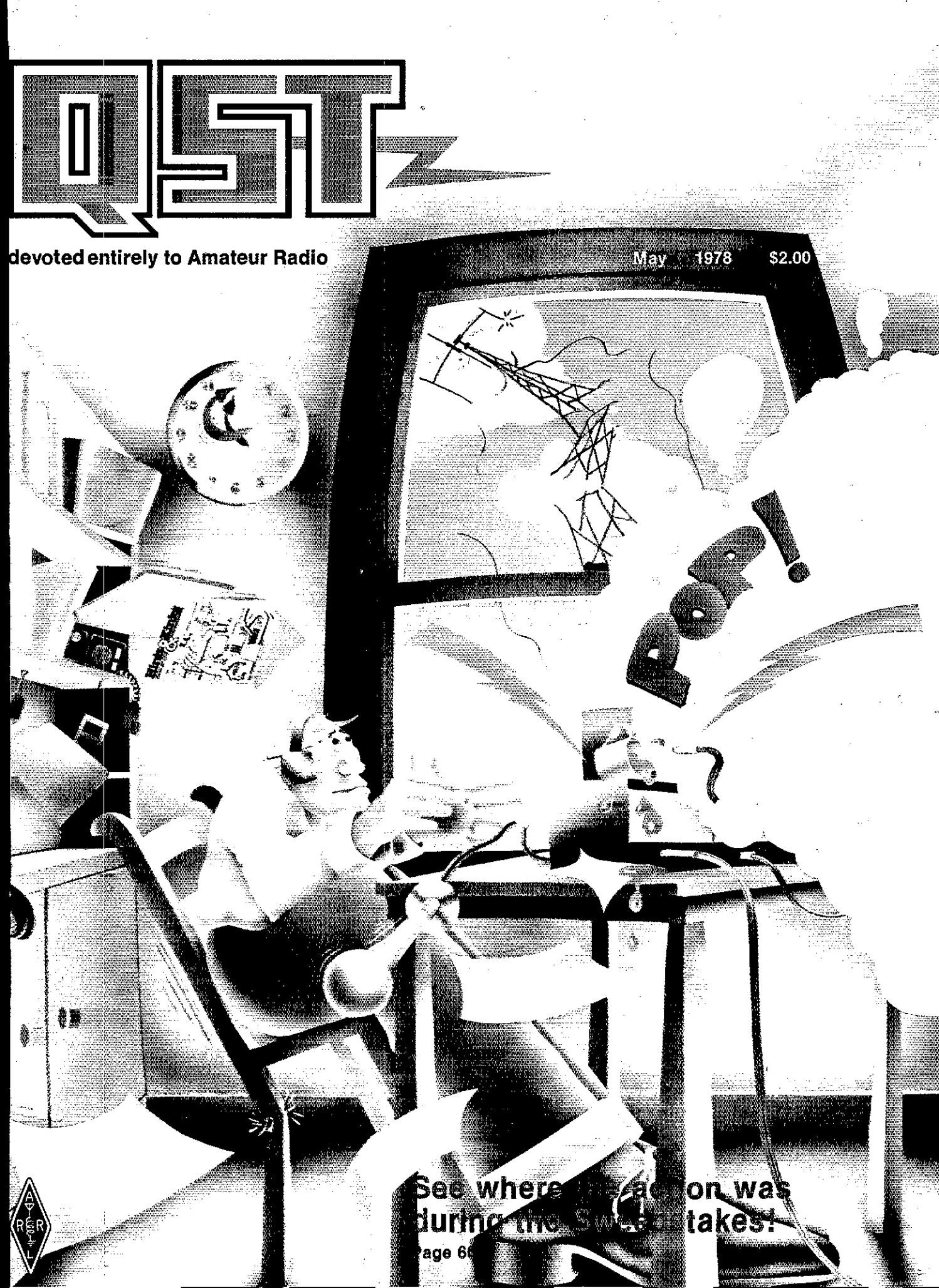
QST

devoted entirely to Amateur Radio

May 1978 $2.00



See where the action was during the Sweepstakes!

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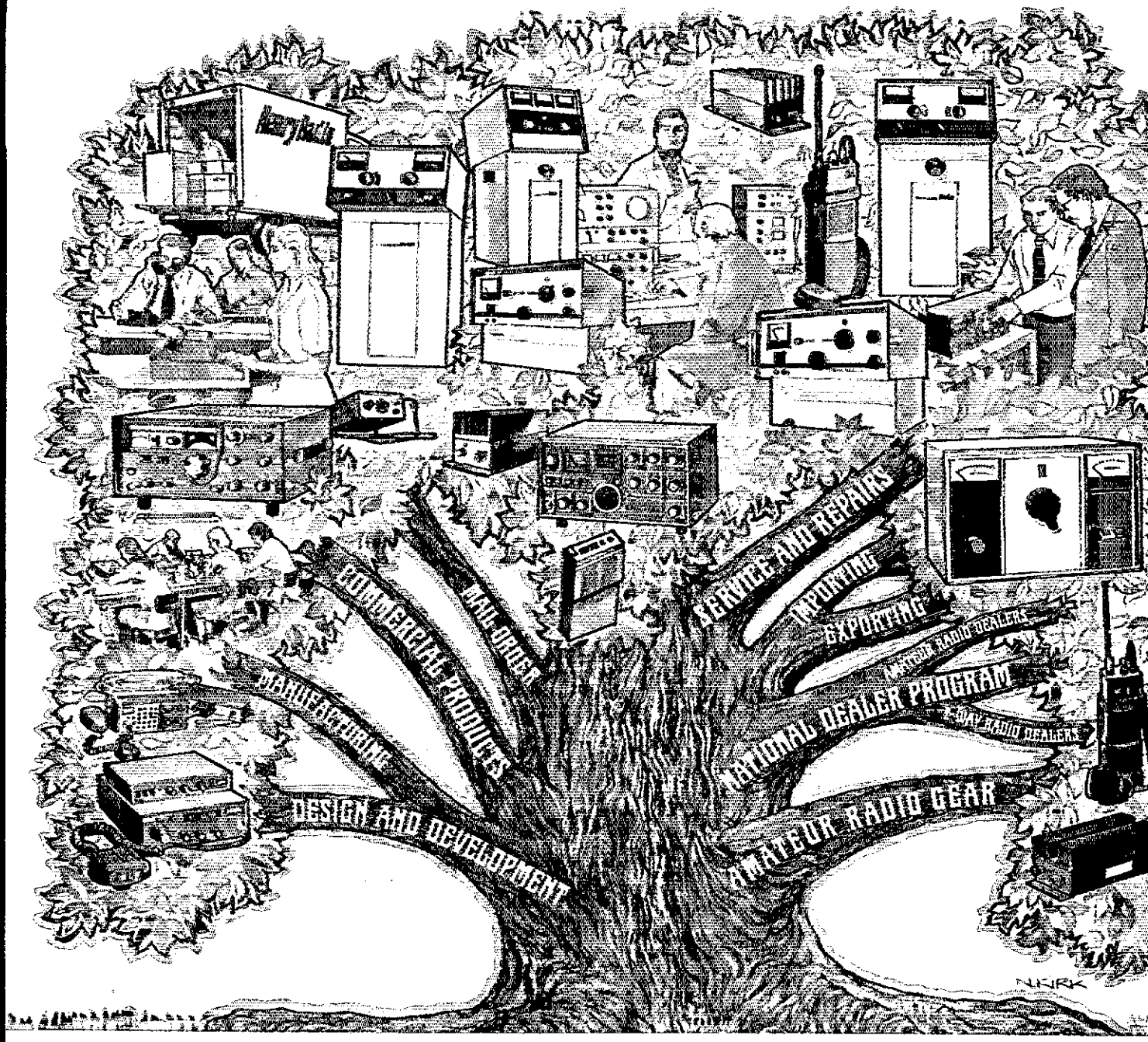

Our tree has many branches

At Henry Radio, we are proud that amateurs not only in the United States but throughout the free world look to us as their pre-eminent supplier of fine communications equipment. For fifty years this has been our principal business and it still is.

Most amateurs don't fully understand, however, the manner in which we have grown and grown so that every year we are better equipped to provide a genuine service to the world amateur fraternity and at the same time extend our unique blend of responsible, expert service to many electronic services in addition to the amateurs.

Our tree has indeed grown many new and sturdy branches. Yes, as always we distribute all the available high quality amateur equipment. In addition, we manufacture a full line of linear amplifiers that have become world famous for quality and reliability. These have provided the standard of reference in amateur radio for many years and are widely employed by commercial and government users. More recently our tube amplifiers have been supplemented by a broad line of solid state amplifiers for the HF, VHF and UHF bands. Many of these amplifiers are type accepted by the FCC for business, Public service, RCC and marine two-way service.

Out of this program has grown an entire new operatio providing high quality FM handhelds, mobiles and fixe station transceivers for all these services. Moreover, a an off-shoot of our vacuum tube amplifier program w now supply R.F. power generators to industry. These a used as plasma generators in thin film plating and oth exotic scientific processes.

What does all this mean to our most important cu tomers, the amateur radio operators of the world. Simp this. As Henry Radio grows these sturdy new branche on our tree of electronic expertise, we continual strengthen our ability to help the amateurs of the wor satisfy their communications requirements. As alway we offer expert, responsible assistance, the kind am teurs need and want. Wherever you live in the worl we invite you to turn to Henry Radio, the pioneer in se vice to the amateur radio fraternity.

Henry Radio

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Butler, Missouri 64730 816/679-3127

This is the amplifier you have been waiting for

The new 2KD-5 linear amplifier...a one piece desk model with the power and reliability of a console

At Henry Radio, we know how to build only one kind of amplifier . . . the best. We want you to compare the 2KD-5 with any other desk model at any price.

Remember, the 2KD-5 is only one model in the world's broadest line of amplifiers . . . both vacuum tube and solid state . . . for HF, VHF and UHF . . . fixed station and mobile . . . low power and high power.

Never before has any one company offered such a cornucopia of high power RF amplifiers.

Remember also that Henry Radio offers a broad line of commercial and FCC type accepted amplifiers covering the range of 3 MHz to 500 MHz. Henry amplifiers are in use all around the world. Commercial and export inquiries are invited.

- The 2KD-5 is a 2000 watt PEP input (1200 watt PEP nominal output) RF linear amplifier, covering the 80, 40, 20, 15 and 10 meter amateur bands.
- Two Eimac 3-500Z glass envelope triodes operating in a grounded grid circuit.
- Pi-L plate circuit with a rotary silver plated tank coil for greatest efficiency and maximum attenuation of unwanted harmonics.
- Full legal input in all modes. 2000 watts PEP input for SSB, 1000 watts DC input for CW, RTTY and AM.
- Jumper for 115 or 230 VAC, 3 wire single phase.
- 10.5" high x 15" wide x17.5" deep
- Price . . . $895.00

2K-4...LINEAR AMPLIFIER. Offers engineering, construction and features second to none. Provides a long life of reliable service, while its heavy duty components allow it to loaf along even at full legal power. Operates on all amateur bands, 80 thru 10 meters. If you want to put that strong clear signal on the air that you've probably heard from other 2K users, now is the time. Move up to the 2K-4. Floor console...$995.00

TEMPO 6N2 brings the same high standards to the 6 and 2 meter bands. A pair of advanced design Eimac 8874 tubes provide 2,000 watts PEP input on SSB or 1,000 watts on FM or CW. Complete with self-contained solid state power supply, blower and RF relative power indicator. ...$895.00

TEMPO 2002. The same fine specs and features as the 6N2, but for 2 meter operation only. ...$745.00

TEMPO 2006. Like the 2002, but for 6 meter operation. ...$795.00

TEMPO VHF/UHF AMPLIFIERS. Solid state power amplifiers for use in most land mobile applications. Increases the range, clarity, reliability and speed of two-way communications. FCC type accepted also.

Model	Drive Power	Output Power	Price
LOW BAND VHF AMPLIFIERS (35 to 75 MHz)			
Tempo 100C30	30W	100W	$159.
Tempo 100C02	2W	100W	$179.
Tempo 100C10	10W	100W	$149.
HIGH BAND VHF AMPLIFIERS (135 to 175 MHz)			
Tempo 130A30	30W	130W	$189.
Tempo 130A10	10W	130W	$179.
Tempo 130A02	2W	130W	$199.
Tempo 80A30	30W	80W	$149.
Tempo 80A10	10W	80W	$139.
Tempo 80A02	2W	80W	$159.
Tempo 50A10	10W	50W	$ 99.
Tempo 50A02	2W	50W	$119.
Tempo 30A10	10W	30W	$ 69
Tempo 30A02	2W	30W	$ 89.
UHF AMPLIFIERS (400 to 512 MHz)			
Tempo 70D30	30W	70W	$210.
Tempo 70D10	10W	70W	$240.
Tempo 70D02	2W	70W	$270.
Tempo 40D10	10W	40W	$145.
Tempo 40D02	2W	40W	$165.
Tempo 40D01	1W	40W	$185.
Tempo 25D02	2W	25W	$125.
Tempo 10D02	2W	10W	$ 85.
Tempo 10D01	1W	10W	$125.

TEMPO 100AL10 VHF LINEAR AMPLIFIER. Completely solid state, 144-148 MHz. Power output of 100 watts (nom.) with only 10 watts (nom.) in. Reliable and compact ...$199.00

TEMPO 100AL10/B BASE AMPLIFIER ...$349.00

Tempo solid state amplifiers are available at Tempo dealers throughout the U.S.

please call or write for complete information.

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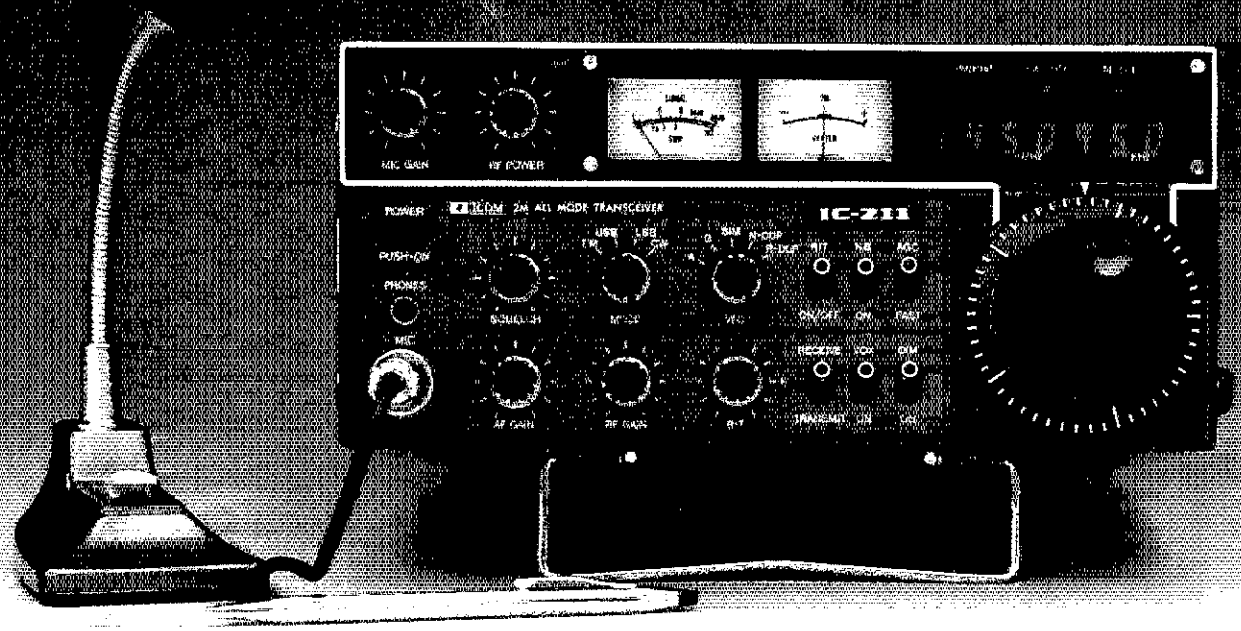
Prices subject to change without notice.

IC-211, the 2meter Maximizer

COMPUTER-COMPATIBLE 4 MHz TRANSCEIVER WITH 2 VFO'S



ICOM's **IC-211** maximizes band coverage, speed, performance and convenience like no other transceiver in the 2 meter world. This Maximizer's single-knob dial provides all 4 MHz in a flash, right to your single fingertip! The **IC-211** maximizes read-out speed with positively no time lag or backlash in display stability, even in modes using 100 Hz steps. The **IC-211's** freewheeling dial, with its superb inertia clutch, is instantly coordinated with the high speed, computer circuitry controlled synthesizer's seven digit read-out using an optical chopper. There is absolutely no mechanical connection between the smooth, bearing mounted flywheel knob and the **two dual-tracking VFO's**, which come built into your **IC-211.**

- **Single knob frequency selection:** The **IC-211** is synthesized with convenient single knob frequency selection over the entire 4 MHz. No more fussing with two or more knobs just to check what is going on around the band. One easy spin of the dial does it all.
- **Two VFO's built in:** The second VFO, which is an optional tack-on with most other transceivers, is an integral feature in every **IC-211.**
- **Variable offset:** Any offset from 10 KHz through 4 MHz, in multiples of 10 KHz, can be programmed with the LSI synthesizer.
- **Remote programing:** The **IC-211** LSI chip provides for input of touch tone and programing data from an external source, such as the microprocessor controlled accessory which will also provide scan and other functions (available summer '78). Computer control from a PIA interface is also possible (data available on request).
- **FM stability on SSB and CW:** The **IC-211** synthesis of 100 Hz steps makes SSB as stable as FM. This extended range of operation is attracting many FM'ers who have been operating on the direct channels and have now discovered SSB.

The **IC-211** is the very best and most versatile 2 meter transceiver made: that's all. For more information and your own hands-on demonstration, see your ICOM dealer. While maximizing performance, the **IC-211** minimizes impatience: yours is ready for delivery now.

Maximize the new repeater band: both the **IC-211** and the **IC-245/SSB** operate the the new FCC repeater spectrum with no modification.

All ICOM radios significantly exceed FCC specifications limiting spurious emissions.

Specifications: Frequency Coverage: 144.00 to 148.00 MHz; Modes: SSB (A3J), FM (F3), CW (A1); Supply Voltage: DC 13.8V + 15%; AC 117V + 10%; Size: 11mm(h) x 241mm(w) x 264mm(d); Weight: 6.8 Kg; TX Output: A3J, 10W (PEP), A1 & F3, 10W; Spurious Radiation: −60 dB below Carrier; Microphone Impedance: 600 Ohms; Sensitivity: A3J & A1, 0.5 microvolt 10 dB S + N/N; F3, 0.6 microvolt for 20 dB quieting; Spurious Response: −60 dB or better; Synthesizer Frequency Range: 144.00 MHz to 148.00 MHz; Synthesizer Step Size: 100 Hz or 5 KHz for SSB, 5 KHz for FM

Supplied with hand held microphone, AC cord, DC cord, fuses and owner's manual.

Specifications are subject to change without notice.

HF/VHF/UHF AMATEUR AND MARINE COMMUNICATION EQUIPMENT

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May 1978
Volume LXII Number 5

Published monthly as its official journal by the American Radio Relay League, Newington, CT, U.S.A. Official organ of the International Amateur Radio Union.

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Subscription rate $12.00 per year postpaid, U.S. funds, U.S. & Possessions; $13.50 in Canada; $14.50 elsewhere. Single copies $2.00. Foreign remittances should be by international postal or express money order or bank draft negotiable in the U.S. and for an equivalent amount in U.S. funds.

Second-class postage paid at Hartford, CT and at additional mailing offices. Postmaster: Form 3579 requested.

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QST is available to the blind and physically handicapped on magnetic tape from the Library of Congress, Division for the Blind and Handicapped, Washington, DC 20542.

Indexed by Applied Science and Technology Index, Library of Congress Catalog Card No.: 21-9421. Microform editions available from Xerox University Microfilms, Ann Arbor, MI 48106.

THE COVER

The 44th SS was one of those! See how you fared, beginning on page 66.

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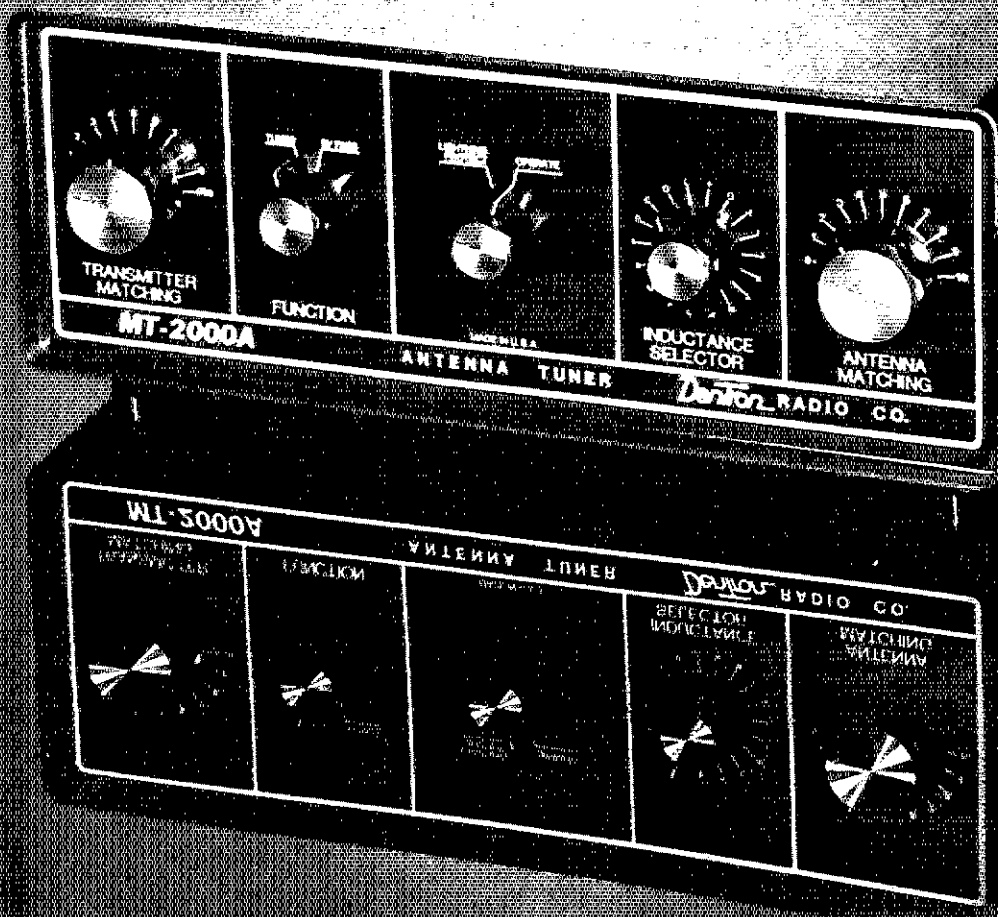
If they copy the style, they can't match the quality



If they copy the quality, they can't meet the price.

The original DenTron Super Tuner. The original Super Super Tuner. The original MT-3000A. And now DenTron brings you the original MT-2000A, an economical, full-power tuner designed to handle virtually any type of antenna.

The sleek styling and low profile of the MT-2000A is beautiful, but be assured that is only a part of the excitement you'll derive from the MT-2000A. The MT-2000A is designed and engineered using heavy-duty all-metal cabinetry, and high quality American components throughout.

When you consider the MT-2000A's unique features: 5¼"H x 14"D x 14"W, front panel coax bypass switching, front panel lightning protection antenna grounding switch, 3KW PEP, and the ability to match coax, random wire and balanced feedline, we're sure you'll decide to buy an American original and stay with DenTron.

MT-2000A **$199.50** at your favorite dealer.

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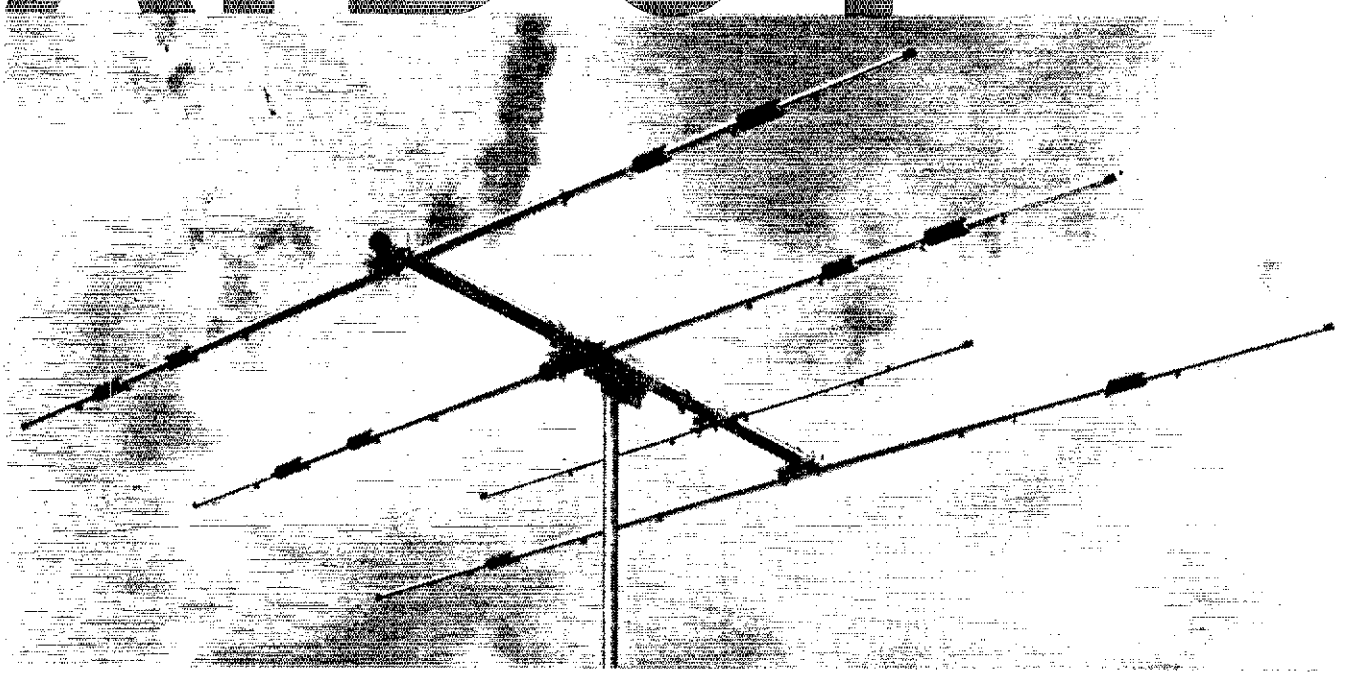
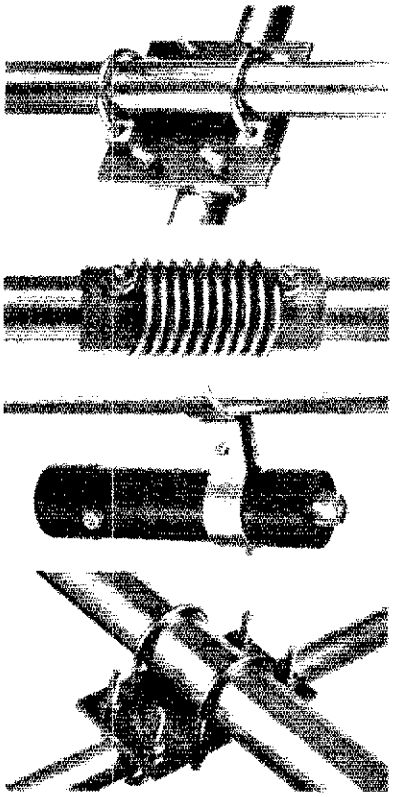
ATB-34





4 ELEMENT-3 BAND
10-15-20 METER BEAM

Cushcraft engineers have incorporated more than 30 years of design experience into the best 3 band HF beam available today. **ATB-34** has superb performance with three active elements on each band, the convenience of easy assembly and modest dimensions. Value through heavy duty all aluminum construction and a price complete with 1-1 balun.

Enjoy a new world of DX communications with ATB-34!

SPECIFICATIONS

FORWARD GAIN -	EXCELLENT	WIND SFC -	5.4 Sq.Ft.
F/B RATIO -	EXCELLENT	WEIGHT -	42 Lbs.
VSWR -	1.5-1	WIND SURVIVAL -	90 MPH.
POWER HANDLING -	2000 WATTS PEP		
BOOM LENGTH/DIA. -	18' x 2 1/8"		
LONGEST ELEMENT -	32'8"		
TURNING RADIUS -	18'9"		

COMPLETE
NO EXTRAS TO BUY

UPS SHIPPABLE

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KENWOOD

pacesetter in amateur radio

IT'S NEW, . . IT'S UNIQUE, . . AND IT'S TRULY USEFUL. IT'S KENWOOD'S SM-220 STATION MONITOR. THE SM-220'S UNEXCELLED VERSATILITY ALLOWS YOU TO MONITOR YOUR TRANSMISSIONS, MONITOR INCOMING SIGNALS, AND MONITOR THE AMOUNT AND STRENGTH OF BAND ACTIVITY* AND PERFORMS AS A GENERAL-PURPOSE 10 MHz OSCILLOSCOPE, AS WELL.

Kenwood offers this totally unique unit as a perfect compliment to your TS-820S or TS-620S station.** The SM-220 permits you to monitor your transmitted signals, thus assuring optimum linearity and maximum performance. With the addition of the BS-5 or BS-8 Pan Display option you will be able to determine visually the location and strength of adjacent signals without tuning your receiver off frequency. The choice of options allows you to adapt the SM-220 to either the TS-820S or TS-520S, depending on which rig you now have or may acquire.

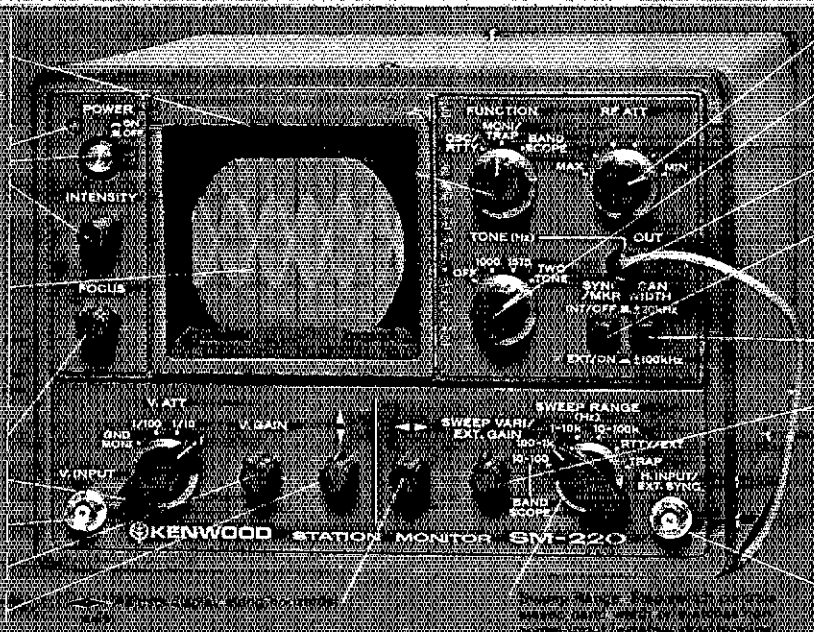
The SM-220 has a built-in two-tone audio generator with full provisions for tuning your exciter and linear amplifier (160 m through 2 m).

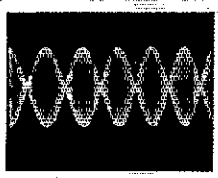
All this costs little more than a general-purpose oscilloscope. And, of course, it's pure Kenwood quality.

*With BS-5 or BS-8 option

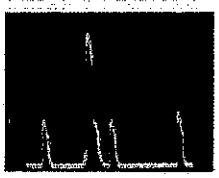
**For other models check with appropriate manufacturer for compatibility.

SM-220



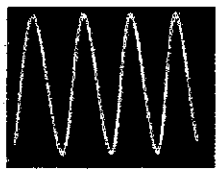


Two-Tone Wave Envelope For "performance" tune-ups or checking proper tranceiver operation.

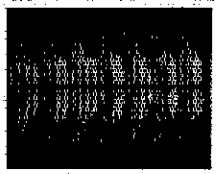


Pan Display Use to check source of interference during "QSO" without moving off-frequency. Also determines location and strength of adjacent frequencies. (Requires BS-5 or BS-8 option)

Keyed Waveform Shows detail of CW keying. Use to monitor the quality of your CW note. (Photo shows ideal waveform produced by TS-820S.)



Oscilloscope Operation (1 kHz) Oscillator function allows Sine, square wave, Lissajous patterns for testing or design work.



Trapezoid (TS-820S w/ TL-922) Shows linearity of power amplifier. Used primarily for testing.

Wave Envelope shows full SSB voice modulation, with processor on (full compression), and "clean signal" at full power.

arma

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WHERE RELIABILITY & ACCURACY COUNT

INTERNATIONAL CRYSTALS

70 KHz to 160 MHz

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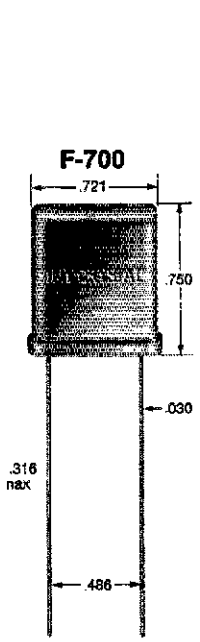
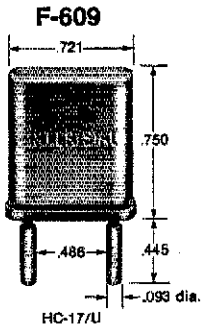
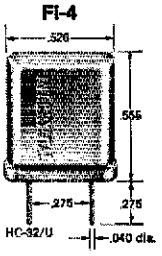
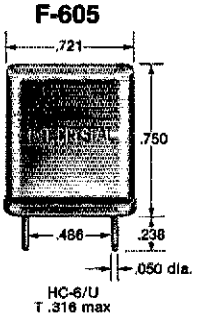
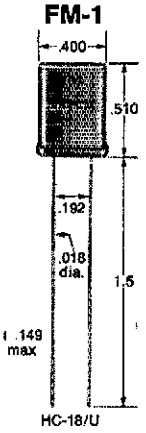


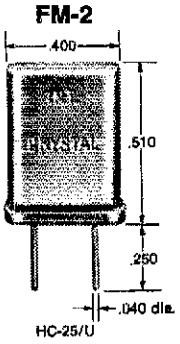








International Crystal Manufacturing Co., Inc. guarantees every crystal against defective materials and workmanship for an unlimited time, when used in equipment for which they were specifically made.



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(GP) for "General Purpose" applications
(CS) for "Commercial" equipment
(HA) for "High Accuracy" close temperature tolerance requirements

International Crystals are available from 70 KHz to 160 MHz in a wide variety of holders.

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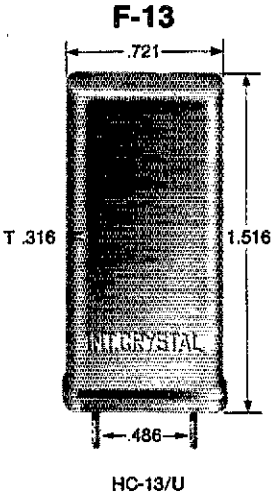

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405/236-3741

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Canada

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THE AMERICAN RADIO RELAY LEAGUE, INC.

"It Seems to Us..."

The American Radio Relay League, Inc., is a noncommercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is noncommercial and no one commercially engaged in the manufacture, sale or rental of radio apparatus is eligible to membership on its board.

"Of, by and for the amateur," it numbers within its ranks practically every worthwhile amateur in the nation and has a history of glorious achievement as the standard-bearer in amateur affairs.

Inquiries regarding membership are solicited. A bona fide interest in amateur radio is the only essential qualification; ownership of a transmitting station and knowledge of the code are not prerequisite, although full voting membership is granted only to licensed amateurs.

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The Fox Control Committee Boo-boos

A Modern Fable

Once upon a time in a land of free men and relatively free women there was an emperor elected by his people, ensconced in a beautiful domed castle on the shores of the backward-flowing Camotop River, and charged with awesome powers of governance.

Being emperor had peanut farming beat, but it wasn't all beer and skittles either. There were a lot of problems. Of course, if a problem was too big for one mere mortal's mental powers, the emperor did exactly what his predecessors had done — gather a group of wise men (or politicians) into what was known as a committee. The theory was that if two heads are better than one, six are better than two, and so on. Already committees had created the camel, the avocado seed, and the Gong Show, to say nothing of social security, the post office and the Edsel. With the emperor's committees doing all the work or at least keeping it off his desk, the emperor had lots of time for his hobby, fox hunting. He really loved to "follow the hounds" as they say, then sit down with visiting dignitaries (and politicians) to his favorite feast of roast wild pig.

Unnoticed by the emperor, one obscure committee left over from a previous administration was wrestling with a problem which either had several or no solutions; they weren't sure which. Their dilemma was that wild foxes were eating the emperor's wild pigs. Since the obscure committee was the Fox Control Committee it was clear even to them that something had to be done — probably by them.

The complicating factor was that the emperor's civilized foxes were the only beasts able to locate and corner the elusive but succulent wild pigs upon which the emperor loved to dine. And of course, the tame foxes, few as they were, trained as they were, and valuable as they were, looked to the Fox Control Committee's dozen eyes just like the wild foxes. The committee's reasoning, like the committee itself, was simple: if it runs like a fox, looks like a fox, and hangs around with foxes, it must be a fox.

But what to do?

Simple: Banish all foxes.

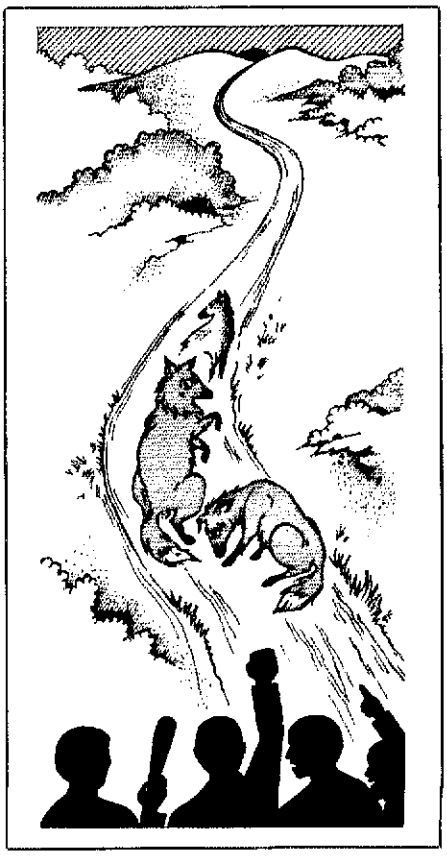
So the committee ordered all foxes to be gone. The first to go, of course, were the emperor's law-abiding foxes. Of the wild foxes, some split, some hid and some said unsayable things which the committee heard but quite properly ignored.

The committee congratulated itself on its success. The wild pigs were no longer being eaten by the wild foxes. In fact, the wild pigs were not being eaten at all, not by anybody — not even the emperor, as he discovered one day after returning from a singularly unsuccessful fox hunt.

"Where is the roast pig?" asked the emperor looking at a totally unacceptable substitute. Hearing the answer, the emperor angrily asked, "Why did the Fox Control Committee not control the lawless instead of punish the innocent?"

Why indeed?

As H. L. Mencken said, "For every complex problem there is a simple solution, and it is wrong." — *Dave Bell, W6AQ*



League Lines...

FCC totally revamped the U.S. call sign structure March 24. For details see page 49! "Washington Mailbox" has been postponed until next month so that we can give you the details of this late-breaking story.

Are you in danger of having your license revoked? That's what happens to several amateurs each year who fail to keep the FCC advised of their current mailing address. It only takes a letter to Gettysburg. See "Happenings", page 48.

George Jacobs, W3ASK (Propagation Editor of CQ), will head the IEEE delegation attending the Popov Society Congress being held in Moscow May 16-18. George hopes to operate from a club station while in the USSR.

FCC created a minor panic in the amateur community when they stated in a press release that they had dropped the prohibition of CBers contacting amateurs. FCC staffers later informed ARRL and news agencies that the rule had been dropped because it was redundant. So there is no practical change.

Four FCC agents accompanied by federal marshals conducted raids in four Maryland localities including Baltimore in early April, seizing $5000 worth of illegal linears, out-of-band CB transceivers and modified vfo's. Five persons face a variety of charges, which could bring them fines of up to $2000 for each day of illegal operation. The raids were a joint effort of the FCC District Office in Baltimore and the Special Enforcement Facility in Laurel, MD.

The IARU amateur societies in North and South America agreed in 1976 that 20-Meter third-party traffic should be transmitted on the low end of the foreign portion, high end of the U.S. portion -- say, above 14300 kHz. The voluntary cooperation of all amateurs is sought, in support of this agreement.

Pacific Northwest Public Relations net meets every Sunday at noon on 3940 kHz. W7CKZ is net control.

Some licensees continue to send the FCC fees with renewals and modifications, causing delays in processing. FCC asks that you send NO fees.

Governor Byrne (NJ) signed bill S-3086 into law February 23 permitting NJ amateurs to have more than one set of license plates with the same call sign.

Wanted! More contributions for our ARRL Library of Sounds. To record for the amateurs of tomorrow what the amateur radio of yesterday and today sounds like, we're looking for more cassettes, gramophone records, whatever, containing the sounds of amateur radio. The sounds of a DX pileup, the NTS in session, a rag-chew between two Novices, moonbounce, the SS contest, the Russian woodpecker, the "exclusive" amateur band at 7 MHz (!) -- these are some of the sounds that ought to be recorded for posterity. We've already got some material on hand, more is desirable. It'll be stored here for the benefit of future researchers and amateur radio historians. Please send your contributions to the ARRL Library of Sounds, with your name and address on each tape reel, cassette, or other recording, together with a brief descriptive phrase identifying the content of the tape. Thanks!

Some newcomers may not be aware that ARRL offers a technical information service for amateur-related problems. If you have an amateur-related technical problem and need help, send a complete description along with a business size s.a.s.e. addressed to Technical Information Service, ARRL Hq., and your name, address, amateur callsign, license class and your membership expiration date.

A Modular Control Unit — Just for Repeaters

Tedious, on-site repeater maintenance a problem? Then go modular! This simple plug-in control unit makes a standardized repeater practical. Or use it to put an emergency repeater on the air in a jiffy!

By Robert D. Shriner,* WAØUZO

The vast number of fm repeaters in existence across the United States testifies to the success of this mode of communication. Behind the scenes, however, are the continuing efforts of responsible individuals who must oversee the operation and maintenance of those stations. Not all of these efforts are shining moments of pleasure, particularly if a station happens to be situated atop a distant mountain. Difficulty in reaching the site is just one of several hindrances that may be encountered by the service crew. Severe weather can make the trek impossible. Then there can be those unforeseen technical problems involved in equipment breakdown that cannot be immediately accommodated for want of a component.

Here in Colorado such problems confronted several repeater groups. Leaders of these associations have met on numerous occasions to confer about particular difficulties involved in operating and maintaining their respective repeaters. Although repeater advisory councils have been formed in some states, the associations in the Centennial state are tied together in little more than a loose confederation. We believe, however, that our conferences have been especially fruitful. In my opinion, what may well be viewed as a breakthrough in repeater maintenance has resulted directly from these discussions.

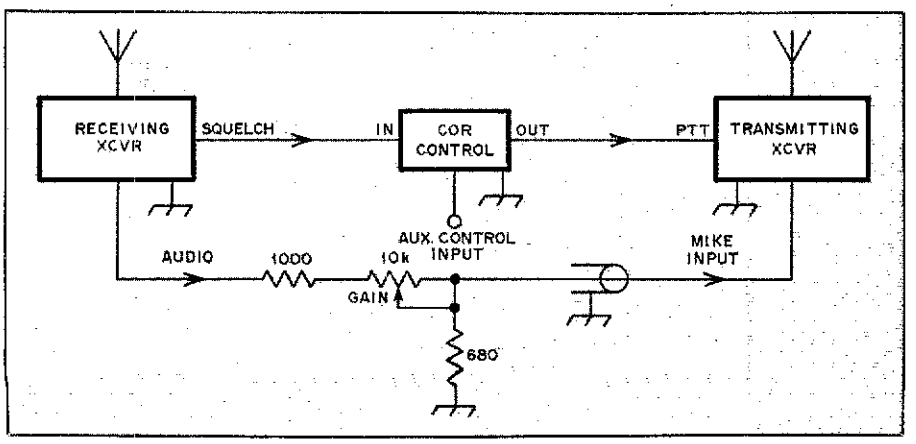
*Box 969, Pueblo, CO 81002

Could we simplify and perhaps even standardize, to some degree, our repeater installations? Surely there were reasons to do so. An unexpected windfall of some surplus Motrac railroad communications sets settled the question. The battle of standardizing was half won.

As we envisioned the standard plan, a repeater would have two transceivers in conjunction with a simple modular control system. Interchangeability of the transceivers would fill a need for backup support should the transmitting or receiving section of a unit fail. Plug-in design, where possible at the repeater, would offer another means of simplification.

But, in our opinion, a very significant advantage of the modular concept for a repeater station is that, in an emergency, a temporary repeater station can be established easily by pressing two mobile units into service. These two units, connected through a modular control unit, should be placed about 100 feet (30.5 m) apart for antenna separation. Imagine the convenience when urgent conditions require immediate repeater communications!

Fig. 1 — Block diagram of a repeater with two interchangeable transceivers. The COR control unit interfaces with any pair of transceivers. Audio from the output of one transceiver is fed to the microphone input of the other by way of the resistance network. Adequate level control is obtained by the 10-kΩ potentiometer. No loss of speech quality is encountered.



Planning the Control System

The task of planning and producing an effective control system fell largely into my hands. Perhaps that happened because

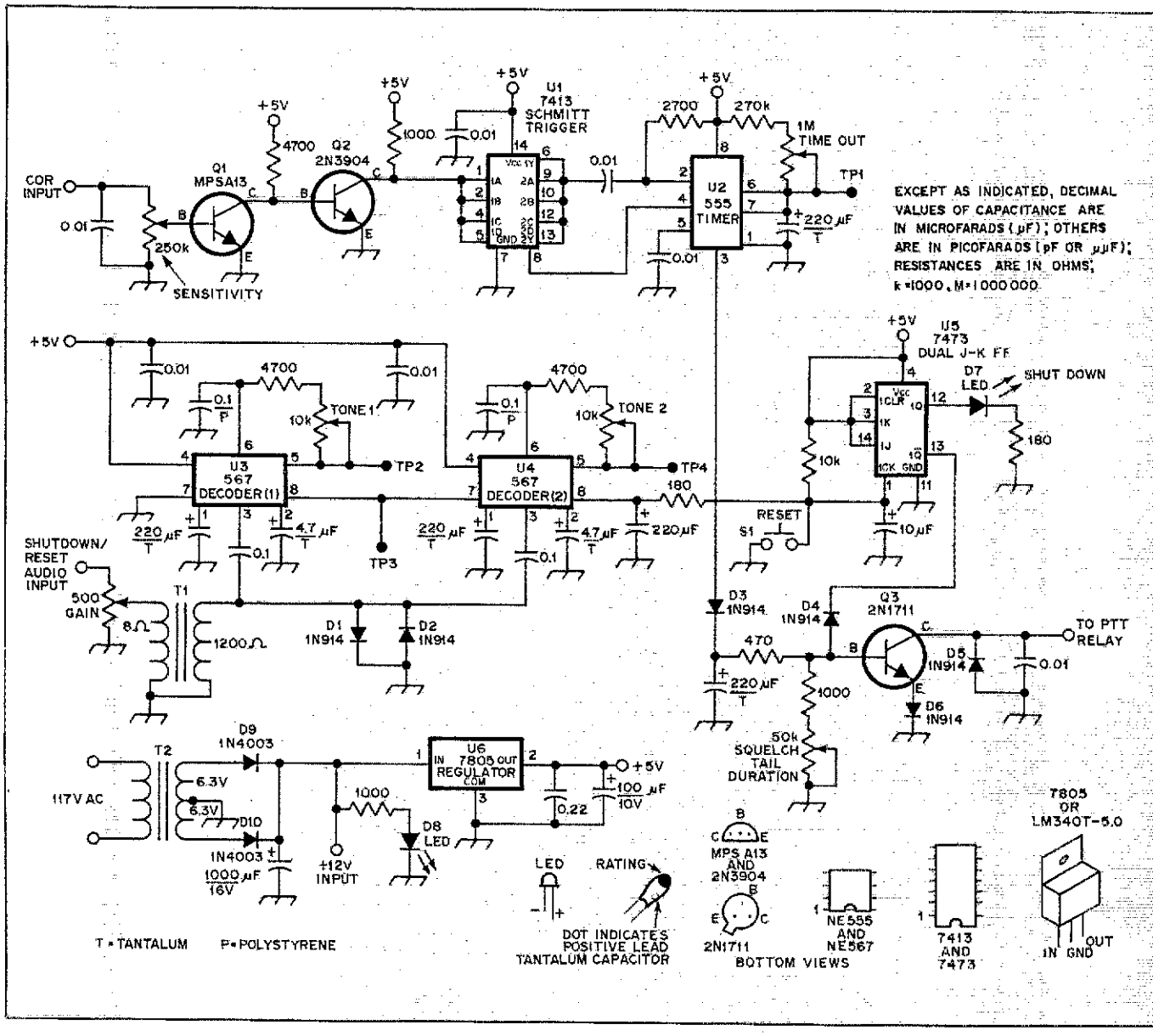


Fig. 2 — Schematic diagram of a simplified repeater control system. Power may be obtained from either a 12-V dc source or a 117-V ac line. All resistors are 1/4 watt, five-percent tolerance, except the variables which are Spectrol type 43 multi-turn potentiometers. All capacitors are expressed in µF. Tantalum capacitors are marked T. Polystyrene or Mylar capacitors are identified with a P. IC pin numbers not shown are not used. T1 is an 8-ohm primary/1200-ohm secondary audio transformer. T2, the power transformer, has a 117-V ac primary and a 12.6-V ct, 100-mA secondary. A normally open push-button switch is used for S1. All components, including the prefabricated circuit board, are available from Circuit Board Specialists, P. O. Box 969, Pueblo, CO 81002.

I had worked with repeaters rather extensively in recent years. The weaknesses of the beasts were no strangers to me.

From the drawing board came the basic configuration of the control system. First there were the original plans. Modifications followed. Final drafts of the prototype were inked not long after, imparting a feeling of reassurance that our efforts would not be in vain. The initial unit, carefully completed at the workbench, became a joy to behold, functioning with success through a round of tests.

What are some of the considerations applied to the COR design? There should be a high degree of sensitivity for tone decoding. The COR should be completely adjustable. Interfacing with *any* transceiver should be possible and not limited to one particular set or make of transceiver. Plug-in modular design would simplify servicing. All parts values should appear on the COR circuit board.

Examining the COR Circuit

Before I explain the circuit of the COR control system, take a moment to look at Fig. 1. This diagram illustrates, in block form, the arrangement of a repeater station that operates according to our plan. One transceiver is for transmitting, the other for receiving. These are interchangeable in the event of transmitting o receiving failure. Because of the adapt ability of the COR, the two transceiver do not have to be identical units. Yo want full backup capability? Well, here i is!

Next, a glance at the photograph wil give you an idea of the COR construction The components are mounted, withou being cluttered, on a 4-3/16 × 5-1/8-inc (106 × 130-mm) plug-in circuit board No need to stretch your imagination t realize how that can simplify repeate maintenance problems. Refer now to Fig 2.

A Schmitt trigger, fed by the dual tran

sistors, processes the COR signal, providing snappy action. The NE555 serves two purposes — driving the final transistor and handling the time-out function. I might point out that the COR section is a modified version of the one that KØPHF and I published in *ham radio* for July, 1976. The modification has been applied to the front end for use with solid-state receivers.

Two NE567 decoders are connected in tandem. These process the two-tone signals from any desired source for repeater access or shutdown. Control of the PTT relay in the repeater "transmit" transceiver is accomplished through Q3 and the associated components. At the lower left of the COR diagram is the regulated power supply which may be operated either from a 117- or 12-V source.

Let's probe the electronics a bit more carefully now that we have danced lightly through the circuit. The COR input is fed from the high side of the squelch circuit of the receiver. In most solid-state receivers the squelch voltage goes positive. When this voltage moves into the positive region, Q1, a Darlington transistor, becomes activated, providing high gain and minimum loading of the receiver squelch circuit. Q2 performs as an inverter to properly drive the 7413 Schmitt trigger.

Previously I mentioned the two purposes of the NE555 timer. (These are to drive the final transistor and establish the time-out function.) After each transmission, the timer is reset by a trigger input at pin 2. As a result the next transmission will have full time. The time-out function is controlled by a 1-MΩ variable resistor connected to pins 6 and 7 of the 555. Time range may be set from one to five minutes.

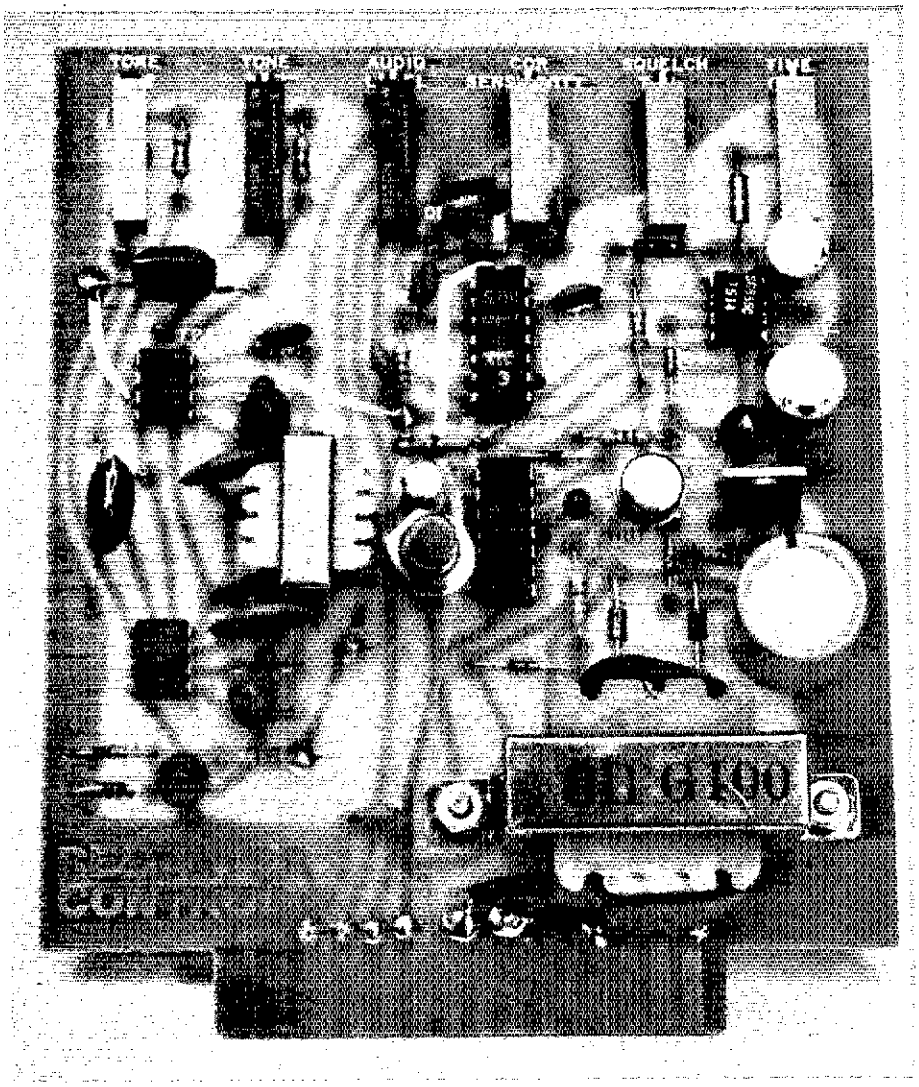
Q3, the final transistor, gets orders directly from the NE555. It, in turn, tells the transmitter to stop or go. To do this, the collector of Q3 is connected to the push-to-talk switch of the transceiver. The easiest way to make this connection is through the PTT switch on the microphone. Remove the back cover of the microphone and there it is.

Perhaps you may be curious about the 220-μF capacitor and resistor network at the base of Q3. This gimmick provides a squelch tail on the repeater. Adjustment of the 50-kΩ potentiometer will enable the repeater to have instant shut-off operation or up to several seconds of "tail."

We need only to mention a bit about the shut-down control before delving into the construction. The source of audio to be applied to the control section of the repeater can be left up to the builder. An auxiliary audio input is provided for control through an additional channel or through a telephone line.

Observe that the two NE567 decoders are connected in tandem. When a proper two-tone signal is fed to the audio input, decoder switching is accomplished through a link between pins 7 and 8 of the devices, as shown in the diagram. The second decoder keys the 7473 flip-flop. When pin 13 ($\overline{Q}$) of the 7473 goes low, it will remove any voltage from the base of Q3. This prevents Q3 from operating, shutting down the repeater.

What happens when the tones are received again? Well, the action is the same, except $\overline{Q}$ will go high and the repeater can now be accessed. A light-emitting diode is connected to pin 12. It glows when the repeater is shut down.



The repeater control board. Plug-in modular design provides quick replacement. Construction of the unit is made easy by means of the uncrowded arrangement of components.

Audio with Raised Eyebrows

Eyebrows will surely rise in view of the simple audio circuit (Fig. 1). But it is effective with no undesirable loss of quality. A load, consisting of a 10-watt, 4- to 10-ohm resistor, must be placed across the speaker terminals of the receiving transceiver.

You will note in Fig. 1 that a 680-ohm resistor has been placed across the audio line between the two transceivers. This is for the purpose of loading. Ample gain control is furnished by the 10-kΩ potentiometer.

Aiding the Repairman

Almost any repeater repairman can tell you about the time he went to the repeater site where he discovered a component burned to a crisp with no way to identify it. Boards with etched labels (not painted or inked) relieve the repairman of a similar difficulty. The photograph of the board depicts the uncluttered layout of components. Easy access to parts makes servicing much easier.

For the sake of sheer dependability, high-quality components should be acquired for the COR system. Tantalum capacitors are recommended for the timing and control circuits. Polystyrene capacitors are best for the frequency-control circuit of the shutdown function.

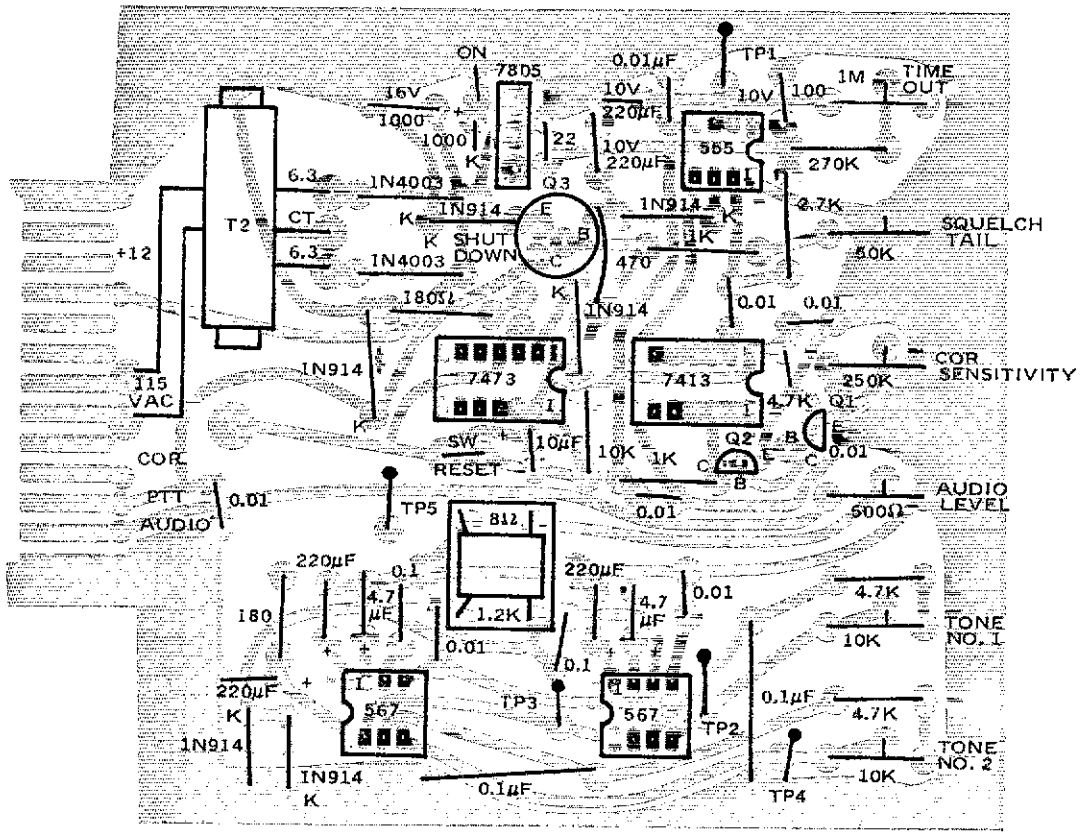


Fig. 3 — Actual-size template for the COR repeater control system with parts placement. The board is double-sided; in each pattern gray represents copper. Components are mounted on the lettered side of the board.

Preferably, IC sockets are to be avoided but if the builders choose to use sockets, only those of the highest grade should be employed.

Construction

The one who has to service a particular repeater at some future time will bless the builder if good soldering has been applied to the COR. And, while on the subject of soldering, I must mention that in the accompanying double-sided patterns the builder will find a pad on each side at a few points on the board. Feedthrough connections must be carefully soldered at both points. Also, at the connecting fingers, feedthrough wires (made from cutoff resistor leads, using the Z-wire technique) are to be installed connecting the fingers on one side of the board to the fingers on the other side. This gives double contact in the module socket for greater continuity and reliability.

I suggest building the power supply section first and then checking the output voltage. This should be within five percent of 5 volts. Note that a separate 12-volt dc input is available in addition to the 117-V ac input.

After one has determined that the power section is functioning correctly, all components for the COR circuit are then to be installed. To test this area of the unit, apply +5 V to the COR input and adjust the sensitivity control to the point where the circuit keys. Q1 will go from high (+5 V) to low (+0.75 V). Q2 will have a collector change from low to high. The 555 output will go from low to high.

The time-out function can be set to the desired time by the 1-MΩ variable control connected to pins 6 and 7 of the 555 timer. The operation can be seen on a high-impedance scope or VTVM by making the test at TP1. In order to observe the action of Q3, connect a small 12-volt relay to the PTT output and to a 12-V source. Set the drop-out time (squelch tail) to whatever is desired.

After the COR is functioning, install the 7473 flip-flop and associated components. The LED on pin 12 indicates when the system is shut down. A push-button switch is included for testing and local shutdown as well as reset. Operate this switch a few times as a test.

If all is well to this point, the next step is to install the two NE567 decoders and associated parts. Connect a frequency counter to TP2 and then set the frequency to whatever tone is desired by adjusting the 10-kΩ potentiometer (tone 1).

Move the counter to TP4 and ground TP3. Set the frequency of the second tone by using the 10-kΩ potentiometer (tone 2). Note that this can be set to the same frequency as the first tone if one desires to use a single tone for control.

To test the tone-operated portion of the system, apply the tones simultaneously for four seconds. The shutdown LED should become illuminated and Q3 should be inoperative. In the event difficulty is experienced, the tone level could be incorrect. The easiest way to determine if the level is improper is to turn the gain control completely down. Then slowly bring the level up until TP3 goes low.

Concluding Thoughts

With this circuit a repeater can be put in operation in a very few minutes. Our intention at the beginning was to enable repeater operators to install and service the station equipment with a minimum of time and effort. There are repeater groups in southern Colorado in both RA and RT classifications who are finding the dual-transceiver/simplified COR control system highly effective. I do wish to make it clear, however, that the circuit is not presented in order that anyone can indiscriminately pop a repeater on the air. Rather, my intent is to share with others an idea of how simplicity, reliability and dependable backup capability can be the keys to successful repeater operation.

Choosing the two transceivers should not be done haphazardly. Receiver selectivity, the ability to accommodate narrow-band reception, and minimum spurious output from the transmitter are factors to be considered.

Power output should not be a major factor in deciding which transceivers are to be obtained for a repeater. A power capability of 10 or 15 watts is quite satisfactory. The prospective buyers of equipment will do well to obtain commercial types of gear such as the mobile equipment made by General Electric and Motorola. The Motrac Motorola units,[1] mentioned earlier, are indeed excellent.

Although I am not about to deny the importance, generally, of good shielding at an installation, I do want to comment on our latest repeater, a 19/79 machine. This upstart has defiantly operated without covers or shielding of the transmitter or receiver. The two units are only two feet apart. We find no trace of desensing. I mention this because I'm convinced that the circuit simplicity is the reason for the trouble-free performance.

Needless to say, I trust that the concept of this repeater system may be beneficial to repeater clubs. I'm mindful especially of those whose service crews know well the vagaries of nature, the unpredictable breakdowns of remotely located equipment, and the undeniable workings of Murphy's laws.

[1]Gregory Electronics, 249 Rte. 46, Saddlebrook, NJ 07662, lists the Motrac units in its recent sales brochure.

Strays

No, this isn't a new version of that frustrating game of mischance, 52 Pickup. The U.S. Postal Service has a few tips for avoiding such occurrences.

A NEW WRINKLE IN 52 PICKUP

☐ The name of the game isn't "Help Stamp Out QSL Cards!" But the photograph does illustrate what happened to one amateur's packet of cards which was mailed to ARRL hq. for a WAS award. Perhaps the sender thought things were tied up pretty in a super-secure packet when he or she whistled off to the post office. Instead, what you see is what we got, and little can be done to unravel the mystery of whose cards were sent and how many are missing. The postal personnel bundled up what they could salvage from the floor sweepings, then sent us the grim remains.

What the U.S.P.S. does prefer is (1) packing the material so it won't shift in the container, and (2) using reinforcing tape instead of string and loose paper which may snag in the automatic sorting equipment. Whether you are applying for WAS, DXCC or another award, pack those cards securely! — *W1CKK*

CLUB NEEDS ASSISTANCE

☐ Having lost all their equipment to thieves, the University of California at Davis Amateur Radio Club is seeking donations of any usable hf or vhf surplus equipment. Please send inquiries to Thomas A. Behrens, W6YE, President, UCD/ARC, 200 Silo, University of California, Davis, CA 95616.

***QST* congratulates . . .**

☐ Bernard Weinstock, K2MU, who passed his Extra Class exam at age 13. "I'm not a genius or anything like that," he writes. "I just like ham radio so much that I really try."

Transmitter Design — Emphasis on Anatomy

Part 1: Which is best — duplication of a published circuit or an understanding of how the circuit works? This builders course provides some "hows" and "whys" for a 10- to 15-watt, 40- and 20-meter cw transmitter.

By Doug DeMaw,* W1FB

A heap of burned-out transistors, some unsavory language and a hastily scrawled sign which read, "Help Stamp Out Transistors," greeted me as I walked into a friend's workshop recently. Fred stood there with a deeply furrowed brow and pointed to a wretched-looking, pc-board assembly which had been worked and reworked until it looked like no hope remained for it. Fred is one of those fellows who loves to build amateur gear, but never took the time to change his thinking from vacuum tubes to semiconductors. He could duplicate the circuits in amateur magazines, but couldn't make them "play" when something went amiss. After some casual conversation and a hot cup of coffee, Fred calmed down and we began troubleshooting his problem child. The major faults were instability in the PA stage and low output from the driver. An hour later we had his transmitter percolating nicely, and Fred poked his thumbs proudly into his chest and proclaimed, "Ain't it a beaut?"

It occurred to me as I sensed my friend's anguish that a better understanding of how a solid-state circuit functions would have saved him countless hours and a considerable amount of grace in the eyes of The Almighty. The foul language and extra money spent for transistor replacements could easily have been avoided. My adventures with Fred helped to inspire this course in transmitter anatomy. Knowing why a particular circuit was chosen by the designer, and how it is supposed to function in the composite assembly, should help you avoid the "Freddie syndrome."

Understanding Our Circuit

The circuit for our workshop project was based on numerous requests for a transmitter that would serve as a mate for "The Mini-Miser's Dream Receiver" which appeared in *QST* for September, 1976. A power output in the 10- to 15-watt bracket seemed suitable for most of the QRP applications one might encounter, and ample power would be available for driving an amplifier later on should the builder be motivated toward QRO.

Fig. 1 shows the block diagram of the transmitter. Let's run through it and see what each section does. Starting at the left we find a 7-MHz VFO. It operates straight through on 40 meters. The arrows show that S1A/S1B routes the rf energy directly to the broadband amplifier module during 7-MHz operation. For use on 20 meters, the VFO output is switched to a push-push doubler by means of S1. Output at 14 MHz is applied to the broadband amplifier when the switch is set for

Two versions of the 7- and 14-MHz cw transmitter are shown here. At the left is the W1FB prototype. On the right is a model built by WAØUZO. Both units are small and lightweight.

*Senior Technical Editor, ARRL

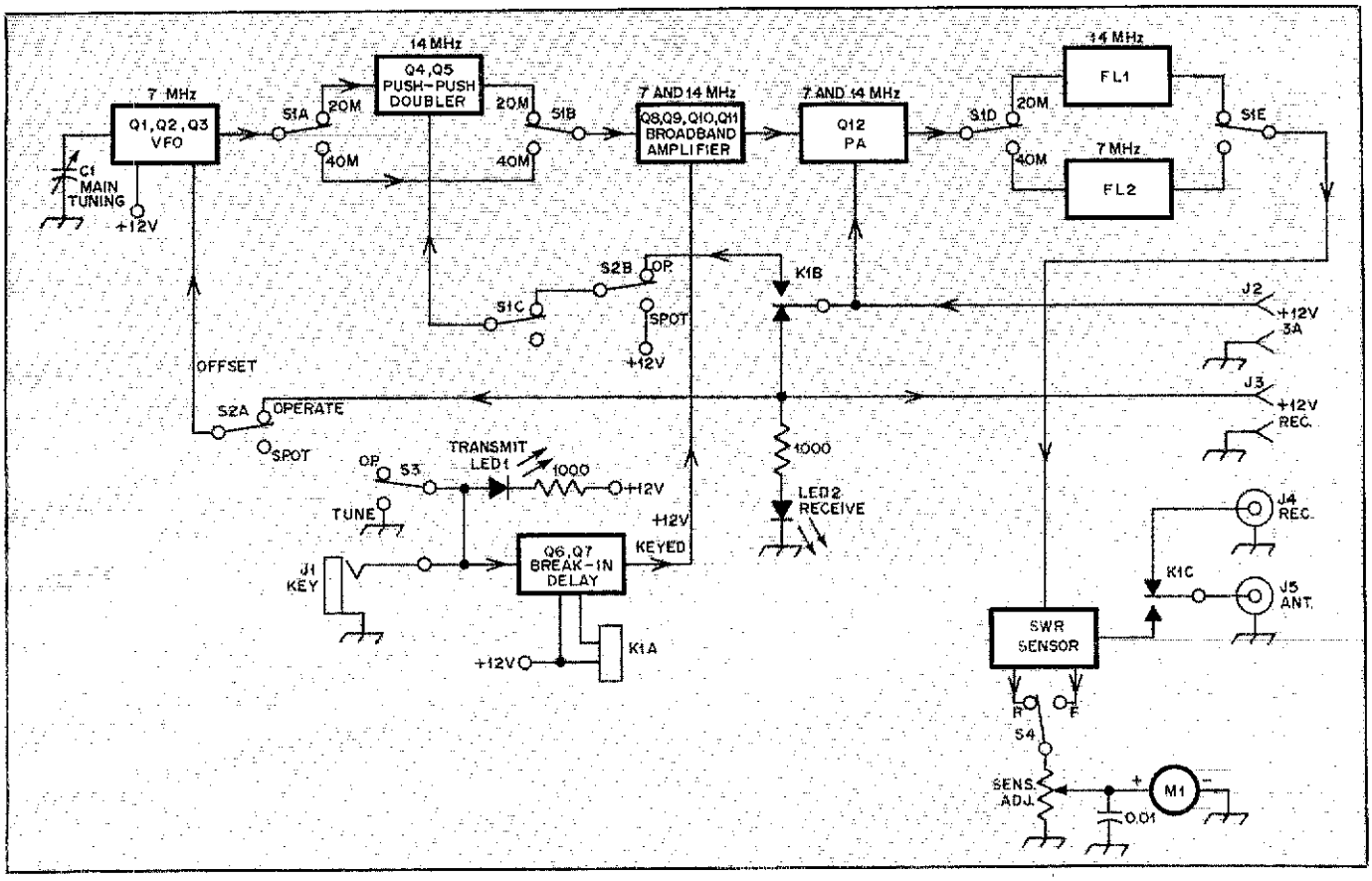


Fig. 1 — Block diagram of the two-band, solid-state transmitter. The arrow heads indicate the direction of signal or dc voltage flow. Coaxial cable (miniature) should be used between the various modules when completing signal paths. S1 is a five-pole, two-position, wafer switch with phenolic insulation. S2 is a dpdt miniature toggle switch. S3 and S4 are spst miniature toggle switches.

20-meter operation. You will notice that an offset line goes to the VFO. When S2A is in the OPERATE position and the key (J1) is open, relay contacts at K1B place +12 V on the VFO-offset line. This voltage turns on a switching diode in the VFO. The diode switches some additional capacitance into the VFO tuned circuit and moves the operating frequency outside the amateur band. This prevents an unwanted beat note in the receiver tuning range during the receive priod. When the transmitter is keyed the offset voltage is disconnected by means of K1B, and the VFO provides output on the desired operating frequency. It is necessary to disable the offset circuit for spotting (zero beating), so S2A is placed in the SPOT position for that function. Operating voltage must be applied to the push-push doubler during 20-meter spoting, and S2B is used for that purpose. Activating the doubler assures a loud beat note when zero beating another 20-meter signal.

As the signal moves to the right in Fig. 1 it reaches the broadband amplifier. This circuit was chosen because it requires no tuned circuits. Elimination of tuned, narrow-band circuits at the output of each of the three amplifiers in the module makes it possible to avoid complicated band-switching circuits. The broadband amplifier delivers approximately 1 watt of output and requires only 10 mW of rf energy from the VFO or doubler to develop its rated output power. Actually, the broadband amplifier is useful from 1.8 to 30 MHz, even though this transmitter covers only two bands. The amplifier is biased for Class A (linear) operation so that it can be driven easily by the VFO. The linearity is not a necessary feature for cw use, however, but would be ideal if this were an ssb exciter.

To the right of the broadband amplifier is a PA stage. It is driven to a power output of 10 to 15 watts by the 1-watt signal from the previous module. A Motorola MRF449A transistor is used in the PA. It is capable of 30 watts of output, and has a rated gain (typical) of 13 dB at 30 MHz. Our purpose in restricting the output to 15 watts is to minimize the overall current drain of the transmitter to 3 amperes or less. This will assure longer battery life during portable operation, and will simplify the requirements of an ac-operated dc supply (regulated). The actual amount of rf output power will depend upon the characteristics of the last stage in the broadband amplifier and the PA transistor. This results from the slight nonuniformity in transistor manufacture: Some have more gain than others. It is for this reason that an output figure of 10 to 15 watts is given.

At the far upper right of the block diagram are two filters — one for each band. They are selected by means of S1D/S1E. Since the PA is also a broadband amplifier there will be a substantial amount of harmonic current in the output. To keep the unwanted energy suppressed by 40 dB or greater it is necessary to use FL1 and FL2. The filters are low-pass types (T networks). They are pretuned, so no external peaking controls are needed.

Output from the filters is routed through an SWR-sensor circuit (lower right of drawing). A panel meter, M1, serves as a visual indicator for trimming an antenna or adjusting a Transmatch for a low SWR. The latter is essential if proper operation of the PA stage is to be realized. Relay contacts at K1C transfer the antenna from the transmitter to the receiver during standby periods.

At the lower left of Fig. 1 we have a break-in delay module. It has a variable time constant which controls the drop-out time of the changeover relay, K1A. The amount of delay time can be determined by adjustment of a potentiometer on the circuit board. Closure of the key charges the timing capacitor, which in turn actuates a bipolar-transistor dc switch. The switch closes K1A and applies operating voltage to the broadband amplifier. S3

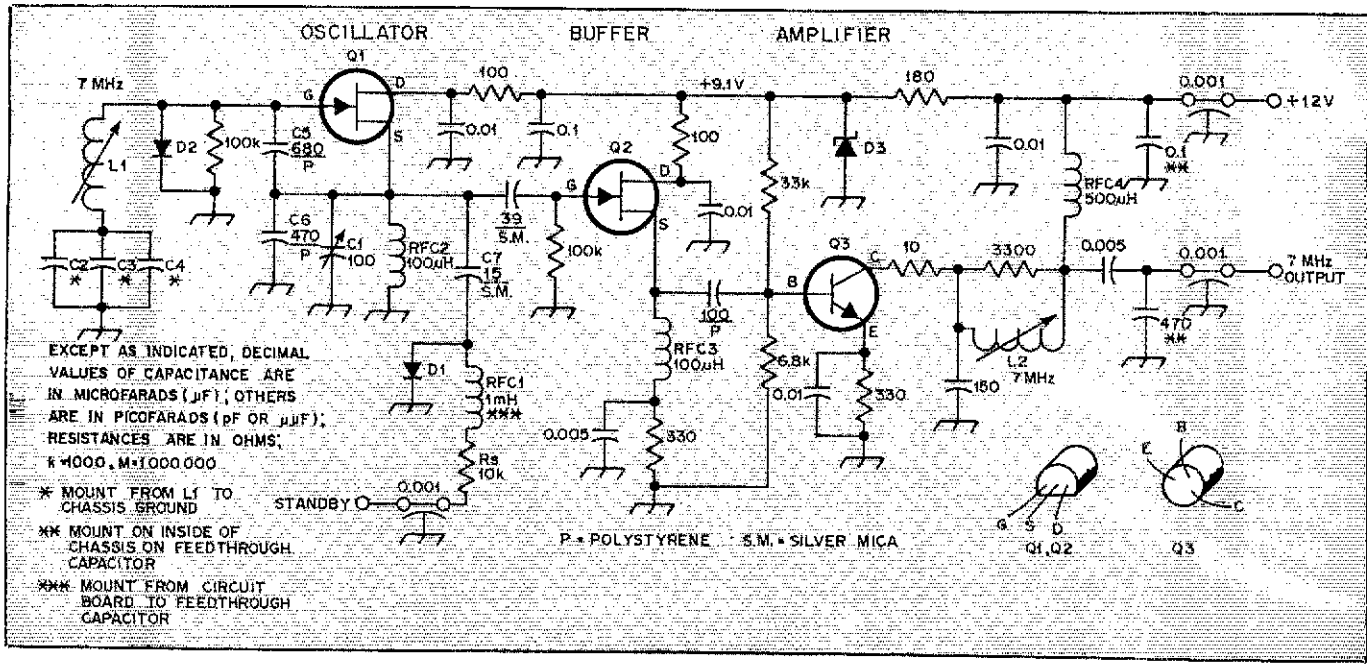


Fig. 2 — Schematic diagram of the VFO. Fixed-value capacitors are disk or chip ceramic unless otherwise indicated. Resistors can be 1/4- or 1/2-W composition. (See June, 1976, *ham radio* for the author's detailed explanation of this VFO circuit.)

C1 — 100 pF, miniature, air variable.
C2 — 50 pF, polystyrene.
C3 — 10 pF, silver mica.
C4 — 27 pF, polystyrene.
D1, D2 — High-speed silicon diode, 1N914 or equiv.
D3 — 9.1-V, 400-mW or greater Zener diode; 1N5293 or equiv.
L1 — Slug-tuned inductor with 6-μH nominal inductance (Miller 42A686CBI in W1FB unit, Miller 23A476RPC in WAØUZO model).
L2 — Slug-tuned, pc-board mount inductor, 3.2-μH nominal inductance (Miller 23A476RPC or 25 turns no. 32 enam. wire close wound on Miller 27A014-6 form).
Q1, Q2 — Vhf JFET, MPF102, 2N5486, 2N4416 or HEP802.
Q3 — 2N2222A or HEP-S3001.
RFC1-4 — Miniature rf choke (Millen J301 or equiv.).

locks the break-in delay circuit into the key-down mode for tune-up purposes. An LED indicator illuminates during transmit periods, and a second LED indicates when the circuit is in the standby (receive) mode. At that time the transfer relay routes 12 volts to the receiver via J3. This control voltage can be used for muting and unmuting the receiver.

Understanding the VFO

The VFO of Fig. 2 has a familiar face, as it has been used in a number of my circuits.[1] It has been such a faithful and predictable performer that it was chosen again. The circuit at Q1 is a Colpitts oscillator, but some of you may prefer to call it a series-tuned Clapp if you date back to the tube era when that type of circuit emerged as one of the more stable varieties of VFO.

Three capacitors (C2, C3 and C4) are used in series with L1 to ground. This method permits a larger amount of inductance to be used at L1 than would be possible in a more commmon, parallel-tuned, VFO tank. The higher inductance is less subject to changes in value from heating than would be the case if high C and low L were used. Three capacitors are used below the coil rather than one so that the circulating rf current will be divided among them. This lowers the heating in any one capacitor and improves stability.

[1]Footnotes appear on page 19.

C5 and C6 are feedback capacitors that take part of the oscillator output (source terminal) and route it back to the input (gate). This feedback is what causes the FET to oscillate. RFC2 is used to keep the feedback energy at the source of Q1 while providing a dc return to ground for the FET. Stated simply, it's an isolating choke for the rf.

Another purpose is served by C5 and C6: They add a considerable amount of shunt capacitance from the FET base to ground. This helps to disguise the small changes in FET junction capacitance during operation — a significant contribution to oscillator stability. D2 gets into this act, also. It conducts on the positive swing of the oscillator rf voltage, and that limits the change in FET junction capacitance. (Maximum capacitance change occurs near the peak of the positive half of the sine wave.) In addition to helping stabilize the oscillator, D2 reduces the harmonic output of Q1. This is because nonlinear changes in junction capacitance encourage the generation of harmonic currents. It is necessary to use a high-speed, rf type of diode for this purpose, such as a 1N914 switching kind.

C7, D1 and RFC1 are used in the VFO-offset circuit. When the +12 volts are applied to D1, as discussed earlier, C7 is placed in parallel with the main tuning capacitor, C1. This moves the VFO operating frequency lower so that the signal won't be heard in the receiver during standby. R_s is used to prevent damage to the diode; it limits the current through the diode junction when the offset voltage is applied through it and RFC1.

The 0.01-μF capacitor and 100-ohm resistor at the drain of Q1 are used to place the drain at ac ground (bypass) and to isolate Q1 from the other transistors in the VFO module. This is called a decoupling network, and it helps prevent unwanted self-oscillation in the remaining VFO-chain stages. Q2 has a similar decoupling network in the drain circuit.

A buffer stage (Q2) is shown in Fig. 2. It functions as an isolation circuit between the oscillator and Q3. It is used as a source follower — the output being taken from the source element of the FET. Because the gate of an FET has a very high impedance (megohms), the transistor does not load the output of Q1. The gate coupling capacitor is small in value (39 pF), and that also reduces the loading effects on Q1. The lighter the loading, the less chance there will be for oscillator "pulling" (chirps) when the transmitter is keyed. Because Q2 is a source follower it will not provide a voltage gain. Actually, a slight loss will occur at Q2. Typically, a voltage gain of 0.9 will be realized when using this type of buffer stage. This means that we lose 10 percent of the rf voltage that is applied to the gate of Q2.

RFC3 is used as a broadly resonant (low-Q) tuned circuit that peaks at 7 MHz with the approximate 5 pF of stray circuit

capacitance. Zener diode D3 is used to obtain a 9.1-volt regulated supply for Q1 and Q2. This prevents changes in oscillator frequency when the 12-volt power supply output changes. Regulated voltage is supplied to Q2 so that it maintains relatively constant operating characteristics: Voltage shifts at Q2 could cause slight changes in internal capacitance and resistance, and those variations could cause some pulling of the oscillator.

VFO Output Stage

It will be necessary to have ample drive to the broadband amplifier strip of Fig. 1. VFO buffer Q2 could not provide sufficient excitation to operate the remainder of the transmitter. Therefore, we have added Q3 to build up the VFO output power. This amplifier stage operates in Class A and uses a high-frequency, bipolar transistor — a 2N2222A. A 10-ohm resistor is placed near the collector terminal to discourage vhf parasitic oscillations. At 7 MHz the resistor offers minor resistance to the signal, but at vhf it looks like a high impedance; this prevents parasitics.

A pi network is used as the output tank for Q3. It is a low-pass type of network, which means it will attenuate harmonic energy. A 3300-ohm resistor is used in parallel with L2 to broaden the response. This will assure relatively constant VFO output to provide an even drive across all of the 40- and 20-meter cw bands.

The output capacitance for the pi network is obtained by utilizing the capacitance of the feedthrough terminal (C3) and the 470-pF shunt capacitor. The collector tank is designed to transform the 500-ohm output impedance at Q3 to 50 ohms at the pi-network output. Even though the input impedance of the first stage of the broadband amplifier is on the order of 500 ohms, this mismatch is desirable. The lower the VFO output impedance, the less chance there will be for pulling effects caused by the later stages in a transmitter. The base-bias voltage for Q3 is taken from the 9.1-volt regulated line to further reduce the chance for pulling at Q1.

Assembling the VFO

Double-sided pc board material is used as a shield box for the VFO. Fig. 3 shows the pc-board pattern and includes a parts-placement guide. Ready-made pc boards or parts kits for the entire transmitter are available from a supplier.[2]

The components should be assembled on the etched circuit board before the side walls are soldered together around the VFO board. A pencil type of soldering iron with a fine tip is recommended for this and all other modules of the transmitter. Excessive heat will damage some of the components, and can cause the pc-board pads to come loose from the base material. Therefore, a 25- or 30-watt iron is the largest size that should be employed.

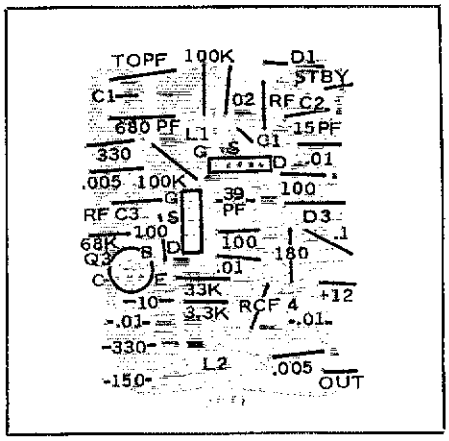


Fig. 3 — Scale layout of the VFO circuit board showing parts placement from the component side of the board.

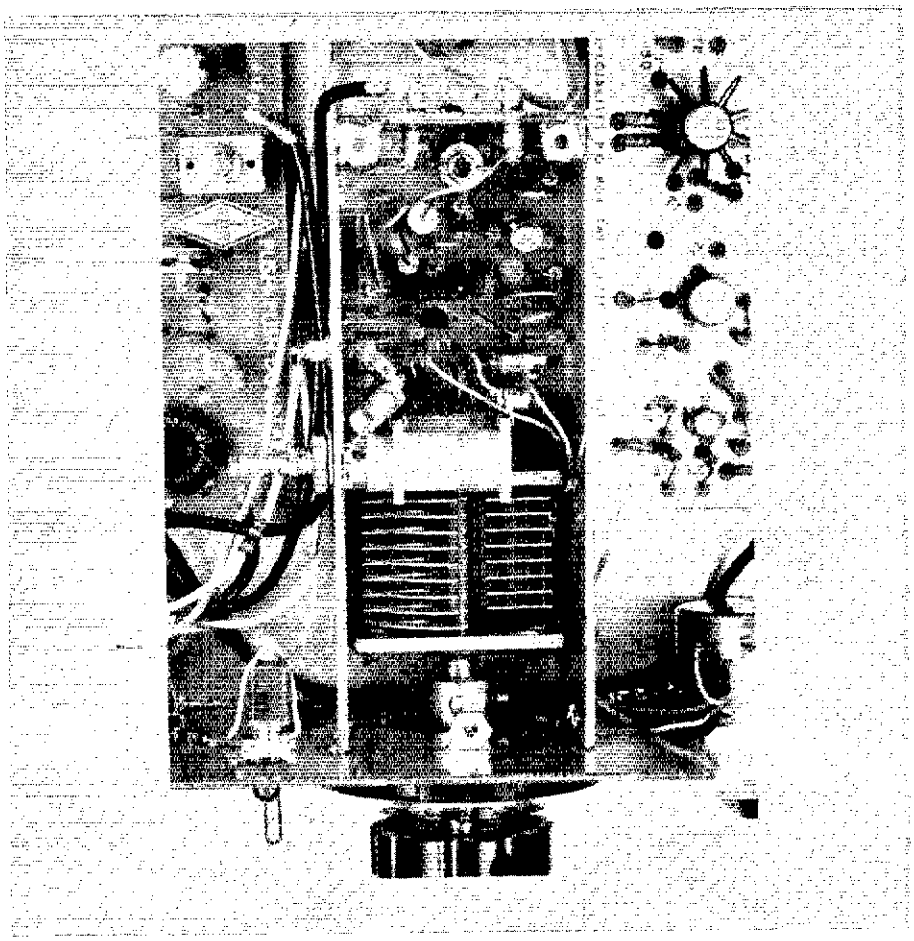
Alignment

VFO testing can be accomplished by shunting the output to ground with a 560-ohm, 1/2-watt resistor and applying +12 volts where indicated on Fig. 2. Attach a two-foot piece of hookup wire to the output and place the loose end near the antenna terminal of a receiver. Next, set C1 so that the plates are fully meshed. With the receiver adjusted to receive 7.0 MHz, move the slug in L1 until the VFO signal is heard. At this point you can adjust L2 for maximum output at 7.1 MHz. The S meter on the receiver will be helpful when tweaking L2.

The offset circuit can be tested by connecting +12 volts to the offset line. The VFO signal can be expected to shift lower in frequency, as stated earlier. There should be no evidence of chirp when keying the 12-volt supply to the VFO.

Summary

Part 2 of this series will treat the push-push doubler and break-in delay circuits. They are on a common circuit board. At the conclusion of Part 2 you will be able to connect the VFO to the doubler and obtain output at 14 MHz. Also, the break-in delay circuit can be tested for correct performance at that time. I hope this explanation of the VFO circuit will prevent you from being afflicted by the "Freddie syndrome!"



A look into the VFO compartment of the WAØUZO model. Coil L1 is mounted on a side wall of the VFO box. Feedthrough capacitors are used as terminals for leads entering and leaving the VFO compartment.

Footnotes

[1]DeMaw, "QRP Shakedown, Caymanian Style!" *QST*, March, 1975.

[2]Negatives, pc boards or complete parts kits for this project can be obtained from Bob Shriner, WAØUZO, Box 969, Pueblo, CO 81002.

VHF Coverage for Collins S/Line Receivers

How to get Collins S/Line performance on vhf without using converters. F-layer DX on 6 meters plus OSCAR?

By Dick Bingham,* N6HZ

Getting started on the vhf bands is relatively painless if you have, as most of us do, an hf receiver already on hand. The Collins 75S-1 double conversion superhet, and later models 75S-3, 75S-3B and 75S-3C, are much more common than their high initial cost would suggest. The 75S-1 is an excellent, reasonably priced receiver readily available on the used market. N6HZ's ingenious scheme for putting an S/Line receiver on frequencies above 30 MHz with no modifications to the receiver is one of those "now why didn't I think of that?" ideas, ideas which seem to be painfully frequent!

Recently, the author purchased a used Collins 75S-1 receiver for use as a tunable i-f for vhf and microwave work. Upon examining the schematic, three very interesting things were noted.

First, the upper frequency limit of the receiver can be easily extended to 63 MHz (to 96 MHz with a passive frequency-doubler circuit for the LO). Second, no power supplies or external oscillators are required, and third, the receiver is not modified in any way.

To accomplish this, a doubly balanced mixer and a band-pass filter (BPF) are required and are connected as shown in Fig. 1. The 75S-1 fixed-oscillator output port, J1, is normally terminated by a 100-ohm load resistor. Local-oscillator power for the mixer is provided by unplugging the load resistor on the receiver chassis and connecting the mixer to J1 through an appropriate length of 50-ohm coaxial cable. The BPF is installed between the antenna and mixer input to eliminate image-frequency problems. The mixer output is connnected through another 50-ohm cable to the receiver antenna terminal, J5.

*4880 Burnside Rd., Sebastopol, CA 95472

The frequency of the crystal used in the receiver is calculated as

f_{REC} = lowest frequency to be received
f_{LO} = fixed LO out of receiver port
f_{IF} = frequency of signal applied to receiver antenna terminals

Consider the case where the desired tuning range is 50.0 to 50.2 MHz, where f_{REC} = 50.0 MHz:

$$f_{REC} - f_{LO} = f_{IF} = f_{LO} - 3.155 \text{ MHz}$$

$$50.0 - f_{LO_{XTAL}} = f_{LO_{XTAL}} - 3.155 \text{ MHz}$$

$$f_{LO} = \frac{50.0 + 3.155}{2} = 26.5775 \text{ MHz}$$

Note, however, that this local-oscillator frequency of 26.5775 MHz is controlled by a crystal selected via the front-panel frequency-range switch. The actual crystal frequency in this case is 13.28875 MHz because the tuned circuitry in the receiver doubles the crystal frequency. See the Collins instruction manual for a discussion of LO crystal frequencies.

Earlier, it was mentioned that the receive range can be extended to 96 MHz. This requires that f_{LO} be doubled and can be achieved passively (with no external power supply) by using a full-wave rectifier and a tuned circuit, as shown in Fig. 2. Transformer T1, used in the frequency doubler, requires a toroid core suitable for operation up to 66 MHz and has three 10-turn windings, two of which are connected in bifilar fashion to form the center-tapped secondary. L1 and C1 form a low-Q circuit resonant at twice the input frequency.

Construction of the doubly balanced mixer has been described previously[1] and uses two more toroids wound the same as transformer T1. Diodes are the hot-carrier type which are available from many sources (e.g., Hewlett-Packard 5082-2800). Also, suitable designs for the BPF are covered in recent editions of the ARRL *Handbook* and are not covered here.

[1]Bingham and Hayward, "Direct Conversion — A Neglected Technique," *QST*, Nov., 1968.

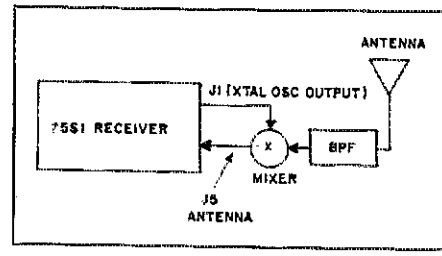


Fig. 1 — Block diagram for extending frequency coverage of the Collins 75S-1 receiver.

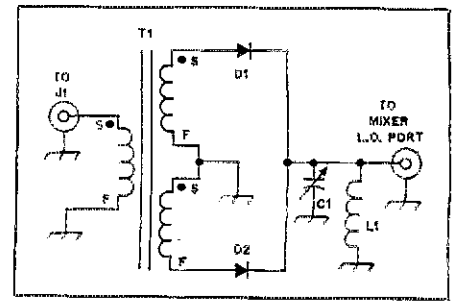


Fig. 2 — Full-wave rectifier and tuned circuit used to double local-oscillator frequency in the 75S-1. See text for component values.

The passive frequency doubler described was required when a surplus 8.860-MHz crystal was plugged into an unused 20-meter crystal position in the 75S-1 receiver. The resulting 35.440-MHz LO signal was used with the doubly balanced mixer and provides frequency coverage of 50.005 to 50.205 MHz as the receiver dial is varied from 0 to 200. Even though a preamplifier is not used, sensitivity is very good and 0.2-μV signals are copied easily.

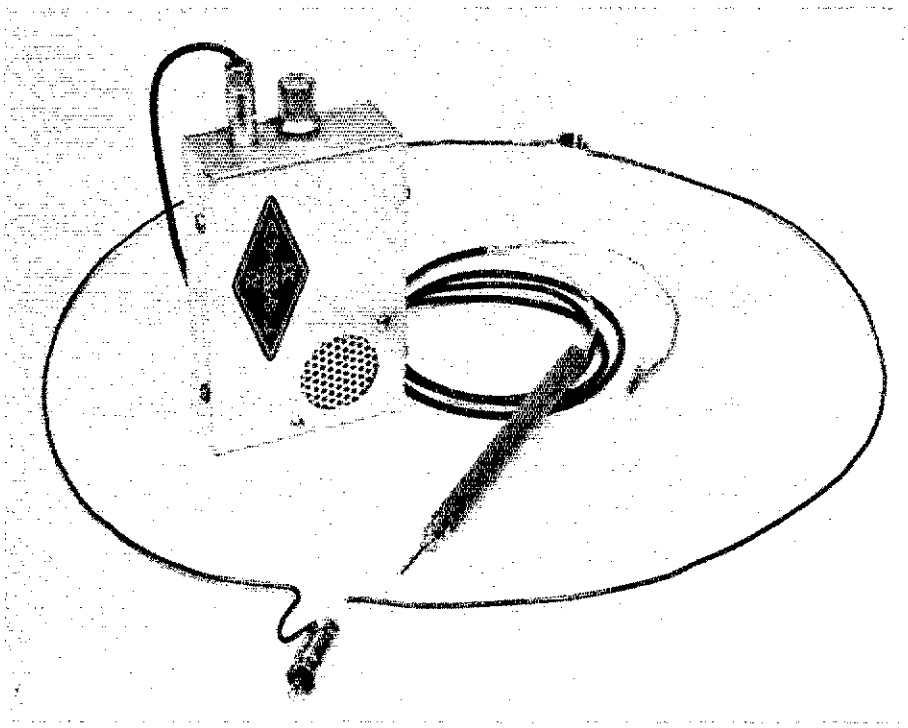
The author can supply the three toroid cores for a 13-cent stamp plus a self-addressed envelope, as long as the supply lasts. See you on 6 meters and up?

An Audio Continuity Tester

Basic Amateur Radio: Got your ACT together? If not, dig the parts out of your junk box and let's get going. This gadget is great for checking pc-board foils and low resistance values!

By Jim Bartlett,* K1TX

If you're thinking our ACT is part of a Broadway production, think again! It's actually a simple piece of test equipment. The acronym stands for Audio Continuity Tester. "What's so great about that?" you're probably saying. "I can use a buzzer and a D-cell battery!" Yes, you could use that type of checker for many continuity tests, but there are certain situations which require a more sophisticated circuit — one which will not apply much voltage or current to any components in the circuit under test, and one which will not read through transistor, diode or IC junctions. Of course, it would also be nice not to have to keep pivoting between the circuit under test and a meter or other visual indicator. If you've ever ruined a delicate transistor or IC because your probe slipped while you were glancing over at your VOM, you can appreciate the value of an *audio* indicator.



The ACT prototype is shown here with probes and direction-finding loop antenna. The cabinet was made from scrap aluminum sheet metal and decorated with an ARRL emblem cut from a larger decal.

Setting the Stage

Our ACT circuit fulfills all of the above requirements. It was originally designed by John Stenbakken, W6SZH, for checking circuit-board foils on computer pc boards. When the probes are placed across a low-value resistance, a low pitch is heard in the speaker — the higher the resistance, the higher the tone. When the probes are shorted together, the lowest obtainable audio frequency can be adjusted by turning the "sensitivity" knob attached to a 50-kΩ potentiometer. The ACT is capable of detecting or responding to resistances in the 0- to 60-ohm range. Of course the maximum value will vary slightly from unit to unit due to differences in component values, but the 60-ohm spread should be pretty close. So actually, the ACT is *most* useful for checking dead shorts — or shorts with little resistance, and this is where it really does a job!

When the pot is adjusted to give a very low tone (50 Hz) when the probes are shorted, substituting any small resistance between the probes will cause the tone to cease. The ACT can sense changes in resistance as small as 0.5 ohm: a change in pitch will be heard. This sensitivity to small changes in resistance makes the ACT an ideal piece of gear for checking circuit-board foil continuity, or for detecting cold solder joints.

*Basic Radio Editor, *QST*

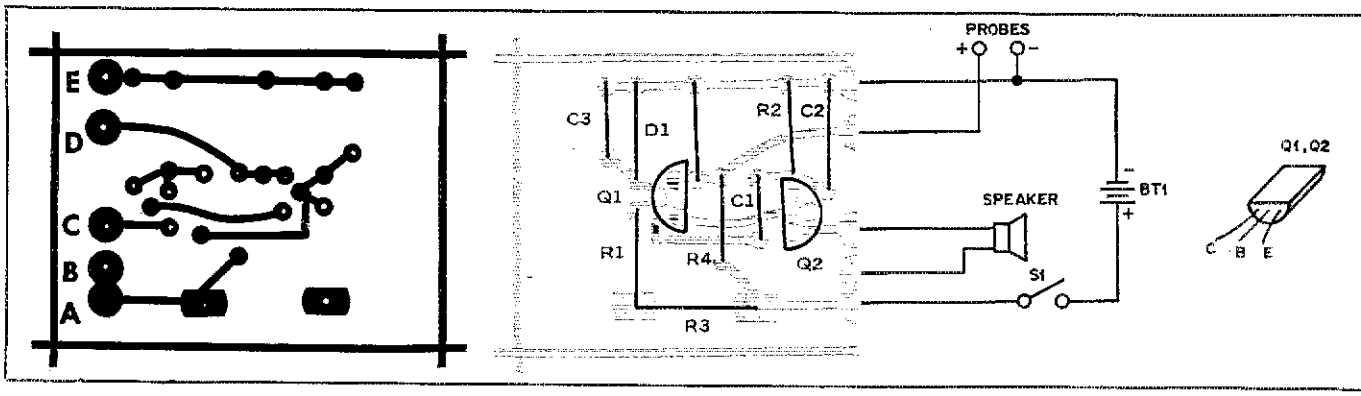


Fig. 1 — Shown here are the ACT pc board template (left) and parts placement diagram (right). Shown from the foil side, the template is reproduced full size with black representing copper. Parts located on the placement drawing are shown from the non-foil or component side of the board.

It will also detect shorted transistors, ICs, diodes and capacitors in or out of circuits. Large values of capacitance (about 1000 μF and larger) applied to the probe tips create a short tone "burst" from the oscillator as the capacitor charges. Once the capacitor has discharged, the burst can be repeated by touching the probe tips to the capacitor leads again. Usually the faster this can be repeated, the more leakage the capacitor has. Also, the longer the burst, the larger the value of capacitance. In order to get the best results when testing capacitors with the ACT, you should turn R3 to its minimum resistance position so that the highest pitch is heard when the probes are shorted.

Changing Scenery

Fig. 1 shows the circuit-board pattern and parts placement guide for the ACT. The prototype was enclosed in a home-made aluminum chassis box about 4 × 2-3/4 × 1-1/4 inches or 102 × 70 × 32 mm (HWD) as shown in the photos. The potentiometer, R3, was mounted directly to the pc board and serves as the sole mechanical support for the circuit board. A small battery clip was fashioned from a scrap piece of aluminum and attached to one of the speaker-mounting screws. Although any two-conductor wire would suffice, these test leads were made from a small length of RG174/U miniature coaxial cable.

An interesting sidelight to normal operation of the ACT is its unusual behavior in the presence of an rf field. When a resistance of between 1 and 120 ohms is placed across the probe tips of the ACT, R3 can be adjusted so that the oscillator will "turn on" when an appreciable amount of rf is present. The specific amount of radio-frequency energy necessary to trigger the oscillator will vary with the components used in construction, and with the length and type of probe leads attached. Of course, the longer and less shielded the test leads are, the more rf will be picked up; and the higher the beta (gain) of Q1, the more sensitive it will be to small signal changes in the base circuit of Q1. Anyway, the prototype has been tested with both a bench signal source and "off-the-air" signals and has been found to be fairly sensitive to rf.

The Plot Thickens

All of this means two things: First, you can't depend on tests you make with the ACT if you are close to an rf source at the time, and second, you can use this device for a number of other things besides continuity testing! For example, you can use it as a cw "off-the-air" monitor, an rf signal tracer, a handy-dandy handheld checker, or even a hidden-transmitter tracking device in a pinch! For use as a cw monitor, just stick any low-value resistor (50 ohms will do) across the probes and set the ACT down in your shack. A small adjustment of R3 may be necessary, but when you start transmitting, the ACT will be beeping right along with you. If a signal tracer sounds intriguing, just ground the common lead, stick a low value of resistance between the probes, and couple the hot lead to the circuit you are tracing. Use a small value of capacitance in series with the hot lead to couple the rf from the circuit to the ACT. Again, some adjustment of R3 may be necessary. The ACT is rf sensitive even at 2 meters, so to check your handheld or portable rig for output, just stick that 50-ohm resistor between the probes and key your microphone. With the right type of directional antenna (such as a small loop with a 5-ohm resistor at the top) substituted for the probes, the ACT could serve as a cw transmitter-hunt receiver at close range. Hot spots were found on W1AW's signal within the ARRL headquarters building using the ACT and a loop antenna 12 inches in diameter. (W1AW is only a few hundred feet from

With the case open, the ACT looks like this. At the left is the pc board supported by potentiometer R3. Also visible are the aluminum battery clamp at right, and a belt clip pop-riveted to the back cover. Having the ACT attached to my belt made using the device much easier, since there were no test leads dragging across the bench.

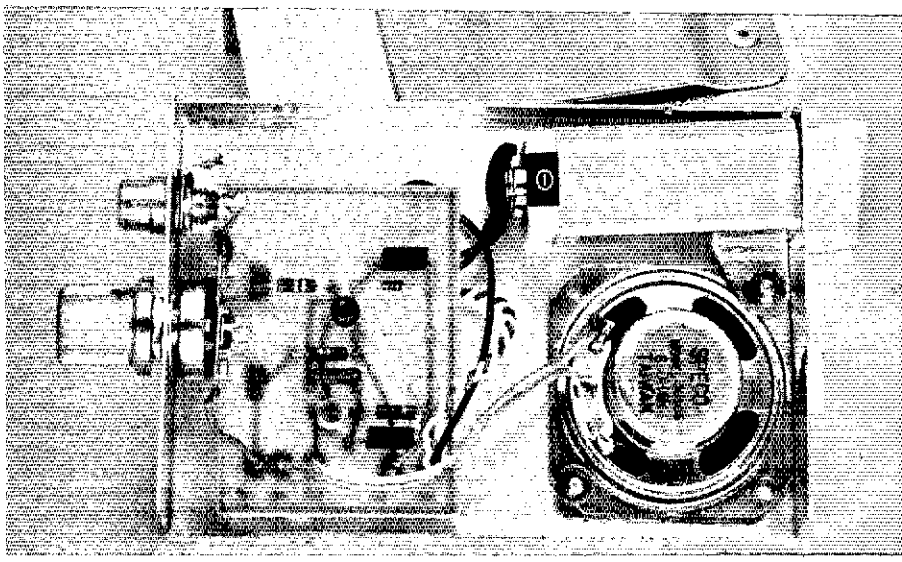


Table 1
Parts List for the ACT

BT1 — 9-volt transistor battery.
C1 — 1-μF Radio Shack no. 272-1406 or equiv.
C2, C3 — 0.1-μF capacitor RS 272-135.
D1 — Silicon signal diode, 1N914 or equiv. RS 276-612.
D2 — Germanium signal diode, 1N34 or equiv.
LS1 — 8-ohm speaker, 2-1/2 in. RS 40-247.
Q1 — Npn silicon transistor, general-purpose type (high beta).
Q2 — Pnp silicon transistor, general-purpose type.
R1, R4 — 10-kΩ resistor.
R2 — 10-ohm resistor.
R3, S1 — 50-kΩ linear miniature potentiometer with spst switch (Calectro B1-664), or
R3 — 50-kΩ potentiometer (RS 217-1716).
S1 — Spst toggle switch (RS 275-612).
Miscellaneous:
1 phono plug (RCA type) (RS 274-339).
1 phono jack (RS 274-346).
1 pair probes (Calectro F2-946).
1 9-volt battery snap connector (RS 270-325).
1 cabinet or enclosure.
Wire, hardware.

the Hq. building.) If DFing isn't your bag, you might even use the above technique to check for "bugs" in your house or shack.

Of course, let's not ignore the ACT's natural suitability as a spare code oscillator or miniature electronic organ. By adding either a hand key or a handful of push-button switches and Trimpots, you can transform your test instrument into a Christmas or birthday present for a young one. Variations of this circuit are limited only by your imagination.

Cast Description

The ACT is basically a two-stage amplifier with feedback to make it oscillate. Note in the schematic diagram (Fig. 2) that one npn and one pnp transistor are used. D1 and D2 are used at the base and emitter of Q1 to provide bias for the stage. This is accomplished by using the approximate 0.6- and 0.3-V drops across the diode junctions. With the diodes used to create a voltage drop instead of resistors, the bias is constant and is not affected significantly by changes in current.

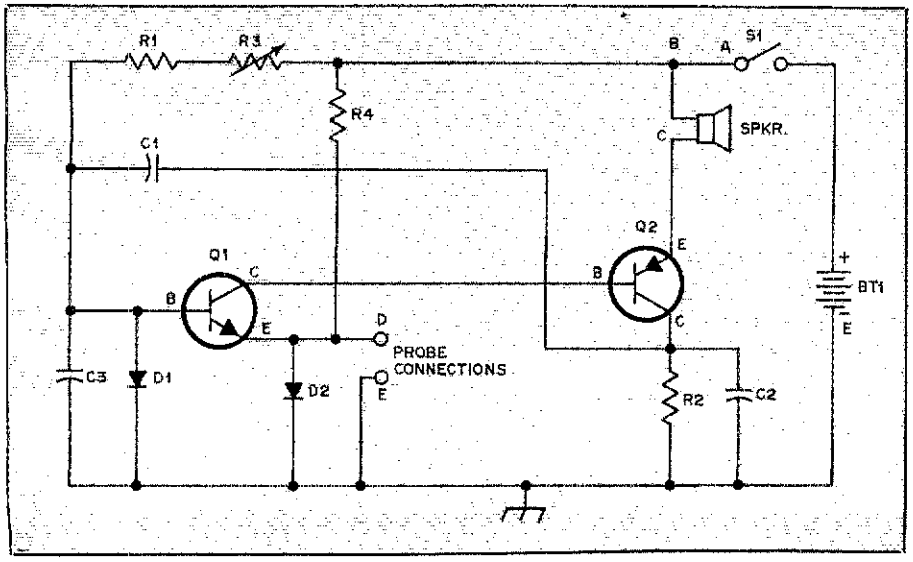
When D2 is removed from the circuit by shorting the probes, the bias on the base of Q1 increases to 0.6 V positive with respect to the emitter. C3 functions with C1 as a voltage divider network allowing only part of the audio produced by the amplifier-oscillator to be used as feedback voltage at Q1. R4 allows enough current flow through D2 to keep it forward biased, making the emitter of Q1 0.3 V above ground even when the transistor is cut off. (This 0.3 V is the maximum voltage applied to circuit components by the ACT.) The value of R4 is chosen to suit the power supply voltage. With a 9-volt battery supply, as is used here, R4 should be 10 kΩ. But for a 5- or 6-volt supply, R4 should be about 1000 ohms.

When a low value of resistance is placed across the probes at Q1, the bias level on the base of Q1 is raised. The lower the value of resistance that is shunted across D2, the greater the positive bias at the base of Q1. As Q1 is biased into conduction, it in turn biases Q2. R2 is used to limit collector current in Q2, which is set up as an emitter follower with the load (speaker) in the emitter lead. Oscillation occurs because feedback through C1 from the collector of Q2 is in phase with the signal at the base of Q1 (180 degrees phase shift in each transistor). This is called *positive* feedback. It causes regeneration.

Finale

If the circuit doesn't work properly when you first turn it on, check all connections for wiring errors or cold solder joints. Make sure the transistors are wired correctly, and that the battery is properly polarized. If the circuit still doesn't percolate after you've corrected any wiring errors, try substituting other high-gain npn transistors for Q1. You will probably find many uses for this device in your shack, but remember — you don't have to be a thespian to make an ACT, just halfway proficient with your soldering iron.

Fig. 2 — This schematic diagram shows the circuit used in the ACT. Specific part designations and values are displayed in Table 1. For those who prefer not to fabricate their own pc boards, pre-etched circuit boards are available from the Carson Chapter VICA Club, Carson High School, 22328 S. Main St., Carson, CA 90745 for an s.a.s.e. and 50 cents. (Pattern provided may differ slightly from that shown in this article.)



Strays

FAR SCHOLARSHIPS

☐ The Foundation for Amateur Radio, Inc., a nonprofit organization with headquarters in Washington, DC, will award five scholarships for the 1978-79 academic year. All amateurs holding at least a General class license or equivalent can compete for one or more of the awards if they plan to pursue a full-time course of studies beyond high school. The scholarship awards range from $250 to $750, with preference given in some of them to residents of various areas. Additional information and an application form can be obtained by sending a letter or postcard postmarked prior to June 1, 1978, to FAR Scholarships, 8101 Hampden Lane, Bethesda, MD 20014.

PVRC ON-THE-AIR REUNION

☐ The 1978 On-The-Air Reunion of the Potomac Valley Radio Club of the greater Washington, DC-MD-VA area will be held the first week in June, bringing together present members and inactive members spread throughout the world. Members no longer listed on the active PVRC rolls are encouraged to send their name, call sign, address and ZIP code to Red Gambrell, W3UO, Secretary, PVRC; 17937 Archwood Way, Olney, MD 20832. PVRC will mail to all active members a 1978 "PVRC Reunion Package" which will include a roster of names and call signs, reunion logs, and other PVRC information.

A DoppleScAnt

Lost any transmitters lately? Find them even when simple methods fail by using a Doppler Scanning Antenna. Ham ingenuity is far from dead, as this project demonstrates.

By Terrence Rogers,* WA4BVY

When our repeater society decided to sponsor a 2-meter transmitter hunt, a buddy and I joined in enthusiastically. Rochester, NY (where I lived at the time), is a high-technology area so we were correct in expecting a high level of competition. A minimum of a Yagi beam, a portable receiver with limiter meter, and good terrain maps seemed to be the order of the day. Although we expected to place well up in the standings, our best finish using the traditional Yagi method was fifth out of 13. This would not seem a humiliating defeat until you consider that we are comparatively poor losers!

A New Method of Direction Finding

A local university library provided the first directions toward a better solution, with a short paragraph about Doppler antennas. The theory of operation is reasonably simple. Radio signals received on a rapidly moving antenna experience a frequency shift due to the Doppler effect, an effect well known to anyone who has observed a moving car with its horn blowing. The radio-frequency shift may be detected by a frequency-modulation receiver which, of course, is the type most often used on 2 meters. The rapid antenna movement can be simulated with a special antenna array and a scanning adaptor, while the audio output of the receiver is analyzed to provide the direction of the received signals, based on the Doppler shift.

Fig. 1 shows a quarter-wave antenna being rotated in a circle about point P, with some constant angular velocity, omega (ω). The instantaneous tangential velocity of the antenna is $V = \omega \times R$. As the antenna approaches the transmitter, the received frequency will be shifted higher. The highest frequency is achieved when the antenna is exactly at point A with maximum tangential velocity toward the transmitter. Conversely, the lowest frequency occurs when the antenna is at point C, with maximum velocity away from the transmitter. The amount of frequency shift due to this Doppler effect is proportional to the channel frequency and the tangential velocity, which is itself a function of the radius R and the angular velocity.

Fig. 2 shows a plot of v_t, the component of the tangential velocity in the direction of the transmitter. Comparing Figs. 1 and 2, notice that at B in Fig. 2 v_t is crossing zero from the positive to the negative and the antenna is closest to the transmitter. The Doppler shift and consequent audio output from the receiver discriminator follow the same plot so that a negative-slope, zero-crossing detector will locate the direction of the transmitter.

The relationship between v_t and the Doppler shift is quantitatively:

$$f' = \frac{f(c \pm v_t)}{c} \qquad \text{(Eq. 1)}$$

where: f' = Doppler-shifted frequency
f = transmitter frequency
v_t = velocity of antenna toward or away from the transmitter
c = speed of light

Solving for the actual Doppler shift of $f \pm f'$ yields

$$\Delta f = \frac{f\, v_t}{c} \qquad \text{(Eq. 2)}$$

Since $v_t = v \cos\Theta$

$$f = \frac{f\, v \cos\Theta}{c} \qquad \text{(Eq. 3)}$$

where $\Theta = 0$ at A in Fig. 1

For example, we could find how fast an antenna would have to rotate to give a 147-MHz transmitter a 1-kHz Doppler shift. First, solve Eq. 2 for v_t:

$$v_t = \frac{\Delta f c}{f} = \frac{1\text{ kHz} \times 3 \times 10^8}{147 \times 10^6} = 2000\text{ m/s} \qquad \text{(Eq. 4)}$$

This is about six times the speed of sound, making the mechanical rotation of the antenna impractical. When this type of antenna is connected to an fm receiver a tone is heard. Knowing that $v = \omega R$, we can solve for ω when R is 0.5 meters. ω = 4000 radians/second, or 637 Hz.

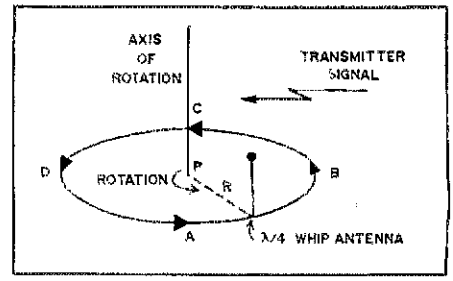
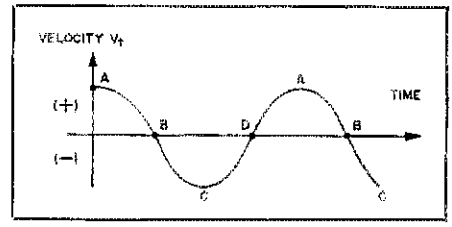


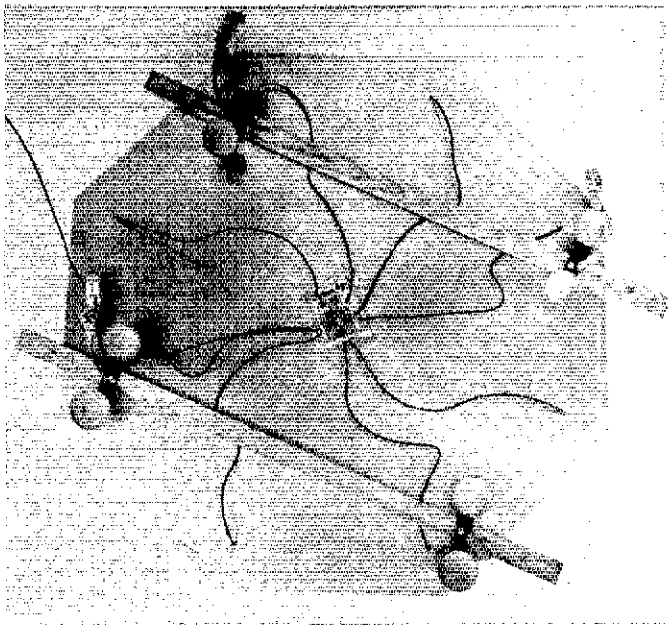
Fig. 1 — Pictorial diagram of the theoretical Doppler antenna, circling at six times the speed of sound.

Fig. 2 — This graph illustrates the frequency shift related to antenna movement toward and away from the signal source. *Both* antenna rotation and signal are time-based.



*46 Oakwood, 6901 Buffaloe Rd., Raleigh, NC 27604

Shown here is the former Mustang II, along with the author and the Doppler antenna system. The pole-mounted whip for 2 meters had no effect on the Doppler system.



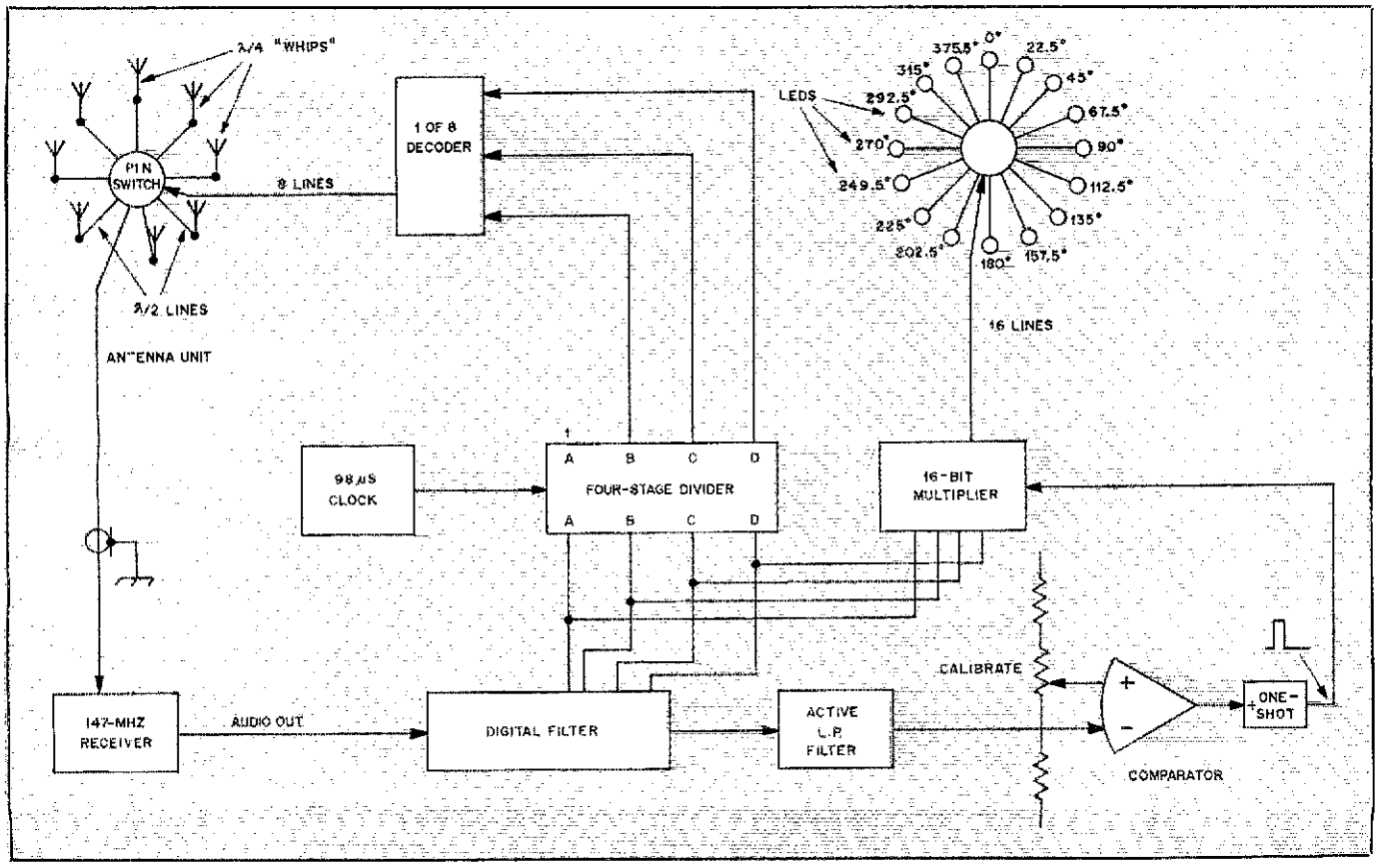
An underside view of the Doppler antenna mounting plate; note the eight equal lengths of small coaxial cable. The PIN diode circuitry is on the circuit board in the center.

Now refer to the system diagram in Fig. 3. The rotation is accomplished by constructing an array of eight antennas equally spaced in about a one-meter (half-wavelength) diameter circle. Any greater diameter leads to an ambiguity in direction. The antennas are then electronically scanned in sequence to approximate the rotation of a single antenna. We used PIN diodes to connect the individual antennas, since they allow us to stop the scan and transmit through the antenna system. The PIN diodes are capable of conducting more rf current than the dc bias current would indicate, whereas ordinary signal diodes will work but not conduct any appreciable rf current.

How the DoppleScAnt Works

Eight antennas are scanned in 1.57 milliseconds, so the clock must operate at

Fig. 3 — System diagram of the Doppler direction finder.



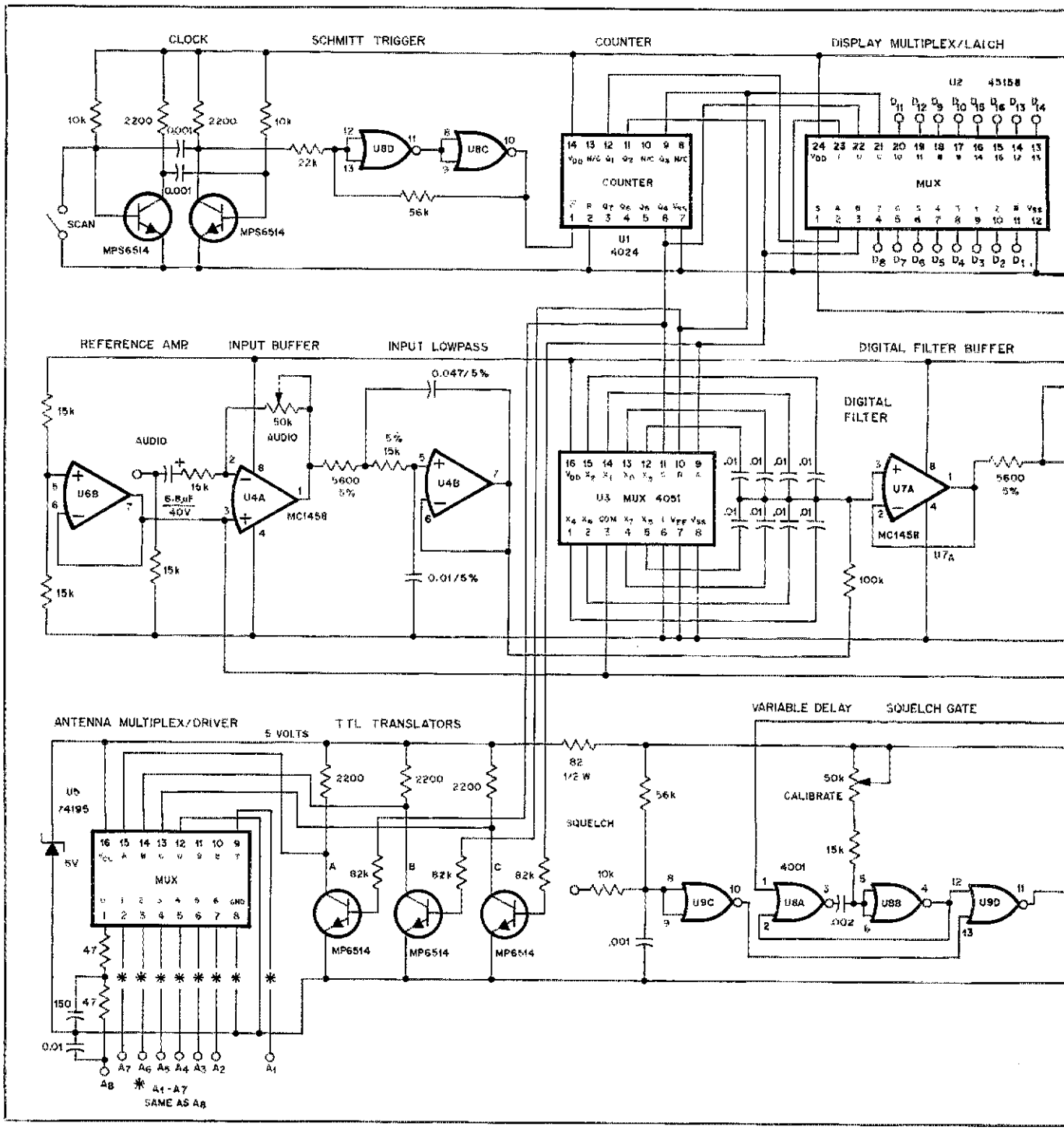


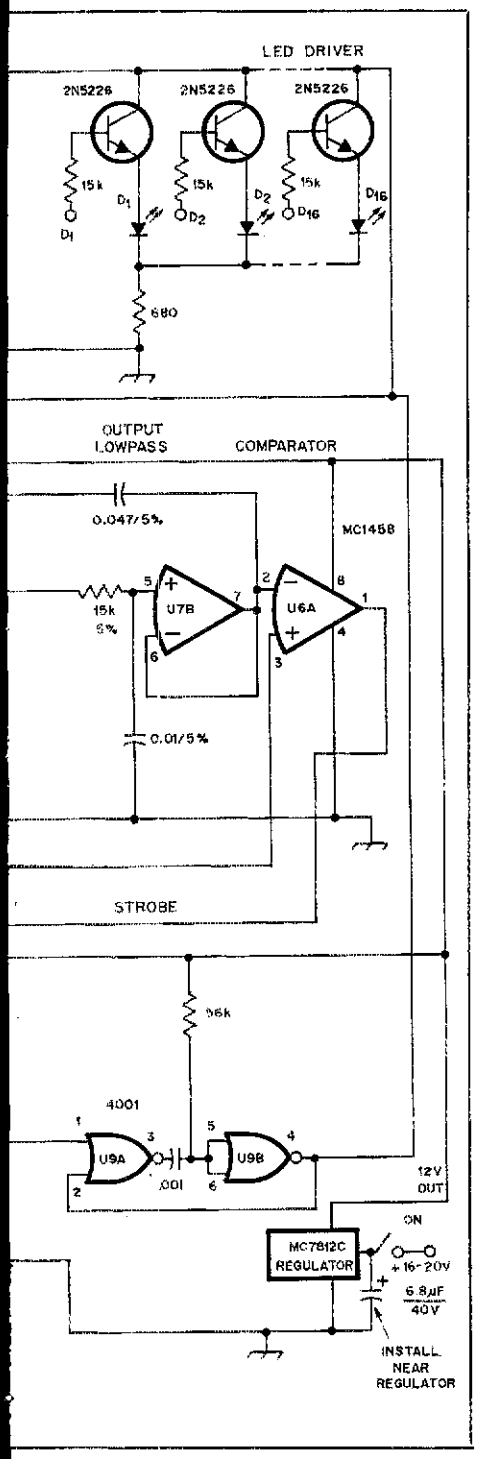
Fig. 4 — Schematic diagram of the control unit used in the vehicle. All resistors are 1/4 watt, 10 percent, unless otherwise noted; capacitor values less than one are in μF, more than one in pF unless electrolytic. All electrolytics are in μF. All capacitors are 20-percent tolerance unless noted. Connect pin 7 of each U8 and U9 to VSS and pin 14 to VDD.

1.57 ÷ 8 or 196 microseconds. We actually chose 196 ÷ 2 microseconds since our compass rose has 16 positions. The 637-Hz tone must be extracted from the composite audio output of the receiver by a narrow filter. However, such a narrow filter introduces considerable phase distortion with just a little mistuning. Therefore, we used a digital filter which is operated by the same clock that controls the scanning. The effect is to have a filter automatically centered on the scan tone even when there is some frequency drifting. A residual phase shift caused by the audio circuitry is calibrated out of the system.

How does the circuit work? Q1 and Q2 form a flip-flop operating at 16 times the scan rate of 600 Hz, or 9600 Hz. The RC waveform output is converted to square waves by the Schmitt trigger formed from U8C and U8D. The scan may be stopped for transmitting by closing the switch.

U1 is a seven-stage ripple counter, of which only the first four stages are used. The Q1, Q2, Q3 and Q4 outputs of U1 are all connected to U2, a four-bit latch and 4-to-16 line decoder. U2 is used to scan the LED display compass rose and to latch an output *only* when a pulse appears at pin 1, the strobe input from the calibrate single shot.

The LEDs are actually driven by 16 pnp switching transistors Q3-Q18, needed because of the low current output of the CMOS IC. All the LED directional



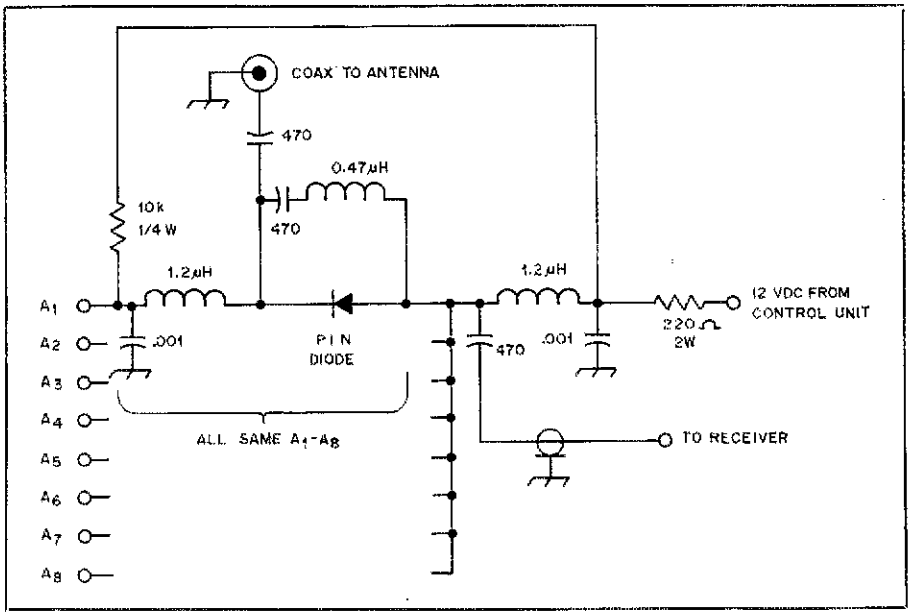


Fig. 5 — Schematic diagram of the PIN diode circuitry mounted beneath the antenna; eight identical circuits are used.

displays have a common current-limiting resistor, R61, since only one LED is on at a time. The diodes are mounted in a circle every 22.5 degrees on the front panel with D1 at the top (zero degrees) and proceeding counterclockwise (the same direction as the antenna is scanned). Number "one" antenna is usually at the right but its exact position is determined in the final test.

U6B is used to provide a stiff source for reference bias for the other op amps. Audio input is to U4A, which is an adjustable buffer amplifier. It is set so that at typical levels of audio from the transceiver, clipping does not occur at pin 1 of U7A, which is the buffer for the digital filter. This is about 1.6 V rms when an 8-volt supply is used. U4B is a low-pass filter which reduces voice audio peaks and overloading to the digital filter.

U3 is fed by outputs Q2, Q3 and Q4 of U1, so a complete cycle for its eight outputs occurs in step with the 16-step cycle of U2. This eight-way-decoded, bidirectional multiplexer is connected as a digital filter with a bandwidth of 10 Hz or less. The stepped output of the digital filter is smoothed by U7B, another low pass.

U6A is a comparator connected to go positive on a negative half of the sine-wave input. This fires the variable single-shot of U8A and U8B. This is used to calibrate out variations between radios, component aging, and so on. A second short-pulse single-shot is formed from U9A and U9B; it fires on the fall of the calibrate single-shot and provides the latching pulse to U2, which then illuminates whatever LED position was decoded at the time of the pulse for the next cycle.

U5 is the only TTL circuit. Its drive comes from Q2, Q3 and Q4 of U1 for the same reasons that U3 is so connected. The CMOS level is translated to TTL levels by Q19, Q20 and Q21. The outputs are open collector and are rated to drive the PIN diodes in the antenna unit directly.

The single-shot which latches the LED display drive may be gated on and off by the receiver squelch. This connection to U9C is labeled SQUELCH and is arranged so that a low potential produces the gating which locks in the current display. This allows the unit to lock on very short transmissions of about 250 ms after the squelch opens. The digital filter is quite narrow and so the sine-wave output usually does not decay to unusable levels by the time the typical squelch has closed.

Fig. 4 is a schematic diagram of the control (adaptor) unit used in the auto. A control cable goes to the antenna unit, which is mounted on the roof with cartop carriers. The circuitry shown in Fig. 5 is mounted on the underside of an aluminum plate which forms the groundplane for all antennas. Aluminum plate of 0.0625 inch (1.6 mm) thickness is quite adequate. The antennas used are commonly available quarter-wave whips. These antennas must be identical, especially in length. The interconnecting half-wavelengths of coaxial cable must all be of the same brand and the same length to within about one-quarter inch.

The capacitor and coil combination around the PIN diodes forms a parallel-resonant circuit with the capacitance of the diodes to increase isolation from "off" units. Note that changing the diode will change the value of the coil. This circuit may be checked with a grid-dip meter. It is not too critical and might be left out with low capacitance diodes. The commonly available Motorola MPN3402 diodes survive a 25-watt, 2-meter transmitter signal if the scan is stopped when one transmits.

Following construction and preliminary trials, the unit should be taken to an open field for calibration. Adjust the audio gain control at a comfortable speaker level, taking care not to overload the digital or low-pass filters (8 volts pk-pk). Set the calibrate control in the middle of its range. A 2-meter (or other band used) transmitter is placed some distance off

and the antenna array rotated until the compass rose reads true relative to the direction of the vehicle.

For aesthetics, the antenna may be rotated a slight amount before it is drilled and secured to the cartop carriers. Then the calibrate control may be adjusted to compensate for this movement. A walk around the auto with a handheld transceiver will reveal if the installation is functioning properly.

We first used a cable connector between the adaptor and the antenna unit which was not polarized. At one of the following practice sessions when the plug was reversed, the driver was instructed to follow the signal into Lake Ontario! Under such conditions the indicator reads correctly ahead and behind but reverses left and right, so it is best to check with a walk-around. Once calibrated in one direction, we did not find it necessary to compensate in other directions to the limit of readout accuracy. We left the pole-mounted, 2-meter antenna on the rear bumper during the tests and found no significant interaction.

Finding Bunnies

Use of this system does demand some skill. When driving down a street one may notice that the display will "dash around" the compass rose. This indicates the presence of multipath reflections that the Yagi competition will also have to weed out. You, however, will know that you are in a high-reflection area, whereas they often do not. If the car is stopped in a reflection the tone will sound distorted (tinny). Rock the car for the best note and then take the reading. You can also remain in motion, which is the best strategy, and have a companion watch the display. Every two or three seconds in a high-reflection area the display will momentarily come to rest. This reading is invariably accurate.

As time goes on and the competition becomes aware that you are using the DoppleScAnt, some countermeasures will have to be brought into play. Encourage the "rabbit" to reduce the time the hidden transmitter stays on the air. Since the system will lock on a bearing in about 250 ms you can find a hidden transmitter which is nearly "off the air" completely. You have just eliminated your Yagi competition!

Our targets tried power and polarization switching to throw us off. The first time that happened our team was not aware of it until we actually found the transmitter, because the system makes no use of amplitude or polarity information. Next, high power was used, as this causes the attenuators used by other contestants to be turned all the way up in the vicinity of the hidden transmitter, so that signals enter the receiver directly and the Yagi becomes useless. This trick is ineffective against the "octopus" system because it does not use an attenuator.

Finally, the sly devils tried transmitting a 600-Hz tone. This might have been effective but the digital filter is only 4 Hz wide and the rabbit does not know what exact frequency the clock is on, due to the tolerances of the components. We also realized that we could adjust the regulator voltage so the pitch changed slightly to avoid the interference.

Some remarks on strategy should be a fitting end to this article. It is sometimes of benefit not to drive immediately in the direction indicated, but rather at quite an angle to it, so that the approximate location of the bunny may be determined by "triangulation" as soon as possible. This will allow a course to be plotted to avoid the general flow of traffic and accompanying delays. The higher accuracy of the "octopus" should allow you to do this in situations where the small portable Yagis will not suffice.

We found that a three-person team is best: a driver, an equipment operator and a strategist. The driver pilots the auto while the operator sees to "calling" the bunny and interpreting the display. (The pictured Mustang II no longer exists, as a result of driver error while said driver was watching the electronics.) The operator also adds the relative bearing to the magnetic bearing of the car and thus obtains the magnetic bearing to the transmitter. The strategist then plots this information, discarding older, more distant (and thus less accurate) bearings, as the hunt progresses. The strategist is also responsible for the first coarse guess of the actual location, so that obstructions such as rivers with no bridges may be avoided in time. This task requires no technical expertise and is a good job to invite a nonham to do.

We found the DoppleScAnt to be our key to winning at an immensely entertaining club activity. If you have the competitive urge, get your club to start up a transmitter hunting program this spring; meanwhile, start building your "secret weapon!"

[Editor's Note: Photocopies of the circuit-board patterns provided by the author are available from ARRL hq. for one dollar (to cover handling) and a business-size stamped return envelope. The author has indicated that he can offer assistance in obtaining ready-made circuit boards and hard-to-find parts. A stamped return envelope sent to him will bring more information.]

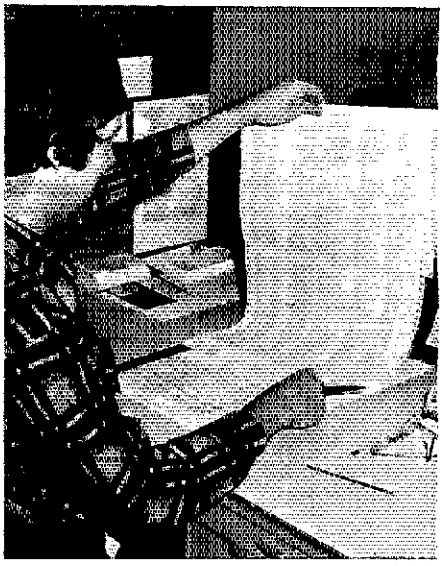
Strays

Predicted Orbits for OSCAR 8

Ref. Orbit	Date	Time (UTC)	Long. W.	Ref. Orbit	Date	Time (UTC)	Long. W.
786	1 May	0130	61	1037	19 May	0121	59
800	2 May	0135	62	1051	20 May	0126	60
814	3 May	0141	64	1065	21 May	0131	61
827	4 May	0003	39	1079	22 May	0136	63
841	5 May	0008	41	1093	23 May	0142	64
855	6 May	0013	41	1106	24 May	0004	40
869	7 May	0018	43	1120	25 May	0009	41
883	8 May	0024	45	1134	26 May	0014	42
897	9 May	0029	46	1148	27 May	0019	43
911	10 May	0034	47	1162	28 May	0024	45
925	11 May	0039	48	1176	29 May	0030	46
939	12 May	0044	50	1190	30 May	0035	47
953	13 May	0050	51	1204	31 May	0040	49
967	14 May	0055	52				
981	15 May	0100	54				
995	16 May	0105	54				
1009	17 May	0100	56				
1023	18 May	0116	58				

Updated orbital information can be obtained from W1AW bulletins. For further information, see "Operating News," page 82.

A first — computerization of the 1978-1979 *ARRL Repeater Directory*. Editor WA1LOU is shown here proofing and duping the computer printout. This free membership service is now available from Headquarters for a 6 × 9-inch s.a.s.e. (46-cents U.S. postage). *(W1YL photo)*



Sunspots and the HW-16

What have sunspots done to that HW-16? Retired when 15 meters became quiet as church on a Sunday afternoon? Well, 15 is alive! So revitalize your sweet '16!

By Earl R. Savage,* K4SDS

To a considerable extent, attitudes of many radio amateurs toward sunspots reflect individual interests in particular bands. For instance, I enjoy operation on 15 and 20 meters because of the DX possibilities. Both bands, however, are highly susceptible to solar activity with the result that entries in my log increase or decrease in number in direct relation to the intensity of that activity.

When sunspot conditions close a favorite band, the obvious alternative is to shift to frequencies that are open. For the owner of equipment with limited band coverage, such as the HW-16, sunspot variations can be particularly bothersome. Mind you, many of us old diehard cw operators think Heath's '16 is the nicest little rig to come off the assembly line or to be packaged in a kit box. (Just can't understand why Heath discontinued producing it!) This cw transceiver dandy is designed for 80-, 40- and 15-meter operation. The vulnerability of the set rests mainly with the latter band, for when that segment goes dead, operation becomes restricted to the two other bands. But let us not treat the HW-16 unkindly for this limitation. There can be an alternative. First, may we consider the assets of this transceiver?

Look through an HW-16 manual and you will note that this rig contains some outstanding features. It has full break-in cw provision, crystal control of the transmitter with provision for an external VFO, and the only tuning required when changing bands or frequency is adjusting the final-amplifier tuning capacitor. In the receiver section there is dual conversion with crystal control of the front end. Both the stability and selectivity are excellent. Antenna switching from transmit to receive and vice versa is accomplished internally. Operation limited to only three bands is the single disadvantage. What happens with solar activity determines in effect whether the HW-16 owner has a transceiver that may be engaged in communication on all three or just two bands.

*2503 Westerly Ave., Charlottesville, VA 22903.

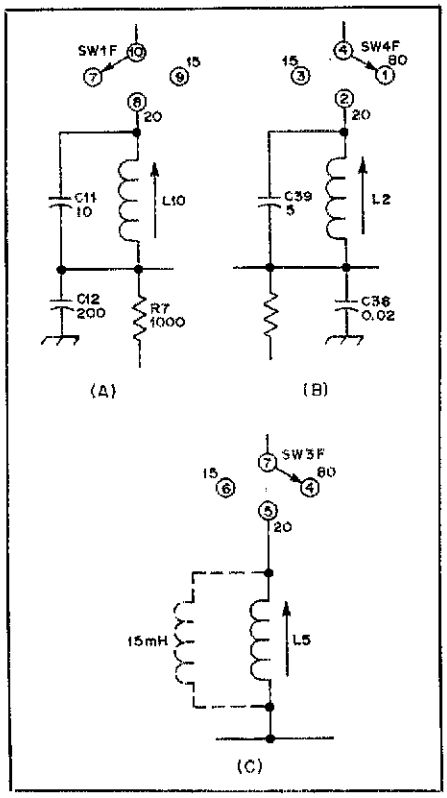


Fig. 1 — HW-16 component changes for operation on 20 meters as explained in text. Attention should be given to text notations concerning L5 as shown at C. Reference should also be made to the schematic diagram in the Heath HW-16 manual.

What to do when 15 becomes as dead as last Sunday's newspaper? One answer was provided by Bud Haake, WØMSV, in 1972 whose Technical Correspondence letter in *QST* for August provided a simple, neat way to change the HW-16 15-meter position so that it would cover the 20-meter segment. I, as well as many other HW-16 owners, followed Bud's instructions and *voila,* our cw transceivers again functioned on three usable bands. The results were indeed rewarding.

Time passes and eventually the sunspots show signs of increased activity. The lid appears to be coming off the 15-meter band. The news is welcome! But, now what? After having successfully converted the HW-16 to operate on 20 meters, does that mean a tormenting moment of decision is again at hand? Having grown fond of 20, how could I surrender this band to regain 15? Could I still have the cake and prove the cliche wrong in this case?

While pondering the several facets of the situation, I began asking myself "What good is 40 to me?" After all, it skips right over my friends around the state. Traffic nets are far from numerous, there is very little low-power DX and more than enough shortwave broadcast interference dominates the band afternoons and evenings. So, what else is new? Only this little gem . . . an inspiration to reverse Bud Haake's conversion, restoring the 15-meter operation as originally designed by Heath and then modifying the 40-meter circuit to function on the 20-meter band! To me, that thought became a showcase diamond, for thereby I would have three usable bands for my HW-16 including both DX bands, 15 and 20, and the other favorite, 80 meters. What more could I ask?

Undoing the WØMSV Conversion

With my goal fully in mind, the entire process of reworking the HW-16 became clear. There were to be two parts of the

operation. One would be to restore the original 15-meter function and the other would be the modification of the 40-meter circuit for operation on the 20-meter band. Amateurs who may wish to consider my plan will need only to perform the second part if their HW-16s have not been converted previously by means of the WØMSV modification.

The "undoing" process is essentially a reversal of the steps outlined by Bud Haake. First replace the 12.545-MHz crystal with the 26.545-MHz unit previously removed for operation on 20 meters, and exchange the wires attached to points T and U on the circuit board, or exchange the wires attached to lugs 1 and 2 on section 3F of the bandswitch. (Disregard step 1 of the 40- to 20-meter modification below.)

Next, move the wire from the 20-meter tap on L12 back to the original 15-meter tap position. Move the wire from the 40-meter tap to the 20-meter tap. (Disregard step 2 of the 40- to 20-meter modification below.)

To complete the restoration, remove the 150-pF capacitor installed across driver coil L9, and remove the 6.5 turns added to rf coil L1. Then align L1, L4 and L9 on the 15-meter band according to the Heath HW-16 manual.

Doing the K4SDS Conversion

There are eight steps involved in modifying the HW-16 for converting the 40-meter operation to function on the 20-meter band. Only step 6 poses any difficulty because of the tightness involved.

Step 1: Replace the 12.545-MHz crystal with a 19.545-MHz crystal.

Step 2: Move the 40-meter tap on the PA coil, L12, to a point exactly halfway between the 15- and 40-meter taps.

Step 3: Replace the 36-pF capacitor across the driver coil, L10, with a 10-pF unit.

Step 4: Replace the 47-pF capacitor across the rf coil, L2, with a 5-pF unit.

Step 5: Connect a small 15-mH coil in parallel with the crystal oscillator coil L5 *or* rewind L5 to a value of approximately 7.5 mH.

Step 6: Disconnect the 680-pF capacitor, C31, from lug 6, section 2F, of the bandswitch and attach it to lug 5, paralleling C29.

Step 7: Disconect the 68-pF capacitor C26 from lug 1, section 2F, of the bandswitch and attach it to lug 12 (to parallel C27). While this part of the modification is tight, it can be done without removing the bandswitch by careful use of forceps and extra-long, long-nose pliers.

Step 8: Align L2, L5 and L10 according to the Heath manual, but do it on the 20-meter band.

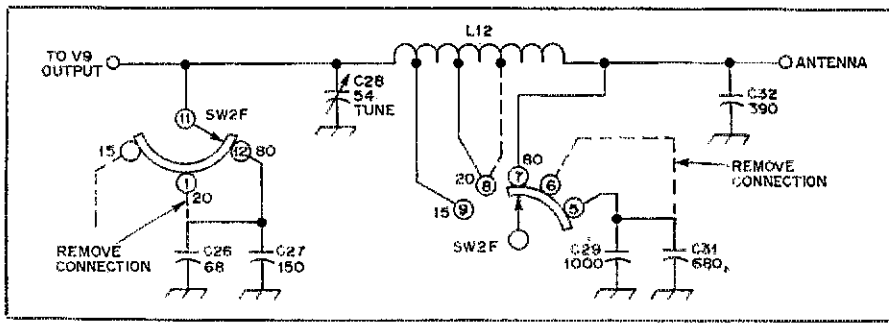


Fig. 2 — Modifications of the output circuit of the HW-16 enabling operation on 20 meters. Th 20-meter tap on L12 is placed midway between the 15-meter tap and the former 40-meter tap. Refe also to the schematic diagram in the HW-16 manual.

There you have it. That's all there is t modifying the HW-16 for operation o the 80-, 20- and 15-meter bands. I have n hesitation about recommending these sim ple changes to the cw owner/operator o an HW-16. They enable one to keep i touch with friends on 80 and still enjo the pleasures of DX on 20 and 15 meters The easy conversion provides anothe reason why I'm convinced the HW-16 is great rig. Actually, my '16 has more tha a dozen modifications . . . some simple . . some more involved. They are all incor porated to make this transceiver perforn for my convenience.* I find that I can di around in it and make it do just abou anything I want. I'd only trade it fo another. As time goes on I may well devis additional modifications. After all, wha ham wants a rig that does only what th manufacturer planned? Not this one!

*For information about other modifications, HW-1 lovers may write to the Printer's Devil Press, Bo 6301, Charlottesville, VA 22906.

Strays

THEY *DO* MAKE 'EM LIKE THEY USED TO

☐ It's been nearly 60 years since 8ADU came up with a suggestion that quite a few amateurs have since made use of. A brief item from *QST* cartoonist Donald Hoffman, 8ADU, in the August, 1919, issue went as follows: "Here's a little idea — run a suggestion that the fellows with long-distance ham receiving sets make themselves up a form for postcards something like this and send each time a new long-distance station is heard. In this way numerous relay possibilities will be discovered where some were careless and didn't notify stations heard formerly. Fellows receiving cards would keep them on file, etc. I used to do this and got a lot of thanks for it from the ones I wrote the cards to."

8ADU's proposed card had these categories: To . . . Heard your station . . . Dates . . . Hours . . . Audibilities . . . Working . . . Apparatus I use . . . Do you hear me? Call . . . .

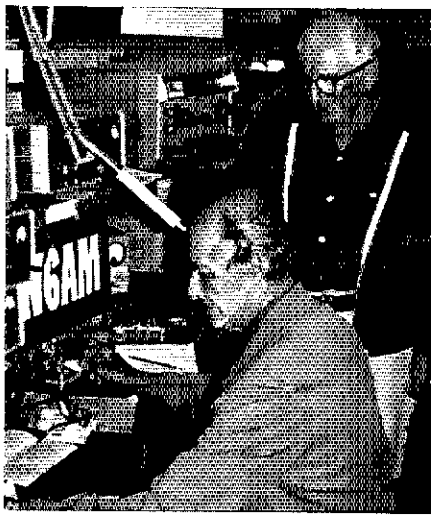
QSLs haven't changed all that much in 60 years, have they? — *WB9VAV*

SARL ASKS COOPERATION

☐ Lately, the South African Radio League has been inundated with QSL cards from all over the world, to be routed through SARL to countries outside South Africa!

"While we are flattered by the confidence these (amateurs) have in us . . . the handling of our own members' cards and authentic DX cards to our members is more than enough to cope with and we will not, in the future, forward these extra cards to amateurs and bureaus outside our boundaries who are not members of the SARL," says H. C. McCallum, ZS1MP, the QSL manager for SARL.

Amateurs are asked to QSL either directly or through the ARRL bureau. For more information, see "QSLs," *QST* for October, 1977.



"DXer no. 1." Don Wallace, W6AM, past ARRL Southwestern Division director, shows East Coaster and fellow past New England Division Director Robert York Chapman, W1QV, how signals sound on the end of the "rhombic farm." The occasion was Bob's visit to Don's home to discuss the merits of the ARRL Foundation.

Product Review

The Bencher Paddle

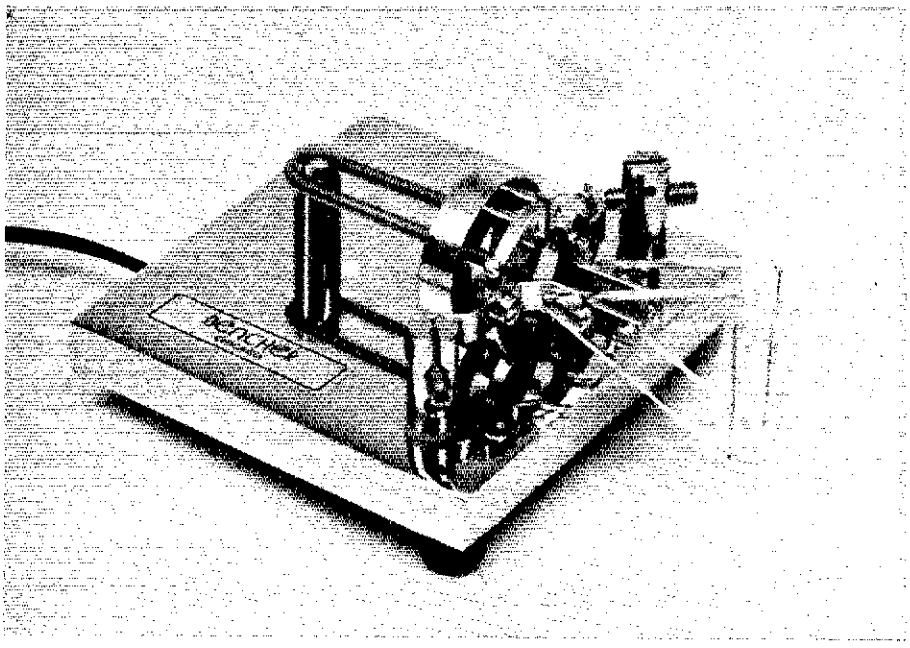
Once upon a time, in the village of Dayton, state of Ohio, a man named Hills designed a keyer paddle. He called it the "FYO," after his W8 call sign. Although he ceased production soon enough to render his paddles both legendary and virtually unobtainable, W8FYO's ideas produced two descendants in the 15 years which followed. One son of FYO was made briefly during 1976 by HAL Communications, even using the name FYO. (A review of that HAL FYO appeared in *QST* for December, 1976.) The second son appeared late in 1977 and is called Bencher. This is its story.

The Bencher paddle is, like the FYO, a beautiful piece of work. In this day of sports cars with simulated everything and radios in plastic boxes, at last we have a paddle that's *heavy*. Either in its chrome configuration (as pictured) or its black steel finish (less money), it stays put on the table; cw addicts' complaint number one is answered.

Diehards will tell you that a properly adjusted paddle for high-speed work must be set by screwing the contact points in until they actually touch, mechanically and electrically. Then they should be backed out the tiniest bit until a breath of air on the handle will close the contacts; requirement number two. The Bencher passed this test of its pivot points with flying colors.

Requirement number three, that the handles be adjustable for different fists, is met in a roundabout manner. While you can't move the handles, they are gigantic, so you can grab them high, grab them low, or grab them in the middle. By the way, those are *not* sharp edges on the clear plastic triangular handles. The edges are rounded smooth so they won't bruise or irritate your delicate fingers.

What you can adjust on the Bencher is the contact spacing and the spring tension. The latter is accomplished in the same manner as the HAL version but completely different from the original FYO design. This is because the original was a single-lever model; the two sons are double lever. An Allen wrench is provided for the contact points, and a small screwdriver will be needed for the spring adjustment. You'll also need a stereo phone plug and a hunk of wire or cable to hook the Bencher up. You can probably get that from the other paddle you've been using.



The Bencher paddle in gleaming chrome, grandson of the FYO paddle (1962) and son of the HAL FYO paddle (1976). The paddle levers pivot on needle bearings and can be adjusted so they close with a mere breath of air — literally.

As their ads say, the Bencher paddle features nylon and brass self-adjusting needle bearings and solid-silver contact points. What they don't say is that the unit has a nice "feel." That's up to the judgment of the user. If it makes any difference, this reviewer liked it, and I won't say that about very many keyer paddles (only three come to mind).

The Bencher paddle is manufactured by Bencher, Inc., 333 W. Lake St., Chicago, IL 60606. Price class is $40 for the steel base, $50 for chrome plus $2 shipping. Money-back guarantee. — *K1TN*

SINCLAIR CAMBRIDGE PROGRAMMABLE CALCULATOR

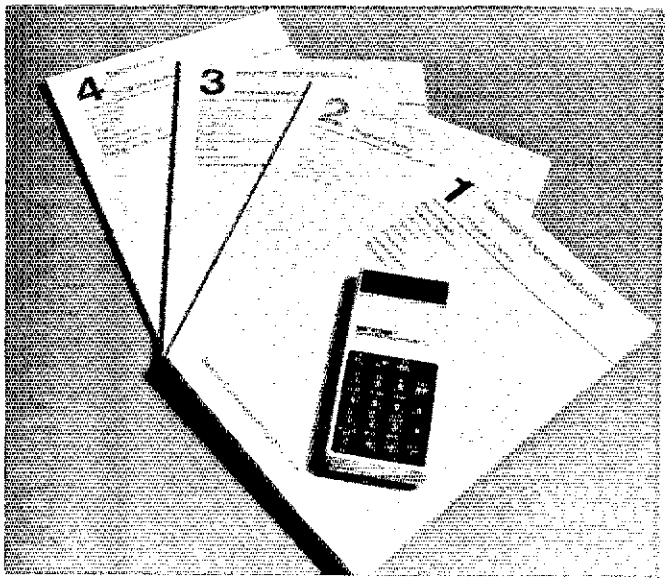
Add two variables together, take the square root of the product, multiply by twice the value of π, then take the inverse of the whole thing and multiply by 1000. Now do all of that again using 50 different sets of variables. Sound easy? Probably not, unless you are the proud owner of a programmable calculator.

Until recently, these devices were between $70 and $500 retail, making them a luxury item for most hams. The price barrier was broken, however, when Sinclair Radionics introduced their new Cambridge 35-step programmable calculator at $30!

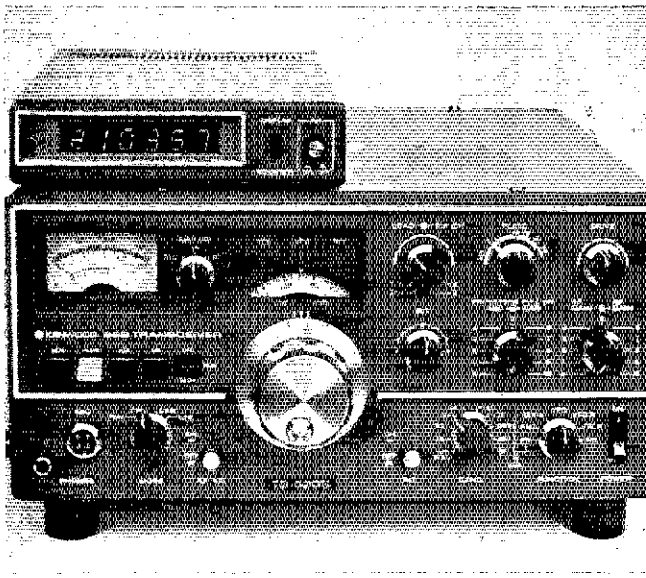
If you figured out the aforementioned problem, you probably recognized it as a form of the LC-to-frequency formula. It doesn't really contain any steps that *require* a programmable calculator to perform, but having one of these little wonders can make the task much easier. When using a programmable calculator, you first determine exactly how you want to solve the problem at hand. After you have the problem-solving steps in the proper order (as I did above, for example), the calculator is placed in the *learn* mode.

Then the problem is calculated in a manner similar to the way it would be on a standard calculator. But while you are pressing the keys, the calculator is storing the keystroke information in memory. When you are finished with the calculation, the machine is placed back in the *standard* mode of operation. Now, when you enter the necessary variables and press the *run* key, the calculator "punches the keys" for you and the problem is completed almost instantaneously!

Different sets of variables can be entered, and each time the *run* button is depressed, the calculator will spit out the appropriate answer. Neat, right? Of course, there are many differences between the Cambridge programmable and more expensive programmables, but this new Sinclair provides basic programming as well as log, algebraic and trigonometric functions, and all at an attractive price.



Shown here is the Sinclair Cambridge with optional program library. The four-book library contains equations and program steps for numerous problems.



Look closely for the differences between this Kenwood TS-520S and predecessor, the TS-520. The smaller unit is the optional DG-5 LED fr quency readout.

The Cambridge uses algebraic logic on a 19-button keyboard. Entries and answers are all displayed on an eight-digit LED display which emits a reddish-purple light. One limitation of the display is its narrow viewing field. This is caused by the use of small convex lenses inside the calculator case which are used to magnify the LED display. The result is a display that is difficult to read when the calculator is placed on a table in front of the user. Handheld use is not impaired.

Other limitations of the Cambridge include its sine, cosine and tangent functions. These calculations can only be performed on the Cambridge programmable when using numbers in the first and fourth quadrants. This doesn't actually keep you from performing any calculations, but just means that if you have obtuse angles, you have to reduce them to what this machine will handle prior to doing the trig functions. In addition, there is some loss of accuracy on tangent calculations as ±1.57 radians is approached. Also, the trig functions on the Cambridge normally operate in the radian mode, not the more common degree mode. This means that for many calculations, you must first hit the proper buttons to obtain degrees before beginning trig functions.

On the plus side, Sinclair has done considerable work on applications and software. That is to say, they have a four-volume program library containing equations, keystroke sequence, and execution of hundreds of programs. The program library, numbered volumes one through four, covers respectively general/finance/statistics, mathematics, physics/engineering, and electronics.

With all of these programs and an inexpensive, handheld programmable calculator, you could amuse yourself for quite a while — but you would still have to punch each program into the calculator. Now if they could only . . . — *K1TX*

The Sinclair Cambridge Programmable Calculator

Description: 35-step programmable calculator, algebraic notation.
Dimensions: 4-1/2 × 2 × 1 inches (114 × 51 × 25 mm) HWD.
Operating voltage: 9 volts, from transistor battery or optional ac-line adaptor.
Display: 8-digit LED (red).
Keyboard: 19 keys, with algebraic, log, trig and inverse trig functions. Tactile feedback on keyboard buttons.
Price class: $30.
Accessories: Program library (four books) at $10 for the set, or $4 each.
9-volt ac line adaptor at $5.
Manufactured by: Sinclair Radionics, Inc., Galleria; 115 E. 57th St.; New York, NY 10022; Tel. 212-355-5005.

KENWOOD TS-520S TRANSCEIVER

You're probably curious concerning what's different about the latest model of an old friend to amateur radio, the TS-520. Well, there are a number of changes found in the current "S" version of that popular gray box! This report treats the circuit alterations and improvements which occurred since the TS-520 was reviewed in *QST* for September, 1974. The general circuit and the outward appearance of the equipment remains unchanged.

Perhaps one of the most severe natural environments for amateur-equipment testing is the tropics. Because a two-week DXpedition was planned by the reviewer, his XYL (W1CKK) and ARRL Technical Secretary, Marian Anderson (WB1FSB), it seemed appropriate that the new TS-520S be taken along on holiday to the island of Antigua. With the kind permission of Trio-Kenwood, the 35-pound rig was hand-carried to that beautiful island in the Caribbean during November of 1977.

It always seems that if trouble with an amateur station is going to take place, it will happen on a field trip where repair facilities and parts are scarce. We were counting on the reliability of the TS-520S, for no spare co ponents were carried on the trip, except fo pair of 6146Bs and a 12BY7A. No tu replacements were necessary, however, nor failures of any type occur despite the hi temperatures and humidity of the tropics. T transceiver was used for two weeks on an op veranda, just 70 feet from the seashore. Ra and salt air reached the rig many times, but t only problem encountered was with the key paddle (eternally dirty contacts). Operati was carried out on cw and ssb from 1.8 to MHz. Quality reports for both modes were cellent. A Curtis keyer was used during work and a late-model, Turner handh ceramic microphone was utilized wh operating ssb. The only obstacle to t W1FB/VP2A operation came each eveni when the line voltage at Half Moon B dropped to approximately 95. Maximum inp power to the transmitter was frozen at watts, but performance was otherwise cellent.

Circuit Differences

These are the circuit modifications made the original '520 circuit: (1) The unit conta an audio speech processor. A pull switch on t front panel engages the processor and alters t age time constant. (2) Receiver gain has be lowered on 80 and 40 meters to redu overloading problems. (3) A 20-dB rf tenuator has been added. It is actuated fro the front panel. (4) Provisions have been add (jacks on rear) for attaching an accesso digital readout head (DG-5). (5) The 160-me band has been added, providing ham-ba coverage from 1.8 to 30 MHz. (6) This mode ac operated, only. An accessory dc-to-dc co verter is required for mobile use. (7) A vern drive has been added to the PA tuning. (8) phone-patch jack has been added to the r apron of the transceiver. (9) An extern receiver jack is located on the rear of the ri

Provisions remain for the use of the exter Kenwood VFO and vhf transverters. Th makes the '520S a practical nucleus for amateur who wishes to operate the bands fro

160 through 2 meters. The transceiver alone is ideal for mobile or portable use in combination with the separate dc-to-dc converter (DS-1A) when 12-volt dc operation is required.

Receiver dynamic-range measurements made in the ARRL lab show that the noise floor is −133 dBm, blocking (1 dB of compression) occurs at 104 dB above the noise floor and IMD is 69 dB above the noise floor, at 14 MHz. Measurements were made in accordance with the W7ZOI technique described in *QST* for July, 1975.

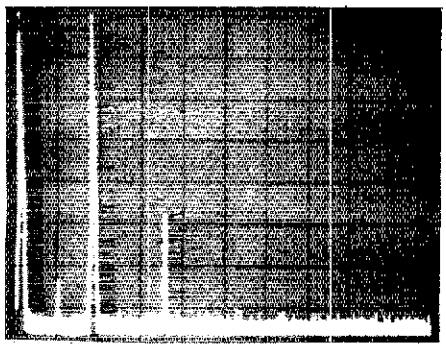
The accompanying spectral displays illustrate the level of spurious output and the transmitter IMD traits. Tests were performed in the ARRL lab by means of an HP-8553B analyzer.

Although no TVI has been observed when using the '520S in the Hartford/Newington area (channels 3, 5, 8, 18, 22, 24, 30 and 40), some incidental radiation of vhf energy was noted when "sniffing" around the cabinet with a probe. If TVI is encountered it will probably happen in TV fringe locations. A simple remedy will be to scrape the paint from mating surfaces of the cabinet, put a screen over the blower orifice, and bypass the ac line from the blower motor. We hope that Kenwood and other manufacturers of amateur equipment will pay *particular* attention to rf shielding of their cabinets in the future, because incidental rf radiation can sometimes cause more TVI than a lack of spectral purity from the transmitter. It should be noted that many brands of amateur gear need improvement in this area, with special emphasis on cabinet bonding and lead decoupling.

In the opinion of the reviewer, the TS-520S is a slick little box that can provide plenty of trouble-free operation. The competitive price should appeal to newcomers and seasoned operators, alike! — *W1FB*

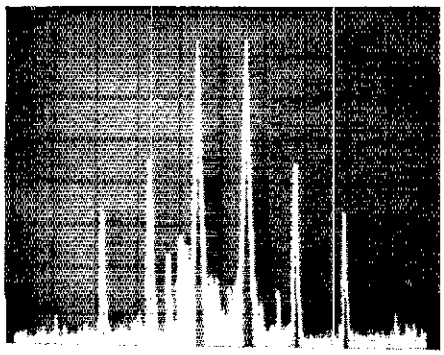
Trio-Kenwood TS-520S Transceiver

Frequency range: 1.8-to-29.7 MHz amateur bands, plus 15-MHz WWV.
Modes: Cw, usb and lsb, plus tune position.
Maximum power input: 200 W PEP for ssb, 160 W for cw.
Stability of VFO: Less than 300-Hz drift, from cold start to one hour later, at 72°F (22°C).
Selectivity at 6-dB points: 2.4 kHz for ssb, 0.5 kHz for optional cw filter.
Audio output: 1 W at 8 ohms; suitable for loads from 4 to 16 ohms.
Tubes: 12BY7A driver, two 6146A tubes in PA.
Power requirements: 117/234 V ac 50/60 Hz; 13.8-V dc operation with dc power supply accessory. Transmit, 280-W consumption.
Dimensions (HWD): 5.9 × 13.2 × 13.2 inches (150 × 335 × 335 mm). Weight, 35 pounds (16 kg).
Color: Two-tone gray with brushed aluminum.
Price class: $650.
U.S. office: Trio-Kenwood Communications Inc., 1111 W. Walnut, Compton, CA 90220.



3.5-MHz, full-power cw spectral display of the TS-520S. The tall pip at the extreme left of the photo is generated in the analyzer and represents 0 MHz. Vertical scale is 10 dB per division; horizontal 2 MHz per division.

Spectral analysis photo of the TS-520S showing the full-power, 3.5-MHz, two-tone test. Each vertical division is 10 dB and each horizontal division equals 1 kHz.



THE SPECTRUM INTERNATIONAL 1296-MHz LOOP YAGI

Perhaps the biggest problem faced by amateur Yagi builders is developing a driven element that at once provides a good match to the feed line and efficiently illuminates the rest of the array. The problem is *especially critical* at vhf and uhf. Accurate SWR indicators and antenna-test ranges are beyond the capability of many hams. Relief has been offered in the literature,[1,2] but the hours of trial and error may be more than some hams can bear. It is essential that all element lengths and spacings be held within critical tolerances to yield best performance. The quagi antenna uses a loop driven element and reflector to provide for easier matching.[3] A full-wavelength loop properly positioned in a Yagi array has a feed impedance close to 50 ohms, as opposed to the very low impedance of a rod element similarly located. This fact makes impedance-transformation devices, such as the gamma match, unnecessary in a quad or loop array. It appears that the two loops may illuminate the directors more effectively than is the case in a true Yagi, as commercial Yagis with loops replacing the original driven element and reflector measure slightly higher gain than the original antenna.

G8AZM presented the dimensions for a 34-element Yagi having loops instead of rods for the driven element and reflector, in 1971.[4] Both the G8AZM and K6YNB/N6NB designs use rod-type directors and *square* loops for the reflector and driven element.

In January, 1975, a 1296-MHz antenna was described which used *circular* loops for *all* elements.[5] This particular design had 26 elements and an aluminum-mesh reflector mounted three inches (7.6 cm) behind the loop reflector. It was manufactured commercially in England, and imported into the U.S. by Spectrum International. In 1976, the British manufacturer stopped shipping this antenna to the U.S. A partial redesign was done and Spectrum International began manufacturing the new version locally. There are two readily apparent differences between the old design and the new. The mesh reflector, which tended to act as a sail in the wind, has been eliminated. Older models of the loop Yagi were constructed on a 1/2-inch (1.3-cm) boom, while the current antennas have a 3/4-inch (1.9-cm) boom. The boom has been extended beyond the reflector to permit mounting from the rear.

Assembly

Installing 26 balky aluminum loops on the boom is somewhat time consuming, but patience is the only prerequisite for successful assembly of the loop Yagi. Connection to the driven element is through a short piece of semi-rigid coaxial line. A type N *male* connector is supplied, which mates with the feed line. The male connector at first seemed incongruous, as most antennas are supplied with female terminations. The connector turned out to be quite useful when the system was installed, as will be seen later.

Carrying the antenna up the tower resulted in a few loops being knocked out of round, but the soft aluminum was easily straightened afterward. A boom-to-mast bracket was fabricated from a piece of 1/8-inch aluminum rack panel, as none was supplied with the antenna. The bracket was intentionally made larger than required. To reduce feed-line losses, the entire 23-cm rf system, consisting of a receiving converter, receive preamp, varactor tripler and three antenna relays, was mounted immediately behind the antenna on the bracket. The male connector on the antenna mated directly to the changeover relay. No signal-wasting coaxial cable or adaptors were required. Power output from the varactor multiplier was approximately 10 watts. During the 1977 June VHF QSO Party, which was certainly not blessed with good tropo conditions, no trouble was had working W1DC/1, nearly 100 miles (165 km) away. W2CNS/3 in Delaware, about 300 miles (500 km) away, was heard, but unfortunately, not worked.

Each year, in August, the East Coast VHF Society holds an antenna gain-measuring contest on the grounds of Trenton (NJ) State College. The loop Yagi was taken to this competition, to see how it performed in comparison with other antennas. It should be noted that this was the only 1296-MHz antenna tested that was specifically designed for amateur use. The other commercial antennas were parabolic reflectors with homemade feeds. Compared with a reference horn assumed to have a gain of 15.4 dB over an isotropic source, the loop Yagi measured a gain of 16.4 dBi. For comparison purposes, a three-foot (0.92 meter) dish has a theoretical maximum gain of 19 dBi at 1296 MHz.[6] A four-foot (1.23-meter) dish with dipole-and-splasher feed tested by the reviewer had a measured gain of 18.9 dBi.[7] The theoretical maximum gain for a four-foot dish at 1296 MHz is 22 dBi. The loop Yagi appeared to perform about as well as a typical three-foot dish.

At the time of this review, the Spectrum International loop Yagi is the only commercially

made antenna for 1296 MHz available in the U.S. As such, it may appeal to amateurs wishing to operate on this band but who do not wish to build their own antennas. Price class of the antenna is $55. It may be ordered from Spectrum International, Inc., Concord, MA 01742. — *W1XZ*

References

[1]McMullen, "The Line Sampler," *QST*, April, 1972. Also appears in current editions of the ARRL *VHF Manual*.

[2]Knadle, "UHF Antenna Ratiometry," *QST*, Feb., 1976.

[3]Evans, "Microwaves — 1000 MHz and Up," *Radio Communication*, Aug., 1971.

[4]Evans, "Microwaves — 1000 MHz and Up," *Radio Communication*, Jan., 1975.

[5]*Microwave Antenna System Computer*, Andrew Corp., Orland Park, IL 1974.

[6]Vilardi, "Easily Constructed Antennas for 1296 MHz," *QST*, June, 1969.

SUPERTEX INC., POWER MOSFETS

As we approach the day when power FETs replace the bipolar transistor for hefty applications, Supertex, Inc., offers an interesting line of these newer devices. A family of p- and n-channel enhancement, V-groove, power MOSFETs are available in TO-39, TO-202, TO-92 and TO-220 packages. Ratings, depending upon the device selected, range up to 60 volts at 2 amperes.

The upper frequency ratings are 900 and 700 MHz for the n- and p-channel types, respectively. A high-speed switching characteristic of four nanoseconds is typical at 1 ampere of drain current.

Significant among the features of these power FETs is that there is no thermal runaway or second-breakdown problem to contend with. Data sheets and prices are available from the manufacturer — Supertex Inc., 1225 Bordeaux Dr., Sunnyvale, CA 94086, or from ESP Co., P. O. Box 1712, Lowell, MA 01853. — *W1FB*

NEW BOOKS

The Zapping of America — Microwaves, Their Deadly Risk, and The Cover-Up, by Paul Brodeur. Published by W. W. Norton and Co., New York, 1977. Hardcover volume, 7 × 10 inches, 343 pages. Price: $11.95.

The somewhat ominous title of this book is, of course, intended to stimulate sales to environmentally conscious laymen. The hazards of microwaves are being given considerable emphasis, no doubt resulting from a series of articles in the *New Yorker*, which were expanded to form this book. A weekly CBS TV program, "60 Minutes," devoted a recent segment to this subject, and articles have appeared in many newspapers across the country. While this book was not written with the radio amateur in mind, its content is of interest to hams, especially those who operate on the vhf and microwave bands.

According to the jacket-liner notes, Brodeur, whose specialty is writing about environmental and occupational medicine, is a staff writer for the *New Yorker*. He's also published two novels and a collection of short stories. This background may bias a science-oriented reader who would prefer to see the subject covered by a more knowledgeable person. These points, in combination with the "Madison Avenue" title, may cause some skepticism. Brodeur's lack of experience in the field of electronics results in some rambling in the text and several technical errors. For example, mention is made of the proliferation of CB radios, which should not be considered as radiators of microwave energy. Later in the book, Brodeur talks about an industrial heating machine which operated at 27 MHz. The latter is alleged to have caused its operators severe medical problems. Whether it did or not, this device was not a microwave generator, and it certainly bears no resemblance to microwave equipment in current use.

Much of the book is devoted to case studies of persons injured in some way by exposure to extremely high levels of microwave energy, such as that found at commercial TV stations (tens of kilowatts). The potentially dangerous heating effects of such energy were well known before Brodeur entered the picture, so there is hardly any new information there. Frankly, the reviewer finds it difficult to believe that a technician would look into the open end of a transmission line carrying rf power. Rather than decry the hazards of microwave energy in general, as the author does, it would seem that more intelligent operating procedures are required in the microwave industries involved. While Brodeur claims that a cover-up is in progress, he was only able to turn up a handful of alleged injuries. Either his research was faulty, or the situation isn't as bad as he claims.

Who's Watching the Oven?

Microwave ovens are an unmistakable part of our vocabulary and our lifestyle. While most users may feel there is no microwave leakage from their ovens, a certain amount of leakage is allowed by the government. It would be possible to prevent all leakage only if the glass door were replaced by a solid metal shield. This would prevent the chef from watching as the meal cooked. Brodeur, and his "expert," a Dr. Zaret, seem to imply that the long-term effects of this low-level leakage could be dangerous. Zaret is an ophthalmologist, and claims some expertise in treating victims of *high-level* radiation. The distinction is important because the effects of high-level microwave radiation are quite different from those of low-level energy.

Rf energy absorbed by the body is converted to heat. Microwave energy is used for cooking and for some industrial processes because it is easier to concentrate in a small beam than rf at lower frequencies. The cooking compartment of a microwave oven functions as a tuned circuit, to stretch an analogy. If living tissue is exposed to microwave energy, the absorbed power will heat the tissue. As warm-blooded animals, our bodies have the ability to dissipate a fair amount of externally applied heat in any form, thanks to our efficient circulatory system. The maximum continuous level of microwave exposure for the whole body allowed in the U.S. corresponds to a radiation intensity of 10 mW/cm^2. Our bodies are capable of absorbing this much energy on a continuous basis without noticeable effect. In fact, if the exposure period is shorter, the level could be higher without being dangerous.

The long-term effects of high-level radiation are more severe. When the body's ability to counter the heating effect of high-level microwave radiation is exceeded, the result is a burning of tissue. The burn is no different than that from any heat source. Medical doctors and physicists at several universities have per-

physicists at several universities have pe
formed research in this area for many year
No one to this writer's knowledge has reporte
any danger from long-term exposure to leve
at or below the American standard. In one ca
where an effect was thought to exist, it wa
found to be as a result of a metal temperatur
sensing probe inserted in the body. The prob
acted to concentrate the energy, increasing i
density near the probe. Brodeur is not able t
provide proof of any long-term effects eithe
of course. He merely hints at them.

In fact, his book constantly alludes to poss
ble dangers but never proves them. His unsu
ported insinuations will do little except to te
rify laymen who read the book. Sever
newspapers and magazines have published a
ticles which relate material from the book. As
result, we may expect to see environmentalis
and so-called concerned citizens seeking to pr
vent the expansion of microwave communic
tions and industrial equipment. Thanks
Brodeur's inability to differentiate betwe
proton accelerators, radar, high-pow
microwave sources and hf communicatio
equipment, hams and CBers may find their a
tivities curtailed by local citizens who are afra
of being "zapped."

As an example of the myths arising fro
Brodeur's work, one popular magazine recen
ly published an article dealing with the boo
The author of this particular article advises
readers that they are constantly being zapp
by CBers. It seems that the "microwave
from a CB rig may be drawn into your car
your steering wheel has a metal rim, suppose
ly increasing the danger! This reviewer is n
aware of *any* class of CB equipment which m
be termed "microwave." The attractive featu
of a metal steering wheel is a new one, too
might be worth investigating as an adjunct
weak-signal reception!

This reviewer is tempted to go on and o
citing the abundant fabrications and disto
tions contained in *The Zapping of America*.
would also be worthwhile to investigate t
antitechnology movement in this country. Th
is a subject perhaps better left to sociologis
We are left with a book which is almost total
bogus, but which is being given wide publicit
Worse yet, many laymen believe the book to
truthful. One would hope that the journalis
who ride the coattails of this book, if not t
one who wrote it, will take the time to disco
the truth. The research which Brodeur a
Zaret claim is needed has, in fact, been do
Some of this material has been published by t
U.S. Government. We are grateful to N3N
who provided copies of the documents listed
the references. — *W1XZ*

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Moore, *Biological Aspects of Microwave Radiatio*
U.S. Department of Health, Education and W
fare, Rockville, MD, 1972.

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Sources in the Washington, DC Area, U.S. Depa
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MD, 1971.

U.S. Department of Defense and U.S. Department
Health, Education and Welfare, *A Partial Inv*
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1971. Available from the U.S. Department
Health, Education and Welfare, Rockville, M
20852. Contains a five-page appendix titled "Pote
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magnetic Waves, in two volumes. Selected pap
of the USNC/URSI annual meeting, October, 19
Also available from HEW.

Technical Correspondence

The publishers of QST assume no responsibility for statements made herein by correspondents.

CRYSTALS — FROM A TO X TO Y

☐ I just finished reading, "Crystals Inside Out" (January 1978 *QST*). It contains good information, but there are some points which I would like to clarify. I'll take them in the order in which they appear in the article.

Quartz is indeed the "most widely used radio crystal material," but it is just as brittle as Rochelle salt. The advantage of quartz is that it is more chemically and mechanically stable. Rochelle salt is also highly water soluble, making it difficult to work with.

Although "a tuned circuit with a high Q has very little dc resistance," it is not the dc resistance that determines Q but rather the resistive component of the impedance. Quartz has very high dc resistance.

Although crystal frequency *is* dependent on thickness, electrode configuration and the angle of cut, the *most* important consideration is the mode of vibration.

AT cuts are used almost exclusively these days. X and Y cuts have not been used for frequency control since WW II. Today, Y cuts are used for thermometers and X cuts as high-frequency transducers.

Even overtones are normally not obtainable. However, they can be driven with crystals not operating in thickness modes by using suitable electrode arrangements.

Crystals can and do operate in fundamental and overtone modes (or other unrelated modes) simultaneously, but not by design. They may also start on one or the other at random in some poor oscillator circuits.

The left diagram in Fig. 4 of the article is a picture of a clamped flexure, not a longitudinal mode.

To avoid confusion caused by incomplete information when ordering crystals, the crystal operating frequency and fundamental *or* overtone operation should be indicated. The fundamental frequency of an overtone crystal should *not* be mentioned. Too many people don't know the difference between overtone and harmonic.

Guaranteeing that an ordered crystal will be "close enough" for your purposes, by specifying the radio it is to be used in, does not always work. Crystal manufacturers cannot keep up with all the new gear being released (if they ever did). Most new gear has information in the instruction manual telling how to order the crystals, and that is the best method. If that is not available, then the *QST* article advice applies.

Temperature coefficient and temperature drift should not be used interchangeably. They are related, but different. A coefficient by definition is a ratio, X/Y. In low-drift crystals it is not a constant, so it should be used only over very short ranges. Temperature (drift) tolerance can be stated as X percent from T_1 to T_2 or in parts/million maximum deviation between T_1 and T_2 or, better yet, as the frequency tolerance in hertz at the crystal frequency and temperature range.

Finally, tourmaline (mentioned in footnote 1 of the article) is no longer used in frequency-control crystals. It is not especially strong and usually full of flaws. — *John D. Holmbeck, W9KZO, President, Northern Engineering Laboratories, 357 Beloit St., Burlington, WI 53105*

ECHOES: AN AMATEUR OBSERVATION AND A PROFESSIONAL REPLY

☐ Worked All Continents on 432 MHz was the goal during schedules I had last spring with ZE5JJ in Rhodesia. Not only did I achieve that goal, but a side benefit was observation of some long-delayed echoes on both my signals and those of ZE5JJ, which I recorded both on tape and on a chart recorder.

I usually have only a tape recorder going during EME (earth-moon-earth) work. Prior to my schedule with ZE5JJ on April 1, 1977 (not an April Fool, because I had been hearing LDEs on my signal throughout March), I ran some echo tests to be sure my system was working properly. I did hear normal (approximately 2.5-second-delayed) echoes on my signal. However, on several occasions I got two sets of echoes (2.5 and 6 seconds) and sometimes only one echo at about 6 seconds.

I quickly rigged up a time reference signal to my stereo tape machine and made a strip-chart recording. I did not have as much time to spend recording LDEs that night because my first interest was working ZE5JJ for my first African QSO.

Although I did complete a contact with Peter, things became rather confusing when I began hearing LDEs on *his* signal. When copying ZE5JJ, I was confronted with two signals sending the same data on slightly different frequencies with one slightly delayed in time from the other. To make things worse, the two signals would fade at different times and sometimes be the same strength. Needless to say, I was very confused!

ZE5JJ tells me that he heard no LDEs on his end. It is very possible that he was listening on the other side of zero beat, thus placing the LDE at zero beat or out of the passband of his receiver. Another thought (both just speculation on my part) is that LDEs are not reciprocal.

The accompanying drawing shows my set-up for recording the LDEs. The audio is routed through a narrow audio filter to enhance the signal-to-noise ratio. This also suppressed any first echo (due to different Doppler shift). I might add that my receiver is never muted. This is done to enable the pitch of the transmitted

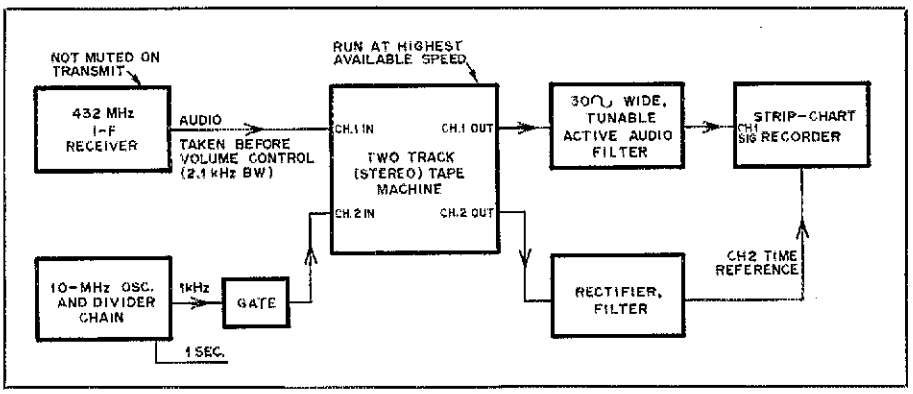
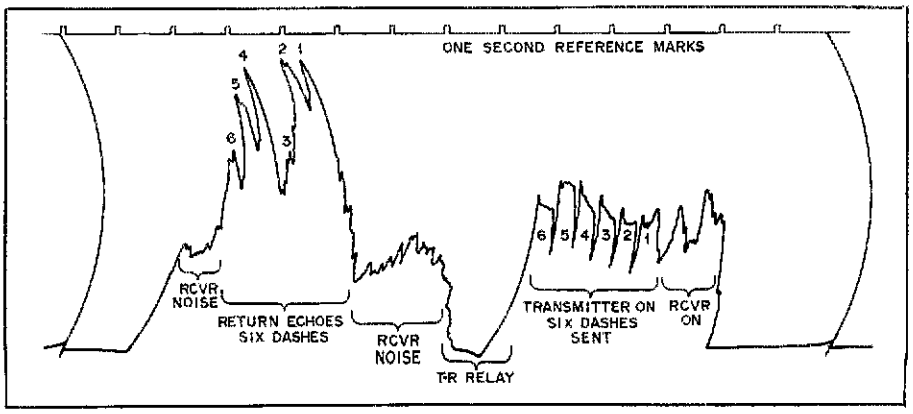


Fig. 1 — K3PGP used this setup to graphically and aurally record 432-MHz, long-delayed echoes during March and April, 1977.

Fig. 2 — K3PGP's strip-chart recording of 432-MHz, long-delayed echoes, April 1, 1977.



signal to be recorded on tape for Doppler measurements.

Although I observed LDEs on and off throughout March and April, 1977, to date no other station has reported a single LDE during those two months. However, I was spending a considerable amount of time specifically looking for LDEs. It is possible to miss LDEs entirely because of circumstances I described in reference to ZE5JJ not hearing any. I have heard no LDEs since the middle of April, 1977. — *John Yurek, K3PGP, RD 6, Box 413, Irwin, PA 15642*

— And a Reply

☐ To K3PGP: We scaled the time delay from your strip chart at 5.75 ±0.1 seconds. Since the delay for two round trips to the moon at maximum distance (406,700 km) is 5.43 seconds, we feel the echo you recorded was not likely a double moon echo.

Our computer says that for April 1, 1977, at 2320Z the one-way, 432-MHz Doppler shift was +533 Hz and the one-way time delay predicted is 1.229767 seconds for a two-way round trip value of 2132 Hz and 4.92 seconds respectively. The calculations are based on data in the *American Ephemeris and Nautical Almanac* and included the changing relative distance between the earth and moon as well as effects of the rotating earth.

We are thus at a loss to explain your "twice-delayed moon echoes" based on any known geophysical phenomena. There remain, of course, the cosmic and earth-based repeater hypotheses [February 1978 *QST* — Ed.].

By the way, the fact that the first set of echoes can disappear should not be taken as necessarily difficult to explain. As you know, lunar echoes fade a great deal in any event, owing to the roughness of the lunar surface and, at least at the lower frequencies, polarization on rotation in the ionosphere. So it does seem that it would be entirely possible for the first echo to be momentarily wiped out, while the second echo (which would very likely follow a different path) might be strongly audible.

We think it would be a good idea to publish your observations and see if any of the amateur fraternity can come up with answers or similar observations. — *Victor R. Frank, K6FV, James M. Lomasney, WA6NIL and Oswald G. Villard, Jr., W6QYT, Stanford Research Institute, Menlo Park, CA 94025*

HOW I DISCOVERED THAT THERE'S POLARITY IN ALTERNATING CURRENT

☐ High-power tube filaments and voltage regulators can be sensitive to low or high line voltage and lead length. The *Handbook* advises that in low-power applications, heater voltage may vary ±10 percent. But in high-power, filament-type tubes, the voltage should be held much more closely, with the rated voltage as a minimum and five percent above the rating as a maximum. This condition is not always easily met, and seems to be rarely considered by the designer or builder as important.

As an example, I built a 2-kW PEP, 1-kW cw amplifier of my own design using a pair of 4-400As in a parallel, grounded-grid configuration. I found that with the filament wiring permanent and the tubes in place, I had 4.5 volts ac at the tube socket, measured with a one-percent ac voltmeter. A pair of 4-400As requires 5 volts at 29 amperes. The filament transformer I used was government surplus, and no doubt it was conservatively rated at 5 volts center-tapped at 30 A. The line voltage measured at the transformer primary was 114 V, and the voltage drop across the filament choke and associated wiring was 0.5 V, indicating a resistance of 0.017 ohm between the filament transformer and the tube socket.

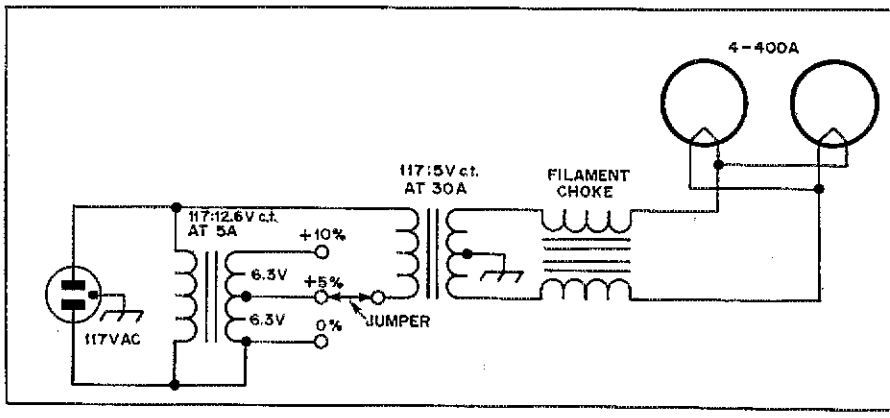


Fig. 3 — W2JDH's scheme for boosting heater voltages to high-power transmitting tubes.

A line voltage of 114 seems adequate, but my line voltage has been known to drop to 105-108 at peak load periods. This would further lower the voltage at the tube socket. Some of the less conservatively rated filament transformers available would only add to the problem.

Since I didn't anticipate line voltage in excess of 120, I incorporated the circuit in Fig. 3. That enabled me to select either (by moving a jumper) straight-through voltage, five-percent boost, or 10-percent boost, using a 12.6-V, 5-A, filament transformer. Using the 10-percent boost, my filament voltage came up to 5.1 with the tubes installed. Considering the going price for amplifier tubes, staying within the ratings should extend tube life and avoid costly replacement.

And Now, AC Polarity

Instrument transformers, widely used by electric utility companies for protecting relay schemes, are clearly marked with polarity or designations to indicate winding direction. These transformers can be hooked up in many configurations to achieve the desired result, because the winding direction and the fact that the transformer is additive or subtractive is known. There's some pretty fancy theory explaining why transformers work the way they do, using terms such as flux, counter emf and induced primary current. It should be sufficient to say there is polarity in ac, which loosely refers to current flow, because your electric meter always runs one way — in the power company's favor!

Transformers used in electronic equipment rarely indicate polarity, but hooking them up in additive or subtractive fashion can solve a number of problems encountered because of line-voltage variation or low-voltage situations. The easiest way to identify the leads coming out of your filament transformer is with an ac voltmeter and a clip-lead jumper.

As shown in Fig. 4, first measure the input or line voltage to the primary of the transformer. Apply the jumper between either primary lead and one of the secondary leads. Attach your voltmeter to the remaining primary lead. If th voltmeter reads 12.6 V (nominal) higher tha the input voltage, the hookup is additive. If it' 12.6 V lower, the configuration is subtractive Leaving the jumper on the primary lead an switching it to the *other* secondary lead wi reverse the result. Remember to move you voltmeter lead also; the voltmeter shoul always be attached to the primary and second ary lead that the jumper is *not* attached to.

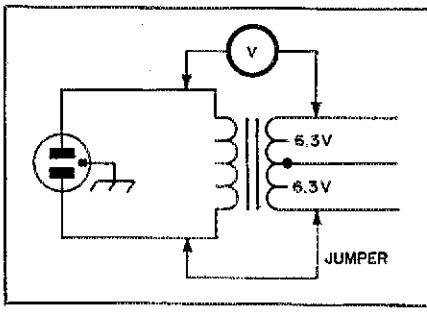


Fig. 4 — Determining whether a transformer is installed "additive" or "subtractive."

A 12.6-V filament transformer is convenien to use because its ratio is roughly 10:1, whic lends itself nicely to a 10-percent boost o "buck" application. Actually, any transforme can be used to add or subtract its primary an secondary voltage.

Fig. 3 shows a pair of 4-400As drawin about 30 A at 5 V. The primary current of th 5-V filament transformer will be in the vicinit of 1 A. Therefore, the transformer used t "boost" the line voltage should be comfort ably rated at more than 1 A at 12.6 V. I dislik hot transformers, so I used a husky 5-A 12.6-V one. The center tap conveniently pro vides a half-voltage point that may be used t "buck" or "boost" by five percent. A center tapped transformer is by no means a prereq uisite. No attempt was made in Fig. 4 t schematically indicate either winding directio or "polarity."

What you're ending up with here is actuall an extremely low-cost autotransformer wit many applications. One which comes to min would be boosting the line voltage to you television set to fill out the picture tube in low voltage areas. Others can probably think o more applications. — *Walt Peterson, W2JDH 13 Hemlock Drive, Parlin, NJ 08859*

Hints and Kinks

THE K7YY SLIDER IMPEDANCE MATCHER

Shocked that my new Kenwood TS-820 would not drive my new homemade grounded-grid amplifier ("Junker Amplifier," October 1970 *QST*), I decided to construct a slider impedance matcher to compensate for an apparently serious mismatch. Ease of tuning even when band hopping was considered essential to construction.

The junk box yielded a surplus inductor and two variable capacitors (a 500-pF unit and one rated at 220 pF). These components were to be the basic elements of the matcher.

Different circuits were tried, including the pi, L (step-up and down) and the double L. All of these worked on some portions of the bands required (20, 40 and 80 meters) but none would match the amplifier to the exciter over all of these frequencies. The pi network worked well for the 20- and 40-meter bands, plus covering 3700 kHz to 4000 kHz.

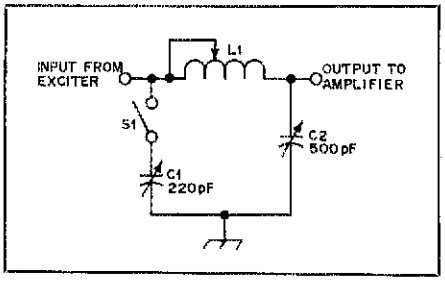
The L step-up network worked well from 3500 kHz to 3700 kHz. As a result, I decided to build the pi network with an spst switch to remove C1 from the circuit when the L network was wanted.

To house the matcher, I made a plywood box to hold the components and allow room for the slider. The base and lid were made from 3/4-inch (19-mm) plywood and the sides were made with 1/2-inch (12.7-mm) material. The lid had to have sufficient weight to cause the slider to make good contact with the coil.

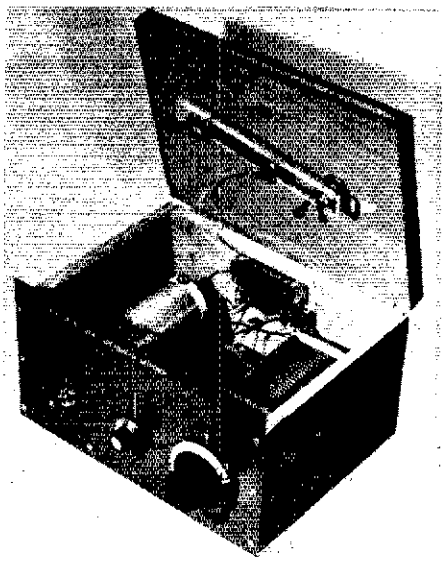
Length of the slider had to be six inches from the pivot point to the contact in order for the arc of travel of the contact point to be sufficiently shallow to make contact with the coil at all times. A space of 1-1/2 inches (38 mm) will allow for mounting the slider on the lid. Inside box dimensions are 7 × 9-1/4 × 4 inches (178 × 235 × 102 mm). The brass spring contact should be well centered over the coil.

I placed a tie point centered above the coaxial connectors at the rear of the cabinet to keep the flexible lead from dragging across the capacitors. Washers and nuts on the stove bolt provide shaft rigidity. Small bolts at the ends of the coil will prevent the slider from falling off the ends.

Setting of C2 is somewhat critical. A surplus Velvet Vernier dial is ideal for tuning the capacitor. The slider provides faster tuning than a roller. My transceiver now excites the amplifier with an SWR of never more than 1.5:1 and usually much less. I am very pleased with the performance of this matcher. — *Al Lafky, K7YY*

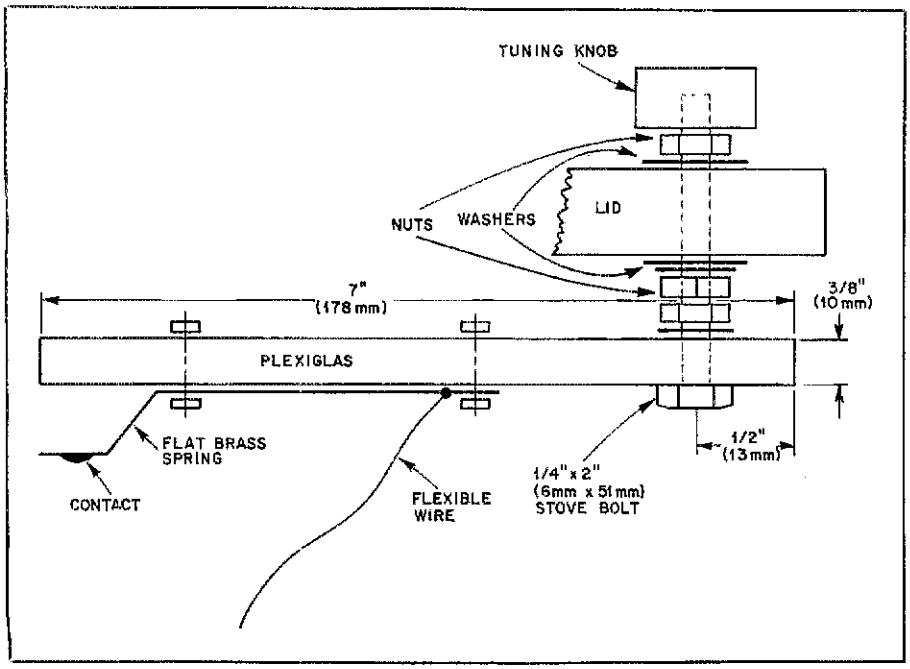


Circuit for the K7YY impedance matching system. A pi or L network may be selected with S1, an spst switch. L1 consists of approximately 32 turns of no. 14 wire on a 2-1/2-inch (63.5-mm) diameter form.



The K7YY slider impedance matcher. Attached to the lid is the Plexiglas slider assembly. C1 and C2 are controlled from the front. The switch disables C1. A knob atop the lid controls the slider.

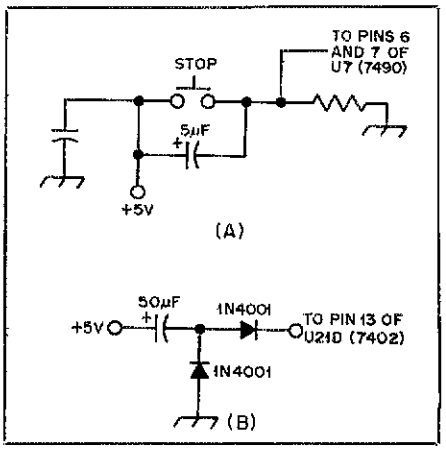
Mechanical construction of the K7YY impedance-matcher slider. Width of Plexiglas arm is 3/4 inch (19 mm).



CAPACITOR FOR THE ACCU-MEMORY

A 5-μF capacitor connected across the STOP button of the Accu-Memory will prevent the keyer from sending at random when first turned on. By adding the 50-μF capacitor and the two diodes shown in the illustration, the display will automatically set to 000 when first turned on. — *Jerry Fitch, WB4PUB*

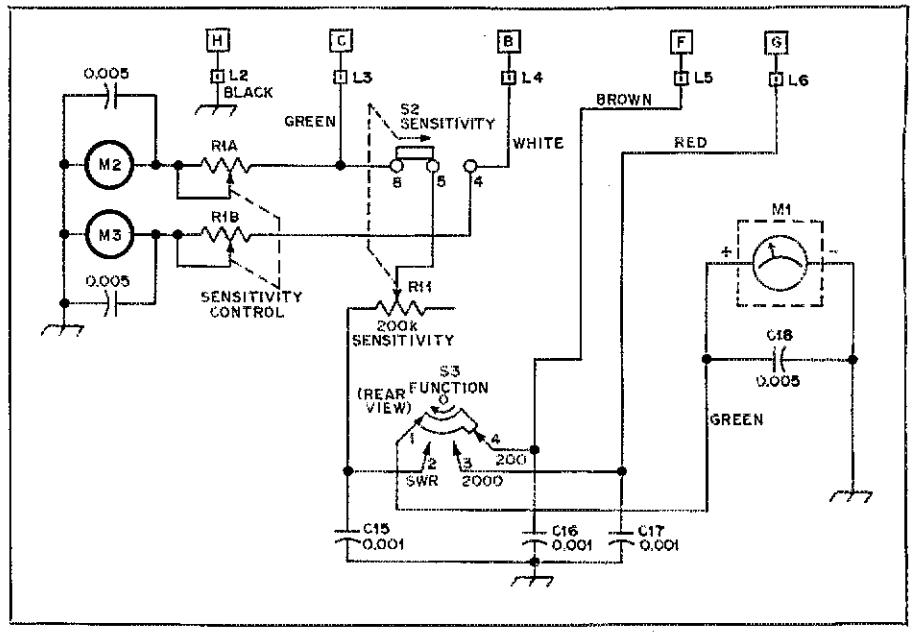
Two modifications for the Accu-Memory.



EXTRA METERS FOR THE HM-102

Adding one or, better, two indicating meters to the Heath HM-102 wattmeter/SWR bridge provides greater flexibility for the operator who likes to change frequency often. This is particularly helpful when separate antenna tuners are being used. The additional meter or meters will avoid possible misinterpretation of the SWR reading.

With two meters installed as indicated by the diagram, operation is more convenient. This arrangement permits the Heath HM-102 meter to be set in the power-output position while one of the additional meters shows forward energy and the other reflected power. The scales on the two additional meters may be hand-inked. Full-scale reference is obtained on the forward power meter. The scale on the second meter is used to indicate the SWR. A dual edgewise meter makes reading particularly convenient. Once the extra meters are put into operation, adjustment of the transmitter and antenna tuner is done quickly and easily. — *Holt Harris, W1WP*



The Heath HM-102 rf power meter can be modified as above to provide individual meters for forward and reverse energy and power output. A dual 200-kΩ potentiometer is used for R1A/R1B. M2 and M3 are combined on a dual-movement, 100-μA edgewise meter, or they may be separate 100-μA meters.

THE W3IRZ HF AND LF OSCILLATORS

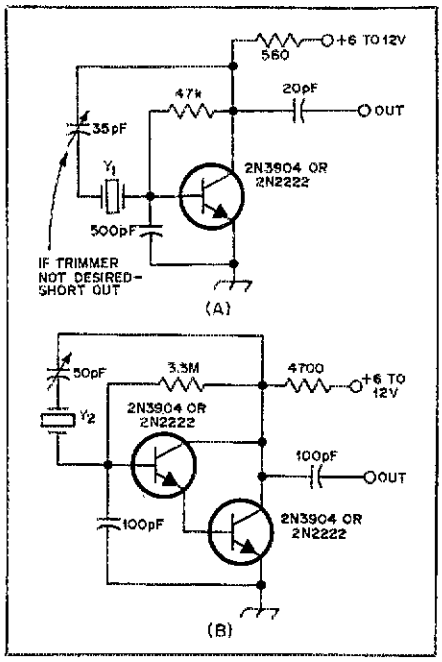
Of the two useful oscillator circuits I am submitting, the first (A) is my own "standard" universal crystal oscillator design. It provides ample output for adjusting nearby equipment on the workbench such as a GE Prog Line receiver. I even found it helpful in the final stages of building my $30 counter.

A 12-channel deck was constructed for 2-meter fm by arranging 12 of these circuits with a common 1000-ohm emitter resistor. Channel switching is accomplished in the collector circuit. My design has the output derived from the emitter resistor. Crystals may range from 3 MHz upward. I have used 7-MHz crystals on the seventh overtone by replacing the collector resistor with a tuned circuit.

The second circuit (B) is for low-frequency crystals such as those for 100 kHz and FT-241 types. A Darlington pair is employed to provide extra gain.

Notice that there are no coils or chokes in these circuits. The transistors include the common npn silicon 2N3904 and 2N2222 types. — *Mike Branca, W3IRZ*

The W3IRZ hf- and lf-oscillator circuits. Crystal frequencies for Y1 in the high-frequency oscillator (A) may range from 3 MHz upward. For the low-frequency oscillator (B) FT-241 and 100-kHz crystals may be used for Y2.



COUPLER FORMULA

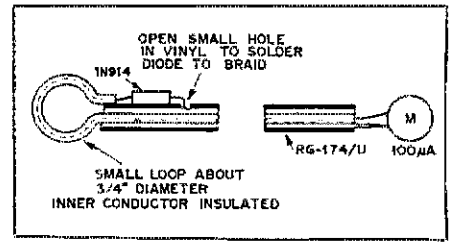
Recently, I built the Ultimate Transmatch with surplus variable capacitors and a surplus variable inductor. The unit would not operate properly on 10 and 15 meters, a condition which seemed related to incorrect and unknown capacitance values. I knew *The Radio Amateur's Handbook* offered a formula for calculating the inductance value, but I wasn't aware of any for air-variable capacitors. After some searching, I found the needed information [page 24 in any recent *Handbook* edition — *Ed.*], and I'd like to pass it on for those amateurs who may be interested:

$$C = 0.224 \frac{KA}{d} (n - 1) \text{ pF}$$

where

K = dielectric constant (air = 1.0)
A = meshed plate area (inch²)
n = no. of plates
d = dielectric thickness (inches)

The equation, when applied to my coupler, indicated that twice the load capacitance I originally provided was necessary. The Transmatch is now working well on all bands, 80 through 10 meters. The equation saved much trial-and-error labor. — *David R. Malley, K1NYK*



For hard-to-reach places, this tuning aid is a practical device.

FOR HARD-TO-REACH LOCATIONS

I made this useful gadget for tuning up commercial equipment on uhf. The idea was not new to me except for the way I assembled it. I used a four-foot piece of miniature coaxial cable (RG-174/U) and a 1N914 diode connected to a microammeter (0-100 μA).

It is an excellent aid for adjusting high-frequency tuned circuits in crystal oscillators and transistor multipliers. Variation of the amount of coupling controls the sharpness of the tuning indicator.

After the loop is formed as illustrated and the diode is soldered in place, wrap vinyl tape from the end of the loop, across the diode, and to a point beyond where the diode is soldered to the cable sheath. The diameter of the loop may be varied as needed. The polarity of the meter leads is determined by the polarity of the diode. — *Arnold G. Wilson, W2EVD*

HINT

☐ Need a housing for the VHF Engineering TX-144? Obtain a Calectro H4-742 chassis box made by General Cement Company. The fit is perfect. — *Emil Carver, K3MZO*

OSCAR in the Classroom

Helping to bring students in your local schools into the space age can be a very enjoyable and rewarding experience.

By Stephen C. Place,* WB1EYI

"This is official AMSAT educational bulletin station W2GN, transmitting to you through AMSAT-OSCAR 7 which is orbiting 910 miles above . . ."

Okay! There it is again, like clockwork. Now I can sit back for 20 minutes and let OSCAR do the work for me.

No matter how many times I stand before a class of eager students, OSCAR's first bleep, as it soars across the horizon and the passband explodes to life, is an exciting experience. The uncertain, anxious glances of students who doubt they could accurately predict the acquisition time of an active, communications satellite, quickly give way to wide-eyed grins of satisfaction.

A boy in the second row leans forward and blurts, "Hey, wow, where is he?" A chorus of, "Yuh, how far away is that guy?" follows.

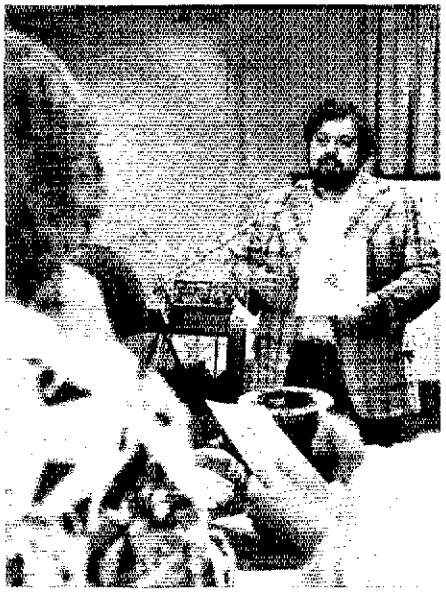
As if answering directly, W2GN continues, ". . . located in East Greenbush, NY. This morning we'd like to say hello to the students in Mr. Robert Clement's class at Plainville Senior High School in Connecticut and to Dan Palaski, the student responsible for arranging the demonstration."

The grins grow to broad smiles and an occasional "Far out!" and "Alright!" rise above the commotion of excited nudging and shuffling.

A few more minutes of the bulletin lets the excitement ebb to a manageable level of constructive enthusiasm. Soon, one of the students spins the receiver's dial to where she's been told the telemetry beacon would be and starts taping the 20-wpm Morse code signals. We'll play the recording back later at half speed so the students themselves can copy the numbers.

"Is This Like CB?"

We'd discussed earlier what an OSCAR satellite is, how we could predict when we would hear it, when we would lose the signal, and what sorts of signals we'd be tuning in. The questions were almost as predictable as OSCAR itself: "Is this like CB?" "Why can't you hear it all the time?" "Why doesn't it fall?" "How does it get up there?" "Can I hear it on my radio back home?" "How much did it cost?"



The students were impressed with the simplicity of the OSCARLOCATOR, which they used to predict exactly when the downlink signals would be heard.

I had explained, to the students' genuine surprise, that OSCAR 7 had cost only $60,000 when, if constructed commercially, it would have run well over a million dollars. They were especially impressed to learn that it had been built in part by radio amateurs who were not professional engineers, and that basements and garages served as the assembly laboratories.

One girl in particular wanted to know how NASA selected secondary payloads to fly as hitchhikers on their launch vehicles. I explained that selection for a piggyback ride depended on several factors: the applicant's record of reliability, the purpose of the mission and who was to benefit. AMSAT's record on all counts has been superb. For example, OSCAR 6, designed for one year of operation, actually lasted four years and eight months, outdistancing the primary payload with which it was launched. During the satellite's lifetime, amateurs used it in countless innovative experiments, including the OSCAR Education Program, proving its worth time and time again. This record was in large part responsible for AMSAT's Phase III elliptical-orbit satellite's being chosen first out of 80 international applicants for a ride on a 1979 European Space Agency launch.

"Okay, okay, you've got enough telemetry. Swing it down on the voice part again," cries one of the students on the edge of the crowd. Everyone has gathered around the rig, those farther away getting more and more impatient for their opportunity. As the girl with the tape recorder grudgingly moves aside, another slips into the chair and adjusts the dial.

". . . you, Fred, and let me say hello to the people in Connecticut too. Welcome to radio amateur satellites. I hope to hear some of you on in the future. Back to you, Vic. W1NU and the group, this is W6CG."

The bulletin is over and W2GN is talking through OSCAR with some of his friends: W1NU in Connecticut, just a few miles from the site of the demonstration; Bud, W6CG, in Anaheim, CA, and, as we soon hear, Walt, W4DWN, in Miami, FL. Again, eyes grow wide as the students listen. New York was one thing, but Connecticut, Florida and California all at the same time!

Just as suddenly as the first signal burst forth from the speaker, the radio drops into silence. These 20 minutes in school have passed all too quickly for the class. As some of the students ask when the next pass will be, others are already back at their desks, eagerly scanning schedules, checking wristwatches and adjusting OSCARLOCATORS.

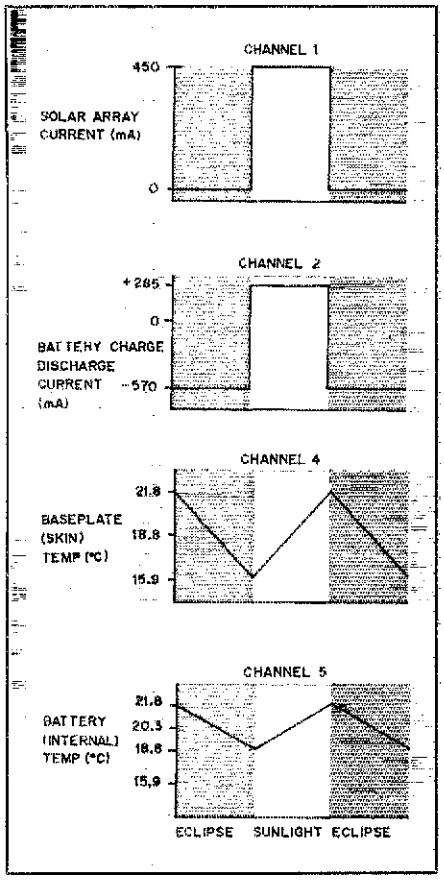
School Can't Be Fun!?!

The glowing faces and sincere enthusiasm which inevitably arise from an introductory OSCAR experience are grati-

*OSCAR Education Program Manager, ARRL

A homemade turnstile for the 2-meter downlink (left) can be put together in a couple of hours by students who are good with their hands. The 432-MHz beam for OSCAR 7 Mode B (right) must be aimed, but the OSCARLOCATOR or a computer printout of beam headings makes this task easy.

Fig. 1 — Sunlight/eclipse monitoring experiment. Telemetry channels 1, 2, 4 and 5 vary predictably when OSCAR 8 enters sunlight from eclipse or eclipse from sunlight. The indicated values are approximate, though the patterns of reaction are accurate. After monitoring the telemetry for a while, you should be able to determine the actual "normal" values. (Note: Channels 1 and 6 tend to overrange. Readings of 101 or 601 probably refer to counts of 101, not 01.)



fying, but the OSCAR Education Program doesn't stop there. Far from it! Depending on the grade level and subject matter, a number of experiments of differing sophistication can be conducted. For example, a computer programming class may tackle the problem of tracking OSCAR with directional antennas. How can they tell if their results are accurate? By listening at the appointed time in the predicted direction. And direct, immediate feedback is one of the most effective teaching techniques.

A physics or space science class might want to measure the range to OSCAR as it zooms overhead. Hands-on laboratory experience in a practical application is invaluable. This experiment (see the sidebar story) requires equipment not found in every classroom, however. Less sophisticated but equally fascinating are experiments which make use of the wealth of information provided by telemetry. Calculating the battery voltage, temperature, solar-array current, and charge/discharge current of a live communication satellite will teach mathematical interpretation, graphical analysis and quite a bit about the actual orbiting hardware.

Hot or Cold Running OSCAR?

The ingenious student, however, can infer much more from the telemetry. Is OSCAR 8 in sunlight or eclipse (darkness)? Let's take a close look.

OSCAR 8 presents us with six telemetry channels, four of which vary predictably with sun exposure: current from the solar panels, battery charge/discharge current, baseplate temperature, and battery temperature. (See Fig. 1.) Channel 1 is the most straightforward: Solar cells do not generate electrical current unless they are exposed to sunlight. Therefore, you should expect no current indicated when OSCAR is in eclipse, and about 450 mA when it is in sun. Channel 2 varies in much the same way. In eclipse, the batteries alone power the spacecraft and you would expect a 570-mA rate of discharge (−570 mA). In sun, however, the solar panels drive the spacecraft and charge the batteries at a rate of about 285 mA.

The baseplate and battery temperatures, channels 4 and 5, will vary, but not in instantaneous jumps. When the satellite enters eclipse from sunlight, the heat will dissipate gradually. At the transition from sunlight to eclipse, this trend will reverse and the satellite will gradually increase in temperature. Though these two channels will track fairly closely, the baseplate (skin) will run a little cooler on the average and vary a bit more radically, giving off and taking on heat more readily. It should vary at most between about 15.9 and 21.8° C.

The battery temperature, channel 5, will run slightly warmer as it is in closer proximity to the satellite electronics, and will vary less dramatically as the surrounding spacecraft prevents as rapid a heat transfer. This channel should vary at most between about 18.8 and 21.8°C. Markedly higher levels on channel 5 would probably indicate thermal problems associated with overcharging the batteries.

OSCAR in the Classroom

What is the OSCAR Education Program? It's a cooperative effort of many people who are concerned with both the amateur radio satellite program and quality education for our youth. In their studies of OSCAR's Doppler shift and orbital mechanics, antenna characteristics and frequency-wavelength relationships, from physics and other sciences to geography and social studies, students learn because they are actively involved.

Care to pitch in? Want more information? It's yours for the asking. Whether you give a talk or a demonstration, or help string a 10-meter dipole, tune a rig or just lend moral support, you'll be making a valuable contribution to your community and to the OSCAR program. And you can be sure that we at Headquarters will support you in every way possible; with our demonstrator's kit, handouts, educational materials for the teachers involved, and coordination.

Let us know what you're doing, too! Your ideas and suggestions are gratefully welcomed. And don't forget that a 1977 *Radio Amateur's Handbook* will be sent to you with our thanks when a teacher drops us a note describing your classroom demonstration. Listen in and ask around: Everyone benefits in the OSCAR Education Program — and OSCAR does the work.

Satellite Ranging Experiment

Have you ever wondered how far OSCAR is from your QTH as it speeds from horizon to horizon? If you can measure the time it takes a signal to make the round trip, it's a simple calculation from there.

An oscilloscope is one way to make the measurement. By triggering its sweep with the transmitted pulse and displaying the received pulse returning from OSCAR, you can read the elapsed time. This figure will consist of the time it takes the signal to travel from your station to OSCAR and back, plus any phase delays in the equipment. Knowing that the delays in your transmitter and in the transponder onboard OSCAR are negligible (measured in microseconds), you need only measure the phase delays in your receiver to make the calculations. Here's how.

Connect your station as shown in the diagram. If you do not have a dual-trace oscilloscope, a single-trace scope with external trigger, or events-per-unit-time counter will do well.

Feed the keyed dc pulses from the key *input* to your transmitter to channel A on a dual-trace scope (such that the pulse triggers both sweeps A and B simultaneously) to the external trigger on a single-trace scope, or to the start connection on an events-counter. Feed the received pulse from your receiver audio output to channel B, or to the signal input on a single-trace scope, or to the events-counter's stop connection. Set the horizontal scale of the oscilloscope to 5 or 10 milliseconds per division. Then, transmit a series of pulses to OSCAR and observe the display.

The time between the initiation of the transmitted pulse (at the start of the sweep) and the leading edge of the received pulse (that point at which it first rises) can be read directly off the oscilloscope display. This is your total time figure.

To measure the phase delay inherent in your receiver, you'll need a signal source at its frequency. An rf generator or a receive converter that converts your transmitter's output to your receiver's frequency will work equally well. In much the same way as before, trigger the sweep with the dc pulse that turns your signal source on and off, and feed the received audio pulse to the signal input on the oscilloscope. The time between the beginning of the trace and the leading edge of the received pulse is the total phase delay in your receiver. It should be about two milliseconds.

The calculations are simple. Subtract the phase delay from the total time and you have the time it took your signal to make the journey up and back. To calculate the range, you only need to know that radio waves travel at the speed of light: 300,000 km/sec. Then, using the formula: 300,000 km/sec. × elapsed seconds = distance, and distance traveled/2 = range, you have the answer.

OSCAR 8 orbits at an altitude of approximately 910 km. Thus, the minimum expected range, when it is directly overhead, will show approximately a 6 ms difference between transmitted and received signals. The maximum range at the horizon is about 3200 km which will show a maximum difference between transmitted and received signals of about 21 ms. Therefore, during a nearly overhead pass, you should expect to see the time between transmit and receive vary from around 20 ms at access of signal to about 6 ms halfway through its journey over your QTH, and back up to about 20 ms at loss of signal (LOS).

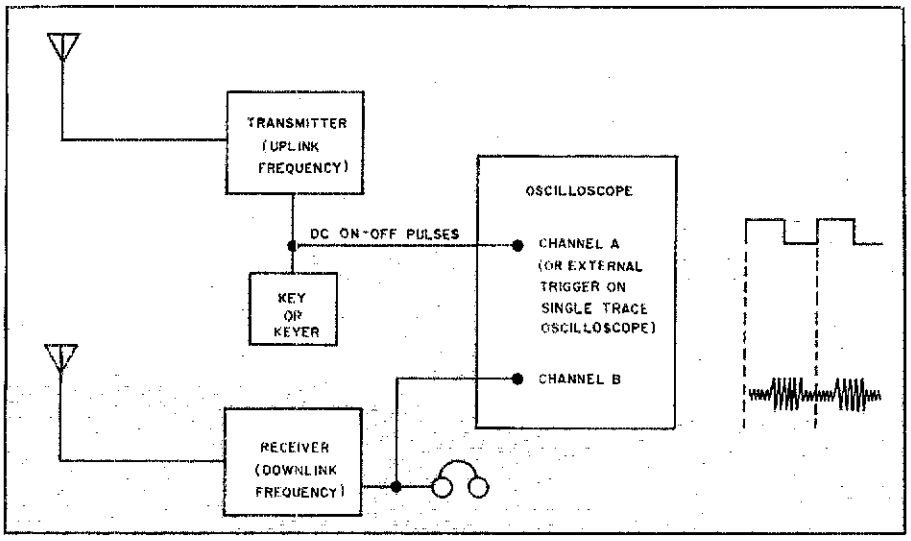


Fig. 2 — Block diagram of the ranging experiment. It can be done either with a single-trace oscilloscope or a dual-trace oscilloscope.

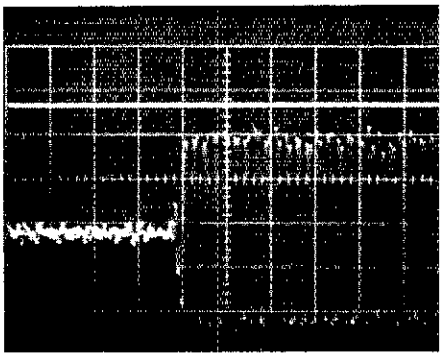


Fig. 3 — Ranging experiment through OSCAR 7. The horizontal scale is set at 5 ms per division. The upper trace shows a portion of the dc pulse which keyed the transmitter and triggered both sweeps. The lower trace shows the received audio. There is an elapsed time of about 19 ms from the rise of the transmit pulse to the leading edge of the received pulse. (Thanks to K1JX, W1VD, K1THP and K1RT for their assistance.)

OSCAR Education Bulletins

Why not give a listen to an OSCAR Education Bulletin and hear firsthand what is going on in the program? These bulletins often play a large part in a student's first personal experience with live communication satellites and make giving a demonstration a snap for the volunteer.

Every Monday, Tuesday, Thursday and Friday morning listen in the downlink passband at about 29.490 MHz on the first two appropriate passes (those passes accessible to North American classrooms during school hours). Each bulletin is repeated twice during a pass, ensuring that students in both northern and southern classrooms will be able to copy the entire message.

The voices you'll be hearing are those of dedicated volunteers who have served the OSCAR Education Program tirelessly over the past few years. The crew of seven is headed by Fred Merry, W2GN, in East Greenbush, NY, a pioneering OSCAR user who does quite a bit of mobile satellite work. On the West Coast, California seems to be the center of OSCAR educational activity. Bud Schultz, W6CG, of Anaheim, is very active as a telecommand station and AMSAT area coordinator, as well as being an education bulletin station. Carl Klein, W6DOW, from Carson and George Dillon, W6ELT, from Santa Ana, are also very active. On the East Coast, Walt Dixon, W4DWN, from Miami, is also one of the Florida AMSAT area coordinators. Rounding out the crew are Bob Shearer, WA4DYL, in Louisville, KY and Stewart Haag, K4UQ, in Jeffersontown, KY. A tip of the hat to these volunteers who have helped make the OSCAR Education Program a success. If you'd like to participate, contact the OSCAR Education Program Manager, ARRL.

Would you like to have a bulletin tailored to your audience? It's a guaranteed way to rouse enthusiasm in a receive-only demonstration. Send all the relevant information, including the orbit number, date of your presentation, the name of the school or organization, and names of teachers and others responsible for you being there, to OSCAR Ed at ARRL headquarters. Please send your request well in advance of the scheduled time to enable us to make the arrangements.

Marconi Station Reborn on Cape Cod

Were you among those who celebrated the 75th anniversary of "CC"?

By Stephen C. Place,* WB1EYI and Peter O'Dell,** N1UM

In the early morning hours of January 16, 1978, Bob "Whitey" Doherty, K1VV, alone in the empty KM1CC shack, peered out across the dark expanse of scrub pine and sand dunes that led to the Atlantic. A deathly cold winter wind chased ominous clouds across the faint glimmerings of an eerie January moon.

Shivering at the bleak emptiness, he turned back to the glow of his 160-meter transmitter.

"CQ CQ CQ DE KM1CC . . . " shattered the silence as the coarse buzz from Whitey's spark gap simulator sped across the wintry wasteland, seeking out some as yet unknown station. ". . . KM1CC K"

Nothing. Only a faint crackle rose above the noise. Then, what was it? Yes, there, again, down in the noise, a low haunting raspy flutter, fading in and out, yet still recognizable.

"You've got to be kidding," he whispered. But no, it was unmistakable, the broad whining rush of a vintage spark gap was actually responding. "KM1CC DE 8XX FB SIG OM UR 59 SPARK GAP K"

KM1CC, the special-event station at South Wellfleet, MA, had conjured up the ghost of hamming past.

Time Warp

The following morning, to the amusement of the rest of the arriving crew, Whitey recounted his "unnerving" experience and triggered what was to be a week-long binge of swapping stories. Many of the old-timers reached back into the distant recesses of their memories and spun countless tales of the "way it was back when I was a kid." Though the original 1903 Marconi station that successfully bridged the wide Atlantic predated most of the crew, local Marconi historian Frank Caswell, W1ALT, was able to turn the clock back 75 years and share the results of his meticulous research with a captive audience. Some highlights of his stories:

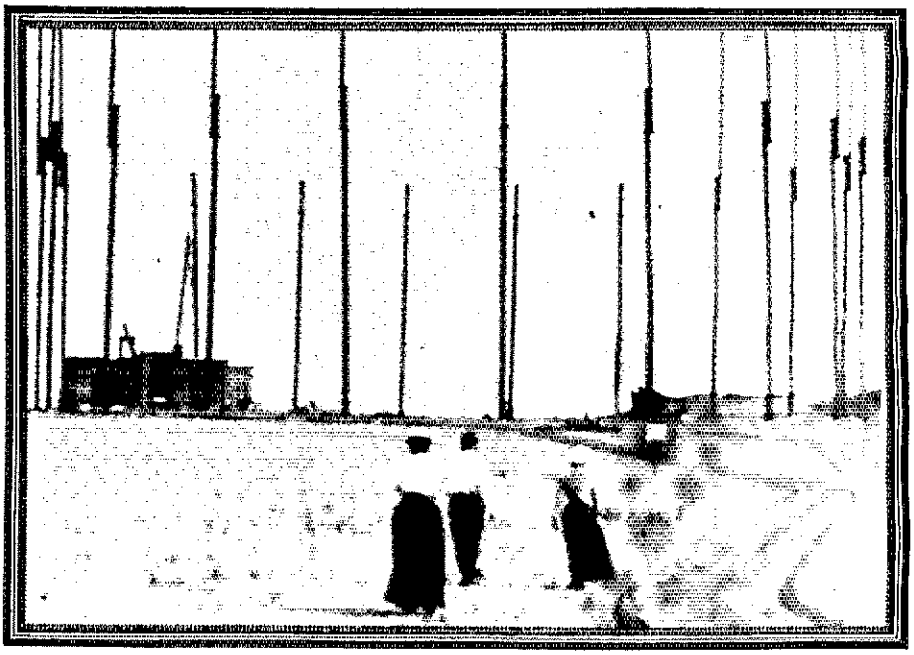
"Old 'CC' was unlike anything today's ham has experienced. Marconi's three-foot diameter spark-gap rotor fed 30,000 watts of power to a huge antenna array suspended from four 200-foot towers on the South Wellfleet dunes. Housewives in the area quickly learned not to hang laundry on their damp clotheslines in the morning, and few were so foolhardy as to touch metal objects when Old CC was operating. The inevitable shocks were, to say the least, very unpleasant. How did the neighbors know when CC was on? The explosive, crackling crash of the transmitted signal thundered for miles around. Reception was good without a receiver!

"The electrical length of the transmitting antenna determined the operating frequency, though the width of the resulting signal was about 1000 times greater than today's, often spanning several MHz. Let's see, that's about one of our hf band allocations per signal — and some think our bands are crowded today!"

A Blend of Past and Present

But stories of days gone by, as fascinating as they were, did not overshadow the full-blown KM1CC special-event station operation which enabled all radio amateurs around the world to share in the celebration. Despite severe New England weather, volunteer ops came from hundreds of miles around, some only to find their stay involuntarily pro-

How it was. Cape Codders were skeptical when Marconi planted 20 200-foot masts in sand dunes on the stormy Atlantic. Their fears proved correct, as the antenna farm was blown down in a nor'easter gale in November, 1901. Four 200-foot timbered towers replaced the original masts about a year later. (*photo courtesy of National Park Service, Cape Code National Seashore*)



*Assistant Club and Training Manager, ARRL
**Public Information Officer, ARRL

longed as a nor'easter raged during the week. Early in the week a local Air Force base turned up two SSTV "fanatics" who treated the transient crowds to several days of very entertaining, if unusual, graphics. And a couple of the hams from WCC, the busiest commercial radio station on the East Coast, took a busman's holiday from their communications with ships on the Atlantic to help out in the amateur bands.

Radio amateurs were not, however, the only visitors to find the station exciting. Their curiosity piqued by local media coverage, many Cape Codders came to see the excellent radio museum assembled at the Marconi beach visitor's center. Those discouraged from leaving the warmth of their homes during the storm were able to share in the excitement through Dick Golden's "Program PM," a four-hour talk show broadcast over WQRC from the Marconi station site. Throughout the day, hundreds of visiting school children got their first taste of amateur radio — though the exotic flavor of talking with foreign lands appeared to be lost on some of them. One 8-year-old boy stared sullenly at a rig for 20 minutes as UKs, JAs, VP8s and an HPØ were worked one after another. Not until a W4 meekly crept in and signed "Ft. Lauderdale" did the youngster register any indication of being impressed. "Wow, Florida!" he screamed as he rushed off to get his buddies. I guess it all depends on your perspective.

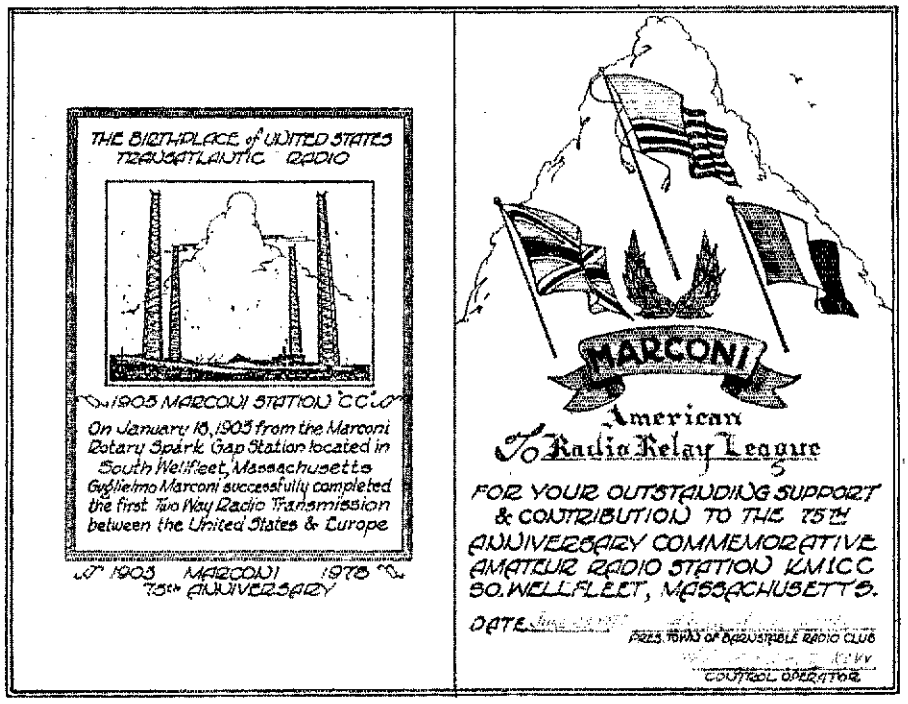
"The Best-Laid Plans . . ."

As always, Murphy was an unwanted, though expected, visitor. A reliable rig that had performed flawlessly throughout the preceding two years blew two finals five minutes into the transmission of President Carter's special message to KM1CC. (I have it on K1VV's authority that it was strictly an accident — the rig is apolitical.) They were back on the air within the hour. Gioia Marconi Braga, daughter of the "world's first amateur," also sent a message of greeting to South Wellfleet. (See sidebar story.)

Murphy also stirred up an 80-knot Cape Cod breeze that twisted the 20-meter beam's elements to a jaunty 45° angle and ripped down the 80-meter dipole. As the coup de grace, though, he buried 1200 feet of coax under 3 inches of solid ice, making the eventual teardown a feat of brute strength and endurance.

Despite the setbacks, KM1CC was a resounding success. More than 7747 contacts were made on all bands from 160 to 2 meters, on cw, ssb, RTTY, fm, a-m, SSTV and OSCAR. Many were probably attracted to the unique "synthesized spark gap" signal produced by an NE555 oscillator set at very low speed and connected through the mic jack. (FCC authorization was secured beforehand, of course.)

Thanks to the good planning of the Town of Barnstable Radio Club with K1VV in particular, the cooperation of the FCC, fellow special-event stations GB3MSA, EIØMFT, VO3CC, VE1CR and IY4FGM, and the thousands of participants, the nine days of KM1CC will be remembered for years to come.



The handsome five-color certificate given to persons who helped make KM1CC an unqualified success. It may well have been the last special-event call sign granted by the FCC.

"I too am only an amateur . . ."

"At the beginning of our century, Thomas Edison remarked, 'I would like to meet that young man who had the monumental audacity to attempt and succeed in jumping an electrical wave across the Atlantic.' He was referring, of course, to my father, Guglielmo Marconi, who was in his mid-20s then. So you see, what is taken for granted by so many of us today, was an incredible feat of human ingenuity 75 years ago. It is good for us to remember the faith, the vision, and the unwavering perseverance of those early pioneers. And it is right for us to salute radio amateurs all over the world on this occasion.

"My father was always very close to them. He considered radio amateurs part of his 'spiritual family' and never tired of keeping in touch with them, sharing their ideas, their problems, and their achievements.

"To one young man who was showing him how he had put together his own set, and in answer to his deprecating remarks about his work not being too good because, after all, he 'was only an amateur. . . .' my father replied, 'Don't forget, young man, that I, too, am only an amateur.'

"I think we all owe a debt of gratitude for the services radio amateurs have rendered unselfishly to mankind on so many occasions, and in so many different ways . . . more dramatically in times of emergency, but more consistently from day to day in just keeping watch over the waves of the air . . . .

"The magic of radio endures in their hearts. We are reminded of it because of them."

Gioia Marconi Braga

UR RST 59 . . . 1 (?)

The combination of the "rare" KM1CC call and the unfamiliar A2 modulated cw had many ops stumped. Reactions over the air attested to the fact that special-event calls are just as much a thing of the past as spark gap. Contacts heard in and around the Novice bands:

"UR RST IS 59 . . . $\overline{BT}$ . . ."

"RST 592 $\overline{BT}$ UR RIG SOUNDS BROKEN MAYBE YOU CAN RETURN IT $\overline{BT}$ . . ."

"RST 594 $\overline{BT}$ SNDS LIKE...SNDS LIKE UR GIVING SOMEONE THE RASPBERRIES $\overline{BT}$ . . ."

"KM1CC DE WB1... $\overline{BT}$...$\overline{BT}$...$\overline{BT}$...DO YOU SPEAK ENGLISH? . . ."

"RIG SNDS TERRIBLE OM $\overline{BT}$ UR 591...SG"

And from many high-speed fists:

"UR 599 NY OM . . ."

"UR 599 MIAMI . . ."

"UR 59 FB $\overline{BT}$ BRINGS A TEAR TO MY EYE"

Hmm, can newcomers really recognize "poor" signals better than the experienced veteran?

CPR — It's a Lifesaver!

The ham shack can be a hotbed of danger. It pays to know cardiopulmonary resuscitation, the simple technique for saving lives.

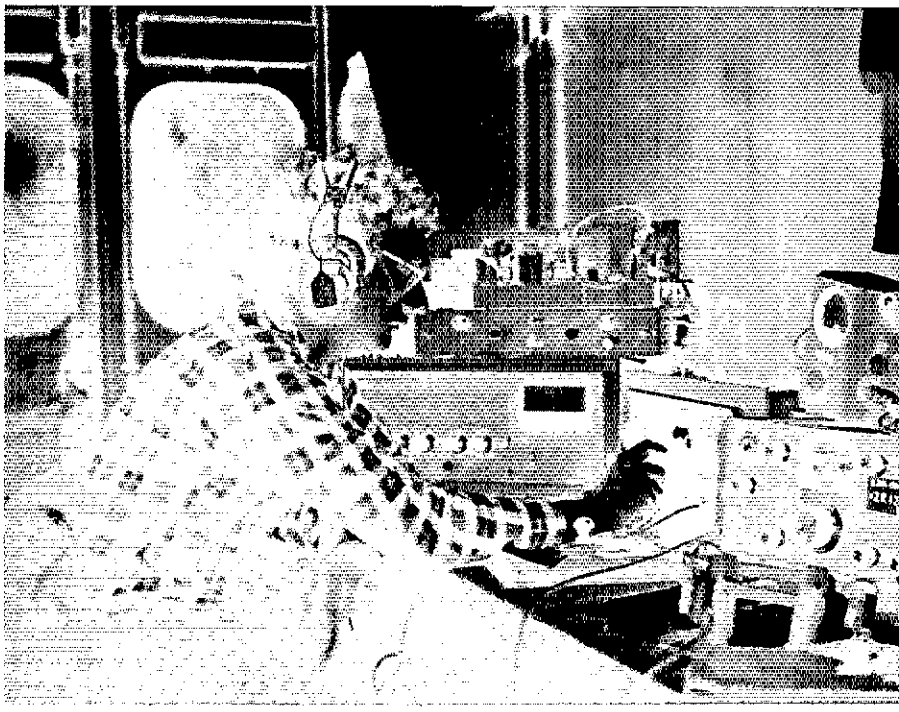
By Casimir P. Harris,* WB6HBI

Most of us don't usually think about it any more than we have to, but the typical amateur is exposed to several risks peculiar to his hobby. For example, a ham may spend considerable off-the-air time climbing into the wild blue yonder on antenna towers. He or she may forget, once in a very great while, to shut off the house current before probing the innards of a transceiver. And, because an amateur may very well be a middle-aged or older male, the ogre of coronary artery disaster can be lurking nearby.

Physicians are by no means immune from these risks. In fact, I may as well confess at the outset that I'm thinking of myself. After almost a week of nightly hunting to find what proved to be a sheet-metal screw that had been left behind to mess up the circuitry of my new rig, I got a nasty jolt from the house current. I also had a recent airborne trip off a ladder. And I'm an older male. So I have good reason to ponder the risks of our hobby.

As it happens, the three risks mentioned all may lead to death by a single mechanism — cardiac arrest, the "sudden death" of the headline. It causes an abrupt failure of the pumping action of the heart. If circulation of the blood is not restored in three or four minutes, irreversible changes occur in the cells of the nervous system.

Fortunately you don't have to be a doctor to restore circulation following cardiac arrest. After a short training session a high-school student can do it on the football field, a policeman at the scene of a traffic accident, or a ham in his friend's radio shack.



Prevention is the best treatment for hamshack accidents. CPR could just save *your* life.

Much to Learn

As a retired anesthesiologist I know the technique of resuscitation rather well. As a relatively new ham I found that I had much to learn about electricity. Much to my surprise, the first death from "electric currents" other than lightning was reported as recently as 1879.[1] Since then U.S. Public Health Service mortality figures suggest an increased popularity of electric currents over natural gas, kerosene, and whale-oil lamps.

Lightning, with its mile-long spark gap, one million volts, two thousand amperes, and terrifying air blast, kills several hundred persons a year in this country. Mankind's modest, more widely spread electricity kills many more. It can be very sneaky.

Only 0.2 mA (ac) applied directly to the heart wall may cause a series of wild, irregular, ineffective movements. Instead of squeezing down rhythmically like a fist clenching and unclenching, the heart quivers like a bag of worms. Circulation stops. In about four minutes the cells of your brain and spinal cord begin to die because they are extremely sensitive to lack of oxygen normally carried in the blood. This unhappy state is the result of one form of cardiac arrest — *ventricular fibrillation*.

1 or 2 mA at 60 Hz can just be felt by the moistened finger.

16 mA causes pain and spasm, but at that level you can still let go if you want to.

*Rte. 3, Box 863, Woodland, CA 95695

[1]*Nursing Times*, May 22, 1975, 5938.

Looking for a Club Program?

Clubs! Here's a worthwhile means of filling your open program dates. Local emergency-group officials will usually jump at the chance to teach CPR. If you can't spare three or four meeting nights, why not have an explanation of the technique and the first lesson taught at a club meeting. Members who'd like to attend follow-up classes at the Red Cross (or wherever they are taught) will be encouraged to do so. Scheduling such a program before Field Day might just prevent disaster at this favorite annual event.

Local Red Cross officials usually have quite a good relationship with amateur organizations. Contact your EC for more information.

One club that has had great success with CPR is the Lake Erie (OH) ARA. Its annual program has trained local amateurs in a variety of lifesaving techniques. It paid off recently, as W8YMB probably saved the life of a co-worker who choked on some food. Cliff applied lifesaving skills and the "Heimlich technique" to prevent the victim from choking. You may never get to use your newly acquired knowledge, but you'll be pretty disappointed if you need it and don't have it! — *WA1STO*

100 mA is enough, if it passes through the heart en route from one hand to the other, to create the same "bag of worms" problem as the 0.2 mA applied directly.

Larger currents tend to stop the heart completely — no movement at all; not even the bumbling bag of worms. This complete lack of muscular contraction is called *asystole*. It is the other kind of cardiac arrest. Of course it, too, requires immediate treatment.

Alternating current is meaner than direct. Even in small doses, it causes muscles to contract. When you are zapped by a suitable alternating current, your heart stops beating, your breathing stops — and you can't let go! The muscle contraction holds you there while the current builds up to an evermore effective dose. If no one else is around (you can't call them) to flip the switch and pull you free, your only help is that your wife forgot to pay the power bill. Just maybe they'll disconnect you in time.

Electricity can damage your body in other ways, too, causing selective damage along major blood vessels because of their high conductivity, electrothermal burns of skin and other areas of high resistance, and widely spread nerve defects caused by lack of oxygen. However, these generally don't call for emergency treatment of the same urgency as cardiac arrest.

Very sedentary or arthritic hams may take some small comfort from this statistic (others be careful!): Falls kill about 17 times as many as do electric currents. And cardiac arrest may follow the complications of a bad fall. But the real "hit man" is coronary artery disease. He carries off as many as 17 times the number resulting from falls and electricity combined.

You Can Learn How

Much dying is, tragically, not necessary. Death commonly occurs only after a period of cardiac arrest; and cardiac arrest could be treated effectively by millions of persons who don't realize how simple it is to learn. You can learn how to save someone from death. You can learn in one evening.

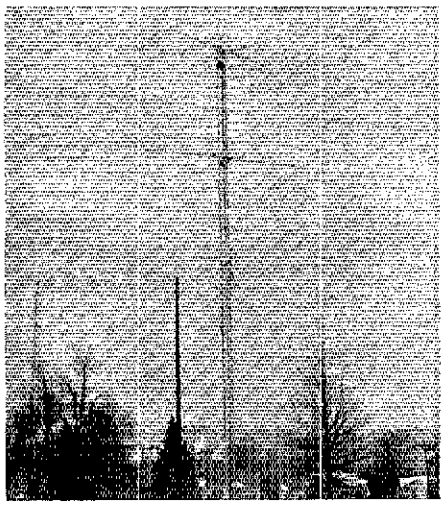
Cardiopulmonary resuscitation (CPR) is a skill, just as learning to send code — only easier. It is a simple skill. You will need demonstrations by a CPR team and a chance to practice on a mannequin that will forgive you if you make a few mistakes. You won't learn from this article or any other; reading is not enough. That's why you'll find no diagrams or other how-to-do-it hints. You have to learn by doing it.

Your doctor has to learn CPR to keep his or her membership on most hospital staffs, and skills are renewed yearly. The same course is given free in many towns to maintenance crews, lifeguards, hospital personnel, police and firefighters. And it is probably available to you.

Perhaps a CPR team could train your radio club every year at a regular meeting. Your family should be there too. After all, if you're typical, you've already been zapped once or twice, you've probably fallen off the tower, and you are likely to be an older male. Your luck can't hold out forever. When you are the most likely victim, you might just as well have a well-trained family.

Your local Red Cross chapter, adult education program, or hospital may sponsor a CPR course. If none is available locally, you can get help in arranging one from those sources, your fire department or the local American Heart Association chapter. And please let me know on 20 meters if you run into any QRM.

Strays



January was a mean-weather month for most of the country and Connecticut was no exception! On January 26 W1YL caught the W1AW 40-meter beam (at 90 feet) being buffeted by 75-mph winds. Believe it or not, the beam survived (so did W1YL).

HAVE SOME "UNUSED" EQUIPMENT?

☐ "I would like to see this equipment put to use in a country where it is needed and where amateur radio can be enhanced by the gift," wrote member John J. D'Luhy, K2EXI. John has very generously donated an almost-unused NCX-3 transceiver and power supply to ARRL/IARU headquarters for use in our program of promoting amateur radio in the less-developed countries.

Many amateurs don't realize that today's amateur radio equipment is all but unavailable in many countries. When new equipment is available, it is often of the variety that is too technically advanced to be easily serviced with locally available components and test equipment. Early tube-type ssb transceivers now retired from service in U.S. ham shacks are the best kind of gear for use in such countries. K2EXI recognized this fact, and decided to do what he could to help.

Do *you* have any older, tube-type equipment, in working condition, lying around the shack? Would you like to see it put to good use in promoting amateur radio in Africa and other developing areas of the world? Your donations of equipment are tax-deductible at the fair market value of the gear. You can obtain assistance and full information from the International Services Officer, ARRL/IARU Hq., Newington, CT 06111. — *WA6IDN*

ARRL PHOTO CONTEST

☐ Winners in the First Annual ARRL Photo Contest will be announced shortly in *QST*. Thanks to all who entered. — *WA1ZUY*

DECATUR CLUB MARKS FOUNDING

☐ Present members of the Decatur (AL) Amateur Radio Club, W4ATD, celebrated the club's 25th anniversary by bestowing honorary offices to all nine of the approximately 15 charter members still holding a license and living in the area. They are W4BFM, W4PKA, W4YDP, W4THW, W4PEX, W4YXQ, W4FXZ, W4USF and W4PNO. Formed in January, 1953, DARC became ARRL affiliated two months later. Club members are using a commemorative QSL design throughout this year. — *WA4MGJ*

Happenings

Conducted By Peter O'Dell,* N1UM

FCC Bans 10-Meter Amplifiers — Commissioner White Dissents in Part

Early in 1977 the FCC proposed to ban the commercial manufacture of amplifiers capable of operation between 24 and 35 MHz and to require commercially manufactured transmitters and amplifiers to meet the Commission's type acceptance requirements (Dockets 21116 and 21117). The Commission made these proposals in an effort to alleviate the interference to televisions and other home-entertainment devices caused by amplifiers that fall into the hands of CBers or unlicensed people who use them illegally.

These proposals were strongly opposed by the amateur community. Amateurs expressed their willingness to work with the FCC to help solve the interference problem, but also made it clear that it was wrong for the amateur service to be penalized for the wrongdoings of others, particularly in view of the fact that the evidence indicated the FCC's proposals *would not work*. In addition to filing comments in opposition to Dockets 21116 and 21117, the League requested permission to appear before the FCC to present oral argument in these significant matters affecting amateur radio. On December 1, 1977, the Commission heard oral arguments in these two dockets. The League, and many others, expressed the belief that punishing amateurs in an attempt to implement proposals which would prove to be ineffective was unconscionable. Alternatives to the Commission's proposals, such as requiring proof of holding an amateur license at the point of sale, were also offered. For background please refer to April 1977 *QST*, page 61; November 1977 *QST*, page 60 and February 1978 *QST*, page 55.

On March 20, 1978, the Commission released a report and order in these dockets which banned the commercial manufacture of amplifiers capable of operation between 24 and 35 MHz. It softened its stand somewhat regarding type acceptance, imposing it only on commercially manufactured amplifiers rather than both amplifiers and transmitters as originally proposed. The Commission's purpose in imposing type acceptance on amplifiers is to prevent the manufacture of amplifiers not expressly designed to operate betwen 24 and 35 MHz, but which could still be easily modified to operate on 11 meters. Examples of features which may result in denial of an application for type acceptance include

1) Any accessible wiring which, when altered, would permit operation of the amplifier in a manner contrary to the FCC's Rules.

2) Circuit boards or similar circuitry to facilitate the addition of components to change the amplifier's operating characteristics in a manner contrary to the FCC's Rules.

3) Instructions for operation or modification of the amplifier in a manner contrary to the FCC's Rules.

4) Any internal or external controls or adjustments to facilitate operation of the amplifier in a manner contrary to the FCC's Rules.

5) Any internal radio frequency sensing circuitry or any external switch, the purpose of which is to place the amplifier in the transmit mode.

6) The incorporation of more gain in the amplifier than is necessary to operate in the Amateur Radio Service. For purposes of this paragraph, an amplifier must meet the following requirements:

i) No amplifier shall be capable of achieving designed output (or designed dc input) power when driven with less than 50-watts mean radio frequency input power.

ii) No amplifier shall be capable of amplifying the input rf driving signal by more than 13 decibels (this gain limitation is determined by the ratio of the input rf driving signal (mean power) to the mean rf output power of the amplifier). If the amplifier has designed dc input power of less than 1000 watts, the gain allowance is reduced accordingly. For example, an amplifier with a designed dc input power of 500 watts shall not be capable of amplifying the input rf driving signal (mean power measurement) by more than 10 dB, compared to the mean rf output power of the amplifier.

iii) The amplifier shall not exhibit more gain than permitted by paragraph (d) (6) (ii) of this section when driven by a radio frequency input signal of less than 50-watts mean power.

iv) The amplifier shall be capable of sustained operation at its designed power level.

7) Any attenuation in the input of the amplifier which, when removed or modified would permit the amplifier to function at its designed output power when driven by a radio frequency input signal of less than 50-watts mean power.

The report and order also contains provisions to allow individual amateurs to construct amplifiers in very limited quantities and to modify their own equipment without regard to the type acceptance requirements, and for manufacturers of amplifiers intended for use by licensed amateurs to obtain waivers of the ban in order to clear inventories. The effective date of the Commission's action is April 28, 1978, with petitions for reconsideration due by April 26, 1978.

Commissioner Margita White issued a statement concurring in part and dissenting in part to the Commission's action. The final paragraph of her statement speaks highly of the amateur service: "The Commission by its proposed ban would remove equipment from the market which is available to amateurs and others who are not the cause of the problem. In fact, amateurs have assisted the Commission in its enforcement problems both in policing their own ranks and in uncovering the illegal use of CB since that the latter can be disruptive of their own service. The ban also will remove linear amplifiers in the 24- to 35-MHz frequency range from the product lines of the legitimate manufacturers and retailers. The Commission has intruded into the marketplace with an unnecessary ban for a purpose admitted by the staff to be largely cosmetic in nature. But the Commission, when asked about TVI interference, proudly can say: 'See what we have done.' "

The Commission's report and order is quite lengthy and detailed. Members may request copies from ARRL, Newington, CT 06111, by sending a 9 × 12-inch envelope with 35-cents postage attached. Be sure to specify Dockets 21116 and 21117. — *K1FHN*

"WR" CALL SIGNS WILL GO; TECHS GET MORE FREQUENCIES; NOVICE LICENSE RENEWABLE

The FCC has continued its trend toward deregulation of the Amateur Radio Service with actions affecting repeaters and Technician and Novice class operators. Initially, the Commission adopted several simplified rules affecting repeater operation last September, but eight parties, including the ARRL, requested reconsideration of some of their provisions. Although the Commission affirmed most of its previous decisions in the present action, it agreed that more protection should be given to weak-signal communication than originally proposed.

The latest action regarding repeaters becomes effective May 15, 1978. Specifically, it provides that:

1) All radio amateurs holding a Technician class or higher license may operate their stations as repeater, auxiliary-link, and control stations without separate licensing or prior FCC approval. This is a continuation of a waiver already in effect.

2) Repeater operation will be permitted at more frequency ranges. Specifically, repeaters

*Public Information Officer, ARRL

will be authorized on 29.5-29.7, 52.0-54.0, 144.5-145.5, and 146.0-148.0 MHz. In addition, repeater operation will be permitted on all amateur frequencies above 220 MHz, with the exception of 220.0-220.5, 431-433, and 435-438 MHz.

3) An amateur using his primary station for repeater operation must use his primary-station call sign followed by "R" or "RPT" if identifying by telegraphy, or "repeater" if identifying by telephony.

4) An amateur presently holding a "WR" call sign has the option of using this call sign to identify while in repeater operation. However, once the "WR" license expires it will not be renewed. The new repeater identifying requirements become binding on former "WR" call-sign holders. Background on the repeater actions can be found in *QST* for January, 1978, page 64 and April, page 56.

In related action on Docket 20282, also effective May 15, the FCC expanded the Technician class operating privileges to include all amateur frequencies above 50 MHz. This action is designed to compensate Technicians, whose nonrepeater operations are partially displaced by the new repeater subbands.

The Novice class license will be changed from a two-year, nonrenewable license to a five-year, renewable license. Any Novice whose license expires May 15 or later will be able to renew his license for a five-year term.

These official actions amend Part 97 of the Commission's Rules and become part of the Amateur Rules on May 15, 1978. — *WA3NLO*

WILL EACH PENNSYLVANIA HAM PAY $20?

Unless the Pennsylvania Legislature takes action on a bill amending the Motor Vehicle Code, chances are you will see fewer call-sign license plates in the Commonwealth. Under the present law, an amateur has to pay an additional $20 for a "vanity plate" to display his call sign. This will also apply to amateurs who got their amateur plates under the old code, once the state takes these plates out of service.

A bill to restore the special amateur plate is stalled in the Senate Transportation Committee. Pennsylvania hams are urged to contact their state legislators, asking that they support *HB 1171* and the *Dyer Amendments As They Relate To Ham Call-Letter License Plates.* There are many proposed changes to the code, so it is most important that the above wording be used.

Anyone wishing to help in this matter should contact Bob Myers, K3HWL, for further information. Bob's address is RD 1, Oakview Drive, Meadville, PA 16335.

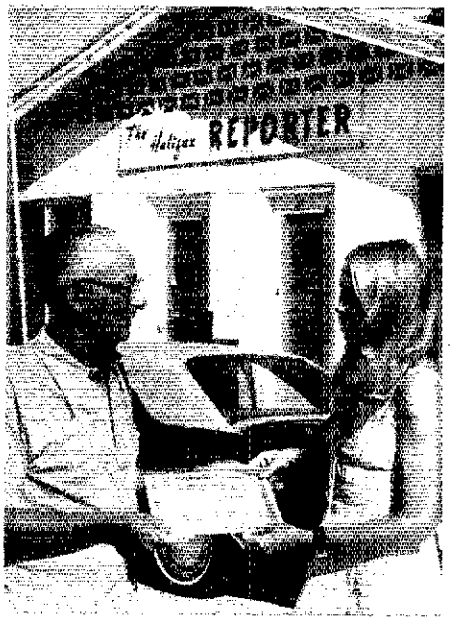
Do you need ideas for your letter? See the letter in this month's "Correspondence" by WA3TCO. — *WA3NLO*

FCC CANCELS LICENSES OF "WHISKEY" CLUB LEADER

The FCC has announced that it has canceled the CB and amateur station licenses of Jesse D. Runyan, WBØRIN. Runyan's Technician class operator's license was suspended for the balance of the license term by the same action.

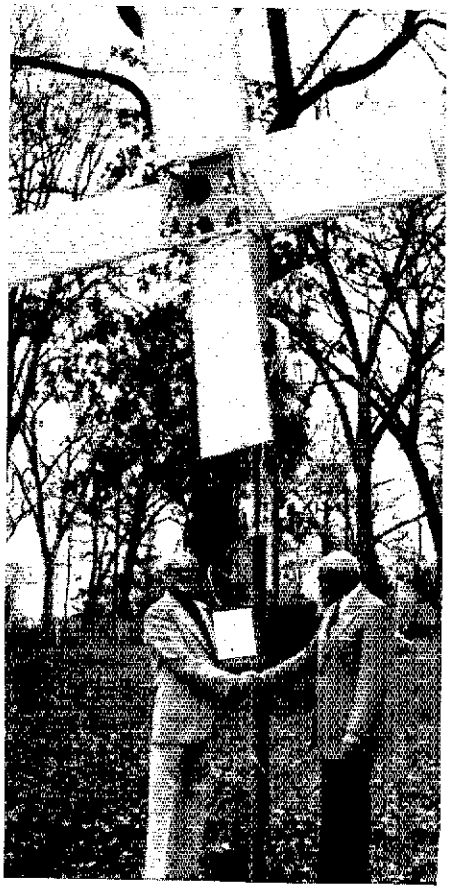
Last October the FCC issued revocation show cause and suspension orders against Runyan. At that time he indicated that he would appear at an FCC hearing; however, four days before the scheduled date of the hearing, he surrendered his CB and amateur licenses in order to terminate the proceeding.

The Commission noted that Runyan was founder, member and leader of the nationwide "Whiskey" organization of single-sideband CB radio operators. The FCC also found that Runyan had assigned "Whiskey numbers" to other CB operators to be used instead of FCC



Readers of the Halifax (Volusia County, FL) *Reporter* have been exposed to community service projects of local amateurs, thanks to Editor Ivy Pruett. She is shown receiving the ARRL Certificate of Merit from Southeastern Division Assistant Director Gray Berry, W4MGO.

Featured on the cover of July 1977 *QST*, WØMCN's wind generator also garnered its builder the Cover Plaque of the Year Award for his article, "Watts from the Wind." Dakota Division Director Gar Anderson, KØGA (right), does the honors.



Filmmaker Dave Bell (right), W6AQ and Southwestern Division Vice Director Jay Holladay, W6EJJ, present a plaque to NBC newsman Roy Neal, K6DUE, for his continuing efforts in amateur radio public relations. (*W6VGQ photo*)

issued call signs. The Commission said that Runyan and the Whiskey organization promoted the use of nontype-accepted equipment at CB stations and unlicensed operation on frequencies above those assigned to CB.

Over the past year the FCC has been taking a strong stand against "hfers," as they call themselves. Although those involved may consider their activity to be an adjunct of CB operation, it is clear that the FCC will take action against *any* license, CB, amateur or other, that the individual might hold. The FCC has unofficially informed us that they intend to take an even stronger stand against hfer activity in the months ahead.

FCC TAKES ACTION AGAINST AMATEURS

The FCC has announced that is has taken punitive action against a number of amateurs for violation of various rules. When the FCC issues a citation, they require a written response within a specified amount of time. If the licensee fails to respond, the FCC has the power to, and *will revoke*, the license in question.

In order to emphasize the point, let us create a hypothetical case. Suppose that WB8NAS moves from Michigan to Connecticut but fails to notify the FCC of a change of address. A couple of years later a bootlegger decides that WB8NAS is an ideal call to use. Said bootlegger then shows up on 3723 some night and announces to all who will listen (on usb) that he is selling cookies for the Girl Scouts and that anyone interested should send the money to Gettysburg.

Hearing this transgression, an FCC monitor sends a notice of violation to the last known address of WB8NAS — Michigan! The post office normally does not forward mail after one year, so the notice of violation is returned to the FCC inscribed "ADDRESS UNKNOWN."

Since the FCC has done everything in its power to locate WB8NAS, and he has not responded, they issue a notice to show cause why the license should not be revoked. The odds are extremely high that WB8NAS will not get this notice either. The result is that WB8NAS has his license revoked and knows nothing of it until he tries to renew. A simple letter to the FCC informing them of the change of address could have averted this.

The following licenses have recently been revoked for failure to respond to official communications. We do not know if the above hypothetical example fits any of these cases because the *callbook* is no more accurate than the latest FCC list:

WB6PUN, effective March 13, David M.Wyers, licensee.

K5YHX, effective February 23, Douglas N. Brooke, licensee.

WA4MCU, effective March 7, Dale R. Parfitt, licensee.

W9LZN, effective April 4, Glenn H. Hierman, licensee.

WB6VTM, effective April 10, Richard S. Thacker, licensee.

If you move, even across town, it is your duty to notify the FCC of any change in your mailing address. If you receive a notice of violation, it is your duty to respond to it with an explanation of what happened — if a bootlegger has used your call, tell the FCC! Failure to take these simple actions can result in the revocation of your license.

ARNS ELECTS W9MOL

The Amateur Radio News Service (an international organization of editors of amateur radio club publications has elected Lee Knirko, W9MOL, president. Jim Romelfanger, K9ZZ; Vivian Douglas, WA2PUU and Norm Monro, K4FRY, were elected vice presidents, and Norman Fitch, G3FPK and Doris Dennstaedt, WA3HEN, were reelected vice president and secretary, respectively. Albin Fischer, W7OA, was elected treasurer of the group.

VE3NR RETIRES FROM DOC

One of Canada's best-known amateurs, W. J. "Bill" Wilson, VE3NR, retired from his post as Special Advisor to the Assistant Deputy Minister (Services) in the Department of Communications in March. In a letter to Wilson, Ron Hesler, VE1SH, director of the Canadian Radio Relay League, praised his work: "I wish to take this opportunity of formally expressing to you, the deep gratitude of the League and the amateurs of Canada for everything you have done, nationally for amateur radio, and internationally, during your official tenure of office."

Bill was born and raised in Ottawa where he now lives with his wife, Mary and son, Irvine. An early interest in his father's discarded neutrodynes and TRFs led to a ham ticket in 1938. Following World War II, he was back on the airwaves as VE3BUZ, later becoming VE3NR. He especially enjoyed the 6-meter band during the sunspot maximum of 1958-59.

Following graduation from Queen's University, Wilson worked for the Northern Electric Company, for two and a half years before joining the Radio Branch of the Canadian government in 1947. Here, he was responsible for the development, construction and maintenance of all types of marine radio aids to navigation.

In 1954, he transferred to the newly established Radio Regulations Section to develop a system of technical standards governing the licensing of radio equipment in Canada. Under Wilson's direction, the branch's electromagnetic compatibility program for microwave systems was created. He also reactivated the Canadian Radio Technical Planning Board (CRTPB) to increase involvement of manufacturers and consumers in the Department's programs.

In 1957-58, he took a sabbatical at the National Defense College in Kingston, ON. Upon his return to Ottawa, Bill found himself busy with preparations for the World Administrative Radio Conference (WARC) of 1959. He was named deputy head of the Canadian delegation and a member of the delegation to the 1959 Plenipotentiary Conference. From 1962 through 1968, Wilson also assumed full responsibility for the international radio conference and ITU Administrative Council work of the Radio Regulations Division.

In 1968, he was designated controller of radio regulations responsible for all aspects of radio regulation in Canada. Wilson later transferred to the National Branch, where he established the Radio Spectrum Policy Division. Returning to Telecommunications Regulations in 1975, he was later promoted to deputy director, in which capacity he paid pa ticular attention to microwave planning General Radio Service ("CB") improvement and electromagnetic compatibility of consume electronic equipment. In 1977, he received th Queen's Silver Jubilee Medal for his work wit the Department of Communications, and wa named special adviser to Mr. Lefebvre, th Assistant Deputy Minister (Services).

Bill's plans for the future include assistin the Canadian Radio Relay League and writing assignment for *QST*. His services wi be most welcome. — *WA1TZK*

AMRAD PAPERS SOUGHT

The Amateur Radio Research and Develop ment Corporation (AMRAD) is calling fo technical papers to be presented at th Technical Symposium held in conjunction wit the National Capital DX Association's DXP '78. The event will be held at the Tysons Co ner Ramada Inn, Falls Church, VA, o September 16, 1978.

Previously unpublished papers are invited o all technical subjects relating to amateur radio Prospective contributors are asked to forwar informal summaries along with a photo of th author and a one-page biographical sketch t Paul Rinaldo, W4RI, 1524 Springvale Avenue McLean, VA 22101, by July 15.

Brooklyn, NY, Postmaster Murray Stein (right), presents Kings County EC W2XY with a certificate of commendation, in recognition of th Brooklyn Post Office Amateur Radio Club's assistance to the Postal Inspection Service during the New York City blackout.

Call Me Anything, But Don't Call Me "Good Buddy"

Sweeping changes in the call-sign assignment system will affect all new U.S. licensees, those who upgrade, and many present amateurs. Here's your guide to the latest FCC action.

By Peter O'Dell,* N1UM

The most comprehensive change in the Amateur Radio Service call-sign structure since World War II went into effect in late March. Under the new system, the 10 call-sign districts of the contiguous 48 states stay the same,[1] as do the first letters of U.S. calls, which are confined by international treaties to W, K, N and A (AA to AL). Beyond that, the rules are all new, as the FCC stated: "All prior call-sign policies and procedures, written or unwritten, are canceled and are hereby replaced." Answers to questions about new call-sign rules follow:

Q. Can I still get a specific call sign?

A. No. Previously, Amateur Extra Class licensees were permitted to request specific 1 × 2 or 2 × 2 call signs. This procedure has been abolished. Formerly, an amateur could request a call sign which he had held earlier, but this procedure has also been abolished. *No requests for specific call signs will be honored.*

Q. Can I keep the call sign that I have?

A. Yes. You may keep the call sign of your primary station license, even if you move permanently to another call-sign district. If you move, regardless of whether or not you choose to change call signs, you must file an FCC form 610 informing the Commission of the new station location and mailing address. (See this month's "Happenings" for an explanation of what could happen to you if you do not inform the FCC of a change in mailing address.) If you wish to retain your present call sign, leave items 13A and 13B blank; that is, to keep your current call sign merely fill out the 610 form in the usual manner. This procedure also applies to licensees who are renewing and wish to retain their call sign.

Q. Can I get a new call sign on my secondary station license?

A. No. FCC will no longer issue any secondary station licenses or any special-event station licenses. Additionally, the Commission will not renew or *modify* an existing secondary station license. Therefore, you can not get a new call sign assigned to your secondary station license. However, if you have a valid secondary license you may keep and use it until it expires.

Q. Is there some way I can keep my secondary call sign?

A. Yes. If you prefer your secondary call sign to your primary call sign, the FCC will permit you to exchange them anytime prior to expiration. At the time the call signs are transferred, the secondary station license will be automatically canceled. If you wish to take advantage of this provision, you must submit a 610 form *and* a letter clearly stating what you wish to be done.

Q. How do I know if I am eligible for one of the new call signs?

A. Because they wish to apportion workload and to gain experience in implementing the new system, the FCC will accept requests for call-sign changes from these four categories only:

1) Newly licensed operators.
2) Amateur Extra Class licensees.
3) Licensees who upgrade their operator privileges.
4) Licensees who change their *mailing addresses* to new call-sign districts.

Please note that we specified mailing address in category 4. The FCC no longer assigns a station call sign based on station location; the new system is to assign the call sign based on *mailing address.* A change in station location only may not be used as the basis for requesting a change of call sign.

In future phases the FCC anticipates permitting licensees who do not currently fit into one of the above categories to apply for new call signs. The FCC has not yet specified how those phases will operate.

Q. Enough already! What is the new system? What do the call signs look like?

A. For the contiguous 48 states, available call signs have been divided into four classes, or "groups." Group A contains all 1 × 2, most 2 × 1 and most A-prefixed 2 × 2 call signs. Group B contains most K-, N- and W-prefixed 2 × 2 call signs. Group C contains all 1 × 3 call signs. Group D contains most K- and W-prefixed 2 × 3 call signs. (See Tables 1 through 4.)

Q. Who gets what?

A. Newly licensed operators who do not presently have a station call sign will have no choice of format. A newly licensed Novice will receive a call sign from Group D, while newly licensed Technicians and Generals will receive Group C call signs. Newly licensed Advanced class operators will be given a call sign from Group B and anyone qualifying for the Amateur Extra Class *in one sitting* will automatically receive a call sign from Group A.

Q. What is the block system?

A. As we go through this section, please refer to the tables. Notice that Group A is divided into 92 blocks. Blocks 1, 2 and 3 are the familiar K-, N- and W-prefixed 1 × 2s. (Block 83 contains the AA-prefixed 2 × 2s.) As one block is used up, the FCC will move on to the next block and assign all available call signs from that block. Group A assignments started with *block 4.* Thus the first call sign issued to an applicant qualified for Group A from the seventh call district was AA7A. The second call sign issued was AA7B and so forth through AA7Z. After AA7Z the FCC will move on to block 5 such that the next call sign issued will be AB7A.

The FCC has retained the option of scanning back over previously issued blocks, at a later date, for any unused call

*Public Information Officer, ARRL

[1]Though the FCC press release describing this action omitted Kansas, FCC staffers have assured us that Kansas will still be treated as part of the 48 contiguous states.

signs and making those immediately available for assignment in the systematic basis. They have not indicated that they anticipate doing this in the near future, however.

Group B assignments began with block 2, except in the first call area. (See Table 2.) For the fifth call district, the first call sign issued was KB5AA and the second was KB5AB. This will go on through KB5ZZ, at which time the FCC will move on to block 3; the next call sign issued will be KC5AA.

In Group C the FCC started with block 2 (see Table 3). Thus for the eighth call district, the first Group C call sign issued will be N8AAA while the second will be N8AAB. When block 2 has been exhausted (i.e., after N8ZZZ has been issued), they will move on to block 3, starting with W8AAA.

Group D assignments started with block 1 (see Table 4). Thus, the first Group D call sign issued in the third call district will be KA3AAA. The FCC will then work its way through block 1 to KA3ZZZ, when it will move on to block 2 (KB3AAA).

For the noncontiguous areas (see tables), the FCC will begin with block 1 in Groups A, B and C and with block 2 in Group D. For example, the first Group A call sign issued to an Alaskan station was AL7A. As with the system in the contiguous 48 states, after one block has been exhausted, the FCC will move on to the next.

Q. I am an Amateur Extra Class licensee holding a 2 × 3. Do I have to take a 2 × 1?

A. No. An Amateur Extra Class licensee holding a Group D call (2 × 3) *may* request a Group C, B or A call sign. An Amateur Extra Class licensee holding a Group C *may* request either a Group B or Group A call sign. An Amateur Extra Class licensee holding a Group B call sign *may* request a Group A call sign. The option also remains to keep the present call sign.

Q. I am an Amateur Extra Class licensee with a 2 × 2. Can I get a 2 × 1?

A. Yes. Any Amateur Extra Class licensee who now holds a Group A 2 × 2 call sign beginning with AA may request a change within Group A. Such a request must be submitted by October 1, 1978. A 2 × 1 call sign will be issued in exchange for the 2 × 2 AA call sign.

Q. I plan to upgrade soon. What options are open to me?

A. A licensee who upgrades his license to a higher operator class may request a new call sign according to the following stipulations. If no request is made, his station will retain its present call sign. The amateur who upgrades to Amateur Extra Class may request a Group A call sign if he now holds a Group B; he may request a Group A or B if he now holds a Group C, and he may request a Group A, B or C if he now holds a Group D call sign.

If an amateur upgrades to Advanced he may request a Group B call sign if he now holds a Group C; he may request a Group B or C if he now holds a Group D. If an amateur holding a Group D call sign upgrades to General or Technician, he may request a Group C.

Q. I am moving to a different call-sign area. What kind of call sign can I request?

A. A licensee who changes his permanent mailing address to a new call-sign area may request a call-sign change. In these cases, a station will be assigned a call sign from the same group (A, B, C or D) as the call sign now held. However, Advanced class licensees now holding Group A call signs may request Group B call signs; General or Technician class licensees now holding Group A or B may request Group C call signs.

Q. OK, I qualify and I want a new call sign. What do I do?

A. Licensees must request a call sign, from the group for which they are eligible, on FCC form 610. (If you need a 610 and the local FCC office does not have them, send an s.a.s.e. to ARRL hq. and we will send you one.) The only request that may be made is for a specific group. No requests will be honored for specific call signs, call-sign blocks, prefixes or suffixes. If a group preference is not indicated in item 13B on form 610 or the applicant is not eligible for the group he requests, he will be assigned a group systematically as if he were a new licensee. If you wish a new call-sign, check item 13A on the 610 form. In item 13B write in the group name you are requesting.

Q. The FCC goofed and issued me two primary licenses. What should I do?

A. Section 97.40 of the FCC Rules permits only one primary station per operator. Although this is not a new limitation, licensees may have received more than one primary call sign due to processing errors. Any such licensee must choose one of them for his sole primary station, and submit the other license for cancelation by October 1, 1978.

Q. Aren't there many more call signs available under this system?

A. Yes. Perhaps the FCC anticipates substantial growth in the Amateur Radio Service. For the contiguous 48 states, there are approximately 100,000 call signs available in Group A. Groups B and C each have roughly 500,000 call signs. As Group D is set up, it has just over 7,200,000 call signs. It does not appear that the Amateur Service as we know it will suffer from a shortage of available call signs in the near future!

Table 1
Group A Call Signs

Block no.	*Contiguous USA*
1	K#¢¢
2	N#¢¢
3	W#¢¢
4-13	AA#¢-AK#¢
14-36	KA#¢-KZ#¢
37-59	NA#¢-NZ#¢
60-82	WA#¢-WZ#¢
83-92	AA#¢¢-AK#¢¢
93	Group B (see Table 2

Note
The following prefixes will *not* be assigned to stations in the contiguous 48 states: AH KH NH NL NP WH WL WP. Pacific-area stations will be assigned AH#¢ KH#¢ NH#¢ WH#¢, then Group B. Alaska-area stations will get AL7¢ KL7¢ NL7¢ WL7¢, then group B. Atlantic-area stations will be assigned KP#¢ NP#¢ WP#¢, then Group B.

Table 2
Group B Call Signs

Block no.	*Contiguous USA*
1[1]	KA1¢¢
2-23	KB#¢¢-KZ#¢¢
24-46	NA#¢¢-NZ#¢¢
47-69	WA#¢¢-WZ#¢¢
70	Group C

[1]KA prefixes will be assigned only to persons living in the first call district. Other KAs are assigned to U.S. personnel living in Japan.

Note
The following prefixes will *not* be assigned to stations in the contiguous 48 states: KH KL K NH NL NP WH WL WP. Pacific-area stations will be assigned calls in the format, AH#¢¢; Alaska-area stations, AL7¢¢; and Atlantic-area stations, KP#¢¢. Once these blocks are used up, assignments will be made from Group C call signs.

Table 3
Group C Call Signs

Block no.	*Contiguous USA*
1	K#¢¢¢
2	N#¢¢¢
3	W#¢¢¢
4	Group D

Note
Pacific-area stations will be assigned KH#¢¢ NH#¢¢ WH#¢¢, in that order; Alaska-area stations KL7¢¢ NL7¢¢ WL7¢¢; Atlantic-area stations NP#¢¢ WP#¢¢. After these are depleted, Group D will be used.

Table 4
Group D Call Signs

Block no.	*Contiguous US*
1-23[1]	KA#¢¢¢-KZ#¢¢¢
24-41	WA#¢¢¢-WZ#¢¢¢

[1]Except KC4AAA-AAF and KC4USA-USZ

Note
The following call-sign formats will *not* be assigned to stations in the contiguous 48 states: KH#¢¢¢ KL#¢¢¢ KP#¢¢¢ WC#¢¢¢ WH#¢¢ WK#¢¢¢ WL#¢¢¢ WM#¢¢¢ WP#¢¢¢ WR#¢¢¢ WT#¢¢¢. Pacific-area stations will be assigned KH#¢¢¢ WH#¢¢¢; Alaska-area stations KL7¢¢¢ WL7¢¢¢; Atlantic-area stations KP#¢¢¢ WP#¢¢¢

International News

Conducted By Bruce A. Johnson,* WA6IDN

Amateurs' Self-Discipline Recognized by Federal German Government

The effectiveness of the Amateur Radio Service's self-discipline was officially recognized recently during the "parliamentary question hour" held by the Federal German government. In answer to a question from the West Berlin Deputy Dr. Dietrich as to the reason for the difference in the monthly fees charged for amateur radio stations (3 DM) and for citizens band fixed stations (15 DM), Parliamentary Secretary of State Haar remarked, "The effort required on the part of the Federal German Post Office for the licensing and supervision of amateur radio stations is considerably less than that for low-power citizens band fixed stations. In contrast to these CB fixed stations, amateur radio stations may only be operated by persons who have passed an examination, the standard and level of which are determined by international regulations; this means that the Post Office's effort and outlay for monitoring purposes are considerably reduced." [Editor's Note: In West Germany — as in many other countries — Post Office authorities administer amateur radio and other telecommunications services.]

The World Administrative Radio Conference is only a year and a half away. Such a statement as this issued by a national government is an important testimony to one of the stronger arguments going for the Amateur Radio Service. For over 65 years, radio amateurs have earned and maintained a reputation of self-discipline and self-monitoring among themselves, thereby reducing the work load of various countries' telecommunications authorities. As WARC-79 draws closer, we should be reminded that this reputation *must* be retained in order to help justify the Service's demands for yet greater privileges and recognition.

*International Services Officer, ARRL

YUGOSLAVS TO HOST HAMFEST AND MEETING

Amateurs who will be in Eastern Europe this July might be interested in attending the 14th meeting of the *Savez Radio-Amatera Jugoslavije*, the IARU member-society representing amateur radio in Yugoslavia. Commencing on 6 July (and running through 8 July), the gathering in Bor, Serbia, will be attended by more than 500 Yugoslav and foreign radio amateurs.

Attendees will be treated to an amateur radio direction-finding ("foxhunt") competition (but be warned that the Yugoslav amateurs excel at this art!), indoor cw competition, amateur emergency net checking, and various competition events for younger amateurs.

The SRJ members would very much like to bid welcome to representatives, competitors and observers from countries which have recently started to develop an Amateur Radio Service. A cordial invitation is extended to any institution or organization from a developing country which is connected with or interested in amateur radio (ministries of sports, education and so on). A special effort will be made to explain amateur radio, and to show how it can play a critical role in helping developing countries.

The setting for the meeting is a beautiful lakeside resort approximately 100 miles southeast of Belgrade. Interested amateurs and organizations can obtain further information by writing directly to the SRJ at P. O. Box 48, 11000 Beograd, Yugoslavia.

HEADING FOR JAMAICA? NOTE THIS . . .

Amateurs planning to vacation in Jamaica — and who wish to operate an amateur station during their stay — should hold a General class license or higher, and apply for a form from Headquarters, Post and Telegraphs Department, P. O. Box 7000, Kingston, Jamaica, West Indies, at least 30 days prior to their expected date of arrival. According to a spokesman for the Jamaican government, your permit, when issued, will be forwarded via registered mail to the applicant's home address. "If an application is not received in time for us to process the permit and send it abroad, it will be forwarded to the Jamaican address as shown on the application form. Each application will be acknowledged, and the applicant will be informed of the action being taken," said a spokesman for the Postmaster General. Permits, when issued, will be valid for one month.

The United States and the Republic of Ghana signed a third-party agreement back in November, 1977. Shown below is Jeff Dunham, 9G1JN (a Peace Corps volunteer physics teacher in Akwatia, Ghana), running the first Ghana-U.S. phone patch for U.S. Ambassador Robert P. Smith (with glasses) and his wife. WA3CON handled matters Stateside and patched the ambassador through to his daughter. One of the key figures instrumental in bringing about the agreement was Kofi Jackson, 9G1AJ, secretary to both the Ghana Amateur Radio Society and the Ghana Frequency Registration and Control Board. While third-party agreements can be viewed as evidence of the responsible attitudes exhibited by most amateurs, we should preserve the integrity of the agreements — and thus the agreements themselves — by carefully complying with the rules governing third-party communications. See August 1977 *QST*, page 71, and February 1978 *QST*, page 60, for the do's and don'ts of patches. *(9G1SM photos)*

YL News and Views

Conducted By Louise Moreau,* W3WR

YL Clubs — Western United States

Looking for a YL club? There are clubs of women amateur radio operators in every section of this country. The Alaska Lassies represent the KL7 gals of the far Northwest and is open to all YLs in that state. Then there is the MINOW on-the-air club for women in Montana, Idaho, Nevada, Oregon and Washington. It is a very active organization that holds personal meetings among the membership twice a year in Walla Walla, WA, for election of officers and other club business.

Farther to the south, in California, three clubs are available — the BAYLARCS in the San Francisco Bay area welcomes women from northern California; the North San Diego YLRC includes women from the southern part of the state, while the second oldest YL club, YLRC of LA, covers the Los Angeles area.

The Colorado YLs meet monthly at members' homes to facilitate the travel over the state for the membership's convenience.

In the Southwest the GAYLARC women have a record of activity dating from 1957 in the Galveston area, leading the club to aid in communications for many public functions. TYLRUN is, as the name implies, the Texas YL Round Up Net that includes women all over the Gulf section. And there is also WHO, the Women Ham Operators.

For women who are unable to attend meetings of the clubs, each one sponsors a club net, or is represented in the major Tangle Net and Working Girls, or Open House Nets. Here it is possible to meet with not only club members in any area, but because of the club atmosphere of these nets it is also possible to meet and secure contacts with YLs from most of the country to acquire the club as well as YL net certificates that are available.

Lovelle Pedersen, WBØJFF, was presented the "Ham of the Year" Award of the Northeast Iowa Amateur Radio Association by club Vice President Bob Trettin, WAØDTD. Lovelle is active on all bands from 2 to 80 meters. She is a member of YLISSB, 10-X and YLRL, as well as president of the Northeast Iowa Club, and secretary-treasurer of the Iowa 75-Meter Net. *(WØLFF photo)*

YLRL 40TH ANNIVERSARY PLANNED

The Penn Jersey YL Club members will act as hostesses for the quadrennial YLRL International Convention that has been slated to be held at the Holiday Inn in Philadelphia, PA, in 1979. The PJYLs plan to make the 40th anniversary of YLRL, the oldest of all women's amateur radio clubs, the theme of the convention.

YLRL CONTEST CUSTODIAN REQUEST

The YLRL Contest Custodian requests that all participants remember that contacts made on any of the repeaters will not be accepted if they are included in contest logs.

1977 TRILLIUM CONTEST RESULTS

The Ontario Trilliums, Canada's first YL club, have announced the winners of the annual Trillium Weekend Contest. The winner, VE3CQY, was awarded a bar for the Plaque that he was awarded in the 1972 contest. Second place went to VE3CYK, and third place was taken by VE4CMG. Both second- and third-place winners received a certificate.

The Trillium station giving the most contacts was Audrey Cuthbert, CY3ILT/VE3ILT.

The stations submitting the "lucky draw" logs were VE3EFI, VE3FXM and VE3CQY.

YL REPEATER LINKUP

The Shenandoah Valley Repeater Association of Winchester, VA, WR4AGT, has expanded to listeners in other areas.

There is now a weekly linkup with the Blue Knob Repeater, permitting YLs from Altoona, PA, and Winchester, VA, to work each Wednesday night at 0200 UTC. So far as is known this is the first repeater linkup that includes scheduled regular contacts between YLs. Virginia, WA4QWC, publicity chairman of SVARC, invites all YLs within the listening area of the two repeaters to join the Wednesday night sessions.

NEW AFRICAN YL CALLS

The YL story in Africa is increasing. With every issue of the *callbook magazine* new countries are showing feminine calls. In Malta, Maria Prasse, 9H1EC; Togo, Daniele Gisele Meunier, 5V7YL; Kenya, Philomena Greenwood, 5Z4QH; and Malawi, Mrs. M. Ertelt, 7Q7CE, are the first YLs in these countries, adding four more to the YL picture as a part of our international interest in amateur radio that is growing in Africa.

Carol (left), WA2ITH and Deloris, WB9LSM, who have been holding weekly schedules on cw for some time, finally met at Carol's home. Both are members of YLRL, and both are active in assisting Novices with code and theory to upgrade their licenses. Both women are active in YLISSB and the 10-10 Net. *(WB9MFC photo)*

*YL Editor, *QST*. Please send all news notes to W3WRE's home address: 305 N. Llanwellyn Ave., Glenolden, PA 19036.

Strays

UNEXPECTED HELP FROM A NEW FRIEND

☐ Not all ham radio talk concerns rigs and propagation. While observing an on-the-air demonstration by Robert Kresky, WAØYML, a Kansas school administrator participated in an unexpected idea exchange with an Oregon teacher. Kresky's QSO for John Laurie, principal of Jardine Junior High School in Topeka, turned out to be with Howard Russell, WA7VRB, a science teacher at Klamath Falls Junior High School.

"Russ" had a particular interest in math minicourse packets, and after a discussion about the curriculum he agreed to send some information to his Kansas colleague. For more than a year now, Topeka JHS math teachers have been using the packets and believe they are just what they needed. They reciprocated by sending math, science and photography materials to the Oregon school.

AMSAT-OSCAR 8 ORBITAL DATA CALENDAR

☐ In cooperation with AMSAT, Skip Reymann, W6PAJ, expects to have available by the end of May an OSCAR 8 Orbital Predictions calendar containing all orbits of the new satellite for the remainder of 1978.

The orbital calendar will be available postpaid for $5 U.S. funds or 30 IRCs ($3 to AMSAT members, and free *on request* to AMSAT Life Members). Overseas orders will be airmailed. Orders and payments should be made in U.S. currency to Skip Reymann, W6PAJ, P. O. Box 374, San Dimas, C 91773 USA.

Orders may also be charged to VISA or Maste Charge. (Be sure to provide your account number, e piration date and other charge-card information.)

For those still without an AMSAT-OSCAR 7 o bital calendar, a new printing will be available shortl Prices and ordering information are the same as f the OSCAR 8 calendar.

Important — To speed up handling of your orde please include a gummed, self-addressed label. Pr ceeds from the orbital calendar benefit AMSAT.

LIGA CONVENTION

☐ The 1978 convention of the *Liga Mexicana d Radio Experimentadores* will be held May 25-27 in th City of Morelia, State of Michoacan. Headquarte will be the Hotel Morelos. — *XE1CCP*

50 Years Ago

May, 1928

☐ The Federal Radio Commission has, at ARRL's urgent request, opened the new band 28-30 Mc. for general amateur use, but has revised phone privileges by limiting them to 5, 160 and 80 (3500-3550 kc.) meters.

☐ Technical Editor Kruse reviews simple methods for getting on the new band, mostly a compromise of earlier circuits for 5 and 20 meters. 9BHR discusses the Ultraudion as a useful 10-meter component.

☐ TOM ("The Old Man") unleashes his vitriol on those who CQ at length but want DX only and won't chew the rag.

☐ Lou Hatry is troubled with all kinds of radio noise at 1OX, and presents a number of audio filter circuits he has found useful.

☐ Amateurs in Minneapolis were threatened with quiet hours because of broadcast interference, but their formation of a "vigilance committee" provided a cooperative intermediary and avoided the restriction.

☐ One of the country's outstanding stations is 6CMQ, as a reading of an extensive station description in this issue will prove.

☐ Howard Mason adapted an idea from telescope mirror makers and shares with us his design of a grinding mechanism for roughing out crystal blanks.

☐ An early feature of his eventual "bag of tricks" is a fieldmeter-wavemeter-voltmeter designed by Professor "Doc" Woodruff, 8CMP.

☐ ARRL's President Maxim pleads for tolerance toward new phone operators, pointing out that not long ago c.w. was similarly ridiculed by spark diehards.

☐ The Editor says we U.S. hams have been somewhat spoiled by the broad freedom from overrestrictive regulation, and will have to work doubly hard to get in shape to meet the new international band regulations effective the first of next year.

☐ 3LA says a simple rotating (scanning) disk in front of a lamp (connected to receiver output) will allow reception of television signals being transmitted by General Electric. — *W1RW*

Silent Keys

It is with deep regret that we record the passing of these amateurs:

W1DBE, Claude F. Hutchinson, Tewksbury, MA
WA1GVA, Nelson J. Wells, Meriden, CT
WA1JBH, Ulysse A. Lussier, Easthampton, MA
W1JYS, Kauko A. Ketela, Florissant, MO
*K1JZU, E. Franklin Phillips, Pittsford, VT
W1LLH, Emil M. Grieco, Meriden, CT
W1OGF, Albert C. Quinn, Swampscott, MA
K1OPN, Robert C. Hescock, Monson, ME
K1SCR, Joseph K. Kerhart, Newtown, CT
W1VT, Henry M. Lane, Belmont, MA
K1ZER, Gerald H. Phillips, West Warwick, RI
WN1ZWQ, Richard Miozza, Fall River, MA
W2BKY, Harold L. Wetterholm, Bricktown, NJ
W2CFW, Charles Peterson, Nutley, NJ
K2IKX, Edward J. Bungue, Mystic Islands, NJ
W2ITQ, Omer L. Martratt, Albany, NY
WB2KGS, Andrew J. Lyons, Huntington, NY
W2KWE, Frederick A. Eckhart Sr., Pennington, NJ
WA2MGS, James S. Dawson, Bay Shore, NY
WA2NWI, Theodore A. Rich, Schenectady, NY
WA2PFP, William F. Baden, Flushing, NY
W2RZO, Arthur E. Fliegauf, Washington, NJ
WB2SVC, James Burke, East Rochester, NY
K2TTM, Charles E. Edmonds, Flushing, NY
W3BSF, Fred E. Zeigler Jr., Sewickley, PA
W3EKZ, Raymond W. Rock, Joppa, MD
W3FC, Russell S. Dennis, Wilmington, DE
W3IZU, Richard C. Fisher, Havertown, PA
WA3OUM, Donald Palace, Morrisville, PA
K3PIR, Forrest E. Koehler, Catasauqua, PA
Ex-W3RM, William J. Moore, Flourtown, PA
WA3SYM, Margaret C. Kaval, Fairchance, PA
K4CBM, Leonard H. King, Naples, FL
WA4CFX, Dr. Earl C. Taylor, Spartanburg, SC
WB4CGV, Linton F. Daskam, Clearwater, FL
K4COK, Arthur J. O'Keefe, Pompano Beach, FL
K4CZH, Robert L. Morris, Greensboro, NC
K4DEA, Archie D. Love, Petersburg, VA
W4ED, James R. Shannon, Wilson, NC
W4LRV, Fio J. Rastellini, DeLand, FL
W4MWA, Jerry O. Stockton, Jacksonville, FL
WA4RFM, Harold L. Forsythe, Williamstown, KY
K4RGL, Dade H. Griffin, Henderson, KY
WA4YEX, Dr. William W. Levis, III, Swansboro, NC
K4YUJ, John K. Breast, Shelbyville, TN
W4YYN, Robert H. Pittman, Knoxville, TN
W5BXP, Roy A. Baker, Ruidoso, NM
W5COG, Travis Madden, Shreveport, LA
W5QLZ, Robert T. Inman, Glastonbury, CT
WB5RTH, Thomas E. Landrum, Jr., Shreveport, LA
W5SCX, William H. Pretty, Ardmore, OK
W6CDJ, Walter J. Cooper, Woodside, CA
W6EVS, Thomas L. Lee, Lawndale, CA
WA6FLB, DeForest Mocker, Aptos, CA
K6KWM, Thomas F. Mayne, San Jose, CA
W6MYC, Carl F. "Johnny" Rothrock, Poway, CA
WA6RIX, George G. Herrschaft, Aptos, CA
K6SKI, Edward C. Schafer, Pacific Grove, CA
W7DSS, Ray A. Fretz, Great Falls, MT
W7EVB, Stanley W. Baker, Waldport, OR
WB7EYG, Harold E. Hani, El Paso, TX
W7FDZ, Ralph G. Reasey, Sparks, NV
W7GZU, J. B. Hayes Bougher, Sun City, AZ
K7MTZ, Louis A. Bove, Patagonia, AZ
W7QLE, David O. Bennett, Grants Pass, OR
WA7SAC, Dolphus L. Baker, Woodland, WA
W8AGE, Archie Huff, St. Ignace, MI
W8APG, William H. Sweet, Bronson, MI
W8CQI, Ellsworth U. Snyder, Springfield, OH
WA8IPL, Alan W. Bachner, Dearborn, MI
W8JG, William C. McNeil, Brunswick, OH
K8NVB, William Worland, Greenville, OH
W8NZI, Charles Jirsa, Rocky River, OH
W8OMI, Charles A. Russ, Wyoming, MI
W8OX, Josef H. Van Wie, Rochester, MI
W8QYY, Edwin L. Stombaugh, Attica, OH
W8STZ, Vail "Pete" Harrison, Georgetown, OH
W8UWK, Joseph W. Swartz, Detroit, MI
WB8VZZ, Joseph C. Kostell, Massillon, OH
W8ZNO, Ken Rowe, Ironwood, MI
W9FFM, Rowell S. Weilert, Marion, IN
W9JFH, Gordon W. Dunnett, Bedford, IN
W9MUU, Frank J. Vertacnik, Indianapolis, IN
W9NZO, James E. Touhy, Elburn, IL
W9RGL, Louis J. Gamache, Berkeley, IL
W9VHD, Arthur W. Sutton, Kenney, IL
WØBNG, Forrest W. Martz, Cedar Rapids, IA
WBØDAU, Karl V. Gronvall, Red Wing, MN
WØFPZ, Henry L. Cook, Denver, CO
Ex-PAØGE, Gerrit H. "Pete" Pieterson, Columbus, OH
WØHU, George W. Pilgram, Sr., St. Joseph, MO
WBØQAW, J. Ted Peterson, Marysville, KS
WØSZS, Charles L. Schmidt, Troy, MO
VE2AWP, Paul E. Brunet, Ste-Foy, PQ
VE3BMS, J. Harris, Toronto, ON
VO1EB, A. "Arch" Bursey, Green Bay, NF
ZL3KN, Gordon J. Wilson, Christchurch, NZ
*Life Member

25 Years Ago

May, 1953

☐ W1JEQ has another neat mobile rig design — this time a deluxe 160- to 6-meter job — but not for beginners.

☐ Television stations in metropolitan areas are generally increasing power, alleviating the TVI problem a bit, and W2OLU shows some of the simple remedies to keep your signal out of the neighbor's set.

☐ Not all of us can afford (or build) sideband gear, and W1DF caters to such amateurs with a 40-watt Class AB1 modulator design, plus an economy power supply.

☐ The war surplus BC-453 still has potentialities, as W6DSR illustrates with his revamping to provide a double superhet and a heterodyne type VFO transmitter for 7 Mc. — a transceiver with single control.

☐ Plug-in coils are on their way out, and W1TS helps their demise with his design of a six-band 6146 amplifier with only two knobs.

☐ A beam doesn't *have* to be horizontal, says W7HAD, who has rigged up two close-spaced, vertical, 3-element beams for 10 meters, easily lowered to the ground for adjustments and just as easily rotated.

☐ Heath has an inexpensive "all-wave" receiver which W1ICP has adapted for the newcomer by adding a b.f.o., r.f. gain control, and a headphone jack.

☐ Amateur radio always needs good public relations, and "No News is Bad News" in this issue tells us how to achieve it.

☐ W2RPU has designed a neat little 220-Mc. hand-carried unit primarily for civil defense use.

☐ National high in the 1952 Sweepstakes was W4KFC — so what else is new?

☐ The National Convention this year will be in Houston — remember when a deluxe single hotel room was $6?

Club Notes

Southern Chester County Amateur Radio Club (PA) is the first club to sign and return the ARRL Code of Ethics support statement. Very few clubs know they can sign this statement, as it is a brand-new offer. After we receive the signed statement, we will send the affiliated club a sheet of ARRL Code of Ethics logos. These logos can be printed on club newsletters, club letterhead stationery, and announcements of auctions, flea markets and hamfests. If your club wishes to support this program — which is dependent on the voluntary cooperation of all amateurs — we want to hear from you. Send an s.a.s.e. to C & T and we will forward the form to be signed. We appreciate your backing.

Has your club officer filled out and returned the annual report sent to your club in January? Keep informed and receive our mailings/freebies by giving us the information requested and a good mailing address. Quarterly mailings to clubs will now be made on *rulemaking petitions* and other actions pending before the FCC and DOC which pertain to amateur radio along with a brief summary of their current status.

The Club and Training Department has a new form for ordering *audio-visual materials*. The form speeds up our handling process for you. If you're looking over the list of films and slide shows, write us for the new forms. And please return A-V materials on time. We're deleting slow-returners from the list of borrowers. — *WA1STO*

Strays

VIRGINIA NOVICE NET

☐ Virginia Novices: Improve your operating and code proficiency by checking into the Virginia Novice Net. Listen for the VNN call-up daily at 2200Z (5 P.M. Eastern Time) on 3740 kHz. More information may be obtained from James E. Ferguson, Jr., WD4MEJ, P. O. Box 27, Pennington Gap, VA 24227.

FOREIGN STATIC

☐ During the recent Ten-Ten International Contest, I kept hearing an unusual noise on the band between 28.5 and 28.8 MHz. It was sweeping across a large segment of 10 meters and causing some havoc to the contesters. During a QSO with KH6JMK, I asked Stan if he could hear this noise. "Don't worry about that thing," he said, "it's just the "Russian Flu!" — *K1TX*

ZL CONFERENCE

☐ The 52nd annual conference of the New Zealand Association of Radio Transmitters will be held at the Wool Exchange and War Memorial Hall in Napier from June 2 to June 5. — *ZL2AHC*

Correspondence

The publishers of QST assume no responsibility for statements made herein by correspondents.

DICTATOR OR DIRIGIBLE?

☐ What is taking place regarding Rick Cooper? — *Herb McAdams, WB9LCN, Richmond, IN*

☐ I hope positive action can be implemented to counter the indicated FCC petition that this group intends to introduce. — *Arthur Smith, N3DR, Ridley Park, PA*

☐ Is this guy for real? — *Larry LeMone, K7IHI, Orem, UT*

☐ This is just another reminder that we must make a continued effort to self-regulate and be constantly aware of the continuing efforts to destroy amateur radio. It is my hope that we can all pull together since this is going to be a tough fight before we're done. — *Virgil DuMond, WB2FGY, Fairport, NY*

☐ The time has come for the more responsible and decent citizens band operators to try self-policing to cut down on illegal operations. The selfishly misguided proposal for taking amateur radio frequencies for more of this too-often obscene or wasteful drivel is shocking. There are substantial benefits from citizens radio and CB organizations, but these benefits are being curtailed by misuse. This radio service is out of control and getting worse. Do not take away amateur radio frequencies for more nonpurposeful babel — let the babel compete with itself and perhaps more sensible CB people will work for more order and usefulness of the CB channels. — *Philip Williams, W9EDK/KSZ 3979 Elmhurst, IL*

☐ The American system is based upon hard work and dedication, not on free handouts. I am confident that you will strive to keep ham radio at its present level of proficiency. We must not let the destruction of amateur radio happen in any way, shape or form. — *Paul DeNapoli, WD8AHO, Livonia, MI*

[Editor's Note: Informed sources indicate no listing of Richard Cooper as a licensed ham, no listing of his law degree or attorney service with the California bar, no record of the so-called million signatures on petitions supposedly circulated among various noted CB clubs, no filing of the supposed $50-million suit. This self-proclaimed "dictatorship" may spell its own demise. We remain watchful.]

VANITY OR SPECIALTY?

☐ The attempt in California to increase amateur radio vehicle license plate fees from $3 to $25 was defeated in the state legislature, and amateur radio gained recognition as a public service by the legislator who originally proposed the fee increase. In some states such plates are labeled "vanity" or "personalized." Perhaps amateurs could use the California format to substantiate the fact that their amateur plates are "specialized" because they represent a station, not a person. — *Gene Signor, WA6HAD, Los Gatos, CA*

☐ "Why do amateurs need call-letter plates?" They stand out and make the amateur readily recognizable to people acting in control at any disaster. Sure, other recognition signs could be used, but they would not be as consistent as call-letter plates. Some hams would think of these as vanity plates, but the vast majority think of them as a tool with which they can better serve the cause to which most amateurs rally — public service. "Will amateurs abuse the privilege?" Some will. Some people will abuse any privilege. "What about other segments of society? If amateurs get their plates out of the 'vanity' category why shouldn't other groups rate the same treatment?" Some probably should, but they have to justify the cost to the state themselves. The real question is, "What effect will it have on the amateur operator's ability to move into disaster areas quickly?" Even this is a financial question. If even one ham is prevented from reaching a disaster scene, what is the cost? If that ham could save but one life, what is that worth to the state? If that person who is saved drives a car, he pays Pennsylvania a minimum of $24 annually to license that car. What about the jobs his work may provide? If you are a ham interested in public service why don't you have your plates? I hope it is because they cost too much or that it is too much of a hassle to get them. If so, please write your representatives and let them know your views. If you don't write but just wait and see if they vote your way, you can just not vote for them in the next election. That will teach them a lesson. But it sure won't do you much good and all it will really do is teach them that they should have been mind readers. — *Roger Galbraith, WA3TCO, Guys Mills, PA (reprinted from the* Crawford Key)

CQ VERMONT

☐ Although I do not speak for all Vermont stations, many of us here would like to offer some advice to help you get that "rare" Vermont QSL card: (1) There are only about 750 hams in the state compared to 300,000 in the rest of the USA, and due to the popularity of 2 meters many Vermont hams do not operate the hf bands. (2) Since there are so few of us we are constantly overloaded with QSL requests. Consequently, many hams here will not QSL unless you send an s.a.s.e. (self-addressed stamped envelope). (3) When one calls "CQ-DX" on the low bands it usually means "CQ any foreign station." (4) Don't irritate the station you want a QSL from by answering his CQ DX call, breaking into his QSO, or other rude practices. — *Jon Knudson, WB1BWV, Cambridge, VT*

THE UNSPORTSMAN

☐ The problem of interference between contests and general operating is well recognized. Certainly the contest occupies the larger portion of the band by sheer weight of numbers and thus does keep some of the casual operators off the band. But, from my experience there is usually room for coexistence and each group keeps to itself without much direct conflict. I heard an incident while operating in the DX phone contest that really bothered me. At 2014Z, 8P6FU was calling CQ to the Pacific, specifically stating his desire for no contest QSOs. He was plagued by at least 10 stations in the contest calling him. He was very much the gentleman and insisted that he wanted no contest QSOs; but offered the information that another 8P6 was in the contest on 28 MHz at the time. This appeal was to no avail and he QRTed shortly thereafter without a QSO. It seems to me that those 10 contest operators have a very poor perspective of amateur radio in toto. Amateur radio is a hobby (defined by some as a pleasant pastime) and contesting is a sport within the hobby. When this degree of malice is shown, amateur radio is no longer pleasant and contesting in such a manner is unsportsmanlike. — *Karl Grunewald, N8NA, E. Lansing, MI*

FRONTWARD AND BACKWARD

☐ I have been a ham since March 1973, and have learned to love cw. There is no music as soothing to the nerves as cw sent at a smooth rhythm by a good fist. I've been hearing a character that I don't understand but has me troubled. I listened to one station for five minutes. The rhythm was perfect, character spacing was good, but he was sending ---- ---- for CQ. After a while I decided that he was sending the letter "C" forward then backward, maybe to let people know that he knows the code both ways. Seriously, I think everyone should record at least one of his/her own cw QSOs each month and try to copy it. Some of us would be shocked at what we hear. — *Scott McDowell, N5SM, Amarillo, TX*

THANK YOU SARA

☐ Thank you is an often-used term in our language today and frequently seems inadequate at a time like this. Nevertheless, "Thank you SARA" (Schuylkill Amateur Radio Association). During the severe snowstorm of February 6-7, 1978, a school bus carrying 21 handicapped children from Pottsville to Shenandoah was unable to complete its run and was stranded in St. Clair. Our concerns for their safety were lessened when we knew you were available with four-wheel-drive vehicles, snowmobiles, radio communication, road condition reports, etc. — *Charles Wernert, Director, Schuylkill Intermediate Unit No 29, Pottsville, PA*

2X QSL AFTER 22 YEARS

☐ The term SWL is not new to amateur radio but concerned with the day-to-day activities of our hobby. We too often forget our responsibility to the short wave listener. The example we set in both attitude and operating procedure may provide inspiration or discouragement to him or her. My own experience serves as an example. As a 13-year-old SWL in 1955 I wrote to W1HSC who promptly responded with a QSL which became a prized possession. Even though other obligations and responsibilities took priority, my interest in amateur radio was kept alive by this card. When I received my own ticket in June, 1977, I wrote to Warren to thank him for his QSL, now 22 years old. I wanted to assure him that SWLs do keep and treasure these. Much to my delight Warren was not only still active, but he promptly responded with a QSL of congratulations. Finally and quite unexpectedly in November of 1977 I heard him in a QSO. A schedule was set up on 75 meters and, almost 23 years later, Warren and I had a most memorable contact and *exchanged* QSLs. While I'm sure this story is not unique, those three QSLs prominently displayed in my shack are a constant reminder of the effect that the ham/SWL relationship can have on the future of amateur radio. — *Jon Walzer, WB1DQP, Newtown, CT*

GIVE IT UP — GONE FOR GOOD?

☐ The FCC in a recent move has eliminated the licensing of secondary-station call signs. While I know this has left many amateurs bitter, I am writing this to express the positive side of the matter. It was fun to play old-timer for a while. The fun I had working all states with a two-letter call won't be forgotten. But I'm not going to give up my first-held call sign even though the FCC has given me until the end of my license term to change. Many hours of soul searching have brought good and bad points to mind. I would have been better off had I never applied for a two-letter call, then I wouldn't have this dilemma. When I opened up a small envelope in 1967 and found that I was WN9VLR a thrill enveloped me that has never left. In 25 years will I regret the decision I'm making now? It's difficult to say, but consider the seniority a WA or WB call may have when everybody is either a two-letter call, WX, or ZZ? I feel there is no substitute for time seasoned experience and if I want someone to think I've been a ham for 50 years, in 50 years, they will. My voice, the attitudes and experiences I express *and* my WA call will surely spot me in a crowd. Remember the FCC stated that call-sign requests are also eliminated with this rulemaking so, once you give it up, likely it's gone for good. — *Vern Weiss II, WA9VLK/W9BV, Kankakee, IL*

How's DX?

Conducted By Bill Lowry,* W1VV

When and Where to Operate

The March column discussed whether listening or calling CQ is the best way to work DX. But no matter what course of action you follow, results will generally be better if you pick the right time and frequency.

Propagation

This is fundamental. If a band is not open, calling or listening for DX is obviously futile. Of course, for casual operating, you can listen on a band to see if it is open, but that is not infallible. Depending on the time of day, the band may be open, but temporary lack of activity may falsely indicate the band is closed to DX. More serious operators want something better than that hit or miss approach. Fortunately, there are a variety of aids available to help you plan your operating time for maximum benefit.

The propagation charts on the next two pages show expected conditions for the month. A brief how-to summary is included with each issue, and full explanations have been given in previous issues of *QST* (Sumner, January, 1977 and Sartori, September, 1977). These should be augmented by listening to the hourly propagation reports at 18 minutes after the hour on WWV (currently transmitting on 2.5, 5, 10 and 15 MHz). To interpret those broadcasts, remember that the higher the solar flux and the lower the K index numbers, the better that conditions will generally be. During the last sunspot cycle bottom, the solar flux dropped into the 60s on occasion, but is frequently well above 100 now and even peaked at 189 in February. Any K index number greater than four is usually not good, as it indicates a deterioration in ionospheric conditions and propagation. Details about how to update the *QST* charts by using numbers from the WWV broadcasts are found in Howard Sartori's article. Ed Tilton's three-part article, "The DXer's Crystal Ball," also contains a wealth of information (June, August and September 1975 *QST*). *The ARRL Antenna Book* and *The Radio Amateur's Handbook* describe propagation in general.

The daily bulletins transmitted by W1AW also contain a brief summary of propagation conditions which is updated every few days. See the "Operating News" section for scheduled transmissions of bulletins. Some of the DX newsletters also contain brief, short-run forecasts.

It's useful to remember that the most efficient transmissions of rf energy occur at frequencies just below the maximum usable frequency (muf), as the reflecting ability of the ionosphere is usually best at that point. In addition, while the muf may be high during the daylight hours, absorption then greatly reduces or eliminates the lower frequencies for DXing. Nevertheless, results can be surprising, and 40 and 80 may close later in the morning and open earlier in the afternoon than you might expect. For example, last November on 40 meters, Europeans were worked from my East Coast station at 0700 EST, which was high noon in Europe. (The antenna system was a pair of phased verticals.)

Short Path or Long?

Knowledge of which path to use — the short or the long one — is sometimes essential for those with directional antennas. While signals may sometimes come through on both paths at the same time, one path is usually much better than the other, and may well be the only path open at that time. For example, from the Northeast late in the afternoon, a good long-path opening to Australia frequently has existed on 20 meters, while earlier in the day the short path has usually been better.

With propagation, however, the unexpected can always occur. The short- and long-path openings are not always reliable, and may even reverse themselves: The long path may open instead of the short, and vice versa. At other times the short path may typically prevail, but on occasion a long path may suddenly appear at an unexpected time and repeat itself for several days. Early last December, for example, a good long path existed between Saipan and the East Coast for several days around 1600 EST. Such openings are often unexpected, and you must be on the air, and alert, to catch them. As the timing of short- and long-path openings will depend on your particular location, your knowledge of them must be developed through listening, experimentation and discussions with other DXers in your area.

It is also highly useful to know when propagation conditions will peak to a given part of the world. The time depends on the frequency you plan to use, but even a given frequency may have several peaks. Again, the charts on the next two pages are invaluable for determining when conditions will be optimum.

Scattering

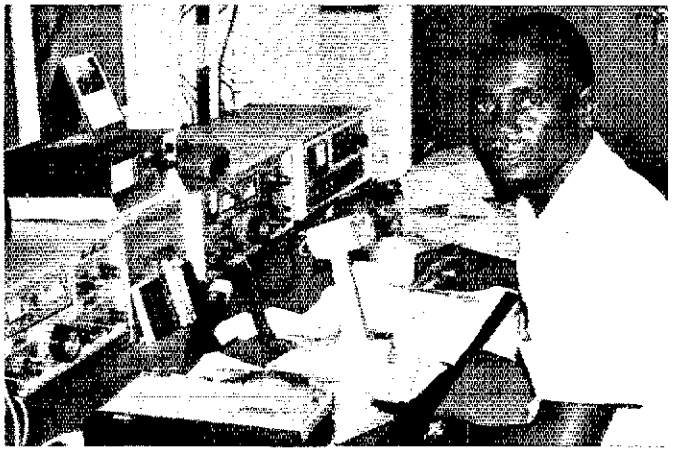
The existence of different types of scatter propagation often makes it possible to work stations on other than great-circle paths. On 10 meters, for example, two stations in the U.S. may not be able to work each other with conventional beam headings, yet if both stations point their antennas at some common point, they can communicate by back scater. In this manner an East Coast and Midwest station can work each other by aiming their antennas in the general direction of Texas. Scattering is further described in *The ARRL Antenna Book*, pages 21 and 22.

Other irregular paths can exist. On 10 meters, from the East Coast to Europe, a beam heading of 90° sometimes produces better results than the great-circle beam heading of

*c/o ARRL, 225 Main St., Newington, CT 06111

Preparing to toast the February 4th opening of 4U1UN at the United Nations Building in New York are, left to right standing, Walter Strysko, W2ZUB; Gerard Doherty, W2UYX, station manager; Mrs. De Henseler; Vincent Sullivan, K2FC, vice president; and kneeling, Max De Henseler, HB9RS/W2, president; and Larry Kettlewell, W3HHG.

Bill Providence, VP2SQ, shown in his shack that overlooks the Caribbean on three sides, was recently visited by WAØLVM.



30° to 45°. On 40 meters, Japan can be worked from the Northeast with a beam heading of about 245°. And so it goes. Knowledge about the unusual DX paths from your location is gained the same way as in the case of long and short paths.

THE DX SCENE

A35DE is operated by Don Greer, WA7JOV, now working in Tonga. He advises the local radio club, soon to be on the air as A35KT. Other active calls there are A35s CR, DE, DG, HU and WL. Guest operator licenses are also issued to visiting yachtsmen, who sometimes continue using them illegally after they leave Tonga. See "QSL Corner."

AC3PT QSL was just received by K4BBF for a QSO of December, 1970. Keep hoping!

CT2BS logs have not been received yet by QSL manager K1NG.

DA4CC was used by DA1BD in the recent WPX contest. QSLs for contest QSOs only go via W8IMZ.

DL1PM/3A is delayed with his QSLing, but will eventually confirm all contacts. (W4AX)

DT prefix will be used by 250 DM operators from February through October, to mark the 25th anniversary of the DM Radioklub.

DX Information Net is operated by the Canadian DX Association on 14.173 MHz at 1900 UTC every Sunday. Net controls are VE3BHV and VE3FSA. They will listen on 14.205 MHz for U.S. stations. This net is for exchanging information, NOT for working DX stations. It won't meet during DX contest weekends. *(Long Skip)*

EL1F, who served as a missionary in Buchanan, has now returned to the U.S. (WD9BGS)

FB8ZM will be on Amsterdam Island for some months. QSL via F6BCN. *(Veron DXpress)*

FMØCOO. VE7DGO states he is not the QSL manager, and will not retain any cards received beyond early summer.

FW8AC should be on for about three years. Gil (ex-TR8GB) is sometimes found around 14.120 MHz from 0900 UTC, using both cw and ssb. *(Long Skip)*

HV3SJ was operated during the last CQ WW Phone Contest by W3US, who is QSLing 100 percent via the HV bureau. (W3UO)

J28AY is active from Djibouti on 80 through 10 meters. QSL via REF. *(DXpress)*

JA QSLs going via JARL should now be sent to the address in "QSL Corner." Other correspondence still goes to JARL, CPO Box 377, Tokyo. (JARL)

KØAX/DU2 will operate mostly on cw near 14.007 MHz around 1200 UTC during his one-year stay in the Philippines. QSL via W4FLA. (LIDXA)

KC4, Navassa Island DXpedition is definite for early fall. Presently indicated crew of K2KA, W2PAU, W6OIG, NØTG, NØWL, WØRJU, WØZH and WBØRSL plan a very big effort. Write to NØTG (ex-WØTGB) for details. (NØTG)

KV4AA still provides a steady stream of QSOs from St. Thomas, averaging about 100 per day!

KX6DC and KX6EB QSOs for 1971 and 1972 are still being confirmed by operator W3KVQ (W2KV). Also QSL manager for 9N1MM for 18 years, Ed will move permanently to Arizona later this year as N7EB.

LA on 160. Special permission was given to Norwegian hams to operate on 160 last February 11-12. It probably won't be given again until after WARC-79. (LA5HE)

P5A-P5Z probably won't be heard for some time, but that is the prefix block assigned to North Korea by the ITU.

Pacific DX Net meets Tuesdays, Fridays, Saturdays and Sundays on 14.265 MHz at 0600 UTC. Rare DX frequently checks in. (LIDXA)

Prefixes. DX News-Sheet offers a handy booklet containing much information about prefixes, countries and zones. Send one dollar or 5 IRCs to 62 Belmore Road, Norwich, NR7 ØPU, England.

SVØEAA. W1PL reports he is not QSL manager and has no knowledge of this station.

TF/OY VHF and HF DXpedition is now scheduled by G4DXC, GM3OLK, GM3YOR and GM8NCM for July and August. In addition to the usual bands, 2 meters and 70 cm will be used. Meteor-scatter propagation on 2 meters will be tried from TF during the Aquarids and Perseids showers, and they are seeking skeds with East Coast stations (for 2 meters only). Write to Alistair Simpson, GM8NCM, 58 Cheviot Road, Kirkcaldy, Fife KY2 6BB, Scotland, stating location and preferred times and mode. If cw, state highest speed. (GM8NCM)

TL8LU. WA2AIV reports he is not QSL manager.

UKØKAC has UA6JAD, Vlad, as QSL manager for this club station on Cape Schmidt, Zone 19. He has all logs beginning with January 1977. (VE4SL)

VE1, Sable Island. 1967 QSOs with Rick Burke, VE1ASE, may be confirmed via VO2CW. See QSL Corner. *(Long Skip)*

VK9, Cocos Keeling, may be activated by P29JS during part of May and June. (LIDXA)

VK9, Mellish Reef, may be put on the air in early July by D. H. Mead, VK2BJL. Other participants for the trip are sought.

VK9ZM is reported back on Willis Island by *DX News-Sheet.*

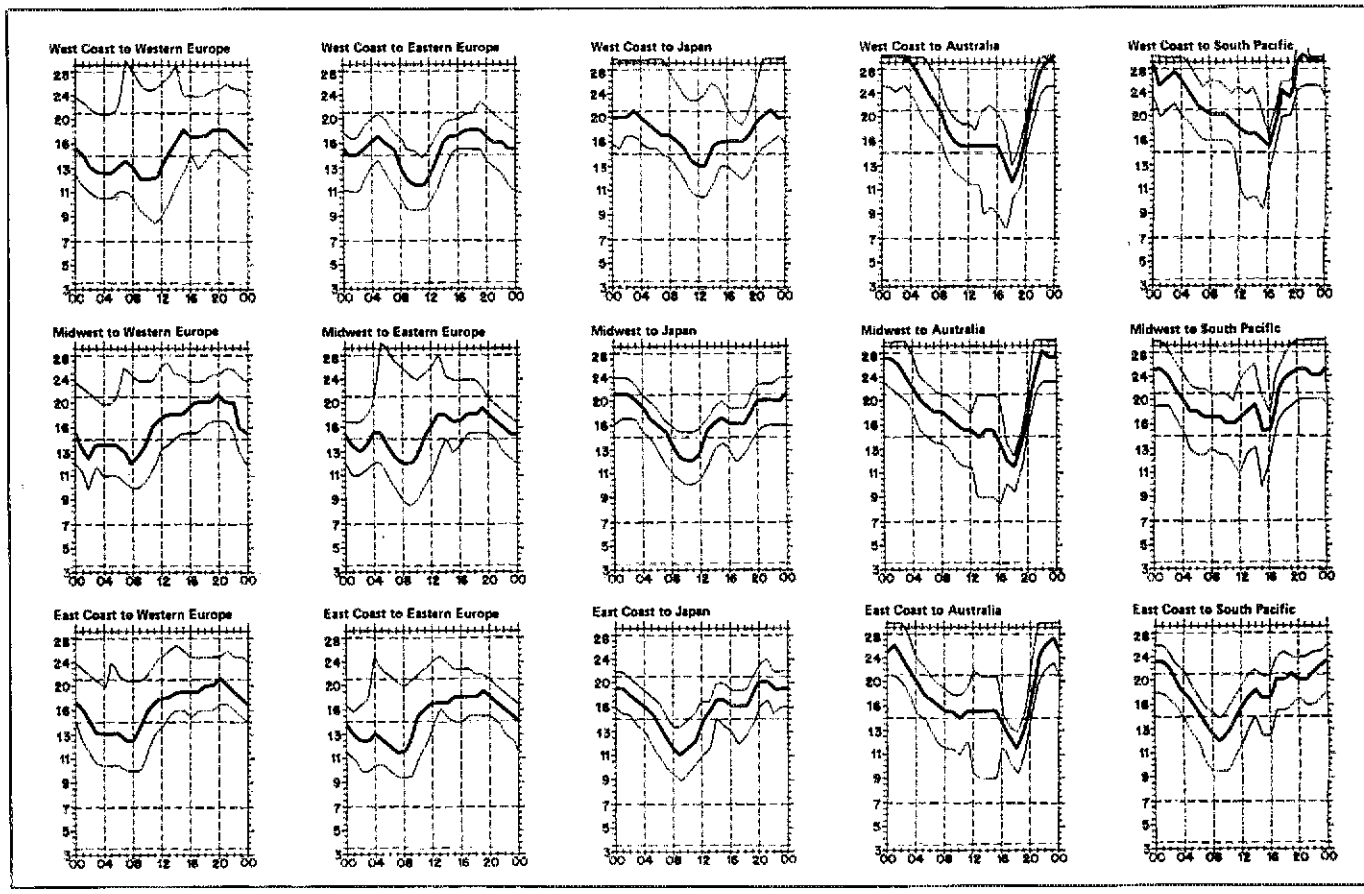
VP2SQ continues providing action and QSLs (via W2MIG) from St. Vincent.

VP5 licensing procedures have been tightened. Licenses are now issued to match the calendar year and must be renewed annually. Applicants must show either proof of licensing in another country, or proficiency in code and theory. Apply to Mrs. Woodstock, Acting Attorney General Legal Office, Grand Turk.

WB8VLG/DU2, active from the Philippines on 15 through 80, uses a linear and inverted V antenna, says QSL manager W7IZH.

WD9FCC/VQ9, with the U.S. Navy on Chagos, frequently checks into the Africana Net on 21.355 MHz around 1700 UTC, reports QSL manager K9GM.

ZD9GG will be on the air until this November. Ian presently operates on Mondays, Thursdays and



When are the bands open? These charts predict this month's average propagation conditions for high-frequency circuits between the U.S. and various overseas points. One chart for East Coast to West Coast is also included. On 10 percent of the days of the month, the highest frequency propagated will be at least as high as the uppermost curve (highest possible frequency, or hpf). On 50 percent of the days of the month, it will be at least as high as the middle curve (maximum usable frequency, or muf). On 90 percent of the days of the month, it will be at least as high as the

Fridays around 14.245 MHz from 2015 UTC with W3DJZ as control, and daily near 21.320 at 1630 UTC and on 3.789 at 2200 UTC. He will give you a cw contact on request. QSL via ZS1Z. (LIDXA)

ZF2AH still has many unclaimed QSLs (via WA6VNR) for those who worked him during November and December of 1977.

ZF2AP requests that those still needing QSLs for QSOs of October and November of 1977 send an s.a.s.e. to W4YKH. QSLs sent to the ZF QSL bureau will not be answered.

ZS6DW. Callbook QTH is incorrect. See the QSL Corner. (ZS6DW)

5H3BP plans to be in Tanzania for 18 months. *(DX News-Sheet)*

8Z4 DXpedition is still scheduled for June, according to *DXpress.*

9X5AE does not have W4CFO as QSL manager, reports K2TV.

QSL MANAGER VOLUNTEERS

QSL Manager Volunteers are WA4CIF, WB4NQG and WB7PSP.

QSL INFORMATION NEEDED

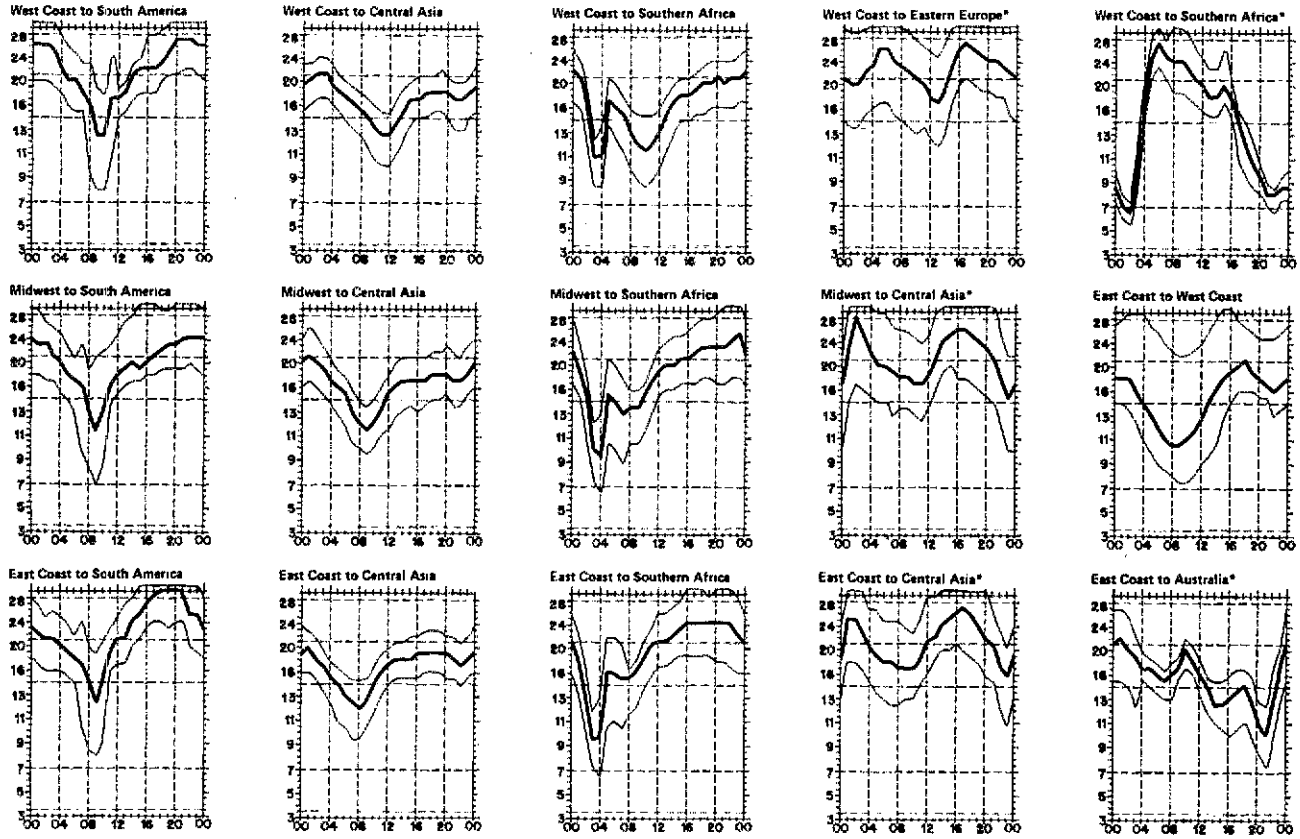
If you know the QSL route for any of the following stations, please write directly to the ham who needs the help: YB4AKK (1976) and ZB2WPX (1974) needed by WB8WHS — FR7AN/G, HI8SAV, HI8VCC/7, HR2AFK, HS4AGN, KZ5AT, TI2HP, VK9RA, VK9RY, VP2SBH, XE1KB, YS1AG, YS1FEA, YS1WAP, ZB2BL, ZB2BX, 3A2AM, 3A2FF, 9G1DY, 9U5HI and 9Y4JC needed by SM5CAK.

In addition: VK3BCJ/P2 needed by W8EY — CR6LV, EL2BD and GC3UJE (early 1969) needed by W5UXE/3 — LZ1ØJF needed by W5IUW — I1DFS, VP2MT, VP4AT and VP4MT needed by WA4CIF — VS6DV and XZ2TH (9/58) and 5U7BA (1/76) needed by W8ZPX.

QSL Corner

Administered by R. L. White, W1CW

Lying peacefully, waiting to be forwarded to their rightful destination, 50,000 QSLs await packaging and a ride via the U. S. Mail to the incoming domestic bureaus. The stacks of cards represent about a month's worth of DX QSLs that are sent to the ARRL Overseas QSL Service office.



lowest curve (optimum traffic frequency, or fot). See January 1977 *QST*, page 58, and September 1977 *QST*, page 35, for a complete explanation. The horizontal axis shows Universal Coordinated Time (UTC); the vertical axis, frequency in MHz. Asterisk indicates long-path circuits. Data are provided by the Institute for Telecommunication Sciences, Boulder, CO. These predictions for May, 1978, assume a sunspot number of 77, which corresponds to a 2800-MHz solar flux of 125.

The picture with this column serves two purposes: It will provide a look at the "new" (it is several months old by now) ARRL Overseas QSL Service office and, for those of you who have no occasion to see relatively large amounts of QSL cards, to show you what 50,000 look like. Actually, the cards shown were not sent for forwarding to DX stations but came in from DX stations. While the "normal" situation does not call for Headquarters receiving the "incoming" QSLs, we do receive some cards destined for the domestic QSL bureaus. These are sent along to the appropriate bureaus.

This set of 50,000 cards is a monthly mailing to the domestic bureaus of cards received at Hq. We calculate that the cards forwarded from Hq. are less than 10 percent of the cards the bureaus receive. Are you helping the QSL bureaus to help you by keeping envelopes on file? You will find the addresses for the domestic QSL bureaus in *QST* every other month. If you haven't sent your envelopes to the bureau, why not do it right now?

Here is some QSL information for the eager ones. We do hope it will be of help. However, it is passed along as we receive it and, therefore, may not be accurate.

A2CSD, Box 70, Orapa, Botswana
CX5RV, Box 37, Montevideo, Uruguay
EL5F, c/o TILL, Box 513, Monrovia, Liberia
EP2EC, Box 14/1652, Tehran, Iran
GU3HFN, Box 100, Guernsey, Channel Islands, Great Britain
HL9VG, Leroy Stenzel, USFK, AC of S J6, APO SF, CA 96301
LU1BR, Luis Alberto Gomez, San Martin 1139-4° P.H., Buenos Aires, 1004, Capital, Argentina
P28AO, Box 1465, Djibouti, Djibouti
TI3JGL, Box 12, Turrialba, Costa Rica
TU2HO, Box 23, Oume, Ivory Coast
VP2LDE, Richard Wagner, 1015 Haber Dr. Brentwood, TN 37027
W4QBA/DU2, Col. E. J. Driscoll, Jr., USMC, Marine Barracks, Box 56, FPO SF, CA 96651
WB6MID/8R3, Box 893, Georgetown, Guyana
ZS6DW, W. F. Meyer, P. O. Bryanston 2021, South Africa
4U1UN, UN Staff Recreation Room, ARC, United Nations Box 20, New York NY 10017
5Z4QD, 6445 Willow Road, Evansville, IN 47714
9K2EX, Hans R. Loow, Sturevagen 48A/1, S-19176 Sollentuna, Sweden

A35DE (WA7JOV)
A6XB (K1DRN)
C5AAF (WB4ZNH)
DA1BD (W8IMZ)
DA4CC (W8IMZ)
EP2LI (1978 WA4PYF)
FM7AV (W1JFL)
GU3CIA (N6MA)
HH5HR (K4UTE)
HM2JN (JA1HBC)
IS0LYN (WB6TZQ)
J3AAG (K1DBA)
KG4BZ (W1GHH)
KH6JFI/Kure (WA6PYN)
N4JI/HC1 (WA4QMQ)
N4ZC/Kure (K4MQG)
N4ZC/KM6 (K4MQG)
PJ9XX (W1XX)
TI2AJF (WD4LAW)
UV0EX (W7PHO)
VE1ASE (1967, VO2CW)
VE3EEW/ZK1 (VE3EEW)
VP2LEU (K6SVL)
VP2MT (WB8LDH)
VP2SQ (W2MIG)
VP5BER (W8IMZ)
VP8PU (WA4JQS)
W4OMW/HC1 (W4OMW)
W4OMW/HC4 (W4OMW)
WB8VLG/DU2 (W7IZH)
WB9AJF/6Y5 (WD4LAW)
YB0ADI (WA2DWE)
YS1RVE (WA0JYJ)
ZD7BW (G3PEU)
ZD8HR (February, 1978, N6HR)
ZF2AH (WA6VNR)
ZS2MI (WA4SSM)
3D2RM (WB5MXO)
4Z4NUT (WA1YAU)
5U7AG (K1VSK)

NEW ADDRESSES

We would like to call particular attention to two QSL Bureau addresses that have changed. Since the JARL P. O. box number is being inundated, mail for the JARL QSL Bureau should be sent to 14-2 Sugamo 1-Chome, Toshima-Ku, Tokyo 170, Japan. When G2MI retired from running the RSGB's QSL Bureau, the address changed since it was G2MI's personal address. He continues to get large amounts of QSL bureau material, however. Please note that the correct address for the RSGB QSL Bureau is now E. G. Allen, G3DRN, 30 Bodnant Gardens, London, SW20 0UD, England.

And for the help we do say TNX to Ks 1DRN 1VSK 2TV 5MM, WAs 1YAU 4JQS 6VNR 0JYJ, WDs 4LAW 9GHS, Ws 1XX 3UO 4OMW 4QBA 6UQF 7HPI 7IZH 7LLM 7PHO 8IMZ 9ZS, and A35DE, CX7BBB, EP2LI, HB9RS/W2, SM0BYD. Do you have a QSL QTH that might be of help to someone else?

DX Century Club Awards

Administered By Don Search, W3AZD

The ARRL DXCC is awarded to amateurs who submit written confirmation for contacts with 100 or more countries on the official ARRL DXCC List. You may also submit cards to endorse your award in 20-country increments through 240, 10-country increments through 300, and in 5-country increments above 300. The totals shown below are exact credits given to DXCC members from February 1 through February 28, 1978. An s.a.s.e. will bring you the full rules for participation in the DXCC, the DXCC list and application forms.

New Members

Mixed

F9IE/319
JA3KM/309
K4SM/276
F6BWJ/251
LU2AFH/248
YS1RRD/248
F6ACV/245
K6UD/235
KL7HCN/225
PY5WD/204
WD8BJK/198
YU1NGO/195
YU4VTU/163
SV1IO/152
W2IQB/152
JA3DAY/147
VE7XL/147
K8AC/140
WB0CWE/139
K1GFH/132
N6ML/131
W5SNU/131
K4CGV/127
JA9CKA/126
G5BEF/123
N1CC/123
N4OH/123
W4OJP/121
JA9YE/120
WA6JUD/119
K3MD/117
GY5MP/117
W4NQI/116
4X4GD/115
DK6BW/114
W5HPV/113
WA6TKT/113
JA1AJA/110
K0YST/110
WA2MEQ/110
WA4BEC/110
F6DZO/109
JA9CZY/108
WB4EBX/108
W0YR/108
K7JRE/107
WB4AKY/107
JA7WMO/1/106
N2UT/106
DE6YHG/106
JA3OCD/105
K5GL/105
WN3OZR/105
W4FHG/105
WA6EGL/VQ9/105
WB6GFM/105
K0LST/104
SM0GMZ/104
WA2IZN/104
WB9YXY/104
SM6BUV/103
W2EEQ/103
K5VV/102
W2FTY/102
W7ZR/102
W9ISF/102
DK5AD/W3/10
WB2OSQ/101
WB4FMJ/101
WB8SDC/101
K2BXG/100
N4ZS/100
WB9VIO/100

Radiotelephone

JA3KM/277
K4SM/275
YS1RRD/247
I0CEP/157
W9TDQ/156
DL8QS/150
SV1IO/150
I8YGZ/135
W2IQB/124
GY5MP/117
W8PCX/115
K1GFH/112
W0TT/111
JH4IFF/110
K9VKJ/110
N9BA/110
OZ9JV/110
HI8XGF/109
W0OKG/109
SM7BBV/108
DK8ON/107
W3KHQ/107
W4OJP/107
PA0KB/106
DL7OG/105
VE6AKG/105
W4FGH/105
WA8ZDL/105
K4GAI/104
VU2AIK/104
WB8GWB/104
W6DFU/103
K0VIY/102
W5FL/102
WA4BEC/102
W7ZR/102
HS1BG/101
K1VII/101
N6ML/101
EP2RL/100
WA2JOC/100
W5VVD/100
WA5VWP/100
WB9OBX/100

CW

I1GXR/170
K7ZR/160
W4JFE/160
W0OQK/119
PY5WD/118
DL3CW/116
N8MC/110
I1SBU/108
JA2TK/103
K9QVB/103
W3ODJ/103
W8DA/102
K9KA/101
AC3TVB/100
HB9ALO/100
K5GO/100

5BDXCC

LU2AFH
K9RL
K9ECE
W6OKK
W6HX
W0OQK

Endorsements

Mixed

W1JR/352
W1JNV/351
ZS6LW/342
VE2WA/337
W6QNA/335
W9LT/330
W2MZV/325
K1DRN/323
YV5AE/320
W4OEL/316
W6YHT/316
W2LW/315
W9RX/314
W0MYN/311
W8AD/310
WA4DRU/309
PY5ATL/308
W9SS/305
JA1CRR/302
W1NG/301
W6VBI/300
W8IBX/300
W0CE/300
K4SB/299
W1UN/298
K5OA/292
W2REH/290
N4KE/285
SP9AI/278
W6SC/277
SM7BBV/276
W1QV/273
WB8OFG/272
WB2VFT/270
N4GG/270
K5KLA/270
W9VA/270
W0RV/269
YU3ZV/266
WB2RBG/265
VE3II/261
W4CZU/261
W7JUO/260
WA5EZQ/260
OH3TH/252
W4LVM/252
W1VV/251
HI8LC/250
YU3DQ/244
WB4SJG/242
YU3CM/242
N4WX/241
HB9T/240
K9HQM/240
K0BJ/240
W2DPL/240
K9GN/239
N4GE/239
W7CE/238
PY4AKR/236
W9EQP/232
W1YN/230
W8GE/229
SM7BIP/225
G3DOG/223
I8RFD/220
KP4AM/220
W5CPI/220
YU1ELM/218
K1NWE/215
W4OHZ/210
HB9AZO/209
K4YOE/206
WA2GEZ/204
W3GK/203
WA3JZR/203
SM0FKD/202
K9TUS/201
W2NJ/201
JA5PUL/200
W3KH/199
WA9CYV/199
K7EQM/182
K9QVB/182
WB9SEJ/182
K2OPJ/180
K4JNM/180
K4TWJ/180
K0LUZ/180
ZL3BK/180
OE2JZ/175
W6OMM/175
K4KBL/169
ZS6BOK/169
W1VH/165
KL7AF/162
N6OZ/160
WA2JOC/160
N0SS/159
W2GND/157
W5FL/145
WD8EOJ/141
WA0LKL/141
N0RF/140
W4RW/140
W6IA/140
WA7OMX/140
W0KC/140
OK3IF/133
WA4WYN/128
K1SF/123
W6DAC/123
W7FOF/123
W0TT/123
KH6CPW/122
N4GJ/122
WB9JOV/122
K4JEZ/120
VE2BLW/120
VE6KY/120
WB4WSB/120
W7YS/120
WB9BAH/120
W2KI/119
WB8GWB/119

Radiotelephone

ZS6LW/341
PY4KL/331
W8GMF/325
K1DRN/323
W5KE/319
F9IE/316
W1GKK/314
W0MYN/311
W4BAA/310
W1JNV/307
WA4GUZ/306
W9SS/305
W9RX/302
OA4BS/299
WA4DRU/295
W9LT/295
K4SB/294
WA4WTG/290
W6NTX/289
K4LSP/288
K5OA/284
W2EV/278
CX9CO/273
JA8BAR/269
WB8CGC/269
VE3II/259
W2FCR/254
DK3VD/253
WA5EZQ/253
EA3OJ/251
W8TWA/250
K2UFM/240
WA9UGI/240
K9HQM/233
K6UD/230
W1NG/229
JA4DLP/221
I8ACB/220
K5GZ/220
KP4AM/220
W1JR/204
W4LVM/202
K6KII/200
N4GG/199
WD8BJK/196
I8YZP/187
WA9CYV/183
WA1PEL/180
W2MPI/180
G3DOG/170
WA4JDI/168
K9GN/163
DF4FX/161
W8CY/161
K8VIR/160
PP8DD/160
W4UW/160
ZL3BK/160
I3ABI/157
W9NSM/152
OZ2YE/146
JH1WKW/142
DL9XW/141
K3RO/141
W8CBA/141
WA4QMQ/140
W5CPI/140
WA0QIT/140
WB5UKI/138
AA4CK/132
WB8RMD/130
K1SF/123
K8CYJ/122
KH6ILF/119

CW

K9GN/222
F3AT/219
WA4FDR/210
W1JR/200
N4WX/200
DL1HH/192
JA3CHO/183
K8DYZ/183
W0BW/181
W1NG/178
W1YN/172
W6BS/161
K9QXY/151
K4SB/148
OH2BN/143
W6RGQ/141
EA2OP/140
K6KII/140
WA2JOC/127
W9DH/121
VE3BX/120

Corrections

December Listing Mixed: K9PNY/DU2 should be K9PNT/DU2/108.
Honor Roll Mixed: W2AX should be listed as 350/316.

Canadian NewsFronts

Conducted By Ron Hesler,* VE1SH

Further Losses Proposed in Canadian Second Draft WARC Paper

DOC has released its second draft proposals for the World Administrative Radio Conference in 1979. Major changes reflected from the first draft proposals (June 1977 *QST*, page 64) are 1800-1900 kHz only exclusive amateur (loss of 100 kHz), 10,100-10,300 kHz exclusive amateur (loss of 100 kHz), deletion of the first-draft proposed new 18.3- to 18.65-MHz amateur band, a new band (as proposed by CRRL) at 902-928 MHz, and the addition of amateur satellite on all frequencies requested by CRRL. All other hf frequencies as proposed in the first draft and as existing at present remain unchanged.

As this report is being written, a meeting of all services is being planned for early April in Ottawa to discuss these new proposals. CRRL will be represented by Director Hesler, Vice President Eaton and Counsel Benson.

The CRRL will make the following formal presentation in respect to these new proposals: request 1900-2000 kHz even if on a shared and/or secondary basis; strong objection to the proposed deletion (again) of 3.8-4.0 MHz; basic agreement on 6900-7100 kHz *provided this portion will be exclusive amateur*; request 100 kHz be added at 10 MHz; repeat our previously requested extension at 20 meters; request reconsideration for reinstatement of the new 18-MHz band as proposed in the first draft; and strong objection to the deletion of 420-430 MHz.

Inasmuch as there have not been any changes proposed to our other hf frequencies (15, 10, 6 meters, and so on) we shall express approval of no intended changes. We shall also present strong argument in support of Article 41 of the ITU Regulations *as presently written* (requiring cw proficiency in order to be licensed for hf operation below 144 MHz) . . . . The second draft proposals include an amendment to delete this requirement! A full report of the April meeting will be carried on this page next month.

EXPERIMENTER LICENSE PROPOSALS

On March 1, DOC issued its formal *Canada Gazette* proposals for the new code-free Experimenter license. There were several serious surprises in this proposal which were unknown or at variance with the discussions on this license class at the recent CARF Symposium. Frequencies proposed for the Experimenter class are

144-148 MHz	420-450 MHz
220-225 MHz	1215-1300 MHz

Of extremely serious consequence are the proposals to permit Experimenters (only) pulse-modulation emission (P0, P1, P5 and P9) from 144.1-148.0 MHz and the deletion of *all* presently authorized emissions at 220-225 MHz, other than that of "packet radio." Packet radio refers to a communication technique through which packets of data are broadcast over a communications channel which is shared by a number of users.

In the first instance, permission to use pulse emissions over practically the entire 2-meter band could seriously interfere and otherwise jeopardize present amateur repeater operations on both sides of the border. In addition, of course, present OSCAR operating frequencies could be seriously affected. Also, Canada's projected repeater growth into the 220- to 225-MHz band would be effectively precluded, not to mention the resultant interference to present U.S. repeaters, especially at border points. Altogether it is a most startling and damaging move on the part of our Department of Communications and one which, we feel, must be effectively countered with every means at our disposal. June 1, 1978, is the deadline for comment, and we urge *all* amateurs and *all* amateur organizations to make their comment known to the Department *prior to that date.* CRRL will file formal protest against (a) permitting Experimenter use of the 2-meter band; (b) the authorization of pulse transmissions if, notwithstanding our position above, Experimenters are permitted use of these frequencies; (c) deletion of present authorized emissions on 220-225 MHz; (d) deletion of A5 emissions for Amateur-grade license holders on 2 meters.

Jim Goodman, VE3FZG, president of the energetic Oakville Amateur Radio Club, manning amateur station VE3HB, at the annual Olympics for the mentally retarded. The Oakville club and Oakville REACT provided communications for the event. A base station and 10 portables were used to handle an assortment of activities ranging from traffic control to dispatching ambulances and other vehicles to aid the injured and elderly.

POTPOURRI

☐In late February, DOC announced that it is moving to set technical standards for home TV games. It also wishes to warn consumers that following a U.S. decision not to license new 23-channel sets, there is a possibility that some General Radio Service (or CB) equipment no longer licensable in the U.S. may find its way to the shelves of Canadian retailers. This equipment is not licensable in Canada either.

☐The Canadian DX Association has created a DX Information Net on 14,173 kHz at 1900Z every Sunday. It is also planned to listen on 14,205 kHz for interested U.S. DXers. The net will not be operational during DX contest weekends.

☐The prefix CG has been authorized for all Canadian amateurs, in commemoration of the Commonwealth Games, until August 31. Also, in recognition of the CNIB 60th anniversary, all White Cane operators may use the prefix VB until the end of the year.

☐New CRRL officials are George Spencer, VE4IM, assistant director for Manitoba; and Herb Tripp, VE7ZK, assistant director for British Columbia. Additionally, Wally Mansz, VE7HQ, has assumed the responsibilities for administration of the Canadian IARU Intruder Watch. Will all Canadian IWers please send all future communications to him at 6520 Maple Road, Richmond, BC.

☐Our hard-working assistant director/SCM, Noreen Nimmons, VE3GOL, has requested to be relieved of many of her responsibilities due to commitments on the home front. She will continue in both of these responsibilities, but with reduced activity. Assistant Director Gord Steane, VE3BMG, will assume the balance.

☐The Division Certificate of Merit has been presented to Mike Goldstein, VE3GFN, for his exemplary work in the ARES, traffic and PR fields.

☐The CRRL Gold Medallion for the 17th Annual W/W RTTY DX CARTG DECADE Sweepstakes has been awarded to VE5RG. The 1978 contest will be the weekend of October 21 and full details are available from CARTG, 85 Fifeshire Road, Willowdale, ON M2L 2G9.

☐The 10th Annual RSO Convention, the largest annual ham event in Canada, will take place in London, ON, October 13-15 and is being hosted by the London Amateur Radio Club.

☐Wilf Antheunis, VE3FEA, is the new public relations assistant for the Toronto area.

*Director, Canadian Division

Coming Conventions

May 5-7
Delta Division, Baton Rouge, LA

May 13-14
Alabama State, Birmingham, AL

May 19-21
New York State, Rochester, NY

May 20
Wisconsin State, Lake Delton, WI

May 27-28
Tennessee State, Knoxville, TN

May 27-28
Virginia State, Roanoke, VA

June 3-4
Georgia State, Atlanta, GA

July 1-2
West Virginia State, Jackson's Mill, WV

August 12-13
Pacific Division, Reno, NV

August 18-19
Saskatchewan Prov., Regina, SK

August 26-27
Alaska State, Anchorage, AK

September 1-3
West Gulf Division, El Paso, TX

September 10
Illinois State, Rockford, IL

September 22-24
ARRL National, San Diego, CA

October 13-15
Midwest Division, Kansas City, MO

October 14-15
New England Division, Boxboro, MA

November 11-12
Hudson Division, McAfee, NJ

November 25-26*
South Florida Section, Clearwater, FL

***Date Change**

NEW YORK STATE CONVENTION

May 19-21, 1978, Rochester, NY

The New York State ARRL Convention/45th annual Rochester Hamfest will be held the weekend of May 19-21 at the Monroe County Fairgrounds near Rochester, NY.

Activities begin on Friday at the Rochester Marriott Inn (hotel headquarters) where an evening Funfest begins at 7 P.M. Entertainment will be provided. Club groups, manufacturers, distributors and publishers will have open-house suites on Friday evening at the hotel.

The huge flea market at the fairgrounds will begin on Friday afternoon and run continuously through Sunday afternoon. The outdoor event will depend on weather, light and shoppers. Indoor space is available and will be open Saturday from 7 A.M. until 5:30 P.M., then reopen Sunday morning at 9 A.M.

The fairgrounds Dome Center (where commercial exhibits and most programming are located) will open at 8:30 A.M. Saturday. FCC tests for Technician and higher classes will also begin at 8:30 A.M. on Saturday. A completed FCC form 610 should be sent to FCC, 601 Market Street, Philadelphia, PA 19106, to arrive in their office not later than May 12. The form must be marked on item 19 "for examination at Rochester Hamfest." FCC will send confirmations and exam times.

At 7 P.M. activities return to the Marriott, where the annual awards banquet will be held. A New York State "Amateur of the Year" will be named and honored at the banquet. After the banquet, a double-feature movie will be shown. The movie titles are *Laurel and Hardy Erect an Antenna* and *Laurel and Hardy Retrieve a Radio.*

Sunday, events return to the fairgrounds except for the annual New York State Army MARS meeting which will be at the Marriott.

For the ladies on Saturday, buses will operate between the fairgrounds, the Marriott and Eastview Mall where they may shop in Rochester's largest indoor mall. The buses will operate every 45 minutes from each location all day. The highlight of the day will be at the Marriott at 3 P.M. when a Hair Care Workshop will be presented. Members of the audience will participate in the demonstrations. Refreshments and awards will be presented at the workshop.

Advance registration is $3.50; registration at gate, $4. Advance registration closes May 13. Banquet tickets are $8.50. Unlimited outdoor flea-market space is available at $1 per parking space. Indoor flea-market space is $5 per table, per day. A limited number of camper hookups are available free on a first-come, first-served basis. There is no additional charge for the ladies shopping tour or workshop, but a regular registration ticket is required. Children under 12 will be admitted free.

Ticket orders and information requests should go to Rochester Hamfest, Box 1388, Rochester, NY 14603.

WISCONSIN STATE CONVENTION

May 20, 1978, Lake Delton, WI

This event will take place in Lake Delton, WI, near the famous Wisconsin Dells.

Featured will be a swap shop, meetings and forums including WARC-79, club officers, MARS, DX, RTTY, with more on schedule. Meet Central Division Director Don Miller, W9NTP. Ladies activities include cooking with microwave ovens, the art of macrame, and more.

Registration opens at 8 A.M. Transmitter hunt on 146.94-MHz fm. Bearing contest at noon. Liars contest. The evening banquet, with chicken and beef, will be followed by entertainment. The unusual and unpredictable happen at this event! Full registration in advance, $7.95; at door, $8.45, to Ken Ebneter, K9EN, 822 Wauona Trail, Portage, WI 53901. Without dinner, $1.50 advance, $2 at door. Happy hour from 5:30 to 6 P.M., dinner at 6 P.M. Fun for all! For more info, write K9EN, address above.

VIRGINIA STATE CONVENTION

May 27-28, 1978, Roanoke, VA

The 1978 Virginia State ARRL Convention, sponsored by the Roanoke Valley Amateur Radio Club, will be held on May 27-28, at th National Guard Armory in Roanoke. Concur rent with the convention, the RVARC will hol its annual hamfest.

Free parking will be plentiful at the Armor site on Reserve Avenue, S.W., and talk-in fre quencies will be 146.52 and 146.385/985 MHz. Also, motels, restaurants and shopping center are readily accessible to conventioneers, YLs XYLs and harmonics.

FCC exams will be administered at the ar mory on Saturday morning, beginning at A.M. Programs featuring a variety of gues speakers, with subjects of interest to all, wil highlight the festivities.

Registration tickets are $2 per person pe day, or $3.25 per person for both days. Th registration fee does not include the Saturda evening banquet, incidentals or personal enter tainment.

There will be surprises galore for those mak ing the trip to the foothills of the beautiful Blu Ridge Mountains. Make it a family outing i Roanoke this spring. For additional informa tion contact Convention Coordinator Jim McElwain, WD4DVD, at 703-989-4421.

TENNESSEE STATE CONVENTION

May 27-28, 1978, Knoxville, TN

Come on down . . . Tennessee State ARR Convention and Greater Knoxville Hamfes Opens 9 A.M. Saturday and Sunday — *indoo* at the Tennessee National Guard Armory o Sutherland Avenue. One $1 admission does i

See . . . the indoor flea market, dealer sales ARRL booth, movies, forums, prizes, plu bingo.

Hear . . . 2-meter and 3980 talk-in an eyeball QSOs.

Have more fun . . . at the Saturday nig banquet, with good food and an ARR speaker. Each buffet meal costs $7; pleas make and pay for reservations by May 24 wit Jo Melton, WB4NKO, 749 Elkmont Road Knoxville, TN 37922. Banquet festivities are a University Inn, three blocks south of I-40/I-7 on 17th Street at Clinch Avenue.

More info . . . by s.a.s.e. from WA4IR P. O. Box 8585, Knoxville, TN 37916, or ca 615-966-5009 nights.

GEORGIA STATE CONVENTION

June 3-4, 1978, Atlanta, GA

The Atlanta Radio Club, Inc., proudly a nounces the ARRL Georgia State Conventio and 50th annual Atlanta HamFestival to b held on June 3-4 at the downtown Marrio Hotel, corner of Courtland and Internation Boulevard.

This year's convention will be bigger a better than ever. Features include an a conditioned exhibit hall, with over 140 co mercial exhibit booths; covered fl market/swap shop area for hundreds of ca only steps from the exhibit hall; technical se sions covering every interest in amateur radi from Novice to Extra Class, including speci microprocessor forums; special hospitalit entertainment and prizes for ladies a

children; on-site FCC exams; thousands of dollars worth of prizes for registrants; parking for thousands of cars; and more.

Registration fee is $3 per person in advance or $4 at the door. Ladies and children free, when accompanied by a registrant. Doors open at 9 A.M. both days. Flea market/swap shop fee is $3 per space, per day, on a first-come, first-served basis. Special hotel rates are $26 per day, single or double occupancy, with children under 16 free when accompanied by an adult.

If you *have not* registered at the Atlanta HamFestival in the past three years, write Atlanta HamFestival, 100 Woodlawn Drive, Marietta, GA 30067, or call 404-971-HAMS, anytime, day or night, and ask for preregistration material. Preregistration material will be sent in late April to all who have registered in the past three years.

Hotel reservations must be made directly with the hotel at 404-659-6500, and HURRY!

Don't miss "the Best Hamfest in the World."

Hamfest Calendar

Alabama: Birminghamfest '78, hosted by the Birmingham ARC, is in the new, air-conditioned Birmingham-Jefferson Civic Center on May 13 and 14. FCC exams, forums, family activities, exhibitors, covered flea market, prizes and a Saturday night buffet. Write to BARC, W4CUE, P. O. Box 603, Birmingham, AL 35201.

California: The sixth annual Sacramento Valley Amateur Radio Ham Swap is May 20, from 9 to 3, at Carmichael Park in Sacramento's North area. Auction, food and prizes. Talk-in on 3965, 19/79 and 223.18/224.78. Free admission. Sponsored by the North Hills Radio Club, K6IS, 5700 Franklin Blvd., Sacramento, CA 95824.

California: The Lockheed Employees Recreation Club ARC's 13th annual hamfest is May 20 and 21 at the LERC facility in Burbank. More details from LERC ARC, 2814 Empire Ave., Burbank, CA 91504. Tel. 213-842-1863.

***California:** The Turlock ARC hamfest is June 3 at the Turlock War Memorial Auditorium, 247 E. Canal Dr. Contact Claude Owens, WB6MDN, Chairman, 1730 River Rd., Modesto, CA 95351.

***Illinois:** The Starved Rock Radio Club hamfest is June 4 at the Bureau County Fairgrounds in Princeton. Registration $1.50 advance, $2 at the gate. ARRL hq. speaker K1ZZ. Send s.a.s.e. to Starved Rock RC, RFD 1, Box 171, Oglesby, IL 61348. Tel. 815-667-4614.

Indiana: The Midwest Repeater Association's first hamfest is May 21 at the National Guard Armory, 2530 173rd St., Hammond. Doors open at 7 A.M. Advance tickets $2, $2.50 at the door. Prizes, displays and reserved flea market ($1). Talk-in on 31/91 and 52. Write to MRA, P. O. Box 342, Griffith, IN 46319.

Indiana: The annual Tri-State ARS hamfest is May 21 at the Vanderburgh County 4-H Center, five miles north of Evansville on Rte. 41. No admission charge! Bingo, prizes and good food. Talk-in 75/15, 19/79 and 52. For details, contact Steve Harris, WB9OYD, Rte. 2, Box 81G, Mt. Vernon, IN 47620.

Indiana: The Wabash County ARC's 10th annual hamfest is May 21, rain or shine, at the Wabash County 4-H Fairgrounds in Wabash. Large flea market (no charge), technical forums, bingo, free parking, and good food. Advance admission $2, $2.50 at gate. Children under 12 free. Write Dave Nagel, WD9BDZ, 555 Valley Brook Ln., Wabash, IN 46992.

Kansas: The Chippewa ARC holds its 10th annual hamfest on May 21 at the Garnett Lake Fairgrounds in Garnett. Air-conditioned swap area and plenty of parking. Exhibits, ladies activities, and covered-dish lunch. Free admission and prizes, too. Talk-in on 01/61 and 52. Information from Steven Couch, Box 531, Ottawa, KS 66067.

Kansas: The Douglas County ARC holds its third annual auction on May 21 at the Douglas County 4-H Fairgrounds, Building 21. Doors open at 9, auction at 1. Prizes and refreshments. For more info, write to Joan Soutar, WBØYPW, 1919 Melholland, Lawrence, KS 66044.

Kentucky: The Northern Kentucky Ham-O-Rama is May 28 in a new location, the Erlanger Lions Club Park, seven miles south of Cincinnati, OH. More prizes, flea market, exhibits and food. Write NKARC, Box 31, Ft. Mitchell, KY 41017.

Maryland: The fourth annual Easton ARS hamfest is May 14, rain or shine, from 10 to 4, at the Talbot County Agricultural Center, five miles north of Easton on Rte. 50. Talk-in on 52 and 146.445/147.045. Lots of room for tables and tailgaters, $2 setup. Donation $2. Write Robert L. Roberts, Jr., K3ONU, P. O. Box 781, Easton, MD 21601. Tel. 301-822-0943 after 6 P.M.

Maryland: The Maryland Mobileers ARC annual hamfest is May 21 at Camp Barrett, Crownsville (near Annapolis). Set up at 10, open at 11. Tickets $3, XYLs and children free. Our indoor tables $3, tailgating or your table $2. Talk-in on 10/70 and 52. Contact Wade Biggs, 712 Riverview Terr., Annapolis, MD 21401.

Michigan: The Wexaukee ARA holds their 18th annual swap and shop on May 20 at the Michigan National Guard Armory, 415 Haynes St., Cadillac, from 9 to 4. Tickets $2. Lunch available. Free parking. Talk-in on 37/97. Write WARA, P. O. Box 386, Cadillac, MI 49601.

Michigan: The West Washtenaw swap and shop, sponsored by the Dexter ARC and Chelsea Communications Club, is June 4, from 8 to 3, at the Chelsea Fairgrounds. Donations are $1.50 advance, $2 at the gate. Tables are 50 cents a foot, $1 for tailgaters.

Michigan: The Monroe County ARC's annual swap and shop is June 11, from 8 to 4, at the Monroe County Community College, Monroe, on Raisenville Rd., off M-50. Donation $1 at gate, free tables and trunk space. Talk-in on 13/73.

Minnesota: Amateur Fair '78, the division's largest exposition for ham operators and computer hobbyists, is June 3 at the Minnesota State Fairgrounds, St. Paul. Free overnight parking for self-contained campers, June 2 only. Talk-in on 16/76 and 52. Flea market — tailgaters and inside. Prizes and forums. Admission $2. Sponsored by North Area Repeater Association, P. O. Box 30054, St. Paul, MN 55175. Tel. 612-933-2823.

Missouri: The St. Louis Repeater Club hamfest is May 21 at the Jefferson Barracks Park. Talk-in on 34/94 and 52. Refreshments and prizes. Donations $1.50 advance, $2 at door. Contact Bob Evans, WBØSVS, 22 Brixworth, Florissant, MO 63033.

Nebraska: The combined second annual Hamboree of the Sioux Land ARC, Sioux Land Repeater Association and 3900 Club is June 3 at the Marina Inn, South Sioux City. Entertainment, exhibitors, flea market, technical programs and banquet. Advance tickets with banquet $5.50, at the door $6.50. Talk-in on 37/97 and 3900. Write to Tom Brosamle, WBØYNX, P. O. Box 2563, Sioux City, IA 51106.

New Hampshire: The Hosstraders Net holds its fifth annual Tailgate Swapfest on May 13 at the Deerfield Fairgrounds. Admission $1. Revenues benefit Boston Burns Unit of Shriners' Hospital. Talk-in on 52, 40/00 and 3940. More info, s.a.s.e. to Joe DeMaso, K1RQG, Star Rte., Box 56, Bucksport, ME 04416, or Norm Blake, WA1IVB, P. O. Box 32, Cornish, ME 04020.

New Jersey: The Irvington RAC, K2GQ, holds its hamfest May 21, from 9 to 4, at the P.A.L. Building, Irvington. Take the Garden State to exit 143 north or 143A south. Talk-in on 34/94 and 52. Refreshments and prizes. Tables $3. Contact Peter J. Kawonczyk, WB2FAS, 285 Union Ave., Irvington, NJ 07083, or Ed Surmaitis, WA2MYZ, Tel. 201-687-3240 evenings.

New York: The Long Island Mobile ARC hamfest is June 4 at the Islip Speedway from 9:30 to 4. Admission for licensed amateurs $1.50, prizes, food and refreshments, computer display, ATV, satellite and ARRL. Bring your rig and power cord for the LIMARC vhf tune-up clinic. Go on the Southern State Parkway to exit 43 (Rte. 111), commercial vehicles via LIE to exit 56. Talk-in on 25/85 and 52. Info and tickets (s.a.s.e., please) from Hank Wener, WB2ALW, 53 Sherrard St., East Hills, NY 11577. Tel. (day) 212-355-0606, or (night) 516-484-4322 or 516-379-6463.

***New York:** The Rome Radio Club hamfest and family day is June 4 at the Floyd Firemen's Hall and Field, Rome. Admission $2. Write to RRC, P. O. Box 721, Rome, NY 13440.

***Ohio:** The Champaign-Logan ARC hamfest is May 14 at the West Liberty Lions Park, West Liberty. Free admission. Trunk sales and tables $1. Prizes. Talk-in on 52. Contact John L. Wentz, W8HFK, President, Box 102, West Liberty, OH 43357.

Ohio: The Erie ARS Vacationland hamfest is May 21 at the Erie County Fairgrounds. Lodging, camping, amusement and picnic facilities nearby. Indoor/outdoor flea market, room for all, rain or shine. Info from EARS, WB8LLY, P. O. Box 2037, Sandusky, OH 44870.

Pennsylvania: The Warminster ARC's fourth annual Hammart fleamarket and auction is May 14, from 9 to 4, William Tennent Senior HS, Street Rd. (Rte. 132, two miles east of Rte. 263), Warminster. Registration $1, tailgating $2 additional. No indoor selling, bring your own tables. Talk-in on 16/76 and 52. More info from Horace Carter, K3KT, 38 Hickory Ln., Doylestown, PA 18901. Tel. 215-345-6816.

Pennsylvania: The 24th annual Breeze Shooter's hamfest is May 21 at White Swan Park, Parkway West (Rte. 60), near the Greater Pittsburgh International Airport. Main prizes, women's prizes, homebrew contest, refreshments and amusement park. Admission, flea market, and parking free. Talk-in on 29.0 and 28/88. Contact Richard Evanuik, WA3LUM, 311 Evergreen Ave., Pittsburgh, PA 15209.

Pennsylvania: The seventh annual Milton ARC hamfest is June 4, rain or shine from 8 to 5, at the Allenwood Firemen's Fairground, Rte. 15, four miles north of I-80. Advance registration for sellers $2.50, at the gate $3, XYLs and children free. Flea market, auction, contests and prizes. Free fm clinic. Talk-in on 37/97, 34/94 and 52. Contact Jerry Williamson, WA3SXQ, 10 Old Farm Ln., Milton, PA 17847. Tel. 717-742-3027.

South Carolina: The Carolina Repeater Society is sponsoring the Columbia hamfest on May 20 and 21, from 9 to 5, at the Jamil Shrine Temple, on I-26 one mile west of I-20. Large, air-conditioned building with plenty of free parking, flea market, dealers, activities. Talk-in on 34/94. Advance tickets $3, at the door $3.50. Contact Larry Johnson, WA4VOJ, 1520 Atlantic Dr., Columbia, SC 29210. Tel. 803-772-7984 or 803-788-1308.

Tennessee: The annual Humboldt ARC hamfest is May 21 at Shady Acres City Park, Trenton. Talk-in on 37/97. Flea market, prizes, ladies' activities, light lunches. More info from Ed Holmes, W4IGW, 501 N. 18th Ave., Humboldt, TN 38343.

Virginia: The Ole Virginia Hams ARC conducts the annual Manassas hamfest on June 4 at the Prince William County Fairgrounds on Rte. 234. Gates open at 7 A.M. for tailgating ($2) and 8 for general admission ($3), under 12 free. Food and refreshments by Woodbridge Wireless. YL and children's entertainment. Dealers, manufacturers, fm clinic, cw proficiency, QSL bureau info. Talk-in on 37/97, 84/24 and CB channel 1. Details from Sam Lebowich, 9512 Sudley Manor Rd., Manassas, VA 22110.

***Washington:** The Clark County ARC holds its annual Ft. Vancouver Hamfair on May 13 and 14 at the Clark County Fairgrounds in I-5 north of Vancouver. Registration $3. Technical seminars, swap and shop, women's and children's activities. Prizes. Catered dinner $4.25, children under 12 $2. Camping with electricity $2.50. Mail to Ft. Vancouver Hamfair, Jack Ellis, K7SUQ, 9610 S. E. 6th St., Vancouver, WA 98664.

Washington: The annual Yakima ARC hamfest is May 21, beginning at 7 A.M., in a new location; Eisenhower HS, 702 S. 40th Ave., Yakima. Prizes, displays and free coffee. Breakfast and lunch available. Overnight parking on the grounds. Talk-in on 34/94. Further info from Leonard Kersheskey, WB7PXV, 7206 Spokane St., Yakima, WA 98909.

West Virginia: The Tri-State ARA's 16th annual hamfest is June 4, starting at 11:30, in Camden Park, Rte. 60, West Huntington. W8VA/8 talk-in on 04/64, 16/76 and 34/94. For info and tickets write to TARA, P. O. Box 1295, Huntington, WV 25715.

Wisconsin: The spring swapfest of the Milwaukee UHF Society is May 14, starting at 7 A.M., on the Waukesha County Expo Center grounds. Reserved indoor space $3. Admission $1.50 advance, $2 at gate. Prizes. Beer and Brats! Take I-94 to Waukesha Co. F, south to FT, west to Expo. Write to Swapfest, P. O. Box 49, North Prairie, WI 53153.

Wisconsin: The Milwaukee Radio Amateur Club's annual auction is May 18, 7:30 P.M. at the club meeting hall, 7500 West State St., Wauwatosa. Open to all hams and proteges, no flea market dealers. No commission or admission. Please tag all gear.

*ARRL Hamfest

The World Above 50 MHz

Conducted By
William A. Tynan,* W3XO

Amateur Radio's R & D Department

Research and development is the life blood of any technology-based activity. This goes for a nation's defense establishment, space program, automobile industry, and all similar endeavors. And, it applies to amateur radio as well. It's a fundamental law of nature that nothing is static. Things are always changing. This process of change may be one of growth, or expansion of capability, or it may be one of decay and obsolescence. But it can't just stay the same. Particularly when competition for limited resources is involved, it is of utmost importance that change be in the positive direction. This premise applies very well to amateur radio, especially now with WARC coming up next year. Our hobby must grow in numbers, true, but it must also continue to justify its claim to a slice of that precious resource — the radio spectrum — by continuing to contribute to society. Providing communication during emergencies is certainly one such contribution, but we must not stop there. It is imperative that we also demonstrate that, as in years past, amateurs continue to contribute to increasing man's ability to communicate via electromagnetic waves. This is where amateur radio's R & D department comes in.

While it is true that some experimentation still takes place on the hf bands and a few amateurs who make the world below 29.7 MHz their homes may try new antennas, improved speech processing, or even experiment with coherent cw and other advances in the radio art, the bulk of amateur radio experimentation is carried out by those who inhabit the vhf and uhf bands. Certainly those who regularly communicate via moonbounce, meteor trails, or weak scatter modes in the ionosphere or troposphere are experimenting and probing ways to increase man's ability to use the radio spectrum to its utmost. The same is true of those who operate regularly on the amateur microwave bands. True, governments and commercial enterprises have been exploiting these frequencies for many years, but their approach is invariably to spend lots of money. It just may be, however, that ham microwave workers can show everyone a few things when it comes to getting the most from the least.

The amateur satellite program is a prime example of this thrifty approach. So far, this vital part of amateur radio has demonstrated that simple spacecraft and unsophisticated groun terminals can provide satisfactory communica tion. Experiments have been conducted whic have demonstrated a capability of locatin downed aircraft thousands of miles away b plotting the Doppler shift on the plane's signa as transmitted through the satellite. Th feasibility of sending medical data from mov ing vehicles to doctors many hundreds of mile away has also been shown. These, and othe successful experiments tried with amateu satellites, are now being considered for othe applications as well.

Certainly those who build and maintain ou extensive network of amateur vhf and uhf te restrial repeaters across the country hav demonstrated how their competence and har ingenuity can serve the radio art, while pro viding a vital facility in times of emergency.

Although far outnumbered by the rest c hamdom, vhf/uhf experimenters contribute t its research and development life blood to a extent far greater than their numbers would in dicate. They must be encouraged to continu and expand their work if amateur radio, as w know it, is to survive.

ANTENNA-GAIN COMPETITION

Antenna-gain contests are always fun and often quite illuminating. One such affair is being held May 20 beginning at 1300 CDT on the grounds of the Flick-Reedy Corporation, Thorndale and York Roads, Bensenville, IL. It is being sponsored by the Megacycle Society of Chicago. Equipment will be on hand to check antennas for 2 meters, 1-1/4 meters, both the 430- and 446-MHz portions of 70 cm, and higher bands if advance notice is given. For further details, contact WB9GOJ at 2558 N. McVicker Avenue, Chicago, IL 60639.

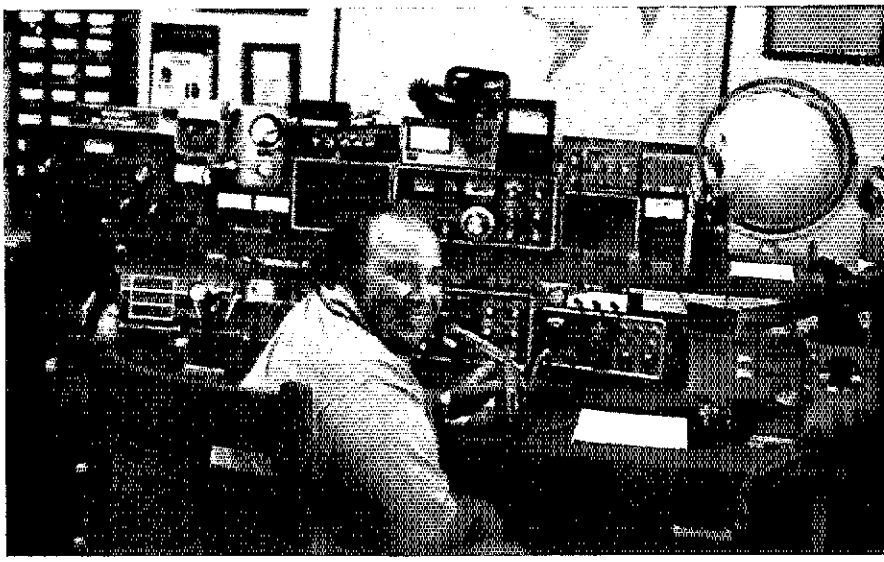
ON THE BANDS

6 Meters — What 6-meter operators have been waiting for, F2 propagation, has arrived for many and may be a reality for the rest of us before long! As usual, the southern latitudes and the Pacific basin are the first beneficiaries; but as solar fluxes mount, can the rest of the world be far behind? According to reports received, most of which are via K5ZMS, the ionosphere started doing its thing on February 28, when, at 2115 UTC, XE1GE began hearing New Zealand TV sound on 50.75 MHz. This lasted for about 1-1/2 hours. In the meantime, also at 2115, Jeff heard the KH6EQI beacon on backscatter. The following day ZL TV was in again, but this time for only about 15 minutes. On March 3 WA7RTA near Portland called to inform me that he had been hearing East Coast fm communications services up to 48 MHz most of the day. Oh so close! That same day, the band burst forth between Hawaii and South America with KH6IAA working LUs 3EX 8BF 2BG 6EHW 4HBI and 9HJW as well as CE3OK between 0120 and 0250 UTC. Later, between 0500 and 0700, Al snagged 10 JAs as well as several ZLs and VKs. Signals ran from S6 to S9 on the South American stations and between S3 and S6 on the JAs. On the same day JA3CMO reports working five KH6s and CE3OK! The same day KH6IJ QSOed 24 JAs on cw as well as LU9HJW, who Nose worked at 0559 UTC (3 A.M. in Argentina!). The following day, March 4, VK4s RO and MS worked four KH6s with S9 signals around 0400 UTC. On the 5th, P29ZDU reports hearing the KH6EQI beacon about 0200. On the 9th, at 2315 UTC, WB3AIT in western PA heard several weak stations, two W6s and a W7, but complete calls could not be made out. Just prior to that, Ed was hearing W1s c backscatter.

Nor was F2 the only game in town for many fo tunately located stations. TE has continued to be ve productive. One who has been availing himself of th mode is KZ5NW, who has managed ssb QSOs wi PY2CSS, PY5MV, PY2PU, LU3EX and CP9AY. H has heard many a-m stations, and worked LU6GH and LU8MBL, who were using that mode. Wh

*Send reports to Bill Tynan, W3XO, P. O. Box 117, Burtonsville, MD 20730, or call 301-384-6736 and record your message.

Well-known vhfer and holder of 50-MHz WAS number 160, WA5HNK, Houston, TX.



makes this performance notable is that the four-element beam at KZ5NW was fixed toward the north at the time. Another station taking advantage of the TE conditions is one well known to 50-MHz devotees, TI2NA. Eric has worked a number of South American stations, including PY2CSS. The TE path has been active in the Pacific also, with numerous contacts between Japan and the south. Just how good conditions have been can be inferred from the fact that 6 meters was used in setting up the VK to JA 144-MHz QSO between VK8GB and JH6TEW mentioned in the 2-meter section.

As promised last month, here is a rundown of the DXpeditions planned for early June on which I have been able to get information. For the June 3 SM1RK Contest, K1TOL, along with W1AIM, will be journeying to FP8. Indications are that they will be succeeded there by K2RW (ex-K2OJD). Rich will be on through the ARRL VHF QSO Party, signing FPØAA. Others operating from exotic QTHs during that contest will be WB2RLK, who will hold forth from VP9; WB2VWW expects to be active from KV4; K8NXI is putting Montserrat on the 6-meter map and W5DZF (ex-VP7DD) hopes to be in the fray from C6A. The longest trip that I have heard about is that planned by W2BN, who is heading for KL7. He hopes to get up a huge, balloon-suspended array, maybe as large as 40 over 40. Let's have a picture of that when you get back, Dave. Probably the shortest jaunt, but one that will be very popular nonetheless, is the expected operation of WB6NMT and N6CA, along with several XE hams just across the border in Baja California. This XE2 setup will have high power on 6 meters through 70 cm and may also radiate signals on the higher bands as well. Other Caribbean DXpeditions include a ZF1 operation planned by W5SXD, and the WB2CHO/VP5 effort. After the contest WB2RLK expects to give the band a whirl from both VP2MX and possibly KV4KA. With all of that intriguing activity, and I'm sure that's not a complete list, we can look forward to a very interesting time.

A friend and very avid vhfer will be heard again shortly, this time from New England. WA4MMP, now Lt. Cmdr. William Shaw, is to complete his current tour of sea duty in the Pacific and be transferred to Newport, RI. Listen for WA4MMP/1 beginning in June.

2 Meters — The Western Hemisphere doesn't have a monopoly on 2-meter TE. In October last year, on the same day that YV5ZZ first bridged the gap to LU, VK8ZCJ, Darwin, Australia, heard a number of JAs but no contacts could be made at that time. Schedules were set up on 144.1 and finally pay dirt was struck at 1150 UTC, February 10, when VK8WJ, also of Darwin, hooked up with JH6TEW, Kikuchi, Japan. Both stations were running quite low power and simple antennas. The setup at VK8WJ consists of 10 watts to stacked five-element Yagis while JH6TEW uses 30 watts to crossed 10-element Yagis. The ssb signals were not particularly strong, running Q4, S1 both ways. The feat was repeated two weeks later on the 24th when VK8GB (new call for VK8ZCJ) also worked JH6TEW. The distance from Darwin to Kikuchi is about 3140 miles (5053 km), which is almost identical to that from Caracas to Buenos Aires. Typical of the TE mode, the path is almost due north and south making nearly a right angle with the magnetic equator. Good work, fellows. Everyone hopes that these are only the first of many 2-meter TE QSOs in that part of the world.

Meanwhile, in this hemisphere, 2-meter TE contacts continue. In addition to his Argentine QSOs of mid-February, reported last month, KP4EOR worked the gang to the south on February 18, 22, 24, 25, as well as on March 3 and 7. As of that date David has worked LUs 3AAT 5DJZ 7DJZ 8DIN 4DYH 1DAU and 2BG. In addition, he has been heard by CX8BE. Signals have ranged from S5 to S9 plus. He is continuing schedules each evening from 2300 to 2315 UTC toward the U.S. and at 0000, 0030 and 0100 UTC to the south.

Sporadic E was not particularly notable last winter, even on 6 meters, and on 2 it was essentially nonexistent. The only communication that I have received which would appear to indicate 2-meter E skip comes from WB5WAE of San Antonio, TX. Bob reports receiving a heard report from VE3IVU of Kingston, ON, citing reception at 1820 UTC, January 12, of his signals through a 34/94 repeater. It was not clear whether the San Antonio repeater was being heard in Kingston or whether Bob's 15 watts to an indoor groundplane was making it all the way to the Kingston 34/94 machine. Despite many calls by VE3IVU, no contact could be established. The two things which make this noteworthy are first, the fact that although it took place in the middle of the winter Es season, this was anything but a good year for that mode, and second, the distance involved, 1579 miles. This is anything but a record for 2-meter E skip, although it is far greater than the average, usually in the 1000- to 1400-mile range. Here is yet another case in which fm, with its high activity, often shows up interesting propagation that might otherwise go unnoticed.

At the 1977 Megacycle Society of Chicago antenna-gain contest, W9ZCL and WB9SNR come to the aid of WA9KIO, while WB9AJZ takes the measurement.

While on the subject of Es, remember that the summer season will be on us soon. WA4MVI has been making a study of E-skip openings on 2 meters along with accompanying weather conditions. Jim works for FAA, so he has access to a lot of weather data. He has noted a strong correlation between the occurrence of E ionization strong enough to affect the 2-meter band and very intense thunderstorm activity, the kind which produces thunderheads to 50,000 feet or more. Going on the basis that such a correlation exists, Jim suggests that we watch the morning TV shows which give the nationwide weather picture for the day. When they say that a particular area will be plagued with violent weather, point your beam in that direction and make some noise. It will be interesting to see how this idea works out. At the end of the season I'll publish a synopsis of reports received.

The 1000 Eastern Time Sunday morning net run by WA2SLY, announced in the March column, is doing well with up to 26 check-ins. The net frequency has been changed from 145.025 to 145.1 MHz.

70 Cm — News from abroad seems to be the main theme of this month's column. If nothing else, this demonstrates that the world above 50 MHz is truly international in scope and there is much happening beyond our borders that is important and interesting. To continue in this vein, here is some exciting information from Down Under. The excellent tropo conditions which exist from time to time along the south coast of Australia are responsible for a claimed new 70-cm terrestrial record. The contact took place at 1017 UTC, January 11, when VK6KZ operating portable west of Albany, Western Australia, worked VK3ZBJ, Frankston, Victoria, near Melbourne, a distance of 2465 km (1532 miles). This comfortably exceeds the old record of 1210 miles set August 16, 1971, by K1PXE and WØDRL. VK6KZ turned the trick with just 2 watts to an eight-element Yagi up 12 feet from his position atop 450-foot Torbay Hill. Information on the setup at VK3ZBJ is not available as of this writing.

Also from Australia comes a sad note. VK2AMW is off EME as a result of vandals breaking into the site on more than one occasion and completely wrecking the place. Lyle, VK2ALU, who masterminded the whole setup, is understandably very discouraged by this senseless destruction of his fine handiwork.

There has been quite a bit of discussion recently about establishing a 70-cm universal window similar to that which sparked the EME scene on 2 meters. YV5ZZ has come up with an alternate suggestion. Ed recommends that a time of 0000 UTC be set up for attempting contacts between the Americas and Europe and Africa any evening that the moon is above the horizon for both areas. He feels that, particularly on weekends, such a procedure could lead to many QSOs. Sounds good. Why don't we give it a try?

Hawaii is now on the 70-cm moonbounce map thanks to KH6IHP. Steve worked K2UYH March 12 and is now available for skeds. His address is 94-1084 Lumi Street, Waipahu, HI 96797. Calls are welcome at 808-671-5211.

SM7BAE notes a lack of news in these pages concerning 70-cm aurora and says that contacts on this band via the buzz mode are quite numerous in northern Europe. His best DX is G3LQR, about 960 km (595 miles), but SM5QUI has worked a UA3 (call not given) at 1260 km (783 miles).

AA4LC calls attention to the fact that some parts of the U.S. are shackled by a 50-watt power input limit on the 420- to 450-MHz band. One such area is along the Gulf Coast, including Les' Mobile, AL, location. I know that some 70-cm operators in the affected areas have received permission from FCC to run the normal legal limit. So let's not let this rule stop us before we try.

23 Cm and Down — N6TX has completed a preliminary design study for a 200-kHz wide linear translator, similar to those in the OSCAR satellites. Paul recommends an input frequency band of 1296.2 to 1296.4 MHz and an output band of 1239.4 to 1239.6 MHz. He provides several reasons for this particular frequency selection, including the fact that it allows the use of a single transverter with an i-f of 28 MHz to cover both bands. Assuming that it is installed at a proposed 3350 msl Bay Area site, the device would provide usable communication up to distances of 80 miles for stations running about 1/2 watt to 10-dBi antennas. Sounds like a fascinating idea which may serve as the prototype for other parts of the country.

It appears that Arizona may become a hotbed of 23-cm activity before long. W7LUX, Flagstaff, reports that he, W7CI and WB7EPA expect to have about 200 watts of ssb on 1296 within the next few months. WA1FSZ says that for him, the high spot of the January contest was making two contacts from W1FMF on 1296; W1GAN and W1JR. Dale used a quickly constructed varactor tripler, homemade 15-element Yagi, and a borrowed converter. Power at the antenna was about 200 mW, but nevertheless signals were good over the 50-mile path to W1GAN. Now that he is fired up, it is certain that WA1FSZ will be heard from again on the microwave bands.

Another inveterate experimenter is WA5QCP, El Paso, TX. Having acquired quite a bit of surplus equipment, he has been trying to find out what he can do with it. One item is a 2250-MHz, solid-state oscillator which he has retuned to 2323.6 MHz where it produces about 1/2 watt. Another project involved the use of a radiosonde transmitter feeding a diode multiplier to yield a few microwatts at 10 GHz.

There's plenty of room for experimentation on the higher bands. Let's hear more about what's going on in this fascinating part of the spectrum.

Public Service

Conducted By Robert J. Halprin,* K1X

Advisory Committee Activities

The Emergency Communications Advisory Committee, a group of amateurs appointed by the president of the League to assist the Board and the Headquarters staff with emergency communications matters, was assigned three projects by the ARRL directors during the January Board meeting. As the complete minutes of the Board meeting appeared in March *QST*, the directives will not be repeated verbatim here. Essentially, Minute 56 directed the ECAC to study the possibility of creating two new awards to replace the present Public Service Award, and Minute 63 directed the committee to (a) study ways to increase participation in the Amateur Radio Emergency Service, and (b) update the Emergency Communications Workbook with recent disaster critiques. Please refer to March *QST*'s "Moved and Seconded" for the complete texts of these orders. The ECAC is to render its report at the July, 1978, Board meeting.

The ECAC would like your comments and suggestions on these or any other emergency communications topics. Among other things, they are studying the possibility of changing the date of the Simulated Emergency Test back to the fall.

The ECAC is made up of 11 volunteer amateurs, each one representing his own call area, with the Canadian member representing all of Canada. Who are they? For 1978, those serving on the committee are Chairman Arthur R. Smith, W6INI, 4515 Melisa Way, San Diego, CA 92117; Vice Chairman W. H. Parker, VE5CU, 214 McMaster Crescent, Saskatoon, SK, S7H 4E3; William A. Sencabaugh, K1UAQ, 120 Middlesex Ave., Reading, MA 01867; James P. Collinsworth, N2JC, 1040 West Walworth Rd., Macedon, NY 14502; Bob Josuweit, WA3PZO, 9 Derwen Dr., Havertown, PA 19083; Monte F. "Bud" Cone, WA4PBG, 317 Van Buren St., Falls Church, VA 22046; H. O. Townsen WA5MLT, 2346 Louise Ln., Norman, O 73071; Everett R. Snider, W7DO, 300 Abbo Richland, WA 99352; Delf A. Noron WA8NDY, Box 523, Buckhannon, WV 2620 Bruce B. Woodward, W9UMH, 6208 Bran shaw Rd., Indianapolis, IN 46220; Harry Legler, WØPB, 304 Miami St., Hiawatha, K 66434. Board liaison is Max Arnold, W4WH and Headquarters liaison is K1XA. Would yo like to be considered for appointment to t ECAC? Advisory Committee nominatio forms are available upon request from Hea quarters.

Any ideas, suggestions, comments, wh have you, on emergency communications, ca be sent to your call-area "spokesman." To i sure distribution to the entire commiteee, yo may wish to route your correspondence direct to either W6INI or that old photocopi jockey, K1XA.

PUBLIC SERVICE DIARY

☐Shepherdsville, KY — December 6. After freight cars from a derailed train crashed into a nearby building and caused a fire, members of the Kentucky Sixth District ARES provided communications at the disaster site. (WA4AGH, EC KY Sixth District)

☐Atlantic Ocean — January 5. WA1PSI received a distress call from a fishing vessel stuck off Cape Cod and relayed the information to the Coast Guard in Boston, who freed the ship. (WA1PSI)

☐Memphis, TN — January 13. Spearheaded by N4ZK, amateurs in four states (AR, KY, LA, TN) searched intensively and located rare type A-negative blood for hospitalized W5GTN. (W5POH)

☐South Pacific Ocean — January 15. WB6YID and KH6AKW assisted a distressed yacht in the midst of a cyclone by contacting the Coast Guard, who provided weather and emergency information. (W6JBM)

☐Atlantic Ocean — January 22. Aboard a vessel WD4INV/C6A broke into the Central Gulf Coast Hurricane Net seeking relief for a passenger who had been bitten by a barracuda. And, WB5LTW contacted the Coast Guard, who aided the victim. (K5WOB)

☐*Repeater Log.* According to reports received to date, repeaters were used in conjunction with 102 vehicular emergencies, five criminal acts, four medical emergencies, four fires, two weather emergencies and two miscellaneous incidents. Repeaters involved were WR1s ABU ACP AEY AHU, WR2s AHD AIX, WR3s ABQ ACM, WR4s ACJ ASW, WR5s ABA ABY ADP AER, WR8s ADA ALM AJL, WR9s ABT AOK.

☐For the month of February, 38 SEC reports were received, indicating a total ARES membership of 14,736. Last year at this time, 28 reports were submitted with a total membership of 10,851. Sections t porting were Alta, Ariz, Ark, Colo, Conn, Del, EN EMass, Ga, Ind, Iowa, Kans, Me, Mar/NFld, Mic Nev, NC, NFla, NTex, Ohio, Okla, Ont, Orang Oreg, Que, SDgo, SF, SJV, SBar, SCV, Sask, SF SNJ, Utah, Va, Wash, WVa, WMass.

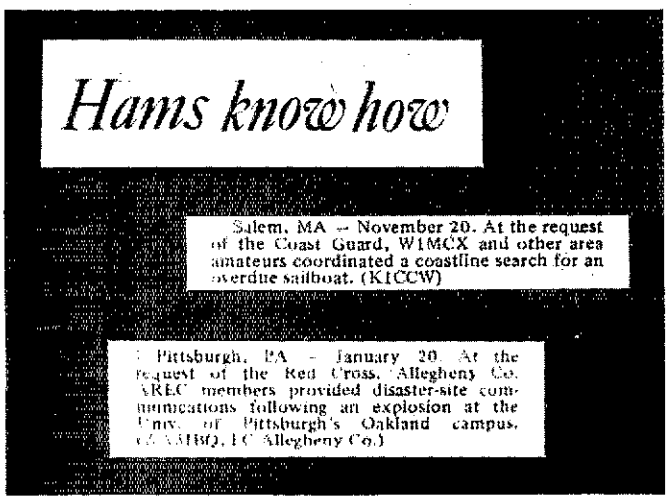
NATIONAL TRAFFIC SYSTEM

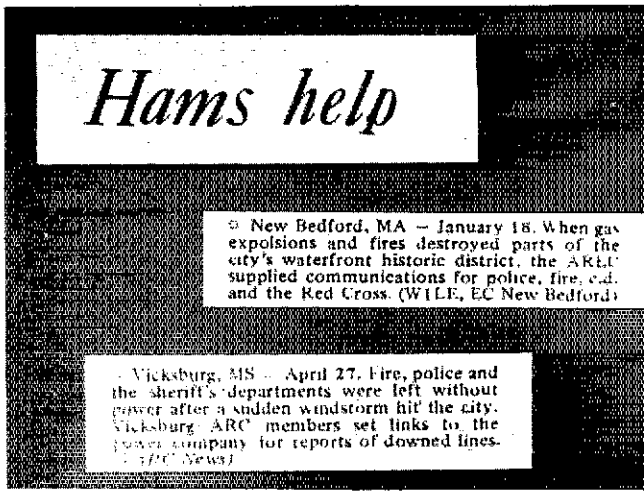
It's been a long time since the terms in the NTS tabu tions below have been explained, so here goes.

Only net abbreviations are given. EAN, CAN a PAN refer to the Eastern, Central and Pacific Ar Nets. Evening session statistics for each area are list first, followed by daytime statistics. Next comes t region net listings; First Region Net — 1RN, Secon Region Net — 2RN, Eastern Canada Net — EC Twelfth Region Net — TWN, and so on. The listin for each region net represent the combined totals daytime and evening sessions. Then comes t

*Asst. Communications Mgr., ARRL

Look familiar? The Mid-Willamette (OR) Amateur Radio Club copied these "Public Service Diary" items and enlarged them for a recent shopping-m display. The headlines were made by using rub-on letters which were also copied and enlarged. All pieces were then mounted onto soft, medium-blue and green mounting board. (*WB7UAB photo*)





transcontinental level with the Eastern, Central and Pacific areas of the Transcontinental Corps. Statistics for section and local nets are grouped together, with the net abbreviation and states they're in footnoted. Under SESSIONS (column 2), the number of sessions reported is listed (with number of successful TCC functions reported being listed for TCC). TRAFFIC (column 3), indicates the actual amount of traffic handled while in directed session (with amount of TCC traffic handled outside of nets for TCC listing). AVG. (column 4) is simply the average traffic handled per session, i.e., traffic divided by sessions. RATE (column 5) is the number of messages handled per minute, i.e., traffic divided by total number of minutes in directed session. The % REP. (column 6) figure indicates the percentage of the time section nets were represented in region nets or region nets in area nets. If all sections are represented in each session of a region net all month, the % rep. is 100 for that region net. The more times reps fail to show, the lower the % rep. figure. % rep. is based upon the number of sessions that *should have* been held. Column 7, % REP. TO AREA NET similarly shows how reliable the regions are on the area nets.

The total number of sessions and traffic for all NTS nets reported for the month is indicated by "Summary." "Record" is the highest totals in the past for the month being reported. If summary numbers exceed record numbers, we've had a record-breaking month.

In the tabulations under "Transcontinental Corps," FUNCTIONS indicates the number of TCC functions there should have been. The percentage of these that were successful (i.e., all traffic the TCC stations received was relayed on schedule to the counterpart TCC station or appropriate nets) is shown under % SUCCESSFUL. Total TCC traffic handled for each area is listed under TRAFFIC, while only traffic handled out of nets is shown in the last column.

Totals for all three areas appear as "Summary." Stations who performed TCC functions during the month are listed in the TCC roster.

While we're at it, we'll add that nets listed under "Independent Nets" are those which are not affiliated with NTS and whose primary coverage area includes at least several states. Net name should not indicate coverage of only one or two states.

February Reports

Area Nets

(evening sessions)
(daytime sessions)

1	2	3	4	5	6	7
EAN	28	2028	72.4	1.647	97.0	
EAN	56	616	11.0	.572	95.2	
CAN	28	1232	44.0	1.096	100.0	
CAN	56	464	8.2	.301	100.0	
PAN	28	1152	41.1	1.244	97.0	
PAN	28	413	14.7	.340	100.0	
Region Nets						
1RN	82	801	9.7	.457	93.4	86.6
2RN	[1]10	863	7.8	.591	93.1	98.2
3RN	84	531	6.3	.550	100.0	98.2
4RN	111	1244	11.0	.428	70.2	98.2
*RN5	28	277	9.9	.356	89.3	100.0
RN6	84	914	10.9	.468	83.9	95.6
RN7	[1]12	710	6.3	.382	95.1	100.0
8RN	77	468	6.1	.393	85.2	98.2
9RN	84	633	7.5	.425	95.6	100.0
*TEN	56	502	9.0	.475	90.0	100.0
ECN						100.0
TWN	84	535	6.3	.345	93.0	100.0
TCC						
TCC Eastern	112[1]	826				
TCC Central	80[1]	614				
TCC Pacific	109[1]	912				
Sections[2]	4773	24469	5.1			
Summary	5909	40204	6.8			
Record	5242	38957	24.3			

*Incomplete report.
[1]TCC functions not counted as net sessions.
[2]Section and local nets reporting (156): BCEN (BC), MEPN MMN MTN (MB), APN (Mar/NFld), CMN GBN GBSSN ODN OPN OSN (ON), WOV/UHF (PQ), SATN (SK), AENB AEND AENM AENS (AL), ASN (AK), AMBN ARN (AR), NCN NEN SCN (CA), CWN CO/WYN (CO/WY), CN CORN CPN NVTN WESCON (CT), DEPN DTN (DE), FAST FMTN FPON FPTN GN NFPN PBTN QFN QFNS SPARC TPTN (FL), CVEN GCN GSN GTN NGSN WGARES (GA), IMN MTN (ID/MT), ILN (IL), ICN INTN ITN (IN), IA75m TLCN (IA), KPN KSBN KWN QKS QKS-SS (KS), KNTN KSN KTN KYN MKPN (KY), LAN LRN LSN LTN (LA), CMEN MSN PTN SGN (ME), MDCTN MDD MEPN (MDC), EMRI EMRI-SS EM2MN HHTN WMPN (MA/RI), MACS MITN MNN QMN WSSN (MI), MSN MSPN MWX PAW (MN), MSBN MTN (MS), GHN (NE), NHVTN (NH/VT), NJN NJPN (NJ), SWN (NM), BARTEN NLIPN NLIVHF WDN (NY), CNN NCSSBN RARS SCSSBN (NC/SC), BN BNR MASER ONN O6mN OSN OSSBN (OH), OAN OFON OLZ OPEN OTWN STN (OK), BSN JARES OSN PDXARES PARES SOFM (OR), EPA EPAEP&TN PTTN WPA WPAP&TN WPA2mTN (PA), SDN SDSSN (SD), TN TNN TPN (TN), TEX TTN (TX), BUN UCN (UT), VFN VN VSBN SVSN (VA), NTN WSN (WA), WVN WVPN (WV), BEN BWN WIN WNN WRN WSBN WSSN (WI).

1 — NET
2 — SESSIONS
3 — TRAFFIC
4 — AVG.
5 — RATE
6 — % REP.
7 — % REP. TO AREA NET

Transcontinental Corps

K5MAT says that February was a very good month for TCC-P, with generally good conditions and only one unannounced absence. Traffic totals were up substantially, too. VE3SB also reports good news; February was the highest percent successful since 1971. Certificates: W6YBV KØBN (TCC Pacific); WB4SKI W5RB K5GM WA5IQU W9CXY W9DND W9FC N9TN WØAM WØHI KØEVH (TCC Central).

1	2	3	4	5
Eastern	114	98.2	2239	826
Central	84	95.2	1206	614
Pacific	112	97.3	1828	912
Summary	310	96.9	5273	2352

1 — AREA
2 — FUNCTIONS
3 — % SUCCESSFUL
4 — TRAFFIC
5 — OUT-OF-NET TRAFFIC

TCC Roster

The TCC Roster (February): Eastern Area (VE3SB, Dir.) — W1s KX NJM QYY, WA1ZAZ, K1s BA EIR GN PAD SSH XA, W2s CS FR GKZ MTA RQ, WA2ICB, N2GM, W3s PQ YQ, K3s KW NGN, N3HR, W4s SQQ UQ, K4s BKX KNP, N4KB, W8s LTA/2 PMJ, K8KMQ, VE3s GOL SB. Central Area (W5GHP, Dir.) — W4ZJY, WB4SKI, W5RB, K5s GM MC TTC, N5s TS YL YX/Ø, WA5s HNN IQU, WB5FDP, W9s CXY DND FC NXG, N9TN, WØs AM HI, KØEVH, WAØTNM. Pacific Area (K5MAT, Dir.) — N5MR, W5KH, K5MAT, WA5RKU, N6GW, W6s EOT MLF OA VZT YBV, K6HW, WA6VBS, KH6IQU, W7s DZX EP GHT VSE, K7IWD, WØs ETT IW LQ, KØs BN DJ TER, WBØTAQ, VE7ZK.

Independent Nets (February)

1	2	3	4
Amateur Radio Telegraph Society	28	496	545
Central Gulf Coast Hurricane	28	333	2984
Clearing House	28	326	594
Empire Slow Speed	28	82	335
Hit & Bounce	53	948	405
IMRA	25	489	988
North American SSB	24	159	178
Southwest Traffic	28	190	1139
Washington Region PON	16	16	347
20 Meter ISSB	24	439	374
75 Meter ISSB	28	638	1059
7290 Traffic	40	508	2645

1 — NET
2 — SESSIONS
3 — TRAFFIC
4 — CHECK-INS

Public Service Honor Roll February 1978

This listing is available to amateurs whose public service performance during the month indicated qualifies for 40 or more total points in the following nine categories (as reported to their SCM). Please note maximum points for each category: (1) Checking into cw nets, 1 point each, max. 10; (2) Checking into phone/RTTY nets, 1 point each, max. 10; (3) NCS cw nets, 3 points each, max. 12; (4) NCS phone/RTTY nets, 3 points each, max. 12; (5) Performing assigned liaison, 3 points each, max. 12; (6) Phone patches, 1 point each, max. 20; (7) Making BPL, 3 points regardless of traffic total; (8) Handling emergency traffic directly with a disaster area, 1 point each message; (9) Serving as net manager for entire month, 5 points. This listing is available to Novices and Technicians who achieve a total of 20 or more points.

66
W5KLV
WA5RKU

64
N5TC
W7VSE

63
N3HR
WB5NKD

62
K4BKX
61
K1BA
W1RWG
WA1UWF
WA1VEI
WA1ZAZ
WB2IDP
N2YL
WA5IQU
N5RB
N5TS
N6CY
W6RFF
WB8JGW
W8SOP
WB8YDZ

60
WA4CNY

59
N2TW
WA4JDH
WB4QBB
WD9CQC
WBØHOX

58
WØHXB

57
WB5NKC
WDØCHX
VE3GT

56
W1KX
WA1UNC
WA2BMI
WB2KIH
WA2ZJP
N4WA
N5ES
W5GHP
WA5YEA
N5YL
W6OA
N8CW
W8IQ
KØEZ
WBØZAL
VE4PG

55
WB6DAB
WA9QCF

53
W1TN
K5TL

52
WA1ZXB
K3JL
W4MEE
K5OWK
WB8MZZ
WØOYH

51
K6JT
WB6PVH

50
WB7AAK
WB8MTD
WD9AUD

49
N1RI
W2MTA
AA4CK
WB4NJU
WB4OXT
WB5OOM
WA6UAZ
WB6UZX
W7GHT
K7GXZ
WA7MEL
WB8WTS
WØFT
WØQTF
WBØVEZ
WAØVGN
VE1WF
VE3DPO
VE5AAE

47
WA1HYN
WA2SPL
WB3AOB
WA3WPY
K3YL
K4JGW
AA4NC
WB5RLR
WB6FTY
N7IT
WBØUIP

46
WA2YGI
WA6KHB
K8FE
W8YIQ

45
WB7DPU

44
WB1CPF
K1UZ
WA1YMN
W2WHB
WA3NAZ/4
W3PQ
WA3YDC
WB4DJU
K4EV
W4LXB
N4NK
WB5LBR
K5MC
W6JXK
WA7JRC
WA8ZNC
W9NXG
NØSN
WBØSZS
WBØVVA
VE1AMR
VE1CH
VE1HJ
VE1LCR
VE3GOL
VE4IZ
VE4QU
VE5XU

43
N4UZ
W4ZJY
WB5KKT
K9LGU
KØEVH

42
WA2MSO
WD4HIF
W4PIM
WA5VBM
VE3FGU

41
N3EE
WB4FAJ
N6GW
N6WP
WB8TTP
W9HOT

40
W1FJI
WA2AIV
WA2EPK
WD5AHH
KH6ST
WBØLFY
WBØVHN
VE4YE

31
WD4HCY/N
WA4QGV/T

28
WD8IYO/T

27
W4MHO/T

22
WA4MJT/T

Brass Pounders League February 1978

BPL Medallions have been awarded to the following amateurs since last month's listing: WA1TBY, WA1ZAZ, WA3ZRY, K4BKX, WB4MXG, WB5LBR, W5REC, W7GHT, W9DND.

The BPL is open to all amateurs in the United States, Canada and U.S. possessions who report to their SCM a message total of 500 or a sum of origination and delivery points of 100 or more for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL form.

1	2	3	4	5	6
WØWYX	31	630	330	377	1341
W3CUL	658	1603	1812	63	4136
KØYFK		541		541	1082
WAØRWM	46	507	11	502	1066
WA4JDH	1	518	500	5	1024
WAØHJZ	24	574	1	396	995
W3VR	310	252	396	16	974
W9ZGQ		664	28	271	963
WA3ZRY	45	314	335	14	708
K1BCS	100	240	337	17	694
W4MEE	3	353	301	12	669
W7DZX	24	311	306	8	649
K5OWK	283	26	305	10	624
WD9CQC	9	319	204	91	623
K7VWA	49	332	62	177	620
WAØQIT	167	137	273	32	609
WA4PZD	290	3	290	3	586
N2TW		267	310		577
W5KLV	13	318	228	12	571
N3KZ	242	40	243	32	557
W7VSE	2	291	238	25	556
WAØVRE	101	221	204		526
W9JIJ	23	250	247	3	523
K3KW	2	320	169	20	511
WA4CNY	3	275	204	20	502
WB9YXN	73	186	220	22	501
K4ZN (Jan.)	12	353	297	7	669
N1NH (Jan.)	86	223	178	17	514
WA4CNY (Jan.)	123	152	140	97	512
WDØCHX (Jan.)	8	231	248	14	501
WA1UNC (Dec.)	3	244	265	6	518
W9FC (Dec.)	16	305	186	11	518

BPL for 100 or more originations-plus-deliveries

WA3ATQ	265	K3CR	123
K4KDJ	199	WB7OJV	122
WA3THT	171	K4TH	116
WA1EXB	153	WB5SDD	116
K8GWW	152	WDØEFB	108
W7SQT	146	K7NTS	105
W7TZK	139		

1 — CALL
2 — ORIG.
3 — RECD.
4 — SENT
5 — DEL.
6 — TOTAL

Results, 44th ARRL November Sweepstakes

The 1977 SS was the year of the clean sweep!

By Tom Frenaye,* K1KI

The 1977 November Sweepstakes nearly matched the previous year's SS in number of entries and number of new records set. A total of 2698 logs was received, a decrease of about four percent from the all-time record of 1976 when a bicentennial year SS award was offered for those making more than 200 QSOs.

Competition was, as it always is, very fierce. Last year's number-three operator on cw, KP4EAJ, bettered his effort by more than 40 QSOs to put KP4RF (ex-KP4AST) on top. The record cw score made by K7VPF at KV4FZ in 1976 (193,500) was topped by just 232 points! The super station on top of the mountain in Puerto Rico also produced a new record on phone with Pete, N6CJ/W6RTT, as operator. The old record held by WØTR was smashed by more than 30,000 points.

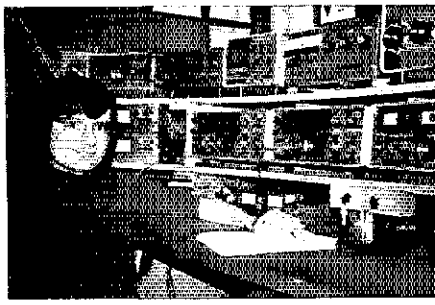
Overall, the top-ten category gets harder and harder to make each year. This year the average top-ten phone score was up more than 8000 points to 260,817 or an average of more than 72 per hour for the contest! The top-ten average for cw was up 3000 points to 176,097 for a rate of nearly 50 QSOs per hour!

On low power, K5LZO buried W8CQN's 1974 record with a 1035-QSO effort. The 1975 record on phone held by WA5VDH was almost topped by N4MM's 175,500 points, but John will have to try again next year to uncover the 27 extra QSOs he needed to break the record. The number-10 spot in the top-ten low-power scores required an increase of 12,000 points (or 10 percent!) in 1977 over 1976. It gets tougher every year.

A couple of scores really do merit special recognition. The effort from VE5DX on phone (number 10 in the top ten) was outstanding, though being about the only station on from Saskatchewan undoubtedly made a difference. George, WØUA, operating from home on cw and at WØTR on phone, turned in the number-two cw and number-three phone score. K4XU managed to make the top-ten low-power on both modes.

Congratulations to all of you who made a clean sweep. A total of 168 managed it on phone (109 in 1976). On cw the going was much tougher with only 27 making it (17 in 1976). The toughest job of all was a clean sweep on both modes. Only five managed it in 1976, but in the 1977 SS dual-mode clean sweeps were accomplished by K1RT, W1ZM, W2SZ (multiop), N6KB, N6MG, K6OQ, K6NA, W7WA, W8RC and VE5DX.

Top Novice scorers, in descending order were WB3DCT/N (33,158 points), WD4AEI/N, WB9UTY/N, WA2IGK/N and WB2JAY/N. Judging from their logs, a lot of higher-class license holders make occasional forays into the Novice bands for needed QSOs.



The big signal up north comes from VE5DX. Jim turned in the top high-power score on both modes in the Canadian Division.

For the third year in a row the Northern California Contest Club earned the gavel in the affiliated-club competition. Their total score was nearly one-million points better than the Potomac Valley Radio Club's score. NCCC seems to be pulling away in the club competition with a large margin of victory each time. The number of entries from the top two clubs was down a bit this year but the average score

*Assistant Communications Manager, ARRL

Division Leaders — CW

Division	High Power	Low Power	Multiop
Atlantic	W3LPL	K3TM	K3GR
Central	W9RE	K9WA	W9YH
Dakota	KØKX	NØNO	KØFVF
Delta	K5GO	K5UR	K5TYP
Great Lakes	K8MR	K8IF	W8UM
Hudson	W2GD	W2CS	K2TR
Midwest	KØMM	KØLUZ	WØEEE
New England	K1RT	W1ZT	K1XM
Northwestern	W7NI	K7ZA	K7WPC
Pacific	N6BT	N6CM	W6YX
Roanoke	K4VX	N4DW	W4BVV
Rocky Mountain	WØUA	KØDJ	WDØBZY/N
Southeastern	KP4RF	N4BP	N4KG
Southwestern	W6AM	W6UQF	WA6PZL
West Gulf	N5AU	K5LZO	N5DU
Canadian	VE5DX	VE1MX	VE3ART/3

Division Leaders — Phone

Division	High Power	Low Power	Multiop
Atlantic	K3NA	WA3TBW	N3ER
Central	W9RE	W9OBF	W9YH
Dakota	WØSD	KØFRP	KØFVF
Delta	W5VSZ	WB5NBC	AA4AA
Great Lakes	W8KIC	N8RA	W8WPC
Hudson	K2TR	WB2VFT	W2SZ
Midwest	WØZLN	WBØISW	WAØSWC
New England	W1ZM	WB2JSJ/1	N1MM
Northwestern	K7SS	W7GKF	W7FO
Pacific	W6XR	K6SSJ	N6EE
Roanoke	K4VX	N4MM	N4DW
Rocky Mountain	WØTR	K7GLL	WB5AXC
Southeastern	KP4RF	KG4OO	WA3FET/K
Southwestern	K6NA	W7UV	AA6RX
West Gulf	K5JA	K5VRX	K5RX
Canadian	VE5DX	VE6ATT	CY4UO

was up. Third place went to the up-and-coming Yankee Clipper Contest Club. They tripled last year's club score (New England Contest Club then) and have to be giving PVRC and NCCC a lot of heat in the next SS. The Texas DX Society and the Frankford Radio Club are new members of the top ten in club competition.

College and university club stations breaking the 200k-point mark were Rensselaer Polytechnic Institute (W2SZ), University of Illinois (W9YH), University of Missouri-Rolla (WØEEE), Ohio State University (W8LT), Georgia Tech (W4AQL), Penn State University (K3CR), University of Manitoba (VC9UM), and Stanford University (W6YX).

The three-tier club competition proposed by the Contest Advisory Committee and approved by the Board of Directors in January should be in effect by the time the 1978 SS comes along. Upcoming issues of *QST* will carry the complete details, but basically the three categories separate clubs with 10 or fewer entries, 11 to 50, and more than 50 entries.

A large number of logs were reduced in score because of duplicate QSOs, though few managed to exceed the two-percent criterion for disqualification. A few lost QSOs for stretching the clock a bit, and many people lost QSOs for incorrect call signs or incorrect exchanges. Remember to get all of the exchange down correctly and to check your logs *after* the contest to make sure you've eliminated the duplicates. Our eagle-eyed log checkers don't miss much!

Special thanks to all of you who used our forms for the contest instead of handmade ones. People using the homemade log and summary sheets don't always manage to include all of the information necessary.

Thanks to Bill Jennings, K1WJ, and to Arlene Duguay whose many hours of checking for duplicates and typing of the results should not go unrewarded.

Soapbox

A lot of big 3-kHz-wide signals with precedence A . . . after 22 years, SS is still the most interesting event in radio!! (KØCHE/9) Dinner bet with N8LL. Early in the contest my kW dies — he pulls ahead. He goes to sleep — I catch up. His rotor dies — now we're neck and neck. He thinks that the contest ends at 2400 and quits — I secretly pull ahead. He calls me on the phone and finds out that I'm still operating, gets back on, pulls ahead and wins. Surf and Turf to N8LL this year. Just wait 'til next year. (N8RA) Apparently a vast number of the contesting fraternity cannot spell. Many stations derived the call sign IJ from my phonetics, India Germany! (N6IG) My wife, Sheri and I worked Sweepstakes together and had a ball. Whenever I couldn't raise a station that we needed, she took the mic and with

Walt, WØCP, ended up number three on phone and number five on cw from the Colorado Section in the 1977 SS.

All-Time High-Power Leaders

CW Call	Score	Year	Division	Phone Call	Score	Year
W3LPL	175,528	77	Atlantic	K3NA	227,700	77
W9YT	154,800	74	Central	W9RE	225,450	77
KØKX	166,204	77	Dakota	WØSD	257,700	77
K5GO	169,312	77	Delta	W5VSZ	228,450	77
K4GSU	169,488	76	Great Lakes	WA8PLZ	213,014	76
W2GD	165,418	77	Hudson	WB2OEU	253,050	76
KØMM	142,992	77	Midwest	KØGXR	180,310	76
K1RT	168,150	77	New England	W1ZM	225,600	77
W7RM	168,150	74	Northwestern	K7SS	286,950	77
WA7NIN	172,950	76	Pacific	WA7NIN	262,950	76
K4VX	164,688	77	Roanoke	K4VX	222,300	77
WØUA	185,400	77	Rocky Mountain	WØTR	285,900	76
KP4RF	193,732	77	Southeastern	KP4RF	318,450	77
W6AM	182,656	77	Southwestern	W6HX	253,200	76
AA5LES	182,780	76	West Gulf	K5LWL/K5JA	244,050	76/77
VE5DX	160,650	77	Canadian	VE5DX	232,350	77

All-Time Low-Power Leaders

CW Call	Score	Year	Division	Phone Call	Score	Year
K3TM	119,574	77	Atlantic	WA3TBW	146,438	77
WB9GFC	128,772	74	Central	W9OBF	134,612	77
NØNO	122,544	77	Dakota	WBØDSP	122,850	72
K5UR	137,970	77	Delta	WA5VDH	179,400	75
W8CQN	137,492	74	Great Lakes	W8TR	117,718	76
W2CS	127,604	77	Hudson	WA2LBT	96,652	76
KØLUZ	115,340	77	Midwest	WBØISW	122,248	77
W1ZT	122,248	77	New England	K1EUF	152,144	71
K7ZA	109,938	77	Northwestern	W7GKF	148,200	77
K6SSJ	106,042	73	Pacific	K7JCA/6	153,825	73
N4DW	107,136	77	Roanoke	N4MM	175,500	77
KØDJ	126,288	77	Rocky Mountain	WBØMIV	176,100	76
N4BP	149,850	77	Southeastern	K4WAR	119,550	69
K6LKD	115,344	74	Southwestern	WB6PXP	136,656	75
K5LZO	153,180	77	West Gulf	K5RHZ	148,000	70
VE1MX	105,376	77	Canadian	VE6ATT	85,680	76

Clean Sweep Phone

W1ZM	N2WT	N4SA	K5HWO	N6CT	W8MNL	WØTR	K1AD*
K1RT	WB2VFT	N4UF	K5TM	K6PU	W8KIC	KØKE	W2SZ*
K1RM	K2SB	N4ZZ	K5GA	K6SG	N8ET	KØGU	WA3EKL*
K1WB	K2IGW	K4XU	K5WA	KH6IJ	WA8UQH	WBØNYY	K3CR*
W1YG	WA2SIS	K4VX	K5NA	K7KH	N8LL	WBØIKN	WB4JSO*
WA1UAD	WA2SFT	K4YF	N6IG	K7JVR	K8MN	WØTPO	W4AQL*
W1ZA	N3AD	N4RV	K6RV	W7ID	W8SWB	KØLUZ	N4DW*
K1AJ	K3SW	N4MM	WA6JUD	W7GKF	W8GS	WBØRET	K5RX*
K1IU	K5JZN/3	W4MYA	N6KB	K7OX	N8II	WØUC	K6HIH*
K1GSK	K3MWV	W4DM	K6SE	W7NI	K8LZ	WØZLN	W6RW*
WA1UZH	K3NA	K7ZZ/4	W6XR	W5XZ/7	K9CT	NØRJ	K6FB*
N4ZC/1	W3LPL	AA4FF	N6TU	W7IL	K9BGL	NØSS	N6RZ*
K1VR	K3TM	KØCMF/4	K6OQ	K7SS	K9NR	KØSCM	K6ZM*
W1OO	K3SA	N4DJ	N7MH/6	K7RI	WA9IXF	WØSD	N6EE*
K1IK	K3RA	KP4RF	N6MG	WA7UWE	K9HDE	WAØLYO	W8LT*
W1FP	WA3VUQ	WB5NBC	N6BT	W7WA	K9CC	VE5DX	W9YH*
K1BW	K3UA	W5VSZ	W6MSF	W7BUN	WB9CGL	N1MM*	W9VL*
W2YV	N4KG	W5YZ	W6MUR	W8RC	WB9TIY	K1WJ*	N9RR*
K2NN	K4JPD	K5JA	WB6UOC	W8FF	W9RE	W1GNC*	W9YB*
W2XL	K4HAV	W5MYA	K6NA	K8MJZ	K9UWA	K1DG*	WAØSWC*
W2RQ	K4FU	K5VRX	N6BV	WB8BGY	N9AW	K1MM*	WBØTCQ*

Clean Sweep CW

K1RT	N4BP	N6KB	K6NA	N7AM	WØUA	VE5DX	W4AQL*
W1ZM	K4PJ	N6MG	W7WA	W8RC	WØZU	W2SZ*	N5DU*
W1XT	N5AU	WB6DSV	K7RA	W9TG	VC9UM	W2HG*	WA6PZL*
W2NJ	K5NU	K6OQ					

*Multioperator

Affiliated-Club Competition

Club	Score	Entries	CW Winner	Phone Winner
Northern California Contest Club	11,205,572	114	N6BT	W6XR
Potomac Valley Radio Club	10,279,768	123	W3LPL	K3NA
Yankee Clipper Contest Club	9,175,366	108	K1OX	K2TR
Mad River Radio Club	5,027,902	49	K3UA	K3UA
Wireless Institute of the Northeast	3,057,338	32	W2RQ	W2RQ
Murphy's Marauders	2,584,050	25	K1RT	K1RT
Texas DX Society	2,333,070	20	K5RC	K5GA
Western Washington DX Club	2,215,510	26	W7WA	K7SS
Frankford Radio Club	2,199,540	27	W2GD	N3AD
Colorado Contest Conspiracy	2,080,984	16	WØUA	WØTR
Southern California Contest Club	1,556,166	16	W6AM	N6UR
South Jersey Radio Amateurs	1,272,381	49	WA2VYA	WA2VYA
Ill-Wind Contesters	1,044,180	14	K9KM	W9XR
Buffalo Area DX Club	1,043,388	15	K2IGW	K2IGW
Richardson Wireless Klub	1,004,150	17	K5NW	WB5TDO
L'Anse Creuse Amateur Radio Club	902,276	25	K8DD	K8DD
Central Illinois DX and Contest Club	885,078	13	K9CT	K9CT
Cascades Amateur Radio Society	817,328	19	WA8QEF	K8MJZ
Minnesota Wireless Association	795,676	13	KØIJL	KØIJL
Ft. Wayne Radio Club	794,730	14	K9TUS	K9KB
Gloucester County Radio Club	766,028	16	W2KI	W2KI
Ohio Valley Amateur Radio Association	700,242	13	W8RSW	W8GS
Central Florida DX Association	669,724	10	N4SA	N4SA
Mid-Mo Amateur Radio Club	648,440	17	NØSS	WØZLN
Saginaw Valley Amateur Radio Association	645,696	30	K8DO	K8DO
Texas Association of Contest Operators	636,766	6	K5ZD	
Indy DXers	592,700	4		
Twin City DX Association	587,406	5	KØKX	
Pennsylvania Wireless Association	534,202	17	K3OX	K3OX
Wisconsin Valley Radio Association	504,962	8	W9NA	W9NA
Central Michigan Amateur Radio Club	496,156	25	W8VPC	WA8QCW
Schaumburg Amateur Radio Club	465,962	4	K9RMA	K9RF
Kankakee Amateur Radio Society	461,578	5	K9NR	
John Brown University Amateur Radio Club				
University of Manitoba Amateur Radio Society				
Ozaukee Radio Club				
Canton Amateur Radio Club				
Northern Florida Amateur Radio Society				
Lake County Amateur Radio Club				
Motor City Radio Club				
Northeast Amateur Radio Contest Operators				
Synton Amateur Radio Club				
Eastern Iowa DX Association				
Connecticut Wireless Association				
Schenectady Amateur Radio Association				
Bluegrass Amateur Radio Club				
Overlook Mountain Amateur Radio Club				
St. Louis Amateur Radio Club				
Central Virginia Contest Club				
Western Carolina Amateur Radio Society				
Southeast DX Club				
Hazleton Amateur Radio Club				
Pennsylvania Amateur Radio Club				
Purdue Amateur Radio Club				
Arinc Amateur Radio Club				
Central Michigan Contesters				
Muskegon Area Amateur Radio Club				
Whitewater Valley Amateur Radio Club				
Lincoln Amateur Radio Club				
Fresno Amateur Radio Club				
Atlanta Radio Club				
Libertyville & Mundelein ARS				
Signal Hill Amateur Radio Club				
Alamance Amateur Radio Club				
Radio Amateur Megacycle Society				
Radio Amateur Technical Society				

her feminine voice she would get them every time! She won't let me live it down either. (WB9MMM/WB9SFT) I knew this was going to be a good contest when contact number 10 was Vermont. The happiest moment of the contest was when VE8AS came back to our first call for section number 75. (K6FB) Happiness is KZ5HQ breaking in and saying "I'm not in the contest, but I heard you say that you needed KZ5 . . ." Biggest thrill was the maximum rate of 113 QSOs per hour in the first hour of the contest and on 10 meters. This 113 is one-sixth of my entire last year's phone SS effort! (N6HE) The dupe sheet was hard enough to do last year, but with Ns and WDs added this year, it was beyond my ability. With AAs, WNs, KNs and WV prefixes on the way, I'm not sure what can be done. (K1MC) How about a Sweepstakes around July like the November SS or like the Bicentennial Celebration? (WB8WEZ) [Andy, the IARU Radiosport Championship is on July 8-9 this year. Try it, you'll like it! — Ed.] I didn't realize that the SWR on 40 meters was 5 to 1, until after I had worked 27 sections. (WB2KIH) My first SS and had lots of fun. I didn't break any records, just wanted to get my feet wet in contesting. I wish that there was more action for the Novice in this contest. (WD4DBB) Courtesy was the order of the day. Good sportsmanship at all times by everyone, makes this a really enjoyable contest. (K2JT) 120 QSOs in 46 sections . . .not bad for an apartment dweller, using a clothesline antenna. Conditions were terrific! (WA1KJT) This year, I had all the bad effects of a hangover on Monday, with none of the "joy." (N4OW) Dear Sadist: The contest, I learned, is fun up to a point. The bookkeeping is no fun. There has to be a better way. Don't know what it could be, but is sure is a pain in the butt (WB7ODU) K2AA — check 15!!! Unreal (WB1AOG/N) I went to see the movie *Star Wars* just before the phone contest and it certainly got me in the proper frame of mind. Unfortunately, "The Force" was with W9RE, not me this year (W9OBF)

Feedback

From 1976 Sweepstakes, K6AC should have been listed as the division leader in the Southwest Division, K1KDP, the division leader (multiop) in the New England Division, and WØNVP as the division leader (low-power) in the Midwest Division. K4WSF should have been number 10 in the low-power top ten. K5VTA was the operator of W5TMN.

Roger, N4RR, relaxes after a job well done. 174k points earned him the number-five slot among the best of the cw operators.

Top Ten

CW Call	Score	Phone Call	Score
KP4RF	193,732	KP4RF	318,450
WØUA	185,400	K7SS	286,950
W6AM	182,646	WØTR	285,750
W3LPL	175,528	WØSD	257,700
N4RR	174,762	W6XR	249,300
N5AU	173,250	K2TR	246,568
K5RC	171,988	KØKE	244,650
K5GO	169,312	K5JA	244,050
K1RT	168,150	K6NA	242,400
KØKX	166,204	VE5DX	232,350

Top Ten — Low Power

CW Call	Score	Phone Call	Score
K5LZO	153,180	N4MM	175,500
N4BP	149,850	WB5NBC	165,000
K5UR	137,970	W7GKF	148,200
K5MR	129,648	WA3TBW	146,438
W2CS	127,604	K5VRX	140,100
KØDJ	126,288	K4XU	139,350
NØNO	122,544	W9OBF	134,612
WB5YEM	122,360	K4FOB/5	126,280
W1ZT	122,248	WA7YXZ	123,432
K4XU	120,472	WBØISW	122,248

Score	Entries	CW Winner	Phone Winner	Club	Score	Entries	CW Winner	Phone Winner
451,456	4	K5GO		Valley Amateur Radio Association	141,914	10	W4XD	WA4RBF
434,792	7	VC9UM	VC9UM	Coconino County Amateur Radio Club	141,156	4	W7YS	
396,596	4	WB9OEC		Northeast Amateur Radio Club	138,946	4		
390,146	9	WB8URG	WB8WDO	IBM Owego Amateur Radio Club	137,860	8	WB2EXL	W2VDX
385,236	7	N4UF	N4UF	Mitre-Bedford Amateur Radio Club	136,774	8	W1KZR	W1FM
373,274	10	W9TG	W9TG	Kettle Moraine Radio Association	136,004	5	W9HE	
343,346	12	K8VA	K8SIA	Montgomery Amateur Radio Club	118,268	4		
338,322	3			Murray State University Amateur Radio Club	116,200	3		
320,202	3			Lubbock Amateur Radio Club	110,750	3		K5ERJ
317,106	4	KØLUZ		Southern Peninsula Amateur Radio Club	107,932	3		
311,886	5	W1BIH		Westpark Radiops	102,072	6	WD8ACM	W8IMF
309,114	6	WA2YYM		West Allis Amateur Radio Club	99,034	9	WB9TSL	WB9MFC
304,712	11	WB4FOT	WB4OSS	Old Barney Amateur Radio Club	97,972	3		
269,474	5	W2XL	W2XL	Larkfield Amateur Radio Club	94,064	3		
266,148	3			Chicago Radio Traffic Association	89,624	6	W9REC	WA9KAN
263,766	3			South Peninsula Amateur Radio Klub	82,882	5		N6IK
250,974	4			Spokane Radio Amateurs	80,316	6		WB7QEI
250,620	3	N4EV		Hub City Radio Club	78,572	4		WBØVGN
247,248	12	K3UK	K3BS	Shore Points Amateur Radio Club	76,962	6	W2KP	WB2EYF
237,086	7	N3DG	WA3WMF	Eastern Connecticut Amateur Radio Association	73,826	5	WB1AJJ	
230,124	3			Radio Club of Tacoma	69,852	3	W7LKG	
226,460	7	N3OS	K3ZZ	Northrop Amateur Radio Club	68,278	3		
226,306	6	W8HW	W8HW	Central Wisconsin Radio Association	68,162	4		
211,426	14		WB8PKU	Wellesley Amateur Radio Society	61,210	3		
210,562	9		N9NC	Boeing Employees Amateur Radio Society	53,844	4		
206,964	3			Reading Radio Club	48,308	3		
192,736	10	WA6JDB	W6DPD	Mike and Key Amateur Radio Club	42,608	3		
180,656	3			Great South Bay ARC	41,348	5	K2TV	
172,610	5	WB9TIY		Southern California DX Club	35,238	3		
161,618	5	WAØLYO		Livingston County Amateur Radio Klub	32,940	5	WB8VCC	
158,612	4		WA4FFW	Anne Arundel Radio Club	31,032	4	WA3YSW	
157,882	4			Lake Success Radio Club	21,908	5		N2RO
144,844	3							

Scores are grouped by call area, ARRL section, and in order from highest to lowest score; single-operator scores first and multiop second. The letter A or B at the end of each line score indicates the power class of the entry. Example: W1ZM 225,600-1504-75-24-B means 225,600 total points, 1504 QSOs, 75 sections, 24 hours of operation, and power over 200 watts.

Check Logs

WA1YNV WA1ZXB K1VOF/2 W2DAU N3AI N3EE WD4HXC WA4QMC W4RAL WA4TKG WB6AAJ WB6KIL/1 WA7IIQ K8IB WB8LZA WB8YQX W9LT W9TNZ WA0DCB VE3AWE VE8AO VE8PZ VE8RCS

Disqualifications

Phone

W1ERX,N3BA,WB9CEP,W9YT, WA0YFU

CW

None

CW Scores

U.S.A.

1

Connecticut

K1RT 168,150-1121-75-24-B
W1ZM(K1ZM,opr) 163,050-1087-75-24-B
K1PR 160,728-1086-74-24-B
K1ZZ 158,656-1072-74-24-B
WA1QNF 158,656-1072-74-24-B
K1RM 156,140-1055-74-24-B
W1GNC 130,752- 908-72-24-B
K1WB 118,428- 834-71-24-B
K1XA 117,504- 816-72-19-B
W1YG 113,820- 813-70-22-B
W1XT 107,550- 717-75-13-B
W1BIH 99,752- 674-74-16-B
W1XX 96,288- 708-68-24-A
K1DH 90,228- 618-73-17-A
N1JW 76,176- 552-69-18-B
W1VV 67,931- 459-74-14-B
K1ZX 67,320- 495-68-10-B
WA1CCR 65,688- 476-69-17-A
W1ACR 63,050- 485-65-19-B
K1CBR 61,104- 456-67-24-A
W1XK 57,600- 450-64-21-A
K1WA 40,392- 306-66-16-A
W1TCJ 40,064- 313-64-13-B
N1JA 36,192- 312-58-19-A
W1BO 29,160- 243-60-14-A
WA1UBX 28,024- 226-62- 9-A
W1VH 26,288- 212-62-12-B
WB1ALW 25,740- 234-55-23-A
W1ECH 23,970- 235-51-12-A
K1THQ 22,082- 181-61-13-A
N1GL 19,800- 220-45- -B
WA1NRG 15,198- 149-51-12-B
WB1AJJ 14,434- 213-34-17-A
W1BL 13,800- 138-60- 4-A
W1TUH 10,150- 145-35- 8-A
K1OQG 8448- 132-32- 5-A
K1DNW 8352- 116-36-10-A
WA1HYN 7564- 122-31- 4-A
WA1ZDW/N 5712- 102-28-20-A
K1TJE 2808- 78-18- 8-A
W1FTX 800- 25-16- 1-A
K1XM(+N1MM) 116,624- 788-74-24-B
K1MUJ(K1OQG,WA1HYN,oprs) 35,028- 278-63-12-B
WB1DQN/N(+WB1FJG/N) 2380- 35-17-14-A

Eastern Massachusetts

K1AR 160,580-1085-74-24-B
W1ZA(K1EA,opr) 159,286-1091-73-24-B
K1IU 133,736- 916-73-24-B
K2YY/1 129,356- 886-73-24-B
N4ZC/1 116,920- 790-74-21-B
K1VR 116,064- 806-72-17-B
W1NB 108,204- 762-71-20-B
W1LK 89,602- 631-71-18-B
N1EE 62,308- 421-74-16-B
N1US 61,506- 459-67-24-A
W1RND 59,754- 433-69-19-A
W1VL 47,652- 361-66-20-A
WA1MEE 46,238- 379-61-17-B
WA1SNR 42,640- 328-65-14-A
W1AX 33,500- 250-67- 5-B
WB1DQO 21,624- 212-51- 9-A
W1KZR 17,712- 164-54- 9-A
W1FM 14,520- 121-60-13-A
K1MC 13,464- 132-51-14-A
WA1UJU 12,800- 200-32-21-A
WA1YNV 11,696- 136-43-16-B
WA1KJT 11,040- 120-46-13-A
N1CW 10,260- 114-45-15-A
W1PLJ 8686- 101-43-12-B
WA1YMN 8610- 123-35-10-A
WA1KSF 8052- 66-61-16-B
WA1TAK 7372- 97-38- 5-A
N1RC 7280- 130-28- 7-A
W1YN 7200- 100-36- 3-B
WA1UZH 7144- 90-38- 8-B
N1AU 6794- 79-43-10-B
W1OPJ 5394- 87-31-11-A
WA1UHA 4620- 77-30- 5-A
W1JR 3696- 56-33- 3-B
WA1NME 3456- 54-32- 9-A
WB1DMZ 960- 30-16- 7-A
K1BA(+W1MJ) 98,974- 697-71-24-B

Maine

K1OT(K1OME,opr) 134,640- 990-68-24-B
K1RQ 123,648- 896-69-24-B
W1KX 80,784- 561-72-21-A
K2NA/1 73,872- 513-72-18-A
W1GX 48,300- 350-69-12-B
WA2ERT/1 39,336- 298-66-22-A
K1YHK 34,848- 264-66-16-A
W1SD 22,620- 174-65- 9-B
K1SA 18,684- 173-54- 6-B
WA1WXQ 9660- 115-42-12-A
W1OO 7904- 104-38- 3-B
W1UA 2288- 52-22- 2-B

New Hampshire

K1OX(K1UA,opr) 160,992-1118-72-24-B
K1XX 142,058- 973-73-24-B
W1PH 130,240- 880-74-24-B
K1FWE 104,974- 719-73-22-B
K1LL 97,704- 708-69-23-A
K1RX 84,840- 606-70-16-A
N1WR 74,382- 539-69-24-A
K1MBQ 52,578- 381-69-21-B
W1UN 6468- 77-42- 2-B
K1PLX 3472- 62-28-13-A
K1HI/1(+WA1MZV) 86,400- 600-72-23-B
W1HZH(+W1(BI) 14,080- 220-64-16-A

Rhode Island

K1AO 120,274- 847-71-24-B
WA1POJ 84,180- 610-69-24-A
K1JA 46,656- 324-72-20-A
WA1KVM 19,872- 184-54-11-A
K1KYI 1080- 30-18- 3-A
K1AD(N1OO,K1GNW,W1OH, N2CN,oprs) 111,148- 751-74-24-B
W1OP(K1DT,N1OM,oprs) 29,880- 249-60-13-A

Vermont

K1IK 118,944- 826-72-22-B
W1AYK 77,280- 560-69-17-B
W1FP 60,976- 412-74-18-A
K2HVN/1 57,460- 442-65-17-B
WA2EQW/1 41,140- 374-55-18-A
WB2JSJ/1 3024- 72-21- 2-A
WB1BZR 2544- 53-24- 6-A

Western Massachusetts

K1BW 145,408-1024-71-22-B
W1ZT 122,248- 826-74-24-A
W1YK(K1IR,opr) 102,492- 702-73-20-A
W1GG 80,064- 556-72-20-B
W1TM 53,318- 503-53-18-B
WA1TAI 43,276- 349-62-14-A
W1EZO 33,516- 266-63-11-A
W1PWK 27,264- 213-64-20-A
W1BR 17,992- 173-52- 8-B
WB1AOG/N 14,300- 130-55-13-A
K1IJU 10,824- 123-44- 7-A
K1KNQ 7420- 106-35- 8-B
WA1TUH 5400- 150-36- 3-A
WB1AUL 6206- 107-29-11-A
W1IAX 448- 16-14-11-A

2

Eastern New York

W2PV(K1DG,opr) 153,884-1054-73-24-B
W2CS 127,604- 874-73-24-A
K2NN(N3BA,opr) 126,728- 868-73-24-B
W2YV 125,268- 858-73-24-B
W2IB 124,246- 851-73-22-B
W2AZO 108,000- 750-72-22-B
K2ZM 86,056- 694-62-23-B
W2XL 82,320- 588-70-23-A
K2DW 75,040- 536-70-20-B
WA2HAI 71,860- 512-70-23-A
WA2YYM 67,536- 504-67-21-A
K2LX 65,860- 450-74-18-B
K2XA 64,454- 481-67-13-B
N2EK 64,446- 467-69-24-A
K2SD 49,724- 401-62-10-B
WB2CFP 43,648- 352-62-22-B
WB2WQA 35,880- 299-60-17-A
WB2YIP 32,736- 264-62-13-A
K2HA 30,228- 229-66-13-A
W2DW 26,676- 234-57- 7-B
WA2FFX 23,052- 226-51-11-A
WA2ZZQ 20,952- 194-54-14-A
WA2LJY 14,880- 155-48- 7-A
W2XU 10,010- 143-35-14-A
W2NRD 8910- 81-55-18-A
WA2OTC 6696- 93-36-18-A
WA2VAX/N 3100- 62-25-24-A
WB2SNT/N 3036- 66-23-18-A
W2FSL 924- 33-14- -A
K2TR(+WA2SPL) 143,226- 981-73-24-B
W2SZ(W1CK,N2FU,W2s SC UP, WB2GSW,oprs) 124,950- 833-75-21-B
WB2SCC(K2KO,W2IDI,WA2s FPG IPB IZM MJH,WB2s CEP JZZ,oprs) 30,336- 237-64-24-A
WA2JDH(+WB2s QZE RIU) 3192- 57-28-10-B

N.Y.C.-L.I.

N2NT 145,785- 985-74-21-B
K2NQ 134,174- 919-73-22-B
K2AU 128,772- 882-73-24-B
W2AEE 125,800- 850-74-24-B
W2FVS 120,028- 811-74-22-B
WB2SJG 118,844- 803-74-22-A
K2PE 111,024- 771-72-23-B
K2YGM 96,048- 667-72-23-B
N2AR 71,898- 521-69-23-A
W2EUO 71,346- 517-69-24-B
N2GC 62,016- 456-68-20-A
N2MA 49,642- 365-68-15-A
WB2GXW 38,780- 324-60-10-A
WA2HTP 30,276- 261-58-12-A
N2KA 25,986- 213-61-10-A
WB2UBK 23,200- 200-58-16-A
WB2JAY/N 14,800- 185-40-24-A
WB2KIH 13,328- 136-49- 7-A
WB2HIQ 10,890- 121-45- 8-B
K2TV 9840- 120-41- 7-A
W2CZZ 9000- 100-45- 6-A
WB2OWG 8128- 127-32-23-A
K2QD 7600- 100-38-13-A
WA2YUS 3472- 62-28- 7-A
WB2CHY 2900- 50-29- 7-A
WB2IBE 1820- 35-26- 9-A
WA2IFQ 1330- 35-19- 6-A
N2RO 532- 19-14- 5-A

Northern New Jersey

W2GD 165,418-1133-73-24-B
W2RQ 148,000-1000-74-22-B
WA2SZQ 116,208- 807-72-24-B
WB2FIT 107,068- 754-71-21-B
K2DM 98,784- 686-72-24-A
K2QQ 87,898- 619-71-23-B
WB2APO 80,660- 545-74-23-A
WB2RTF 72,432- 503-72-21-A
N2OM 65,274- 473-69-22-A
K2YJ 57,850- 445-65-14-B
K2JT 57,256- 421-68-16-A
W2NJ 48,300- 322-75-15-A
WB2POG 46,766- 349-67-15-A
WA2EPK 43,810- 337-65-24-A
N2EW 42,108- 319-66-19-A
WB2FGZ 40,690- 313-65-24-A
WA2GMO 39,942- 317-63-17-A
N2OO 34,060- 262-65- -A
WB2JGQ/N 31,560- 263-60-22-A
K2PF 30,464- 224-68-11-A
WA2ICK 26,108- 214-61-15-A
K2TWK 25,986- 213-61-15-A
WB2GZC/N 13,152- 137-48-13-A
W2HR 11,890- 145-41- 9-A
WA2CWX 5544- 84-33- 4-B
WB2CNF 1974- 47-21- 6-A
N2IN 1536- 32-24- 2-A
K2ROP/T 1232- 28-22- 4-A
WB2RNZ 1156- 34-17- 7-A
WB2LUP 750- 25-15-10-A
WB2MGY 160- 10- 8- 7-A
K2GQ(N2BQ,W2AQR,WA2MYZ, WB2s CKB FAS KGN RRL NEX ZDH,oprs) 41,236- 338-61-24-B

Southern New Jersey

W2REH 145,405-1024-71-22-B
N2MM 116,508- 798-73-20-B
W2KI 112,464- 792-71-24-B
N2CQ 108,000- 750-72-21-B
WA2VYA 106,500- 750-71-24-B
W2PAU 79,074- 573-69-21-B
WB2OSQ 78,810- 555-71-19-B
N2US 75,888- 558-68-22-A
WB2BVV 71,400- 510-70-21-B
K2TD 66,240- 460-72-21-B
W2GND 47,232- 328-72-21-A
W2KP 42,360- 353-60-14-A
N2GL 38,532- 338-57-22-A
WA2KOK 27,610- 251-55-20-A
K2KA 25,996- 194-67-12-B
W2EA 23,084- 199-58- 9-A
WB2EYF 18,656- 176-53-16-A
K2HPV 14,100- 150-47-10-A
WA2NEQ 12,936- 147-44-19-A
K2JF 12,348- 147-42-10-A
WA2YSA 10,800- 120-45- 8-B
W2REB 8372- 161-26-10-A
WA2WJL 6552- 91-36-13-A
WA2ONT 6048- 84-36-16-A
W2FGY 6000- 75-40-11-B
WB2PHD 5022- 81-31-11-A
WB2LCH 3528- 63-28-14-A
WB2VLD 2784- 48-29- 8-B
WA2VKG 2576- 56-23- 7-A
N2CC 2132- 41-26- 3-A
WA2DUE 1122- 33-17-14-A
WA2ONW 972- 27-18-11-A
W2OGZ 690- 23-15- 4-A
WB2GES 546- 21-13- 4-A
WA2GTD/N 384- 16-12- 6-A
K2AA(K2FT,WA2OMP,WB2CAK, oprs) 53,424- 424-63-21-B
WA2FZB(+WB2s AOL RRJ) 1320- 30-22-21-A

Western New York

K2IGW(WA2LCC,opr) 114,940- 821-70-20-B
WA2AOG 108,288- 752-72-24-A
WB2ABD 98,420- 665-74-22-A
WA2ECA 94,176- 654-72-23-A
WA2NPQ(WB2LHE,opr) 89,232- 676-66-23-B
K2FU/2 83,780- 590-71-24-B
WB2EXH 80,454- 583-69-24-A
N2CU 77,418- 561-69- -A
WA2LOI 63,894- 463-69-22-B
W2TZ 59,664- 452-66-10-B
W2FTY 52,392- 354-74-24-A
WA2AVQ 50,040- 417-60-16-A
K2VV 46,516- 401-58- 7-B
WB2EXL 45,024- 336-67-19-A
N2DS 41,400- 414-50-18-B
WA2EYA 39,732- 301-66-21-A
W2JJ 37,932- 327-58- 5-B
K2GXT(WA2FQE,opr) 28,800- 225-64-20-B
WA2AIV 27,900- 225-62-13-A
WA2ZJP 27,450- 225-61-10-B
WA2CJT 24,662- 209-59-12-A
WB2FFY 24,400- 200-61-17-B
WA2IGK/N 19,992- 196-51-18-A
WA2JWG 18,128- 206-44-14-A
K5HE/2 17,200- 172-50- 8-A
WB2YQH 9460- 110-43- 4-A
K2UAN 5200- 100-26- 7-A
WB2PMO 3776- 59-32-18-A
W2EZ 3740- 55-34- 7-A
WA2IMG 2240- 40-28- 7-A
K2GWN 1344- 32-21- 4-A

KØFRP in a before and after photo set, shows what 85-plus mi/h winds can do to a brand-new quad and supports. Al vows things will be fixed up in time for SS 1978.

WB2NFB/N 616- 22-14- 9-A
WB2KMS 570- 19-15-10-A
WA2QXA 120- 10- 6- 1-A
W2HG(+WA2HGS)
77,100- 514-75-23-B
WA2IAT(+WB2FDI)
40,470- 355-57-24-A
W2PE(WA2s OJX OJZ,WB2s OJV OKB OXG,oprs)
24,476- 211-58-24-A
K2KSJ(Multiop) 570- 19-15- 7-A

3

Delaware

W3DA 81,030- 555-73-22-A
WA3UKY 57,164- 461-62-14-B
K3HBP 34,500- 250-69-14-A
W3PQ 26,950- 245-55- 9-A
W3GL 2914- 47-31- 3-A

Eastern Pennsylvania

W3RJ 165,020-1115-74-24-B
K3OO 144,720-1005-72-24-B
N3AD 120,596- 826-73-24-B
K3SEW 100,594- 689-73-24-B
K3VW 88,900- 635-70-15-B
K3OX 87,984- 611-72- -B
W3GRW 87,188- 614-71-20-B
W3BI 78,336- 544-72-20-B
W3MA 77,452- 578-67-17-B
W3BGN 75,136- 587-64-14-A
W3ARK 73,700- 550-67-19-A
K3HXS 67,804- 506-67-14-B
WA3JYB 66,924- 507-66-18-A
N3DG 66,156- 447-74-19-A
W3ADE 52,768- 388-68-21-B
K9AI/3 50,570- 389-65-11-B
K3YL 50,250- 375-67-13-B
K3UK 39,996- 303-66-21-A
WB3CBI 39,330- 345-57-21-A
WA3MVP 36,344- 308-59-13-A
WB3DCT/N 33,158- 281-59-21-A
WB3HNF 33,138- 263-63-24-A
W3BF 24,084- 223-54-18-A
W3ZID 20,880- 180-58-14-A
WB3FNZ 17,760- 185-48-19-A
N3KR 17,064- 158-54-11-B
WA3WMF 16,500- 150-55- 7-A
K3WW 14,760- 205-36- 3-B
K3FD 10,904- 116-47- 8-A
K3KW 10,812- 106-51- 5-A
WB3DIV 10,320- 120-43-21-A
WB3AVF 8658- 117-37-14-A
W3KV 8464- 92-46- -A
W3CLM 8200- 100-41-11-A
N3JD 8200- 100-41-23-A
W1AJS/3 7920- 90-44- 6-A
WB3IUD/N 7144- 94-38-19-A
K3NL 7128- 99-36- 4-A
K3PA 6808- 92-37- 9-B
WB3DJF 3300- 55-30- 9-A
WA3MKB 2904- 44-33- 7-A
WB3AKI 2856- 51-28- 6-A
W3HMR 2756- 53-26- 4-B
WB3FYT/N 2736- 57-24-11-A
WA3NRU 2400- 50-24- 3-A
K3AGU 672- 24-14- -A
WA3RCA(WA3OVH,opr)
598- 23-13- 6-A
N3AY(+K3EIP)
63,140- 451-70-24-A
WB3BKV(+K3FD)
41,168- 332-62-20-A
K3PGI(+WA3BSV)
33,040- 280-59-18-B
K3WGR(+WB3CAC)
19,910- 181-55-18-A
W3OI(Multiop) 5280- 110-24- -A

Maryland-D.C.

W3LPL 175,528-1186-74-24-B
K3ZO 157,324-1063-74-24-B
K3NA 153,008-1048-73-24-B
K3SA 139,722- 957-73-24-B
K3RA 136,224- 946-72-24-B
N3CW 135,488- 928-73-24-B
W3GRF 121,004- 841-72-22-B
K3TM 119,574- 819-73-24-A
W3GZ 113,180- 757-70-24-B
N4IN/3 110,704- 748-74-24-B
K3RS(K3TA,opr)
96,276- 678-71-20-B
W3MR 96,186- 697-69-24-B
K2PLF/3 91,760- 620-74-24-A
W3UO 89,740- 641-70-22-B
N3IO 84,952- 574-74-16-B
N3RL(N3TR,opr)
84,774- 597-71-24-B
N3II 78,912- 548-72-24-A
K3VX 77,472- 538-72-19-A
W3AZ 73,700- 550-67-20-B
N3OS 72,468- 549-66-21-A
WB3ZAS 72,072- 546-66-17-B
W3GNR 71,260- 509-70-22-A
N3UN 70,858- 499-71-19-B
W3FA 70,720- 544-65-20-B
K3ZZ 70,488- 534-66-23-B
WA3KCY 69,160- 494-70-21-B
WB3AVN 68,820- 465-74-14-B
K3DMG 68,724- 498-69-20-A
K3AO 66,740- 470-71-14-B
K3PI 62,586- 513-61-23-A
N3AM 56,700- 450-63-11-A
W3ZP 43,920- 360-61-13-B

WA3EOQ 42,960- 358-60-17-B
K3TW 41,310- 405-51- 8-B
W3HVM 38,016- 288-66-13-B
W3UJ 36,864- 288-64-20-A
WB3AMM 35,456- 277-64-19-B
W3USS(WA1FEO,opr)
34,760- 316-55- -B
K3PZE 32,026- 239-67-18-B
W3XE 29,640- 260-57- 8-B
WB3DBI 26,950- 245-55-18-A
K2SCU/3 27,032- 218-62-13-A
W3EE 26,448- 232-57-16-A
WB3DHA 24,752- 238-52-18-A
WB3DTQ 18,462- 181-51-18-A
K3NS 17,380- 158-55- 6-A
W3ML 15,776- 136-58- 6-B
W3IDT 15,360- 160-48-15-A
WB3IXC/N 15,210- 169-45-24-A
WA3YSW 14,400- 144-50-15-A
DK5AD/W3 14,350- 205-35- -B
K3KA 12,342- 121-51-10-A
WA3EEE 12,338- 199-31-12-A
W3FZV 10,750- 125-43- 6-A
WA3VPL 9180- 102-45-14-A
WA3RSK 7568- 88-43- 2-A
W3DJI 7360- 92-40- 9-A
K3CKT 5040- 72-35- 3-B
K3CN 4968- 69-36- 7-A
K3AZK 4480- 70-32- 9-A
W3TUX 4012- 59-34- 8-A
WB3GWM 3328- 52-32- 6-A
N3PM 3200- 50-32- 6-A
W3RIL 2- 1- 1- 1-B
N3GB(+WA3ECT)
89,838- 651-69-23-B

Western Pennsylvania

K3UA 158,544-1101-72-24-B
K3KO 91,296- 634-72-21-A
W3AS 85,626- 603-71-16-B
W3IW 64,736- 476-68-20-A
W3VC(WA4GBC,opr)
64,528- 436-74-16-B
WA3VJL 63,240- 465-68-20-B
W3GB 61,200- 425-72-23-A
WB3AXN 53,268- 386-69-18-A
K3IC 50,050- 385-65-16-B
K3VCH 33,640- 290-58-16-A
W3HDH 15,048- 132-57- 3-B
WB3CDD 13,770- 153-45-18-A
WA3WIK 10,656- 111-48- -B
WB8AHH/3 5740- 82-35- 8-A
K3LA 2550- 51-25- -A
WB3JIJ 2332- 53-22- 7-A
WB3FBJ 1596- 38-21- 8-A
WB3EUM 468- 18-13- 8-A
WB3JFS 90- 9- 5- 8-A
K3CR(WA3NQX,JFW,ZUS,opr)
129,220- 910-71-24-B
W3YI(WA3s GSB TBL TIQ TJX ZDD,oprs) 19,886- 163-61-16-A
WA3UDI(WB3s DKT DKU HSV, oprs) 19,788- 194-51-10-A

4

Alabama

K4GSK 22,560- 188-60-14-A
W4RAL 16,800- 150-56- 8-A
K4ZGB 10,332- 123-42- 4-B
WB4BXM 4224- 64-33- 5-A
WD4HBZ 2862- 53-27-11-A
WD4DBB 60- 6- 5- 6-A
N4KG(+WN4KKN)
124,320- 840-74-22-B

Georgia

K4BAI 150,516-1017-74-24-B
K4JPD(WA4OZT,opr)
121,552- 856-71-24-B
W4BTZ 117,530- 805-73-24-B
K4BAM 67,592- 476-71-23-A
K4HAV 64,080- 445-72-19-B
WA4IAR 34,200- 285-60-17-A
W4LOD 23,370- 205-57-12-A
W4PDR 18,480- 165-56-13-A
AA4GA 8446- 103-41- 9-A
WB4TYF 1386- 33-21-16-A
WD4KRF/N 992- 31-16- 5-A
W4AQL(N4HR,WA2MBV, WA3WAD,WA4QYV,WD4EON, oprs) 106,500- 710-75-24-B

Kentucky

K4FU 70,372- 482-73-15-B
WB4FOT 68,180- 487-70-20-A
WB4PRU 41,736- 304-67-22-A
N4TY 32,208- 264-61-12-A
N4XM 26,640- 222-60- 8-B
WA4GHO 15,198- 149-51-10-A
WB4UQI/N 7400- 100-37-19-A
WB4LSG 1302- 31-21-16-A
WA4OEB 440- 22-10- 7-A
N4BW 240- 12-10- -A
WA4UQA 180- 10- 9- 5-A
WA4OND(+K4VCS,WB4s MQR PVC,WD4HCS)
29,100- 291-50-24-A
W4JP(+WA4JAV)
11,040- 115-48-10-A

WB4NTB(WA4s NAR PSO UNJ WB4OEM,oprs) 9964- 106-47-14-A

North Carolina

WA4FFW 103,104- 716-72-23-B
N4AA 59,400- 450-66- 9-B
N4YM 51,660- 410-63-14-B
WA4PSL 49,270- 379-65- 9-A
N4RE 35,990- 295-61-12-A
K4CAX 32,736- 264-62- 9-B
K3OMI/4 26,962- 221-61-13-A
WD4AEI/N 26,796- 231-58-23-A
WB4BGL 23,712- 208-57- 9-A
WA4LWO 20,608- 161-64-13-B
N4GF 13,932- 129-54- 8-B
WD4MBV/N 4588- 74-31-24-A
N4ZH 8000- 100-40- 4-A
WD4MBV/N 4588- 74-31-24-A
WB4TTJ 2550- 51-25- 6-A
WD4CTA 552- 23-12- 7-A
W4AHY(AA4ZZ,WA4s RVC UOP WB4CFV,WD4KWU,oprs)
22,032- 204-54-23-A

Northern Florida

N4SA 149,628-1011-74-20-B
N4UF 109,200- 780-70-24-B
K4LAN 95,566- 673-71-16-B
W4VQ 81,252- 549-74-12-B
N4GG 37,440- 312-60- 6-B
WB4DTS 30,916- 262-59-11-A
WA4DOL 20,988- 198-53-16-B
WD4HDS 17,900- 179-50-17-A
WB4SQA 15,900- 150-53- 5-A
N4EF 8800- 100-44- 4-A
WA4MOJ 4620- 66-35-12-A
WB4YFF(+WB4DRZ)
95,566- 673-71-23-B
W4IZ(N4UF,WB4s UKX YEY,oprs)
29,040- 242-60-17-A

South Carolina

K4OAQ 85,932- 693-62-24-A
K4RV 51,504- 348-74-18-A
WD4AWN 12,954- 127-51-20-A
WD4LLC/T 2912- 52-28-14-A
WD4LBC/T 2088- 36-29-18-A
N4EE 2070- 45-23- 4-B
WD4IWO/N 1140- 57-10-14-A

Southern Florida

N4RR 174,762-1197-73-24-B
N4BP 149,850- 999-75-24-A
N4OW 118,712- 836-71-24-A
WA4KMO 64,944- 492-66-15-B
K4XB 57,078- 453-63-21-B
K4HYE(N2CR,opr)
34,364- 242-71-14-A
N4KB 21,230- 193-55- 7-A
WA4UQM 15,484- 158-49-10-A
WA4FYZ 11,520- 120-48- 9-B
WA4LZR(K4XF,WAØACF,oprs)
98,420- 703-70-24-B
WB4QNX(K4IQJ,WA4CTC, WB4NTH,oprs)
20,374- 167-61-12-B

Tennessee

N4ZZ 153,792-1068-72-24-B
K4XU 120,472- 814-74-24-A
K4AMC 93,024- 646-72-24-A
N4SX 88,536- 651-68-20-B
K3CQ/4 76,928- 601-64-24-A
N4UW 75,190- 515-73-21-A
K4PJ 48,375- 323-75-18-B
WB4MUZ 39,032- 287-68-21-B
K4BQ 27,966- 237-59-11-A
K4XO 26,000- 200-65- 7-A
WA4EVB 20,604- 202-51-14-A

Virginia

K4VX(WB4SGV,opr)
164,688-1128-73-24-B
W4KFC 144,004- 973-74-19-B
K4PQL 139,018- 979-71-23-B
K4FJ 133,920- 930-72-24-B
W4DM 109,938- 753-73-23-B
N4DW 107,136- 744-72-23-A
W4YE 105,228- 711-74-22-A
W4EI 100,656- 699-72-22-B
W4HBK 91,908- 621-74-24-A
N4ZR 78,242- 551-71-24-A
WA4WYN 74,606- 511-73-23-A
K4GKD 72,136- 508-71-12-B
K4CG 70,716- 498-71-12-B
K1FR/4 70,380- 510-69-19-A
K4JM 66,930- 485-69-13-A
W4NH 66,080- 472-70-14-B
K4KA 61,962- 449-69-17-A
W4ZM 61,200- 450-68-12-B
W4EZ 61,028- 418-73-13-B
K4OD 59,924- 422-71-19-B
W4GF 58,220- 410-71-13-B
W4MYA 47,736- 351-68-10-A
W4XD 45,540- 330-69-16-A
K4TM 42,918- 311-69-12-A
K4KDN 42,420- 303-70-22-A
K4GEL 33,634- 251-67-11-A
K4EVH 33,150- 255-65-24-A
W4KP 32,804- 278-59-22-B
WA4UYD 32,076- 297-54-13-A
WA4EAZ 27,594- 219-63-12-A
K4EJG 23,790- 195-61-15-B
N4RA 22,950- 225-51- 6-A
K4JTH 21,710- 167-65-20-B
K4VO 16,352- 146-56-10-B
WA4FKK 16,060- 146-55-12-A

N4YJ 15,484- 158-49- 7-A
WB4DBK 13,120- 160-41- 6-A
AA4TC 12,544- 128-49-16-A
N4QS 12,576- 131-48- 7-A
WD4JEK 12,160- 152-40-21-A
WA4NTP 11,480- 140-41-18-A
WD4ECK/N 10,906- 133-41-21-A
N4LE 10,620- 118-45- 6-A
K4EJ 10,620- 90-59-10-A
W3YY/4 10,064- 148-34- 6-B
K5KT/4 8569- 102-42- 7-A
K4AW 3976- 71-28- 3-B
N4XG 2322- 43-27- 4-A
WB4WDM 2000- 40-25-15-A
K4DHB 1188- 33-18- 3-A
N4MM 864- 24-18- 1-A
WB4NBI 98- 7- 7- 2-B
W4ZRJ 8- 2- 2- 1-A
W4BVV(K3KU +Net)
159,840-1080-74-24-B
N4RV(+Net) 149,776-1012-74-24-B
W3ZZ/4(+Net)
121,508- 821-74-21-B
WA4YTN(+WA3KWU)
37,576- 308-61-17-A
W4RBC(WB8ZNE,WBØUZZ,oprs)
5110- 73-35-12-A

West Indies

KP4RF(KP4EAJ,opr)
193,732-1309-74-24-B
KP4EKI 148,148-1001-74-23-B
WB8NTK/KP4
78,810- 555-71-21-B
KG4OO 19,780- 215-46-18-A

5

Arkansas

K5GO 169,312-1144-74-24-B
K5UR 137,970- 945-73-24-A
WB5YEM 122,360- 874-70-24-A
WB5NBC 110,016- 764-72-23-A
WA5HNN 109,872- 763-72-22-B
W5KL 71,552- 559-64-16-B
WB5STD 36,252- 318-57-16-A
W4OGG/5 19,100- 191-50- -A
WB5TGP/N 17,150- 175-49-24-A
W5EIJ 6248- 71-44- 7-B
WB5WOQ 4680- 65-36- 9-A

Louisiana

K5KU 150,672-1032-73-24-B
W5MH 93,586- 641-73-24-A
K5MC 55,120- 424-65-16-A
W5WG 47,334- 343-69-22-A
W5HGT(WB5YDF,opr)
30,240- 252-60-23-A
WD5GCD 18,370- 167-55-18-A

Mississippi

W5VSZ 137,376- 954-72-24-B
K5SA 125,800- 850-74-22-B
K4VFY/5 113,884- 802-71-22-A
W5TV 28,440- 237-60-19-A
WD5GNR/T 9064- 103-44-16-A
WD5GDA 950- 25-19- 9-A
K5TYP(WB4KST,WB5s NRH ZQD, WB6UVI,WA7YEJ,WB8FBN, WD8LOQ,WDØETG,oprs)
22,776- 219-52-24-A

New Mexico

WA5YTX 137,048- 926-74-24-B
W5YZ 93,536- 632-74-24-A
W5QJH 52,948- 427-62-10-A
W5JOV 2760- 46-30- 2-A

Northern Texas

N5AU 173,250-1155-75-24-B
K5RHZ 150,192-1043-72-24-B
K5NW 131,904- 916-72-24-B
K5MR 129,648- 888-73-24-A
N5TP 121,392- 843-72-19-B
W5ONL 67,060- 479-70-19-A
WB5RPU 61,776- 468-66-24-A
K5ME 53,250- 375-71-24-A
WB5BNG 34,018- 233-73-23-A
K5SOR 30,360- 230-66-16-A
K5ZAI 11,280- 120-47-12-A
WD5AAT 9102- 111-41- 5-A
W5QF 8190- 91-45- 5-A
WB5TDO 8112- 104-39-15-A
WB5ZFX/N 8000- 100-40-19-A
WB5MJK 7138- 83-43-11-B
W5LA 3534- 57-31- 3-A
W5SOD 2912- 52-28- 6-B
K5BOX 1720- 43-20- 4-A
WA5SMJ 1320- 33-20- 8-A
WD5BCI 96- 8- 6- 5-A
K5SR(+K5FN,WB5WRO)
103,806- 711-73-20-B
K5GD(+WB5TGK)
16,720- 152-55-13-A
WD5GXO/N(+WD5EEF/T)
8118- 99-41-24-A
WD5BCF(+WD5BCH)
1092- 26-21-16-B

Oklahoma

WB5QGE 64,056- 471-68-24-A
WB5WFB 53,558- 439-61-21-A

K5EA 50,148- 398-63-10-
WB5VXL(+WB5ZRN)
2500- 50-25-13-

Southern Texas

K5RC 171,988-1178-73-24-
K5ZD 159,840-1110-72-24-
K5LZO 153,180-1035-74-23-
K5NU 147,600- 985-75-24-
K5FP 115,488- 802-72-21-
K5NA 114,878- 809-71-16-
K5WA 114,610- 785-73-20-
K5MA 95,472- 663-72-15-
K5KG 94,896- 659-72-18-
K5TM 90,440- 646-70-12-
K5GB 90,000- 625-72-19-
W5DPA(WB5LIC,opr)
84,096- 584-72-21-
N5QQ 78,390- 585-67-22-
K4FOB/5 68,380- 526-65-16-
K5EI 37,210- 305-61-16-
W5NR 31,960- 235-68-14-
WB5NDQ 23,296- 208-56-13-
WA5ZKO 14,964- 129-58-12
WD5DPP 9270- 103-45-12
WB5UCL 8692- 106-41- 8
WB5NXH 2200- 44-25- 2
WB5GMB 950- 25-19- 3
N5WW 864- 27-16- 1
WA5IYX 240- 12-10- 5
N5DU(+WB5QWX)
147,600- 984-75-24
W5AC(K5s FJZ GN MW VK,oprs)
146,592-1018-72-24

Canal Zone

KZ5FR 110,814- 759-73-19-

6

East Bay

K6XV 150,672-1032-73-24
K6RV(N6OP,opr)
138,892- 952-73-24
N6KB 117,160- 789-75-24
WA6JUD 89,216- 656-68-24
N6VV 81,322- 557-73-20
N6NE 73,982- 521-71-20
K6ZM 67,308- 474-71-23
K6ATV 65,888- 464-71-24
K6RM 59,782- 421-71-22
K6PJY 58,220- 410-71-19
K6CSL 20,160- 180-56-21
WA6QC7 10,904- 116-47-11
W6RQZ 7332- 94-39-14
WD6AEF 256- 16- 8-12
W6BB(N6KL,WA6DGX,oprs)
39,520- 304-65-17
K6HIH(+K6AUC)
116,362- 797-73-24
W6CO(WB6s DXR MKT,oprs)
23,800- 200-59-16

Los Angeles

W6AM(N6TJ,opr)
182,646-1251-73-24
K6SE 142,284-1002-71-24
K6MP 123,264- 856-72-20
N6PN 90,864- 631-72-24
WA6PPZ 78,480- 562-70-21
W6OLO 56,032- 412-68-23
N6GL 36,984- 276-67-18
WA6FYW 33,672- 276-61-12
WA2ZEW/6 30,056- 221-68-18
N6SU 19,836- 171-58-
N6AA 18,338- 173-53-
K5DY/6 15,552- 162-48-
WA6VVR 7448- 98-38-13
N6IC 6100- 61-50-
WA6PXY 6004- 79-38-
WAØQNT/6 5110- 73-35-
WA6HQS 4200- 60-35-14
N6HE 3872- 44-44-
WA6PZL(+WB6JJE)
91,500- 610-75-23
WB6VVS(+K6YMK)
44,982- 357-63-15
WB6NEM(+WB6YTU)
42,624- 333-64-24
W6YRA(WA6IKO,WB6WKY, WD6BAY,oprs) 8484- 101-42-10

Orange

K6LL 160,162-1097-73-24
K6IM 57,460- 442-65-1
WA6KHB 34,282- 281-61-1
WB6AKR/6 16,200- 150-54-
N6HK 10,404- 102-51-1
WB6AJV 2520- 42-30-
WA6KMS 1044- 29-18-1
WD6BNG 126- 9- 7-
WA6IWH/T 98- 7- 7-
WA6JAH(+K6CYX,WA6SRI, WB6BGV) 59,568- 438-68-

Santa Barbara

K6WI 98,112- 672-73-24
W7CB/6 67,620- 483-70-14
W6KPJ 66,882- 471-71-24
N6MW 65,992- 452-73-12
WB6CBV 24,544- 208-59-18
W6MUL 16,284- 138-59-
WB6HTK 10,856- 118-46-
WB6DNN 6080- 76-40-11

Santa Clara Valley

N6BT 160,580-1085-74-24-B
W6XR 145,708- 998-73-23-B
N6MG 131,580- 877-75-24-B
N6CN 129,352- 874-74-24-B
W6MSF(WA6VEF,opr) 125,424- 871-72-24-B
WB6DSV 125,400- 836-75-24-B
N6IG 124,320- 840-74-24-B
N6GG 122,988- 831-74-24-B
N6TU 122,056- 836-73-24-B
K6OQ 116,850- 779-75-24-B
K6BR 99,968- 704-71-24-B
W6TPH 93,744- 651-72-21-B
N6CM 93,732- 642-73-24-A
K6XM 93,586- 641-73-23-A
N6RO 88,400- 650-68-11-B
K6FB 81,760- 560-73-23-B
W6IO 79,032- 534-74-22-A
K6RU 75,036- 507-74-17-B
K6MA 73,260- 555-66-22-B
WA6GFY(WB6EXW,opr) 67,670- 505-67-20-B
WB6GYJ 57,120- 408-70-16-B
W6CNA 52,122- 357-73-18-B
W6LFB 30,222- 219-69-14-A
W6NWS 25,190- 229-55-18-A
N6IK 24,480- 204-60- 9-B
W6SUJ 24,400- 200-61-11-A
W6VG 22,000- 200-55-18-A
K6SMH 17,400- 150-58- 8-B
W6KZJ 16,060- 146-55- 7-B
WA6ITV 13,800- 150-46-17-A
WB6HWQ 11,500- 115-50- 8-A
K6MO 10,152- 108-47- 6-A
WA6AMW 7392- 88-42- 6-A
K6ZX 6800- 85-40- 4-A
N6NF 6510- 105-31- 5-B
WA6VCN 4818- 73-33- 8-A
WA6HAD 360- 18-10- 6-A
W6YX(W2JU,K4EO,WA6s ACE ITV K7MH,oprs) 136,752- 924-74-24-B
W6JZU(W1ARR,WA6HJV,oprs) 132,568- 908-73-22-B
K6DC(+WA6DGX) 123,696- 859-72-23-B
N6RZ(+WB6CJE) 115,048- 788-73-24-B
N6LC(+WB6UOC) 103,248- 717-72-24-B
WB6PCO(+WA6SAK,WB6SHD) 84,560- 604-70-24-B
W6YL(WA6HCI,WB6PYI,oprs) 58,624- 458-64-17-B

San Diego

K6NA 161,250-1075-75-23-B
W6UQF 103,944- 732-71-24-A
W6RDF(K6ZH,opr) 70,280- 502-70-14-B
W6JL 53,634- 377-71-13-A
N6TE 38,726- 289-67-10-A
W6UUS(N6MZ,opr) 28,408- 212-67-11-B
W6JXA 12,954- 127-51-10-A
N6ND 12,000- 100-60-10-A
N6KA 10,848- 113-48- 5-A
AA6EE 8568- 102-42-10-A
WA6UAZ 3596- 62-29- 3-A
N6KW 2160- 45-24- 2-A
K6NS 240- 12-10- 1-B

San Francisco

N6RA 151,256-1036-73-24-B
N6BV 145,188- 981-74-24-B
N6CT 118,260- 810-73-24-B
WB6NHF 96,944- 664-73-24-B
WD6BTQ 26,334- 231-57-20-A
WB6QVW 22,852- 197-58-18-A
K6ILM 7954- 97-41- 3-A
K6LRN 5040- 70-36- 4-A
WD6CKD/N 1776- 37-24- 7-A
WB6TKD 72- 6- 6- 2-A
W6BIP(+WA6DJI) 110,408- 746-74-22-B

San Joaquin Valley

K6AYA(WA6OEC,opr) 84,732- 614-69-18-B
WA6KMW 52,360- 374-70-21-A
WB6YMO 40,602- 303-67-20-A
W6BYH 36,984- 268-69-17-A
WA6JDB 36,366- 319-57-11-B
N6UR 30,680- 260-59- 9-B
K6TG 18,920- 172-55-11-A
W6BVM 8360- 95-44- 5-B
N6PR 8232- 98-42-14-A
WB6KHR 1440- 30-24- 4-A
WA6SOM 816- 24-17- 6-A
WA6YAB 616- 22-14- 5-A
WB6ITM 300- 15-10- 2-A
W6YKM(+K6AO,W6MYP) 67,692- 497-68-22-B

Sacramento Valley

N6JV 108,040- 740-73-24-B
K6SG 98,560- 704-70-24-B
W6NKR 62,780- 430-73-17-B
W6EGX 37,440- 260-72-17-A
N6DM 25,760- 184-70-15-A
N6JM 13,776- 123-56- 6-B
WA6BRV 5920- 80-37- 7-A

Pacific

KH6IJ 113,442- 777-73-23-B
KH6JMP(K1BT,opr) 39,960- 333-60- 8-B
KH6HC 15,606- 153-51-13-A

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Arizona

WB7AEB 137,936- 932-74-24-B
K7CS 99,360- 720-69-21-A
W7ZMD 93,388- 631-74-20-B
W7YS 80,496- 559-72-17-B
K7KH 71,346- 517-69-16-B
K7CPC 64,960- 464-70-23-A
K7JVR 57,084- 402-71-17-B
WB7ODU 40,626- 333-61-19-A
WA7NXL 39,260- 302-65-21-B
N7MM 31,944- 242-66-14-A
W7KPL 30,208- 236-64- -A
WB7PXD

WB7PXS 28,304- 232-61-13-A
K7BO 21,616- 193-56-15-A
N7IR 21,358- 181-59-14-A
WA4DOU/7 17,500- 125-70-20-A
W7BMC 15,680- 140-56-13-A
WB7EUJ 3900- 65-30- 7-A
WA7IYG(K7WC,WB7s ORT,QJS, WBØHBS,oprs) 62,580- 447-70-24-B

Idaho

W7ID 142,228- 961-74-24-B
W7LLM 79,328- 536-74-19-A
WA4QIP/7 4290- 65-33- 5-A
WB7NSW 112- 8- 7- 1-A

Montana

W7JYW 99,360- 690-72-23-B
WB7EJS 2214- 41-27-11-A

Nevada

K7OX 134,474- 947-71-23-B
W7HI 75,336- 516-73-20-A
WA7YHP 59,640- 420-71-24-A
K7PSK 23,664- 204-58-24-A
WB7TPV 14,014- 143-49-24-A
WB6GFJ/7 1302- 31-21- 3-A
WB6BYU/7(+WA6MYU) 936- 26-18- 5-A

Oregon

W7NI 151,548-1038-73-24-B
K7FU 103,740- 741-70-24-A
K7TM 89,836- 607-74-24-A
W7TC 74,382- 539-69-23-B
W7WHO 70,700- 505-70-21-A
W7KMB 70,596- 477-74-23-A
K7VM 49,660- 382-65-17-B
W7JZV 48,024- 348-69-22-B
N7TE 23,154- 227-51-24-A
W7TWL 4352- 64-34-14-A
WB7NVL 4320- 72-30-11-A
W7LT 4032- 56-36- 6-B
WA7YOH 1344- 32-21- 5-A
WB7SRX/N 832- 26-16-18-A
K7WPC(+WB7PQU) 73,304- 539-68-23-B

Utah

K7UM 71,960- 514-70-18-A
N7RU 27,612- 234-59- 7-B

Washington

W7WA 123,150- 821-75-24-B
K7ZA 109,938- 753-73-24-A
WA7RKJ 101,814- 717-71-24-B
N7DX 100,594- 689-73-24-B
N7ZZ 99,216- 689-72-19-B
K7RA 92,400- 616-75-17-B
N7AM 81,150- 541-75-21-B
K7WA 70,664- 484-73-24-A
WA7VNI 58,788- 414-71-21-A
W7LKG 51,972- 366-71-24-B
W7NP 47,214- 387-61-16-B
K7NF 30,798- 261-59-13-B
K7SS(W7FU,opr) 29,380- 226-65- 6-B
WB7QEI 21,112- 203-52-18-A
WB7DSI 21,008- 202-52-17-A
K7MF 20,680- 188-55- 7-B
W7LRD 18,880- 160-59-18-B
K7OEW 17,670- 155-57- 7-A
W7BYK 16,500- 165-50- -A
W7BUN 14,448- 168-43- 5-B
W7AJS 13,920- 145-48-13-A
WB7OJV 12,040- 140-43-24-A
WB7PEX 10,488- 138-38-22-A
K7BFL 5832- 81-36- 5-A
W7ERH 5508- 81-34-13-A
K7UU 5400- 100-27- 3-A
W7DK(WB7NVP,opr) 3432- 66-26- 4-A
WB7PSP 2860- 65-22- 8-A
WB7RMQ/N 1440- 36-20-14-A
K7MM(+KH6IFN,WB6NCK,WB7s EHM SOL) 65,262- 447-73-24-A
N7RV(+K7YST) 38,412- 291-66-22-A
WB7FFF(+WB7EEH) 37,878- 321-59-22-B
K7NWS(W7LUR,WB7SPF,opr) 616- 22-14- 7-A

Alaska

KL7GN 32,574- 267-61-13-A
KL7AF 18,228- 186-49- 9-B

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Michigan

K8LX(WA8ZDT,opr) 151,694-1039-73-24-B
K8IF 113,734- 779-73-23-A
N8BM 112,420- 803-70-22-B
W8RC 110,400- 736-75-24-B
K8DD 102,952- 725-71-20-B
W8JKU 93,240- 315-74-23-B
WA8MAM 88,914- 609-73-24-A
WA8JFQ 87,188- 614-71-24-B
K8WSN 86,162- 643-67-21-B
W8VPC 82,644- 582-71-22-A
K8RM 82,110- 595-69-20-A
K8QKY 77,818- 533-73-22-A
WA8MEC 73,712- 542-68-20-A
W8MNL 72,420- 510-71-70-B
WA8QEF 70,200- 540-65-24-B
K8DO 68,544- 504-68-24-B
WB8GUD 68,310- 495-69-20-B
W8TJQ 67,104- 466-72-23-A
K8MJZ 67,060- 479-70-22-B
W8FJ 67,000- 500-67- 9-B
K8MWB 65,520- 455-72-24-A
W8HW 63,888- 484-66-18-A
K8TE 56,304- 414-68-15-B
W8QM 55,624- 409-68-23-B
K8VA 54,470- 419-65-19-B
WB8MTD 52,992- 414-64-20-A
WD8ANC 51,660- 369-70-20-A
W8MPD 46,410- 357-65-15-A
K8IRC 45,632- 368-62-13-A
WB8AAX 44,160- 345-64-20-B
WB8YRY 41,040- 360-57-20-A
WA8ECH 40,986- 297-69-21-A
WB8VWW 39,780- 306-65-17-A
WB8FEZ 39,650- 305-65-24-A
WA8RTP 39,558- 347-57-13-B
WD8DIB 38,418- 337-57-24-A
K8TPT 36,850- 275-67-18-A
WA8QAF 35,640- 297-60-22-A
K8KA 35,280- 294-60- 9-A
K8CN 33,840- 282-60-10-A
K8SIA 33,132- 251-66-15-B
K8CYK 32,382- 257-63-18-A
WB8YDR 31,122- 273-57-19-A
WB8KFV 30,090- 255-59-11-B
N8OK 30,044- 259-58-20-A
N8WW 30,030- 231-65-12-A
WD8BVI 30,024- 278-54-11-A
WA8MOY 28,006- 209-67-20-A
W8KPK 25,172- 203-62-15-A
W8PVI 24,738- 217-57-18-A
WD8DMX 24,592- 232-53-16-A
W8WVU 20,696- 199-52- 5-A
WB8NSF 19,952- 172-58-20-A
W8TWA 19,580- 178-55- 7-A
K8DU 19,440- 180-54-13-A
WB8YZE 18,816- 168-56-11-B
WD8DSV 17,160- 165-52-13-A
WA8QCW 16,224- 156-52-11-A
WD8DWQ 16,112- 152-53-19-A
N8WA 16,112- 152-53-18-A
W8JUP 15,510- 141-55- 9-A
WB8VCC 15,072- 157-48-24-A
N8NA 14,586- 187-39- -A
W8IS 14,560- 140-52- 6-A
WB8ZME 13,066- 139-47-19-A
WD8BHE 13,020- 155-42-13-A
WD8DQR 12,056- 137-44-14-A
W8EGI 11,960- 130-46- 6-A
W8PBO 11,070- 123-45- 3-B
W8LCU 10,656- 111-48-10-A
WB8VBC 10,434- 111-47- 6-B
W8OM 10,200- 100-51- 5-A
WA8VEB 9450- 105-45- 4-A
WD8CSA 9200- 115-40-15-A
WD8DKM 9176- 124-37- -A
K8OT 9000- 100-45-11-A
W8VWY 8856- 108-41- 6-A
K8LF 8400- 100-42-11-B
W8HAN 7052- 86-41- 8-B
WD8MFS 6560- 80-41-18-B
K8MVZ 6480- 90-36-16-A
WB8WBJ 6438- 67-37- 6-A
WD8LKG 5890- 95-31-11-A
WA8LSS 5858- 101-29-20-A
WB8BBO 5698- 77-37-14-A
WB8NXG 5698- 77-37-11-A
WB8LZA 5254- 71-37- -B
K8LJG 4960- 80-31- 2-A
WD8DNZ 4884- 74-33-10-A
W8TCY 4860- 81-30-11-A
WB8LWS 4818- 73-33-10-A
WB8VVY 3654- 63-29- 9-B
W8YL 3300- 55-30- 4-A
WD8MFP 3190- 55-29-16-A
WB8SHL 3190- 55-29-11-A
WA8COR 3120- 52-30-13-A
WB8KFU 3100- 50-31-15-A
WD8ITP 2520- 60-21-14-B
WD8JNP 2254- 49-23- 5-A
W8QS 2200- 50-22- 8-B
W8IJS 2112- 48-22-18-A
WD8IBW 1890- 35-27- 8-A
WB8YOB 1840- 46-20-12-A
WB8ILV 1400- 35-20- 6-A
WD8JET 1360- 34-20- -A
W8DYC 1050- 25-21- 3-A
W8TKW 1000- 25-20- -A
WB8JZZ 540- 18-15-12-A
WD8JUJ 384- 16-12- 3-A
WB8PLO 340- 17-10- 9-A
K8GB 288- 12-12- 6-A
WD8AXB 272- 17- 8- 3-A
WD8MCN 210- 15- 7- 2-A
K8TK 200- 10-10- 1-A
WD8NKC 154- 11- 7- -A
WB8AYW 144- 12- 6- 1-A
K8BR 80- 8- 5- 2-A
W8UM(N2IC,W2PA,N3ER,oprs) 125,720- 898-70-24-B
W8JKU(Multiop) 46,620- 315-74-23-B
WB8JYX(+WB8MDG) 9592- 109--4- 5-B
WD8EDJ(+WD8AEL) 8888- 101-44-22-A
WA8LSS(+WD8CUQ) 5858- 101-29-20-A
WD8CQN(+N8HT) 5780- 85-34-18-B
W8QN(+WB8VAS) 5530- 79-35- 6-B
WD8ECT(+WD8ECU) 4154- 67-31-24-A
WB8UHS(+WD8JUJ) 2646- 63-21- -A

Ohio

K8MR 154,216-1041-74-24-B
WA8YWX(K3LR,opr) 151,552-1024-74-24-B
W8KIC 146,438-1003-73-24-B
N8ET 122,976- 854-72-24-B
K8AC 121,824- 846-72-23-B
K8NZ 106,704- 741-72-15-B
K8URE(N9AG,opr) 105,228- 711-74-24-B
W8KRR 92,500- 625-74-20-A
W8RSW 92,352- 624-74-18-B
WA4RIJ/8 89,060- 610-73-24-A
WB8SVN 88,184- 604-73-24-A
K8RMN 86,724- 594-73-24-A
K8EKG 82,600- 590-70-17-A
W8CD 80,500- 575-70-21-B
W8GS 80,068- 541-74-16-B
N8LM 71,000- 500-71-19-A
W8FN 71,000- 500-71-19-A
W8TK 69,810- 537-65-11-B
WD8ACM 68,742- 513-67-22-B
W8UPH 67,968- 531-64-22-B
K8MN 65,136- 472-69-18-B
K8BL 60,480- 432-70-18-A
W8SWB 58,650- 425-69-20-B
W8IQ 55,664- 392-71-10-A
W8LHV 54,166- 371-74-18-B
WB8URG 54,102- 381-71-24-A
N8TM 50,440- 388-65-12-B
W8XU 46,800- 360-65-17-A
WA8KKN 45,426- 339-67-17-A
W8GOC 41,340- 318-65-17-A
N8FU 40,848- 296-69-20-A
W8VQI 39,600- 300-66-15-B
W8IDM 37,092- 281-66-14-B
W8EDU(K8MT,opr) 36,360- 302-60- 8-B
K8DL 35,160- 293-60-10-B
WD8CJQ 34,816- 256-68-17-A
WB8YVI 34,428- 302-57-11-A
W8TD 32,240- 248-65-16-A
WA8LWH 32,128- 251-64-16-B
WA8UQH 27,846- 221-63- 9-B
W8YD 26,040- 210-62-15-B
WB8NBA 24,530- 223-55-22-A
WD8JJA 24,108- 246-49-24-A
WD8AFB 22,936- 188-61-17-A
K8DG 22,288- 199-56- -A
WB8YQT 21,412- 202-53-20-A
WD8DTG 21,204- 186-57-14-A
K8BA 21,168- 216-49-13-A
W8PCS 19,440- 162-60- 9-A
K8EF 18,056- 148-61-10-A
N8XX/8 16,640- 130-64- 9-A
W8DWP 16,608- 173-48-11-A
WD8CIE 15,708- 154-51-16-A
K8HF 12,152- 124-49- 5-B
WB8YDP/N 5312- 83-32-14-A
WB8UVZ 5254- 71-37-17-A
K8NU 5110- 73-35- 3-B
WB8NBY 4556- 67-34- 9-A
WB8TJS 2860- 55-26- 6-A
W8DXT 2646- 49-27-19-B
WD8BQV 2600- 52-25- 5-A
W8MC 2240- 35-32- 4-A
WD8EKX 1632- 20-12- 9-A
WD8DKJ/N 1320- 33-20-16-A
W8LZT 1000- 25-20-17-A
WD8LFK 930- 31-15- 7-A
WD8BGW 552- 23-12- 6-A
WD8KNE 98- 7- 7- 3-A
WB8VWM 50- 5- 5- 1-A
K8ND(+WB8HWE) 122,882- 842-73-24-B
WB8JBM(WB8s DQP LSN, WD8LRV,oprs) 121,126- 853-71-24-B
W8LT(K1LT,WA8YBT,WB8s FSV TXE,oprs) 107,380- 767-70-23-B
W8AL(+WA8ADA,WB8s LCF VLK, WD8DIT) 33,384- 321-52-23-A

West Virginia

N8II 129,168- 897-72-24-B
K8JQ 96,040- 686-70-17-B
W4NW/8 66,640- 476-70-16-B
W8UT 25,010- 205-61-12-A
WD8EGW 14,800- 200-37- 9-A
K4CQA/8 14,352- 138-52-17-A
W8JWX 8910- 99-45- 5-B
K8SR 4896- 68-36- 6-A
WD8JJQ/N 1804- 41-22- 6-A
WB8WEZ/N 112- 8- 7- 4-A
W8IJ 8- 2- 2- 1-A

9

Illinois

K9KM 144,152- 974-74-24-B
K9RMA(K9NO,opr) 132,728- 912-72-24-B
K9CT 132,202- 931-71-24-B
K9TI 113,960- 814-70-22-B
W9VA 112,608- 782-72-23-B
K9WA 110,084- 754-73-24-A
WB9CGL 108,928- 736-74-24-A
K9CC 108,720- 755-72-24-B
WA9PBK 108,062- 761-71-20-B
K9UIY 104,340- 705-74-22-A
K9NR 101,088- 702-72-24-B
N9RR 93,840- 680-69-23-B
K9KO 93,720- 710-66-24-A
W9RW 93,388- 631-74-19-A
N9NA 86,250- 625-69-21-A
K9RS 81,760- 560-73-23-A
WA9GAM 80,316- 582-69-24-B
W9MVL 76,176- 502-72-20-A
WB9SDE 73,968- 522-67-18-B
K9JU 73,278- 531-69-23-A
K9EI 68,870- 485-71-21-A
K9CW 67,192- 454-74-18-A
WB9TIY 62,580- 447-70-20-A
WA9EBT 49,956- 362-69-13-A
K9UQN 42,900- 330-65-12-A
N9TR 38,144- 298-64-18-A
W9NU 36,036- 273-66-17-B
WA9FYG 26,880- 224-60-18-A
WA9FBC 25,498- 209-61-13-B
WB9TPN 23,200- 200-58-19-A
WB9ZKK 22,600- 226-50-16-B
WB9UTY/N 20,570- 187-55-17-A
W9QWM 20,384- 182-56-12-A
WA9IXF 18,810- 209-45- 6-B
W9REC 18,544- 152-61-12-B
WB9IOG 16,224- 156-52-14-A
WB9YVR 13,680- 152-45-23-A
WD9DCL 13,348- 142-47-10-A
WB9SMU 11,934- 117-51-13-A
K9AR 11,172- 133-42- 5-B
WB9ZED 10,800- 120-45-13-A
WB9VJN 10,290- 105-49- 9-B
W9HPG 10,272- 107-48- 7-A
WA9UHA 10,064- 136-37- 9-A
W9WR 9612- 89-54-10-B
WD9ERG 8118- 99-41-22-A
W9TNZ 6106- 71-43- 8-A
W9LBQ 6084- 78-39- 9-A
WB9GOJ 5688- 79-36- 3-A
WD9COA 3840- 60-32-17-A
WA9KAN 3584- 64-28-14-A
W9ZEN 3300- 66-33- 7-A
WD9DVQ 3200- 50-32- 4-B
W9AGM 2800- 50-28- 3-A
K9JK 1200- 30-20- 2-A
WA9WXC 672- 21-16- 2-A
WD9DMV/N 546- 21-13-12-A
WB9NEH 468- 18-13- 2-A
K9HDE 418- 19-11- 3-A
WD9AIG 400- 20-10- 7-A
WA9OFM 144- 9- 8- 1-A
WB9HGN/T 128- 8- 8- 1-A
W9YH(K9s GL JA VV,WB9s HRQ OEP MEK,oprs) 135,864- 918-74-24-B
W9DY(WA9s LEY VYB,WB9TZM) 87,162- 597-73-24-B
N9JF(+WA9QNM) 76,464- 531-72-24-A
K9BK(+WB9YJU) 50,864- 374-68-23-A
WB9PTK(+WB9YTE) 28,160- 220-64-19-A
WB9YTC(+WB9TAB) 25,842- 219-69-24-A

Indiana

W9RE 148,148-1001-74-24-B
K9UWA 140,600- 950-74-24-B
W9TG(WA9ITB,opr) 139,650- 931-75-23-B
K9TUS 91,584- 636-72-19-B
WB9QCP 85,504- 668-64-24-B
W9OBF 84,490- 595-71-24-A
W9JOO 82,080- 570-72-24-A
K9DC 62,342- 511-61-18-A
W9LTU 53,312- 392-68-19-A
N9JG 49,824- 346-72-24-B
W9EI 47,784- 362-66-13-A
K9NS 39,808- 311-64-14-B
WB9QYU 39,312- 312-63-20-A
WB9SKA 31,440- 262-60-12-A
WB9VHZ 28,024- 226-62-17-A
WB9JKO 26,562- 233-57-10-A
WA9DJP 26,216- 226-58-23-A
WA9YOS 25,800- 258-50-12-A
W9QLW 24,800- 200-62-12-B
WA9PKL 11,696- 136-43-14-A
WB9PIR 9546- 111-43-11-B
WB9GCH 9240- 105-44-16-B
WD9FAP 7680- 120-32-15-B
K9DMH 6600- 100-33-15-B
WD9ATB 6560- 80-41- 7-B
WD9EWT 2800- 56-25-13-A
WD9EWM 2288- 52-22-10-A
N9RC 2250- 45-25- 7-B
WB9OYD 1480- 37-20- 8-A
K9WWT(+WB9PIF,WD9s ETH ETJ) 62,700- 475-66-24-B
N9NB(+N9NC,WD9s AHO DAS) 57,204- 454-63-22-B

Wisconsin

W9NA 132,336- 919-72-23-B
W9YT(WB9KMQ,opr) 120,842- 851-71-24-B
N9AW 110,880- 770-72-24-B
WB9OEC 95,200- 680-70-20-B
N9UR 92,584- 652-71-23-A
W9LO 91,448- 644-71-23-A
W2WOE/9 88,324- 622-71-24-B
W9OP 88,040- 620-71-17-B
W9OC 87,454- 599-73-24-A
WA9IRV 84,048- 618-68-24-A
WB9PYE 59,340- 430-69-18-A
W9HE 58,098- 421-69-16-A
W9GHY 54,046- 443-61-24-A
W9MDU 49,392- 392-63-17-A
WB9TXE 47,952- 324-74-23-A
KØCHE/9 46,900- 350-67-21-B
WB9EJE 45,016- 331-68-22-A
W9FBC 41,182- 349-59-17-A
W9GIL 33,534- 243-69- -A
W9EA 21,840- 195-56-10-B
W9WI 21,094- 199-53- 8-A
WB9BJO 20,720- 185-56- 7-B
WB9TSL 7830- 87-45- 6-A
K9KR 7560- 105-36- 6-A
WD9DTF/T 4292- 74-29-20-A
W9YCV 3504- 73-24- 5-A
WB9DVQ 3200- 50-32- 4-B
WB9UIU 2288- 52-22-12-A
K9WTF 840- 28-15- 8-A

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Colorado

WØUA 185,400-1236-75-24-B
K7LR/Ø 139,104-1008-69-24-B
WØCP 131,040- 910-72-24-B
KØDJ 126,288- 877-72-23-A
WØETT 110,522- 757-73-24-A
WAØYFU(WBØDLE,opr) 94,220- 673-70-24-A
WØYK 72,226- 539-67-24-A
NØST 39,690- 315-63-13-A
WØDZ 35,658- 283-63-14-A
WØHXB 26,790- 235-57- 8-A
WDØBML/N 14,880- 155-48-23-A
WBØMCL 1564- 34-23- 7-A
WBØQPQ 570- 19-15- 2-A
WDØBZY/N(+WDØDLY/N 28,160- 256-55-23-A
WØQEY(WD5BCK,WBØYTU, WDØEGE) 12,838- 131-49-18-B
WBØZBE(+WDØDUA) 3720- 62-30-13-B

Iowa

KØMM 142,992- 993-72-24-B
NØGA 142,560- 990-72-24-B
KØLUZ 115,340- 790-73-24-A
WØEJ 108,360- 774-70-24-B
WAØVKF 102,384- 711-72-23-B
WØSI 99,426- 681-73-24-A
WAØODK 89,460- 639-70-24-A
WBØPYD 86,052- 606-71-16-B
WØIZ 68,256- 474-72-24-A
WBØJEE 60,016- 484-62-18-A
WAØUZG 48,732- 393-62-21-A
WØVU 41,942- 313-67-15-A
WAØCZA 33,712- 301-56-13-B
KØPNZ 27,018- 237-57-17-A
WØWP 25,724- 218-59- 9-A
NØBB 10,400- 80-65-19-A
WØJTC 3074- 53-29- 8-A
WØVX 952- 27-18- 1-B
WBØSPY 546- 21-13-14-A
WØIO(WB3BCJ,WAØWGE,WBØs CHP CSG UZI VRQ,oprs) 44,604- 354-63-21-B

Kansas

WAØSWC 73,128- 554-66-18-B
KØFPC 70,226- 481-73-23-A
WBØVEZ 29,610- 235-63-15-A
WØIX 11,000- 100-55- 6-A
KØSBV 10,296- 99-52- 6-B
WBØWQQ/N 9652- 127-38-17-B
WBØTOQ 7488- 96-39-12-A
WØYRN 5950- 85-35-13-A
WDØEFT 5852- 77-38-19-A
WDØDGJ 5184- 72-36-16-A
NØIN 4216- 68-31- 1-B
WBØOLA 3422- 59-29- 6-A
WBØZAT 2430- 45-27- 7-A
WBØPED 50- 5- 5- 3-A

Minnesota

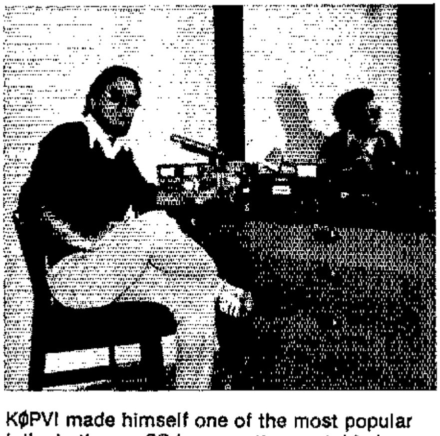
KØKX 166,204-1123-74-24-B
WØZZ 148,000-1000-74-24-B
WØSA 142,704- 991-72-24-B
KØIJL 125,244- 882-71-22-B
NØNO 122,544- 828-74-24-A
KØTO(WAØLKL,opr) 117,460- 839-70-24-B
WØUC 111,106- 761-73-24-A
WØYCR 105,420- 753-70-20-B
WØUO 104,400- 725-72-24-B
KØMPH 102,240- 710-72-24-A
WØBF 66,264- 502-66-11-B
WBØOUH 63,382- 473-67-20-A
KØFZG 55,704- 422-66-20-A
WBØNPB 50,274- 399-63-22-A
WØROE 45,508- 367-62-21-A
WBØYUU 30,438- 267-57-15-A
WBØWYU 28,490- 259-55-12-A
WBØPGZ 25,878- 227-57- 9-A
KØIR 25,048- 202-62-12-A
WØMSV 24,426- 207-59- 9-A
WBØPWG 23,760- 198-60-16-A
KØVW 20,800- 200-52-10-A
WBØUKI 15,824- 172-46-16-A
WBØZUV 10,028- 109-46-23-A
WDØEHX 5518- 89-31-18-A
WØUBT 4988- 86-29- 4-B
KØTG 4380- 73-30- 4-A
KØTK 2496- 48-26- 2-A
KØFVF(+KØTK) 59,592- 464-64-14-B
KØLTC(KØGRA,WBØs FBN GPR HRX MCJ MJJ RYB SNG SNH SNP TFA UBT,WDØs CIZ EZE,ops) 35,796- 314-57-24-B

Missouri

NØSS 140,160- 960-73-24-B
KØDEQ 116,340- 831-70-24-B
WØZLN(WAØCWV,opr) 104,044- 703-74-20-B
NØTT 97,300- 695-70-24-A
KØVBU 91,296- 634-72-24-A
NØDX 83,720- 598-70-15-B
WAØIYY 62,696- 461-68-18-A
NØRJ 53,940- 435-62-21-A
WØZU 53,250- 355-75-18-A
WØRNG 45,108- 358-63-18-A
WBØLFY 33,060- 290-57-15-B
WØQWS 27,492- 237-58-10-A
WBØBAV 14,006- 149-47-11-A
WØBV 13,502- 157-43- 9-A
KØQNU 12,382- 151-41- 7-B
WDØECO 10,530- 117-45-10-A
WBØOFJ 2916- 54-27- 9-A
WBØTPK 1848- 44-21-10-A
WDØCRW 1426- 31-23-15-A
WBØGRJ 768- 24-16- 3-A
KØJJS 208- 13- 8- 2-B
WØEEE(NØAX,WBØs IXI SDK,oprs) 102,930- 705-73-24-B
WBØTPP(+WBØUFJ,WDØs AHU AZM) 18,200- 182-50-21-A
WBØZGE(+WBØZGD) 6264- 87-36-17-A

Nebraska

WØQNP 25,648- 229-56-19-B
WB6FHK/Ø 13,056- 136-48- 9-B
WBØWHM 8888- 101-44- -A
WDØBQG 8712- 99-44-19-B
WAØMRH 6150- 75-41-18-A
KØNB(+WBØKDI) 70,144- 548-64- -B



KØPVI made himself one of the most popular folks in the cw SS by operating portable in seven-land and passing out the much-sought-after Wyoming Section.

N6IG finished in seventh place on cw in the Santa Clara Valley Section.

At the ripe old age of 14, Paul, VE1AVI, entere his first SS and enjoyed every minute of it.

North Dakota
KØFRP 78,336- 544-72-22-A
WA9IAT/Ø 5624- 76-37-11-B

South Dakota
WØSD(KØRA,opr) 131,320- 938-70-24-B
WBØPYL 65,928- 492-67-23-A
WAØLYO 47,710- 367-65-22-A
WØPHP 10,488- 117-46- 8-A
WAØBWF 2132- 41-26-12-A
WAØZXV 220- 11-10- 4-A
WBØVGN(+WDØCUC) 43,092- 342-63-20-A
WBØLQX(+KØOR,WBØs ZZF ZZH,oprs) 3780- 63-30- 7-B

VE

Maritime-Newfoundland
VE1MX 105,376- 712-74-21-A
VE1VI 38,488- 283-68- -A
VE1EP 10,082- 71-71- -A
VE1AVI 9890- 115-43-14-A

Quebec
VE2AH 64,610- 497-65-21-B
VE2AQP 47,610- 345-69-20-B
VE2HY 47,520- 360-66-18-A
VE2FU 24,486- 231-53- 6-A
VE2EOH 17,200- 172-50- 9-B
VE2DUN 2000- 40-25- 3-A

Ontario
VE3GCE 76,300- 545-70-22-A
VE3DAP 60,320- 464-65-21-A
VE3BAY 45,152- 332-68-19-B
VE3DUS 32,574- 267-61-11-A
VE3ACB 25,620- 210-61-17-A
VE3YV 10,608- 102-52- -B
VE3DH 5106- 69-37- 4-A
VE3AOJ(+VE3CPW) 4884- 66-37- 8-A
VE3IRN 336- 14-12-13-A
VE3ART/3(+VE3s ATO FBI GAS) 94,068- 702-67-19-B

Manitoba
VC9UM(VE4VV,opr) 122,550- 817-75-22-B
VE4OY 85,342- 601-71-22-A
VE4RF 74,592- 518-72-20-A
VE4UO 28,500- 250-57-12-A
VE4XI 9632- 112-43-12-A
VE4GBS/4(VE4UO,opr) 70- 7- 5- 1-A

Saskatchewan
VE5DX 160,650-1071-75-24
CY5YA 59,400- 495-60-17

Alberta
VE6ATT 25,134- 213-59-15
VE6AFE 552- 23-12- 5

British Columbia
CY7CC 154,660-1045-74-24
VE7CMK 69,030- 531-65-24
VE7IQ 58,320- 405-72-21
VE7CKF 1360- 40-17- 9

Phone Scores

U.S.A.

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Connecticut
W1ZM(K1ZM,opr) 225,600-1504-75-24-B
K1RT 221,850-1479-75-24-B
K1RM 211,200-1408-75-24-B
K1EB(WB2GXW,opr) 168,046-1151-73-24-B
K1WB 146,550- 977-75-24-B
W1YG 135,600- 904-75-23-B
W1OD 123,060- 879-70-22-B
WA1UAD 109,200- 728-75-21-B
K1CO 86,140- 590-73-24-B
N1JW 84,672- 588-72-14-B
W1VV 81,906- 561-73-13-B
K1DH 80,798- 569-71-12-B
W1GSH 72,988- 514-71-18-B
WA1ZVS 61,124- 518-59-23-A
K1WA 59,280- 456-65- 8-B
WA1UBX 53,060- 379-70-14-A
K1ZZ 52,440- 460-57- 5-B
WA1ZEF 43,940- 338-65- -A
W1XK 35,772- 271-66-13-A
W1TUH 22,578- 213-53-12-A
WB1ASH 17,600- 200-44-16-A
WB1DLA 15,600- 156-50-11-A
WA1UNK 13,832- 133-52-13-A
K1DD 8184- 132-31- 6-A
WA1SQB 6120- 90-34- 2-B
N1GL 4590- 85-27- 2-B
N4OC/1 2750- 55-25- 3-B
N1MM(+K1XM) 181,350-1209-75-24-B
K1WJ(+WB6KIL,WA1QNF) 169,950-1133-75-24-B
W1GNC(+W1XX) 147,300- 982-75-24-B

Eastern Massachusetts
W1ZA(K1UA,opr) 197,250-1315-75-24-B
W1CF(K1OME,opr) 192,428-1318-73-19-B
K1AJ 185,700-1238-75-24-B
K1IU 153,600-1024-75-24-B
K1GSK 140,850- 939-75-24-B
WA1UZH 104,400- 697-75-24-B
N4ZC/1 88,200- 588-75-13-B
K1VR 70,350- 469-75-17-A
W1YN 66,716- 464-72-15-B
K1MBQ 60,066- 423-71-20-B
W1FM 60,048- 417-72-24-A
W1FJ 35,464- 286-62- 5-B
WB1DML 35,420- 322-55-22-A
W1FJI 30,972- 267-58-12-B
W1DYH 22,032- 204-54-10-B
K1FIR 20,300- 175-58- 8-B
K1PTE 18,422- 151-61- 7-A
W1CRL 15,400- 140-55- 9-A
N1CW 15,360- 128-60- 8-A
W1AX 13,600- 100-68- 5-B
WA1SNR 13,356- 126-53- 4-A
W1PLJ 10,500- 125-42-11-B
K1CHY 5168- 68-38- 9-A
WA2MZE/1 5148- 78-33- 6-A
N1RC 504- 18-14- 1-A
W1JR 198- 11- 9- 1-B
K1DG(+K1AR) 180,600-1204-75-24-B
WA1VMU(K1ZX,N1EE,WA1ZZV, WB2CTO,WB2MZU,oprs) 95,060- 679-70-19-B
K1MM(K1s AR DG,oprs) 93,000- 620-75-16-A
W1TKZ(WA1s PQY TAK WOE YHT WB1s BVN BVQ,oprs) 48,438- 349-69-22-B
WA1CBH(+WA1s WNF WNL WZF ZJV) 46,092- 334-69-20-A

Maine
K1RQ 177,750-1185-75-24-B
K1SA 71,680- 512-70-16-B
W1OO 64,950- 433-75-11-B
W1UA 47,952- 333-72-12-B
W1GX 44,800- 350-64-11-B
W1SD 41,026- 281-73-15-B
WA1DXS 27,216- 216-63- -A
WA1WXQ 22,960- 205-56-18-A
WA1DIO 1470- 35-21- 2-A

New Hampshire
K1XX 220,076-1487-74-24-B
K1FWE 116,352- 808-72-21-B
WA1YDC 95,542- 713-67-24-A
K1LL 84,490- 595-71-19-A
K1PLX 31,960- 235-68-22-A
K1GW 27,948- 274-51-12-B
W1FMF 26,660- 215-62- 8-A
WA1TZV 5332- 86-31- 7-A
W1UN 520- 20-13- -B
WB1CAG(+K1UTI,WA1s ODG,SUH WB1s ACB,CTE) 53,868- 402-67-19-B

Rhode Island
WA1TFF 142,968- 966-74-22-B
K1AO 100,100- 715-70-21-B
W1GFH 89,176- 628-71-23-A
K1KYI 75,372- 571-66-20-B
K1HMO 52,920- 378-70-14-B
N1DM 16,218- 159-51- 7-A
WA1YIS 14,292- 146-51-12-A
K1DS 13,632- 142-48- 6-A
WA1POJ 12,400- 200-31- 6-A
K1AD(N1OO,W1OH,oprs) 147,900- 986-75-24-B
W1OP(WA1RKL,opr) 2508- 57-22- 6-A
K1UZ 1022- 33-17- 1-A

Vermont
K1IK 170,400-1136-75-21-B
WB2JSJ/1 116,772- 789-74-24-A
W1FP 60,900- 406-75-15-A
WB1BZR 19,360- 176-55-12-A

Western Massachusetts
K1BW 199,950-1333-75-22-B
K1KNQ 122,544- 851-72-19-B
WA1TAI 101,178- 693-73-19-A
W1GG 83,804- 574-73-21-A
W1ZT 80,208- 557-72-20-A
K1SF 32,376- 228-71-12-B
WA1YRA 24,244- 209-58-12-A
WA1PCJ 22,272- 192-58-12-A
K1IR 13,800- 150-46- 3-A
W1IAX 7448- 98-38- 9-A
W1BR 7200- 100-36- 3-B
W1YK(K1IR,WA1s NDJ,TUH,VUR, oprs) 69,352- 657-68-14-B

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Eastern New York
K2TR 246,568-1666-74-24-B
W2YV 194,850-1299-75-24-B
W2PV(K2XA,opr) 187,902-1287-73-24-B
K2NN 187,350-1249-75-24-B
W2AZO 114,318- 783-73-23-B
K2ZM 111,024- 771-72-18-B
K2SD 100,344- 678-74-14-B
WA2ZPT 87,696- 609-72-22-B
K2DW 86,380- 617-70-23-B
W2XL 81,260- 542-75-19-A
WB2KDC 61,410- 445-69-22-A
WB2MJQ 19,038- 167-57-12-A
WB2FDP 11,934- 117-51-13-A
K2HA 11,220- 110-51-12-A
K2GSF 10,600- 100-53- 7-B
N2FS 1632- 34-24- 3-A
W2IB 132- 11- 6- 2-B
W2SZ(N2FU,W2s SC UP,WB2GSW, oprs) 208,200-1388-75-24-B
K2AE(WA2YMM,WB2CFP,oprs) 98,420- 703-70-24-B
W2IR(WA2s EQW EYO,oprs) 57,754- 431-67-17-B
WB2EYB(+WA2EAF) 39,184- 316-62-12-A
WB2SCC(+K2KO,W2IDI,WA2ALV, WB2s CEP JZZ MJH,oprs) 36,456- 294-62-24-A
WB2NEC(+WB2IKA) 25,220- 194-65-18-A
WA2FFX(+WB2SNT) 12,446- 127-49- 5-A

N.Y.C.-L.I.
N2NT 179,080-1210-74-22-B
N2AR 93,388- 631-74-23-A
K2PE 71,686- 491-73-15-B
K2NO 66,936- 504-67-10-B
W2FVS 46,230- 335-69- 8-A
WB2SJG 45,024- 336-67- 8-A
N2GC 39,680- 310-64-13-A
WB2IBE 24,592- 212-58-19-A
WA2HTP 20,720- 185-56-13-A
WA2HLP 19,260- 214-45-15-A
K2OVS 15,600- 150-52-10-A
K2TV 14,880- 155-48- 8-A
WB2HIQ 12,408- 132-47- 9-B
N2RO 11,448- 158-53-11-B
W2HAE 8556- 93-46- 4-A
W2LEJ 6160- 77-40- 8-A
WB2PXA 5600- 80-35- 8-B
K2AU 3120- 60-26- 3-B
WA2OJK 2800- 50-28- 3-B
K2RO 943- 41-23- 4-A
W2CZZ 816- 24-17- 1-A
K2GIC 748- 22-17- 1-B
W2SGK 112- 8- 7- 1-B
W2TNI 32- 4- 4- 1-A
WA2BOT(+WB2OUV,WB2MAV) 100,980- 765-66-22-B
K2HVN(+WA2s FFQ LDS) 82,416- 606-68-17-B
W2JGQ(+W2TDQ) 78,120- 558-70- -B
W2AEE(WA2s YPO,ZKY, WD9EAV,oprs) 75,504- 572-66-18-B

Northern New Jersey
W2RQ 193,800-1293-75-24-B
N2WT 157,350-1049-75-23-B
WA2SZQ 149,952-1056-71-24-B
W2GD 146,668- 991-74-17-B
WA2NPP(W2VT,opr) 123,078- 843-73-17-B
WB2VFT 95,400- 636-75-21-A
K2DM 92,046- 667-69-23-A
N2OM 64,240- 440-73-23-A
K2LG 56,364- 427-66-17-B
WB2RTF 50,978- 359-71-15-A
K2OP 50,148- 398-63-22-A
N2OO 47,840- 368-65- 8-A
WB2POG 40,180- 287-70-13-A
WB2UTO 23,436- 189-62-17-A
K2PF 20,130- 165-61- 9-A
WB2QYT 19,716- 159-62- 5-B
WA2JKP 18,240- 190-48-14-B
WA2EPK 16,836- 183-46- 6-A
WA2CWX 12,480- 130-48- 6-B
W2GNW 10,484- 99-53-10-A
WA2LFK 9270- 103-45-12-A
W9KVF/2 8978- 67-67-12-A
K2JLT 6324- 102-31-10-A
N2GJ 4732- 91-26- 3-A
WB2FIT 2650- 53-25- 4-B
W3EVQ/2 2208- 46-24-17-A
WB2MGY 600- 20-15- 5-A
K2GQ(N2BQ,W2AQR,WA2MYZ, WB2s CKB,FAS,KGN,NEX,RRL, ZDH,oprs) 68,600- 490-70-24-A
K2YJ(+K2AZ) 153,032-1034-74-24-B
N2EW(+W1GD WA4GWG) 64,326- 453-71-22-B
K2BSA(WA2s WDX,WDZ,WEC, WB2WWW,oprs) 43,670- 397-55-16-B
K2MFF(Multiop) 42,160- 340-62-16-B

Southern New Jersey
K2SB(WA3LRO,opr) 167,250-1115-75-18-B
WA2VYA 160,175-1128-71-24-B
W2REH 148,888-1006-74-14-B
K3DVS/2 111,754- 787-71-23-A
W2KI(WB2APO,opr) 105,120- 720-73-24-A
WB2OSQ 91,280- 652-70-19-B
WA2OMY 91,140- 651-70-19-B
N2HI 81,030- 555-73-21-B
N2MM 74,104- 556-67-13-B
W2PAU 68,600- 490-70-18-B
WB2BVV 67,592- 476-71-15-B
WB2BYU 63,700- 455-70-23-A
W2FGY 57,744- 401-72-21-B
WA2WJL 38,580- 296-65-11-A
WA2KOK 31,676- 258-61-21-A
K2KA 31,536- 219-72-11-B
WA2MNO 25,842- 219-59-21-A
W2REB 23,426- 221-53-12-A
N2SL 21,700- 217-50-14-A
N2MR 19,502- 199-49-10-A
K2TD 18,952- 176-61- 6-B
N2GL 17,860- 190-47-10-A
WA2MLJ 10,860- 131-30-13-A
W2PFQ 9990- 111-45-15-B
W2ROW 7254- 93-39-11-B
WA2GTD 7216- 88-41-14-B
W2TDN 6780- 113-30- 8-A
W2OGZ 6732- 102-33- 8-B
WB2PHD 5700- 95-30-10-A
WA2DUE 5576- 82-34-10-B
WB2FJE 5148- 99-26- 2-A
WB2HGI 5130- 57-45-14-A
WB2EYF 3792- 79-24- 4-A
WB2UVB 3696- 84-22-12-A
K2HPV 3534- 57-31- 4-A
W2EA 2296- 41-28- 3-A
WA2DWT 1560- 39-20-11-A
W2KP 754- 29-13- 2-A
WB2VLD 750- 25-15- 3-B
WA2ONW 690- 23-15- 6-A
N2CQ 650- 25-13- 7-B
W2FST 600- 50- 6- 3-B
N2CC 440- 20-11- 1-B
WA2AWS 192- 12- 8- 3-A
WA7UJW/2 36- 6- 3- 2-A
K2AA(K2FT,W2s FYS,ORA, WA2OMP,oprs) 91,448- 644-71-24-B
WB2RVX(+W2PJC) 17,100- 150-57-12-B

Western New York
K2TGW(WA2LCC,opr) 185,400-1236-75-24-B
WA2AOG 150,964-1034-73-24-B
WA2SIS 134,550- 897-75-24-B
WA2SFT 113,700- 758-75-21-A
WA2ECA 106,856- 722-74-22-A
WA2NPQ(WB2THS,opr) 100,232- 737-68-14-B
K2GXT(WA2FQE,opr) 57,744- 401-72-24-B
W2VDX 43,260- 309-70-1
WA2AWX 42,560- 304-70-12
WB2ABD 38,178- 303-63-11
W2HG 36,992- 272-68-13
K2SSB 35,230- 271-65-15
WB2YQH 24,278- 199-61-11
WB2TKY 17,484- 141-62-13
N2TW 15,810- 155-51- 4
WB2PMO 15,344- 137-56-14
WB2QDN 13,720- 140-49-10
K2ZR 12,900- 150-43- 4
WB2GTB 11,800- 100-59- 9
WB2EXL 10,240- 128-40- 9
WB2AIO 9600- 100-48- 2
N2CU 9540- 106-45- 5
WA2IAV 9324- 111-42- 8
WA2SON 7070- 101-35- 3
K2VV 5032- 74-34- 1
WA2HRL 4030- 65-31- 8
W2JJ 2800- 56-25- 1
WA2BSE 1968- 41-24- 9
WA2CJY 1932- 42-23- 3
WA2IMG 1750- 50-35- 6
K2CC(WB2s CKM,DLH,oprs) 72,562- 511-71-22
K2GEE(+WA2EXZ,WB2BNX) 61,202- 431-71-17
W2PE(WA2s GNE OJZ ORS,WB2 OJV OJX OKB OXG,oprs) 60,434- 451-67-24
WA2AVQ(+WB2FBI) 41,440- 370-56-16

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Eastern Pennsylvania
N3AD 170,400-1136-75-24
K3SW 158,400-1056-75-23
WA3LVR 121,064- 818-74-24
K3OX 118,252- 799-74-22
K5JZN/3 105,300- 702-75-17
W3GRW 97,348- 661-74-21
K3MWV 92,400- 616-75-18
N3BA 91,080- 660-69-24
WB3FKK 79,716- 546-74-24
WA3MKB 65,800- 470-70-22
K3HXS 64,454- 481-67-12
W3IVW 46,958- 443-53-12
K3BS 41,316- 313-66-10
WB3GJF 41,052- 311-66-19
K3KHL 40,256- 296-68-15
W3LTB 36,600- 300-61-21
W3IQS 36,432- 276-66-11
W3BGN 34,572- 258-67- 7
WA3NHO 30,800- 275-56-14
WA3ZXY 26,838- 213-63-18
WB3ATA 26,754- 273-49-11
WB3AKI 23,562- 187-63-14
K3YL 22,080- 180-53- 7
WB3AAK 21,890- 199-55-23
WB3APB 19,278- 189-51-11
W3BI 18,096- 349-52- 6
WB3AVF 13,824- 144-48-10
WB3FNZ 12,954- 127-51- 7
W3MGF(N3EG,opr) 12,446- 127-49- 4
W3KF 11,040- 240-23- 3
WA3ZPA 7200- 90-40- 9
WA3WMF 6864- 88-39- 5
K3YLL 5742- 87-33-20
K3AGU 4582- 79-29- 7
WB3IRA 4424- 79-28- 8
W3MA 3840- 46-20- 3
W3IIT 2976- 48-31- 5
W3IKJ(K3FD,opr) 2460- 49-25- 3
W1AJS/3 2142- 51-21- 2
N3EG 288- 16- 9- 2
K3PA 72- 6- 6- 1
N3DG/3(+K3DLS,WA3s FOF WL WB3s CPW CTP) 130,388- 881-74-24

W3DZI(+WA2DHD,WB2AFM,WA3s UOC ZZU) 47,436- 354-67-24-A
K3CSG(WA3s LWR TVH WAC, WB3s BGV CWZ FEO GPT IOV IRK,oprs) 47,360- 370-64-24-A
K3PGI(+WA3BSV) 42,160- 340-62-24-B
WA3RCA(WA3OVH WB3FHI,oprs) 14,300- 143-50-14-A
WB3EKN(Multiop) 3300- 66-25- 8-A
WA3OVH(+WB3FED) 2280- 76-15- 4-A

Delaware

WA3UKY 76,024- 559-68-10-B
K3HBP 46,200- 330-70-11-B
W3WNG 23,790- 305-39-20-A
W3NX 4544- 71-32- 3-A
W3SUE 2700- 45-30- 5-A
WA3TVS(+N2RF) 65,536- 512-64-23-B

Maryland-D.C.

K3NA 227,700-1518-75-24-B
W3LPL(N3IO,opr) 197,700-1318-75-24-B
K3TM 193,350-1289-75-24-B
W3USS(WA1FEO,opr) 173,808-1207-72-24-B
K3ZO 170,542-1201-71-19-B
K3SA 165,300-1102-75-24-B
W3FA(WA3ZAS,opr) 164,428-1111-74-24-B
K3RA 154,650-1031-75-23-B
N4IN/3 113,442- 777-73-21-B
K2PLF/3 107,164- 734-73-24-A
N3UN 94,462- 647-73-17-B
W3GNQ 92,856- 636-73-16-B
WA3VUQ 91,200- 608-75-20-B
W3MR 90,520- 620-73-19-B
W3TK 81,030- 555-73-19-B
W3UO 75,774- 519-73-17-B
WB3AVN 74,296- 502-74-11-B
N3RL 73,008- 507-72-17-B
N3II 72,720- 505-72-17-A
WA3ZJT 71,710- 505-71-24-B
W3UJ 62,860- 449-70-24-A
W3AZ 62,050- 425-73-20-B
K2SCU/3 61,344- 432-71-16-B
W3IDT 59,220- 470-63-22-A
K3KA 48,340- 346-70-15-A
K3PI 46,376- 374-62-13-A
WB3FAF 45,968- 338-68-22-A
N3US 44,672- 349-64- 8-B
W3IKA 41,344- 304-68-17-A
WB3CGI 40,870- 305-67-19-B
W3HVM 40,066- 299-67-10-B
WA3UPH 33,966- 333-51-12-A
K3TW 32,120- 292-55-18-B
K3WL 28,408- 268-53-20-B
WB3GWM 26,040- 210-62-12-A
K3KU 23,814- 243-49-12-A
K3CKT 22,852- 197-58- 6-B
K3ZZ 22,660- 206-55- 9-A
W3JPT 22,458- 197-57- 7-B
WA3TAI 21,042- 167-63- 5-B
WB3DTQ 14,410- 131-55- 9-A
W3TUX 12,402- 117-53- 9-A
DK5AD/W3 4144- 74-28- 3-B
WB3AHN 3990- 57-35- 3-A
W3ZSR 3984- 83-24- 1-B
WA3YSW 2484- 54-23- 3-A
W3PYZ 1584- 36-22- 8-A
WA3ROX 868- 31-14- 3-B
W3PWO 510- 17-15- 2-A
W3RIL 2- 1- 1- 1-B
K3RS(K3TA,N3TR,oprs) 145,336- 982-74-24-B
N3GB(+WA3RCT) 138,380- 935-74-23-B
WA3EKL(+WA3BDF,KCY) 138,150- 921-75-24-B

Western Pennsylvania

K3UA 214,800-1432-75-24-B
WA3TBW 146,438-1003-73-24-A
K3LWM 143,560- 970-74-24-B
W3GNR 66,172- 466-71-19-A
W3QII 38,916- 282-69-21-A
K3VCH 17,710- 161-55- 9-A
W3SMX 17,640- 140-63-10-A
K3IC 13,312- 128-52- 5-B
K3LR 12,080- 151-40- 3-A
K3HWL 6732- 102-33- 2-A
WB3HND 2646- 49-27- 6-A
N3ER(W3AS,K3OTY,WB3JXH, VE3BUV) 156,140-1056-74-24-B
K3CR(WA3NQX,WA3JFW,oprs) 141,450- 943-75-24-B
WA3WIK(+K3s LA LR,WB3CWW) 125,954- 887-71-21-B
W3YI(WA3s GSB TBL TIQ TJX VJL ZOD,WB3FWZ,oprs) 53,108- 374-71-22-B
W3KWH(K3s RYA TP,WA3s TSI VSQ,WB3s EHQ FKC,oprs) 34,188- 259-66-12-B

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Alabama

K4ZGB 77,760- 540-72-19-A
K4EEK 73,292- 502-73-17-B
N4KG 41,100- 274-75- 5-B
N4EM 6966- 102-34- 5-B
WD4KEX 6800- 85-40- 5-A
K4GSK 2900- 50-29- 9-A
WB4JSO(+WBØNZF,WB4TCH, WD4KWM) 163,950-1093-75-24-B

Georgia

K4JPD(WA4OZT,opr) 229,200-1528-75-24-B
N4EU(WA4PUJ,opr) 132,016- 892-74-24-B
K4BAI 93,312- 648-72-12-B
K4UEE 89,568- 622-72-14-B
K4HAV 75,900- 506-75-15-B
AA4RF 69,496- 476-73-18-B
K4KKJ 58,272- 427-68-12-B
AA4GA 47,390- 338-70-22-A
WB4PRM 30,956- 218-71-20-A
K4BAM 29,036- 238-61-11-A
W4JM 24,570- 189-65- 6-B
W4GKI 19,760- 152-65-16-A
WB4YBE 18,528- 193-48-15-B
K2JEK/4 7056- 98-36-10-A
W4AQL(N4HR,WA2MRV, WA3WAD,WA4QYV,WD4EON, oprs) 166,350-1109-75-24-B
W4DOC(N4EW,W4s MRJ NJQ, WA4s AZL HNL NAO OPV PZD WB4s PSU VSP,WD4s CPV DCP LBA,oprs) 38,556- 306-63- -B

Kentucky

WB4OSS 111,296- 752-74-16-B
K4FU 99,450- 663-75-14-B
WB4PRU 43,920- 305-72-20-A

W4PAK 42,478- 317-67-11-B
WD4AJE 24,120- 180-67-14-A
WD4FOT 10,250- 125-41- 2-A
WA4OEB 4810- 65-37- 8-A
WA4UNJ 108- 9- 6- 1-A
WB4NTB(WA4s PSO UNJ,WB4OEM oprs) 106,128- 737-72-21-B
WA4QQV(+WA4QMQ) 97,056- 674-72-24-B
WD4HVW(+WD4HCS) 47,528- 348-68-23-B
WB4WBO/4(+WA4PTA) 22,184- 188-59-17-A

North Carolina

N4AA 179,968-1216-74-20-B
WA4FFW 88,948- 601-74-15-B
AA4NC 77,848- 526-74-11-A
K4MOB 72,660- 519-70-20-B
WD4JRS 34,848- 264-66-23-B
WB4VHE 28,386- 249-57- 7-B
WB4SGA 14,328- 199-36-11-B
N4RE 14,250- 125-57- 8-A
WB4TTJ 9056- 106-38- 9-A
K4GF 3300- 50-33- 3-B
W4AHY(WB2BLK,AA4s BB ZZ, WA4UOP,WD4KWU,oprs) 50,646- 367-69-17-A
K4EG(K4DWX N4EY W4IZI WB4BHQ WD4s GZY HKT,oprs) 26,950- 245-55-19-B

Northern Florida

N4SA 187,050-1247-75-22-B
N4UF 186,750-1245-75-24-B
W4WKQ 75,776- 519-73-13-B
W3TOO/4 55,580- 397-70-18-A
WA4JDI 43,692- 331-66-15-A
W4VQ 41,124- 298-69- 5-B
W4IZ 20,832- 186-56-20-A
WA4HOH 17,584- 170-56-11-B
WA4QCX 17,346- 147-59-10-B
N4GG 13,072- 152-43- 3-B
WA4MUB 9272- 122-38-10-B
WA4MOJ 4484- 59-38- 6-A
WD4ITK 1080- 36-15- 3-A
N4MS 756- 27-14- 2-A
W4IZ(WA4PVT,WB4YEY,oprs) 20,832- 186-56-20-A

South Carolina

WA4ALC 144,448- 976-74-24-B
K4OAQ 44,304- 312-71-20-A
WD4CHS 5214- 79-33- -A

Southern Florida

N4BP 68,444- 482-71- 8-B
W4OST 50,050- 385-65-21-B
W4PCS 45,152- 332-68-15-B
W4LEP 10,752- 111-48- 9-B
N4KB 1980- 45-22- 2-B
N4UD(+WA4KMO) 120,888- 828-73-23-B
WB4QNX(W4FAJ,K4s CEY IQJ, WA4GKQ,WB4s NTH OEJ ORS oprs) 52,260- 402-65-22-B

Tennessee

N4ZZ 226,800-1512-75-24-B
K4XU 139,350- 929-75-24-A
N4UW 76,260- 544-70-17-A
WA4OYR 64,512- 448-72-20-B
K4PJ 47,450- 325-73-19-B
WA4WXT 37,110- 286-65-17-A
WD4EXO 34,060- 262-65-19-A
K4AMC 28,084- 238-59-20-A
K8VOA/4 9680- 121-40- 4-B
W4OGG/4 6438- 87-37- 6-A
WA4BTG 4968- 69-36- 5-B
WA4BTK 4480- 70-32- 3-A
K4XO 3200- 40-40- 2-A
WA4GZT 2240- 40-28- 4-A
AA4AA(+K4s LN LSP,N4s IR OI TI TN,W4JD,WA4s HHW HRT JTI LOE QMC RRJ YHA ZAI, WD4LTH) 153,328-1036-74-23-B

Virginia

K4VX(W3ZZ,opr) 222,300-1482-75-24-B
K4YF(WA3AMH,opr) 202,950-1353-75-24-B
N4RV 201,000-1340-75-24-B
N4MM 175,500-1170-75-22-A
W4MYA 149,100- 994-75-22-B
W4DM 135,300- 915-75-20-B
K7ZZ/4 134,400- 896-75-23-B
K4FJ 117,238- 803-73-20-B
K4AF(WB3DNL,opr) 102,950- 725-71-24-B
AA4FF 81,750- 545-75-24-A
KØCMF/4 81,000- 540-75-18-B
K4PQL 79,100- 565-70-15-B
WA4JIY 76,176- 529-72-20-B
N4DJ 75,450- 503-75-16-B
WB4DBK 69,290- 533-65-18-A
WB4FQR 67,450- 475-71-18-B
W4YE 54,806- 409-67- 8-B
K4YT 50,664- 347-73-12-B
WA4WYN 49,494- 339-73-16-A
W4JAT 48,990- 345-71-15-B
W4JK 48,776- 364-67-24-B
W4JVN 45,920- 328-70-13-B
W4EZ 45,184- 353-64- 9-B
N4ZR 43,648- 341-64-11-B
K4OD 42,700- 305-70-11-B
WB4ETD 40,820- 314-65-15-A
K4JTH 40,040- 308-65-20-B
N4IY 39,798- 297-67-11-A
W4NND 38,144- 298-64-15-B
WA4NTP 33,480- 270-62-18-A
W4NH 32,004- 254-63- 8-B
N4RA 29,618- 251-59- 6-B
WB4IWR 29,388- 237-62-23-A
K4EVH 27,430- 211-65-20-A
W4UBE 26,220- 220-60-19-A
WA4FKK 25,420- 205-62- 9-A
W3YY/4 24,452- 303-42- 5-B
W4GF 23,180- 190-61- 7-B
WD4CDY 21,216- 208-51-18-B
WA4RBF 19,398- 183-53-11-A
W4EI 18,768- 184-51- 7-B
K5KT/4 15,504- 152-51- 2-B
W4KMS 14,916- 226-66-12-A
W4BVV 13,200- 150-44- 3-B
K4KA 11,660- 110-53- 5-A
W4KP 10,856- 118-46-12-B
W4XD 7040- 110-32- 8-A
WB4KIT 6460- 95-34- 5-B
WD4GCE 5576- 68-41- 7-B
WB4WDM 4550- 130-35-13-A
WB4YPT 2900- 100-29- 3-B
AA4TC 884- 34-13- 2-A
WØDAD/4 352- 16-11- 1-A
N4DW(+WB4PAT,WA4s PMQ SCE) 127,350- 849-75-24-B
W4RKC(N4FM,WB4s CTN,FNW, MFW,NER,WD4s CDT,IHW,IHY, oprs) 44,000- 400-55-17-B
WAØDYJ/4(+WD4ECK) 43,904- 343-64-17-B

N4XG(+WA4OHX,opr) 30,160- 232-65-16-A
WD4CYA(+WD4CYB) 27,260- 235-58-13-A

West Indies

KP4RF(N6CJ,opr) 318,450-2123-75-24-B
KG4OO 78,694- 539-73-21-A
WA3FET/KP4(+WA3PTU) 196,692-1329-74-21-B

5

Arkansas

WB5NBC 165,000-1100-75-24-A
N5XR(K8CC,opr) 155,104-1048-74-16-B
W5JW 152,278-1043-73-19-B
WB5STD 93,532- 698-67-23-A
K5JH 4900- 70-35- 9-A
W5EIJ 600- 30-10- 2-B

Louisiana

K5SL 89,936- 616-73-22-B
W5WG 51,552- 358-72-22-A
WD5GCD 5472- 76-36- 4-A

Mississippi

W5VSZ 228,450-1523-75-24-B
W5MH/5 62,064- 431-72-24-A
K5UKH 52,668- 399-66-17-A
W5UCY 13,786- 113-61-13-B

New Mexico

W5YZ 106,050- 707-75-22-A
WD5EVK 58,800- 420-70-21-A
WB5TXJ 27,406- 193-71-20-A
WB5CAG 19,072- 149-64-16-A
K5NM 720- 30-12- 1-A
WB5AXC(WA5s UAL WHN,WB5s AQD LYJ OAU,WBØMAH,KL7HMT oprs) 85,836- 622-69-24-B

Northern Texas

K5JA 244,050-1628-75-24-B
W5MYA(K5TM,opr) 218,250-1455-75-24-B
K5RHZ 187,664-1268-74-23-B
WB5AHX 98,988- 678-73-22-B
WB5TDO 67,340- 481-70-19-A
WB5BNG 58,032- 403-72-22-A
K5ERJ 43,904- 343-64-14-A
W5LKP 41,440- 296-70-21-B
WA5UBK 41,210- 317-65-18-A
W5GN 27,494- 233-59- 8-A
W5SOD 25,636- 221-58-14-B
K5WIQ 13,832- 133-52- 8-B
K5ZAI 13,770- 135-51- 8-A
WA6ROC/5 12,848- 146-44- 4-B
WD5CSV 12,000- 120-50-20-A
W5LA 11,616- 121-48- 5-A
K5MR 8514- 99-43- 2-A
WB5MRB 816- 24-17- 2-A
K5RX(+K5XR) 192,750-1285-75-23-B
WB5UKI(+WB5s JBP,LWB,WYE, WD5EWP) 151,230-1065-71-20-B
K5SR(+K5FN,W5YR,WB5s OON, PIP) 149,904-1041-72-24-B
WB5RPU(+K5SOR,WD5AAT) 69,840- 485-72-24-A
W5ONL(Multiop) 39,520- 304-65-14-A

Oklahoma

K5VRX 140,100- 934-75-24-A
N5ND 73,968- 536-69-18-B
WA5TSJ 63,440- 488-65-11-B
WB5WFB 19,698- 201-49-13-A
K5HWO 18,500- 790-75-23-B
W5KI 1296- 27-24- 3-A
WB5VXL(+WB5ZRN) 13,120- 180-41-13-A

Southern Texas

K5TM(K5ZD,opr) 231,300-1542-75-24-B
K5GA 208,950-1392-75-24-B
K5WA 193,650-1291-75-21-B
K5NA(WB5QWX,opr) 186,624-1296-72-24-B
N5WW 178,932-1209-74-23-B
K4FOB/5 126,280- 902-70-22-A
K5ZD(WB5NXH,opr) 115,776- 804-72-21-B
N5DU 111,398- 763-73-16-B
W5VPV 72,816- 492-74-13-A
K5BZU 71,142- 501-71-16-B
WD5CSK 68,444- 482-71-22-B
WA5IYX 55,752- 404-69-22-B
K5KG 44,800- 350-64- 6-B
W5KNZ 43,722- 347-63- 9-A
K5GB 41,400- 345-60-10-A
WA5KLK 25,830- 205-63-13-A
K5MA 3174- 69-23- 1-A
WA5ABR 3016- 58-26- 5-A
K5LZO(+WB5RUS,WD5CZF) 161,912-1094-74-24-A

6

East Bay

N6IG 201,900-1346-75-24-B
W6BH(WA6VEF,opr) 198,764-1343-74-24-B
K6RV(N6OP,opr) 190,050-1267-75-24-B
WA6DIL 190,032-1284-74-21-B
WA6JUD 183,600-1224-75-24-B
N6KB 156,450-1043-75-22-B
N6VV 73,000- 500-73-20-B
K6RM 58,520- 418-70-18-A
K6PJY 53,406- 387-69-19-A
K6ATV 39,440- 290-68-13-A
W6LD 34,060- 262-65-11-B
WA6KEQ 31,548- 239-66-13-A
W6OT(K6CSL,opr) 24,708- 213-58-24-B
WA6QCZ 15,912- 156-51- 9-A
W6RQZ 5160- 60-43- 7-B
K5GOE/6 3828- 58-33- 6-A
K6HIH(+K6AHC) 156,750-1045-75-24-B
W6BB(N6s KL,TV,oprs) 18,616- 179-52- 7-B

Los Angeles

AA6AA 174,616-1196-73-24-B
W6RW(K1RX,opr) 157,500-1050-75-20-B
N6HE 143,116- 967-74-23-B
K6SE 129,000- 860-75-14-B
WB6JJE 66,882- 471-71-19-A
W6CN 53,200- 380-70-20-A

K6MP 49,010- 377-65- 9-B
W6OEO 44,086- 329-67-17-B
WB6RXW 30,504- 246-62-21-A
WB6NFO 16,356- 141-58-20-A
WA6PXY 15,552- 144-54- 5-B
WA6BIE 10,920- 91-60-18-A
WA6BJJ 10,878- 111-49-14-A
N6IC 10,800- 90-60- 7-B
WA6VVR 10,272- 107-48-12-A
WB6ZWP 8240- 103-40-10-A
WAØQNT/6 6232- 76-41- 3-A
WB6GCV 144- 12- 6- 1-A
AA6RX(+WA6OTU) 166,176-1154-72-24-B
WB6VVS(+K6YMK) 63,474- 447-71-20-B
W6YRA(WA6TKO,WA2AZO, WB6s NFA,WKY,WD6BAY,oprs) 27,552- 246-56-12-A

Orange

K6LL 143,568- 997-72-16-B
K6XX 78,048- 542-72-20-A
WA6JAH 29,640- 247-60- -B
WB6KRI 28,476- 226-63-11-A
N6HK 27,008- 211-64-13-B
WD6BNG 6162- 79-39-12-A
K6IM 1968- 41-24- 2-B
WB6AJV 600- 20-15- 2-A

Santa Barbara

N6MB 112,628- 761-74- -B
W7CB/6 111,252- 762-73-16-B
N6TA 62,424- 459-68-13-A
K6WJ 30,720- 240-64-19-A
W6KPJ 22,154- 209-53- 8-A
N6MW 13,132- 134-49- 2-B
WB6IDK 7568- 88-43-14-B
N6NB/6(+N6s MA,VR,WA6s DJS, IJZ) 188,352-1308-72-24-B

Santa Clara Valley

W6XR 249,300-1662-75-24-B
N6TU 206,850-1379-75-24-B
K6OQ 185,250-1235-75-24-B
N7MH/6 184,050-1227-75-24-B
N6MG(WA6PGB,opr) 181,500-1210-75-24-B
N6BT 181,200-1208-75-21-B
W6MSF(N6KT,opr) 175,800-1172-75-23-B
W6MUR(WA6DGX,opr) 172,350-1149-75-24-B
WB6UOC 157,500-1050-75-22-B
K6BR 129,648- 876-74-22-B
WA6GFY(WB6EXW,opr) 123,580- 835-74-22-B
K6SSJ(N6HT,opr) 120,960- 840-72-21-A
W6OAT 112,464- 781-72-16-B
N6LC 111,000- 750-74- -B
K6KLY 110,668- 758-73-22-B
K6HNZ 96,348- 651-74-22-B
W6VG 72,240- 516-70-21-B
WB6HWQ 68,182- 467-73-21-A
K6ITL 59,052- 399-74-14-B
K6VGW 59,568- 408-73-15-A
W6DBV 36,608- 286-64-17-B
N6CN 36,096- 282-64- 7-B
N6IK 30,550- 235-65-12-B
WB6MDF 28,680- 239-60-11-B
W6SUJ 22,110- 201-55- 8-A
W6LH 21,616- 193-56- 7-A
WA6ITV 18,480- 168-55- 7-B
WB6LUJ 11,430- 127-45-17-A
WA6BZT 10,152- 108-47- 5-A
WB6SWH 6798- 103-33- 6-A
WB6BYU 5644- 83-34- 7-A
W6WZF 5320- 76-35- 8-A
W6LFB 4480- 70-32- 9-A
W6PLT 4032- 63-32- 3-A
W6ODM 2856- 51-28- 4-B
N6NF 1014- 39-13- 2-B
W6TPS 300- 15-10- 2-A
K6RU(+N6RO) 168,720-1140-74-24-B
K6FB(WB6s JGS,PCO,SHD,oprs) 164,250-1095-75-24-B
N6RZ(+W6OKK,WA6OCV, WB6CJE) 158,400-1056-75-24-B
K6ZM(+W1ARR,WA6HJV) 134,400- 896-75-24-B
W6YX(W2JU,WA6ITV,oprs) 114,700- 775-74-23-B
WB6WSL(K6ODK,W6QVU,WA6s LBY,KVT,VCN,VAQ,VAS,WB6s AAJ,GSZ,POT,JJX,POR,GSW,RRU, PZT,WD6s CTR,CIO,AGL,oprs) 77,520- 570-68-24-B
K6DC(+WA6DGX) 38,400- 300-64-21-B

San Diego

K6NA(WA6ELX,opr) 242,400-1616-75-24-B
W6RDF 193,680-1345-72-24-B
W6UQF 36,314- 271-67-14-A
WA6NEL 23,364- 198-59- 6-A
WA6UFY 22,388- 193-58-13-B
K6GC 14,740- 134-55-10-A
W6KBD 198- 11- 9- 4-A

San Francisco

N6BV 210,450-1403-75-24-B
N6CT 186,000-1240-75-24-B
AA6DX 157,916-1067-74-24-B
WB6FCR 76,650- 525-73-22-B
WB6QVW 54,786- 397-69-23-A
N6QC 17,934- 149-64-13-A
K6XZ 11,616- 121-48-13-B
WA6DNM 9696- 101-48- 3-A
W6BIP(+K6SMH,WA6DJI,PYN) 126,688- 856-74-20-B
K6LRN(+WB6TKD) 1344- 32-21- 3-A

San Joaquin Valley

N6UR 148,920-1020-73-20-B
K6PU(N6QR,opr) 143,700- 958-75-19-B
WA6KMW 63,332- 446-71-16-A
W6DPD 41,040- 285-72-15-B
WA6JDB 39,664- 296-67- 9-B
N6PR 30,552- 228-67-18-B
WA6YAK 28,098- 223-63-13-A
W6YKM 24,696- 196-63- 8-B
WB6ITM 20,064- 176-57- 7-A
WB6KHR 16,748- 158-53-12-A
WA6YAB 8400- 100-42- 8-A
W6RLG 4176- 58-36- 8-A
K6AO 336- 24- 7- 2-A
N6EE(+WB6IUK) 173,100-1154-75-23-B
K6AYA(+K6TG,WA6OEC, WB6UJD) 103,536- 719-72-24-B
WB6OPD(WA6SOM,WB6SUN, WD6AXU,KP4DIS,oprs) 46,280- 356-65-21-B

Sacramento Valley

W6TPH 131,254- 899-73-24-B
K6SG 124,350- 829-75-23-B
N6JV 112,776- 762-74-24-B
N6JM 43,488- 302-72-12-B
W6NKR 15,290- 139-55- 9-B
WA6BRV 4686- 71-33- 4-A

Pacific

KH6IJ 134,100- 894-75-23-B
KH6JMP 41,730- 321-65- 5-B
KM6FC 37,406- 317-59-17-A

7

Arizona

WB7AEB 193,888-1328-73-24-B
K7KH 167,850-1119-75-22-B
K7JVR 153,600-1024-75-24-B
W7ZMD 109,872- 763-72-24-B
W7UV 109,158- 791-69-21-A
W7YS 15,288- 196-39- -A
WB7QYG 10,304- 112-46-11-B
WA7EBR 8000- 100-40-10-A
WB7ATZ 4860- 54-45- 5-A
WA7IYG(JH1MTQ,K7WC,WB7s ORT SCK,oprs) 47,436- 354-67-12-B
K7RUF(WB7s BZZ,CAA,CAC,oprs) 16,422- 161-51-24-B

Idaho

W7ID 216,150-1441-75-24-B
WA7YXZ 123,432- 834-74-23-A
WA4QIP/7 76,796- 231-58-15-A
W7LQT 56,140- 401-70-16-B
WAØHJU/7 23,870- 217-55- -A
W7LLM 21,190- 163-65- 9-A
W7KXA 160- 10- 8- 3-A

Montana

W7GKF 148,200- 988-75-20-A
K7LTV 126,900- 846-73-15-B
W7JYW 116,070- 795-73-21-B
W7LR 91,760- 645-74-18-B
K7PGL 5016- 76-33- 5-A
WB7EJS 1160- 29-20- 5-A
W7FO(K7JM,RRS,W7ROE,WA7s FLG HKH MUU WB7s BLL PUE, oprs) 124,960- 880-71-21-B

Nevada

K7OX 218,700-1458-75-24-B
WB7PIJ 23,482- 199-59-20-A
W7LHE 9248- 68-68-10-B

Oregon

W7NI 199,950-1333-75-24-B
W5XZ/7 175,350-1169-75-23-B
W7IL 151,050-1007-75-24-B
W7JZV 60,531- 409-74-20-B
W6OUR/7 36,010- 277-65-20-A
W7MLJ 34,840- 260-67-22-A
K7YCI 20,874- 213-49-10-A
W7TWL 13,000- 125-52-17-A
K6XM/7 12,800- 128-50- 4-A
WA7YOH 2600- 50-26- 7-A
K7FD(WA7s WEP WNQ) 53,620- 390-69-21-A

Utah

W7OGU 7920- 99-40- 6-B
W7GXC 49,280- 385-64-13-A
W7OGU 7920- 99-40- 6-B
W7LN 7280- 91-40- 6-A

Washington

K7SS 286,950-1913-75-24-B
K7RI 208,658-1391-75-20-B
WA7UWE 185,400-1236-75-24-B
W7WA 171,900-1146-75-23-B
W7BUN 166,050-1107-75-22-B
N7ZZ 162,644-1114-73-24-B
WB7ONX 118,990- 815-73-19-B
K7AWB 97,200- 675-72-21-A
W7KKR 94,146- 663-71-21-B
WB7BNP 82,600- 590-70-22-B
WA7FOE 72,988- 514-71-13-A
N7AM 66,654- 483-69-19-B
WA7SCN 64,240- 440-73-15-B
WB7BLQ 61,244- 502-61-18-B
WA7PVE 51,830- 355-73-17-B
W7LKG 49,140- 351-70-19-B
W7LRD 42,612- 318-67-18-B
WB7QEI 35,242- 263-67-14-A
WB7DSI 31,030- 267-58-17-A
K7WA 25,724- 218-59-10-A
WA7RDJ 25,296- 204-62-18-B
WB7AJR 22,578- 159-71-14-B
K7ND 17,248- 154-56-12-A
K7TU 15,792- 141-56- 9-B
K7CX 15,392- 148-52- 8-A
WB7PEX 14,812- 161-46-21-A
WA7ZZA 11,074- 113-49- 8-A
K7WTG 10,960- 137-40- 4-B
WB7PSP 10,920- 130-42-11-A
K7BFL 7830- 87-45- 4-A
K7EFB 7200- 90-40- 8-A
WB7RYM 6768- 94-36-20-A
K7MF 4680- 90-26- 3-B
K7YY 3100- 50-31- 4-B
K7RS 2288- 52-22- 4-A
WB7OXA 1672- 44-19-13-A
K7MM(+KH6IFN,WB6NCK,WB7s EHM SOL) 61,486- 433-71-24-A
K7NWS(WA7TRI,WB7BET,oprs) 27,938- 229-61-12-B
WB7BFK(+WB7BFM) 56,280- 402-70-21-B
N7DX(+K7NF) 45,486- 361-63-11-B
K7NWS(WA7TRI,WB7BET,oprs) 27,938- 229-61-12-B
N7RV(+WA7LVN) 21,594- 183-59-18-A

Wyoming

K7GLL 114,318- 783-73-21-A
KØPVI/7 76,728- 556-69-15-A
WA7ZXL 20,130- 165-61-18-A

Alaska

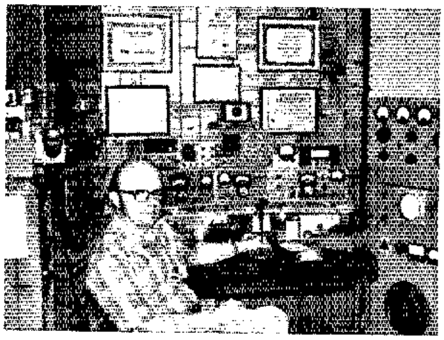
KL7GRP 80,008- 548-73-18-B
KL7AP 31,928- 307-52-10-B
KL7GN 4544- 71-32- 4-A

8

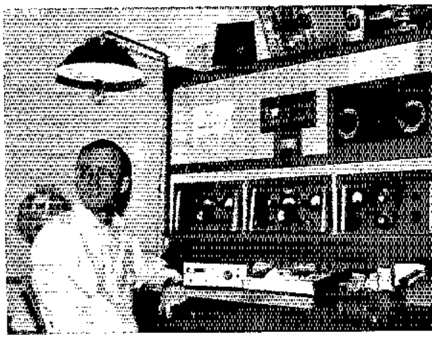
Michigan

W8RC 174,800-1166-75-24-B
W8FF 139,650- 931-75-20-B

Ray, K9RS, scoffs at the old wive's tale that you can't work 'em if you live in an apartment. Ray had 65k on phone and 82k points on cw from Illinois, using a 120-foot wire strung out of his apartment to back up his words.



Jeff, W7ID, made a lot of SS participants happy by supplying the Idaho multiplier. Jeff's combined cw and phone scores topped 358k points.



WA5YTX finished number one on cw in New Mexico. Fred says that the A-1 beer (upper right of picture) is the "cw man's brew."

K8MJZ 129,900- 866-75-22-B
W8WD 114,768- 797-72-22-B
K8DO 113,296- 776-73-24-B
WA8QEF 110,522- 757-73-24-B
K8DD 98,550- 657-75-20-B
WA8JFQ 85,994- 580-73-19-B
K8PAO 83,352- 604-69-18-B
WB8BGY 80,850- 539-75-24-B
W8MNL 75,600- 504-75-17-B
K8SIA 72,144- 501-72-20-B
WA8RRR 63,948- 438-73-15-A
WA8MEC 59,714- 409-73-20-B
W8HW 53,960- 380-71-22-A
N8BM 49,764- 377-66- 8-B
K8LF 47,082- 399-59-11-B
N8WA 45,962- 343-67-21-A
K8OI 44,988- 326-69-20-B
WA8ZDT 44,958- 381-58- 6-B
WB8GAO 43,296- 328-66-18-B
W8VPC 40,832- 319-64-16-A
WB8PKU 40,430- 311-65-21-A
WA8MJY 39,128- 292-67-19-A
K8TE 38,192- 308-62- 6-B
WA8QCW 36,984- 268-69-10-A
WB8ZME 36,270- 279-65-20-B
W8ETH 35,360- 260-68-20-B
WB8AAX 34,136- 251-68-17-B
W8QGP 33,728- 272-62-14-B
W8HAN 33,356- 269-62-14-B
WB8OQR 32,746- 264-62-10-A
WA8ECH 32,370- 249-65-17-A
K8BR 31,110- 255-61-16-A
WD8DIB 28,672- 256-56-18-A
WB8LWS 28,288- 221-64-15-A
WD8ONZ 25,480- 245-52-18-A
WB8YSC 24,600- 205-60-15-A
WB8NSF 23,424- 192-61-21-A
WD8JMP 22,932- 182-63-18-A
W8QQL 22,920- 191-60-15-A
WB8OBF 21,838- 179-61-13-A
WD4IPT/8 21,122- 179-59-15-B
K8CJF 21,008- 202-52-16-A
WB8PLO 20,900- 190-55-13-A
W8PBO 20,882- 197-53- 9-B
WD8JNP 17,172- 159-54-14-A
W8FSZ 17,136- 153-56- 8-B
WB8GDO 17,110- 145-59- 7-A
WB8WBJ 16,650- 185-45-14-A
W8FH 15,840- 132-60-14-A
WB8XS 15,370- 145-53-12-B
WB8GUD 14,100- 141-50- 6-B
WB8ARC 12,760- 145-44- 7-B
WD8BLS 12,420- 138-45- 8-A
WB8VVY 12,330- 137-45-12-A
K8CQF 11,408- 124-46-18-A
WD8DIX 10,580- 115-46- 8-A
K8VA 9372- 142-33- 5-B
WB8VBC 8514- 99-43- 6-A
N8NA 8400- 100-42- 3-A
WB8BBO 8240- 103-40-11-A
K8TK 8200- 100-41- 8-A
K8WSN 8192- 64-64- 7-B
WB8NDP 7680- 96-40- 6-A
WD8DSV 7600- 100-38- 7-A
N8AR 7482- 87-43- 5-A
WB8ILV 7426- 79-47- 7-A
WA8GJR 7140- 102-35-12-A
WB8SHL 6528- 92-34- 8-B
WB8WCA 5688- 79-36- 7-A
W8UCG 4620- 70-33- 3-A
WB8TNE 3990- 57-35- 7-A
W8MOF 3876- 57-34- 5-B
WA8TOF 3844- 62-31- -A
WB8YOB 3250- 65-25- 6-A
W8TCY 3068- 59-26-10-A
K8ZKM 2842- 49-29- 4-A
WB8ZKA 2600- 52-25- 2-A
K8QLM 2500- 50-25- 7-A
W8LOI 2448- 99-26- 3-A
W8TIC 2200- 50-22- 5-A
WD8CEG 2160- 45-24- 4-B
WD8BWN 1802- 53-17-10-A
WB8AHJ 1134- 27-21- 3-B
WB8AYW 1120- 40-14- 1-A
WB8FEZ 930- 31-15- 3-A
W8KTJ 910- 35-13- 3-A
K8HJI 756- 27-14- 3-A
K8NJ 468- 18-13- 1-A
WB8JIX 460- 23-10- 1-B
W8JUP 300- 15-10- 1-A
WD8BPH 216- 12- 9- 1-A
WB8UVQ 12- 3- 2- 1-B
K8PBQ(K8NKB,WA8VAI,WB8s OWY,SBI,VAI,VWE,ZHC, WD8JXK,oprs) 101,232- 703-72-24-B
N8HT(+WD8OGM WD8s CQN LRR) 97,588- 787-62-24-B
WB8JDA(+W8TJQ) 76,516- 517-74-19-B
WB8JYX(+WB8MDG) 72,432- 503-72-21-B
W8LDB(+K8AYZ,WD8IKZ) 66,240- 460-72-21-B
WD8ITS(+WD8KAM) 54,740- 391-70-24-B
W8MRM/8(W8MPD,WD8CSA,oprs) 43,884- 318-69-23-A
WA8LSS(+WD8CUQ) 43,152- 348-62-18-B
W8QN(+WB8VAS,WD8OKR) 41,080- 316-65-13-B
W8SH(WB1s CIA FOF,WA6ABD, N8JM,WB8s TCC YGG,WD8s BCS JKP NWD,oprs) 40,704- 318-64-24-A
WD8JEJ(+WA8UDW) 32,400- 270-60-19-A
WD8EDJ(+WD8AEL) 26,500- 204-65-24-A
W8JXU(WA8UPU,WB8s SVI ZPN, WD8AYU,oprs) 25,920- 216-60-12-A
W8VWY(+K8ZJU) 25,228- 238-53-10-B
K8DAC(W8CTY,WD8s JEP JNQ, oprs) 18,900- 189-50-23-A
K8GB(+2 mtr net) 18,144- 126-72-18-B
WD8DQR(+WD8JPX) 17,066- 161-53- 8-A
K8BWC/8(+WD8JNR) 15,370- 145-53-20-A
WB8NXG(+WD8JZZ) 11,520- 120-48- 7-A

Ohio

W8KIC 208,800-1392-75-23-B
WA8YWX 182,336-1232-74-24-B
K8MR 174,788-1181-74-22-B
N8ET 173,700-1158-75-23-B
K8NZ 127,166- 871-73-16-B
WA8UQH 124,950- 833-75-22-B
N8LL 120,450- 803-75-24-B
K8MN 115,350- 769-75-22-B
W8SWB 110,550- 737-75-21-B
W8GS 104,550- 697-75-12-B
WD8IZK 104,044- 703-74-22-B
WB8WDO 94,032- 653-72-24-B
N8RA 90,312- 636-71-21-A
W8TD 91,020- 615-74-24-B
K8BL 70,148- 494-71-19-A
K8URE 66,896- 452-74-20-B
WB8URG 63,802- 440-73-22-A
W8EDU 60,884- 491-62-12-B
N8LM 57,680- 412-70-18-B
WA4RIJ/8 45,288- 333-68-11-A
N8FU 41,730- 321-65-18-A
W8LHV 40,588- 278-73-14-B
W8VQI 35,640- 270-66-13-B
W8HQN 34,790- 245-71-23-A
WB8VPA 29,964- 227-66-17-A
WB8NBY 27,572- 226-61-16-B
WB8AZN 25,016- 236-53-18-A
W8UPH 24,816- 264-47-13-B
WB8TJS 24,708- 213-58- 7-A
WB2LOF/8 21,252- 161-66- 8-A
W8EQG 20,832- 186-56-15-A
K8NU 20,650- 175-59- 4-B
WB8NBA 20,176- 194-52-17-A
W8XU 19,928- 188-53- 9-A
W8IDM 18,216- 138-66- 8-B
WB8WKP 16,648- 283-59-17-B
W8OJW 17,600- 160-55-13-A
WD8AFB 16,536- 156-53-14-A
W8DXT 16,000- 160-50-20-A
K8EF 15,792- 141-56- 5-A
W8IMF 14,144- 136-52-12-B
K8FO 13,524- 138-49- 4-B
WD8ACM 10,296- 117-44- 5-A
K8BA 10,098- 109-46-10-A
WD8CZH 7854- 119-33- 5-A
WD8KNE 7056- 84-42- 5-A
W8PCS 6720- 80-42- 6-A
WD8BZD 6408- 89-36- 9-A
WD8BBQ 6240- 80-39- 8-B
N8TM 3120- 60-26- 2-B
K3LR/8 2640- 60-22- 2-A
N8XX/8 2500- 50-25- 3-A
W8WPC(+K8BPX) 192,992-1306-74-24-B
WB8JBM(WB8DQP,WD8s LEN LRV,oprs) 168,128-1136-74-24-B
WB8OFR(+W8XT,WB8s ILW,MRU, SVN,VLU) 167,754-1149-73-24-B
W8LT(K1LT,K8LT,WB8s INV,LZR NXC,TXE) 165,900-1106-75-24-B
K8ND(+K8NU,W8FU,WB8HWE) 159,140-1090-73-24-B
W8BAP(K8s KX SUB,WB8s GZL JOJ,WD8BGF) 54,944- 404-68-24-B
WD8DQX(+WD8LZG) 36,540- 261-70-16-B
W8AL(WA8ADA,WB8s LCF,VLK, WD8s AYE,DIT,MBK,oprs) 35,640- 270-66-22-A
N8RB(+WB8s YVI,YXU) 22,660- 206-55- 8-A

West Virginia

N8II 182,400-1216-75-24-B
K8LZ 85,050- 567-75-19-B
K8BS 44,238- 303-73-18-A
WD8EGW 41,580- 378-55-17-A
W8UT 35,466- 257-69-12-B
K3KX/8 16,422- 161-51-12-A

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Illinois

K9CT 187,500-1250-75-24-B
K9BGL 177,000-1181-75-24-B
K9RF(K9RK,opr) 169,164-1143-74-24-B
W9XR(WA9PBK,opr) 131,128- 886-74-22-B
WB9SDE 129,312- 898-72-19-B
K9NR 119,850- 800-75-20-B
WA9IXF 111,450- 743-75-18-B
K9HDE 111,300- 742-75-22-A
WB9CXG 97,776- 679-72-19-B
K9CC 96,600- 644-75-19-B
WB9CGL 96,600- 644-75-24-A
K9RMA 93,010- 655-71-23-A
WB9TIY 80,100- 534-75-20-A
K9KD 78,624- 546-72-24-A
K9BG 75,828- 534-71-18-B
W9UVM 71,540- 511-70-24-B
K9UIY 70,574- 497-71-19-A
WB9YEB 66,220- 473-70-23-A
K9RS 64,676- 437-74-23-A
WB9NEH 60,208- 424-71-19-B
WD9DDW 58,960- 440-67-19-A
K9HQL 55,440- 385-72-17-A
WB9PUL 53,728- 368-73-15-B
W9RW 47,616- 372-64- 9-B
WB9VJN 38,400- 320-60-14-B
K9PIG 35,840- 280-64-13-A
K9AR 34,800- 300-58- 8-B
WA9KAN 34,398- 273-63-17-A
WD9ERG 32,818- 269-61-23-A
WB9LFD 32,364- 279-58- 9-B
WB9YJU 32,004- 254-63-17-B
WB9PVW 29,358- 233-63-17-A
W9DJZ 27,956- 241-58-23-A
WA9SVZ 24,120- 180-67-10-A
WB9IOG 16,874- 143-59-13-A
W9CQD 15,158- 143-53-12-A
W9QWM 13,950- 155-45-10-A
WA9LEY 12,936- 147-44- 6-B
WB9OTE 11,800- 118-50-16-B
WB9UKK 10,712- 103-52- 8-B
K9KKX 10,080- 112-45-10-B
W9REC 9118- 97-47-16-B
K9BK 8800- 100-44- 5-A
W9HPG 7680- 96-40- 8-A
N9TI 7298- 89-41- 2-B
N9NA 6724- 82-41- 3-A
K9CW 6048- 56-54- 4-A
K9PW 5688- 79-36- 7-A
WA9FBC 5100- 75-34- 5-A
WB9POX 4340- 62-35- 9-A
WA9OFM 4080- 60-34- 2-B
WB9QGX 646- 19-17- 2-A
W9YH(K9s GL,VV,WB9s MEK,OEP VEJ,WD9DNK,oprs) 178,650-1191-75-24-B
W9VL(+N4FD) 175,050-1167-75-24-B
N9RR(+WB9ZKK) 124,200- 828-75-23-B
K9DN(+WB9BIK) 62,906- 443-71-23-B
W9ZCL(+N9YL,WA9ZPL,WB9s OKL TTE WVY YVP) 52,096- 407-64-20-B
WB9MMM(+WB9SFT) 23,200- 200-58-18-A

Indiana

W9RE 225,450-1503-75-24-B
W9LT 159,578-1093-73-24-B
K9UWA 142,350- 949-75-16-B
WB9CEP 137,808- 967-72-20-B
K9KM/9 13,695- 167-41- 3-B
W9OBF 134,612- 922-73-24-A
N9QX 95,922- 657-73-22-B
N9JG 76,650- 525-73-21-B
N9RC 75,180- 537-70-19-B
K9CDB 58,016- 392-74-14-A
WB9VIO 51,972- 366-71-17-B
W9TG 50,944- 398-64- 9-B
N9NC 49,580- 360-67-11-A
W9CUC 48,576- 368-66-14-B
WB9SKA 46,368- 336-69-14-A
K9KB 45,900- 306-75-18-B
WB9QYU 44,748- 339-66-20-A
K9NS 40,468- 302-67-11-B
WB9GCH 39,552- 309-64-16-B
WA9UXP 38,908- 274-71- -A
WD9DAS 36,018- 261-69- 9-B
WD9AHO 35,784- 284-63-12-A
K9TUS 31,842- 261-61- 8-B
WD9FAP 30,492- 242-64-18-B
W9JOO 29,252- 206-71-12-A
K9HCK 26,928- 198-68-12-A
WB9OCD 26,640- 222-60-19-A
WD9AHS 21,692- 187-58-10-A
K9DMH 19,936- 178-56-19-B
WA9PKL 17,408- 136-64-13-A
WB9QJV 16,440- 137-60-11-B
WB9ODH 16,422- 161-51-15-A
WB9UAO 13,804- 119-58-12-A
K9KM/9 13,695- 167-41- 3-B
W9OBL 11,200- 140-40- 6-A
W9QLW 11,040- 120-46-11-B
K9IAP 10,664- 124-43-10-A
WA9JWL 10,396- 113-46- 7-B
WA9DJP 9900- 110-45-20-A
WB9WHT 9682- 103-47-14-A
WB9KGR 5940- 90-33- 4-A
WA9UFO 4104- 54-38- 4-B
WB9LCN 2500- 50-25- 2-A
WB9TYL 1480- 37-20- 3-B
K9OC(+WA9SUS) 133,348- 901-74-24-B
W9YB(WA2QAL,WB2TQK, KL7IWW,K9HI,WB9PUM, oprs) 103,650- 691-75-24-B
N9CC(+WB9s RUS SSE) 37,324- 301-62-15-B
WB9LFE(+WBØs PXY,TOK) 35,164- 298-59-24-A

Wisconsin

W9YT(K9TR,opr) 163,840-1105-74-24-B
W9NA 126,836- 857-74-20-B
N9UR 117,364- 793-74-24-A
N9AW 107,550- 717-75-24-B
KØCHE/9 77,816- 548-71-20-B
W9ZR 51,504- 348-74-10-B
K9HFR 50,260- 359-70-16-B
W9GKJ 39,390- 303-65-16-A
WB9VOZ 35,772- 271-66-24-A
WB9MFC 31,744- 248-64-14-A
WB9EJE 25,960- 220-59-19-A
K9WTF 23,128- 196-59-14-B
WB9BSO 19,372- 167-58-21-A
W9CUS 19,344- 186-52-18-A
W9HE 16,720- 190-44- 7-B
WB9SVM 14,352- 138-52-13-A
K9KR 13,568- 128-53- 5-B
WA9BZW 12,236- 133-46-16-A
WA9AKV 9840- 120-41- 8-B
WB9QXO 9476- 103-46-11-A
WD9ESX 2352- 42-28- 6-A
WA9POV 1020- 30-17- 7-A
W9OC(+WB9PCQ) 105,850- 725-73-20-B

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Colorado

WØTR(WØUA,opr) 285,750-1905-75-24-B
KØKE 224,650-1631-75-24-B
KØGU 223,050-1487-75-24-B
WBØNYY 212,550-1417-75-23-B
WØCP 209,802-1437-73-24-B
WBØIKN 201,150-1341-75-24-B
WBØPEA 90,252- 654-69-22-A
WØYK 81,200- 580-70-24-B
WØQKY 78,402- 537-73-23-A
WØETT 63,376- 466-68-24-A
WØRMA 58,616- 431-68-20-A
KØTER(KØDJ,opr) 50,964- 411-62- 8-B
NØAY 49,014- 389-63-16-A
NØST 48,180- 365-66-10-A
WØTPO 46,200- 308-75-18-B
WBØSEQ 11,424- 119-48-13-A
WBØZBE 8200- 100-41-10-A
KØDJ 6806- 83-41- 3-A
KØPVI 5100- 75-34- 2-B
WBØMCL 1564- 34-23- 8-A
KØNA(+KØSDP,WAØs BLQ,PXE, IJO,YGQ,WBØs,LNZ,PSV,VNI, YAG,ZQG,WDØAIT) 55,968- 424-66-24-A

Iowa

KØMM 176,268-1191-74-22-B
KØLUZ 104,100- 694-75-21-A
KØAL 103,452- 699-74-18-B
WBØCHS 37,422- 297-63-16-B
WAØQID 15,840- 132-60- 8-A
WBØJTH 14,688- 153-48-13-A
WØEJ 12,928- 202-32- 4-B
WBØPYD 8600- 100-43- -A
KØEVC 4408- 76-29- 9-A
WBØUIT(+WØSI,WBØs OLX,RJG, UCP,UKB) 23,246- 197-59-17-A
WBØOKP(+WØYSE,WDØBIG) 11,610- 129-45-13-A

Kansas

WØIUB 130,760- 934-70-19-B
WBØRET 126,000- 840-75-22-B
WBØISW 122,248- 826-74-24-A
KØEQY 111,744- 776-72-19-B
WØRT 53,132- 359-74-13-B
WAØPBQ 50,268- 354-71-15-A
KØSBV 26,268- 199-66-11-B
WBØTOQ 19,500- 195-50-16-A
KØFPC 1470- 35-21- 2-A
WAØSWC(+WAØTKJ) 143,850- 959-75-24-B
WBØQFV(+WBØRZN) 19,872- 184-54- 9-B

Minnesota

NØAT 135,000- 900-75-23-B
KØIJL 84,242- 577-73-14-B
WØUC 62,850- 419-75-15-A
KØFZG 50,410- 355-71-21-A
KØMPH 46,240- 340-68-13-A
WBØPTB 39,910- 307-65-12-A
WBØPWG 35,904- 264-68-15-A
KØSE 31,868- 257-62-10-A
WAØQWY 27,816- 228-61-14-A
WDØAPT 25,668- 207-62-20-A
KØIE 24,416- 218-56-10-A
WBØUKI 21,112- 203-52-19-A
WØBP 20,406- 179-57- 3-B
NØNO 14,688- 204-36- 6-A
KØTG 11,172- 114-49- 5-A
WØTIV 6272- 56-56- 6-A
WBØOUH 6204- 94-33- 3-A
KØFVF(+KØTK) 73,698- 519-71-21-B
WAØYJB(+WBØLTH) 60,492- 426-71-23-A
KØLTC(KØGRA,WBØs FBN,GPR, HRX,MCJ,MJJ,SNG,SNA,SNP,TFA, UBT,WDØs CIZ,EZE,oprs) 60,160- 470-64-23-B
KØBK(+WBØs RAS YKM,WDØAGF) 38,912- 304-64-21-A

Missouri

WØZLN(WAØCWV,opr) 177,900-1186-75-24-B
NØRJ 133,200- 888-75-24-B
KØDEQ 127,420- 861-74-20-B
WØQWS 94,032- 653-72-22-A
NØSS 86,550- 577-75-10-B
WBØTMK 50,232- 364-69-21-A
WBØOQV 38,488- 283-68-11-A
WAØEQY 24,640- 224-55-13-A
KØJJS 20,832- 186-56- 7-B
WBØOFJ 18,816- 168-56- -A
KØQNU 16,290- 181-45-12-B
WØEEE(NØAX,opr) 12,236- 133-46- 4-B
KØIET 10,736- 122-44- 3-B
WØRNG 9108- 99-46- 5-A
WBØATD 8030- 73-55- 4-B
WBØMPH 6364- 86-37- 7-B
WØVE 4992- 78-32- 3-A
WDØFDK 1080- 30-18- 5-A
KØLIR(NØIS,WØHBH,WAØIYY, WBØIKR,oprs) 119,732- 809-74-17-B
WBØTCQ(+WØGZI,WBØs QWW, QWX) 104,400- 696-75-19-B

Nebraska

KØSCM 170,400-1136-75-24-B
WØPXD 63,270- 555-57-12-B
WØRIC 59,400- 396-75-18-B
WAØYPY 54,940- 410-67-16-B
KØJBL 52,640- 376-70-19-B
WAØJCE 30,256- 244-62-12-A
WDØAPV 16,956- 157-54-12-A
WAØJIH 4466- 77-29- -A
NØYC(+KØCQB,WBØIUT) 91,732- 646-71-24-A
KØNB(+WBØKDI) 82,502- 581-71-22-A

North Dakota

WAØCSL 76,568- 563-68-20-B
KØFRP 71,260- 509-70-17-A
WA2DJM/Ø 16,218- 159-51-13-A

South Dakota

WØSD(KØZZ,opr) 257,700-1718-75-24-B
WBØPYL 107,032- 787-68-15-B
WAØLYO 61,650- 411-75-20-A
WBØMWJ 55,860- 399-70-15-B
WAØBWF 39,648- 336-59-16-B
WAØARS 32,964- 246-67-13-A
WBØVGN 14,014- 143-49- 6-A
WBØSTQ 11,438- 133-43-11-A
WBØSTR 10,028- 109-46-10-B
WBØLQX(+KØs KFC OR,WBØs ULX ZZH) 14,664- 156-47- 6-B

VE

Maritime-Newfoundland

VE1MX 29,304- 222-66- 6-A
CK1CM 12,000- 120-50- 8-B
VE1EP 10,952- 74-74- -A

Quebec

VE2YU 46,720- 320-73- 7-B
VE2GS 10,600- 106-50-10-A

Ontario

VE3GD 50,832- 353-72-18-A
VE3CEF 38,178- 303-63-15-B
VE3FWS 37,248- 291-64-18-A
VE3FEA 24,156- 183-66-11-A
VE3DUS 15,912- 153-52- 7-B
VE3GCE 14,000- 140-50- 5-B

Manitoba

VC9UM(VE4OY,opr) 143,664- 984-73-23-B
CY4UO(+VE4s NU VV) 30,492- 242-63-13-A
CY4VV(+VE4UO) 24,174- 237-51-11-A

Saskatchewan

VE5DX 232,350-1549-75-24-B

Alberta

VE6MP 140,008- 946-74-24-B
VE6ATT 85,680- 630-68-22-A
VE6AGV 37,386- 279-67- 8-B
VE6CGY 7790- 95-41- 4-A
VE6AFE 330- 15-11- 3-A

British Columbia

VE7CMK 174,327-1194-73-24-B
VE7AQF 168,720-1140-74-24-B
VE7AJP 64,328- 473-68-17-B
VE7BTG 24,192- 216-56-14-A

Yukon-N.W.T.

VE8AS 57,960- 414-70-17-B

Rules, 1978 IARU Radiosport Championship

If you missed the first running of this everybody-works-everybody contest in 1977, do yourself a favor and plan now to participate in 1978. Achievement and participation awards are now available.

The fantastic support and participation of the first IARU Radiosport Championship is spelled ENCORE, in capital letters. So number two is coming up in short order.

An expanded awards structure highlights the second annual IARU Radiosport Championship. Awards are now available for various achievement levels; for making 250 QSOs, 1000 QSOs and/or 50 total multipliers.

Scoring is slightly different for 1978. One point is earned for a QSO with a station in your own ITU zone. Three points for a QSO with a station outside your own ITU zone, but on your own continent. And five points for a QSO with a station on a continent other than your own. The rules for 1978 are explained fully, below. Read on. . .

Entries from U.S. and Canadian amateurs will be accepted *only* if made on official log sheets and summary sheets or a *reasonable* facsimile. Those will be available upon request in mid-May in any quantity desired. Send a large, self-addressed stamped envelope to ARRL Headquarters, 225 Main Street, Newington, CT 06111, USA. Log sheets contain space for 100 contacts per sheet of paper; don't forget to also request CD-77 forms for keeping track (in matrix form) of W/VE contacts and form CD-175 for DX contacts. Such forms (filled out) are required with any U.S. or Canadian entrant making a total of more than 200 contacts. The summary sheet contains a worldwide ITU zone list.

Eligibility: All amateurs worldwide, in single-operator and multioperator, single-transmitter categories. No multi-transmitter allowed. Separate categories of competition for single-operator station will include the following: cw only, phone only, and mixed phone and cw. Mixed-mode only for multi-operator entries. Guidelines for single-operator and multi-single are the same as for the ARRL International DX competition (page 67, December 1977 *QST*).

Contest Period: July 8 and 9, 1978 (UTC). Maximum 36 hours for single-operator entries. Off times must be *at least* 30 minutes in length. No time limit for multi-single stations, although once a multi-single station commences operation on a particular band, it must remain on that same band for *at least* 10 minutes.

Valid Contacts: All amateur bands, 160-2 meters. Each station may be worked

Listed by prefix, alphabetically, are the countries of the world and the ITU zone of each.

A2	57
A3	62
A4	39
A5	41
A6	39
A7	39
A9	39
AP	41
BV	44
BY	42, 43
C2	65
C3	27
C5	46
C6	11
C9	53
CE	14, 16
CEØA	63
CEØZ	14
CEØX	14
CM, CO	11
CN	37
CP	12, 14
CR5	47
CR9	44
CT	37
CT2	36
CT3	36
CX	14
D2, 3	52
D4	46
D5	46
D628	53
DJ	28
DM	28
DU	50
EA	37
EA6	37
EA8	36
EA9	46
EA9	37
EI	27
EL	46
EP	40
ET	48
F	27
FB8Z	68
FB8W	68
FB8X	68
FC	28
FG	11
FH	53
FK	56
FL	48
FM	11
FO	10, 63
FP	09
FR	53
FS	11
FW	62
FY	12
G	27
GC	27
GD	27
GI	27
GM	27
GW	27
HA	28
HB	28
HBØ	28
HC	12
HC8	12
HH	11
HI	11
HK	12
HKØ	11
HKØ	12
HKØ	11
HL, HM	44
HP	11
HR	11
HS	49
HV	28
HZ, 7Z	39
I, IT	28
IS	28
JA	45
JD	45
JD1	45
JT	32
JW	18
JX	18
JY	39
W1	08
W2	08
W3	08
W4	08
W5	07
W6, 7	06
W8, 9	08
WØ	07
KB	61, 62
KC4	67, 69, 70, 71, 72, 73
KC4	11
KC6	65
KC6	64
KG4	11
KG6	64
KG6R, S, T	64
KH	61
KJ	61
KL	01
KM	61
KP4	11
KP6	61, 62
KS4, HKØ	11
KS6	62
KV	11
KW	65
KX	65
KZ	11
LA	18
LU	14, 16
LX	27
LZ	28
OA	12
OD	39
OE	28
OH	18
OHØ	18
OJØ	18
OK	28
ON	27
OX, XP	05
OY	18
OZ	18
P2	51
PA	27
PJ	11
PY	13, 15
PYØ	13
PYØ	15
PZ	12
S2	41
SM	18
SP	28
ST	48
SU	38
SV	28
TA	39
TF	17
TG	11
TI	11
TI9	11
TJ	47
TL	47
TN	52
TR	52
TT	47
TU	46
TY	46
TZ	46
UA	19, 20, 29, 30
UA1, UK1	75
UA2, UK2F	29
UA, UK, UV, UW9-Ø	20-35
UB, UK, UT, UY5	29
UC2, UK2A/C/I/L/O/S/W	29
UD6, UK6C/D/K/	29
UF6, UK6F/O/Q/V	29
UG6, UK6G	29
UH8, UK8H	30
UI8, UK8	30
UJ8, UK8J/R	30
UL7, UK7	30
UM8, UK8M, N	31
UO5, UK5O	29
UP2, UK2B/P	29
UQ2, UK2G/Q	29
UR2, UK2R/T	29
VE1, 2	09
VE3	04
VE4, 5	03
VE6, 7	02
VE8	02, 03, 04, 75
VX	09
VY	09
VK1, 2, 3, 5, 7	59
VK4, 8	55
VK6	58
VK	60
VK9	60
VK9	54
VK9	55
VKØ	68
VKØ	60
VP1	11
VP2E	11
VP2A	11
VP2V	11
VP2D	11
VP2G	11
VP2M	11
VP2K	11
VP2L	11
VP2S	11
VP5	11
VP8	16
VP8	73
VP9	11
VQ9	41
VQ9	53
VR1	62
VR3, 7	61
VR4	51
VR6	63
VR8	65
VS5	54
VS6	44
VS9	41
VS9K	39
VU	41
VU7	49
VU7	41
XE	10
XF4	10
XT	46
XU	49
XV	49
XW	49
XZ	49
YA	40
YB	54
YI	39
YJ	56
YK	39
YN	11
YO	28
YS	11
YU	28
YV	12
YVØ	11
ZA	28
ZB	37
ZD7	66
ZD8	66
ZD9	66
ZE	53
ZF	11
ZK1	62
ZK2	62
ZL	60
ZM	62
ZP	14
ZS	57
ZS2	57
ZS3	57
1S	50
3A	27
3B6, 7	53
3B8	53
3B9	53
3C	47
3CØ	52
3D2	56
3D6	57
3V	37
3X	46
3Y	67
4S	41
4U	28
4W	39
4X, 4Z	39
5A	38
5B, ZC	28
5H	53
5N	46
5R	53
5T	46
5U	46
5V	46
5W	62
5X	48
5Z	48
6D	48
6W	46
6Y	11
7O	39
7P	57
7Q	53
7X	37
8P	11
8R	12
8Z4	39
9A(M)	28
9G	46
9H	28
9J	53
9K	39
9L	46
9M2	54
9M6, 8	54
9N	42
9Q	52
9U	52
9V	54
9X	52
9Y	11

once per frequency band, regardless of mode. Crossband contacts not allowed, except contacts via the OSCAR satellites, which count as a separate band. Contacts within one's own ITU zone count one point, outside of one's ITU zone but within one's own continent count three points, and outside of one's own continent count five points.

Multipliers: The sum of the number of different ITU zones worked on each band.

Exchanges: Signal report and ITU zone.

Scoring: Final score equals number of QSO points times the zone multiplier.

Reporting: All entries worldwide to be sent to IARU Headquarters, Box AAA, Newington, CT 06111, USA. All U.S. and Canadian entrants *must* use official log sheets and summary sheets, or a *reasonable* facsimile. Entries must be accompanied by dupe sheets if they made 200 or more QSOs. Entries must be postmarked no later than August 21, 1978. All entries become the property of the IARU and none can be returned. In cases of dispute, the decisions of the IARU Awards Committee are final.

Awards: A certificate will be awarde to the highest scoring cw-only, phone only and mixed-mode entrant in eac ARRL section, each ITU zone, and eac DXCC country. In addition, achieve ment-level awards are available. A cer tificate and/or endorsements are availabl for: making 250 QSOs, 1000 QSOs, and or making a total of 50 or more multi pliers. In the case of multiple award level achieved, only the highest award will b issued. Additional awards may be made a the discretion of each country's IARU member-society.

Parts Out, Hertz In . . .

FMT goes metric! Largest turnout ever for the first metric-standards FMT.

By Jim La Porta,* N1CC

This marks the first FMT under the new standards for the Class I OO. The requirement for appointment to this Official Observer category was changed (effective January 1, 1978) to a measurement accuracy of 100 hertz or less for at least two readings made during the FMT. The FMT tabulation will show all those participants whose measurements were within 100 Hz of the umpire. Those whose average (for at least two readings) error was less than 5 Hz from the umpire are qualified as "Honor Roll," and are noted with an asterisk. By two readings we mean one averaged reading each on two bands or early and late runs on the same band.

Problems at W1AW negated readings on 20 meters during the early run. Propagation prevented umpire readings on the 20-meter late run so that no 20-meter readings were considered for this FMT.

Umpire measurements of W1AW for the early run were 7,039,084 Hz and 3,558,453 Hz. During the late run a measurement of W1AW on 7,022,781 Hz coupled with the 3,562,240 Hz reading established the reference frequencies.

There were 198 participants who made a grand total of 2,162 readings of W1AW during the FMT. 159 participants were able to better the 100-Hz limit and 57 of these beat the 5-Hertz "Honor Roll" limitations. Stations who failed to meet the 100-Hz criteria, but whose participa tion is appreciated included K1LWI W1HJP, W1QV, W1SPP, WA1OHA K2BEV, WB2AWQ, K3JL, W3MR WA3JSZ, WA3YGQ, WB3ERE, K4AC K4JK, K4TXJ, W4LS, WB4GHI, N5TT W5FIP, K6QPG, W6CBF, W6VHU W7JIE, WA7EYZ, N8ET, W8YA WA8QBJ, K9IIK, K9UQN, W9TGN WB9GUY, WB9TIC, WB9ZBH, KØLB WBØGTL, WBØOGK, VE1BAF, VE6XC and VE7BWA; better luck next time!

Next time, in this case, is the May 1 FMT (the evening of May 12, locally Check April "Operating Events" for fu details. Reserve September 17 an November 4 for the remaining 197 FMTs.

*Deputy Communications Manager, in training, ARRL

Deviation in Hertz from Umpire

Participants Call Sign	Early 40	80	Late 40	80	Average
N1AO	084				084
N1NH	032				032
K1CZ	000				000
*K1VHO	000	000			000
W1AYG			054	001	028
W1BGW		000			000
W1DU		019			019
*W1JH		001		001	001
*W1JUM		001			001
*W1PLJ		000		000	000
W1TS	101	042			072
W1VH	041	022			032
N2BE		029			029
*N2UT	004	001			003
K2KSJ	061	097			079
K2RG		009			009
W2AIQ		031			031
W2AXT		000			000
W2DX	100	054			077
W2FE		003			003
W2FFU		003			003
W2ND		042		009	026
W2XQ	034				034
WA2AIV	068	107	014	058	062
*WA2MEL	002	000			001
*WA2SZV	002	002	002	002	002
WA2WHD	078	075			077
WB2CEE	042	057	018	012	034
WB2QLX	021	097		010	043
K3FD		072			072
W3ADE	047	135			091
W3BFF		006			006
*W3KEK		001		002	002
WA3NDQ			058	003	031
*K4BE			001	000	001
*K4KA	001	000			001
K4MZE			019		019
K4MZK	034	053			044
*K4NWE		001		000	001
*K4OTR		001		002	002
W4DGF	013	021			017
W4GH	016				016
*W4IBU	001	001	001	001	001
W4NTO	000				000
W4PKD	114	041		072	076
W4QN	018	036			027
W4RHZ		000			000
W4TL	054	003			029
W4UCL	126	003	019	160	077

*WA4AXA	000	001			001
WA4LPV	008	006			007
WA4LWO	009	003			006
*WA4YVQ	001	000	001	002	001
N5CY	064				064
N5DZ			001	004	003
K5CM	000	000			000
K5DL	009	005			007
*K5JW	000	001			001
K5MF	019	006			013
K5MUK	116	033			075
K5OA	033			165	099
*W5FMO	001	001		001	001
*W5IJW	000	000	000	001	000
W5IL			069	010	040
*W5IQH	000	000	001		000
*W5OS	000	000		000	000
*W5QIV			003	000	002
WA5GBD	084	053			069
WA5NOM			009	004	007
WA5QMI	001				001
K6CL	036			050	043
K6EPX	114		013	102	073
K6GG	084				084
K6HI	043		063		053
*K6IJ	004		001		003
*K6MZN	001		003		002
KH6CZ			031		031
*W6CBX	000		003		002
*W6CDF	000			000	000
W6ELT	060		107	040	069
W6EY	034	053	011	040	035
*W6RQ	001		001		001
W6SFH	002				002
W6SSB	068	103	002	038	053
WB6YID				020	020
K7DUE	084			065	075
*K7QXL	001		000	001	001

*K7ST	001			001	001
W7DQS	039	019	024	010	023
*W7DY	002	001	003	000	002
W7FIS	034	003	069	060	042
W7SK	167	040	028	056	073
WA7HGB	034		019		027
WA7IJN	008				008
*WB7CRU	000		005	001	003
WB7SUW	034	053	019	010	029
K8JH	026	042			034
W8AYI				082	082
*W8CUJ	000	000	000	001	000
W8HZA	012	004			008
*W8JLJ	000	000	000	000	000
W8LX	019	017			018
*W8NWU	000	000	003	001	001
*W8OK	000	000	001	000	000
*W8PZT		002			002
*W8YZ	001	002			002
W8ZM		047			047
WA8NOI				000	000
*WA8TVZ	001			002	002
WB8HKK		115		011	063
WB8HWE	048			012	030
*WB8STQ	001	001			001
K9BGL	034	010			022
K9CW	047	023			035
*K9WGN	001	001	001	000	001
*K9WMP			003	007	005
W9FN	016		019	000	012
W9GF	045	009			027
*W9HPG		000	001	001	001
*W9KO	000	001	001		001
W9TG	014	012			013
*W9TJ	000	001	001	001	001
*W9ZTK	000	001	001	001	001
WA9CWE	011	071			041
WA9HCZ			008	010	009

*WA9JWL	003	000		000	001
WA9PVS	094	137	041	090	091
NØND	044				044
*NØRS	000	009	003	001	003
KØEZ	019	022			021
*KØKPJ	004		003		004
*KØMZ	003	001			002
KØPVG			001	011	006
*WØBJ	001	003	000	000	001
WØDWB	014		007		011
WØEUQ	059				059
WØGW	084	053	006	040	046
*WØKL	002	000			001
WØMV				000	000
*WØRWG	002	005	003	003	003
*WØRWH	001	006	001	004	003
WØSS	071	048			060
WAØEFN	001	016	031	020	017
WAØTAS	009	013	010	015	012
WAØVPY	007				007
WAØYCY	039	010			025
WBØUFQ			009	003	006
*VE2ECW	003	009	004	005	005
VE2HN		000			000
VE2JN				012	012
VE2WQ		010		013	012
VE2XL	010	001		011	007
*VE3AC	001	003			002
*VE3BDC	000			001	001
VE6MJ	066		081	040	062
*VE6QM	001		000		001
ex-7HM		001			001
*R.C. Ireland	000			000	000

*"Honor Roll," two or more readings (on two or more frequencies or runs) with an average of 5 hertz or less deviation from the umpire.

June VHF QSO Party

Now, add those DXCC countries to your multiplier total.

For 1978, the scoring of the June VHF QSO Party has been changed to allow each DXCC country, which is not also included in an ARRL section, worked per band to count as a separate multiplier on the band worked. (For example, the Virgin Islands, KV4, are in the ARRL West Indies Section and can not be counted again as a separate DXCC country, while Bermuda, VP9, is not in an ARRL section and counts as a separate multiplier the first time it is worked on each particular band.)

Official entry forms are available from Hq. for an s.a.s.e. Official forms or a *reasonable* facsimile must be used.

Hot on the heels of a 1977 June VHF QSO Party that saw 16 all-time division records fall, the 1978 edition should prove pretty interesting in its own right.

Good luck.

Rules

1) The 1978 June VHF QSO Party begins at 1900 UTC, Saturday, June 10, and ends at 0600 UTC, Monday, June 12. Entrants may operate no more than 28 out of the 35 hours. The seven hours of off-time must be taken in increments of 30 minutes or more. Listening time counts as operating time. All contacts must be made on amateur bands above 50 MHz using authorized modes of emission.

2) Name-of-section exchanges must be acknowledged by both operators before either may claim contact point(s). A one-way exchange does not count.

3) Fixed, portable or mobile operation under one call, from one location only, is permitted. A transmitter used to contact one or more stations may not be used subsequently under any other call during the contest period (with the exception of family stations where more than one call is assigned to one location by FCC/DOC. Multitransmitter operations are limited to *only one signal per band* (6, 2, 1-1/4, etc.).

While no minimum distance is specified for contacts, equipment in use should be capable of real communications (i.e., able to communicate over at least a mile).

Contacts made by retransmitting either or both stations do not count for contest purposes. In addition, use of the 146- to 148-MHz segment of 2 meters is restricted as follows: Contest contacts may be made only on these recognized simplex frequencies: 146.49, .52, .55, .58 and 147.42, .45, .48, .51, .54, .57 MHz. Contest contacts may *not* be made on any other frequency between 146 and 148 MHz; this restriction includes all repeater frequencies (including 146.76 and 146.94 MHz). Also, use of the national calling frequency (146.52 MHz) is restricted to four hours total operating time for each participating station during the contest period (including both listening and transmitting time). These four hours may be taken in operating periods of not more than one hour each and must be clearly indicated in the log. After each operating period on 146.52, the participating station may not transmit on 146.52 MHz

for at least 15 minutes.

4) Scoring: 1 point for *completed* two-way exchanges on 50 or 144 MHz; 2 points for such exchanges on 220 or 420 MHz; 3 points for such exchanges on the higher uhf bands. The sum of these points will be multiplied by the number of different ARRL sections and different DXCC countries *not* included in an ARRL section, worked per band. Crossband work does not count. Aircraft mobile stations cannot be counted for section multipliers.

5) Foreign entries: All contacts with foreign countries count for score. Each different DXCC country (*not* included in an ARRL section) worked per band counts as a separate multiplier. Foreign stations may only work stations in ARRL sections for contest credit and will give their country name as part of the exchange.

6) A contact per band may be counted for each station worked. Example: W2EIF (SNJ) works K1YON (Conn) on 50, 144 and 220 MHz for complete exchanges. This gives W2EIF 4 points (1 — 1 — 2) and also 3 section-multiplier credits. (If W2EIF contacts other Connecticut stations on these bands, they do not add to his section multiplier but they do pay off in additional contact points.) Each station may be worked only once per band, regardless of mode.

7) Each section/country multiplier requires a complete exchange with at leas one station. The same section/countr can provide another multiplier point onl when contacted on a new vhf band.

8) Awards: Entries must be postmarke no later than July 10, 1978, and should b made on ARRL form CD-68. A certificat will be awarded to the high-scoring single operator station in each ARRL section. I addition, the high-scoring multioperato station will receive a certificate in eac section from which three or more vali multiple-operator entries are received o where exceptional effort has been dis played.

9) Disqualifications: See February 197 *QST*, page 83.

Field Day Rules

A fired-up generator, a speedy operator, a cloud of mosquitoes, and a hearty Hi-Ho Calamine. It's Field Day, June 24-25.

For Field Day, 1978, the "free" Novice Station option is available to any Class A group whose entry classification is *two* or more non-Novice transmitters (see miscellaneous rule 9c below).

Official entry forms for Field Day are now available from Headquarters. You will need one summary sheet for your entire operation and one CD-77 (aka dupe sheet, aka check sheet) for each band/mode (one for 80 phone, one for 80 cw, one for 40 phone, one for 40 cw, etc.). A business-sized self-addressed stamped envelope (with one unit of first-class postage) will bring five sheets, so plan accordingly. If you intend to use the OSCAR satellites on FD, request a special schedule of passes when you request your summary sheet and CD-77 forms.

Good luck!

Rules

1) *Eligibility:* The Field Day is open competitively to all amateurs in the ARRL Field Organization (plus Yukon and N.W.T.). Foreign stations may be contacted for credit but are not eligible to compete.

2) *Object:* For portable and mobile stations, to work as many stations as possible. For home stations, to work as many portable and mobile stations as possible.

3) *Conditions of Entry:* Each entrant agrees to be bound by the intent as well as the provisions of these rules, the regulations of his licensing authority, and the decisions of the ARRL Awards Committee.

4) *Entry Classifications:* Entries will be classified according to the number of transmitted signals, simultaneously on the air at any one time during the FD period, followed by the designation of the nature of the individual or group participation. Once a transmitter makes a contact on a band, it must remain on that band for at least 15 minutes. During this 15-minute period, the transmitter is considered to be transmitting a signal, whether it is or not, for purposes of determining transmitter class. Class A: Club group (or nonclub group with three or more licensed amateurs) set up specifically for operation in the FD and using portable identification. Such stations must be located in places which are not regular station locations and must use no equipment or facilities installed for permanent station use, nor any structures installed pe manently for FD use. Stations must operated under one call (except when Novice/Technician position is used, provided by miscellaneous rule 9c) a under control of a single licensee trustee for each entry. All equipme (including antennas) must lie within a ci cle whose diameter must not exceed 10 feet. All contacts must be made wi transmitter(s) and receiver(s) operati from a power source independent of co mercial mains. Entrants who, for a reason, operate a transmitter or receiv from commercial mains for one or mo contacts, will be listed at the end of th class. Class B: Nonclub stations set and operated by not more than two censed amateurs. Other provisions sa as for Class A. Class C: Stations locat in vehicles capable of operation while motion and normally operated in t manner, including antenna. Class C s tions may operate stationary, but no s tionary equipment or facilities may used. A Class C station may not be us as a station in any other class. T operator of a Class C station may a operate from another station during t FD period but scores for his mobile ope tions must be submitted separately. Cl D: Stations operating from permanent licensed station locations, not portable

Operating Period

Starts	*Ends*
Saturday, June 24 1800 UTC	Sunday, June 25 2100 UTC

mobile, using commercial power. Class E: As above, but using emergency power for transmitters and receivers.

5) *Field Day Period:* FD operation starts at 1800 UTC the fourth Saturday of June and lasts until 2100 UTC the following Sunday, a period of 27 hours. Class A and Class B entries who do not begin any setting-up operations until 1800 UTC on Saturday may operate the entire duration of the FD period. Others may operate no more than 24 consecutive hours; i.e., once FD operation has started it must cease 24 hours from that point.

6) *Bands:* Each phone and each cw segment is considered as a separate band. All voice contacts are equivalent and RTTY is counted as cw. A station may be worked once on each band. Crossband contacts are not allowed. The use of more than one transmitter at the same time in a single band is prohibited, except that a Novice/Technician position may operate on any Novice band segment at any time. Contacts made by retransmitting either or both stations do not count for scoring purposes.

7) *Exchanges:* Stations in the U.S., possessions and Canada must exchange ARRL section (see page 8 in any *QST*) and signal report. Valid contacts with stations outside of a section consist of sending a signal report and section and receiving a signal report and country from the foreign station.

Hot air has more uses than simply activating a microphone. Aero mobile/balloon at WØUK/Ø (2A).

8) *Valid Contacts:* A valid contact is defined as a two-way exchange (see above) between stations. Class A, B or C stations may contact any station. Class D or E stations may contact any Class A, B or C station.

9) *Miscellaneous Rules:*

a) Operators participating in the FD may not, from any other station, contact for point credit the FD portable station of a group with which they participated. This is intended to outlaw any kind of manufactured contacts.

b) A station used to contact one or more FD stations may not subsequently be used under any other call during the FD period. This rule is intended to outlaw multiple contacts on the same band with the same station, using different calls. It is not, however, intended to prohibit the use of jointly owned stations which are normally used under different calls by members of the same family.

c) Any Class A group whose entry classification is two or more non-Novice transmitters may also use one Novice/Technician operating position (to be set up and operated only by Novice and Technician class licensees) without changing their basic entry classification. The Novice/Technician position must keep their own logs and check sheets. The Novice/Technician position QSO total may be added to the group QSO total before multiplying.

10) *Scoring:* Scores are based on the number of valid contact points times the multiplier corresponding to the highest power used at any time during the FD period, plus bonus points. Phone contacts count one point each, and cw contacts count two points each. Power multipliers: If all contacts are made using a dc input power of 10 watts or less *and* if a power source other than commercial mains or motor-driven generator is used (e.g., batteries, solar cells, water-driven generators, etc.), multiply by five. If any or all contacts are made using a dc input power of 200 watts or less, multiply by two. Multiply by one if any or all contacts are made using a dc input power over 200 watts and up to 1000 watts. Dc power on ssb phone is considered to be half the peak-envelope power. Batteries may be charged while in use for Class C entries only. For other classes batteries charged during the FD period must be charged from a power source independent of the commercial mains.

11) *Bonuses:* The following bonus points may be added to the score (after the multiplier is applied) to determine the final score. Only Class A and B stations are eligible for bonuses. Do not add bonuses to your final score — all applicable bonuses will be added at Headquarters.

a) 100 points for 100-percent emergency power per transmitter classification. ALL equipment and facilities at the FD site must be operated from a source independent of the commercial mains.

b) 50 points for public relations. Publicity must be obtained or a bona fide attempt to obtain publicity must be made, or operation conducted from a public place (example: a shopping center). Evidence must be submitted in the form of a clipping, a memo from a BC/TV station stating publicity was given or a copy of material sent to news media for publicity purposes.

c) 50 points for message origination. A message must be originated by the club president or other FD leader, addressed to the SCM or SEC, stating the club name (or nonclub group), number of operators, field location and number of ARES members participating. The message must be transmitted during the FD period and a fully serviced copy of it must be included with the FD report. The message must be in standard ARRL message form as explained in *Operating an Amateur Radio Station.* The message must be correct in all respects or no credit will be given.

d) 5 points for each message received and relayed during the FD period, up to a maximum of 50 points. Copies of each message, properly serviced, must be included with the FD report.

e) 50 points can be earned by completing at least one QSO via the OSCAR satellite during the FD period. The repeater provision of rule 6 is waived for OSCAR QSOs, as is the 15-minute provision of rule 4. An OSCAR station does not count as an additional transmitter. On the summary sheet show OSCAR as a separate "band."

12) *Club Aggregate Mobile Score:* Entries under Class C may be combined to form an aggregate score for their club, having no connection with the club's portable entry, if any. Individual reports must include the club name. The club secretary or other designated club official must submit the club aggregate mobile score claim. Only bona fide members of a club operating in the club territory (175-mile radius from the club headquarters address) may contribute to this aggregate mobile score.

13) *Reporting:* Entries must be postmarked no later than July 24, 1978. The official summary sheet, plus a list of stations worked on each band and appropriate proof(s) for bonuses constitute an entry. *An entry that does not include check sheets will be classified as a check log.* A copy of your FD log is not required unless specifically later requested by ARRL. Send a stamped addressed envelope to ARRL hq. for FD forms which include a summary sheet and check sheets.

14) *Disqualifications:* See February 1978 *QST*, page 83.

Field Day Came Early to New Mexico

A contingent of New Mexico hams didn't wait for the last weekend in June last year to participate in their annual outdoor rite. They had the Los Alamos fires to thank for Field Day's early arrival.

By G. Bruce Maxwell,* N5GB

As spring fades into summer, a ham's thoughts rise to the rites of summer — Field Day! Being out-of-doors, smelling fresh new scents, hearing night sounds, eating questionable food, drinking extremely questionable coffee, and thrilling to the call of "CQ FD" will cause most any ham to experience a fast pulse and racing heartbeat.

However, with Murphy around, even the best in life can go sour, and Field Day came early to northern New Mexico last year. The afternoon of Thursday, June 16, greeted the residents of Los Alamos with a sight they fear every June before the rains start: smoke billowing from the nearby mountains.

Man's carelessness had started a fire in the Jemez Mountains west of Los Alamos, and with powder-dry conditions in the forests and some Los Alamos Scientific Laboratory high-explosive storage areas lying close by, it seemed that emergency conditions might be real this Field Day.

Ambulance Pressed into Service

The Los Alamos Amateur Radio Club, W5PDO, had acquired a 1968 military ambulance through the Navy MARS program and equipped it with both hf and vhf amateur stations as well as local civil defense and air-to-ground Civil Air Patrol equipment. This van, along with either a 10- or 5-kilowatt generator, had been used many times on searches, furnishing much-needed link with public com munications.

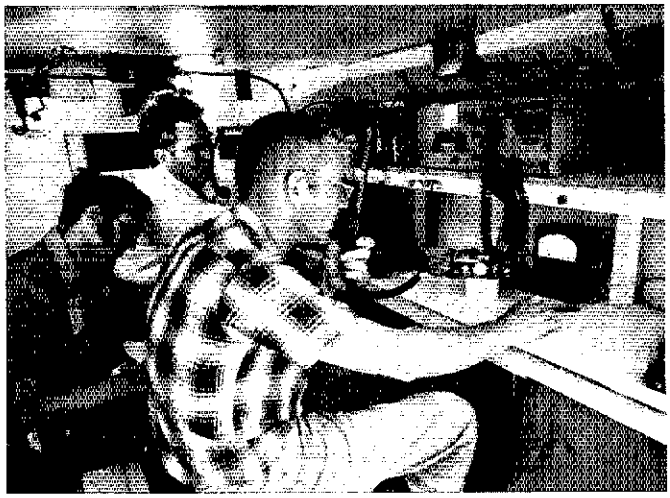
We offered the van and generators t the U.S. Department of Agricultu Forest Service in Santa Fe, and within 3 minutes our phone call was returned: th 10-kilowatt generator was needed at th Forest Service fire camp located a Graduation Flats, 15 miles west of Lo Alamos.

Ironically, Graduation Flats was favorite place to have Field Day, an W5PDO went there or nearby near every year. And so, this year too; bu Field Day was starting one week early an the place was very crowded!

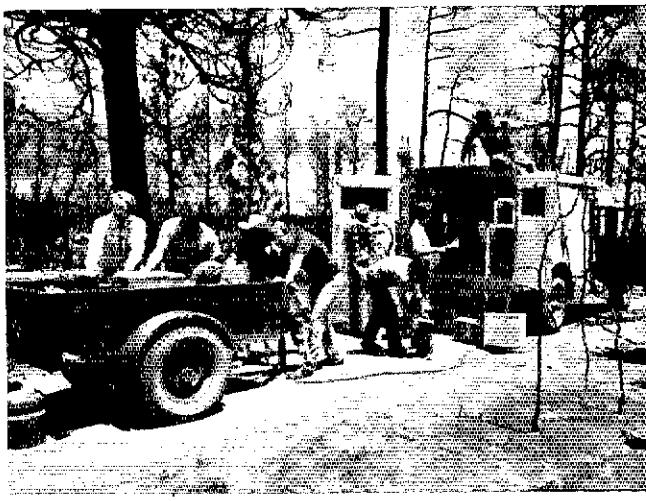
Indeed, a small city of about 100 population greeted our communicatior

*711 Jeffrey, Los Alamos, NM 87544

The Los Alamos ARC crew handled voluminous traffic via four local repeaters and obtained necessary supplies for the Forest Service's fire fighters.



As a devastating forest fire raged nearby, amateurs unpacked and assembled their self-contained and self-powered portable ham shack.



van pulling its generator. The fire camp contained a mayor, called a camp boss, and several small businesses including a weather station, timekeepers, food caterers, supply house, first aid, copy machines, communications and machine shop.

The Forest Service needed power and floodlights; our communications van went along because it was the only vehicle capable of pulling the needed generator.

After our generator was set up and the floodlights connected, we looked up the Forest Service communications crew to see how the professionals handled an emergency. Their array of equipment was mindboggling! Case upon case of vhf handhelds were scattered about and truckloads of portable repeaters had been brought in.

We mentioned to the crew chief that we had some phone-patch capabilities through our 2-meter repeaters. The chief was an amateur from California and knew exactly what we had to offer. We retreated to the van fully expecting to watch the generator and stay out of the way of the people who had a fire to put out.

Logistics for fire fighting are overwhelming, and the Forest Service understands them well. However, even the best system can be overloaded. Communications channels are planned to pass needed information, but channels which linked the fire camp to the dispatcher quickly became flooded.

Normal Channels Jammed

It was this flood that brought us into the communications aspect of the fire. A supply officer needed to talk to the warehouse in nearby Santa Fe. The normal Forest Service channels were jammed, so he asked if we could help. We quickly set up a phone patch. Amazing! He could talk directly with the warehouse man.

This patch was the first drop in the bucket. The bucket was soon overflowing because the Forest Service quickly realized what was available. With their own system, they could only talk to people who had radios; with our phone patches, they could talk to people anywhere in the country.

The phone company was asked to bring in a mobile phone van to provide communications. Graduation Flats is located in an area surrounded by mountains very strategically located in the wrong locations for microwave relay and the phone company was unable to establish a suitable link into their system. We had long used those very mountains to our advantage. For hams living on the flat lands, it's difficult to imagine vhf communication distances available when you have a few mountains that rise sharply to six or seven thousand feet above average terrain. Repeater coverage in New Mexico will normally range from 200 to 300 miles! And if you find a "hot spot," even greater distances can be covered.

With this coverage available, we set up phone-patch capability using four repeaters: WR5ABU, the Los Alamos Amateur Radio Club repeater; WR5AFP, the Santa Fe VHF Society repeater; WR5AEQ, the Amateur Radio Caravan Club repeater, located some 100 miles away in Albuquerque; and WR5ARO, the Jemez Mountain Repeater Association's new solar-powered repeater. At our club station, W5PDO, we set up equipment to operate phone patches simultaneously on three phone lines.

Because of the nature of the message traffic, autopatch was not usable. Most traffic involved long-distance phone calls. These were placed collect and required an amateur to initiate them through the telephone operator.

Losing Ground

The La Mesa fire proved very stubborn. Each new day dawned with the fire fighters losing ground. As more fire crews arrived from all over the western United States, Graduation Flats couldn't handle them all. Another fire camp was established in Andio Canyon and we supplied an amateur station. The hams who served there brought their own equipment and provided around-the-clock communication support.

At midweek the fire crews began to make headway, and on Thursday the fire was contained behind 38 miles of fire lines after having burned more than 15,000 acres of Ponderosa pine forest. Thursday night it rained, and by Friday the fire crews had become more relaxed as they thought of leaving for home. We prepared for increased phone-patch traffic to families back home.

We handled a great volume of traffic during the eight-day operation. Two basic types were passed via phone patches: official traffic, and health and welfare. Official traffic involved Forest Service traffic as well as all support services such as food caterers, trucks which hauled water, weather information, and even copy-machine repair orders. Forest Service traffic generally involved traffic passed into Santa Fe and Albuquerque dealing with additional crews, supplies, and so on. Traffic into Santa Fe to the Forest Service warehouse grew to such a large volume that the Santa Fe VHF Society established a station at the warehouse to handle traffic directly.

Getting Them Home

As the fire approached containment and eventual control, traffic changed to that of arranging transportation home. Fire crews had come from as far away as Washington, Idaho, the Dakotas, Wyoming and California; amateur radio provided the only communications home.

Health-and-welfare traffic was passed when official traffic lessened. This traffic generally informed families where the fire fighters were. When fire crews are assembled, they don't always know where they are going. One conversation overheard: "Honey, I'm not in Arizona; I'm in New Mexico! I don't know exactly where, though."

As the fire camp shut down, Field Day had started for real. We were tired and almost "hammed-out," but we were not going to let a tradition down. A few antennas were erected for the hf bands and we put in an appearance for Field Day 1977. After making a few contacts, someone came to the door of our van. He needed another phone patch.

Strays

SMALL BUT SEXLESS

☐ I will have been on the scene only a short time, but I have accumulated a vast storage of information about amateur radio. I like to think I am an authority on all aspects of the hobby. On a scale of 1 to 10, I rate 20. Being modest as I am, I must confess there are unknowns I am unaware of, but when discovered by the diehard experimenter, I will be there.

I am rather fat for my height but with all the cognition it's hard to say no. But I must brag a little and say that I am firm but squeezable. I like to be held and admired, especially by YLs. Off the record, a few XYLs have held me when the OM is at the NOFARS meeting.

I like to brag of my knowledge, but when really down to the nitty gritty, I really obtained the skills from my ancestors. My forefathers go back to the time when radio was two cans and a length of no. 14 wire. In fact, the Indians used tom-toms and code to communicate long distances. I also like a little humor but when one is so humble and dedicated to a specific technical field as I am, *National Lampoon* I can't be.

I know about all modes of communications from ssb to ATV, and have total recall. I will and want to share my smarts with everyone. I can be available seven days a week, 24 hours a day. But like all material things I have a price. It's reasonable — next time we meet I will advise.

I would like to come to your shack and assist in this wonderful hobby of amateur radio. So look for me down the log. My handle is *1978 Radio Amateur's Handbook. — Ed Palagyi, WB4QVK, from the* Balanced Modulator

Operating News

Conducted By George Hart,* W1NJ

Toward a 10-Meter Band Plan

Not so many years ago the possibility of losing the 10-meter band caused a flurry of activity to spur interest. A need was felt to protect the band from intrusion from nonamateur sources. A flip of the dial these days will tell you that there is now a traffic jam on most of the band. Improving conditions, easy transition from CB for the new Novice, simple antennas, and the ease of communications with very low power levels have once again popularized the band. Headquarters has been flooded with requests for technical articles as well as operating guides.

A forthcoming issue of *QST* will treat a simple conversion of a CB a-m transceiver to 10 meters, and soon after articles that deal with PLL conversions and changes to CB single-sideband rigs will be available. This series of technical articles will increase the proliferation of signals on 10 meters. For many years ARRL has elected only to suggest certain frequencies and to promote "gentlemen's agreements" for band usage. In perhaps 90 percent of the situations this has worked satisfactorily. Certain committees, such as the VHF Repeater Advisory Committee, have been formed and provide an input to Headquarters so that suggestions can be made public and adopted on an international basis when possible to further the gentlemen's agreements, thereby fulfilling part of the amateur spirit long enjoyed by our fraternity.

In search of this goal, a study has been made of the common practices, regulations pertinent, and prospects for channelization. Channelization has been tossed around in this column before, and is in fact in use on the frequencies above 50 MHz. Contrary to many of the expressed opinions, the concept in itself did not come from the Citizen's Radio Service. Channelization began early in amateur radio with calling frequencies, and later net frequencies, long before CB was even a spark in a manufacturer's mind.

Common practices have for years implied that the space 28.5 to 28.9 MHz be reserved for ssb and that above 28.9 was where the dinosaurs of the band on a-m would reside. Also, convention has placed RTTY on 28.090 and SSTV on 28.680 as calling frequencies, and placed a "DX window" from 28.5 to 28.6 MHz. Groups such as the 10-10 International Net have set calling frequencies at 28.6 and a-m stations have generally honored the 28.9 mark as a guidepost. All of these practices follow the gentlemen's agreement concept, and are subject to revision if the fraternity as a majority has other needs.

We would like to suggest to the membership that these conventions be continued with some modifications to take into account new provisions of the law and the greater population on 10 meters. A glance at your ARRL *License Manual* will tell you that in addition to the conventions, there are strict restraints on mode in certain segments, for U.S. amateurs. Most notably these are the restriction on RTTY to 28.0-28.5, power limitation of 250 watts in the 28.1-28.2 Novice subband, fm voice operation (deviation greater than that permitted for a properly adjusted A3 signal, i.e., 3 kHz) to above 29 MHz, and specific restriction of repeater stations to 29.5 to 29.7 MHz.

Adding to this the OSCAR window of 29.3 to 29.5 MHz, where specialized communications techniques are evident, you have a convention tossed into a regulated area. It i perhaps in this situation that the gentlemen' agreement concept of hamming is the most im portant to preserve. With the repeater subban close to OSCAR, most users have chosen to us the low-in/high-out practice with a 100-kH split starting at 29.510 MHz, to avoid in terference to OSCAR beacons at 29.502 MH

With these common practices and regula tions in mind, along with the desire to maintai the status quo of practices currently under wa on 10 meters, we have observed that, as a sta dard, conversions of a-m CB radio equipme are usually limited to an even 2-MHz change the existing frequency channels in these radio making their spread from 28.965 MHz 29.255 MHz for the 23-channel variety and 29.405 MHz for the 40-channel radios. Mo complicated conversions of ssb units would n need to comply with this plan, because s operation occurs most commonly on the spe trum from 28.5 to 28.9, and CB ssb units a ford easy VXO conversions to use other th "channelization" techniques.

Under present regulation, 10-meter repeate are subject only to the standard 1-kW pow limitations. The repeater portion of 10 h about 17 repeaters in 1977, but early 19 registration of repeaters indicates that t population may jump to as many as 50 th year. Repeaters on 10 are predominantly f but a growing number of machines are on s or a-m. With 100-kHz splits and 10-kHz cha nels, only nine repeater pairs are available f use in this subband. More than any other ba used for repeaters it is up to the amateur frat nity to impose self-regulation to preve mutual interference. Some steps that seem be in order are low power output on repeate

*Communications Manager, ARRL

W1AW Operating Schedule (April 30, 1978-October 29, 1978)

PDST	CDST	EDST	UTC	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
6 A.M.	8 A.M.	9 A.M.	1300*	Slow[1]	Fast[2]	Slow[1]	Fast[2]	Slow[1]		
7	9	10	1400*	←		Cw Bulletins[3]	→			
8	10	11	1500*	←		RTTY Bulletins[4]	→			
1 P.M.	3 P.M.	4 P.M.	2000*	Fast[2]	Slow[1]	Fast[2]	Slow[1]	Fast[2]	Slow[1]	Slow[1]
2	4	5	2100	←		Cw Bulletins[3]	→			
3	5	6	2200	←		RTTY Bulletins[4]	→			
4	6	7	2300	Slow[1]	Fast[2]	Slow[1]	Fast[2]	Slow[1]	Fast[2]	Fast[2]
5	7	8	0000	←		Cw Bulletins[3]	→			
6	8	9	0100	←		RTTY Bulletins[4]	→			
6:30	8:30	9:30	0130	←		Phone Bulletins[5]	→			
7	9	10	0200	Fast[2]	Slow[1]	Fast[2]	Slow[1]	Fast[2]	Slow[1]	Slow[1]
8	10	11	0300	←		Cw Bulletins[3]	→			
9	11	12	0400	←		RTTY Bulletins[4]	→			
9:30 P.M.	11:30 P.M.	12:30 A.M.	0430	←		Phone Bulletins[5]	→			

[1]Slow code practice on cw bulletin frequencies, 8 minutes each session; 5, 5, 7-1/2, 7-1/2, 10, 13, 15 wpm.
[2]Fast code practice on cw bulletin frequencies, 8 minutes each session; 35, 30, 25, 20, 15, 13, 10 wpm.
[3]Cw bulletins, 18 wpm, on: 1.835, 3.58, 7.08, 14.08, 21.08, 28.08, 50.08, 147.555 MHz.
[4]RTTY bulletins 60 wpm/170-Hz shift on 3.625, 7.095, 14.095, 21.095, 28.095 147.555 MHz.
[5]Phone bulletins on 1.835, 3.99, 7.29, 14.29, 21.39, 28.59, 50.19, 147.555 MHz.
*W1AW will beam 45° for these transmissions on Mondays, Wednesdays and Fridays during May and June on 20, 15 and 10 meters. European listeners are encouraged to report use of these transmissions during this trial period.

Normal W1AW visiting hours are Monday through Friday, 8 A.M. to 5 P.M., and Saturday and Sunday 3:30 P.M. to 1 A.M. (all local Eastern Time). The station address is 225 Main St., Newington, CT 06111 (about 7 miles south of Hartford). Note: ARRL office-visiting hours are 8 A.M. to 5 P.M. Monday through Friday. Maps with local street detail are available upon request. Please note that all footnoted frequencies are approximate. If you wish to operate when visiting, you must have your original operator's license with you. (Schedules can also be arranged to work W1AW.) The station will be closed May 29, July 4 and September 4. *Staff:* Chief Operator/Asst. Communications Mgr. C. R. Bender, W1WPR; Chris Schenck, W1EH; Stan Gibilisco, W1GV.

In a communications emergency monitor W1AW for special bulletins as follows: *phone* on the hour, *RTTY* at 15 minutes past the hour, *cw* on the half hour.

To improve your fist by sending in step with W1AW (but not over the air!) and to allow checking the accuracy on certain tapes, note the UTC dates and *QST* text to be sent in the 0300 practice from the issue of *QST* two calendar months past: May 5, It Seems to Us; May 9, World Above; May 15, League Lines; May 18, Public Service; May 24, Happenings; May 31, Operating News.

tone-encoded access, low antennas, and in particular the use of multimode techniques so that, much as OSCAR, the repeater will faithfully repeat the input. Also to be considered are directional antennas for both input and output to avoid mutual interference with another repeater, perhaps across the country. Skip conditions on this band are what caused the move of many public service communications services from the 30- to 50-MHz commercial band during the last period of high sunspot activity. Skip conditions, however, are not only a fact of life for amateurs, but the spark of experimentation that keeps amateur radio growing. Use your operating ability and technical knowledge to utilize the spectrum space in such a manner that proves the gentlemen's agreement concept workable. Several stations operate 10-meter beacons; check next month's "How's DX" column for the specific details. The portion from 28.2 to 28.3 MHz should be reserved for such beacons which are an excellent indication of band openings.

The table below can be used as a guideline. If you feel that a different plan would be better utilized, you are encouraged to drop us a line. Let us take your input and modify practices where reasonable to make 10-meter operation a more pleasant and efficient operation for our future. — *N1CC*

Table 1
ARRL Suggested Band Plan — 10 Meters

Frequency (MHz)	*Mode*
28.000-28.500	cw
28.000-28.100	RTTY (28.090 calling)
28.100-28.200	cw (*Novice* — 250 W maximum)
28.200-28.300	International Beacons
28.500-28.900	ssb (28.680 SSTV)
28.900-29.300	a-m
28.900-29.300	fm simplex
29.300-29.500	OSCAR (receive only)
29.510-29.700	repeaters (fm, a-m, ssb)

SCM ELECTION NOTICE

To all ARRL members in the Southern Florida, North Dakota, West Indies, Oklahoma, Minnesota, Connecticut, Idaho, Western New York, and Ohio sections: You are hereby solicited for nominating petitions pursuant to an election for Section Communications Manager. A petition, to be valid, must contain the signatures of five or more full ARRL members residing in the section concerned. Photocopied signatures are not acceptable. No petition is valid without at least five signatures *on that petition*. No member may sign more than one petition. It is advisable to have a few more than five signatures on each petition.

Petition forms (CD-129) are available on request from ARRL headquarters but are not required. The following form is suggested:

(Place and date)

Communications Manager, ARRL
225 Main Street, Newington, CT 06111

We, the undersigned full members of the . . . ARRL Section of the . . . Division, hereby nominate . . . as candidate for Section Communications Manager for this Section for the next two-year term of office.
(Signature . . . Call . . . City . . . ZIP . . .).

SCM candidates must have been a member of the League for a continuous term of at least two years and a licensed amateur of General class or higher (Canadian Advanced Amateur Certificate) immediately prior to receipt of petition at Headquarters.

Petitions must be received at Headquarters on or before 5:30 P.M. Eastern Local Time, June 9, 1978.

Whenever more than one member is nominated in a single section, ballots will be mailed from Headquarters on July 3, 1978, returns counted August 22, 1978, and SCMs elected as a result of the above procedures will take office October 1, 1978.

If only one valid petition is received for a section, that nominee shall be declared elected without opposition, for a two-year term beginning October 1, 1978.

If no petitions are received for a section by the specified closing date, such section will be resolicited in October *QST*, and an SCM elected through the resolicitation process will serve a term of 18 months.

Vacancies in any SCM office between elections are filled by appointment by the communications manager.

You are urged to take the initiative and file a nominating petition immediately.

George Hart, W1NJM
Communications Manager

REPEAT SCM NOMINATING SOLICITATION

Since no petitions were received for the North Carolina and South Dakota sections as a result of notices in October and November *QST*, nominating petitions for these sections are herewith resolicited. See the above notice for details on how to nominate.

SCM ELECTION RESULTS

The following were elected for two-year terms of office beginning April 1, 1978:

Balloting Results

In the Virginia Section, Richard "Rick" L. Genter, K4BKX, defeated Robert L. Follmar, N4RF, 985-734.

In the Louisiana Section, S. T. "Tom" Losey, Jr., WB5NEZ, defeated John J. Meyer, W5JFB/N5JM, 415-340.

In the Eastern Pennsylvania Section, George S. Van Dyke, Jr., W3HK, defeated Allen R. Breiner, W3TI and Robert "Bob" A. Josuweit, WA3PZO. George Van Dyke received 586 votes, Allen R. Breiner received 547 votes and Robert Josuweit received 381 votes.

AMSAT-OSCAR 7

Ref. Orbit	*Date*	*Time (UTC)*	*Long. W.*	*Ref. Orbit*	*Date*	*Time (UTC)*	*Long. W.*
15814B	1 May	0001	57.5	16078B	22 May	0147	84.1
15827B	2 May	0055	71.0	16090B	23 May	0046	69.0
15840A	3 May	0150	84.6	16103A	24 May	0140	82.6
15852B	4 May	0049	69.5	16115B	25 May	0040	67.4
15865B	5 May	0143	83.1	16128B	26 May	0134	81.0
15877A	6 May	0043	67.9	16140A	27 May	0033	65.9
15890B	7 May	0137	81.5	16153B	28 May	0128	79.4
15902B	8 May	0036	66.3	16165B	29 May	0027	64.3
15915A	9 May	0131	79.9	16178A	30 May	0121	77.9
15927B	10 May	0030	64.8	16190B	31 May	0021	62.7
15940B	11 May	0124	78.4				
15952A	12 May	0024	63.2	16203B	1 June	0115	76.3
15965B	13 May	0118	76.8	16215A	2 June	0014	61.2
15977B	14 May	0017	61.7	16228B	3 June	0108	74.7
15990A	15 May	0111	75.2	16240B	4 June	0008	59.6
16002B	16 May	0011	60.1	16253A	5 June	0102	73.2
16015B	17 May	0105	73.7	16265B	6 June	0001	58.0
16027A	18 May	0004	58.5	16278B	7 June	0056	71.6
16040B	19 May	0059	72.1	16291A	8 June	0150	85.2
16053B	20 May	0153	85.7	16303B	9 June	0049	70.1
16065A	21 May	0052	70.5	16316B	10 June	0144	83.6

Spacecraft Frequencies

Spacecraft	*Uplink*	*Downlink*	*Beacon*
A-O 7			
Mode A	145.850-145.950 MHz	29.400-29.500 MHz	29.502 MHz
Mode B	432.125-432.175 MHz	145.975-145.925 MHz	145.972 MHz
A-O 8			
Mode A	145.850-145.950 MHz	29.400-29.500 MHz	29.400 MHz
Mode J	145.900-146.000 MHz	435.100-435.200 MHz	435.095 MHz

NOTES

Have you listened to OSCAR 8 yet? This newest of amateur satellites is available to anyone with a good-quality, 10-meter receiver. To track it, you'll need an OSCARLOCATOR and reference-orbit information (available on W1AW bulletins). It orbits the earth every 103 minutes; the morning and evening passes occur at approximately the same times each day. Decoding the telemetry from the beacon is a simple matter using the ARRL OSCAR telemetry forms, available from Hq. for an s.a.s.e. When you return it, we'll send you a colorful OSCAR 8 QSL card.

To keep abreast of the latest developments, tune in to the regular phone and cw bulletins over W1AW, AMSAT bulletins transmitted around 29.440 MHz on Mode A, 145.960 MHz on Mode B, during A-O 7 reference orbits, and AMSAT nets (East Coast at 0100 UTC Wednesdays on 3850 kHz lsb; Mid States at 0200 UTC; West Coast 0300 UTC).

1) All time and date references are in UTC.
2) The times and longitudes are for OSCAR's first equator crossing each day, which is called the reference orbit.
3) A-O 7 will operate Mode A only on days of the *year* fully divisible by three (May 3 is day number 123, for example), and the other two days in between will be Mode B.
4) All Monday orbits are reserved for QRP use only. Use a maximum of 10 watts erp. Wednesdays are reserved for special experiments: authorized users only. This includes *Tuesday evenings* for the Western Hemisphere.
5) The Mode B transponder inverts signals. Upper sideband on 432 MHz becomes lower sideband on 145 MHz.
6) A-O 7 progresses an average of 28.737448 degrees west per orbit in a period of 114.945199 minutes for the month of May.
7) A-O 6 has been permanently removed from active service.

This schedule of orbits for OSCAR 7 is a regular feature of *QST*. After a precise determination of orbital data can be made, a reference orbit schedule for OSCAR 8 will be published as well. Tune in W1AW bulletins for updated reference orbit data. Further information on the radio amateur satellite program can be obtained free of charge from ARRL hq. Also, the popular and informative series of *QST* articles for the beginner has been reprinted in book form. *Getting to Know OSCAR — from the Ground Up* covers OSCAR 6, OSCAR 7, the newest satellite, OSCAR 8, launched in early March, and the exciting Phase III program scheduled for late 1979. It includes the OSCARLOCATOR, a tracking device that lets you know which passes you can access and where the satellite is in the Northern Hemisphere at any given moment. The book is available for $3 postpaid ($3.50 outside the U.S.), from the ARRL.

Operating Events

MAY

3: West Coast Qualifying Run (W6OWP prime, W6ZRJ alternate), 10-35 wpm at 0400Z (Universal Coordinated Time, abbreviated UTC, with Z used as a time designator), on approximately 3590/7090 kHz. This is 2100 PDST the night of May 2 (9 P.M. PDST). Please note that dates are always shown at least two months in advance and times are always the same local "clock time." Underline one minute of the highest speed copied, certify that the copy was made without aid, and send to ARRL for grading. Please include your full name, call (if any) and complete mailing address. A large, addressed, stamped envelope will help to expedite your award/endorsement.

4-5: SOWP Third Annual CW QSO Party, sponsored by the Society of Wireless Pioneers, from 0000Z May 4 through 2359Z May 5 (to avoid weekend QRM). Exchange name, membership number, and QTH. Suggested frequencies are 55 kHz up from the low end of each band (Novices in the center of each Novice segment). Members who can only participate part-time are requested to make their calls on even hours during the period. To commemorate the Society's 10th anniversary a special certificate to all members who contact a minimum of 10 other members during the period. (Certificate requests should include a list of contacts, dates, times, membership numbers, and an s.a.s.e.) Send requests to Pete Fernandez, W4SM, 129 Hialeah Road, Greenville, SC 29607 (no later than May 31).

6-7: New York State QSO Party, sponsored this year by the University of Buffalo Radio Club, WA2NPQ, from 1700Z May 6 to 0500Z May 7 and 1200-2359 May 7. Stations may be contacted once on phone and once on cw on each band. NY stations may work each other. Mobiles/portables changing counties may be reworked. Exchange consists of report, serial number starting with 001, and QTH (counties for NY, state/country for others). Suggested frequencies: cw, 1810 3560 7060 14060 21060 28060; phone, 3900 7275 14285 21375; Novice, 3725 7125 21125 28125. Score one point per QSO times the number of multipliers: states, provinces and countries for NY stations; and counties for others (maximum of 62). Number the first contact for each new multiplier. A check sheet is required for stations making more than 100 contacts. Awards. Entries should be mailed no later than June 15 to either James Phelan, WB2LHE, RR 1 MacGregor Dr., Mahopac, NY 10541, or John Carioti, WB2THS, Box 690, Phoenix, NY 13135. Results will be sent if a no. 10 s.a.s.e. is included with your entry. **Georgia QSO Party,** 2000Z May 6 through 0200Z May 8, 17th annual sponsored by the Columbus Amateur Radio Club, Inc. No time or power restrictions, and contacts may be made once on phone and once on cw on each band (OSCAR counts as one band) with each station. GA mobile or portable stations count as a separate station in each county. Exchange QSO no., RS(T) and QTH; county for GA stations; state, province or country for others. (Note, GA-to-GA contacts permitted.) Each complete contact counts two points. GA stations multiply their total QSO points by the number of different states and Canadian provinces worked. DX stations may be worked for QSO points but do not count as multipliers. Out-of-state stations will use the number of GA counties worked as their multiplier (possible 159). No repeater QSOs, except OSCAR. Certificates, plaques. Suggested frequencies: cw, 1805 3590 7060 14060 21060 28060; ssb, 3900 3975 7245 14290 21360 28600; Novice, 3718 7125 21110 28110. Try 160 meters at 0300Z. Try 10 on the hour and 15 on the half-hour during daylight periods. Usual log, indicate multipliers and include signed declaration. Mail your entry to CARA, c/o Jeanne J. Hunting, K4RHU, 2701 Peabody Ave., Columbus, GA 31904. Postmark entries by June 5 and include a large s.a.s.e. (with 24-cents postage) for a copy of the results. Novices should clearly designate their logs as such. **Vermont QSO Party,** sponsored by the Central Vermont Amateur Radio Club, from 2100Z May 6 through 0100Z May 8. VT stations score one point per contact and multiply by the number of ARRL sections and countries worked. All others score three points per VT station worked and multiply total by the number of Vermont counties worked on each band. The same station may be worked once on each band and mode. Mobiles may be worked considering each new county they enter as a new "station." Awards. Suggested frequencies: 3565 7065 14065 21065 28160 50260 144-144.5, 3909 21375 28600 50360 145.8, 3932 7290 14325. Try cw on the odd hour and phone on the even hour UTC. Exchange QSO number, RS(T) and county (for VT) and ARRL section (for others). Logs with an s.a.s.e. must be mailed by June 15 to Peter Kragh, W1AYK/K2UPD, 170 Summit Ave., Ramsey, NJ 07446. All band/mode activity is urgently needed from the counties of Bennington, Caledonia, Essex, Grand Isle and Orleans — contact K2UPD. **10-X Chapter Certificate Hunters QSO Party,** sponsored by the Long Island Amateur Radio Service, full 48-hour period UTC. Object is to contact as many certificate holders and V-P's as possible. Exchange call, name, QTH, 10-X number, total of three chapter certificates or less and V-P number (if any). Two-way QSOs only are valid. Score one point for each 10-X number received, a point for each certificate number or non-numbered award received. Total number of points is then multiplied by the total number of V-P numbers received for the total score. (Max. is four points and one multiplier for each exchange). Awards. Log legibly and send entry to Bob Watson, WA2MHL, 2 Suffolk Court, Oceanside, NY 11572. Please include your chapter name and an s.a.s.e. if a copy of the results is desired. Logs must be received by July 1.

13: Frequency Measuring Test, open to all, begins with a callup at 0200 and 0500 UTC May 13. Remember, this is the evening before, May 12, by local time. The periods of measurement start at 0207 (20 meters), 0215 (40 meters) and 0223 (80 meters); for the late run, 0507, 0515 and 0523, respectively. Each measuring period lasts five minutes. Submit your averages for each five-minute period which will be compared with the umpire's averages during the same period. (The umpire is a professional measuring laboratory.) Tell how many readings you took to form your averages. Approximate frequencies for the early run are 14142, 7074 and 3565 kHz; late-run frequencies are 14090, 7018 and 3520 kHz. Your report must be received by May 24 to qualify for the August *QST* report of the competition. W1AW will start transmitting the official results in a special bulletin May 25. **World Telecommunications Day Contest phone,** the full 24-hour period UTC, sponsored by the Brazilian Society LABRE (*Liga de Amadores Brasileiros de Radio Emissao*), cw May 20. This event commemorates yearly World Telecommunications Day (May 17). Each participant will attempt to make the highest possible number of contacts with the different ITU zones of the world in order to enable his country to win the ITU Trophy. Operation 160 through 10 meters. Categories are single operator, multiband, fixed station or mobile maritime operating on 76 to 90 ITU zones, inclusive; clubs to be considered as special multiop/multiband participants, (all operators of "multis" must sign the log). Send RS(T) and ITU zone. Contacts in the same country from 160 through 10 meters count zero points; in the same country in the same zone on 40-20-15-10 count one point, on 160 and 80 two points; in another ITU zone on the same continent, on 20-15-10 count two points, on 40 three points, on 160 and 80 four points; in another zone on another continent 20-15-20 three points, 40 five points, 160-80 six points. Repeat contacts on other bands count for points, but zones counted once only. For country determination use the ARRL DXCC Countries List. To determine points for the country, (and the trophy) scores of the five top entries per country per mode are added together. (Multis not added in for this final score.) Trophy, medals, certificates. Log separately for each mode, see that they're postmarked before June 30 and send to LABRE, U.I.T. Contest Coordination, P. O. Box 07-0004, 70.000 Brasilia DF, Brazil. Note: W1, 2, 3, 4, 8 and 9 are in ITU Zone 8; W5, Ø, Zone 7; W6, 7, Zone 6; VE/VO 1, 2, Zone 9; VE3, Zone 4; VE4, 5, Zone 3; VE6, 7, Zone 2; VE8 Yukon, Zone 2; the rest of VE8 split between Zone 2, 3, 4 and 75. Logs to contain usual info, time in UTC, stations, messages, band, notation of new continent, zone multiplier and points; complete with summary and signed declaration.

13-14: Massachusetts QSO Party, from 1200Z May 13 through 2200Z May 14, no time limit. A station may be worked once per band (cw and phone considered separate bands). No crossband or repeater QSOs permitted. MA stations may work each other. Special class for Novices and Techs who operate cw within Novice bands only. Novices sign call /N, Techs sign call /T. In this class Novices and Techs will compete against each other. Submit separate logs and summary sheets for this class. Exchange RS(T) and county (for MA), and ARRL section (or country) for others. Count two points for each completed exchange. Outside stations multiply total QSO points by different MA counties worked (total of 14). MA stations multiply total QSO points by the number of different MA counties plus ARRL sections. Note: DX counts for QSO points only, no multiplier. Suggested frequencies: cw, 1810 3560 7060 14060 21060 28060; phone, 1820 3960 7260 14290 21390 28590 50110 146,520; Novice and Techs, 3720 7120 21120 28120. Awards. Mailing deadline June 30. S.a.s.e. for results and awards. Send to Al Marshall, W1FJI, 60 Meadow Rd., Westport, MA 02790. **The Russian Contest, CQ-M (CQ-Peace),** sponsored by the Radio Sports Federation of the USSR, from 2100Z Sat. to 2100Z Sunday, 80-10 meters; cw and ssb (cross-mode contacts not valid). (At press time late word was unavailable, but these are the usual rules.) Call CQ-M. Categories: single-op, single band, single-op, multi-band, multi-multi. Exchange RS(T) and serial contact no. The Soviet stations will transmit RS(T) plus number region (oblast). The same station may be worked only once on each band during the contest, irrespective of the mode. Contacts between stations in the same continent count one point; contacts between stations on different continents count three points. Contacts between Soviet stations count only one point, irrespective of the continent. Contacts between stations in the same country count only for multipliers (not for QSO points). Each country counts as a new multiplier per band. Total multiplier is the sum from all bands. Awards plus special notation for those working more than 50 Soviet stations during the CQ-M period. If your log confirms the conditions of the popular USSR awards (R-150-S, R-100-0, W-100-U, R-15-R, R-10-R and R-6-K) certificates will be issued upon request. (See "From Russia with Love," March 1978 *QST*.) The committee requests all those participating to mail no later than July 1 to the Krenkel Central Radio Club of the USSR, CQ-M Contest Committee, P. O. Box 88, Moscow, USSR. *CQ-M!*

16: W1AW Qualifying Run at 0200Z, 10-35 wpm transmitted simultaneously on 1.835 3.58 7.08 14.0 21.08 28.08 50.08 and 147.555 MHz. This is 220 EDST (10 P.M. local Eastern time) the night of May 15. Follow the additional instructions under the May listing.

19-21: YL ISSB QSO Party, cw only May 1 1800-2400Z, cw and phone May 20 0001Z to 2359 May 21. One six-hour rest period must be taken for each 24 hours of contest operation (to be noted in log). All bands, cw and phone. Special team combinations, for details contact K6JG. The rules are extensive. Drop a note to W6ANB, with an s.a.s.e. for complete details: 224 15th St., Santa Monica, C 90402.

20: World Telecommunications Day Contest cw, s May 13 details. **Armed Forces Day Communication Tests,** no information in at press time. Special W1AW bulletins will give frequencies. Otherwise follow for mat shown page 83, May 1977 *QST*.

20-21: EME Contest (second part), rules page 8 March *QST*.

20-22: Michigan QSO Party, sponsored by the Oa Park Amateur Radio Club, from 1800Z May 2 through 0300Z May 21 and 1100Z May 21 throug 0200Z May 22, phone and cw combined. MI statio may work MI counties for multipliers. A station m be contacted once on each band/mode. Po tables/mobiles may be counted as new contacts ea time a county change takes place. Exchange RS(T QSO no., county (for MI), state or country for other Multipliers are counted only once. MI stations sco one point per QSO multiplied by the sum of stat (KL7/KH6 count as states), countries, and MI cou ties and VE counts as a country. The maximu multiplier is 80. For non-MI stations, multiply QS points times Michigan counties. QSO points follows: one point for each MI phone QSO and tw points for each cw contact, five points for each clu station contact (W8MB), maximum multiplier of 8 Vhf entries only, same as before except th multipliers per vhf band are added together for t total multipliers. Suggested frequencies: cw, 1810 35 3725 7035 7125 14035 21035 21125 28035 2812 phone, 1815 3905 7280 14280 21380 28580; vhf, 50.1 145.025. Single ops only qualify for a variety

awards. Usual summary with full details including name and address in block letters, and a signed declaration. MI stations include club name for combined club score. Party contacts do not count toward the Michigan Achievement Award unless one fact about Michigan is communicated. Members of the MI Week QSO Party Committee are not eligible for individual awards. Committee decisions final. Results will be finalized July 31 and mailed to all entrants. Mailing deadline is June 30. Send to Mark Shaw, K8ED, 3810 Woodman, Troy, MI 48084. **Kansas QSO Party,** sponsored by the Central Kansas Amateur Radio Club, WØKQU, from 2000Z May 20 through 0200Z May 22. Work each station once on each band; cw and phone are considered separate bands. KS stations send signal report and county. Others send report and state/province/country. KS stations multiply total contacts times the sum of U.S. states, VE provinces and other ARRL DXCC listings worked. Everyone else multiply total KS contacts times the number of KS counties worked. Awards. Look for cw 55 kHz up from the bottom of the band and phone 25 kHz above the Advanced/General dividing log. Novice, 20 kHz above the lower band limit. Send logs and comments to Robert Davis, KØFPC, 1857 South 4th, Salina, KS 67401. Be sure to include your name and address as well as all relevant information. S.a.s.e. NOT required for summary of the results. A check (dupe) list is required for entries containing 100 or more QSOs.

23: W1AW Qualifying Run, 2000Z. This is 4 P.M. EDST. Other details under the May 16 listing.

27-28: Francophones Countries Contest, sponsored by *Reseau des Ematteurs Franais*, the French IARU society, cw 0000-2400Z May 27, phone 0000-2400Z May 28. Single operator only, no more than 18 hours of operation permitted in each mode. Exchange RS(T) and QSO number starting with 001. QSO with Francophone countries only: French DPF provinces (each suffix after the French call; AL Alsace-Lorraine, AP Alps, AV Auvergne, BG Bourgogne, BT Bretagne, CP Champagne, FC Corse, FT Franche-Comte, GC Gascogne, IF Ile-de-France, LG Languedoc, ND Nord, NM Normandie, TR Touraine; FG FM FR FY FB8W FB8X FB8Y FB8Z FH FK FO FO (Clipperton) FP FU/YJ FW; 3A C3 DA1/2 (French army in DL) CN TJ TL TN TR TT TU TY TZ XT J2 3V 3X 5R 5T 5U 5V 6W 7X; ON LX HB 4U HH VE2 OD 3B8 9U 9X 9Q. QSOs with Francophone countries on the same continent count two points, with different continents four points. Final score equals QSO points times the sum of the multipliers on all bands. Report promptly with log, summary, to Francophone Test, REF, Square Trudaine 2, 75009 Paris, France.

JUNE

3-4: Ford QSO Party, PVRC On-The-Air Reunion, Minnesota QSO Party
8: West Coast Qualifying Run
10-11: VHF QSO Party, KZ5 QSO Party
14: W1AW Qualifying Run
17-18: West Virginia QSO Party, All-Asian Contest phone
21: W1AW Qualifying Run
24-25: FIELD DAY

JULY

1-2: 7-Land QSO Party
4: Straight-Key Night
8-9: IARU Radiosport Competition
15-16: VHF Space Net Contest, 10-10 Summer QSO Party, HK Contest
22-23: Rhode Island QSO Party
29-31: County Hunters Contest

Feedback

☐ Unfortunately, an uncorrected parts overlay found its way into print in the April 1978 *QST* article, "A 20-Meter High-Performance Direct-Conversion Receiver." The mistakes are too numerous for a written rundown, but the new improved layout shown here should greatly help the prospective builder. Also, the dark black pattern should aid those wishing to use the photographic process for circuit board fabrication. The schematic is correct except for the value of C12 which is 10 μF.

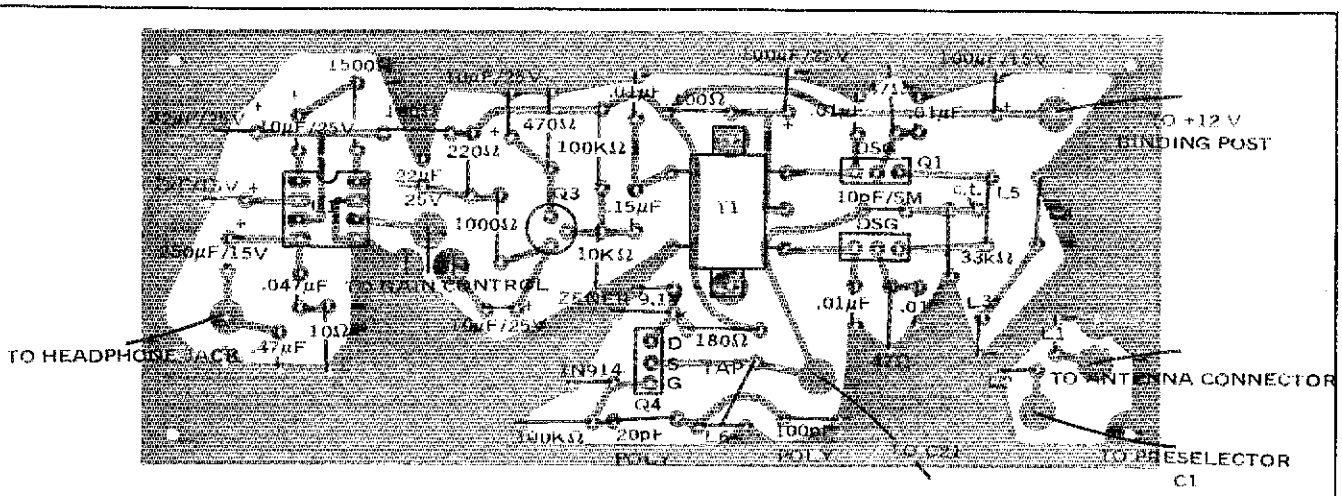
☐ The call sign of Jerry Abrams, WB2ZEX, was listed incorrectly in "PR Coup — NYC Marathon" (page 51, March *QST*).

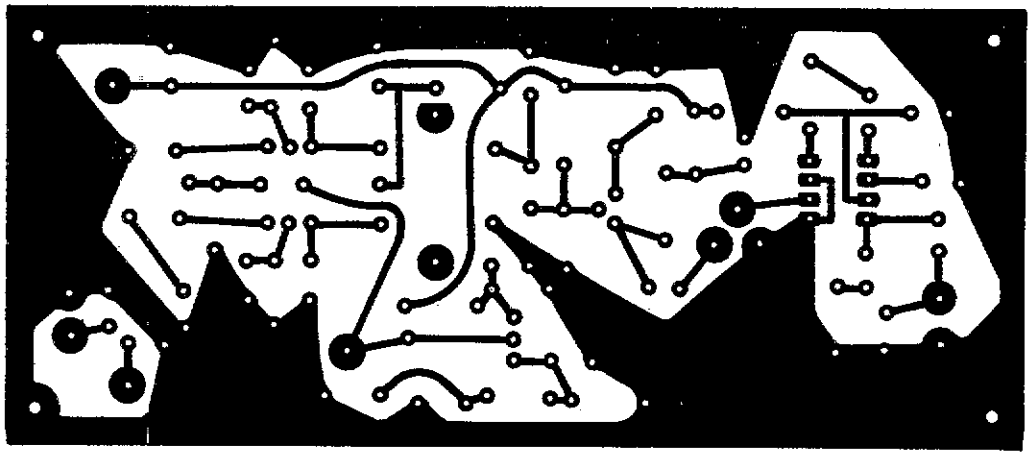
☐ The overall dimensions of the Davis CTR-2-500 Frequency Counter ("Product Review," April), should have been given as 2-1/2 × 8 × 8 inches (64 × 203 × 203 mm).

☐ Under new regulations, the minimum-size card or letter the Postal Service will accept is 3-1/2 × 5 (April *QST*, page 33). A surcharge will be added for smaller cards or letters until December 1, when pieces smaller than 3-1/2 × 5 inches will not be accepted under any circumstances. — *W2LT*

☐ The call sign of William S. Barnes ("Silent Keys," March *QST*) should have read K2LT.

☐ The Cyrillic alphabet in "From Russia with Love" (March *QST*, page 50) should have shown an I opposite the "backward N" instead of an L. — *W7WQ*





Station Activities

SCM ⚡ AREC ⚡ ORS ⚡ OVS ⚡ SEC ⚡ OBS ⚡ TCC ⚡ OO ⚡ NTS ⚡ WAC ⚡

CP ⚡ A-1 OPR ⚡ EC ⚡ DXCC ⚡ CLUBS ⚡ RM ⚡ OPS ⚡ RCC ⚡ PAM ⚡ WAS

CANADIAN DIVISION

ALBERTA: SCM, Sydney T. Jones, VE6MJ — SEC: VE6XC. PAM: VE6AFO. Congratulations to VE6CAI on his appointment as EC for Lethbridge area. A change in the Red Deer repeater frequency will occur on May 1, 1978 and after that date will be 146.4-147.0. The first two way QSO on 432 MHz was recently made between Barrhead and Edmonton by VE6FS and VE6AK who are now keeping twice a week sked. The Feb. meeting of the NARC featured an ATV demonstration. VE6ABC is doing a fine job with the NARC code practice on 3740 Mon., Wed. and Fri. at 0300 GMT. VE6BU worked many of his old friends from his new QTH in Mexico using the call XE1VV. Traffic: VE6HO 56, VE6AAT 36, VE6ABC 14, VE6AMM 12, VE6XD 9, VE6AFO 8, VE6BIM 6, VE6BBL 2.

BRITISH COLUMBIA: SCM, H. E. Savage, VE7FB — We are fortunate to have VE7HQ as our National Coordinator for Intruder Watch (Canada). Wally is prepared to visit the local clubs by asking. We also have VE7ZK as our British Columbia Vice-Director, CRRL. British Columbia Amateur Radio Public Service Net, Net Manager & OPS, VE7BOO and VE7QC has also agreed to hold down as 2nd in command. Prince George ARC supplied communications for 1978 Northern B.C. Winter Games. With fourteen amateur supplying radio communications. Traffic: VE7ZK 164, VE7HQ 149, VE7DKY 139, VE7FB 84, VE7DFY 60, VE7COA 38, VE7BLS 10.

MANITOBA: SCM, Peter Guenther, VE4PG — Asst. SCM: VE4UL. RM: VE4YE. PAMs: VE4JP VE4TE. Enjoying the sun south of the border are VE4GB VE4FG VE4JA VE4EF and others. The slow CW Net has been a success and more to come. Look for more RTTY stations in the near future and more on the way. Check your local net mgr. for a possible alternate net frequency on 40 when 80 and 75 goes out. MEPN 28 sess., 1139 QNI, 22 QTC. MTN 28 sess., 226 QNI, 76 QTC. MMN 28 sess., 444 QNI, 6 QTC. Traffic: VE4PG 92, VE4QU 45, VE4RO 42, VE4IZ 37, VE4UL 34, VE4HR 18, VE4JI 12, VE4LU 12, VE4IX 8, VE4AAU 6, VE4NM 6, VE4CR 4, VE4QJ 4, VE4TE 3, VE4AAD 2, VE4AAF 2, VE4PA 2, VE4DS 1, VE4JP 1, VE4OD 1, VE4XN 1.

MARITIME-NFLD.: SCM, Aaron D. Solomon, VE1OC — Asst. SCM: VO1FG. SEC: VE1DI. PAM: VO1JN. RM and APN Mgr.: VE1WF. RM and NTN Mgr.: VO1GW. Silent Keys: VE1VO VE1BMP. Hosp. VE1s AMW BGG BFH GG. Feb. Act. incl. VE1 and White Cane Phone Contests. NSVHF ex. VE1YZ pres.; VE1AAC, vice-pres.; VE1YW, secy-treas. VE1AJZ, tech. Decided to form NS Repeater Council. Gore Rep. Assn. ex. VE1ALS, pres.; VE1GC, vice-pres.; VE1OM, secy.; VE1AMZ, treas. W.C. Contest winners VE1s UV II. Sighted VE1s GL GA. VE1s BCG BMY have new equipment. VE1s BMY BMZ & VO1MR teaching classes in A. Radio. VO1BL experimenting in S/F Scan Amateur TV. APN: Sess 28, QNI 140, QTC 114/93. Traffic: (Feb.) VE1WF 183, VE1LCR/RO 118, VE1HJ 69, VE1AMR 31, VE1CH 27, VE1ASW 20, VE1ABG 16, VE1BGA 12, VO1HL 2. (Jan.) VE1BGA 14.

ONTARIO: SCM, Larry Thivierge, VE3GT — Asst. SCM: Noreen Nimmons, VE3GOL. Appointments: VE3BZR ORS; VE3GFS EC for Windsor and VE3FHZ OPS. VE3FEA appointed PRA for Metro Toronto and will be responsible for the ARRL film library, tapes, slide shows etc. Special thanks to VE3GOL for her outstanding work in this area. VE3s FMY and JPW are members of the West Side RC. Thornhill RAC celebrating their first anniversary. The Boon Dock Net meets every Sun. evening at 2030 local time on 3600 kHz and is looking for more check-ins from the Merrickville-Kemptville area. Interest in traffic handling among new amateurs is high. Oakville ARC's recent dinner and dance very successful. OVMRC welcomes new members VE3s IDS KIL KEH and FB. VE3GX's Pot Lid Net, an informal slow speed cw net has been operating for five years. VE3CDK placed first for Canada in the OH Interstate QSO party, VE3GT second. VE3s CES IAC and IZO of CARTG active in the Mississauga-Brampton area on 2-meter VHF RTTY, they are using 147.57 simplex. Congrats to VE3s ICX JHR GMI and HNX on passing their Advanced. VE3GFN, who was recently presented with an ARRL Certificate of Merit by VE3AR, received his 30 wpm sticker and has increased his DXCC total to a lofty 140 confirmed. Associate League members are requested to inform Hqtrs. when their licenses have been received in order that full membership status may be accorded, including voting privileges. New amateurs are VE3s IJL IJM IJK ITQ JUM and JUO. Peterborough ARC members VE3s JPD IQZ IQM IRW IRK AAY and FDP participated in the ARRL VHF weekend where "Murphy" played a prominent role. VE3GYQ elected pres. of the Southern Ont. and Western NY Repeater Council. Now is the time to begin formulating your Field Day plans. TFMCS's new executive has VE3EJW as pres.; VE3HE, treas.; VE3BUI, secy.; VE3PQ tech. dir.; VE3ENH, membership; VE3s APZ and BDW, dir. Traffic: (Feb.) VE3SB 204, VE3GOI 170, VE3DPO 155, VE3ISW 151, VE3CDK 149, VE3GJG 139, VE3HGJ 109, VE3GT 108, VE3GFN 80, VE3FGU 63, VE3FZG 50, VE3EWD 50, VE3CYR 49, VE3FHZ 48, VE3JRT 45, VE3GNW 42, VE3ATR 33, VE3DVE 32, VE3FHQ 23, VE3GYD 22, VE3IDL 22, VE3EBC 16, VE3IFP 16, VE3HCS 8, VE3BZR 3, VE3DZH 3, VE3GCC 2. (Jan.) VE3GNW 70, VE3EEH 46, VE3APK 22, VE3FHQ 19, VE3JRT 19, VE3IDL 11, VE3DZH 5, VE3GCC 4, VE3HCS 4.

QUEBEC: SCM, Ed Sieb, VE2BAQ — VE2AGP has worked BY0SA with flea-power. VE2AOL is supervisor of VE2AT repeater, VE2s AUI and BJG keep it in great performance. The VE2CRT machine now has autopatch. Que. section net-QSN- now meets nightly on new frequency 3700 kHz, at 1900. All check-ins welcome. VE2EON reports the Que. RC operates a slow speed CW net in French every night at 1930 local (EST) time; the goals of the CWQ net is to promote CW operation in French; congrats to VE2EOO and her group. Amateurs from Que. and Ont. operated during the Canadian Ski Marathon, providing a vital communications link to marathon officials; VE2BFH and VE3EFL and the rest did a superlative job. Traffic: (Feb.) VE2UN 93, VE2EOH 73, VE2APT 57, VE2EC 42, VE2DYS 40, VE2DEA 35, VE2BP 34. (Jan.) VE2EOH 119, VE2BP 60, VE2EC 58, VE2NL 41, VE2DYS 40, VE2UN 30, VE2DEA 6. (Dec.) VE2UN 49.

SASKATCHEWAN: SCM, P. A. Crosthwaite, VE5RP — I am very pleased to see amateurs in various parts of the province setting up displays. The news media are beginning to let the people know what Amateur Radio can do for them. Schools through their science fairs are now having a chance to see amateur radio at its best. Some displays touched on the OSCARS. This is making a very good impression on the students. Traffic: VE5AAE 54, VE5DN 36, VE5YK 26, VE5RP 15, VE5UZ 14, VE5QY 13, VE5KS 10, VE5HG 9, VE5DF 6, VE5EK 6, VE5UK 4, VE5ABK 3, VE5ABN 3, VE5HE 3, VE5NJ 2, VE5XY 1.

ATLANTIC DIVISION

DELAWARE: SCM, Roger E. Cole, W3DKX — SEC: W3PQ. PAM: W3WD. RM: W3QO. PSHR: K3JL 52, WA3WPY 47, W3PQ 44. K3JL, Del. QSO Party chmn. for the DARC has completed his report. 121 Logs were submitted, 103 from Out-of-State. Del. leaders were: K3SXA/3 Multi-op with SXA and WA3QLS 23199 pts. Single-op, K3JL/3 Sussex Co. 1475, WA3WPY New Castle Co. 6636, and W3CTM Kent Co. 288. Everyone was glad to hear that W3IUO is at home and recovering from his coronary. N2UT K3KIB and WA3WTK are all new NCS stations for the DTN and doing excellent work. DEPN: QNI 113, QTC 14. DTN: QNI 321, QTC 145. Traffic: N3CL 367, W3PQ 127, WA3WPY 85, K3JL 76, W3QQ 72, W3DKX 46, WA3WIY 26, W3WD 15, WB3DUG 9, WA3DUM 8, WB3ENF 6.

EASTERN PENNSYLVANIA: SCM, G. S. Van Dyke, Jr., W3HK — SEC: W3FBF. RMs: K3NGN K3KW WA3PZO W3IAZ. Net Rpts. EPA QNI 657, QTC 435; PTTN QNI 386, QTC 162; PFN QNI 374, QTC 649; AREC (2) QNI 10; EPAEP&TN QNI 298, QTC 98, CM6&2 QNI 20, QTC 10. OVS repts WA3NDQ W3CL K3YD. OO repts K3RDT W3CL WA3TMP WA3RPG W3KEK K3NSN. OBS rpts W3AVJ W3ID W3CL WA3LWR W3VA. BPL: W3CUL W3VR WA3ZRY K3KW WA3ATQ WA3THT. PSHR: N3HR WA3YDC K3YL. The election is over now so lets all get together and make EPA the greatest (what else?). U of P N3KZ back in action. WA3ATQ gave up on spring, now looking for summer! WA3NDQ echos others about fun on 160. WA3PZO now sporting RTTY gear. W3PD says his ground plane has moved up, 10 feet of snow under ant. Many report 10 meters wide open in all directions. W3WRE reports no activity for Feb. only reason given is month too short! W3GMK enjoying the problem of trying to get spare parts for old gear! PTTN welcomes W3BI N3NR & WA3RKH. Welcome W3DP, ex-W9WMA. K3ARR now big A, WA3YAY back in circulation. PAMs will soon be made RMs. ORS and OPS and OVS who handle Tfc will be made OTS. It will happen at renewal time or ASAP. We need an SEC who can get EPA back on top where it used to be. I have some nibbles but if you are interested or know of someone who is let me know. The snow is gone, I hope it wasn't too hard on the antennas. Looks like the Pack Rats might have done it again in Jan. Traffic: W3CUL 4136, W3VR 974, WA3ZRY 708, N3KZ 557, K3KW 511, K3NGN 395, WA3THT 395, WA3ATQ 389, WA3WQP 379, N3HR 258, K3FD 193, K3YL 134, W3IPX 118, W3ATJ 103, WB3BKV 87, WA3YDC 60, WA3NDQ 39, WA3PZO 33, W3AVJ 28, W3PD 20, WA3CKA 18, K3YD 18, W3ID 15, W3ADE 14, WA3LWR 14, K3NB 14, W3CL 12, WB3FNZ 12, N3GP 11, WA3GUK 6, W3VA 6, WA3TMP 4, WA3RPG 2, WA3BJQ 1, W3EU 1, W3GMK 1, W3HK 1, K3IAZ 1, K3KCM 1, W3KEK 1, WA3VDO 1, W3WRE 1.

MARYLAND — DISTRICT OF COLUMBIA: SCM, Karl R. Medrow, W3FA — N3II is the MDC SEC. Send your EC reports to him. K3IS would have made the Dec. PSHR except for the late report. WB3CGG reports WB3BWX a Silent Key. BARC news at 7:30 PM 07/67 and repeated at 6 PM on 34/94, tnx to K3RA and BARC. OOs W3MR WA3RSK with W3WBY reporting funny things on the repeater and WA3JSZ taping it all for evidence. FAR's Gaithersburg hamfest had 5050 paid, 35 exhibitors and 537 tailgaters. Montgomery County Tower ordinance back in limbo, but be vigilent! WA1FEO/3 puts out the Capitol Hill ARS newsletter. New Extras K3JC and WA3SEY. Generals WB3JLU and WB3GEJ and Advanced to WB3DHA and WB3FWF. Congrats to all. W3CDQ got a nice score in the QCWA contest. W3FZV worked 57 old timers. With the nets: Net/Mgr Sessions/Traffic/QNI average. For Jan. MDD/W3QQ 60/218/6.9. Top Brass N3CL and WA3WPY. For Feb. MEPN/WA3PRW/23/107/24.6. 100 percent W3DKX WA3ZRY others WB3CES WA3PRW and WA2YFM. WR PON/W3DFW 16/16/21.7. MDC PON/W3OYY 4/16/23.3 MDCTN/K3ORW 16/72/17.5 with top honors to WB3AOB WA3ZRY W3DKX and K3ORW. N3RC is a ski buff in CO and VT. N3IT is pursuing classes at the Dundalk Community College. WB3CGG likes his new KWM2. W3ZNW does it on ARES, RACES and MDD. Congrats to WA3RSK MDC winner in the Sept. MDC QSO Party. The rest in order K3HPG WB3ANV N3II W8BZY/3 W3OFU WB3DBI WA3UJE K2SCU/3 K3NS W3FZV W3GG W3IKA K3XX N3RL WA3VPL W3PYZ W3XE and W3BHE. Top ten visitors WB2VWW WA1LZS VE3CDK W1AQE WA4PSL W1TEE K4YFH WA3UNX N4LM and W9QWM. Congrats to all. All antennas are back up at W3MR. WA3EHK is back in business at Catonsville. W3HJH had to cut down the old pine tree, and now his antenna is on the tower. K3ORW heads for the cellar when the winter is over. N3QA is back on full power. WA3PRW almost made PSHR this month. WB3CES is surrounded by microphones. WB3AOB is a busy trafficer when snow days are called at the high school. Traffic: (Feb.) WB3AOB 216, W3FA 99, N3QA 35, WA3PRW 28, WA3EHK 25, WB3CGG 18, N3IT 13, K3ORW 13, W3FZV 12, W3WBY 12, WB3CES 4, W3HJH 4, W3ZNW 1. (Jan.) K3IS 134. (Dec.) K3RA 72.

SOUTHERN NEW JERSEY: SCM, Raymond F. Clancy, WB2GTE — Snow storm downed W2ZQ ants. W2PU has ant. problems. WA2MNJ applies for EC. SEC W2HOB reports SET a success. W2LPJ code instructor at Jersey

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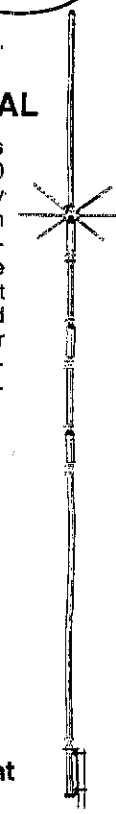
4-BAND VERTICAL



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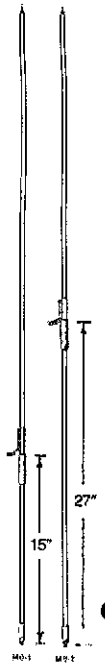
MO-1 or MO-2

(Deck/tender mtg.) (Bumper mtg.)



MO-1 or MO-2 masts are 54", have fold-over feature with quick lockup/release for easy garaging. Precision wound resonators have adjustable 17-7 stainless steel tip rod.

Choice of: **MO-1** or **MO-2** masts **plus** . . . RM-75, RM-40, RM-20, RM-15, RM-10 resonators . . . **plus** choice of: BM-1 bumper mount or SSM-2 ball mount.

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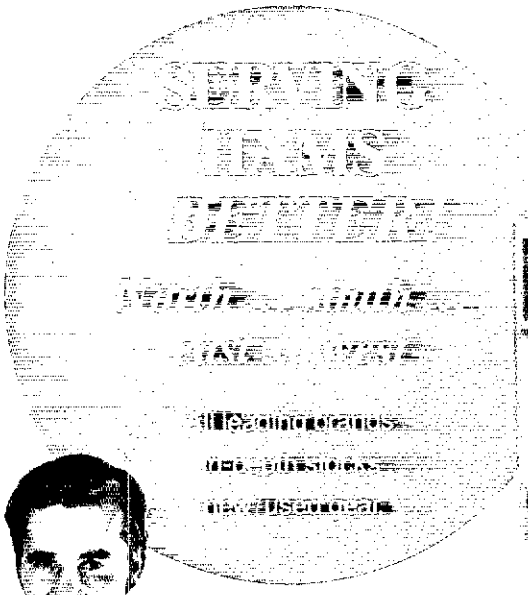

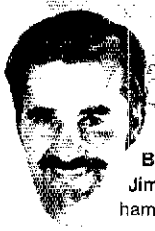

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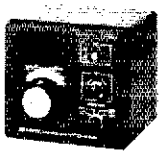
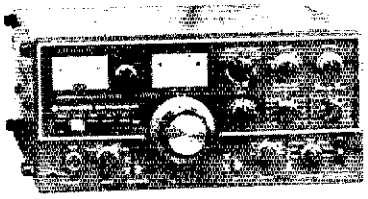


PLUS prepaid shipment of both items (UPS Brown)



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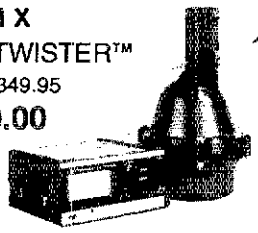
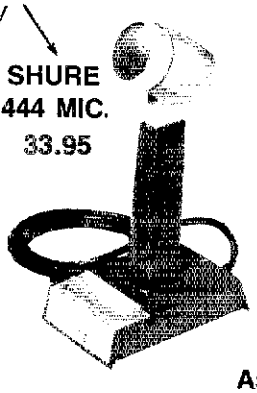


SHURE 444 MIC.
33.95



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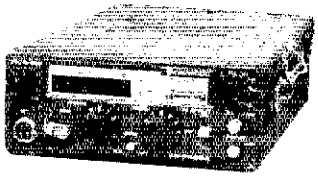

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12 TUNE control
13 PLL unit
14 RF unit
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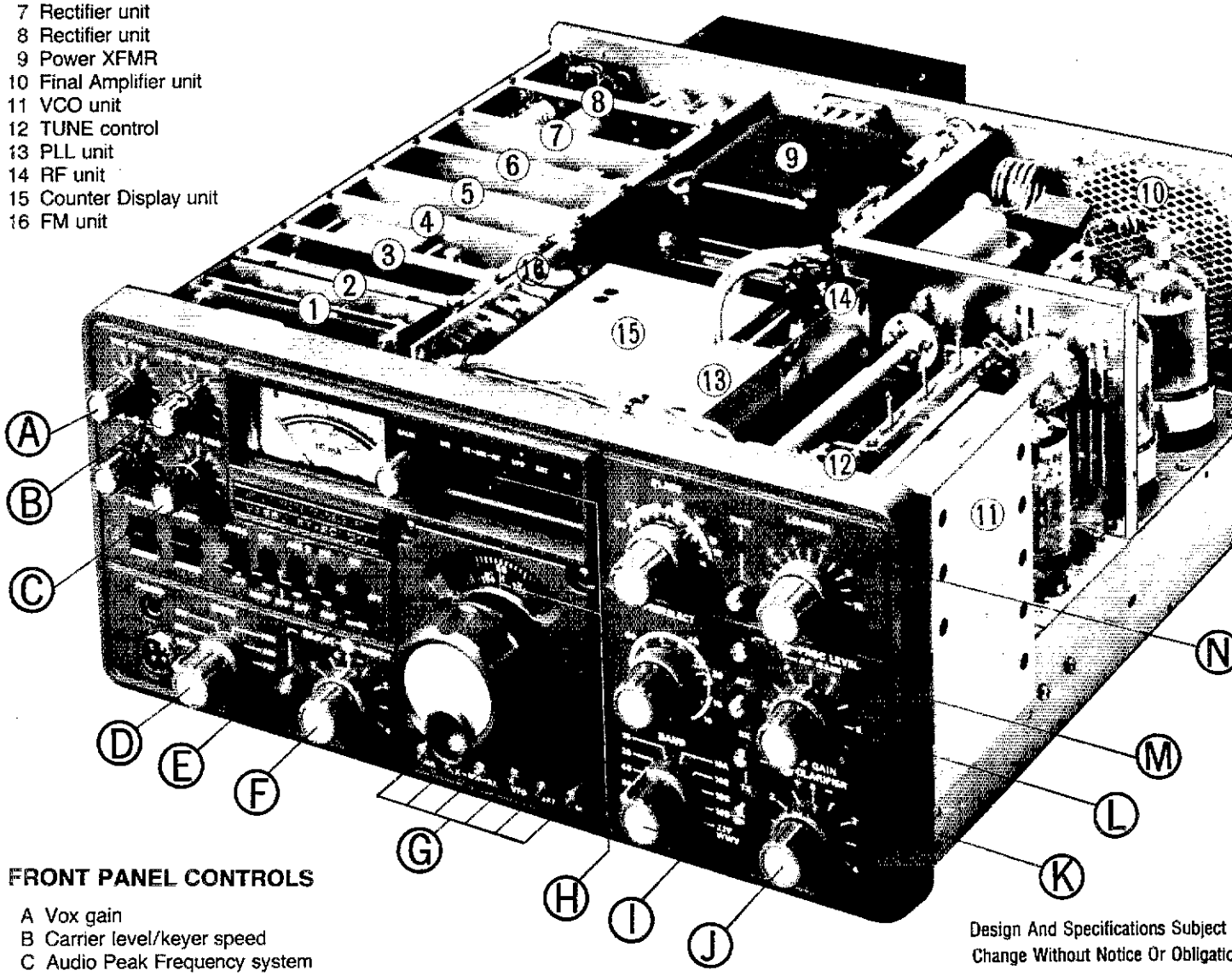

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K RX/TX Clarifier selector
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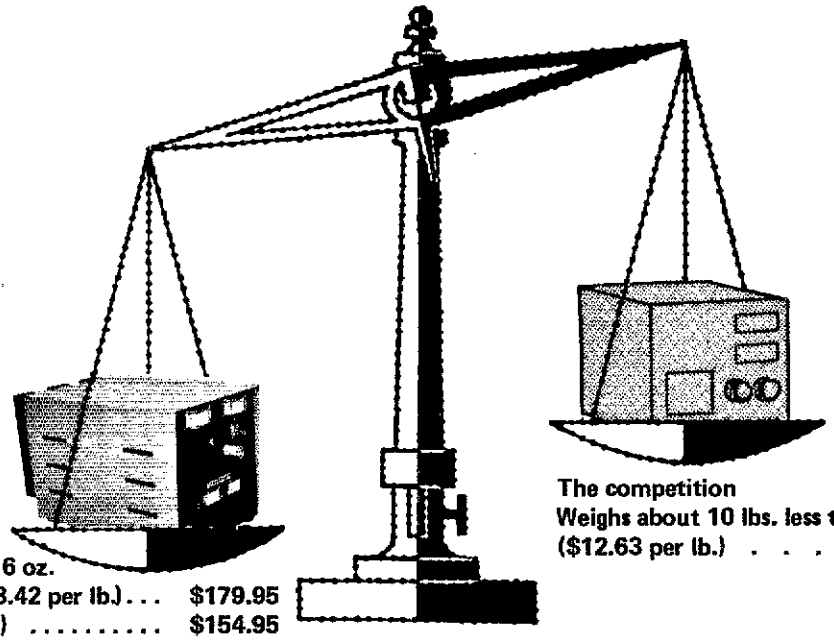

PS-25M — 21 lb. 6 oz.
Wired & tested ($8.42 per lb.) . . . $179.95
Kit ($7.25 per lb.) $154.95

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25 Amp regulated power supply with fold back current limiting, over voltage and transient protection. Also, output voltage and current meters.

You might find a cheaper power supply, but you can't find one as well built with top quality components. Other power supplies with lighter weight transformers and components are no match for the VHF Engineering PS-25M. It is rated at 20 amps continuous duty (not 10 amps). This power means extra dependability and versatility when you need it.

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FEATURES

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- 115/220 volt input — 50/60 cycle.
- Units are factory wired for 110 volt AC, 50/60 cycle power. A simple jumper will reconfigure the input for 220 volt AC, 50/60 cycles.
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SPECIFICATIONS

Voltage Output:
adjustable between 10-15V
Load Regulation:
2% from no load to 20 amps
Current Output:
25 amps intermittent (50% duty cycle)
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50 mV at 20 amps
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Model 225 with non-tactile keys $44.95

Battery Powered Tone Encoder with Snap Action Keys

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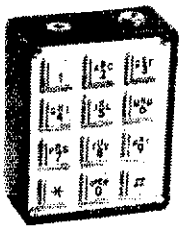

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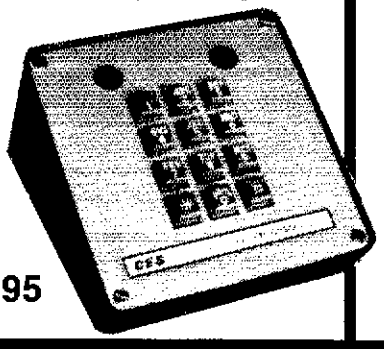
Autodialer

CES Model 251 stores up to 10 twenty-two digit phone numbers including access and clear codes. Autodialer is programmed from the keyboard. Internal battery holds memory when disconnected from 12v supply. Numbers not in memory can be dialed from keyboard. Available in tone or pulse dialing.



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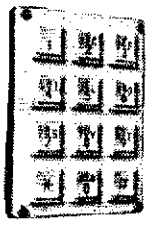
Thin Tone Encoders

2-7/8 x 2-1/4 x 7/16 inches with Snap Action Keys



CES Model 211 has a Snap Action Keyboard with standard dual tone frequencies. Other features include a .2% accuracy and is crystal controlled. MOS Digital IC provides high immunity to R.F. and voltage fields regulated for supplies of 7 to 35v. Easily mounted to Transceivers.

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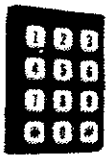
Model 210 same as 211 but with non-tactile keys.

Miniature Tone Encoders

2-3/8 x 1-11/16 x 3/8 inches Smallest



Model 215

CES Model 215 is the smallest the industry offers — with all the features of the above Model 210. Order Model 216 with Snap Action Tactile Keys.

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Model 216 with Snap Action Keys $44.95

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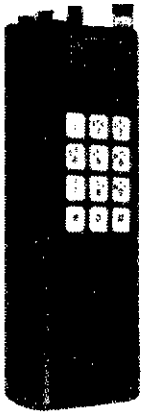

Model 220 for Standard 146A

Model 221 for Motorola HT $49.95

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WESTERN NEW YORK: SCM, Joseph M. Hood, K2YA — Asst. SCM: W2MTA. SEC: N2JC. The Nov. activities report for WNY which was missing from Feb. QST evidently never arrived at ARRL and must have been lost in the mail. Thanks for all the inquiries regarding the missing column, its nice to know its missed. SEC N2JC attended an Industrial Safety and Emergency Planning meeting involving several large Rochester area industries as well as local public safety officials. According to N2JC there was significant interest in Amateur Radio Emergency services and he received support from public safety officials in selling the amateur service concept. RARA which now has a total membership of over 725 has spring licensing course enrollment of over 100. Regret to report that K2DF, N2BM formerly K2GFL and WA2SMM are Silent Keys. WA2PUU reports that the Onandaga County Emergency Net meets on the first and third Mon. of each month on the 147.90/30 repeater. K2DNN SP reports that the Chemung County AREC Net has moved to the 146.10/70 repeater on a trial basis. The Rochester VHF group collected 215 logs and over 690 thousand points for the VHF Contest. Sorry to report that W2BOC is in the hospital. Hope he is all OK when this gets to press. WA2TPC has his old call back and is now KN2MDQ. Congrats to N2TW on BPL again this month. W2AET is a new Class I OO. Traffic: N2TW 577, WA2ELD 230, KN2MDQ 147, WA2ZJP 140, W2MTA 122, WA2HSB 102, W2FR 95, W2PZL 95, WB2KHT 88, WB2PJV 42, WA2AIV 32, WB2WCE 31, K2GJC 20, W2UYE 20, K2VR 17, WB2ELB 16, K2DNN 7.

WESTERN PENNSYLVANIA: SCM, Donald J. Myslewski K3CHD — SEC: WA3VUP. Asst. SECs: K3SMB WA3LJW PAM: K3SMB. VHF PAM: W3GQJ. RMs: K3AT W3NEM W3KUN.

Net	kHz	Time/Days
WPA CW Traffic	3585.0	7:00 PM Dy
WPA Phone Traffic	3983.0	6:00 PM Dy
PA Traffic & Training	3610.0	5/30 PM Dy
WPA Races	3990.5	9:00 AM Su

Next month W3GQJ will take over the reins as SCM for WPA until elections are held later in the year. My term would have normally expired in June but new SCM election procedures would have extended the present term to Dec. Other personal commitments scheduled previously prevent me from accepting another term as SCM. It is with deep regret to note the Silent Key of K3EDK. Get well wishes for W3UIR and K3VCI. K3RYA attained WAS status. WB3IED is a new Novice. WB3IEE upgraded to Technician Class. WB3GTM WB3CJJ WB3FXD WB3IEE upgraded to General Class and WA3TGR WA3YTA WB3FNU upgraded to Advanced Class. The WPA CW Traffic Net had 28 sessions, 420 QNI and 189 QTC. The Butler County Traffic Net had 28 sessions, 148 QNI and 13 QTC. The WPA (Pgh) 2 Meter Traffic Net had 28 sessions, 396 QNI and 90 QTC. PSHF credits N3EE WB3DKT WB3GZR. Traffic: K3CR 248, W3EGJ 146, K3HI 127, W3AS 90, WB3HGL 87, N3FM 80, W3YQ 76, WB3DKT 74, W3GB 72, W3RUL 57, W3TEF 55, WA3YEQ 52, WB3EYY 49, K3LYK 48, K3HCT 27, WA3YXJ 22, K3OIH 21, K3CHD 19, W3ATQ 14, W3SN 12, WA3QNT 11, WA3ZAO 9, WB3EYH 8, WB3EUM 8, W3UT 8, K3VQV 8, WB3GZR 6, WA3UNX 6, W3IW 2, K3UA 2.

CENTRAL DIVISION

ILLINOIS: SCM, Edmond A. Metzger, W9PRN — Asst. SCM: Harry Studer, W9RYU. SEC: W9AES. PAM: WA9KFK. RM: W9NJP. Cook County EC: W9HPG.

Net	Freq	Times/Day	Tfc	Sessions
ILN	3690	2330/0300 Dy	315	56
Ill Phone	3915	2245 Dy	199	28
NCPN	3915	1200/1700	213	48
IEN	3940	1400 Su	18	4

This column's sympathy to the families and friends of W9HJX of Alton and WB9LDI of Urbana who recently joined the ranks of Silent Keys. W9SE and WA9VGK are the newly elected officers of The Lakeview Amateur Radio Assn. W9OBS has a new 120 volt gasoline generator for standby power. WD9IBX, WD9IBY and WD9IBZ are new Novices in the Canton area. WR9AKE is a new 440 repeater autopatch in Springfield. Radio Amateur Technical Society (RATS) new officers are WB9JSR, WB9GEN K9KD and N9CR. W9BON is spearheading operation on 160 kHz with W9LTV WB9FJJ K9DQU K9JVC and W9TCO experimenting with converters, antennas and transmitters. The Starved Radio Club will hold their annual hamfest on June 4 at Princeton, and the Six Meter Club of Chicago will hold their hamfest on June 11 at the Santa Fe Park in Willow Springs. WB9YTO now K9XL with an Advanced ticket. W5KLV reports the CAND passed 464 messages with the 9th Region Net participating 100 percent including W9YZR K9MUH W9JIJ W9NXG and W9HOT. The St Clair Amateur Radio Club has a new duplexer for WR9AKJ. Their new officers are K9ZHN WD9BCR WB9GZR W9TRO W9UWP and WD9BGR. W9TRO has a new 220 rig. The Marissa ARC now using a 220 repeater. WD9DZV upgraded to General. WB9VEE also went to General. New Novices in the Springfield area are WD9HKU WD9IFF WD9HXJ and WD9HZM. Plans are going into their final stages for the 1979 Central Division Convention which will be held in Milwaukee next summer. It will be sponsored by the West Allis Radio Amateur Club, Inc. K9UXC has been appointed as EC for Iroquois Co. The Sterling Rock Falls hamfest was well attended and many an eyeball QSO was held. The Ill Repeater Council held their quarterly meeting at this hamfest. WB9TDB passed his General and awaiting his ticket. Its not too late to start thinking about Field Day

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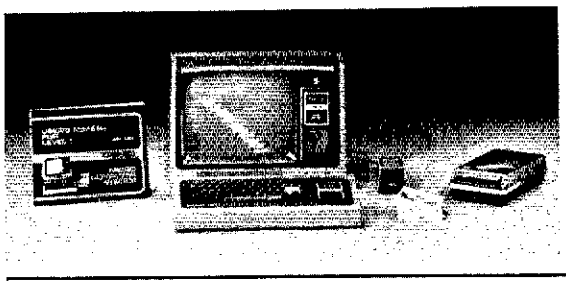

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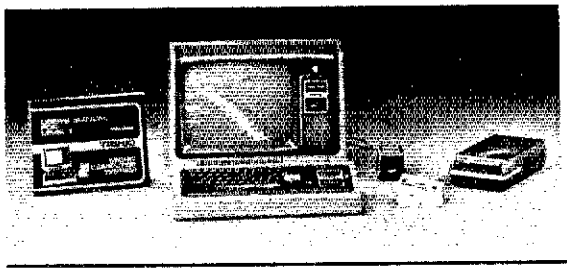

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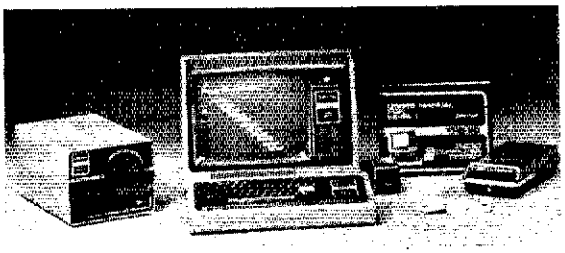

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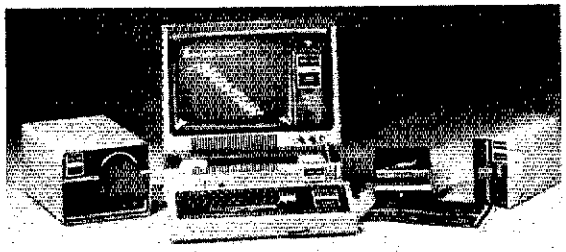

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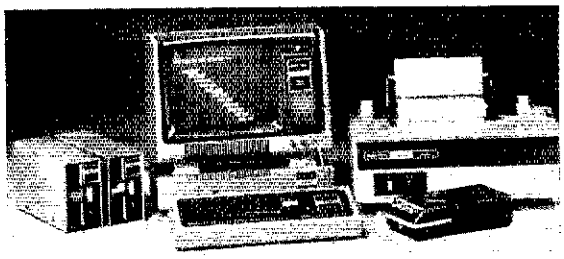

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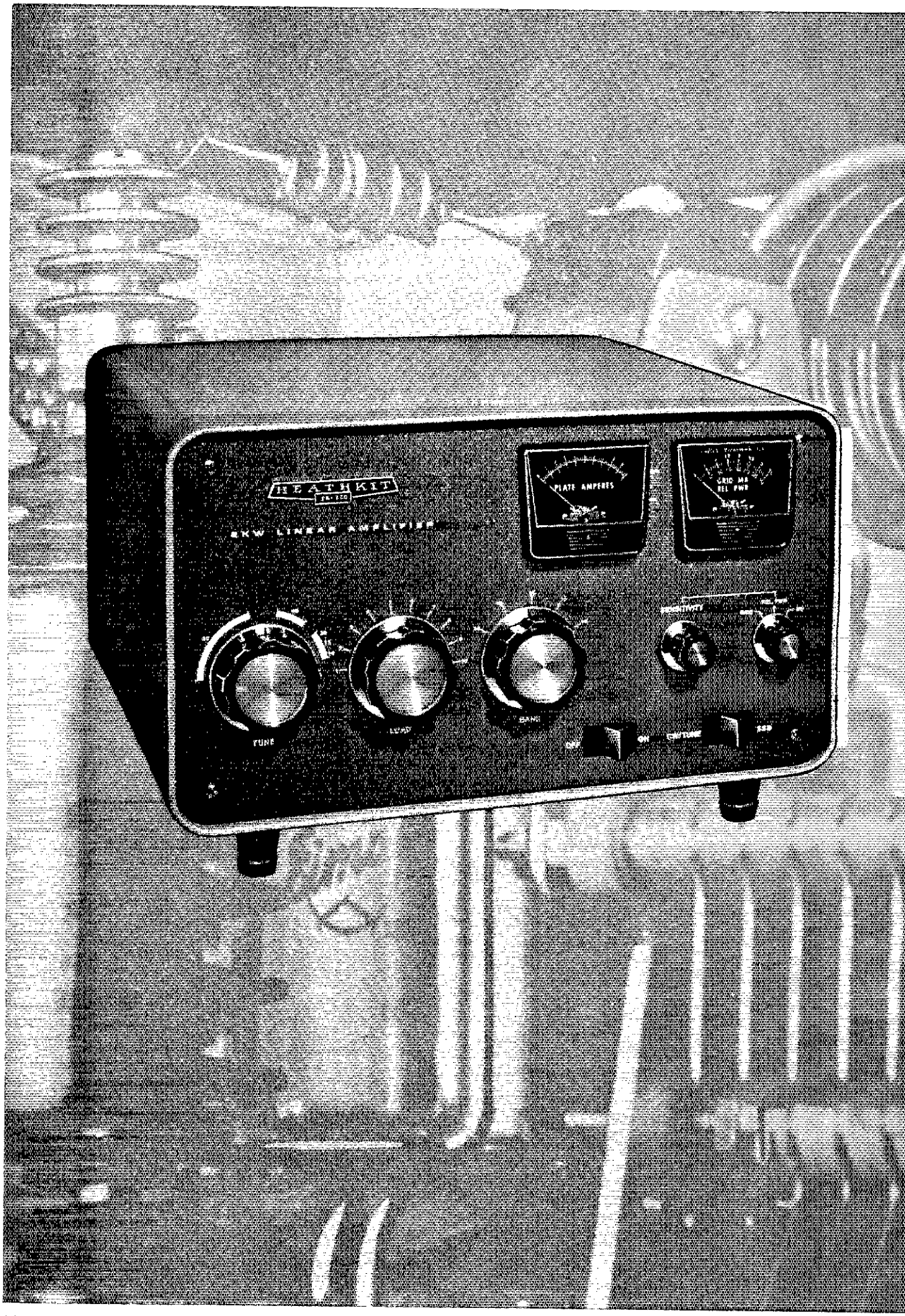
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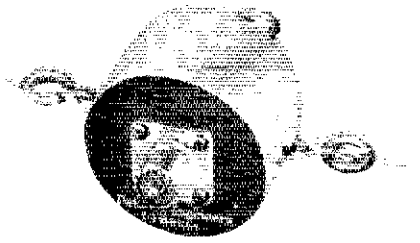

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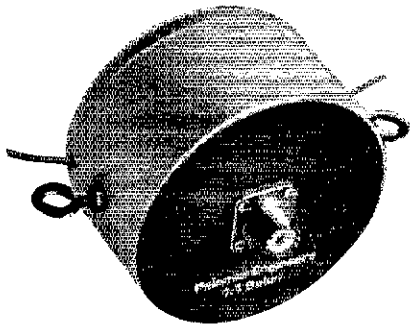

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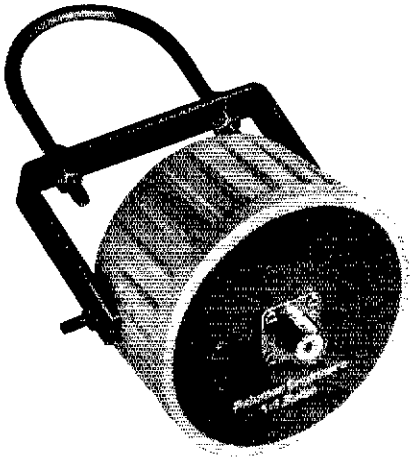

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Get the committees organized and make plans for the biggest ham event of the year. Jars donated a complete set of ARRL publications to the Joliet Public Library. W9HOT reports that 9RND had a traffic total of 133 during 28 sessions. W9JIJ is the only BPL recipient for the month. Traffic: (Feb.) W9JIJ 523, W9NXG 233, N9TN 228, K9MX 180, W9HOT 162, WD9BFX 145, W9OK 135, WA9KFK 134, WB9JSR 130, WA9BGW 98, W9NJP 86, W9OBS 73, W9KR 61, N9DR 60, K9DAC 54, W9LNQ 53, W9OYL 38, K9EEA 34, K9SW 32, W9PE 29, N9MX 23, WB9RFC 18, N9BT 16, W9PRN 16, WB9ZED 13, WB9SGK 8, WB9PHM 6, W9RYU 6, W9WMP 6, WB9NEH 5, K9BK 4, WA9UHA 1. (Jan.) W9PE 60.

INDIANA: SCM, M. P. Hunter, W9LF — SEC: W9UMH. N6DQ advises he is ex-WA9KBS and would like to hear from some of his friends. The first week ends of the ARRL DX contests are now over and some very fine scores have surfaced. Good conditions prevailed on the bands most of the time which made it a super time. To all of you skeptics, 10 meters is alive and well. I managed to pull off a 10-meter WAC in 28 minutes during the end of Feb. Congrats to W9FC on his very first BPL. I'm a little late on the recognition, but it was a very good effort. BPL congrats also to WB9YXN. W9UMH has issued Emergency Service Awards to several of the deserving who assisted during the Jan. snows. Net Tfc: ICN 37, QIN 310, ITN 368, INTN 52. Traffic: (Feb.) WB9YXN 501, W9FC 318, W9QLW 203, W9LTU 160, W9HUF 133, W9EI 126, WB9TOW 119, K9FG 109, W9ZW 94, K9EQT 92, W9DLF 75, WB9PIR 63, W9JIJ 56, W9IOH 40, K9WWJ 40, WA9ITB 30, WA9QCF 30, K9YBM 25, WA9OHX 24, WB9DIX 20, W9PMT 19, WD9EWM 16, K9HPZ 16, K9DCX 15, K9CGS 10, W9CMT 8, W9RTH 5, WB9HCH 3, K9PNP 3, W9BDP 2. (Dec.) W9FC 518.

WISCONSIN: SCM, Roy A. Pedersen, K9FHI — SEC: W9FZC. PAMs: W9AYK K9UTQ W9IEM. RMs: WB9ICH K9KSA W9SFL K9LGU K9EN. Nets, Freq., Time, QNI, QTC, Mgr.: BWN, 3985, 1245Z M-S, 662, 603, W9AYK; BEN, 3985, 1800Z, Dy, 772, 118, W9IEM; WSBN, 3985, 2300Z, Dy, 1218, 289, K9UTQ; WNN, 3725, 245Z, Dy, 57, 5, WB9ICH; WSSN, 3662, 0030Z, M-W-F, 30, 9, K9KSA; WIN-E, 3662, 0100Z, Dy, 295, 167, W9SFL; WIN-L, 3662, 0400Z, Dy, 197, 79, K9LGU; WRN, 3662, 0130Z, Sat., 16, 6, K9EN; Wi Ex PO, 3925, 1801Z, M-F, 591, 39, WA9NIX. Husband and wife team in Mancorad Club WD9ERO and WD9HLD. K9UTQ teaching Novice class in Adams-Friendship VTAE. WSBN certificate to WB9MVZ K9TYO WB9UEP. Are you or your club ready for Field Day? WB9IFG on 220 MHz. WB9UEK now K9XJ. RACES station in Wausau is WC9ABH. New EC for Kenosha County is WB9LST. New Novices Beaver Dam area WD9IGN WD9IGM WD9IGO WD9IGP WD9IGQ WD9IGR WD9IGS WD9IGT WD9IGU. BEN certificate to WA9KMB. The following ARES nets have fine participation, YTARC, Washington Co. Milwaukee Co and Waukesha Co. Does your county have an ARES net?, let your SCM know. WB9ESM now Advanced. WD9HAX new ham in Sussex. BPL to W9ZGQ, WD9CQC. Don't forget WNA picnic July 9 in Oshkosh, lets have a good turnout. Dodge Co. on .04-64 net Mon. at 0200Z. Jefferson Co ARES net just starting on .52 Mon.-Thurs. at 0100Z. Traffic: (Feb.) W9ZGQ 963, WD9CQC 623, W9DND 410, W9SFL 198, WD9AUD 115, K9FHI 111, K1EF/9 74, W9IEM 73, WB9ICH 72, K9UTQ 56, WD9DHF 54, W9AYK 51, K9LGU 49, WB9RRU/9 48, K9AKG 44, WB9UIJ 37, W9IHW 35, WB9BRE 30, K9JPS 29, WB9ABF 28, K9KSA 28, W9FDY 25, WB9MPF 25, W9UW 22, W9YCV 22, WB9ESM 20, WB9OAL 17, K9ANV 15, WB9YUH 12, WA9BZW 4, W9NQ 4, WA9WYI 3. (Jan.) K9ASC 2.

DAKOTA DIVISION

MINNESOTA: SCM, Helen Haynes, WBØHOX — SEC: WØSA.

Net	Freq.	Time	QNI	QTC	Mgr.
MSN 1	3685	6:30p	226	105	NØHY
MNS 2	3689	10:05p	72	23	KØPIZ
MSPN N	3945	12:05p	632	84	WBØJYT
MSPN E	3929	5:45p	562	271	WØDUW
PAW	3925	9-12 1-5	3603	272	WAØYVT
MWX	3925	6:15p	208	148	WBØUKI (sub)

Please take note of the changes: MSSM (RM) is now WBØZAL, MSN 1 (RM) is now NØHY, MSN 2 (RM is now KØPIZ. Congratulations to Novice WDØEFB on making BPL, also to WAØQIT for BPL 3 consecutive months, keep up the good work. WBØZAL WBØEFB and WAØQIT had a real experience on their 1st SET. Pictures show WDØEFB and WAØQIT with handcuffs at the city jail. They made the local paper as a job well done in public relations. Congratulations are in order for the upgrades of licenses: Nov. to Tech. WDØDHT WDØCDT and WDØCDS; Tech. to Gen. WDØBZU WBØZEZ WBØUZS WDØBMM WDØEXA; Gen. to Adv. WDØAPU WDØBJL and WDØCTY. K2SV/Ø was WA2SLQ/Ø, please note this is a correction from last month QST. Traffic: WAØQIT 609, WBØHOX 394, WDØEFB 222, WBØZAL 153, WØYBT 139, WBØRIL 139, WBØYUA 134, WDØJYT 120, WBØUIP 102, NØHY 85, WØDUW 84, WBØUKI 78, WAØTFC 66, KØPIZ 64, WØRIG 57, WBØNZB 53, WBØPKG 31, KØJTW 26, WØPNE 24, WBØQNX 23, KØTS 16, KØHJC 16, KØBR 14, NØJP 14, KØCSE 13, KØFLT 12, WBØSYT 11, WØOPX 10, WAØRKV 8, KØXBI 8, WBØTHE 7, WAØEZQ 6, KØHB 5, WDØBXD 3, WBØURJ 3.

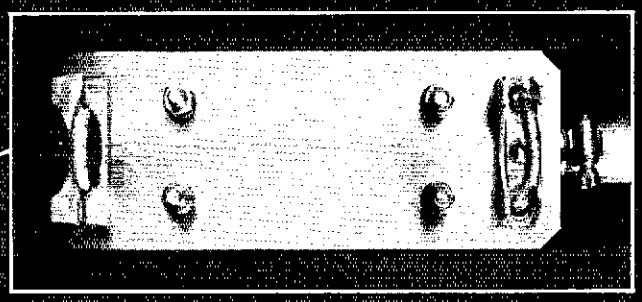
NORTH DAKOTA: SCM, Mark J. Worcester, WAØWLP — KØPYZ in the hospital. Hettinger ARC conducting Novice classes, with 12 people registered, being taught by WBØSHD KØGPX and WØVWJ. Repeater now operating at Hettinger on 28/88. Minot ARC challenges all ND clubs for high score in upcoming Field Day June 24-25. WDØETG/N made high score in the Novice roundup for the Minot Club. New ham WBØVPH in Carpio. WAØSUF back on 75 after some antenna problems. Looks like there will be a 75 meter RTTY net with ND and SD combining their efforts, contact WBØWSQ for more info. Dickinson Repeater was heard in Bis. by WAØWLP while it was on the air for a short test.

Net	kHz	CST/Days	Sess.	QNI	QTC	Mgr.
DATa	3996.5	1700 S-S 1800 M-F	37	372	114	WBØWSQ
YL Wth	3996.5	0730 S-S	28	642	658	WAØRWM
Emergency YL Wth	3996.5	Feb 7-8	1	53	53	

Traffic: WAØRWM 1066, WAØCRH 158, WBØAJ 133, WBØWSQ 39, WØWWL 29, WAØJPT 4.

SOUTH DAKOTA: SCM, Ed Gray, WØSD — The 1978 South Dakota Hamfest will be held at the Surbeck Center on the campus of the S.D. School of Mines and Technology, Rapid City, S.D. July 1 & 2, 1978. Registration beginning 4 PM Fri. June 30th. Pre-registration

BUILT FOR ACTION FROM THE GROUND UP



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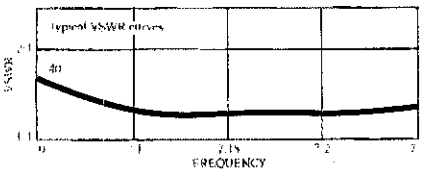

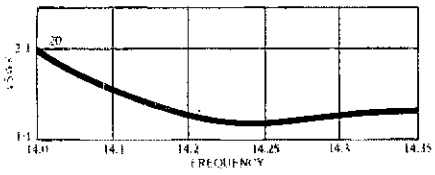

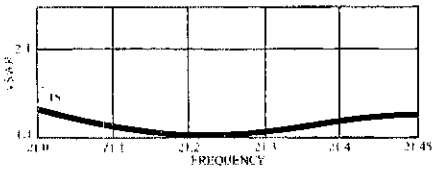

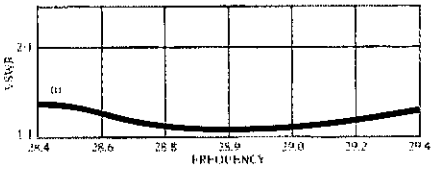

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4010V's fine-tuned to handle 2000 PEP. With a typical VSWR of 1.5:1 at resonance.

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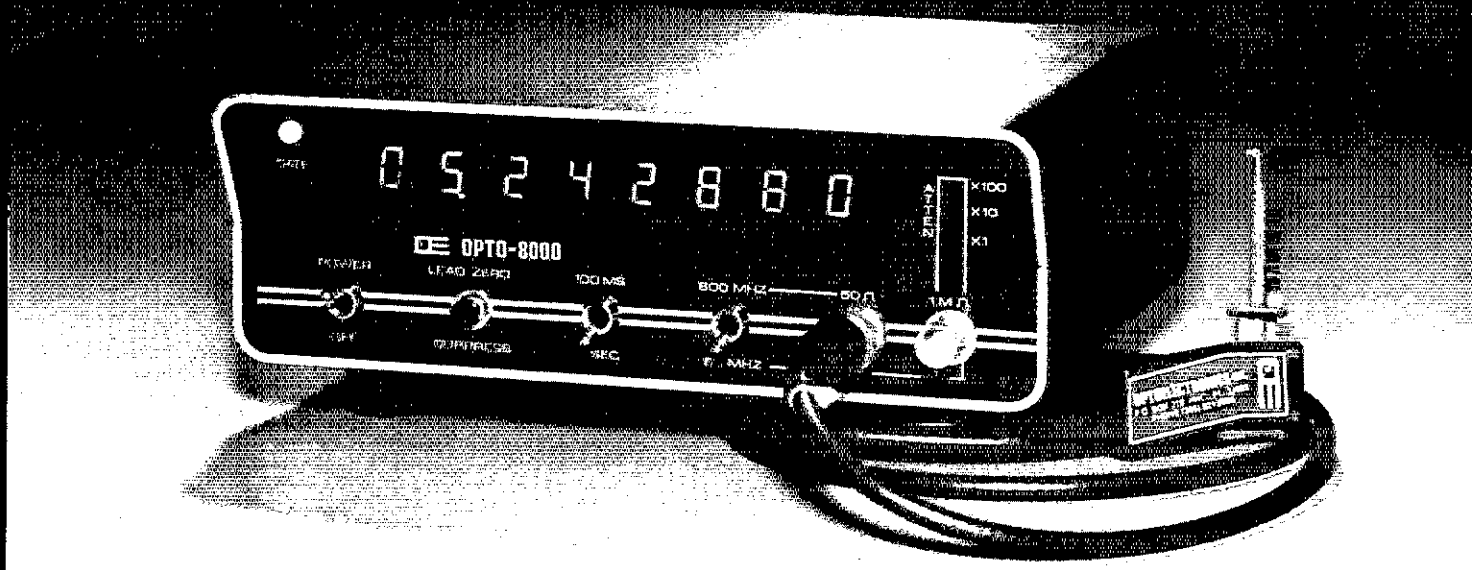

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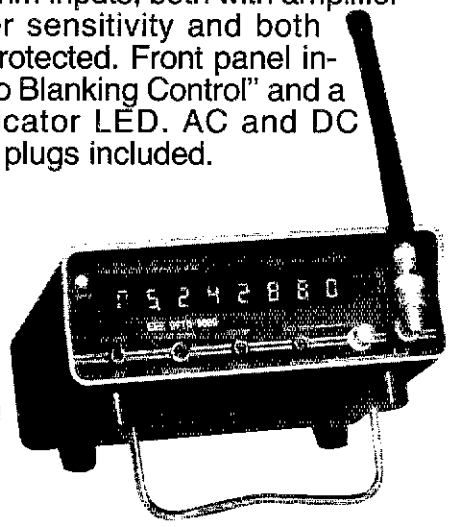

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Frequency Range—10 Hz to 600 MHz
Resolution—1 Hz to 60 MHz; 10 Hz to 600 MHz
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Input Connectors Type —BNC
Approximate Size—3"h x 7½"w x 6½"d
Approximate Weight—2½ pounds
Cabinet—black anodized aluminum (.090" thickness)
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FC-50 — Opto-8000	**Kit $59.95**
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FC-50 — Opto-8000.1 (w/TCXO)	**Kit $109.95**
*FC-50 — Opto-8000.1F	**Factory Update $149.95**

*Units returned for factory update must be completely assembled and operational

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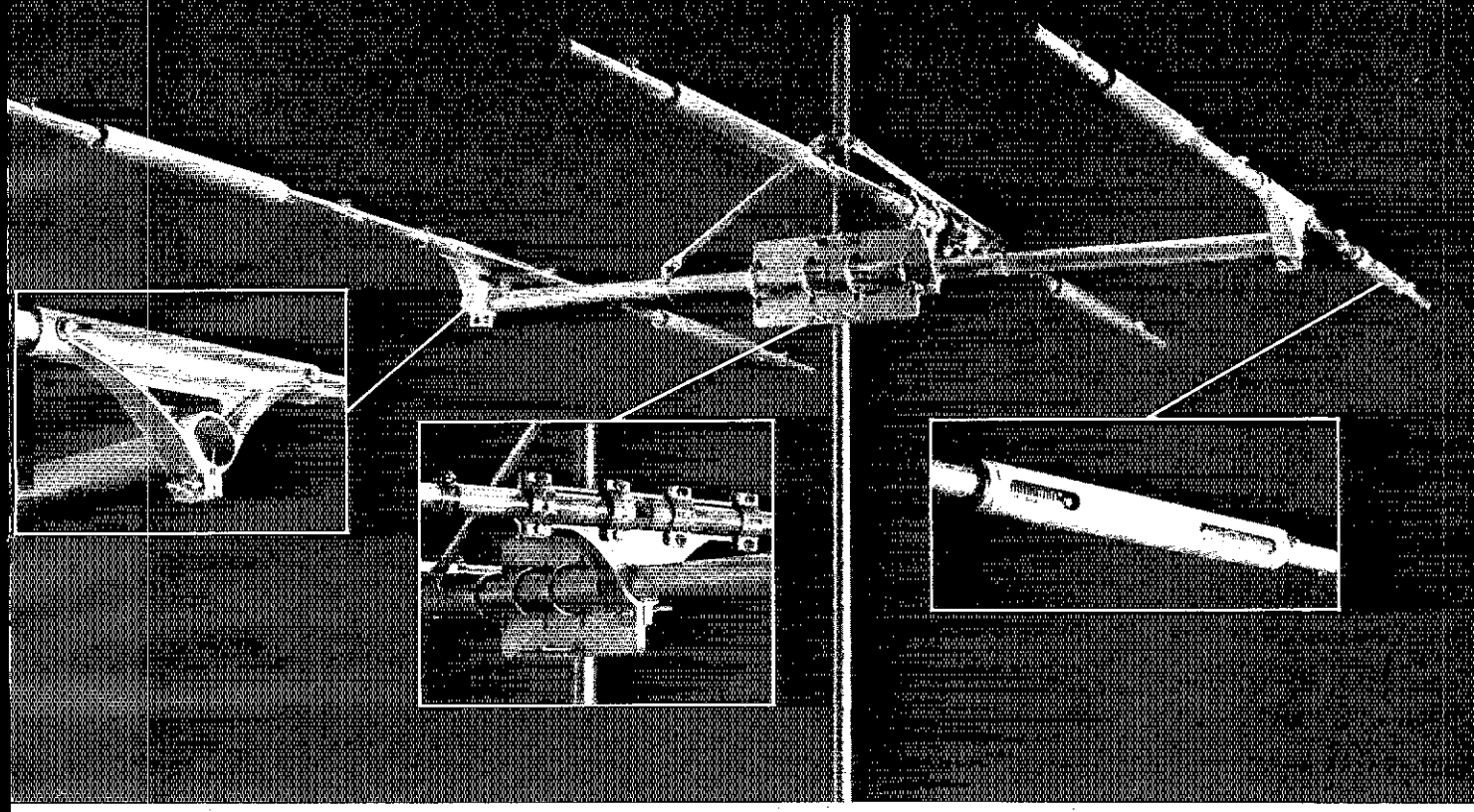
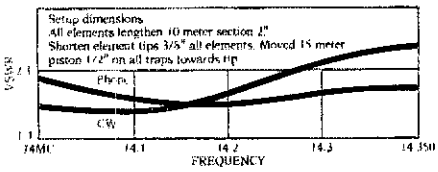
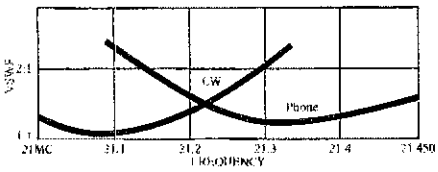
TOO STRONG TO GIVE THE WIND A BREAK!

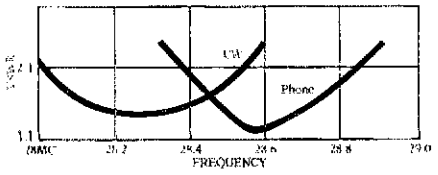


Braced against the elements as only Swan can do it! Even hurricane winds to 100 MPH can't lower the boom on your operations.

The Swan TB3HA Tri-Bander: a really heavy-duty 20-15-10 meter beam. 3 solid elements, all working on all bands. With a VSWR of 1.5:1 or better at resonance, plus a full 2000-watt PEP rating, our TB3HA is built to work up a storm!







Strongest fittings available: this you've got to see. Exclusive cast-aluminum braces grasp tubes at every joint, spreading stress over an 11¾" span. Compared to slipshod U-bolt plates—no contest!

Reinforced by super specs, TB3HA's one tough competitor:

- ☐ 16′ turning radius.
- ☐ longest element: 28′2″
- ☐ 16′ boom, optimum spacing.
- ☐ direct 52 Ohm coaxial feed.
- ☐ wind load @ 80 mph: 110 lbs.
- ☐ 44 lbs. net weight.
- ☐ $199.95 complete. Swan Credit Card accepted.

For $199.95 at your local Swan dealer you can start operating tri-band from a position of real strength—because TB3HA is Swan-engineered to work under pressure!

Please rush full information on Swan's Heavy Duty Tri-Band Beam Antennas:

☐ 3-element TB3HA
☐ 4-element TB4HA

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City _____

State _____ Zip _____

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146-220-440 MHz
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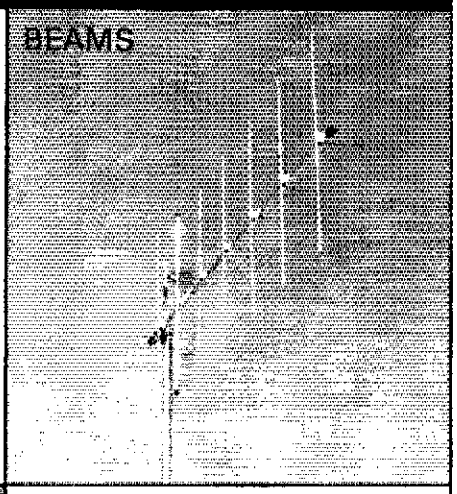
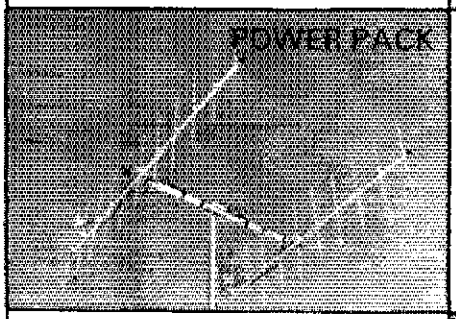
- Direct 52 ohm feed
- Rugged
- Seamless aluminum construction

...and high performance make for years of trouble free activity with any CUSHCRAFT FM Beam.





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Stacked for increased performance, CUSHCRAFT Power Pack arrays come complete. Ready for use when full quieting results are needed to access distant repeaters or long haul simplex contacts.

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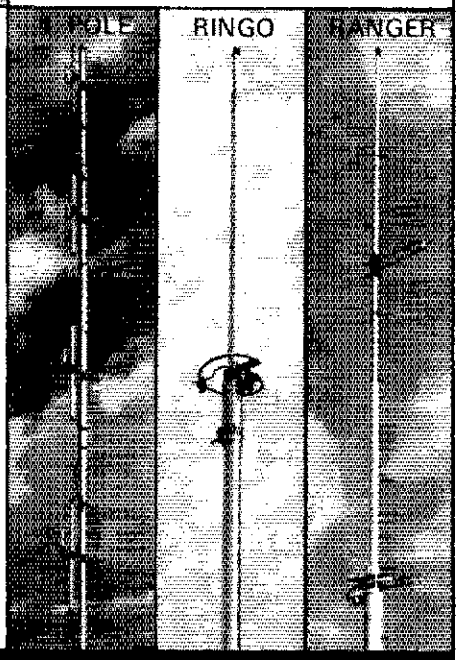
antennas are recognized world wide for their low angle of radiation, ease of assembly, and tremendous performance on all amateur FM frequencies. Regardless of the FM frequency, rely on Cushcraft to deliver "FULL QUIETING PERFORMANCE".



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before June 1 is $4.50 and $5.00 after that. A program of activities and information on accommodations is available by writing Black Hills Amateur Radio Club Box 1014, Rapid City, S.D. 57709. Persons are urged to come for the whole weekend as plenty of activities are scheduled for Fri. night and Sat. as well as Sun. This concludes my last column as SCM and I wish to thank everyone who has provided me with information. Traffic: WAØVRE 526, WAØINM 196, KØFRE 158, WØBVB 98, WBØVGN 67, WBØEVQ 60, WBØZEB 52, WBØTUJ 50.

DELTA DIVISION

ARKANSAS: SCM, S.M. Pokorny, W5UAU — SEC: WA5VNV. PAMs: W5POH WA5ZWZ K5MEA. RM: W5MYZ. Nets, kHz, Time/Day, QNI, QTC, Mgr.: ARN, 3995, 0030/Dy, 1071, 130, K5MEA; OZK, 3760, 0100/Dy, 189, 22, W5MYZ; APN, 3937, 1200, M-S, 944, 51, W5POH; M-Bird, 3928, 2230 M-F, 756, 32, WA5ZWZ. CAREN, Little Rock planning Hamfest/Flea market for Aug. W5ASD has another Novice class going. ECs who have not sent a list of ARES members to the SEC, please send it to the SCM. The Fulton, Izard & Sharp Co. hams holding a coffee break last Mon. of month. For more info call W5BBV in Fulton Co., W5UAU in Izard Co. & WB5HQC in Sharp Co. Jonesboro Club will hold hamfest Aug. 20 at Crowley's Ridge Park. OBs: K5MEA 18, K5DW 6, WB5WWA 6. PSHR: WB5FDP 44, W5POH 39. Traffic: WB5FDP 104, K5MEA 83, W5UAU 35, W5KL 24, W5POH 24, K5DW 15, WB5GWU 15, WB5WWA 10, WB5LWJ 4, WB5GQH 1.

LOUISIANA: SCM, Robert P. Schmidt, W5GHP — Asst. SCM: N5JM. RM: N5TS. PAM: K5TL. VHF PAM: W5VBX. Congrats to Tom Losey, K5TL, our new SCM. For the last four years it has been my pleasure to serve in this position. I would like to take this space to thank all LA ARRL members for their help and assistance. I particularly wish to thank all those members who served in leadership positions. The various LA Traffic net mgrs. our Parish ECs, and those who assisted by being Net Control Stations and Liasion stations to the higher nets. I also want to thank all the clubs and their officers for providing me with their bulletins. Starting in Apr., please send your monthly reports to our new SCM. Remember the Baton Rouge Hamfest, this month which is also the Delta Division Convention. New officers of the Lafayette ARC are K5FNQ, pres.; WA5KNC, vice-pres.; K5DPG, secy.; K5ARH, treas.

Net	Freq.	Time/Day	QNI	QTC	Mgr.
LAN	3615	7&10 PM Dy	467	257	N5TS
LTN	3910	6:30 PM Dy	527	87	K5TL
LSN	3703	8:30 PM M-F	104	26	WB5OOM
LRN	3587.5	6:30 PM Su & W	12	18	N5RB

Traffic: N5TS 246, W5GHP 204, WA5IQU 190, W5MI 178, N5YL 137, K5MC 123, WB5OOM 111, N5RB 93, K5TL 60, WB5LBR 54, N5ES 34, K5BLV 23, W5YN 20, WB5IKT 8.

MISSISSIPPI: SCM, E. Ed Robinson, W5XT — SEC: WB5FXA. Jackson County Campus ARC now licensed, as WD5IIA, tnx to K5MK. With various changes of calls please note your SCM's change from W5YTN to W5XT. Time now to be making firm plans for Field Day. Several areas in the state planning a fight for top honors. Is your club ready? W5RUB reporting good OO activity. N5FG also reports DX activity hot. DRNS, WB5CDX, 28 sess., QTC 277 with MS represented 89 percent by K5QNE W5QDC WD5GNR W5EDT WB5NGF, CGCHN, K5WOB. 28 sess., QNI 2984, QTC 333. MSBN, WB5SNB, 28 sess., QNI 2083, QTC 93. MTN, WB5FHA, 28 sess., QNI 137, QTC 55. MN, WA5JWD, 23 sess., QNI 283, QTC 8. Traffic: W5EDT 179, N5RN 158, WB5FHA 141, W5YTN 36, WB5SNB 23, K5AKM 21, K5OAF 20, WA5OKI 17, WA5GIT 12, WB5VFS 12, WD5BVY 9, K5WSC 9, W5RUB 5, W5BW 3.

TENNESSEE: SCM, O.D. Keaton, WA4GLS —

Net	Freq.	Time(Z)/Days	QNI	QTC	Mgr.
TPN	3.980	1140 M-F 1245 M-F 0030 M-S-Su 1400 S,Su,H	5684	278	WA4EWW W4PFP WB4YPO
TN	3.635	0100 Dy	270	103	K4YFC
TNN	3.710	0000 MTTh	67	37	WA4CNY
ETVHFN	50.4	0200 MWF	110	4	WA4WZJ
ETVHFN	145.2	0200 TTh	31	0	WB4DZG
MTTMN	28.80	0200 TF	59	0	W4EAY
WTVHFN	146.37 146.97	0300 Dy	1089	555	WA4VVX
TCDWN	146.31 146.91	0200 W	290	0	WA4BOC
TTN	28.750	0030 TF	96	4	WB4PPY
WMARCN	146.07 146.67	0200 WFM	278	0	W4TZG
QCVHFN	145.1	0200 F	14	2	WB4BXG
TSFMAN	146.19 146.79	0200 M			WD4ARY
KARCN	146.37	0100 Th	5	0	WB4BXG

Everyone plan to attend the Humboldt Hamfest on the 21st and the Knoxville Hamfest on the 27th & 28th. Officers of the Chattanooga ARC are: WD4ARY, pres.; W4KAU, vice-pres.; N4OM, treas.; WA4ZEL, secy. Officers of the BMARC & KARC are: WA4ZAL, pres.; WA4FIQ, vice-pres.; BMRC, WB4OIS, vice-pres.; KARC, WA4QMC, secy-treas.; BMRC, WD4BJF, secy-treas. WB4BXG, act. mgr.; N4IR Zero Beat Ed. OPS canceled on WB4MPJ who moved to FL. WA4WHQ appointed OBS for VHF in Memphis area. Welcome to K4WOP & K4VIG who have moved to TN. Welcome new licensees: WD4KAN WD4LGV WA4TLZ WD4MLX WD4KMY WD4KWD WD4MPE WD4MPI WD4KNZ WD4KJA WD4FYQ WD4JVV WD4IGB WD4MVU. Traffic: WA4NIF 504, WA4CNY 502, K4CNY 189, K4JGW 158, W4ZJY 94, WB4PRF 90, WB4ZSZ 72, WB4BKF 61, WB4YPO 47, WB4HOI 39, K4XE 39, WB4GZF 38, WB4DJU 37, WB4JZF 30, W4PFP 26, WA4DKC 20, W4TZG 17, W4VJW 14, W4TYV 13, WA4BDL 11, WA4WVW 10, W4PSN 8, W4RUW 7, K4WOP 6, WB4BXG 5, W4EWR 5, WB4BGV 4, K4MZE 4, WB4YBL 2.

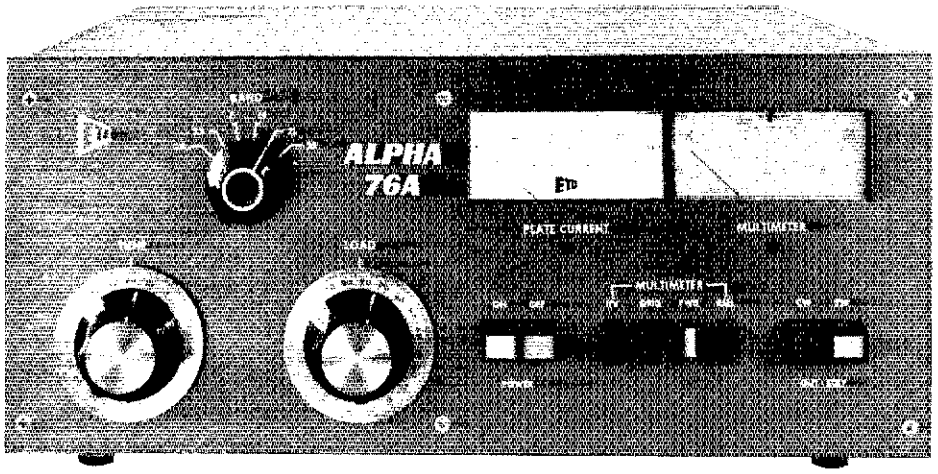
GREAT LAKES DIVISION

KENTUCKY: SCM, Ted Huddle, W4CID — SEC: WB4ZML.

NEt	QNI	QTC	Net	QNI	QTC
KRN	249	42	KYN	235	92
MKPN	1010	72	KSN	200	60
KTN	1259	163	KNTN	360	158
KPON	58	2	5DARES	66	5
CARN	182	22	SEKEN	25	1

New Novice in Lexington is WD4ORW. The "Jump Team" concept under the new Des Communications Plan appears to be catching on. Contact your local EC or

ALPHA 76A



A RUGGED NEW BEAUTY IN A CLASS BY ITSELF

There are lots of so-called "Maximum Legal Power" linear amplifiers on the market. Why is it that so many knowledgable amateurs, after checking out (and often owning) the others, ultimately choose an ALPHA?

For one thing, "maximum legal power" doesn't begin to tell the whole story. Nearly all manufacturers' ratings implicitly assume an amateur service duty cycle much less than 100%. Even the terms "continuous" and "100%" duty have been so debased in recent years as to be meaningless unless explicitly defined. The consequence, too often, is a power transformer or tube going up in smoke during a long operating period.

Every ALPHA amplifier is unequivocally rated to run a full 1000 watts of continuous, average d-c power input, in any mode, with No Time Limit (NTL). You could leave your ALPHA (ANY ALPHA) all day with a brick on the key, at a kilowatt input (or at 2 KW PEP input, two-tone SSB) without hurting it. In fact, you could leave it for weeks: last year we ran a standard ALPHA 76 key-down at a kilowatt for 18 days without ill effect. That's ALPHA POWER. To top it off, your new ALPHA is protected by ETO's exclusive 18 MONTH factory warranty —SIX TIMES AS LONG as the industry-standard 90 days! Now that DOES pretty much tell the whole story.

What's new with the ALPHA 76A? We haven't tampered with success. Behind that sleek new exterior is the same robust, reliable, easy-to-use powerhouse that January QST described with such phrases as, "Typically excellent ETO construction . . . ," ". . . excellent efficiency . . . ," ". . . tunes smoothly . . . ," and ". . . runs cool and quiet . . ."

The basic ALPHA 76 components and circuit remain unchanged for very good reason: hundreds of 76's in service over the past two years have suffered NOT ONE SINGLE INSTANCE of transformer burn-out, and virtually no tube failures—less than 0.1%! That record is particularly remarkable when you consider the extent to which owners take their ALPHA's for granted.

We think the new ALPHA 76A sets a standard for style. And ETO engineers have added a separate Plate Current meter and a new push-button power control system, making it even more convenient to use. But the real beauty of every ALPHA linear amplifier is INSIDE the cabinet . . . where engineering and craftsmanship tell the whole story of ALPHA superiority.

A few ALPHA's may still be available with factory-installed 10 meter coverage. Contact ETO or your dealer today for detailed information and fast delivery. Six meter ALPHA 76/6 available about June 1: $1095. Order now.

ALPHA: Sure you can buy a cheaper linear . . . But is that REALLY what you want?

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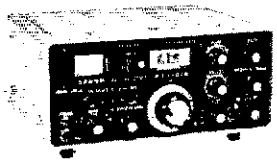

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Fully Syn 2M FM
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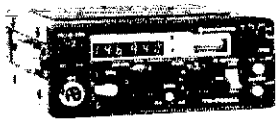

7400A 25 watts
Fully syn. 2M FM
List $399.00
Call for Super Quote

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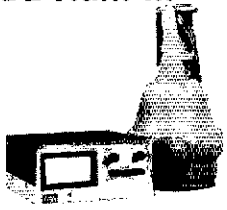

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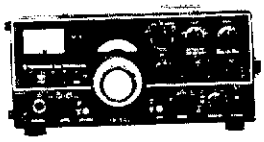

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2. Ext. Speaker $30.00
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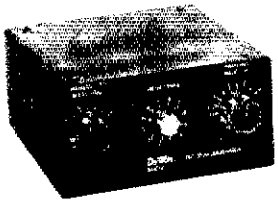

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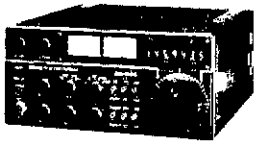

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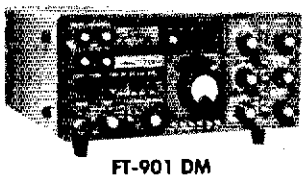
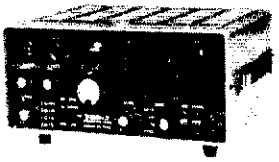


FT-901 DM
160-10M all Mode HF
List $1299.00



FRG-7
Broadcast to 30 MHz
List $315.00

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IC-701
160-10M HF all Solid State
100 watts output, Digital
List $1499.00

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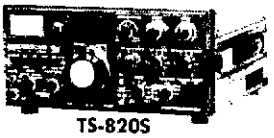
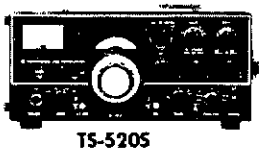


TS-820S
Deluxe 160-10M CW, SSB
List $1098.00



TS-520S
160-10M CW, SSB
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TR-7500
2M 100 Ch. Programable
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T-599D R-599D
List $549.00 each

DRAKE

R4C Rcvr
160-10M List $699.00

T-4XC TX
160-10M List $699.00

L4B Linear Amplifier
80-15M List $995.00

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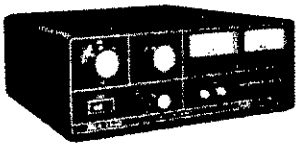
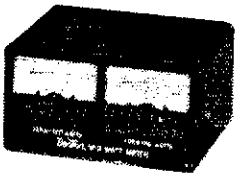


MLA 2500
Linear Amplifier List $899.00



W-2
Dual Watt Meter List $99.00

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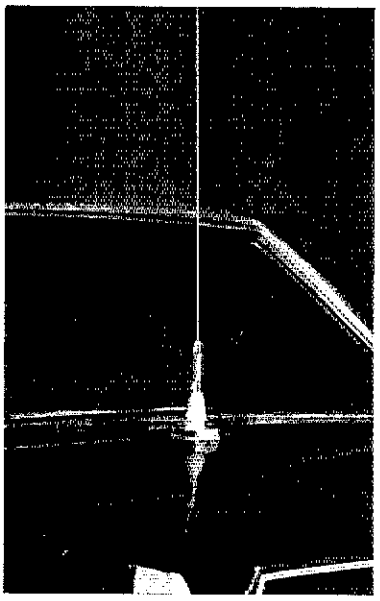
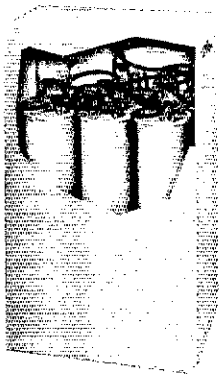
Whichever band you're operating in, depend on Decibel to provide your best combination of quality and performance. We supply mobile and base station antennas and duplexers in the frequencies where you need them. Any repeater's operation and performance will be improved by upgrading to Decibel's 30-year tradition of quality.



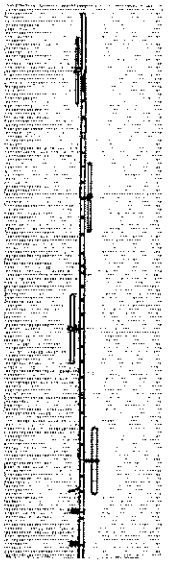
MOBILE GAIN ANTENNAS

Decibel offers two outstanding series of mobile antennas designed to provide the utmost in performance, reliability and durability. The Decision series, illustrated, features space-age styling plus traditional quality for roof or trunk attachment. Standard, no-hole or magnetic mounting is offered with or without springs. The Classic series, proven over the years, continues a tradition of quality and performance.

BROAD BAND GAIN ANTENNAS



Decibel's base station antennas are rugged and include built-in protection against lightning damage. For extreme resistance to environmental factors, they're constructed using our exclusive Vapor-Bloc® weather resistant cable. They feature high gain and are factory adjusted for minimum VSWR over a wide frequency range. Easy to install . . . and easy to buy . . . from Decibel.



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Duplexers from Decibel are available in 4- or 6-cavity models, with the enclosure offered optionally. We offer industry's broadest choice of models.

WHATEVER YOUR REQUIREMENTS FROM 30 TO 960 MHz, DECIBEL'S GOT YOU COVERED.

Decibel offers multiple products that have made us leaders in the commercial RF market.

- Base station antennas
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- Duplexers
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- Isolators and circulators
- Hybrid couplers
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- Transmitter combiners — both hybrid and low loss types
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Manufacturers of **quality** communications products for more than 30 years.

our SEC if you want to join one. WB4KYT and WA4ODV are conducting Novice classes in Ashland. Hamfest dates so far: Northern KY — May 28, Lexington — Aug. 13. Others will be published as they are received. Traffic: WA4WSM 145, WB4NPD 136, WA4IGS 90, WA4AVV 89, W4CID 56, W4BAZ 41, WA4JAV 39, WD4LSA 36, WB4AUN 29, W4CDA 25, WB4ITJ 25, WB4ILF 19, WB4TKJ 19, WA4FAF 17, WA4YDO 16, WD4KIC 12, WA4AGH 10, K4UMN 10, WA4NWT 10, K4HOE 9, K4AVX 6, WA4ROI 4, WD4LXX 3.

MICHIGAN: SCM, Stanley J. Briggs, W8MPD/K8SB — SEC: WA8EFK. RMS: W8JYA PAMs: W8SOP K8LNE WA8WVV (VHF).

Net	Freq.	Time/Day	QNI	QTC	Sess.
MACS*	3953	1600 Dy	964	511	28
QMN*	3663	2300/0300 Dy	1168	462	85
UPEN	3922	2200 Dy	931	143	32
WSSB*	3935	0000 Dy	1258	128	28
GLEN	3932	0230 Dy	691	111	28
BR Net	3930	2230 M-S	489	76	24
MiTN*	3932	2330 Dy	151	49	9
MEN	3930	1400 Su	124	21	4
MI6M	50.7	0000 Dy	113	8	24
MNN*	3722	2230 Dy	18	3	7

VHF PAM Report: 9 rpts. rcvd., 607, 56, 38, *National Traffic System Nets. Michigan Emergency Calling Frequency: 3932 kHz. Amateur Radio was well represented at the Michigan Science Teachers Assn. Convention in Lansing with W8MRR and WB1EYI's live OSCAR demonstration. OSCAR 7 came in on schedule which impressed the group very much. Your group can help your local school take part in the OSCAR Education program. New appointments: WD8DMX and WD8JYT OPS, WD8APM OBS, WD8DMX ORS. I am sorry to report the following Silent Keys: W8DED WA8MMA W8QJC W8RL K8SUU K8WJI K8YHX K8ZGV. All SET results are not in yet, but so far they look very good. One test message monitored "The entire business district of Dundee destroyed X Total damage $400." Upgrades: WD8JPX WD8PKC to General, K8NTK to Adv. WD8KMU to Tech. 220 MHz got a lot of use during SET. 43 messages were passed into Monroe County thru WR8AOK. W8AP reports his major on the air interest these days is getting 5 Band WAS. K8AXL's 4 half waves in phase for 75 meters has been saturating receivers all over the midwest all winter! Good set-up for an NCS. WD8DRU reports that May 3 is Solar Energy day and suggests groups consider a demonstration station using solar power. Cascades Amateur Radio Soc: WB8LLN, pres.; WA8QEF, vice-pres.; WB8PCK, secy.; WD8IWJ, treas.; K8CWG, act. mgr. Monroe County Radio Com. Assn.: WB8GWB, pres.; WD8IUE, vice-pres.; WB8TKL, secy-treas.; WD8IUH WB8SEZ, trustees; W8UIQ, sta trustee. A lot of old club calls will be no more if FCC gets its way with Docket No. 21135. Have you filed your comments on it yet? Comment Deadline is June 2. At least Orig. & 5 copies. Traffic: (Feb.) W8MRM 269, K8KC 256, W8YY 252, K8KMQ 243, K8GWW 230, K8LNE 220, WB8ITT 193, WB8QYU 179, K8FE 176, WB8MTD 167, W8MPD 160, WB8YDZ 157, K8RV 155, W8YZ 148, WA8DHB 141, WB8POL 140, K8DYI 99, K8CN 98, W8YIQ 93, WD8LRT 92, WA8WZF 72, W8VPW 71, W8SOP 67, K8DTG 62, WB8-JET 61, WB8DJS 58, WB8HNB 56, K8ZJU 53, WD8JYT 48, K8WRJ 45, WB8ETB 44, K8UPE 40, WB8YRY 39, WD8DMX 38, WD8CSA 37, WB8EEU 37, WD8BSE 35, W8HKL 35, W8DSE 34, W8IHX 34, K8JED 33, W8SCW 31, WB8ZNS 30, K8GXV 29, W8CUP 25, WB8HYR 24, WA8OAF 24, WA8VBZ 24, WD8MFC 20, W8DCN 18, W8EOI 18, WA8MAM 18, WA8RXI 18, WB8VAI 18, WA8MDK 17, WB8TTA 17, W8RNQ 17, W8BEZ 16, W8TBP 16, WB8JIX 15, W8VIZ 15, WA9WVV 15, WB8YIG 15, WD8JRX 14, W8SDB 14, K8AXL 13, WB8SYA 13, K8BZL 12, WA8AXF 11, WD8DIB 11, WD8APM 10, WB8APN 9, WB8NCD 9, WB8UZM 9, W9QBE 8, WB8AFO 7, W8LDS 7, W8NOH 7, W8JUP 6, WD8NIK 6, WA8FJF 4, N8NA 4, WD8DRI 3, K8GB 2, WA8LSS 2, WA8VDC 2, N8AG 1, W8WVL 1. (Jan.) WB8QYU 81, W8POZ 17, WD8BKM 7, W8YY 7, W8BEZ 5, WB8NCD 2.

OHIO: SCM, Hank Greeb, W8CHT/N8XX — Asst SCMs: WA8MCR N4VY SEC: K8AN. PAMs: W8DIL W8FU WA8SSI. RMs N8CW WB8KKI W8TP WB8WTS. Net Reports (Feb.)

Net	Times	Freq.	Sess	QNI	QTC
OSSBN	1430/2000/2245	3.9725	84	2496	788
OSN	2210	3.577	28	214	84
ONN	2230	3.708	25	107	51
06mN	0100	50.16	28	314	36
BN	2245/0200	3.577	55	580	288
BNR	2200	3.605	28	115	109

During Ohio Council of Amateur Radio Clubs meeting March 11 a committee was empowered to review the constitution and by-laws in order to make the Council more representative and functional. Ideas are solicited and may be sent to WB8VLR, secy. Ohio 6-Meter Net certificates were awarded to WB8AYM WD8CMK WD8CTX K8CKY WD8DZN W8DIB W8EOK WB8EWK WA8FMD WA8GQA K8IOW WB8MHE WA8NED WB8OTH WB8PUN WA8QFQ WA8SSI WB8UNT WB8USE WA8U-QB WB8VYF WA8VWH WB8YLI WB8YGW W8ZCV WA8ZFH. N4VY/8 is new Asst. SCM to direct the OBS program. Our goal is to have an OBS for every repeater and every local net in the section. Do you have an OBS on your repeater or net? If not, why don't you volunteer? N8CW takes over as Ohio Slow Net Mgr. on May 1, with WB8JGW taking the duties of Section Traffic Manager (currently Asst. SCM) effective the same time. SET and real Emergency reports were received from 31 ECs. I'm currently looking for replacements for those who did not report. The goal of our SEC is to have an active emergency preparedness group in each country. Does your county have an active group, headed by an active EC? Traffic: WB8KWD 382, WA8MCR 324, W8PMJ 304, WA8HGH 280, WB8WTS 252, WB8KKI 241, W8ENI 217, WB8MZZ 179, N8CW 178, W8IQ 152, W8DIL 120, WA8ZNC 118, N8TM 104, WB8JGW 102, WB8OMQ 93, W8QZK 91, WB8CJU 68, WB8UFB 62, W8FN 57, W8GGX 57, W8WEG 53, WA8SSI 52, WB8TTP 51, W8TH 50, N8XX 49, WD8CDA 48, WB8SIQ 45, WD8DQX 43, K8DL 42, W8TP 42, W8LZF 40, K8BYR 37, WB8VLR 32, WA8VWH 32, WB8MRL 31, WD8BBQ 30, WD8IYO 29, W8RG 29, WB8TFG 29, WB8TJS 25, WB8TRK 24, WD8BMK 21, K8DMU 21, W8OE 20, WB8PIY 20, WD8MGP 16, WD8MTV 16, WB8UIN 16, W8EK 15, W8QIL 14, WB8BGX 12, WB8QHV 12, WB8UJM 12, WA8VEC 12, WD8DIP 11, K8JE 10, W8OUU 10, WA8RQQ 10, WB8YBJ 10, K8CKY 9, WB8TCZ 9, WB8VWM 9, K8IOW 8, WB8YGW 8, WD8JTT 7, WD8CTX 6, WB8GGR 6, W8IM 6, K8ND 6, K8HF 5, WB8LWY 5, W8LT 4, W8ZM 4, N8AA 3, WD8BUO 3, WB8AWM 2, W8EDU 2, WB8VCG 2, N4VY 2.

HUDSON DIVISION

Amateur TV is easy with the new ROBOT Scan Converter

If you're a licensed Ham who can operate a camera and tune a TV set, you have all the skills necessary to operate slow scan television on amateur radio.

All licensed amateur radio operators, except novices, can operate amateur television

And there is ample room on those bands designated for SSTV. The FCC has authorized SSTV operation on all phone bands except 160 meters and the General Class portions of the phone band on 80, 40, 20, and 15 meters. With the exception of the General Class portion, a licensed Ham can operate SSTV on the same frequencies he operates phone.

Contacts are easy to make

At last count there were over 12,000 SSTV stations in operation in over 100 radio countries, from the Netherlands to New Zealand, from Italy to South Africa, and the list is growing rapidly.

Making contacts on the SSTV frequencies is easy. Just tune to 14.230 MHz and listen to the SSTV operators rag chew about this exciting activity. Call-ins with or without SSTV gear are welcome and you'll find that slow scanners are happy to answer any questions you have about SSTV.

DX'ing on SSTV?

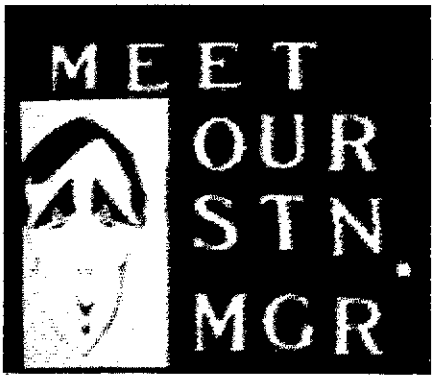
You bet! There's tremendous interest and activity among SSTV'ers for DX'ing. Many have WAC, and several stations have made DXCC on Slow Scan (W8YEK was the first to log 100 countries 2X SSTV more than a year ago). There's even an active USSR station, who, while not allowed to transmit pictures, anxiously receives and acknowledges SSTV contacts.

Amateur television can be a family activity

Imagine transmitting pictures of your station, your QSL card, pictures of yourself, your family, even a "TV Program" to another SSTV'er halfway around the world. You can do it easily with the new ROBOT Scan Converter, a CCTV camera, and TV monitor. Your entire family can now get into the activity. Many slow scanners write us that SSTV has become a family project, with the whole family building displays, making art work, working the camera, writing "programs".

Record your SSTV transmissions on an audio tape recorder!

Yes, we said, AUDIO tape recorder. Tape is a basic tool for SSTV'ers. Many CQ calls are put on continuous loop tape so the operator can keep it running as long as necessary to call CQ without having to use his camera each time. A tape recording will provide a picture absolutely as good as the live original!



It's all made possible with the new ROBOT model 400 scan converter . . .

- All solid state Random Access Memory
- Slow to fast and fast-to-slow conversion capability
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- Frame freeze from any standard CCTV camera, broadcast video or video tape source

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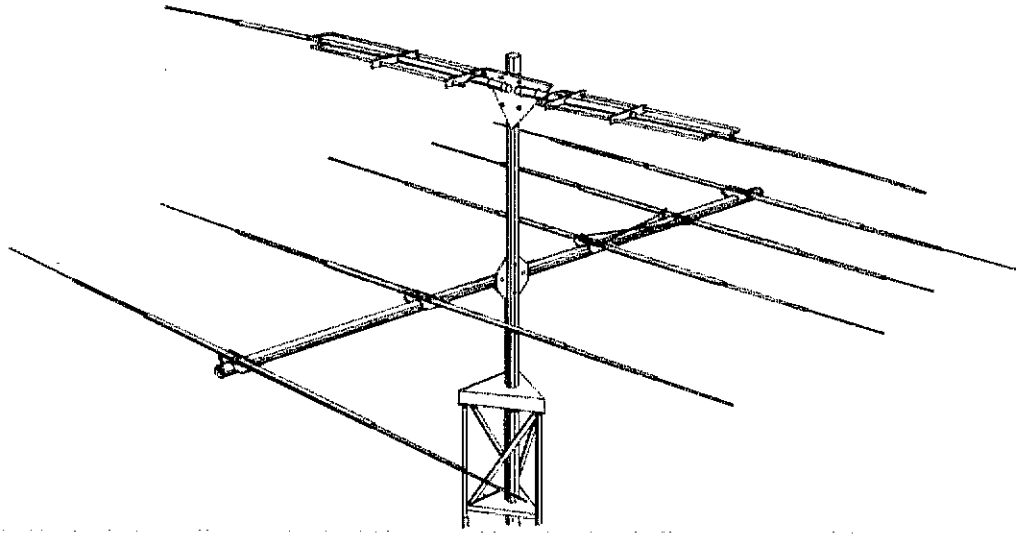
Upgrade your coverage on '40

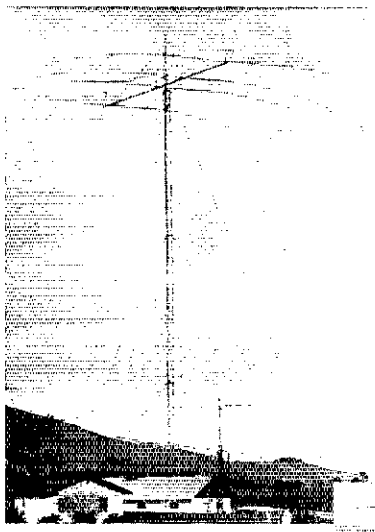


- Add on 40 meters to any 20 meter beam without interaction.
- **Point it!** Realize optimum performance, minimum noise/signal off ends.
- Fold-back, **high Q linear loading** is extremely low loss.
- **Strong!** Same as elements used in the KLM 40 meter four element beam.
- Mounts on any mast or boom to 3" diameter.
- **Compact** . . . light. Only 46 feet and 15 lbs.
- **Affordable** . . . modestly priced.

Upgrade your operations with a versatile KLM horizontal, rotatable dipole. Mount it above, and on the same mast as your existing beam. It may subsequently be converted easily into two phased verticals or used as a building block for a two or three element beam. At nominal heights, the sharp end nulls of the figure-eight pattern substantially reduce noise and unwanted signals off both ends. Compare this to filled-in nulls of an inverted vee dipole.

Efficient! Performance only slightly less than a full-length 64 foot antenna at foreshortened length of 46 feet. The dipole may be tuned for general coverage or optimized for favorite band segments. Element is split for direct 50 ohm feed (a KLM 1:1 balanced-to-unbalanced balun is optionally available; Model KLM-3-60-1:1).

Turning radius: 23 ft. Wind area: 2 sq. ft. Maximum mast size: 3".



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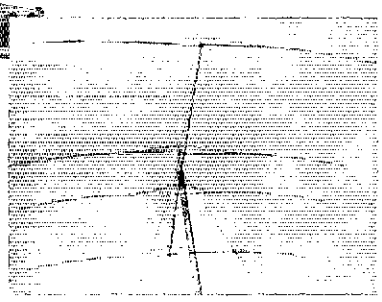

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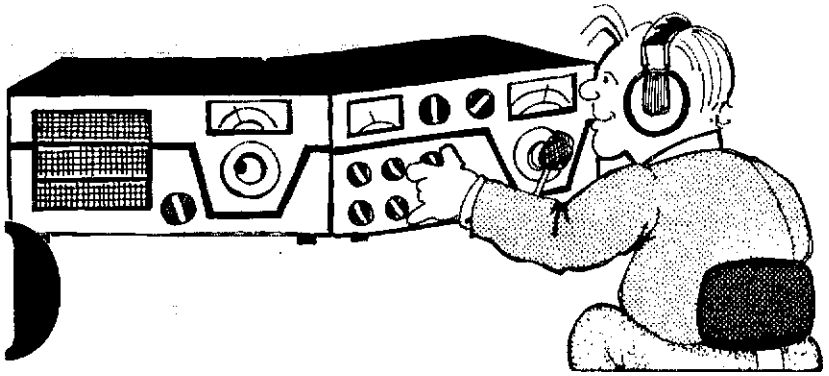

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Now for one low price the Drake TR-4CW transceiver, MS-4 matching speaker, and AC-4 power supply can be yours! The Drake TR-4CW covers 80 thru 10 meters • Modes: SSB, AM, CW • 300 watts PEP on SSB, 260 watts on CW, AM • 500 Hz CW filter included • Transceiver or separate PTO • Wide-range receiving AGC • Receiver Incremental Tuning • Solid-state VFO • Shifted carrier CW • VOX or PTT and much more! The AC-4 power supply has an input of 120 or 240 VAC • Output: 650 VDC or 12.6 VAC • Fits inside MS-4 cabinet.

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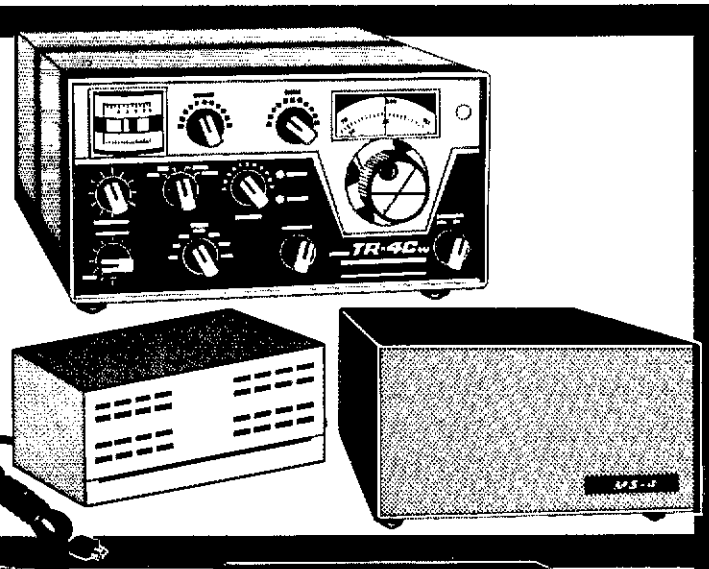
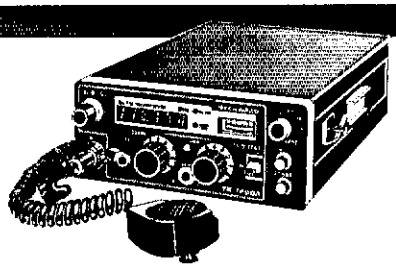
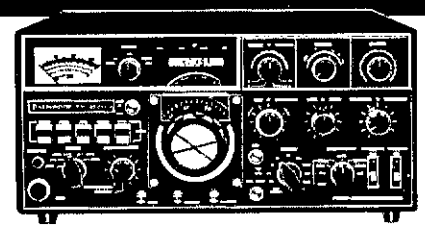




KENWOOD TR-7400A 2 meter FM mobile transceiver

TR-7400A features Kenwood's continuous Tone Coded Squelch (CTCS), 4 MHz band coverage, 25 watt HI output — 5 to 15 watt adjustable LOW output, & fully synthesized 800 channel operation. LED 6-digit readout, large helical resonators, 2-pole 10.7 MHz monolithic crystal filter, repeater offset circuit and much more!

399.00 list price. Call for our quote.



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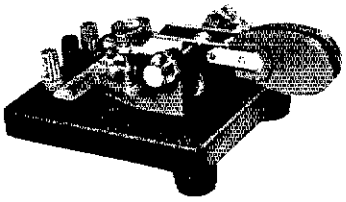
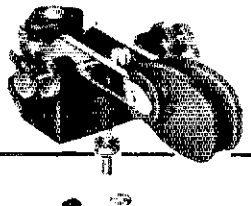


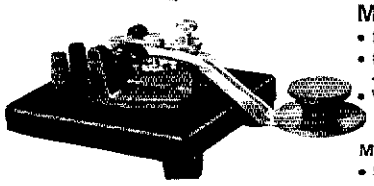
Model HK-1
- Dual-lever squeeze paddle
- Use with HK-5 or any electronic keyer
- Heavy base with non-slip rubber feet
- Paddles reversible for wide- or close-finger spacing

$29.95



Model HK-2
- Same as HK-1, less base for incorporation in own keyer

$19.95



Model HK-3
- Deluxe straight key
- Heavy base . . . no need to attach to desk
- Velvet smooth action

$16.95

Model HK-3A
- Same as above less base **$9.95**

Navy type knob, only **$2.75**

Model HK-4
- Combination of HK-1 and HK-3 on same base

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EASTERN NEW YORK: SCM, Guy L. Olinger, K2AV Asst. SCM/SEC: WB2VUK. Asst SEC: K2AYQ. RM W2CS K2OYG W2WSS. PAMs: N2YL WB2QEI. Net NYPON 5 PM 3913; ESS (slow) 6 PM 3590; NYSPT&EN PM 3925; NYS 7 PM & 10 PM 3677. Congrats (or co dolences?) to WB2VUK on appointment as Asst. SC Paul will step in in case of my disability. (Stupidity e cepted). Seems strange not to have someone make B this month. Guess I'm getting spoiled. Attention: all y folks on the county emergency nets — coming out so Details on a competitive exercise called a Preparedne Duel. Pits one county vs. another and scores setup tim and message handling. Sudden callup during one eve ing of a designated week. All over in two hours aft callup. See your EC. Have been following with relief th recovery of W2YJR. Should be seeing more of Jack b time you read this. WB2OOH has new ICOM 21 WA2OTC now plus 16 db with DX60B. Congrats Overlook Mtn ARC new officers N2FS WB2ECA K2S K2HA W2XL. Same to new upgrades. Advance WB2POM WA2KPG WB2KLS. General: WB2OX WB2KLU WA2STM. Technician: WA2TCX WA2LT WA2TQP WA2SYJ WA2OMG. Feb. PSHR: N2Y WA2SPL. Reporting: W2AZO WB2ZCM WA2NC WB2COY. Traffic: (Feb.) N2YL 396, WA2SPL 35 WB2KDC 149, W2YJR 142, N2JK 121, W2BIW 120, K2A 98, WA2YYM 79, W2CS 76, WA2EOW 62, W2EFU 6 W2IT 57, W2SZ 51, K2DN 29, WA2OTC 25, WA2CJY 1 WA2MKQ 11, K2HNW 8, WA2PAU 8, WB2QOH 2. (Jan WB2ZCM 90, W2YJR 45.

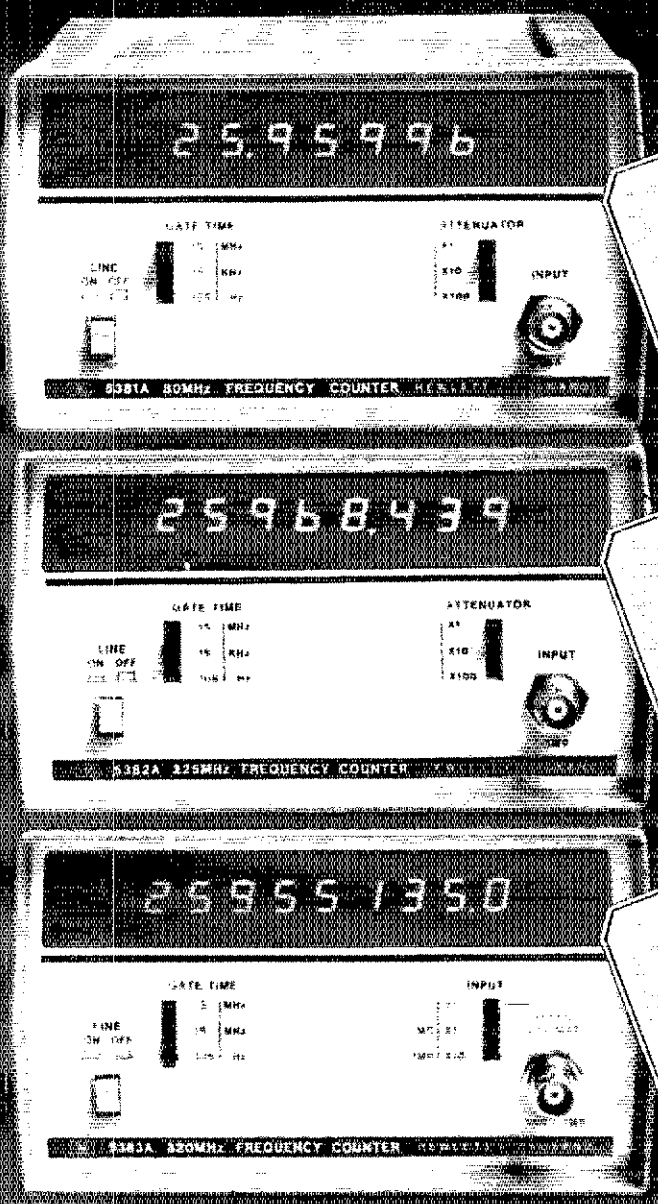
NEW YORK CITY — LONG ISLAND: SCM, John Smale, K2IZ — SEC: K2HTX. PAM: WA2YEI. RM WB2IDP. The following are major AREC/RACES net join one, please. Bronx 28.64 MHz, 50,35 MHz, 146.88 fr Kings: 28.64 MHz, 50.35 MHz, 146.88 fm; Richmor 146.88 fm; New York 29.5 MHz, 146.88 fm; Queens 29 MHz, 50.52 MHz, 145.62 am/fm; Nassau: 28.72 MH 145.68 am; Suffolk (West): Hunt, 28.73 MHz, 145.59 ar Smithtown; 28.65 MHz, 147.21 fm; Babylon: 21.430 MH 146.085/685 fm; Islip: 28.65 MHz Suffolk (East): 146.6 fm; Brookhaven: 146.115/715 fm; Riverhead: 3730 kH cw. Note: net times between 2000 and 2100 local c Mon. Congratulations to K2LCK, who after 22 year finally made the jump from Tech to Advanced. WA2HW is now an Extra, WB2LRR made General, WB2KZU mac Advanced. WA2KEQ and WA2KES made General, W2X reports that users of WB2ACV are delighted with th W2CMA built recent Tech improvements. Start savin now and plan to attend the Hudson Division Conventio Nov. 10, 11, 12th at the Playboy Club in McAffee, N WB2IWX is now N2WX. I hope that everyone participate in Field Day this year, don't forget that origination c traffic counts towards your final point total. WA2BN now has the SB614 station oscilliscope for his statio WA2JKG now has an FT 101E for his station with a 2 conv, he also reports his code speed is now 25 wpm Congrats to WB2SGA and WB2KDG on upgrading Tech, and WB2DCU to General. It is with deep regr that this column lists WA2JKT as a Silent Key. Grum man ARC toured the LILCO operations center Hicksville for their March meeting, the club also provi ed communications between two locations for th Hicksville Americans Soccer Club the weekend of Fe 11 and 12th. The Great South Bay ARC had W2AIM a their guest speaker for the March meeting and he spok about Pitcairn Island and VR5TC. It is with deep regre that this column lists WB2FNL as a Silent Key. K2ENC Jr. received his call of WA2VPK. Congrats to WB2DC who upgraded from Tech to Advanced. Radio Centr ARC received their club call of WA2UEC. Citibank ha become the sponsor for the Civilian Amateur Radi Patrol. Officers for the Citibank club are K2RO, pres WA2AVY, VP; WA2GXQ, secy-treas; WB2PHT, truste Traffic (Feb.) WB2KIH 367, WB2IDP 318, WA2BMI 25 WB2HIQ 107, WA2JKG 83, WA2YEI 39, K2GCE 3 W2HXT 27, WA2CZY 23, K2JFE 20, N2WX 18, WB2DC 12. (Jan.) W2HXT 65, WA2KKJ 12. (Dec.) W2GKZ 17 K2JFE 12.

NORTHERN NEW JERSEY: SCM, Bob Neukomm WA2MVQ — SEC: WB2VUF. RM: W2XD. PAMs: WB2LC WA2OPY (VHF). RM RTTY: W2PSU. RS NJSN: N2MW.

Net	Mgr	Freq.	Time/Days	Sess.	QNI	QS
NJN	W2XD	3695	7 P Dy	28	332	187
NJN	W2XD	3695	10 P Dy	28	184	42
NJSN	N2MW	3730	8:15 P Dy			
NJPN	WB2LCC	3950	6 P Dy	28	538	226
NJPN	WB2LCC	3950	9 A Su	4	61	16
NJRTTY	W2PSU	147.51	7 P Dy			
NJ2MTR						
Tfc Net	WA2OPY	145.5	8:30 P Dy			

Please note the new frequency of the NJ2MTR Tfc Ne NJDXA new officers: W2JB, pres.; W2GW, vice-pres K2CM, treas.; W2GK, secy. DX cards reported to be lat due to the recent dock strike and the blizzard whic cancelled the NJDXA Jan. meeting. Hope you are receiv ing cards by this issue. OO reports from WB2CST an W2TPJ with lots of "Chirpy" signals reported. Ne courses being taught at the following: Fairlawn AR WB2RLO Novice and General classes started Fri. Ma 3rd and run for 12 weeks. Contact WA2OFI 345-277 N2OL is teaching a Novice course in Pompton Lakes New Novices: WB2VZX WB2WAE WA2VZW; an "Techs" WB2WAB WB2UZW and WB2LHG. Ne Generals: WA2LTS and WA2PIP. WB2CST has been ap pointed to and joined the "First Class CW Operator Club" and is QRV on 160 with FOC members with hi new C-Line, new tower and 203BA beam. WB2QOQ go married, moved to Colonia and is planning a big antenn farm especially for VHF-UHF. Welcome to the new han in Middletown WA2TKQ who attends the U. of Miam with N2CR. Cranford ARS new officers for 1978: N2N pres.; W2OPE, veep; WB2GZF, secy.; WB2VOJ, treas WB2WIH, act. mgr. W2CVW worked 4 countries and W6 in CQ 160 test also several QSOs in VHF SS on 6N with an 80-mtr wire ant. WB2MSO has a new MLA250 Linear. WA2EPK has all his QSLs for WAS on CW WB2JJW has upgraded his rig to an SB-104A. W2T deployed to Rota, Spain with the "Seebees" and just go the new "C"-line. WA2UDT working 28 MHz with 3 states on 10. "Hey" don't forget to put in your registra tion for the ARRL Convention at the Bunny Club in Nov See coming events column for particulars. Late note New General is WA2DTO. WA2JUQ has finished hi WAC, WAS and DXCC in less than a year! WA2GE worked HZ and 3C1 giving him 210 DXCC with his ne FT-101E and his mom WB2RME a Novice of 2-1/2 month has worked 47 states and 33 DX countries. Modesti WA2OPY advises she upgraded to the Advanced ove 2-1/2 years ago. She likes to keep her light under bushel. Belated congratulations! Late upgrades

Smart pros count faster– and spend less.



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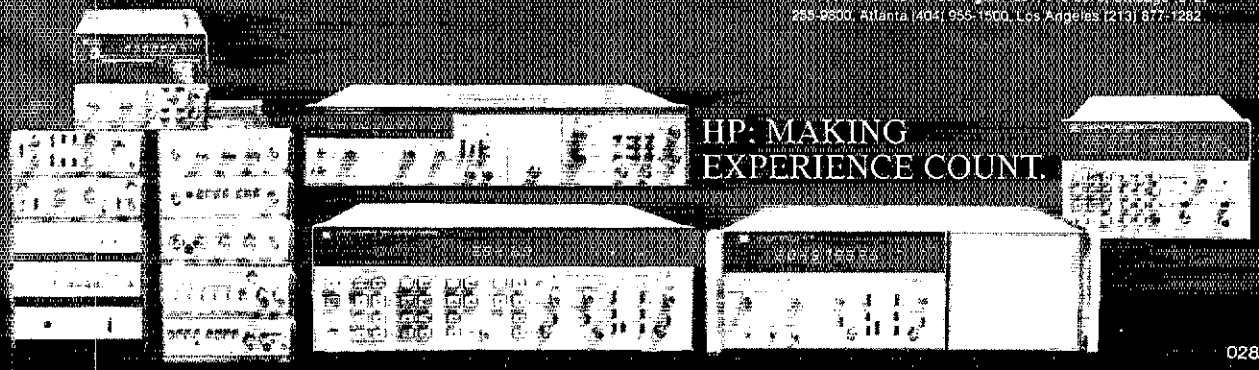

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GENERAL SPECIFICATIONS

Semiconductors:	39 diodes, 23 transistors; 11 integrated circuits
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Power Consumption:	Receive — 5.5 watts (includes dial and meter lamps); Transmit — 260 watts
Dimensions:	3-1/4" high x 9" wide x 12-1/2" deep (82.55 mm x 228.6 mm x 317.5 mm)
Weight:	8-1/4 lbs. (3.66 kg)

PERFORMANCE SPECIFICATIONS

Frequency Range:	80 meter band — 3.5 to 4.0 MHz 40 meter band — 7.0 to 7.5 MHz 20 meter band — 14.0 to 14.5 MHz
Modes:	CW; USB; LSB
RF Input Power:	SSB — 250 watts PEP nominal CW — 250 watts DC maximum (adjustable)
Transmitter:	
Antenna Impedance:	50 ohm, unbalanced
Carrier Suppression:	Better than −45 dB
Side-Band Suppression:	Better than −55 dB at 1000 Hz
Distortion Products:	Better than −26 dB
AF Response:	500 to 2500 Hz
Spurious Radiation:	Harmonics better than −45 dB below 30 MHz; better than −60 dB above 30 MHz
Frequency Stability:	Less than 100 Hz drift per hour (from a cold start at room temperature)
Microphone:	High impedance 3000 ohm
Receiver:	
Sensitivity:	Better than 0.5 watts audio output for 0.5 μV input
Signal-to-Noise Ratio:	Better than 10 dB S+N/N for 0.5 μV input
Image Ratio:	Better than −60 dB (typical with respect to 0.5 μV input: 80 meters — −130 dB; 40 meters — −100 dB; 20 meters — −75 dB).
IF Rejection:	Better than −70 dB (typical with respect to 0.5 μV input: 80 meters — 110 dB; 40 meters — 80 dB; 20 meters — 75 dB).
Intermodulation Intercept Point:	Better than 10 dBM
Selectivity:	2.5 kHz — 6 dB; 5.0 kHz — 60 dB
Audio Output Power:	More than 3 watts
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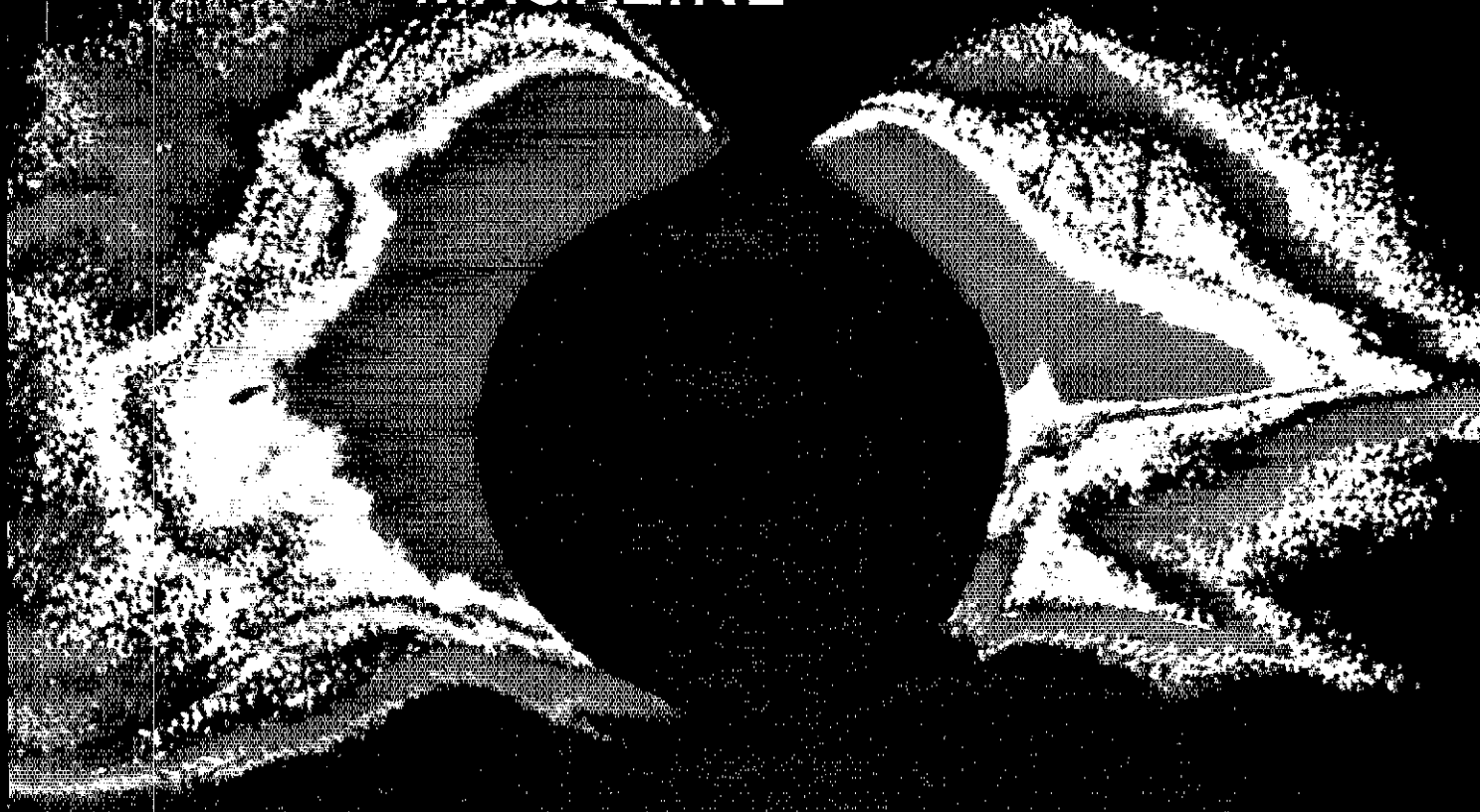

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[illegible]
WB9VOD Dan Pore[illegible]

Dear HORIZONS:
[illegible] keep up the good work.
WB3BDV Washington, Pen[illegible]

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I think your magazine's just great! I would probably [illegible] even if the price were $20.00. I like the articles [illegible] especially like the "Questions and Answers" series. [illegible] the good work.
WB2JWY Flushing, N[illegible]

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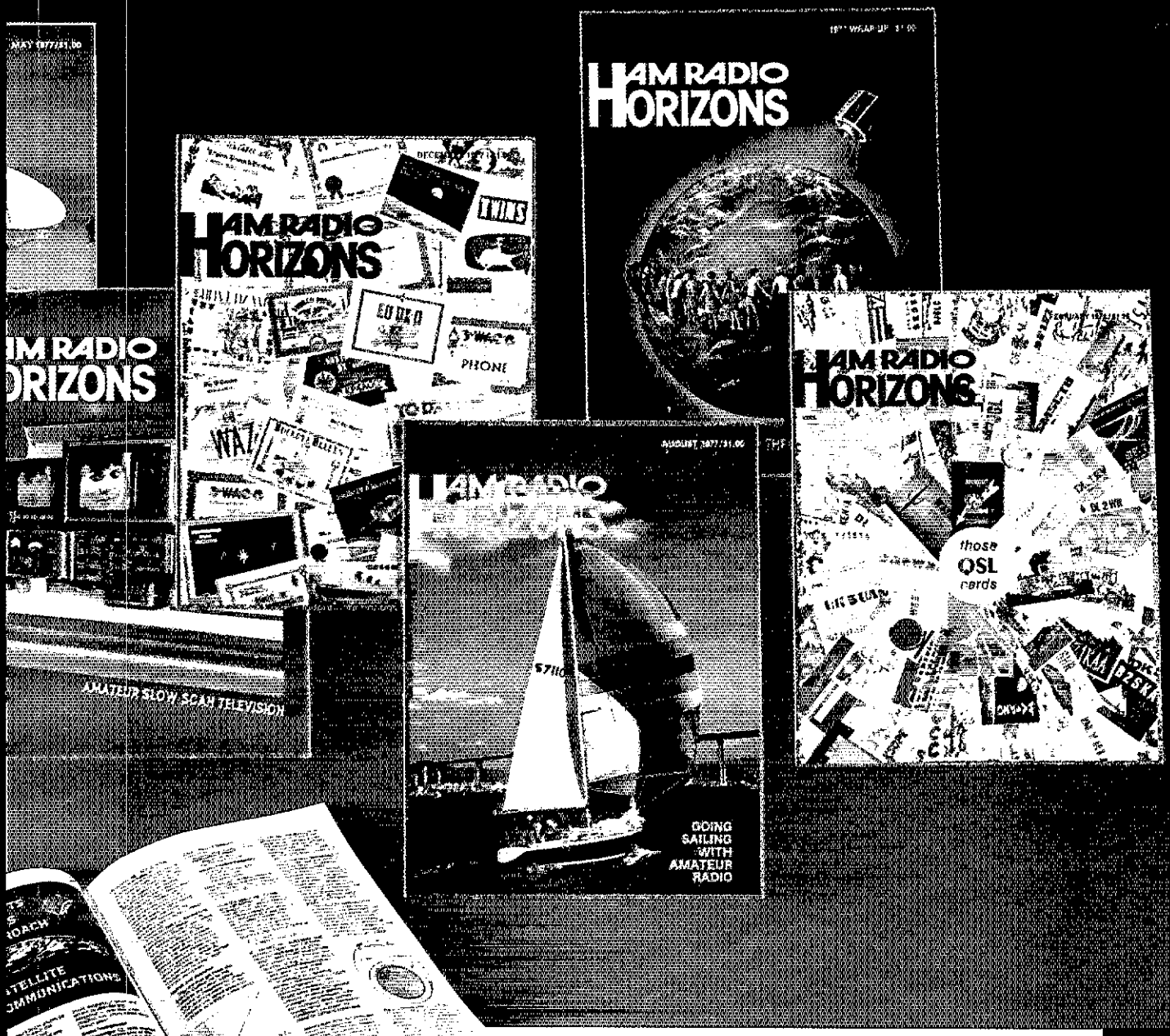
F.C.B. Oklahoma [illegible]



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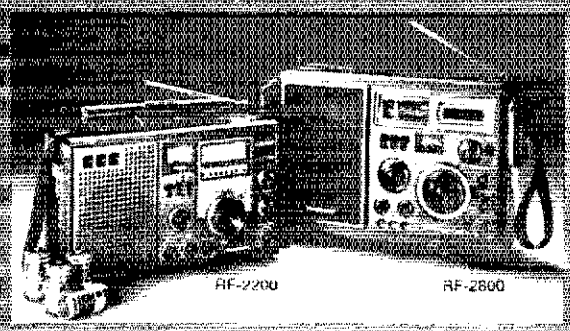

Panasonic.

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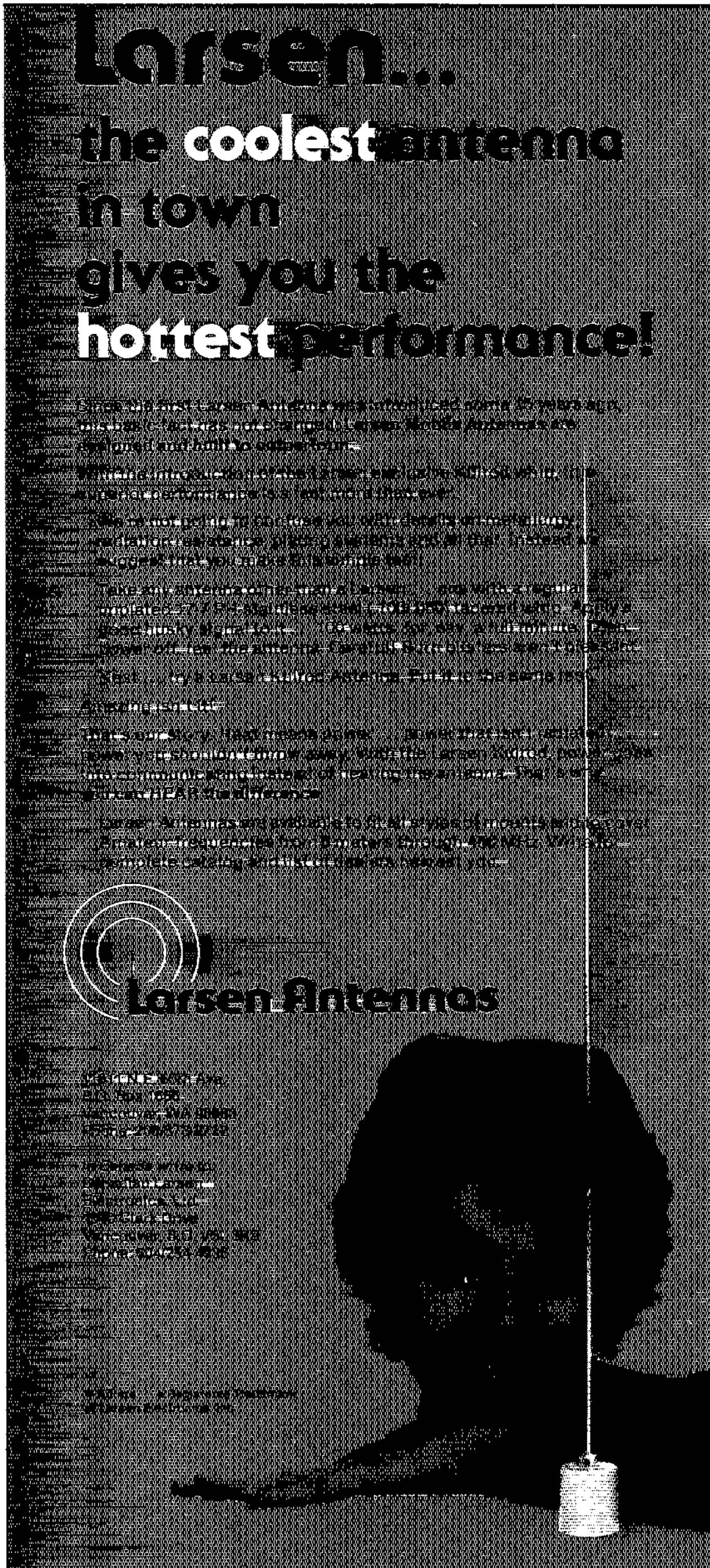

WA2DLZ to advanced; WB2VOL and WB2WNK Novices
Traffic: (Feb.) W2WHB 210, W2CQB 148, WA2NPP 13
WB2MSO 94, W2ZEP 94, WA2EPK 83, W2LTP 8
WB2ELF 51, WA2MVQ 51, K2OP 40, W2WSE 3
WB2JJW 34, W2QNL 31, K2SE 28, N2GJ 24, W2UH 2
N2NS 21, W2ODV 19, WB2NSV 18, WA2IXB 17, K2ZFI 1
W2KB 15, WB2KLF 11, W2XD 9, WB2JVE 8, W2CC
N2TM 6. (Jan.) WB2HSG 37, WA2GLZ 9, W2CVW 7.

MIDWEST DIVISION

IOWA: SCM, Max R. Otto, WØLFF — SEC: WØIYW
PAM/HF: WBØAVW. PAM/VHF: KØLKH. RM: KØEVH
WBØZXU active on 432 SSB/CW using 100 ft. towe
WAØDXZ has new preamp and eleven-elements on
WØEIT has new KDK FM2015R, and WØTCH has a ne
ICOM 22S. WBØQMU home from hospital and WAØUW
should be out soon. WBØJJL will chair the 1979 Midwes
Convention to be held in Cedar Rapids. Change in ca
WØAPF-NØFF, WAØATY-N4OR, WØBUA-KØRN, KØCQ
KØCQ, WAØDAG-KØYL, KØDQI-KØDQ, WØFDM-KØG
WØFHE-WØSR, WØFQW-WØFQ, WØGRE-KØGR, WØGX
N6FA, WAØIOT-NØII, WAØJEK-KØRE, WØJGQ-NØH
WAØKST-WØKT, WBØKTK-KØRM, WAØKWH-WØC
WØLTB-KØKD, KØLUP-WØDQ, KØMKD-KØVV, WØMO
W6XD, WØMUH-KØAT, WØONG-WØEZ, WAØNYU-KØC
WBØOHW-KØAF, WBØOLJ-KØZQ, WØPCO-W5FO, KØPI
KØJH, WØPJG-NØJM, WØPRR-WØUV, WØPRY-WØS
WØPUG-WØHJ, WAØQXG-KØJD, WAØQYS-WØU
WØQZR-NØBB, KØRCZ-WØTS, KØRJV-KØKK, WAØSJ
KØWW, WAØSRM-KØMR, WBØSVI-NØWA, WAØUIB-WØS
KØUJJ-KØCF, WØVCM-WØWC, WAØVDX-WØV
WAØWGL-NØLA, WAØYWI-KØKW, WØZNT-WØZN, KØZP
WØGN and WBØZVB-KØSL. 3900 Club officers; WØDU
pres.; WØRAG, veep; WØFZO, secy/treas/NCS. WØTG
and WAØAUX helped to give Iowa 100 percent on DTR
which handled 464 messages in 56 sessions. Tall Co
TLCN, 3560, 0030/0400 Dy, WØYLS Mgr., QNI 385, QT
148, sess. 56. IOWA code ICN 3713, 0045 T-T-
WBØNRN/WBØYRH Mgrs., QNI 38, QTC 13, sess. 12.
75M, 3970, 1830 M-S, KØJVO Mgr., QNI 1550, QTC 10
sess. 24. 2330Z KØRN Mgr., QNI 982, QTC 76, sess. 2
Traffic: (Feb.) WAØAUX 472, WØSS 153, N5YX/Ø 14
KØEVH 134, WØYLS 121, WAØCZA 32, WBØKHO 4
WBØAVW 20, WBØNSS 19, WØJPJ 19, WBØYRQ 1
WBØMCX 6, WDØCDL 5, WBØPYD 5, WDØFCI 4, KØTFT
(Jan.) WBØPYD 7.

KANSAS: SCM, Robert M. Summers, KØBXF — SE
WØKL. PAMs: WØOYH WBØSZS. RM: WØFT. I have adde
to the ARRL staff of KS WBØSZS as PAM. His prime jo
will be to coordinate the VHF activities within the stat
utilizing the repeater system etc. He will be in conta
with many of you, both those operating in the traff
nets as well as those of you who aid us in the ARES pr
gram. Fred also is going to try and renew the efforts
the MID-States Mobile Monitor Service. If you have th
desire to do an NCS spot on MMM, contact him. WØA
lost on 40-M Beam during recent Ice storm. The TV st
tion lost its 900 foot tower at Goodland. Must have bee
Disaster City for a while. Net reports for Feb.: KPN QN
276, QTC 22. KSBN, QNI 1350, QTC 145. CSTN, QNI 113
QTC 112. QKS-SS, QNI 140, QTC 58. KWN, QNI 803, QT
571. QKS, QNI 550, QTC 248. KS EC net still needing rep
from each of the zones Sun. at 1 PM on 3920 kHz. Traff
(Feb.) WBØOBH 261, WØOYH 174, WBØVEZ 129, WØA
109, WØHI 105, WØFIR 103, WØFT 84, WØCHJ 7
WAØLBB 61, WBØVVA 53, KØEZ 50, NØSN 44, KØBXF 4
WØPB 40, WBØHGG 36, WØFDJ 30, WBØLUN 28, NØIN 2
WAØKVP 19, WØKL 15, WØRBO 13, WAØSEV 1
WAØSRQ 10, WØNYG 8, WBØSZS 7, WØERQ 7, WBØBIY
WØFPC 6, WAØOWH 3, WAØOWJ 1. (Jan.) WBØVVA 7
WØMA 4.

MISSOURI: SCM, L. G. Wilson, KØRWL — Asst. SC
Joe Flowers, WØOTF. SEC: WBØFKY. WBØSAA is spo
ting a new call NØRJ and WAØJNF is now KØX
WDØGPU and WDØGPV are sporting new HW100s. Th
new EC for Stone County is WAØJOG and the new PA
is WBØVHN. NØWM is having rig problems, but hopefu
will be returning to the air soon. The Ozark ARC is wor
ing hand in hand with the Lawrence County Ci
Defense on emergency coordination for the upcomi
storm season. Our deepest sympathy to the family a
friends of KØBIY who passed to the ranks of the Sile
Keys. MSN — 57, 23; MEOW — 325, 66; HBN — 291, 2
SCEN — 83, 7; PHD — 21, 9; NEMOE — 108, 1; MOSSB
— 910, 115; MON — 182, 112; MON 2 — 90, 42. In answ
to the many requests from out of state stations, the m
jor nets oeprating in the state of MO and times are
follows: MOSSBN — 3.963 kHz, 5:30P CST (6P Summe
MEOW — 3.963 kHz, 4:30P CST; MSN — 3.715 kHz, 4
CST; MON — 3.585 kHz, 7P CST; MON 2 — 3.585 kH
9:45P CST; HBN — 7.280 kHz, 12N CST. Congratulatio
to the following new licensees: Novice: WDØs FZF GA
GAL GAW GAX GBM GBN GBW GCQ through GCS GC
GCW GCX GCZ GDC GDP GDY GDZ GEA GEE GE
through GEK GEZ GFB GFG GFQ GFS GFU through GF
GFZ GGA through GGC GGE GGF GGI through GG
GGN GGO GGR GHD GHE GHH GHI GHL GHN GH
GHZ GIA GIC through GIE GIM GIN GIP through GI
GNC through GNH GNT through GNW GNY throug
GOA; Tech: WBØUBX, WDØs CFJ GNB and GN
General; WBØVIR; Extra: WBØSJD. Traffic: (Feb.) KØON
335, WBØVHN 283, WØHH 210, WØBMA 184, WØOTF 12
KØSI 78, WØBV 75, WBØLFY 48, WBØVDO 45, KØSSN 3
WØOUD 38, WAØFKD 37, WØEPI 36, WBØSSB 36, KØB
28, WDØFDT 23, WBØFKY 15, KØVBU 14, KØRWL 1
WØQAU 8, WAØMOF 5. (Jan.) WAØFKD 69, WAØMOF 3

NEBRASKA: SCM, Ed O'Donnell, WBØGWR — WØJD
and WØJHT are Silent Keys. WAØASM, SEC, plann
and carried through a successful SET exercise. Th
Platte Valley 2M net members will work with the Sco
sbluff, Nat'l Wx Service as Skywarn spotters. The Mi
way ARC of Kearney, sponsored their 2nd Annu
Midwest Spring Convention on Apr. 1st. The event had
great success. Net Reports: 160M Wx Net, QNI 596, QT
4; Cornhusker Net, QNI 1415, QTC 76; Mid-Nebr 2
ARES Net, QNI 298, QTC 6; Morning Phone Net, Q
1513, QTC 20; Nebr. 75M ARES Net, QNI 219, QTC
Nebr. Storm Net, QNI 1345, QTC 55; Platte Valley 2
Net, QNI 32, QTC 0; PM Net, QNI 383, QTC 110; QCW
QNI 58, QTC 0; Sandhills Wx Net QNI 341, QTC 2
Western Nebr. Net, QNI 488, QTC 11. Traffic: WØFQ
328, WØVEA 86, WØEUT 57, WØSGA 28, WØGKK 2
WAØOMB 30, WAØCBJ 29, WØHTA 22, KØJFN 1
KØDGW 17, WAØJIH 13, WAØQEX 13, WBØGWR 1
WØYFR 11, WØZNI 11, WØGEQ 8, WBØSYV 8, WAØOQX
WØHOP 6, KØODF 6, KØSFA 6, WBØGMQ 5, KØHNT
WAØLOY 3, WØNIK 3, WØWZR 3, WAØPCC 2, WBØROG
WØOMN 2, WØPXD 1, WØRJA 1.

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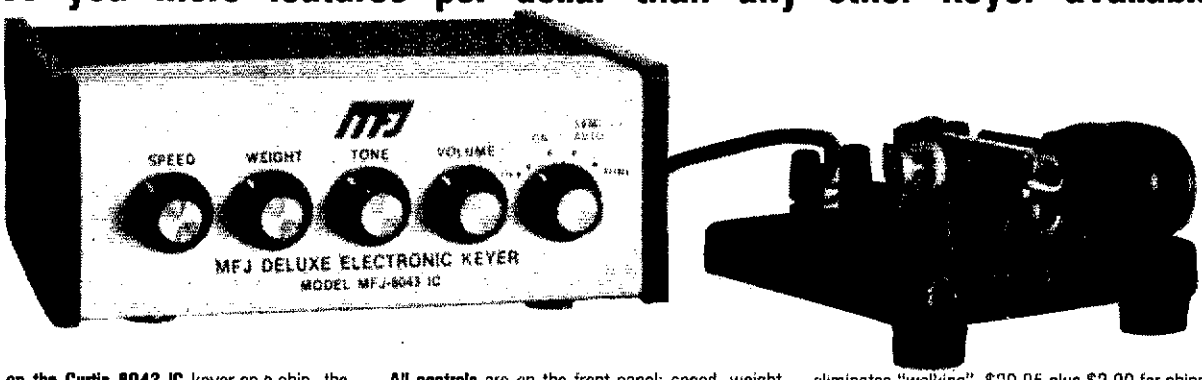
This NEW MFJ Deluxe Keyer at $69.95 . . .

gives you more features per dollar than any other keyer available.



Based on the Curtis 8043 IC keyer-on-a-chip, the new MFJ Deluxe Keyer gives you more features per dollar than any other keyer available.

Sends iambic, automatic, semi-automatic, manual. Use squeeze, single lever or straight key.

Iambic squeeze key operation with dot and dash insertion lets you form characters with minimal wrist movement for comfortable, fatigue-free sending.

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Dot memory, self-completing dots and dashes, jam-proof spacing and instant start for accurate and precise CW.

Totally RF proof. No problems, whatever.

Ultra-reliable solid-state keying. Keys virtually any transmitter: grid block, —300V max., 10 ma, max.; cathode and solid state transmitters + 300V max., 200 ma, max.

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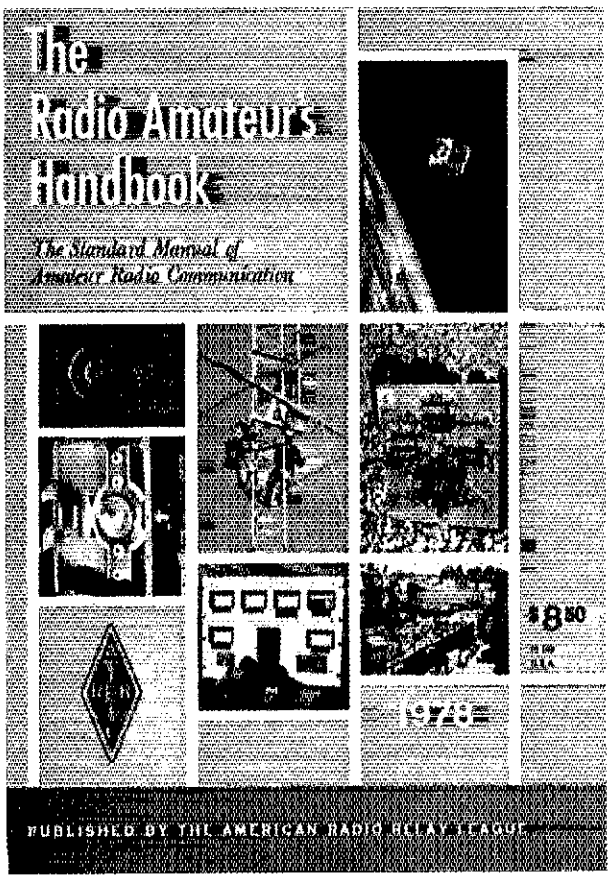

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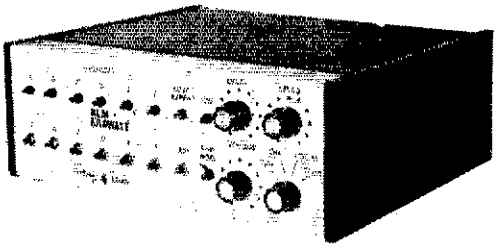

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GENERAL INFORMATION

All solid-state reprogrammable memory keyer with six 25 character (512 bit) "MOS" memories with adjustable auto-repeat mode. Full IAMBIC keyer with triggered clock DOT & DASH MEMORIES operates from 2 to 50 WPM. Silent grid-block and cathode keyed output. Built-in monitor and speaker.

FEATURES

- Designed for contests or daily QSO's
- Programmable as fast as you may send
- Speed adjustable from 2 to 50 WPM
- Full erase feature (4 seconds) or record over old message
- Six 512 Bit (25 character) messages, i.e., CQ CQ DX CQ DX DE W3HXK W3HXK
- Automatic repeat mode adjustable from 0 to 2 minutes
- Individual message, auto repeat, and end of message lamp indicators
- Silent output for grid block and cathode keyed circuits
- Full IAMBIC operation with DOT and DASH memories
- Optional remote control available
- Built-in monitor/speaker with volume control
- Mode switch allows normal operate, local and tune
- 115 VAC 50/60 Hz or 8 to 16 VDC 6 watts (220 VAC 50/60 Hz optional available)
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- Weight 2 lbs.

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CONNECTICUT: SCM, John Mc Nassor, W1GVT — SEC: W1XX. RM: K1EIR. PAM: K1EIC. VHF: WA1ELA.

Net	Freq	Time/Days	Sess	QNI	QTC
CN	3640	1900/2200 Dy	57	361	257
CPN	3965	1800 M-S/1000 Su	42	854	280
VHF-2	28/88	2130 Dy	28	431	117
CORN	147.75/.15 RTTY	24 Hrs	1	4	27
WESCON	147.78/.18	2030 M-F	50	1388	94

High QNI: CN W1KV K1GF, CPN W1NQO K1DFS. SEC W1XX held special session of Conn. EC Net to cover results of the SET. Thanks to all! W1HHR visited several clubs to explain the new ARRL Insurance Service for personal equipment. WESCON Net.Mgr. WB1AIU invites all to check in to this new Net. With deep regret we add the call of W1EDL to the list of Silent Keys. New officers: Manchester RC K1NYK pres.; K1AAF, vice-pres.; WB1GGJ, secy.; WA1YEC treas. ICRC (28/88) WA1LMV, pres.; WA1UOC WA1SZU, vice-pres.; WA1TZK, secy.; K1YGS, treas. Tri-City ARC appreciated W1QV presentation of ARRL History. Greater Fairfield ARA now has "FARA News" in production. Congratulations to: WA1TZK Advanced Class; All new novice class (too many to list); All Nets, NCS and stations that participated in the SET! Field Day plans should be well under way — A "First" for many new Novice operators. Be sure your club provides every opportunity for Novice members to enjoy an active part in Field Day. Traffic: (Feb.) K1GF 261, WA1HYN 182, K1DFS 137, WA1LOU 135, W1XZ 116, WA1ZVS 114, WB1CPF 110, WB1AIU 66, K1XA 62, K1OQG 57, W1GVT 53, W1KV 41, WB1ASH 39, W1BDN 34, W1JA 33, WA1TPF 28, K1KAM 22, W1AW 19, WB1ACZ 11, W1TR 11, K1SRF 11, W1QV 10, K1AQE 8, W1BDI 7, W1HHR 7, K1DII 6, W1HVU 6, WA1UXA 6, W1CUH 5, W1GSO 4. (Jan.) W1WEE 2.

EASTERN MASSACHUSETTS: SCM, Frank Baker, W1ALP — Blizzard of '78. I don't think anyone can report all who helped out in this disaster. Many humorous and sad events. WA1EBG WA1AXF, WA1TWA are Silent Keys. HHTN had 396 QNIs, 64 QTC. Ex-W1PXW coming back this year. NEEPN had 69 QNI, 15 QTC. W1JBD in FL. A nice writeup in the paper about W1MCX and the job he did in the Feb. storm. K1GUG has a new daughter. WA1ZXB, WA1UNC made BPL. K1LWI & WB1DGG on 10. WA1ZXB has WAS. WA1PJJ & WA1UQE Asst. ECs by W1XA. W1ATX now retired. W1HZU has 145 for DXCC. WA1UWF stuck in the storm at KM1CC. WA9NEW's girl is WD9HSO. Chelmsford ARA has program on air for CE MARS. W1TKZ has RTTY. WA1ZIC's XYL WA1ZIL is a Silent Key. WA1VIE K1PTE W1GAT WA1RBE & WA1QAA all have new FT-227R Memorizers on 2M FM. WA1MUF W1UC took part in Ski-A-Thon conducted by K1GOI. EMRIPN for Jan. had 304 QTC, 684 QNI. K1FB new OO. WA1YMN new ORS. WA1ZXB new OPS. K1TKI is retiring, has HW-101 on cw. Norwood ARA had an Auction. Officers of Massasoit ARA: K1PJ, pres; WA1EZB, vice-pres; WA1IVN, secy; W1ECK, treas. K1VV showed the pictures of KM1CC celebration, which are very good. W1GUY & W1LJH go in to Bobs plane and gets on 2 quite often. WB1ECL upgraded from Tech. to Advanced. WA1KTY spoke at the Wellesley ARS on the making of semi-conductors & transistors. W1ZMO has his Advanced. W1NF still doing a fine job as one of our top OOs. WA1QQV did fine job during storm busy with Missing persons bureau and a writeup in the Globe & Traveler. SEC W1AOG writes from FL and says it has been cool, will be home in Apr. K1FW & W1ECK do a swell job on our repeater on 18, MARA. WA1VEI is now mgr. of the 1RN (D). EMRI had 459 QNI, 301 QTC. WA1UNC is Asst. to WA1ZAZ. HHTN had 288 QNI, 74 QTC. EM2MN had 51 QNI, 20 QTC. EMRIPN had QNI 207, QTC 856. WA1UWF has his Advanced. N1NA is new RACES Dir. for Attleboro. Endorsed as EC for Randolph, W1IC, ex-W1YYZ. Chelmsford ARA had a film "The Intruder" burglar proofing your home.Traffic: (Feb.) WA1ZAZ 412, WA1UNC 402, WA1EXB 356, WA1UWF 298, WA1EYY 215, K1BA 207, K1PAD 205, WA1YMN 201, WA1VEI 172, K1GN 139, W1FJI 104, W1EMG 90, WA9NEW 76, W1PEX 68, W1DMH 54, WA1VAB 44, W1LE 37, W1DMS 35, W1DGD 35, WA1ZGX 24, W1MJ 23, W1NF 18, WA1YMD 18, WA1IFE 16, WA1CRE 12, W1XA 12, WA1MUF 11, K1GK 10, W1SR 9, WA1QMZ 7, W1UC 6, W1ATX 4, WB1FGD 4, WA1QAJ 4, WB1FBO 2, WA1FNM 2, W1HZU 2. (Jan.) WA1UWF 406, K1BA 367, WA1UNC 236, WA1VEI 190, K1GN 149, WA9NEW 125, W1FJI 105, K1BSO 90, W1PEX 59, W1TKZ 22, WA1TAK 16, WA1IFE 10. (Dec.) WA1UNC 518.

MAINE: SCM, Bill Mann, W1KX — SEC: WA1YUW. New Appts. EC: (Kennebec Co.) W1JTH: OO: K1CZ: OBS: K1HKF: OESs: WA1SMY WA1JZP WA4UJJ/1 W1RWG K1YXO. On Mar. 11 (Lewiston) 16 hams met with BCEP about comms. for river flooding. Cent. Me. Emerg. Net flood drill on 10/70 rptr. Mar. 25. Maine Section Net meets Sun. 0900 local on 3940 kHz for emerg info. traffic and section info. Aroostook ARA. officers: WB1BSS, pres., WB1DEH, vice-pres.; K1TFW, secy.; WB7VKH, treas.; K1TFX, tech. Adv. Augusta Emerg. Amateur Radio Unit leaders: W1GCM, pres.; KL7IEP/1, vice pres.; W1TGY secy-treas. St. Croix Valley Radio Club: K1HHC, pres.; WA1JQW, secy. VE1ACJ, treas. They meet 2nd Sun. of month. Feb. rpts: Sessions/QTC/QNI. PTN 28/172/248. SGN 24/110/1147. MSN 11/7/54. CMEN 12/11/126. BYN 24/32/1062. Traffic: (Feb.) W1KX 349, W1RWG 140, W1HDC 111, WA1CFX 60, W1BJ 50, WA2ERT/1 46, N1RP 41, W1CTR 31, K1NAN 24, WA1YJY 20, W1ERW 18, K1TZH 14, WA1SMY 13, WA4UJJ/1 10, WB3HYD/1 9, W1JTH 7, W1AHM 4, WB1FAK 4, WA1MZA 4, WA1MUX 2, WA1JCN 1, WB8UHU/1 1. (Jan.) K1GUP 23, WA1MUX 16.

NEW HAMPSHIRE: SCM, Robert C. Mitchell, W1NH/W1SWX — SEC: K1RSC. RM: N1HH. PAM: W1TN. Appointments: WB1ELP as ORS & OPS. Endorsements: K1RSC SEC, W1JB EC, N1HH ORS, W1JB W1BYS & K1SHR OPS, W1QKA W1ALE & K1SHR OVS. W1SWX & W1JB OO. K2QIW now W1HXR. W6ZBS moved to Concord. WB2JCU moved to Manchester. W5GWD needs HN on 160. K1OIQ atop Mt. Washington uses Solar power to communicate to other repeaters. WA1UKM made CW WAS. W2BN visited K1BCS. The Medicare Net & W1JB were active in the snow emergency. The GSPN had 318 check-ins & 101 traffic. K1WER now Advanced. WA1PEL & K1GOT gave an SSTV Demo. at the Great Bay Radio Assn. WB1DHS now General. W6JCF in Hampstead. WA1SQM/5 checked into the CNEN. It is sad to report the passing of W1UQQ. Those who check into the NHVTN over 20 times are K1NH WB1ELP W1TN N1NH & K1BCS. Recent visitor to Manchester was W9HVH, friend of W2BFU/1. WA1CFT resigned as EC, Rockingham Co. Any volunteers for replacement? K1RSC reports the '78 SET better than ever. W1WUO WA1IEC &

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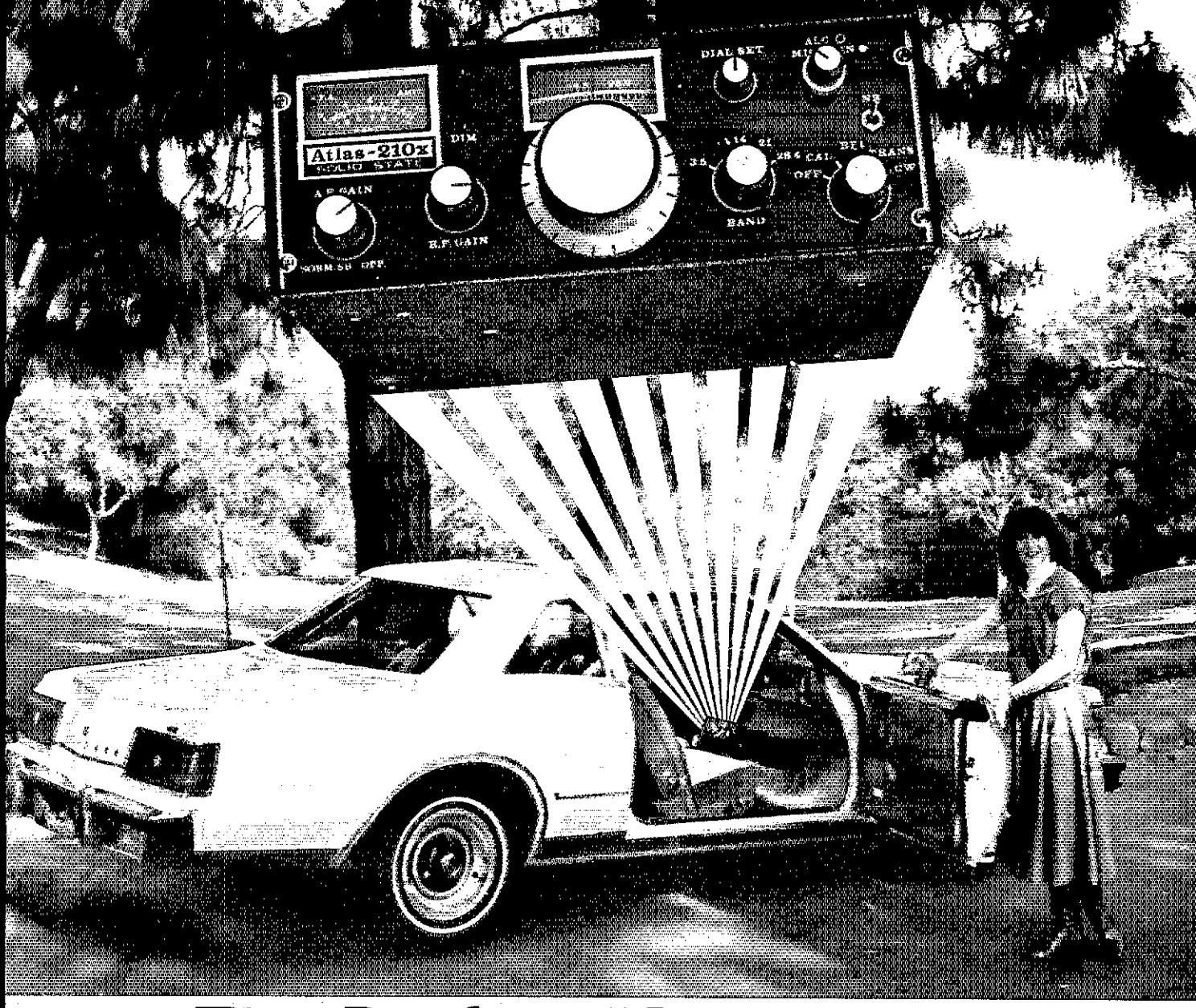

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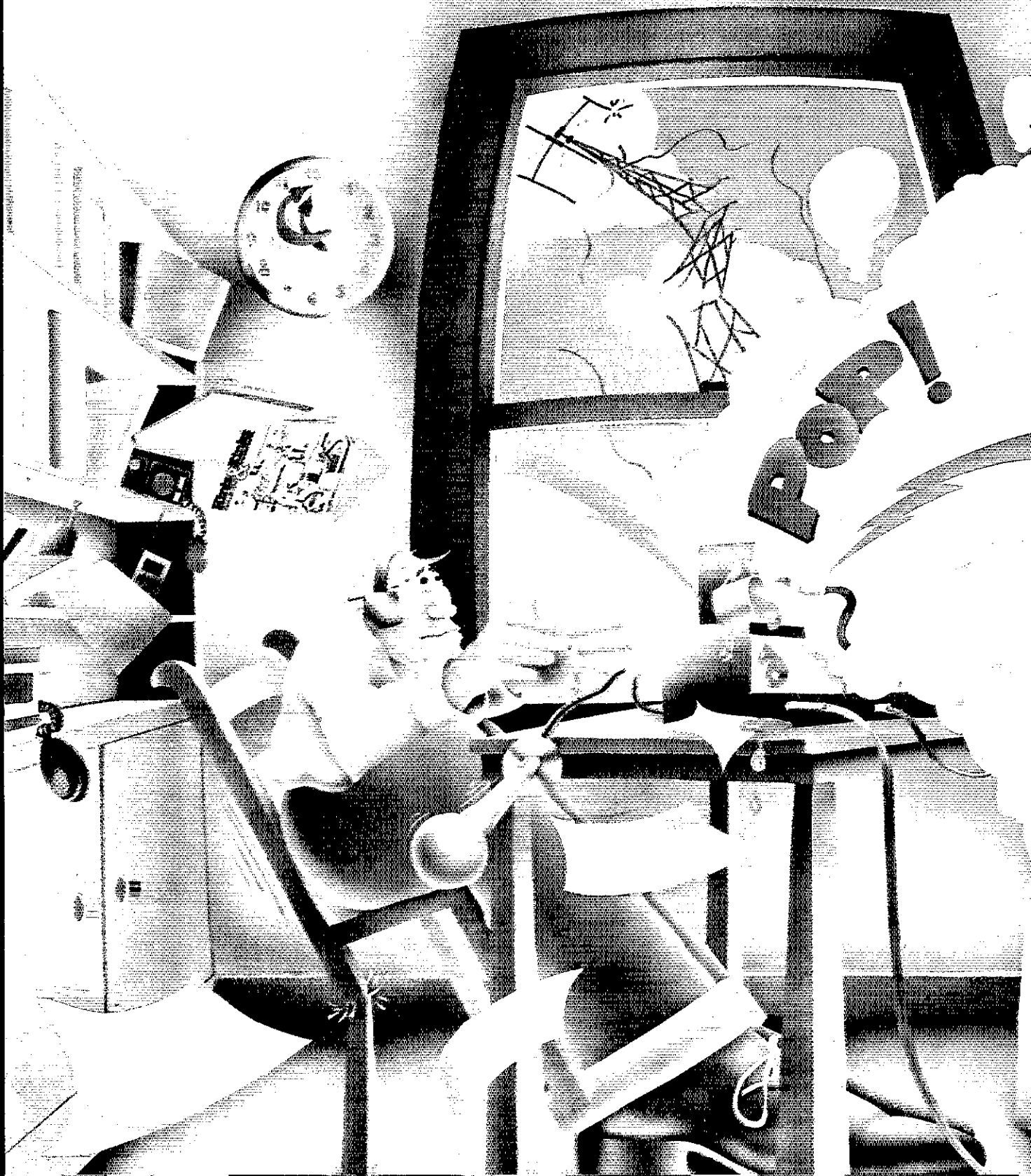
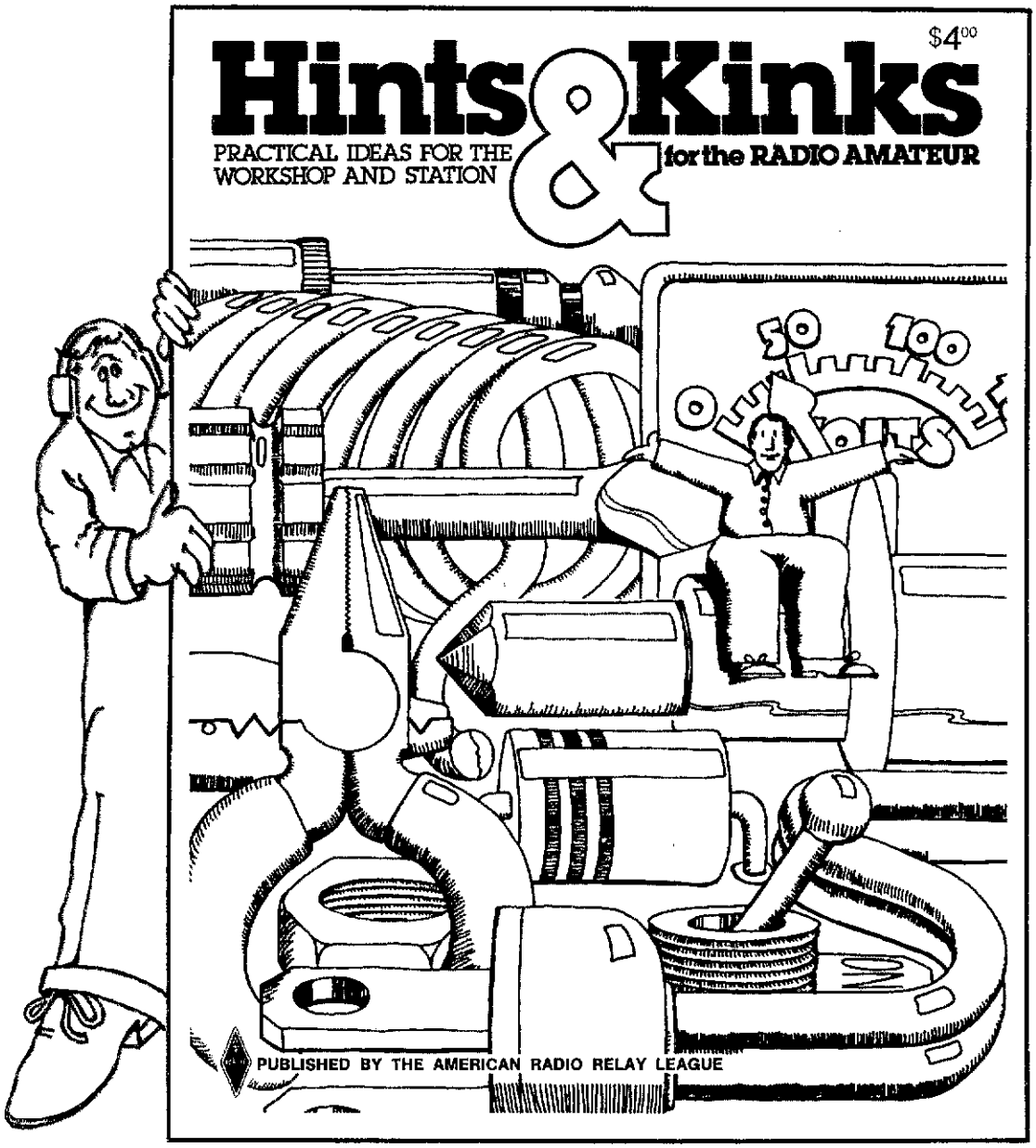


BRAND NEW!



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continuous coverage reception capability

160-10 Meters

Amateur Band transmission, including capability for MARS, Embassy, Government, and future band expansions*

The Drake TR-7 System significantly advances the technology of worldwide radio communications and unfolds an entirely new state of the art.

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In 1963 Drake led the way by producing the first commercially available transceiver that employed the now widely copied 9 MHz i-f frequency. Even today, 15 years later, many major competitive transceivers are still being introduced using i-f's in this range.

In 1978 Drake leads the way again by developing the first commercially available amateur transceiver that uses a 48 MHz i-f, through the technique of "Up-Conversion." This system greatly improves image and general coverage performance, and will be copied in the years to come. With Drake, you can join the new state of the art today!

The design philosophy behind the new Drake "7 system" has created a most sophisticated system concept, extending from engineering to the visual appearance of the system and each of its parts.

The TR-7 System is the result of one of the most extensive engineering and development programs in the history of the R. L. Drake Company, and provides the user with many innovative design features.

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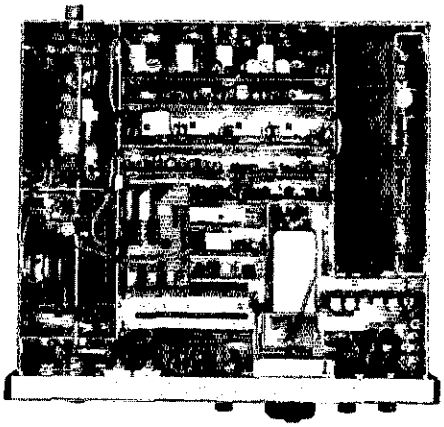
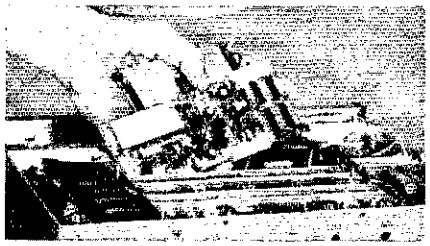
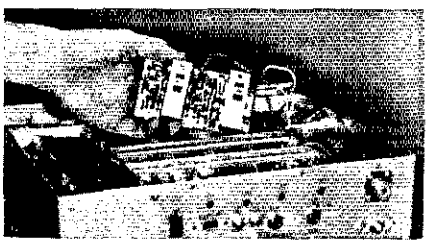


Broadband, Solid State Design—100% solid state throughout. All circuits are broadbanded so there is no need for preselection tuning or transmitter adjustments of any kind.

Synthesized/PTO Frequency Control—A Drake exclusive: Special high performance synthesizer, combined with the famous Drake PTO, provides smooth, linear tuning with 1 kHz dial and 100 Hz digital readout. 500 kHz up/down range switching is pushbutton controlled.

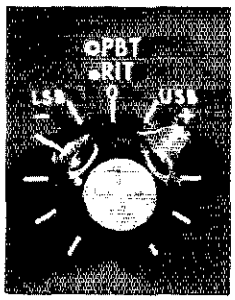


Continuous, Wide Range Frequency Coverage—The TR-7/DR-7 provides reception from 1.5 thru 30 MHz—continuously, and **zero thru 30 MHz** continuously with the optional Aux-7 Range Program Board. The highly advanced Drake Synthesizer makes this possible, and is an industry first. The TR-7/DR-7 provides transmit coverage for all Amateur Bands 160 thru 10 meters. With the optional Aux-7 Range Program Board, diode-programmable out-of-band transmit coverage is available for MARS, Embassy, Government, and future band expansions in the range 1.5 thru 30 MHz.* The Aux-7 Board provides 0 thru 1.5 MHz receive coverage and crystal-controlled fixed channel operation for Government, Amateur, or semi-commercial applications anywhere in the hf range. The TR-7 w/o DR-7 and Aux-7 provides coverage of the Amateur Bands 160 thru 15 meters and the 28.5-29.0 MHz range of 10 meters. The Aux-7 Range Program Board is also useable in the standard TR-7 for extra range coverage as noted.



State of the Art Receiver Design—The Drake TR-7 introduces another industry first for amateur transceivers: "Up-Conversion," in combination with a special uhf high level double balanced mixer for superior strong signal handling, spurious and image response performance. The first i-f of 48.05 MHz places images well outside the receiver passband, and provides for true general coverage operation without i-f gaps.

True Passband Tuning—The TR-7 employs the famous Drake Full Passband Tuning instead of the limited range "i-f shift" found in some other units. The Drake System tunes from the top edge of one sideband, through center, to the bottom edge of the other sideband. In fact, the range is even wider to accommodate RTTY. Full passband tuning greatly improves receiving performance in heavy QRM.

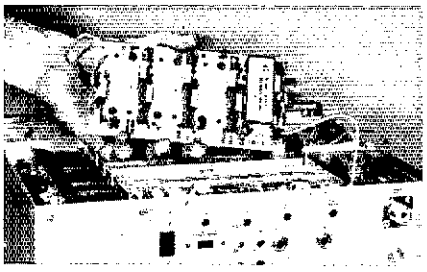


*Note: Out-of-band transmitter coverage for MARS, Government, etc. is available only in ranges authorized by the FCC, Military, or other government agency for a specific service. Proof of license for that service must be submitted to the R. L. Drake Company, including the 500 kHz range to be covered. Upon approval, and at the discretion of the R. L. Drake Company, a special range IC will be supplied for use with the Aux-7 Range Program Board. Prices quoted from the factory. See operator's manual for details.

(TR-7 features continued on next page)

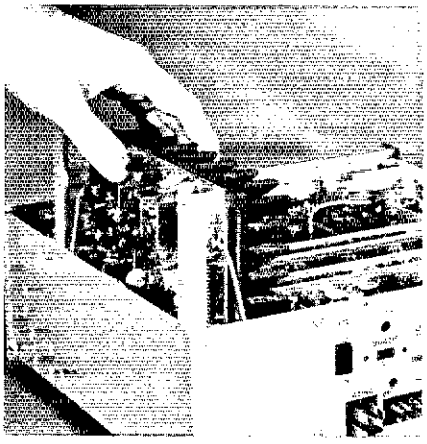
DRAKE TR-7 solid state continuous coverage synthesized hf system

Unique Independent Receive Selectivity—Optional receiving selectivity filters can be installed internally and pushbutton-selected from the front panel. These may be selected independently of transmit mode and provide optimum response for various conditions of ssb, cw, RTTY, and a-m. You may also transmit cw while receiving ssb, or vice versa, or even transmit one sideband while receiving the other. The standard filter is 2.3 kHz for ssb. You may choose from optional 300 Hz, 500 Hz, a special 1.8 kHz for crowded ssb, or 6 kHz filter for a-m.

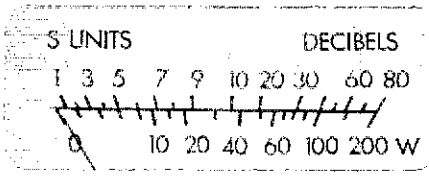


Effective Noise Blanker—This accessory is custom engineered to provide true blanking performance.

Special High Power Solid State PA—A Drake custom-designed diagonal heat sink provides for an internally mounted power amplifier with nothing mounted outboard subject to physical damage. The unique air ducting effect of this amplifier allows an optional rear-mounted fan to provide continuous duty on SSTV/RTTY. Continuous ssb/cw operation is available without the fan, due to the excellent heat sink design. The optional Drake PS-7 Ac Supply is rugged, rated for continuous duty, and will easily handle power requirements. The System is rated 250 watts input—in any of its modes. Fully VSWR protected.



TR-7 Internal Test Facilities—As well as the standard "S" meter function, the TR-7 metering includes a built-in rf Wattmeter/VSWR Bridge. Also, the DR-7 digital counter reads frequencies to **150 MHz** for test purposes. Access to the counter is from the rear panel.



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N1TF have CD appointments and check into the K1KKM Haverhill repeater on 146.025/625. WB1ELP formerly W1CIH. June 18-24 is Amateur Radio Week. Traffic: (Feb.) K1BCS 694, W1TN 68, WB1FFZ 64, W1HXR 50, WB1ELP 34, W1JB 29, K1SHR 28, K1ACL 16, WB1FNO 9, WA1PEL 5, W1NH 4. (Jan.) N1NH 514, WB1ALR 8, WA1VKM 6.

RHODE ISLAND: SCM, J. Titterington, W1EOF — RM: N1RI. PAM: N1DM. After 4 very serious storms, the performance of the amateur radio community has to be viewed with pride and commendation for all. Great work, folks. Fidelity ARC held their meeting on 2-mtr Simplex. Officers at EBAWA, WA1YIS, pres; WA1ZFS, vice-pres.-treas.; N1DM, secy. N1RI has new 435 MHz converter for OSCAR 8. N1DM has new Helical antenna for 435 MHz & OSCAR. W1AM gives 2nd talk on computers at Newport ARC. Am looking for an SEC, anyone interested, contact me. EMRI Slow Speed Net — QNI 76, QTC 27; EMRI 2pmtr tfc net — QNI 207, TFC 50. Traffic: (Feb.) N1RI 136, K1UZ 40, W1EOF 23, N1DM 16.

VERMONT: SCM, Bob Scott, W1RNA — SEC: W1VSA. WA1SYQ reports Mt. Snow repeater is now operational on 147.69 xmit & 147.09 receive. Coverage into MA, NY, CN, RI, NH, & VT. Increased use is welcomed. WA1GUV active on the NHVTN CW net. This net will change to 3622 as of May 3. 12 members BARC furnished communications for the 3rd annual Ski-A-Thon, Feb. 12, at the Trapp Family Lodge in Stowe — on 2 meters, what else! By the way, my condolences to the Ed. of BARC! VTPN 4/69/7; VT RFD 4/72/13; VT SSB 28/493/69; GMN 24/484/65; Carrier 24/571/31. These nets are a good place to meet a very nice group of guys & gals. New hams are more than welcome. Traffic: (Feb.) K1BQB 133, WB1AFY 28, W1RNA 15, WB1BZR 9.

WESTERN MASSACHUSETTS: SCM, Bill Lowe, W1TM — SEC: WA1DNB. PAM: WA1MJE. RM: Temp. W1TM. Hampden Co. RA doing fine job with W1 QSL Bureau, Novice and General instructions, active club stn. (W1NY) and regular news bulletins. W1YK on with new final built by K1IR, also has two-element 40-mtr beam. W1ZT/MM1 enroute EA8 to 8P6 has skeds with W1WF and K1NM. CMARA meeting time/place conflicting with local wrestling matches. WB1AUV building new Rptr. WA1OPN visited by League officials. Welcome new ops.: WB1s FZA FZE FZV FZZ GAA GAB GAF GAK GAL GAZ GBB GBD GBM GBY GCW GCZ GDF GEE GET GFN GFR GFS GGK GHK GHQ GHR GHS GIQ GIX GIZ GJC GKN. Traffic (Feb.) WA1MJE 365, W1TM 235, WB1AUV 60, W1DOY 58, W1ZPB 57, W1BVR 45, WB1EHS 31, W1KK 30, W1DVW 28, K1IJV 20, WA1OPN 12, W1YK 8, K1PUG 3.

NORTHWESTERN DIVISION

ALASKA: SCM, Roy Davie, KL7CUK — The Alaska Snipers Net had another record month with over 1300 ck-ins. The newly formed Alaska DX Assn. Net on 3895 at 0430 daily is growing rapidly. A lot of good info being passed on the latest DX. KL7SHM and KL7JFJ are having trouble in keeping their antennas intact with 80 plus knot winds. KL7HOV is the proud owner of a complete Collins station. If the new Novice stations keep coming on the air like they have been we will be swamped. KL7FHF and crew are working hard on the ARRL AK State Convention in late Aug. Plan your vacations to attend this bang up affair. Several stations looked forward to OSCAR 8, now up. I am sorry to report KL7CAH is now a Silent Key. KL7JDH and KL7JDI are still busy meeting nets. Lets have your activities so every one will know what is going on in AK. Traffic: (Feb.) KL7JDI 48, KL7JDH 25, KL7JFJ 19.

IDAHO: SCM, Ed Hamlin, W7KDB — SEC: W7JMH. PAM: WA7HOS. Net. Sess., Freq., Time, QNI, QTC, Mgr.: FARM, 25, 3935, 0200, 48, W7CJC; RACES, 18, 3990, 1510, 491, 11, WA7WXI; IMN, 20, 3635, 0300, 154, 109, W7GHT. WA7BDD is rec. secy. for IMN net. Treasure Valley RA now an ARRL affiliate with W7TYG prexy. WB7NSW EC for Elmore Co. W7FIS doing great job as OO and is active along with W7GBO on the MARS Net. WA7NRP EC at Burley, is active on the Mt. Harrison Net. Pocatello ARC had 56 members during 1977. K7LD is N/C on Pocatello 2-meter net. Kinport repeater registered with ARRL. Pocatello Club had successful SET with WA7ZPO as EC. WB7TET OBS for Central ID. New Nampa ARC getting a good start, meetings on the 2nd Tue. of the month. W7KDB may be moving to W6-Land. Payette has a new repeater on 147/72-147/12. WA7HOS is the Inn Keeper. W7GHT made PSHR. W7PKR now active on the RACES Net. WB7UTT new ham in Moscow. W7NNX has new 2-meter rig. Traffic: W7GHT 301, W7GBO 49, W7LLM 37, W7ASA 17, W7KDB 12, W7IY 10, WB7NSW 10, W7FTN 4.

MONTANA: SCM, Robert Leo, W7LR — WA7QBN reports MTN QNI 945, QTC 53. WA7PZO says Butte classes & DX FB. W7IDK ready for flood traffic. W7IXD active in MARS & RACES. IMN QNI 154, QTC 109. OO reports from WA7IJN WA7OBH. WB7SWH active in Hardin. K7CTI active in DX & contests. Bozeman area hams furnish 2 & 75 meter links for Bozeman to West Yellowstone snowmobile races. Many new 2-meter repeaters built this winter. Traffic: WB7CGT 50, K7CTI 49, W7IXD 44, WB7ETS 41, W7LR 11, WA7KMP 10, K7CHY 7, WA7PZO 7, W7GP 6, W7HAH 3, W7NEG 3.

OREGON: SCM, Dwight J. Albright, W7HLF — SEC: W7LBH. RM: K7OUF. NM BSN: WA7GFE. NM OSN: N7NO. NM WCN: K7UJY. NM ARES: WA7RWM. ARES, 3993.5, 5:15 & 7 PM, QNI 299, QTC 42; OSN, 3585, 6:45 PM, QNI 180, QTC 183; BSN, 3908, 5:45 PM, QNI 588, QTC 66, QST 12; Linn-Benton ARES, QNI 550, QTC 2, QST 31; Jackson Co. ARES, 7:15 MWF, 147.06, QNI 140, QTC 24; Portland ARES, QNI 1036, QTC 9, sess. 25, K7WW. The following are OBSs covering OR on HF&VHF. WA7JKX 146.52 Mon., Josephine Co. WB7DIP on repeaters Lane Co. Linn Co. WB7DSK repeaters in Hillsboro area. WA7ZAP repeaters in Central OR. WA7RQS repeaters in Clatsop Co. W7JHZ in Linn Benton Co. repeaters. WA7SSO repeaters in Corvallis area. WB7TAZ Albany area. W7HLF in Southern OR HF & VHF Jackson Co. Some of these stations copy directly from W1AW RTTY and CW. Others the voice transmissions. Yours truly has to rely on the cards. Traffic: (Feb.) W7VSE 556, K7NTS 375, K7IWD 153, WA7IHS 144, W7DAN 60, WA7GFE 60, WB7DPU 50, WB7AAK 48, W7HLF 47, K7QPW 39, WB7DIP 39, N7NZ 36, K7QFG 32, W7XI 26, K7KPT 12, W7LT 12, K7WW 10, WB7BSF 4, W5EZI7 2, WA7ZAP 1. (Jan.) WA4HRG/7 36.

WASHINGTON: SCM, Bob Klepper, W7IEU — SEC: WA7RWK. RM: K7OZA. PAMs: K7YR W7HR. NTN, 11:30 AM, 3970, QNI 1540 QTC 64. ESN, 5 PM, 3920, QNI 427, QTC 38 WARTS, 6 PM, 3970. CBN, 6 PM, 3960. NWSSB

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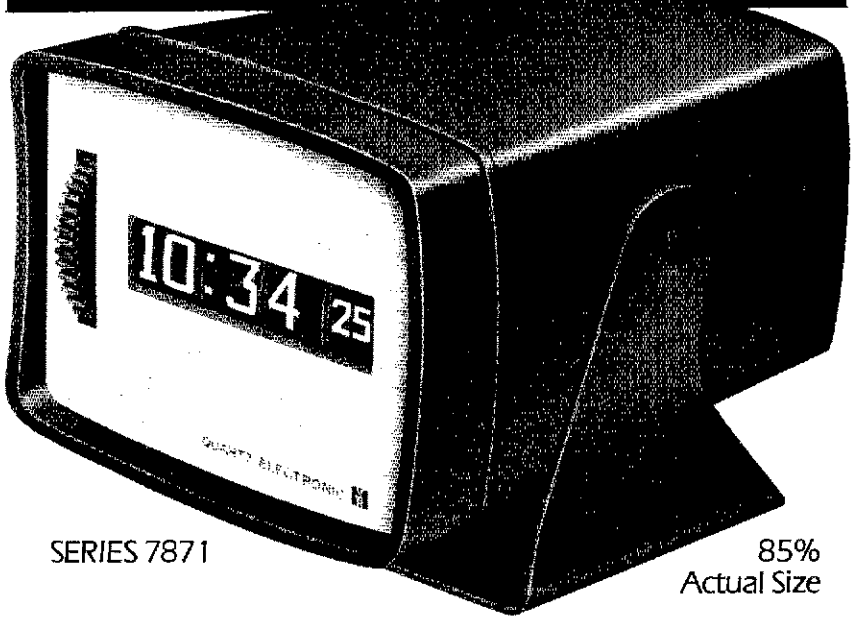

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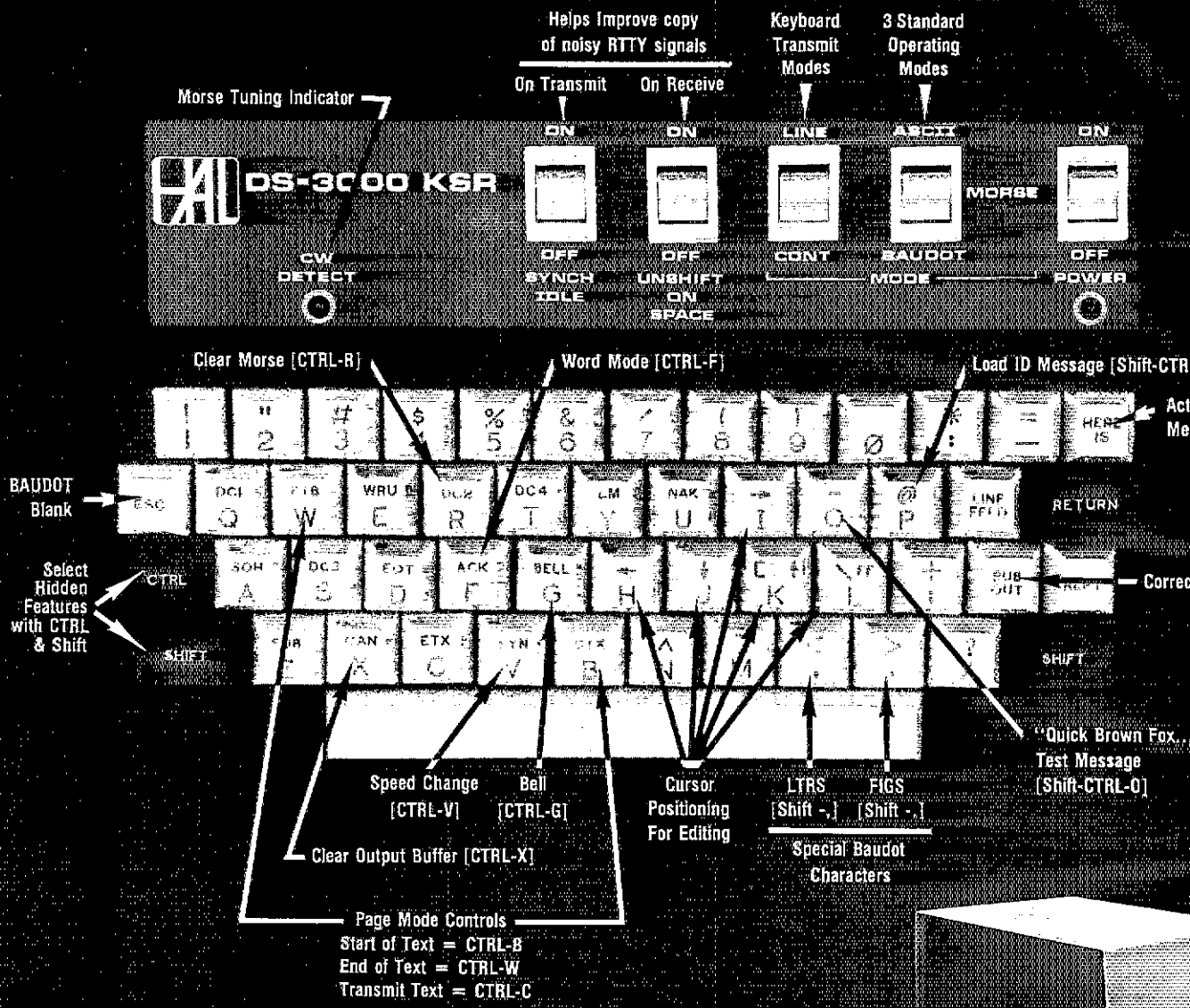

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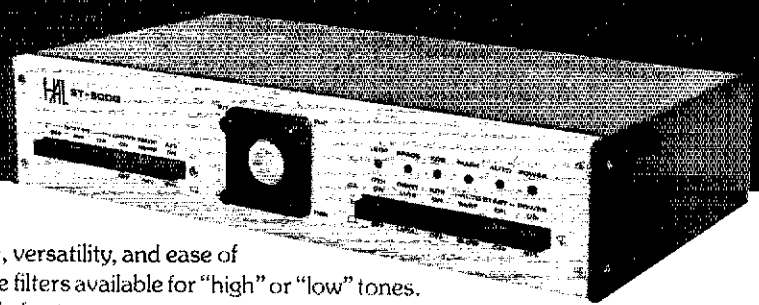

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6:30 PM, QNI 778, QTC 51. WSN, 6:45 PM, 3590, QNI 326 QTC 118. Clark Cty Information Net, 7 PM, .84/24. Tue., QNI 36, QTC 7. How many of you have talked to your EC about the OES appointment? N7CT had to curtail his bulletin transmissions due to rig problems. WB7EBP W7LUP W7ZIW new ORS appointees. K7GXZ WA7CRQ WB7ECH WB7EXK WB7OPP have upgraded. K7VSZ new EC for Island Cty. W7IXF EC for Skagit Cty. Fort Vancouver Hamfair May 13, 14. Yakima Hamfest May 21. Minnows annual meeting in Everett May 27, 28. New King Cty. ARES nets: 7 PM Tue. 81/21 (WR7ACS); Tue. 8 PM, 52.29/53.29 (WR7ABP). N7IT is secy.-treas. of ESN. N7AJ glad to be back on ttc nets after hospital stay. WB7OXA ttc. mgr. for W7YH. W7AXT active on 2-mtr with hand-held. WA7YCM sends code practice on 146.58, 9:30 PM. Everett Repeater (WR7AFJ) 31/91 YL net Thur. 10:30 AM looking for YL check-ins. PSCARC net changed to 12 PM Sun. 3940, followed by PR net. BEARS net changed to 3925 at 12:30 PM. Spokane Dialtwister Annual Banquet May 13. WWARA discussing 20 kHz channel spacing on 2 meters. OO K7MF received thank you card as result of a discrepancy report to a young amateur. EC WA7TWB making PS officials in San Juan Cty very aware of ARES. W7AIB still having knee problems finds it difficult to operate for any length of time. Intruder Watch can use more help in the Section according to W7JIE, see him for details. N7AM satisfied with results of vertical array used in DX test. N7RC has 106 DX countries on 80 but all not confirmed yet. WB7PVF, NCS for Novice net Sun. 7:30 PM, 28.150 in Oak Harbor area. WB7VHS. WB7VCJ new YLs in Clark Cty ARC. WB7VCJ also the youngest amateur in the club. NAS Whidbey Island ARC officers: WB7BFM, pres.; WB7NVM, vice-pres.; Bob Roesner, secy-treas.; K7TBT, maintenance; Jim Monroe, PR.; WB7BFK, trustee. Pend Oreille ARC officers: WB7ELV, pres.; WB7NHQ, vice-pres.; WB7RRG, secy-treas.; WB7RRE, librarian; WB7SGX WB7OAX, editors. Island Cty ARC officers: WB7BFK, pres.; Roy Evans, vice-pres.; Fay Ritchie, secy-treas. WA7RUY, pres. West Seattle ARC looking for input on ideas to improve the club. W7GNT joined Silent Keys while in AZ. NAS Whidbey Island ARC thanks all those who handled traffic for them during the recent open house. Traffic (Feb.) W7DZX 649, K7GXZ 169, N7RC 146, WA7BDD 132, WB7OJV 122, K7CTP 114, N7IT 91, N7AM 70, W7BUN 57, WA7LQV 56, N7AJ 45, N7RV 40, W7LG 39, W7LUP 36, W7ZIW 35, W7EBU 30, WA7OJI 30, WA7RCR 19, N7CT 18, W7IEU 13, W7YH 13, W7AXT 8, W7PGY 8, WB7EOK 6, W7IXF 6, WA7KGT 5, K7NZV 4, WA7TWB 4, WB7CFH 2. (Jan.) N7RC 74, WA7AZO 9.

PACIFIC DIVISION

EAST BAY: SCM, Bob Vallio, W6RGG — SEC: W6IIH. It now appears that the Co. of Alameda Planning Commission will recommend acceptance of the proposed ordinance of the East Bay RC coalition formed by K6UWR and W6IIH. That proposal is a ninety-foot height limit on all amateur radio towers providing they are installed after issuance of a building permit and inspection by the county. My thanks to all who participated. Special thanks to K6AN. NCN schedule: 3630 at 1900 and 2030, and 147.84/24 (WR6ADC) at 1930, daily. 1978 Officers of CCRC and W6URA, pres.; W6JKY, VP; WB6AAJ, secy.; K6RTU, treas. New Advanced Class licensees are WB6PYP WB6JTH WB6OQW and a new General Class licensee is WA6IUS; congrats! K6OE is the subject of an excellent biographical sketch in NCN's "THE RELAY." Ken recently replaced a heap of gear with a new Atlas rig. N6NE attended the Model United Nations in Washington, DC. K6XO new ORS. WB6VGC and WB6FHH received certificates of merit from SARS for their contributions to Amateur Radio. WA6YZK a new General Class licensee and also the 13-year-old daughter of proud papa N6SZ. W6ZF is holding down the North end of the section as Asst. SCM. Traffic: (Feb.) N6CY 331, K6OE 313, K6HW 303, W6JXK 191, W6OA 109, WB6UZX 32, N6NE 7, WB6VEW 6, K6PMG 4. (Jan. N6CY 429. (Dec.) N6CY 431.

NEVADA: SCM, Leonard M. Norman, W7PBV — Asst. SCM: W7SK. SEC: K7ZAU. N7SD is custodian for NV triple 7 Award "777" for 10-meter contacts. QSL N7SD for details. Two meter repeaters for Southern NV 07/67, 22/82, 16/76, 31/91, 28/88, 34/94, 78/18, 90/30, 96/36. WB7EIZ is Field Day chairman for SNARS. Reno two meter repeaters, 01/61,* 16/76, 78/18; Lake Tahoe 25/85, 015/615,* 81/21,* have autopatch. K7ZOK has a new 2M station. W6CDH and WB7UIN are active YLs on CW. WB7BDX W7MWF W7PRM and WA7RPZ attended the annual Quartzsite Rally. WB7QIA WA7NCR active on 2M. WB7PLZ new General Class. W7GVA now N6EE. W7VZS returned from a Holiday in KH6-Land. W7BKQ FB following eye surgery. W7JUD has 264 DX stations confirmed and looking for more. Traffic: W7ILX 198.

PACIFIC: SCM, Pat Corrigan, KH6DD — SEC: KH6CKJ. RM: KH6JAC. This is my last column. Personal commitments dictated that I not actively seek re-election this term. It has been my privelege to know and serve this fine membership for two terms. I was honored to work on your behalf on many items including a couple landmark changes in this section. I look forward to a continuing active role in section affairs with our new SCM, George, N7HR. I hope all will give him the support he needs. W3PK, prexy of AMSAT here for visit after AO8 launch. KH6BZF reports VE4MP & W7VZS were visitors. KGMB-TV filmed KH6 participation in AO8 launch. They also showed hams helping in Calif. fires-ARRL film. Traffic: KH6DD 46, KH6BZF 34, KH6ST 25.

SACRAMENTO VALLEY: SCM, Norman Wilson, N6JV — SEC: W6SMU. The North Hills RC will hold their 6th annual Sacramento Ham Swap on May 20 at Carmichael Park. Amateur Radio classes are being sponsored by the Grant Union Adult Ed. Dept. at Foothill High School in Foothill Farms. The El Dorado Co. ARC holding classes at Herbert Green School in Placerville. New calls include: K6USP and WD6s BAS BDL BFQ BJC BPA CNW CPM CUK DUG EPS EQF EYT FAN FEI FIR and FKA. WB6GFJ has his UHF gear going for OSCAR 7 and 8 mode J. WB6CQF a new Advanced and WB6WRV has his General. W6DCA fried his gear when high winds dropped his tower thru a 6kv line. The ARRL Affiliated Club charter was presented by N6JV to the River City ARCS at their Feb. meeting. Also on the program was a presentation by the Sac. Sheriff Dept. on their surveillance program. Traffic: W6RSP 33, W6DEF 19, WB6GFJ 4.

SAN JOAQUIN VALLEY: SCM, Charles McConnell, W6DPD — Asst. SCMs: WA6YAK W6TRP WA6HIN. SEC: WA6YAB. SJV amateurs did a great job in helping in the flooding of Feb. 1978. Officers of the Stanislaus ARA are W6XK, vice-pres.; W6SQR, secy.; WD6CYZ, treas. New

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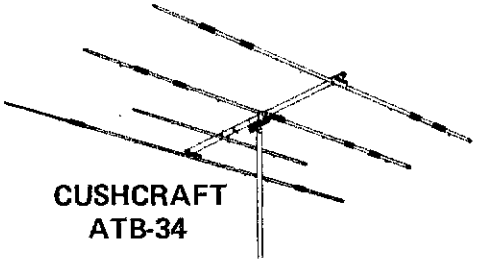
Antenna Sale!



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Classic 33	3 ele. 10, 15, 20 Mtr. beam	$232.50	$189.95
Classic 36	6 ele. 10, 15, 20 Mtr. beam	310.65	249.95
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TA-36	6 ele. 10, 15, 20 Mtr. beam	335.25	279.95
TA-33 Jr.	3 ele. 10, 15, 20 Mtr. beam	151.85	129.95
TA-40KR	40 Mtr. add on	92.25	74.95
CUSHCRAFT			
ATB-34	4 ele. 10, 15, 20 Mtr. beam	239.95	199.95
ARX-2	2 Mtr. Ringo Ranger	32.95	29.95
A147-20T	2 Mtr. Twist	54.95	47.95
A144-10T	10 ele. Twist 2 Mtr.	34.95	31.95
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A14T-MB	Mounting Boom	15.95	14.95
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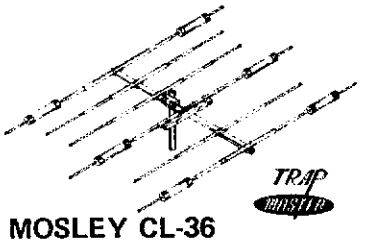
4BTV	10-40 Mtr. Trap Vertical	99.95	82.95
RM-75	75 Meter Resonator	15.50	13.50
RM-75s	75 Meter Super Resonator	30.00	26.50
G6-144-A	2 Mtr. Base Colinear	67.55	57.95
HY-GAIN			
TH6-DXX	Super Thunderbird	249.95	209.95
TH3-MK3	3 ele. 10, 15, 20 Mtr. beam	199.95	169.95
Hy-Quad	2 ele. Quad 10, 15, 20 Mtr.	219.95	189.95
TH3-Jr.	3 ele. 10, 15, 20 Mtr. beam	144.50	129.95
18 HT	Hy-Tower 10-80 Mtr. Vertical	279.95	239.95
14AVQ/WB	10-40 Mtr. Trap Vertical	67.00	57.00
18AVT/WB	10-80 Mtr. Trap Vertical	97.00	84.95
203	3 ele. 2 Mtr. beam	12.95	
205	5 ele. 2 Mtr. beam	16.95	
208	8 ele. 2 Mtr. beam	19.95	
214	14 ele. 2 Mtr. beam	26.95	
WILSON			
System One	5 ele. 10, 15, 20 Mtr. beam	259.95	239.95
System Two	4 ele. 10, 15, 20 Mtr. beam	199.95	185.00



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Ham III	$125.00
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CD-44	$105.00

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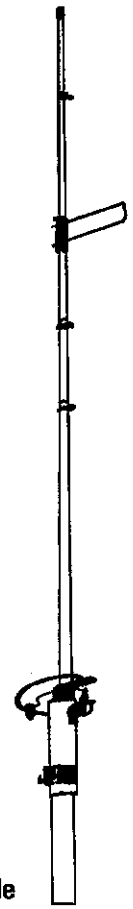
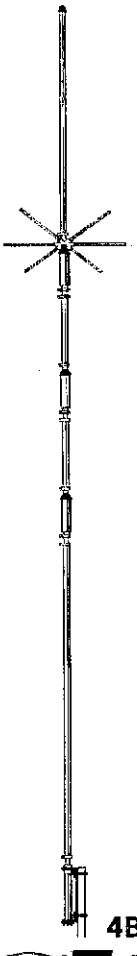


RINGO RANGER



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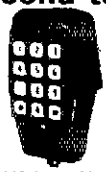
Regulated AC/PS Model FMPS-4R . . . $39.95



FMMC-1* Microphone with Built-in Touch Tone Pad.

WHY BUY LESS? THE FMMC-1 HAS IT *ALL!*

- New! Auto key up
- Snap-Action Keyboard
- Adj. level and tone balance
- Use with any transceiver
- Only 3¾" x 2"

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- **FREQUENCY RANGE**: Receive and Transmit: 144.00 to 148.995 MHz, 5Khz steps (1000 channels) INCLUDING NEW BAND 144.5-145.5MHz + MARS-CAP and MULTIPLE OFFSET.*
- **LED DIGITAL READOUT.**
- **4 CHANNEL RAM SCANNER WITH IC MEMORY**: Program any 4 frequencies and reprogram at any time using the front panel controls—search for occupied (closed) channel or vacant (open) channels. Internal Ni-Cad included to retain memory (no diode matrix to wire or change).
- **MULTIPLE FREQUENCY OFFSETS**: Three positions A,B,C, provided for installation of optional crystals: EXAMPLE - 1 MHz offset. Duplex Frequency Offset Built in - 600 Khz PLUS or MINUS 5 KHz steps, plus simplex, any frequency.
- **INTERNAL MULTIPURPOSE TONE OSCILLATOR BUILT IN**: 1750Hz tone burst for "whistle on operation" and sub-audible tone operation possible by simply adding a capacitor across the terminals provided. Internal 2 position switch for automatic and manual operation, tone burst or sub audible tone PL - adjustable 60-203Hz (100 Hz provided).
- **AIRCRAFT TYPE FREQUENCY SELECTOR**: Large and small coaxially mounted knobs select 100KHz and 10KHz steps respectively. Switches click-stopped with a home position facilitate frequency changing without need to view LED's while driving and provides the sightless amateur with full Braille dial as standard equipment.
- **FULL AUTOMATIC TUNING OF RECEIVER FRONT END AND TRANSMITTER CIRCUITS**: DC output of PLL fed to varactor diodes in all front end RF tuned circuits provides full sensitivity and optimum intermodulation rejection over the entire band. APC (AUTO POWER CONTROL) - Keeps RF output constant from band edge to band edge. NO OTHER AMATEUR UNIT AT ANY PRICE has these features which are found in only the most sophisticated and expensive aircraft and commercial transceivers.
- **TRUE FM**: Not phase modulation - for superb emphasized hi-fi audio quality second to none.
- **RIT CONTROL**: Used to improve clarity when contacting stations with off frequency carrier.
- **MONITOR LAMPS**: 2 LED's on front panel indicate (1) incoming signal-channel busy, and (2) Transmit.
- **FULLY REGULATED INTEGRAL POWER SUPPLY**: Operating voltage for all 9v circuits independently regulated. Massive Commercial Hash Filter.
- **MODULAR COMMERCIAL GRADE CONSTRUCTION**: 6 Unitized modules eliminate stray coupling and facilitate ease of maintenance.
- **ACCESSORY SOCKET**: Fully wired for touch tone, phone patch, and other accessories. Internal switch connects receiver output to internal speaker when connector is not in use.
- **MULTI-PURPOSE METER**: Triple Function Meter Provides Discriminator Meter, "S" Reading on receive and Power Out on Transmit.
- **RECEIVE**: Better than .25uv sensitivity, 15 POLE FILTER as well as monolithic crystal filter and AUTOMATIC TUNED LC circuits provide superior skirt selectivity - COMPARE!
- **HIGH/LOW POWER OUTPUT**: 15 watts and 1 watt, switch selected. Low power may be adjusted anywhere between 1 and 15 watts. Fully protected-short or open SWR.
- **OTHER FEATURES**: Dynamic Microphone built in speaker, mobile mount, external 5 pin accessory jack, speaker jack, and much, much more. Size 2½ x 7 x 7½. All cords, plugs, fuses, microphone hanger, etc. included. Weight 5 lbs.

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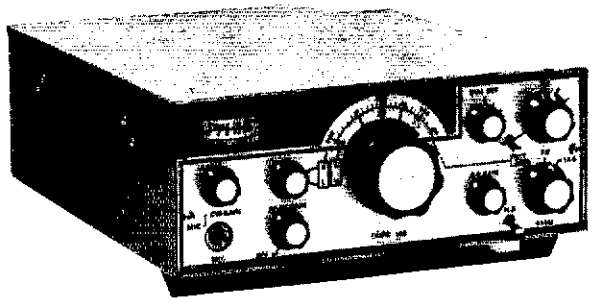

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- Superb Commercial Grade Quality and Construction Second to none!
- Superior Audio Quality!
- Totally Solid State
- **250 Watts**
- Modular Plug-in Circuit Board Assembly
- Dual Speed VFO Dial-Vernier
- Semi-Break In CW with Sidetone

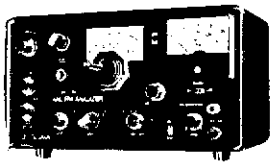
ALDA 103 HF TRANSCEIVER

NEW! SIGMA MODEL AF250L

DEVIATION/MODULATION METER

Introductory Price

$169

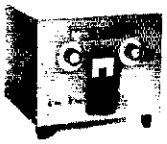


FEATURES: Extremely stable local oscillator for easy measurement of HF, VHF, and UHF bands employing negative feedback, to insure extremely high stability ● Easy to read, accurate linear scale ● Direct off the air signal measurement capability. **OPTIONAL 12v DC Power Kit - $12.** ***FULLY CERTIFIABLE FOR COMMERCIAL USE.***

SPECIFICATIONS: Frequency: 1.8MHZ-520MHZ/3 range select (A,B,C,EXT), A range: 26.5 MHZ-40MHZ, B range: 48MHZ-60MHZ, C range: 140MHZ-156MHZ (generous overranges), EXT. range: 1.8 MHZ-520MHZ (Need Signal Generator) ● Input level: (1) Through type input level: IW-200W (RF Input Terminal), (2) Direct input level: More than 80db/50ohm impedance ● Amplitude modulation: 0-100% ● Frequency diviation: 0-20KHZ ● Accuracy: +/-3% of full scale ● Intermediate frequency: 10.7MHZ ● RF Attenuator: 0-60db variable ● Audio Signal oscillator: (1) Audio Frequency—1,000HZ (1 KHZ), (2) Output level—More than 1V RMS (variable) ● Power Source: AC117 ● Dimensions: H-5½" (140mm), W-10¼" (260mm), D-7¼" (184mm) ● Wt.: 7lbs.

SUPERB NEW WANZER Z-4 TRANSMATCH

- Roller Inductor
- Switchable Double-L or Pi
- In/Out Switch
- Commercial Grade Construction
- 160-10 Meters
- 3KW

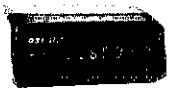


Introductory Price

$129

DSI

Fully Certifiable for commercial use



COMPARE!

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factory assembled not a kit

600 MHZ FREQUENCY COUNTER WITH CRYSTAL OVEN TIMEBASE

● Sensitive—No Direct RF Connection Required
● Accurate—.5PPM ● Selectable Resolution

NEW! TRISTAO'S

40 foot Self-Supporting Crank-up Mast

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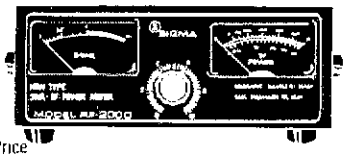
SIGMA RF-2000 SWR & POWER METER



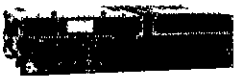
Cal PWR Scales 200W-2000W Freq Range 3.5-150 MHz. Please do not confuse the RF2000 with similar appearing lower priced units. RF2000 is an individually calibrated professional quality instrument. Unequaled at many times the price. Size 7" (w) x 2 1/3" (d).

$29

Introductory Price

SHIPPING ANYWHERE U.S. - $1

SUPERB NEW ICOM IC-701 HF TRANSCEIVER



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GO PRIVATE! **on 2 meters with the FMTD-1***

Touch tone pad (encoder) actuated. Quiets your receiver until other station sends private 3 digit code, selected from front panel. 999 Channels. Receiver can be muted or opened manually or remotely with a touch tone pad. Bright led's indicate muting and reset. State of the art digital circuitry. Works with the KDK FM2015R or any 2-meter rig. 5 pin din plug supplied. Size 5½"D x 6½"W x 1"H. Wt. 12 oz.

SPECIAL INTRODUCTORY PRICE **$75.00**

FM2015R Accessories — **KDK SPECIAL SALE FM144 Accessories**

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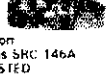
FMMC-1*	Microphone with Built-in Touch Tone Pad..... $49.95
FMTD-1*	Private Call Decoder for use with and Programmed by any Touch Tone Pad..... $75
MARS-CAP	and Multiple Offset Kit* - Any Frequency, Any Split, No Crystals $5
FMAT-1	½ Wave Portable Antenna for Hotel, Motel or Apartment $7.95
Extra DC Cord & Plug	$4.00
Service Manual	$4.00
Mounting Bracket (Extra)	$6.00

FMOF-1	Offset Option Kit - 2 Extra Positions, Crystals Required . $5
FMOF-2	1 MHz Offset Option Kit (No Crystals to Buy) $5
MARS-CAP	Option Kit - Any Frequency Any Split $12

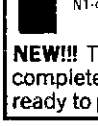
NEW!! ADD 5 CHANS (TOTAL 10) TO SRC-146A



- Simple 10 min. installation
- Same color and quality as SRC 146A
- Completely WIRED & TESTED
- ALSO usable with most other hand helds

Price $29

New Standard 2 Meter FM Transceivers Model SRC 146A



	Special Package
SRC 146A	$314
4 Xtals 34-94 and 94-94	No
USA 2 Deluxe Base Charger	$42
PT3644 Leather Case	$12
AT 19 Rubber Ant and Whip	$10
N1-cads	$30
Reg.	$413

NEW!!! Touch Tone pad completely wired and ready to plug in - $59.95

Our Price **$289**

COMPARE!

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Model 8020A

Professional DMM

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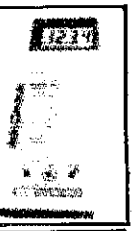

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RF TRAVEL-TENNA

A 2 meter ¼ wavelength amateur antenna designed to provide an efficient antenna system by extending the range of fixed-portable or base station operation of base, mobile, handheld transceivers or scanner receivers. Improves the signal strength over inefficient HT antennas, built-in scanner antennas, and mobile units with attached whip or coat hanger ground plane antennas in hotel, motel, townhouse or apartment locations.

SPECIFICATIONS

ELECTRICAL: 2 MHz bandwidth, 1.5:1 SWR - 146/148 MHz, 30 watts max.

MECHANICAL: 56" long with 6' co-ax and connector attached

MODEL	CONNECTOR TYPE	PRICE
101-PLC	PL-259 TYPE	$7.95
101-SMP	2.5 mm Subminiature Phone Plug - (Standard)	$7.95
101-MPP	3.5 mm Miniature Phone Plug - (Midland)	$7.95
101-FC	'F' Type - (Wilson 2W)	$7.95
101-BNC	BNC - (Genave, Wilson MK II & MK IV)	$8.95
101-TNC	TNC - (Wilson 5W)	$9.95
101-RCA	RCA / Phono Type	$7.95
101-MBC	MB - (Hy-Gain)	$8.95

RF OMNI-1

A new ½ wavelength two meter antenna utilizing a fiberglass housing and a PVC base that weather-proofs the enclosed radiator and matching section. The radiator is silver plated copper for maximum radiation efficiency and is shunt fed (DC grounded). The design does not require ground plane radials that interfere with other adjacent antennas. Three models suitable for base station, marine, or vehicular installations. Choice of black or white in two of the three models.

For base station or marine use, the OMNI - 1 features light weight and low wind loading which reduces the size and strength requirements of the mounting structure.

Except for the co-ax connector, the exposed surface of the OMNI - 1 is non-metallic and is therefore excellent for marine installations. Accessory mounts available for marine use, models 199-501 & 199-502.

For vehicular use the OMNI - 1 is ideal where ¼ or 5/8 wavelength antennas will not operate due to an irregular or non-metallic ground plane surface (fiberglass vehicle). It also minimizes performance loss at highway speeds due to whip flex as encounted with small stainless steel whip antennas. A quarter turn disconnect model is available which can be readily removed for storage.

SPECIFICATIONS

ELECTRICAL

Frequency Range 146 - 148 MHz
SWR ..... Less than 1.15:1 at resonance
Bandwidth ... 3.5 MHz (1.5:1 SWR)
Power Rating .... 100 Watts

MECHANICAL

Length ..... 66 inches
Weight ..... 6 oz. (190-201) 8 oz. (190-202) 11 oz. (190-203)
Surface Area ... 27.34 square inches
Connector ..... SO-239 type

MODEL	DESCRIPTION	PRICE
190-201	Base or sailboat with co-ax connector at antenna base, white fiberglass.	$17.50
190-202	Vehicle or power boat with 3' co-ax and 3/8 - 24 male stud, specify white or black	$20.50
190-203	Vehicle use, 3' co-ax and quick disconnect with 3/8 - 24 male stud, specify white or black.	$21.50

RF Antenna Mounts

199-501	A two piece snap - in white PVC sailboat mast mount. Designed to accept and offset the model 190-201 type antennas. Offset is 5¾ inches and may be varied to suit individual installation requirements. Installation is made by mounting the two mounts 6 inches apart with the stainless steel screws supplied.	$7.50
199-502	A white plastic totally adjustable ratchet mount for power boat antenna installation. Locks antenna in the upright as well as the down position and may be mounted on the deck or bulkhead. Accepts 3/8" - 24 or 1" - 14 antennas and includes stainless steel hardware.	$16.50

RF HT Antenna Adaptor Cables

Small flexible 4 foot co-ax cable assemblies primarily intended for interfacing between a hand held tranceiver and a base or mobile antenna / amplifier. Inline SO-239 connector on one end for antenna / amplifier connection and the required HT connector at the other end.

195-011	2.5 mm Subminiature Phone Plug - (Standard)	$7.95
195-012	3.5 mm Miniature Phone Plug - (Midland)	$7.95
195-013	'F' Type - (Wilson 2W)	$7.95
195-014	BNC - (Genave, Wilson MK II & MK IV)	$8.95
195-015	TNC - (Wilson 5W)	$9.95
195-016	RCA / Phono Type	$7.95
195-017	MB - (Hy-Gain)	$8.95

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call of the 13-73 repeater (SARA) is WD6EJF/RPT. Officers of the Kern County ARC are WA6JJA, pres.; WA6LMX, vice-pres.; WA6LCP, secy.; WA6RXI, treas. The club meets the 1st and 3rd Fri. in Bakersfield. WA6YMU new EC for Calaveras Co. WB6BLV is OO. WB6JDM worked Europe on 10m. K6EKH now Extra. WB6WYA a General, and WD6BJK a Tech. WA6CTR has an FMH-2. WD6BJJ and WB6MHQ have Alda 103. WA6OQV a Wilson handheld. WA6KZV a TS820S. WA6JDB and W6DPD made NCN Honor Roll for Jan. 1978. The Turlock ARC Hamfest is Sat., June 3. Amateurs of Fresno ARC, Tulare County ARC, Kings County ARC, Madera County ARC, Turlock ARC plus Central Cal Am. Teleprinter Soc. provided Communications for the United Cerebral Palsy Telethon on Mar. 4-5, 1978. Traffic: WA6GJV 25, W6DPD 22, WB6VJW 14, WA6JDB 5, WA6YAB 4.

SANTA CLARA VALLEY: SCM, Jim Maxwell, W6CF — SEC: WB6IZF, RM: W6RFF, W6RFF and W6AUC both made PSHR. OSCAR 8 is up! Among those SCVers playing unsung roles in the OSCAR 8 saga is K6GSJ, who personally spent hundreds of hours in front of a milling machine, patiently grinding out pieces of the spacecraft structure and module boxes. As of this writing, OSCAR 8 is up, healthy, and operating. Congrats to the following SCVers who made the NCN Honor Role for June: WD6AVB WA6JWK W6KZJ W6RFF W6YBV and K6YKG. 58 attended the annual NORCAL Chapter meeting of QCWA in Feb., reports W6AUC. The 1978 pres. of the chapter is K6DZU. Welcome to new SCV OOs K6WR (recently of PA9WRR), and N6TU. WB6EXW is the proud holder of a sparkling 5BWAS plaque, recently acquired after years of stalking the bands. Don't forget the Fresno Hamfest, to be held at the Fresno Holiday Inn Airport from May 5 to May 7. The Marble Cone fire from last year seems to have stimulated great interest in emergency preparedness, reports SC WB6IZF and EC W6ASH. For example, a total of 52 hams turned out for W6 ASH's recent SET effort covering Palo Alto, Mt. View and Los Altos. W6XN is the recently appointed No. Calif. coordinator for AMSAT. Local queries to XN are guaranteed to yield a swift response. PAARA meetings are returning to the first Fri. of each month. The usual meeting place is the Menlo Recreation center at 7:30 PM. Novices note: The Santa Clara Valley ARA Novice net mets each Wed. evening at 7:30 PM local on 28.120. Net control WB6PRU invites all hands to join in. Traffic: W6YBV 137, W6RFF 97, N6VB 85, W6AUC 52, W6KZJ 23, W6ZRJ 17, WB6UOC 10, WA6HAD 5, N6TU 2.

ROANOKE DIVISION

NORTH CAROLINA: SCM, Bill Parris, K4GHR — SEC: W4EHF, PAM: W4OFO, RM: K4MC. Plans have begun by several clubs in preparing for Field Day and the VHF QSO Party this month. Support your local club in their plans. Tar Heel Emerg Net elections resulted in WB4MXG & W4OFO returning as Net Magr. & Net Secy. respectively. New Dir. include WA4LQG & WA4CUD. K4PU now has 97 countries on 160 mtrs, anyone want a sked? WCARS (Asheville) was the receipient of a donation by W4WDC consisting of a complete station which will be set up in the Health & Social Services Bldg club call is W4MOE. WB4TTJ (EC) notes the beginning of a 15 Mtr Emerg Prep Net in the Novice band in the Asheville area. Officers for the Cape Fear ARS (Fayetteville) include WA4SXC, pres.; W4WMZ, vice-pres.; WB4WZH, sec-treas.; WA4WMU, recorder. K4FTB back from trip to KH6 to visit KH6IHZ, his son. WB2SXD/4 working to start a new club in the Catawba/Alexander Co. area. WD4HCY reports over 20K points in Novice Roundup with WA4SRD 13K points in YL/OM Contest. DX interest running high with WA4NHP & K4MQG providing DX tips in their club bulletins. Come to Winston on June 9-10 to Antique Wireless Assn. regional meeting, contact W4DBT for more info. Following QNI/QTC received for Feb.: CNN 278/56; CNCTN 1202/74; NCSSBN 1707/42; RARS 284/33; PT&TN 150/8. Traffic: (Feb.) W4EAT 292, AA4NC 212, WB4MXG 166, WD4JRS 124, WD4FJM 114, K4MC 103, K4FTB 88, WB4ZIQ 77, WA4FFW 69, WD4HCY 62, W4FMN 59, N4ZH 59, K4AI 58, N4UE 57, WA4LZD 52, W4OFO 48, WA4OOS 44, K4VHT 44, WD4DKF 43, WA4SRD 42, WA4WOR 34, WA4UTC 31, K4GHR 30, WB4OXT 30, WD4MBV 25, WD4CNQ 20, WB4TTJ 20, WB4TOP 19, WB4ULP 17, WD4CNS 14, W4EHF 14, WB4WII 9, W4IZI 6, WB2SXD/4 6, WA4KWC 4.

SOUTH CAROLINA: SCM, Tom Lufkin, WA4DAX — Asst. SCM: Garry Barnette, WA4MDP. SEC: WB4TNS. Chief PAM: W4MTK. PAM: WA4DZG. RM: WB4CAK. Late report (Jan.) The 1978 SET very successful with all section nets participating. The S.C. SSB net had over 20 counties represented and handled over 100 pieces of traffic and 20 stations on emergency power. Carolinas Net reported 77 QNI with 93 messages handled. The Anderson Club reported participation from a very cold mountain top. The Trident Club involved the local Red Cross in their operation. I think the week end showed that in the case of a real emergency SC Amateurs are prepared. The PX reported brisk activity in the annual hurricane hunt held during the SET weekend. The Palmetto ARC in Columbia active again with WA4FRY as pres. Amateur Radio Week in SC will be the week of the 14th to the 20th of May culminating with the Columbia Hamfest the weekend of the 20th. Regret to report WB4NCV of Gaffney as Silent Key. Net Reports Anderson 2mtr QNI 611, QTC 20; CNN QNI 305, QTC 73; PX QNI 196, QTC 35; SCSSB QNI 1691, QTC 293. Traffic: (Jan.) K4ZN 669, N4PQ 429, WA4KXZ 225, W4MTK 160, W4ANK 148, W4NTO 97, K4FRX 77, W4OCX 49, WB4UDK 40, W4FMZ 30, W4FVV 27, WB4CAK 21, WA4JWC 12, N4EE 7.

VIRGINIA: SCM, Robert L. Follmar, N4RF — SEC: WB4ZNB. PAMs: WB4DQZ VSBN; W4JK SVSN. RMs: K4BKX VN; AA4CK VSN; W4SHJ 4RN. Welcome to your newest PAM, W4JK mgr. of the Shenandoah Valley Service Net. CDR John D. Peters USN, our newest OO has a right to be proud. John's 10 yr old son (also named John) passed his Novice exam making him the youngest licensed amateur in the Southeastern FCC Region. The Norfolk newspapers carried three separate articles on young John's & his father's radio activities. The articles were passed to Hq by the SCM for further notice. OO rpts recd from K1ER W4HU & K4ZVS, tnx men. Club papers recd from PVRC W4CA K4AF (Pentagon) AMRAD HRRA SPARK TARC. Twenty Tidewater Radio Amateurs "worked" the Chesapeake Election Net which is a Biannual affair & Public Service of the Hampton Roads Repeater Assn. (HRRA). Commencing Apr. 1 the VA Section will have a new SCM as K4BKX won the election. Give Rick your full support. Many nice words recd by N4RF for past performances, tnx gang! Law school and DXing keeping WB4DBK busy. Improving band condx

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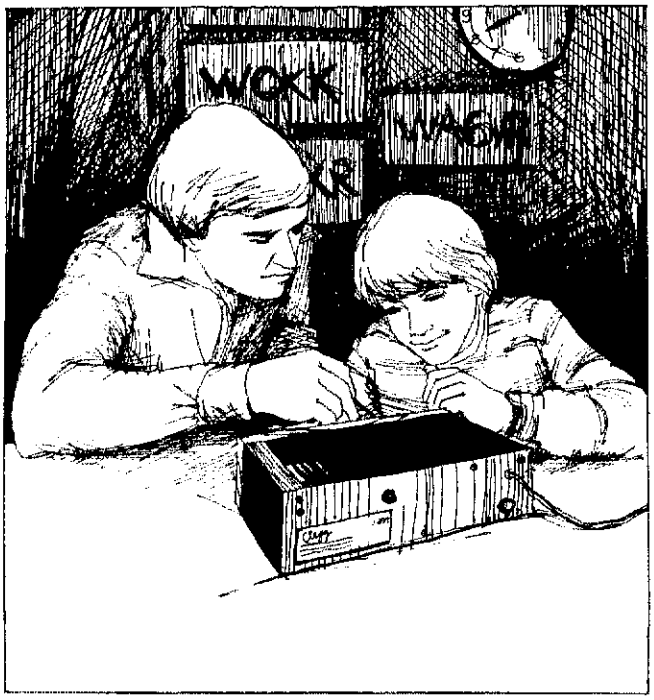

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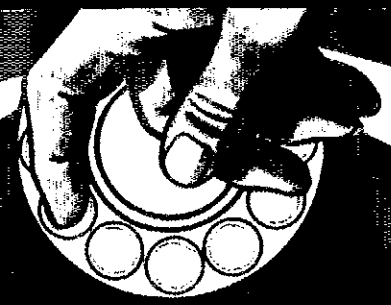

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(DX) starting to compete with WA4STO's time but t
total "still hanging in there" says Byron, hi. W4YVG ha
a problem staying on the air since a feller in Richmon
is repairing his Swan. K8LGA will be our new VN Mag
in April, congrats! SEC WB4ZNB has had a vy ruff tim
with the flu, as well as some of us! Hope ya-all are fee
ing much btr! WA4NTP just got on 220 MHz tnx
bargains from Vienna Winterfest. W4OOL is bldg som
open wire feeders inside while the snow is falling ou
side, hi. WB4FNW rpts the winter wx also upset his a
tivities, can't will em all, hi. W4NWM says DX is lookin
up but still has tower on the ground but wx is looking u
W4KFC visited IARU societies in OA CP CE CX ZP & L
Attended meeting of IARU International Wrking GRP
Geneva. Also spent time at ITU Aeronautical Radi
Conf. Busy VeePee! WA4FTJ recd DXCC (QRP) this mo
also 3 awards from Germany & the DUF from Franc
Rig then went on the blink for 3 wks. WB7SVK no
WD4OVR. A real Virginian now, hi. W4JUJ enjoye
YL/OM & QWCA QSO Parties and checking in to th
VSN. W4SVG rpts his rig out of svc. WA4YJF spent mo
time shovelling snow this month than handling tf
W4HU has new freq. counter-gud investment. Traffi
(Feb.) W4SQQ 316, K4KNP 286, K4BKX 244, K4KDJ 24
K4GR 231, W4LXB 206, W4UQ 183, AA4CK 165, WB4K
147, WA4CCK 137, WB4FLT 133, N4RF 129, WB4DB
122. WB4PNY 114, N4NK 105, K4JM 103, W4JK 9
WB4DQZ 84, WA4UYD 79, WA4STO 77, W4YVG 6
K8LGA/4 50, K4MLC 47, WB4ZNB 47, WA4NTP 3
W4OOL 37, WA4QWC 35, K4VWK 34, N4LE 33, W4SH
33, WB4QAX 26, K4EJ 22, WB4FNW 17, W4NWM 1
K4KA 15, WB4FNW 14, W4SUS 14, WA4QDI 14, WA4FD
11, W4KFC 11, WA4FJT 11, W4KXE 10, WD4OVR
W4JUJ 7, W4ZM 5, W4SVG 5, W4TZC 4, WB4BYC
WA4YJF 3, N4OI 2. (Jan.) W4SVG 19, W4TZC 1
WB4DRC 9, K1ER 8, WD4HBA 4. (Dec.) N4UY 2
WB4BYC 10. (Nov.) WB4BYC 12.

WEST VIRGINIA: SCM, Donald B. Morris, W8JM
W8HZA received 56 year QCWA award and along wit
W8PZT rated high in FMT tests. W8LZI upgraded to E
tra. WB9DMS holding code and theory classe
Lewisburg area. Fairmont repeater now operating 31/
under call of W8JM. WA8WPW WB8TJN WB8AK
WB8ZKB along with the ole timers building up the WV
CW net. WD8JYM and WD8JYN back on air, after bein
accused of TVI. Source, oscillating Tv Booster.

Net	Freq.	Time(Z)	Ck-In	Tfc.	Ses
Phone	3990	1700 Dy	641	68	28
Phone	3990	2300 Dy	2007	240	28
CW	3567	0000 Dy	182	51	28
Hillbilly	14290	1700 Su	187	76	4
Midnight	3990	0500 Wk-end	641	68	4

Traffic: (Feb.) WB8YMJ 85, W8JM 46, WA8RUZ 45, K8B
34, WB8III 31, W8HZA 30, W8JWX 26, WA8WPW 2
WB8YXJ 17, WA8YTP 16, K8KT 16, WB8VAZ 15, W8L
14, K8MS 14, K8ZDY 10, WB8XKV 8, WD8DHC 7, K8MH
7, WD8EGW 6, W8LYV 6, WB8SCG 6, WB8IHA
WB8ZTL 5, WB8TJN 5, WD8CDQ 5, K8MZM 4, WB9IQA
4, WA8LFW 4.

ROCKY MOUNTAIN DIVISION

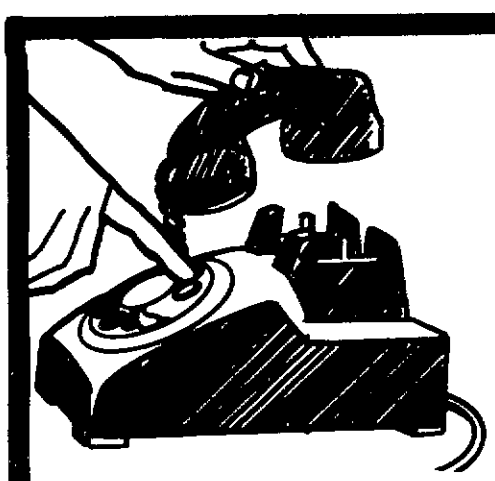
COLORADO: SCM, Clyde O. Penney, WAØHLQ — SE
KØFLQ. RM: KØTER. PAMs: KØCNV WAØYGQ. New
elected officers for the Longmont ARC for 1978 a
WA4JBU, pres.; WBØOWT, vice-pres.; WBØOSA, secy
WDØEHJ, treas. Newly elected officers for the Wester
Slope Radio Club are WBØUJO, pres.; WØNBF, vic
pres.; WØLAE, secy-treas. WBØMTA, who works as
volunteer in St. Thomas More Hospital in Canon City,
performing a very worth-while service by originatin
radio messages for the patients there. WBØPVT ha
finally repaired his 62-foot tilt-over tower, after losing
to a high wind in Dec. Congratulations to WBØZQG wh
passed Extra Class exam, and to WBØVNI who upgrade
to General class. Net Tfc. for Feb.: SSN QNI 159, QT
44, QNF 728; Hi Noon QNI 1212, QTC 43, Informals 16
27 sessions, QNF 1310; Columbine QNI 1278, QTC 15
Informals 408, QNF 1557; CWN QNI 260, QTC 277, 2
sessions, QNF 946. Late Tfc. (Net) for Jan.: SSN QNI 164
QTC 52, QNF 667; Late Net Tfc. Dec.: SSN QNI 183, QT
38, QNF 614. Traffic: (Feb.) WØWYX 1341, KØYFK 108
WAØHJZ 995, WBØMTA 452, WDØCHX 317, WBØMC
157, WBØQPQ 136, WØIW 135, WBØZQG 91, WAØYGQ 8
WØHXB 46, KØDND 42, WØRE 42, WBØPVT 30, WØLAE 1
WDØAJD 12, WØMYB 11, WBØYKH 6, KØSPR 5, WAØYE
4. (Jan.) WDØCHX 501, WBØMCL 234, WBØIBS 226, WØIW
138, WØHXB 131, KØFLQ 125, WAØYGQ 100, WØETT 9
WBØZQG 54.

NEW MEXICO: SCM, Joe T. Knight, W5PDY — SE
W5ALR. PAM: K5IKL. RM: K5KPS. Southwest Net (SWN
meets daily on 3585 kHz, 1915 local time and handle
207 msgs with 245 stations reporting in. New Mexic
Roadrunner Net (NMRRN) meets daily on 3940 kHz a
1800 local and handled 85 msgs with 1014 station
reporting in. New Mexico Breakfast Club meets daily o
3940 kHz at 0700 local, handled 69 msgs with 639 check
ins. Congrats to WA5FPS who worked DJ7KL on 29.6 FM
and to WD5AHH for making her first PSHR. Looking fo
ward to the Chili/Bean Feed at Las Cruces, NM Apr. 3
1978. Four Search & Rescue missions in Feb. keep us a
busy. Swap net each Mon. night at 8:00 local on M
Taylor Rpt 34/94. WB5SHG and WA5ETF improving afte
Hosp. stays. Traffic: (Feb.) N5NG 293, W5UH 251
W5JOV 234, K5KPS 102, N5SJ 82, WA5MIY 42, K5XY 4

UTAH: SCM, Carl R. Ruthstrom, W7GPN — K7UN
transmits Official Bulletins Tue., Thur., and Fri. on 371
kHz at 0200Z, just prior to UCN sessions. WA7MEL ha
new IC-22s. He needs check-ins for TWN on Tue., Wed
and Fri. WA7UEA new member on UCN. W7BE report
that the UVHFS road and weather net had 110
responses during month. Officers of the UVHFS ar
K7PQB, pres.; W7HBL, vice-pres.; WB7NDL, secy
WB7KMF, treas.; W7CWK, freq. coord.; WA7GKM
Repeater Engr. K7SAJ was instrumental in helping
man injured in a Jeep roll-over on a lonely road. He cal
ed for help on 146.16/76 repeater and answered b
K7GRC who summoned aid. The Utah Hamfest spon
sored by the Utah Council of AHCs will have its ARR
sanctioned event at Taylorsville Park, an all day affai
the 17th of June. Plan to come. Traffic: (Feb.) WA7JR
57, WA7MEL 56, WA7OAU 23, W7UTM 14, WB7ECL 13
W7OCX 11, WB7DMI 10, W7BE 2.

WYOMING: SCM, Chester C. Stanwaity, W7SDA — Ass
SCM: W7KHH. PAM: WA7WFC. RM: K7KSA.

Net	Freq.	Time/Days
WY Weather Net	3923	8:45 AM M-S
WY Poney Express	3923	8:00 AM Su
Jackalope Net	3923/7260	12:15 PM M-S



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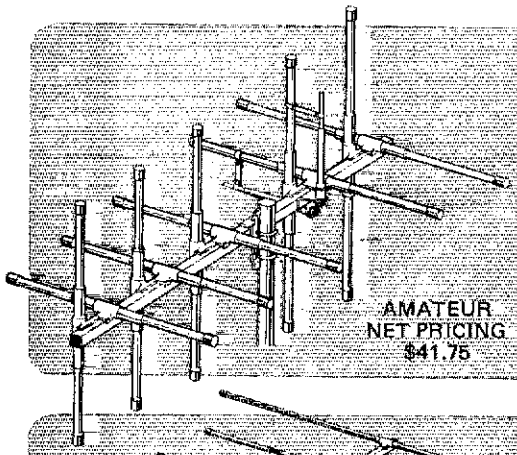
NEW ORLEANS, LA. 70190
PHONE 504-568-9879

LOOK OUT The FINCO Stingers are here!

FINCO Is introducing its new Stinger Series Amateur Antennas.



AMATEUR NET PRICING $41.75

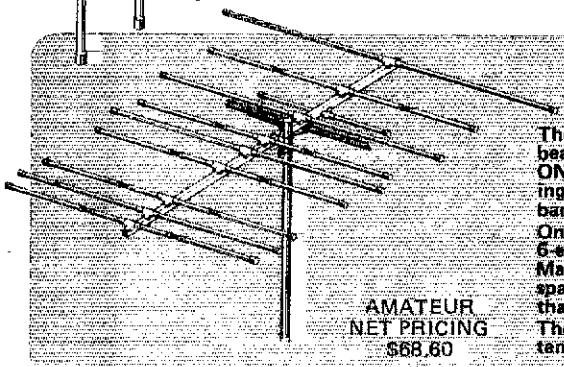
FINCO STINGER A 2+2

2 Meter

The model Stinger A 2+2 is a ten-element, dual polarization 2-meter antenna designed for OSCAR communications or where switching from horizontal to vertical polarization is required. The A 2+2 can even be phased to operate on both horizontal and vertical polarization at the same time (circular polarization). This is not only ideal for OSCAR work but gives your station versatility for ground communications.

Wide, non-linear element spacing gives the A 2+2 superior gain. However, since it is a five element beam in one given plane, the half power beam width does not make satellite tracking difficult because of sharp directivity. The dual gamma match assemblies provide for a very low V.S.W.R. and will withstand 2,000 watts P.E.P.

The Stinger construction features make the A 2+2 extremely heavy duty. Provisions are made for mounting the antenna at the end of the boom – for azimuth control – or at the middle of the boom for normal applications.



AMATEUR NET PRICING $68.60

FINCO STINGER A62

6 & 2 Meter

The model Stinger A 62 is a truly remarkable combination 6 and 2-meter beam designed for optimum performance on both bands yet only requiring ONE transmission line. This is accomplished through the use of exclusive phasing elements to accomplish dual band operation with no sacrifice to either band – NO SWITCHING REQUIRED!

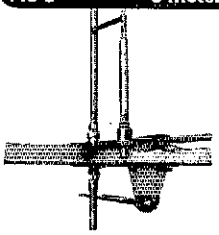
On 2-meters, the A 62 has 6 colinear elements – equivalent to three 1/2 λ 6-element yagis stacked side by side – thus giving outstanding performance. Maximum forward gain is assured on 6-meters through the use of four wide spaced elements. The heavy duty Stinger construction is used throughout so that the antenna will withstand 100 mph plus wind loads.

The A 62 is ideal for mounting on the same mast as your tri-bander or other antenna thus easily opening up the world of 6 and 2-meter VHF communication.

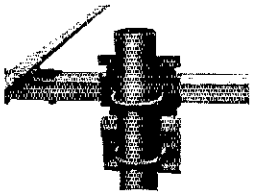
OTHER FINCO STINGER AMATEUR BEAMS AVAILABLE:

MODEL	AMATEUR BAND	ELEMENTS	BOOM LENGTH	AMATEUR NET PRICING	MODEL	AMATEUR BAND	ELEMENTS	BOOM LENGTH	AMATEUR NET PRICING
A10-4	10 Meter	4	16'	57.15	A2-5	2 Meter	5	5½'	25.60
A6-3	6 Meter	3	6'	27.30	A2-10	2 Meter	10	10'	41.15
A6-5	6 Meter	5	13'	41.95	A1¼-10	1¼ Meter	10	8'	29.65

ENGINEERING FEATURES:

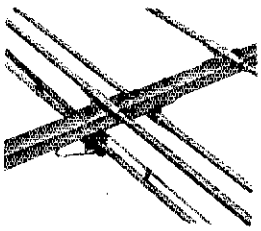


All Stinger Series Amateur Antennas incorporate heavy duty fully adjustable gamma matching systems to allow for maximum power transfer. The design provides for minimum V.S.W.R. and a wide bandwidth. A built in SO-239 type connector assembly is utilized plus the matching systems are power rated at 2,000 watts P.E.P.



A 4"x 6" x full 1/8" thick heavy duty plated steel mast to boom mounting assembly is used on all Stinger Series of Amateur antennas. The bracket assembly locks permanently on the square boom and thus withstands high wind loads and torque without twisting or becoming misaligned. The assembly accepts mast diameters of up to 2" O.D. Provisions for mounting either in a vertical or horizontal plane is incorporated in several models.

Exclusive Stinger square boom construction is used on all amateur antennas. The 1¼" square booms are of .064 wall high tensile strength aluminum which is many times stronger than its round counterpart. Also, special bracket assemblies have been developed to allow instant element to boom alignment – plus they stay aligned in the highest wind and ice loads. All elements are of thick wall high tensile strength aircraft quality aluminum.



Antenna design engineering is a specialty at FINCO. Top quality lab standard test equipment is used throughout the development and design of all antennas. The FINCO antenna test range has been carefully checked for erroneous reflection characteristics that could cause errors in antenna designs. Shown is the sophisticated stub and matching system that has been developed for the Stinger A62, 6 and 2-meter dual band beam. No traps or coils to burn out or detune, thus assuring you of the highest possible performance on both 6 and 2-meters.

Write for Catalog No. 20-827, Department 36

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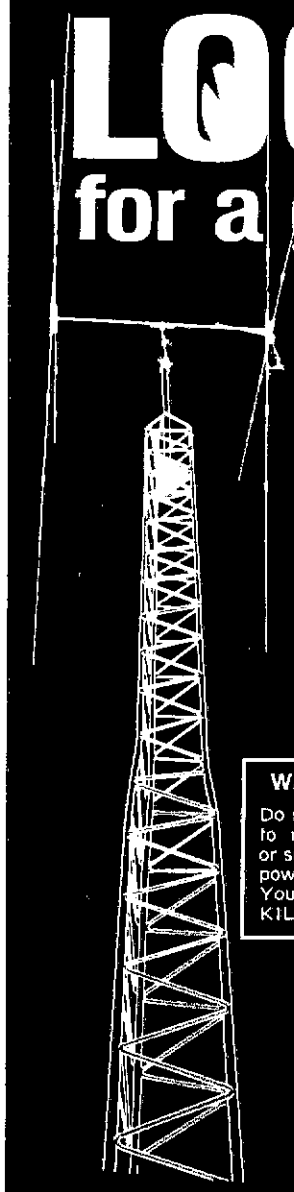
Midland's choice alternative in "220" is P.L.L. synthesized Model 13-513. Here's advanced design with modular construction and digital frequency readout. It's programmed for 500 frequencies between 220 and 225 MHz, with a 5 KHz shift up giving 500 more . . . and 4 offsets are available for repeater use. The receiver has a multiple FET front end with monolithic crystal and ceramic filters. The transmitter switches for 20-watt, 10-watt or 2-watt output. With automatic SWR and polarity protection, internal DC filtering, electronic switching and a jack for tone burst and discriminator meter, the "513" is a very desirable "220" mobile . . . or base.

Pair either of Midland's "220" mobiles with Midland's trunk/roof mount or magnet mount antennas (Models 18-950 and 18-951) for top-notch performance on the band.

MIDLAND INTERNATIONAL

For more about Midland "220" Mobile, write: Midland Amateur, P.O. Box 1903, Kansas City, Missouri 64141

Attention HAMS LOOKING for a great tower?



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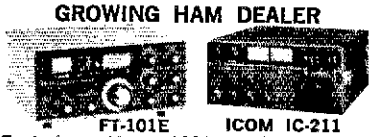

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Colo/Wyo	3715		5:30 PM Dy
WY Cowboy Net	3923		6:45 PM M-F

WA7IXH has a new TS520. WB7BVT a new TS7400. WA7USI a new four-element tri-band beam mounted on the sixty foot tower mentioned in this column earlier. W7SDA has a TS700A all mode two meter transceiver. K7SLM reports the WY Cowboy net held 20 sessions with 757 QNIs and 36 QTCs. Traffic: (Feb.) K7VWA 620, W7SOT 401, W7TZK 308, W7SDA 28, W7BMJ 7.

SOUTHEASTERN DIVISION

ALABAMA: SCM, Frank S. Brown, W4LNN — New appointments: SEC: K4WYT. OO: K4JYO. OES: W4RNX. Asst. Dir. K4AOZ. WA4JYU, asst. PAM reports AENM (3965 kHz) Sun. 8 AM session a big success with 30 check-ins. Not bad for a start. WA4RND, NM AEND (3725 kHz), age 15, received her 25 wpm certificate. She invites you to check-in. Thanks to N4MD for developing AENB into a top CW net. Check-in on 3575 kHz and see. Thanks to WA4JDH and W4IBU for representing AL on daytime RN5 and CAN nets. New affiliated clubs: West Alabama ARS, Demopolis. Walker Co. ARC, Jasper. Grissom High School, Huntsville. WD4KDM won honors with his station in Winfield High School science fair. Huntsville Area YL ARC celebrated their first anniversary. Upgrades: Extra WB4MAL/AA4JP K4LUX/K4ZM WB4DWB K4YWD/AA4WD WA4AYA/AA4TG. Advanced WB4UKY WA4ZJK WD4GRB. General WD4DHI WD4DHH WD4LDU WB4TJO. Tech. WD4KTP. Calhoun Co. ARC held weather seminar with 39 attending. 14 new members join Birmingham ARC. Golden Gabbers on Anniston 147.69/09 celebrated 2nd anniversary. W4CUE mobilized during severe weather that gave Birmingham it's third snowfall. WD4NYL logs eleven new states during the Novice Roundup. W4WJF and WD4EGK teaching Novice classes in Birmingham. Traffic: (Feb.) WA4JDH 1024, N4MD 421, WN4KKN 85, WA4VKD 85, K4AOZ 82, WA4RND 62, WA4TYH 53, W4LNN 37, W4EF 22, WB4TKU 18, WA4RMP 10, WB4TVY 7, K4UMD 6, W4MHO 4, WA4UBW 2. (Jan.) WB4DWB 30, W3EF 7.

GEORGIA: SCM, A. H. Stakely, K4WC — SEC: K4YRL. RM: N4UZ. PAM: K4JNL. Congrats to K4EV WA3NAZ/4 W4PIM N4UZ making PSHR and to WA4PZD for doing same in Jan. as well as making BPL. Also, to WB4FAS making General. New officers of Perimeter ARC, WD4NOJ, are WB4CBL, pres.; WA4VMI, veep.; WA4BVZ, sec-treas.; WB4VEF, publicity. WB4ACV now W4OUN. GSN QNI 403, QTC 181. GTN QNI 89, QTC 49. W. GA ARES Net QNI 65, QTC 3. NGSN QNI 43. CVEN no 1 QNI 44, QTC 1. CVEN no. 2 QNI 892, QTC 70. N4UZ now relaying Official Bulletins each Mon. nite on Carrolton repeater. WB4FAS got first DX novice with GW4BNJ on a sewing machine rcvr! WA3NAZ/4 getting on RTTY and K4VHC is on VHF RTTY. W4JM now has a record of 50 years of not winning at a hamfest when he missed the prize at Orlando! Your SCM needs written or radiogram reports by the sixth of each month. If you don't have the monthly report form, ask for them by radiogram mail or phone. Need Official Observers to help clean up the bands. If you can help contact SCM. Traffic (Feb.) W4FOE 381, W4PIM 172, WA3NAZ/4 137, N4UZ 130, W4GH 85, W4ELO 61, WB4FAS 42, K4WC 24, K4EV 19, WB4TEK 19, K4VHC 15, WA4OZT 7, W4JM 5, K4PIK 3. (Jan.) WA4PZD 586, W4DOC 412, WB4FAS 51, WA4CBT 35.

NORTHERN FLORIDA: SCM, Frank M. Butler, Jr., W4RH — SEC: WA4WBM. RM: WB4GHU. PAM: WA4TNC/75 WA4FKE/40 WB4BSZ/VHF.

Net	Freq.	Time(Z)	Days	QNI	QTC	Mgr.
NFPN	3950	2330	Dy	1284	199	WB4PGB
QFN	3651	0000/0300	Dy			WB4GHU

New appts. WB4WOO as EC Walton Co. W4UJL & N4KF as OES; WB4FAJ as OBS/OPS; WA4VLT as ORS. SNCs earned by WB4FAJ and K4ZRM on FMTN. It was a pleasure having W1HDQ and XYL from ARRL Hq. visit several groups in the Section this month. W6DSD/4, active Panama City ham and former EC, a Silent Key. Bay Co. ARES under EC K4RZM active for five days during train derailment and evacuation which followed. New officers of Five Flags ARA: K4HYV WB4PKW and WA4RQH. The club graduated 8 from the Novice class and has started and Advanced Class course, WB4GEM the instructor. WA4RQH qualified for WAS. WA4VLT and WA4HFG upgraded to Advanced. WD4BRT active on 2m FM from Milton/Harold area. WB4KGW working DX on 10m with converted CB rig. WB4SKI/K4HYV put RTTY to good use during SET, using punched tape. Fort Walton hams and clubs marking all radio eqpt. with ID numbers assigned by Sheriff's Office. New Callbooks have been donated to the local library by Playground ARC. WA4ZFR has joined WA4NIJ in rare Union Co. Recent programs at NOFARS were given by WB4URU on IC technology and by WA4OCX on his home-built computer. Orange Park ARC new officers: WB4CGD K4YLX WA4MST & WA4UKJ. Lake Monroe ARS has a new meeting place at Sanford airport. WA4JNE won 10-10 WAS award. WA4JCP teaching Adv./Extra theory for DBARA. Traffic: (Feb.) WB4QBB 406, N4PL 331, N4WA 230, WB4TZR 134, WB4FAJ 103, W4KIX 94, WB4DTS 85, WA4OEM 80, WD4HIF 77, W4LDM 76, WD4IIO 67, WB4RIS 64, W4FZX 62, WA4CRI 59, WD4NYY 57, W4MGO 56, N4SS 56, W4DTV 43, W4RH 38, K4OER 34, WA4TNC 34, WB4VAP 33, WA4FKE 25, W4MVG 25, WA4HCS 18, WA4VLT 16, WB4YKV 15, WA4STZ 14, WD4LUG 13, WB4WYX 13, WA4EYU 10, K4RNS 8, WB4VMP 6, WA4CLY 5. (Jan.) K4VFY 110, WA4FKE 89, WA4VLT 27, WD4LUG 15, N4KF 11.

SOUTHERN FLORIDA: SCM, Woodrow Huddleston, K4SCL — Asst. SCM: WB4AID. SEC: WB4ALH. Asst. SEC: W4WYR. RM: W4MEE. PAMs: WB4AID & WA4NBE. Nets, Freq. and managers: QFN, 3651, WB4GHU (WA4JPV will take over July 1); QFNS 3715, WA4JPV; GATOR, 3651, W4MEE; FAST, 3940, WA4NBE; FMTN, 7247, WB4AID; FPTN, WB4WYG, 3940. We now have an Asst. SCM, WB4AID, with specific responsibilities: 1. Be ready to do SCM duties if he is disabled. 2. Issue Section Net certificates. 3. Oversee training activities. Other appointments effected in Feb. are: W4NET OES, WD4MIB OBS, N4XR ORS. W4ESH reports new and upgraded licenses in Collier County: Novices WD4OTW WD4NXI WD4NXK WD4NXJ; General N4BS up from Novice; Tech WD4EEF up from Novice. W4BK enjoys gadding about in his Winnebago — to Miami test in Jan., Orlando in Feb., and Winnebago Rally in Eustis in March. WB4ALH has his revised Southern Florida Section Emergency Plan ready for distribution. Main revision is designation of Southern Florida Emergency Net (SFEN) to operate on 3940 and/or 7247 as directed by SEC for emergencies or drills but managed directly by FAST Net or FMTN

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25 watts	–	25A	25C	25D	25E
50 watts	50H	50A	50C	50D	50E
100 watts	100H	100A	100C	100D	100E
250 watts	250H	250A	250C	250D	250E
500 watts	500H	500A	500C	500D	500E
1000 watts	1000H	1000A	1000C	1000D	1000E
2500 watts	2500H				
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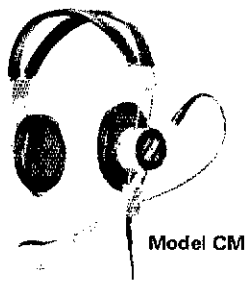
Headphone Impedance	32-20 ohms	2000 ohms	32-20 ohms	32-20 ohms	32-20 ohms	32-20 ohms	32-20 ohms	32-20 ohms
Microphone Frequency Response					50-8000 Hz	50-8000 Hz	50-8000 Hz	50-8000 Hz
Microphone Impedance	–	–	–	–	High	High	High	High
Microphone Sensitivity Below 1 volt/microbar at 1kHz	–	–	–	–	−51dB ±5dB	−51dB ±5dB	−51dB ±5dB	51dB ±5dB
Price:	$9.95	$11.65	$28.30	$37.90	$42.80	$56.90	$68.30	$64.50



Model CM 610

Model C 1210

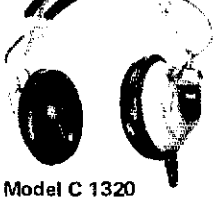
BOOM MIC HEADSETS

For the ultimate in communications convenience and efficiency, select a boom mic headset. Long-time favorites of professional communications, boom mic headsets allow more personal mobility while always keeping the mic properly positioned for fast, precise voice transmission. Boom microphones are completely adjustable to allow perfect positioning. And, boom mic headsets leave both hands free to perform other tasks.

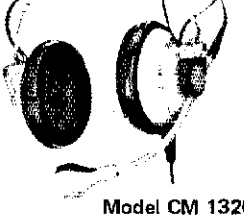
All models are supplied with "close-talking" microphones to limit ambient noise pick-up and provide superior intelligibility. Each model has a convenient, inline push-to-talk switch, which can be wired for either push-to-talk relay (switch is normally open) or voice operated transmitters. The switch may be used as a momentary push button, or can be locked in the down position. All models have rough, flexible, 7 foot cords which are stringent and flexed, unsheathed. Communication gray with black trim.

Model C 610

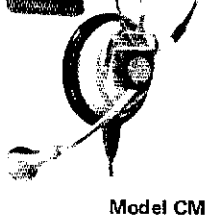
Model CM 1210



Model C 1320



Model CM 1320



Model CM 1320S

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- Activities Galore!

Registration: $3 per person IN ADVANCE, $4 at the door
Ladies & Children FREE!

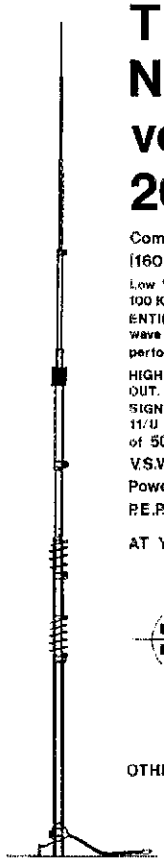
If you do not receive a Preregistration Packet by May 1st, write:

Atlanta HamFestival 1978
100 Woodlawn Drive
Marietta, Georgia 30067

or call Area 404/971-HAMS anytime day or night (PLEASE DO NOT CALL BEFORE MAY 1st)

Hotel Rate: $26 per day single OR double!
Write for Hotel Reservations to:
Marriott Hotel • Courtland at International Blvd. • Atlanta, GA 30303
or phone: Area 404/659-6500 and hurry, hurry, hurry!

THE BEST HAMFEST IN THE WORLD!



The only REALLY NEW 80-10 meter vertical design in 20 years!

Completely automatic bandswitching 80 through 10m [160-10m with optional TBR-160 add-on unit.]

Low V.S.W.R. over entire 40, 20, 15, & 10m bands plus ANY 60-100 KHZ segment of 80/75 m. NO ANTENNA TUNER NEEDED! ENTIRE 28 ft. length active on 80, 40, 20, & 10m with full 1/4 wave resonance on 15 m for greater bandwidth & superior DX performance. Ground, roof, or tower mount- no guys needed.

HIGHEST QUALITY CONSTRUCTION & WORKMANSHIP THROUGHOUT. HIGH STRENGTH ALUMINUM ALLOY AND FIBERGLASS DESIGN. Complete with 1-1/8 in. O.D. tubular mounting post, RG-11/U matching line, and connector for PL-259. Use any length of 50-52Ω coax.

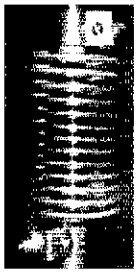
V.S.W.R. at resonance: 1.5:1 or less; all bands.
Power rating: Legal limit SSB/CW 40-10m; 1200 W. P.E.P./500 W. CW on 80/75m.

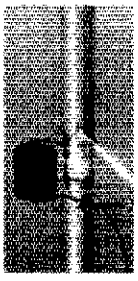
AT YOUR DEALER OR DIRECTLY FROM

BUTTERNUT ELECTRONICS CO.
ROUTE ONE
LAKE CRYSTAL, MN. 56055
PHONE 507-947-3126

OTHER MODELS, TOO! FREE INFORMATION.

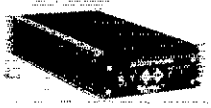
15m trap


80m coil


Base

Model HF5V-II $74.50 PPD. IN CONT. USA (BY UPS). MN. RESIDENTS ADD TAX.

KLM Amplifiers



144-148 Mhz Amplifiers	
PA 2-70B	159.95
PA 2-70BL	169.95
PA 2-140B	229.95
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PA 10-40BL	94.95
PA 10-70B	139.95
PA 10-70BL	149.95
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PA 10-160BL	229.95
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"The Midwest's Fastest Growing Ham Dealer"

10 AMP - POWER TABS!

SCRS! TRIACS! QUADRACS!

Order by Cat. No. and voltage!
#SM1448 - TRIACS #SM1730 - SCR
#SM1590 - QUADRACS

PRV	Sale	2 for
☐ 50	$ .55	$ .56
☐ 100	.69	.70
☐ 200	.88	.89
☐ 400	1.19	1.20
☐ 600	1.59	1.60

THIS SPECIAL ONE CENT SALE IS FOR MAGAZINE ADS ONLY

POLY PAKS' PENNY-PINCHING ONE CENT SALE

THESE ONE-CENTERS ARE THE CENT-CIBLE WAY TO SHOP AND SAVE!

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IT MAKES "CENTS" TO GIVE OUR CUSTOMERS THE BEST BARGAINS!

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Order By Cat. No.SM1981 & Type No.

Type	Each	2 for
☐ SN7400	$.19	$.20
☐ SN7401	.19	.20
☐ SN7403	.19	.20
☐ SN7404	.25	.26
☐ SN7405	.19	.20
☐ SN7406	.19	.20
☐ SN7408	.21	.22
☐ SN7410	.19	.20
☐ SN7413	.39	.40
☐ SN7414	.65	.66
☐ SN7416	.29	.30
☐ SN7420	.19	.20
☐ SN7423	.29	.30
☐ SN7426	.25	.26
☐ SN7427	.25	.26
☐ SN7430	.29	.30
☐ SN7432	.25	.26
☐ SN7437	.25	.26
☐ SN7438	.29	.30
☐ SN7440	.19	.20
☐ SN7442	.69	.70
☐ SN7443	.69	.70
☐ SN7444	.65	.66

Type	Each	2 for
☐ SN7445	.99	1.00
☐ SN7446	1.35	1.36
☐ SN7447	1.25	1.26
☐ SN7448	1.35	1.36
☐ SN7450	.19	.20
☐ SN7451	.19	.20
☐ SN7453	.19	.20
☐ SN7454	.19	.20
☐ SN7455	.19	.20
☐ SN7460	.19	.20
☐ SN7462	.19	.20
☐ SN7464	.19	.20
☐ SN7465	.19	.20
☐ SN7470	.25	.26
☐ SN7471	.25	.26
☐ SN7472	.25	.26
☐ SN7473	.55	.54
☐ SN7474	.29	.30
☐ SN7475	.79	.80
☐ SN7476	.59	.60
☐ SN7478	.59	.60
☐ SN7480	.29	.30
☐ SN7482	.39	.40

Type	Each	2 for
☐ SN7483	.99	1.00
☐ SN7485	1.49	1.50
☐ SN7486	.39	.40
☐ SN7488	1.95	1.96
☐ SN7490	.69	.70
☐ SN7491	.79	.80
☐ SN7492	.45	.46
☐ SN7493	.49	.50
☐ SN7494	.69	.70
☐ SN7495	.69	.70
☐ SN7496	.69	.70
☐ SN7498	.69	.70
☐ SN74100	1.49	1.50
☐ SN74107	.39	.40
☐ SN74112	.25	.26
☐ SN74113	.19	.20
☐ SN74114	.25	.26
☐ SN74121	.49	.50
☐ SN74123	.69	.70
☐ SN74125	.59	.60
☐ SN74126	.39	.40
☐ SN74132	1.25	1.26
☐ SN74140	.99	1.00
☐ SN74141	1.49	1.50
☐ SN74145	1.25	1.26
☐ SN74148	1.75	1.76
☐ SN74150	.99	1.00
☐ SN74151	.99	1.00
☐ SN74153	.99	1.00
☐ SN74154	1.75	1.76
☐ SN74155	.79	.80
☐ SN74156	.69	.70
☐ SN74157	.99	1.00
☐ SN74158	.99	1.00
☐ SN74160	1.25	1.26
☐ SN74161	1.25	1.26
☐ SN74163	1.19	1.20
☐ SN74164	.99	1.00
☐ SN74165	1.25	1.26
☐ SN74166	1.25	1.26
☐ SN74173	1.25	1.26
☐ SN74174	1.49	1.50
☐ SN74175	.99	1.00
☐ SN74177	.79	.80
☐ SN74179	1.49	1.50
☐ SN74180	.49	.50
☐ SN74182	.69	.70
☐ SN74190	1.49	1.50
☐ SN74191	1.75	1.76
☐ SN74192	.85	.86
☐ SN74193	.85	.86
☐ SN74194	1.25	1.26
☐ SN74195	.49	.50
☐ SN74197	.75	.76
☐ SN74190	1.75	1.76
☐ SN74200	5.50	5.51
☐ SN74251	1.75	1.76
☐ SN74284	4.50	4.51
☐ SN74285	4.25	4.26

POP-AMPS AT "CENT-CIBLE" PRICES

Case code: T=TO-220 Power Tab; V=Mini dip, K=TO-3; H=TO-5; N=DIP.

Type	Each	2 for
☐ LM300H	$.49	$.50
☐ LM301H-V	.45	.46
☐ LM308V-H	.79	.80
☐ LM309K	1.29	1.30
☐ LM311H-V	.79	.80
☐ LM318V	1.29	1.30
☐ LM320H-5, 12, 15	1.29	1.30
☐ LM320K-15	1.29	1.30
☐ LM320T-6, 5	1.29	1.30
☐ LM322N	1.19	1.20
☐ LM324N	1.75	1.76
☐ LM339N	1.09	1.10
☐ LM340K-5, 6, 8, 12, 15, 18,	1.29	1.30
☐ LM340T-5, 6, 8, 12, 15, 18, 24	1.29	1.30
☐ LM350N	.59	.60

Type	Each	2 for
☐ LM370N-H	1.29	1.30
☐ LM374H	1.79	1.80
☐ LM376V	.29	.30
☐ LM377N	2.25	2.26
☐ LM381N	1.69	1.70
☐ LM531H	1.49	1.50
☐ LM532H-N	.29	.30
☐ LM555V	.75	.76
☐ LM558V	.79	.80
☐ LM561N	1.00	1.01
☐ LM565N	.99	1.00
☐ LM703H	.49	.50
☐ LM704H	.29	.30
☐ LM709N-H	.25	.26
☐ LM710N	.39	.40
☐ LM733N	.79	.80
☐ LM739N	.89	.90

Type	Each	2 for
☐ LM741V-H	.30	.29
☐ LM1304	.80	.79
☐ LM1310	1.00	.99
☐ LM1312	2.00	1.99
☐ LM1414V	.80	.79
☐ LM1458V	.70	.69
☐ LM1800N	1.00	.99
☐ LM3028H	.66	.65
☐ LM3900N	.50	.49
☐ LM3909V	1.76	1.75
☐ LM4198	1.96	1.95
☐ LM4250	1.20	1.19
☐ LM75451	.40	.39
☐ LM75453	.40	.39
☐ LM75491	.80	.79
☐ LM75492	.80	.79
☐ LM75494	.60	.59

1N4000 Epoxy Rectifiers

• Miniature! • 1.5 Amp! Order by Cat. No. and Type No.

Cat. No.	Type No.	PIV	Price	1¢ MORE!
☐ SM2377	1N4001	50	10 for $.65	20 for .66
☐ SM2378	1N4002	100	10 for .75	20 for .76
☐ SM2379	1N4003	200	10 for .85	20 for .86
☐ SM2380	1N4004	400	10 for .99	20 for 1.00
☐ SM2381	1N4005	600	10 for 1.29	20 for 1.30
☐ SM2382	1N4006	800	10 for 1.39	20 for 1.40

1.5 AMP

BULLET RECTIFIERS!

Order by Cat. No.SM60B84 and voltage

☐ 50V	10 for $.59	20 for $.60
☐ 100V	10 for .69	20 for .70
☐ 200V	10 for .79	20 for .80
☐ 400V	10 for .89	20 for .90
☐ 600V	10 for 1.09	20 for 1.10
☐ 800V	10 for 1.19	20 for 1.20

MICRO MINI

TOGGLE SWITCHES!

3 Amps, 125 VAC contacts, with chrome handles, complete with mounting hardware.

Cat. No	Type	Sale	2 for
☐ SM3936	SPDT	$1.29	$1.30
☐ SM5085	SPDT*	1.39	1.40
☐ SM4037	DPDT	1.45	1.46
☐ SM5087	4PDT*	1.95	1.96

BUY 1 AT OUR SALE PRICE — GET 2 FOR 1¢ MORE

LYTIC KLINIC

Electrolytic capacitors

Order by Cat. No.SM3269 and value

UF	V	Style	Sale	1¢ SALE
☐ 10	15	P.C.	10 for $1.00	20 for $1.01
☐ 50	15	P.C.	8 for 1.00	16 for 1.01
☐ 15	25	P.C.	8 for 1.00	16 for 1.01
☐ 50	25	P.C.	6 for 1.00	12 for 1.01
☐ 20	15	Axial	10 for 1.00	20 for 1.01
☐ 20	15	P.C.	10 for 1.00	20 for 1.01

6 AMP CARTWHEEL RECTIFIERS

Cat. SM3584 — *AXIAL LEADS

PIV	SALE	1¢ SALE
☐ 50	$ .29	2 for $ .30
☐ 100	.36	2 for .37
☐ 200	.45	2 for .46
☐ 400	.61	2 for .62
☐ 600	.79	2 for .80
☐ 800	.90	2 for .91
☐ 1000	1.19	2 for 1.20

LEDS!

YOUR CHOICE 5 for $1.00
1¢ SALE 10 for $1.01

Order by Cat. No.
☐ #SM2135 JUMBO RED LEDS
☐ #SM2137 MICRO RED LEDS
☐ #SM2790 JUMBO RED CLEAR LEDS
☐ #SM2792 JUMBO TAPERED AMBER
☐ #SM2140 MICRO GREEN LEDS

ZENERS!

Order by Cat. No.SM5210 & voltage & wattage!

1 Watt	Sale	1¢ SALE
☐ 7.5V	5 for $1.	10 for $1.01
☐ 8.2V	5 for 1.	10 for 1.01
☐ 9.1V	5 for 1.	10 for 1.01
☐ 11.V	5 for 1.	10 for 1.01
☐ 12.V	5 for 1.	10 for 1.01
☐ 15.V	5 for 1.	10 for 1.01

5 WATTS	Sale	1¢ SALE
☐ 3.3V	3 for $1.	6 for $1.01
☐ 6. V	3 for 1.	6 for 1.01
☐ 6.2V	3 for 1.	6 for 1.01
☐ 8.2V	3 for 1.	6 for 1.01
☐ 9.1V	3 for 1.	6 for 1.01
☐ 12. V	3 for 1.	6 for 1.01
☐ 15. V	3 for 1.	6 for 1.01
☐ 18. V	3 for 1.	6 for 1.01
☐ 24. V	3 for 1.	6 for 1.01
☐ 30. V	3 for 1.	6 for 1.01

THIS NEW LIST OF "ONE-CENTERS" HELPS FIGHT INFLATION!

Quan. Description (Order by Cat. No. in parenthesis)	Sale	1¢SALE
☐ 1—WOODGRAIN CABINET, 3½ x 10 x ¼" deep, spkrs, alarms. (#SM5201)	$1.49	2 for $1.50
☐ 2—LCD THERMOMETER "TAPE", 88-108° F, 7" x 1". (#SM5195)	1.00	2 for 1.01
☐ 1—JOYSTICK, four 100K pots, with knob (#SM3808A)	4.95	2 for 4.96
☐ 1—EECO THUMBWHEEL SWITCH, BCD, 0-7 (#SM2870A)	1.49	2 for 1.50
☐ 1—8-TRACK TAPE TRANSPORT, with preamp (#SM3010)	9.95	2 for 9.96
☐ 1—PLESSEY TV SIDEBAND FILTER, for chan. 3 or 4 (#SM3975)	1.95	2 for 1.96
☐ 5—TRANSITORS, 2N3904 equal, NPN, switching (#SM5209)	1.00	10 for 1.01
☐ 1—METER, 50uA, 1½" square, 0-20db (#SM3705)	1.19	2 for 1.20
☐ 1—SPST RELAY, norm. open 12-24 VDC, 1250 ohms, dip style (#SM5175)	1.00	2 for 1.01
☐ 1—VEEDER ROOT COUNTER, 000-999, resettable, panel mt. (#SM5081)	1.49	2 for 1.50
☐ 2—DUAL GATE MOSFET, sim. to 3N200, 3N187, for RF & Mixer (#SM5101)	1.00	4 for 1.01
☐ 1—8-TRACK TAPE HEAD, with plug' n' cord (#SM3468)	2.50	2 for 2.51
☐ 10__CALCULATOR KEYBOARDS, 20 keys and more (SM3524)	$2.00	20 for $2.01
☐ 15__SLIDE VOLUME CONTROLS, asstd values (SM3057)	2.00	30 for 2.01
☐ 10 CRYSTALS, may include CB, Ham & more (SM3250)	2.00	20 for 2.01
☐ 150__MOLEX IC SOCKETS, on a strip, cut to length (SM3144)	2.00	300 for 2.01
☐ 100__TERMINAL STRIPS, from 2 lugs up (SM3136)	2.00	200 for 2.01
☐ 30__NE-2NEON LAMPS, all 100% good (SM2613)	2.00	60 for 2.01
☐ 40-ft. SHIELDED CABLE, 1 cond, mikes, phonos, (#SM3577)	2.00	80 ft. for 2.01
☐ 50__TRANSISTOR ELECTROS, asstd values, styles (SM2747)	2.00	100 for 2.01
☐ 3__SOUND TRIGGERS, sound triggers scr w/amp (SM3625)	2.00	6 for 2.01
☐ 15__6V TEST INDICATORS, leads, grain-o-wheat (SM3526)	2.00	30 for 2.01
☐ 100__CAPACITOR SPECIAL, discs, mylar, lytics, more (SM2738)	2.00	200 for 2.10
☐ 30 MINI TRIMPOTS, to 1 meg, 1 turn, ¼W (SM3345)	2.00	60 for 2.01
☐ 10 VOLTAGE REGULATORS, hobby LM320, 340, TO-3 (SM3330)	2.00	20 for 2.01
☐ 30__PANEL SWITCHES, slides, rotaries, mod, etc (SM3268)	2.00	60 for 2.01
☐ 200__RESISTOR SPECIAL, ¼ to 1W, carbon, metal (SM3054)	2.00	400 for 2.01
☐ 200__HALF WATTERS, resistors, carbon, metal (SM3046)	2.00	400 for 2.01
☐ 100__NATIONAL IC BONANZA, linears, 7400s ROMS (SM2860)	2.00	200 for 2.01
☐ 40__HOBBY LEDS, asstd types, mostly useable (4R2859)	2.00	80 for 2.01
☐ 15__LM340T VOLTAGE REGULATAORS, 5 to 24V, TO-220 (SM2635)	2.00	30 for 2.01
☐ 100__TWO WATTERS, resistors, carbon-metal marked (SM2735)	2.00	200 for 2.01
☐ 100__POLYSTYRENE CAPS, asstd values, voltage, hi-Q (SM2729)	2.00	200 for 2.01
☐ 50 THERMISTORS, resistors that change with temp (SM4089)	2.00	100 for 2.01
☐ 20 BRIDGES, untested, 2, 4, 6, 10, amp, full wave (SM4022)	2.00	40 for 2.01
☐ 25__LAMP'N'SOCKET SETS, micro, 1.5V, T2 (SM3957)	2.00	50 for 2.01
☐ 15__MIXED READOUTS, hobby, untested, .127, .3, .5, etc. (SM3619)	2.00	30 for 2.01
☐ 150__QUARTER WATTERS, resistors, metal film, marked (SM3413)	2.00	300 for 2.01
☐ 100__PLASTIC TRANSISTORS, untested, RO-92 (SM2604)	2.00	200 for 2.01
☐ 200__PREFORMED RESISTORS, ¼, ½, 1W, marked, asstd (SM2608)	2.00	400 for 2.01
☐ 200__PRECISION RESISTORS, ¼, ½, 1W, 1%, 2% marked (SM2428)	2.00	400 for 2.01
☐ 60__DIPPED MYLARS, shiny finish, asst values (SM2597)	2.00	120 for 2.01
☐ 30__VOLUME CONTROLS, audio, linear, asstd values (SM2421)	2.00	60 for 2.01
☐ 5__7.5 VOLT ZENER DIODES, 1 watt (SM5187)	1.00	10 for 1.01
☐ 5 9.1 VOLT ZENER DIODES, 1 watt (SM5188)	1.00	10 for 1.01
☐ 30-FT. WIRE WRAP WIRE, 30 gauge (SM3803)	1.19	60-ft for 1.20
☐ 5__TANTALUM CAPS, 2.2uF, 25V (SM5189)	1.00	10 for 1.01
☐ 1__ALARM CLOCK CHIP, MM5316, 4-digits (SM1759)	2.95	2 for 2.96
☐ 5__PANCAKE PHOTOCELLS, 600 to 15K ohms (SM2939)	1.00	10 for 1.01
☐ 1__100KHZ MARKER CRYSTALS, approx for marker gen. (SM3896)	1.95	2 for 1.96
☐ 1 MOTHERBOARD EDGE CONNECTOR, 106 pins, .125" (SM3987)	3.50	2 for 3.51
☐ 1__48-PIN EDGE CONNECTOR, .156" spacing (SM3963)	1.95	2 for 1.96
☐ 1__JOYSTICK, two 10K pots, for computers, TV games (SM5037)	2.95	2 for 2.96
☐ 1__CHARACTER GENERATOR, 5 × 7 Mostek MK 2002P (SM3898)	4.95	2 for 4.96

READOUTS!

		ONE CENT SALE
☐ 3½ DIGIT LCD WRISTWATCH DISPLAY. (#SM3960)	3 for $1.19	6 for $1.20
☐ GE FLUORESCENT NIXIES, 7-seg, blue (#SM3684)	1 for 1.00	2 for 1.01
☐ SPERRY FLAT NIXIES, orange dual digit (#SM5014)	2 for 1.19	4 for 1.20
☐ SPERRY FLAT NIXIES, orange, .3", 1½-dig (#SM5015)	2 for 1.19	4 for 1.20
☐ MAN-3 BUBBLE READOUT, .19" red, com cath. (#SM3338)	6 for 1.00	12 for 1.01
☐ MAN-4 READOUT, bubble, red, com anode (#SM1503)	2 for 1.00	4 for 1.01
☐ FND-10 BLOCK READOUT, .122" com cathode (#SM2082)	2 for 1.19	4 for 1.20
☐ 8-DIGIT READOUT, led, com cathod, red (#SM5190)	1 for 1.95	2 for 1.96
☐ FND-503, .5" red, com cathode, 7-seg. (#SM2949)	1.50	2 for 1.51

SPEAKERS!

	Each	2 for
☐ 6" TWIN CONE SPEAKER, hi-fi, for car'n'home (#SM5059)	$4.50	$4.51
☐ 2¾ × 5" OVAL SPEAKER, 8 ohms (#SM2553)	1.49	1.50
☐ 2 × 6" OVAL SPEAKER, 8 ohms (#SM3454)	1.49	1.50

MICROPHONES!

	Each	2 for
☐ CONDENSOR MIKES, sensitive, 500 ohms, 1½V (#SM3178)	$4.95	$4.96
☐ COMMUNICATIONS MIKE, 500 ohms, CB-HAM (#SM4074)	4.50	4.51
☐ NOISE CANCELLING MIKE, Ham-CB, 500 ohms (#SM3902)	6.95	6.96

RELAYS!

	Each	2 for
☐ SPDT 12V BLOCK RELAY, 5A contacts (#SM4032)	$1.98	$1.99
☐ SPDT 12V REED RELAY, 1A contacts (#SM4094)	1.49	1.50
☐ SPDT 12V SENSITIVE, 2000 ohm coil (#SM3044A)	1.95	1.96

AMPLIFIERS!

	Each	2 for
☐ 8 WATTS ON A BOARD, with built-in preamp (#SM5040)	$5.95	$5.96
☐ 9 WATTS ON A CHIP, Toshiba TA7205 (#SM5057)	4.95	4.96
☐ 3 WATTS ON A CHIP, G-E PA 263 (#SM1522)	1.50	1.51

TRANSFORMERS!

	Each	2 for
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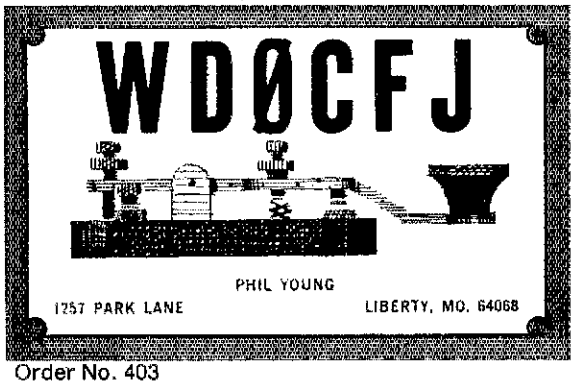

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manager as appropriate. This gives SEC a measure of control and enables him to get the reports he needs while allowing usual Section Net managers to retain control and get credit for their net participation. We think it will work OK. Let's everybody make necessary preparation for the hurricane season. It will be here before you know it. Traffic: (Feb.) W4MEE 669, K4TH 394, K4SJH 368, K4SCL 358, WA4SCK 264, WB4WYG 253, WA4NBE 224, WA4PFK 185, WA4JPV 171, WB4AID 156, WB4NJU 152, WA4EIC 139, WA4GYR 135, N4KB 123, WB4ALH 107, W4NTE 101, WB4PIB 69, WA4QGV 64, W4KMN 56, W4GPL 51, W4IRA 51, W4YCL 48, WB4GSV 43, K4NAN 43, W4DVO 41, W4GDK 40, W4ZJ 39, W4WYF 37, WB4YKE 36, WD4COL 35, WA4MNX 33, K8PXM/4 28, W4SMK 28, WB4AOC 27, WA4RLV 24, W4QM 21, WB4KSJ 20, N4TW 17, K4EUK 15, W4IYT 13, WA4MJT 11, W4MML 11, WA4KCR 10, W4TJM 8, WD4BAJ 5, WB4HYE 5, W4BK 4, WB4SNX 3, N4XR 3, WB4LXH 2. (Jan.) K4EUK 30, K4GRM 18, W4ESH 15, WB4DWU 6, N4TW 5, W4PJT 2.

SOUTHWESTERN DIVISION

ARIZONA: SCM, Marshall Lincoln, W7DQS — PAMs WA7KQE W7UQQ. RM: W7EP. W7KOY did an outstanding job operating as an "information central" on the Phoenix 34/94 repeater during flooding in early March. She coordinated many reports of road closings and emergency situations, keeping 94 users informed of current events. Many Phoenix area FMers assisted by providing information, and ARES-RACES members in Pima County monitored the situation and prepared to go to Phoenix to assist if needed. W7FEZ and WB7OEC appeared on TV with reports from amateurs of the emergency. A fine example of the public service spirit of many AZ hams. K7CC has been appointed by the FCC as an examiner for the handicapped, and reports he will be putting an automatic OBS feature on his 34/94 repeater. Members of the Tucson Repeater Assn. assisted the Tucson rodeo committee. Scottsdale ARC Novice code practice on Tues. nights has been changed to 10 meters due to TVI, and a high speed practice session added on Thur. Nets: Cactus 179, ATEN 95, SWN 207. Traffic: W7EP 165, WB7TPY 141, K7UXB 92, WB7CAG 76, W7LVE 56, K7NTG 40, WA7KQE 31, WA7ITG 24, W7DQS 18, WB7ORT 15, WA7WEB 12, WB7CZL 6, K7JKM 6.

LOS ANGELES: SCM, Perry Masterson, W6RHS — SEC: WB6FRM. The month of Feb. was a busy time for the LA Section, judging from all the reports received. The SCM visited several of the local Radio Clubs. It is my intention to visit all the organizations in the Section to meet as many amateurs as possible. We are still looking for willing hams to fill holes in our field organization. If any of you are interested or want specific information on any office, contact me by telephone, radio, letter or any other means at your disposal. WD6BBS has been licensed as a Novice for about 10 months now, but is afraid to get on the air because she is afraid of making mistakes. Any YLs in the section want to give her some encouragement? W6RIQ has installed a new trap antenna for 160 on up and is reporting satisfaction with the way it is working on 75. The OOs in the section had a busy month. The reports I have received seem to indicate amateur radio as a whole needs to re-read the regs and use a little more caution when approaching band edges. K6KA has been especially active both in monitoring the bands and in the Intruder Watch program. K6CL reports the same type of activity. N6HE reports OO activity again this month. N6HE also wonders why 2-meter propagation around hills is better when it rains. He should of had a lot of practice with that the last few months here in the Los Angeles area. Not too much from the VHF gang as of yet. I have appealed to them for reports in all the colums written and in the talks I have made in the Section. I still need more inputs. The Carson ARC 220 MHz repeater WR6AVQ is scheduled to go atop Palos Verdes soon. Testing at WB6MYD's QTH continues. The amateur training classes are still busy and the results are encouraging. The Alhambra High School group, the PCC group and the Lockheed group have told me great things about the budding hams. We congratulate them and offer our full support and thanks for a fine effort. I know there are many others doing an equally commendable job, but I have no input on their activities. YL activity reporting was limited this month. I hope to have more details for next month. Traffic: N6PZ 184, W6INH 142, W6OEO 137, K5DY/6 68, K6EA 42, N6HI 28, W6BWG 23, K6CL 19, W6BRO 10.

ORANGE: SCM, Wm. Heitritter, WB6AKR/6 — Asst. SCM: K6KNC. SEC: W6AQB. RM: K6JT. PAM: W6CPB. ECs: WB6ARK K6GGS W6LKN K6KNC W6WPI WA6YWS. Anaheim ARC reports the following assistance the Red Cross during the Huntington Beach mini tornado and Silverado Canyon flooding disasters: K6KNC WB6ORK WA6OWJ K6WS K6UJO WB6GCC WA6NFO WB6UZZ WA6SKE WA6PSR WD6BIQ W6RB WD6AQK WB6DAB WA6TKV WB6LVR WA6COX W6IBP W6IBP WA6TEY WB6ARK W6RUP W6SUL W6QXE and WB6NEX. The Citrus Belt ARC (San Bernardino) reports W6DZO and N6GA conducting Novice and General classes Redlands High School 7:30 P.M. beginning Feb. 14. Fullerton ARC reports WB6DCB upgraded to General. Victorville ARC reports W6TUE new Novice WA6ZWU obtained 1st Class Radiotelephone, WB6YSI and WB6QHU achieved 2nd class Radiotelephone licenses. W6WPP has appointed WA6EPI and WD6AUV as Asst. ECs in Riverside County. South Orange ARC reports upgrades: WB6KCX to Extra; WD6AEI to Advanced; WD6CQT WD6DTO WD6EDB to General; WD6DPJ to Technician; new licenses: WD6EDB WD6OPJ WD6EOI WD6EDE WD6ECK WD6EDC WD6DTO WD6EDK. South Orange ARC has contributed a complete set of ARRL publications to Saddleback College Library. W6TIO has converted a CB set to 10 Meters (Standard Horizon 2) with instructions supplied by Standard. K6JT has appointed WB6DAB Asst. Mgr. of SCN/Mgr. SCN/2 Net. Traffic: (Feb.) WB6EIG 442, WA6KHB 222, W6RE 93, WB6DAB 45, K6JT 30, W6VOZ 22, W6CPB 21, W6QBD 7, WA6YWS 5. (Jan.) WB6EIG 365, K6JT 170, W6RE 158, WB6DAB 98, WA6KHB 64, WA6YWS 43, W6CPB 24, W6QBD 6.

SAN DIEGO: SCM, Arthur R. Smith, W6INI — Only four months to the National Convention in San Diego, Sept. 22-24, 1978. QCWA's antique wireless display was destroyed in the Aerospace Museum fire. Contact curator W6QLO at 447-2038 if you have anything to donate to restore the collection. WA6PWA is now EP2R. He will be in Tehran, Iran for three years with American Bell International. New Novices: WD6FGL WD6FGM WD6FGO WD6FGP. Upgraded: to Extra WA6OZS; to General WD6AEE WD6BRO WD6CQP WD6CWN

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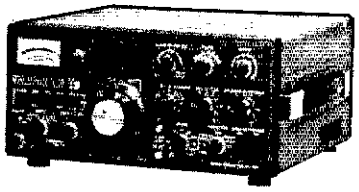

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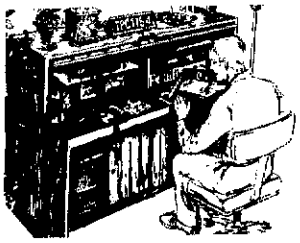

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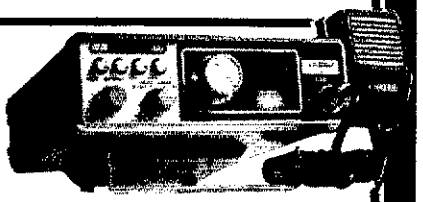

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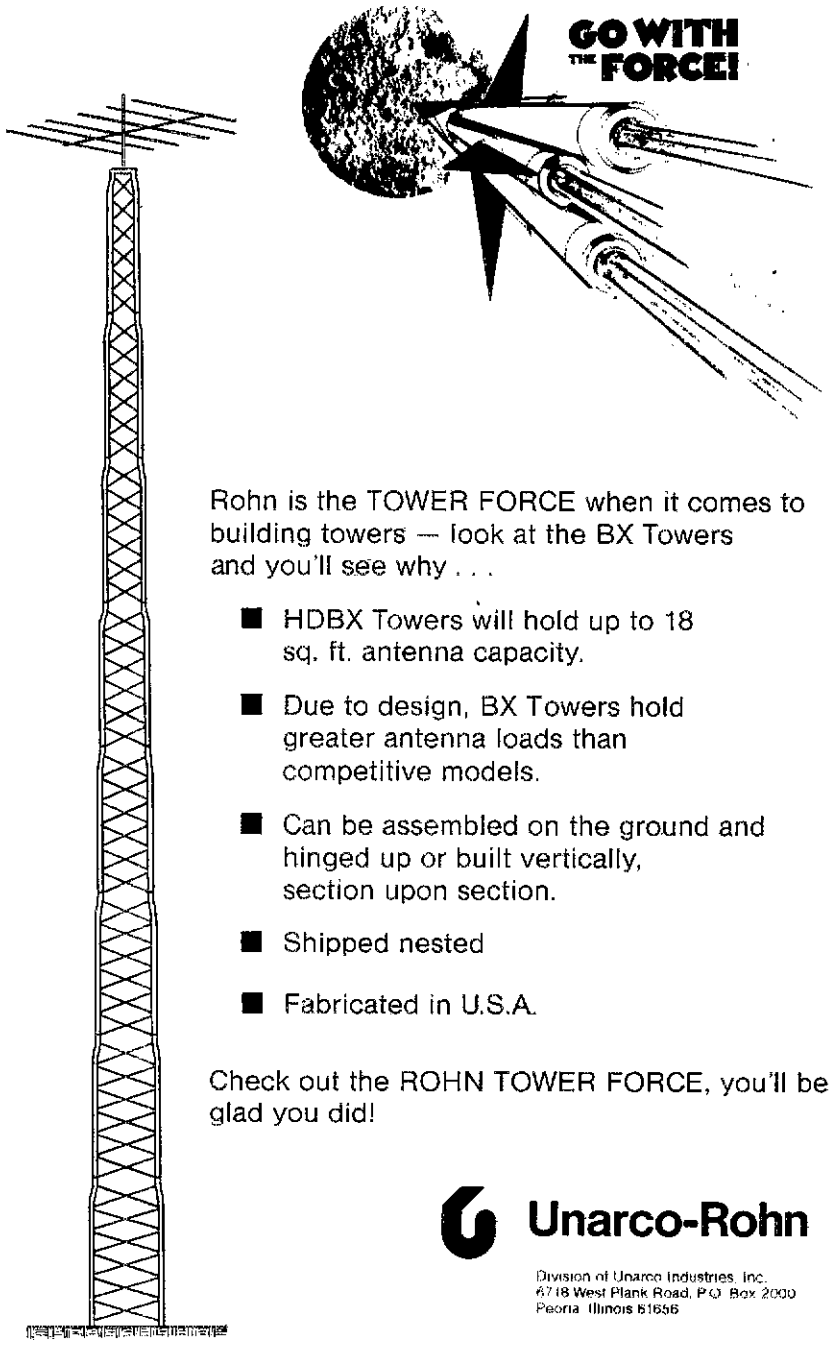

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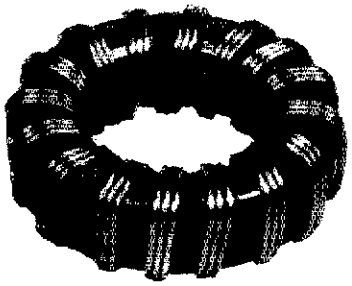

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SANTA BARBARA: SCM, D. Paul Gagnon, N6MA — WB6BWZ appointed the following Asst ECs: WA6ZLC AA4CD K6SZS N6GC W6JFP WB6JHJ. Tnx to ARES in Ventura for manning flood evacuation centers for RC WB6JKM assisted motorist and reported gas leak via WR6AOX autopatch. WB6RHR and WB6SBX provided road assist in SLO during storm via WR6AEL. WB6HJW and WA6KAC presented ARES to Paso Robles club W6YY spoke on DX stations and K6BPY on antennas at SBARC. Satellite ARC supported OSCAR 8 launch with 5 stations at Vandenberg from W6AB. WB6AKG spoke on SSTV at Bunker Ramo ARC. WA6EKG spoke on Computers at Simi Settlers ARC. They have a nice Worked Simi Valley award. Contact WA6GUT. The Lompoc ARC has affiliated with ARRL. Poinsettia ARC awards include Novice DX, WAS, WAD, Cal Counties, and a special award. Contact WA6KYW. WA5SEB arranged a tour of OSCAR 8 before meeting for area hams WA6OBT coordinated comms for the Hidden Valley Marathon. N5MR vacationed in UT skiing and QNI SCN with 5-watt QRP. N6NB mounted a new 70-ft tower on a trailer. Also gave a talk at So Cal DX Club. WB6JKM sent over 70 bulletins in first month as OBS. WR6AVI has new solid state repeater with Microprocessor control WA6LFV new TS700A. WB6BWZ passed CP25 proficiency. WA6TLP now on RTTY with Model 15 and homebrew TU. W6SXV checking into SCN/1 and 2. WB6HOZ reports Novice, Gen, Advanced, and Extra classes in session for SBARC. Remember the section net on 3935 Sun. at noon. An LO net meets Sun. at 1700 on 3907. W6ZRR new OBS. WA6VBS now N6WP. Traffic: (Feb.) KH6IQU 251, N6WP 237, K6WI 142, W6ZRR 38, W6ZXV 24, N6MA 11, WB6JKM 3, WB6BWZ 1. (Jan.) WB6HJW 28.

WEST GULF DIVISION

NORTHERN TEXAS: SCM, Ted Heithecker, W5EJ — Asst. SCM: K5PC, RM: W5GN, are working actively to increase participation of everyone in amateur activities in North Texas, with reports showing the results. W5QPX reports much outside activity in Jan., but didn't seem to slow down his "QO" and "IW" work. W5QKM reports Henderson Cty Communications Club changing to Athens ARC, and going for ARRL affiliation. WA5ZNZ pres. of Dallas ARC put a new linear in operation, clear the road! DARC and CRW going good with much participation. K5WIQ sent "the shorted circuit" — good information with general schedules for all sorts of activities, a regular grab-bag. We receive quite a few reports too late to include — mailing deadline to ARRL (QST) is the 7th of each month! K5IBI, editor of the local oscillator plugging for participation in the emergency communications activities in Panhandled ARC. We think this is one area amateurs can really shine — get in and participate. Golden Spread Convention set for Aug 11, 12, 13. W5GSN sent copy Key City ARC news, Chuck full an reports W1AW big and fat on 21075 0800. Comments from many in North Texas sending regards to Lew McCoy, he's missed in these parts, get well soon Lew WD5BDC, net mgr SW Traffic Net sent in fine report WB5LAT reports planning for 2 mtr WX Net and Field Day activities underway. K5PC launching big EC recruitment drive — watch out boys! K5DOI reports Arlington ARC repeater now equipped for police call back, with setup used in flood watch PGM by AARC members in cooperation city emergency planning. W5TI glad to see snow disappearing, and still handling traffic all out ARTS Net growing and improving! WA5UBK reported Lubbock ARC now 2 years old, with new prexy K5ILW K5WIQ's Novice class well underway, with upgrade doing fine too. WR5APD antenna fell during Texas ice storm. W5CTZ sent in a big activity report for Jan. which arrived too late. Mail isn't what it used to be — delivery that is. Nominations for SCM in North Texas open soon participate and become a real part in ARRL work! Real heavy tfc reports for Feb. So will end with the old sage W5QPX saying — the world is full of willing people some willing to work and the rest willing to let them. Hear tell WB5MRB sat in as NCS on MARCO a few times. W5VMP and WB5SDD made PSHR Feb. W5KLV report on CAN-D shows North Texas stations WA5BHF WB5SDD and WA5INJ active. WB5CDX report on D-RN shows WA5BHF WB5SDD W5BKM W5CTZ WA5INJ WA5VBM W5UFL W5YVK and W5VMP active! Traffic: WB5SDD 395, W5TI 273, WB5MRB 224, WD4BDC 148, W5CTZ 106, WD5AAT 97, W5GSN 61, WB5LAT 57, WB5WPM 50, K5PC 42, WA5INJ 39, WA5EZT 20, WB5RPU 14, W5EJ 9, K6PVI 7, K5DOI 2.

OKLAHOMA: SCM, Leonard Hollar, WA5FSN — OK is very proud of, and extend our congratulations to WA5SEB for his part in the OSCAR 8 program. It looks like the 'old Night Owl Net' has been revived, only now it is on the OK. City 07/67 repeater and starts at 11 P.M. and lasts until —. They have excellent coverage of the state and often the OLZ and RN5 reps, bring traffic and move it here. With the 01/61 machine on at Hugo and 75/15 back on at Enid, OK is well covered by 2M FM. Did you check your beam? The unusual amount of ice we had this winter has been hard on them. Miami and Enid among those running classes this spring. 6 ops sent in reports for PSHR. BPL K5OWK. Looking at rest of traffic reports we have some good liaison stations helping with section and area nets. OK Net reports still look good with new calls showing up almost daily. OAN can always use more, practice your cw. OTWXN WX reports up again and WX Bureaus will be glad to have more reports. Traffic: K5OWK 624, W5REC 274, WB5NKQ 259, WB5NKD 182, W5RB 157, WB5KKT 82, W5SUG 57, WB5ELG 55, W5UYH 54, W5BYC 52, WB5OGZ 45, WA5OUV 43, K5CAY 31, W5VOR 24, WA5FSN 20, WB5RLR 19, W5FKL 14, WB5AOH 12, WA5ZKI 9, W5JJ 8, WB5OYU 4.

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- TEN-TEC #540 Triton List $699 only $619
- YAESU FT-301 (dial) with AC Power Supply and CW Filter Value $966 only $769
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- YAESU FT-101E Reg $799 only $709
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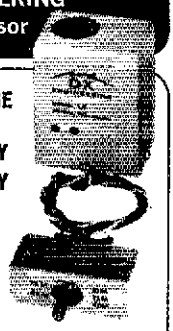
Here's what you can expect from the DX ENGINEERING RF Speech Processor



- 6 db INCREASE IN AVERAGE POWER
- MAINTAINS VOICE QUALITY
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- EXCELLENT FOR PHONE PATCH
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This is RF Envelope Clipping—the feature being used in new transmitter designs for amateur and military use.

Models Now Available
Collins 32S, KWM-2 .....$ 98.50 ea.
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Watch for other models later!

DX Engineering
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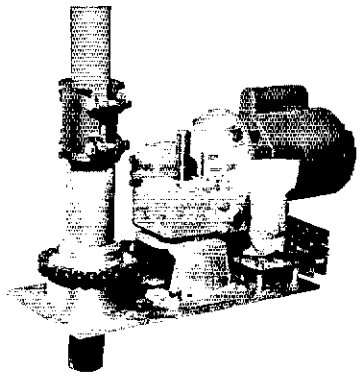
STEP UP TO TELREX

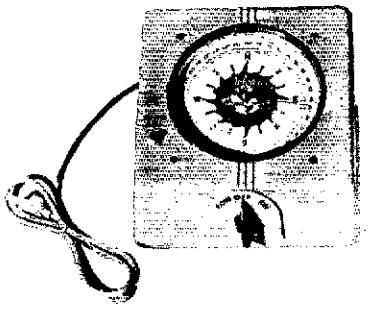
Professionally Engineered Rotator Systems

Featuring a Telrex custom-built 3-stage reduction Rotator-Selsyn-Indicator system, which incorporated a 2-stage worm wheel reducer, and a chain-driven final stage with feed thru antenna mast captivation.



Telrex Rotator System Model A1312RISX illustrated (6000 inch lbs rotating torque)

Telrex has Amateur & Commercial Rotators for practically any use.



Automatic antenna locking and electrical limit of rotation provided.

For technical data and prices on complete Telrex line, write for Catalog PL 70.

COMMUNICATION SYSTEMS SINCE 1921 Telrex Laboratories ASBURY PARK, NEW JERSEY 07712 U.S.A.

G.R. WHITEHOUSE & CO.

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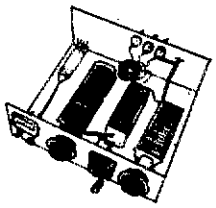
TRANSMATCH PARTS



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154-10 Single section 350 pf. transmitting capacitor, 154-507 Dual-section 192 pf. section transmitting capacitor, 229-203 Roller Inductor 28 µh by Multronics, 3902-1 Turns Counter by Barker & Williamson. SEPARATELY PRICED AT $163.80 NOW $129.95

WE ALSO STOCK THE OTHER TRANSMATCH PARTS.

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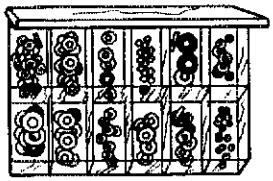

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INDIVIDUAL TOROIDS AVAILABLE FROM THE FOLLOWING LIST, PRICES EACH:
A Columns: 1—4 pcs. • B Columns: Mult. of 5 pcs. (Save ⅓)

	A.	B.		A.	B.		A.	B.
T12-2	$.25	$.15	T44-3	$.45	$.30	T68-10	$.55	$.35
T12-10	.25	.15	T44-6	.45	.30	T80-2	.60	.40
T25-2	.30	.20	T44-15	.45	.30	T80-3	.60	.40
T25-6	.30	.20	T50-1	.45	.30	T80-6	.60	.40
T25-12	.30	.20	T50-2	.45	.30	T94-1	.90	.60
T30-2	.30	.20	T50-3	.45	.30	T94-2	.90	.60
T30-6	.30	.20	T50-6	.45	.30	T94-3	.90	.60
T37-2	.40	.25	T50-10	.45	.30	T94-6	.90	.60
T37-6	.40	.25	T50-12	.45	.30	T106-2	1.15	.75
T37-10	.40	.25	T68-2	.55	.35	T106-3	1.15	.75
T37-12	.40	.25	T68-3	.55	.35	T130-2	1.75	1.15
T44-2	.45	.30	T68-6	.55	.35	T130-6	1.75	1.15
						T200-2	2.40	1.60

TRANSMATCH BALUN SPECIAL 3T200-2 cores plus 20' #14 Teflon Covered Wire SAVE $3.45 TBS Kit.....$9.75

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Includes convenient plastic storage box and one dozen each of FB43-101, FB43-801, FB64-101, FB64-801, FB73-101 and FB73-801 plus new spec sheets. Value $7.50 for $6.95

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(NEAR ORLANDO)
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WA5RKU. OOs rptg this month: K5DL WB5CIT. OVS rptg WB5CIT. DRN5 Mgr W5KLV again made BPL this month. Sister Mary, WA5VBM, received a 40-ft teletower from an anonymous doner; cranks up and folds over! ORS WA5-JYH upgraded to Extra; rprts new officers for Beaumont AR and Rptr club: WA5NRG, pres.; WA5JYH, vice-pres.; WA5JMZ, secy-treas. New ECs: WA5CXG, Travis County; W5CKC, Harris County. WB5PPQ has new TS-820S. W5KR has new IC-245. OPS WA5RVT has new Wilson 2-mtr HT; rpts Brazoria ARC donated full set of ARRL publications to Brazoria County library. OPS WA5YEA moved to Georgetown. K5HXR retired; is looking forward to active hamming and public service work. OVS WB5CIT rprts new transmitter for WR5AGT. From AAR-COVER (Austin ARC): WB5LXD WB5EYL WB5HZQ WB5YWQ aided Austin Independent School District with second annual Elementary Cross Country run; approximately 500 students, age 9-12, took part. WB5URY, WD5CLI and WD5CLG upgraded to Technician; that is step two. Traffic: (Feb.) W5KLV 571, K5HZR 313, WA5RKU 257, WA5YEA 194, N5TC 188, WA5VBM 150, W5BGE 60, W5KR 45, WA5RVT 38, WA5CXG 37, WB5ZRH 36, WA5JYH 33, K5MUK 30, WB5LTW 10, K5RVF 6, W5QO 3, WB5YDA 2. (Jan.) WA5CXG 38, WB5LTW 33. (Dec.) WB5LTW 74.

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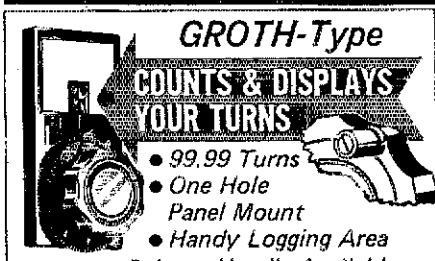
NOTICE

Instructograph Co. Closed For Vacation July 10 To August 10, 1978

GROTH-Type



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Case: 2x4"; shaft ¼"x3"

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TC 2	$8.00
TC 3	$8.75
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Add $0.75 for Air or UPS

Model TC2: Skirt 2-1/8"; Knob 1-5/8"

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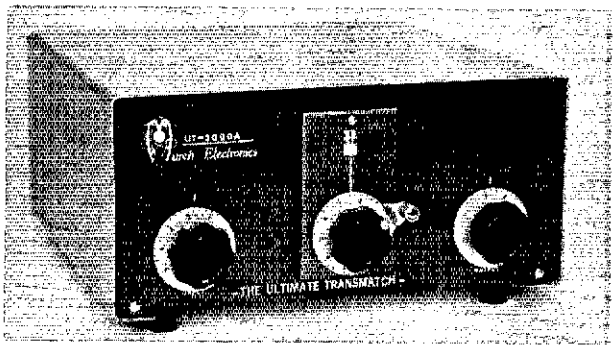
FROM MURCH ELECTRONICS the UT2000A

THE ULTIMATE TRANSMATCH



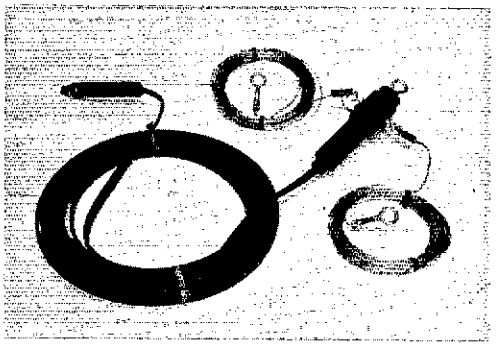
Similar to the one in Lew McCoy's article July 1970 QST also 1976 Handbook

- Use with any coax or end fed random wire antenna, ideal for apartment dwellers
- 2 kW P.E.P. (1 kW continuous) 1:1 SWR to transmitter
- 10-80 continuous, including MARS
- Use with any wattmeter or SWR indicator
- Heavy duty throughout (4000 volt capacitors)
- Rotary Inductor with turns counter for precise and rapid tuning

12" w 12" d x 5½ h, 12 lbs shipping weight

MODEL UT-2000A **$139.95 + SHIPPING**

MULTIBAND ANTENNA 10 - 80 M



- Field Proven 4 years
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- Coax fitting to connect twin lead to 52 ohm transmission line (68 feet or more, not included)
- Ready to use. Great on all bands when used with the Ultimate Transmatch

MODEL 68A, 2000 w P.E.P. **$44.50 p.p.**

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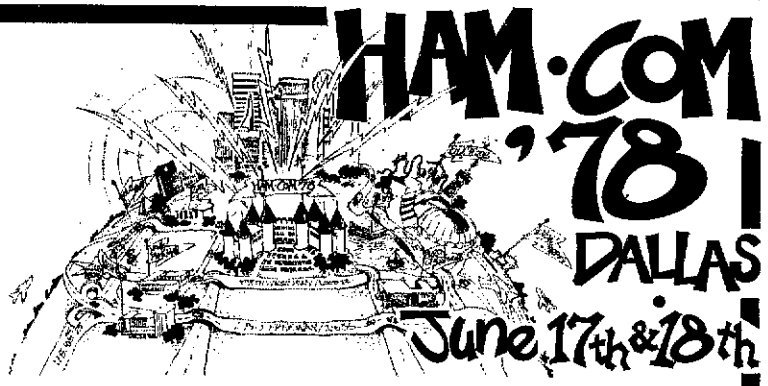

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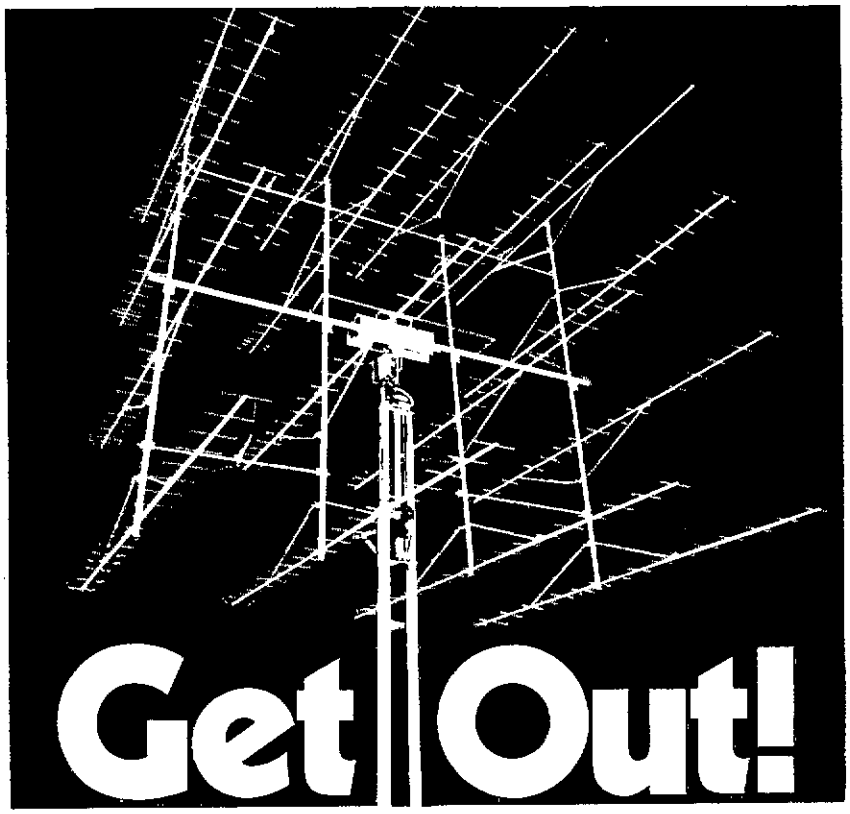

OK, you made the decision to UP YOUR FREQUENCY and explore the uncharted regions of UHF. The choice of gear is endless, and it is *all* state of the art. You find one that suits your personality, and microwaves are a reality. But what good is your fantasy if you can't get out? Interesting dilemma? Not anymore. **TEXAS RF DISTRIBUTORS** introduces the **F9FT**. These French-made beauties by Tonna Antennas have become legend throughout Europe, and now you can own one. Whether you operate on 144 MHz, 432 MHz or Oscar, you can finally have the confidence that your signals are not lost at the end of your feed line.

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20116 16 el	144-148	9.7	21
20421 21 el	432-435	5.7	15
20199 9 el 19 el	OSCAR 144-148 432-435	5.5	11

F9FT IS AT YOUR DEALERS NOW, OR CALL OR WRITE:

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Nominal fees for campers, vans and trailers. Gates will open at Noon, June 3rd.

Free coffee and doughnuts – 8:30 to 9:00 a.m.

This is an A.R.R.L. Approved Hamfest with A.R.R.L. public information booth manned by League Officials.

No Inflation!!! Registration $1.50 before May 25, $2.00 at Gate.

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STARVED ROCK RADIO CLUB – W9MKS - WR9AFG
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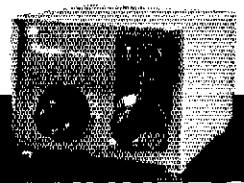

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- **FULL YEAR GUARANTEE**

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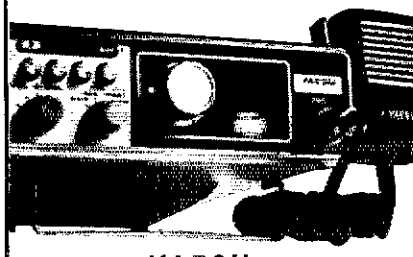

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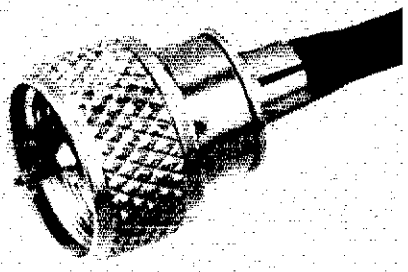

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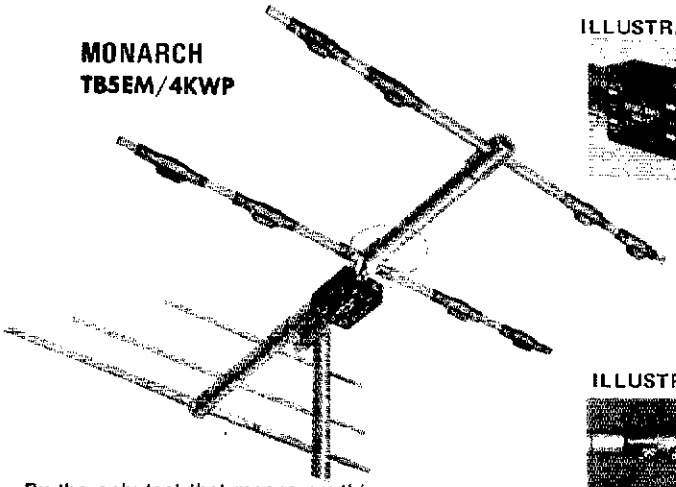
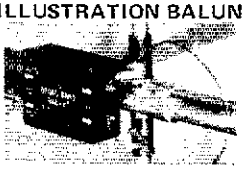


ILLUSTRATION BALUN



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By the only test that means anything . . . on the air comparison . . . this array continues to outperform all competition . . . and has for two decades. Here's why . . . Telrex uses a unique trap design employing 20 HiQ 7500V ceramic condensers per antenna. Telrex uses 3 optimum-spaced, optimum-tuned reflectors to provide maximum gain and true F/B Tri-band performance.

For technical data and prices on complete Telrex line, write for Catalog PL 7

COMMUNICATION SYSTEMS SINCE 1921 **telrex** Laboratories
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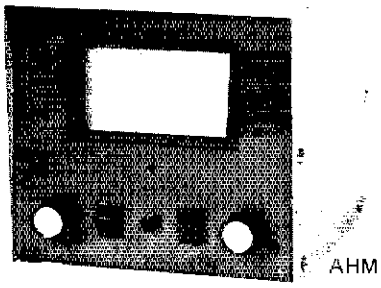
ROTOR PROTECTION WITH AUTOBRĀK DELAY



AHM

Rotor Damaged? Been off the air waiting for parts? No more! AUTOBRĀK reduces the inherent problem of damaged rotor components due to instant brake engagement. AUTOBRĀK allows the antenna array to come to a coasting stop before brake engagement, thereby reducing stress on rotor components.

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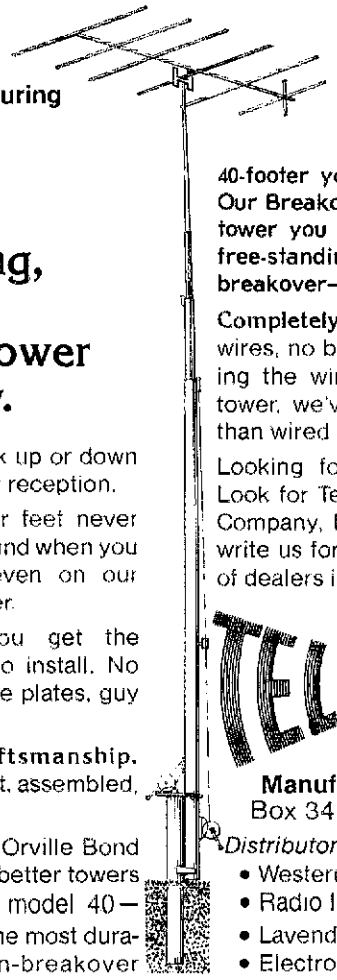
Brand new from Tele-Tow'r Manufacturing Company

The only completely free-standing, telescoping, breakover tower you can buy.



They telescope. Crank up or down easily to pinpoint best reception.

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Completely free-standing. No guy wires, no brackets. Yet, by stretching the windload over the entire tower, we've made them stronger than wired or bracketed towers.

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TELE TOW'R

Tele-Tow'r Manufacturing Company,
Box 3412, Enid, OK 73701

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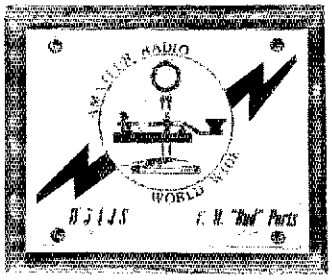
STATION I. D. PLAQUE



This is a plaque that every amateur radio operator will be proud to display in his shack. Large 8''x10'' solid walnut base with hanger. Operator's name and call are printed on high quality parchment featuring key and mike design. The key and mike design are printed in blue and brown with the name and call in black. Parchment is placed under plexiglass and mounted on the walnut plaque.

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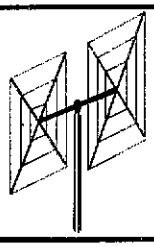
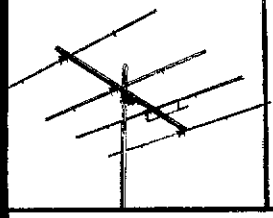
Now check this super price: 10/15/20 quad, complete, ready for simple assembly . . . **JUST $59.95.**





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In an age of compromise, Gotham beams stand out offering championship performance at modest prices. Adjustable to any frequency within band, at lowest SWR, these beams are built strong to resist adverse weather conditions. Each beam is full size for full size performance, not mini beams, or trapped beams; including boom, all hardware, and gamma match; requires 52 or 72 ohm coaxial feedline; 7/8" and 1" aluminum alloy elements for maximum strength and low wind loading.

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FREIGHT PREPAID on 2, 6, and 10M beams shipped to the 48!

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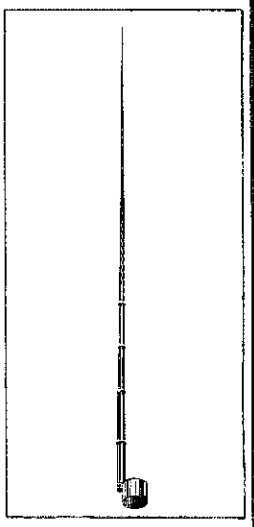

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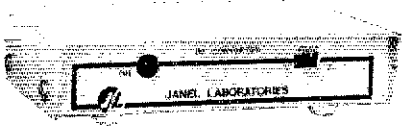

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FOR 2 METER TRANSCEIVERS

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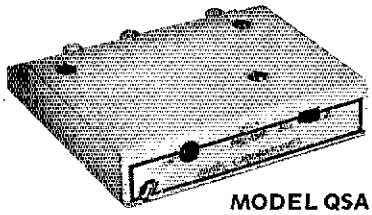

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The QSA 5 preamp is a high performance, low noise preamp for improving the receiving sensitivity of 2 Meter transceivers. This preamp features easy installation with no modification to the transceiver required. Can be used with virtually all 2 meter transceivers and on all modes — FM, SSB, CW or AM. Relays in the QSA 5 automatically bypass the preamp when transmit power is sensed. Now available with BNC or SO-239 connectors.

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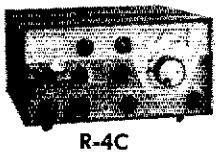
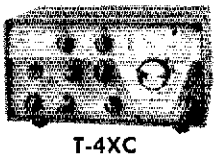
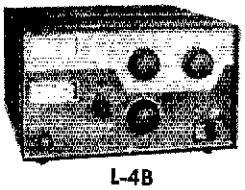

R-4C


T-4XC

DRAKE


L-4B

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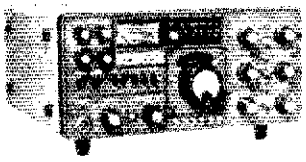
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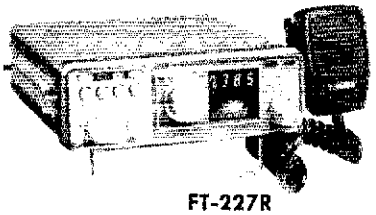
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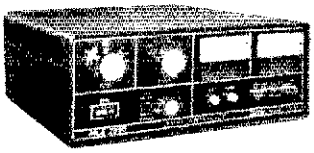
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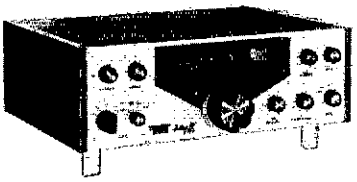
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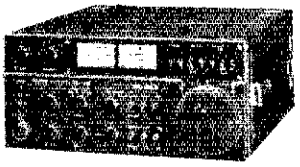
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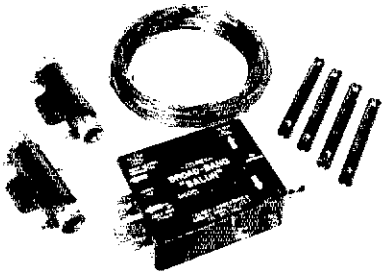

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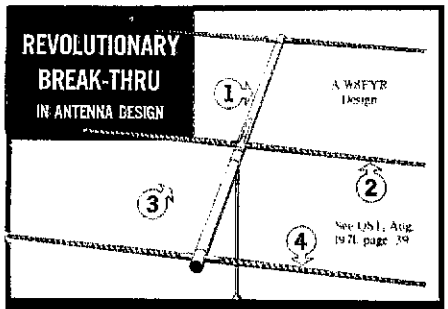

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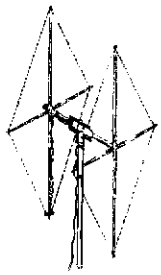

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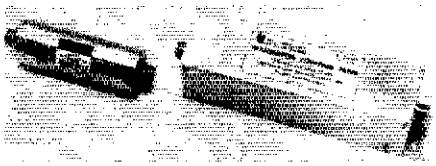
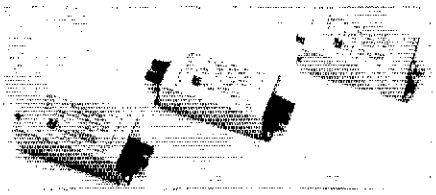
New Filters

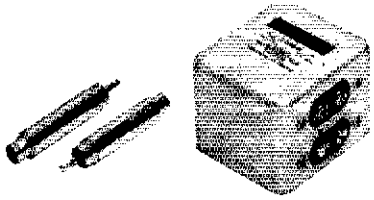
Eliminate Interference To TV & Audio Equipment



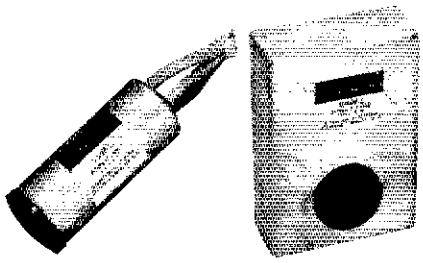
Low-Pass Filters eliminate or greatly reduce interference to TV channels 2 and 5 by CB or radio amateur station when installed in antenna lines of those transmitters. Input and output impedance 50 ohms. Insertion loss .3 db max.; VWSR 1.2:1. Attenuation greater than 75 db above 41 MHz. C-511-T: 25 W AM 50 W PEP SSB. C-514-T: 1000 W AM 2000 W PEP SSB.



High-Pass Filters, when installed in the antenna, eliminate or greatly reduce front end overload interference to TV or FM receivers caused by CB or amateur radio transmitters and other high frequency radio services. Filter attenuates signals below 40 MHz by a power factor greater than 1,000,000 to 1. Impedance C513-T1: 75/300 ohm; C-513-T2: 75/75 ohm; C-513-T3: 300/300 ohm.



Audio Interference Filters eliminate interference caused in your audio equipment by CB, radio amateur transmitters and other radio services. C-505-R installs in the input lines of audio equipment. Consists of 1 pair. C-506-R installs in speaker lines. Unit will take care of stereo speaker system.



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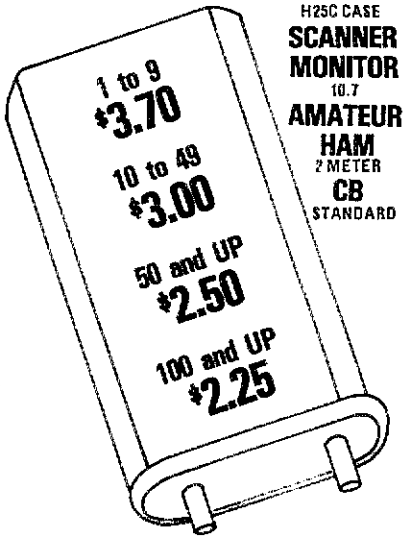

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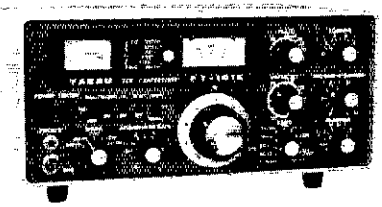

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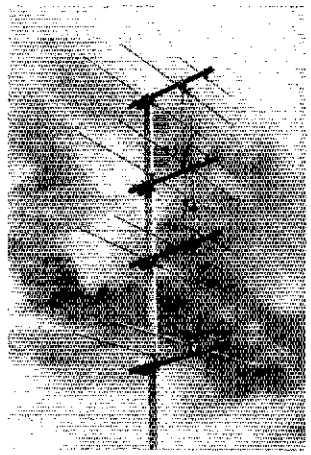

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The publisher of *QST* will vouch for the integrity of advertisers who are obviously commercial in character, and for the grade of character of their products and services. Individual advertisers are not subject to scrutiny.

Clubs/Hamfests

QCWA Quarter Century Wireless Association is an international nonprofit organization founded 1947. Any Amateur Radio Operator licensed 25 or more years is eligible for membership. Members receive a membership call book and quarterly news. Write for information. Q.C.W.A. Inc. 1409 Cooper Drive, Irving TX 75061.

PROFESSIONAL CW operators, retired or active, commercial, military, gov't., police etc. invited to join Society of Wireless Pioneers — W7GAQ/6 Box 530, Santa Rosa CA 95402.

FREE Sample copy Long Island DX Assn. bulletin. Latest DX news. Business size s.a.s.e. to the L.I. DX Assn., P. O. Box 173, Huntington NY 11743.

EDITING a club paper? Need public relations help? You should belong to the Amateur Radio News Service. For information write: Doris Dennstaedt, WA3HEN, 303 N. Hamonds Ferry Rd., Linthicum Heights MD 21090.

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ROCHESTER Hamfest & NY State ARRL convention, May 19-21. Add your name to mailing list — write Rochester Hamfest, Box 1388, Rochester, NY 14603 — phone 716-424-1100.

TRI-COUNTY ARC annual hamfest May 7. Rain or shine — Indoors at Stirling, NJ Youth Center just off Valley Road. 9:00 AM to 4:00 PM. Tables $5, buyers $1. Talk-in on 146.52 and 147.855-147.255. For info write Tri-county ARC P.O. Box 412, Scotch Plains, NJ 07076 or call Herb W2CHA 201-647-3461.

N.E.C.T. 2nd Annual Hamfest: Sunday, May 21st. At: All Seasons Ice Rink, one mile west of Illinois Route no. 59, on North Aurora Road, Naperville, Illinois. For further information contact: WD9HDA, (Cliff) 312-420-8629.

KENTUCKY Ham-O-Rama — Sunday, May 28 (Memorial Day Weekend) at Erlanger Lions Club Park, Erlanger, Kentucky. 10 minutes from Cincinnati, Ohio on I-75. Flea market, refreshments, exhibits. Write NKARC, Box 31, Ft. Mitchell, Kentucky 41017.

CENTRAL Michigan Amateur Repeater Association Fourth Annual Swap & shop in Midland, Michigan, June 3rd at the Midland County Fairgrounds. Camping & program Friday evening. Computer demonstrations, other events. Donation: $2 at door, $1.50 in advance. Talk-in: 146.07-146.67 WR8AKN, 146.13-146.73 WR8AHM and 146.52 simplex. Info & tickets, s.a.s.e. to Don Zahm, WB8SDJ, 3871 Monroe Rt.8, Midland, MI 48640.

VACATIONLAND Hamfest: Enjoy a family outing at Sandusky, Ohio, Sunday May 21, 1978. Cedar Point Amusement Park only 5 minutes away. Lodging, camping and picnic facilities nearby. Indoor-outdoor flea market area, room for all — rain or shine. Info and reservations WB8LLY, P. O. Box 2037, Sandusky, OH 44870.

HAMFEST — Egyptian Radio Club, Inc., W9AIU, Granite City, IL, Sunday, June 11, 1978.

4TH ANNUAL giant flea market, June 4, 1978. Eastern Connecticut Amateur Radio Association. For info call 203-928-5930.

HAMFESTERS 44th annual picnic and hamfest, Sunday, August 13, 1978 at Santa Fe Park, 91st and Wolf Road, Willow Springs, Illinois, Southwest suburb of Chicago. Exhibits for OMs and XYLs, Famous Swappers Row. Tickets at gate $2, advance $1.50. For Hamfest info or advance tickets (send check or money order, SASE appreciated) to Bob Hayes W9KXW, 18931 Cedar Ave., Country Club Hills, IL 60477.

JUNE 4, 1978, Starved Rock Hamfest, Bureau County Fairgrounds, Princeton, Illinois. Advance registrations $1.50 if postmarked before May 25, after that $2. Large s.a.s.e. please for registrations, map, information, etc. W9MKS/WR9AFG/SRRC, RFD no. 1, Box 171, Oglesby, IL 61348. 815-667-4614.

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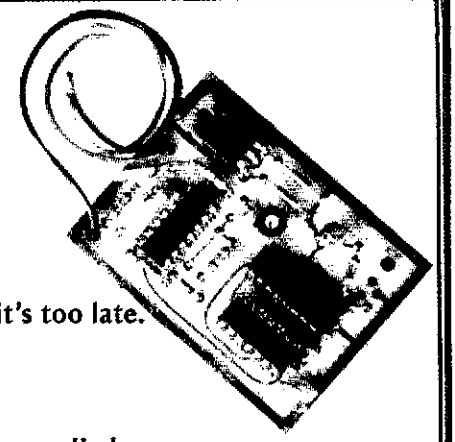

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DB-54	20-15 Duobander		375.00
DB-43	15-10 Duobander		169.00
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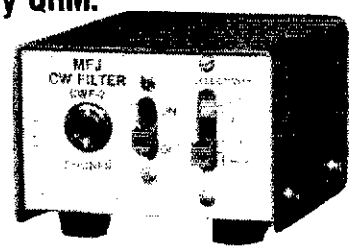

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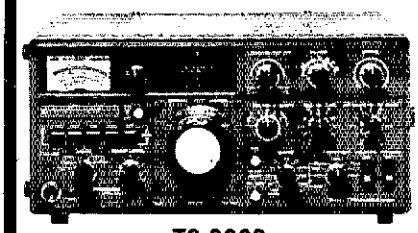

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TS-820 160-10m transceiver	919.00
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CW-820 CW filter	49.00
DS-1A DC converter	65.00
R-599D 160-10m receiver	549.00
S-599 Speaker	25.00
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TV-506 6m transverter	249.00
TS-600 6m FM/SSB/CW/AM Xcvr	699.00
TS-700S 2m Multi-mode Xcvr	729.00
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SP-70 External speaker	28.00
TBM Tone burst (specify freq.)	12.00
TR-2200A 2w 12 ch 2m FM Xcvr	229.00
MB-1A Mobile mounting bracket	13.00
RA-1 Flexible antenna	9.50
TR-7400A 25w 2m FM synth. Xcvr	399.00
PS-8 Power supply	129.00
PL (specify freq)	27.00
TBM Tone burst (specify freq)	12.00
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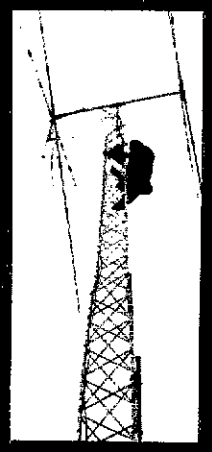

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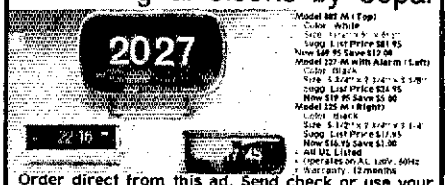

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ROME Ham Family Day will be held at it's new location on June 4, 1978. For info write Rome Radio Club, P. O. Box 721, Rome, NY 13440. (Dealer inquiries invited.)

AMATEUR Computing 78, Washington, DC, July 22-23. Personal computing, amateur telecomputing, commercial exhibits, seminars, club activities and amateur displays. Registration at door $5. To preregister send check for $4 payable to AMRAD to P. O. Box 682, McLean, VA 22101. For hotel reservations, call 703-521-1900 or write Sheraton National Motor Hotel, Columbia Pike and Washington Blvd., Arlington, VA 22204.

RADIO Expo '78. Special dates, this year only, are September 30, October 1. Lake County, Illinois, Fairgrounds, between Chicago and Milwaukee. Over 4000 attended last year. Dozens of manufacturer and distributor exhibits, indoor/outdoor flea market areas, seminars. Free camping. Flea market open Friday for set-up. Tickets $2 advance, $3 at gate. Exhibitor space still available. Call the Expo answering machine (312-690-1177). For tickets and info, write: Radio Expo '78, P. O. Box 305, Maywood, IL 60135.

SOUTH JERSEY hamfest and 62nd birthday celebration of the SJRA June 4, 1978 Ellisburg shopping center Cherry Hill NJ intersection routes 41 and 70. Tailgate fleamarket, exhibits, YL and children's programs. Family registration $2.50 in advance. $3.50 at the gate. Tailgaters $5.00 per space. Spend the weekend in the historical Philadelphia area. Will monitor ECARS, talkin 52. Info and tickets K2AA, Box 293, Cherry Hill NJ 08002 or telephone 609-4296032.

WARREN, Ohio Hamfest — Sunday, August 20, 1978; Trumbull K.S.U. Campus, Route 45 at Warren, Outerbelt. 21st Big year with the famous flea market. All close-in parking; lakes and parks nearby. Commercial displays, talk-in stations. $2 door registration. Arrowsigns lead from I-80; I-20; Ohio Routes 5, 11 & 45. Details? QSL: Hamfest, Box 809, Warren, OH 44482.

DeVRY Technical Institute, Amateur Radio Club, WA2MDT — Flea market outdoors on May 20th at 9:00 A.M. at the school. 479 Green Street (between Rts 1 and 9) Woodbridge, NJ buyers — No admission, sellers — $1.50 for space.

THE Satellite Amateur Radio Club will hold its annual Swap/Fun Fest and Santa Maria BBQ on Sunday, June 18. Join us for the best steak and biggest hamfest in the west. Fantastic activities! Swap tables available. All you can eat dinner — $6 adults; $3 children under 12. Contact W2KVA/6 at (805) 925-0398, or write SWAPFEST, P.O B. 2531, Orcutt, CA 93454.

HAMFEST! Indiana's friendliest and largest hamfest. Wabash County Amateur Radio Club's 10th annual hamfest will be held Sunday, May 21, 1978, rain or shine, at the Wabash County 4-H Fairgrounds in Wabash County. Large flea market (no table or set-up charge), technical forums, activities for the XYL, plenty of free parking, lots of good food at reasonable prices. Talk-in 147.63/03 & 146.28/88. Only one ticket to buy this year. Admission is $2 in advance, $2.50 at the gate. Children under 12 years old admitted free. For more information on advance tickets, write Dave Nagel, WD9BDZ, 555 Valley Brook Lane, Wabash, IN 46992.

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2SC2028	1.10	HA1339A	5.20	TA7045M	3.50	UPC566H	2.25
2SC2029	4.75	LA1201	4.25	TA7055P	5.50	UPC575C	4.10
2SC2074	3.00	LA4031P	3.50	TA7060P	1.85	UPC595C	3.60
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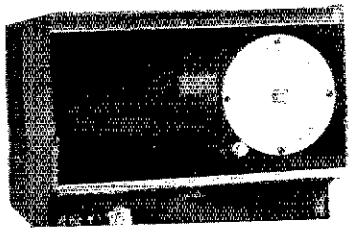

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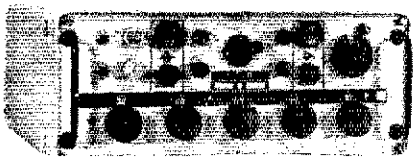

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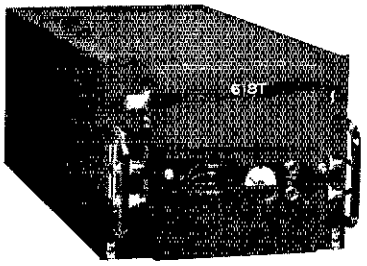

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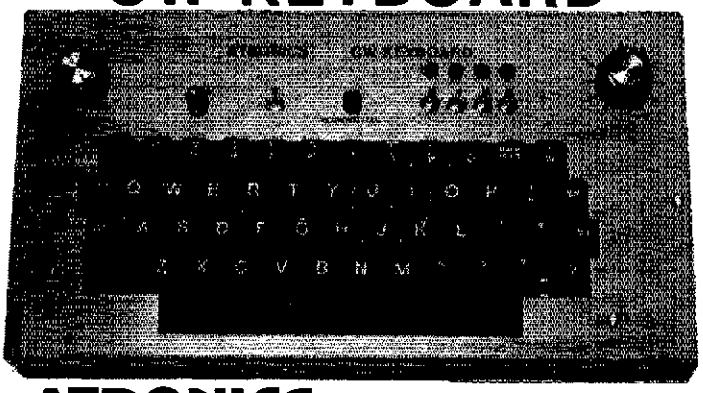

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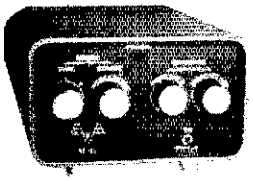

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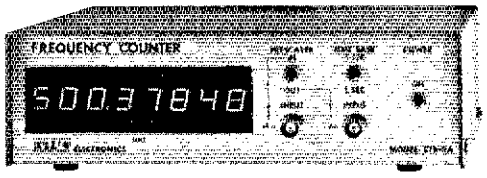

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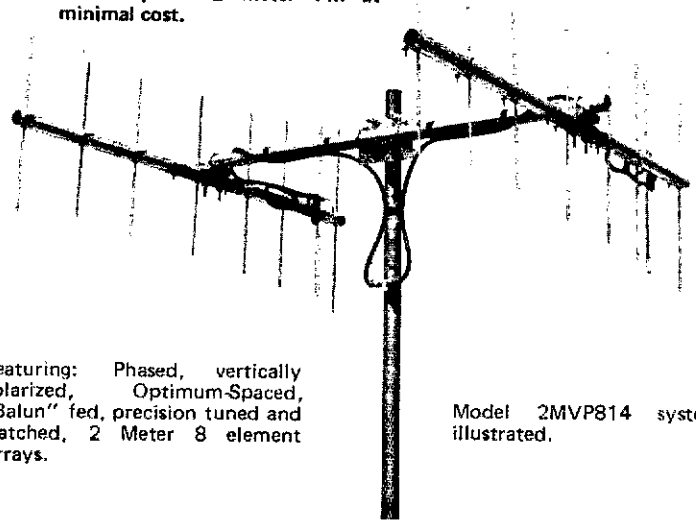

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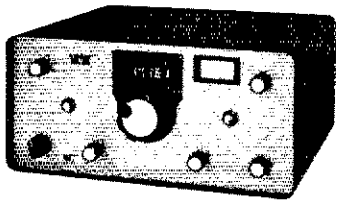

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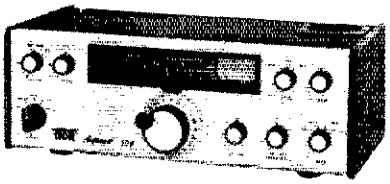

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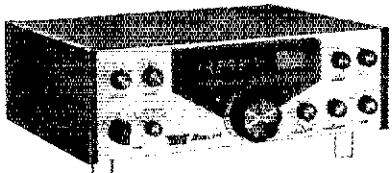

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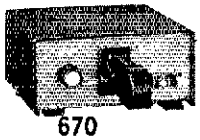

670
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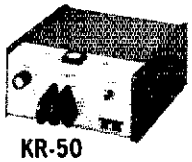

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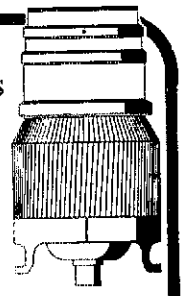

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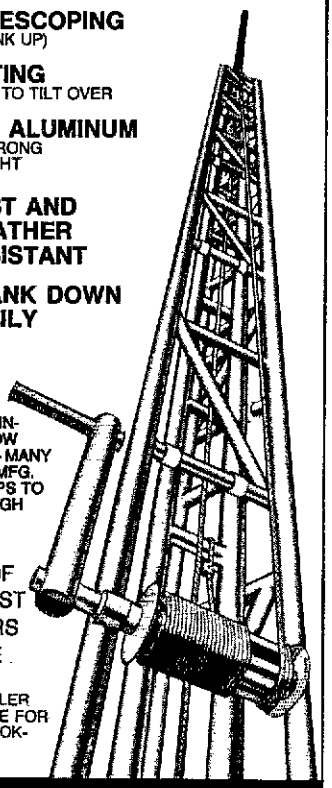

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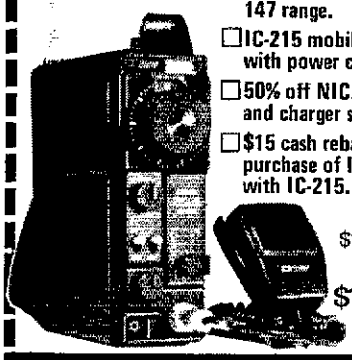

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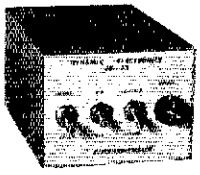

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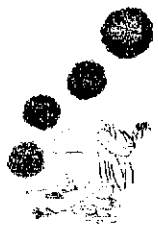

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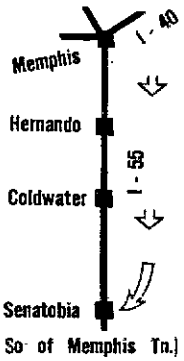

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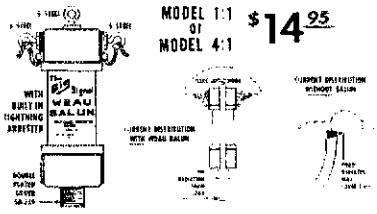

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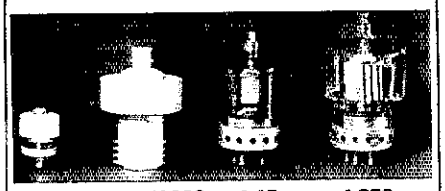

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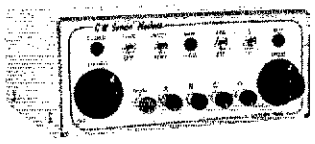

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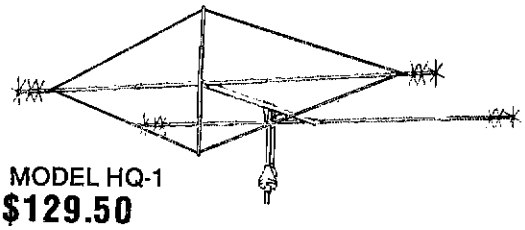

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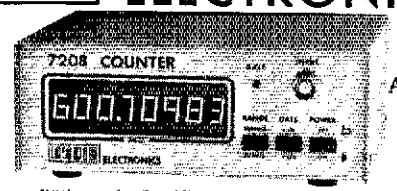

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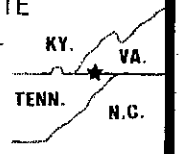

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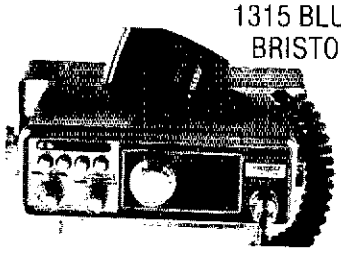

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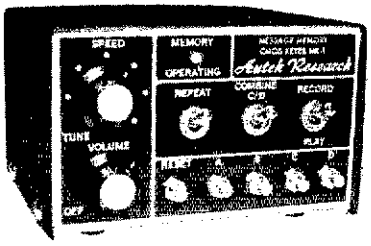

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- Just tap button to start any of 4 messages. Each is about 25 characters long. For example, 1 message will hold "CQ CQ CQ DX DE W6DYD W6DYD K". Total memory approx. 100 chars.
- Handy "repeat" switch repeats message forever until reset. Use for longer CQ's, or leave a listening pause at end of CQ. If no answer, keyer automatically repeats CQ until answered. YOU SIT BACK AND WAIT FOR A CALL!
- Another switch combines 2 of the 4 messages for extra length (approx. 50 chars.), e.g. "QTH IS LA LA NAME IS BILL BILL RIG HR IS KW ES BEAM ES NEW MEMORY KEYER"
- "Memory-Saver" feature standard.

PLUS A GREAT AUTOMATIC KEYER:
- State-of-the-art keyer pleases beginners and CW "pros" alike.
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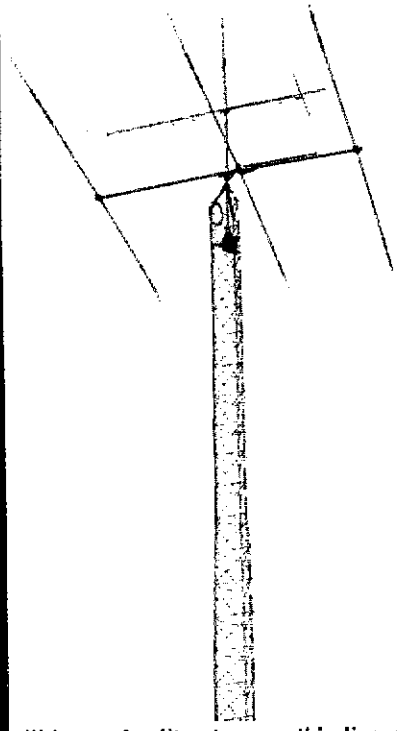

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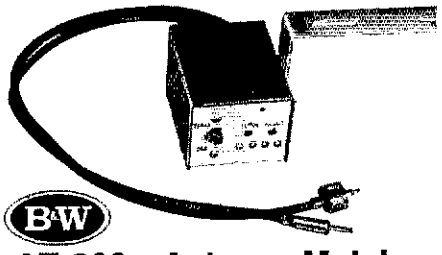

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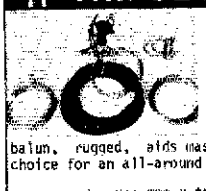

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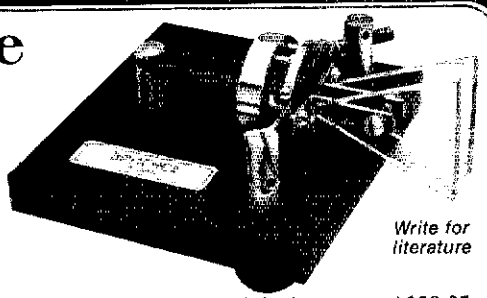

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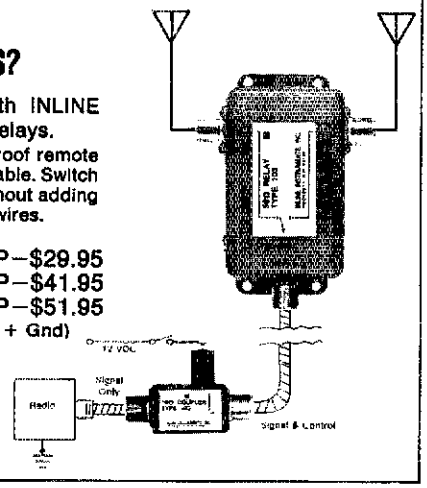

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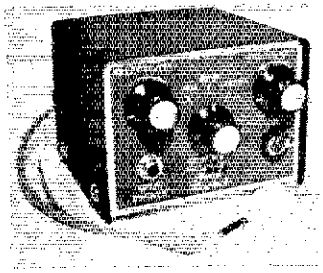

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HEATH SB230 Linear. Used only several hours. $385 (Licensed amateurs only.) Carl Mills, WA3ZHW, RD5 Stroudsburg, PA 18360. 717-992-4538. Also Heath IM5228 VTVM. $40.

SELL: HW-202 2M fm xcvr, mike, TouchTone, manual Xtals 94/94, 01/61, 16/76, 28/88, 22/82, 34/94, excellent $175. Dick, W4LWY, Rt. 1, Box 50, East Palatka, FL 32031. 904-325-2812.

SALE — Yaesu FTdx 401, cw-filter $490, speaker/patch $25, VFO 401 $75, TR-22 $125. All for $700. Or your offer over $650. Split UPS costs. KØZFL, 303-589-2335.

COLLINS S-Line 75S-3B, 32S-3, 30LII, 312B-4, 516F2, DM 1, winged emblems, package sale, $2100. Hammarlund HQ-180-A $290. All mint with manuals. Prefer local pick up if possible. K6QPT, Sacramento, CA 95813 916-442-0371.

LINEAR amp, 15 thru 6 meters, 5 watts in 100 PEP out. Sell only to licensed amateur. Lafayette HA-270. $50 601-475-8740, WB5FXI.

SELL — New condition R-390-A $500. Also sell TM "XFK" FSK generator exciter $100. One table model model 28 teletype, $200. Type boxes $25. Complete set lab and field tech manuals on R-390-A $50. 28 Teletype manuals $10 each. W4AIS, 306 Thornwood Drive Taylors, SC 29687.

SWAN 600T, 600R with VOX, cw filter, A-M filter and ex speaker 600 watts $850 mint condition 18 months old Ten-Tec Argonaut 509 mint with warranty card $27 Drake R4 receiver mint $185. ICOM 21A with DV-21 scanner accessory mint $295. 6 month old Triton IV digital transceiver mint $695. WB4PUD, W.B. Jones P.O. Box 805, Springfield, TN 37172. Day 615-384-3502, nite 615-384-8653.

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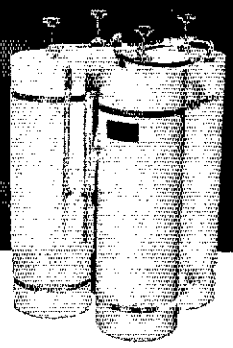

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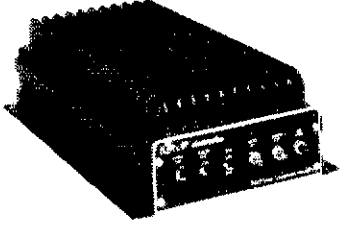

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TEN-TEC Century/21 with all crystals, Model 670 keyer, MFJ antenna tuner, Swan SWR meter. Perfect Novice station; in new condition — $340. Also, Telex headphones — $5; Shure 444 microphone — $30; Butternut HF-5V trap vertical antenna, 80-10 meters — $50. Everything in mint condition. I pay UPS shipping except HF-5V. Mike Ryder, WB9CQH, 201 Depot, Oregon, IL 61061.

WANTED: Ginpole for Rohn 25, coils for GD-1 B Heath Dipper. Gary Bytnar, WA9HEG, 302 N. Maple, Grant Park, IL 60940.

HEATH HR-1680 excellent condition, fully tested and aligned. $175. Money order or certified check. Scott Moeller WDØFVA, 2023 University, Grand Forks, ND 58201. 701-746-1006.

HAMMARLUND HQ-100 general coverage receiver $95. Heath 12VDC supply for HW12 $35. Stan Seiffert, Route 3, Box 145A, Snohomish, WA 98290. 206-568-5892.

FOR SALE: Old copies QST. July, 1931; 11 mos. 1932; Feb. and June, 1933; Jan. 1934; June 1935; May, June, August 1936; Jan., Feb., May thru Nov. 1937; Jan. 1938. Condition good. What am I offered? A. Triman, 5658 Ledge Rd., Madison, OH 44057.

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QUAD kits from $16.25 to $30. Send sase for information. WAC, 404 Sanders Rd., SW, Huntsville, AL 35802.

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CASH waiting for best HW-16 offered: WD4GSJ, 1013 Brownwood, Orlando, FL 32807.

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CONAR MD400 transmitter 25W output and MD50 receiver, condition excellent, $100 for both. WB3IE 814-674-8306, 618 Magee Ave., Patton, PA 16668

SELL: Heath SB-614 scope $140. Call 515-292-6010, Mik Rolling.

SELL — Collins F455Q7 plug in 526-9380-00. W8BUR

DENTRON MLA-2500 for sale to licensed amateur onl Like new condx. Price - $650. Pick up only. No shipping K9GEL, 11100 Springmill Road, Carmel, IN 46033 317-846-1207.

160M fans: Sell Pearce-Simpson am marine radios - Capri 30 & Simpson 75. Marty Linke, WD9ABG, 621 Grace, Lombard, IL 60148.

DIGITAL multimeter — Fluke 8000A - mint conditio $150. WA2EKK, P.O. Box 358, Henrietta, NY 1446 716-334-3525.

FOR SALE: Tektronix oscilloscopes 585A, includir 585A plug in, tiltable mobile cart $495.; 535A, CA plug-i mobile cart $425.; 531A, CA plug-in, mobile cart $29 Signal generators Boonton, 202B and Univerter 203B $175.; Hewlett-Packard 20,000R $55. Q-meter, Boonto 260A $195. VTVM Ballantine 310A $75. Shipping ar packaging not included. All equipment in excelle operating condition. K1MII, Shirley Kronenberg, Phaiba Lane, Stamford, CT 06902. 203-324-2723.

GOT junked Gonset GSB-201 linear amp? Will pay goo price for good bandswitch. W4BIW, 1356 Vistaleaf D Decatur, GA 30033.

DRAKE TR-4C mint (10 hours), Drake AC-4 power suppl Heath SWR HM-102, Astatic Mic., $690 or best offer pay ship. P. Cornelius, P.O. Box 638, New Baden, 62265.

WANTED: ICOM or SBE 440 MHz transceiver. Plea state condition and price. Price to include shipping UPS. P.H. Connors, WA9SJD. 312-823-0093.

ROHN Towers — special sale — 25G sections $33. each, freight collect — 48' fold over tower comple freight prepaid $471.50 each, 30 sections 25G freig prepaid $1074.15. National Rohn Distributor — Radio 2503 GE Road, Bloomington, IL 61701. 309-663-2141.

SELL or trade: Uaesu FT101E with fan & filter — 1/01 scope — FL2100 amp — All new Dec. 1977. Sell $11 Trade even for Atlas 350XL and 350 ac power supp Russ Lindley (804-572-3534), Rt. 2, Halifax, VA 24558.

SELL: FT101E, fan, cw filt., spkr, 526 mic, cherry. $7 Eves. WA2OIZ, 18 Englehart Dr., Scotia, NY 123 518-399-1254.

TUBES! Oldies- '40's, '50's, '60's - new, boxed. s.a.s.e. list. Hal Parks, WB2BNH, 293 Warburton Ave., Yonke NY 10701.

WANTED: Johnson Navigator or Eico 723 — Elm AF-68 — Hallicrafters HT-40 & SX-140 — Hammarlu HQ-110A. J. Arnold, W4NCD, 4944 Cleveland Ave., C Fort Myers, FL 33907.

WANTED: Swan VX-2 VOX. WB5CRX 914 Deonne Circ Norman, OK 73071. 405-364-5406.

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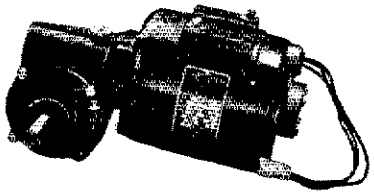

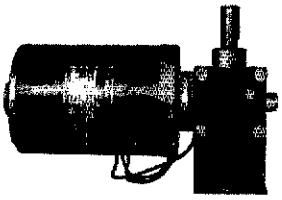

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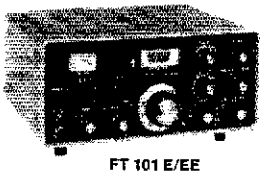

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Mr. Jack Burchfield
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Dear Jack:

Having operated my Triton IV for about ten days I would like to express my comments regarding this transceiver.

When I unpacked the unit upon receipt I had grave doubts that I had bought the right transceiver, never having seen one in real life. Its front panel looked rather simple in comparison to its Japanese counterparts. However, once switched on and used on the air, all those slight doubts were soon forgotten. Having had almost any transceiver put on the market over the past ten years I can honestly say that this is the best unit I have ever had. It is a much more quiet receiver in comparison to others on the market today. The noise blanker is superb and one of the best tried so far. The circuit design is what I have been looking for for a long time. Doubled balanced mixers for receive and transmit, separate receive front end etc. etc. The unit met all specs . . . .

I have another reason for liking the Triton IV so much. "State of the Art" techniques have improved the present transceivers in looks as well as performance. However, (in many) the complexity came with it, in particular from a service point of view. Although the design of the Triton IV is right up to date and flawless in performance, electrically it has been kept straight forward. Therefore, only simple test equipment is needed for alignment or fault tracing should this ever become necessary, — something the average amateur can do himself.

All in all, a superb transceiver. I hope this letter has been of interest to you and I would like to congratulate you and the TEN-TEC Corporation on your efforts.

Sincerely yours,
Arn van der Harst, VK5XV

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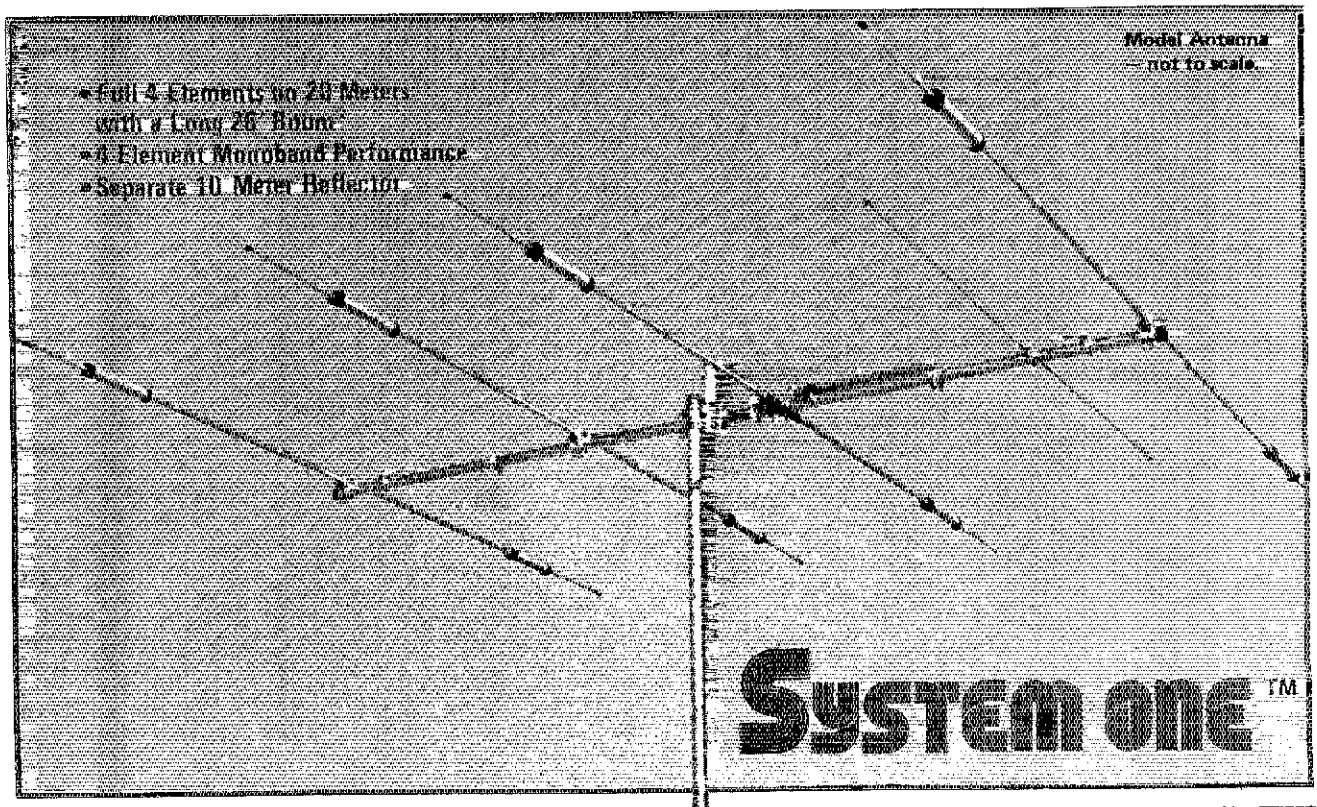
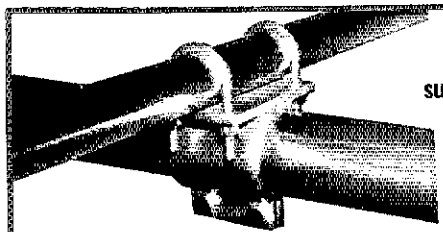
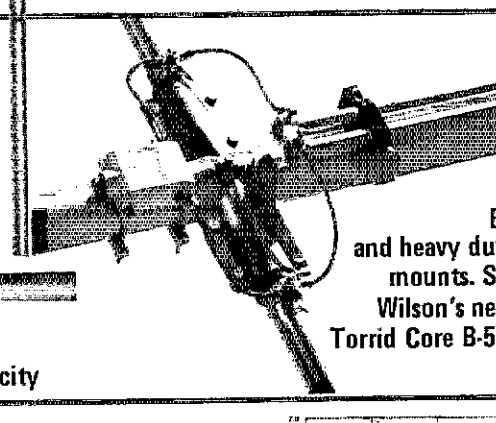
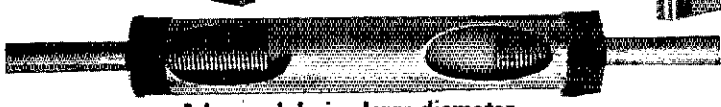




The mechanically superior construction uses heavy duty boom to element extrusion.



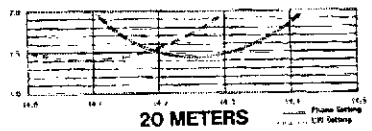
Insulated driven element with precision Beta match and heavy duty element mounts. Shown with Wilson's new optional Torrid Core B-50-A Balun.

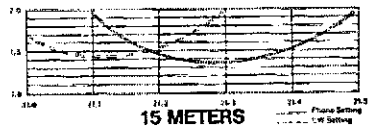


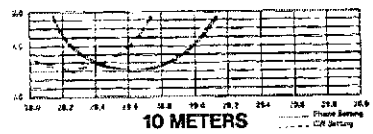
Advanced design large diameter High-Q Traps for minimum loss and maximum power capacity

SPECIFICATIONS: SY-1

Matching Method	Beta	Boom Length	26'	Required	
Band MHz	14-21-28	Boom Diameter	2" O.D.	Mast Diameter	2" O.D.
Maximum Power Input	Legal Limit	No. of Elements	5	Surface Area	8.6 sq. ft.
VSWR (at Resonance)	1.5 to 1	Longest Element	26' 7"	Windload at 78 mph	215 lbs.
Impedance	50 ohms	Turning Radius	18' 6"	Shipping Weight	65 lbs.
				UPS Shipment in 2 Cartons	







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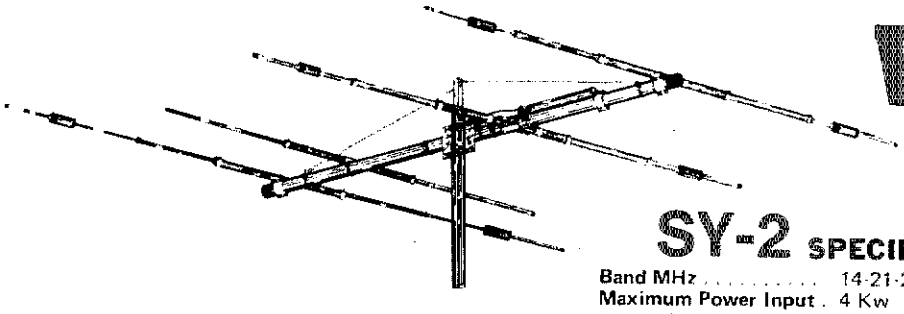


Wilson

SY-2 SPECIFICATIONS

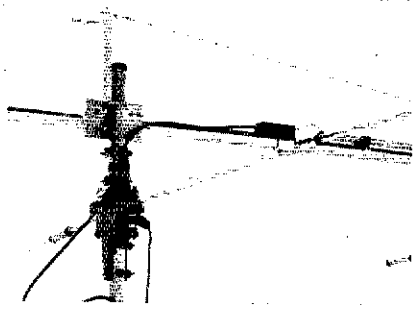
Band MHz	14-21-28	Boom Diameter	2" O.D.
Maximum Power Input	4 Kw	Surface Area (Sq. Ft.)	6.15
VSWR (at Resonance)	1.5:1	Wind Loading at 80 mph	153
Impedance	50 Ohms	Assembled Weight (Lbs. - Approx.)	47
Boom (O.D. x Length)	2" x 18'6"	Shipping Weight (Lbs. - Approx.)	50
No. Elements	4	Matching Method	Beta
Longest Element (Ft.)	27' 2"		
Turning Radius (Ft.)	16' 5"		
Req'd. Mast Diameter	2" O.D.		

Only One Feed Line Required **SHIPS BY U.P.S.!!!**

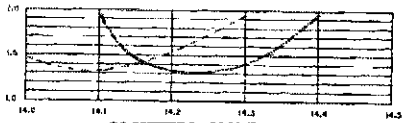
Delivers outstanding performance on 20, 15 and 10 meters. Features Wilson's large diameter High-Q Traps, feeds with 52 ohms coax, a beta match method presents tapered impedance which provides most efficient 3 band matching and DC ground to eliminate precipitation static. The result is SWR less than 1.5 to 1 at resonance on all bands and maximum front-to-back. An added feature is the separate 10 meter reflector for correct monoband spacing. Add to this the rugged boom to element mounting, heavy duty taper swaged elements, and you have

System Two™

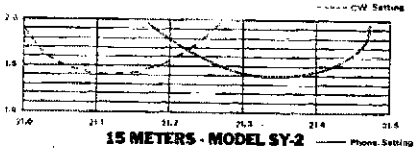
. . . space efficient, high performing, cost effective new tribander.



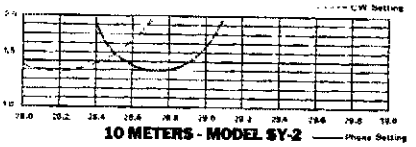
Wilson's WR-500 Rotor and SST-64 Crank-up Tower used with System Two. Recommended Balun: Wilson BN-50A.



20 METERS - MODEL SY-2 —— Phone Setting - - - - CW Setting

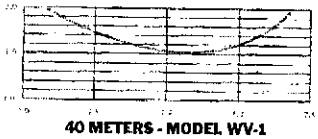


15 METERS - MODEL SY-2 —— Phone Setting - - - - CW Setting

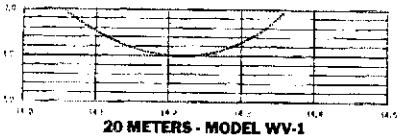


10 METERS - MODEL SY-2 —— Phone Setting - - - - CW Setting

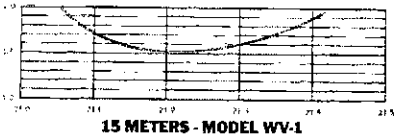
40 THRU 10 METERS VERTICAL TRAP



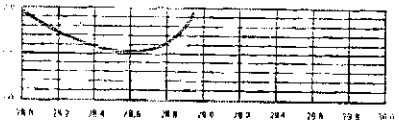
40 METERS - MODEL WV-1



20 METERS - MODEL WV-1



15 METERS - MODEL WV-1



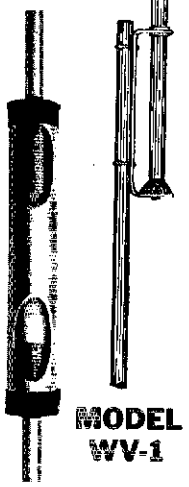
10 METERS - MODEL WV-1

WV-1 WILSON VERTICAL TRAP ANTENNA

No bandswitching necessary with this vertical. An excellent low cost DX antenna with an electrical quarter wavelength on each band and low angle radiation. Advanced design provides low SWR and exceptionally flat response across full width of each band. Featured is the Wilson large diameter High-Q traps which will maintain resonant points with varying temperatures and humidity. Easily assembled, the WV-1 is supplied with base mount bracket to attach to vent pipe or to mast driven in the ground. The new WV-1 Antenna is competitively priced . . . and ships via UPS!

SPECIFICATIONS

Input Impedance: 50 Ohms • Powerhandling capability: Legal Limit • Two High-Q Traps with large diameter coils • Low Angle Radiation Omnidirectional performance • Taper Swaged Aluminum Tubing • Automatic Bandswitching • Mast Bracket furnished • SWR: 1.5:1 on all Bands • 1½" O.D. Heavy wall aluminum tubing • Does not require guying • Overall length: 19' 3".



MODEL WV-1

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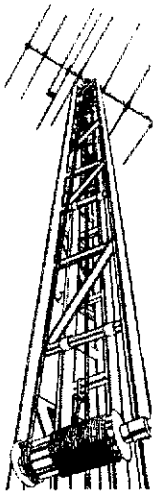

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AIL automatic noise meter. Excellent condition. Gas discharge noise source - $200 firm. Yaesu FT-2 Auto. Full set of crystals. Works perfectly. $130. WA2BIT (N2MB) 212-327-4952.

O'SCOPE Heath IO-4541. Never used, factory calibrated $175. 404-549-2849 WA4FNV.

WANTED: QST in permanently-bound volumes. 1971, 1968 and all before 1966. Neil Friedman, N3DF, 2301 E. Street, N.W., Apt-701, Washington, D.C. 20037.

ICOM IC-230 w/15 kHz splits, IC-3PA, $250. WA6VZV, 565 Oxford Cir., #128, Davis, CA 95616. 916-758-3155.

COLLINS 70E-23 PTO, new $50. Teletype 28KSR, 60 wpm, very nice $150. KØCKX 319-354-4478.

TELETYPE — Model 33 ASR 400, Model 28 ASR 275, Model 28 KSR 150. Model 32 KSR 200. All mint condition. No shipping. Will consider ham gear on trade. Maurice Weinschenker, K3DPJ, 12690 Rte. 30, North Huntingdon, PA 15642. Fone 412-863-7006.

FOR SALE: HT46 xmtr, clean, $100 firm. It works. K2TBZ

APARTMENT portable antenna. Use anywhere. Solves landlord problems. 80-10 meters. 13 feet maximum length. Folds to 5 foot package. Model AV-1 $49.95 plus $3 UPS. Antenna Supermarket 138 S. Walnut St., Palatine, IL 60067. 312-359-7092.

FOR SALE: Drake T-4X in perfect condition — $385. Power supply $90. W2CVY 70 Beech Terr., Wayne, NJ 07470.

TELREX 326B 20mtr beam. Excellent. W2LFB, 42 Carlton Terr., Bloomfield, NJ 338-1930.

JOHNSON 275W Matchbox, like new $75. Johnson 1000W SWR bridge $16. B&W 426 low pass 1000W filter $14. WA9LBO 414-744-1422.

WANTED Collins 75S-3, 32S-3, 516F-2, and 312B-4 series equipment. Have cash for mint station. All letters answered. Phil Burr, YS1PBE, Box 5012, M/S4299, Dallas, TX 75222.

NEED manual for Hallicrafters SX-101A. Zerox copy fine. WD4ESN, Box 1570, Summerville, SC 29483. Neogtiable.

WILL swap Leader color bar generator Model 388 mint for what have you. Don Ellis, K3LQQ, 43 Poplar Lane, Levittown, PA 19054.

WANTED: Hallicrafters PS-150-120AC power supply. Hugh McKnight, BOQ 6-337, U.S. Naval Station, Charleston, SC 29408.

WANTED Collins KWM-2A, 75S-3C, 312B-4/5, 55G-1 preselector, SM-3, round emblems preferred; cabinet for 51S1, CEI SM8511 signal monitor; working or not, must be reasonable; also need matched 8122 tubes; VX-501; SSTV, Robot 400. H. Kolesnik, WBØRVG/5, 4011 Skyline Drive, Farmington, NM 87401.

ARGONAUT 509, 210 p.s. 206 calibrator, 208 cw filter, 1 year old, like new, $320; Mini-Products HQ-1 quad - still in factory carton, $80; Ten-Tec PM2B, 210 p.s. very good, $60. Jim Hite, AA4AJ, 1155 Boy Scout Rd., Hixson, TN 37343, 615-842-1562.

FT243 xtals wanted. 1750 kHz only. Send letter or brochure. Machamer, 2201 N. Hawthorne, Melrose Park, IL 60164.

DRAKE TR4, noise blanker, RV4, AC3, DC3, perfect condition $575. Philip Schwebler, W9GCG. 4536 N. 50 St., Milwaukee, WI 53218.

WANTED: Instructograph, tapes and instructions. State price and condition. WB5HIH, Box 6415, Waco, TX 76706.

DRAKE TR4C, 34 PNB, RV4C, one year old, mint, new finals, $575. W6IAE. 408-736-2938.

LINEAR amplifier, ultra low-loss coax (solid), Siltronix 90-1 VFO for sale. All new, cannot use equipment, No CB'ers or bootleggers. Call 201-584-8306 weekdays 3-7, Sundays 12-5. S. Jackson

MICROPROCESSOR kit-Motorola 6800 D2 kit, unopened package, includes keyboard, display, monitor, ram io. Kay, W2HTF, 51 Tidewater, Willingboro, NJ 08046. 609-877-1345. List $235, sell $170.

WANTED: Misers Dream Receiver and/or literature for same. Full description first letter. Owen Laughlin 1310 Pinecrest Dr., Ferndale, MI 48220.

FOR SALE: Lafayette HA-410 20 watt ten meter am xmtr receiver, good cond. $100 firm- cert. check or money order only. (Will ship UPS.) Lawrence E. Heath, WA4IHW P.O. Box 97, Mechanicsville, VA 23111. 804-746-8463.

DRAKE R-4A, mint, $300. B&W 6100, mint, $200. L-1000-A, $100. 5100-B, $100. All work perfectly WB2GZU, Rt. 1, Little Falls, NY 13365. 315-823-2965.

SELL Heath DX-40 xmtr $30, HG-10 VFO $60, HR-10B tcvr $70, HW-7 QRP xcvr $50, HWA-7-1 p/s $5. W9MTL, 525 E. Cecil, Neenah, WI 54956. 414-722-5116.

HAVE HR-2B Regency 2 meter rig perfect with five xtls mike, ac power supply, 150 dollars firm. Sid Tritsch W2NFU RD1, Box 64, Lockwood, NY 14859.

MUST SELL: Heath HW-2036 with Micoder II and HWA-2036-3 ac supply. 4 megahertz modifications. New and factory aligned. Also 5/8 wavelength whip with magnetic, trunk lid, and drill bases. New. All for $300 Alan Rose 212-877-8539.

FOR SALE: Heath HW-1680, new and factory aligned $179. Andy, 212-GE6-9503.

WANTED Drake C4 and L4B. WD8ODH. 513-651-1370.

HALLICRAFTER SX-100. Good condition. $100. You ship. Wilson, Rt. 2, Brewster, MA 02631. 896-3549.

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TAKE MECHANICAL DESIGN. Experience tells us: make it rugged. So, like all fine solid-state devices such as computers and good test equipment, the 540/544 transceivers have their strength built into the chassis — the case is merely a cover. Ruggedness is carried over into the circuit boards as well. Component leads are "clinched," not just inserted, to give additional strength and to prevent annoying intermittents.

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TAKE ELECTRICAL DESIGN. Experience tells us: push the state-of-the-art. Example: we pioneered high power solid-state design for HF amateur radio gear. The advantages are numerous: efficient, small size, no lethal voltages, less heat, longer life, greater reliability. Example: broadband design. The advantages: easier operation for everyone, rag-chewers, DX chasers, even net operators. No out of reasonance danger, no need for a dummy load to prevent tune-up QRM, no boring, time-consuming "tune-up" procedures. Another example: computer aid. In circuit design, in manufacturing, for speed and optimization. Example: computer compensating oscillator drift to achieve rock-like stability.

TAKE SERVICING. Experience tells us: make it easy, for everyone. So the 540/544 transceivers have modular design with plug-in circuit boards. And trouble-shooting (if it's ever needed) can be done by you with ordinary test equipment. (Of course, Ten-Tec service people are ready to help).

TAKE OPERATING CONVENIENCE. Experience tells us: everyone wants it. Examples: high sensitivity with low internal noise makes the 540/544 transceivers great for DX, especially during poor band conditions. Full break-in on CW turns conventional QSOs into interesting conversations. Pre-selectable ALC gives automatic level control at various input powers (40-200 watts) plus optimized input power for linear amplifiers. "Semi-hard" keying effectively penetrates pileups, QRM, and QRN, yet is highly articulate and pleasant to copy. Pulsed calibrators are easy to identify. VOX that eliminates "anti-VOX" by triggering on a tone present in your voice but not in the transceiver speaker. (There are even more conveniences in the following "features" list.)

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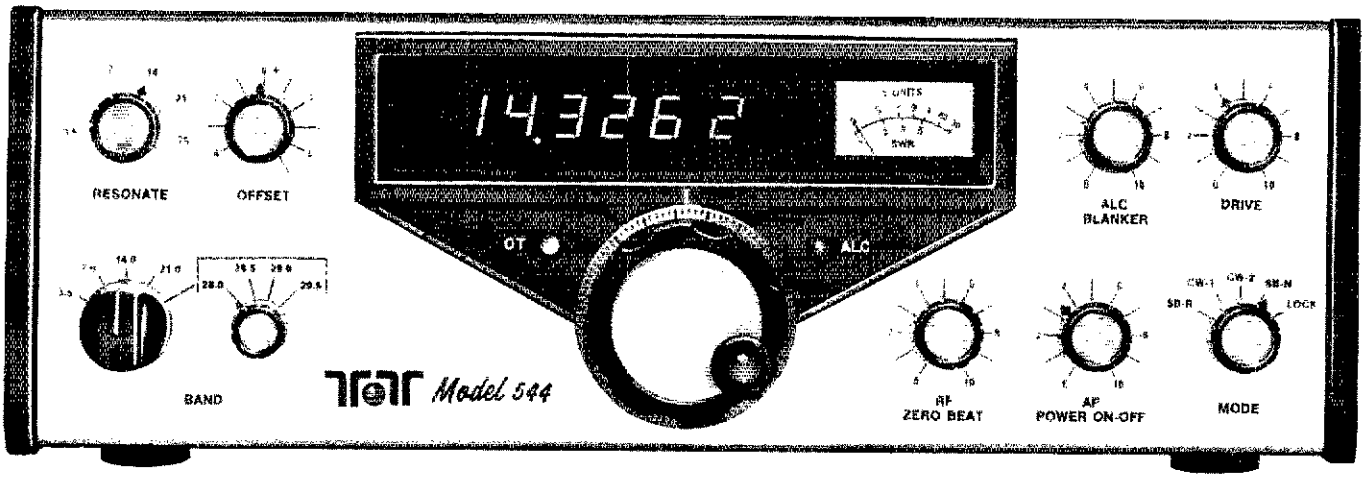

REPLACE rusted antenna bolts with stainless steel bolts. Small quantities, free catalog. Elwick, Dept. 271, 230 Woods Lane, Somerdale, NJ 08083.

HEATH HR-1680 receiver with HS-1661 speaker, $200. Heath HW-8 with power supply, $125. Mint condition. Elselt, 712-336-1354 evenings.

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HQ 170C for sale. Excellent condition except clock inoperable. Includes manual and speaker. $165 includes shipping. W5QVI 778 Crestway Drive, San Antonio, TX 78239.

SELL: Johnson Viking Invader 200 watt cw/ssb/am transmitter. Very good condition on all bands. $150.00 plus shipping. Dick Bischoff, WØGA, 1312 N. 6th St., Burlington, IA 52601.

SELL ICOM IC-22 with crystals for 16/76, 22/82, 28/88, 34/94, 52/52, 94/94. Mobile mount, mike, and manual included. Excellent condition. $120. W8YA, Dement Rd., Triadelphia, WV 26059.

WANTED: 3AQP1 scope tube. W2TB

SELL: Johnson kilowatt matchbox with directional coupler. Mint. $125 firm. W3ENS, 1503 Gordon Cove Drive, Annapolis, MD 21403.

USED test equipt. cheap, s.a.s.e. for list. Heath SB10, $25. VF-1 $12. W2IOE, 958 Vail Rd., Parsippany, NJ 07054.

WANTED: Heath SB-10. State price, condition. Landerer, 23 Birchwood Pk. Dr., Syosset, NY 11791. 516-931-7262.

WANTED: Used condenser checker. Prefer Sprague Tel-ohmike. Wesley Peterson, 202 Sunset, New London, IA 52645.

JUNE special: Wilson MKII $195; Cushcraft, MFJ at discount prices. s.a.s.e. for flyer. EGE, Inc., 2410 Drexel, Woodbridge, VA 22192.

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QUALITY stainless hardware fasteners! Insulators! List 20c! Walt, W8BLR, 29716 Briarbank, Southfield, MI 48034.

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QST and CQ issues 1966 thru 1975. 73 issues 1967 thru 1975. Best offer. No singles. WØQL, Fred Lagerholm, Kinberling City, MO 65686.

SWAN 500 with power supply, $325. Collins R-648/ARR-41 $175. Both excellent. WB6ZJF, 1417 Eureka, Bakersfield, CA 93305.

SELL QST 1951 thru 1957, 1968 thru 1976. All or part. K2BO, 53 Burnham Road, Morris Plains, NJ 07950.

WANTED: Ten-Tec Argonaut reasonable, WA3UQR.

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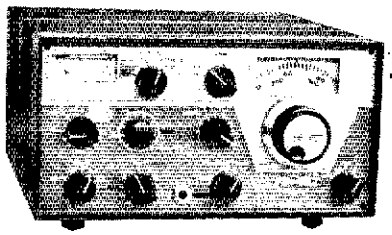

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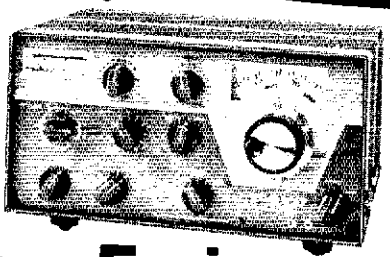

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#2 — T-4XC Transmitter + AC-4 Supply	$849.00	$750.00
#3 — R-4C + T-4XC + AC-4 + MS-4	$1581.00	$1350.00
#4 — TR-4CW/RIT Xcvr + AC-4 & MS-4	$982.00	$832.00
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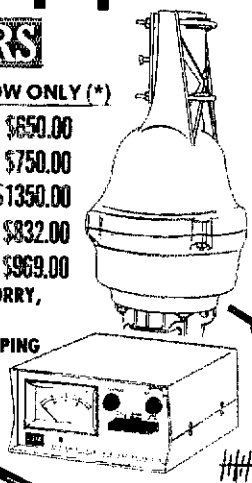

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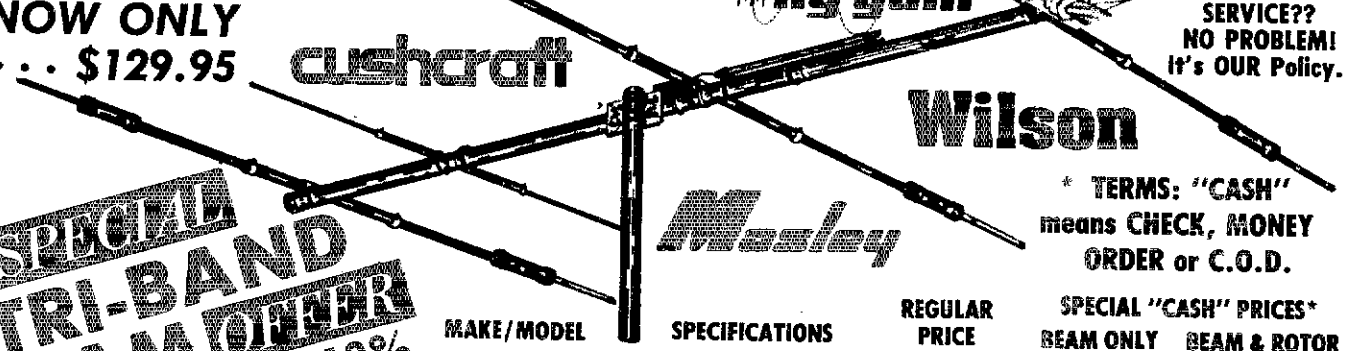

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10% "CASH" SAVINGS NOW IN EFFECT on these popular TRI-BAND BEAMS! AND . . . with "PACKAGE" PURCHASE of selected TRI-BANDERS . . . you can BUY A NEW CDE HAM-III ROTOR for LESS THAN ONE HUNDRED DOLLARS! LIMITED — ORDER NOW & SAVE! CALL or WRITE TODAY . . .

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HY-GAIN TH3-JR.	3-Element/300W	$144.50	$129.95	$242.50
HY-GAIN TH3-MK3	3-Element/1KW	$199.95	$179.95	$289.95
HY-GAIN TH6-DXX	6-Element/2KW	$249.95	$224.95	$329.95
MOSLEY TA-33-JR	3-Element/1KW	$151.85	$136.50	$247.50
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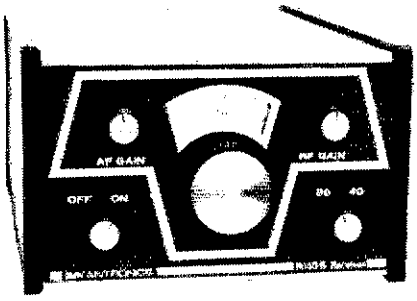

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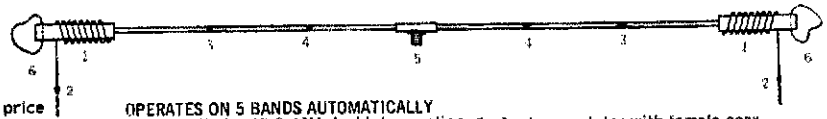

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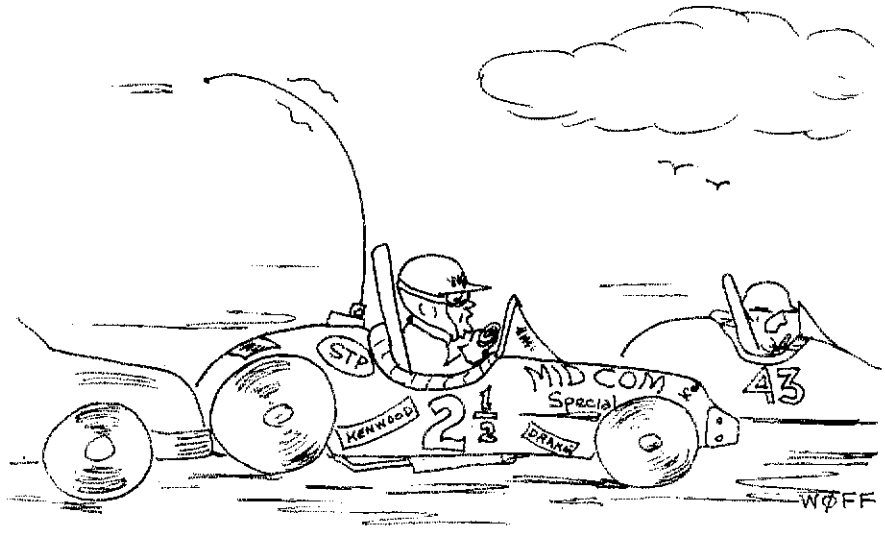

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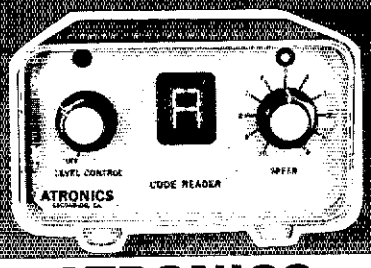

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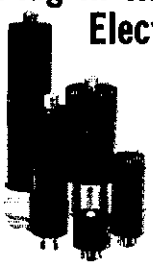

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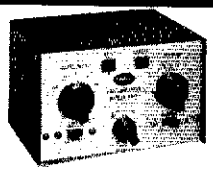

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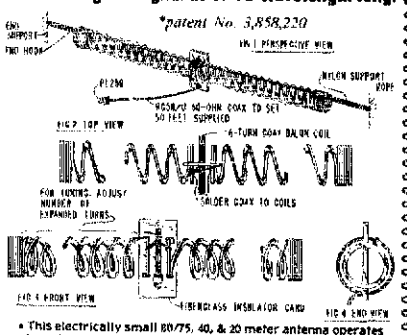

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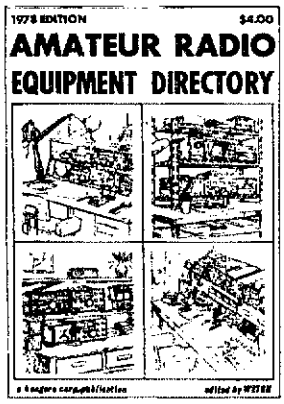

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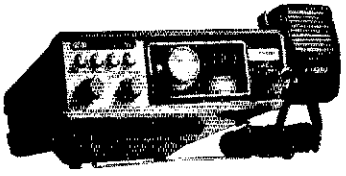

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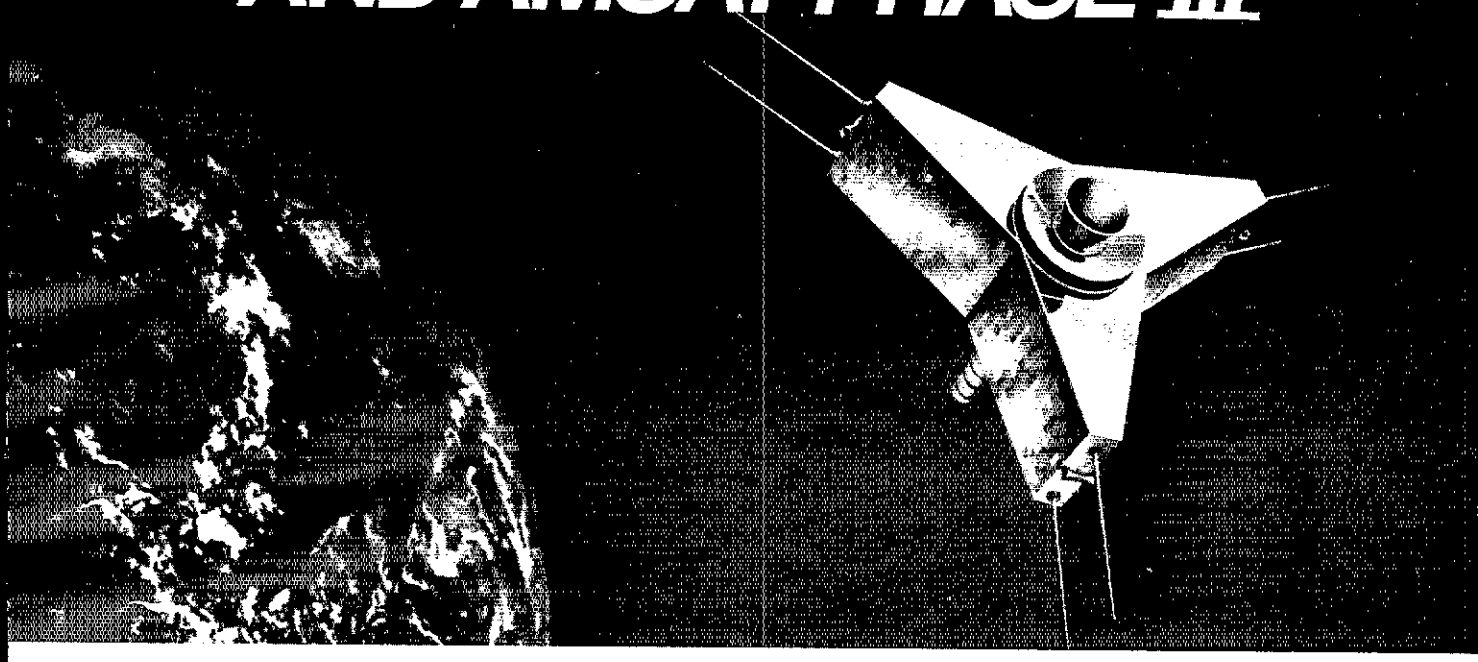

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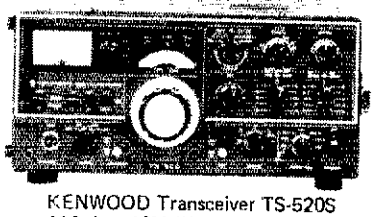

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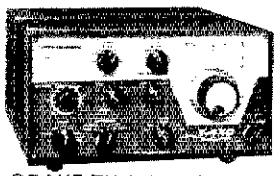

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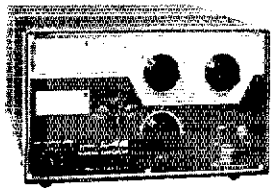

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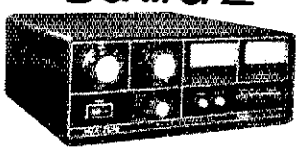

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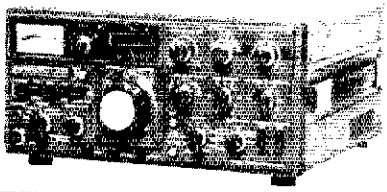

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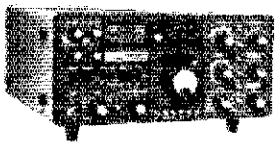

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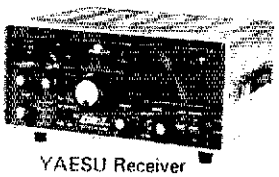

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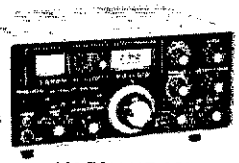

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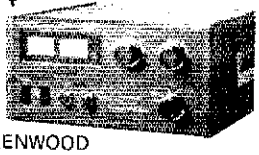

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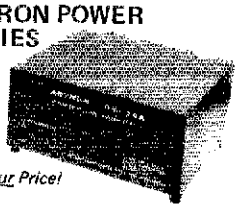

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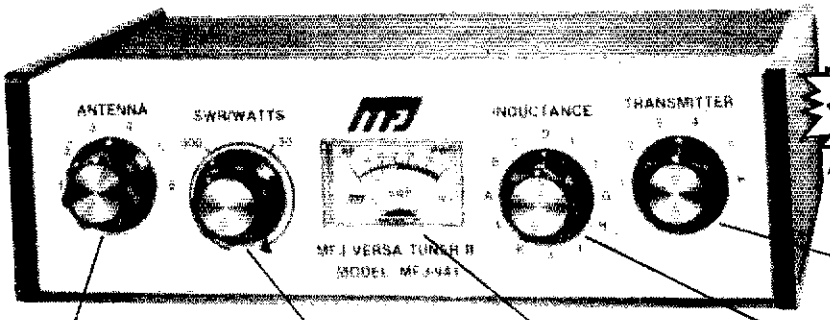
This NEW MFJ Versa Tuner II . . .

has SWR and dual range wattmeter, antenna switch, efficient airwound inductor, built in balun. Up to 300 watts RF output. Matches everything from 160 thru 10 Meters: dipoles, inverted vees, random wires, verticals, mobile whips, beams, balance lines, coax lines.



BRAND NEW

$79.95

Antenna matching capacitor. 208 pf. 1000 volt spacing.

Sets power range, 300 and 30 watts. Pull for SWR.

Meter reads SWR and RF watts in 2 ranges.

Efficient airwound inductor gives more watts out and less losses.

Transmitter matching capacitor. 208 pf. 1000 volt spacing.

Only MFJ gives you this MFJ-941 Versa Tuner II with all these features at this price:

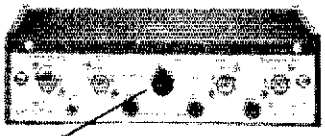
A SWR and dual range wattmeter (300 and 30 watts full scale) lets you measure RF power output for simplified tuning.

An antenna switch lets you select 2 coax fed antennas, random wire or balance line, and tuner bypass.

A new efficient airwound inductor (12 positions) gives you less losses than a tapped toroid for more watts out.

A 1:4 balun for balance lines. 1000 volt capacitor spacing. Mounting brackets for mobile installations (not shown).

With the NEW MFJ Versa Tuner II you can run your full transceiver power output — up to 300 watts RF power output — and match your transmitter to **any** feedline from 160 thru 10 Meters whether you have coax cable, balance line, or random wire.



ANTENNA SWITCH lets you select 2 coax fed antennas, random wire or balance line, and tuner bypass.

You can tune out the SWR on your dipole, inverted vee, random wire, vertical, mobile whip, beam, quad, or whatever you have.

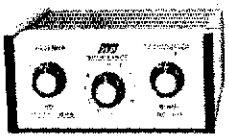
You can even operate all bands with just one existing antenna. No need to put up separate antennas for each band.

Increase the usable bandwidth of your mobile whip by tuning out the SWR **from inside your car.** Works great with all solid state rigs (like the Atlas) and with all tube type rigs.

It travels well, too. Its ultra compact size 5x2x6 inches fits easily in a small corner of your suitcase.

This beautiful little tuner is housed in a deluxe eggshell white Ten-Tec enclosure with walnut grain sides.

SO-239 coax connectors are provided for transmitter input and coax fed antennas. Quality five way binding posts are used for the balance line inputs (2), random wire input (1), and ground (1).



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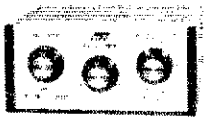
BRAND NEW

MFJ-901 VERSA TUNER

New efficient air wound coil for more watts out.

Only MFJ uses an efficient air wound inductor (12 positions) in this class of tuners to give you more watts out and less losses than a tapped toroid. Matches everything from 160 thru 10 Meters: dipoles, inverted vees, random wires, verticals, mobile whips, beams, balance lines, coax lines. Up to 200 watts RF output. 1:4 balun for balance lines. Tune out the SWR of your mobile whip **from inside your car.** Works with all rigs. Ultra compact 5x2x6 inches. SO-239 connectors. 5 way binding posts. Ten Tec enclosure.



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BRAND NEW

MFJ-900 ECONO TUNER

Same as MFJ-901 Versa Tuner, but does not have built-in balun for balance lines. Tunes coax lines and random lines.

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MFJ-16010 RANDOM WIRE TUNER

Operate 160 thru 10 Meters. Up to 200 watts RF output. Matches high and low impedances. 12 position inductor. SO-239 connectors. 2x3x4 inches. Matches 25 to 200 ohms at 1.8 MHz.

$49.95

BRAND NEW

MFJ-202 RF NOISE BRIDGE

This MFJ RF Noise Bridge lets you adjust your antenna quickly for maximum performance. Measure resonant frequency, radiation resistance and reactance. Exclusive range extender and expanded capacitance range (± 150 pf) gives you much extended measuring range.

Tells resonant frequency and whether to shorten or lengthen your antenna for minimum SWR. Adjust your single or multiband dipole, inverted vee, beam, vertical, mobile whip or random system for maximum performance. 1 to 100 MHz. SO-239 connectors. 2x3x4 inches. 9 volt battery.

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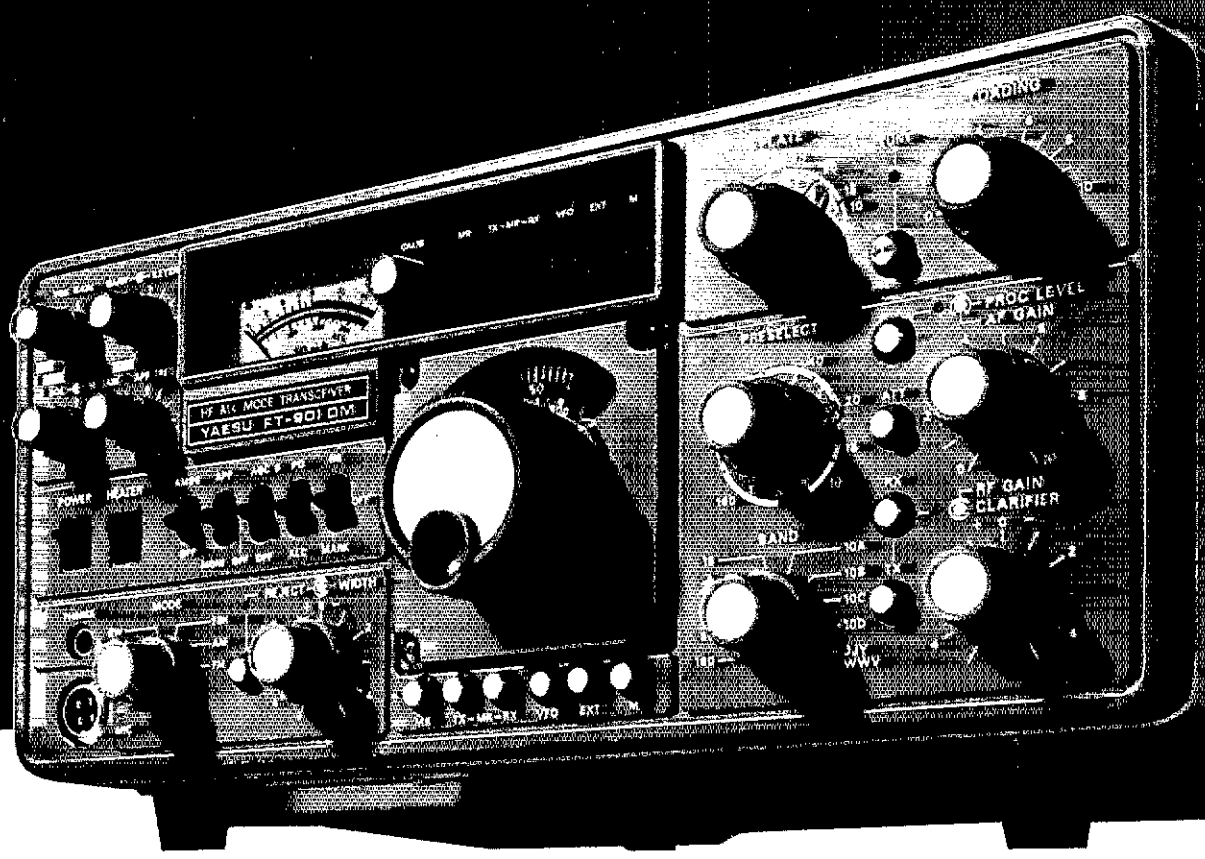

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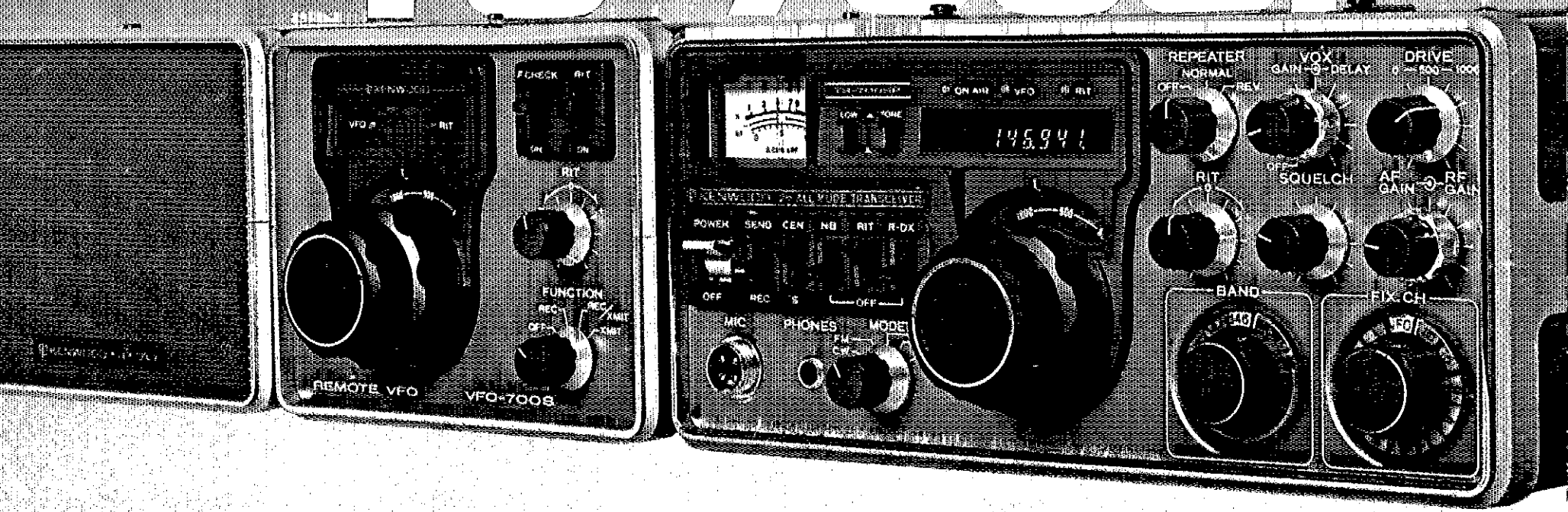
TS-700SP



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