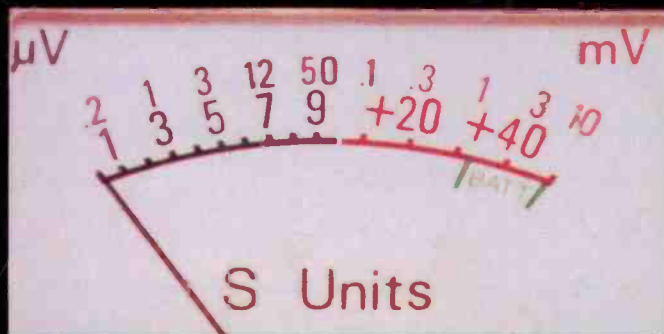


# GROVE

140 DOG BRANCH ROAD BRASSTOWN, NC 28902-0098



WIDE AM SYNC  
 MED USB  
 NAR LSB  
 SHRP FM

10 MHz

SLOW FAST DOWN



## GROVE SW-100 COMMUNICATIONS RECEIVER



BATTERY

PHONES

NOTCH  
TONE

FILTER  
UP

MODE  
UP

FILTER  
DOWN

MODE  
DOWN

Order Line: (800) 438-8155 (M-F, 8am-5:30pm EDT)  
 Office Line: (704) 837-9200 (M-F, 9am-5pm EDT)  
 Technical Line: (704) 837-7081 (M-F, 8:30am-11:30am and 1:00pm-4:30pm EDT)  
 FAX Line: (704) 837-2216 (24 hours/day, 7 days/week)

### Bulletin Board System:

The Grove System BBS's hours are as follows:  
 Monday-Friday, 6:30pm-8am Eastern Daylight Time and 24 hours/day on weekends.  
 All phone numbers are active during the same time periods.

- (704) 837-7081 -- 9,600/12,000/14,400 BPS
- (704) 837-9200 -- 300/1200/2400 BPS
- (704) 837-5957 -- 300/1200/2400 BPS



# **ROVE ENTERPRISES, INC.**

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

As you can see from the cover of your new catalog, Grove Enterprises has taken a remarkable step forward. After 12 years of earning our reputation as a supplier of accessories, publications and other-manufactured equipment, we have introduced the first of an expanding line of sophisticated receiving equipment and accessories for the discriminating listener, manufactured in the United States of America by Grove Enterprises.

The SW-100 was years in the making, and it didn't come easily. Disappointments followed optimistic hopes in a continuing cycle, until we finally developed this superior product at a competitive price.

The new Grove receiver concept is not intended to put other manufacturers out of business; rather, it is modular in concept, allowing the new owner to start at a low base price, then choose which features he requires without having to pay for functions he will never use.

And a quick glance through your new catalog will reveal other exciting new products and publications to enhance your listening power — and many former products now reduced in price for additional savings!

It's hard to realize in these hot "dog days" that fall will soon be in the air, but it will. Be sure you're not caught short when winter keeps you inside. Check through the Grove catalog and order those items you keep putting off — before it's too late!

*P.O. Box 98 • 140 Dog Branch Road • Brasstown, NC 28902-0098  
Voice 704-837-9200 • Fax 704-837-2216*



# 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 30 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, wrap items so no scratching or rubbing occurs, 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. Any product returned in not-as-new condition will be assessed a fair refurbishing charge. 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. If you return via another method (e.g. UPS Red, Federal Express)—**only UPS ground charges will be refunded**. 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 \$10 from the amount you have shown on your order, you will be notified before shipment. If the increase is under \$10, 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 other equipment you have ordered, we will contact you to be sure you want the order shipped.

## ANY QUESTIONS?

If you require additional technical information on our products, call 704-837-7081 or send questions along with a self-addressed stamped envelope, and we will be happy to reply. Questions regarding shipping methods, accounts, etc., call 704-837-9200.

## 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), check your service manual for the repair center nearest you or call our toll-free line (1-800-438-8155) for the name, address, and phone number of the service center nearest you.



# Choosing a Shortwave Receiver

Copyright 1992 by Grove Enterprises Inc.

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 is 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 150 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. Additional features are found on the new upgraded model SW77, listed in this catalog.

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.

The Grove TUN3 and TUN4 preselectors will reduce or eliminate overload interference on low cost receivers which suffer from poor dynamic range, and are equipped with connectors for an external antenna.

For the serious listener the new Grove SW-100, Drake R8, ICOM R71A, Kenwood R5000 and JRC NRD535 head the list.

## 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 high 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.

Directional antennas concentrate incoming signals ("gain") from one direction while rejecting interfering signals from other directions.

The large capture area (aperture) of a big antenna overcomes poor sensitivity in old receivers by providing stronger signals, but modern receivers have excellent sensitivity and require smaller antennas.

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.

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

## FEEDLINE

A wire run from your receiver to a nearby tree may produce excellent reception, but it is susceptible to electrical noise pickup from nearby appliances; 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.

## 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, it eliminates intermodulation, image interference and desensitization caused by strong signals in economy receivers. It is not an impedance matching device nor preamplifier, so it won't make received signals stronger.

In contrast, an amplified preselector like the Grove TUN4 not only passes those desired signals, but amplifies them as well, often improving reception when the antenna is small or indoors.



**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.

The old-fashioned gap-type lightning arrestors so common during the vacuum tube era are no longer adequate; transistors burn out at voltages much lower than an air gap can protect. Offering much better protection are the new gas-charge types such as the Grove LA1 and Alpha Delta TransiTrap.

While nothing can guarantee protection from a direct lightning strike (always disconnect your antenna from your equipment during storm season), these devices will harmlessly short-circuit any voltages induced on the antenna by close strikes.

**The Top 100 SW 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 communications) using upper side-band (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	13113.2
4593.5	Air Force MARS	
4637.5	Offshore petroleum	13181
4670	"Spy numbers" broadcasts	13201
4742	"Spy numbers" broadcasts	13215
5015	Army Corps of Engineers	13241
5320	U.S. Coast Guard	13270
5598	International airlines	13282
5616	International airlines	13306
5680	U.S. Coast Guard	13354
5692	U.S. Coast Guard air/ground	14441.5
5696	U.S. Coast Guard air/ground	14447
5703	Tactical Air Ground	
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	
6738	U.S. Air Force air/ground	
6753	Canadian Air Force	
6761	Strategic Air Command	
6802	"Spy numbers" broadcasts	
6927	Andrews AFB, VIP	
8291.1	Ship to shore, Pacific	
8418	"Spy numbers" broadcasts	
8740.6	Ship to shore	
8778	U.S. Navy	
8784	Ship to shore	
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	
10493	FEMA emergency net	
10780	NASA air/ground	
11176	U.S. Air Force air/ground	
11182	Scott Air Force Base, air/ground	
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	
12429.2	Ship to shore	

U.S. Coast marine weather
U.S. Navy
U.S. Air Force air/ground
U.S. Air Force air/ground
U.S. Air Force air/ground
Flying weather
Flight weather
International airlines
NOAA hurricane hunters
Navy MARS
Navy MARS

**INTERNATIONAL BROADCASTERS**

*(Schedules subject to change)*

5960	Canada
6045	Germany
6175	England
7325	England
7355	USA
7375	Costa Rica
9530	Spain
9590	Netherlands
9695	Sweden
9755	Canada
9745	Ecuador
11550	Ecuador
11950	Cuba
12095	England
15120	USA
17795	Australia
21740	Australia

**TIME SIGNALS**

<u>WWV</u>	<u>CHU</u>
5000	3330
10000	7335
15000	14670

08/92

**Technical Question on catalog products? Call Sue 704-837-7081**



**New from Grove!**  
**Designed and manufactured in the USA!**

# INTRODUCING **The Grove SW-100**

**Full-Featured General Coverage Receiver**



Production model may vary slightly in appearance.

Built to exacting government surveillance standards, the SW100 professional grade receiver offers premium features at affordable cost.

Secured in a compact, all-metal enclosure, the lightweight SW100 tunes from 10 kHz through 32 MHz (1000 MHz with optional converter, available December 1992) and offers 1000 memory locations. Precise 10 Hz frequency readout on a large backlit LCD; receives all modes including AM, USB, LSB and narrowband FM! Even RTTY, FAX, packet and other digital modes with suitable optional decoder.

Advanced synchronous detection reduces fading and distortion on distant AM stations while allowing the passband to be tuned for optimum reception. Up-conversion and wide dynamic range virtually eliminate images and intermod. Crystal

and multi-element piezo filters assure optimum reception under brutal interference conditions.

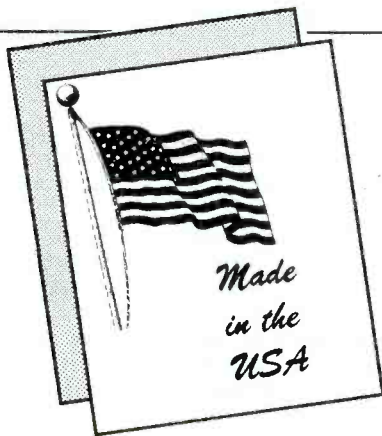
Enjoy unexcelled sound from a tone equalized, full-fidelity, 4" top-mounted speaker, while a sensitive, all-mode squelch removes irritating background noise between signals. Annoying tones and whistles are sliced out with a 40 dB notch filter, and a low-distortion pulse noise limiter suppresses electrical interference.

Read signal strengths accurately in S units and microvolts; a center tuning indicator assures precise frequency adjustment. Tape recorder control allows recording of your favorite programs; an RS232C computer interface is available.

**Order  
GR1**

**Introductory price  
of only  
\$799<sup>95</sup>**

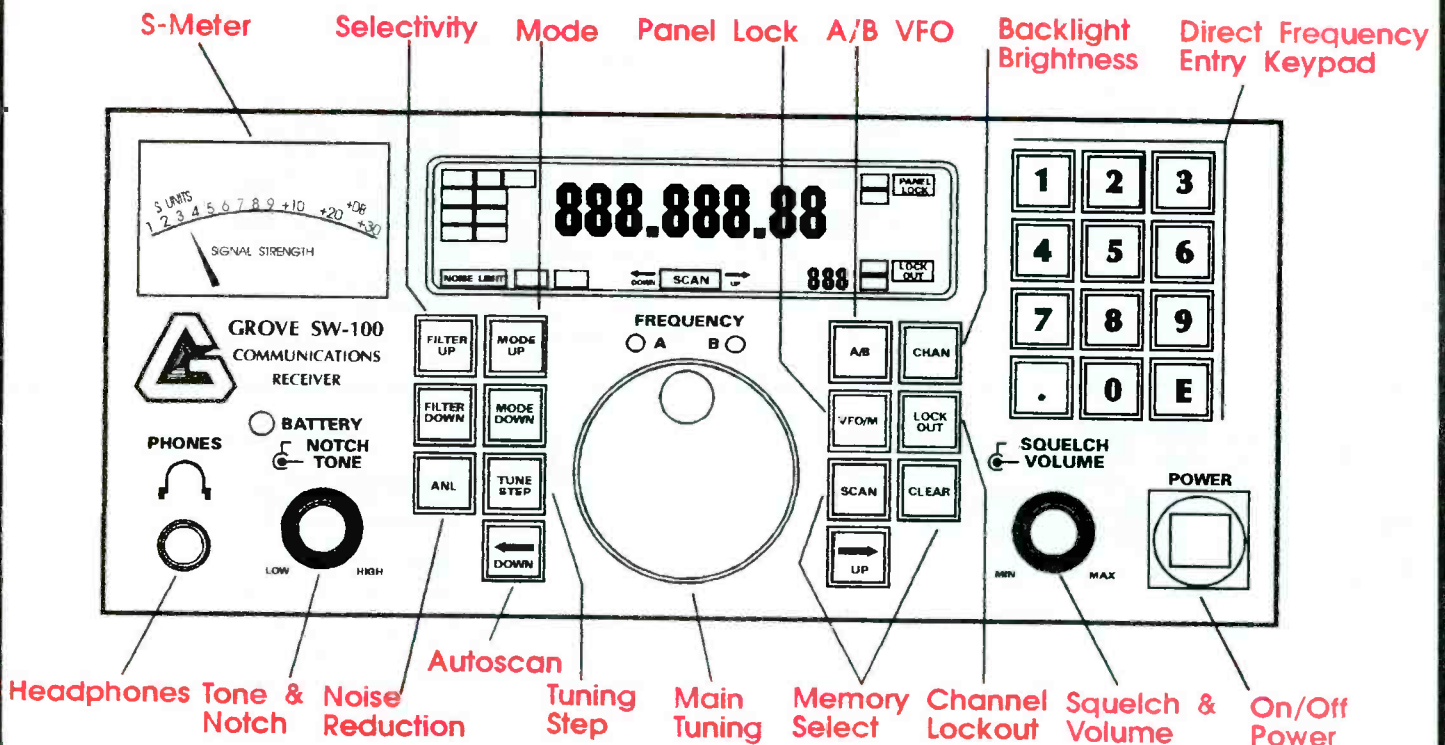
Shipping \$14 UPS  
 \$27 UPS 2nd Day Air  
 \$28 US Priority Mail  
 \$24 UPS Canadian  
 \$35 Canadian Air Parcel Post



## Options and Accessories

(including expected availability)

<b>GAC1</b>	30-1000 MHz frequency extension module (includes wideband FM filter) (12/92)	\$499
<b>GAC2</b>	RS232C interface with squelch and signal strength lines, cable, disc, program and documentation (12/92)	
<b>GAC4</b>	12 VDC mobile cigarette lighter power adaptor (9/92)	
<b>GAC5</b>	240 VAC AC adaptor (9/92)	
<b>GAC15</b>	Rechargeable battery pack (12/92)	
<b>GAC7</b>	19" rack mount kit (9/92)	
<b>GAC8</b>	Carrying handle (9/92)	
<b>GAC12</b>	30 kHz medium FM filter (9/92)	
<b>GAC13</b>	1 kHz sharp CW/RTTY filter (9/92)	
<b>GAC14</b>	Dust cover (9/92)	\$9.95



## SPECIFICATIONS

**Frequency Range:** 10 kHz-32 MHz

**Memory:** 1000 channels (10 banks of 100) store frequency, mode, selectivity, channel number, lockout

**Scan:** 20 channels per second (varies with mode and frequency) with 2 second delay; A/B VFO automatically follows dual-frequency communications

**Frequency Readout Accuracy:** 10 Hz (5 decimal places)

**Center Frequency Tuning Indicator:** LED

**Frequency Accuracy:** +/- 5 ppm

**Sensitivity (10 dB SINAD SSB, 50 ohms):** 0.5 microvolts (8 dB) or better

**Dynamic Range:** 80 dB min.

**Intermodulation (3rd Order Intercept Point):** +15 dBm min.

**Image/IF Rejection:** 90 dB min.

**Selectivity (2:1 shape factor, -6/-60 dB):**

AM/SSB wide 6.0 kHz, medium 3.0 kHz, narrow 2.4 kHz, sharp 1.0 kHz (optional); FM narrow 15 kHz, sharp 6.0 kHz

**Tuning Steps:** AM 100/1000 Hz, AM synch/SSB 10/100 Hz, NFM 2.5/12.5 kHz, plus user defined 10 Hz-1000 kHz

**Conversion Scheme:** Up-converted superheterodyne (45 MHz, 455 kHz)

**AGC:** 10 mS attack, 10 mS AM/FM decay, 500 mS SSB decay

**Receiving Modes:** AM, AM synch, USB, LSB, NBFM

**Noise Limiter:** Low distortion pulse clipping

**Overload Protection:** Induced lightning and signal overload

**Tone control:** Bass/treble adjust

**S Meter:** D'Arsonval movement registers S units and microvolts

**Display:** Backlit LCD

**Notch Filter:** Suppresses 450-5200 Hz tone interference 40 dB

**Squelch:** Signal activated, all modes

**IF Output:** 45 MHz for SDU

**Power Requirement:** 12 VDC @ 1 A; 120 VAC adaptor included Recorder Activator: Sinks 12 VDC @ 1 A

**Record Output:** 600 mV @ 1000 ohms

**Audio:** 4 watts @ less than 10% THD into 4 ohms

**Internal speaker:** Top mounted, 4" full fidelity

**Earphone Jack:** 1/4", 4-16 ohm, anti-blast protected

**External speaker jack:** 1/8"

**Dimensions:** 4"H x 10"W x 8"D; rack mountable

**Weight:** 5.5 lbs.

**Warranty:** One year



From R.L. Drake —

## The R8 Communications Receiver!

It has been nearly a decade since this respected American company withdrew from manufacturing communications equipment; now they have returned better than ever!

The exciting new R8 general coverage communications receiver offers outstanding 100 kHz-30 MHz performance at a competitive cost. Four voice-bandwidth filters combined with excellent audio design make international broadcast listening as well as utilities monitoring a pleasure.

Synchronous detection reduces fading and distortion while passband tuning rejects adjacent frequency interference. Ideal for AM, SSB, RTTY, CW reception.



Optional converter allows AM/FM reception 35-55, 108-174 MHz, while a builtin microprocessor/controller offers RS232 computer control and multiple-function scanning.

Dual VFOs, switchable preamp/attenuator, dual-time-zone clock timer, switchable antenna inputs, universal power supply and more combine to make this new receiver an outstanding value.

Order RCV1  
Retail ~~\$979~~

Grove discount price only

**\$959<sup>95</sup>**

\$14 UPS; \$27 UPS 2nd day; \$28 US Priority Mail  
\$24 UPS Canada; \$35 Canadian air parcel post

### ACCESSORIES:

- ACC43 VHF Converter \$199.95
- ACC49 External Speaker \$48.95 plus \$6 UPS
- ACC67 Service Manual \$39.95
- ACC77 PC Software \$58.95
- Installation fee \$20

### SPECIFICATIONS

Frequency range: 100 kHz-30 MHz (35-55/108-174 MHz with optional converter)  
Keypad frequency entry: Yes  
Tuning steps: 10/100 Hz (10/100/1000 FM/AM)  
RIT (fine tuning) not required  
Display: Backlit LCD  
Dimmer: Yes  
Type of listening recommended: International broadcast and utilities  
Receiving modes: AM, narrow FM, USB, LSB, RTTY, CW, synchronous AM  
Memory: 100 channels  
Banks: 10  
Lockout: No  
Priority: No  
Search: No

Delay: Yes  
Squelch: Yes  
Clock: Dual time zone  
Audio output power: 2.5W @ 4 ohms for 10% THD  
Record audio output: Yes  
Recorder activator: No  
S meter: Analog  
Computer interface: RS232  
Conversion scheme: Double up-conversion  
Sensitivity: 0.5 uV 1.5-30 MHz (0.25 uV 5-30 MHz with preamp), 1 uV 100 kHz-1.5 MHz  
Selectable preamplifier: Yes  
Selectable attenuator: Yes  
Selectivity: (-6/-60 dB, 2:1 shape factor) 6/4/2.3/1.8 kHz; 500 Hz (3:1)  
Image rejection: greater than 800B 1.5-30 MHz, greater than 60 dB 100 kHz-1.5 MHz

Frequency stability: +/- 10 ppm - 10° to 50° C  
Selectable AGC: Off/slow/fast  
Dynamic range: 90 dB @ 20 kHz spacing  
Passband tuning: +/- 3 kHz  
Noise blanker/limiter: Dual  
Adjustable notch filter: 500-5000 Hz, 40 dB  
Tone control: Yes  
Antenna connector: Dual, switched  
Dimensions: 13-1/2"W x 5-1/4"H x 13"D  
Weight: 13 lbs.  
Power requirements: 100/120/200/240 VAC, 50/60 Hz; 11:16 VDC @ 2A  
Warranty: 1 year



## Kenwood R-5000

### SPECIFICATIONS

Frequency range: 100 kHz - 30 MHz  
Keypad frequency entry: Yes  
Tuning steps: 10/100 Hz/1/2.5/5/10/20/50 kHz set by mode RIT (fine tuning) Yes  
Display: Fluorescent  
Dimmer: Yes  
Type of listening recommended: Domestic and international broadcasting; two-way SSB/CW/RTTY  
Receiving modes: AM, USB, LSB, narrow FM, RTTY, CW  
Memory: 100 channels  
Scan: Yes, programmable  
Banks: 10  
Lockout: Yes  
Priority: No  
Search: Yes  
Clock: 24 hour, dual function with timer  
Audio output power: 1.5 watts  
Record output: Yes; no activator  
S meter: Analog  
Computer interface: Optional  
Conversion scheme: Dual up-conversion; 50.1125/8.83 MHz  
Sensitivity: SSB 1.6-30.25 uV (5) 00-1600 kHz 4 uV; 150-500 kHz 1uV  
Selectable preamplifier: Yes  
Selectable attenuator: 10/20/30 dB  
Selectivity: (-6/-60dB) AM 6/24 kHz; SSB 2.5/4.9 kHz  
Image rejection: 80 dB  
Frequency stability: +/- 300 Hz after 30 minutes warmup  
Selectable AGC: fast/slow/off  
Dynamic range: 102 dB  
Passband tuning: Yes  
Noise blanker/limiter: Dual  
Adjustable notch filter: Yes  
Antenna connector: SO-239 (UHF); random wire terminal  
Auxiliary connector: No  
Dimensions: 10.62"W x 3.78"H x 10.6"D  
Weight: 12.3 lbs.  
Power requirements: 12 VDC (with optional adaptor), 120/240 VAC  
Warranty: One year  
Accessories included: None

This extraordinary communications receiver has built-in modes for AM, FM, USB, LSB, CW, FM and FSK (RTTY). 100 memory channels store frequency, mode, and antenna selection (two inputs); 10 Hz tuning accuracy. Non-volatile memory retains functions even if long-life lithium battery fails.

Filters are provided for 6 kHz AM, 5 kHz SSB; you can add up to two more (one each: CW, SSB or AM). Excellent audio quality for broadcast monitoring.

Order RCV7  
Retail ~~\$1099.95~~

Only  
**\$879<sup>95</sup>**

\$25 UPS; \$35 UPS 2nd day air; \$39 US Priority Mail  
\$35.50 UPS to Canada; \$45 air parcel post to Canada

### OPTIONAL ACCESSORIES

If only accessories are ordered, add \$10 to total order.

ACC50	VC20 118-174 VHF conv.	\$199.95	ACC59	IF232C translator control	\$94.95
ACC51	YK88A 6 kHz AM filter	\$84.95	ACC69	IC-10 interface	\$34.95
ACC52	YK88S 2.4 kHz SSB filter	\$84.95	ACC62	Headphones HS5 deluxe	\$64.95
ACC53	YK88SN 1.8 kHz narrow SSB	\$84.95	ACC63	Headphones HS6 lightwt	\$44.95
ACC54	YK88C 500 Hz CW filter	\$84.95	ACC65	SP23 external speaker	\$65.95
ACC55	YK88CN 270 Hz narrow CW	\$94.95		(plus \$7.50 UPS shipping)	
ACC56	DCK2 12VDC mobile power cable	\$12.95	ACC66	MB430 mobile mount bracket	\$34.95
ACC57	VS1 voice synthesizer	\$59.95	ACC68	Service manual	\$25
				Installation of one or more accessories \$20.	





## JRC NRD-535D

The top of the line has a new leader! Japan Radio Company, manufacturer of the coveted NRD series of professional communications receivers, has just introduced an advanced receiver design with superb performance features.

Offering continuous frequency coverage of 90 kHz through 30 MHz and reception modes for AM, USB, LSB, CW, RTTY, FAX and narrowband FM, frequency is displayed to 10 Hz accuracy on a giant, brightness-adjustable fluorescent display; tuning resolution is an incredible 1 Hz at a drift-free +/- 2 parts per million!

JRC's remarkable new continuously-variable passband filter allows the user to custom-select the exact filter bandwidth he wants, from 0.5-5.8 kHz, to reduce or eliminate adjacent channel interference with minimum impact on the fidelity of the desired signal. Exalted carrier selectable sideband (ECSS) permits additional clarity of reception on AM international broadcasters who are plagued by adjacent-frequency interference.

Four filter bandwidths may be selected for any mode (except NBFM which is 12 kHz). The dual noise blanker is extremely effective in reducing or eliminating aggravating impulse noise like ignition noise and the woodpecker.

Comfortable, effective listening is enhanced by the array of front panel controls like squelch, AF and RF gain controls, tone control, and AGC timing. A powerful 24-hour clock-timer can be pre-adjusted for frequency, mode and on/off time, and even includes a record activator so you can automatically listen to or record a transmission of interest. A built-in RS232 interface allows your computer to control virtually every function of this remarkable receiver for even greater listening power.

### SPECIFICATIONS

Frequency range: 90 kHz-30MHz

Keypad frequency entry: yes

Tuning steps: 1 Hz minimum

Display: Fluorescent

Dimmer: 4 levels

Type of listening recommended: Utility and foreign broadcasting

Receiving modes: AM, CW, RTTY, FAX, NBFM, USB, LSB

Memory: 200 channels

Scan: Yes

Banks: No

Lockout: No

Priority: No

Search: Yes

Delay: Yes

Squelch: Yes

Clock: 24 hour clock/timer

Audio output power: 1 watt @ 4 ohms

Record audio output: 1 mW @ 600 ohms (mini phone plug)

Recorder activator: yes

S meter: Analog-emulation fluorescent

Computer interface: RS232 built-in

Conversion scheme: Triple up-conversion (70.45 MHz/455/97 kHz)

Sensitivity: 0.5 uV 1.5-30 MHz (SSB)

Selectable preamplifier: No

Selectable attenuator: 20 dB

Selectivity: (-6/-60 dB) AUX 12/24 kHz, WIDE 6/15 kHz, INTER 2/6 kHz, NARR 1/3 kHz, FM 12 kHz, continuously adjustable 0.5-5.8 kHz

Image rejection: -70 dB

Frequency stability: +/- 2 PPM after one-hour warmup

Selectable AGC: Fast/slow/off

Dynamic range: 106 dB @ 300 Hz BW

Passband tuning: +/- 1 kHz

Noise blanker/limiter: Dual width

Adjustable notch filter: -30 dB

Tone control: Yes

Antenna connector: SO-239 (UHF)

Auxiliary connector: No

Dimensions: 13"W x 5"H x 11"D

Weight: 20 lbs.

Power requirements: 120/240 VAC @ 50/60 Hz; 12 VDC 2 A

Warranty: One year

Accessories included: None



Order RCV3

**\$1688<sup>95</sup>**

\$20 UPS; \$35 UPS 2nd day;  
\$35 US Priority Mail; \$30 Canadian UPS;  
\$45 Canadian Air Parcel Post

### OPTIONAL ACCESSORIES

ACC5	Upgrade Kit (0.5-5 kHz tunable filter for early models)	\$169.95
ACC 24	6ZCJD00 serial cable for computer	\$59.95
ACC25	NVA-319 matching speaker with pushbutton audio filters	\$179.95
ACC26	CFL-218A 1.8 kHz extra sharp SSB/RTTY filter	\$139.95
ACC27	CFL-232 500 Hz sharp CW filter	\$139.95
ACC28	CFL-251 2.4 kHz sharp SSB/fax filter	\$139.95
ACC29	CGD-135 High stability (+/-0.5 PPM) crystal oscillator	\$79.95
Upgrade and filter installation fee: \$20 any quantity		

**SALE**

**Special closeout price from Grove  
while quantities last!**

## JRC NRD-525



Order RCV 16 **\$889<sup>95</sup>**

\$20 UPS; \$35 UPS 2nd Day;  
\$35 US Priority Mail; \$30 Canadian UPS;  
\$45 Canadian Air Parcel Post

Eventually, a receiver is going to be discontinued. Now you can get this remarkable receiver at a greatly reduced price.

Two hundred memory channels 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. Factory selectivities are 12, 4 and 2 kHz; two more may be added in any mode. A double super-heterodyne 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 and computer compatibility make this a remarkable receiver.

Order Line — 1-800-438-8155



## ICOM PRICES INCREASING OVER 18%...

But, as a Grove customer, you can still purchase ICOM products at the current prices while supplies last!

### The Standard of Comparison Worldwide!

# ICOM R-71A

This receiver is as professional as it looks. The brilliant fluorescent display provides frequency information down to tenths of a kilohertz and alerts the listener to other dial settings (mode, memory, channel, VRO).

Signal resolution of 10 Hz eliminates the need for RIT, even on SSB or RTTY, mode and may be scanned or searched. 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.

Filter selectivities of 6, 2.3 and 0.5 kHz are provided; you may add one more for use in any mode.

This latest version also reintroduces passband tuning.

Of interest to the visually impaired is the optional EX-310 speech synthesizer which announces the displayed frequency in English.

### SPECIFICATIONS

Frequency range: 100 kHz-30MHz  
 Keypad frequency entry: Yes, plus tuning knob  
 Tuning steps: 10 Hz  
 RIT (fine tuning): No  
 Display: Fluorescent  
 Dimmer: Yes  
 Type of listening recommended: Domestic and international broadcasting, two-way communications  
 Receiving modes: AM, USB, LSB, RTTY, CW, narrowband FM  
 Memory: 32 channels plus 2 temporary VFO memories  
 Scan: yes  
 Banks: Mode scan  
 Lockout: No  
 Priority: No  
 Search: Yes  
 Delay: Yes  
 Squelch: Yes  
 Clock: No  
 Audio output power: 2 watts  
 Record output: Yes  
 Recorder activator: Yes  
 S meter: Analog

Computer interface: Optional  
 Conversion scheme: Quadruple up-conversion  
 Sensitivity: 0.2 uV with preamplifier on  
 Selectable preamplifier: Yes  
 Selectable attenuator: Yes  
 Selectivity: (-6/60 dB) wide 6/15 kHz; narrow 2.3/4.2 kHz; optional FM 15/25 kHz  
 Image rejection: 60 dB  
 Frequency stability: 50 Hz  
 Selectable AGC: Yes  
 Dynamic range: 86 dB  
 Passband tuning: No  
 Noise blanker/limiter: Dual, adjustable  
 Adjustable notch filter: Yes  
 Antenna connector: SO-239 (UHF)  
 Auxiliary connector: 70 MHz IF output  
 Dimensions: 11-1/4"W x 4-3/8"H x 10-7/8"D  
 Weight: 16-1/2 lbs.  
 Power requirements: 120/240 VAC; 12 VDC with optional EX299  
 Warranty: One year  
 Accessories included: None



## \$849<sup>95</sup>

Order RCV6

Retail ~~\$999~~

\$15 UPS; \$30 UPS 2nd Day;  
 \$30 US Priority Mail  
 \$39 Canadian Air Parcel Post;  
 \$25.50 UPS to Canada

### OPTIONAL ACCESSORIES

One or more accessories installed at time of order -- \$20 flat fee.

ACC1	EX257 FM mode detector	\$49.95
ACC2	SP3 speaker	\$65 (plus \$7.50 UPS)
ACC3	DC Power kit EX299	\$12.25
ACC4	CR64 high stability crystal	\$79.95
ACC73*	UX14 Level converter	\$70.95
ACC74*	CT-17 computer Interface	\$95.95
*Must use ACC73 & ACC74 together		
ACC7	EX310 voice synthesizer	\$59.95
ACC8	FL32A CW narrow filter	\$69.95
ACC9*	FL44A SSB filter	\$178.95
ACC10*	FL63A CW narrow filter	\$59.95
*Use only one filter		
ACC12	RC11 remote control	\$70.95
ACC13	MB12 mobile mount bracket	\$25.95
ACC14	Service manual	\$25
Headphones - see Kenwood ad on page 8		



## ICOM R-72 GENERAL COVERAGE COMMUNICATIONS RECEIVER

For the serious shortwave enthusiast on a budget, the new R72 offers full 100 kHz-30 MHz frequency coverage and direct keypad entry with advanced features. A backlit LCD shows the receiver's 10 Hz frequency resolution, while 101 scannable memory channels store frequencies in AM, LSB, USB, RTTY, and CW. Dual-range search is included as well as an analog S meter and a recorder activator coupled to a 24 hour clock timer.



Retail ~~\$999~~

Order RCV8

Only  
**\$799<sup>95</sup>**

\$15 UPS; \$30 UPS 2nd day; \$30 US Priority Mail  
 \$39 Canadian Air Parcel Post; \$25.50 Canadian UPS

OPTIONAL ACCESSORIES: ACC4 High Stability Crystal \$79.95  
 Installation Fee \$20

### SPECIFICATIONS

Frequency range: 100 kHz-30 MHz  
 Keypad frequency entry: Yes  
 Tuning steps: 10Hz/1kHz/10kHz  
 RIT (fine tuning): unnecessary  
 Display: Backlit LCD; 10 Hz resolution  
 Dimmer: Yes  
 Type of listening recommended: Domestic and international broadcasting; two-way SSB/CW/RTTY  
 Receiving modes: AM, SSB, CW; FM optional  
 Memory: 101 channels  
 Scan: Yes  
 Banks: No  
 Lockout: Yes  
 Priority: No

Search: Dual range  
 Delay: Yes  
 Squelch: Yes  
 Clock: Yes with timer  
 Audio output power: 2 watts  
 Record Output: Yes  
 Recorder Activator: Yes  
 S meter: Yes; analog  
 Computer interface: optional  
 Conversion scheme: Triple up-conversion; 70.4515 MHz, 9.0115 MHz, 455 kHz  
 Sensitivity: 100 kHz-1.8 MHz 2uV SSB/12.6uV AM; 1.8-30 MHz (preamp on) 0.16 SSB/2uV AM; optional FM 0.5uV  
 Selectable preamplifier: Yes  
 Selectable attenuator: 10/20/30 dB

Selectivity: (-6/-60dB): AM wide 6/20 kHz; AM narrow/SSB 2.3/8 kHz; optional FM 15/30 kHz  
 Image rejection: 70 dB  
 Frequency stability: +/- 30 Hz after 1 hour warmup  
 Selectable AGC: fast/slow  
 Dynamic range: 100 dB  
 Passband tuning: No  
 Noise blanker/limiter: dual  
 Adjustable notch filter: No  
 Tone Control: No  
 Antenna connector: SO-239 (UHF) and push clip  
 Auxiliary connector: No  
 Dimensions: 9.5"W x 3.7"H x 9"D  
 Weight: 10.6 lbs.  
 Power requirements: 120/240 VAC, built-in niacds; optional 13.8 VDC mobile kit.  
 Warranty: One year  
 Accessories included: None



## Philips DC-777 Mobile AM/FM/Shortwave Radio

For those mobile shortwave listeners who want it all—FM stereo, local AM medium wave and international broadcasting, the DC777 even includes a stereo cassette player so you can hear your favorite tapes when listening conditions aren't the best. Twenty memory channels with autosearch, a brilliantly-backlighted LCD frequency display, crisp stereo FM, compact in-dash mounting, digital frequency entry—just a few of the advanced features which are found on this high quality, multiband auto radio. DIN mounting bracket included for imported vehicles.



**Order RCV12 \$389<sup>95</sup>**

\$7 UPS; \$12 UPS 2nd Day Air; \$15.50 US Priority Mail; \$12 Canadian UPS; \$18 Canadian Air PP

### ACCESSORIES:

- ACC91 Pull-out security mount \$59.95
- ACC92 U.S. vehicle dashmount kit \$19.95  
*(specify model and year when ordering)*
- ACC93 Wired remote control kit \$79.95

### SPECIFICATIONS

Frequency Range: 530-1710, 3170-21910 kHz AM; 87.5-108 MHz FM  
Keypad frequency entry: Yes  
Tuning steps: 1/10 kHz AM, 50 kHz FM  
RIT (fine tuning): No  
Display: Backlit LCD  
Dimmer: No  
Type of listening recommended: Broadcasting  
Receiving modes: AM/WFM  
Memory: 20 shortwave presets  
Scan: Yes  
Banks: No  
Lockout: No  
Priority: No  
Search: Five-level autostore  
Delay: Infinite  
Squelch: No  
Clock: Three program timers  
Audio output power: 50 watts max.  
Record audio output: No  
Recorder activator: No

S meter: No  
Computer interface: No  
Conversion scheme: Double conversion  
Sensitivity: Unavailable  
Selectable preamplifier: No  
Selectable attenuator: No  
Selectivity: Unavailable  
Image rejection: Unavailable  
Frequency stability: Unavailable  
Selectable AGC: No  
Dynamic range: Unavailable  
Passband tuning: No  
Noise blanker/limiter: No  
Adjustable notch filter: No  
Tone control: Bass, treble, balance fader  
Antenna connector: Motorola  
Auxiliary connector: No  
Dimensions: 7"W x 2"H x 6"D  
Weight: Approx. 8 lbs.  
Power requirements: 13.6 VDC  
Warranty: One year  
Accessories included: DIN mounting bracket



## The Sangean ATS-803A

Whether you are a beginner looking for a high performance portable at low cost, or a seasoned SWL planning on a second receiver, this is clearly the most feature-packed, high performance portable under \$200!

**Order RCV4 Only \$169<sup>95</sup>**

\$7 UPS; \$12 UPS 2nd day; \$15 US Priority Mail  
\$17 Canadian Air Parcel Post; \$11 Canadian UPS



### SPECIFICATIONS

Frequency range: 150 kHz - 30 MHz, 87.5 - 108 MHz  
Keypad frequency entry: Yes  
Tuning steps: 1 kHz  
RIT (fine tuning): Tuning knob and BFO  
Display: Illuminated LCD  
Dimmer: No  
Type of listening recommended: Domestic & intl broadcast, casual  
Receiving modes: AM, SSB, wideband FM  
Memory: 9 channels  
Scan: Yes  
Banks: No  
Lockout: No  
Priority: No  
Search: Yes  
Delay: Yes  
Squelch: No

Clock: With alarm/sleep functions  
Audio output power: 900 milliwatts  
Record output: 5 pin DIN connector; 1 millivolt @ 1000 ohms  
S meter: LED light bar  
Computer interface: No  
Conversion scheme: Dual up-conversion; 55.845 MHz, 10.7 MHz, 450 kHz  
Sensitivity: Not available  
Selectable preamplifier: No  
Selectable attenuator: RF gain control  
Selectivity: Wide/narrow AM/SSB (6.5 kHz AM)  
Image rejection: AM 50 dB; FM 60 dB  
Frequency stability: Quartz PLL  
Selectable AGC: No

Dynamic range: Not available  
Passband tuning: No  
Noise blanker/limiter: No  
Adjustable notch filter: No  
Tone control: Separate bass & treble  
Antenna connector: RCA photo plug  
Auxiliary connector: No  
Dimensions: 11-1/2"W x 6-1/4"H x 2-1/2"D  
Weight: 4 lbs.  
Power requirements: 2 AA and 6 D cells or 120 VAC  
Warranty: 1 year  
Accessories included: AC adaptor, stereo headphones, shoulder strap, SW handbook, external antenna adaptor.

## Top-of-the-line With Built-In Cassette Recorder

## Sangean ATS-818CS

Imagine—record your favorite programs automatically with the dual-zone clock timer on any frequency from 150 kHz through 30 MHz, 87.5-108 MHz FM as well! This impressive portable has SSB and CW reception, 45 memory channels, wide/narrow filter selectivity, signal strength indicator, AC wall adaptor and more!



**Order RCV9 Retail \$399 Only \$249<sup>95</sup>**

\$7 UPS; \$14 UPS 2nd day; \$15.50 US Priority Mail  
\$20 Canadian Air Parcel Post; \$12.50 Canadian UPS

### SPECIFICATIONS

Frequency range: 150 kHz-30 MHz AM/SSB, 87.5-108 MHz FM  
Keypad frequency entry: Yes  
Display: Backlit LCD  
Dimmer: Yes  
Recommended use: Casual SW listening  
Receiving modes: AM, SSB, FM  
Memory: 45 presets  
Scan: Yes  
Banks: No  
Lockout: No  
Priority: No  
Search: Yes  
Delay: Yes  
Squelch: No  
Clock: Dual time display with record timer

Audio output power: 800 mW  
Record output: No  
Recorder activator: Internal programmable cassette recorder/player  
Signal strength indicator: Yes  
Computer interface: No  
Conversion scheme: Double conversion  
Sensitivity: Not available  
Selectable preamplifier: RF gain control  
Selectable attenuator: No  
IF selectivity: Wide/narrow switch  
Image rejection: Not available  
Frequency stability: Not available  
Selectable AGC: No

Dynamic range: Not available  
Passband tuning: No  
Noise blanker/limiter: No  
Adjustable notch filter: No  
Tone control: Yes  
Antenna connector: Yes  
Auxiliary connector: No  
Dimensions: 11-1/4"W x 7-3/8"H x 2-3/4"D  
Weight: 3 lbs. 13 oz.  
Power requirements: AC, internal batteries  
Warranty: One year  
Accessories included: AC adaptor, external antenna adaptor, shortwave handbook



# The Sony ICF-SW77

For those who have been looking for the next step up, it's here! The new Sony ICF-SW77 has all of the features of the popular ICF-2010 (except air band), plus:

- Front panel tuning dial
- Separate bass and treble controls
- 162 non-volatile memory channels
- Stereo FM (headphones)
- Station name display
- 50 Hz fine tuning steps
- Broadcasting time display
- 24 hour/local time clock
- 5-event timer
- Worldwide power supply



Order RCV10  
Retail ~~\$549<sup>95</sup>~~

Only

**\$465<sup>95</sup>**

\$7 UPS; \$14 UPS 2nd day; \$17 US Priority Mail  
\$20 Canadian Air Parcel Post; \$12.50 Canadian UPS



## Sony ICF-SW55

- Frequency range and modes: 150 kHz-30 MHz AM/SSB, 76-108 MHz FM
- Station name tuning with LCD display
- 125 Frequency Memory
- .1/1 kHz Tuning Steps
- EEP ROM Memory (no battery backup required)
- FM Stereo (earphones only)
- World Time Clock
- Includes carrying case, soft pouch, world band guidebook, AC adaptor, AN-71 compact antenna, stereo earphones

Order RCV15  
Retail ~~\$449<sup>95</sup>~~

Only

**\$369<sup>95</sup>**

\$7 UPS; \$14 UPS 2nd day; \$17 US Priority Mail  
\$20 Canadian Air Parcel Post; \$12.50 Canadian UPS

# SONY ICF-2010

*The World's Most Popular Radio!*

This is the full-featured portable for the serious shortwave listener. Synchronous detection allows interference-free reception on many stations difficult to hear on other radios. Narrow/wide selectivity switching; 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.



### SPECIFICATIONS

Frequency range: 150 kHz-30MHz, 76-108, 116-136 MHz  
Keypad frequency entry: Yes, plus tuning knob  
Tuning steps: 100 Hz  
RIT (fine tuning): No  
Display: Backlit LCD  
Dimmer: No  
Type of listening recommended: Domestic & international broadcasting, casual two-way SSB and aircraft  
Receiving modes: AM, USB, LSB, wideband FM; synchronous detection  
Memory: 32 channels  
Scan: Yes  
Banks: No  
Lockout: No  
Priority: No  
Search: Yes  
Delay: Yes  
Squelch: No  
Clock: 12/24 hour with alarm and sleep timer  
Audio output power: .380 milliwatts  
Record output: Miniplug; .775 millivolts @ 1000 ohms; no activator  
S meter: LED bargraph

Computer interface: No  
Conversion scheme: Dual up-conversion  
Sensitivity: 0.2 uV SSB  
Selectable preamplifier: No  
Selectable attenuator: DX/local switch  
Selectivity: Wide 18 kHz @ -50 dB; narrow 10 kHz @ -50 dB  
Image rejection: Not available  
Frequency stability: Quartz PLL  
Selectable AGC: No  
Dynamic range: Not available  
Passband tuning: No  
Noise blanker/limiter: No  
Adjustable notch filter: No  
Tone control: Yes  
Antenna connector: 1/8" mini phone plug  
Auxiliary connector: No  
Dimensions: 11-3/8"W x 6-1/4"H x 2-1/16"D  
Weight: 3-3/4 lbs.  
Power requirements: 2 AA and 3 D cells or 120 VAC  
Warranty: One year  
Accessories included: AC adaptor, earphone, shoulder strap, wire antenna, external antenna adaptor/plug, shortwave handbook.

Order RCV2  
Retail ~~\$459<sup>95</sup>~~

Only

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

\$7 UPS; \$13 UPS 2nd day  
\$16 US Priority Mail  
\$18 Canadian Air Parcel Post  
\$12.50 Canadian UPS



**SPECIFICATIONS**

Frequency range: 150-29995 kHz, 87.6 - 108 MHz  
 Keypad frequency entry: Yes  
 Tuning steps: 5 kHz, fast/slow button  
 RIT (fine tuning): +/- 10 kHz AM and SSB  
 Display: Backlit LCD  
 Dimmer: No  
 Type of listening recommended: Domestic & international broadcasting, casual SSB  
 Receiving modes: AM, wide FM, SSB  
 Memory: 10 channels  
 Scan: Yes  
 Banks: No  
 Lockout: No  
 Priority: No  
 Search: Yes, with times delay  
 Delay: No  
 Squelch: No  
 Clock: With timer & sleep function  
 Audio output power: Unavailable  
 Record audio output: yes  
 Recorder activator: yes  
 S meter: Single "tune" LED  
 Computer interface: No  
 Conversion scheme: Dual conversion  
 Sensitivity: Unavailable  
 Selectable preamplifier: No  
 Selectable attenuator: DX/local switch  
 Selectivity: Unavailable  
 Image rejection: Unavailable  
 Frequency stability: Unavailable  
 Selectable AGC: No  
 Dynamic range: Unavailable  
 Passband tuning: No  
 Noise blanker/limiter: No  
 Adjustable notch filter: No  
 Tone control: Music/news switch  
 Antenna connector: No  
 Dimensions: 7-9/32"W x 4-11/16"H x 1-1/4"D  
 Weight: 1-1/4 lbs.  
 Power requirements: 4 AA cells or AC adaptor  
 Warranty: One year.  
 Accessories included: Stereo earplugs, carrying case, reel antenna, AC wall adaptor.

# The New SW7600 - A Potent Portable from Sony



It was inevitable. The early models ICF 2002 and 2003 have been replaced by a tiny marvel with AM, SSB, and even FM stereo coverage! Measuring just over 7 inches wide and weighing 22 ounces, the SW7600 is loaded with features! DX/local switch reduces "pumping" on strong SSB signals; power switch lock prevents accidental battery depletion during transport.

Continuous 150 kHz-29.995 MHz frequency coverage plus 87.6-108 MHz FM headphone stereo (headphones included!), pushbutton tuning, tone control, external antenna jack, clock timer with sleep function, tilt bracket, keyboard lock, direct-entry keypad and ten scannable memory channels keynote the high-tech features of this potent portable!

Manufacturer's suggested retail ~~\$249<sup>95</sup>~~

Order RCV11

**\$219<sup>95</sup>**

\$7 UPS; \$10 UPS 2nd day; \$13 US Priority Mail  
 \$11 Canadian UPS; \$15 Canadian Air Parcel Post



## Sony ICF-SW1S

*"The SW1's performance is superior to that of any other micro-portable."...Larry Magne, as quoted in Monitoring Times*

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 ozs., yet it incredibly boasts a LCD digital frequency readout, 150 kHz-30 MHz AM frequency coverage in 5 kHz increments, 24 hour digital clock/timer, keypad tuning, and ten scannable memory channels!

But that's not all. It comes equipped with FM stereo reception (and teeny earphones to boot!), and a universal 100-240 volt automatically-adjusted AC power supply with worldwide adaptor plug.

Yet there's 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! And if you do have room for a wire antenna, simply reel it out of its retractable capsule accessory.

Order RCV13

Only

**\$279<sup>95</sup>**

\$7 UPS; \$12 UPS 2nd day  
 \$15 US Priority Mail  
 \$17 Canadian Air Parcel Post  
 \$11 Canadian UPS

### SONY COMPARISON CHART

		ICF-SW55	ICF-SW77	ICF-2010	ICF-SW7600	ICF-SW1S
Received Band	• FM Stereo	Yes	Yes	No	Yes	Yes
	• Air Band	Yes	No	Yes	No	No
Way of Tuning	• Station Name Tuning	Yes	Max 100 Stations	No	No	No
	• AM Tuning Step	100 Hz	50 Hz	100Hz	5kHz	5 kHz
	• Preset Memories	125	162	32	10	10
	• Broadcasting Time Display	No	Yes	No	No	No
	• Auto Program Select	No	Yes	No	No	No
Tuning Mode	• AM Wide/Narrow filters	Yes	Yes	Yes	No	No
	• SSB Wide/Narrow filters	No	Yes	No	No	No
	• USB/LSB Select	Yes	Yes	Yes	Yes	No
	• Synchronous Detection	No	Yes	Yes	No	No
Others	• Clock	Yes	Yes	Yes	Yes	Yes
	• Timer	Yes	Yes	Yes	Yes	Yes
	• Rec Out Jack	Yes	Yes	Yes	Yes	Yes
	• Ext Antenna Jack	Yes	Yes	Yes	Yes	Yes
	• Sleep Mode (min)	Yes	Yes	Yes	Yes	Yes
	• Tone Control	Yes	Yes	Yes	Yes	Yes



# NEW



## Universal M8000 Multimode Decoder

Now, the most advanced data reader/decoder ever produced! Nothing could be simpler: plug the new M8000 into your receiver's or scanner's speaker or earphone jack, connect a printer or VGA color monitor, and copy Morse code, RTTY, ASCII, TOR (FEC and ARQ), packet, FDM, Russian Cyrillic, bit inversion, facsimile and even piccolo--all off the air! The M8000 will even automatically tune its filters!

Ideal for testing data transmissions--reads digital pager transmissions (GOLAY and POCSAG) when connected to any scanner (unlawful for unauthorized listening!). Print squelch prevents noise from generating garbled messages, while internal displays alert you to baud rates, control characters, tuning graphs and other information, all in 16 vibrant colors!

Operates on 120 or 240 VAC, 50/60 Hz, and measures 16-3/8"W x 3-1/2"H x 12-3/4"D. Truly a remarkable monitoring accessory for the serious utilities enthusiast.

Retail price ~~\$1999<sup>95</sup>~~

Grove price only

**\$1298<sup>95</sup>**

Order DEM6

**OPTIONAL ACCESSORIES WITH M7000:**  
19-inch rack panel mounting kit \$19.95

Plus \$10 UPS; \$20 UPS 2nd day air;  
\$20 US Priority Mail; \$35 Canadian Air Parcel Post;  
\$25 Canadian UPS

## MFJ-1278

### All-Mode Digital Decoder For Your Computer!



If you have an IBM compatible computer (Mac and Commodore adaptors available) and a shortwave receiver or transceiver, you can now display radioteletype messages, bit inversion RTTY, packet communications (military, commercial and amateur), news and weather facsimile photos and maps, AMTOR and SITOR messages, Morse code, Navtex alerts, ASCII text, even amateur slow-scan television! Top-rated demodulator in independent tests!

Multi-grey level gives sharp newsphoto and SSTV imaging! LED all-mode tuning meter makes perfect signal adjustment a snap, and an automatic signal identification circuit selects the mode for you! If you are a licensed amateur, the MFJ-1278 can be used for transmitting as well! Let us know what model transceiver you have, and we'll provide the interface cable (see list below)!

Hams can use the personal mailbox soft-partitioned memory for electronic messages.

Includes port for Epson or IBM compatible printer. Full-color SSTV is displayed on your color monitor with the optional MFJ-1289 terminal software.

Comes with 32K RAM, host mode, KISS interface for TCP/IP/MSYS, independent transmit level for each port, random code generator, lithium battery backup, RS-232 and TTL serial ports, socketed ICs, tuneup command, peripheral I/O port, automatic serial numbering, programmable message memories, dual radio ports for HF and VHF, CW paddle jack, audio amplifier and monitor speaker for signals and sidetones, packet connect bell, full operation manual. As if this weren't enough, each 1278 is accompanied by a coupon entitling the owner to one free upgrade in the future!

The MFJ-1278 alone prints out SSTV and FAX, but requires the MFJ-1289 MultiCom enhancement package to display on screen. This powerful IBM-compatible software provides high-resolution FAX imaging, macro keys for instant mode changes without having to reset parameters, and an alarm for detecting key letters, words or phrases. For transmitting, many additional features are provided.

Measures only 9-1/2"W x 1-1/2"H x 9-1/2"D. Powered directly from 120 VAC/60 Hz, or 12 VDC.

Only

**\$249<sup>95</sup>**

Order DEM8

\$7 UPS  
\$13 UPS 2nd day  
\$15 US mail priority  
\$12 Canadian UPS  
\$18 Canadian Air Parcel Post

#### ACCESSORIES:

ACC38	MFJ-1278B Macintosh adaptor	\$49.95
ACC39	MFJ-1282B Commodore 64/128 adaptor	\$39.95
ACC40A	MFJ-1289 Hi-res enhancer (5-1/4" disk)	\$59.95
ACC40B	MFJ-1289 Hi-res enhancer (3-1/2" disk)	\$59.95
ACC61	MFJ-1290 Amiga adaptor	\$49.95
DEM4	MFJ 1278-T Turbo with 2400 baud modem	\$329.95

#### TNC cables, \$13.95 each:

ACC41	Icom 8 pin (MFJ-5084)
ACC42	Yaesu 8 pin (MFJ-5080)
ACC46	Kenwood, Alinco 8 pin (MFJ-5086)
ACC44	Kenwood HT (MFJ-5026)
ACC45	Icom, Yaesu HT, Alinco DJ-560 (MFJ-5024)



**New Low Prices  
on Grove Antenna  
Systems**

## Grove's Indoor SWL Antenna System

*Out performs competitive  
active antennas  
Connects to any receiver equipped with  
an external antenna jack*

**Your key to exciting shortwave  
reception without an outside antenna!**



### SPECIFICATIONS

**Gain:** Approximately 20 dB  
**Freq Range:** 100 kHz-30MHz in 4 bands  
**Preselector Type:** Series-tuned L-section filter  
**Power Required:** 9 to 18 volts DC (12 VDC nom.) @ 30 mA.  
**Connectors:** SO239 (4) signal line, 2.1 mm DIN power  
**Cabinet:** Custom formed aluminum, baked enamel finish  
**Dimensions:** 9-1/4"W x 3"H x 4"D  
**Weight:** 1-1/2 lbs.

Here's the apartment dweller's dream—a high performance, amplified indoor antenna system for general coverage shortwave and medium wave monitoring. This thin profile, flexible wire antenna can be inconspicuously run along molding, out a window to a tree, even under a rug. And when connected to the powerful TUN-4 signal booster, you have instant coverage from 100 kHz to 30 MHz!

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

The powerful new TUN-4 MiniTuner Plus can be used with any indoor or outdoor antenna to improve received signal strengths enormously. Just a few feet of wire or your present indoor shortwave antenna will give exciting new depth to your listening pleasure!

Easy to use and extremely flexible, the TUN-4 has a built-in, solid-state booster amplifier to give additional strength to all received signals from 100 kHz through 30 MHz, broadcasters and utilities stations. Wall adaptor (120VAC/12VDC) included.

### WHAT YOU NEED TO ORDER:

**TUN-4** MiniTuner Plus **\$99.95**  
**ANT6** Hidden Antenna *(see pg. 22)* **\$19.95**  
**CKSW** Accessory kit **\$12.95** *(\$3 shipping if ordered separately)*

*includes 20' antenna wire, banana plug plus 3 adaptors for all portable and tabletop multi-band radios equipped for external antenna connections.*

Shipping charges for system: \$7 UPS; \$11 UPS 2nd Day Air; \$8 US Priority Mail  
\$15 Canadian UPS; \$13 Canadian Air Parcel Post

## Grove's Outdoor SWL Antenna System

*Connects to any receiver with  
an external antenna jack*

A high performance, low cost shortwave/longwave dipole designed for total 100 kHz-30MHz 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 SWL's... Includes pre-measured stranded copper antenna wire, porcelain end insulators, custom center insulator for your PL-259 coax connection, and full instructions.

Then add 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.



### WHAT YOU NEED TO ORDER:

**TUN-3** MiniTuner **\$49.95**  
**ANT-2** Skywire antenna *(See pg. 14 for specs)* **\$29.95**  
**CB 50** **\$19.95** or **CB100** **\$29.95** *(See page 26)*

**CKSW** Accessory Kit **\$12.95** *(\$3 shipping if ordered separately)*  
*(includes 20' antenna wire, banana plug, 3 adaptors for all portable and multiband tabletop radios equipped for external antenna connections.)*

Shipping charges for system: \$8.00 UPS; \$12 UPS 2nd Day Air; \$8 US Priority Mail  
\$13.50 Canadian UPS; \$16 Canadian Air Parcel Post

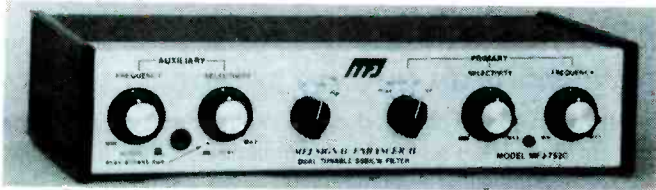
### SPECIFICATIONS

**Frequency Range:** 100 kHz-30MHz 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



Improve reception with  
this agile filter!

## MFJ 752C Signal Enhancer II



Reduce interference and enhance sound with the latest all-mode, dual, tunable filter. Connect between your receiver's or scanner's external speaker jack and an external speaker or headset, then tune the two filters to peak or notch audio signals.

Remove annoying whistles with the 70 dB notch filter. Set audio bandwidths from a sharp 40 Hz to full range sound. Suppress static crashes and impulse noise with the ANL clipper.

External speaker, headphones and AC power supply required.

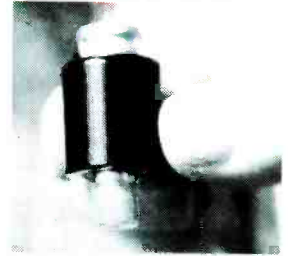
Order **FTR1** **\$94<sup>95</sup>**

\$5 UPS Shipping; \$8 UPS 2nd Day  
\$7.50 US Priority Mail; \$11 Canadian Air PP  
\$10 Canadian UPS

ACCESSORY: ACC95 AC Power Supply \$9.95

## Lightning/EMP Protector for Scanners and Shortwave Receivers

While nothing can withstand a direct lightning hit, the new Grove LA-1 connects between your antenna cable and radio to prevent induced voltages from nearby lightning strokes, high-powered transmitters, and other massive energy surges from burning out your equipment\*



Appearance may vary

Not a flimsy spark gap or simple diode shunt, the Grove LA-1 uses state-of-the-art gas discharge technology, proven in government tests to be the best deterrent against lightning and electromagnetic pulse (EMP) surges.

Responds in one ten-millionth of a second to short-circuit bursts of 250,000 volts at currents of 5000 amps, while allowing normal signal voltages (and even control voltages up to 50 volts AC or DC) to pass undisturbed! Extremely low signal loss—0.2 dB at 1500 MHz! Ideal for protecting scanners, shortwave receivers, CB equipment, VCRs, TVs, satellite receivers, FM stereo systems and more.

The tiny protector measures only 3/4"D x 1-1/2"L and comes equipped with standard F connectors for home entertainment equipment and Grove accessories. Adaptors are available as shown below.

- LA1F** (equipped with F connectors) **\$19.95**
- LA1B** (equipped with BNC connectors) **\$24.95**
- LA1P** (equipped with PL-259 UHF connectors) **\$24.95**
- LA1M** (equipped with Motorola connectors) **\$29.95**

\$3 UPS; \$5.50 UPS 2nd Day;  
\$6 Canadian APP; \$8 Canadian UPS

\*Will not prevent AC power line surges; such protectors are available from Radio Shack, computer stores, and most department stores.

## The Grove Skywire Antenna

Now with improved waterproof feedline connector  
at no extra charge!

# Skywire



HAMS! Ideal for transmitting when used with a transmatch. (1.8-30 MHz at up to 250 watts)

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 connector ready for your PL-259 (UHF male) equipped coaxial cable (50 or 75 ohm); includes two professional porcelain end insulators and complete instructions.

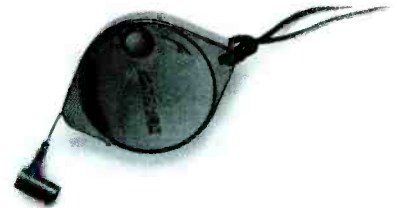
Only  
Order **ANT 2** **\$29<sup>95</sup>** \$3.75 UPS; \$6 UPS 2nd day  
\$4.50 Priority Mail;  
\$6.50 Canadian Air PP;  
\$8 Canadian UPS

Coax cable not included—see page 26

### 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

## Portable Shortwave Reel Antenna



Have you ever been in a situation with your shortwave portable where you just know a few extra feet of antenna would bring in that weak station? This new reel antenna is the answer!

23 feet of insulated wire rolls up by a finger spool into a pocketable package for convenient storage; clip it to your whip antenna and reel out whatever length you need for signal improvement!

Only  
Order **ANT 15** **\$8<sup>95</sup>**

\$3.75 UPS; \$6.50 UPS 2nd Day Air; \$3.50 US Parcel Post  
\$6 Canadian Air Parcel Post; \$8 Canadian UPS





# Choosing a Scanner

Copyright 1992 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

The most common frequency ranges monitored by scanner enthusiasts are: 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 band 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 question 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 of 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 tuning range and aren't a problem.

### 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 Uniden, ICOM, AOR, Radio Shack, and Cobra. Additionally, the Yaesu FRG-9600, Kenwood RZ-1, and ICOM R-1, R-100, R-7000 and R-9000 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 PRO-2006 is more immune to interference from intermodulation and images, making it an excellent choice for strong or weak signal areas like large cities.

In comparison, while the Bearcat BC760XLT and BC800XLT have superb sensitivity, they are easily overloaded by strong signals; use them in rural or deep suburban locations, or with their own attachable whip antennas in the city.

### SCANNER ANTENNAS

**HAND-HELD** - The whip antenna included with your scanner is fine for local reception of strong signals, but if you are interesting 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 screwthread).

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

**MOBILE** - Inside a vehicle, a scanner's



## COAXIAL CABLE

attachable whip is shielded by the vehicle body and an external antennas is recommended. A rooftop location is ideal, providing uniform response in all directions. Mounted elsewhere (fender, trunk, bumper), the pattern will favor the direction of the car body.

The short length and low height of mobile antennas 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 antennas like the popular Grove ANT4 come equipped with a Motorola plug or BNC connector and have strong magnetic bases which will not come loose at normal road speeds.

Amplified antennas like the Diamond D505 offer much greater range, but may overload and cause intermod in strong signal areas.

If an outside antennas 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-4 will boost reception range.

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

Several discones are extremely well constructed including the Diamond D-130. It is an excellent, omnidirectional, VHF/UHF transmitting antenna and performs well for local reception.

Most low-cost base antennas work well for local coverage (25-50 miles distance). Remember, the smaller the dimensions of the antenna, the poorer it will perform on low band (30-50 MHz).

The best nondirectional, all-band scanner antennas on the market are the Antennacraft ANT-7 Scantenna, sold by Grove, and the Channel Master 5094A MoniTenna available from Channel Master.

An "omnidirectional" antenna mounted within a couple of feet of a metal mast or another antenna becomes directional due to signal reflection. In this case, turn the mast or antenna while listening to signals of interest to determine the best overall position, then tighten it down.

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

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. These cables and connectors are available from some 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-4 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.

## FILTERS AND ATTENUATORS

One of the most common causes of interference is strong signal overload. An attenuator reduces all signals, regardless of frequency, by the same amount; band-reject (stop-band) filters and wave traps 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 remove one specific frequency.

The Grove FTR-5 is a combination filter designed to reduce interference from shortwave, AM, TV and FM broadcast stations, a common problem, as well as any one user-selected signal in the 100-174 MHz range.

## A Scanner Sampler

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), names 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.

35.02	McDonald's order window
40.50	Army Search/Rescue
41.50	Army aircraft
46.61-46.97	Cordless phones
46.75	Pres. Helicopter
47.42	Red Cross
49.83-49.89	Wireless baby monitors
121.5	Air emerg/calling
122.0	Flight weather
122.2	Flight service
122.75	Gov't air to air
122.8	Small airport UNICOM
122.9	gov't aircraft
122.925	Natural resources air
123.1	Air search & rescue
123.45	Pilots air to air
126.2	Military air towers
135.575-	
135.625	ATS-3 satellite
143.625	Russian Mir cosmonauts
148.15	Civil Air Patrol
150.00	Russian satellite
151.625	Itinerant walkie talkies
154.37	Fire mutual aid
155.34	Hospital/ambulance
155.37	Police/mutual aid
156.8	Boats call/distress
157.05	Coast Guard
157.10	Coast Guard
157.15	Coast Guard
162.40-	
162.55	Weather service
163.200	U.S. Marshall
165.2875	ATF
165.375	Secret Service
165.950	IRS
167.050	FCC
167.5625	FBI
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
311.0	SAC primary
321.0	SAC secondary
344.6	Mil flight weather
349.4	MAC primary
381.8	CG aircraft
415.200	Fed protection service
415.700	Air Force One
417.200	Fed Protection Service
462.95-	
463.175	Paramedics
464.500	PGA tournament
469.500	NASCAR racing



**ICOM PRICES INCREASING OVER 18%...**  
 But, as a Grove customer, you can still purchase ICOM products at the current prices while supplies last!

# ICOM R7100

## VHF/UHF Communications Receiver



ICOM has done it again! They took the most popular features of the legend R7000, added a few features that listeners wanted, and released this new, compact receiver.

The R7100 offers continuous frequency coverage (no gaps) from 25 to 2000 MHz on a brilliant LCD readout, selectable tuning steps, USB/LSB/AM/FM modes with wide and narrow selectivity switching.

900 scannable memory locations store frequency, channel number, mode and search steps; ten search banks with memory channel lockout, 5 or 12 channel-per-second scan speed and scan-resume delay are also found on this model.

High sensitivity and stable SSB reception are additional perks, as are sensitive, all-mode squelch and easy pushbutton function selection.

Order  
**SCN15**

**\$1139<sup>95</sup>**

\$16.50 UPS; \$33 UPS 2nd day air;  
 \$35 US Priority Mail;  
 \$27 Canadian UPS;  
 \$43 Canadian Air Parcel Post

### SPECIFICATIONS

Frequency range: 25-2000 MHz  
 Keypad frequency entry: Yes  
 Tuning steps: 100 Hz; 1/5/10/12.5/20/25/100 kHz; 1 MHz  
 RIT (fine tuning): No  
 Display: LCD  
 Dimmer: yes  
 Type of listening recommended: Utility monitoring  
 Receiving modes: AM, WAM, FM, WFM, NFM, USB, SSB  
 Memory: 900 channels  
 Scan: 5/12 ch/sec  
 Banks: 9  
 Lockout: Yes  
 Priority: Yes  
 Search: Yes  
 Delay: 0/2/5/10 seconds; infinite  
 Squelch: Yes  
 Clock: Yes with 2 event timer  
 Audio output power: 2 W @ 10% THD  
 Record output: Yes  
 Recorder activator: Yes  
 S meter: analog  
 Computer interface: Optional

Conversion scheme: Triple up-conversion under (778.7 or 266.7, 10.7 MHz; 455 kHz)  
 Sensitivity: 0.35 mV NFM  
 Selectable preamplifier: No  
 Selectable attenuator: Yes  
 Selectivity: @ -6dB: 2.4 kHz SSB, 6 kHz AM/NFM, 15 kHz AM/FM, 150 kHz WFM  
 Image rejection: 50 dB  
 Frequency stability: +/- 1.5 ppm 25-250 MHz, +/- 5 ppm 25-1000, +/- 10 ppm 1300 MHz  
 Selectable AGC: No  
 Dynamic range: Unknown  
 Passband tuning: No  
 Noise blanker/limiter: ANC  
 Adjustable notch filter: No  
 Tone Control: No  
 Antenna connector: N female  
 Auxiliary connector:  
 Dimensions: 9-1/2" W x 3-3/4" H x 9-1/2" D  
 Weight: 13 lbs.  
 Power requirements: 13.8 VDC, 117/240 VAC  
 Warranty: One year  
 Accessories included: Plugs, fuses, DC cord, spare screws

### OPTIONAL ACCESSORIES

(\*Call for price and availability)

- \* Remote control
- \* Computer interface
- ACC36 UT36 Voice Synthesizer \$33.95
- ACC71 SP20 Speaker \$139.95
- ACC72 TVR7100 Video Adaptor \$209.95
- ACC74 CT17 Level Converter \$89.95
- ACC78 Service Manual \$25
- ACC83 MB5 Mounting Bracket \$25.95
- ANT8N 46" Extendable Ship Antenna \$23.95
- Installation of one or more accessories \$20

# ICOM R7000

## Continuous Coverage VHF/UHF Receiver!

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 readout accuracy! Add to this enormous tuning range 99 memory channels with priority function, keyboard entry or dial tuning, FM/AM/SSB modes, five tuning speeds, 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, and programmable scanning with auto-write memory, and you have the most advanced scanner receiver ever designed for the serious VHF/UHF listener.

Order **SCN4**

Retail ~~\$1199~~

**\$999<sup>95</sup>**

\$16.50 UPS; \$33 UPS 2nd day air; \$35 US Priority Mail;  
 \$27 Canadian UPS; \$43 Canadian Air Parcel Post



## Icom R-100 MOBILE/DESKTOP SCANNER

For the full-spectrum listener, this compact scanner is hard to beat: continuous tuning range from 100 kHz through 1856 MHz with direct keypad entry or knob tuning, 100 channel memory, switchable preamp and attenuator, programmable 24-hour clock timer, 10 search ranges, LCD bargraph S meter, AM and wide/narrow FM mode detection (no SSB) just begin the list of features.



Grove discount price only

Order **SCN14**

**\$599<sup>95</sup>**

**ACCESSORIES:**  
**ACC75 AC Adaptor \$24.95**

\$8 UPS; \$14 UPS 2nd Day Air;  
\$16 US Priority Mail  
\$12 Canadian UPS;  
\$19 Canadian Air Parcel Post

### SPECIFICATIONS

Frequency range: 100 kHz-1856 MHz  
Keypad frequency entry: Yes  
Tuning steps: 1.5/8/9/10/12.5/20/25 kHz  
RIT (fine tuning): Tuning knob  
Display: Backlit LCD  
Dimmer: On/Off  
Type of listening recommended: Domestic and international broadcasting, including FM and TV audio; VHF/UHF scanning  
Receiving modes: AM, narrowband FM, wideband FM  
Memory: 100 channels  
Scan: Three modes/20 channels per second  
Banks: Ten with programmable characteristics  
Lockout: Yes  
Priority: Yes

Search: 10 ranges  
Delay: 3 programmable functions  
Squelch: All modes  
Clock: 24 hour with timer and sleep switch  
Audio output power: 2.5 watts  
S meter: LCD bargraph  
Computer interface: No  
Conversion scheme: Triple conversion  
Sensitivity: 500 kHz-1.6 MHz 10 uV AM; 1.6-50 MHz 5.6 uV narrow FM/3.3 uV AM; 50-905 MHz 0.4 uV narrow FM/1. uV AM  
Selectable preamplifier: 15 dB  
Selectable attenuator: 20 dB  
Selectivity: (-6 dB) narrow FM 15 kHz; 180 kHz wide FM; AM 6 kHz  
Image rejection: Unknown  
Frequency stability: Unknown

Selectable AGC: No  
Dynamic range: Unknown  
Passband tuning: No  
Noise blanker/limiter: Yes  
Adjustable notch filter: No  
Tone control: No  
Antenna connector: BNC  
Auxiliary connector: No  
Dimensions: 5.8"W x 2"H x 7.1"D  
Weight: 3.1 lbs.  
Power requirements: 12 VDC  
Warranty: One year  
Accessories included: VHF/UHF telescoping antenna, HF wire antenna, DC power cable, mounting bracket, fuses, speaker plug, cable tie and screws.

## ICOM R1 General Coverage Pocket Scanner

Imagine, a shortwave and VHF/UHF scanner with continuous 100 kHz-1300 MHz (no gaps!) frequency coverage that fits in your shirt pocket! You select the mode—AM, FM wide or narrow—and install up to 100 of your favorite shortwave and scanner frequencies into memory. An edge-lit LCD shows frequency, memory channel, and other settings as well.

Less than 2" wide, the R1 scans, searches and autoloads, has knob tuning, a signal strength indicator, and even a 24-hour clock timer! This high-sensitivity scanner comes with flex whip, rechargeable battery, AC wall charger/adaptor and belt clip.

Order **SCN13**

Retail **\$599**

Only

**\$449<sup>95</sup>**

\$6 UPS; \$9 UPS 2nd Day Air; \$11 US Priority Mail  
\$9 Canadian UPS; \$12 Canadian Air Parcel Post

### ACCESSORIES:

<b>ANT8</b>	Range extending telescoping whip	<b>\$16.95</b>
<b>ACC19</b>	R1 Carrying case (no battery pack)	<b>\$19.95</b>
<b>ACC30</b>	BP-90 Replaceable AA battery case	<b>\$16.95</b>
<b>ACC33</b>	BP-90 Carrying case	<b>\$19.95</b>
<b>ACC32</b>	BP-84 Triple-life battery pack	<b>\$75.95</b>
<b>ACC34</b>	BP-84 Carrying case	<b>\$19.95</b>
<b>ACC31</b>	CP-12 Cigarette power cord	<b>\$18.95</b>
<b>ACC48</b>	BC-72A Desk Charger	<b>\$99.95</b>
<b>ACC76</b>	Service Manual	<b>\$25</b>
<b>HDP1</b>	Headphones	<b>\$19.95</b>



### SPECIFICATIONS

Frequency range: 100 kHz-1300 MHz  
Keypad frequency entry: Yes  
Tuning steps: 0.5/5/8/9/10/12.5/15/20/25/30/50 kHz  
RIT (fine tuning): Tuning knob  
Display: Edge-lit LCD  
Dimmer: On/Off  
Type of listening recommended: Domestic & international broadcasting, including FM and TV audio; VHF/UHF scanning  
Receiving modes: AM, narrowband FM, wideband FM  
Memory: 100 channels  
Scan: 20 channels/second  
Banks: No  
Lockout: Yes  
Priority: Yes  
Search: 10 ranges with autoloading  
Delay: 2 second, 10 second timed  
Squelch: All modes  
Clock: With on/off timer  
Audio output power: 150 milliwatts @ 8 ohms  
Record audio output: Earphone jack  
S meter: LCD bargraph  
Computer interface: No  
Conversion scheme: Trip conversion 266.7/10.7 MHz/455 kHz  
Sensitivity: NFM, 0.4 uV; AM, 0.79 uV, WFM 3.2 uV  
Selectable preamplifier: No  
Selectable attenuator: No  
Selectivity: (-6dB) AM 15 kHz; narrow FM 15 kHz; wide FM 150 kHz  
Image rejection: Not available  
Frequency stability: Not available  
Selectable AGC: No  
Dynamic range: Not available  
Passband tuning: No  
Noise blanker/limiter: No  
Adjustable notch filter: No  
Tone control: No  
Antenna connector: BNC  
Auxiliary connector: No  
Dimensions: 1-7/8"W x 4"H x 1-1/2"D  
Weight: 9.9 ounces  
Power requirements: Internal nicads; 120 VAC wall charger/adaptor included; 6-16 VDC external  
Warranty: One year  
Accessories included: Flex antenna, AC wall adaptor/charger, belt clip



**SPECIFICATIONS**

Frequency range: 29-54, 118-174, 406-512, 806-956 MHz (less cellular)  
 Keypad frequency entry: Yes  
 Tuning steps: 5/12.5 kHz determined by frequency range  
 RIT (fine tuning): No  
 Display: Edgelit LCD  
 Dimmer: On/Off  
 Type of listening recommended: VHF/UHF utilities  
 Receiving modes: AM/narrow FM determined by frequency range  
 Memory: 200 channels  
 Scan: 16 channels per second  
 Banks: 10  
 Lockout: Yes  
 Priority: Ten channels  
 Search: Yes  
 Delay: Individual channels  
 Squelch: Yes  
 Clock: No  
 Audio output power: 450 milliwatts  
 Record audio output: Earphone jack  
 Recorder activator: No  
 S meter: No  
 Computer interface: No  
 Conversion scheme: Double conversion  
 Sensitivity: 0.4 uV 29-54/136-174 MHz, 0.5 uV 406-512 MHz, 0.8 uV 118-136 MHz, 1uV 806-956 MHz  
 Selectable preamplifier: No  
 Selectable attenuator: No  
 Selectivity: (-55 dB) 50 kHz  
 Image rejection: Unavailable  
 Frequency stability: Unavailable  
 Selectable AGC: No  
 Dynamic range: Unavailable  
 Passband tuning: No  
 Noise blanker/limiter: No  
 Adjustable notch filter: No  
 Tone control: No  
 Antenna connector: BNC  
 Auxiliary connector: No  
 Dimensions: 2-11/16"W x 7-1/2"H x 1-3/8"D  
 Weight: 1-1/4 lbs.  
 Power requirements: 12 VDC (internal nicads)  
 Warranty: One year  
 Accessories included: Earplug, AC wall adaptor/charger, flex whip, leatherette case

The world's choice hand-held scanner at a popular price!

**Uniden Bearcat BC200XLT**

Unlike its competitors, the BC200XLT comes equipped with a detachable nicad battery pack, leatherette holster, AC wall charger/adaptor, and earplug.

Instant weather scan is pre-programmed. Audio has plenty of punch for noise locations. The rugged, rubberized keypad has excellent tactile feedback.

Order **SCN9** Only **\$239<sup>95</sup>**  
 Retail ~~\$489<sup>95</sup>~~

\$6 UPS; \$9 UPS 2nd Day Air; \$9 US Priority Mail  
 \$10 Canadian UPS; \$12 Canadian Air Parcel Post



**ACCESSORIES:**

- ACC99** Extra Bearcat Battery pack **\$39.95**  
(plus \$4 UPS shipping if ordered separately)
- ACC16** Extra Metro West long-life battery pack **\$65.95**  
(see page 26 for more details)
- ACC70** Pro-Charge 7 (see page 26 for more details) **\$36.95**
- HDP1&** Headphones (see page 31 for more details) **\$19.95**
- ACC35** 3/32" Adaptor for headphones **\$1.50**

**Uniden Bearcat BC760XLT**

Measuring a tiny 2" high by 7" wide and deep, this scanner is ideal for mobile installations. Many agencies use CTCSS ("PL") sub-audible encoding to separate groups of users. With the optional ACC96 decoder and ACC97 switch installed in your BC760XLT, you can choose which channels you want to

hear with normal squelch, and which will respond only to the proper tones all at the same time!

The 760 also has pre-programmed service search capability, just push a button to find active police, fire, aircraft, maritime, emergency, and weather channels!

Order **SCN12**  
 Retail ~~\$399<sup>95</sup>~~ Only

**\$269<sup>95</sup>**

**OPTIONAL ACCESSORIES**

- ACC96** CTCSS Squelch Decoder **\$59.95**
- ACC97** ON/OFF plug-in switch **\$10.95**  
(must use ACC96 and ACC97 together)
- ACC98** Preamplifier (plug-in) **\$29.95**
- Installation of ACC96 and 97 **\$10.00**

\$7 UPS; \$12 UPS 2nd Day Air;  
 \$15 US Priority Mail  
 \$11.50 Canadian UPS;  
 \$20 Canadian Air Parcel Post

**SPECIFICATIONS**

Frequency range: 29-54, 118-174, 406-512, 806-956 MHz (less cellular)  
 Keypad frequency entry: yes  
 Tuning steps: 5/12.5 kHz determined by frequency range  
 RIT (fine tuning): No  
 Display: Backlit LCD  
 Dimmer: No  
 Type of listening recommended: VHF/UHF utilities  
 Receiving modes: AM, narrow FM determined by frequency range  
 Memory: 100 channels plus pre-programmed police, fire, aircraft, maritime, emergency, weather frequencies  
 Scan: 15 channels per second  
 Banks: 5  
 Lockout: Yes  
 Priority: Channel one  
 Search: Yes  
 Delay: yes  
 Squelch: Yes  
 Clock: No  
 Audio output power: 3 wats  
 Record audio output: External speaker jack; no activator  
 S meter: No  
 Computer Interface: No  
 Conversion scheme: Dual conversion  
 Sensitivity: 0.4 uV 29054/136-174 MHz, 0.5 uV 406-512 MHz, 0.8 uV 118-136 MHz, 1uV 806-956 MHz  
 Selectable preamplifier: Optional accessory  
 Selectable attenuator: No  
 Selectivity: (-55 dB) 50 kHz  
 Image rejection: Unavailable  
 Frequency stability: Unavailable  
 Selectable AGC: No  
 Dynamic range: Unavailable  
 Passband tuning: No  
 Noise blanker/limiter: No  
 Adjustable notch filter: No  
 Tone control: No  
 Antenna connector: BNC  
 Auxiliary connector: No  
 Dimensions: 6-5/16"W x 1-5/8"H x 7-3/8"D  
 Weight: 1-1/4 lbs.  
 Power requirements: 12 VDC, 120 VAC wall adaptor included  
 Warranty: 1 year  
 Accessories included: Mobile mount kit, DC cord, attachable whip



## Uniden Bearcat BC800XLT

Top of the Line — With Uninterrupted 800 MHz Coverage!



The BC800XLT features low, high, air, UHF and 800 MHz band coverage with 40 channels of memory and instant weather reception.

Other features include search capability, 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 @ +/- 25 kHz, instant weather reception, brilliant fluorescent display, AC/DC operation, direct channel access, individual channel delay, priority channel one, fully synthesized keyboard entry.

Order SCN 11

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

Only

**\$239<sup>95</sup>**

\$7 UPS; \$13.50 UPS 2nd Day Air;  
\$16 US Priority Mail  
\$12 Canadian UPS; \$19 Canadian Air Parcel Post

### SPECIFICATIONS

Frequency range: 29-54, 118-174, 406-512, 806-912 MHz  
Keypad frequency entry: Yes  
Tuning steps: 5/12.5 kHz determined by frequency range  
RIT (fine tuning): No  
Display: Fluorescent  
Dimmer: No  
Type of listening recommended: VHF/UHF utilities  
Receiving modes: AM, narrow FM determined by frequency range  
Memory: 40 channels  
Scan: 15 channels/second  
Banks: 2  
Lockout: yes  
Priority: Yes  
Search: Yes  
Delay: Individual channel  
Squelch: yes  
Clock: No  
Audio output power: 1.5 watts  
Record audio output: External speaker jack; no activator  
S meter: no  
Computer interface: No  
Conversion scheme: Double conversion  
Sensitivity: 0.6 uV 29054/136-174 MHz, 0.8 uV 118-136/406-512 MHz, 1 uV 840-012 MHz  
Selectable preamplifier: No  
Selectable attenuator: No  
Selectivity: (-55 dB) 50 kHz  
Image rejection: Unavailable  
Frequency stability: Unavailable  
Selectable AGC: No  
Dynamic range: No  
Passband tuning: No  
Noise blanker/limiter: No  
Adjustable notch filter: No  
Tone Control: No  
Antenna connector: 2 Motorola (separate 800 MHz jack)  
Auxiliary connector: No  
Dimensions: 10-1/2"W x 3-5/8"H x 8"D  
Weight: 7.1 lbs.  
Power requirements: 120 VAC, 12 VDC  
Memory backup: 2 AA cells (not supplied)  
Warranty: One year  
Accessories Included: Attachable whips (2)

### SPECIFICATIONS

Frequency range: 29-54, 108-174, 406-512, 806-956 MHz (less cellular)  
Keypad frequency entry: Yes  
Tuning steps: 5/12.5 kHz determined by frequency range  
RIT (fine tuning): No  
Display: Edgelit LCD  
Dimmer: No  
Type of listening recommended: VHF/UHF utilities  
Receiving modes: AM/narrow FM determined by frequency range  
Memory: 50 channels  
Scan: 5/15 channels per second (selectable)  
Banks: 5  
Lockout: Yes  
Priority: Channel one  
Search: Yes  
Delay: Individual channel  
Squelch: Yes  
Clock: No  
Audio output power: 1.3 watts  
Record audio output: Earphone jack  
Recorder activator: No  
S meter: No  
Computer interface: No  
Conversion scheme: Double conversion  
Sensitivity: 0.5 uV or better 29-512 MHz FM, 0.8 uV 108-136 MHz, 1 uV 806-956 MHz  
Selectable preamplifier: No  
Selectable attenuator: No  
Selectivity: (-55 dB) 50 kHz  
Image rejection: Unavailable  
Selectable AGC: No  
Dynamic range: Unavailable  
Passband tuning: No  
Noise blanker/limiter: No  
Adjustable notch filter: No  
Tone control: No  
Antenna connector: BNC  
Auxiliary connector: No  
Dimensions: 9"W x 6-1/2"D x 2-1/4"H  
Weight: 1 lb. 6 oz.  
Power requirements: 12 VDC  
Warranty: One year  
Accessories included: 120 VAC wall adaptor, whip

## Uniden Bearcat BC855XLT



Don't be fooled by its low price. The BC855XLT is a low-profile, desktop scanner with outstanding performance. Offering a frequency range of 29-54, 108-174, 406-512 and 806-956 MHz (less cellular, restorable), this sleekly-designed scanner includes 50 memory channels, individual channel lockout and delay, automatic squelch, priority, a non-volatile memory and powerful, crisp 1.3 watt audio!

All land mobile public service bands, civilian aircraft band, instant weather channel access are yours, and its BNC jack accommodates a snap-on whip (provided) or your external antenna. A 12-volt AC wall adaptor is included.

Order SCN8

Only

**\$189<sup>95</sup>**

Retail ~~\$299<sup>95</sup>~~

\$6 UPS  
\$9 2nd Day Air  
\$9 Priority Mail  
\$10 Canadian UPS  
\$12.50 Canadian Air Parcel Post



# NEW!

## Realistic PRO-43 Handheld Scanner



Yes, Realistic is now leading the market with their new 200 channel, programmable, hand-held scanner with increased frequency range: 30-50, 118-174, 220-512 and 806-1000 MHz (less cellular).

Military and civilian aircraft, public safety, amateur, government, maritime, business--all VHF/UHF communications services in a compact 2-1/4"W x 5-3/4"H x 1-1/2"D handheld weighing only 14-1/2 ounces, sturdy belt clip and BNC flex whip included.

Runs off 6 AA alkaline or nicad batteries (not included). With its fast 25 per second scan rate, this triple-conversion scanner is a winning companion!

Order SCN 17

Retail ~~\$349~~

Grove price only

**\$299<sup>95</sup>**

\$6 UPS; \$9 2nd Day Air;  
\$9 Priority Mail  
\$10 Canadian UPS; \$12.50  
Canadian Air Parcel Post

### ACCESSORIES:

ANT 8	Range extending antenna	\$16.95
ACC47	Nicad batteries (6 required)	\$1.95/each
ACC37	AC Wall Adaptor/Charger	\$7.95

### SPECIFICATIONS

Frequency range: 30-50, 118-174, 220-512, 806-999.9875 MHz  
Keypad frequency entry: Yes  
Tuning steps: 5/12.5/25 kHz determined by frequency range  
RIT or fine tuning: No  
Display: Edgelit LCD  
Dimmer: On/off  
Recommended use: VHF/UHF utilities  
Receiving modes: AM/FM narrow  
Memory: 200 channels  
Scan: 25 channels per second  
Banks: 10  
Lockout: Yes  
Priority: Channel one  
Search: 50 channels per second  
Delay: Individual channel, 2 seconds  
Squelch: Yes  
Clock: No  
Audio output power: 250 milliwatts  
Record audio output: Earphone jack  
Recorder activator: No  
Computer interface: No  
Conversion scheme: Triple conversion: 608/48.5 MHz/455 kHz  
Sensitivity: 1 microvolt or better  
Selectable preamplifier: No  
Selectable attenuator: No  
IF selectivity: (-50 dB) 40 kHz  
Antenna connector: BNC  
Auxiliary connector: No  
Dimensions: 2-1/4" W x 5-3/4"H x 1-1/2"D  
Weight: 14.5 ounces  
Power requirements: 9 VDC (6 AA cells)  
Warranty: One year  
Accessories included: Belt clip, flex whip antenna

*The Most Popular High-Performance Scanner  
Ever Made is Even Better  
and At a Grove Discount Price!*



## The Realistic PRO 2006

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 CBI! Resists strong signal overload interference.

Rapid 26-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 provide for external speaker, tape recorder, and DC adaptor.

Order SCN 6

Retail ~~\$399~~

**\$359<sup>95</sup>**

Plus \$7 UPS, \$12.50 2nd Day Air,  
\$15.50 U.S. Priority Mail  
Canadians: \$12 UPS, \$19 Air P.P.

RECOMMENDED ACCESSORY: SP10 amplified extension speaker for car-filling sound (see page 31).

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

### SPECIFICATIONS

Frequency range: 25-520, 760-1300 MHz (less cellular)  
Keypad frequency entry: Yes  
Tuning steps: 5, 12.5, 30 (if cellular restored), 50 kHz  
RIT (fine tuning): No  
Display: Backlit LCD  
Dimmer: Yes  
Type of listening recommended: VHF/UHF communications; casual FM broadcast  
Receiving modes: AM, wide & narrow FM  
Memory: 400 channels; frequency and mode  
Scan: 26 channels per second  
Banks: 10  
Lockout: Individual channel  
Priority: Any channel  
Search: 26 channels per second  
Delay: 2 seconds, individual channels  
Squelch: Yes  
Clock: No  
Audio output power: 1.3 watts @ 8 ohms  
Record audio output: 600 mV @ 10K ohms  
Recorder activator: No  
Smeter: No  
Computer interface: No  
Conversion scheme: Triple up-conversion  
Sensitivity: 0.5 uV NFM 25-1100 MHz; 2 uV AM; 3 uV WFM  
Selectable preamplifier: No  
Selectable attenuator: Yes, 10 dB  
Selectivity: (-6/-50 dB) 18/30 kHz NFM/AM; 300/600 kHz WFM  
Image rejection: Unavailable  
Frequency stability: Unavailable  
Selectable AGC: No  
Dynamic range: Unavailable  
Passband tuning: No  
Noise blanker/limiter: No  
Adjustable notch filter: No  
Tone control: No  
Antenna connector: BNC  
Auxiliary connector: No  
Dimensions: 8-1/2"W x 4"H x 8"D  
Weight: 4-3/4 lbs.  
Power requirements: 120 VAC @ 60 Hz; 13.8 VDC (10 watts)  
Warranty: One year  
Accessories included: Telescoping whip, manual



## Extend the Reception Range Of Your Handheld Radio!

*6 dB gain over rubber duckies!*

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.

If your interest doesn't include 30-50 MHz low band, choose our new ANT-19 with its full adjustability from 4"-18" (transmits and receives from 144-960 MHz).

<b>Order ANT-8</b>	<b>(7"-46")</b>	<b>\$16.95</b>
<b>ANT-19</b>	<b>(4"-18")</b>	<b>\$12.95</b>
<b>ANT-8B</b>	<b>(w/right-angle BNC adaptor)</b>	<b>\$21.95</b>
<b>ANT-8N</b>	<b>(w/right-angle N adaptor)</b>	<b>\$23.95</b>

\$3.50 UPS; \$5.50 UPS 2nd Day Air

\$4 First Class Mail; \$4 Canadian small packet; \$7.50 Canadian UPS

*"The ANT-8 really did wake up my Cobra SR-15. Now I can get Los Angeles, California everyday on my hand-held scanner that I never could get before. For some reason, we get the Beverly Hills area on 33.700 and 33.820 from November to April from 9 am or so to 6 pm or so. This has been going on for years, but I could only get it on my base before!"*

— Officer R.J. Stika #1  
Iowa City Police Department

## Austin Condor High-Performance Flex Antenna

For years we have been looking for a replacement "rubber duckie" that really makes a difference on handheld scanners. It's here! The Austin "Condor" is guaranteed to improve weak signal scanner reception—on all frequency ranges—when compared to the original scanner antenna.



**Order  
ANT 14** Only

**\$29<sup>95</sup>**

\$3.75 UPS; \$6 UPS 2nd Day Air; \$4 US Priority Mail;  
\$8 Canadian UPS; \$6 Canadian Air PP

## The Grove Hidden Antenna



The Hidden Antenna may be used alone with your scanner for improved signal reception, over your attachable whip or may be connected to the powerful Grove PRE4 or TUN4 for considerably increase signal strength on scanners and shortwave receivers.

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, with 3 adaptors for PL259 (UHF), Motorola and BNC connections.

Only  
**Order ANT 6** **\$19<sup>95</sup>**

\$3.75 UPS; \$6.50 UPS 2nd day; \$3.50 US Parcel Post  
\$6 Canadian Air Parcel Post; \$8 Canadian UPS

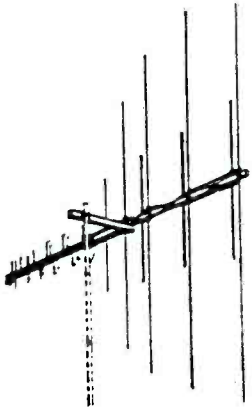




6-9 dB gain over other scanner antennas!

# SCANNER BEAM

The Best Scanner Antenna Money Can Buy!



Order **ANT1**

Only

**\$59<sup>95</sup>**

\$6 UPS; \$9.50 UPS 2nd Day  
\$11 US Priority Mail  
\$13 Canadian Air PP  
\$10 Canadian UPS

Only shipped in U.S. and Canada

Our world-renowned Scanner Beam has been improved to provide 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—available on pg. 26). Approximate size 8'H x 5'L.

## THE SCANTENNA FROM ANTENNACRAFT!

This new, full-frequency, omnidirectional scanner antenna will equal or outperform any competitor on the market. Its dipole-cluster design utilizes broadband techniques to provide continuous frequency coverage from 25-1300 MHz, offering superb reception of public safety, civilian and military aircraft, hams, personal communication devices, maritime, CB — anything in its frequency range! Requires TV type F connector on your coax—available on pg. 26. Approximate size 7-1/2'H x 4-1/2'W.



Order **ANT 7**

Only

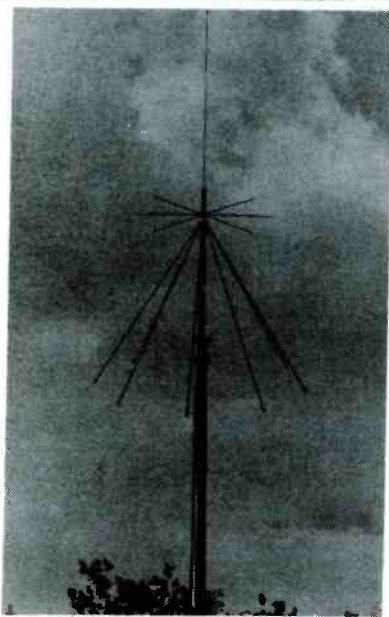
**\$39<sup>95</sup>**

Only shipped in U.S. and Canada

\$5 UPS; \$8 UPS 2nd Day Air; \$7 US Priority Mail, \$11 Canadian Air Parcel Post, \$10 Canadian UPS

## 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 Diamond offers a professional grade discone at a popular price.

Designed for use with wide-frequency coverage VHF/UHF scanners and receivers, the Diamond D130J 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 D130J is omnidirectional 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 2-1/8" diameter).

Choose 50 or 100 feet of coax from page 26.

### SPECIFICATIONS

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

Order **ANT 9**

Only

**\$79<sup>95</sup>**

\$5 UPS; \$7.50 UPS 2nd Day;  
\$7 US Priority Mail  
\$10 Canadian Air Parcel Post  
\$9 Canadian UPS



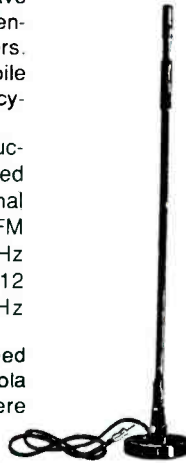
EXCLUSIVELY FROM GROVE!

## Designed for Today's Wide Frequency Coverage Mobile Scanners!

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

Utilizing Grove's exclusive bifilar helix construction, this sleek, black, 24" fiberglass whip, mounted on a strong 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 interstate highway speed and equipped with 12 feet of coaxial cable with Motorola and BNC connector, the ANT-4 will perform where others fail.

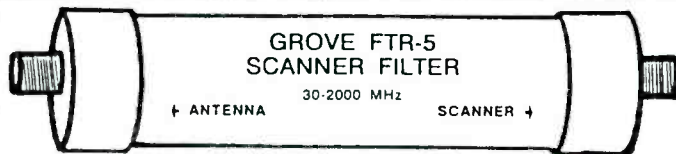


**ANT-4** **\$49.95**  
**(Magnetic mount antenna with Motorola and BNC connector)**

plus \$4.50 UPS; \$7.50 UPS 2nd Day; \$6 US Priority Mail  
\$9.50 Canadian Air Parcel Post; \$8.50 Canadian UPS

**ANT-4W** **\$24.95**  
**(Whip antenna alone for your 3/8" x 24 TPI threaded mount)**

plus \$3 UPS; \$6 UPS 2nd Day; \$4.50 US Priority Mail  
\$6 Canadian Air PP; \$7.50 Canadian UPS



## SCANNER FILTER

Years ago, our first scanner filter allowed the listener to reject any signal in the VHF high band which was causing overload problems. It was a step in the right direction.

But interference problems, are far more severe now, with multiple sources disrupting listening. A simple notch filter is no longer the answer. Enter: The new Grove FTR5 Scanner Filter! Ideal for use with outside antennas and with signal boosters (preamplifiers)—anytime interference is troublesome.

An adjustable 100-220 MHz 30 dB notch filter allows you to reduce or eliminate single-frequency interference from aircraft, mobile telephone repeaters, paging signals, NOAA weather stations, nearby amateur or other repeaters.

High-Q microstripline circuitry features custom-wound inductors for deep interference rejection. A rugged weatherproof enclosure allows masthead mounting. Standard F connectors are provided for convenient interconnection with other adaptors or accessories.

A diode shunt array protects your scanner from nearby lightning strokes and high-powered transmitters. A high-pass filter removes shortwave feedthrough, while band-reject filters remove FM and TV broadcast interference automatically.

Nothing has been overlooked in this state-of-the-art 30-2000 MHz filter. Full instructions included.

<b>Order</b>	<b>FTR5</b>	<b>F connectors</b>	<b>\$39.95</b>	
	<b>FTR5B</b>	<b>BNC conn</b>	<b>\$44.95</b>	\$3 UPS; \$6 2nd Day Air
	<b>FTR5M</b>	<b>Motorola conn</b>	<b>\$44.95</b>	\$4 US Priority Mail;
	<b>FTR5P</b>	<b>PL259 conn</b>	<b>\$44.95</b>	\$8 Canadian UPS
	<b>FTR5N</b>	<b>N conn</b>	<b>\$44.95</b>	\$6 Canadian Air Parcel Post

### SPECIFICATIONS

Passes: 30-50, 118-174, 225-1500 MHz	Insertion Loss: less than 3dB
Rejects: 0-30, 50-118, 174-225 MHz	Dimensions: 6"L x 1-1/8"D
Frequency Range: 30-2000 MHz (nom.)	Weight: 3 ounces

## Windshield Mount Scanner Antenna



No holes and no magnets, this 22" Valor Glas-Master is designed for today's wide-frequency-coverage mobile scanners, 30-1200 MHz (not for transmitting). Simply clean an area on your rear window (cleansing pad included) and stick the antenna base to the glass. A companion coupler on the inside of the window does the rest!

15' of cable with BNC and Motorola connectors included—no assembly required.

**\$49.95 manufacturer's retail**

*Grove price only*

**Order**  
**ANT 13** **\$39.95**

\$4 UPS; \$7 UPS 2nd Day Air; \$5 US Priority Mail  
\$8 Canadian UPS; \$7.50 Canadian Air PP

**ACCESSORY: ACC94 Adhesive re-mount kit** **\$4.95**

## RECEIVE CONTINUOUS 810-912 MHz ON YOUR PROGRAMMABLE SCANNER

## GRE SUPER CONVERTERS

Looking for the best way to get uninterrupted 810-912 MHz coverage on your hand-held or desktop scanner? Whether your scanner doesn't have that range now, or is one of the models with certain 800 MHz frequencies factory-censored, these high-sensitivity converters from GRE will fill in the gap!

Simply install a nine-volt battery (not supplied); BNC connectors are provided to interconnect with your scanner. Use an 800 MHz-capable external antenna or attach a whip adjusted to about 4" (or 12" for gain) like the Grove ANT-19 (\$12.95) or ANT-8 (\$16.95).

When you tune 410-512 MHz on your scanner, you will be receiving 810-912 MHz! Just add 400 to the frequency displayed on your scanner, and you'll know your receive frequency when the scanner is switched on. A handy bypass switch allows you to restore normal operation of your scanner without having to remove the converter.



Super Converter II  
for handheld  
scanners



Super Converter 9001  
for tabletop scanners

factory price ~~\$94~~

**ORDER CVR2 for hand-held scanners: \$79.95**

**ORDER CVR3 for desktop or mobile scanners: \$84.95**

\$4 UPS; \$6.75 UPS 2nd Day; \$6 US Priority Mail  
\$8 Canadian Air Parcel Post; \$8 Canadian UPS



## Metro West Long-Life Battery Pack for BC200XLT, BC205XLT, and BC100XLT



Over the years, MetroWest has introduced a number of innovative accessories for hand-held scanners, but none is more welcome than their new, double-life battery pack for the popular Uniden BC200XLT hand-held scanner.

The "Pro-Pack 1200" is numbered for its 1200 mAH charge capacity, twice that of the BP200 which comes with the BC200XLT from Uniden. The replacement look-alike slips right on the scanner to replace the original.

About 1/4" taller and slightly fatter than the Uniden pack, the Pro-Pack 1200 does not allow the top strap of the Uniden case to button over the top as it did before, but is still may wrap around the front or back securely.

Because the charger jack on the battery pack had to be relocated due to battery density, the scanner must be removed from its holster before it can be recharged. The user may wish to punch a second hole at the new location for plug-in convenience.

An AC wall adaptor/charger is included.

Order ACC16 Only

**\$65<sup>95</sup>**

\$4 UPS; \$6.75 2nd Day Air; \$5.75 US Priority Mail  
\$8 Canadian UPS; \$8 Canadian Air PP



## New! Metro West Pro-Charge 7

### Drop-In Charger for the Metrowest Battery!

Charge your high-capacity Metrowest battery like the pros with this drop-in charger (not for original Bearcat battery pack). Automatic circuit provides a full charge in just seven hours, yet prevents overcharging! Powered by your 12 VDC wall adaptor or from the Grove ACC23 cigarette lighter cord.

Lightweight (8 oz.) and compact (3-1/4" x 4-1/2" x 1-3/4"); two-color LED indicator shows charge status.

Order ACC 70 Only

**\$36<sup>95</sup>**

\$4 UPS;  
\$6.75 2nd Day Air;  
\$5.75 US Priority Mail  
\$8 Canadian UPS;  
\$8 Canadian Air PP

## Rechargeable AA Nicad Batteries (500 milliamp)

Grove Discount Price  
only

**\$1<sup>95</sup>/ea**

For use with the PRO-37 as well as other handheld scanners.

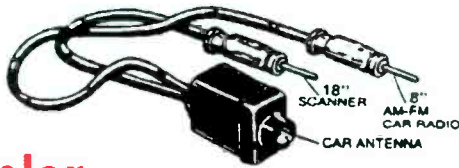
Order  
ACC 47

plus \$1.50 shipping  
any quantity



Convert Your Car Antenna  
Into a Scanner Antenna!

## Mobile Antenna Multicoupler



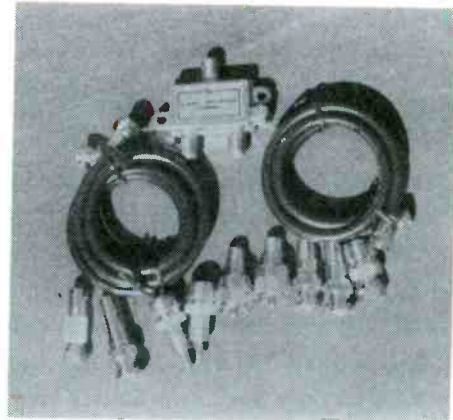
How would you like to enjoy excellent 30-960 MHz scanner reception using your existing AM/FM auto antenna? That's right; no holes, no magnets, no scratched paint or clumsy cables going through doors and windows. Ideal for low-profile monitoring installations where a separate scanner antenna is desirable.

The Para Dynamics PDC 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. If you need a BNC connection, order an ADP 22 for \$5.95.

Order CPL-63 **\$14<sup>95</sup>**

\$3.50 UPS; \$6.50 2nd Day Air; 4 US Priority Mail  
\$8 Canadian UPS; \$6 Canadian Air PP

## Dual Scanner Multicoupler



Would you like to connect two scanners (or one scanner with separate antenna jacks) to one antenna cable? The new Grove CPL-SC universal multicoupler is the answer! Insertion loss only 3 dB maximum; port isolation typically 25 dB; impedance 50-75 ohms.

Consisting of a wide-frequency-coverage splitter (25-1300 MHz or more) and two 3' output cables with adaptors for UHF (PL-259), Motorola, F, and BNC connectors (input and output), you'll be set for any combination.

Order CPL-SC **\$29<sup>95</sup>**

ADP 15 adaptor for ICOM  
AH-7000 discone, \$5.95

\$3.50 UPS  
\$6.75 UPS 2nd Day Air  
\$4 US Priority Mail  
\$7.50 Canadian UPS  
\$6 Canadian Air PP



## Premium Low-Loss RG-6U 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 need, 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!

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

**CB50 (50 feet w/ connectors) \$19.95**

\$4 UPS; \$7.50 UPS 2nd Day; \$5.50 US Priority Mail;  
\$7.50 Canadian Air PP; \$8 Canadian UPS

**CB100 (100 feet w/ connectors) \$29.95**

\$4.50 UPS; \$7.50 UPS 2nd day; \$6.50 US Priority Mail;  
\$8.50 Canadian Air PP; \$9 Canadian UPS

<b>Cable loss per 100 ft:</b>
1.6 dB @ 50 MHz
2.6 dB @ 170 MHz
4.6 dB @ 450 MHz

No other lengths available

### Adaptors Available:

- ADP1 UHF Female to F male
- ADP2 F Female to PL259 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

- ADP9 F 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
- ADP17 BNC female to F male
- ADP18 F/2 wires

- ADP19 UHF/2 wires
- ADP22 MOT/BNC
- ADP24 BNC female to PL259 male

Adaptors may be ordered separately for \$5.95 each. Free shipping if ordered with other products; \$1.50 for one or more shipped alone.

If you are unsure which adaptor is needed call Sue at 704-837-7081 for assistance.



**New Low Prices  
on Grove Antenna  
Systems**

# Grove's Outdoor Scanner Antenna System

Start with our Scantenna or Scanner Beam  
then add our PRE-4 Wideband Preamplifier



\*Not recommended for metropolitan use

The PRE 4 Power Ant has taken all the best from its successful predecessors and combined them into one powerful signal booster for scanners, even TV and FM stereos!

Equipped with a high gain, low noise, solid state amplifier stage, the PRE-4's front panel control allows custom selection of up to 20 dB of amplification!

The weatherproof remote booster module may be attached at the antenna for maximum effectiveness to overcome coax cable losses, or may be mounted on the back of the control box for convenience. Power is supplied to the remote module through your coax.

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. 120VAC/12VDC wall adaptor included.

## WHAT YOU NEED TO ORDER:

**ANT 7 Scantenna (see page 23) \$39.95**

*or*

**ANT 1 Scannerbeam (see page 23) \$59.95**

*plus*

**PRE 4 Preamplifier \$59.95**

**CK-SC Scanner Interconnect Kit \$12.95**

*(includes one 3' F/F cable with adaptors for most scanners)*

Shipping charges for system: \$10 UPS; \$17 UPS 2nd Day Air; \$15.50 US Priority Mail  
\$17 Canadian UPS; \$20 Canadian Air Parcel Post

**SPECIFICATIONS**  
**GAIN:** 20 dB max.  
**CONNECTORS:** Type F for signal line; 2.1 mm. DIN for power  
**CABINET:** Custom formed aluminum, baked enamel finish  
**DIMENSIONS:** 4"W x 2"H x 3"D  
**WEIGHT:** 10 oz.

*Connects to any scanner equipped with an external antenna jack*

# Grove's Indoor Scanner Antenna System

The Apartment Dweller's Dream



The Grove Hidden Antenna System is a high performance, amplified indoor antenna for scanner monitoring. The 66-inch flexible ANT6 can be tucked in a corner, hung behind a drape—just about anywhere out of sight. And when connected to the powerful PRE4 signal booster, you have instant coverage from 30 to over 1000 MHz.

Yes, wide area scanner coverage will be at your fingertips, and you can operate two scanners

Hidden Antenna, as packaged, with Grove PRE4

## WHAT YOU NEED TO ORDER:

**ANT 6 Hidden Antenna (see page 22) \$19.95**

**PRE 4 Preamplifier \$59.95**

**CK-SC Scanner Interconnect Kit \$12.95**

*(includes one 3' F/F cable with adaptors for most scanners)*

Shipping charges for system: \$7 UPS; \$11 UPS 2nd day Air; \$8 US Priority Mail  
\$15 Canadian UPS; \$13 Canadian Air Parcel Post

**"I wish to compliment you on the design of the PRE4. This is the best of three preamps that I have used for listening to the ATS-3 satellite. It beats the Radio Shack 15-1117 and the Ramsey 2 meter preamps in noise and amplification."**  
--Martin Toomajian, Jr.  
Watervliet, NY



## Communications Headphones

### For All Listening Requirements

Imagine—an ear-cushioned headset with adjustable volume controls for each earpiece and a stereo/mono switch built in! These new phones have a power handling capacity of 0.5 watts, frequency response of 20-18,000 Hz, sensitivity of 105 dB and 32 ohm impedance to match all external speaker/earphone jacks.

Perfect for any audio application—stereo systems, communications receivers and scanners. Coil cord with 1/4" plug included.

*Ideal for sports events!*



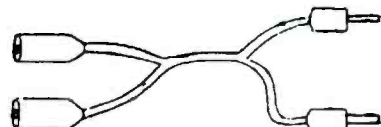
**Order HDP 1**

*Only*

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

\$5 UPS; \$7 UPS 2nd Day Air; \$5.50 US Priority Mail  
\$8.50 Canadian UPS; \$7.50 Canadian Air PP

Actual appearance may vary



**Accessories:**

ACC80 Universal Adaptor

\$12.95

ACC35 3/32" Adaptor (fits BC200XLT)

\$1.50

**Universal adaptor:** one or two 1/4" headphone jacks to 3/32" (2.5 mm) or 1/8" (3.5 mm) plug — fits all model scanners

## Mobile Cigarette Lighter Power Adaptor for Bearcat Scanners!



Simply plug the Grove ACC23 into your vehicle's cigarette lighter to charge the batteries and/or operate your Bearcat scanner or any other mobile accessory, including radar detectors and the Grove PRE4 Power Ant, which use a 12 volts DC, center pin positive, 2.1 mm barrel connector.

**ACC23**

*Only*

**\$9<sup>95</sup>**

**INCLUDING FIRST CLASS MAIL SHIPPING**

## Clip-On Mini Speaker for Handheld Radios

Brand new! This tiny (2" square), lightweight (2-3/4 oz.) speaker plugs into any standard 1/8" (3.5 mm) earphone jack and provides excellent, concentrated sound when clipped to a lapel or collar. Ideal for crowded or noisy locations where you don't want your scanner blaring and don't want the confinement of an earphone.



**Order SPK 9**

*Only*

**\$9<sup>95</sup>**

\$3.50 UPS; \$5.50 UPS 2nd Day Air; \$3.50 Priority; \$6.75 Canadian UPS; \$5 Canadian Air PP

**ACCESSORIES:**

ACC35 3/32" (2.5 mm) adaptor \$1.50 (for BC200XLT, etc).

## Recoton Smart Charge Portable Power Station



Don't ever be caught in a power shortage again. This portable powerhouse from Recoton provides 3, 6, 9 and 12 VDC to your battery- or DC-operated equipment at currents of up to 10 amps (120 watts)!

Ideal for camping or emergency radio operation—ham, CB, scanners and shortwave receivers, other two-way radio equipment—camcorders, portable TVs and refrigerators during storm power outages, or even starting battery-dead vehicles and boats. Charges from convenient 120 VAC line or a vehicle cigarette lighter (plug included).

The internal safety-sealed, 6.5 ampere hour, lead-acid battery has an automatic shutoff to prevent overcharging; a built-in voltmeter alerts you at all times to output voltage and battery condition.

Lightweight (8 lbs) and compact (7" x 4" x 8"), this Recoton Smart Charge power station is UL listed for safety and quick-charges in only three hours from your cigarette lighter receptacle or eight hours from an AC wall receptacle.

**Order PWR1**

**\$79<sup>95</sup>**

plus \$7.25 UPS; \$15 2nd Day Air; \$15.50 US Priority Mail; \$12 Canadian UPS; \$20 Canadian Air Parcel Post



**NEW** Low cost, Professional Quality Walkie-Talkies

## Realistic BTX-120

Why buy cheap toys when you can own professional handie-talkies? This Realistic BTX120 is ideal for business, personal, educational, medical complex, security, shopping center, camping and recreational communications. Clear, strong audio (350 milliwatts) and high sensitivity (0.5 microvolts) assure reliable communications of up to a mile or more, depending upon terrain.

Full one-watt power (switchable to 1/2 watt for battery conservation), flex whip with BNC connector for range-extending antennas, two channel capability (itinerant 151.625 MHz installed), charge status and transmit lights, stainless steel belt clip, slip-on battery pack for inexpensive AA cells, battery charger and license form (no test required) all included.

Measures a compact 2-1/2"W x 6"H x 1-1/2"D and weights a scant 17 ounces.

Order **TRCV1**  
Only **\$149<sup>95</sup>**

plus \$6 UPS; \$9 UPS 2nd Day Air; \$9 US Priority Mail  
\$10 Canadian UPS; \$12 Canadian Air Parcel Post



### ACCESSORIES:

ANT19	Range extending antenna	\$12.95
ACC89	Lapel mike/speaker	\$17.95
ACC58	Extra slip-on battery pack	\$39.95

Check the electromagnetic radiation levels  
in your environment!

## ELF RADIATION DETECTOR ONLY \$99<sup>95</sup>!



Order **GSM2**  
Only **\$99<sup>95</sup>**

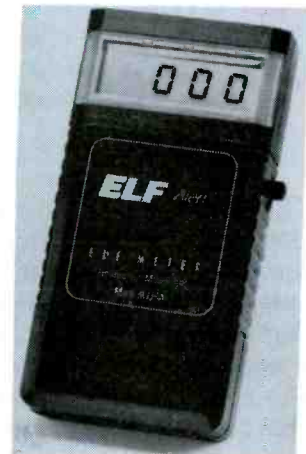
plus \$3.75 UPS; \$6 UPS 2nd Day Air;  
\$4.50 US Priority Mail; \$8 Canadian  
UPS; \$6.75 Canadian Air Parcel Post

By special arrangement with the manufacturer, Grove brings you this sensitive, dependable ELF (extremely low frequency) exposure meter to arm you against the hazards of electromagnetic radiation.

Not limited to just 60 Hz like competitive narrow-frequency units, this meter measures from 30-300 Hz to detect harmonic radiation from power lines and other sources.

Simply switch this pocket instrument on and read instantly the radiation from computers, radios, home stereo and video systems, appliances, power lines, electric blankets and more. Standard 9-volt battery included.

Choose from low-level **GSM2** (0.1-199.9 milligauss) or standard **GSM3** (1-1999 milligauss), only \$99 each including vinyl zipper pouch and informative instructions.



Order **GSM3**  
Only **\$99<sup>95</sup>**

plus \$3.75 UPS; \$6 UPS 2nd Day Air;  
\$4.50 US Priority Mail; \$8 Canadian  
UPS; \$6.75 Canadian Air Parcel Post



## Frequency Counter Facts

Frequency counters are among the most useful of all laboratory instruments, but their limitations as well as their advantages must be understood. Since they are broadband devices (untuned), they respond to all signals strong enough to be registered. If two or more signals are present at the same time, they will be measured at the same time—in a meaningless readout.

For this reason, in populated areas it is best to use a frequency counter with a short antenna located close to the source of signal to be measured; this way, only the desired signal frequency will be shown. A longer antenna may be used out in the country to measure a signal perhaps hundreds of feet away.

Now, use your Opto frequency counter to find the frequencies of public safety and business walkie talkies, cordless telephones, CB and ham transceivers, government and military transmitters, baby monitors, hidden bugs and wireless intercoms—anything radiating a steady signal in the frequency range of the frequency counter!

## Optoelectronics Pocket Frequency Counters



**Model #2300**  
**Order CTR 4**  
 only  
**\$125<sup>95</sup>**

We have added the necessary options and discounted the total for your best value! Ideal for calibrating signal generators, transmitters, for countermeasures applications, and for determining the unknown frequencies of transmitters, walkie-talkies, mobile radios, base stations, cordless phones, ham and CB radios, radio control units and other signal emitters.

These tiny, precision instruments offer outstanding sensitivity and TCXO (temperature compensated crystal oscillator) accuracy of 1 part per million. All prices include rechargeable battery pack and AC wall charger/adaptor, but not antennas (available from the list of accessories below). Units operate for several hours on a fresh charge, or continuously with the wall adaptor.

The effective range of these frequency counters varies from about one foot (cordless phones) up to 75 feet or more for more powerful transmitters.

For casual applications such as reading the frequencies of nearby transmitters, select the new 2300. Measuring a scant 3-1/2"W x 3-3/4"H x 1"D and weighing about nine ounces, it offers 1-2400 MHz frequency range, 8 LED readout and VHF/UHF sensitivity of 3 millivolts (3 mV).

Or, look at the advanced features of the new, premium 3000: Ten-digit LCD readout, optional backlite for clear night-time viewing; total-spectrum 10 Hz-3000 MHz frequency range—from sub-audible through microwave! 1 mV typical sensitivity; 16-segment LCD signal-strength bargraph for tuning nearby transmitters or tracking hidden transmitters; even lab measurement capability of period, time interval and ratio are included at no extra cost.

For surveillance applications ("sweeping" rooms for hidden bugs), an optional audible tone alerts you to the presence of an unseen transmitter, changing its pitch as you approach its hidden location without having to see the bargraph! A powerful pocket package at its advertised \$450, and an incredible value at Grove's price of only \$359.95!

### ACCESSORIES:

- ACC11 Zippered soft case (for 3000) \$15.95
- ACC18 Zippered soft case with display window (for 2300) \$12.95
- ANT19 4"-18" telescoping whip \$12.95
- ANT8 7"-46" long-range telescoping whip \$16.95
- ACC6 Test probe for circuit testing \$20.95



**Model #3000**  
**Order CTR 6**  
 only  
**\$349<sup>95</sup>**

**Optional backlite \$64.95**  
**and sweep tone**

### Shipping for above units:

- \$5 UPS; \$8 UPS 2nd Day Air; \$8 US Priority Mail
- \$9 Canadian UPS, \$10 Canadian Air PP





## Lightning/EMP Protector for Scanners and Shortwave Receivers

While nothing can withstand a direct lightning hit, the new Grove LA-1 connects between your antenna cable and radio to prevent induced voltages from nearby lightning strokes, high-powered transmitters, and other massive energy surges from burning out your equipment\*



Appearance may vary

Not a flimsy spark gap or simple diode shunt, the Grove LA-1 uses state-of-the-art gas discharge technology, proven in government tests to be the best deterrent against lightning and electromagnetic pulse (EMP) surges.

Responds in one ten-millionth of a second to short-circuit bursts of 250,000 volts at currents of 5000 amps, while allowing normal signal voltages (and even control voltages up to 50 volts AC or DC) to pass undisturbed! Extremely low signal loss—0.2 dB at 1500 MHz! Ideal for protecting scanners, shortwave receivers, CB equipment, VCRs, TVs, satellite receivers, FM stereo systems and more.

The tiny protector measures only 3/4"D x 1-1/2"L and comes equipped with standard F connectors for home entertainment equipment and Grove accessories. Adaptors are available as shown below.

- LA1F (equipped with F connectors) **\$19.95**
- LA1B (equipped with BNC connectors) **\$24.95**
- LA1P (equipped with PL-259 UHF connectors) **\$24.95**
- LA1M (equipped with Motorola connectors) **\$29.95**

\$3 UPS; \$5.50 UPS 2nd Day;  
\$6 Canadian APP; \$8 Canadian UPS

Will not prevent AC power line surges; such protectors are available from Radio Shack, computer stores, and most department stores.

## GRE Super Amplifier



Would you like more range out of your hand-held scanner? Try the new GRE Super Amplifier with built-in battery and 20 dB (adjustable) gain from 100-1000 MHz!

BNC connectors allow the Super Amplifier to be mounted between the scanner and rubber ducky antenna; a bypass switch permits the unit to be disabled without having to remove it.

A 9-volt alkaline battery (not supplied) will provide up to 24 hours of continuous operation; a convenient external power jack permits the unit to be used continuously from a 9 VDC wall adaptor (not supplied).

Order **PRE1**

Grove price only

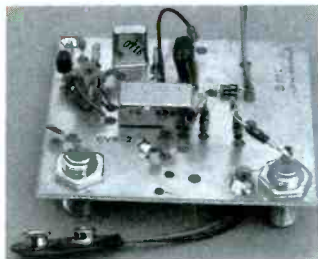
Retails for ~~\$69~~

**\$54<sup>95</sup>**

\$3.75 UPS; \$6.50 UPS 2nd Day Air; \$5 US Priority Mail  
\$8 Canadian UPS; \$7 Canadian Air PP

## Hear Shortwave on Your Scanner!

How would you like to hear the 4-22 MHz worldwide shortwave stations on your scanner? If you presently have aircraft band coverage, the world is yours with the new CVR1 Scanverter module from Grove Enterprises! We even provide the antenna!



Not a kit, the Grove Scanverter module comes fully assembled and tested! Simply attach a 9 volt battery (not included) and listen to BBC, Radio Moscow, the Voice of America, even time and propagation alerts from WWV and CHU! And if your scanner covers 115-141 MHz (AM mode), you can hear your local AM broadcasters and even CB!

The Grove shortwave Scanverter connected to your scanner unleashes global listening power! A quick glance at your conversion chart tells you where to tune in signals and how to interpret your scanner's frequency readout for shortwave.

The CVR1 Shortwave Scanverter module comes complete with antenna and interconnect cable which plugs into your antenna jack (cabinet not included.) Tell us your scanner model when you order.

Order **CVR 1** Only **\$39<sup>95</sup>**

\$3.50 UPS; \$6 UPS 2nd Day; \$6 Canadian UPS; \$6.75 Canadian APP



## Amplified Extension Speaker

The new Grove SP10 amplified extension speaker turns your scanner's mousy squeak into a lion's roar! Your radio's volume control automatically sets the SP10's output power. Ideal for emergency vehicles—or your own car (rugged metal tilt bracket included). Fills noisy locations with clear, room-expanding sound.



Capable of delivering a powerful 10 watts when connected to your radio's external speaker or earphone jack, yet small enough for under-dash mounting. Connect the SP10 to your vehicle's 12 volt system for mobile applications, or order the SP10A for AC operation.

Imagine—crisp, room-filling sound from your Realistic, Bearcat, or other compact receiver. Sleek, black communications styling and no more small-speaker blues!

### SPECIFICATIONS

Dimensions: 4-1/2"H x 5"W (less bracket)  
Weight: 26 ounces  
Speaker size: 4" square  
Impedance: 3-16 ohms nom.  
Input audio voltage: 1.5 V P-P max.  
Audio power: 18 watts peak

Operational power: 12 VDC @ less than 200 mA typ.  
Audio cable: 10 ft.; 3.5 mm (1/8") mini phone plug  
DC cable: 5 ft., color-coded; in-line 2 A. fuse

Manufacturer's suggested retail: ~~\$78.45~~

Grove price only

Order **SP10 (for mobile use)**

**\$39<sup>95</sup>**

plus \$4.50 UPS; \$7.50 UPS 2nd day  
\$6 US priority; \$9 Canadian UPS  
\$9 Canadian air parcel post

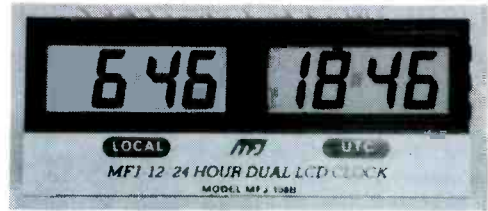
Order **SP10A (for 120 VAC operation): only \$49.95**



## MFJ Dual Digital Clock

This compact digital timepiece features two large LCD quartz movements to provide accurate 24 hour UTC radio time as well as local time. Mounted in a rugged extruded aluminum frame with a handsome brushed accent, the clock features high-contrast, 5/8 inch numerals, easy to see anywhere in your radio room.

Powered by a long-life battery, the clock may be switched to show seconds as well. Measuring a scant 4-1/2"W x 2"H, the MFJ108B dual time clock can easily fit on any radio desk and provide valuable time information instantly.



Order **CLK2**

Only

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

\$3.75 UPS, \$6 2nd Day Air, \$4 US Priority Mail  
\$8 Canadian UPS; \$7 Canadian Air PP

**NEW**

## MFJ World Map Clock



This new desk digital world map/clock adds a touch of golden elegance to your radio room. Time zones are available at the touch of a button, and the day of the week, date, and local 12 or 24 hour time with one second per day accuracy are also displayed in large LCD characters.

Key cities across the globe are highlighted to make identification easier and an alarm tone can be set to alert you to any particular time. The MFJ-112 measures 4" H x 3-1/2" W and battery is included.

Order **CLK4**

Only

**\$24<sup>95</sup>**

\$3.75 UPS, \$6 2nd Day Air, \$4 US Priority Mail  
\$8 Canadian UPS;  
\$7 Canadian Air PP

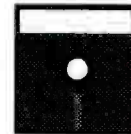
## FCC DATABASE ON DISK!

*Exclusively from Grove Enterprises*

City	State	Frequency	Service	Callign	License
MANVILLE	RI	M00870.03000	CL	KNKA292	PROVIDENCE
MAPLEVILLE	RI	M00154.19000	PF	KNGM17	CELLULAR
MELVILLE	RI	M03700.00000	CX	EB65036	OAKLAND



OR



**NEW  
1992  
EDITION!**

*"I received your FCC Database Program and am just gobbling up the information on it. It is great! (Jim Lockwood--Salem, OR)*

Now you can own the exhaustive Federal Communications Commission State Index database - millions of listings - all on convenient IBM-compatible disks with custom database manager included!

Services include broadcasting, radio common carrier (including cellular and mobile telephone), experimental, private, cable, land mobile, industrial, business, public safety (police, fire, medical), land transportation, specialized mobile radio, aviation ground stations and marine coastal stations.

All records are cross-indexed by frequency, licensee name, state, city, callign and service. If you need to identify a signal, simply type in whatever information you have and watch the full file come up!

Requires a hard drive\*\* and a minimum of 512K RAM; supports a mouse and CGA, EGA and VGA graphics.

Available on 5.25" High (1.2mb), 5.25" Low (360K) and 3.5" High (1.44mb) density disks.

**Only \$59.95\* for your program disk and one state and \$49.95\* for each additional state!**

1992 Updates: \$9.95 for program and \$29.95 for data

Please specify your state and what density (3.5HD, 5.25HD, 5.25LD\*\*(360K) disks that you need.



**ORDER TODAY!**

**Full installation of this program can take up to 1 hour, depending on the state.**

\* Plus \$2.50 shipping for one or more states.

\*\* CA, TX and FL not available in 5.25" Low Density (360K) format.

\*\*\* Requires anywhere from 1.8mb to 46.2mb of Hard Disk space, depending on the state.



## Color Wall Chart of the Radio Spectrum

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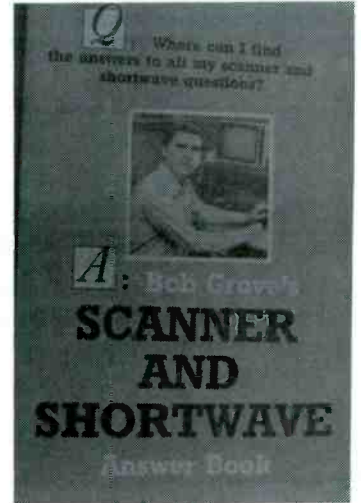
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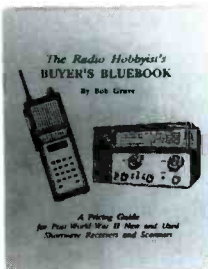
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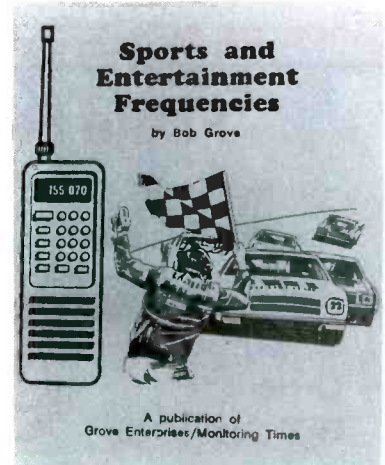
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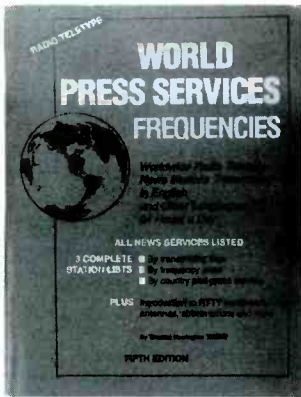
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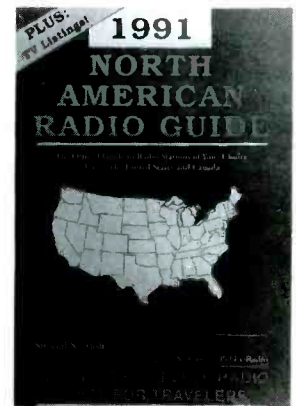
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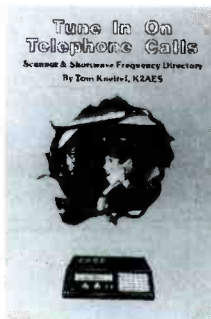
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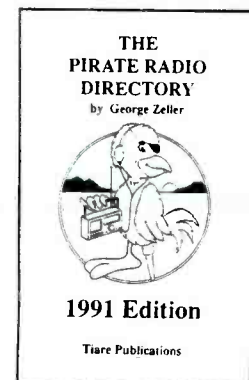
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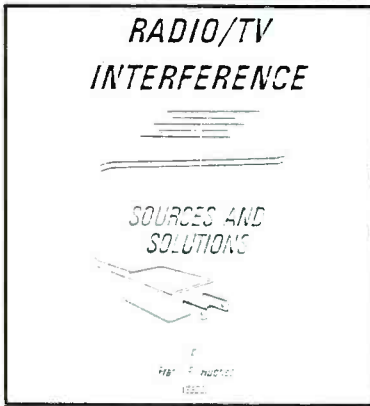
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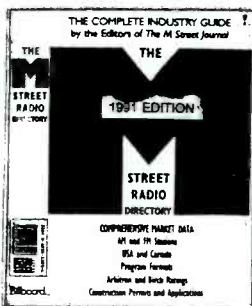
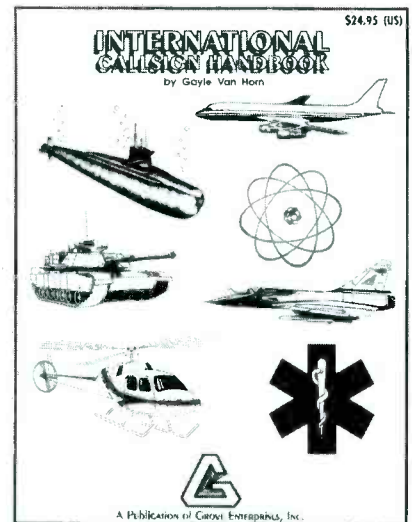
After years of collecting and verifying tactical callsigns, Gayle Van Horn has finally published the most exhaustive list of tactical callsigns and their identifications ever assembled for shortwave and scanner listeners. Now you, the radio listener, can get this massive, 250 page directory!

You will now know what all those codes from the US Air Force, Navy, Army, Customs, Secret Service, Marine Corps, and foreign military actually are! Internationally registered callsigns and their users around the world are listed as well, with comprehensive entries from coastal maritime stations, embassies, merchant marine, aviation, NASA, US and foreign military, Interpol, MARS, and many more!

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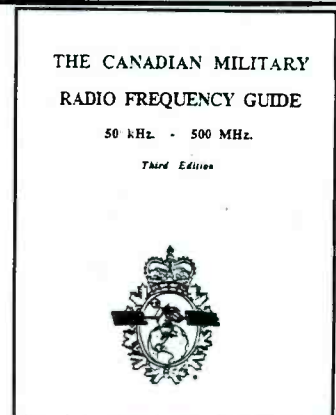
by Robert S. Ing

Previously, shortwave and scanner monitors have had to rely on occasional club bulletins or U.S. frequency directories for Canadian utilities information. This new book lists Canada's extensive worldwide military frequencies and locations of CFARS, Coast Guard, UN, NATO, NORAD, Snowbird, and many other military deployments.

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## Federal Frequency Assignment Master File

by *The Communications Research Council*

224 controversial pages provide the most comprehensive look at federal government frequencies in print. While most listeners will rejoice at the massive listings of federal and military frequencies—some quite sensitive, others will resent their being publicly published.

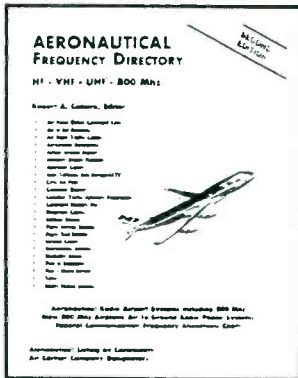
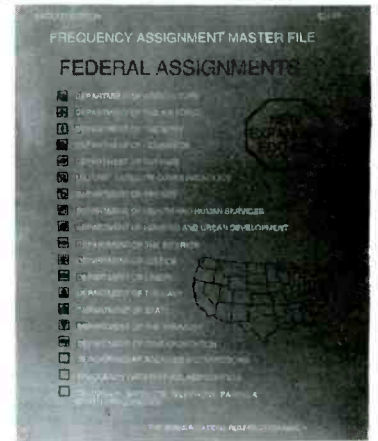
Well over 100 of those federal agencies, from the Central Intelligence Agency to the National Security Agency, from the FBI to the Border Patrol, are listed. And the book isn't just for scanner listeners; shortwave frequencies are listed as well, including the elusive Mystic Star network.

No matter where you're located, you'll hear many of these frequencies in use. Alphabetized by department and agency and their locations, then listed in frequency order, this compendium is the most authoritative reference for armchair monitoring of "forbidden" frequencies we've ever seen!

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Arranged alphabetically by state, lists include service, name, location, call sign, frequency and use. Tables include allocations, voice designators and more.

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This fifth edition of Tom Kneitel's exhaustive frequency directory for aircraft monitoring enthusiasts includes 2-30 MHz shortwave SSB as well as VHF-AM/FM and UHF-FM for all 50 states and Canada.

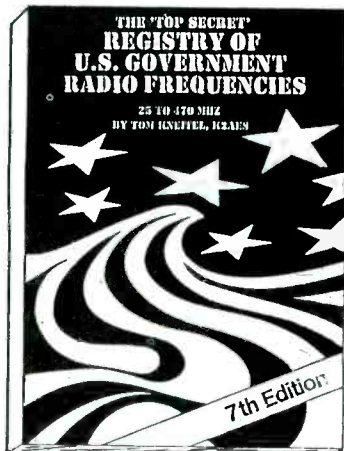
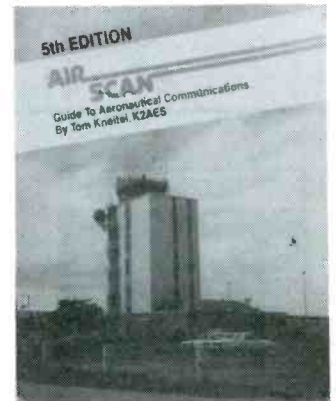
Many obscure but interesting listings are included as well, such as military and federal tactical frequencies, flight service stations, NASA support frequencies, conservation agencies, even air show frequencies!

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Yes, this is the book which made headline news and shook up Washington when a copy was uncovered during a major organized crime raid at a subversive listening post. Kneitel's Registry is the most massive collection of sensitive federal government and military radio frequencies in commercial publication.

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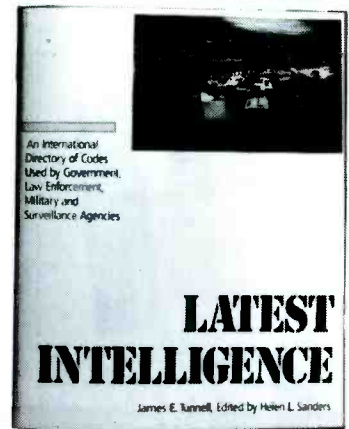
## Latest Intelligence

by James E. Tunnell

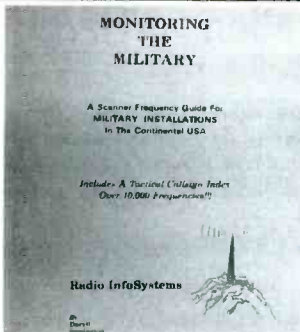
To quote the publisher's own description, "An international directory of codes used by government, law enforcement, military, and surveillance agencies." Whether your listening interest is scanner or shortwave communications, this encyclopedic reference is indispensable. Alphabetized by topic, thousands of terms, abbreviations, street-slang references, and surveillance buzz words are explained for the first time in this giant 300 page book.

Tables of frequencies used by DEA, ATF, FBI, cellular telephones, FAA, aircraft flight test, U.S. marshals, Border Patrol, medical networks, U.S. Air Force Mystic Star, military air refueling, aerobatic teams, Secret Service, and others are included.

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Frequency listings for 30-50, 118-174, and, 225-420 MHz are included for air tactical and refueling operations, military police, base security, paging, medical, disaster, fire/crash, command posts, commanders' nets, maintenance, and more.

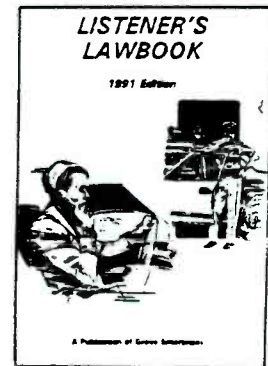
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Attorney Frank Terranella, whose specialty is radio law, has collected all of the monitoring laws across America, state by state (as applicable), and includes a thorough discussion of the 1934 Communications Act, the 1986 Electronic Communications Privacy Act, and even the latest FCC proposal to remove all police, fire, and medical channels from radio! Approximately 48 pages, 8-1/2" x 11".



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Edited by Gene Hughes (Hollins Radio Data)



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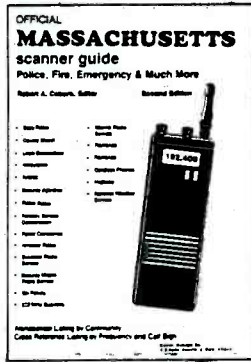
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## Directory of North American Military Aviation Communications (VHF/UHF)

by Jack Sullivan

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No other scanner directory ever published offers the extensive and accurate information contained in this new directory of military aviation communications. Compiled from official records, these four exhaustive volumes include frequencies, modes, locations, agencies, and uses for over 20,000 listings!

Aerial maps, a listener's glossary of terminology, monitoring hints, and a table of abbreviations highlight this information-packed set. Lists are cross-referenced by frequency and state, and alphabetized by city. And talk about comprehensive—this set covers not only the United States but Canada, Mexico, Virgin Islands, Bahamas, Cuba, Puerto Rico, and Central America as well!

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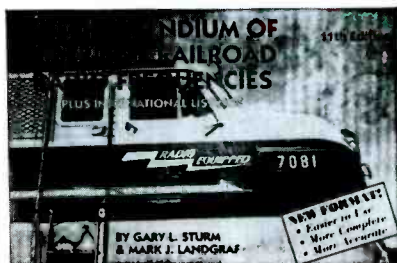
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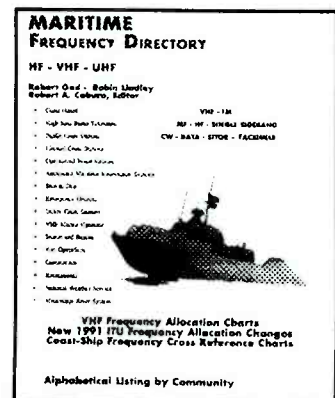
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by Robert Gad, Robin Lindley, Robert A. Coburn

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Identify those elusive DX stations by their musical interval signals, slogans and languages as shown in the exhaustive listings within its pages.

Additional chapters provide expert guidance in selecting equipment and accessories for listening. This 600-page standard reference should be on the bookshelf of every shortwave listener.

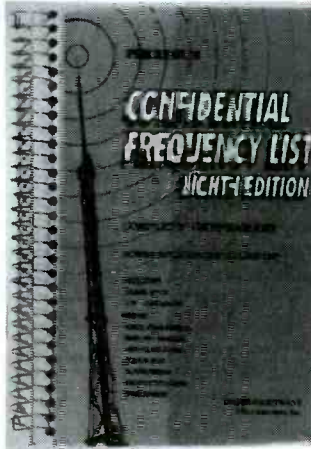


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If you are trying to learn more about the fascinating world of shortwave listening, this new book by a leading expert is just what you need. Harry Helms explains in easy-to-understand terms all about the hobby, from the types of listening targets to choosing the right receiver and accessories.

Join Helms on a world tour of the international broadcasters—including pirates and clandestines, describing their policies regarding verification reports (QSLs). Frequencies and time zones are accented to assure you the best catches. Utilities (the two-way communicators of the spectrum) are discussed in considerable detail, with some fascinating insights into the mystery stations. 320 pages, 6" x 9".



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Listings include U.S. and foreign Air Force, Navy, Coast Guard, Army, Energy and State departments, FBI and FCC networks, scientific installations, spies and smugglers, pirates and clandestines, emergency communications networks, aircraft and ships, NASA Space Shuttle tracking networks, English language broadcasting worldwide and much, much more!

All communications stations are cross-referenced by agency and frequency for rapid identification of those unknowns! An exhaustive glossary of commonly-heard radio communications terms, acronyms and abbreviations is included.

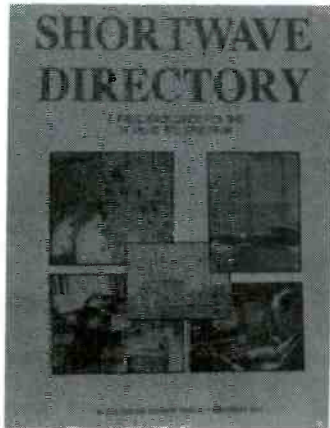
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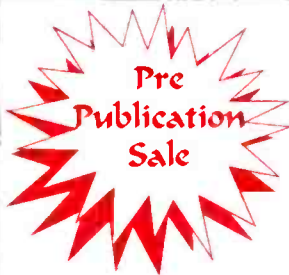
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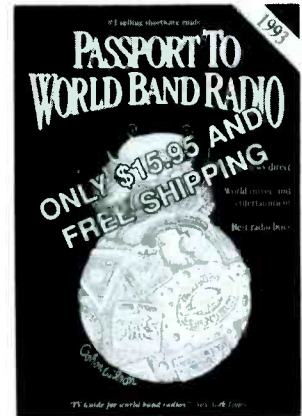
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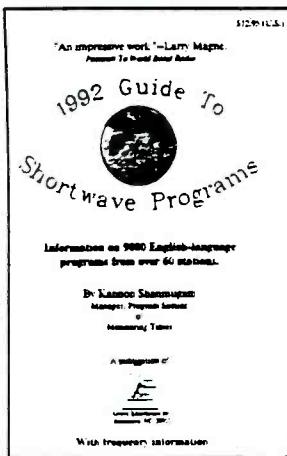
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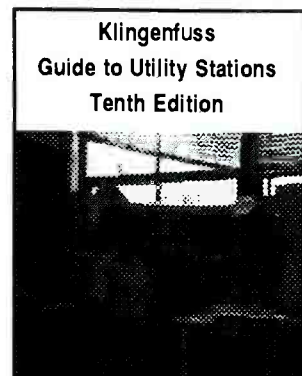
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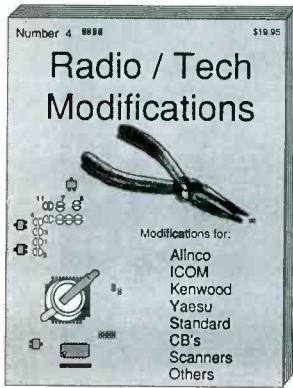
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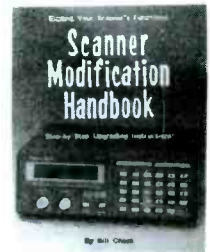
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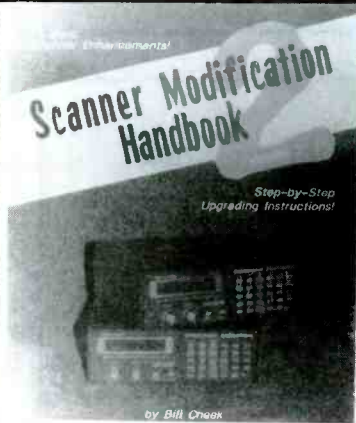
by Bill Cheek

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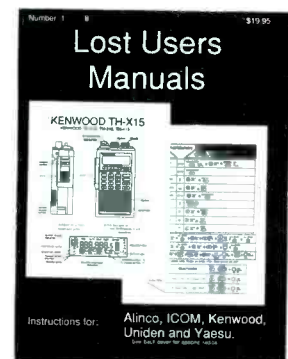


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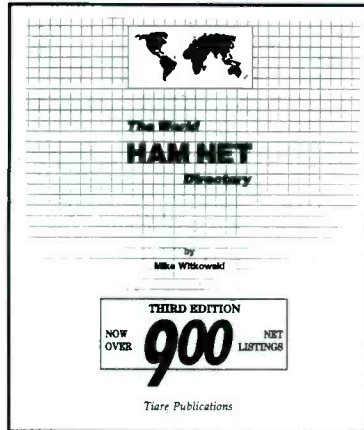
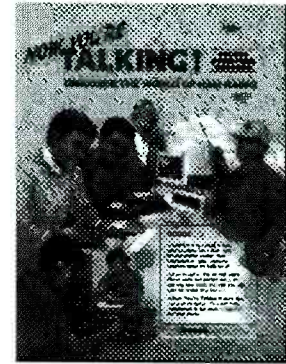
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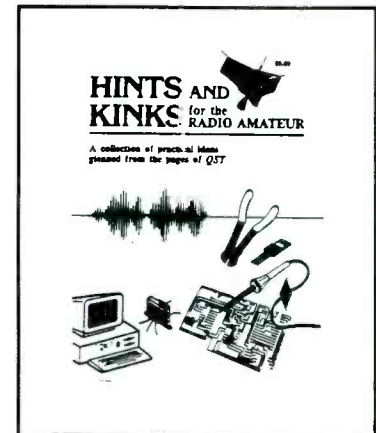
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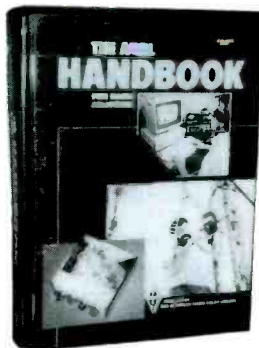


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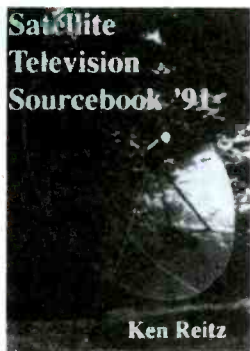
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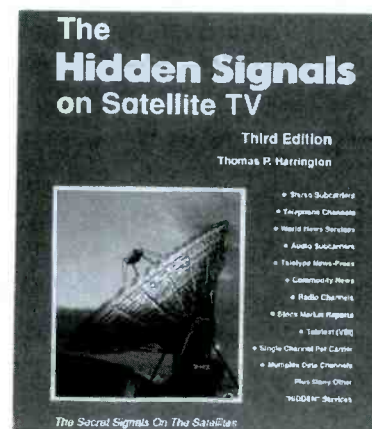
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