the Grove ANT-6 Hidden Antenna, untuned preamplifiers should be avoided in large cities because of strong signal overload, especially from nearby broadcasters.

### PRESELECTORS

A passive (unamplified) preselector like the Grove TUN-3 MiniTuner can be thought of as a frequency-adjustable gate for radio signals; its purpose is to pass desired signal frequencies while rejecting all others. Installed between the antenna line and receiver, they eliminate intermodulation, image interference and desensitization caused by strong signals in economy receivers. They are not impedance matching devices nor amplifiers, so they don't make received signals stronger.

### GROUNDING

A connection to an earth ground rarely makes signals stronger, but will lessen the hazard of electrical shock and may reduce electrical line noise interference or AC hum on received signals.

An effective ground consists of a short length of heavy gauge wire (or coax cable shield) connected to a single metal pipe or rod driven at least eight feet into moist soil. Dry soil or sand is worthless as a ground. A metal (not PVC) cold water pipe may work, but hot water pipes are usually caulked at the water heater, electrically insulating them. As a last resort, connect your ground wire to the screw holding on the wall plate over the AC outlet.

Equipment chassis should be commonly tied together by a single ground wire to reduce common mode hum. Experiment with different grounding combinations for best results.

### FILTERS AND ATTENUATORS

Overload interference can be reduced if incoming signal levels can be reduced. An attenuator reduces all signals, regardless of frequency, by the same amount; band reject (stop band) filters and wavetraps remove a specific swath of spectrum; low pass filters cut off all signals above a certain frequency; high pass filters cut off all frequencies below a certain frequency; and notch filters attempt to slice out one specific frequency.



# JRC NRD525

## The Ultimate Receiver



### SPECIFICATIONS

Receiving Frequency Range . . . . . 0.09-34MHz  
 Receiving Mode . . . . . RTTY, CW, SSB (USB/LSB),  
 AM, FM, FAX  
 Channel Memory . . . . . 200 channels  
 Receiving System . . . . . Double superheterodyne  
 1st IF 70.45399-70.453 MHz  
 2nd IF 455 kHz  
 H.F. Sensitivity \* S/N 10dB:  
 0.09-1.6 MHz . . . . . 5.0 microvolts SSB  
 . . . . . 15 microvolts AM  
 1.6-34 MHz . . . . . 0.5 microvolts SSB;  
 . . . . . 2 microvolts AM  
 (Bandwidth, INTER, NQL (FM), 20dB)

Selectivity:

Bandwidth	Attenuation	
	6dB	60dB
AUX	12 kHz or more	—
WIDE	4 kHz or more	10 kHz or less
INTER	2 kHz or more	6 kHz or less
NARR (opt.)	1 kHz or more	3 kHz or less
FM	12 kHz or more	—

Image Frequency Rejection . . . . . 70dB or more  
 Intermediate Frequency Rejection . . . . . 70dB or more  
 Frequency Stability . . . . . ±3 PPM  
 Dynamic Range . . . . . 100dB or more  
 (500 Hz if IF band)  
 PBS Variation Range . . . . . ±1 kHz or more  
 Notch Attenuation . . . . . -30dB or more  
 BFO Variation Range . . . . . ±2 kHz or more  
 RIT Variation Range . . . . . ±5 kHz or more  
 AF Output:  
 Speaker—0.5W or more (at 4 ohm load and 10%  
 distortion); Line/Recording—1 mW or more (at  
 600 ohm load and 10% distortion)  
 Antenna Input Attenuation . . . . . Approx. 20dB HF  
 Power Supply . . . . . 120/240 VAC; 12-16 VDC  
 Auxiliary Circuits:  
 Noise blanker, S-meter, side-tone input,  
 transmission monitor, squelch, dimmer, tone  
 control, clock, timer, IF notch filter, pass band shift  
 Dimensions: . . . . . 13"(W) x 5"(H) x 11"(D)  
 (excluding projected parts)  
 Weight . . . . . Approx. 19 lbs.  
 Antenna Connector for PL-259

Whether you are into utilities DX'ing or broadcast band monitoring, the new Japan Radio Company NRD525 is THE ultimate receiver. Crisp, clean, undistorted audio from an internal speaker is complemented by an array of custom controls to assure single-signal reception.

Two hundred memory channels will store your choice of frequencies from the continuous 90 kHz-34 MHz tuning range, in any mode—AM, FM, USB, LSB, RTTY, CW, and FAX. Memory channels may be scanned or searched, each channel storing such information as frequency, mode, bandwidth, AGC timing, and attenuation setting.

Frequencies may be keyboard entered and dial selected. Filters are provided for selectivities of 12, 4, and 2 kHz. A double superheterodyne circuit (70.45 MHz/455 kHz) features up-conversion for minimum image response, and wide dynamic range (greater than 100 dB) assures excellent intermod immunity. IF and image rejection are typically 70 dB or more. High sensitivity (0.5 uv SSB) catches the weakest signals.

Passband tuning and a notch filter allow precise targeting of signal interference while an effective noise blanker permits rejection of pulse noise. Tone control, BFO, RIT, squelch, RF gain, step tuning, 24 hour clock timer with record activator, computer compatibility, . . . even an optional converter (34-60, 114-174, 423-456 MHz) to extend the receiver's range into VHF and UHF make this a most remarkable receiver. One year warranty from JRC.

Powered by 120/240 VAC or 12 VDC.

CALL TOLL-FREE (MC & Visa Only)  
 1-800-438-8155

Order RCV1  
 Retail \$~~1285~~<sup>00</sup>

You pay only  
**\$1169<sup>00</sup>**

\$10 UPS Shipping  
 \$20 U.S. Parcel Post  
 Canadians. \$35 Air P.P.

**Options available:**

(If ordering options only, add \$7 to total order)  
 VHF/UHF converter, CMK165 . . . . . \$359<sup>95</sup>  
 RTTY demodulator, CMH530 . . . . . 139<sup>00</sup>  
 Cable for CMH530 . . . . . 59<sup>95</sup>  
 Cable for CMH532 . . . . . 59<sup>95</sup>  
 RS232C interface, CMH532 . . . . . 99<sup>00</sup>  
 300 Hz CW filter, CFL231 } Use only . . . 119<sup>95</sup>  
 500 Hz CW filter, CFL232 } one . . . 119<sup>95</sup>  
 1.0 kHz RTTY filter, CFL233 . . . . . 119<sup>95</sup>  
 1.8 kHz SSB filter, CFL218 . . . . . 119<sup>95</sup>  
 Service Manual . . . . . 30<sup>00</sup>  
 External speaker, NVA88 . . . . . 49<sup>95</sup>  
 plus \$5 UPS  
 Headphones (see Kenwood ad, page 9)  
 Installation of one or two filters is \$20 at  
 time of NRD 525 purchase



The Standard of Comparison Worldwide!



# ICOM R-71A

This receiver looks as impressive as it sounds, professionally and thoughtfully laid out with easy-to-read panel legends. The brilliant fluorescent display provides frequency information down to tenths of a kilohertz and alerts the listener to other dial settings (mode, memory channel, VFO).

Continuous tuning (100 kHz-30 MHz) with signal resolution of 10 Hz eliminates the need for RIT, even on SSB or RTTY.

A 32-channel memory (plus 2 independent VFOs) stores both frequency and mode and may be scanned or searched. Additionally, the squelch works on the scan mode (as well as normal reception), stopping automatically on a busy channel for monitoring! A real bonus for use with add-on frequency converters.

An effective noise blanker has adjustable controls for optimum reduction of a wide variety of impulse noises, from power line hash to the Russian woodpecker.

An internal speaker produces good audio and tone control adjusts sound to comfort.

Filter selectivity may be further enhanced by the use of the independent notch filter and passband tuning controls.

OPTIONS—Remote operation of the R71-A is possible using the hand-held RC-11 frequency control. It is possible to computer-control the ICOM with an external interface.

Of enormous interest to the visually impaired is the low cost EX-310 speech synthesizer which announces the displayed frequency in English. One year warranty from ICOM.

Retail **ONLY**

Order RCV6 ~~\$999~~ **\$839<sup>00</sup>** \*12 UPS; \*20 U.S. Mail P.P. \*30 Canada Air P.P.

### SPECIFICATIONS

- Dimensions . . . . . 11 1/4"Wx4 3/8"Hx10 1/8"D
- Frequency Stability . . . . . 50 Hz after 1 hour warmup (10 Hz with optional CR-64 crystal oven)
- Power Required . . . . . 117/235 VAC, 50/60 Hz (12 VDC with optional IC-CK 70)
- Audio Output . . . . . 2W min at 8 ohms
- Selectivity (6 and 60 dB points):  
SSB/CW and RTTY—2.3/4.2 kHz (Adjustable to 500 Hz); CW/RTTY narrow 500 Hz/1.5 kHz); AM 6/15 kHz (adjustable to 2.7 kHz); FM 15/25 kHz (with optional EXT-257)
- Sensitivity (internal preamp ON):  
1.6-30 MHz, all modes: 0.15-0.5 microvolts
- Spurious signal rejection . . . . . 60 dB min.
- Circuit: Quadruple conversion superheterodyne.
- Antenna Connector for PL-259

### ACCESSORIES

- ONE OR MORE ACCESSORIES INSTALLED AT TIME OF ORDER—\$20 FLAT FEE
- EX 257 FM Mode Detector . . . . . \$49.00
  - SP-3 speaker . . . . . \$61.00  
(plus \$5 UPS)
  - EX299 DC power kit . . . . . \$12.25
  - CR-64 high stability crystal . . . . . \$79.00
  - EX-309 parallel computer interface . . . . . \$59.00
  - CT17/UX14 serial computer interface . . . . . \$165.00
  - EX-310 voice synthesizer . . . . . \$59.00
  - FL-32 CW narrow filter (500 Hz) } Use only \$69.00
  - FL-63A CW narrow filter (250 Hz) } one \$59.00
  - FL-44A high grade SSB filter, 2.4 kHz . . . . . \$178.00
  - RC-11 infrared remote controller . . . . . \$70.00
  - MB-12 mobile monitoring bracket . . . . . \$25.00
  - Service manual . . . . . \$25.00
  - Headphones (see Kenwood ad, this page)

And look at these options! (If ordering options only, add \$7.00)

- 108-174 MHz VHF converter, VC20 . . . . . \$199<sup>98</sup>
- 6 kHz AM filter, YK88A . . . . . 84<sup>95</sup>
- 2.4 kHz SSB filter, YK88S . . . . . 84<sup>95</sup>
- 1.8 kHz narrow SSB filter, YK88SN . . . . . 84<sup>95</sup>
- 500 Hz CW filter, YK88C . . . . . 84<sup>95</sup>
- 270 Hz narrow CW filter, YK88CN . . . . . 94<sup>95</sup>
- 12 VDC mobile power cable, DCK2 . . . . . 12<sup>95</sup>
- Voice Synthesizer, VS1 . . . . . 59<sup>95</sup>
- IF-232C translator controller . . . . . 94<sup>95</sup>
- IC-10 interface . . . . . 34<sup>90</sup>
- Headphones
- HS5 deluxe black . . . . . 64<sup>95</sup>
- HS6 lightweight . . . . . 44<sup>95</sup>
- HS7 micro headphones . . . . . 29<sup>95</sup>
- External speaker, SP430 . . . . . 64<sup>95</sup>
- Mobile mounting bracket . . . . . 34<sup>95</sup>
- Service manual . . . . . 20<sup>90</sup>
- Installation of one or more accessories . . . . . 20<sup>90</sup>



# Kenwood R-5000

Kenwood has taken the user-friendly package of their popular R2000 general coverage receiver and upgraded the circuitry with the advanced receiver section of their high quality amateur transceiver, producing a communications receiver of extraordinary performance.

Built-in modes include AM, FM, USB, LSB, CW, FM, and FSK (RTTY). With continuous frequency coverage from 100 kHz to 30 MHz, the R5000 boasts: 100 memory channels which store frequency, mode and antenna selection (two inputs); keypad frequency entry as well as tuning dial; digital frequency display to 10 hertz accuracy; selectable AGC; variable IF shift and notch filter; squelch control; RF attenuator and gain control; dual noise blankers for effective interference rejection; programmable scanning and searching with center-frequency stop; non-volatile memory retains functions even if long-life lithium backup battery fails; dual 24-hour clock timer and muting terminals for recording; antenna connector for PL-259; and dual 120/240 VAC power supply.

The R5000 receiver features a professional 102 dB dynamic range front end for superior rejection of strong signal interference and a high stability dual VFO is accurate to within 10 ppm over wide temperature excursions. 90-day warranty from Kenwood.

Order RCV-7 **ONLY**  
~~\$999<sup>95</sup>~~ **\$845<sup>00</sup>**

Retail ~~\$999<sup>95</sup>~~ \*10 UPS Shipping \*15 U.S. Mail P.P., \*30 Canada Air P.P.

CALL TOLL-FREE (MC & Visa Only)  
1-800-438-8155



## SONY ICF-2010

The World's Most Popular Radio!

CALL TOLL-FREE  
(MC & Visa Only)  
1-800-438-8155

Yes, this is a full-featured portable for the serious shortwave listener. With a frequency coverage from 150-30,000 kHz (AM/SSB), 76-108 MHz (FM) and 116-136 MHz (AM aircraft), the 2010 has both direct-frequency keyboard entry as well as a tuning dial. A 32-channel memory may be scanned and frequency readout is on a crisp liquid crystal display.

Synchronous detection allows interference-free reception on many stations difficult to hear on other radios.

Separate RF gain control and attenuator switch accommodate a wide range of signal strengths.

Narrow/wide selectivity switching, 12/24 hour clock/timer allows up to 4 automatic on/off cycles per day for frequencies and times of your choice, 10-step LED signal strength meter, audio tone selection for speech or music, and 10 station direct-access keyboard combine to make this Sony product a remarkable value for beginners or seasoned SWL's.

Accessories supplied include adaptor, earphone, shoulder strap, wire antenna, external antenna connector, and shortwave handbook. All this and a one-year warranty from Sony besides!

### SPECIFICATIONS

#### Frequency Range

AM: (SW, MW, LW) 150-29,999.9 kHz

FM: 76-108 MHz

Air: 116-136 MHz

#### Selectivity ( - 50dB):

±9.0 kHz (wide)

±5.0 kHz (narrow)

#### Antenna System:

AM/FM Air Band Telescopic antenna; AM (150-1610 kHz) built-in ferrite bar antenna

Antenna Connector ..... 1/8" Mini Plug

Inputs ..... DC-In 4.5 V; External Antenna input (mini jack x 2)

Outputs ..... Earphone, Record out (mini jack)

Speaker ..... 4"

#### Radio Section Power Requirements:

3 "D" & 2 "A" batteries (not supplied); AC 120 V, 60 Hz with AC adaptor (supplied)

Dimensions (HWD) ..... 6 1/4"H x 11 3/8"W x 2 1/16"D

Weight ..... 3 lbs. 12 oz.

Supplied Accessories ..... Earphone, C-D3 C adaptor

Order RCV 2 Grove discount price:

**\$338<sup>00</sup>**

Manufacturer's Suggested Retail \$459<sup>95</sup>

\$5 UPS Shipping

\$10 U.S. Mail P.P.; \$15 Canada Air P.P.

#### Just look at these features:

AM/SSB/CW reception from 150 kHz to 30 MHz

FM from 87.5-108 MHz

Keypad frequency entry as well as tuning dial

Illuminated LCD frequency readout

Scanning with 9 memory channels

Wide/narrow selectivity switch

Separate bass and treble controls

Direct selection of twelve shortwave broadcast bands

Clock with preset frequency alarm and sleep function

Battery or AC power

Headphone jack for stereo FM listening

Five-step LED signal strength indicator

BFO and RF gain controls

External antenna jack for long distance reception

180-day warranty from Sangean.

## The Sangean ATS-803A

CALL TOLL-FREE (MC & Visa Only)  
1-800-438-8155



Whether you are a beginner looking for a high performance portable at low cost, or a seasoned SWL planning on a second receiver, the Sangean ATS-803A offers surprising performance at such a budget price; includes AC adaptor and stereo headphones.

This receiver is clearly **the most feature-packed, high performance portable under \$200!** Equipped with 1/8" mini antenna jack.

Size 11 1/2"W x 6 1/4"H x 2 1/2"D; Weight: 4 lbs.

Order RCV4

Grove price:

**\$189**

Former nationally advertised price: \$239

**Recommended accessories: AA cells for microprocessor (2 required); D cells from portable power (6 required)**

Plus \$5 UPS,

\$10 U.S. Mail P.P.

\$15 Canadian Air P.P.



# Infotech M7000: The Most Advanced Multimode Data Reader Ever Produced!

Imagine a stand-alone decoder that plugs into your receiver's speaker or earphone jack - no computer or interface required - which provides a printout of messages sent in Morse code (5-120 WPM), Moore code, RTTY (45-250 baud), ASCII (75-1200 baud), TOR (FEC and 2/4 channel, 86-200 baud ARQ), packet, TDM, FDM (4 channel), Russian Cyrillic (video) as well as FAX photos (4 speeds, 3 IOCs)!

Composite video output allows viewing on an inexpensive monitor, while both parallel and serial ports are provided for printers. A scope output offers mark/space levels for perfect tuning.

Autotuning makes adjustments a snap - just tune in a signal and a microprocessor automatically sets itself for the correct filters, baud rate and even mark/space shift and polarity (RTTY only!). Standard shifts may be selected or variably adjusted from 30-1200 Hz.

Bar graphs and LED status lights allow manual selection of optimum settings for all models. On-screen displays show baud rates of incoming signals, bit patterns, split-screen (2 channel) ARQ, self test and other callouts.

Additional functions include: 11 user-programmable memories for custom setups, selcal, noise squelch, bit inversion decode, 4 page scrolling, input/output gain controls and much more! Power required: 120/240 VAC, 50/60 Hz @ 25 W. Dimensions: 16-1/8"W x 3-1/2"H x 12-3/4"D

## OPTIONAL ACCESSORIES WITH M7000:

Real time/date clock status display **\$1058.00**

FAX video **\$1089.00**

SAVE! BOTH OPTIONS **\$1129.00**

19-inch rack panel mounting kit **\$19.95**



Order DEMI Retail **\$1129<sup>00</sup>**

**\$999<sup>00</sup>**

Plus \$10 UPS

\$20 Parcel Post 35 Canadian Air Parcel Post

## ADD PROFESSIONAL SOUND TO YOUR SHORTWAVE RECEIVER, SCANNER OR TRANSCEIVER WITH THIS PREMIUM EXTENSION SPEAKER! SEPARATE BASS AND TREBLE ADJUSTMENTS GIVE YOU COMPLETE CONTROL!



It's a fact. The cheap speakers installed in today's radio equipment make noisy, distorted signals even harder to read.

Fortunately, there's help: the Grove SP100 Sound Enhancer\*, a high performance, wide-range speaker with a massive magnet, secured in a rugged, metal acoustical chamber.

This extraordinary extension speaker will help your desktop radio produce richer, fuller sound you never knew it had. Separate bass and treble controls invite you to tailor the sound to your listening requirements.

1/4" front panel jack for stereo or monaural earphones and a 3-foot interconnect cord with a 3.5 mm (1/8") phone plug to fit your receiver's 4 or 8 ohm external speaker output are included.

A speaker-disabling switch allows you to tune in a RTTY or FAX signal, then switch off the speaker while the message is silently displayed on your video screen or typed out on your printer.

Measures a compact 8"W x 5.5"H x 6"D

Why wait any longer to increase your listening pleasure? Order the SP100 Sound Enhancer today!

## Order SP-1

\$5 UPS, \$6 UC Parcel Post, \$9 Canadian Air Parcel Post

**\$99<sup>50</sup>**

\* Cannot be used with the Sony ICF2010 or Sangean ATS803 unless the internal volume-limiting resistor to the earphone jack of those radios is bypassed.

### SPECIFICATIONS

Power capacity: 20 watts RMS

Speaker size: 4" cone, 1" voice coil

Magnet: 10 ounce ferrite

Impedance: 8 ohm (nominal)

Controls: Bass, treble, speaker disable

Headphone jack: 1/4" stereo/mono

External cord: 3 foot with 1/8" (3.5 mm) plug

Cabinet: Welded steel, removable back

Dimensions: 8"W x 5-1/2"H x 6"D

Weight: 6-1/2 pounds



## Grove's Indoor SWL Antenna System

Connects to any receiver equipped with an external antenna jack

Left: Hidden Antenna, shown coiled, with optional Power Ant III and Minituner. Drawing depicts antenna in extended position, ready for use.

### Our "Hidden Antenna System" is your key to exciting short wave reception without an outside antenna!

Here's the apartment dweller's dream—a high performance, amplified indoor antenna system for general coverage shortwave, medium wave and even scanner monitoring.

This 66-inch, thin profile, flexible wire antenna can be tucked in a corner, hung behind a drape—just about anywhere out of sight. And when connected to the powerful PRE-3 signal booster, you have instant total spectrum coverage from 100 kHz to over 1000 MHz!

Yes, global short wave reception will be at your fingertips, and you can operate two radios at one time!

See pages 25 and 26 for detailed specifications

## Designed for use with the Grove Power Ant III

The Grove PRE-3 Power Ant has taken all the best from its successful predecessors and combined them into one powerful signal booster for scanners, short wave and medium wave receivers, even TV and FM stereos!

Equipped with a high gain, low noise, solid state amplifier stage, the PRE-3's front panel control allows custom selection of up to 30 dB of amplification!

### What you need to order:

ANT-6 Hidden Antenna	<b>\$9.95</b> (free shipping)
PRE-3 Power Ant III	<b>\$49</b> (plus \$2 <sup>00</sup> UPS, \$3 U.S. Parcel Post, \$4 Canada)
ACC-20 AC adaptor	<b>\$9.95</b> (free shipping with PRE-3)
ACC-60 receiver cable	<b>\$7.50</b> (you specify connector or receiver model; one for each receiver)

100 kHz-1000 MHz



CALL TOLL-FREE (MC & Visa Only)  
1-800-438-8155

## Add the Grove Minituner for Incredible Reception!

The addition of the Grove Minituner to the ANT 6/PRE-3 combo will allow signal peaking to perfection as well as eliminate intermodulation and image interference on your general coverage receiver. (Not for VHF/UHF scanning.)

### Here's what you will need in addition to the combo above:

TUN-3 Minituner	<b>\$49.00</b> (plus \$2 <sup>00</sup> UPS, \$3 U.S. Parcel Post, \$4 Canada)
ADP-1 UHF/F adaptor	<b>\$5.00</b> (free shipping)
ADP-2 F/PL-259 adaptor	<b>\$5.00</b> (free shipping)

100 kHz-30 MHz





# Grove's Outdoor SWL Antenna System



Connects to any receiver equipped with an external antenna jack

## 1. Start with . . .



See pages 25 & 26 for detailed specifications

High performance, low cost shortwave/longwave dipole antenna designed for total 100 kHz-30 MHz coverage without the gaps found in more expensive trap antennas. Modeled after the famous Grove all-band transmitting dipole, the 66-foot SKYWIRE is off-center fed, designed specifically for serious SWLs . . . Includes pre-measured stranded copper antenna wire, porcelain end insulators, custom center insulator for your PL-259 coax connection, and full instructions.

ANT-2 Only **\$19** (plus \$2.00 UPS; \$3 U.S. Mail Parcel Post; \$4 Canada Air P.P.)  
(Cable sold on Page 16)

## 2. Add the Acclaimed Minituner

The addition of the Grove Minituner to your outdoor shortwave antenna will allow signal peaking to perfection as well as eliminate intermodulation on your general coverage receiver. Comes equipped with standard UHF (PL-259) connectors. Special 1/8" UHF miniplug adaptor for Sony and similar portables, order ADP 6, \$5.00. (Not for VHF/UHF scanning.)



Plus \$2.00 UPS  
\$3 U.S. Parcel Post  
\$4 Canada Air P.P.

Order TUN-3

**\$49**

For blockbuster reception, even with a smaller antenna connected to your Minituner . . .

## 3. Add the Amazing Power Ant III

The Grove PRE-3 Power Ant has taken all the best from its successful predecessors and combined them into one powerful signal booster for short wave and medium wave receivers.

Equipped with a high gain, low noise, solid state amplifier stage, the PRE-3's front panel control allows custom selection of up to 30 dB of amplification!



Two output connectors are provided allowing you to use two receivers on one antenna at the same time! All connectors are type F for maximum signal transfer.

What you need to order:

- PRE-3 Power Ant III **\$49** (plus \$2.00 UPS, \$3 U.S. Parcel Post, \$4 Canada)
- ACC-20 AC adaptor **\$9.95** (free shipping with PRE-3)
- ACC-60 receiver cable **\$7.50** (specify connector or receiver model; one for each receiver)
- ADP-1 UHF/F adaptor **\$5.00** (free shipping with PRE-3)
- ACC-90 DC mobile cord **\$2.95** (free shipping with PRE-3)

"I hooked up the Skywire to my Panasonic RF-3100 and it sounded like a new receiver. I've heard things in the past couple of days I didn't even know was out there. With the Minituner III hooked up I heard even more! I don't know why I went as long as I did without buying either one of them. Now I'm using them on my Sony ICF-2010 and again I can't believe the difference."

Mike Day, OH.

"Considering that Botswana is the farthest place on earth from Hawaii, getting fair to good reception from a 50 kW station is not bad—thanks to the PRE-3 and TUN-3."

—R. Jones  
Kailua, HI

### Power Ant III Specifications

Gain	30 dB @ 1 MHz
	29 dB @ 10 MHz
	27 dB @ 50 MHz
	21 dB @ 150 MHz
	13 dB @ 450 MHz
	10 dB @ 900 MHz
Noise figure	2 dB nominal
Usable frequency range	10 kHz-1300 MHz
Input/output impedance	50-75 ohms nominal
Power required	12 VDC @ 40 ma.
Connectors	F type
Dimensions	4"W x 2"H x 3"D
Weight	6 ounces

CALL TOLL-FREE (MC & Visa Only)  
1-800-438-8155



# Choosing a Scanner

Copyright 1988 by Grove Enterprises, Inc.

P.O. Box 98, Brasstown, NC 28902 (Phone 704-837-9200)

## Caveat: ECPA '86

The Electronic Communications Privacy Act of 1986 forbids the monitoring of certain services receivable on scanners. Although there is no evidence at present that the new law is being enforced, violations are punishable by fine and/or imprisonment. The following list is included as a guide only and Grove Enterprises assumes no liability for its accuracy or interpretation.

The law forbids monitoring: 1. Encrypted or scrambled signals; 2. Paid subsidiary carrier authorization (SCA); 3. Mobile telephones or voice paging; 4. Remote broadcast or studio/transmitter links.

You may monitor any other transmission "readily accessible to the public" including public safety, federal and military, aircraft and maritime, amateur and CB, business and industrial, private land mobile, cordless telephones and any interference-causing protected transmission long enough to identify its source.

The consumer electronics marketplace bulges with products competing for your dollar. By following a few simple rules you will make the right choice in buying that new scanner.

### FREQUENCY RANGE

There are three conventional frequency bands which have been monitored for years by scanner buffs: 30-50 MHz (VHF low band), 144-174 MHz (VHF high band) and 450-512 MHz (UHF). Most scanners now include the 406-420 MHz federal government land mobile and 420-450 MHz amateur bands as well. These bands all utilize narrow band FM for communications.

The civilian VHF aircraft band (118-136 MHz, AM mode) provides another interesting target for monitoring as does the emerging 806-960 MHz band, sometimes called the cellular band or microwave mobile (806-960 MHz), now in use in all major metropolitan areas. Very few receivers include the military UHF aircraft band (225-400 MHz, AM mode).

The prospective scanner buyer should decide which of these aspects of listening are of greatest interest before purchasing a radio.

### PROGRAMMABLE OR CRYSTAL?

Stay away from crystal type scanners unless you won't be changing frequencies. For the majority of listeners, keyboard programmable scanners are the way to go — no two ways about it.

### MOBILE, BASE OR HAND HELD?

Scanners come in a variety of models to meet the particular needs of the listener. Do a lot of driving? Install a mobile unit. Constantly in and out of the car, office or home?

You may prefer a hand-held. Do most of your listening in the office or home? A base unit would be more practical.

Many models are capable of more than one application, accepting power from AC mains as well as mobile battery supply. AC wall adaptors charge batteries in hand-helds and power the scanner when plugged in.

Most hand-held scanners have small speakers which do not compete well in a noisy environment; an earphone or external speaker will solve that problem.

### TECHNICAL SPECIFICATIONS

The terminology used to rate a scanner's performance may be explained simply.

**Sensitivity** refers to the weakest signal voltage that the radio will respond to readably; the lower the number, the better. Good sensitivity is about 0.5 microvolts.

**Selectivity** is the radio's ability to reject adjacent frequency interference; the sharper, the better, especially in urban areas. Average selectivity for a scanner would be about 30 kHz (sometimes stated as +/- 15 kHz) at -50 dB.

**Dynamic range** is the ability of a scanner to handle extremely strong as well as extremely weak signals. Since none of them does it very well, this specification is never given.

**Intermodulation** ("intermod") is an internally-generated interference produced when strong signals mix together, producing spurious signals. It is often recognizable because of its distorted contents from two or more signals. Intermod results from inadequate dynamic range.

**Images** are produced in every receiver. They are recognizable as a duplicate of the legitimate signal, offset by 21.4, 21.6 or 21.7 MHz (twice the intermediate frequency — I.F.) from the actual frequency, depending

upon the scanner. With up-conversion design, image frequencies fall outside the listener's range to avoid interference.

### WHICH SCANNER IS THE BEST?

Like answering "Which car is the best?", we must list qualifications. At the present time, programmable scanners are available from seven manufacturers: Uniden, Regency, J.I.L., AOR, Radio Shack, Cobra and Fox. Additionally, the Grove SR-1000, Yaesu FRG-9600 and ICOM R-7000 offer VHF/UHF coverage and scannable memories.

Most popular scanners have excellent sensitivity and reasonable selectivity (reject adjacent channel interference), but suffer from intermodulation and image interference from strong signal overload, especially when used with an outdoor antenna.

The Realistic PRO-2004 is virtually immune to interference from intermodulation and images, but it has the lowest sensitivity; this makes it an excellent choice for strong signal areas like large cities. In comparison, the Bearcat BC760XLT and BC800XLT have superb sensitivity, but are easily overloaded by strong signals; use them in rural or deep suburban locations.

### SCANNER ANTENNAS

**Hand-held** - The whip antenna included with your scanner is fine for local reception of strong signals, but if you are interested in reaching out further, a larger external antenna is necessary. The Grove ANT-8 adjustable whip will increase range on any hand-held scanner or transceiver equipped with a BNC connector (not screw-thread).

Hand-held radios may also be connected to mobile antennas like the Grove ANT-4 and rooftop base antennas as well, provided they are equipped with BNC connectors.

**Mobile** - In mobile installations, a scanner's attachable whip is shielded by the vehicle body and an external antenna is recommended. A rooftop location is ideal, providing all-direction coverage. Mounted elsewhere (fender, truck, bumper), the pattern will favor the direction of the car body.

### Best Programmable Scanners Presently Manufactured

RADIO SHACK	BEARCAT	COBRA	AOR
PRO 2004	BC 760XLT	SR-15	AR 3000
PRO 2021	BC 800XLT	SR-12	AR 2002
PRO 34	BC 200XLT		AR 900



Mobile scanner antennas are notorious for their compromising performance. Their short lengths and low height limit their distance, and loading coils restrict their frequency range. 800 MHz coverage is more by accident than design. The mobile scanning enthusiast must be content with local listening.

Mobile scanner antenna cables traditionally come equipped with a Motorola plug (the Grove ANT4 allows a choice of BNC or Motorola) and have strong magnetic bases which will not come loose at normal road speeds.

If an outside antenna is undesirable, the car's existing AM/FM antenna may be used with a multicoupler like the Grove ANT-63 with some compromise in signal strengths. In weak signal areas, a preamplifier like the Grove PRE-3 will boost reception range.

Base - Many discons advertise 25-1300 (or higher) MHz response. While it is true that any antenna will get some signals at virtually any frequency, most discons have poor response below 100 MHz and erratic response above that.

Several discons are extremely well constructed including the ICOM AH7000 which features low-loss RG-8/U cable and N connectors, and the Diamond D130 which comes with lossy RG-58/U and PL-259 connectors.

Most low-cost base antennas like the Grove ANT5B Omni work well for local coverage (25-50 miles distance). Possibly the best nondirectional, all-band scanner antenna on the market is the Channel Master 5094 MoniTenna. Featuring total 30-960 MHz coverage, it comes with 65 feet of low-loss coax and is fitted with a Motorola connector. Because it is oversized for storage and shipping, it is not sold by Grove Enterprises, but is available from some scanner and TV dealers.

An "omnidirectional" antenna mounted on the side of a metal mast or alongside another antenna separated by only a couple of feet is directional; the proximity of that other metal causes reflections which make the antenna responsive to specific directions, sometimes profoundly so. It should be rotated on its mast while listening to signals of interest to determine best overall position, then tightened down.

For extended range, a directional antenna like the Grove Scanner Beam, used with an inexpensive TV rotator, offers up to 8 dB gain in its forward direction while receiving local signals all around. VHF and UHF reception in excess of 100 miles under favorable conditions are frequently reported.

### COAXIAL CABLE

At VHF/UHF frequencies, common CB-type RG-58/U coax will actually absorb signals. We recommend low-loss RG-6/U like the Grove CB-50 and CB-100 cables with custom connectors. It offers 100% shielding, small diameter, flexibility and low cost.

For the lowest possible losses, especially in runs in excess of 100 feet, use Belden 9913 or RG-11/U mini. Connectors are available from electronics distributors and TV and video accessory outlets.

Don't be concerned with impedance; although your scanner is designed to work with 50 ohm cable, no antenna made maintains a constant impedance over the wide frequency range of modern scanners. You want low loss and 100% (or close to it) shielding.

### PREAMPLIFIERS

One of the most misunderstood accessories is the preamplifier. Its purpose is to boost weak signals which would remain unheard on a receiver without it. To do this it needs to have a very low noise figure, but very little gain.

Antenna-mounted preamplifiers are especially helpful in overcoming losses in long coaxial cables (over 100 feet and above 400 MHz).

Wideband (untuned) preamplifiers like the Grove PRE-3 work well in low-signal-strength environments, but when used with outside antennas in a metropolitan area they saturate easily, causing desensitization (signals are weaker than before) and generate intermodulation (spurious signals) as well.

## Top 100 Scanner Frequencies

The spectrum above 30 MHz is saturated with two-way intrigue — air to ground, ship to shore, military and federal government, public safety, hams, businesses, trains — if you know where to look.

By convention, the VHF and UHF portion of the bands are divided into discrete segments (bands), named as follows: 30-50 MHz, VHF low band; 72-76 MHz, VHF mid band; 108-174 MHz, VHF high band; 225-512 MHz, UHF; and 806-960 MHz, microwave mobile or cellular band.

- 34.81 Fish & Wildlife
- 34.83 Fish & Wildlife
- 35.02 McDonald's order window
- 35.22 Paging
- 35.58 Paging
- 35.62 Paging
- 35.64 Medical paging
- 40.07 Nat'l Park buses
- 40.21 Nat'l Park buses
- 40.45 VA paging
- 40.50 Army Search/Rescue
- 40.68 Industrial devices
- 41.50 Army aircraft
- 43.22 Paging
- 43.58 Paging
- 46.61-
- 46.97 Cordless phone bases
- 46.75 Pres. helicopter
- 47.42 Red Cross
- 49.67-
- 49.97 Cordless phone handsets/  
walkie talkies
- 49.83 Wireless baby monitors
- 75.00 Airport marker beacon
- 121.5 Air emerg/calling

- 121.75 Russian cosmonauts
- 122.75 Gov't air to air
- 122.8 Small airport UNICOM
- 122.9 Gov't aircraft
- 122.925 Natural resources air
- 123.05 Helicopter
- 123.1 Air search & rescue
- 123.45 Pilots air to air
- 126.2 Military air towers
- 132.0 Goodyear blimp
- 135.575-
- 135.625 ATS satellite
- 143.46 Air Force MARS
- 143.625 Russian Mir cosmonauts
- 143.99 Army MARS
- 146.52 Ham walkie talkie
- 148.15 Civil Air Patrol
- 150.00 Russian satellite
- 151.625 Itinerant walkie talkie
- 152.0075 Medical paging
- 152.03-
- 152.21 Paging
- 152.51-
- 152.81 Mobile phone
- 154.37 Fire mutual aid
- 154.60 Bus. paging/comm.
- 155.16 Hospital/ambulance
- 155.28 Hospital/ambulance
- 155.34 Hospital/ambulance
- 155.37 Police mutual aid
- 155.475 Police intersystem
- 156.8 Boats call/distress
- 157.05 Coast Guard
- 157.10 Coast Guard
- 157.15 Coast Guard
- 159.495 Brinks trucks
- 159.600 Wells Fargo trucks
- 161.640 Goodyear blimp
- 162.40-
- 162.55 Weather service
- 163.100 Fed gov't portable
- 163.200 U.S. Marshal
- 163.250 Medical paging
- 163.4125 Army Corps of Eng.
- 163.4375 Army Corps of Eng.
- 165.2875 ATF
- 165.375 Secret Service
- 165.950 IRS
- 167.050 FCC
- 167.5625 FBI
- 170.200 Fed'l disaster net
- 170.875 Federal Prisons
- 170.925 Federal Prisons
- 236.6 Air Force Towers
- 241.0 National Guard
- 243.0 Military aircraft calling/distress
- 255.4 Mil. flight weather
- 257.8 Mil. tower calling
- 259.7 Space Shuttle
- 264.9 NORAD secondary
- 266.5 SAC refueling
- 272.7 Mil. flight weather
- 296.8 Space Shuttle
- 311.0 SAC primary
- 321.0 SAC secondary
- 340.2 Navy towers
- 342.5 Mil. flight weather
- 364.2 NORAD primary
- 381.8 CG aircraft
- 408.400 Fed. gov't (shared)
- 415.200 Fed protection service
- 415.700 Air Force One
- 417.200 Fed Protection service
- 418.050 Fed gov't portable
- 418.075 Fed gov't shared
- 418.575 Fed gov't portable
- 459.675 Tone paging
- 460.975 Wells Fargo trucks
- 462.95-
- 463.715 Paramedics
- 464.550 PGA tournament
- 469.500 NASCAR racing
- 469.9125 Goodyear blimp security
- 1090 Aircraft VORTAC



# ICOM R7000

## Continuous Coverage VHF/UHF Receiver!

Now used by government and military agencies worldwide, the ICOM R7000 provides total spectrum 25-1000 (triple conversion) and 1025-2000 (quadruple conversion) MHz frequency coverage with 100 Hz fluorescent read-out accuracy!

Add to this enormous tuning range 99 memory channels with priority function, keyboard entry or dial tuning ( $\pm 5$  ppm stability,  $-10$  to  $60^{\circ}\text{C}$ ), FM/AM/SSB modes, five tuning speeds (0.1/1/5/10/12.5/25 kHz), S-meter/center tuning meter, 2.8/9/15/150 kHz filter selection, noise blanker, internal speaker with 2.5 watts of audio power, spurious signal suppression greater than 60 dB, high sensitivity (0.5 uv @ 12 dB SINAD FM), and programmable scanning with auto-write memory, and you have the most advanced scanning receiver ever designed for the serious VHF/UHF listener.

CALL TOLL-FREE (MC & Visa Only)  
1-800-438-8155

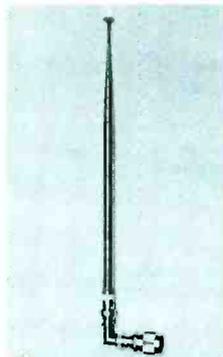
RETAIL

~~\$1199~~

YOU PAY  
ONLY

**\$1019**

<sup>\$12</sup> UPS Shipping  
<sup>\$20</sup> U.S. Mail P.P.; <sup>\$30</sup> Canada Air P.P.



ACC 67 ONLY \$19<sup>95</sup>  
<sup>\$150</sup> UPS if  
ordered separately

But the features don't stop here. Optional accessories include the RC-12 remote controller, a voice synthesizer to announce frequency settings, and even an access port for external computer control!

### Order SCN 4

**DIMENSIONS:** 11 $\frac{1}{4}$ "W x 4 $\frac{3}{8}$ "H x 10 $\frac{7}{8}$ "D; **WEIGHT:** 16 lbs.; **POWER:** 117/240 VAC, 1.5 A

**ANTENNA CONNECTOR:** Type N female

### MODIFICATIONS/ACCESSORIES:

High speed scan modification .....	\$20 <sup>00</sup>
ACC 67 6"-46" ext. whip antenna (shown) ....	\$19 <sup>95</sup>
*RC 12 remote controller .....	\$70 <sup>00</sup>
*EX310 voice synthesizer .....	\$59 <sup>00</sup>
*EX-299 12 VDC power kit .....	\$12 <sup>25</sup>
CT-17 serial computer interface .....	\$95 <sup>00</sup>
<i>Installation charge: \$20 for one or more accessories</i>	
TV R7000 video adaptor .....	\$139 <sup>00</sup>
Computer interface instructions .....	\$10 <sup>00</sup>
Service manual .....	\$25 <sup>00</sup>
SP3 speaker .....	\$65 plus \$5 UPS
MB12 mobile mounting bracket .....	\$25 <sup>00</sup>
ADP-3 F to N antenna adaptor .....	\$5 <sup>00</sup>
Headphones (see Kenwood ad, page 3)	

See page 22 for antenna for R7000!



*The Top-of-the-Line PRO-2004 is the Most Popular  
High-Performance Scanner Ever Made!*

# Realistic® PRO-2004

## Wide Coverage Scanner!

CALL TOLL-FREE (MC & Visa Only)  
1-800-438-8155

### At a Grove Discount Price!

You can walk into your chain retail store and pay \$430 for this luxury scanner, or you can order it from Grove for only \$389!

The PRO-2004 provides continuous frequency coverage between 25-520 and 760-1300 MHz\* in your choice of mode - AM, narrowband FM or wideband FM. With no crystals

needed, this exceptional unit delivers a wide range of frequencies not found on most scanners - including public service, broadcast FM, military bands and CB!

#### Features include:

- Up-conversion rejects images
- 300 memory channels
- High-impedance (10 K ohm) recorder output
- Ten memory banks
- Individual channel lockout and delay
- Stores up to ten search ranges in memory
- Priority on any channel
- Giant, brilliantly backlit LCD shows frequency, channel and function
- Fast/slow scan and search speeds
- Selectable search steps - 5, 12.5, 50 kHz (30 kHz on cellular when restored)
- Zeromatic search stop for accurate frequency readout
- Dimmer for night viewing
- Sound squelch skips dead carriers ("birdies")
- Dual 120 VAC/12 VDC power supply
- Weight: 8 lbs.
- Dimensions: 10-3/4"W x 3"H x 9"D



Search mode finds new channels, with an incredible 300 channels available for storing the ones you like. Rapid 16-channel-per-second scan and search complements this scanner's excellent interference immunity for metropolitan monitoring. Built-in speaker and telescoping antenna are included. Jacks provided for external speaker, tape recorder and DC adaptor.

*\*Comes with simple instructions to restore continuous coverage disabled by the factory.*

**ONLY**  
**\$389<sup>00</sup>**

**Order SCN5**  
**Retail \$419<sup>95</sup>**

Plus \$5 UPS  
\$10 U.S. Parcel Post  
Canadians: \$15 Air P.P.



# Bearcat's BC800XLT

## Top of the Line - With 800 MHz!



Yes, the BC800XLT features wide frequency coverage: 29-54, 118-136 (AM), 136-174, 406-512, and 806-912 MHz FM with 40 channels of memory in two banks.

Other features include rapid scan (15 channels per second), powerful 1.5 watt audio amplifier, two telescoping antennas (one for 800 MHz range), better than 1 microvolt sensitivity, 55dB

selectivity @  $\pm 25$  kHz, instant weather reception, brilliant fluorescent display, AC/DC operation, direct channel access, individual channel delay, priority channel one, fully synthesized keyboard entry.

Dimensions: 10-1/2"W x 3-5/8"H x 8"D; Weight: 7 lbs., 2 oz.

Order SCN-11

**New Low Price!**  
**\$249<sup>00</sup>**

Retail \$499<sup>95</sup>

\$5 UPS

\$10 U.S. Parcel Post, \$15 Canada Air P.P.

### BC800XLT SPECIFICATIONS:

Band Coverage: 10 Bands-Weather Channel

Frequency Range:

10 Meter "Ham" Band (29-29.7 MHz)

Low Band (29.7-50 MHz)

6 Meter "Ham" Band (50-54 MHz)

Aircraft (118-136 MHz)

Military Land Mobile (136-144 MHz)

2 Meter "Ham" Band (144-148 MHz)

High Band (148-174 MHz)

Federal Government

Land Mobile (406-420 MHz)

70 cm "Ham" Band (420-450 MHz)

UHF Band (450-470 MHz)

"T" Band (470-512 MHz)

800 Band (806-912 MHz)

Channels: 40 Channels (Two 20 Channel Banks)

Scanning Speed: 15 Channels per Second

Display: Vacuum Fluorescent Digital Display

Controls/Switches: Volume Control; Squelch Control with Auto Squelch

Power Requirement: 117 VAC or 13.8 VDC; 2 AA-size memory backup batteries (not included)

Sensitivity:

29-54 & 136-174 MHz (0.6 microvolts)

118-136 MHz (0.8 microvolts), 60% (1kHz modulation 10 dB SINAD)

406-512 MHz (0.8 microvolts)

840-912 MHz (1.0 microvolts  $\pm 3$  kHz deviation 12 dB SINAD)

Selectivity: -55 dB @  $\pm 25$  kHz

Audio Output: 1.5 W at 10% T.H.D.

Antenna: Two Telescoping Antenna Included (one for 800 MHz)

Connectors: External Antenna Jacks (MOT female); External Speaker Jacks; AC Power Jack; DC Power Jack.

Options: External Antenna Plug

# Bearcat BC760XLT

Measuring a tiny 2" high by 7" wide and deep, this upgraded version of the BC600XLT is ideal for mobile or base installations. Features include user-programmable search ranges, five priority channels, individual channel lockout and delay, direct channel access, external antenna jack

(MOT female), and optional CTCSS tone-squelch decoder. Mobile mounting kit, DC cord, AC wall adaptor, plug-in whip, and operating manual are all included at no extra charge!

In addition to normal 29-54, 118-174 and 406-512 MHz coverage, the new 760 also has 806-952 MHz (less cellular band; you can restore full coverage with included instructions). And with its pre-programmed service search capability, just push a button to find active police, fire, aircraft, maritime, emergency, and weather channels!

One hundred memory channels may be scanned sequentially or in five 20-channel banks. Controls are backlit for night use. And look at these switch-activated, plug-in options never before available for a scanner:

Recommended Retail \$399<sup>95</sup>

Order SCN12

**GROVE Discount Price \$259<sup>00</sup>**

\$5 UPS Shipping

\$10 U.S. Mail P.P.; \$15 Canada Air P.P.

CALL TOLL-FREE (MC & Visa Only)

1-800-438-8155

### OPTIONS:

(Installation fee at time of purchase - \$10)  
**SIGNAL BOOSTING PREAMPLIFIER** for weak signal locations. May be switched in or out of circuit. Plugs into back of radio.

Order ACC98

\$34<sup>95</sup>

**CTCSS TONE SQUELCH DECODER** for selective paging of your unit—ideal for volunteer firefighters, emergency medical teams. All 38 tones may be programmed into your choice of channels. May be switched on or off. (Must use ACC97 with ACC96.)

Order ACC96

\$60<sup>00</sup>

**ON/OFF SWITCH** which must be used with decoder.

Order ACC97

\$8<sup>95</sup>





# The Bearcat BC200XLT

*A Premium Scanner at a Popular Price!*

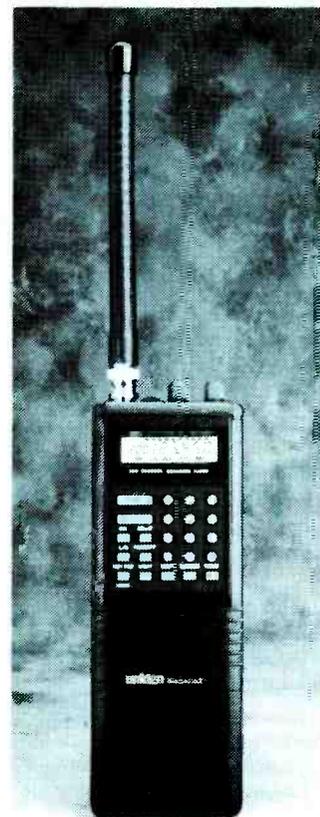
After extensive comparison tests with competitive products in our own lab, we conclude that the Bearcat BC200XLT is the optimum handheld scanner. Unlike its competitors, the BC200XLT comes equipped with detachable nicad battery pack, leather holster and AC wall charger/adaptor.

This sleek, programmable scanning receiver covers 29-54 MHz (includes 10 and 6 meter amateur bands as well as VHF low band), 116-174 MHz (aircraft, amateur 2 meters and VHF high band), 406-512 MHz (federal, amateur and civilian UHF), and 806-824, 849-869, 894-960 MHz (continuous 806-960 MHz restorable with instructions included).

200 memory channels can be sampled sequentially or in any combination of ten 20-channel banks. Instant weather scan is pre-programmed--just touch a button and hear your local weather update. Up to ten priority channels may be installed and ranked in importance. Search allows automatic hunting for new active frequencies.

Individual channels may be temporarily locked out or delayed to hear replies. Audio has plenty of punch for noisy locations. Flexible rubber duckie antenna is equipped with BNC connector for easy removal and interchangeability with external antennas like the Grove range-extending ANT-8 telescopic whip (page 21) and ANT-4 all-band mobile antenna (page 23).

Sharp IF selectivity assures steep rejection of adjacent channel interference. High sensitivity snags even the weakest signals. The rugged, rubberized keypad has excellent tactile feedback without the annoying "beep" heard on other scanners.



#### SPECIFICATIONS

Frequency range: 29-54, 118-174, 406-512, 806-960 MHz

Cellular frequencies deleted at the factory, restorable

Memory: 200 channels in ten 20-channel banks

Scan/search rate: 16 per second

IF selectivity: 55 dB @ +/- 25 kHz

Sensitivity: 0.25-0.50 microvolts nominal

Dimensions: 2-3/4"W x 7-1/2"H x 1-1/4"D

Weight: 35 ounces

Extra BP200 battery pack \$39 plus \$1<sup>95</sup> UPS shipping

Order SCN 9

New Low Price  
**\$259<sup>00</sup>**

\$5 UPS, \$10 U.S. Mail Parcel Post, \$15 Canadian Air Parcel Post



## The Bearcat BC100XLT

Introducing the BC-100XLT, with 100 memory channels! Yes, the all-time popular Bearcat hand-held programmable scanner has aircraft reception, 100 channel memory, illuminated LCD display for night viewing, search, rapid scan (15 channels per second), direct channel access, lockout, delay, low battery indicator, 10 ranked priority channels, and keyboard lock.

Frequency coverage is 29-54, 118-174, 406-512 MHz. Accessories included: Rubber ducky antenna (with BNC base), AC adaptor/charger, Nicad batteries, earphone, and carrying case.

Handsome black case with chrome accents.

Dimensions: 7-1/2" H x 2-7/8" W x 1-3/8" D; Weight: 2 lbs., 10 oz.

Order SCN10

Now Only  
**\$209<sup>00</sup>**

CALL TOLL-FREE (MC & Visa Only)

1-800-438-8155

\$5 UPS Shipping

\$10 U.S. Mail P.P.; \$15 Canada Air P.P.

Retail \$349<sup>95</sup>



## THE AR900 SHIRT POCKET SCANNER!

*Now Improved!\**

It's true--you don't have to sacrifice performance in order to reduce size. AOR has proven that with their AR900 pocket programmable scanner. Featuring a frequency coverage of 27-54, 108-174, 406-512 and 830-950 MHz, the 900 covers all land mobile services, hams, civilian aircraft and even CB.

The high-contrast LCD readout shows frequency, memory channel, mode and a variety of other status callouts. It is strongly backlit for easy night viewing. 100 memory channels can store and recall your favorite frequencies in sequence or in five selectable banks of 20 channels each.

Five separate search ranges may be programmed, allowing you instant access to five different frequency ranges to discover new activity. Select the step increments of your choice--5, 10, 12.5 or 25 kHz (even 30 kHz in the forbidden cellular band!)-and you can select AM or FM mode in any range!

Its wide dynamic range and 54 MHz IF assure vastly improved overload immunity and image rejection when compared to competitive models, a distinct advantage for big city monitoring!

Other features include individual channel lockout, all-channel selectable delay, search hold, up/down search stepping, keypad lock, clear entry button, and a non-volatile memory which holds its 100 frequencies even when batteries are exhausted.

Measuring a scant 2" x 5-3/4" x 1-1/2" and weighing a featherweight 12 ounces, your AR900 comes complete with NiCd battery pack, AC wall charger/adaptor, rugged chrome steel belt clip, two BNC-type flex antennas (for all-band monitoring and improved 800 MHz band listening), earphone and full instructions.

*\*No more "wandering birdies"!*

Order REC2

**\$275<sup>00</sup>**

\$5 UPS    \$10 US Parcel Post    \$15 Canadian Air Parcel Post





# Extend the Reception Range Of Your Handheld Scanner!

## HAND HELD RADIOS

Today's hand-held VHF/UHF scanners and handie-talkies from Bearcat, Regency, Cobra, Radio Shack, ICOM, Yaesu and Kenwood have excellent sensitivity and talk power, but their range is reduced by their short "rubber ducky" antennas. Grove has the solution!

Just replace that inefficient flex antenna with our universal full-length whip—and stand back! Extendable from 7 to 46 inches, the ANT-8 is made of chrome-plated brass and equipped with a standard BNC base. Transmits on 45-960 MHz; receives 25-1300 MHz.

## DESKTOP UNITS

If your desktop scanner is equipped with a BNC antenna connector, try the new Grove ANT-8B with right-angle adaptor for improved low, high and UHF band reception when an outside antenna is not practical.

ANT-8B **\$17<sup>95</sup>** plus \$1.50 UPS shipping (free shipping with scanner)

*"The Grove ANT-8 full-length antenna is fantastic. It's increased range for scanner enthusiasts makes its price about one-fourth its real value! I've retired my rubber ducky."*  
George Finger  
Watkinsville, GA

**Universal  
Full-Length  
Antenna**

Order ANT-8

ONLY

**\$12<sup>95</sup>**

plus \$1<sup>50</sup> UPS  
\$2<sup>50</sup> First Class  
U.S. or Canada



*Convert Your Car Antenna  
Into a Scanner Antenna!*

## Mobile Antenna Multicoupler

How would you like to enjoy excellent 30-960 MHz mobile scanner reception using your existing AM/FM auto antenna? That's right; no holes, no magnets, no scratched paint or clumsy cables going through doors and windows. Ideal for low-profile monitoring installations where a separate scanner antenna is undesirable.

The Antenna Specialists MON-63 Mobile Multicoupler takes only seconds to install and allows simultaneous use of your AM/FM car radio as well as your mobile scanner. Equipped with standard Motorola connectors for your car radio and most scanner models.



CALL TOLL-FREE (MC & Visa Only)  
1-800-438-8155

Order ANT-63

ONLY

**\$19<sup>95</sup>**

\$2.00 UPS or  
U.S./Canadian Parcel Post



# SCANNER BEAM

*The Best Scanner Antenna Money Can Buy!*

Our world-renowned Scanner Beam provides unexcelled 30-50 MHz low band reception, 108-136 MHz aircraft, 136-174 MHz high band, 225-400 MHz military aircraft and satellites, 406-512 MHz UHF, and 806-960 MHz microwave mobile.

HAMS NOTE—can be used for transmitting up to 25 watts on 144, 220 and 420 MHz bands. 50/75 ohms nominal impedance.

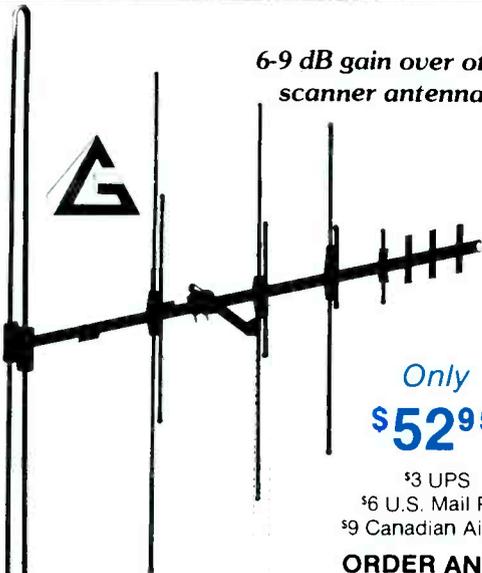
May be used with inexpensive TV antenna rotator for boresight accuracy, or fixed in one direction as required for those elusive, distant stations. Local signals still come in loud and clear from all directions.

Balun transformer, offset pipe and all mounting hardware included (requires TV type F connector on your coax). Approximate size 6'H x 4'L.

*"I hear 800 MHz signals 40 miles away and aircraft up to 200 miles with my Grove Scanner Beam."*

—L. Reeves, Wagoner, OK

6-9 dB gain over other scanner antennas!



Only  
**\$52<sup>95</sup>**

³ UPS  
⁶ U.S. Mail P.P.  
⁹ Canadian Air P.P.

**ORDER ANT1B**

*Low-loss Cable and Connectors sold on Page 16!*

# OMNI

The OMNI, developed by Bob Grove, is a non-directional vertical dipole with continuous 30-960 MHz coverage. A single 66-inch element works on the harmonic principle to provide in- and out-of-band scanner reception throughout the VHF/UHF spectrum.

Listen to low band, UHF, military and civilian aircraft bands, even 800 MHz mobile, all on one low cost antenna.

All mounting hardware included.

Requires TV Type F connector on your coax.

ANT-5B only

**\$21<sup>00</sup>**

Plus \$2.50 UPS Shipping  
\$4 U.S. Mail P.P.  
\$6 Canada Air P.P.



CALL TOLL-FREE (MC & Visa Only)  
1-800-438-8155

# Professional Wideband Discone

*Best Discone on the Market for VHF/UHF Receivers*

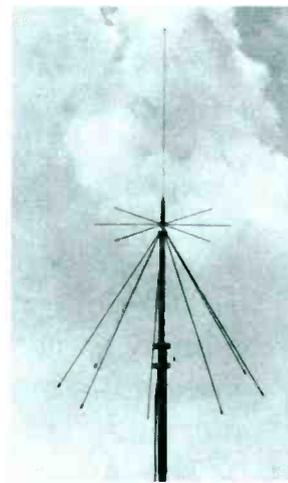
The discone antenna is used by government and military agencies worldwide because of its recognized high performance, wide bandwidth characteristics. Now ICOM offers a professional grade discone at a popular price.

Designed for use with the ICOM R7000 receiver (25-2000 MHz continuous coverage), the AH7000 discone consists of 16 rugged, stainless steel elements and is capable of transmitting

up to 200 watts in the amateur 50, 144, 220, 432, 900, and 1200 MHz bands.

As a receiving antenna the AH7000 is superb, outperforming any omnidirectional antenna we have ever used for continuous 25-1000 MHz (and above) coverage. A base-loaded, vertical top element is used as a low band (30-50 MHz) frequency extender.

The elements are arranged on a 24-inch support pipe equipped with two strong mounting brackets to accommodate any standard mast-pipe (1" to 2½" diameter). Included is approximately 50 feet of low loss 50 ohm coaxial cable with N connectors factory installed. Receiver adaptors available at additional cost at time of order; see page 16.



ONLY  
**\$94<sup>00</sup>**

plus \$3.50 UPS  
⁶⁰ U.S. Mail Parcel Post  
Canadians: \$10 Air Parcel Post

**Order ANT-3**

**SPECIFICATIONS:**

- Frequency coverage ..... 25-1300 MHz
- Impedance ..... 50 ohms nominal
- Power rating ..... 200 watts
- Connector ..... Type N
- Antenna style ..... Discone
- Vertical length ..... 66 inches
- Weight ..... 2.2 pounds



EXCLUSIVELY FROM GROVE!

## The First Mobile Antenna Designed Specifically For Today's Wide Frequency Coverage Scanners!

For years, mobile scanning enthusiasts have had to settle for compromised reception from antennas designed long ago for limited coverage scanners. Now, Grove introduces the first high-performance mobile antenna designed in our labs for the new, wide-frequency-coverage scanners.

Utilizing Grove's exclusive multi-element construction, this sleek, black, 24" fiberglass whip, mounted on a strong, chrome-finished magnetic base, assures premium signal reception on 30-50 MHz low band, 88-108 MHz FM broadcast, 118-136 MHz aircraft, 136-174 MHz high band, 225-400 MHz military aircraft, 406-512 MHz UHF land mobile and 806-960 MHz microwave mobile.

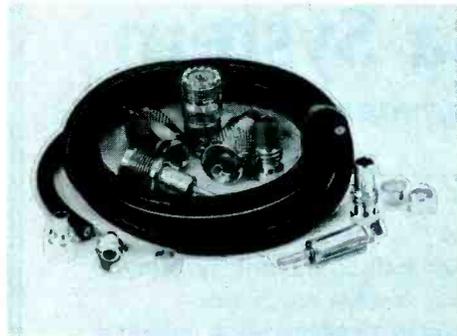
Tested to withstand at least 85 MPH road speeds and equipped with 12 feet of coaxial cable with your choice of Motorola or BNC connector, the ANT-4 will perform where others fail.

**ANT-4M (Magnetic mount antenna with Motorola connector) \$30**

**ANT-4B (Magnetic mount antenna with BNC connector) \$35**

**ANT-4W (Whip antenna alone for your 3/8" x 24 TPI threaded mount) \$19**

\$2<sup>00</sup> UPS  
\$3<sup>00</sup> U.S. Mail Parcel Post  
\$5 Canada Air Parcel Post



CALL TOLL-FREE (MC & Visa Only)  
1-800-438-8155

## Premium Low-Loss RG-6/U Cable with Connectors

Have you had trouble finding the right coaxial connectors for linking your antenna and receiver? We can help! Simply tell us what connectors you want installed, or what antenna and radio you will be using. We will provide you with a cable which is ready to attach between your antenna and receiver!

**CB50 (50 feet w/ connectors) \$19.95 plus \$2<sup>00</sup> Shipping**

**CB100 (100 feet w/ connectors) \$29.95 plus \$3<sup>00</sup> Shpg.**

Cable loss per 100 ft.:
1.6 dB @ 50 MHz
2.6 dB @ 170 MHz
4.6 dB @ 450 MHz

ADP1 UHF Female to F male  
ADP2 F Female to PL 259 Male  
ADP3 F Female to N Male  
ADP4 F Female to Male Mini-Plug  
ADP5 N Female to BNC Male  
ADP6 UHF Female to Male Mini-Plug  
ADP7 UHF Female to N Male  
ADP8 N Female to PL 259 Male  
ADP9 F Female to BNC Male

### Adaptors Available:

ADP10 UHF Female to BNC Male  
ADP11 UHF female to MOT male  
ADP13 BNC/BNC (right angle elbow)  
ADP14 F female to MOT male  
ADP15 N female to F male

ADP16 N female to MOT male \$7<sup>50</sup>  
ADP17 BNC female to F male  
ADP18 F/2 wires  
ADP19 UHF/2 wires

Adaptors may be ordered separately for \$5 each (except ADP16, \$7.50). Free shipping if ordered with other products; \$1<sup>50</sup> for one or more shipped alone.



Grove's

# Outdoor Scanner Antenna System

... connects to any receiver equipped with an external antenna jack

## 1. Start with our OMNI or SCANNER BEAM antenna

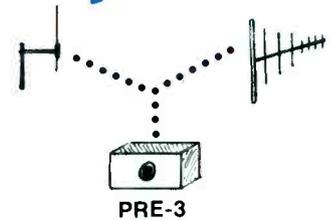
See descriptions on page 15.

## 2. Then add our Wideband Preamplifier, Power Ant III \*

The Grove PRE-3 Power Ant has taken all the best from its successful predecessors and combined them into one powerful signal booster for scanners, short wave and medium wave receivers, even TV and FM stereos!

Equipped with a high gain, low noise, solid state amplifier stage, the PRE-3's front panel control allows custom selection of up to 30 dB of amplification!

Two output connectors are provided allowing you to use two scanners on one antenna at the same time! All connectors are type F for maximum signal transfer.



### What you need to order:

OMNI (Ant-5B)

OR SCANNER BEAM (Ant-1B)

PRE-3 Power Ant III

ACC-20 AC adaptor

ACC-60 receiver cable (approx. 36")

\*Not recommended for metropolitan use

**\$19** (plus \$2<sup>00</sup> UPS, \$4<sup>00</sup> U.S. Parcel Post, \$6 Canada Air P.P.)

**\$49** (plus \$3<sup>00</sup> UPS, \$6<sup>00</sup> U.S. Parcel Post, \$9 Canada Air P.P.)

**\$49** (plus \$2<sup>00</sup> UPS, \$3 U.S. Parcel Post, \$4 Canada)

**\$9.95** (free shipping with PRE-3)

**\$7.50** (you specify connector or receiver model; one for each receiver)



Grove's

# Indoor Scanner Antenna System

... connects to any receiver equipped with an external antenna jack

## The Apartment Dweller's Dream

The Grove Hidden Antenna is a high performance, amplified indoor antenna system for scanner monitoring and general coverage shortwave and medium wave reception.

This 66-inch, thin profile, flexible wire antenna can be tucked in a corner, hung behind a drape—just about anywhere out of sight. And when connected to the powerful PRE-3 signal booster, you have instant total spectrum coverage from 100 kHz to over 1000 MHz!

Yes, wide area scanner coverage and even global short wave reception will be at your fingertips, and you can operate two radios at one time!



CALL TOLL-FREE

(MC & Visa Only)

1-800-438-8155

### What you need to order:

ANT-6 Hidden Antenna

**\$9.95** (free shipping)

PRE-3 Power Ant III

**\$49** (plus \$2<sup>00</sup> UPS, \$3 U.S. Parcel Post, \$4 Canada)

ACC-20 AC adaptor

**\$9.95** (free shipping with PRE-3)

ACC-60 receiver cable (approx. 36")

**\$7.50**

(you specify connector or receiver model; one for each receiver)



Hidden Antenna, as packaged, with Grove PRE-3



ANT-6



## The Famous Grove MINITUNER

A tunable signal filter for improved short wave, medium wave and long wave reception.

You can eliminate those phantom images and intermod signals that plague your radio when using an outdoor antenna. Simply connect the MiniTuner between the antenna cable and your receiver and adjust the dial for peak reception of your favorite station!

A bypass function allows the MiniTuner to be switched out of the circuit without having to remove it from the antenna line. An antenna grounding selector protects your receiver from nearby (not direct) lightning strikes and transmitters. (Not for VHF/UHF scanning.)

Order TUN-3

CALL TOLL-FREE (MC & Visa Only)  
1-800-438-8155

ONLY  
**\$49<sup>00</sup>**



\$2.00 UPS Shipping;  
\*3 US Mail P.P.; \*4 Canada P.P.

### SPECIFICATIONS:

**Frequency Range:** 100 kHz-30 MHz in 4 bands

**Circuit:** Series-tuned L-section filter

**Tuner:** 365 pF air-variable capacitor, ball bearing drive

**Input connector:** SO-239 (UHF, female) with random wire provision

**Output connector:** PL-259 (UHF, male) on 24" coax cable

**Enclosure:** Custom formed aluminum

**Dimensions:** 4"W x 2"H x 3"D

**Weight:** 12 ounces

HAMS! Ideal for transmitting when used with a transmatch.



## Outdoor dipole for worldwide shortwave reception

Highest performance and lowest cost—an unbeatable combination! Why restrict your frequency coverage with the gaps found in expensive trap dipoles or unpredictable random wire when you can get unsurpassed full-frequency reception with the Grove Skywire?

Comes assembled with SO-239 UHF female custom connector ready for your PL-259 (UHF, male) equipped coaxial cable (50 or 75 ohm); includes two professional porcelain end insulators and complete instructions.

ONLY

**\$19<sup>00</sup>**

\$2.00 UPS Shipping;  
\*3 US Mail P.P.; \*4 Canadian Air P.P.

Coax cable not included—see page 16

The Grove



# SKYWIRE

*"Signals are much stronger now that I have replaced my more expensive trap dipole with the Grove Skywire."*

—C. Kisser  
Kingsport, TN.

### SPECIFICATIONS:

**Length:** 66 feet

**Feedpoint impedance:** 50 or 75 ohm (nominal)

**Feedpoint location:** 22 feet from end

**Elements:** 18 AWG (16 x 30) bare stranded copper

**Connector housing:** Heavy duty black phenolic



*Boost those weak signals with the Grove...*

# Power Ant III

Wideband Preamplifier for all Frequency Ranges



**RECOMMENDED ACCESSORIES:**

- TUN-3 MiniTuner (for shortwave only)(page 18)
- ACC20 Universal AC power adaptor (page 20)
- ANT-5B OMNI (page 15) or ANT-6 Hidden Antenna (below)
- ACC-60 receiver cable—you specify connector or receiver model, one for each receiver—\$7.50 each)
- ACC 90 Mobile DC cord \$2.95

**Specifications**

Gain .....	30 dB @ 1 MHz
	29 dB @ 10 MHz
	27 dB @ 50 MHz
	21 dB @ 150 MHz
	13 dB @ 450 MHz
	10 dB @ 900 MHz
Noise figure .....	2 dB nominal
Usable frequency range .....	10 kHz-1300 MHz
Input/output impedance .....	50-75 ohms nominal
Power required .....	12 VDC @ 40 ma.
Connectors .....	F female
Dimensions .....	4"W x 2"H x 3"D
Weight .....	6 ounces

The Grove PRE-3 Power Ant is a powerful signal booster for scanners, shortwave and longwave receivers, even TV and FM radios!

Equipped with a high gain, low noise, solid state amplifier stage, the PRE-3's front panel control allows custom selection of up to 30 dB amplification!

The PRE-3 is also easy to install. If you have adequate length on your scanner antenna coax, measure back 2-3 feet from the connector and cut it. Install two F connectors on the cut ends (available from Radio Shack) and attach them to the PRE-3.

Two output connections allow you to use two receivers on one antenna at the same time! All connectors are type F for maximum signal transfer.

**USE WITH OUR FAMOUS TUN-3 MINTUNER (See p. 18) FOR INCREDIBLE SHORTWAVE/LONGWAVE RECEPTION!**

If you have an outside antenna, connect it to the PowerAnt/MiniTuner combo and stand back as signals pin your S-meter! Don't forget to order the accessories you will need to power the PRE-III and connect it to your antenna and receiver.

Order PRE-3



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## The Grove Hidden Antenna

Although designed to attach to the powerful Grove PRE-3 signal booster, the Hidden Antenna may be used alone with your scanner (not with shortwave receiver), replacing the plug-in whip, for improved signal reception.



Hidden Antenna, as packaged

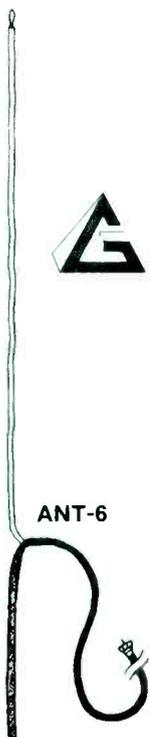
This five-foot, thin-profile, flexible wire antenna can be hung in a corner, behind a drape—just about anywhere out of sight. Comes fully assembled with 20 feet of coax and F male connector (NOTE: we will substitute the connector of your choice for \$5.00).

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Hidden Antenna with optional PRE-3 (see pp. 7 & 17)



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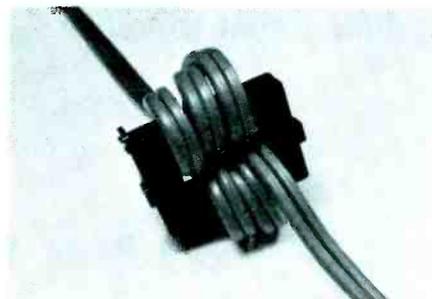
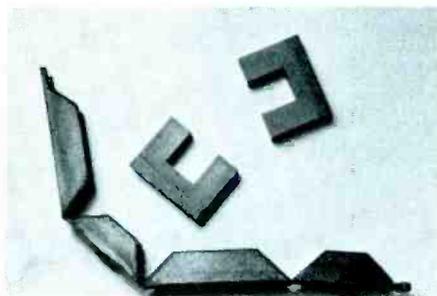
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# Shortwave Directory

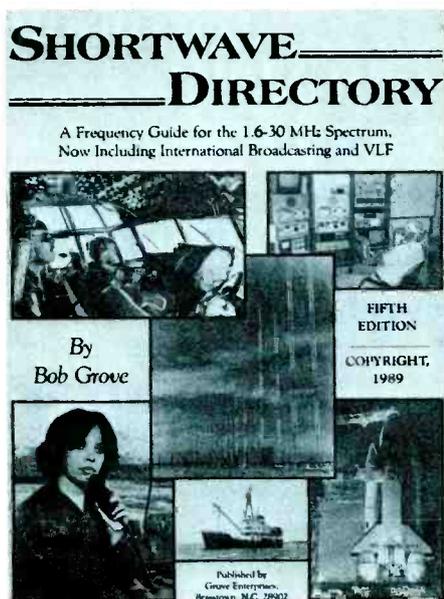
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Now recognized as the standard of reference for North American shortwave listeners, this DXer's bible is crammed with up-to-date, accurate frequency and user information from 10 kHz to 30 MHz.

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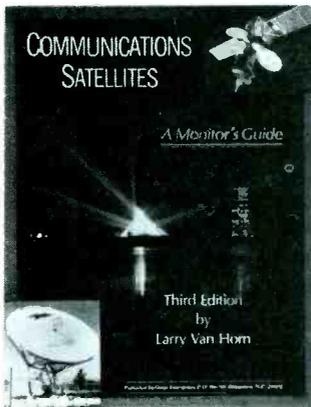
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By Tony Jones and Larry Magne



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*Passport* is the ultimate radio roadmap to exotic lands - who's on what frequencies at what times, broadcasting to where and in what language. A team of the world's top monitors make it accurate, while computer-generated graphics make it easy to use. And Larry Magne's highly acclaimed, no-holds-barred, 1989 "Buyers Guide to World Band Radio" is included.

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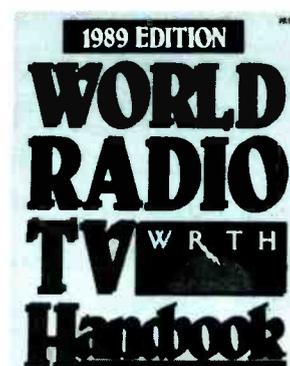
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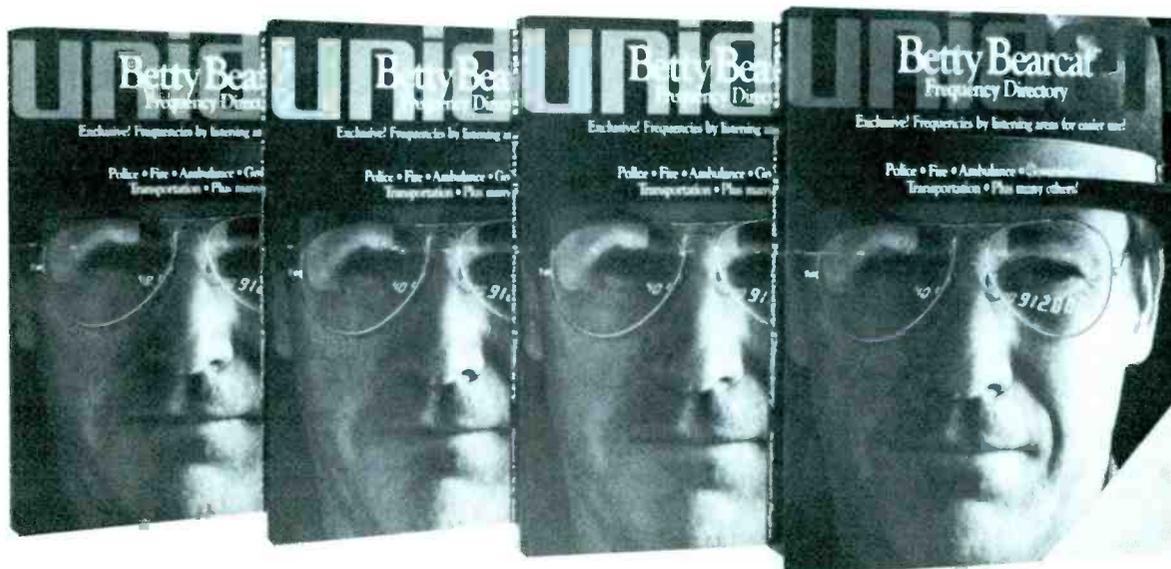
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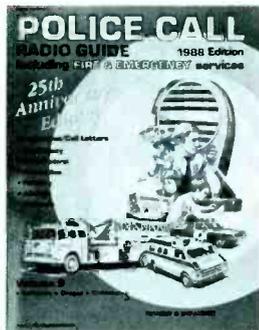
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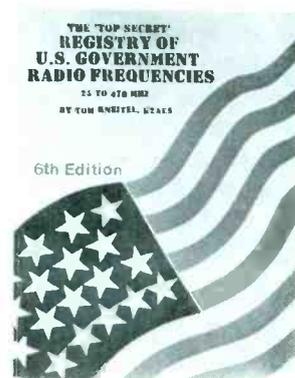
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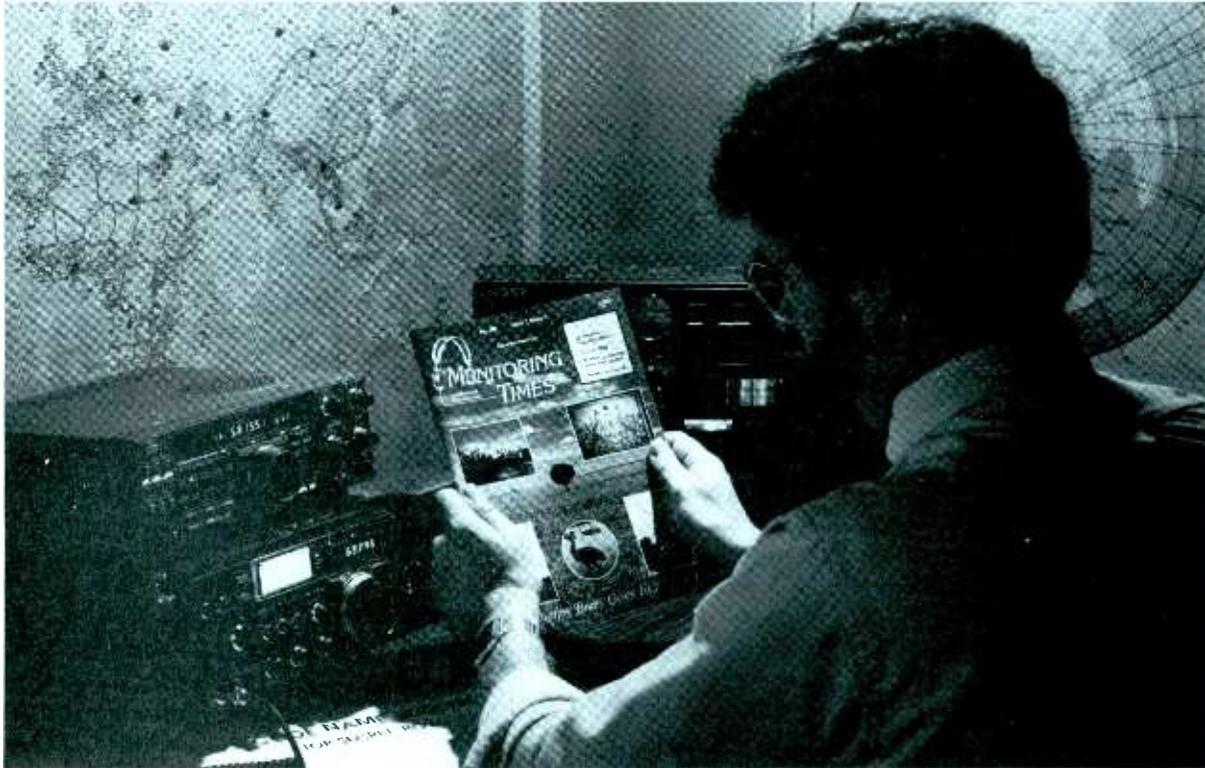
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*Keep up the excellent work on Monitoring Times. You people certainly are a pleasure to do business with. Very easy going.  
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*Thanks for the help in determining my reception problem. UHF is new to me and I just did not realize how critical the antenna, coax, and connectors performance must be in order to receive at these frequencies.*

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