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QST

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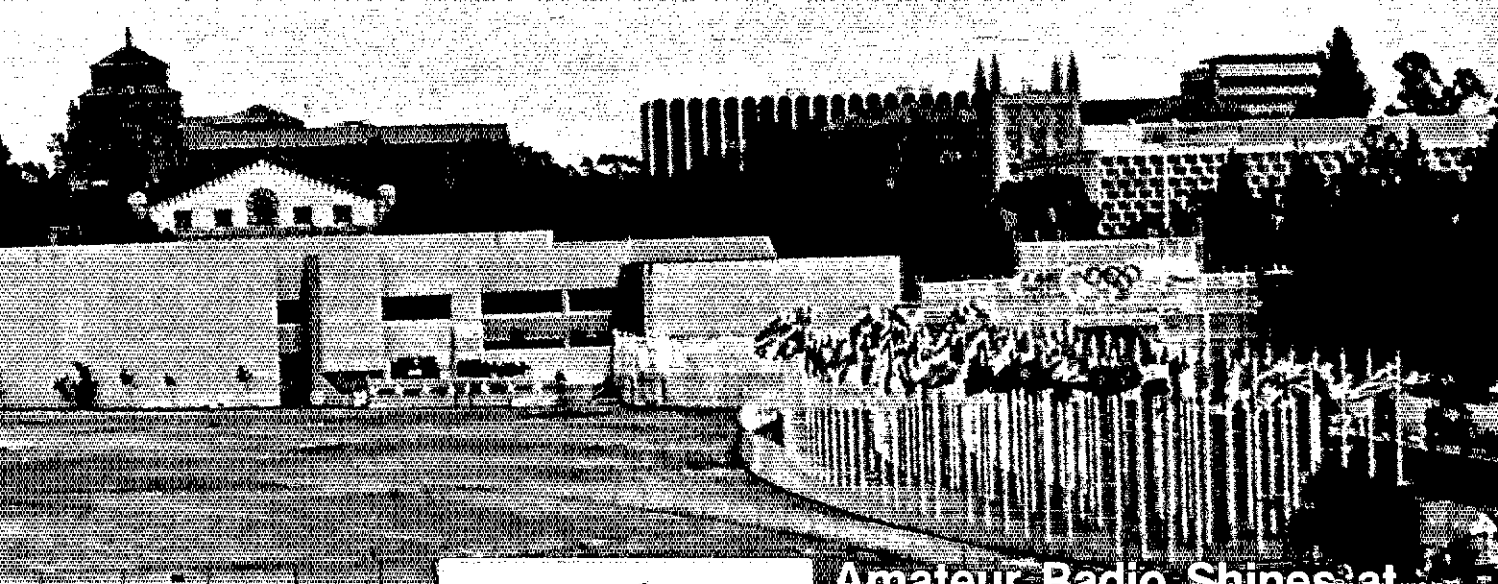

Amateur Radio Shines at the XXIII Olympiad

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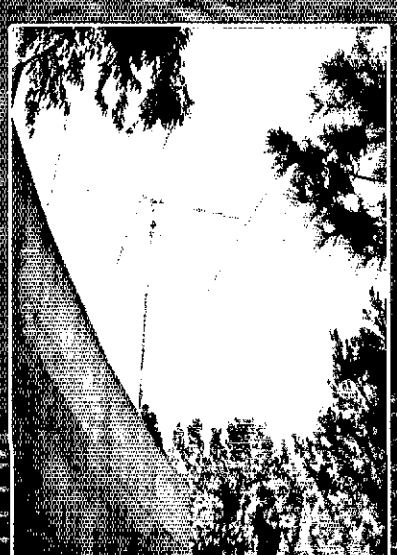

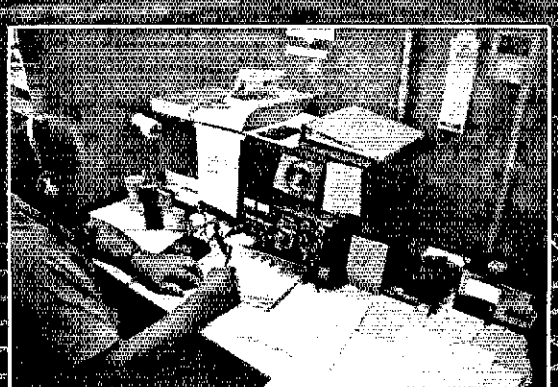

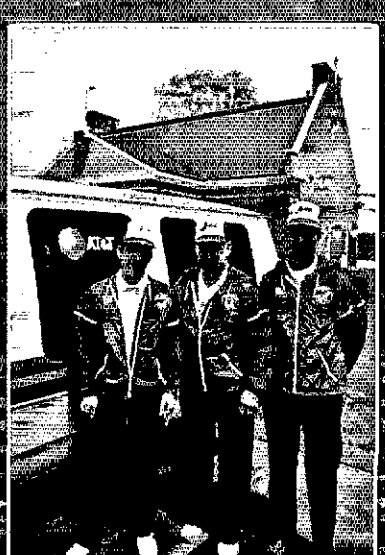

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No, we don't sell RF by the watt but we do offer a broad line of power RF devices for many different services... communications, HF-VHF-UHF (both vacuum tube and solid state), plasma generation for sputtering, etching, laser excitation, optical emissions spectrometry, cancer research, nuclear magnetic resonance, NMR imaging, meteor burst communications and many others. Frequencies from 1.5 to 500 MHz and power levels from 10 watts to 10,000 watts. Possibly no other single company offers such a wide range of standard and special RF power amplifiers
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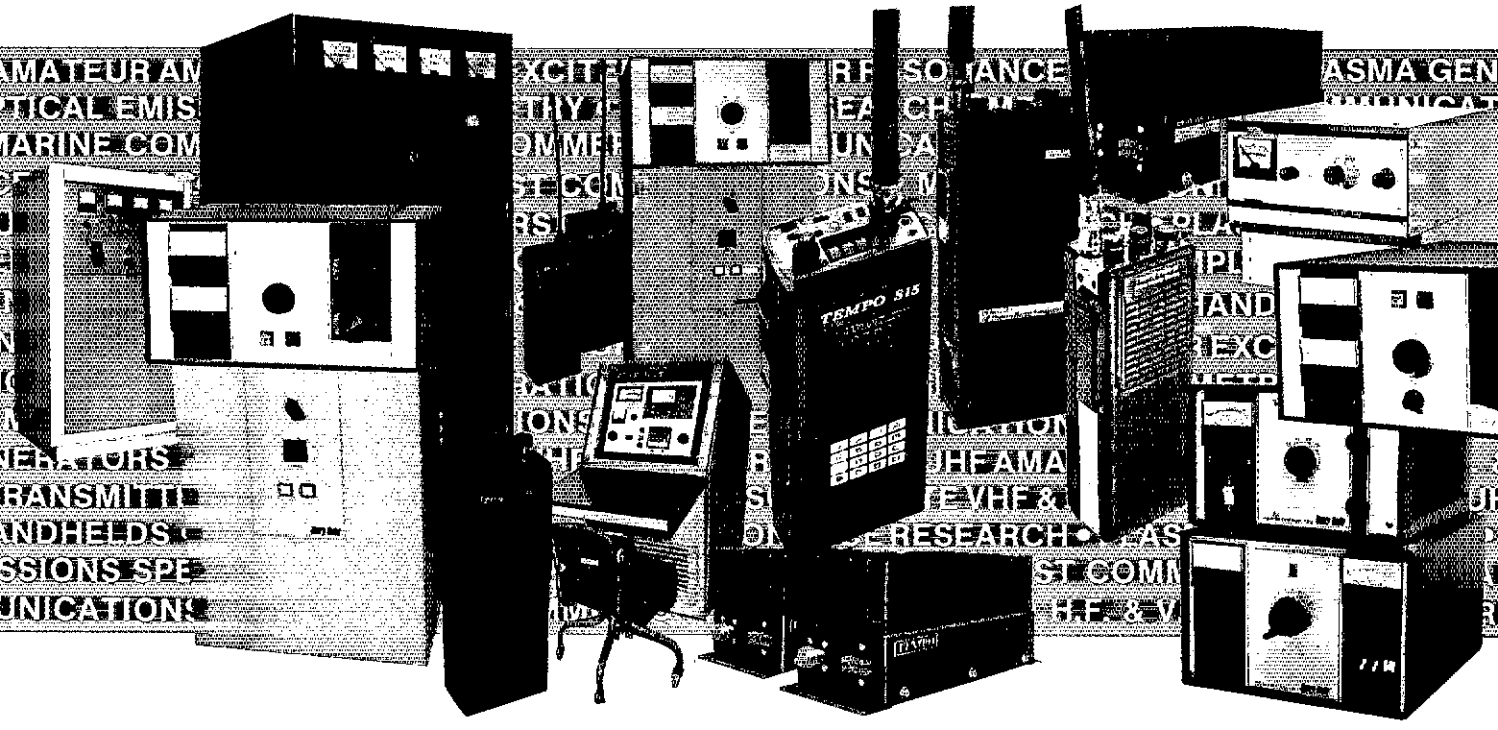

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- Storage is equivalent to 4500 lines, 90 pages, 80 ft. of TTY paper, or 15 hours of text at 60 WPM!
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The DSK3100 adds non-volatile memory and extended storage features you, our customer, need. Rather than designing a new product to replace it, we have again up-dated the DS3100 to make it truly the most advanced and user-friendly RTTY system sold. With the addition of the DSK3100, the DS3100 remains the unchallenged leader in state of the art communications. Write for our latest RTTY catalog and see the DSK3100 at your favorite HAL dealer.

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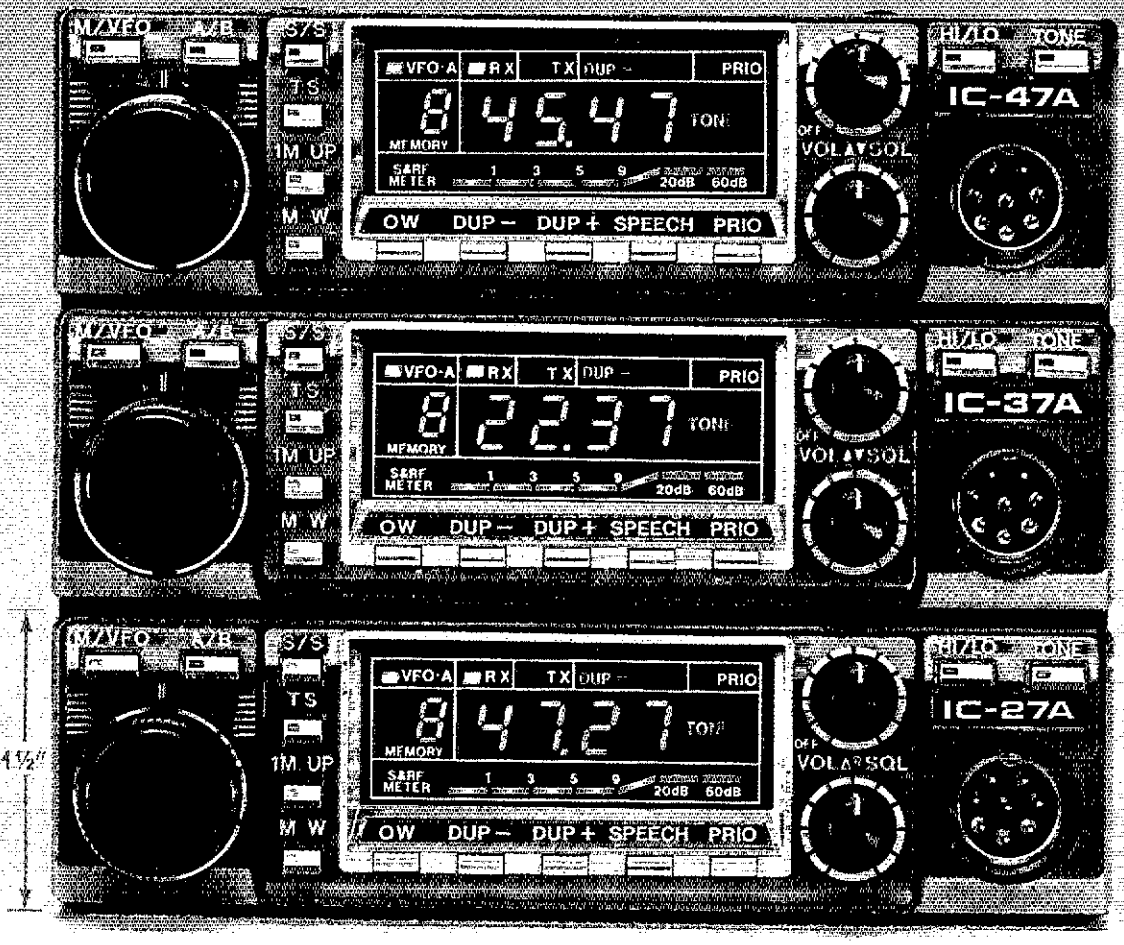
World's Most Compact Mobiles VHF/UHF/220MHz



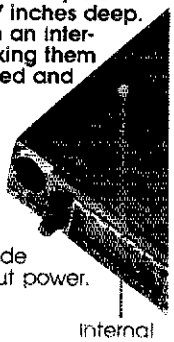
IC-47A 440MHz 25 Watts

IC-37A 220MHz 25 Watts

IC-27A 2 Meter 25 Watts

ICOM presents three ultra compact mobiles...the IC-27A 2-meter, the IC-37A 220MHz and the IC-47A 440MHz. The smallest mobiles available, the IC-27A/37A/47A series measure only 5½ inches wide by 1½ inches high by 7 inches deep. Yet, they contain an internal speaker making them fully self-contained and easy to mount.

25 Watts. In such an incredibly small package, the IC-27A/37A/47A are able to provide 25 watts of output power.



32 PL Frequencies. The IC-27A/37A/47A come complete with 32 PL frequencies ready to go. Each PL frequency may be selected by the main tuning knob and stored into memory for easy access along with frequency.

9 Memories. The IC-27A/37A/47A have 9 memories available to store receive frequency, transmit offset, offset direction, and PL tone. Memories are backed up by a lithium backup battery, which will store memories for up to seven years.

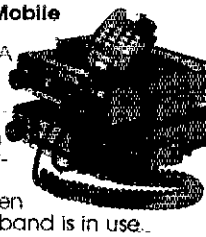
Speech Synthesizer. As an added plus, the IC-27A/37A/47A feature an optional speech synthesizer to verbally announce the receiver frequency of the transceiver through the simple push of a button. This allows the operator to hear which frequency he is operating on without looking at the transceiver.

Scanning. The IC-27A/37A/47A series has a scanning system which allows scanning of memories or scanning of the band.

Priority Scan. Priority may be selected to be either a memory channel or a VFO channel. By using sampling techniques, the operator can determine if a frequency which he wants to use is free or busy.

Microphone. Each IC-27A/37A/47A comes complete with a microphone with a 16-button pad for access to your favorite repeater or for dialing through an autopatch.

Stacking Mobile Mounts for the IC-27A/37A/47A make a small complete station for 1 to 3 bands. Each band is full featured and fully operational even when another band is in use.



The ICOM IC-27A/37A/47A provide superb performance in the mobile radio environment. See them at your local ICOM dealer.

ICOM

The World System

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September 1984 *Volume LXVIII Number 9*

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CONTENTS

OUR COVER

From the cross-country Torch Run to NG84O at the Olympic Village, hams rose to the occasion of the XXIII Olympic Games, making life a bit more pleasant for many participants and attendees. See pp. 45 and 60. Photos courtesy K6LAE (large and two middle photos), N6VI (left) and K1ET (right). Special thanks to W6EJJ.

TECHNICAL

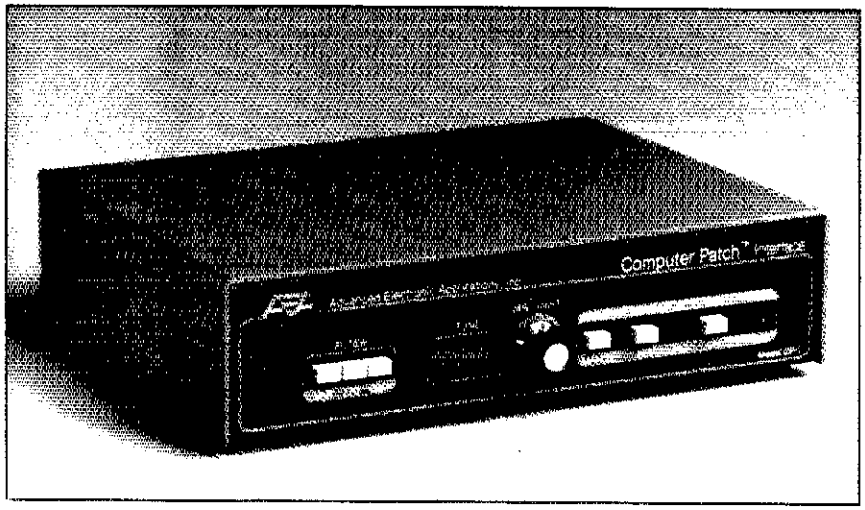
BEGINNER'S BENCH

NEWS AND FEATURES

OPERATING

DEPARTMENTS

ENGINEERING MAKES THE DIFFERENCE



Production Expertise And Service Integrity Form The Foundation For Your Long-Term Satisfaction

The fact that the Computer Patch Interface unit by Advanced Electronic Applications, Inc. is known as the best value on the market is no accident. The CP-1 was designed by Al Chandler, K6RFK (PHD-E.E.), an active RTTY user since 1963.

Given a cost per unit budget for the CP-1, Al designed as much performance as possible into the Computer Patch, including a unique new tuning indicator, referred to by one of our customers as the "Dead Eye Dick" tuning indicator. This indicator is ideal for RTTY and CW, in that it is both fast to tune and (within 10 Hz) as accurate as scope tuning. It also performs under poor signal to noise conditions in which other indicators provide no useful data.

Al's variable shift tuning was designed to move the space filter center frequency from 2225 Hz to 3125 Hz without changing the bandwidth (by varying the Q of the filter). All this is accomplished using a precision ganged potentiometer to assure proper tracking of the multiple filter stages. We could have used a pot costing a tenth as much by simply using a two-pole filter design, but we feel the advantage of a sharper filter reduces the noise bandwidth significantly and allows the variable shift control to be used like passband tuning for extra elimination of adjacent channel interference.

Some manufacturers are concerned that amateurs might try calibrating their own equipment and, therefore, have used non-adjustable components, which results in sub-optimal performance. Although more costly, trimpots used in AEA equipment allow factory adjustment for performance to design specifications. Competently designed active filter circuits need not be adjusted after leaving the factory; however, for specialized use the owner can easily change filter parameters.

Mindful of the fact that many of our customers are new to RTTY, Al made the CP-1 tuning as forgiving as possible, while providing the most critical operator a piece of equipment in which he could be proud. Even old "pro's" are surprised at the poor signal conditions under which the CP-1 will still provide good copy.

You can now experience the BEST RTTY, CW, and AMTOR offered. Couple the CP-1 with our new AEASOFT™ software packages designed for the MARS, SWL, or amateur radio operator, and you will feel a pride reminiscent of what "made in U.S.A." brought in years gone by. Please do not hold the low price of the CP-1 against us. This is one case where you get much more than you pay for relative to any of the competitive units. For more information send for our FREE catalog. Better yet, see your favorite dealer.

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Top performance, easy installation, 4 band operation, and moderate price are yours with Cushcraft's new A4, 4 element beam. A4 operates on 10-15-20 meters. A74 add-on kit expands operation to either 40 meters or the new 30 meter WARC band. New engineering gives better performance through improved trap design with fewer parts, less installed weight and greater strength. You too can experience exciting DX contacts with A4 available through dealers worldwide.

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TH-21AT/41AT

Kenwood's advanced electronic technology brings you a new standard in pocket/handheld transceivers! The TH-21AT/41AT features a high impact molded case and is designed to deliver convenient, reliable performance in a package so small, it will slip into your shirt pocket! It measures only 57 (2.24) W x 120 (4.72) H x 28 (1.1) D mm (inch) and only weighs 260 g (0.57 lb) with batteries. In typical Kenwood fashion these transceivers provide superior transmit and receive performance.

Both the 2 meter and 70 cm versions deliver one watt R.F. output on HI power and 150 mW low, for really extended battery life! Functional design includes three digit thumb-wheel switch for easy frequency selection along with a built-in 5 kHz UP-Shift switch and repeater offset switch. (±600 kHz or simplex, 2m version and ±5 MHz or simplex 70 cm version.)

Both the 2 meter and 70 cm pocket/handheld transceivers are available in standard or 16-key autopatch DTMF encoder versions. Kenwood thread-loc antenna connector is also provided.

See your authorized Kenwood dealer and take home a pocket full of 2 m or 70 cm performance today!

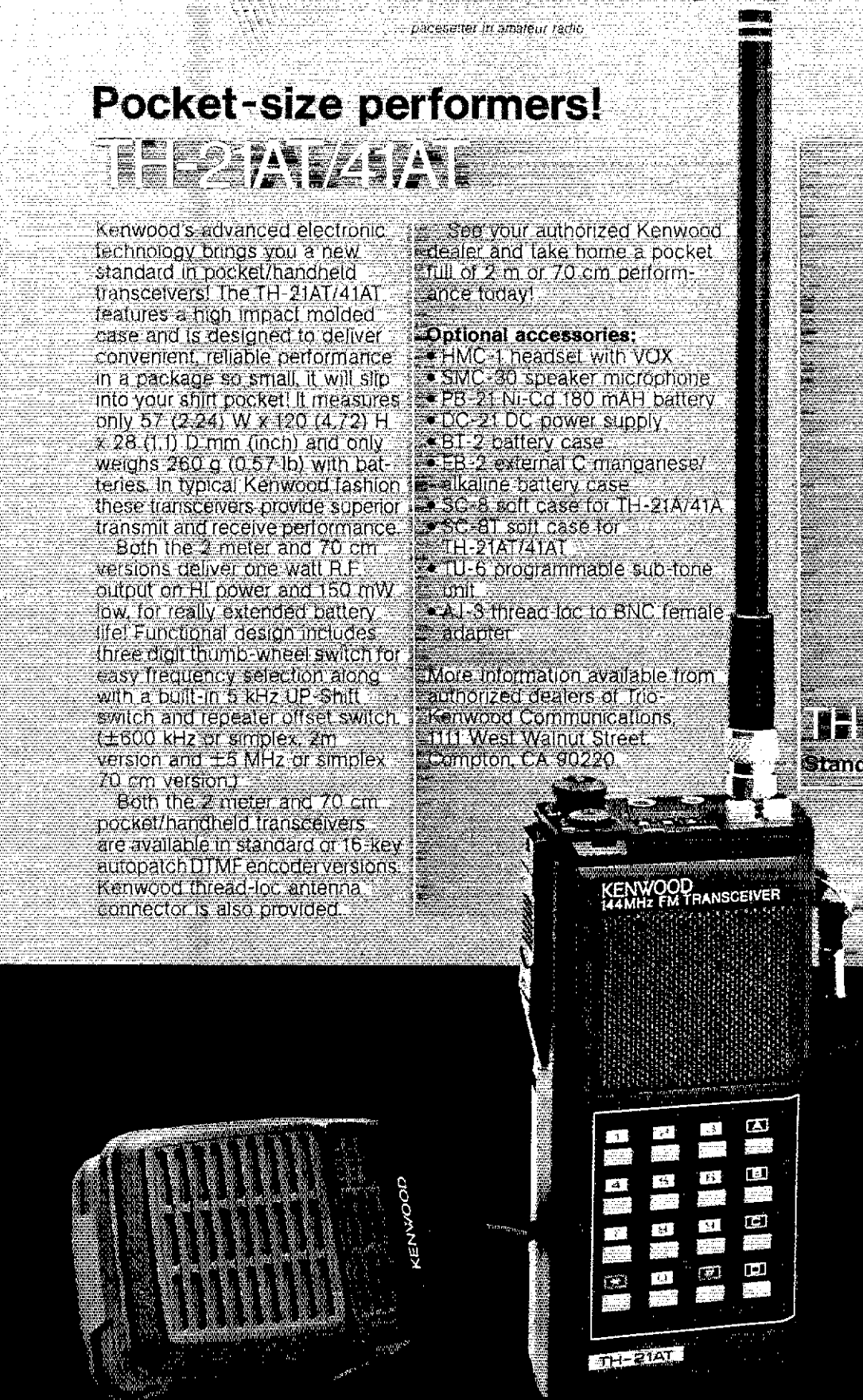
Optional accessories:

- HMC-1 headset with VOX
- SMC-30 speaker microphone
- PB-21 Ni-Cd 180 mAH battery
- DC-21 DC power supply
- BT-2 battery case
- EB-2 external C manganese/alkaline battery case
- SC-8 soft case for TH-21A/41A
- SC-8T soft case for TH-21AT/41AT
- TU-6 programmable sub-tone unit
- AJ-3 thread-loc to BNC female adapter

More information available from authorized dealers of Trio-Kenwood Communications, 1111 West Walnut Street, Compton, CA 90220.

TH-21A/41A

Standard versions.



TH-21AT/41AT Subject to FCC approval. Specifications and prices are subject to change without notice or obligation.

KENWOOD

pacesetter in amateur radio

TS-430S "Digital DX-terity!"

TS-430S

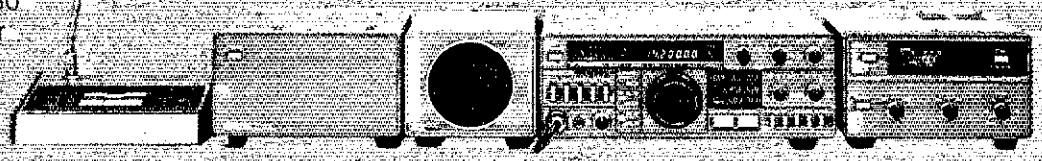
Digital DX-terity...that outstanding attribute built into every KENWOOD TS-430S that lets you QSY from band to band, frequency to frequency, and from mode to mode with the speed and ease that will give you a dominant position in DX operations.

KENWOOD'S TS-430S, a revolutionary, ultra-compact, HF transceiver has already won the hearts of radio Amateurs the world over. It covers 160-10 meters, including the new WARC bands (easily modified for HF MARS). Its high dynamic range receiver tunes from 150 kHz-30 MHz. It utilizes an innovative UP conversion PLL circuit for superior frequency stability and accuracy. Two digital VFO's allow fast split-frequency operations. A choice of USB, LSB, CW, or AM, with FM optional, are at the operators fingertips. All Solid-state technology permits inputs of 250 watts PEP on SSB, 200 watts DC on CW, 120 watts on FM (optional), or 60 watts on AM. Final amplifier protection circuits and a cooling fan are built-in.

Eight memories store frequency, mode, and band data, with Lithium battery memory back-up. Memory scan and programmable automatic band scan help speed up operations. An IF shift circuit, a tuneable notch filter, and a Narrow-Wide switch for IF filter selection help eliminate QRM. It has a built-in speech processor. A fluorescent tube digital display makes tuning easy and fast. An all-mode squelch circuit, a noise blanker, and an RF attenuator control help clean up the signal. And there's a VOX circuit, plus semi-break-in, with side-tone. All-in-all, it just could be that the expression "Digital DX-terity" is a bit of an understatement.

TS-430S Optional Accessories: In typical KENWOOD fashion, there are plenty of optional accessories for this great HF transceiver. There is a special power supply, the PS-430. An external speaker, the SP-430, is also available. And the MB-430 mounting bracket is available for mobile operation. The AT-250 automatic antenna tuner was designed primarily with the TS-430S in mind, and for those who prefer to "roll their own," the AT-130 antenna tuner is available. The FM-430 FM unit is available for FM operations. The YK-88C (500 Hz) or YK-88CN (270 Hz) CW filters, the YK-88SN SSB filter, and the YK-88A AM filter may be easily installed for serious DX-ing. An MC-60A deluxe desk microphone, MC-80 and MC-85 communications microphones, an MC-42S mobile hand mic., and an MC-55 8-pin mobile microphone, are available, depending on your requirements. TL-922A linear amplifier (not for CW QSK), SM-220 station monitor, PC-1A phone patch, SW-2000 SWR/power meter 160~6 meter, SW100A SWR/power/volt meter 160-2m, HS-4, HS-5, HS-6, HS-7 headphones, are also available.

More information on the TS-430S is available from authorized dealers of Trio-Kenwood Communications, 1111 West Walnut Street, Compton, California 90220.



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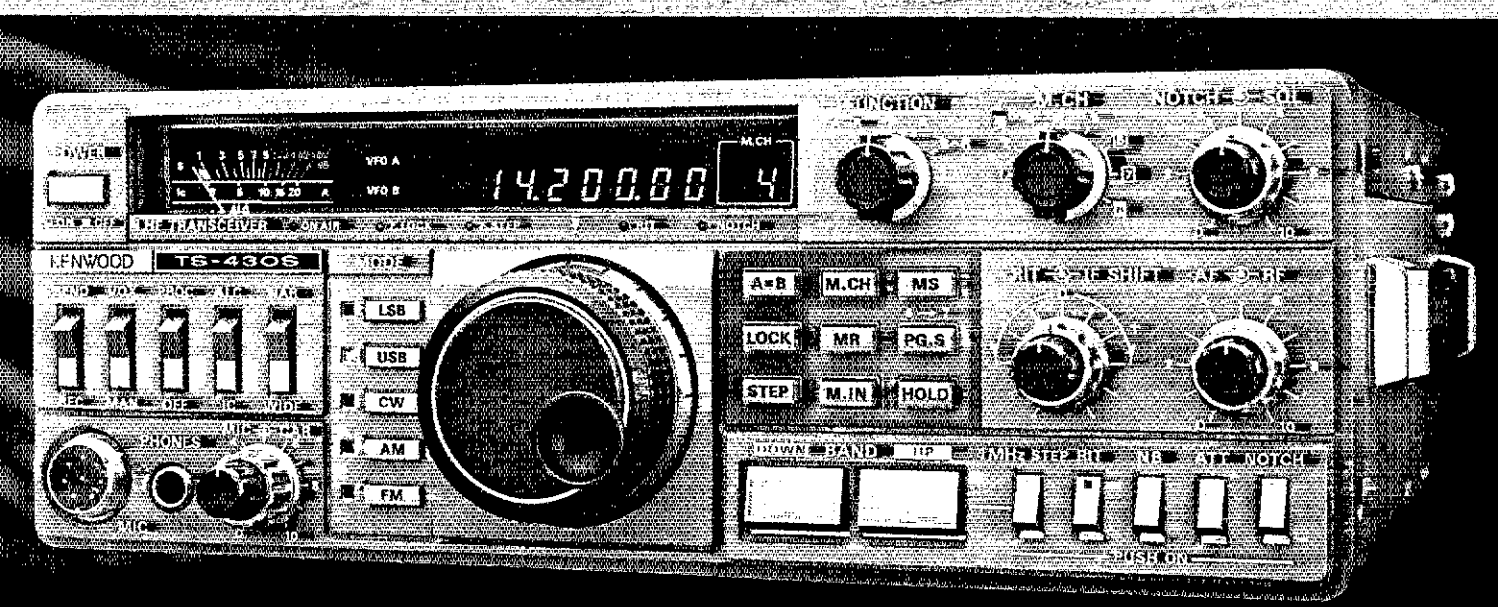

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THE AMERICAN RADIO RELAY LEAGUE, INC.

The American Radio Relay League, Inc., is a noncommercial association of radio amateurs, organized for the promotion of interest in Amateur Radio communication and experimentation, for the establishment of networks to provide communications in the event of disasters or other emergencies, 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.

ARRL is an incorporated association without capital stock chartered under the laws of the State of Connecticut, and is an exempt organization under Section 501(c)(3) of the Internal Revenue Code of 1954. Its affairs are governed by a Board of Directors, whose voting members are elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is noncommercial, and no one who could gain financially from the shaping of its affairs is eligible for membership on its Board.

"Of, by, and for the radio amateur," ARRL numbers within its ranks the vast majority of active amateurs in the nation and has a proud history of achievement as the standard-bearer in amateur affairs.

A bona fide interest in Amateur Radio is the only essential qualification of membership; an Amateur Radio license is not a prerequisite, although full voting membership is granted only to licensed amateurs in the U.S. and Canada.

All membership inquiries and general correspondence should be addressed to the administrative headquarters at 225 Main Street, Newington, CT 06111 USA. Telephone: 203-666-1541, Telex: 643958 AMRAD NEWI. MCI MAIL (electronic mail system) ID: 215-5052 (user name: ARRL).

"It Seems to Us..."

Spectrum Management

The radio spectrum is a valuable and scarce resource. Seeing that it is put to the best possible use, in the public interest, is a responsibility of the Federal government. In the United States, the responsibility is shared by two agencies: the Federal Communications Commission (FCC) and the National Telecommunications and Information Administration (NTIA). The FCC looks after the interests of the nongovernment users (including state and local government agencies); the NTIA, the Federal government users. In those frequency bands that are available exclusively to government or to nongovernment users, the two agencies can go pretty much their own way; in those bands that are shared by the two groups of users, FCC and NTIA work together to achieve their overall public-interest goal.

Of course, the public interest is not static; it must be reexamined on a continuing basis, particularly in the face of rapid technological development. Frequency allocations which made sense in years past may be inefficient or unnecessary today. New uses for the radio spectrum are constantly being developed; their potential for public benefit must be weighed against their impact upon other spectrum occupants. Decisions cannot be made solely on a technical basis; economics must be entered into the equation. Once a substantial investment has been made in equipment, its owners — be they private citizens or government agencies — will resist change. To illustrate the point, to a surprising degree today's spectrum allocations reflect planning conducted during the Second World War! For this reason, an allocations decision based upon perceived short-term benefits invariably will turn out to be wrong.

What does all this have to do with Amateur Radio? Weren't our allocations established at the World Administrative Radio Conference in Geneva, back in 1979? Aren't we "safe" until the next such conference? Addressing the last question first, the answer is an emphatic "no." The reason is that the international Table of Frequency Allocations permits national administrations a great deal of discretion and flexibility, particularly with respect to terrestrial services operating at VHF and higher. In the international Table, above 30 MHz, exclusive allocations to a specific radio service (such as the Amateur Service) are the exception. While our bands at 50 and 144 MHz are exclusive amateur allocations in this part of the world, the same is not true of the amateur bands between 220 MHz and 10.5 GHz; there, we share the spectrum with a number of other radio services. In fact, our access to these bands is conditioned on our not causing harmful interference to one or more of those other occupants. In most cases, the sharing partner we have had to protect is government Radiolocation, usually military radar. This sharing arrangement generally has worked to our advantage: Relatively few restrictions on amateur operation have been necessary, we can accept the occasional interference from radar that occurs, and we have proved, from the military standpoint, to be more compatible as sharing partners than some other service might have been.

As pressure on the spectrum has grown, this reasonably happy state of affairs has begun to change. At WARC-79, we lost access on a worldwide basis to a part of the 1215-1300 MHz band (namely, the part from 1215 to 1240 MHz) because of a perception that amateur operation there might cause harmful interference to a new, satellite-borne radionavigation system. Domestically, FCC has placed us on notice that in the future we'll be unable to use 2310-2390 MHz so as to protect aeronautical flight-test telemetry from interference. New restrictions to operation in the 420-430 MHz band along the Canadian border are pending, to protect land mobile operations in Canada (Canadian amateurs lost access to that part of the band several years ago). Land mobile interests in this country have drawn a bead on at least 2 MHz of the 220-MHz band, in anticipation of government radiolocation operations being phased out by the end of the decade. FCC has taken no position on this last issue; the 220-MHz band must be discussed during joint NTIA/FCC long-range planning activities before any FCC action could be forthcoming. Even so, speculation as to what the Commission might do could have a chilling effect upon further development of the band.

Of course, the impact of technology is not all on the side of increasing spectrum use and increased congestion. Some developments permit the same job to be done with less; others reduce the desirability or the need for spectrum for a particular purpose. Some such innovations make it to the marketplace on their own; others, particularly those that endanger entrenched economic interests, face an uphill battle.

With that in mind, one hopes that the FCC and NTIA will not be distracted, by an examination of the tiny slice of spectrum that is our 220-MHz band, from the much larger and more significant spectrum management opportunities which are emerging.

For example:

- Some proponents of the land mobile service see 216-222 MHz as a good place to introduce amplitude compandored sideband (ACSB) into everyday use in that service, using 5-kHz channel spacing instead of the much wider spacings required by FM. But if ACSB holds promise for the land mobile service, should the users of that service not be encouraged to adopt the technique by introducing it in *existing* bands, with suitable incentives for making the switch? How can a mode of emission touted for its spectrum-conserving characteristics be used to justify an *expansion* of the land mobile allocations?
- Television broadcasting continues to occupy the lion's share of the spectrum that is most suited to land mobile use. Yet, in recent years there has been a tremendous increase in the number of television viewers served by cable — and a corresponding *decrease* in the number of viewers who rely on over-the-air reception. Should this dramatic shift not be reflected in any long-range spectrum planning?
- The main culprit in gobbling up UHF spectrum is not the transmitted television signal — it's that the FCC continues to sanction inferior TV receiver design. The specifications for UHF television receivers date back a third of a century, to a time when it was a trick just to make a set *work* at those frequencies. Because the Commission assumes that TV receivers will have poor image rejection and excessive oscillator radiation, the use of a UHF TV channel in a service area means that a total of *16* channels cannot be used in that area. In other words, because of these taboos a single UHF TV station precludes other uses of spectrum nearly *20 times* the width of our 220-MHz band! Isn't it time this incredibly wasteful practice was ended?
- The telecommunications needs of our mobile population are being met in a variety of new ways: cellular telephone service, digital paging and dispatching, and other techniques which are more spectrum-efficient than conventional land mobile techniques. Shouldn't these new techniques be encouraged and allowed to develop before more spectrum is turned over to land mobile use?

Just as there is room for disagreement on questions of land management — the use of our national forests, for example — so there is room for honest disagreement on spectrum management questions. But, at least let us be certain that the right questions are being asked!

— *David Sumner, K1ZZ*

League Lines...

HF phone bands expanded! See Happenings, this issue.

The ARRL is now a Volunteer Examiner Coordinator for all 13 FCC-defined regions. See page 47.

The Cumberland County Amateur Radio Service is the new incoming Third Call Area QSL Bureau. See page 53 for details.

The FCC suspended Dave H. Meehan's (W7IVK) Advanced class license for one year and said he will not be allowed to operate on 7235-7280 kHz after the suspension period. According to a July 27 FCC news release, the Commission cited Meehan for willfully interfering with other amateur communications near 7255 kHz, violating Section 97.125 of the FCC Rules.

Harold Claypoole, ex-N6BII, has been placed on three year's probation by the U.S. District Court for the Southern District of California on conditions that he cease violating radio regulations and he not transmit without an FCC license. Claypoole has a long history of Amateur Radio violations. (See QST, July 1983, page 51.) The San Diego FCC Field Office received more than 50 complaints from other amateur operators about Claypoole's unlicensed operation. U.S. Marshals seized Claypoole's radio equipment and prosecution ensued in February. According to the July 31 FCC news release, FCC usually handles amateur interference problems by way of violation notices and fines; however, "it became necessary to take firm action in this case to silence the continued disruptive operations following the repeated warnings of the Commission and area amateurs."

Several full-time positions are open at ARRL Hq. in Newington. The Club and Training Department is looking for an Assistant Club Program Manager. Duties include editing Radio Club News and contributing to Club Corner in QST. Excellent writing skills, a willingness to travel and a Technician class or higher ham license is required. Experience with Amateur Radio clubs a plus. Contact Sally O'Dell, KB1O, Club Program Manager, for details.

Membership Services is looking for a licensed amateur to fill an opening for Membership Services Assistant. The successful candidate for this non-technical position will have good writing and oral skills, an ability to work effectively with other people, and a desire to work for the interests of Amateur Radio. College degree a plus. Contact Rick Palm, K1CE, Acting Manager, Membership Services Department.

The Technical Department has two full-time job openings. One is for an Editorial Assistant with two years of formal electronics training or equivalent experience. The other is for a Technical Information Specialist with at least one year of formal electronics training. Both jobs require Amateur Radio licenses, General class or higher. Please contact Paul Rinaldo W4RI, Technical Department Manager.

ARRL is now publishing a bi-weekly packet radio newsletter called Gateway that should be of interest to beginning and experienced packet radio enthusiasts. Subscription rates for ARRL members in the U.S. are $6 (U.S. funds) for Third Class Mailing; and $11 (U.S. funds) for First Class Mailing to the U.S., Canada and Mexico. Overseas Air Mail subscriptions are available at $14 (U.S. funds) per year. Add $3 if you are not an ARRL member.

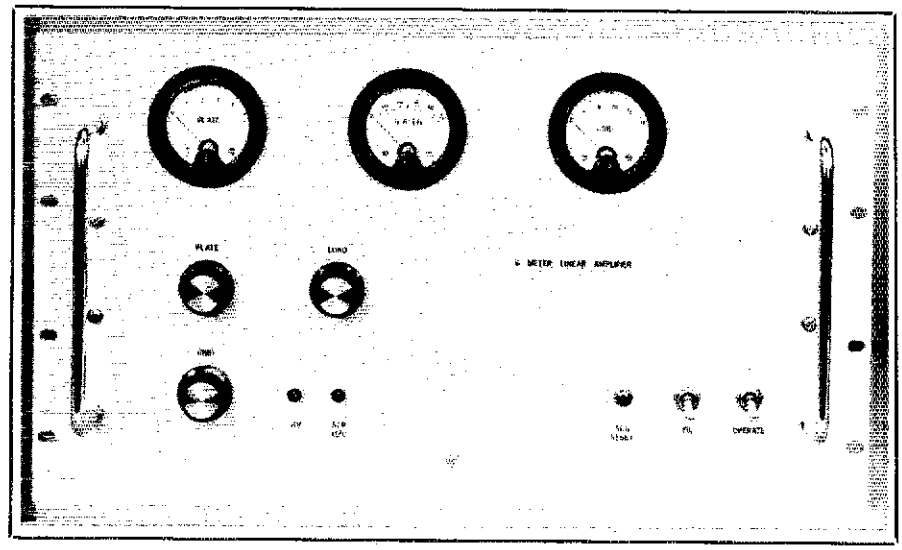
ARRL is conducting an informal survey of the STS-9/W5LFL mission. Specifically, how many hams operated amateur stations in schools, and how many people (hams and non-hams) have seen the video tape "Amateur Radio's Newest Frontier." Please send your responses to ARRL Hq. Mark the envelope "STS-9 Survey."

October QST will carry a new Ham-Ads category: "Antique-Vintage-Classic." This category should have wide appeal to individuals seeking to sell or to acquire older Amateur Radio equipment and accessories. The regular Ham-Ad rules and rates, as found in the Ham-Ad preamble each month, will apply. The category will appear just before the "General" Ham-Ads.

"The Amateur Auxiliary for Volunteer Monitoring," described on page 11 of August QST, announced the League's expanded commitment to maintaining high standards of on-the-air conduct. If you're not presently an Official Observer, but wish to participate in this important new program, please contact your Section Manager, listed on page 8 of QST.

A Cathode-Driven Tetrode for 6 Meters

Stability, power, low cost: Is this what you're looking for in a 6-meter do-it-yourself project? If so, look what's here!



By David Munyon,* W7DVB

The advantages of grounded-grid amplifiers are numerous and have been proven over the years. They include: simplicity of design, good third-order IMD characteristics, inherent stability (generally without the need for neutralization) and noncritical tuning. The only requirement is abundant driving power. Usually, this is a small price to pay, unless the driver you intend to use is one of the many popular, low-power (10- to 25-W-output) VHF transceivers. Also, with the tremendous increase in the use of 100%-duty-cycle modes such as RTTY and SSTV, many of us would rather not operate our exciters at half to full bore while driving an amplifier. If you're willing to sacrifice only one of the aforementioned advantages — simplicity — the remaining attributes of grounded-grid operation can be made available at a considerable reduction in driving power.

Enter the Tetrode

For many years, tetrodes (most often connected as triodes) have been used in grounded-grid circuits. But we have good reasons to consider the tetrode as a cathode-driven performer in its own right. First, the drive requirements are reduced. A 4-400A requires 40 W of drive power for full output when triode connected. Only half that amount is needed to drive its class-AB1 counterpart. The second reason is cost. Tetrodes are still available as hamfest and surplus items at a fraction of their original cost. (Some of the newer triodes cost more than the exciters that drive them!)

But not all tetrodes can be triode connected. All of the external anode family of tubes, and a few others, have internal geometry that allows the control grid dissipation to be greatly exceeded if the tube is operated as a triode. Therefore, those tubes should be cathode driven only as tetrodes. The usual way to do this is to ground the control and screen grids to RF with low-inductance bypass capacitors, and then place operating voltages on them. The cathode can be driven in a normal fashion, and the tube operated in any class consistent with linear service. Class-AB1 has the lowest drive requirements and is the easiest with which to work.

Tetrode Vs. Triode

I concede that the addition of a screen element complicates the overall circuit, especially if the screen-circuit provisions are made properly. But, the circuit need be no more complex than that of its grid-driven equivalent. The cathode-driven tetrode requires grid bias and a well-regulated screen supply. Also, there is no correct way to load a tetrode without a meter to monitor the screen-grid current. This device is invaluable and should not be omitted for the sake of economy.

No discussion of the screen-grid circuit would be complete without some mention of an overcurrent-protection circuit. Several solutions have been offered in the past (including the use of no protection circuit!), and each has its disadvantages. Sensitive relays are expensive and their use can have an adverse effect on screen-voltage regulation. Current-limiting supplies do an excellent job of protecting the tube, but do not inform you when something is wrong. Since screen current is extremely sensitive to minor plate-voltage excursions and plate-loading conditions, the builder has to be absolutely certain that these are correct, and that plate voltage is always present with screen voltage, if the screen-protection circuit is to be eliminated. The protection circuit is well worth the small cost involved. This amplifier incorporates an inexpensive and simple circuit that contains none of the disadvantages mentioned earlier.

A Cathode-Driven 4CX250B

I became aware of the cathode-driven tetrode years ago while trying to get a 4-1000A to work on 50 MHz. The results were so good that, when it came time to build an amplifier for my new solid-state transverter, I decided that building a grid-driven amplifier would be a giant step backward.

The 4CX250B is an excellent tube for 6-meter use. This tube has a high plate-

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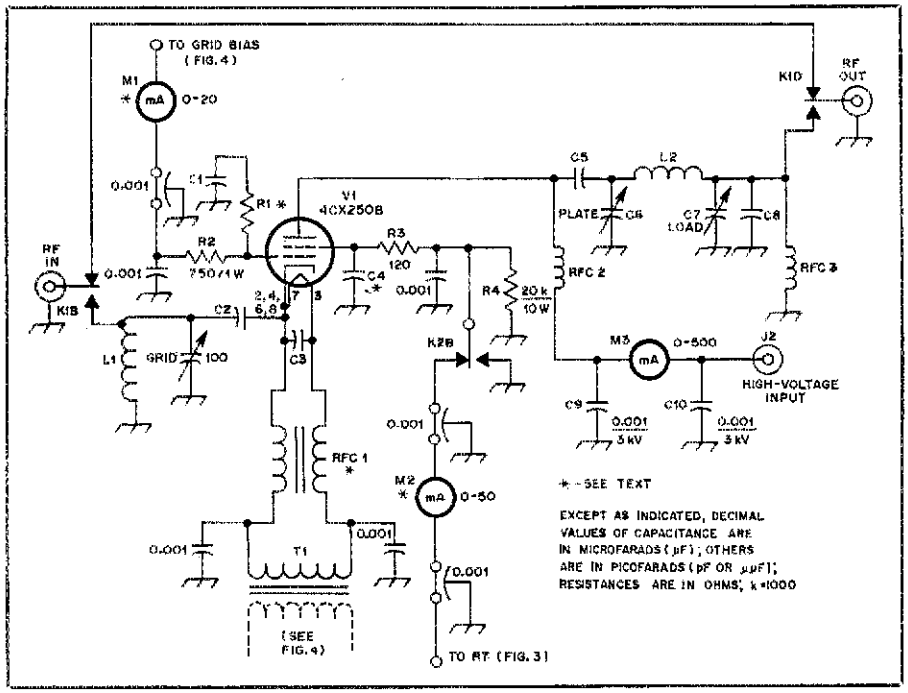


Fig. 1 — Schematic diagram of the 6-meter amplifier RF section. Unless otherwise specified, resistors are ½-W, 10%-tolerance types. Feedthrough capacitors have 500-V ratings; bypass capacitors are disc-ceramic, 1-kV.

C1 — 470-pF, 2.5-kV disc-ceramic (see text).
C2, C3 — 0.001-μF, 500-V silver mica.
C4 — Part of tube socket assembly (see text).
C5 — 500-pF, 5-kV ceramic (Centralab 858S-500 or equiv.).
C6 — See text (approx. 6 pF).
C7 — 140-pF air variable, receiving type.
C8 — 75-pF ceramic (Centralab 850S-75N or equiv.).
L1 — 4½ turns no. 14 bare wire, ½-inch-dia, 1½ inches long, tapped one turn from hot end.
L2 — 6 turns no. 10 bare wire, 1-inch-dia, 1½ inches long.
RFC1 — 15 turns no. 16 enameled wire close-wound on a ½-inch-dia ferrite rod.
RFC2 — 1-5/8 inches no. 22 enameled wire close-wound on a 3/8-inch-dia. Teflon® rod.
RFC3 — Ohmite Z50 (or equiv. 5-10 μH RF choke).
V1 socket — Eimac SK-600 or SK-620.
V1 chimney — Eimac SK-606.

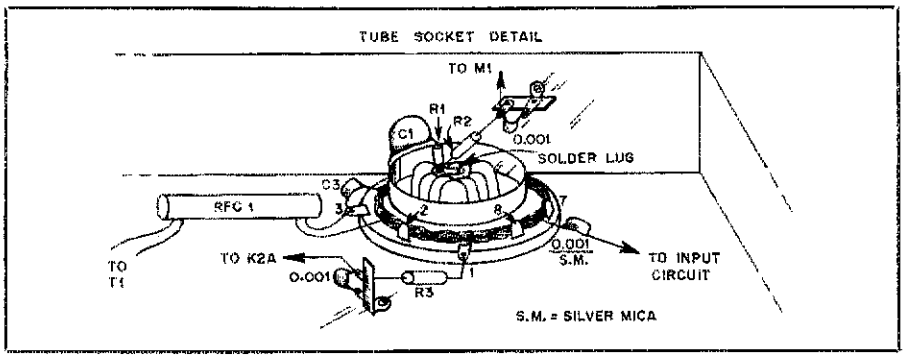


Fig. 2 — Tube socket detail. See text.

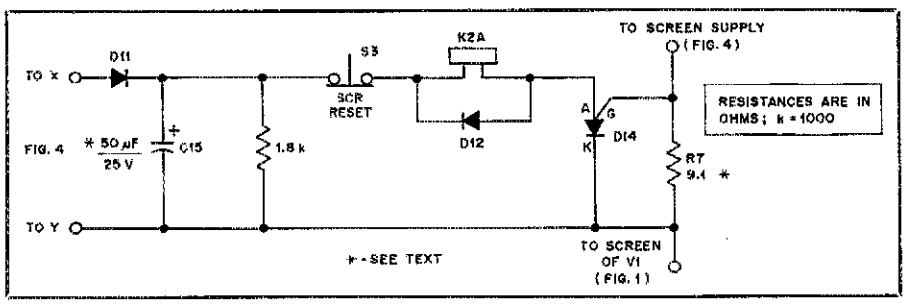


Fig. 3 — Screen overcurrent-protection circuit. Resistors are ½-W, 10%-tolerance types.

D11, D12 — 1-kV, 2.5-A silicon diodes.
D14 — 4-A, 200-V SCR (Jameco C106B1, ECG 5455 or equiv.).
K2 — DPDT 12-V dc relay, 1-A contacts (see text).

dissipation rating for its small physical size, has reasonable power-supply requirements, and requires approximately 10 W of drive in a cathode-driven, class-AB1 configuration. (If much more drive is available, an appropriate attenuator must precede the input circuit.) The only differences between this design and its grid-driven equivalent are the filament/cathode and control-grid circuits.

Filament/Cathode Circuit

In Fig. 1, notice that the cathode and one of the filament connections are tied together. Normally, the isolation created by the physical separation of the two elements is sufficient to ensure stability, and a filament choke would not be required. I felt that this would not be the case on 50 MHz, and a call to Eimac confirmed it. At Bill Orr's recommendation, I tied the cathode and filament together, and fed the filament through a choke. The cathode impedance is approximately 120 ohms. In the interest of best linearity and minimum drive requirements, a tuned input circuit is used. The tank coil is tapped to present an input impedance of 50 ohms.

There are many sockets designed for use with this family of tubes. I recommend that you use one that incorporates a built-in screen bypass capacitor (1100 or 2700 pF); either one will do. A few of these types of sockets are so constructed that the four cathode pins are grounded internally; do *not* use one of these. An Eimac SK-600 or SK-620 socket is recommended. The four cathode pins (2, 4, 6, 8) and one of the filament pins (7) of the socket must be wired together to form one low-inductance connection. The easiest way to do this is to carefully bend pins 1 and 3 parallel to the chassis, and then strap together pins 2, 4, 6, 7 and 8. Make certain that this strap forms a complete circle around the socket. For strap material, I use some stretched and flattened shield braid removed from RG-58 coaxial cable. All connections made to the cathode, or the filament (pin 7), can be made anywhere along this ring. See Fig. 2 for details.

Grid Circuit

The tube grid is accessed through the socket center connector and is bypassed to ground by C1. The capacitance of C1 is not as important as its physical size. C1 should be a high-voltage, disc-ceramic type (2 kV or more), whose body nearly spans the distance between the connection points. This provides for an absolute minimum lead length. Use a solder lug on the grid pin, and solder the other capacitor lead directly to the inside of the air duct on the tube-socket bottom.

When my amplifier was first tested, I found that the plate current idled at about 40 mA, and was completely independent of grid voltage. This self-biasing was traced to a parasitic in the grid circuit, and was eliminated by the addition of a

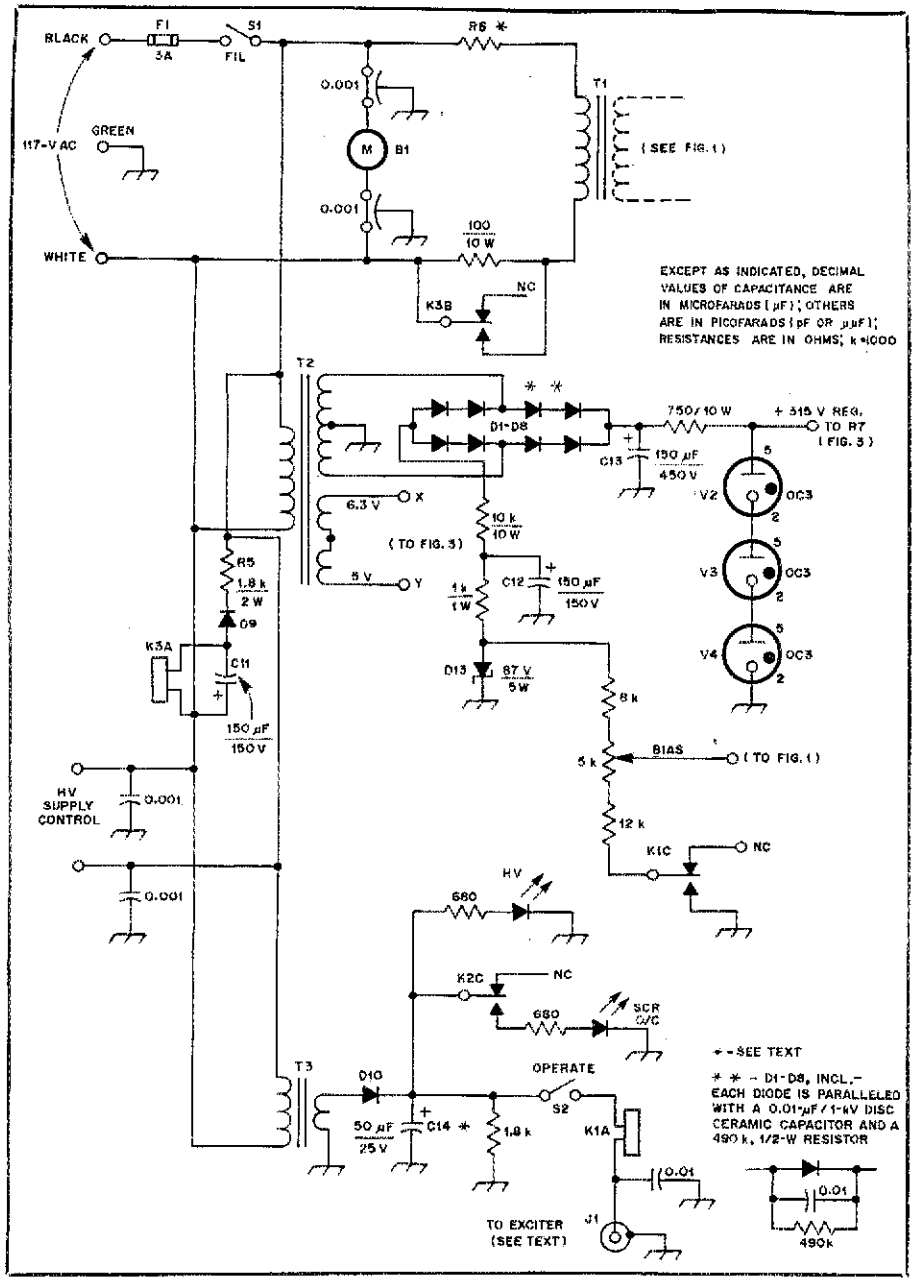


Fig. 4 — Power-supply section of the 6-meter amplifier. Unless otherwise specified, resistors are ½-W, 10%-tolerance types; feedthrough and bypass capacitors have 500-V ratings.

B1 — Squirrel-cage blower, 56 CFM (minimum), 117-V ac motor.
D1-D10, incl. — 1-kV, 2.5-A silicon diodes.
D13 — 87-V, 5-W Zener diode.
K1 — 3PDT 12-V dc relay, 5-A contacts.
K3 — SPST 234-V ac relay, 3-A contacts (see text).
T1 — 117-V primary; 6-V, 2.6-A secondary (see text).
T2 — 117-V primary; 580-V c.t., 75-mA secondary with 6.3- and 5-V filament windings (see text).
T3 — 117-V primary; 12-V, 1-A secondary.

series-connected resistor, R1. If you wish to experiment, R1 should be a ½-W, carbon-composition resistor with a resistance value that is the minimum required for complete stability. R1 should be placed as shown in Fig. 2; I found that a 3.9-ohm resistor kept my amplifier unconditionally stable.

In the interest of stability, don't use chokes in place of R2 and R3 in the grid and screen circuits. M1, the grid-current meter, can have a range of from 0-1 mA to 0-20 mA or so, and is included only to ensure that grid current is never drawn, and the operation remains class-AB1.

Screen Circuit

Relay contacts K2B are part of the screen overcurrent-protection circuit, the operation of which will be discussed later. Because the 4CX250B draws negative screen current on occasion, the screen-current meter should ideally be of the zero-center type. As these meters are expensive and not readily found, a standard meter can be pressed into service by using bleeder string, R4. Notice that 15 mA of bleeder current is drawn through the meter whenever K2 is open (normal). This offsets the actual zero reading of the meter to the 15-mA position and allows a negative current of 15 mA to be metered. This is more than adequate for the 4CX250B. If a zero-center meter is used, R4 may be eliminated unless the screen supply shunt regulator is replaced by a series regulator. In that case, the bleeder would be necessary to offset the effects of secondary emission.

For the overcurrent-protection circuit (Fig. 3), an SCR (D14) seems to be a natural. A very small gate voltage, developed across R7 by the screen current, turns on the SCR and causes K2 to close. This removes screen voltage from the tube and grounds the screen, preventing further abuse. A second set of relay contacts (K2C) is used to light a front-panel-mounted LED. D14 continues to lock out the screen voltage until the SCR is reset by removing its anode voltage. This is done by momentarily pushing the RESET switch, S3.

D11, C15 and the filament windings of T2 provide dc power for a 12-V relay at K2. A relay with a different voltage rating can be used if this supply is modified accordingly. The value for R7 was found experimentally by substituting a variable, low-voltage supply for the screen supply. A 0-100 mA meter and load resistor were placed in series with R7, and the voltage slowly increased until the gate threshold was reached and the SCR fired. The threshold current was noted, and R7 varied until the desired current would trigger the SCR. With R7 equal to 9.1 ohms, the SCR fired consistently at 45 mA.

Since 15 mA of the current drawn through R7 will be bleeder current, this allows a maximum of 30 mA for screen current, which is well below the 12-W screen dissipation rating for the tube. Note that the entire overcurrent-protection circuit is hot with screen voltage, so proper precautions must be taken during construction. I built the protection circuit on a PC board, but it could have just as easily been chassis-mounted using terminal strips.

Construction

The amplifier is built on a 3 × 8 × 17-inch chassis; a 3 × 5 × 7-inch chassis houses the output network components.[1] A 10½- × 19-inch rack panel is used for the amplifier front panel. The general physical layout should be followed, as it is

[1]mm = In × 25.4; m³ = ft³ × 0.0283.

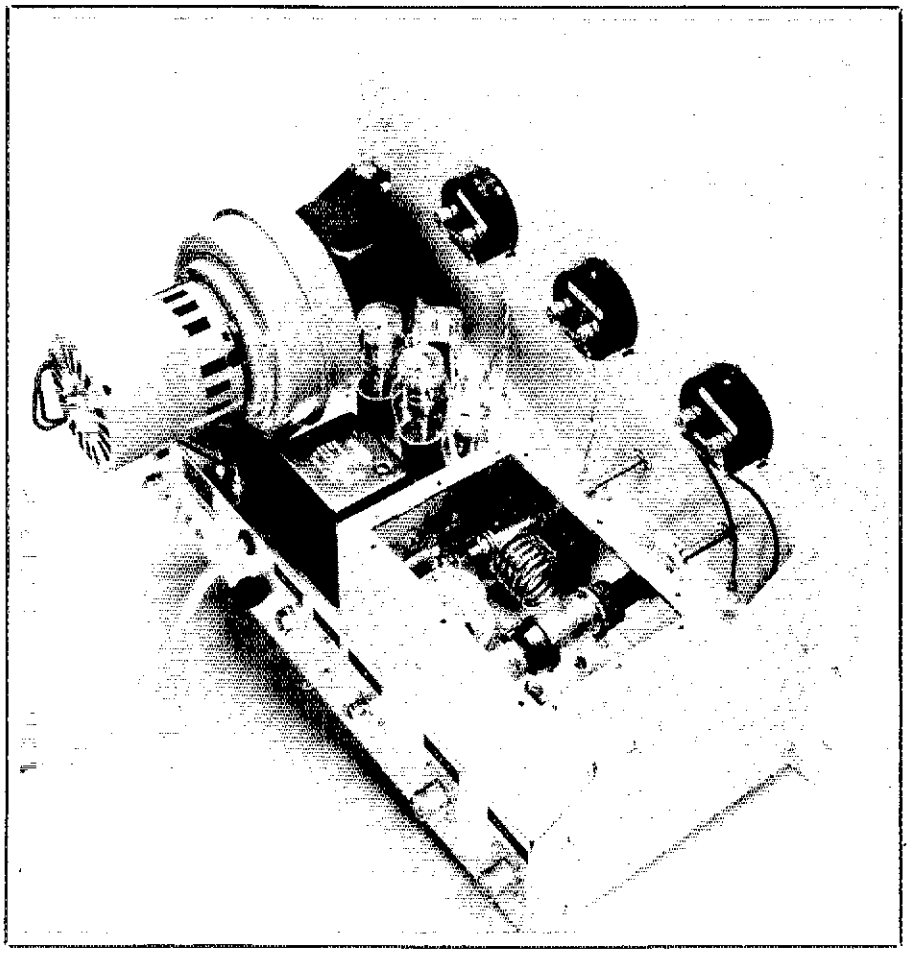


Fig. 5 — The final-amplifier-compartment cover has been removed for this photo.

well dictated by the flow of the circuit. All RF leads should be kept as short as possible, especially the bypass capacitor leads. Keep the dc leads cabled and as far away as possible from the RF leads. Most power-supply components are mounted on a fiberglass terminal board that is secured against the side of the chassis.

K3, D9, C11 and R5 (Fig. 4) constitute a time-delay circuit for filament inrush-current protection, and can be included if you feel that this is important. As it stands, the delay is approximately 1 second, which is more than ample. The 234-V ac relay is used on dc, and closes at about 70 V. The charging rate of C11 is controlled by its capacitance and the ohmic value of R5, and can be varied by changing their values.

Ideally, the input and output relays should be coaxial types; however, I used a single open-frame, 3PDT type and encountered no problems. The center pole is used for control (K1C), as that increases the isolation between the input and output circuits. In grid-driven amplifiers, I have never been able to use an open-frame relay for input and output switching. Because of the lower gain of this cathode-driven amplifier, I find no evidence of feedback or instability. Don't use plug-in type relays in their original form for K1. Remove the case, plug and connecting wires, and bolt the relay directly to the chassis. Use coaxial-cable braid to make the RF connections.

The power supplies (Fig. 4) are of standard design. They may be replaced by any supplies yielding similar voltages, and need not reside on the same chassis as the amplifier. The high-voltage supply should produce 2-kV dc under load. S1 turns on all supplies, including the external high-voltage supply. S2, the STANDBY/OPERATE switch, supplies power to K1, which allows the amplifier to be placed in operation; otherwise, the amplifier is simply bypassed.

If a 6.3-V ac filament transformer is used for T1, R6 will have to be included to drop the filament voltage to 6 V. The ohmic value of R6 will have to be determined experimentally. Use a resistor with the highest wattage rating practical for good voltage stability. With an accurate voltmeter, measure the filament voltage *at the tube socket* with the filament choke in place, as there will be a slight voltage drop across the choke. Nothing will cause a 4CX250B to "go south" quicker than high filament voltage, and that means anything in excess of 6 V.

The filament choke (RFC1) consists of 15 bifilar turns of no. 16 enameled wire wound on half of an Amidon ½-inch-diameter ferrite rod. The rod can be cut to a proper length by filing a small groove around its circumference, and then breaking it clean. Cover the rod with heat-shrink tubing or electrical tape before and after winding the choke. This will keep the rod and winding together, and make it self-supporting by its four leads.

The meters I used all have 0-1 mA movements and homemade shunts. The original meter-face calibration marks were carefully erased, and new ones applied using dry-transfer labels. Most such labels are ideal for panel marking, but are a bit too large for meter-face use. Your local stationery store should have transfers with smaller-sized numbers. During amplifier operation, care should be taken to avoid accidental contact with the plate-voltage meter, as it has high voltage on it.

Most VHF amplifiers have a higher-than-necessary Q in the output circuit because of the use of high minimum-capacitance air-variable capacitors. This is acceptable providing the rest of the output components are heavy-duty types and can handle the higher circulating currents. (The small vacuum variable I used is admittedly first class, and it may not be used by many other builders.) Rather than using an air-variable capacitor, a homemade two-disc system is a preferred choice. If you can find a neutralizing capacitor with plates of 2-inch diameter or so, that would be ideal. If you must use an air-variable capacitor, use one with the least minimum capacitance; remove all unnecessary plates leaving just enough to do the job.

Tune-Up

Before the tube is placed in the socket, close S1 and check that all of the operating voltages are correct. Ground the bottom end of the bias string at K1C, and check that the BIAS potentiometer range will supply −50 to −60 V; then set it at −55 V. J1 should be connected to the external-circuit control jack of your exciter so that it is grounded when your exciter is keyed. Open S1 and make certain all voltages have bled down, then install the tube. Close S1 and S2. After the tube warms up, with no drive applied, key the exciter and adjust the BIAS potentiometer so that the plate idling current is exactly 100 mA.

While the tube is idling, rotate all the tuning controls throughout their respective ranges. If there are no sudden plate-current increases, the amplifier is stable. With a small amount of drive applied, tune the GRID and PLATE controls for maximum output. Once you are satisfied that both of these controls will provide resonance, apply full drive and retune the plate to resonance.

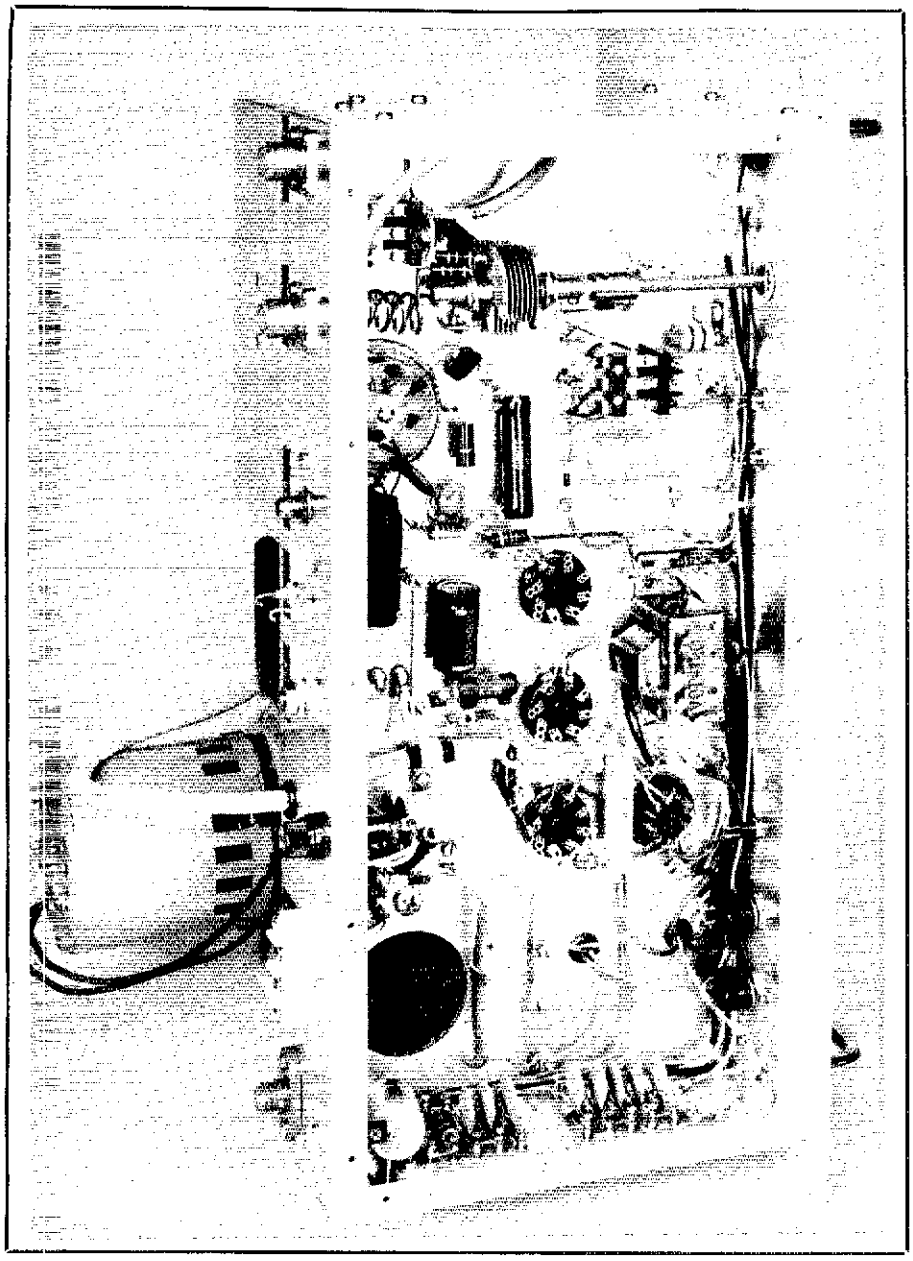


Fig. 6 — A bottom view of the 6-meter amplifier. The screen-protection circuit is mounted on the PC board to the right of the tube socket.

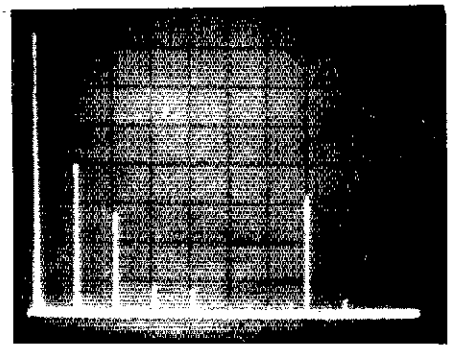


Fig. 7 — Spectral photo of the 6-meter amplifier without external filtering. Vertical divisions are each 10 dB; horizontal divisions are each 50 MHz. The fundamental (second pip from the left) has been notched approximately 40 dB by means of notch cavities to prevent analyzer overload. The seventh harmonic is approximately 48 dB below peak fundamental output.

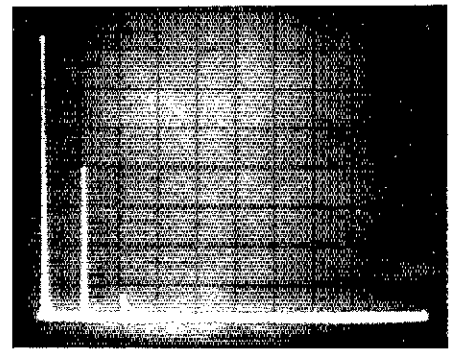


Fig. 8 — The addition of a simple filter (see Fig. 9) at the amplifier output provides for excellent harmonic attenuation, and its use is recommended. All conditions are otherwise the same as those of Fig. 7.

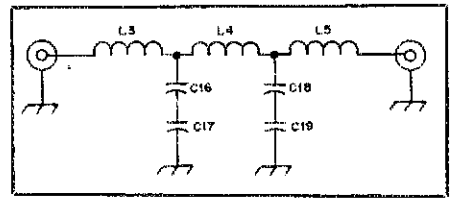


Fig. 9 — This simple harmonic-suppression filter, or one of similar characteristics, should be used at the output of the amplifier. The filter may be contained in a 2¼ × 2¼ × 5-in (HWD) aluminum box.

C16-C19, incl. — 110 pF, 1-kV silver-mica capacitors.
L3, L5 — 4 turns no. 14, 5/16-in-ID, ½ in long.
L4 — 5 turns no. 14, 7/16-in-ID, 5/8 in long.

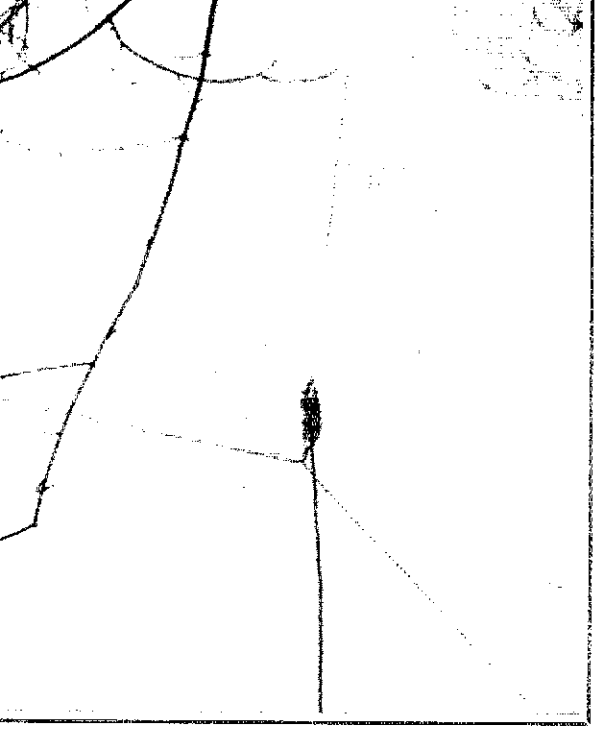
Increase loading slowly, retuning the PLATE control each time, until a screen current of 5 mA (the meter actually reads 20 mA) is indicated. Observe how sensitive the screen current is to the operation of the LOAD control, and that it is by far the best indicator of plate resonance. If grid current is indicated, you're overdriving the amplifier.

Adjust the drive level and the plate TUNE and LOAD controls so that the plate-current meter indicates 250 mA and the screen-current meter indicates 5 mA at resonance. Under these conditions, this amplifier develops a power output of about 310 W. With modulation, voice peaks should not exceed 150 mA on the plate-current meter, and a small amount of negative screen current is normal.

Summary

This amplifier has been in operation now for over a year, and all reports of its operation have been complimentary. I hope that this amplifier will be duplicated by many who had previously resigned themselves to grid-driven designs. Much of the material presented here is general enough to encourage interest in the cathode-driven tetrode as a viable alternative to the grounded-grid triode. I will be glad to answer all letters of inquiry regarding this amplifier; please include an s.a.s.e.

David Munyon, W7DVB, was first licensed in 1955. He presently holds an Advanced ticket. Dave has a BS in Mathematics and Physics from Arizona State College, from which he graduated in 1963. He is a Boeing 727 copilot for United Air Lines, and has been a 6-meter enthusiast and VHF-equipment builder since the late '50s.



A Tree-Mounted 30-Meter Ground-Plane Antenna

Work DX with this inconspicuous, low-cost and easy-to-build wire antenna. It's great also for portable operation.

By C. L. "Chuck" Hutchinson,* K8CH

A tree-mounted, vertically polarized antenna? Sound silly? Well, it's not! Perhaps textbooks do not recommend it, but I'm having good luck with a 30-meter "ground plane." The antenna did not cost much, is inconspicuous and works quite well for DX QSOs.

The evolution of this idea began more than a decade ago. My friend Al Francisco, K7NHV, was a doctoral candidate at Michigan State University. Al was living on campus and wanted to get on the air from there. University rules did not permit outside antennas. How would he solve this dilemma?

Al's solution was simple, and it worked! He ran a piece of RG-58/U cable from a bedroom window to the ground. From there, he slit a shallow trench to a nearby tree and buried the cable. At the base of the tree a couple of radials were soldered to the coax-line braid, then buried. Another piece of wire formed the main radiator of his 20-meter vertical. You had to walk right up to the tree to see it! Even more amazing to Al and his friends was that it worked about as well as you would expect for any 20-meter vertical with only a couple of radials. It was a good idea, the kind one doesn't forget!

Several years later I moved to a new location. In short order, a modest tower with a triband beam sprouted from the back yard. Dipoles for the 40- and 80-meter bands were hung in the trees. It was possible to work DX on 40 meters, but the low dipole worked *too well* on short skip; a vertical antenna would be a better alternative. I knew from experience that a vertical with 16 or more radials would be a good performer.

Where to put the antenna? That's when Al's idea came back to mind: Use a tree to support the vertical radiator! This time a TV mast, not wire, would serve as the vertical radiator. About 30 feet from the corner of the house stood a full-grown walnut tree. A look at the tree confirmed that three branches were perfectly situated for supporting a 40-meter vertical.

Later that day, with the help of my teenage son, the vertical was eased into position close to the tree trunk. A length of treated 4- × 4-inch lumber was buried to serve as the base insulator.[1] A large nail held the vertical mast in place. My son (Bryant is a good tree climber) wrapped a short length of clothesline rope around the mast at each branch. Next, he tied four square knots. The loose ends were then wrapped around and tied to the branches. We finished the job by burying 32 radials around the mast and running a piece of RG-8/U cable into the ham shack. The results were great! For the next three years the antenna served me well. Many choice DX tidbits were snagged while using that vertical antenna.

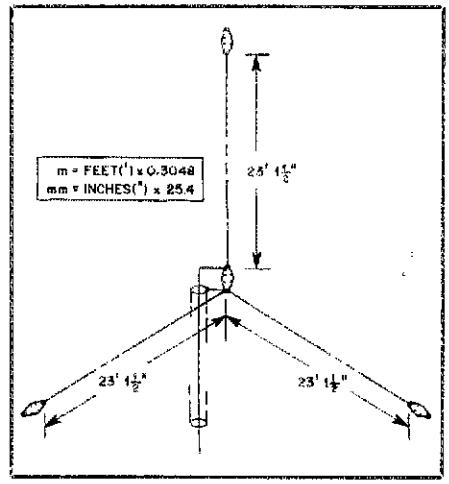


Fig. 1 — Dimensions and construction of the 30-meter ground-plane antenna.

An Antenna for 30-Meter DXing

On the day the 30-meter amateur band was opened by the FCC, I used a Transmatch and 40-meter dipole to make a few contacts. Later, I tried an 80-meter dipole. Both were okay, but each worked too well on short skip. Stations within a couple of hundred miles were very loud — not the best situation for DXing!

A vertical antenna would cure that ... perhaps another version of the K7NHV special. There was a serious problem, however. Limited space and rocky soil meant that a good radial system would be almost impossible to realize. Rats! But wait, why not build a ground-plane antenna? I could make it all from wire, and two radials should be sufficient. I went to work.

I reached for my calculator and came up with the proper length for the elements, using the formula:

$$\ell_{(feet)} = \frac{234}{f_{MHz}}$$

*ARRL Senior Assistant Technical Editor

[1] m = ft × 0.3048; mm = in × 25.4; kg = lb × 0.4536.

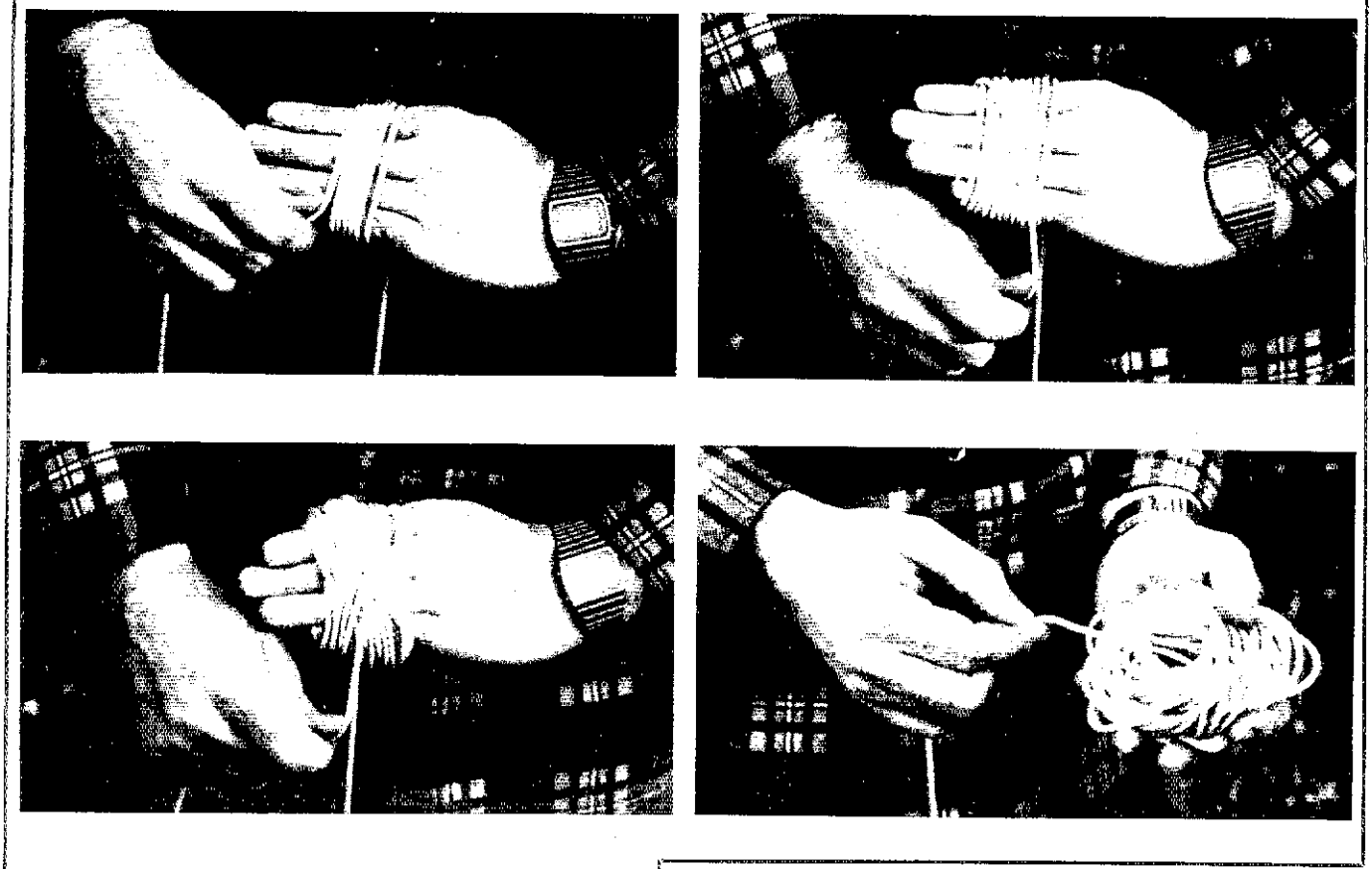


Fig. 2 — Chuck, K8CH, demonstrates how Ben Hassell, W8VPC, prepares a line for throwing. When the weight is thrown, the line should come freely out of the middle of the ball.

The vertical portion and each radial of the ground plane should be 23 feet 1½ inches for resonance at 10.12 MHz. The wire and insulators were on hand. It did not take long to assemble the antenna as shown in Fig. 1.

This time, the perfect tree was found at the back of the lot. Beneath it grows a lot of brush — it makes it hard to work around, but great for camouflage. Only one obstacle stood in the way of speedy installation. How to get a line through the crotch 40 feet above the ground?

Getting a Line into a Tree

Many methods are used to get an antenna support line into the "right" crotch of a tree. You could use a bow and arrow or a slingshot. A strong person can throw a no. 18 nylon line, with a proper weight on the end, to about 40 feet. That's good enough for this project.

There are a few tricks you should avoid learning "the hard way." First, make sure there is nothing breakable within throwing range. Unless you are extremely fortunate, at least one throw will go astray. Second, secure the free end of the line so it does not end up out of reach in the air. This is particularly frustrating when you have just managed to "hit the target."

I like to use an 8-inch adjustable wrench for a throwing weight. It has just about the right heft, and it is nice and smooth. If you don't like to gamble, use something else. For this project, I found a floor flange that weighed a bit less than a pound. It worked quite well.

When you miss your target, as I frequently do, don't try to pull the throwing weight back over a branch. Take it from one who knows the indignity of viewing a beautiful, shiny adjustable wrench swinging in the breeze from a rotten old tree branch. It takes only a few seconds to let the weight fall to the ground and then pull the line on through the tree. That way you get another try with the same weight. Trees look ugly when they are decorated with

dangling wrenches, transformers, pipe fittings and rocks!

Make sure your throwing line does not tangle, or you will have a mess. Ben Hassell, W8VPC, uses a method that is particularly effective in brush or tall grass. Ben lays the throwing weight on the ground. He then scramble-winds the line into a ball around his fingers (Fig. 2). The end of the line tied to the weight comes out of the middle. For a right hander, lightly grasp the ball in the left hand. ("Southpaws" reverse hands.) With the right hand, lift the weight by the line and swing it 'round and 'round. Let the weight fly in the direction of the "right" crotch. Success may require several attempts, but keep trying.

Working on a mowed lawn is much easier. Lay the line out in front of you in large S shapes. Make sure there are no twigs or stones for the line to catch on. You want the line to feed smoothly from the ground as the weight goes flying on its way.

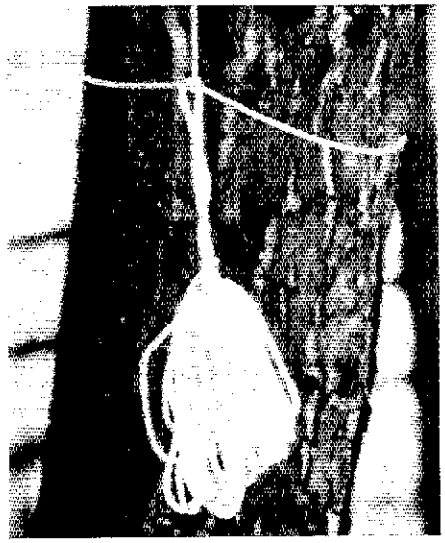


Fig. 3 — One method for securing the downhaul line to a tree. Excess line is neatly stored out of the way.

Final Steps

It took a few tries to get the line through that crotch at 40 feet. After that, things went easily. I tied the top insulator to the end of the line and hauled it up to just below the crotch. A doubled-up section of the downhaul line was wrapped around the tree at head level, and tied. Excess line was secured as shown in Fig. 3. Shorter lengths of line were tied to the radial ends and were secured to convenient trees above head level.

After several weeks of operation, I find myself well satisfied with the tree-mounted ground-plane antenna. It works at least as well for DX as does a dipole at 60 feet. For stations less than a couple of hundred miles away there is pretty good rejection. (The dipole works for them). There is no "dent" in my pocketbook, but perhaps best of all, the antenna is almost invisible. Why don't you give it a try? QST

Strays

QEX: THE ARRL EXPERIMENTERS' EXCHANGE

☐ Wonder what you've been missing by not subscribing to *QEX,* the ARRL newsletter for experimenters? Among the features in the August issue were:

- Cliff Francis, Jr., WØMBP, shares antenna ideas in his article, "Thoughts on Antenna Design"
- "A Coax-Antenna Trap Program for the TIMEX/SINCLAIR 1000," by Andy S. Griffith, W4ULD
- Several unrecognized achievements on 48, 72 and 300 GHz are commented about in the VHF+ Technology column by Geoffrey Krauss, WA2GFP

QEX is edited by Paul Rinaldo, W4RI, and Maureen Thompson, KA1DYZ, and is published monthly. The special subscription rate for ARRL members is $6 for 12 issues; for nonmembers, $12. There are additional postage surcharges for mailing outside the U.S.; write to Headquarters for details.

NEW ENGLAND REPEATER COORDINATION MEETING

☐ Calling all New England Repeater Groups! There will be a meeting on September 15, from 1 to 5 P.M., at the Yankee Drummer Motor Inn, Rte. 12, Auburn, Massachusetts, just off the Mass Pike. Topics of discussion will include New England repeater frequency coordination programs and policies. If you or your group owns and operates a repeater, please send a representative. Your valuable input is needed. See you there!

QST congratulates...

☐ the following radio amateurs on 50 years as an ARRL member:

- Fred Berger, K4GX, of Venice, Florida
- Arnold B. Freeman, W2YD, of McKenzie, Tennessee
- Lawrence Lynch, W9CUV, of Monticello, Illinois
- Sam A. Sullivan, W6WXU, of Sonoma, California
- Edwin Wicklund, WØIGZ, of Kensington, Minnesota
- Alonzo Wierenga, W8GG, of South Haven, Michigan

TA PROFILES

☐ On March 16, 1977, we had the pleasure of welcoming Helge Granberg, K7ES, to our ARRL Technical Advisor team. His technical expertise on solid-state SSB devices and their applications and, more recently, on the development of high-power RF MOSFETs for SSB has been of great value to the League and Amateur Radio. Helge has written numerous articles for *QST,* and is the recipient of a *QST* Cover Plaque award (Jan. 1983). He has also contributed informative material for the ARRL *Radio Amateur's Handbook.*

Helge earned an EE degree from Syracuse University, and has been a member of the IEEE since 1967. He is the holder of two U.S. patents, has published over 25 articles for domestic and foreign professional magazines, and has written many Motorola Application Notes and Engineering Bulletins.

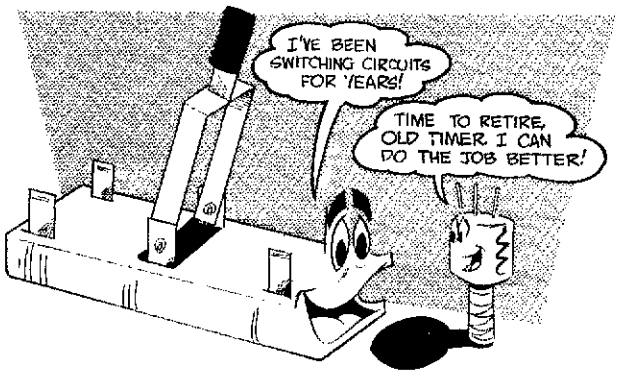
First licensed in Finland in 1950, as OH2ZE, he now holds an Extra Class license. He also holds an FCC Radiotelephone license, First Class. His primary interest in Amateur Radio is DX (mostly CW), and he has contacted 266 countries since 1980.

Residing in Phoenix, Arizona, Helge is the Principal Staff Engineer for the Motorola Semiconductor Products Sector (RF Power Group). His hobbies include gun collecting, electronics (not job related) and camping. — *Marian Anderson, WB1FSB*

TA Roy Hejhall, K7QWR (left), presenting TA Helge Granberg, K7ES/OH2ZE, with his *QST* Cover Plaque. The presentation was made at a Motorola Company awards banquet.

BEGINNER'S BENCH

Electronic Switching and How It Works



Replace those old-fashioned toggle switches with up-to-date diodes and transistors and you'll have simpler, less expensive and less cumbersome circuits.

By Doug DeMaw,* W1FB

What could be more ordinary than a switch? True, they are not very spectacular devices, but few circuits can be made to function without some type of switch — mechanical or electronic. Electronic switching is not new, but the state of the switching art has moved forward in grand style since semiconductors became as common as patent medicines. Furthermore, the cost of a solid-state switching device (diode, IC or transistor) is generally less than that of a comparable mechanical unit, such as a toggle switch.

Substantial levels of ac and dc power can now be switched by means of large diodes, power FETs, Triacs, and the like. Also, relatively high potentials can be accommodated safely by some rather small semiconductor components. At the dawning of our solid-state era, we were able to switch low amounts of signal and dc, and at fairly low voltage levels. It seemed in those days that the technology was not going to offer much promise toward replacing cumbersome manual switches with tiny diodes or transistors, but the trend today is clearly toward semiconductor switches. Amateurs can take advantage of the many options presented by solid-state switches, so let's examine a few basic concepts and see how we can develop practical circuits that use diode and transistor switches. First, in the interests of accuracy, let's look at the shortcomings of electronic switches.

Some Limitations

There is no magic in the electronic-switching art. In other words, we can't achieve everything that mechanical switching offers. But, we can come close to realizing the concept of universal replacement of mechanical switching components. What are the trade-offs? First, high-power RF switching is still a tough assignment with present-day low-cost transistors or diodes. Second on the list of not-so-neat features is that large solid-state switches need heat sinks of substantial size, and they may also call for cooling fans. This results in mass and expense that is not acceptable for amateur projects. High-power switches can become larger and more costly when using semiconductors. Number 3 on my list is the inherent internal resistance of most solid-state switches: It is seldom possible to have a zero resistance through a semiconductor switching device. Although the resistance of such a semiconductor junction in the ON mode may be only a fraction of an ohm, it can be enough to cause a problem. Some semiconductor switches have internal resistances greater than an ohm when activated. This becomes a source of difficulty at high power (heating and voltage drop by virtue of the I^2R rule), and in certain types of switching circuits it means that *complete* switching is not possible. For example, the internal resistance of a power FET is specified as RDS (resistance from drain to source) when it is switched to the ON state. This will vary with the device, and can range from 0.5 ohm to a few ohms, depending on the particular FET chosen. Well-designed mechanical switches, on the other hand, will exhibit a nearly zero-resistance condition between the contacts.

How else might we vilify the solid-state switch? Well, we should mention that input-output isolation is seldom of the magnitude that we can obtain with a suitable mechanical switch. This is caused by the semiconductor internal resistance and capacitance. It is a concern mainly when we wish to use a semiconductor to switch a signal line; for dc applications it is not a matter of importance. Finally, in many circuits that contain electronic switches, we need to actuate them by means of a mechanical switch. However, it is often practical to control dozens of electronic switches simultaneously with a single SPST mechanical switch, and therein lies the advantage!

Some Basics

Fig. 1 illustrates the fundamental principle of mechanical and solid-state switching. Assume we wanted to apply dc to a specific module. Example A shows the mechanical means to do this. Circuit B relies on a bipolar transistor to switch the dc on and off. The dashed lines show that the base of Q1 must be grounded to actuate the circuit. This can be managed by the use of a mechanical switch, or by triggering Q1 with another semiconductor switch elsewhere in the system. The use of a PNP transistor permits application of the +12 V to the emitter, and also enables us to turn Q1 on by grounding the base through R1. If we used an NPN transistor at Q1, we would need to apply +12 V at R1 in order to saturate (switch) the transistor. Also, the +12 V of operating potential would have to be fed to the collector rather than to the emitter, as shown.

By grounding the PNP-transistor base, or through applying +12 V to R1 of an NPN device, we are providing what is called *forward bias*. This causes the transistor to conduct heavily, which makes it perform the switching function. Too much current, caused by excessive base-emitter voltage, can destroy the transistor. Therefore, a series resistor is used (R1). Too little forward bias, conversely, will prevent the transistor from saturating com-

*ARRL Contributing Editor, P.O. Box 250, Luther, MI 49656

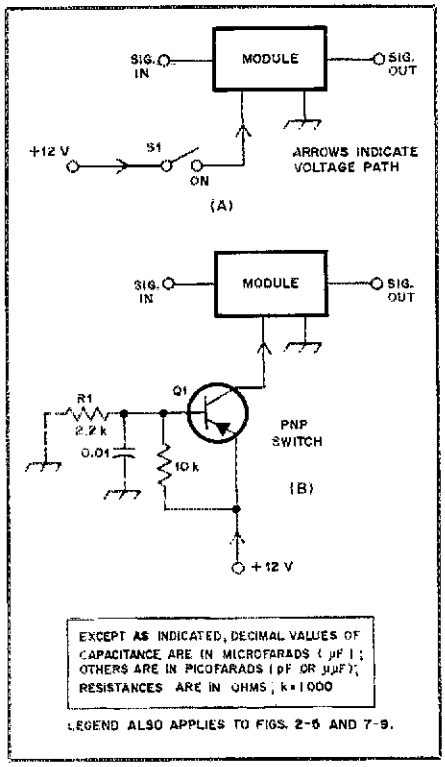


Fig. 1 — Comparison between a simple mechanical switch and an equivalent solid-state type.

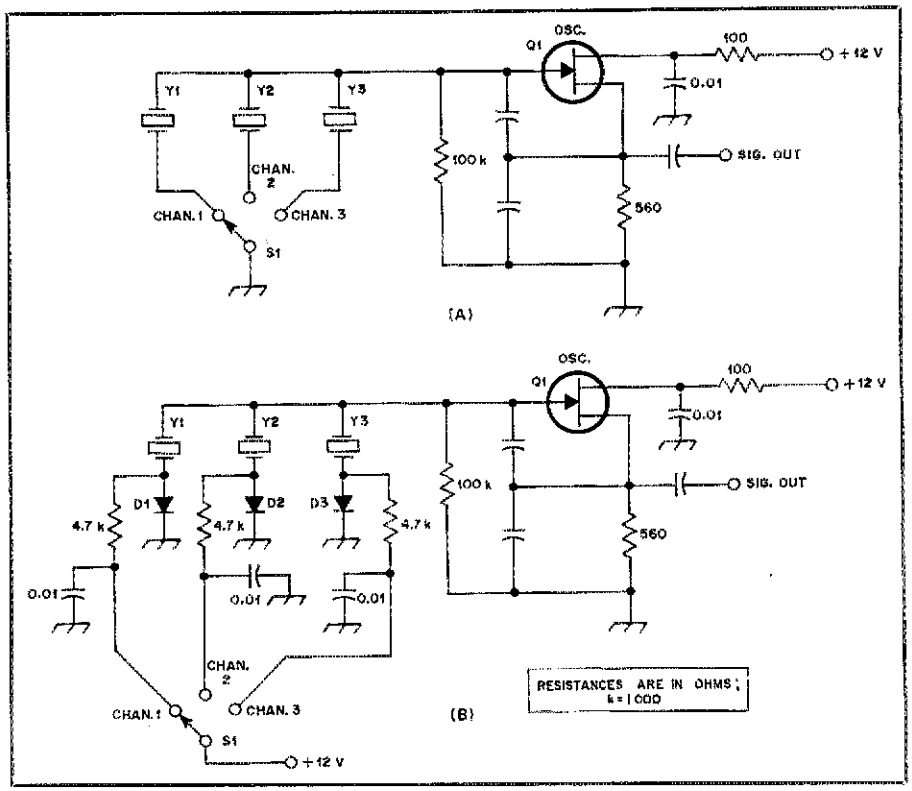


Fig. 2 — Diodes may be used in place of a mechanical switch to select oscillator crystals, as shown at B.

pletely. This will result in partial operating voltage reaching the module of Fig. 1B.

A comparison between mechanical and diode switching is offered for your study in Fig. 2. Circuit example A illustrates the old way of selecting crystals in a multi-frequency oscillator. This method is acceptable if the switch leads are very short or if the crystals are mounted directly on the switch. It is necessary to always keep RF leads as short as possible to prevent impairment of the performance.

Fig. 2B demonstrates the use of diodes in place of S1 of Fig. 2A. This enables us to locate the selector switch a great distance away from the crystals, and the connecting leads will carry dc rather than RF. The diodes offer a practical convenience, and the same control switch may be used to actuate many solid-state switches elsewhere in the overall equipment when the crystals are selected one by one. The 4.7-kΩ resistors near D1, D2 and D3 limit the current that flows through the diode junctions. They also serve as RF chokes in the switching lines to S1. In this low-power circuit, we can safely use inexpensive 1N914 high-speed switching diodes. They are suitable into the microwave region. When dc is routed to a diode through S1, it becomes forward biased and conducts, thereby completing the circuit between the bottom end of the crystal and ground. Diodes can be used in a similar manner to complete various RF circuit paths. They are often used in *series* with signal lines.

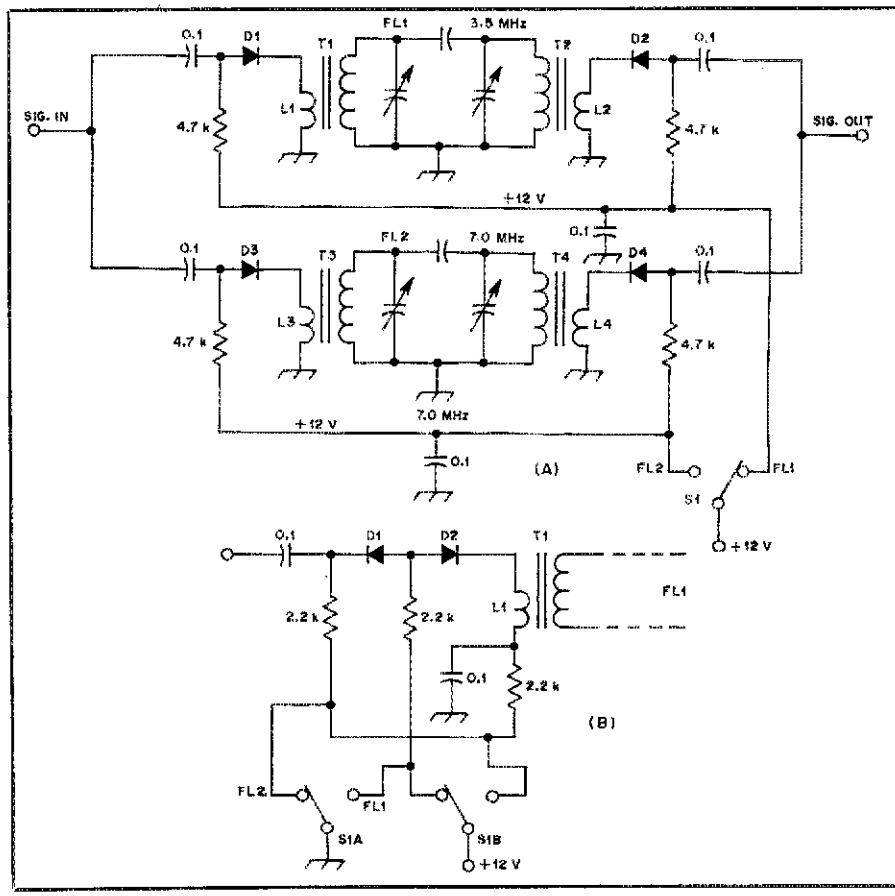


Fig. 3 — Series-diode switching is illustrated here. Example A shows how a pair of band-pass filters could be selected by means of diode switching. A better technique is shown at B (see text).

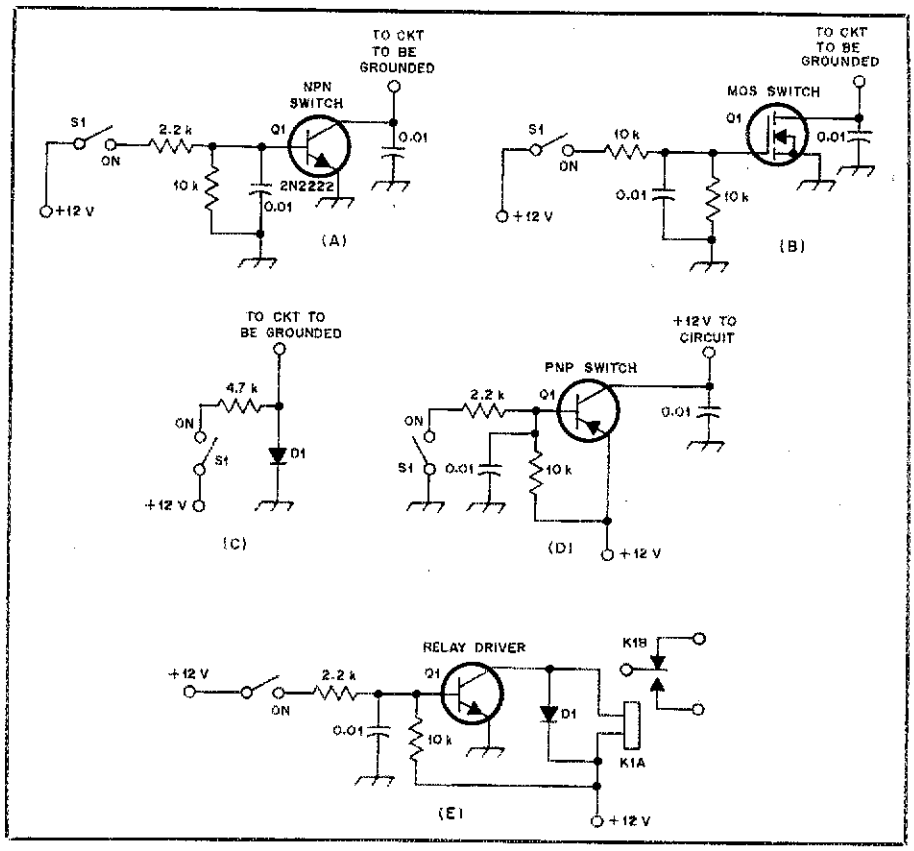


Fig. 4 — Various semiconductor switches (see text).

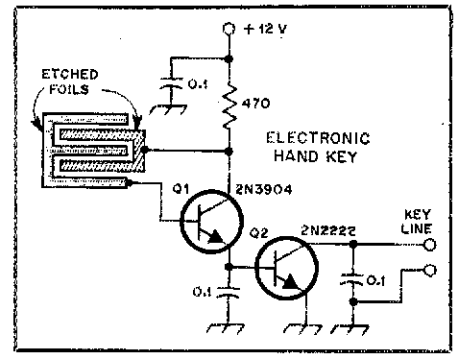


Fig. 5 — Practical circuit for an electronic hand key. The etched-foil grid at the left is the keying contact. Transmitter or code-practice oscillator keying occurs when the operator places his or her finger on the copper grid. The resistor is in ohms, and the capacitors are in microfarads.

Examples of series diode switching are given in Fig. 3. The circuit at A shows a typical arrangement in which we might use diodes to select band-pass filters. The input and output ends of each filter are connected to switching diodes to permit electronic insertion or removal of the desired filter. This circuit will function as shown, but it is a simplification of diode switching, for the purpose of making the example less difficult to understand. Each diode has a 4.7-kΩ resistor in series with the related +12-V line to limit the junction current and to function as an RF choke. If the resistors were not used as chokes, the input and output signal to and from the filters would be lost to ground through the +12-V line. Each diode obtains its dc ground return through the tuned-circuit windings (L1, L2, L3 and L4). Small diodes of the 1N914 variety work well in this circuit.

A better way to employ diodes for series switching is shown in Fig. 3B. Here we have two diodes in a back-to-back arrangement. This circuit would be used at each end of FL1 and FL2 of Fig. 3A. The advantage of using two diodes is better isolation of the filters. Forward bias is applied to the diode anodes via S1 when a filter is selected. The unused filter (not shown) is well isolated from the signal line because reverse bias (+12 V applied to the diode cathodes) is switched to the dormant diodes to prevent any conduction caused by RF energy that may be present. When S1 of Fig. 3B is set for FL1 use, D1 and D2 are turned on and the signal path is completed. When S1 is changed for use of FL2, D1 and D2 are reverse biased to turn them off. Additional ground and +12-V lines are also connected to the contacts of FL1 to control the remaining six diodes that would be used for two filters of the type indicated in Fig. 3A. One DPDT switch would be used to control all eight diodes.

Here we see the advantage of solid-state switching, for if a mechanical switch were used, it would require four poles with two positions each. Also, the lead lengths from the filters to the switch sections could be prohibitive, and the input/output isolation of the filters could be poor because of signal leakage across the switch sections. RF chokes can be used in place of the resistors if desired, but there should still be a current-limiting resistor in the dc line to the diodes.

Basic Shunt Switches

Fig. 4 contains a number of examples that show how we may use various semiconductor devices as shunt switches. S1 in each case represents a mechanical switch or CW key that turns on the electronic switch. As we learned earlier, turn-on can be effected also by other electronic switches in the overall circuit. For example, AGC voltage or rectified speech energy could be used to actuate a semiconductor switch, depending on the application for the switch; the possibilities are virtually without limit.

Circuit A of Fig. 4 is an NPN transistor switch. A positive voltage is required at the base of Q1 in order to turn it on. The 10-kΩ resistor from the base to ground is used to minimize transistor leakage current when the switch is in the OFF mode. This circuit might be used to key a driver stage in a solid-state CW transmitter. If so, the collector of Q1 would be hooked to the emitter of the keyed stage. S1 would be the CW key, or the keying line from a keyer.

Fig. 4B shows a similar circuit, but with a power FET switch. Since we have an enhancement-mode FET in our circuit, the transistor requires a forward gate bias to turn the device on and make it switch.

A simple diode switch is shown at C of Fig. 4. To the right is a PNP transistor switch (D). The base must be grounded through the 2.2-kΩ resistor to cause turn-on. A 10-kΩ resistor is connected from base to the +12-V line to help cut off the transistor in the OFF mode. This resistor can be eliminated in the circuits of Fig. 4A, 4D and 4E if two 1N914 diodes are connected in series with the emitter leads. The diode junctions will reverse bias the transistors by approximately 1.4 V. The resistor or biasing diodes are especially important in the circuit of Fig. 4E — a relay driver. Without reverse bias, the relay may remain energized after the transistor is turned off. This is because a small amount of leakage or idling current will remain, and it may

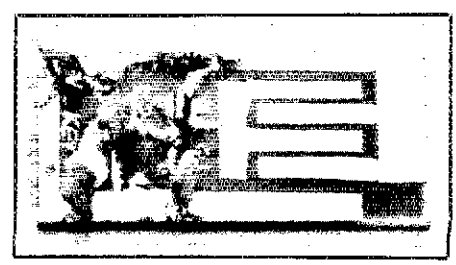


Fig. 6 — The test-model key shown in Fig. 5.

be ample to keep the relay closed once it has been energized. D1 of Fig. 4E is used to clamp voltage spikes that occur when the field coil of K1 collapses at turn-off. Such spikes, if allowed to exist, could follow the +12-V line and damage semiconductor devices elsewhere in the circuit.

An Electronic Straight Key

So that we may understand how two transistors can be arranged to work in concert as dc switches, let's look at Fig. 5. Q1 is made to turn on when we place our finger on the circuit-board foil at the left. The resistance of our skin completes the bias circuit for the base of Q1. This actuates Q1, which in turn fires Q2, the keying transistor. When Q1 switches on, dc voltage appears at the emitter. At this moment, the positive potential also reaches the base of Q2, causing it to switch to the ON state. This closes the keying line to our transmitter.

There is no current-limiting resistor at the base of Q2 because there will not be a prohibitive voltage level coming from Q1. This is because the contact resistance of our fingers is sufficiently high to prevent Q1 from completely saturating. Hence, the output voltage from the Q1 emitter will be low enough for safe operation of Q2. A huskier transistor can be used at Q2 if the key-line current warrants a transistor with a dissipation rating greater than that of the 2N2222. A 2N2102 (or equiv.) would be a good choice.

A photograph of a crude test model of the hand key is presented in Fig. 6. The copper grid is etched as shown, and isolating pads are used to contain the transistors and related parts. A three-circuit key plug is needed to accommodate the +12-V, keying and ground leads. This key will operate satisfactorily from a 9-V transistor-radio battery as well. Three bypass capacitors are used to help keep unwanted RF energy from affecting transistor performance.

Fig. 7 shows the driver and PA stages of a simple QRP CW transmitter. The key from Fig. 5 could be used to operate the dc switch, Q3, of Fig. 7. When our finger is placed on the copper grid of the key, Q3 will turn on. This action will permit the flow of dc to driver Q1, thereby keying our transmitter.

D1 and D2 of Fig. 7, 1N914 small-signal diodes, are used as a TR (transmit-receive) switch. This circuit was introduced by Wes Hayward, W7ZOI, and has been used for QSK (full break-in) in many of his QRP rigs. In this example, the diodes are turned on by RF energy from the collector of Q2 when Q3 is actuated. Some of the RF voltage is sampled by C1 and is routed to the diodes. During transmit, D1 and D2 are shorted to ground, thereby protecting the receiver input circuit. The diode conduction threshold is roughly 0.7 V. As a result, there will be a 0.7-V RF potential appearing at the receiver input circuit. This is not a great enough voltage to cause harm to the receiver. I have applied that amount many times to the input line of my FT101E, FT301D and FT102 transceivers, and no damage resulted. Greater details of this type of TR circuit are given in the League's book, *Solid State Design for the Radio Amateur*.

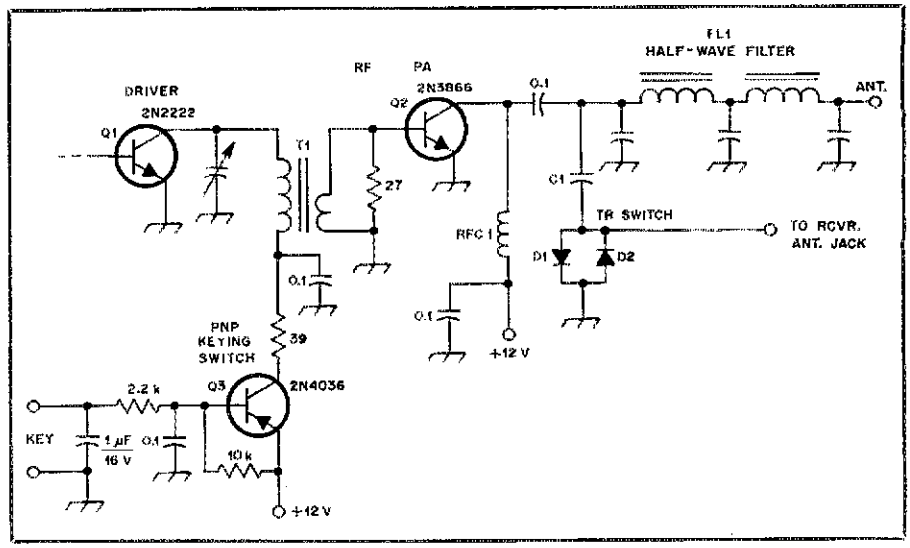


Fig. 7 — Example of a transistor keying switch (Q3) and two diodes (D1 and D2) used as TR switches for QSK operation.

One of the penalties for using the simple TR circuit of Fig. 7 is a loss in received signal (about 6 dB, from my experience). This is because C1 must be relatively small in value to prevent it from affecting the design of the output network of Q2. I use a capacitive reactance of 400 for C1. Thus, at 7 MHz, we would have a 56-pF capacitor at C1. The signal loss can be corrected by inserting a low-gain RF amplifier between the TR switch and the receiver input line. Fig. 8 shows how this might be done. A grounded-gate JFET, such as an MPF102, would serve nicely at Q5.

A More Elaborate Switching Circuit

An illustrative transmitter circuit is presented in Fig. 9. The arrangement for Q4, Q5 and Q6 is one I developed for personal use with a few QRP rigs up to 3 W in RF output. Q4 is a standard PNP keying switch, as discussed earlier. It not only actuates oscillator Q1, it also triggers dc switch Q5, which in turn activates Q6. When the key is closed, the signal energy to the receiver is shorted to ground by Q5. At the same moment, the series diodes, D2 and D3, are turned off by virtue of transistor switch Q6 being in the OFF state. This prevents signal energy from passing through the diodes to the receiver. When the key is up, Q6 conducts and provides a dc ground return for the diodes, which

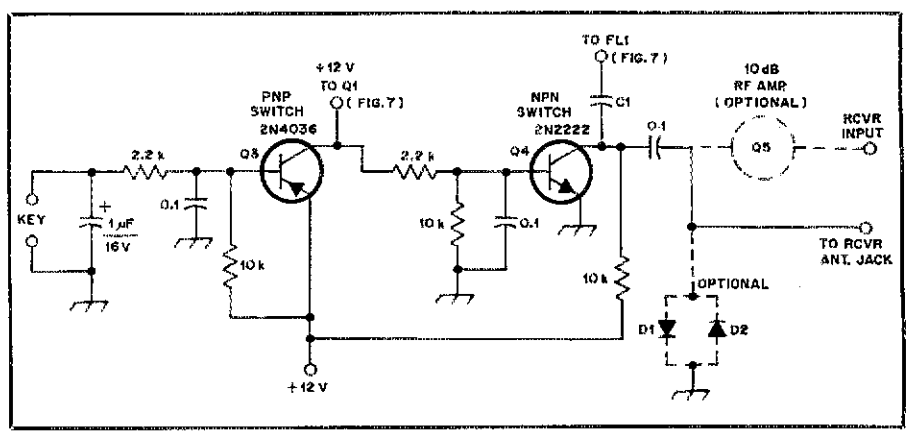


Fig. 8 — An improved TR system in which Q4 shorts the RF energy to ground when the key is closed. D1 and D2 are optional. They may be added as safety backup for Q4. Signal loss on receive is common with this simple TR circuit (see text), so an RF amplifier can be added at Q5 to compensate for loss in the TR circuit.

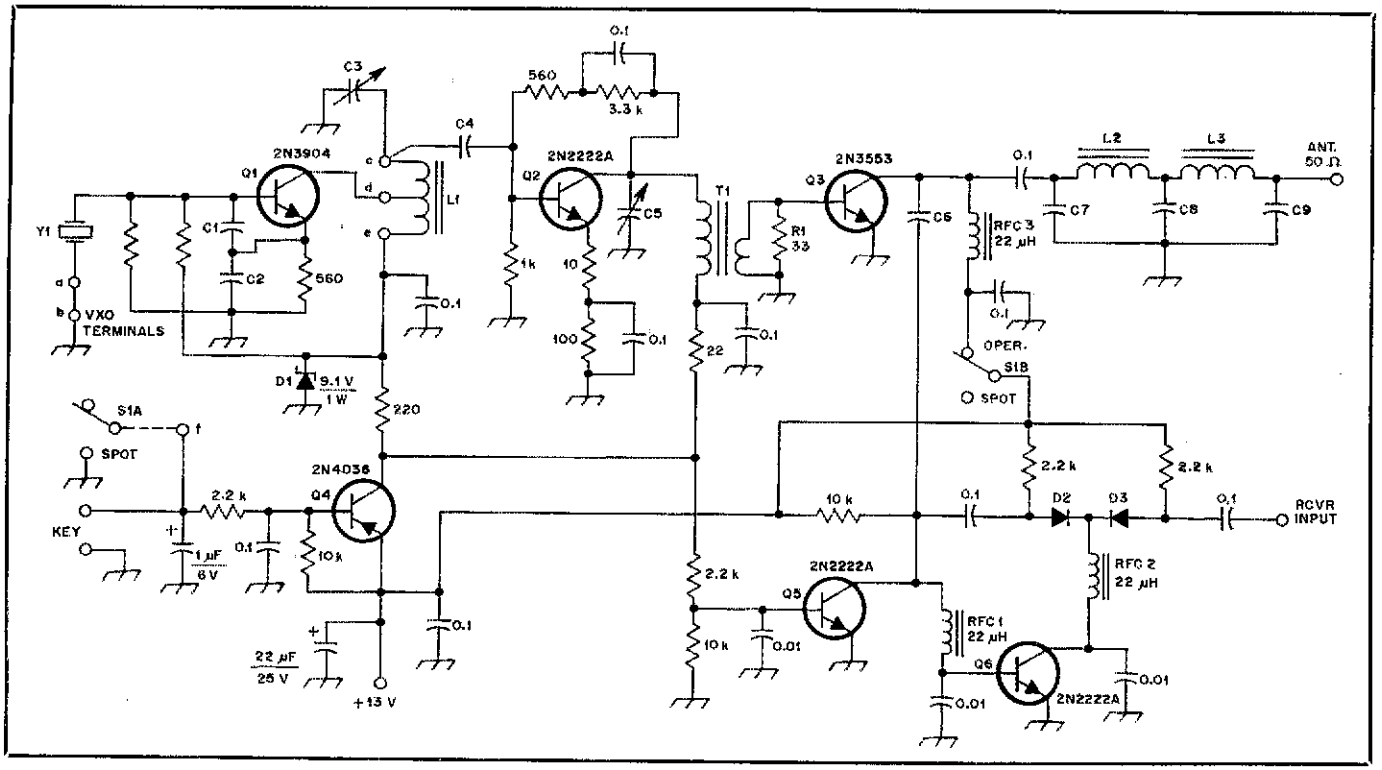


Fig. 9 — A somewhat elegant TR switching method that uses a series diode switch and a signal shunting transistor (Q5, D2 and D3). An explanation is given in the text. This is purely an illustrative RF circuit from Q1 through Q3. Therefore, there is no parts list.

enables them to reach the ON state. In effect, the action of Q5, D2 and D3 offer added attenuation and double protection for the receiver during transmit periods. The use of Q5 alone greatly reduces the signal level to the receiver input, as compared to the circuit of Fig. 7. I have measured only a few millivolts peak to peak from the receive line to ground when using a transistor shorting switch in place of TR diodes. There is no parts list for the transmitter of Fig. 9, since it is purely an example of how the switching techniques might be used. If you like QSK operation, you may want to experiment with this circuit.

In Conclusion

The intent of this primer on electronic switching is to stimulate thinking on your part, and to encourage you to work with semiconductor switching circuits. Since ICs contain diodes and transistors, many of them are applicable to circuit switching. A number of logic ICs are designed expressly for switching use and for gating.

Certainly, solid-state switches lend themselves well to use in compact circuits. The overall cost of a switching circuit may be somewhat less than that of a similar circuit containing mechanical switches. Also, by replacing relays with semiconductor switches, we can greatly reduce the current required by the overall circuit in our gear.

PIN diodes are designed especially for switching in RF voltage lines. An excellent example of PIN diode TR usage is given in *The Radio Amateur's Handbook*. See the chapter on keying (in recent editions).

You should have no problems in obtaining suitable switching devices these days. Ham radio flea markets and surplus outlets offer a plethora of diodes and transistors for this job, and the unit prices are often less than 10 cents! Perhaps it's time for you to "switch" to solid state!

Strays

WRITING TO HQ.?

☐ Each year, ARRL Hq. receives some 350,000 pieces of correspondence, which translates into a lot of cards and letters that have to be sorted, routed to the proper department and answered. To help us continue to provide prompt, efficient service to our members, we ask that you follow these guidelines when writing to ARRL.

1) Use a separate piece of paper for each separate request.

2) Type your letter (if possible), or print or write clearly.

3) Include your name, address, call and membership number from your *QST* label.

4) Enclose a business-sized, self-addressed, stamped envelope if a reply is required.

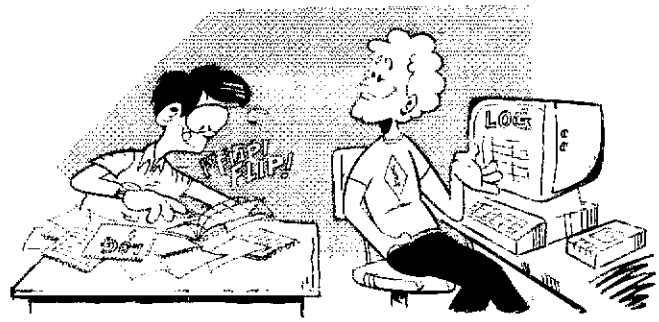
5) Address your request to a particular individual or department, if possible, especially when responding to correspondence received from Hq.

6) Send a check or money order (IRCs for foreign requests) when applicable. Do *not* send cash.

ATTENTION HEATH ET-3400A OWNERS

☐ I'd like to call the attention of Heath ET-3400A owners to the July 1984 *QST* Product Review column. Pete O'Dell's (KB1N) review of the '3400A appears there. Also, the June 1984 issue of *QEX* has an article by Don Varner, WB3CEH, describing a way to double the memory capacity of the '3400A — without additional hardware. — *Paul K. Pagel, N1FB*

LOGPROG — A DXer's Log in BASIC



Does confusion reign as you try to sort through the pile of QSO data in your log? Are you buried in a "paper blizzard"? Let your computer do the work for you!

By Robert C. Cheek,* W3VT

DXing has always been my main operating interest. Because of the awards rules, I had to begin again working on the countries list, DXCC, 5BDXCC and other measures of DX performance when I moved to Japan. I found that a great deal of excitement was added to the game when all the "old" countries suddenly became "new" ones! Each operating period, the DX bands seemed alive with fresh opportunities, and new confirmations arrived frequently. So, upon my return to the U.S. in 1982, I decided to renew the DX chase from the beginning. I kept the usual manually prepared check lists of countries worked by band and mode, QSLs sent and received, and countries confirmed and awaiting confirmation.

Shortly after my return to the U.S., I acquired a TRS-80® Model III microcomputer. I soon realized that, with a suitable set of programs, I could maintain my log data in a disk file and have the computer keep the records for me. As I tuned around the bands, the computer could provide a source of almost instantaneous answers to questions such as: "Have I worked this station before, and if so, when, what band, what mode, what is the operator's name, and have I received a QSL?"; "Do I need this country on this band, this mode?"; "Do I have a confirmation from this country?" and so on. Furthermore, I could have the computer neatly fill out my QSL cards in rapid-fire fashion. Finally, I could at any time ask the computer to display an up-to-the-minute count of countries worked and confirmed.

LOGPROG

The BASIC program, which I have dubbed LOGPROG, and its companions, REFLPROG and UPDATE, are the result of my efforts to put these ideas into practice. LOGPROG is so indispensable to my DXing efforts that now, when I start a DXing session, I first load LOGPROG into the computer and select the inquiry program. Only then do I begin to tune around to see "what's cooking" on the DX bands. I have had several repeat QSOs in which I have been complimented on my good memory when I have called the other operator by name and have referred to our previous QSO on such-and-such a date. The compliments are all owed to LOGPROG!

These programs were originally written as a single program with menu-selectable functions. As my QSO total grew, conservation of RAM became a prime objective in refining the program. QSO-data file maintenance is a function not requiring instant availability. Therefore, file-maintenance routines are separated to conserve as much memory as possible for current QSO data, inquiries and other functions. These routines, called UPDATE, can be called by selecting the file-maintenance option from the LOGPROG main menu. UPDATE can also be run independently of LOGPROG.

My 48-kbyte computer can now handle log data in RAM for about 1050 QSOs at a time, all accessible for quick inquiry. UPDATE provides for completely deleting QSOs from the main file (LOGDATA) or for transferring them to a separate file called REFILE1. This file is accessed for inquiry and QSL updating by REFLPROG, a simple version of LOGPROG. When the number of QSOs in LOGDATA reaches 1050, I delete data on repeat QSOs, transferring some multiple QSOs with the same country on the same band and mode to REFILE1. I retain in LOGDATA the record of at least one confirmed QSO per country/mode/band, or a QSO that has been made but is still awaiting confirmation. Thus, the count of countries worked and confirmed is still correct. But when I have to access the refiled data, my recall of names is a little slower!

How LOGPROG Works

A listing of LOGPROG is shown in Fig. 1. These routines perform all the master-menu functions except file maintenance and reference to refiled data. Lines 10 through 30 provide for necessary housekeeping and for reading the active QSO data file, LOGDATA, from disk into RAM. The DIMension statement, line 20, lists the data items carried in the file for each QSO record:

- D — date, in the MMDDY format
- T — time in 24-hour format
- W$ — call sign of the station worked
- B — frequency of operation (band)
- R — signal report given
- N$ — name of the operator worked
- C$ — usual prefix of the country
- Q — QSL status

The date is a 5-digit integer in which MM is the month, DD is the day and Y is the final digit of the year. For example, 06224 equates to June 22, 1984. If you prefer, you can use DDMMY. For the QSL status, I use a 1-digit code. A 0 means no QSL is being sent and none is expected; 1, a QSL is sent or will be sent shortly; 2, a QSL has been sent and one confirming this QSO has been received.

To conserve memory, the mode of operation is omitted from the data file. The mode is deduced by the program from the signal report, making use of the fact that all signal reports using integers less than 60 (59 or below) denote SSB contacts, and all

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others are CW contacts. All numerical data items (date, time, report, band and QSL status) are defined as integers (line 10) and are stored as such. Thus, 3.5 and 3.8 (MHz) are stored as the value 3, even though the decimal values may have been typed in during the data-entry process. Leading zeros are dropped from date and time entries. LOGPROG routines deduce from the signal report (and hence from the mode) whether "3" for frequency of operation means "3.5" or "3.8," and also convert the stored integer value 1 to 1.8 (for 1.8 MHz) where necessary. The routines also supply any leading zeros in the data items for time. For ease in reading dates, the routines add a zero to the 1-digit months in the format MMDDYY for display purposes.

The variable, Z, in the DIMension statement (line 20) is the current number of QSOs in the LOGDATA file. Before the file is read into RAM, the DIMension statement sets aside space for one additional set of QSO data, which will be blank, to accommodate the search routines. The search routines sometimes need to look beyond the last QSO in the file to determine that they have passed the last record.

The Master Menu

After the file is read into RAM, the master menu (lines 1000-1010) is displayed as follows:

1) Inquiry
2) Add, delete or refile QSOs
3) Record QSL receipts
4) Print and address QSLs
5) Count countries worked and confirmed
6) Examine refiled data

ENTER NUMBER OF SELECTION

At this point, the program stops and awaits a menu selection.

The Inquiry Routine

Line 2010 offers three basic questions for selection:

1) *Have I worked this station before?* This option is queried by keying in a 1, a comma, the country prefix, a comma, the station call sign and a trailing comma, and pressing ENTER. If the answer is YES, the call sign is repeated and the date, band, mode, operator's name and the QSL status are displayed for each QSO with that station, followed by END OF LIST and a redisplay of the inquiry menu. If the answer is NO, only END OF LIST appears, indicating that a search has disclosed no QSO with that station.

2) *Have I worked this country before?* Choose this option by keying in a 2, a comma, the country prefix and two trailing commas, and pressing ENTER. All QSOs with this country prefix are listed by call sign, data, band, mode, operator's name and the QSL status, again followed by END OF LIST and a redisplay of the menu.

```
10 CLEAR 15000:DEFINT A-E,H-Z:DIM H,L,M,N,X,V,W,A,B,C,D,F,Q,R,S,T,Z,C$,W$,M$,N$,P$
,L$,D$,T$:OPEN "I",1,"LOGDATA":INPUT #1,Z
20 DIM D(Z+1),T(Z+1),W$(Z+1),R(Z+1),B(Z+1),N$(Z+1),C$(Z+1),Q(Z+1):CLS:PRINT"READIN
G LOGDATA TO MEMORY. QRX"
30 FOR N=1 TO Z:INPUT#1,D(N),T(N),W$(N),R(N),B(N),N$(N),C$(N),Q(N):NEXT N:CLOSE
1000 CLS:PRINT "LOG PROGRAM MENU":PRINT
1010 PRINT"1.Inquiry":PRINT"2.Add, delete or refile QSO's":PRINT"3.Record QSL rece
ipts":PRINT"4.Print and address QSL's":PRINT"5.Count countries worked and confirme
d":PRINT"6.Examine refiled data"
1015 PRINT:PRINT"ENTER NUMBER OF SELECTION":INPUT S:ON S GOTO 2000,3000,4000,5000,
6000,7000
2000 CLS
2010 PRINT"1. Have I worked this station before? Enter '1,PFX,CALL,'":PRINT"2. Hav
e I worked this country before? Enter '2,PFX,,'":PRINT"3. Have I worked this count
ry,this band? Enter '3,PFX,,BAND'":PRINT"(Enter '4,,,' to return to Main Menu)"
2020 INPUT A,C$,W$,B:IF A=4 GOTO 1000 ELSE GOSUB 2150:IF W=0 GOTO 2010 ELSE ON A G
OTO 2030,2050,2070
2030 FOR X=V TO W:IF W$(X)=W$ GOSUB 2090
2040 NEXT X:PRINT"END OF LIST":GOTO 2010
2050 FOR X=V TO W:GOSUB 2090
2060 NEXT X:PRINT"END OF LIST":GOTO 2010
2070 FOR X=V TO W:IF B(X)=B GOSUB 2090
2080 NEXT X:PRINT"END OF LIST":GOTO 2010
2090 IF R(X)<60 M$="SSB"ELSE M$="CW"
2100 D$=STR$(D(X)):IF LEN(D$)=5 THEN D$="0"+MID$(D$,2,4)ELSE D$=MID$(D$,2,5)
2110 F=B(X):IF F=3 IF M$="CW" F=3.5 ELSE F=3.8
2120 IF F=1 THEN F=1.8
2130 IF S=4 RETURN
2140 PRINT W$(X);TAB(12)D$;TAB(22)F;TAB(28)M$;TAB(34)N$(X);TAB(48)Q(X):RETURN
2150 W=0:H=Z+1:L=1:M=Z/2
2160 FOR N=1 TO 11:IF C$(M)=C$ GOTO 2200
2170 IF C$(M)<C$ L=M ELSE H=M
2180 M=((H-L)/2)+L
2190 NEXT N:PRINT"PREFIX NOT IN LOG":RETURN
2200 FOR N=M-1 TO 0 STEP-1:IF C$(N)<>C$ THEN V=N+1:GOTO 2220
2210 NEXT N
2220 FOR N=M+1 TO Z+1:IF C$(N)<>C$ THEN W=N-1:RETURN
2230 NEXT N:RETURN
3000 RUN"UPDATE"
4000 CLS
4010 PRINT@0,"PRESS'Q'to record QSL rcvd,If finished PRESS'F'to update disk."
4020 PRINT@64,"(Press 'M' to return to Main Menu without updating disk.)":P$=INKEY
$:IF P$=""GOTO 4020
4030 IF P$="F"GOTO 4120
4040 IF P$="M"GOTO 1000
4050 IF P$<>"Q"GOTO 4010
4060 PRINT"Enter'PFX,CALL,DATE(MMDDY),BAND,MODE'":INPUT C$,W$,D,B,L$:GOSUB 2150:IF
 W=0 FOR N=1 TO 800:NEXT N:IF S=4 RETURN ELSE 4000
4070 FOR X=V TO W:IF W$(X)=W$ GOTO 4080 ELSE 4100
4080 IF R(X)<60 M$="SSB"ELSE M$="CW"
4090 IF L$=M$ AND D(X)=D AND B(X)=B THEN IF S=4 RETURN ELSE GOTO 4110
4100 NEXT X:CLS:PRINT@0,W$;D;B;L$;" NOT IN LOG UNDER ";C$;" PREFIX.":PRINT@64,"CHE
CK DATA AND RE-ENTER":GOTO 4060
4110 Q(X)=2:PRINT W$;" ";D;" ";B;"  ";L$;"  UPDATED":FOR N=1 TO 800:NEXT N:GOTO 40
00
4120 PRINT"UPDATING DISK. QRX":OPEN"O",1,"LOGDATA":PRINT#1,Z
4130 FOR N=1 TO Z:PRINT#1,D(N);",";T(N);",";W$(N);",";R(N);",";B(N);",";N$(N);",";
C$(N);",";Q(N):NEXT N:CLOSE:GOTO 1000
5000 CLS
5010 PRINT@0,"Press 'P' to print a QSL or 'M' to return to Main Menu.":P$=INKEY$:I
F P$=""GOTO 5010
5020 IF P$="M"P$="":GOTO 1000
5030 IF P$<>"P"GOTO 5010
5040 GOSUB 4060:IF W=0 GOTO 5000
5050 GOSUB 2100
5060 FOR N=1 TO 21:LPRINT:NEXT N:LPRINT TAB(12)"SOUTH":LPRINT TAB(11)"CAROLINA":LP
RINT:LPRINT:LPRINT:LPRINT:LPRINT TAB(19)"73,";N$(X):LPRINT:LPRINT TAB(40)"X":LPRIN
T:LPRINT
5070 T$=STR$(T(X)):LPRINT TAB(1)W$(X);TAB(12)LEFT$(D$,2);TAB(15)MID$(D$,3,2);TAB(1
8)"6"+RIGHT$(D$,1);TAB(23)STRING$(5-LEN(T$),"0")+RIGHT$(T$,LEN(T$)-1);TAB(28)F;TA
B(32)"MHz";TAB(38)R(X);TAB(47)M$:CLS
5080 PRINT@0,"To print call on back of card re-insert it and press 'P'"
5090 PRINT@64,"or press 'R' to return to printing routine.":P$=INKEY$:IF P$=""GOTO
 5090
5100 IF P$="R"GOTO 5000
5110 IF P$<>"P"GOTO 5080
5120 FOR N=1 TO 25:LPRINT:NEXT N:LPRINT TAB(25)W$(X):FOR N=1 TO 5:LPRINT:NEXT N:GO
TO 5010
6000 CLS:PRINT"COUNTING COUNTRIES. QRX":W=0:C=0:S=0:C$=""
6010 FOR N=1 TO Z:IF C$(N)<>C$ THEN W=W+1:S=0:C$=C$(N)
6020 IF S=0 AND Q(N)=2 THEN C=C+1:S=1
6030 NEXT N
6040 CLS:PRINT W;" COUNTRIES WORKED    ";C;"COUNTRIES CONFIRMED":PRINT:PRINT"LOG P
ROGRAM MENU":PRINT:GOTO 1010
7000 RUN"REFLPROG"
```

Fig. 1 — LOGPROG program listing.

3) *Have I worked this country, this band?* In this case, the entry is a 3, a comma, the country prefix, two commas and the band of operation, and ENTER. No trailing comma is needed. The answer is the same as for item 2, except that QSOs on the specified band only are displayed. This inquiry is useful if you have worked a country many times, but are not sure which band it was on or which mode was used on that band. If you select option 2, and many entries exist, the display will scroll so rapidly you might not be able to identify the ones in which you are interested. In addition to the prompts for the three options, the display also provides for a return to the main menu at any time by entering a 4, followed by three commas.

QSO data are arranged numerically and alphabetically in the data file by country

prefix. A binary search routine, the heart of the inquiry program, can find any specified country prefix if it exists in the log among as many as 2048 QSO records, in 11 iterations or less. (Actually, 2048 records cannot be accommodated in 48 kbytes of RAM, but the search capability is there.) If the prefix is not found, a message is returned: PREFIX NOT IN LOG. The variable, W, previously initialized to zero, is used as a flag to indicate whether the search for the prefix has been successful. If W is still zero when the subroutine returns control to line 2020, indicating an unsuccessful search, the inquiry menu is displayed.

The first inquiry is answered by lines 2030-2040, which perform a serial search for a specific call sign from the beginning to the end of the QSOs in the prefix group. If the call sign is encountered, control goes to the subroutine 2090-2140, which deduces the mode from the signal report (line 2090). The subroutine prefixes a zero to the single-digit months in the date (line 2100), and converts a stored "3" for the frequency band to 3.5 or 3.8, depending on the mode (line 2110) or a stored "1" to 1.8 (line 2120). Then, line 2140 displays a line of QSO information — call sign, date, band, mode, operator's name and the QSL status. Control then returns to line 2040, and the process is repeated if additional QSOs with the same station are found.

The second inquiry is handled by lines 2050-2060. These lines call on the subroutine to display every QSO with a particular country prefix. For the third inquiry, lines 2070-2080 search the QSOs in the prefix group for those on the specified band, and again call the subroutine to display those found.

In all cases, after a search is completed, the search routine prints END OF LIST and returns control to line 2010, which displays the inquiry options.

Add, Delete or Refile QSOs

Menu item 2 is the file-maintenance option (addition, deletion or refiling of QSOs). If it is selected, line 3000 runs UPDATE (described later).

Recording QSL Receipts

Menu selection 3 updates the file to record the receipt of new QSLs. This option does not require the separate UPDATE file-maintenance program; therefore, QSL-status updating is provided for within LOGPROG in lines 4000 through 4130.

Lines 4010 and 4020 offer the option of recording as many QSL receipts as desired. The letter "Q" prompts the entry of the data needed to identify the QSO. Sometimes, the QSL data entered may not agree with that already in the log. In this case, the program displays the message "(QSO data) NOT IN LOG UNDER (the prefix entered). CHECK DATA AND RE-ENTER." If no obvious error has been made during the current entry process, pressing M returns the main menu. From here, the inquiry program can be selected in case it is necessary to check the data on file to run down the discrepancy.

For each new QSL, entry of five data items is required: the prefix, call sign, data, band and mode (entered as CW or SSB). If the desired QSO is not found, line 4100 displays the usual CHECK DATA AND RE-ENTER message and the prompt line is displayed. If a QSO that is in full agreement with the entered data is found, control goes to line 4110. This program step changes the QSL status for that record to "2" and displays, for about two seconds, the information that the record has been updated. Control then returns to line 4000 for repetition of the whole process for the next QSL.

Up to this point, only the QSO records in RAM have been changed. These changes are not captured on disk in the LOGDATA file unless F is pressed in response to the prompt of line 4010. Therefore, after entering all the new QSL data, F must be pressed to write the updated records to disk. Pressing F transfers control to lines 4120-4130, after which the main menu is displayed.

Preparing QSL Cards

Menu selection 4 allows you to fill out and address QSL cards from your QSO data. ("Addressing" in this case means printing the call sign of the addressee on the back of the card.) This routine (lines 5000-5120) formats data to fit the report form and a few other items on my particular card, shown in Fig. 2. With some simple printing format changes, the routine can be adapted to work with any QSL card. In fact, it can be adapted to print an entire QSL on blank card stock.

After making the menu selection, but before entering any data in response to the prompts, the first step is to lay a blank QSL card on edge behind the printer platen. The card should be ready to be fed to the proper printing position. A prompt appears at the beginning of this procedure and after each QSL is filled out, enabling you to print more cards (press P) or return to the main menu (press M). If the prefix is not in the log, a message to that effect is displayed briefly. If the prefix exists but the QSO record is not found, a "QSO NOT FOUND, CHECK DATA AND RE-ENTER" message appears. In either case, the message is followed by the data-entry prompt.

The printing process starts with line 5060. My QSL card displays an outline map of South Carolina. American hams will recognize it, but many DX hams may not. Therefore, after a series of 21 line feeds to get the card into proper position, the first thing printed is "SOUTH" and "CAROLINA" on two successive lines in the center of the map. After four more line feeds, the printer tabs to an available space and prints "73," and the name of the operator of the station worked. I later sign the QSL under this spot. Finally, there is a line feed and a tab to the "Pse QSL" block where an X is inserted, and two more line feeds bring the report-form line into printing position.

Some string manipulations are required to divide the elements of the data into three parts to fit the month, day and year blocks on the report form, and to place an "8" before the single digit representing the year. Also, any needed leading zeros must be supplied for the time. These functions are all performed in line 5070.

After the printing on the face of the card is completed, lines 5080-5090 offer a choice

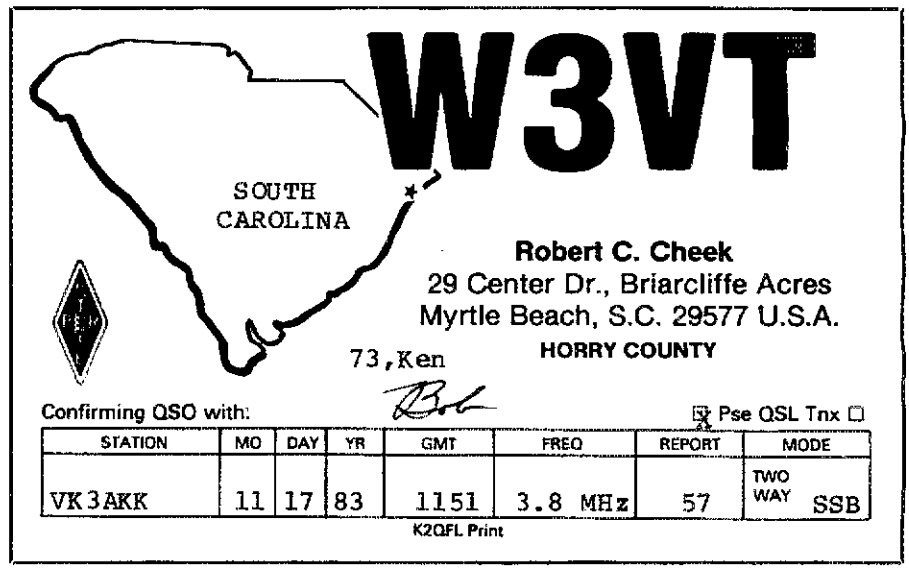


Fig. 2 — A QSL card filled out by LOGPROG.

```
10 CLS:PRINT"READING REFILED DATA TO MEMORY. QRX":CLEAR 15000:DEFINT A-E,H-Z:DIM N
,X,Z,A,B,D,F,Q,R,S,T,C$,W$,M$,N$,L$,D$,T$,P$:OPEN "I",1,"REFILE1":INPUT #1,Z
20 DIM D(Z+200),T(Z+200),W$(Z+200),R(Z+200),B(Z+200),N$(Z+200),C$(Z+200),Q(Z+200)
30 FOR N=1 TO 1000:INPUT#1,D(N),T(N),W$(N),R(N),B(N),N$(N),C$(N),Q(N):ON ERROR GOT
O 60:NEXT N
60 CLOSE:RESUME 70
70 FOR N=1 TO 1001:IF W$(N)="" THEN Z=N-1:GOTO 1000
80 NEXT N
1000 CLS:PRINT"REFILED DATA MENU":PRINT
1010 PRINT"1.Inquiry":PRINT"2.Record QSL receipts":PRINT"3.Return to LOGPROG menu"
:PRINT:PRINT"ENTER NUMBER OF SELECTION":INPUT S:ON S GOTO 2000,4000,6000
2000 CLS
2010 PRINT"1. Have I worked this station before? Enter '1,,CALL,'":PRINT"2. Have I
 worked this country before? Enter '2,PFX,,'":PRINT"3. Have I worked this country,
this band? Enter '3,PFX,,BAND'":PRINT"(Enter '4,,,' to return to REFILED DATA menu
)"
2020 INPUT A,C$,W$,B:IF A=4 GOTO 1000 ELSE ON A GOTO 2030,2050,2070
2030 FOR X=1 TO Z:IF W$(X)=W$ GOSUB 2090
2040 NEXT X:PRINT"END OF LIST":GOTO 2010
2050 FOR X=1 TO Z:IF C$(X)=C$ GOSUB 2090
2060 NEXT X:PRINT"END OF LIST":GOTO 2010
2070 FOR X=1 TO Z:IF C$(X)=C$ AND B(X)=B GOSUB 2090
2080 NEXT X:PRINT"END OF LIST":GOTO 2010
2090 IF R(X)<60 M$="SSB"ELSE M$="CW"
2100 D$=STR$(D(X)):IF LEN(D$)=5 THEN D$="0"+MID$(D$,2,4)ELSE D$=MID$(D$,2,5)
2110 F=B(X):IF F=3 IF M$="CW" F=3.5 ELSE F=3.8
2120 IF F=1 THEN F=1.8
2130 PRINT W$(X);TAB(12)D$;TAB(22)F;TAB(28)M$;TAB(34)N$(X);TAB(48)Q(X):RETURN
4000 CLS
4010 PRINT@0,"PRESS'Q'to record QSL rcvd.If finished PRESS'F'to update disk."
4020 PRINT@64,"(Press'M'to return to REFILED DATA Menu without updating disk.)":P$
=INKEY$:IF P$=""GOTO 4020
4030 IF P$="F"GOTO 4120
4040 IF P$="M"GOTO 1000
4050 IF P$<>"Q"GOTO 4010
4060 PRINT"Enter'CALL,DATE(MMDDY),BAND,MODE'":INPUT W$,D,B,L$
4070 FOR X=1 TO Z:IF W$(X)<>W$ GOTO 4100
4080 IF R(X)<60 M$="SSB"ELSE M$="CW"
4090 IF L$=M$ AND D(X)=D AND B(X)=B GOTO 4110
4100 NEXT X:CLS:PRINT@0,W$;D;B;L$;" NOT IN LOG.":PRINT@64,"CHECK DATA AND RE-ENTER
":GOTO 4060
4110 Q(X)=2:PRINT W$;" ";D;" ";B;"  ";L$;"  UPDATED":FOR N=1 TO 800:NEXT N:GOTO 40
00
4120 PRINT"UPDATING DISK. QRX":OPEN"O",1,"REFILE1":PRINT#1,Z
4130 FOR N=1 TO Z:PRINT#1,D(N);",";T(N);",";W$(N);",";R(N);",";B(N);",";N$(N);",";
C$(N);",";Q(N):NEXT N:CLOSE:GOTO 1000
6000 CLS:RUN"LOGPROG"
```

Fig. 3 — REFLPROG listing.

of printing the call sign on the reverse side of the card, returning (via line 5010) to print another card or returning to the main menu. If the call sign is to be printed, the card is reversed and placed an edge behind the platen. Pressing P gives control to line 5120, which line feeds the card, prints the call sign at the approximate center of the reverse side, and feeds the card out of the printer. Control then passes to line 5010 for instructions regarding the next QSL.

Counting Countries Worked and Confirmed

Menu selection 5 begins at line 6000, which initializes the variables used in the routine. W is the count of countries worked, C represents countries confirmed and S is a switch.

Line 6010 starts a sequential search of the entire QSO file in which each country prefix is examined. When a new prefix is encountered, W is incremented by one and S is set to zero. If the QSL status of the first or any succeeding QSO in the prefix group is 2, C is incremented by one and S is set to 1. The nonzero value of S prevents any additional confirmations within the prefix group from being counted.

When the QSO data search is completed, line 6040 shows the count of countries worked and confirmed at the top of the screen, and the menu is displayed again. With some simple changes, this routine can be adapted to counting countries worked an/or confirmed on a particular band or mode.

Examining Refiled QSO Data

UPDATE provides for deleting QSO data or transferring data to a separate file called REFILE1. To query this file or record QSL receipts from QSOs in it, a simplified version of LOGPROG, named REFLPROG, is called when menu item 6 is selected. Fig. 3 is a listing of REFLPROG. The menu selections include only inquiry (identical to LOGPROG), recording QSL receipts and a return to LOGPROG and its main menu.

The QSO count (Z), which is recorded at the beginning of REFILE1, is not always up to date. This is because REFILE1 is opened at the end of the file when QSOs are transferred from LOGDATA by UPDATE, and the recorded value of Z is not changed in this process. (Z is brought up to date when receipts of new QSLs are entered.) Therefore, the dimension statement (line 20) provides for as many as 200 QSOs more than the value of Z recorded at the beginning of the file. Line 30 attempts to perform the reading of 1000 sets of QSO data, and when the end of the file is reached, an OUT OF DATA error occurs. This error is trapped by the ON ERROR GOTO statement and control goes to line 60, which closes the file, terminates the error trap and passes control to line 70. Line 70 determines the current value of Z, which is used in the subsequent routines.

QSOs are transferred from LOGDATA to REFILE1 in random order from various prefix groups. Therefore, a sequential search through the file is employed in REFLPROG to locate QSOs with a particular station, country or band/country, and it is not necessary to enter the prefix when searching for a particular call sign. The responses are substantially slower than those from LOGPROG, but for a secondary inquiry facility they are adequate. Use of REFLPROG to record QSL receipts is exactly the same as for LOGPROG, except that entry of the country prefix is unnecessary.

Initializing REFILE1 and LOGDATA

In order for the file-maintenance program UPDATE to work successfully, the REFILE1 and LOGDATA files must be initialized, and LOGDATA must contain at least one QSO record. These requirements can be satisfied by running LOGPROG and proceeding as follows: When the error message FILE NOT FOUND and the READY prompt appear, enter the direct statements OPEN "0", 1, "REFILE1": PRINT#1,1:CLOSE and press ENTER. This will initialize REFILE1. Initialize LOGDATA by entering data items for the first QSO as described in the following steps. Key in the parentheses (enclosing the array subscripts) to the left of the equal signs, and the quotation marks where they appear, but *do not* include the parentheses to the right of the equal signs. Follow each entry with ENTER.

D(1) = (The date in MMDDY format or if you prefer, as DDMMY. Five digits only are allowed).

T(1) = (UTC time, with or without leading zeros).

W$(1) = ("Call sign of the station worked").

R(1) = (Signal report you sent).

B(1) = (Band of operation).

N$(1) = ("Name of the operator worked").

C$(1) = ("Usual prefix of the country worked").

Q(1) = (Digit denoting the QSL status).

Next, key in the direct statements, Z = 1: GOTO 4120, and press ENTER. Lines 4120 and 4130 will initialize the LOGDATA file, record the first QSO and return to display the main menu. UPDATE can then be called from the main menu and used to add QSOs to the LOGDATA file. The quotation marks required during initialization are *not* used in response to the data-entry prompts displayed by LOGPROG or UPDATE.

File Maintenance

LOGDATA file maintenance consists primarily of adding QSOs, deleting them or transferring them to REFILE1. It may also include the correction of data-entry errors made in previous additions of QSO

```
10 CLS:CLEAR 14000:DEFINT A-Z:DIM A,B,C,D,H,L,M,N,R,S,T,V,W,X,Y,Z,C$,W$,L$,M$,N$,S
$,K$:OPEN"I",1,"LOGDATA":INPUT#1,Z
20 DIM D(Z+10),T(Z+10),W$(Z+10),R(Z+10),B(Z+10),N$(Z+10),C$(Z+10),Q(Z+10):PRINT"RE
ADING LOGDATA TO MEMORY. QRX"
30 FOR N=1 TO Z:INPUT#1,D(N),T(N),W$(N),R(N),B(N),N$(N),C$(N),Q(N):NEXT N:CLOSE
1000 CLS
1010 PRINT@64,"Press'A'to add QSO's,'D'to delete QSO's,'R' to refile QSO'S
1020 PRINT@128,"or 'M' to go to Main Menu":K$=INKEY$:IF K$=""GOTO 1020
1030 IF K$="A"GOTO 3000
1040 IF K$="M"GOTO 3380
2000 CLS
2010 INPUT"How many deletions or refiles (MAX.10)";A:C=A:IF A=0 OR A>10 GOTO 2010
2020 FOR N=1 TO A:PRINT:PRINT"DELETION OR REFILE NO.";N
2030 INPUT"Enter 'PFX,CALL,DATE,BAND,MODE'";C$,W$,D,B,L$:GOTO 3110
2040 FOR Y=M-1 TO 0 STEP-1:IF C$(Y)<>C$ THEN V=Y+1:GOTO 2060
2050 NEXT Y
2060 FOR Y=V TO W-1:IF D(Y)<>D OR B(Y)<>B OR W$(Y)<>W$ GOTO 2090
2070 IF R(Y)<60 THEN M$="SSB" ELSE M$="CW"
2080 IF M$=L$ THEN J(N)=Y:PRINT "DATA VERIFIED":GOTO 2130
2090 NEXT Y:PRINT"QSO not found. Check entry data."
2100 LINE INPUT"Enter 'R' to try again, or 'S' to skip this deletion.  ";S$:IF S$
="R"GOTO 2030
2110 IF S$<>"S" GOTO 2100
2120 J(N)=Z+1:C=C-1
2130 NEXT N
2140 IF C=0 CLS:PRINT"NO VALID ENTRIES":GOTO 1010
2150 IF C=1 GOTO 2200
2160 S=0
2170 FOR N=1 TO A-1:IF J(N)=<J(N+1) GOTO 2190
2180 J=J(N):J(N)=J(N+1):J(N+1)=J:S=1
2190 NEXT N:IF S=1 GOTO 2160
2200 A=C:IF K$="R"GOSUB 3400
2210 PRINT:PRINT"UPDATING DISK FILE. QRX":OPEN"O",1,"LOGDATA":PRINT#1,Z-A
2220 IF J(1)=1 AND A=1 GOTO 2300
2230 IF A=1 THEN FOR N=1 TO J(A)-1:GOSUB 3330:NEXT N:GOTO 2300
2240 IF J(1)=1 GOTO 2260
2250 FOR N=1 TO J(1)-1:GOSUB 3330:NEXT N
2260 FOR X=1 TO A-1:IF J(X+1)=J(X)+1 GOTO 2280
2270 FOR N=J(X)+1 TO J(X+1)-1:GOSUB 3330:NEXT N
2280 NEXT X
2290 IF J(A)=Z GOTO 3340
2300 FOR N=J(A)+1 TO Z:GOSUB 3330:NEXT N:GOTO 3340
3000 CLS:INPUT"How many to be added (MAX.10)";A:IF A=0 OR A>10 GOTO 3000
3010 FOR N=1 TO A:PRINT:PRINT"QSO No.";Z+N:INPUT"Date";DD(N):INPUT"Time";TT(N):INP
UT"Call";WW$(N):INPUT"Report";RR(N):INPUT"Band";BB(N):INPUT"Name";NN$(N):INPUT"Pre
fix";CC$(N):INPUT"QSL Status";QQ(N):NEXT N:IF A=1 GOTO 3100
3020 S=0
3030 FOR N=1 TO A-1:IF CC$(N)=<CC$(N+1) GOTO 3070
3040 D=DD(N):T=TT(N):W$=WW$(N):R=RR(N):B=BB(N):N$=NN$(N):C$=CC$(N):Q=QQ(N)
3050 DD(N)=DD(N+1):TT(N)=TT(N+1):WW$(N)=WW$(N+1):RR(N)=RR(N+1):BB(N)=BB(N+1):NN$(
N)=NN$(N+1):CC$(N)=CC$(N+1):QQ(N)=QQ(N+1)
3060 DD(N+1)=D:TT(N+1)=T:WW$(N+1)=W$:RR(N+1)=R:BB(N+1)=B:NN$(N+1)=N$:CC$(N+1)=C$:Q
Q(N+1)=Q:S=1
3070 NEXT N
3080 IF S=1 GOTO 3020
3090 PRINT:PRINT"ENTRIES SORTED"
3100 FOR N=1 TO A:C$=CC$(N)
3110 H=Z+1:L=1:M=Z/2
3120 FOR X=1 TO 11:IF C$(M)=C$ GOTO 3160
3130 IF C$(M)<C$ THEN L=M ELSE H=M
3140 M=((H-L)/2)+L
3150 NEXT X:IF K$="A" THEN 3180 ELSE PRINT"PREFIX ";C$;" NOT IN LOG":GOTO 2100
3160 FOR W=M+1 TO Z+1:IF C$(W)<>C$ IF K$="A"THEN 3200 ELSE 2040
3170 NEXT W
3180 FOR W=1 TO Z:IF C$(W)>C$ GOTO 3200
3190 NEXT W
3200 I(N)=W:NEXT N
3210 PRINT"MERGE POINT(S) LOCATED. UPDATING DISK FILE":Z=Z+A:OPEN"O",1,"LOGDATA":P
RINT#1,Z
3220 IF I(1)=1 GOTO 3240
3230 FOR N=1 TO I(1)-1:GOSUB 3330:NEXT N
3240 IF A=1 GOTO 3300
3250 FOR X=1 TO A-1
3260 GOSUB 3320
3270 IF I(X+1)=I(X) GOTO 3290
3280 FOR N=I(X) TO I(X+1)-1:GOSUB 3330:NEXT N
3290 NEXT X
3300 X=A:GOSUB 3320:IF I(A)>Z-A GOTO 3340
3310 FOR N=I(A) TO Z-A:GOSUB 3330:NEXT N:GOTO 3340
3320 PRINT#1,DD(X);",";TT(X);",";WW$(X);",";RR(X);",";BB(X);",";NN$(X);",";CC$(X);
",";QQ(X):RETURN
3330 PRINT#1,D(N);",";T(N);",";W$(N);",";R(N);",";B(N);",";N$(N);",";C$(N);",";Q(N
):RETURN
3340 CLOSE:CLS:PRINT"FILE UPDATED"
3350 PRINT@64,"Press'A'to add QSO's,'D'to delete QSO's,'R' to refile QSO's
3360 PRINT@128,"or 'M' to goto Main Menu":K$=INKEY$:IF K$=""GOTO 3360
3370 IF K$="D"OR K$="A" OR K$="R" GOTO 10
3380 IF K$<>"M"GOTO 3350
3390 CLS:PRINT"QRX":RUN"LOGPROG"
3400 OPEN"E",1,"REFILE1"
3410 FOR N=1 TO A:PRINT#1,D(J(N));",";T(J(N));",";W$(J(N));",";R(J(N));",";B(J(N))
;",";N$(J(N));",";C$(J(N));",";Q(J(N)):NEXT N
3420 CLOSE:RETURN
```

Fig. 4 — Listing for UPDATE.

data to the file. All of these functions are performed by UPDATE, Fig. 4. UPDATE is run by selecting main-menu option 2, or it can be run independently of LOGPROG.

In order for the search routines and the country-counting routine used in LOGPROG to work successfully, LOGDATA must be an ordered file with all QSO records for a given prefix grouped together, and the groups must be in ascending numerical/alphabetical order. When entering data, use a unique prefix and use it consistently for each country on the ARRL Countries List. I use the prefix shown in the List as the standard prefix for each country. If the List gives the same prefix for more than one country, I add a suffix to distinguish them. On the List, for example, VK9 may be Norfolk Island, Willis Island or any of several others. I use VK9N, VK9W, and so on, to make each prefix unique for each of the VK9 countries.

For deleting QSO records, UPDATE reads the file into memory and then identifies the records to delete. These records are sorted in ascending numerical order. The entire file is then sent to disk under control of routines that bypass the records to be deleted. The new LOGDATA file thus contains the previous records minus the deletions. If QSO records are to be transferred to REFILE1, the procedure is identical except that the identified records are added at the end of REFILE1 before LOGDATA is updated.

To merge additions into the LOGDATA file, a similar approach is used. New QSO records are sorted by country prefix in ascending order. For QSOs with prefixes worked previously, the location following that prefix group in the file is determined. Another routine finds the proper location for QSOs with prefixes not already in the log. Then, the old file is sent to disk under control of routines that insert the new records into the stream at the proper locations.

UPDATE

Lines 10-30 are housekeeping statements. Line 20 anticipates the addition of 10 new QSO records for each run (Z + 10). After the data is read into RAM and the variables are initialized, line 1010 enables a choice of adding more QSOs to the LOGDATA file, deleting or refiling existing QSOs, or returning to the main menu (A, D, R or M).

Deleting or Refiling QSO Records

Choosing this option displays the prompt "How many deletions or refiles (MAX. 10)?" Line 2020 establishes an entry and verification loop to find each QSO to be deleted and its location. The data-entry prompt is identical to that used in LOGPROG to identify QSO records for updating QSL status and during QSL-card printing. If an error is made entering the prefix, and the subroutine is unable to find the entry, "PREFIX (as entered) NOT IN LOG" is displayed, followed by "Enter R to try again or S to skip this entry." If the error is obvious, you may decide to reenter the data. Pressing R returns the entry prompt line. If the error is not obvious, enter S, and the program will request the next entry.

If the QSO exists in the file, line 2080 identifies the deletion point as J(N), displays "DATA VERIFIED" and returns control to line 2020 for the next entry.

Should the search fail to locate the QSO record, "QSO not found. Check entry data." is displayed, and you're given the choice of trying again or skipping the entry.

In the unlikely event that none of the QSOs in a group of entries is located (because of data discrepancies), and all intended entries are skipped, line 2140 prints "NO VALID ENTRIES," and returns control to line 1010 of UPDATE. You can then choose to start over again with deletions or refiles, add more QSOs or return to the main menu.

If more than one valid deletion or refile is identified, lines 2160-2190 perform a simple bubble sort to place the data locations in ascending order. Line 2150 bypasses this sort when only one valid entry is made.

If R (refiling QSO data) was selected previously, control passes to the subroutine at line 3400. This routine opens REFILE1, adds the identified data to the end of the existing file, closes the file and returns control to line 2210. This process is skipped if D (simple deletion) was selected.

At this point, as far as the LOGDATA file is concerned, all identified records are to be deleted. When the last record is transferred to disk, "FILE UPDATED" is displayed and a new selection from the UPDATE menu is offered.

Adding QSOs to the File

Line 3000 displays the prompt "How many to be added?" Because a maximum of 10 records can be added in one run of UPDATE, any answer outside the 1-10 limits causes the prompt to be repeated. You're then led through the data-entry sequence, item by item, for each set of data. When the entries are completed, they are sorted by country prefixes. (This step is bypassed if only one QSO is added.) The new records are then merged with the old, and the entire file is transferred to disk. You're then given the chance to rerun UPDATE to add or delete more QSOs, or to return to LOGPROG and the main menu.

Correcting File-Data Errors

Data-entry errors made when adding QSOs to the file sometimes show up later when an attempt is made to fill out QSL cards or to update the QSL status for a particular QSO. In these cases, the errors may not allow the search routines to find the right QSO. Errors may also show up in the answers to inquiries. The most straightforward way to correct such errors is to use the inquiry routines to find out just how the QSO record appears in the file. Then the record can be deleted by using UPDATE (identifying the record with the data as it exists in the file) and then reentered correctly.

Hints, Kinks and Cautions

Although I have dispensed with all manual checklists, I continue to use a manually kept log. Such a log is a necessity for special notes, QSL addresses, and the like. The order of the data items in the LOGDATA file for each QSO is the same as in my log, and it is easy to transcribe those items when I have completed a series of QSOs. Also, the log is the ultimate source of backup in case something happens to the computer.

File Backup

To provide immediate backup for the QSO file, I always copy LOGDATA and REFILE1 to another disk after not more than 15 or 20 new QSO records are added to each. I also maintain an up-to-date, separate copy of LOGPROG, REFLPROG and UPDATE on the same backup disk. I make a second backup copy of everything on another disk often enough to keep this second copy reasonably current. Except during the copying process, I avoid having any two of these disks in my dual disk drive at the same time.

These precautions may seem extreme, but on one occasion I experienced a momentary power outage during the process of making the single backup copy I maintained at that time. The result was loss of data on over 200 QSOs from the original and backup files! Reentering that much data at one time is tedious!

Postscripts

LOGPROG, REFLPROG and UPDATE run on a TRS-80 Model III 48-kbyte computer with TRSDOS V1.3 and disk BASIC. The programs can be adapted to operate with cassette files instead of disk files, and because they are written in BASIC, should run successfully (with necessary dialect changes) on many other computers having a BASIC interpreter and sufficient memory. I do not, however, have experience with any such systems and am unable to offer any advice for the modifications required.

For those TRS 80 Model III owners who do not wish to key in the programs from the listings, I will supply a disk containing the three programs for $12 to cover the cost of the disk, mailing and handling.[1] Modification of the QSL printing routine is up to you.

[1]The ARRL and *QST* in no way warrant this offer.

Bob was first licensed, as W4BRG, in 1932 at age 15. He held the call W3LOE from 1946 to 1968. His major interests include the technical and DX aspects of Amateur Radio, and he's authored articles for Ham Radio, CQ, 73, *the Japanese publication* Ham Journal *and* QST. *A fellow in the IEEE, Bob holds a BSEE from Georgia Tech and an MSEE from the University of Pittsburgh. He was issued 10 U.S. Patents.*

Employed by Westinghouse Electric for 43 years in various engineering, administrative and general-management positions, retired in 1982 as Vice President, Technology, of Westinghouse Electric Japan, K. K. During his stay in Japan from 1976 to 1982, Bob operated as JF1YBU.

Next Month in QST

Anyone who's ever taken an amateur exam will tell you that you should know something about how receivers work. If this is one of the areas you've yet to master, you'll want to absorb the Beginner's Bench article in October *QST*. It provides a good overall view of how receivers allow you to hear signals that may have originated thousands of miles away.

If you were one of those who took more than a passing interest in the January *QST* article on a Keyboard Keyer and Code-Practice program for the VIC 20, you'll want to read how to add CW receive capability. This, and much more, coming your way in October *QST*.

Strays

President W3EDO, WA3HUP, WB3CQN and Secretary W3AMQ (l-r) of the York (Pennsylvania) ARC went to Jordan recently in hopes of presenting King Hussein, JY1, with this White Rose Award. Unfortunately, Hussein was unable to meet with them, but they did manage to compile some 1100 contacts during their two-week stay.

I would like to get in touch with...

☐ anyone with any information on the Typhon 150-W transmitter for 2-30 MHz. W. A. Roett, Rte. 20, 12155 Hibiscus Dr., S.W., Fort Meyers, FL 33908.

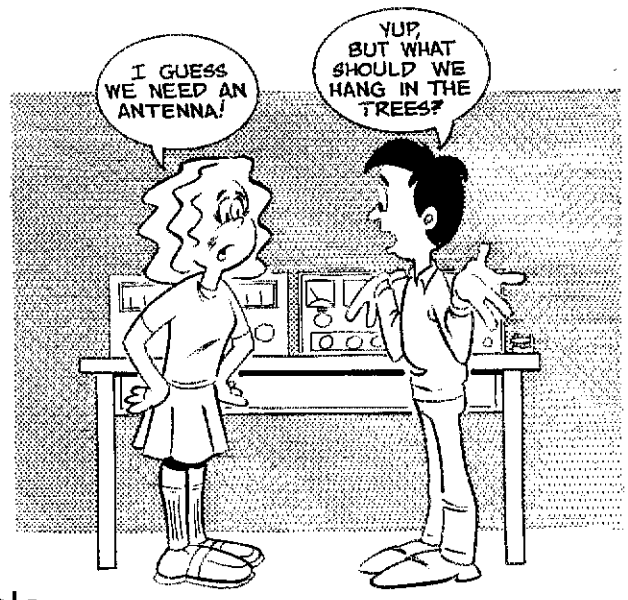
☐ anyone knowing of a source of parts for an NPC Electronics power supply, Model 103R. Nick Hauck, K6QPE, 371 Bethel Sp. 27, Sanger, CA 93657.

☐ anyone who has a schematic diagram or a service manual for an Eico signal generator, Model 324. Jim Webb, KE4VI, 6209 Sheldon, Apt. 1B, Tampa, FL 33615.

☐ any Yaesu FT-757GX owners interested in exchanging information on the air or via a newsletter. John Dowlan, W3HU, Box 5021, Spring Hill, FL 33526 (s.a.s.e., pse.).

• *First Steps In Radio*

Radio Antennas and How They Operate



Part 9: No amateur station can operate without an antenna. How do you pick the best type for your needs and budget? There's no simple answer, but learning their pros and cons is a good first step.

By Doug DeMaw,* W1FB

Have you strung up your "Aunt-Enna" yet? That term is sometimes used in jest to describe an antenna. But, there are less humorous names for antennas, such as *aerials* or *radiators*. The term aerial is somewhat out of style, but some old-timers still use the word on the air. You will also become aware of other antenna names as you listen to amateurs talking. For example, you might run across such words as vertical, Yagi (multielement directional antenna), rhombic (large wire antenna that is diamond shaped), and long wire.

Whatever style of antenna you select, and despite what it may be called, you will need an antenna for your ham radio station. In fact, you may eventually have several antennas on your property for communicating on various frequencies and over a variety of distances.

Most beginners start with just one antenna, but as their quest for long-distance communication (DX) increases they may add new and better antennas. Even if you don't anticipate being licensed in the near future, you will still need an antenna for shortwave listening, and for reception of W1AW code-practice sessions.[1]

Match Your Antenna

I've known a number of new hams who thought they could get on the air with a random length of wire at whatever height they could manage. Grave disappointment often followed. I have even known some Novices who gave up on Amateur Radio because "nobody answers my CQs." (The term CQ means "calling any radio amateur," and it is sent on CW or voice with the station call letters to let other hams know that we are seeking a QSO, or "contact.") These amateurs received no responses to their CQs because they had ineffective antennas, and thereby were transmitting weak signals.

The first rule for a suitable antenna is that it be *matched* to the transmitter and receiver. What does this mean? Well, our station equipment has a specific characteristic antenna-terminal impedance, generally 50 ohms. Few antennas exhibit a 50-ohm impedance without some type of adjustment or impedance-matching circuit (known also as a "matching network"). The objective is to make the antenna feed point become the same impedance as that of the station equipment. If this is not done, maximum power transfer between the transmitter and the antenna will not occur. Similarly, the received signals will be weaker than normal if the impedances are not matched. Many commercial devices are available for matching purposes. They are called Transmatches, antenna tuners or antenna couplers. In some types of systems, they can be used to match an antenna to a transmitter while in others they are used to "fool" a transmitter into thinking it is operating into a proper impedance, or *load*. This does not correct the mismatched condition at the antenna, but it does permit the transmitter to operate at full rated power without problems. From this we can establish as rule number 1 that the antenna should be matched to the feed line,

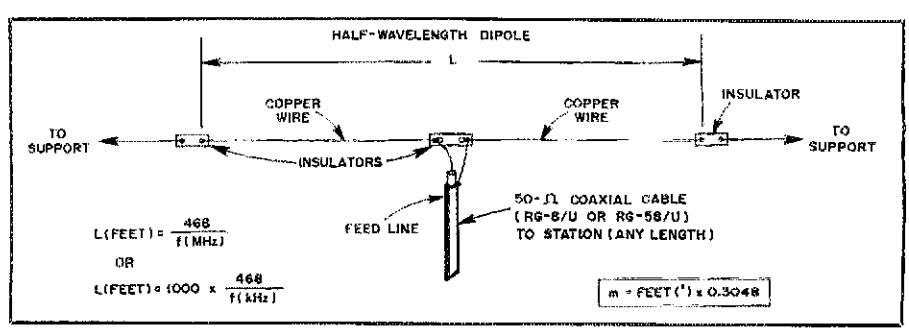


Fig. 1 — Details of a dipole antenna that is ½-wavelength long electrically. This is often a new amateur's first antenna.

[1]Notes appear on page 34.

*ARRL Contributing Editor, P.O. Box 250, Luther, MI 49656

transmitter and receiver for best results.

Some antennas need no matching device to work correctly with the station equipment. A popular example is the dipole antenna (also called a "doublet" by some hams). If cut to the proper length, it will exhibit an impedance that is close to 50 ohms. All that we need to do is connect it to the station gear through a length of 50-ohm coaxial cable. Fig. 1 illustrates this style of antenna. It is perhaps the most common "first antenna" for new amateurs. The overall length is ½ wavelength at the favored operating frequency.

For example, suppose you are a Novice and want to start operating in the 80-meter Novice band (3700 to 3750 kHz). You would want to cut the antenna for the center of that band (3725 kHz). Using the formula in Fig. 1 you would have a length (L) of 125.63 feet, or 125 feet 7½ inches.[2] The feed line would be connected at the exact center of the wire, as shown.

A common variation of this antenna is shown in Fig. 2. What we have here is a drooping dipole, or "inverted V." The formula for length is the same as for the antenna of Fig. 1. The inverted V needs only one high support (for the center), which makes it simpler to erect. If we cut our dipoles to the operating frequency, they are said to be "resonant," and this is desirable. When an antenna is resonant, the feed point looks like a pure resistance to the feed line. If it is not resonant, we will encounter a component known as "reactance," and it can make our antenna difficult to match to the feed line. Ideally, the reactance should be tuned out or canceled by means of a matching circuit. A detailed description of reactance can be found in *The ARRL Antenna Book*.

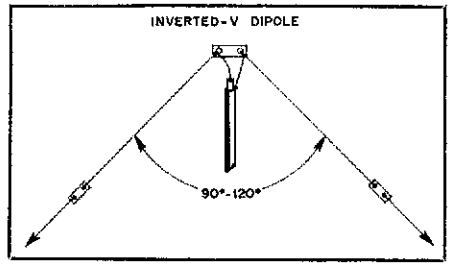


Fig. 2 — A variation of the dipole in Fig. 1. Only one supporting structure is needed for this antenna.

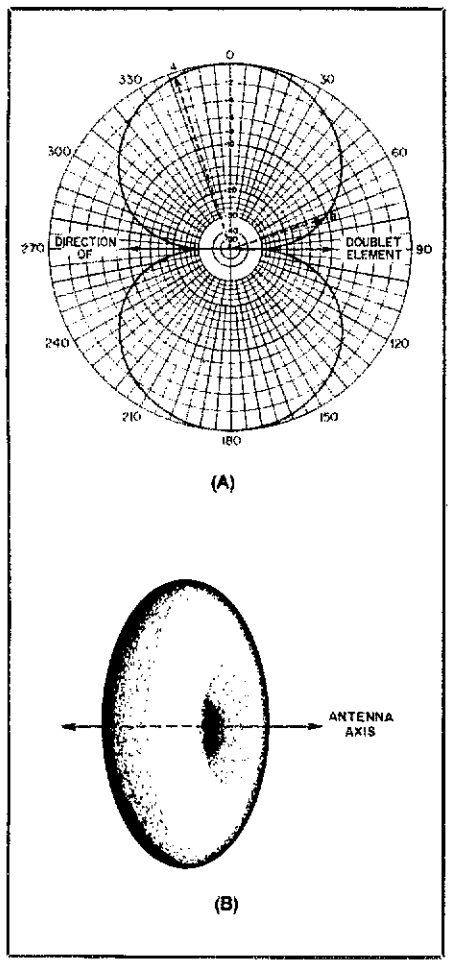


Fig. 3 — At A, the figure-8 pattern of a dipole that is ½ wavelength or greater above ground. If one could see the energy being radiated, it would have the doughnut shape at B.

What's a Dipole?

What are the characteristics of a dipole antenna? One feature is that it will radiate a figure-8 pattern (bidirectional) if it is approximately ½ wavelength or greater above ground (see Fig. 3). The lower the height above ground, the more omnidirectional it becomes. The feed impedance will vary with the height above ground, and may be as high as 100 ohms or as low as 25 ohms. In either extreme, most transmitters will work satisfactorily over these feed-impedance ranges.

It is seldom practical to erect an 80-meter dipole ½ wavelength or more above ground, for this would require support poles of approximately 130 feet! Most hams settle for whatever height is convenient, and good close-range (out to a few hundred miles) communications are common with 80-meter dipole heights of, say, 25 feet. As we mentioned earlier, low heights will cause the antenna to radiate equally well in all directions, since the figure-8 pattern tends to vanish. In general, the lower the height, the shorter the effective communications distance (depending on propagation conditions).

There is still another consideration when we deal with antenna height: a trait known as "radiation angle." It has a relationship to the angle, respective to the horizon, at which the radiation occurs. The lower the radiation angle, the greater the distance our signals can span. A dipole that is high above ground is best for low-angle work when seeking DX. On the other hand, if our dipole is quite close to ground, it will radiate a high-angle signal (almost straight up), which is good only for relatively close range, and without directional traits. We can learn from this that many factors affect dipole-antenna performance. These rules apply to all antennas erected in the horizontal format above ground.

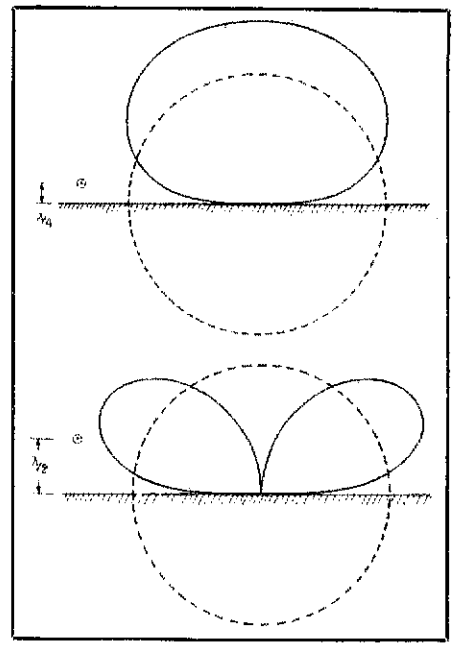


Fig. 4 — Illustrations of the radiation angles of two antenna heights (¼ and ½ wavelength). The dotted lines show what the pattern would be if there was no ground reflection under the dipoles.

Finally, a dipole antenna has limitations. It is good for just one amateur band when it is fed with coaxial cable. Also, it may cover only a part of an amateur band before a mismatch occurs. This phenomenon is known as "antenna bandwidth." Special broadband antennas have been designed to minimize this undesirable condition.

One way to avoid this problem is to use what is called a multiband dipole. Not only can we deal with the limited bandwidth by tuning the feed line, we can operate on many amateur bands with a single dipole erected as shown in Fig. 1 or 2. The main difference is in the type of feed line we use, plus the addition of a matching circuit in the radio room.

Fig. 5 illustrates two antennas that can be used in this manner. The antenna at A is capable of performing well from 160 through 10 meters if it is elevated well above ground and is not near conductive objects such as power or phone lines and metal structures. (All antennas work better if these conditions are observed.)

The characteristic impedance of the balanced feed line is not critical if it is in a range from 300 to 600 ohms. TV ribbon line can be used also if it is of high quality.

The antenna of Fig. 5B is known as an end-fed Zepp. It got its name from the type of antennas that were used on Zeppelins

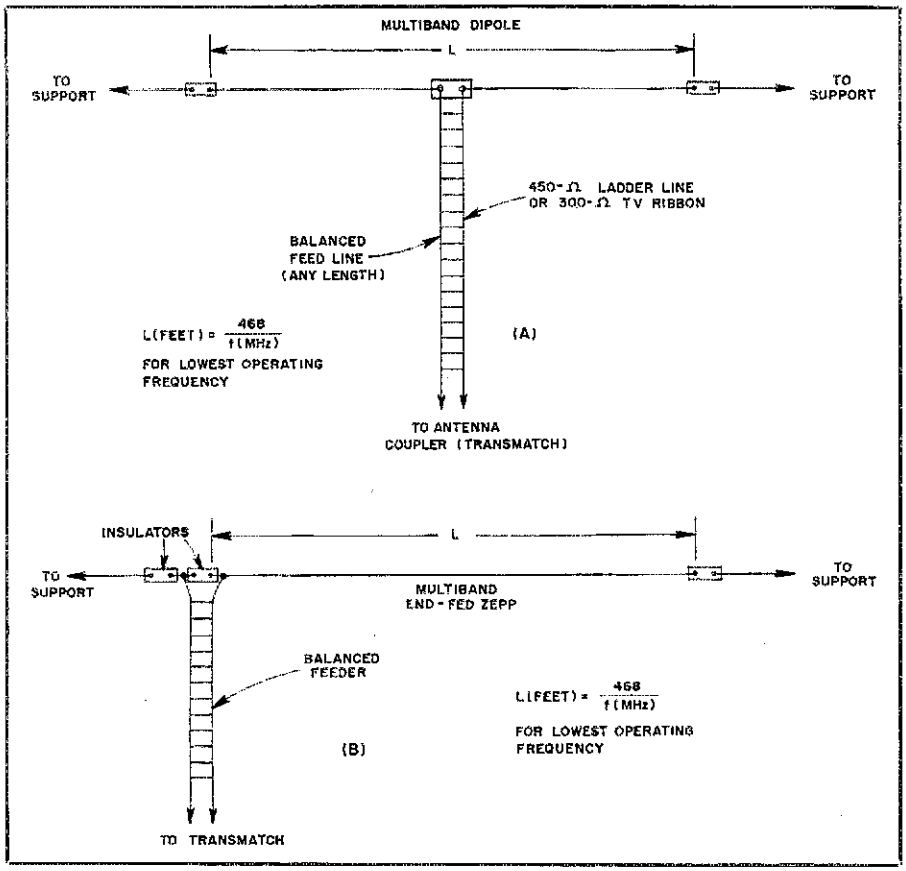


Fig. 5 — Two versions of the ½-wave wire antenna. In each example, the wire is cut to an electrical ½ wavelength in accordance with the formula in Fig. 1, using the lowest anticipated operating frequency in the calculation. A Transmatch is used to match the feed line to the station equipment.

many years ago. It is not as desirable an antenna as is the one at A of Fig. 5, but it will serve well for multiband use. The center-fed multiband antenna of Fig. 5A is probably the best choice for beginners in terms of cost versus complexity and performance.

All of the antennas we have discussed thus far are horizontally polarized. This means the radiated energy is *parallel* to the earth in the direction of the lines of force. A vertically polarized antenna has electric lines that are *perpendicular* to the earth. For close-range work (signals not reflected off the ionospheric layers), the antenna at each end of the communication circuit should be of the same polarization — vertical to vertical, or horizontal to horizontal. Horizontally polarized signals travel only very short distances over ground at HF, while vertically polarized waves can propagate long distances along the ground. Both work fine at VHF and UHF. A substantial signal loss will result if a polarization mismatch exists — vertical to horizontal antennas. For skywave (skip) communications, the polarization match is not significant because the signals that bounce off the ionosphere become somewhat "tumbled" and may arrive back at earth with various polarization traits.

Should You Go Vertical?

Antennas for use on automobiles are almost always of the vertical type. They offer low radiation angles and are simple to install. For line-of-sight VHF communications to amateur repeaters, it is necessary that the repeater antenna also be vertically polarized to prevent signal-path loss from polarization mismatch of the transmitted waves.

Many amateur fixed-location stations also have vertical antennas for HF-band use. They require very little physical space and are good low-angle radiators for DX operation. Some vertical antennas are designed for single-band use, while others contain "traps," which permit them to be used on many bands. These traps contain a coil and capacitor in parallel, thus forming a tuned (resonant) circuit for the band of interest. The trap serves to divorce electrically the portion of the antenna beyond (above) the trap. Dipole antennas can be built along the same principles to allow multiband use.

The vertical antenna radiates equally in all directions and is, therefore, an omnidirectional antenna. A ½-wavelength dipole can be erected vertically to produce the same results. Most vertical antennas are 1/4 or 5/8 wavelength long. They can be thought of as one half of a dipole. The missing half is in the earth and is called the "image half."

Fig. 6B shows how this can be envisioned. The dashed lines represent the image half of the dipole. For this to take place, we must create a ground system for use with the vertical antenna. A number of wires can be extended outward to form a circle from the base of the vertical antenna to form a ground screen. These wires may be buried in the soil, or they may lie on the ground. The more ground screen or *radial* wires used the better. But, most antenna engineers agree that 120 radials, each ¼-wavelength long, represent a reasonably good ground system for vertical antennas. However, many hams report satisfactory results when using as few as six

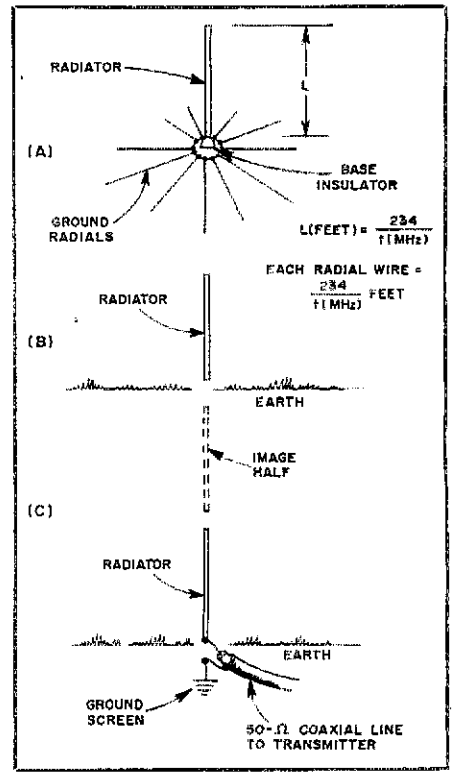


Fig. 6 — Many amateurs use vertical antennas. These radiate a vertically polarized wave, are effective over long distances, and have an omnidirectional radiation pattern (like a doughnut, with the radiator at the center). A ground screen or ground radials are needed to provide the missing half of the system, and to provide a reflective surface for the wave. Illustration B shows how the image half of the dipole appears in the earth under the radiator, making the system function as a vertical dipole. The feed line is connected as shown at C, with the shield braid of the coaxial cable connected to earth ground and the ground screen, while the center conductor of the cable attaches to the lower end of the radiator. The feed impedance is typically 30 ohms or less, so many hams insert a matching device to elevate the feed impedance to 50 ohms.

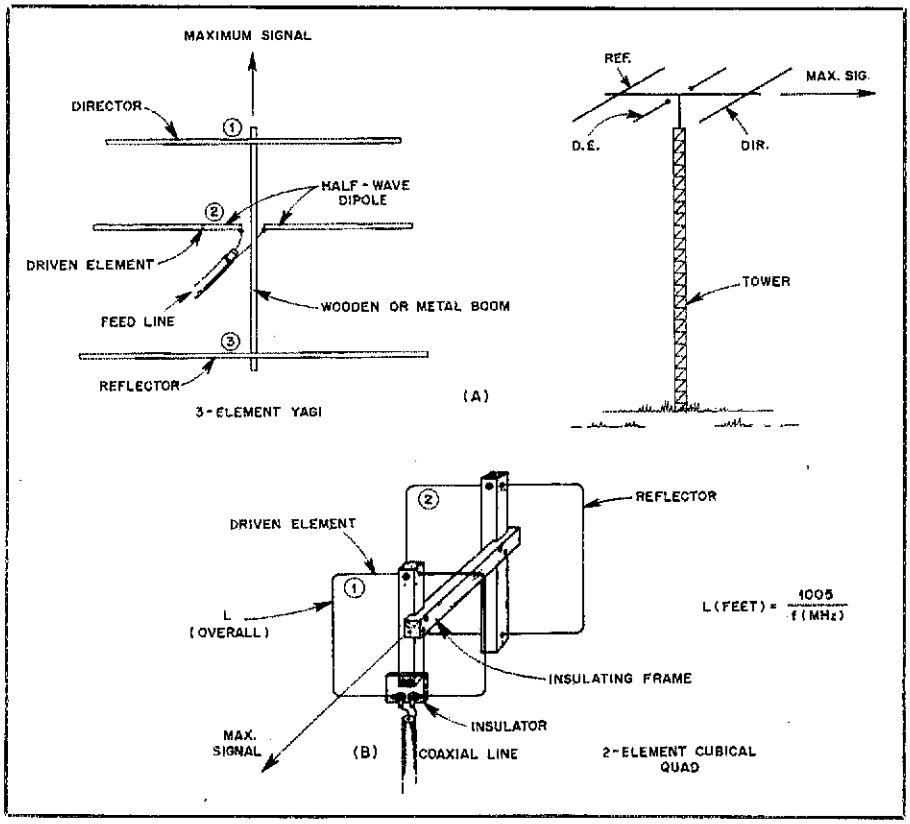


Fig. 7 — Examples of popular directional gain antennas (beam antennas). At A is a Yagi antenna with a reflector, a driven element and a director. Antenna B is a cubical quad type with two elements (reflector and driven element). Both antennas may have additional directors to increase the gain, but only one reflector is used with beam antennas.

ground radials. It depends on the ground conductivity in a given region.

Directional Gain Antennas

Many antennas have what is known as gain. Increased gain means an increase in effective signal power. If we were to replace a dipole antenna (no gain) with a 10-dB gain antenna, the effect would be the same as raising the transmitter power from 100 to 1000 W! It can be seen, therefore, that antennas with gain offer advantages for certain types of operation. Most of the popular gain antennas are also *directional*, and are erected so they can be rotated. This rotation is necessary if we are to maximize our signal power in a given direction. The directionality helps us two ways, during transmit *and* receive. Rotatable TV and FM antennas are good examples of gain types of directional antennas. These are called *beam* antennas because the signal is beamed in a particular direction, as is the case with a beam of light.

In its basic form, a beam antenna consists of a radiator (driven element) and a reflector. However, directors may also be added to increase the overall antenna gain. The two most popular forms of beam antennas are the Yagi-Uda (usually called "Yagi") and the cubical-quad antenna. Both types are shown in Fig. 7. Illustration A is a three-element Yagi antenna. The driven element (2) is a ½-wavelength dipole. The reflector (3) acts as a mirror (as with a light source) to direct the energy forward. It has a length approximately 5% greater than that of element 2. The director (1) further enhances the forward radiation of the signal. It is roughly 5% shorter than element 2. As this antenna is rotated away from the station at the other end of the communication circuit, the signal becomes weaker and weaker, and there may be several deep nulls in the response during rotation. This can work to our advantage in reducing interference from other stations and noise sources.

The cubical-quad antenna of Fig. 7B uses full-wavelength loop elements. A two-element version is shown. The reflector (2) is 5% greater in perimeter than is the driven element (1). Both antennas provide horizontal polarization, as shown. By rotating either of them 90 degrees on its axis, we can obtain vertical polarization. In other words, if antenna B of Fig. 7 had the feed terminals on the side rather than the bottom, it would have been rotated 90 degrees.

The spacing between the elements of either beam antenna will usually vary from a ¼ wavelength to somewhat less than a ¼ wavelength. The spacing chosen depends on the design objectives, which include feed impedance, forward gain and rejection off the rear of the antenna. Additional director elements can be added to these antennas to improve the gain and effective antenna bandwidth. Yagi beam antennas seldom present a 50-ohm impedance. Therefore, it is common practice to include some type of matching device at the feed point so 50- or 75-ohm coaxial cable can be used for the feed line. Antenna traps can be installed in the Yagi elements for multiband operation. Generally, the three bands concerned are 20, 15 and 10 meters. A three-band Yagi is referred to as a "tribander." Although there are numerous gain types of beam antennas, only the Yagi and the cubical quad have been treated here. *The ARRL Antenna Book* (recommended reading) describes most of the antennas used by radio amateurs, and their theory of operation. The book also explains various matching circuits.

Feeding Your Antenna

We've learned that most antennas can be used with feed lines of any convenient length. We need to be aware, however, that all feed lines have some loss, and certain ones are worse than others. And, the longer our feed line, the greater the loss. Open-wire ladder line is the least lossy, while coaxial cable of small diameter is the worst. The small coaxial lines are RG-58/U and RG-59/U types. Larger-diameter cable, RG-8/U and RG-11/U, is better. The higher the operating frequency, the greater the line losses per 100 feet of cable. So, it is conceivable that with a certain line loss our 100-W signal might diminish to 30 or 40 W by the time it reached the antenna — especially at VHF and higher! The same loss is experienced in the receive mode. Therefore, we should always try to keep the feed line as short as we can.

The larger conductors are best for antennas to keep losses down and to enhance the strength (physical) of the system. For wire antennas, it is wise to use no. 10 through no. 14 conductor sizes, likewise with the wire elements of cubical quads. For Yagi antennas, it is normal practice to use

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Glossary

antenna — a device made of conducting material for sending transmitter signals, or for receiving them.
antenna coupler — a device consisting of coils and capacitors that can be adjusted to provide an impedance match between a transmitter and an antenna, or between a transmitter and an antenna feed line.
antenna tuner — same as an antenna coupler.
dipole — an antenna that is ½ wavelength overall and is fed at the electrical center.
director — an electrical element of a gain type of antenna, such as a Yagi.
gain — the ability of a circuit to enhance the amplitude of an ac or RF signal.
ground screen — an artificial earth ground consisting of conductive material, such as wire or screen.
image antenna — a nonphysical part of an antenna system that exists in the earth under the antenna.
ionosphere — the outer layers of the earth's atmosphere, with some electron and ion content.
load — a device that is capable of receiving power.
long wire — a straight wire antenna that is 1 wavelength or greater overall.
matched — a condition in which two identical impedances are joined.
matching network — see antenna coupler.
multiband — the property of a circuit or antenna to function on several frequency bands.
polarization — vertical or horizontal lines of force, respective to antenna radiation. Circular polarization is also possible.
radial wires — the wires in a ground screen that extend radially from the base of an antenna.
radiation angle — the angle, respective to earth, that an antenna field leaves an antenna.
radiator — the portion of an antenna system to which the power is applied; also known as the driven element in some antennas.
reflector — a conductor in a multielement gain type of antenna; it acts as an RF mirror to direct the signal forward past the driven element.
Transmatch — a matching network designed mainly for matching the transmission line (feed line) to the transmitter; similar to an antenna coupler or tuner.
trap — a resonant, parallel-tuned circuit placed in an antenna element to isolate portions of the element from other element sections.
Yagi — a type of directional gain antenna, named after the co-inventor, Hidetsugu Yagi, a Japanese engineer.

aluminum tubing for the elements. Small Yagi antennas, of the kind used at VHF and higher, may contain aluminum rods for the elements. All insulators should be of high-quality material, such as ceramic, steatite, Plexiglas®, high-dielectric plastic compounds or fiberglass.

The gauge of wire used in ground screens is not as critical. Smaller wire, such as no. 20 through 26, can be used with success, but heavy-gauge wire will stand up longer to corrosion.

What You've Learned

It may seem that I left a great deal unsaid. I did, but only because this installment of First Steps in Radio is meant as an introduction to the principle of antennas. Entire books are written about antennas, and still a great many details are omitted. It is for this reason that I have recommended *The ARRL Antenna Book* as a study guide.

It is important that we recognize the difference between vertical and horizontal antenna polarization, the effect of antenna height on the angle of radiation, and that the feed impedance of an antenna must be matched to that of the feed line. We also need to remember that some antennas are directional and capable of gain, while others have no gain and are omnidirectional or bidirectional. If you've absorbed this much, then our article this month has been worthwhile.

Notes

[1]Check *QST* for a schedule of W1AW code-practice transmissions at various speeds.
[2]mm = in × 25.4; m = ft × 0.3048.

Strays

CE PROFILES

☐ *[Editor's Note: From time to time, we'll be publishing a profile on one of our Contributing Editors, to acquaint readers with people not on the Hq. staff who write columns that appear regularly in* QST.*]*

Contributing Editor Richard L. Baldwin, W1RU, was first licensed in 1934, at age 14. As W1IKE, Dick was active in traffic handling, which he gave up in the mid-'40s to pursue DXing. He now has more than 270 countries confirmed.

On his 17th birthday, Dick enlisted in the Naval Reserve on the basis of his Amateur Radio license, which kept him in good stead throughout his Navy days. Called to active duty in 1941, he spent most of his time on destroyers in the Pacific (where, Dick says, he had a number of rather exciting experiences).

Post WW II, Dick operated XU1AB for several months along the northeast coast of China. He then completed his undergraduate work at Bates College, where he set up W1IKE in the physics lab, and received his masters in physics from Boston College.

Dick came to work at ARRL Hq. on September 15, 1948 as an assistant secretary. His first tour of duty lasted until 1952, when he took a job with Motorola as zone sales manager for Maine-Vermont-New Hampshire. Four years later, he returned to Hq. to become Managing Editor of *QST* ("The best job I ever had," he says). He served as Assistant General Manager from 1963 to 1975, when he became General Manager. Dick retired from Hq. in 1982 to Maine.

IARU News Contributing Editor Richard L. Baldwin, W1RU

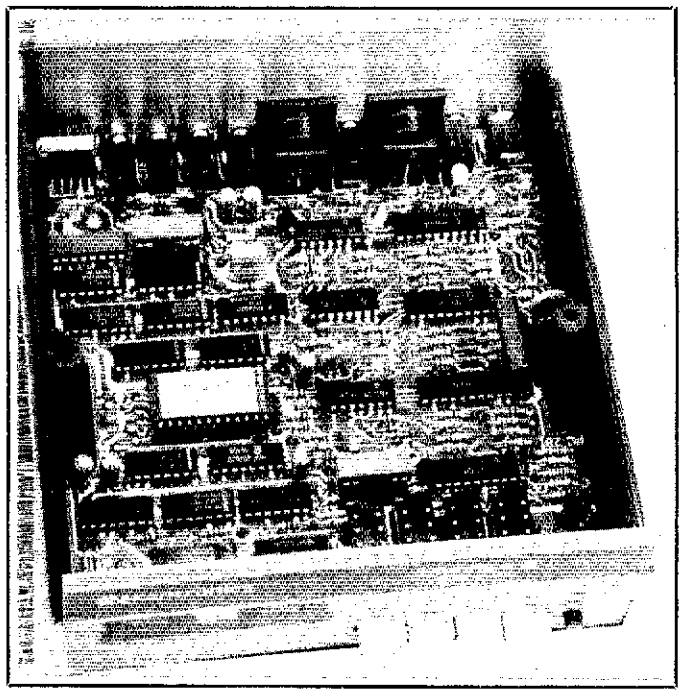
In November 1981, Dick began conducting the International News column, succeeding Dave Sumner, K1ZZ — a position to which his perspective as IARU Secretary and later as ARRL International Affairs Vice President and IARU President contributed greatly. The column title was changed to IARU News in January 1983. Dick believes that his greatest achievement in Amateur Radio was in being the League's ITU conference man beginning in 1964 and playing a key role in the worldwide WARC-79 preparation that led to three new amateur HF bands at 10, 18 and 24 MHz. He has always found IARU work fascinating, and hopes to continue it for many years. (Dick is the incumbent President of IARU, and is also the nominee for the post under the new IARU Constitution.)

Dick's major operating awards are WAC, WAS, DXCC and CP-35 (40 WPM from W1NJM). He is currently set up with an FT-ONE and a Cushcraft antenna at 100 feet for 10-28 MHz and dipoles for 1.8-7 MHz. Active on several Maine repeaters, Dick is a member of the Mid-Coast Repeater Club and the Augusta Emergency Amateur Radio Unit.

Product Review

Conducted By Paul K. Pagel,* N1FB

Kantronics Interface II Terminal Unit and Hamtext™ — Amtorsoft™ Software



The Interface II Terminal Unit is an RTTY/CW/AMTOR modem that's designed for use with your radio equipment, computer and appropriate software. Kantronics supplies several software packages for popular personal computers; this review describes the software for the Apple® II series of computers. (If you're not interested in AMTOR operation, Kantronics offers CW/RTTY-only software, too.) The equipment is designed to send and receive CW at speeds of 5-99 WPM, Baudot at 60, 67, 75 and 100 WPM, and ASCII at 110 and 300 bauds, and offers AMTOR modes A, B and L. Operator-selectable features include Un-Shift On Space (USOS), diddle, automatic ID, word wraparound, automatic carriage return/line feed and printer line feed.

During the course of this review, I examined three software versions: V1.4 (the original disk packaged wth the Interface), V1.5 (the version current at the time of review) and V1.6 (a beta-test model). Changes are being made to the V1.6 software as this review is written; therefore, this review is as current as copy deadlines permit.

Description

Manuals

The interface and software are sold separately, so two manuals are required reading. The Interface instruction manual is 22 pages long. A schematic diagram, a component-placement diagram and a parts list are included. No alignment (there are no variable controls) or troubleshooting instructions, PC-board overlays or PC-board X-ray views are supplied. A well-written functional description and a block diagram of the modem help you to understand its operation. Pictorial diagrams illustrate a typical station setup and I/O connections. Instructions for modifying the modem for 300-baud ASCII operation, use of the modem with a mechanical teleprinter keying loop and AFSK output-level alteration are given. These are all simple modifications.

Software information is contained in a 27-page, three-ring binder. There's a multiple-pocket, plastic retainer within the binder that's used for storing the master disk, the interface card and the modem/interface card connecting cable. (No schematic diagram or circuit information for the interface card is supplied.) This manual begins with a description of AMTOR operation and the invitation to read an enclosed book entitled, *Introduction to and the Operation of AMTOR*, written by Phil Anderson, WØXI.

The information in the software manual and the enclosed book is, for the most part, well presented, but errors do exist. (As the software is being revised, the printed information is being updated.) Tables are used to list the various keyboard commands for the different modes of operation. There are common tables for the Apple II and II+ and another pair of tables for the //e. The primary difference between the table pairs is to show the use of ESCape key commands for the earlier model computers and the use of the OPEN-APPLE and CLOSED-APPLE keys on the //e.

Physical

A plastic, beige-colored, clam-shell enclosure houses the Interface electronics. This compact, lightweight unit measuring only 2-1/2 × 6-1/8 × 6-1/4 inches (HWD).[1] A single, 10-segment, green LED tuning bar is situated at the left-center of the front panel. Immediately above the tuning bar are two labels: MARK (to the left) and SPACE (on the right). The tuning indicator has a "split personality": Half of the total number of segments are used to indicate the level of each RTTY tone. Beneath the bar are four other indicators: CW, 170, 425 and 850. These are illuminated when the desired mode and shift are selected. The CW indicator is red; the three shift indicators are green. Four push-button switches and a power-on LED are to the right of the tuning indicator. The push-button switches control SHIFT SELect, FM/AM operation, CH A/CH B switching and power OFF/ON. SHIFT SELect is a momentary-contact switch that permits a choice of CW operation or 170, 425 or 850-Hz RTTY shifts. As SHIFT SELect is repeatedly closed, the Interface will cycle through the four choices. (The power-on default mode is CW.) The remaining three switches are latching types. FM/AM turns the modem limiter circuit on or off to suit reception conditions. CH A/CH B allows the operator to select between two separate sets of I/O lines. This means you could have two rigs connected for use with the Interface — an ideal situation if you operate HF and VHF. OFF/ON controls the application of external dc power to the modem.

Kantronics supplies a number of connectors for use with the Interface. There are two 5-pin DIN plugs (one already attached to a 3-foot length of multiconductor cable), a 4-pin female microphone plug that is compatible with some transceivers, a 1/8-inch female power plug and four 1/8-inch, two-conductor male plugs for I/O connections. There's also a length of two-conductor "zip" cord for making up a power-supply cable. You must supply an external, 11- to 15-V dc source with a current capability of at least 200 mA.

The rear panel supports all the modem I/O and power-supply connections. As mentioned earlier, there are two separate sets of front-panel-selected I/O lines. These are channeled through two 5-pin female DIN jacks and provide for PTT, AFSK output, scope mark/space output and ground connections. Separate 1/8-inch female AUDIO IN jacks are used for each channel. A 1/8-inch male POWER input jack, four 1/8-inch female jacks (EXTernal SPeaker, FSK OUT, KEY IN, KEY OUT) and a 5-pin male COMPUTER header jack round out the connections.

The COMPUTER jack is used to connect the modem with the computer by means of a 3-foot-long, five-wire cable and the interface card supplied with the Kantronics software (not with the modem). Of course, you don't have to use the Kantronics software and interface card with the Interface II modem. If you use another modem, though, the I/O lines may not be totally compatible, so you should check that before you apply power to the system.

Assuming you do use the complete Kantronics package, the interface card must be plugged into one of the Apple peripheral-card slots (2-5). This double-sided PC board contains a 6522 VIA (Versatile Interface Adapter), a couple of address-decoder ICs and a few resistors and capacitors. A jumper wire is used to set the card for use in one of the previously mentioned slots. (Apple //e owners with an 80-column card in-

[1]mm = in × 25.4.

*Assistant Technical Editor

stalled should not use slot 3.) The card provides the system with a time-of-day clock (hours/minutes/seconds) and the requisites for interfacing the modem and computer.

A single, well-populated, double-sided PC board carries the 23 ICs, two DIP relays and a number of other components that make up the modem proper. The board is screened with component identification numbers, but many of them are hidden by the components themselves. Although the top and bottom cabinet halves are plastic, the front and rear panels are aluminum, and the inside of the cabinet has been sprayed with a conductive coating.

Electrical

The audio input stage is amplitude limited, providing a fixed amount of gain for the following active filters. There are two prelimiter switched-capacitor filters (MF10s), one each for 170-Hz and 425-/850-Hz shift operation. The 170-Hz filter is used during CW operation and has a center frequency of 765 Hz. Following the input filters is a limiter stage. This stage may be bypassed for AM (limiterless) operation. Some operators prefer to use this mode when strong interfering signals are present. Kantronics mentions this mode is generally best for CW reception. After the limiter, the signal is passed to two more MF-10 switched-capacitor filters for mark and space detection. Low-pass filtering, threshold correction and slicer stages follow the detectors, and the signal is then passed on to the computer.

Here's a different approach for you: Mark and space tones for transmission are generated by a crystal-controlled circuit that uses an EPROM as a frequency cataloger! Basically, the EPROM determines the rate at which a counter is run. The counter drives a ring counter-D/A converter combination that generates a five-level synthesized sine wave. A two-pole, low-pass filter smooths the wave after which it is attenuated and passed to the output.

Plug-in DIP reed relays are used to control the CW KEY OUT and PTT lines. The DPDT front-panel CH A/CH B switch selects the audio input and PTT lines for the chosen channel; other connections on the output jacks are common.

Software

During the course of the review, I had the opportunity to use three versions of the Apple software. After I'd "gotten my feet wet" with the first version, found a few bugs in it and contacted Kantronics about them, I was told that the version I had was outdated. I returned the disk to Kantronics to have the software updated to V1.5 and also received a beta-test V1.6. Kantronics was kept informed of any difficulties I encountered during the review.

The Apple software offers a selection of three configurations: Apple II/II+, Apple //e 40-column mode and Apple //e 80-column mode. At last: RTTY/CW software that takes advantage of the 80-column feature of the Apple //e! (More on that later.) Unfortunately, provisions have not been made to recognize an 80-column card in the Apple II or II+. Because the software is not copy-protected, you can easily make a backup copy using the Apple COPYA program.

Although I don't recommend you do it (because of the different keyboard commands), Apple //e owners can take advantage of all three software configurations. Should you select to emulate the earlier-model Apples, you must remember to have the CAPS LOCK key set for upper-case characters. In any of the configurations, the screen presentation remains basically the same, the exception being, of course, 40 more columns per line of display in the //e 80-column mode.

The HELLO program BRUNs one of three binary files according to your menu selection. Next, you must identify the slot (2-5) in which the interface card has been placed. The third menu asks you to choose the mode of operation or one of a couple of other options. There is no program-configuration scheme provided (except on beta-test V1.6), so each time the program is run, you must pass through the first two menus answering the same questions each time. A SELCAL ID and other information requested on inner menus also requires reentry. Each time you elect to print the holding buffer (Programs Options menu), you must enter the printer-interface-card slot number. If you do much bouncing back and forth between menus (as I did during the review), this constant reentry of information can be bothersome. A better approach (appearing in V1.6) is to allow program configuration that requires a single entry of the SELCAL ID, Kantronics interface-card slot number, printer-interface card type and slot-number, then bypass the first two menus after configuration. After all, the chances are that the system in use will not change from one operating period to the other, and the master disk can always be used to reconfigure the program.

The software provides time transmission, and message storage and editing capabilities. There's a break-in buffer, printer options, disk storage and retrieval procedures, and a number of other features too long to list. Although a SELCAL ID is requested, that information is used only in AMTOR operation. No RTTY SELCAL or WRU (Who aRe yoU) provisions are included. You cannot select ASCII word length (set at 8 bits), parity (fixed at none), and word/character-mode transmission is not offered; the program uses letter-mode transmission only.

Received and transmitted information may be printed immediately, and data in the holding buffer may be sent to the printer as well. The software and manual indicate that a total of eight different printer-interface cards is supported, and an option for a user-specified card is provided. The cards listed are the Kantronics, Epson™, Grappler™, Grappler+™, SSM parallel, SSM serial, Apple parallel and EP12G. The Kantronics selection allows you to connect the printer directly to the Hamtext interface card. The cable (an option available from Kantronics) requires that one end be compatible with your printer, and the Kantronics interface card end requires a two-row, 20-pin connector. No printer/interface card cable is included with the software/interface card combination, so this option was not checked. Kantronics states that the output from the Hamtext card will drive any Centronics-compatible parallel printer.

The user-specified-card option requires that a machine-language program be written to accommodate your particular printer-interface card. This program must be stored on page three, beginning at $0300. Some hints on what the program should contain are given in the manual. You might also take a look at the code near $0C1C (location may vary according to software version); that's where the inherent printer routines are stored. Don't forget: You'll have to BLOAD the printer-card routine each time you use the software, so modify the HELLO program to do that for you.

Operation

I was pleased to be able to use the 80-column screen capabilities of my Apple //e with this setup. I immediately got the feeling of more "elbow room." The entire screen is initially devoted to displaying received text. Once you press a key, the screen is divided into four sections; all mode selections using essentially the same screen format. The top-most section has three status lines that display mode of operation, transmit speed, receive speed, clock time, TR status, transmit-buffer space available (TBA) and holding-buffer space available (HBA). Beneath the status lines is a single "Times Square," right-to-left, output scroll. Below that is a four-line transmit buffer display with the rest of the screen (13 lines) devoted to displaying incoming text. The display format is easy on the eyes. It's also pleasing to note that the upward-scrolling text doesn't run into the bottom of the line above.

Once you've made your choice of operating mode, the interface-card clock starts "ticking." You can reset the clock at will. When the time is transmitted, hours and minutes are sent.

CW

This selection defaults to a receive/transmit speed of 10 WPM. No provisions are made to allow the default speed to be changed, but changing the speed (in receive mode only) is a matter of a few keystrokes. Although the receive algorithm is adaptive, Kantronics suggests that the program will function more smoothly if the transmit speed closely approximates that of the received CW. I found this to be true.

The software provides these prosigns: AA, AR, AS, BA, BT, K, KN, NNN, SN and SK. During receive, many (not all) of the prosigns are displayed as inverse characters; this helps to separate the text.

I quickly discovered that the AM (limiterless) reception mode of the modem is the best for CW operation. Incoming noise pulses play havoc with CW reception in most any setup, and this is evident with the Interface II in the FM mode. Switching to AM provides a different picture. The receive algorithm is quite good, and I was surprised to find that it copied some "fists" that other software I use is not able to understand.

Tuning in a CW signal is not difficult at all. During CW reception, the tuning bar will show a mid-range, brightly illuminated segment that appears to shift right and left. Proper tuning requires that the segments illuminate center to right (toward the SPACE panel label). When the signal is properly tuned in, you'll have a center and right-hand segment brightly illuminated, with more dimly lit segments in between. (Watching the LED bar graph during CW-signal tuning reminded me of "Little Brick Out," a low-resolution graphics game on the Apple programs disk!)

RTTY

Program default speed is 60 WPM, still the most commonly used amateur RTTY speed. Tuning in a Baudot or ASCII RTTY signal is a simple matter of getting the left- and right-most tuning-bar segments illuminated. I found weak-signal reception to be quite good, hampered primarily by QRM. Speed changes, selection of different inner menus, clearing the screen, etc., are accomplished with simple keystrokes. The 80-column display is a pleasure to use. Reverting to a 40-column display is difficult for me after using the "expanded" screen.

I tried mark-only reception by switching to the 425- and 850-Hz shift positions while copying stations using 170-Hz shift and speeds of 60 and 100 WPM. This method works quite well with strong signals.

AMTOR

There are three types of AMTOR operation you can use: Mode A, master/slave; Mode B, with forward error correction (FEC); and Mode L, listening. If you've never used AMTOR before, you might try spending some time in Mode L — just listening — to gain some familiarity with what you can expect to see on your screen. Since you're eavesdropping in Mode L, you won't be getting error-free copy (you'll see the repeated information), but it will give you

a taste of AMTOR operation.

AMTOR signals are a bit more difficult to tune in than a Baudot/ASCII RTTY signal. There isn't instant data display on the screen. Before the information is displayed, synchronization must be accomplished. Once that happens, and valid data is received, the incoming data will pop onto the screen in groups of three: three letters, two letters and a number, etc. (Spaces count, too, don't forget!)

The second status line of the AMTOR screen displays LOCK, VALID, XMIT and IDLE labels. Beneath these labels a cursor-like inverse block will appear when that function is active: LOCK, when synchronization has been achieved; VALID, when valid data is incoming; XMIT, while you're transmitting (in addition to the RECEIVE or TRANSMIT indication at the upper-right side of the screen); and IDLE, if idle characters (diddle) are being received. You can expect action (in Mode L, for instance) once the LOCK and VALID or IDLE cursors are present.

I found several AMTOR stations on the air during my weekend operational periods. It's apparent from some of the information I copied that there are a number of people learning to operate AMTOR, so I didn't feel alone! Mode L operation is simple to use, but I initially had difficulty trying to establish contact with other AMTOR stations in Mode A. Although both manuals led me to believe I could insert spaces to use as a general-purpose SELCAL ID as a means of establishing reception, none of the software versions allowed me to do that; only letters A-Z are accepted or I'd have to opt for the "CQCQ" default SELCAL ID. I learned that the blank SELCAL ID feature had been dispensed with, but the current manuals don't reflect that change. Should you exit the AMTOR mode (purposely or accidentally) and return to the main menu, you'll have to reenter the SELCAL ID. I found it too easy to inadvertently strike a key and find myself back at the main menu.

The present manuals lead you to believe that first calling in Mode B then chatting in Mode A is a thing of the past. Not so! Unless the SELCAL ID is known beforehand, you'll never get off the ground. If it's your first time on the air, you probably don't know *anyone's* SELCAL ID, and they don't know yours, so how are you going to contact someone? Basically, you should "broadcast" (Mode B) your SELCAL. Use a 3 × 3 × 3 — CQ, your call sign and SELCAL ID. Then, depending on the response you receive, stay in Mode B or switch to Mode A (select Slave). If the response you hear sounds like an ASCII transmission, remain in mode B; if it's a "chirping" response, switch to Slave and enter *your* SELCAL ID. (When you're the Master station, enter *the other station's* SELCAL ID.) If the station calling you is "chirping," he or she is using Mode A, and will assume the role of Master. When the Master station finishes transmission, you respond by typing the appropriate control keys to place your station in transmit mode. You must do this on the initial transmission of text even though your station is "chirping." After that, changeover will be automatic. This information ought to be enough to get you started . (For more AMTOR operation information, I'd recommend two *QST* articles.[2,3])

Immediately after selecting the Master AMTOR mode option from the menu (to call a specific station whose SELCAL is known), the AMTOR mode display appears and your station is placed in transmit mode, cycling between receive and transmit for a period of 30 seconds. "If at first you don't succeed" in making contact, you can "try, try again" by simply pressing RETURN.

On several occasions, the 40- and 80-column Apple //e AMTOR programs (including V1.6) got confused when I switched from Mode L to the main menu. While the menu was displayed, the AMTOR mode blocks appeared on screen above the Kantronics Hamtext headline. This did not occur when I used the Apple II program option. The "fix is in" on this problem now.

Some Comments

I think that a modem package should be ready to go, right from the box. Some manufacturers don't package connectors and/or cables that must be used with their modems/interfaces; others (like Kantronics) leave out the power supply. I'd say the lack of a power supply is the lesser of the two evils, as most, if not all, hams today have 12-V dc sources on hand. Connectors, however, may often be difficult to obtain, especially the proper header types. Still, why not supply a complete package?

The printer-card selection portion of the software manual confused me. I initially got the impression that I could not print while receiving or from the holding buffer without first specifying which printer-interface card is in use. That's not so. You must select one of the printer card options to print during reception, but printing from the holding buffer is independent of which card you've selected. In fact, selecting NONE (Ø on the menu) still allows printing from the holding buffer — assuming, of course, you do have a printer-interface card installed and a printer connected! (The "printer selection" referred to in the manual and in the menu is a misnomer; it's actually "printer-interface card" selection.)

I experienced what I believe is another problem with the Apple //e software. The problem manifests itself when attempting to make more than one dump from the holding buffer to the printer. The first indication that this problem exists is the double-spaced letters that appear on the screen and scroll top to bottom (the 80-column card is active during printing of the buffer). During the course of the second and any successive buffer dumps prior to program hang-up, the displayed information becomes noticeably garbled. Shortly thereafter, the printed output becomes fouled and the program hangs.

I used the standard Apple 80-column text card and a Call-A.P.P.L.E. extended-memory, 80-column text card; this program selection functioned exactly the same way with both cards. When I run the 40-column (Apple II/II +) version of the program, the buffer dump works properly. The only cure I found is to press CONTROL/RESET from within the Programs Options portion of the program. After that, multiple buffer dumps print properly every time.

Program operation during the buffer dump is visually altered by the CONTROL/RESET action, and appears in one of two ways depending on whether CONTROL/RESET is pressed before or after printer-interface-card selection; you get a bottom-to-top scroll or no scroll at all. Without the scroll, the screen is blank except for a few double-spaced letters at the very top. (The early V1.4 software inserts random zeros in the holding-buffer printout, but V1.5 doesn't.) Of course, you can always save the holding buffer contents to disk and print the file later.

I noted some file-handling procedures are different, or missing, from normal Apple operation. In V1.4 and V1.5, you can CATALOG a disk, but you can't DELETE disk files from within the program. It's also possible to save a file with no name, or files whose names begin with digits ("no-no's" under normal DOS operation). Such files are difficult to handle outside of the Kantronics program — try to DELETE one! (You can use FID to recopy desired files to another disk, and then INITialize the source disk to clear all the files.) Software V1.6 overcomes these anomolies.

AMTOR operation may certainly have its applications (and initially is a novelty), but for day-to-day ragchewing, I think I'll stick with RTTY or CW. I don't need absolutely error-free copy to have an enjoyable ragchew. Should I miss a necessary bit of information, I can always ask for a repeat. Sure, you can talk to Africa, or some other distant place, using low power and not miss a single word, and all your typographical errors and misspellings will be received error-free. AMTOR doesn't tire as it struggles to get the information through without error, but it's a slow, time-consuming process, and waiting for protracted periods of time for purely *conversational* information to pop on the screen tires me. I also did not relish listening to the constant cycling of the TR relays in my newly purchased Kenwood TS-430S; they get more of a workout during one AMTOR session than they do in a month of weekends. An SSB QSK transceiver (manufacturers: It's been done already) would be ideal for AMTOR.

There is another side to the coin, however. Unlike Baudot or ASCII RTTY, the duty cycle of the transmitter (in Mode A) is close to 50% — maybe 55% — as opposed to 100% for the other modes. And, generally speaking, AMTOR should fare better under conditions of CW QRM. AMTOR will just wait for the opportune moment and then push the message through. With the other modes, you'd have to retype the information.

One day, I realized that, in addition to the normal, low-level, computer-signal interference (a raucous buzz) present in the receiver, I had some unwanted "company" — low-level "chugging" noises — during RTTY reception. I mused that the noises sounded much like a heavily muffled, mechanical-teleprinter noise. The chugging is in rhythm with the blinking MARK LED tuning indicator. The interference doesn't register on the S meter, and I am still able to copy SØ RTTY signals with the "ghost teleprinter" chugging away in the background. I found I could eliminate some of the computer interference by passing the computer/modem interconnection cable through a large, ferrite toroid several times. This does shorten the effective cable length, however. It appears that much of the noise emanates from the line associated with the slot-determining jumper on the modem-interface card.

I think the Interface II and its matching software (despite the present software glitches) are a powerful and multifeatured package. You may find the package satisfies most, if not all, of your RTTY/CW/AMTOR requirements. Thankfully, the Kantronics software policy is friendly; updates of early software versions are made at no charge (you should have V1.5 at least), regardless of the elapsed time since purchase. This is a policy to be commended. (Few software houses provide cost-free updates.) Also, program changes made for your personal convenience are available at a nominal charge. The beta-test V1.6 (or later revision) software may be available by the time this review appears in print.

The Interface II and Hamtext/AMTORSOFT software are available from Kantronics, 1202 East 23rd St., Lawrence, KS 66044. Price classes: Interface II, $270; Hamtext for the Apple, Commodore-64™ and VIC 20™, $100; Amtorsoft (same computers), $90; Apple Hamtext/Amtorsoft, $140. — *Paul K. Pagel, N1FB*

[2]J. P. Martinez, "AMTOR, an Improved Error-Free RTTY System," *QST*, June 1981, pp. 25-27.
[3]P. Newland, "An Introduction to AMTOR," *QST*, July 1983, pp. 11-13.

Hints and Kinks

Conducted By Larry D. Wolfgang,* WA3VIL

RADIO MODEM WITH FSK RTTY FOR HF RIGS

☐ I have a VIC 20™ computer, and I wanted to use it with my Kenwood TS-520SE transceiver as an RTTY station. I built the modem shown in Fig. 1 for about $20, which is much less than for any of the commercial units. The connections shown are for use with the Kantronics software. This cartridge plugs into the EXPANSION slot. Other software packages (or other computers) may require a different set of connections.

I wanted to use FSK instead of AFSK so I could operate my radio in the CW mode, and take advantage of the narrow filters in the '520. This way the modem does not have to include additional filtering, which simplifies construction and tuning. A simple modification to my TS-520SE allows it to operate in this mode. I believe this modification will also work with many other radios.

This approach does have some limitations. My modem only works with 170-Hz shift. It does not have the fancy packaging and controls found on many of the commercial modems. I had to open my radio to make a few circuit connections for FSK operation. And last, but not least, I did not support any Amateur Radio equipment manufacturers or dealers by building this unit!

Adding FSK to my transceiver was relatively simple. If your rig has an RIT knob, then it probably also has XIT, although it may not be located on the front panel. The RIT potentiometer usually varies the voltage to a varactor diode in the VFO circuit. There should be a dc line going to a relay or other transmit/receive switching logic. Somewhere along that line is a calibration (or XIT) potentiometer to adjust the transmit frequency. Connect a wire to the varactor diode between the RF isolation resistor and the RIT and XIT potentiometers. Applying a voltage to this line during transmit causes the frequency to shift.

In the Kenwood TS-520SE, I added this line at tie point RT3 on the PC board for the fixed-channel crystals. This is located just behind the VFO on the radio top side. To protect the power supply against accidental grounding of the FSK line, I placed an 18-kΩ series resistor in this line (inside the radio).

The value for R1 must be determined experimentally. You may also have to change the 27-kΩ value. The '520 frequency display changes as you adjust the RIT control. Short the input of U2B to ground and adjust the resistors for a 170-Hz shift of the display frequency. If the frequency display on your radio does not change as the RIT control is rotated, you may have to use a frequency counter to make this adjustment.

I drilled two holes in the back panel, near the phone-patch jacks, and installed new jacks for the FSK input and PTT-line keying. This way I do not have to connect the modem to the microphone jack or change connectors to switch operating mode.

My modem is on a Radio Shack perfboard with an edge connector that allows me to plug it directly into the USER Port on the back of my computer. All of the lines required for use with my software package are also available at the GAME Port (JOYSTICK socket).

The EXAR XR-2211 demodulator IC is available from Radio Shack, and comes with a data sheet that helps you select the proper components to custom tailor the frequency response. When a carrier is detected, pin 5 goes low, enabling the data output from pin 7. Q1 reduces the amount of noise that gets printed. I chose values that place the operating frequency at about 850 Hz, which is the center frequency of the CW filter of my radio, and produce a bandwidth of about 170 Hz.

I did not find an LED lock indicator to be a useful tuning aid, so I added the meter circuit shown. Other junk-box meters can be accommodated by changing the series resistor. The meter should read nearly full-scale with 5 V applied through the series resistor. Be sure you don't draw more than the 5-mA current limit of the IC. You could use a spare section of U2 if you need more current. These buffers are capable of supplying 42 mA.

To adjust the modem, tune in an RTTY signal using a narrow-bandwidth CW filter. (Be sure you can hear both tones coming through the filter.) Adjust R2 to obtain good copy on the screen.

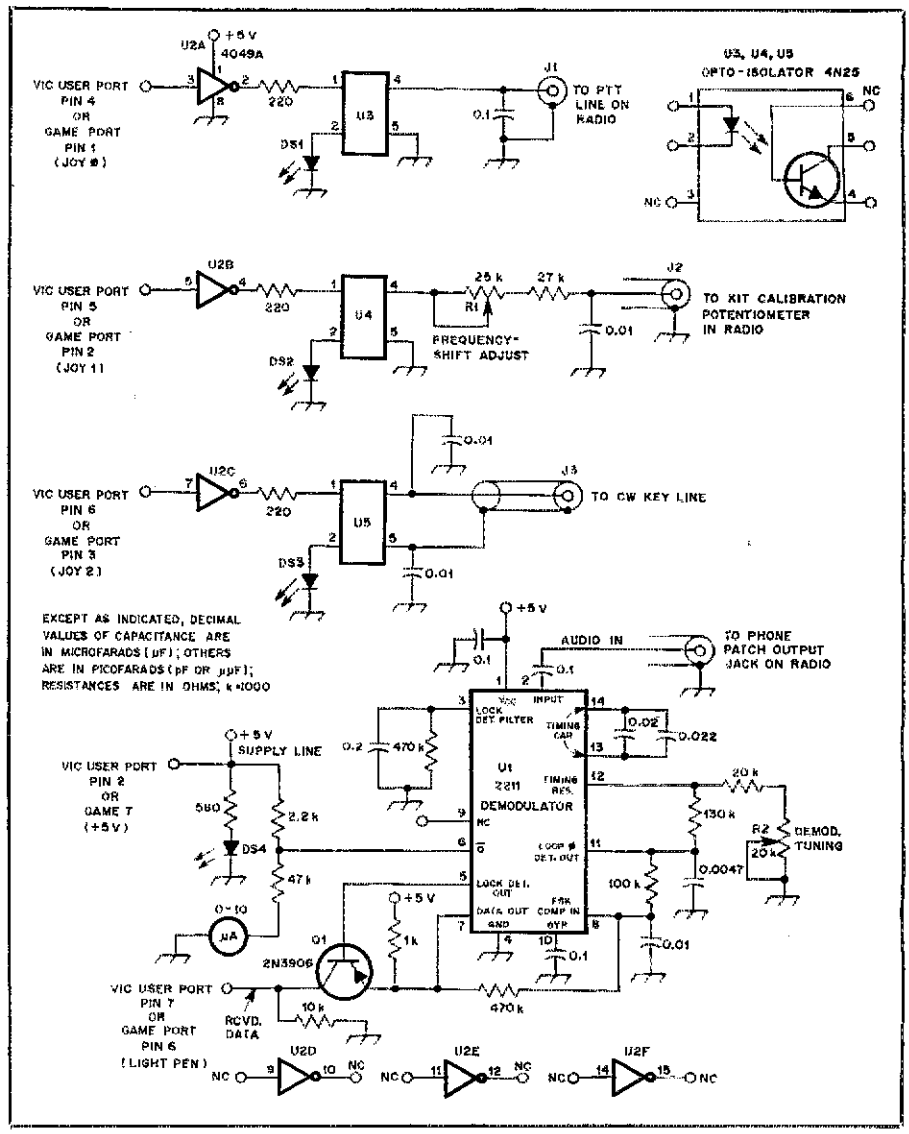


Fig. 1 — Schematic diagram of an FSK radio modem. The connections shown are for a VIC 20™ computer for use with the Kantronics Hamsoft™ program.

U1 — XR-2211 demodulator (Radio Shack part no. 276-2337).

U2 — 4049A hex inverter/buffer (Radio Shack part no. 276-2449).

U3, U4, U5 — 4N25 opto-isolator, or equiv. Available from Jameco Electronics.

*Assistant Technical Editor

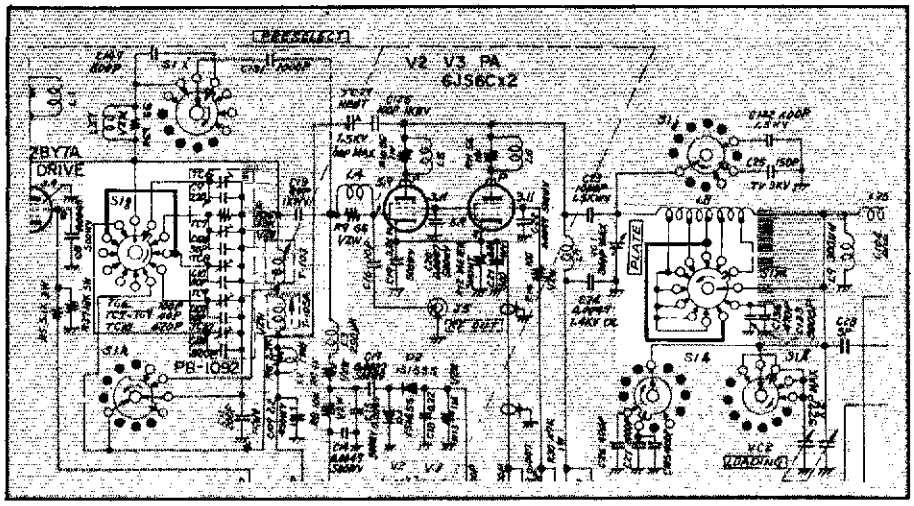


Fig. 2 — Partial schematic diagram of the FT-101 transceiver, showing the addition of jumpers on bandswitch sections to allow the unit to transmit on the 30-meter band. Jumpers between the WWV and 20-meter positions may also be needed on the third and fifth wafers, counted from the front.

If the frequency display on your radio does not change when you turn the RIT control, and if you don't have a frequency counter to adjust the FSK circuit, you might like to try this method: Disconnect the PTT line and tune in the marker generator to lock the demodulator IC. Now fill the computer transmit buffer and have the program send data to the radio. Adjust R1 so both tones can be heard in the receiver. Since the computer program cannot transmit and receive at the same time, the data will not print to the screen. Now have a friend get on the air with you to confirm that you have the correct frequency shift or make fine adjustments.

This is my first try at RTTY, so I have nothing with which to compare this system. I have used it to receive at up to 300 bauds, and have been told that my signal prints very well. — *John Dewey, KA9CAR, Crystal Lake, Illinois*

10-MHz OPERATION WITH THE YAESU FT-101 MODELS

☐ A letter to Yaesu Electronics Corporation brought me the information needed to enable 10-MHz transmit capabilities on my FT-101E. Apparently, these same modifications will work for other models in this series. They already have a 10-MHz WWV receive position, so it is just a matter of adding a few jumpers on the bandswitch to enable the transmitter on this band.

First locate the bandswitch (after removing the cover, of course) and note the positions of the third, fifth and eighth wafers, counted from the front. Install a jumper between the WWV contact and the 20-meter contact on each of these wafers. Use short lengths of insulated wire. My radio already had the jumpers installed on the third and fifth wafers.

Next, install a jumper between the WWV contact on the last wafer and the ninth turn of the tank coil. [This should be at or near the 20-meter tap point. — Ed.] These changes should allow the transmitter to operate on the 10-MHz band. Fig. 2 shows a partial schematic diagram to help readers locate the eighth (S1G) and thirteenth (S1M) bandswitch wafers. (Some of the schematic diagrams may label these wafers differently).

This modification places the 20-meter mixer and driver stages in parallel with the WWV position, so any adjustments made to that band will also affect the 30-meter transmit operation. — *Rolla Wade, KF4TF, Kingsport, Tennessee*

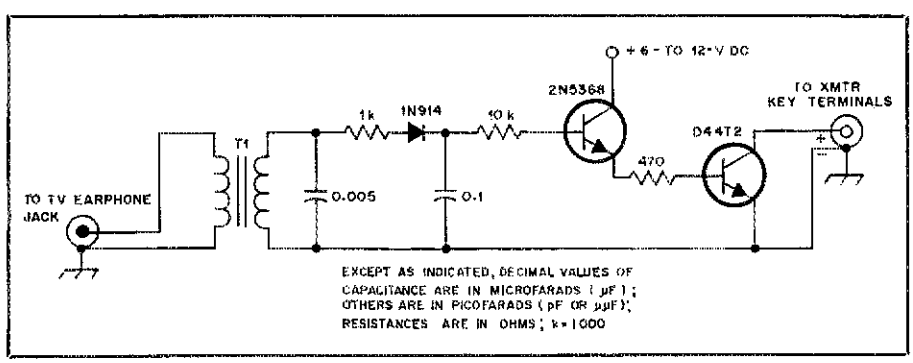


Fig. 3 — Schematic diagram of an interface circuit built by N1BBH to key his CW transmitter from the sound generated by his computer. T1 is a pocket-radio output transformer. The secondary is connected to the sound input here.

VIC 20™ CW TRANSMITTER INTERFACE

☐ As I sat looking at my old straight key next to my computer keyboard, a thought crossed my mind: "That computer can do everything the hand key can, and more!" I wrote a BASIC program for the VIC 20 to generate Morse code and send it to the TV speaker. As it turned out, my observation was correct. The computer makes more precise errors when I type the wrong keys. It also creates a vast store of new alibis for my sending!

The BASIC program works okay at speeds of up to about 25 WPM, but after that the timing is too far off. But it is fun to change the program and add new features as ideas strike me.

To connect the computer to my transmitter, I needed some type of interface circuit. I decided to use the sound sent to the TV to key my rig. Fig. 3 shows the circuit I built. T1 is the output transformer from a junked pocket radio. The original secondary winding is connected to the earphone jack on the TV by means of the cord from the junk-radio earphone.

D1 can be any small-signal silicon diode. I used a 2N5368 transistor for Q1, but many NPN transistors will work. Q2 can be more of a problem. It must be able to withstand the open-circuit voltage and short-circuit current of your transmitter key line. In my case that comes to 150 V and 120 mA. The GE D44T2 transistor can handle these values with no problem. Check the specifications for your radio before selecting a substitute part.

Before turning on your transmitter, set the TV volume control so it provides 6 V across C2 during a code element. This assures ample drive for the transistors. The circuit works great, but I prefer my straight key. I feel smarter than it! — *W. E. "Bud" Dion, N1BBH, Terryville, Connecticut*

UPPER- AND LOWER-CASE ASCII TRANSMISSIONS WITH THE VIC 20

☐ While operating ASCII RTTY with my Commodore VIC 20 computer, I noticed that several stations were able to transmit both upper- and lower-case letters. I became curious, and began to experiment with my Kantronics Hamsoft™ program. I discovered a combination of keys that enable the computer to send the values for lower-case ASCII letters.

To switch to lower-case letters, press the "Commodore" key (at the lower-left corner of the keyboard), and simultaneously press the SHIFT key. Any letters you type will now be lower case. Use the SHIFT key to send a capital letter. To return to all upper-case letters, press the "Commodore" key and the SHIFT key again. You can also go to the main menu and then return to ASCII mode. You can shift to lower-case mode on CW and Baudot RTTY, but only the screen display will be affected. The transmitted data does not change.

[These key strokes switch the character sets generated by the computer. With any of the Commodore computers, the character codes generated are not ASCII values. Any terminal program used to send data to a modem must translate the Commodore values to ASCII values before transmission. — Ed.]

My Kantronics manual does not mention this feature. The newer Hamtext™ software does describe the change to lower-case characters for ASCII transmissions. — *Andy Corbin, WD4KDN, Vinton, Virginia*

Technical Correspondence

Conducted By
Bob Schetgen,* KU7G

AN UPDATE ON SLOPING-WIRE ANTENNAS

☐ The half-sloper is an antenna that was applauded by some about five years ago. My article about it is provocatively titled, and stimulated a flood of correspondence.[1] I expected this because some amateurs had successfully used it, whereas others had been unable to resonate the antenna. Those amateurs who had successfully used it, and were able to resonate it employing a sloping wire about λ/4 long, had a 20-meter or tri-band beam antenna on their tower. Those who had not been able to resonate the antenna had no beam antenna on their tower. (This was the configuration I had modeled.) The sloper therefore operates like an "upside down" ground-plane antenna. The beam antenna is the ground plane, corresponding to the disc of a discone antenna. The pattern is not strongly directional, but for those amateurs who have observed some directionality, the tower seems to act like a reflector. The enigma of the half-sloper is, therefore, resolved.

If you have a tower without a beam antenna on it, and therefore have not been able to successfully employ the half-sloper, take notice. You can configure a sloping-wire radiator into an antenna system that provides superior performance. Perhaps you have already done so, by using a half-Delta (or ground-plane) loop.[2] Experimenters in the U.K. have devised an alternative.[3] A sloping wire can be operated as a parasitic reflector, and optimized to provide a maximum front-to-back (F/B) ratio (up to 24 dB) and maximum forward gain (up to 2.4 dB with respect to the tower as a monopole radiator).

The sloping-reflector arrangement devised by Ford consists of a parallel pair of wires, slung from near the top of the mast (but insulated from it) at a slope of 45°. Two wires provide increased bandwidth over a single wire. The reflector is tuned by inserting a passive reactance in series with the base of the reflector where it is attached to its own radial ground screen (see Fig. 1). A cardioid azimuthal pattern results.

Dimensions (see Fig. 2) for various sloping-wire antennas having different mast heights are given in Table 1. A mast height of 90° is near optimum. A height of 16.7 meters (55 ft), which is a typical tower height, corresponds to 76° at 3.775 MHz. The sloping reflector is too closely coupled to the tower at heights of less than 70°, and a series resistance as well as reactance is necessary to achieve an optimum F/B ratio.

The U.K. studies show that, while a significant F/B ratio is possible with the parasitic acting as a reflector, no more than about 2 dB F/B can be expected when the parasitic element acts as a director. Therefore, additional reflector(s) would be needed to reverse the directional pattern in practical applications. All unused reflectors must be broken by an insulator at about midspan, with relay switching to open or short out the insulator for directional control.

The mast could be fed as a folded unipole with four wires that connect to it at the top, and are insulated from it at the bottom. A skirt wire would connect the lower ends of the drop wires. A matching network at the tower base would provide a match to 50-Ω coaxial cable.

The choice is yours. There are at least three ways to use your tower on the lower HF bands (160, 80 and 40 meters) with sloping wires. — *John S. Belrose, VE2CV, ARRL Technical Advisor, Aylmer, Quebec*

[1] J. S. Belrose, "The Half-Sloper — Successful Deployment Is an Enigma," May 1980 *QST*.
[2] Belrose, "The Half-Delta Loop," May 1982 *Ham Radio*.
[3] E. T. Ford, "A Directional MF Transmitting Antenna Comprising a Single Guyed Mast and a Sloping-Wire Parasitic Reflector," ICAP 83, IEE Conference Publication No. 219, Part 1, pp. 235-239, 1983.

Table 1
Dimensions for Sloping-Wire Antennas

Electrical Dimensions (see Fig. 2)				*F/B Ratio (dB)*	*Gain (dB)*	*Reflector Tune (Base Tune-Ω)*
G1	*G2*	*H*	*S*			
60°	72°	17°	44°	25	−1	6 + j95
70°	84°	18°	51°	17	+1.6	0 − j25
76°	88°	3°	65°	13	+1.8	0 + j20
93°	84°	18°	51°	24	+2.2	0 + j10

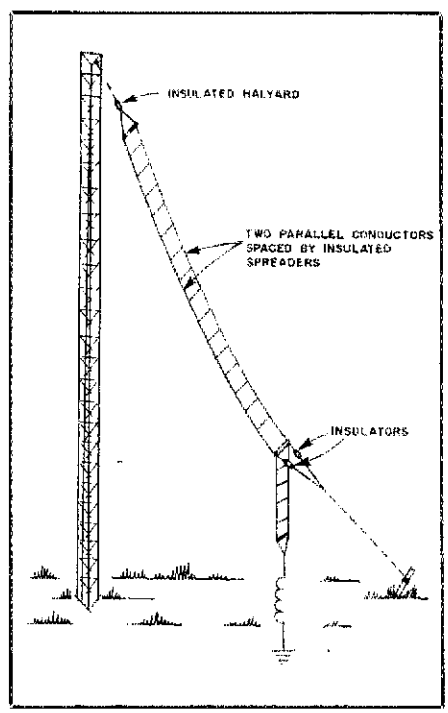


Fig. 1 — A directional MF/HF antenna with a sloping twin-wire reflector as described by Ford (see note 3).

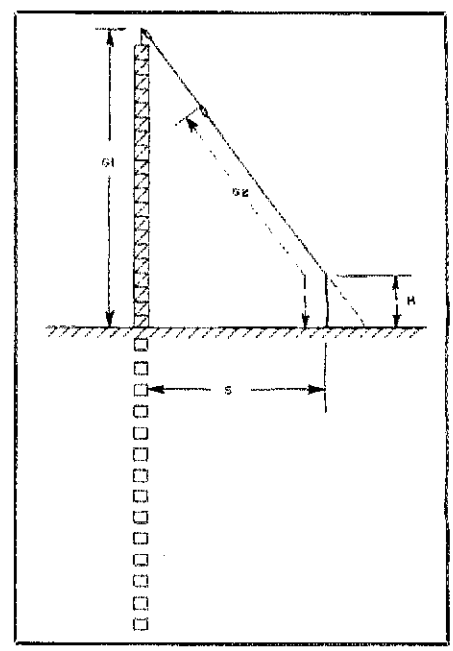


Fig. 2 — An antenna with a sloping reflector. The variables shown correspond to the dimensions (in electrical degrees) shown in Table 1. No feed or matching system is shown. A shunt feed (*The ARRL Antenna Book*, pp. 8-19 to 8-20) would be suitable.

*Technical Editorial Assistant

SPREAD-SPECTRUM COMMUNICATION: A NEW IDEA?

☐ Spread-spectrum communication is the intentional "broadbanding" of signals by scattering RF energy over a range of frequencies, with only a small amount of RF on any one frequency at any given instant. Reception is achieved by synchronous "descattering" of the signals. The technique was first proposed for military use in the 1940s, but it has recently received attention from Amateur Radio operators. Is this a new idea?

The following is an excerpt from *Radio for Everybody*, by Austin Lescarboura, published in 1922. Lescarboura wrote about radio in the 1920s and '30s. He worked for Hugo Gernsback publications and also wrote speeches for David Sarnoff of RCA:

> The question of secrecy is an important one, for nobody cares to be talking to a relative or friend while one hundred thousand other persons are listening in. Just so long as the messages stay on the wires, they are private, but at the present stage of radio telephony, the moment these same messages are passed through the radio transmitter they become public property. However, this question of secrecy can be solved — and will be solved, in the very near future. There are several ways in which this end can be attained. Perhaps the ultimate solution will be obtained by a system of double or triple waves employed simultaneously for the transmission of speech so that unless a person has a receiving set which intercepts a certain combination of waves, only a small and almost unintelligible part of the conversation will be detected. It is also quite possible to use a device at the transmitting end which continually alters the wave length of the transmitted radiotelephone waves, while the receiving set is also provided with a means of altering its wave length in step with the transmitter.

That paragraph, written 62 years ago, proposes a spread-spectrum communications concept. The reasons stated may be different from those of today, and his timing prediction is certainly inaccurate, but the essence of the technique is there. — *Ken Johnston, W7LIX, Helena, Montana*

ANTENNA-BOOK CURRENT PROBE

☐ I recently built An RF Current Probe (*The ARRL Antenna Book*, 1982 edition, p. 15-22). Builders be aware that the rotor of C1, rather than the stator, should be grounded to the metal cabinet. Otherwise, hand capacitance through the plastic knob to the capacitor shaft makes accurate tuning extremely difficult. — *Fred G. Alden, W8JTD, Sparks, Nevada*

INDUCTANCE OF SPACE-WOUND SOLENOID COILS

☐ The time required to produce perfect space-wound coils may be reduced by using a formula that yields the number of turns based on the required inductance. The inductance formula given in the *Handbook* may be written in another form more convenient for this use:[4]

$$L = \frac{d^2n^2}{18d + 40(\ell)}\ \mu H \qquad \text{(Eq. 1)}$$

where

d = effective diameter of the winding, in inches
ℓ = length of the winding, in inches
n = number of turns

[4]mm = in × 25.4.

Table 2
Spacing Factor K for Eq. 2 and 3†

K	Description
1	Close wound
2	Spaced one wire diameter
3	Spaced twice wire diameter

†In all cases, K is equal to the reciprocal of the turns per inch divided by the wire size, in inches.

Then

$$\ell = K \times b \times n \qquad \text{(Eq. 2)}$$

where

K = spacing factor (see Table 2)
b = wire diameter, in inches

When Eq. 2 is substituted for ℓ in Eq. 1, and Eq. 1 solved for n, Eq. 3 results:

$$n = \frac{20\ KbL + \sqrt{(20\ KbL)^2 + 18d^3L}}{d^2} \qquad \text{(Eq. 3)}$$

The effective diameter, d, is the sum of the form diameter and the wire diameter; it is appreciably larger than the form diameter when large wire is wound on small forms. Since d is squared in the formula, significant errors may result when this factor is neglected. Incidentally, K need not be an integer, but noninteger values make little practical sense. — *Frank Noble, W3MT, Bethesda, Maryland*

MORE ON COMMODORE KEYBOARDS

☐ Thanks to Dan Whipkey, N3DN, for a very good keyboard and code-practice program ("A Keyboard Keyer and Code Practice System," Jan. 1984 *QST*). I became frustrated when practicing code with the program. Immediately after I hit RETURN, the dots and dashes came pouring from my machine, while I fumbled for my pencil and paper. Add the line

```
1195 FOR T = 1 TO 4000: NEXT
```

to provide a short delay before the code begins. — *Sam McGibbon, KD9DJ, Fairmount, Indiana*

[A similar technique

```
1195 FOR T = 1 TO 6: POKE 1019, 86: SYS
  1009: NEXT
```

could be used to send a series of Vs, just like the FCC examination. — Ed.]

☐ In the May 1984 Technical Correspondence article, "C64 Keyboard," there appear to be some errors. The following are the changed lines I found necessary to make the program work correctly:

```
360 IF X$ = "ZZ" GOTO 101
1470 ON YQ GOTO 1090, 101
```

Line 190 sets the variable, TC, equal to zero. Since the variable is not used elsewhere in the program, the definition on line 190 can be eliminated. — *L. W. Phillips, VE3MYQ, Nepean, Ontario*

☐ Thanks for the information about Machine-Language (ML) Morse-code generation using a C64 (May Technical Correspondence). I am using a BASIC send-and-receive program I wrote myself, and had been looking for a character-generation routine to provide well-formed, high-speed code.

I was a little disappointed, however, with the quality of the sidetone generated with the SID (Sound Interface Device) parameters specified. Both chirp and key clicks were present. A steady tone results when locations 54272 and 54277 are left at zero. The clicks are reduced when 16 (hexadecimal $10), rather than zero, is used to turn off Voice One.

My program uses the data port for both input and output. If 255, rather than one, is sent to the port, all pins set for output (by the data direction register) are keyed.

Finally, the time required for the computer to load the ML routine into the cassette buffer is reduced drastically when the data lines contain decimal values, rather than their hex equivalents. Less than four seconds is needed to load the routine from decimal data. — *David L. Oliver, W9ODK, Shevlin, Minnesota*

☐ *QST* readers may be interested in an addition I have made to the VIC 20™ CW keyboard program. When using a keyboard keyer, it is often convenient to have a straight key available, perhaps for tune-up purposes or to send a few characters at a different speed when QRM is heavy. While it is quite simple to connect a straight key in parallel with the computer keying relay, the following lines of BASIC code, when added to Dan's program, turn the SPACE bar into a straight key:

```
245 IF ASC(B$) = 94 THEN GOTO 1500
1500 S = 36875
1501 K = PEEK(197): IF K=32 THEN POKE
  37136,1: POKE S, 234: POKE S+3, 15:
  GOTO 1501
1510 POKE 37136,0: POKE S,0: IF K=62
  THEN POKE 198,0: GOTO 200
1520 GOTO 1501
```

Press the "up-arrow" key to select straight-key operation while in the keyboard mode. Press HOME to return to keyboard operation. — *Jim Giammanco, N5IB, Baton Rouge, Louisiana*

[The straight-key routine is written for the VIC 20. For the C64, use the following routine. — Ed.]

```
245 IF ASC(B$) = 94 THEN GOTO 1500
1500 K = PEEK(197): IF K=60 THEN POKE
  56577,1: POKE 54276, 17: GOTO 1500
1510 POKE 56577,0: POKE 54276,0: IF
  K=51 THEN POKE 198,0: GOTO 200
1520 GOTO 1500
```

Feedback

☐ Lawrence Studebaker points out an error in Fig. 2 of his July *QST* article, "Simple, Low-Cost Computer Control for the ICOM-720." Pin 11 of J2 (the BUSY line) should be connected to pin 5 of U7, if your computer requires the BUSY signal. Pin 11 of U7 has no connection.

☐ Author Chris Bowick's name was misspelled in the July New Books column. Since the book was published, he's also had a call sign change: He is now WD4C.

Taking a Test Under the ARRL Volunteer Examiner Program

- How To Sign Up For The Test
- What To Expect During The Test Session
- Where To Find Study Materials

By Curt Holsopple,* K9CH

The ARRL's Volunteer Examiner Program is scheduled to begin this month. At long last, we can reverse the trend of ever-decreasing test opportunities for persons seeking an Amateur Radio license or upgrading. The ARRL's program is designed to serve all areas of the United States, plus some overseas locations, so finding a test site convenient to you should be much easier. Let's take a look at the process from the viewpoint of a person who wants to take a test for a Technician or higher class license.

Remember: The Novice license is administered under a separate program (see "New Novice Test Procedures," Sept. 1983 *QST*, p. 56). Also, this discussion covers the VE Program as run by the American Radio Relay League, and does not apply to those of other Volunteer Examiner Coordinators (VEC).

Finding an Available Test Session

One of the best features of the Volunteer Examiner Program is that exams can be scheduled according to local needs, and so will be promoted on a local basis. Test sessions will be sponsored primarily by clubs, with hamfests and conventions also featuring exams as a part of their programs. [Beginning with August 1984 *QST*, volunteer examiner test sessions being held at ARRL conventions are listed each month in the Coming Conventions column. — Ed.]

Test sessions must be established at least three months in advance. This gives plenty of time for the session's sponsor to advertise the test date. The test session can be publicized at club meetings and in newsletters, through announcements made on local repeater and HF nets, on posters in electronics stores and in schools.

If you don't hear of any test sessions being conducted in your area, there are two other ways to find out what is available. First, check with the nearest FCC Field Office. All sessions are on record there at least 30 days in advance of any registration cutoff date. Second, information on all ARRL-coordinated test sessions will be available through a referral system being maintained at League Hq.

Sorry, we won't be able to give out test session information over the phone from Headquarters; our limited staff will be busy supplying the Volunteer Examiners so they'll have everything they need to conduct exam sessions smoothly. However, we will be glad to mail to you a computer printout of sessions closest to you or in any other area you specify (such as in a neighboring state). Please send us your address and the earliest date you plan to take a test.

How to Apply to Take the Exam

Anyone wishing to take a test under the ARRL's Volunteer Examiner Program needs to register at least 30 days in advance of the test date. This allows the VEC time to get the test materials ready, and lets the test-session examiner team know how many people to prepare for.

You must complete an FCC Form 610 (application for Amateur Radio license). These are available from various publishers' booths at conventions and hamfests, or may be obtained by sending an s.a.s.e. either to an FCC Field Office or to ARRL Hq. The applications will also be available for an s.a.s.e. from most local Volunteer Examiner Teams.

The application and a check or money order for $4 should be sent to your local Volunteer Examiner Team. (The FCC approved the cost recoupment procedure in their Report and Order in Docket 84-265, July 12, 1984.) Make the funds payable to "ARRL/VEC." Remember: The application and test fee must be in the hands of the VE Team no later than 30 days before the test date. Amateurs who are upgrading

ARRL is a VEC

The ARRL and FCC signed the VEC Operating Agreement on July 21, officially designating the League as a Volunteer Examiner Coordinator for all areas of the U.S. and some locations overseas. The ARRL's Volunteer Examiner Program will begin testing at conventions and hamfests nationwide this month (see Coming Conventions, this month and last, for planned test sites). Test sessions sponsored by clubs and other groups will begin November 1.

Note: The FCC will discontinue routine testing at their field offices at the end of 1984; all testing after that time will be conducted under the Volunteer Examiner Program. The FCC may recall a candidate for a retest in cases of suspected fraud, however. This safeguard is no different than the FCC's past practices.

"One of the best features of the Volunteer Examiner Program is that exams can be scheduled according to local needs, and so will be promoted on a local basis."

*Manager, ARRL Volunteer Examiner Program

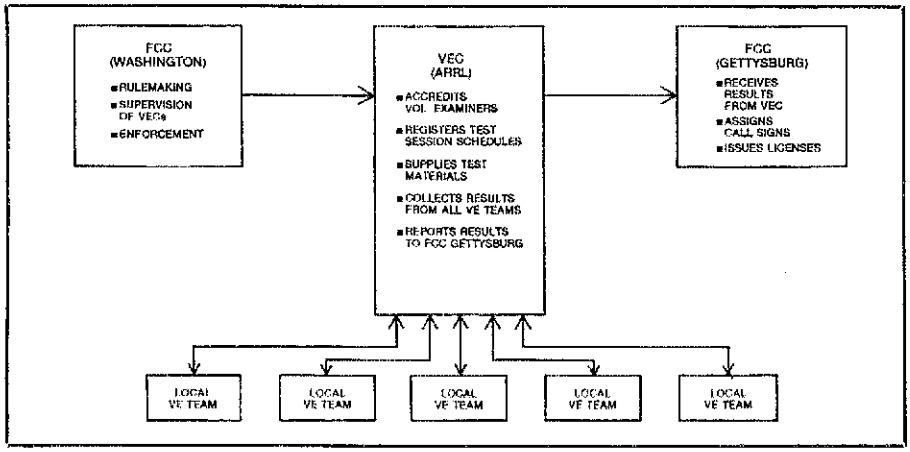


Fig. 1 — Organizational flow chart for the newly instituted Volunteer Examiner Program.

must include a photocopy of their license with the application.

What to Bring to the Examination

You must provide certain things when you come to the test session:

- your original Amateur Radio license
- two sharpened pencils, an eraser and a pen
- two forms of positive identification.

The required ID papers include a photo driver's license or an employment ID card plus one other positive ID. If no photo ID is available, bring *two* of the following: any other ID or license; a birth certificate; a utility bill, bank statement or other correspondence that gives your name and address; a work permit or a school report card; or a passport. If you have a valid code-credit certificate from the FCC or any other VEC, or a First, Second or Third Class Radiotelegraph license, bring that to the test session so you can be given the appropriate credit for the code test.

What to Expect at the Test Session

One of the ARRL's prospective Volunteer Examiners said it well: "Instead of that big blond guy from Chicago handing you the examination, you could find it handed to you by some bald-headed guy with a mustache from Radcliff, Kentucky. Otherwise, you won't be aware that anything has changed from a year ago."

The test session itself will be very much the same as it was when run by the Commission prior to 1983, except that the test location and time will be much more convenient for the candidates. When you register for an ARRL-coordinated test session, the VE Team will send you an appointment confirmation card telling you exactly when and were to appear for the examination. The trek downtown to the Federal Building is a thing of the past. Now the test sessions will probably be held in locations such as neighborhood schools, churches or meeting halls.

Glossary

Volunteer Examiner Coordinator (VEC) — the organization(s) appointed by the FCC to coordinate the work of the many Volunteer Examiners. The VEC also prepares and distributes test materials, and collects test results.

Volunteer Examiner (VE) — an Advanced or Extra Class radio amateur who has been accredited to administer Amateur Radio examinations.

VE Team — the FCC-required group of three accredited VEs who run a test session.

"The test session . . . location and time will be much more convenient to the candidates."

The 5-minute code test will be a recording of a typical transmission from one ham to another, followed by a 10-question comprehension test. No sending test is required. The written-element test will be multiple-choice. If you pass, you'll "instantly upgrade" if you already hold any FCC Amateur Radio license (including Novice).

What to Study

The test questions used by the Volunteer Examiner Program will be drawn from the question pools released by the FCC during the past year. The questions are available in a series of bulletins released by the FCC. You can receive a set of questions by sending an s.a.s.e. (37 cents postage, please) to an FCC Field Office or to ARRL Hq., Special Requests, 225 Main St., Newington, CT 06111. Specify which license class you're interested in.

Various Amateur Radio publishers are coming out with study guides based on these new question pools. When you use a license manual or handbook to study, you may also want to have the syllabus (list of topics) on which the test questions are based. If not included in the study guide you use, a syllabus is available from the FCC or ARRL Hq. for an s.a.s.e. Ask for "PR Bulletin 1035, Syllabus," which covers *all* license classes.

Don't Hold Back

The ARRL's Volunteer Examiner Program will be in full swing by the end of 1984. We plan to begin testing at conventions and some hamfests during September and October, and will add many more sessions beginning November 1.

Do you have the itch to upgrade your ham ticket? Great! Hit the books now, and you may be enjoying your new privileges before ringing in the new year! QST

Strays

I would like to get in touch with...

☐ any Bendix AM marine radiotelephone owners interested in joining a net on 160 meters. Mark Starin, KB1KJ, 457 Varney St., Manchester, NH 03102.

☐ anyone who has a 5-pin base diagram for a James Knight 100-kHz frequency standard, type JK5. Roy Albright, N5RA, 107 Rosemary, San Antonio, TX 78209.

DOC ASSIGNS SPECIAL PREFIXES FOR POPE'S VISIT

☐ In response to a request concerning the assignment of special call-sign prefixes for the Pope's visit to Canada, the Department of Communications has made available special call-sign prefixes for Canadian amateur use September 9-20, 1984. The call-sign prefixes have been assigned as follows:

Newfoundland	XK1
Labrador	XK2
Maritimes	XJ1
Quebec	XJ2
Ontario	XJ3
Manitoba	XJ4
Saskatchewan	XJ5
Alberta	XJ6
British Columbia	XJ7
NWT	XJ8
Yukon	CJ1

Industrial-Arts Teacher Chosen 1983 Instructor of the Year

KA1KD motivates his students through Amateur Radio.

By Steven Ewald,* WA4CMS

The challenge of teaching Amateur Radio as part of an electronics curriculum in junior high school has been met, and it continues to grow. The Bethel (Connecticut) Middle School Amateur Radio Club has not only ignited Amateur Radio interest among 7th and 8th grade students but also throughout the community and the Connecticut school system. This enthusiastic program is guided by industrial-arts teacher Peter Kemp, KA1KD, the 1983 Herb S. Brier Instructor of the Year.

The Herb S. Brier, W9AD, Instructor of the Year Award is now in its sixth year. The Lake County (Indiana) Amateur Radio Club, in cooperation with the ARRL Training Branch, sponsors the annual award in memory of Herb, a dedicated Amateur Radio instructor and longtime Novice editor for *CQ*. The award honors outstanding instructors who carry on the tradition of W9AD. An impartial panel of licensed amateurs selects the candidate who best exemplifies the spirit of excellence in Amateur Radio instruction.

Bethel Middle School staff and students are thankful to have the talent and commitment of Pete Kemp, KA1KD. "Pete and I have been colleagues in the Bethel school system for 10 years or so now," Alice Grover wrote. "During many of those years, he has spent countless volunteer hours working with our teenagers, coaching, teaching and testing them in the skills a good ham operator needs to have."

"I had never heard of ham radio until I was introduced to it by Mr. Kemp, and now it's one of my favorite hobbies," Bill Fesh, KA1KPT, explained. "He let me come (to the school station) at 7 every morning to use the rig or be taught a new aspect of the hobby. These privileges are not just for me, but for everyone interested."

Pete Kemp has successfully incorporated the Novice class and code training into his electricity/electronic industrial-arts course. By the end of the 10-week grading period, students have studied basic electricity, communications and specialized electronic techniques. Students are offered the chance to take the Novice exam. The Bethel Middle School club station serves as an activity center for licensed students and provides encouragement for those learning Amateur Radio.

Peter Kemp, KA1KD, recipient of the 1983 Herb S. Brier Instructor of the Year Award.

Herb S. Brier, W9AD, Award

1978	Sam May, AD7F
1979	Dr. Arthur Smith, N3DR
1980	Dan Hoover, W9VEY
1981	Eddie Miller, W5EXI
1982	Paul Woodland, W8EEY and Vera Woodland, WD5BOW
1983	Peter Kemp, KA1KD

"Since the inception of this program, our little middle school has turned out an average of 45 Novices a year," Pete wrote. "Our classes have been well received by the school and community. The Bethel Middle School ARC has expanded its membership by allowing the students from other schools to participate." The Connecticut State Department of Education has also commended the innovative program.

"My philosophy of teaching revolves around the basic premise that theory is only theory unless it can be related to the student in terms of its practical application," Pete explained. His course stresses hands-on training, classroom demonstrations, field trips and peer-teaching elements using former students.

Pete is also active in helping adults gain an Amateur Radio license, and upgrade. "He has coordinated Novice and upgrading needs of the Candlewood Amateur Radio Association for the past few years, helping newcomers of all ages get started successfully in Amateur Radio," John Davidson, KE1H, said.

With the Candlewood ARA, Peter organizes antenna-raising parties for new operators and encourages new hams to get on the air, even from his station at home. "Novice equipment is hard to find at a good price," John McDonald, KB1EI, added. "Mr. Kemp acts as a middleman in helping these Novices get equipment of their own."

KA1KD has served as ARRL Section Manager of Connecticut since 1981, a post he leaves at the end of this month. In operating activities, he's a member of the National Traffic System and the Amateur Radio Emergency Service, and enjoys RTTY and computers. As a member of the local Cable Television Advisory Council, he has been very active overseeing an instructional videotape series. According to KE1H, "Peter was part of the production of a videotaped tutorial when he was studying to be a Novice. As he got his license, he began involving junior high students in Amateur Radio and developing a pattern of helping others and broadening their knowledge in the true 'Elmer' spirit."

The runner-up for the 1983 Instructor of the Year Award is Robert S. Czachorski, K8XL, of Grandville, Michigan. Bob has taught Amateur Radio for the past 10 years and has experience in teaching all five Amateur Radio grades. He conducts on-the-air code practice for radio amateurs wanting to upgrade, and he's very active in teaching Amateur Radio at the Godwin Heights High School, where he is Science Department Chairman.

Honorable mentions go to Gordon West, WB6NOA, and to Rod Koeb, N3CDI. Congratulations to all for promoting Amateur Radio through excellent instruction.

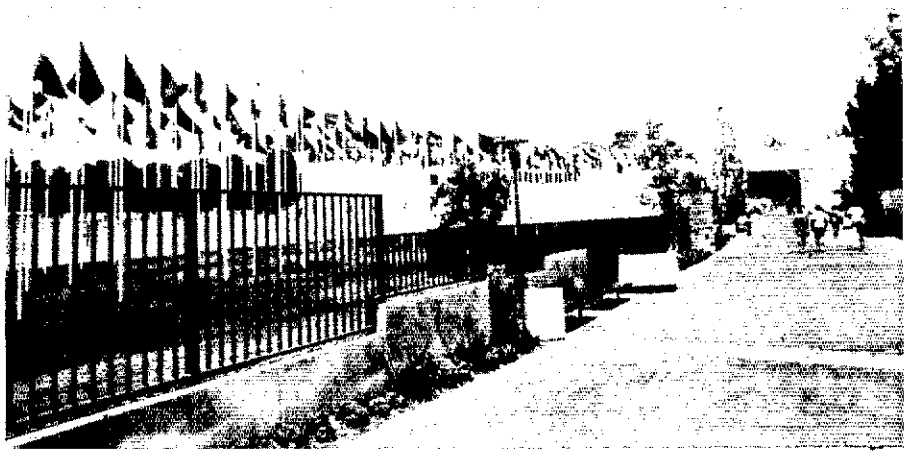
Nominations are open for the 1984 Instructor of the Year Award. Help us recognize outstanding Amateur Radio instructors by writing to ARRL Headquarters with your letter of recommendation and support.

*Assistant Training Manager, ARRL

Amateurs Support Los Angeles Olympics

The Los Angeles Olympic Games are making extensive use of the latest technology, supplied by several big-name contractors. Does that mean there is no longer a place for Amateur Radio at the Games? Not at all! Amateur Radio had a significant involvement in the 1984 Summer Games. The most visible example is station NG84O, located on Main Street at the UCLA Olympic Village. The station provided a message service to Olympic participants as well as commemorative contacts with amateurs all over the world. The station operated at least 12 hours per day from July 14 to August 15, primarily on 20, 15 and 10-meter CW and SSB. The station was able to handle messages for participants from 38 countries that permit their amateurs to handle third-party traffic with the United States.

In addition, amateurs supported the yachting events and also health services (through the American Red Cross) at some of the "out of stadium" events, such as the men's and women's marathons and the equestrian endurance event. Amateurs provided public-safety communications support for the Los Angeles Police Department and, through RACES, to the LA County Sheriff's Department. With the extensive involvement of Amateur Radio in the Torch Relay Run and additional special-event operations at the soccer venue in Palo Alto, Amateur Radio played a significant role in the Games of the XXIII Olympiad. A future *QST* article will fill you in on the details. — *Jay Holladay, W6EJJ*



Flags of all nations represented at the XXIII Olympiad line a walkway at the Games in Los Angeles. Amateur Radio Station NG84O served participants as a message center, while providing hams around the world with commemorative contacts. *(photo courtesy K6LAE)*

Strays

GOOD PUBLICITY FOR WORLD'S FAIR STATION

☐ A mob of TV and newspaper reporters, along with many wide-eyed visitors, were on hand to welcome a special guest to the Louisiana Amateur Radio Exhibition (LARE) in July. (For more on Louisiana World Exhibition station K5WF, see August *QST*, page 52.) Mrs. Gioia Marconi Braga, daughter of radio pioneer Guglielmo Marconi, stopped by the ham station, K5WF, to see and chat with the organizers of the joint Amateur Radio/Marconi Exhibits.

One of the volunteer radio operators, Harry A. "Jock" Maclaren, W5FGO, in particular enjoyed talking with Mrs. Braga about the early days of her father's company. Jock got his first job working for the London Marconi Company at the age of 18. Later that day LARE President John Uhl, KV5E, hosted a cocktail party in Mrs. Braga's honor. — *W. Dale Clift, WA3NLO*

Part of the TV, radio and newspaper personnel who covered Mrs. Braga's July visit to K5WF, the Amateur Radio station at the Louisiana World Exposition in New Orleans.

Old-time "Marconi man" W5FGO welcomes Mrs. Gioia Marconi Braga to the exhibit of her father's achievements.

I would like to get in touch with...

☐ anyone who has successfully converted to solid state Ted Crosby's (W6TC) HBR-13 receiver, the subject of *QST* articles in the late '60s. Ted Van Loan, 7810 Seville Cir., Bradenton, FL 33529.

☐ anyone interested in helping me compile a handbook of problems and cures for the Atlas 350-XL. George Brumley, KØWTM, 532 North Doris, Wichita, KS 67212.

***QST* congratulates...**

☐ Bob Jones, W5BJ, of Dallas, Texas, on receiving the 1984 Charles Gore Award from the Dallas ARC in recognition of his service to the community.

Space Shuttle 007 Get Away Special

By E. F. Stluka,* W4QAU

The Marshall Amateur Radio Club Experiment (MARCE) was planned and designed by the Marshall Space Flight Center Amateur Radio Club for supporting the Space Shuttle Get Away Special (GAS) #007 student science experimenters. A unique scheme to use Amateur Radio for the beacon data transmission was devised. There will be two transmission paths for you to monitor: direct from the Shuttle and from the Shuttle via AMSAT-OSCAR 10. These new ideas present a challenge to those who can monitor 435 and 145 MHz. Want to get involved in another pioneering Amateur Radio space project? Launch is scheduled for October 1, 1984 at 1100 UTC.

Project Explorer is the name of the Experimental Program for GAS #007, the seventh Get Away Special in NASA's small, self-contained payload program. (Details of the Student Involvement Program are given in August 1984 *QST*, page 73.)

Project Explorer is sponsored by the Alabama Space and Rocket Center, which paid the fee for GAS #007, and by the Alabama Section of the Institute of Aeronautics and Astronautics. The Project Explorer Integration Group, managed by Konrad Dannenberg and Alfred Orillion, asked MARC to provide an Amateur Radio Experiment when no proposal was received from a nationwide solicitation for student experiments.

The following objectives were considered in the design of MARCE:

- Demonstrate the feasibility of Amateur Radio data communication from the Space Shuttle cargo bay during a Shuttle mission, on a noninterference basis with the Orbiter and Orbiter payloads.
- Encourage broader participation among Amateur Radio enthusiasts in this space research venture, capitalizing on the pioneering spirit of Amateur Radio operators and shortwave listeners throughout the world; and
- Involve education groups from grade school and up, to emphasize space communication opportunities for similar ventures through volunteer research and creativity.

*2802 Brett Rd., Huntsville, AL 35810

Voice Message Formats

Format A

QST QST QST FROM WA4NZD TIME 00000
STATUS 10 DATA 012 014 014 014 015 012 225
135 255 FROM WA4NZD OUT

Format B (when experiment is ON)

QST QST QST FROM WA4NZD TIME 00003
STATUS 10 DATA 015 014 013 012 015 013 255
190 255
STATUS 98 TIME 0000 DATA 3F 4A 3B 3C 3D 42
AF A2 FROM WA4NZD OUT

Notes

Data, time and status will vary.
Measurement list, status dictionary and data curves are required to read messages.

The MARCE mission objectives are to provide (1) primary power networks, control and distribution, (2) an instrumentation system, (3) a data system and (4) an RF transmission system for direct downlink or for possible AMSAT-OSCAR 10 relay from the Orbiter Cargo Bay to radio amateurs and shortwave listeners around the world.

The GAS #007 5-cubic-foot, 200-pound experiment package consists of three student experiments and MARCE. Please refer to Amateur Satellite Program News in *QST* for March, June and July 1984 for additional information.

MARCE will provide information on the MET (mission elapsed time) and the operational status of the student experiments during flight by downlinking (Shuttle to earth) data to Amateur Radio stations around the world. The data will be transmitted by voice in English so Amateur Radio operators and shortwave listeners around the world can participate. The identification signal "WA4NZD," as used by the Marshall ARC will be included at the beginning and end of each transmission.

To listen to the direct 435.033-MHz downlink (Shuttle to earth), you will need an FM receiver with a 20-kHz RF bandwidth and a 0.1 microvolt sensitivity. To receive the 435.033-MHz MARCE beacon through the OSCAR-10 satellite, a 145.972-MHz 2-meter FM receiving station will be required. Ground antennas ideally should have circular polarization with at least 10-dB gain.

Three transmission cycles of eight hours each are planned. A transmission cycle will consist of a 30-second transmission every four minutes. When experiment #1 is active, transmissions will last about 45 seconds. The first eight hour cycle will be activated at GAS #007 "turn-on." The second and third cycles will be started during the two operating periods of experiments #1 and #3.

When To Listen

The first of the three eight-hour transmission periods will be activated at 1 day 10 hours 0 minutes MET, the second at 2 days 9 hours 30 minutes and the third at 3 days 9 hours 45 minutes. The experiment will be turned off at 7 days 0 hours 0 minutes MET.

Latest orbital information will be available from several sources. The Johnson Space Flight Center ARC station will transmit on 3.940, 7.265, 14.280, 21.365 and 28.600 MHz. AMSAT nets and W1AW will carry bulletins on regularly scheduled frequencies and times. One of the best information sources will be AMSAT-OSCAR 10 on Special Service Channel H2 (145.963 MHz).

Amateur Radio stations and SWLs will record the measurement data and relay the information via high-frequency Amateur Radio channels or by mail to MARC, CM21X, Marshall Space Flight Center, Huntsville, AL 35812, and other NASA centers that might want to participate. It may also be possible to use an existing OSCAR satellite, OSCAR-10.

All data is expressed in decimal digits from 000 to 255. Conversion to English units requires use of factors. Voltage and current are linear measures. Temperature and pressure measurements are nonlinear, thereby requiring calibration curves. Voice message formats are shown in the sidebar.

If you would you like to decode the telemetered data, send an s.a.s.e. marked "GAS 007" to C&TD, ARRL Hq., 225 Main St., Newington, CT 06111. We'll send you the data curves you'll need to understand the messages.

Tune up your 145- and 435-MHz receiving equipment and check the AMSAT nets and W1AW bulletins for the latest news. We are about to experience new excitement in Space Shuttle communications. Will you be among the first to hear the first signals directly from the Shuttle or relayed from OSCAR 10? QST

Happenings

- *HF Phone Bands Expanded*
- *ARRL Now a 13-Region VEC*
- *Cable TV Details*

HF Phone Bands Expanded!

On July 20, the FCC released a Second Report and Order expanding the HF phone bands (P.R. Docket No. 82-83). The FCC also granted the Petition for Rule Making filed by Randall F. Soball, KH6XX, allowing phone operation on 7075 kHz-7100 kHz in Hawaii (RM-4228). In effect, the FCC has adopted ARRL's proposed band plan as filed during the comment period (see *QST*, October 1982, p. 51).

Last year, the commission had released a First Report and Order that authorized expanded phone operation on 20 meters. (See *QST*, June 1983, p. 59.)

Effective 0001 UTC, September 1, U.S. Amateur Radio operators may operate phone (A3 and F3 emissions, as well as slow-scan television and FAX [A4, A5, F4 and F5 emissions]) on the following frequencies:

- *3750 to 3775 kHz — Amateur Extra*
- *3775 to 3850 kHz — Advanced and Extra*
- *3850 to 4000 kHz — General, Advanced and Extra*
- *21,200 to 21,225 kHz — Amateur Extra*
- *21,225 to 21,300 kHz — Advanced and Extra*
- *21,300 to 21,450 kHz — General, Advanced and Extra*
- *28,300 to 29,700 kHz — General, Advanced and Extra*

Consistent with past practice, RTTY (F1 emission) will not be permitted in the newly expanded phone segments.

With regard to the 40-meter band, FCC agrees with ARRL that phone-band expansion would be detrimental to CW operations; however, the Commission will allow phone operation on 7075-7100 kHz in Hawaii and other areas near ITU Region 3, including Alaska. The Commission agreed with most commenters that because of Hawaii's proximity to ITU Region 3, where phone operation is permitted, hams in this area would get relief from interference from Regions 1 and 3. Daniel K. Robbins, KL7Y, and Herbert C. Holeman, WL7BIL, noted that expanded 40-meter phone operation should include Alaska, because of its proximity to Asia.

In summary, the FCC adopted the expansion plan as submitted in the ARRL's comments, with the addition of expanded phone operation at 7075-7100 kHz in certain geographic areas near Region 3. Remember that these new phone privileges are not available until 0001 UTC, September 1, 1984. — *Wayne T. Yoshida, KH6WZ*

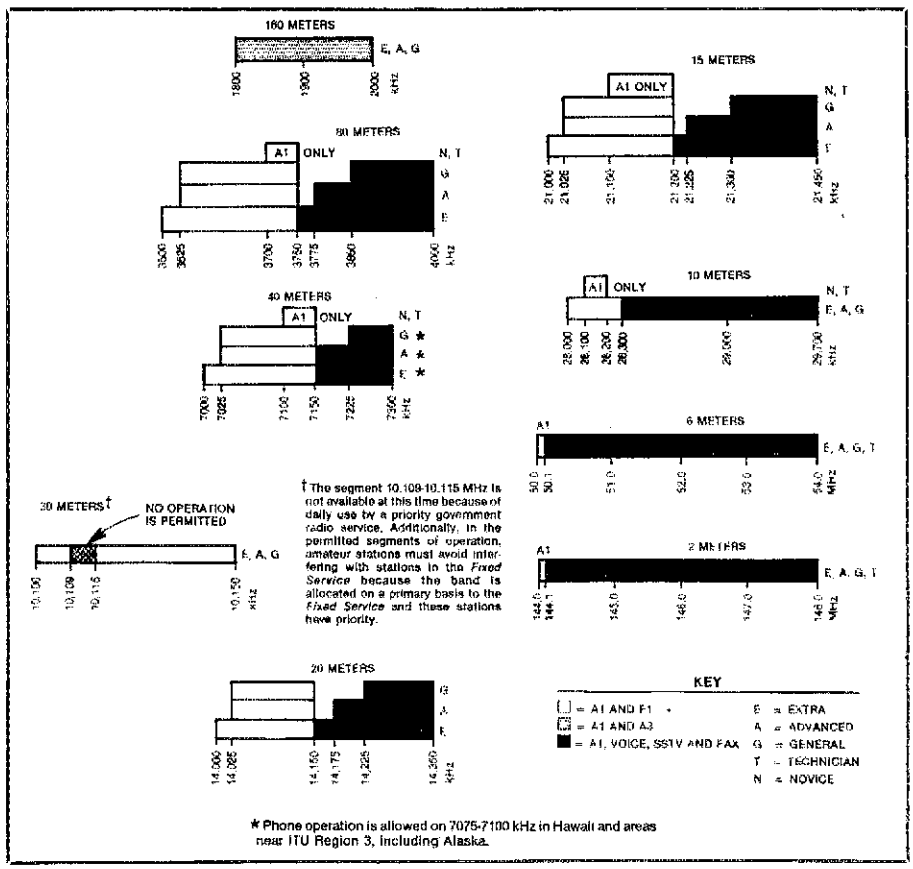


Fig. 1 — This chart includes the new HF phone-band privileges that become effective at 0001 UTC September 1, 1984. Until then, U.S. amateurs must follow the mode allocations depicted in the chart on page 51, January 1984 *QST*.

ARRL NOW 13-REGION VEC

The American Radio Relay League is now a Volunteer Examiner Coordinator. On July 21, culminating more than two years of intensive planning and preparation, ARRL President Larry Price, W4RA, put his signature on the VEC Memorandum of Agreement at the ARRL National Convention in New York City. It had already been signed by FCC Managing Director Ed Minkle. The completed document was then returned to Private Radio Bureau Chief Bob Foosaner, while several hundred amateurs looked on. The agreement authorizes the ARRL to accredit Volunteer Examiners and coordinate giving upgrade exams in each of the 13 FCC-defined regions.

On July 12, the Commission ruled on Docket 84-265, permitting recoupment of expenses by VECs. In anticipation of this, ARRL had filed its petition to become a VEC on June 27. The ARRL will now proceed on its announced course of action, coordinating Technician, General, Advanced and Extra Class exams at hamfests and conventions in September and October. Beginning in November of this year, ARRL will coordinate exams at any location. Sponsors must register with the ARRL VEC Office, 225 Main St., Newington, CT 06111, at least 75 days in advance.

The thousands of Advanced and Extra Class licensees who have applied to serve as Volunteer Examiners with the ARRL are completing and returning their application materials to Hq. They will be accredited and sent credentials in time for the first ARRL-coordinated exam sessions in September.

To determine when exams will next be given in your local area, check hamfest and convention brochures for September and October. Your FCC field office has exam-schedule information for all VECs. An article on taking exams under the Volunteer Examiner Program appears elsewhere in this issue.

SOME GOOD COMES FROM CABLE TV DECISION

As reported last month in this column, the FCC has denied the League's request (RM-4040) to prohibit cable television from operating on frequencies assigned to the Amateur Service. The ARRL contended that problems would inevitably

occur between amateur operations and cable operations because of the close geographical proximity of the two services (both being primarily in residential neighborhoods), the inherent sensitivity of state-of-the-art amateur equipment, the reluctance of some cable companies to properly maintain their cables, and the lack of explicit FCC rules to require cable companies to remedy interference suffered by their subscribers when they receive interference from Amateur Radio operations (the ingress problem). The amateur is not to blame in cases of ingress of his or her signal into the cable system, but more often than not the cable subscriber will place the blame on the amateur and the cable company will encourage this view.

The FCC found that "while CATV operators are responsible for harmful interference, the relief sought in ARRL's petition is excessive." The FCC concluded that there was no justification in the record to warrant a blanket preemption of CATV operations on all amateur frequencies. The Commission noted, however, that "it is clearly the responsibility of the CATV system operator to solve such interference problems pursuant Rule Sections 76.613(b) and 76.605. A continuous and vigilant maintenance program is required in order to minimize CATV interference." Moreover, the FCC continued, "The Commission strongly urges CATV system operators to implement sufficient measures to minimize signal leakage as specified in Section 76.605 and to resolve all interference problems in accordance with Section 76.613. In the absence of a diligent effort on the part of CATV operators, the Commission will have no choice but to enforce the rules and levy fines for violations.

The League has learned that the FCC intends to significantly increase its resources devoted to CATV rules enforcement. This, plus the strong warnings contained in the *Memorandum Opinion and Order* denying ARRL's petition, should send a clear message to the cable industry that it must eliminate harmful interference to Amateur Radio operations or face strict enforcement of FCC's rules.

NO SHARING OF 2310-2390 MHz, SAYS FCC

Earlier this year, in the *Second Report and Order* of the WARC-79 implementation proceeding (General Docket 80-739), the FCC removed amateur access as a secondary service to the 2310-2390 MHz segment of the 2300-2450 MHz band. This action was taken, according to the FCC, to protect new aeronautical flight test telemetry operations from interference. On February 21, 1984 the League filed a *Petition for Partial Reconsideration*, stating that FCC's action was premature as no technical analysis had ever been provided to establish the presumed interference between primary aeronautical telemetry and Amateur Radio use of the band. In addition, the Petition stated, since aeronautical telemetering operations would take place on a limited and specifically defined geographic basis, the possibility of sharing on a geographical basis seemed feasible and should be fully explored. Later, the Southern California Repeater and Remote Base Association (SCRRBA) also filed for reconsideration on similar grounds. (See April 1984 *QST*, p. 62, May 1984 *QST*, p. 66, and July 1984 *QST*, p. 57, for background.)

On June 28, 1984, the FCC denied both reconsideration petitions on the grounds that aeronautical telemetry and telecommand operation involve the safety of life and property, and that the secondary amateur allocation was deleted from this band to protect this safety service from harmful interference that could result in loss of life. The Commission stated its belief that there is very little possibility for geographical sharing, as these frequencies will be used for aeronautical telemetry at various locations throughout the U.S., including military bases in California and on the East Coast, and because amateurs are not required to notify the Commission when they move their operations on a temporary basis. While the risk of such interference would be small, the FCC feels it cannot be ignored, and that sharing this band with the amateur service is not a good idea.

The Anchorage Amateur Radio Club was the first Volunteer Examiner Coordinator (VEC) to conduct amateur examinations. Some of those participating at the first session on April 17, 1984 were (standing, l-r) NL7A, KL7IOL, KL7CQ; (seated, l-r) KL7KL and KL7HFQ. KL7IOL holds the distinction of being the first person to pass an exam under the VEC program.

The winner! Jon J. Willis, WD0AIT, of Littleton, Colorado, winner of the 1983 Hiram Percy Maxim Award, enjoys himself during a recent QSO at W1AW. *(KH6WZ photo)*

FCC OKAYS VOLUNTEER EXAM REIMBURSEMENT

On December 8, 1983, President Reagan signed Public Law 98-214, which authorized funding of the FCC for the next two years. An amendment to the bill was Senator Goldwater's proposal to amend the Communications Act to allow recovery of costs in the Volunteer Examiner Program. On December 7, 1983, the ARRL filed with the FCC a *Request for Agency Action* requesting that the FCC implement the soon-to-be signed legislation as soon as possible by *Order*. The FCC instead released a *Notice of Proposed Rule Making* (PR Docket 84-265) on March 9, 1984, stating that since large numbers of people would be affected, it was necessary to seek further public comment. The League filed comments in support of FCC's proposal on April 16 (see May 1984 *QST*, p. 63, and June 1984 *QST*, p. 58, for details).

On July 12, the Commission voted to amend the Amateur rules to provide for reimbursement of out-of-pocket expenses incurred by Volunteer Examiners (VEs) or Volunteer Examiner Coordinators (VECs) in the preparation, processing or administration of Amateur examinations above the Novice class. The new rules provide that

1) the maximum allowable cost to be reimbursed per examinee is $4, which will be adjusted each January for changes in the Consumer Price Index;

2) this maximum cannot be exceeded for any one examination at a particular session, regardless of the number of examination elements an examinee takes;

3) the VEs or VECs must keep records of the out-of-pocket expenses and reimbursements, and certify annually to the FCC that these expenses were necessarily and prudently incurred; and

4) the VEs and VECs must make arrangements between themselves for collection and distribution of the reimbursements.

Any expenses that relate to administration of amateur examinations qualify for reimbursement; the Commission declined to be any more specific. Recovery of overhead and amortization of capital expenses are allowed if they follow accepted accounting practices. The FCC will permit VECs to estimate their annual costs in advance and recover the pro rata share from examinees on that basis. At year end, the VEC must tally everything up; if recovered expenses exceed actual expenses incurred, the next year's fees must be lowered sufficiently to return the overcharges to the amateur community. The new rules become effective August 31, 1984.

UNLICENSED AMATEUR RADIO OPERATOR FACES INJUNCTION

On April 13, 1983, the FCC fined Gary W. Kerr, of Los Gatos, California, $2000 following the denial of renewal of his amateur license (WA6JIY) because of his disruptive and deliberate interference to 2-meter repeater operations in the San Francisco area. The Commission's San Francisco office has tried numerous times to collect the fine, but with no success. (See October 1982 *QST*, p. 52, and November 1983 *QST*, p. 70, for background.) As a result, Joseph P. Russoniello, U.S. Attorney for the Northern District of California, has submitted a complaint for recovery of the $2000 penalty and for preliminary and injunctive relief to stop further unlicensed Amateur Radio operations by Kerr.

In its release announcing the U.S. Attorney's action, the FCC made particular note that this action is not "a typical response in a service which has for years prided itself as 'self-regulatory.' However, present problems with 2-meter repeater operators have given the Commission serious concerns for the future of amateur radio requiring firm enforcement action to halt the degenerative trend."

FCC PROPOSES RELAXATION OF SW BROADCAST RULES IN REGION 3

The 7100-7300 kHz band is allocated to the Amateur Radio Service in Region 2 (the Americas), and to the Broadcasting Service throughout the rest of the world. Under this international allocation, stations under the jurisdiction of the FCC could theoretically operate in

Be a Contributor to the Goldwater Scholarship Fund

Here's your opportunity to thank Barry, K7UGA, for his long-term staunch support of the Amateur Radio Service and to let him know of your appreciation. Send in your contribution *now*.

If your contribution is $25 or more, we will list your name and call in *QST*. If your contribution is $100 or more, in addition to your name and call appearing in *QST*, you will receive a signed photograph of the Senator, suitable for display in your hamshack. And for contributions of $1000 or more, in addition to the above, we'll put your photo in *QST* and you'll receive a personal thank you call from Robert York Chapman, W1QV, President of the ARRL Foundation, which is administering the Goldwater Scholarship Fund.

We welcome *all* contributions, regardless of size. Please help us achieve our goal of building an endowment sufficient to fund the Goldwater Scholarship in perpetuity. What better way to honor a great amateur, a great statesman and a great human being? Please make your check payable to the ARRL Foundation Goldwater Scholarship Fund, and send to ARRL Foundation, 225 Main St., Newington, CT 06111.

Recent contributors of $25 or more include: Julian R. Benjamin, W4RZN; John S. Davis, WB4KOH; Robert S. Erickson, WØQNH; Golden W. Fuller, W8EWS; Charles F. Grey, ND7K; William L. Haas, W2GMY; Ralph W. Held, K6QS; Fred A. Helwig, W6IHU; Paul R. Hunter, WØPLN; James L. Kerr, K8KJ; Dwaine P. Modock, WA8MEM/AAR5WC; Conrad R. Price, N4DSY; Raleigh Amateur Radio Society, W4DW; Maurice L. Schietecatte, N8CEO; Virginia S. Schietecatte, N8EOA; Karl Schworer, N2EOQ; David R. Siddall, K3ZJ; Herbert C. Smith, W4PHD; Ben Turpen, W8CQM; Bernie Wahl, KY2Z; Perry F. Williams, W1UED; Woodrow W. Williams, W8WEG.

Joseph Mullan, W3RLR (left), and Hazard Reeves, K2GL, major contributors to the ARRL Scholarship Honoring Senator Barry Goldwater.

this band outside of Region 2, but the FCC rules have never been amended to reflect this. Now, at the request of Trans World Radio Pacific, licensee of an international broadcast station on Guam, the Commission has proposed to authorize the 7100-7300 kHz band for use by international broadcast stations under its jurisdiction in Region 3 (Southern Asia and the Pacific).

Under international rules, the Amateur Service in Region 2 must tolerate interference from international broadcast stations operating in Regions 1 or 3. The FCC said, however, that a footnote would be added to the proposed rule change to prohibit FCC-licensed stations from beaming their transmissions to Region 2.

Comments on the proposal, MM Docket 84-706, are due on or before September 24, 1984, with replies due on or before October 24, 1984.

FCC GRANTS PARTIAL RECONSIDERATION IN VOLUNTEER EXAMINING DOCKET

In response to *Petitions for Reconsideration* filed by the Capitol Hill Amateur Radio Society (CHARS) and David B. Popkin, W2CC, the FCC has granted partial reconsideration of its October 6, 1983 action authorizing the use of volunteers in the Amateur Radio examination process. CHARS had sought relaxation of the requirement that the FCC design the examinations, requesting that this responsibility be delegated to Volunteer Examiners (VEs).

Popkin had asked for clarification and reconsideration of the rules assigning each Volunteer Examiner Coordinator (VEC) a unique identifier for each testing session. He had also asked that telegraphy examinations require "one continuous minute" of solid copy for successful completion.

The Commission granted CHARS's request by eliminating the requirement that the FCC design written examinations for the General/Technician, Advanced and Amateur Extra Class licenses. Rather than immediately permitting Volunteer Examiners to design exams above the Novice class, there will be a two-year transition period during which only VECs would design the examinations.

Turning to Popkin's first request, the FCC noted that the purpose of the unique identifier suffixes is to ensure that amateurs are not inadvertently subjected to FCC enforcement action when operating legally under temporary authority pending receipt of a newly upgraded license. The Commission simplified its rules in this regard, however, by designating four different temporary identifier suffixes, depending on the license class to which an amateur has upgraded: KT for Technician class, AG for General class, AA for Advanced class and AE for Amateur Extra Class.

The FCC denied Popkin's request to institute a "one continuous minute" requirement in order to pass a telegraphy examination, stating that there are several alternatives for determining an applicant's ability to send and receive Morse Code, including message content examinations.

FCC SEEKS CODIFICATION OF REBROADCAST RULES

Last October, during the invasion of Grenada when KA2ORK was for a period of time the only nonmilitary source of information from the island, Amateur Radio received significant attention from the broadcast media. To provide guidance during the period of the invasion, the FCC issued a Public Notice stating that broadcast stations did not need to obtain permission from the FCC before retransmitting ham conversations.

FCC emphasized, however, that news gathering was restricted to reporting what was being said on the air, and that a reporter could not conduct an interview over the air, or ask any questions through the operator of an amateur station. This rule and interpretation were not permanently codified into the Commission's rules.

On July 12 the FCC adopted a *Notice of Proposed Rule Making* (BC Docket 79-47) proposing to amend Parts 73 and 97 of its rules concerning commercial radio and television rebroadcasts of messages transmitted by nonbroadcast radio stations. Since the signing of Public Law 97-259 in 1982, amateur and CB transmissions have been exempt from the secrecy provisions of the Communications Act. In view of this, the Commission now believes it is no longer necessary to require broadcasters to obtain permission from the originating stations in situations involving rebroadcasts of amateur and CB transmissions. Therefore, it is proposing to exempt these rebroadcasts from the prior authorization requirements of Section 73.1207(c)(1) of its rules.

The FCC also proposes to eliminate the requirement that broadcast stations obtain FCC approval to rebroadcast transmissions of private nonbroadcast radio stations, as well as the requirement for written notification that approval was obtained before rebroadcast of transmissions made by government-owned radio stations. For amateur and CB transmissions, no FCC approval would be required; for other transmissions, prior written permission to rebroadcast must be obtained from the originating station and made available to the FCC on request.

Finally, the Commission proposes to rewrite Section 97.113 of the Amateur rules to specifically prohibit the use of amateur stations for broadcast news gathering and production purposes. Comments are due October 24, with replies due November 23.

SECTION MANAGER APPOINTMENT

In the Nebraska Section, Vern J. Wirka, WBØGQM, has been appointed to complete the term (until December 31, 1984) of Reynolds Davis, KØGND (resigned).

Correspondence

Conducted By Peter R. O'Dell,* KB1N

All letters will be considered carefully. We reserve the right to shorten letters selected in order to have more members' views represented. The publishers of *QST* assume no responsibility for statements made herein by correspondents.

WITTY REPLY TO SAVAGE RESPONSE

☐ I guess I had better reply to Mr. Savage's remarks on CW (July). His outlook on CW seems uninformed. BK means Over Quickly without the use of call signs. It is a QSK type of operation and is very popular with CW ops nowadays. Although a bit overused by contesters, it helps with the flow of the conversation. A simple K would invite everyone else to join in.

I suggest that Mr. Savage and the rest of the SSB types come down and see where Amateur Radio really lives. That's right! No phony contacts, no lists/nets, a lot less QRM and no need for a mega-watt amp. Nice, easy and friendly. Try it some time. I guess you might call this a Witte Reply to a Savage Response?

P.S.: What the heck does "Good Buddy" mean? — *Russell M. Witte, KW6H, Ventura, California*

☐ Here's my vote for using BK on CW. On Field Day, I used the format that the sending station used: BK, K, or no ending at all. On a clear frequency K seemed to be best, but when two or more stations were on the same frequency and sending at the same rate, it becomes hard to tell who you are talking to (maybe the guys working three per minute didn't care and just logged whatever they heard).

When I sent BK at the end of my transmission and heard a BK reply, there was a feeling of friendship as well as a certainty that we were communicating. To me, it's worth an extra four seconds or less at 30 WPM for this synchronism.

How do you reply to the sending station when he just sends a K? Do you send his call again or just send the exchange and hope you are the one he is listening to? Or maybe send QSL before sending the exchange.

As to no ending at all, that four seconds is lost anyway waiting to see if the other guy stopped sending. Then you lose sync and may end up repeating or doubling.

Frankly, I prefer the friendly feeling of BK. Maybe after I become animal about contesting, I also will become Savage, or just forget the fun of CW and let them talk to my computer! — *Randy Lilly, N3ET, Allentown, Pennsylvania*

EXPENSIVE CHANGE

☐ The Amateur Radio community (at least here in Texas) is about to undergo an expensive change in the 2-meter band if somebody gets their way. It seems that a proposal has been made to change to a 20 kHz band plan. Currently, we are using a 15 kHz "inverted-split" band plan and not a 30-kHz band plan (as many people may think). Additionally, nowhere has a technical reason or justification been given for the change. The first notice of a band-plan change I saw in *QST* this year was the July issue (page 19). Something like this should have received a little more advance notice (warning in this case) than it did.

Before we make any big (and expensive) changes then, I'd like to detail a few items which justify keeping the 15-kHz inverted-split band plan:

1) Using a 15-kHz band plan results in a 1/3 (32.8%) increase in available 2-meter repeater frequencies in the 146-148 MHz range (from 40 to 53) over a 20-kHz plan.

2) A 15-kHz inverted-split band plan provides 30 minimum between any two repeater outputs instead of only 20 kHz or 15 kHz.

3) A 15-kHz inverted-split band plan makes more efficient use of a scarce resource in a very popular band than a 20-kHz band plan. This is accomplished by placing the inverted-split repeater inputs between the "straight-up" repeater outputs. Sufficient isolation is afforded to users of the straight-up by two factors. Number one, the split repeater primary coverage area will be some distance away, causing any mobiles using it to be within the primary coverage area. Number two, the selectivity that most receivers exhibit at ±15 kHz (ranging from 60 dB for an IC-2A to 100 dB for a Motorola Motrac®).

4) The FCC regulations (90.173[f]) governing land mobile two-way radio allows a 15-kHz frequency separation between base stations with as little as 10 miles distance between them. If we go with a 15-kHz inverted-split plan, we can go one better than that and place only the weaker mobiles (inverted-split repeater inputs) between our repeater outputs (as described in 3 above). FCC regulations also require a report of field strength or the consent of the adjacent channel (±15-kHz) licensee for distances of between 16 and 35 miles. Again, this is for base stations (repeaters); the figures would be much smaller for mobiles.

5) Current radios will work in this scenario, as field observations in the Northern Texas area confirm.

6) Saves some of us the expense of recrystaling our rock-bound HTs. It will also save others the expense of having duplexers retuned. I am also informed that some synthesized radios were not designed to work in 20-kHz steps.

I believe that if anything is to be proposed as a prelude to change, it is a change of the 145 MHz range and its repeater spacing to 15 kHz. — *James V. Poll, WB5WPA, Allen, Texas*

TERRIFIC

☐ Just want to express my thanks for the excellent job you are doing. Your W1AW code transmissions — superb. Your magazine, *QST*, is the best in my opinion. Every edition reflects that constant desire to do better, make it easier and more clear. Terrific! — *Bill Holmquist, KA9KFN, Chicago, Illinois*

☐ I am enclosing my Volunteer Examiner's Application Form, Part 2, and the open book review question and answer sheet.

I would like to compliment ARRL and the Volunteer Examiner Program staff on the outstanding job in developing, producing and distributing the Reference Manual and accompanying information. This is one of the best introductory and informational manuals I've ever seen, and I've reviewed many, both civilian and military. Congratulations on the job, and success with the future development of the program. — *Robert N. Dobbing, WD2AHT, Capt., U.S. Navy (Ret.), Eatontown, New Jersey*

NO-BUDGET HAMMING

☐ Hail to Michael Moon, KA7QZK (July *QST*, p. 54). "No-Budget Hamming" is an alive, but largely forgotten, alternative. This op has spent 22 happy and satisfying years on a homebrew 6146 driven by a tri-tet 5763 crystal oscillator (this after 11 years on a homebrew 807). I now have a number of nice acquaintances, a handful of very close friends and 93 confirmed countries, each with its own unique story attached. I applaud state of the art; it has done wonders. I may even get there someday. But "instant arrival" is not the only way to be a ham. Somewhere in our hobby we need to continue to nourish the breed that builds 6AL5 oscillators and makes antennas out of magnet wire from the broken-down clothes dryer. — *James O. Chatham, W4TNF, Louisville, Kentucky*

Mini Directory

As a convenience to our readers, here is a list of items of particular interest and when they most recently appeared in *QST*.

Advisory Committee Members	March 1984, p. 60
Board Standing Committees (Minute 65)	May 1984, p. 60
Call Sign Assignment System	June 1983, p. 61
Contest Guidelines	July 1984, p. 88
License Renewal Information	Jan. 1984, p. 51
Major ARRL Operating Events and Conventions — 1984	Jan. 1984, p. 52
MARS Information	April 1984, p. 86
Pending Dockets	Feb. 1984, p. 65
QSL Bureaus Incoming	June 1984, p. 62
Outgoing	This issue, p. 53
QST Abbreviations List	Jan. 1984, p. 53
Reciprocal-Operating Countries	Nov. 1983, p. 71
Third-Party-Traffic Countries	Aug. 1984, p. 77
U.S. Amateur Frequency and Mode Allocations	This issue, p. 47

*Public Information Coordinator, ARRL

How's DX?

Conducted By Ellen White,* W1YL/4

Kermadec 1984

ZL1BQD's abbreviated report of this year's operation in the southwest-central Pacific Ocean, about 600 miles north-northwest of New Zealand and about 500 miles south of South Tonga, managed to capture the flavor, the very essence, of a DXpedition to one of the relatively "rare" ones.

"It is 11:30 A.M. Tuesday, March 13, and 10 of us are finally on board the *Shiner*, on the way to one of our life's great adventures. The years of hard work by ZL1AMO and the months of departmental negotiations by Dr. John Craig, scientific party expedition leader, have finally paid off.

"Enroute, a routine of three hours on watch and six hours off was quickly established, and would be continued for five days. To the 'rookies' who never sailed before, the fascination of the sea took hold. We were all amazed to see very small Welcome Swallows (along with other bird life) 200-300 miles away from land. We watched dolphins ride our bow wave and saw the spectacular sight of seas bursting into green light with phosphorescence during the small hours of the morning.

"When we were four days out, we saw the start of the Kermadecs: Forst Island, Esperance Rock, Curtis Island, Cheesman Island and Caley Island. We now felt we'd see our destination, Raoul Island, in just a few hours. At last, marine radio contact was made with ZL8AFH (Warrick, the island's radio technician/operator). We were told to lay off as close as we'd like to their unique landing platform. Everything had to be lifted onto the island, trusting to the steady hands of Warrick in the winch house!

"Raoul Island is still an active volcano with upwards of six quakes per day. Most of the island is covered with Nikau Palm, a type of undergrowth, with a canopy of beautiful Pohutakawa. Along the northern coastline is a self-sufficient farm which supports the permanent residents on the island. There are still a few goats and wild cats on Raoul, along with lots of rats. Bird life is quite prevalent, with the song of the Tui making the bush come alive. The fruit of the orange grove has to be tasted to be believed, and the bananas grow freely and sweetly, as well.

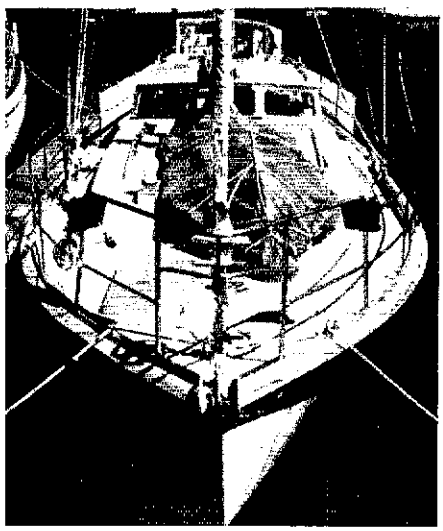
"The Amateur Radio party consisted of ZL1AMO (ZL1AMO/C, VR6HI, ZK2EA, ZK9RW, ZK1MB, A35EA, 5W1CW, H44RW, VK4ANS/LH, YJ8RW, 3D2RW, ZK1CQ, ZL8AMO), ZL1AAS (ZL1AAS/C, ZL8AAS), ZL1BQD (FKØRR, VK9NR, 3D2RJ, ZM1BQD, ZL8BQD, VR6RR) and W6REC (ZLØAJW, ZLØAJW/8, VK9LL, VK3DA, 3D2FR). We managed to erect a 160/80-meter dipole up about 80 feet, supported above the cliffs between two very high Norfolk Pine trees. A second dipole for 80/40 was similarly hoisted. Two tribanders rounded out the "antenna farm." All of us brought along our own personal radio equipment, which included an ICOM IC-740, ICOM Auto Tuners, and Kenwood TS-830 and TS-430. Propagation was very favorable, giving upwards of eight hours a day on 10 meters, where it was a distinct pleasure to work 28-MHz "DXotics" like 5T5, 5N1, 6V1, HKØ, 9L1, CN8, ZS3 and 7Q7. We tried to cater to special interests, like the QRP group, and particularly want to thank the stateside stations who stood by and enabled us to do just that. The best QRP was with N6HJ, with 100 mW!

"CW expert Ron, ZL1AMO, worked approximately 10,000; ZL1AAS totaled 5000 — mainly on phone; ZL1BQD, about 10,000 phone/CW; and W6REC (his first DXpedition) well over 5000 multimode. All in all, we topped 30,000 contacts to all parts of the globe. For a very nice change, *we* were called by BY1PK! 160-10 were covered, with most contacts with the states and Japan. (A special mention must go to DK9KE and his net on 21.157 MHz for getting so many Europeans through to us.)

"The first few days were idyllic. Then, three days into the operation, Cyclone Cyril made its way down from Tonga and struck Raoul Island in the small hours of the morning. Just after midnight, the anchor ropes holding our yacht, *The Shiner*, broke and the boat holed itself against the rocks in Boat Cove. The captain and two of his scientists had to abandon the boat and make the hazardous trip ashore. We were indeed fortunate that no lives were lost. The boat itself, though, was a total loss, together with quite a bit of personal gear. Our island hosts, together with the oceanographers from the scientific party, did a terrific job in salvaging what was possible. It was more than a bit of a damper to the expedition, but when it was known that no lives were lost, we could at least carry on with the radio work with easier minds. Of course, we now had to make alternative arrangements for our trip back home.

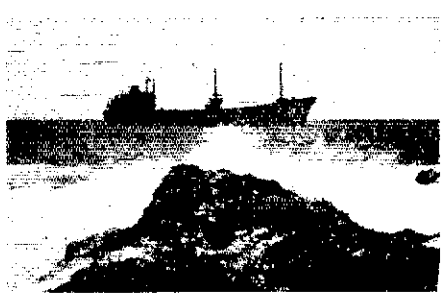
"After we explored several different alternatives, we finally had to accept the offer of a diversion pickup by the coastal freighter *M. V. Villi*, from Tonga. This was an added expense

A typical Kermadec landing.



The *Shiner* intact prior to departure to Kermadec.

Kermadec operators included W6REC, ZL1BQD, ZL1AAS and ZL1AMO.



The *M. V. Villi* provided transportation home.

*19620 SW 234 St., Homestead, FL 33031

we had not planned for, but there was no other alternative. Other than a little seasickness, we enjoyed a very nice and comfortable trip back home with a very friendly crew of Tongians on board. There was great excitement by all the party when we finally sighted New Zealand again. The lights of Auckland City and the prospect of meeting families again was an indescribable thrill.

"We hope we can do this again — from other Pacific DX locations. We especially want to thank all those who helped — particularly our hosts on Raoul Island, for their phone calls, meals and hospitality when times were so tense. Thus, we end the trip of a lifetime to rare and exotic Raoul Island in the Kermadecs."

THE CIRCUIT

☐ Mozambique: AB4Y recently arrived in Maputo and is confident of early approval of licensing. Chas plans to be *very* active and to do his best to "erase" this rare one from the "most wanted" list. His XYL, Kay, N4GPB, also intends to be active. Watch for them portable C9 and, hopefully, as C90A for Chas and C90YL for Kay. Additional local interest in licensing is brewing, and some talk is surfacing about a DXpedition to Europa and Juan De Nova. Chas will be in Maputo for at least two years, as support telecommunications officer for the embassy. He has been doing a lot of listening and reports U.S. signals are 5 and 9.

PREFIXES		QTH	
R A	1,3,4,6	Russian	European RSFSR
R M	1P	Soviet	Franz Josef Land
R V	2	Federal	Kaliningrad
R W	9,0	Socialist	Asiatic RSFSR
R Z	for club stations	Republic	
R B		Ukranian SSR (Ukraine)	
R C			
R X		Kyelorussian SSR (Kyelorussia)	
R D		Azerbaijan SSR (Azerbaijan)	
R F		Georgian SSR (Georgia)	
R G	1-0	Armenian SSR (Armenia)	
U H		Turkmen SSR (Turkmenistan)	
R I		Uzbek SSR (Uzbekistan)	
R J	Three-letter suffixes end-ing in WA-ZZ for clubs (e.g., UP4ZZZ and UP1BZA)	Tadzhik SSR (Tadzhikistan)	
R L		Kazakh SSR (Kazakhstan)	
R M		Kirgnia SSR (Kirgizia)	
R O		Moldavian SSR (Moldavia)	
R P		Lithuanian SSR (Lithuania)	
R Q		Latvian SSR (Latvia)	
R P		Estonian SSR (Estonia)	
4K1		Antarctica	

Thanks to ARRL International Programs Manager Nao Akiyama, JH1VRQ/N1CIX, for bringing order to those new Soviet call signs.

☐ The Matchtown Award: SM7AAZ reports that contacts during this calendar year are valid for the award (see February 1984 *QST*, page 63).

☐ Father/Son: The June issue of our journal noted that serious DXers W4JD/AB4H, father and son, *both* participate on the Honor Roll. Now, Arkansas-active N5DX notes similar doings in the 5th call area. John, N5DX, at 312/336 (ex-W5DRW), has been a ham for 52 years, while his son, K5GO (ex-WA5RTG), shows up as 311/328 (but, then, son Stan has just been licensed for 17 years!).

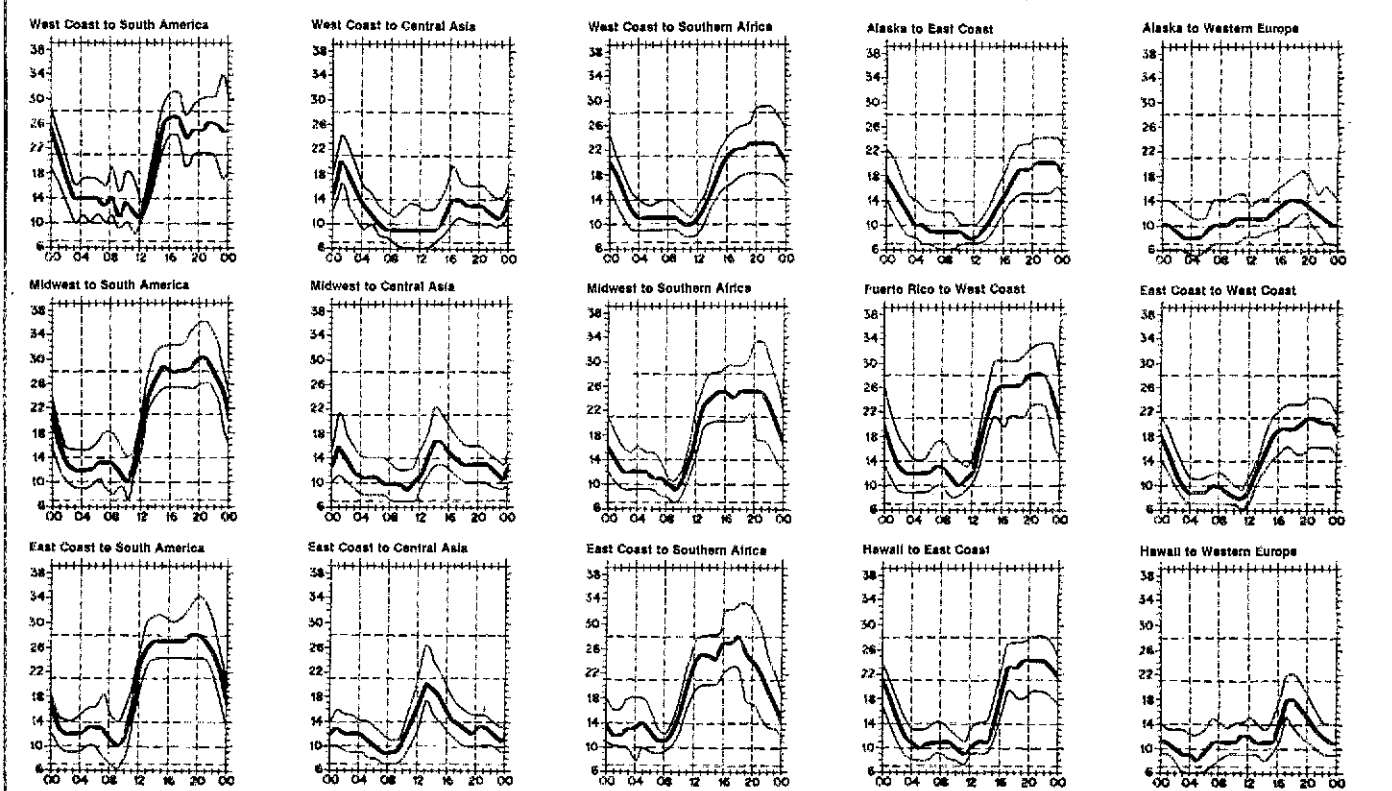
☐ Grand Caymans: K5RX notes good results following the May 21-27 foray to Grand Caymans, with 3312 two-ways from the north side of the island. Cards for ZF2HX via K5RX, and ZF2HF via KM5R.

☐ KP2A/D: AF2C is planning on closing out the logs for this three-year-old event in December. After December, Jay will only honor direct QSLs with an s.a.s.e. or proper postage. About 80% of the over-40,000 contacts have been confirmed. Are you a part of the remaining 20%?

☐ BY1QH: This new station, at Qin Hua University in Beijing, should be inaugurated at about the time you receive this issue.

☐ International DX Association: W4WMQ notes a new net function, a DX Assistance Hour to provide the same services for non-U.S. DXers as the original net. Your DX brethren might take note of the following: 0300Z Thursday and Sundays on 14,236 kHz, with KB7SO and KC3EK as net controllers.

☐ A true story: W6OB notes that over 20 years ago he worked ZS2MI as W6RLN, but never got the card. Retired now, he has been attempting to gather up all outstanding cards, but had not met with much success on Marion Island. A couple of months ago he worked ZS1OU and asked him about ZS2 activity, going on to relate the contact of 20 years ago. Much to W6OB's surprise he found out that ZS1OU managed cards for ZS2MI at that time, and in one short week ZS2MI became confirmed. The bottom line is *never give up!* QST



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

QSL Corner

Administered By Joan Hushin, KA1IFO

NEW THIRD-CALL-AREA BUREAU

Effective September 1, the Third Call Area QSL responsibilities will be assumed by the Cumberland County Amateur Radio Service, P.O. Box 448, New Kingstown, PA 17072-0448. This new bureau will accept only self-addressed, stamped, clasp envelopes, 5 × 7½ inches in size. It will *not* offer the mail credit system used previously. *Please note this very important change: In order to ensure that you receive your cards, appropriate envelopes should be filed as soon as possible.* The new bureau will *not* have access to previous records or arrangements made with the old bureau. Contact the Cumberland County Amateur Radio Service for more information. Please enclose an s.a.s.e. with your inquiry.

ARRL-MEMBERSHIP OVERSEAS QSL SERVICE

Send outgoing cards to this address: American Radio Relay League, 225 Main St., Newington, CT USA 06111.

This is an "outgoing" service that allows ARRL members to send DX QSL cards to foreign countries at a minimum of cost and effort. While QSLing direct to foreign amateurs is faster, it is also more tedious. Time spent searching for addresses in the foreign *Callbook*, addressing and stuffing envelopes, and mailing could be better spent operating DX. And, the cost of IRCs, airmail postage and envelopes can be prohibitive.

An unlimited number of QSLs may be sent for distribution 12 times per year. The fee is just $1 per pound or portion thereof (155 QSL cards average a pound).

The ARRL-Membership Overseas QSL Service operates *only* in an "outgoing" capacity. To receive QSLs from DX stations, see "The ARRL DX QSL Bureau System," in December 1982 *QST*, page 77, or send an s.a.s.e. to ARRL QSL Bureau, 225 Main St., Newington, CT 06111.

U.S. amateurs may send SWL reports to foreign shortwave listeners. Unlicensed (associate) members may send SWL cards to foreign amateurs. QSL managers: write for details.

Requirements

1) Presort your DX QSLs alphabetically by call sign prefix (A3, AP, C6, CE, F, FG, G, GI, GM, JA, 3A2, etc.).

2) Enclose the address label from the brown wrapper of your current copy of *QST*. This information shows that you are a current ARRL member. Family members may also use the service by enclosing their QSLs with those of the primary member. Include the appropriate fee with each individual's cards and indicate "family membership."

Sightless members who do not receive *QST* should indicate that the QSLs are from a "sightless member."

ARRL affiliated club stations may utilize the service when submitting club QSLs by indicating the club name. Club secretaries should check affiliation papers to ensure that membership is current.

3) Enclose payment in the form of a check, money order or cash. Sending large amounts of cash through the mail is not suggested. Please do not send stamps.

QSL Manager Volunteers

WD4GDZ
WD8RBW

Special Notes

☐ There is a new address for the VE6 CRRL Incoming QSL Bureau: N. F. Waltho, VE6VW, General Delivery, 9714-94th St., Morinville, AB T0G 1P0.

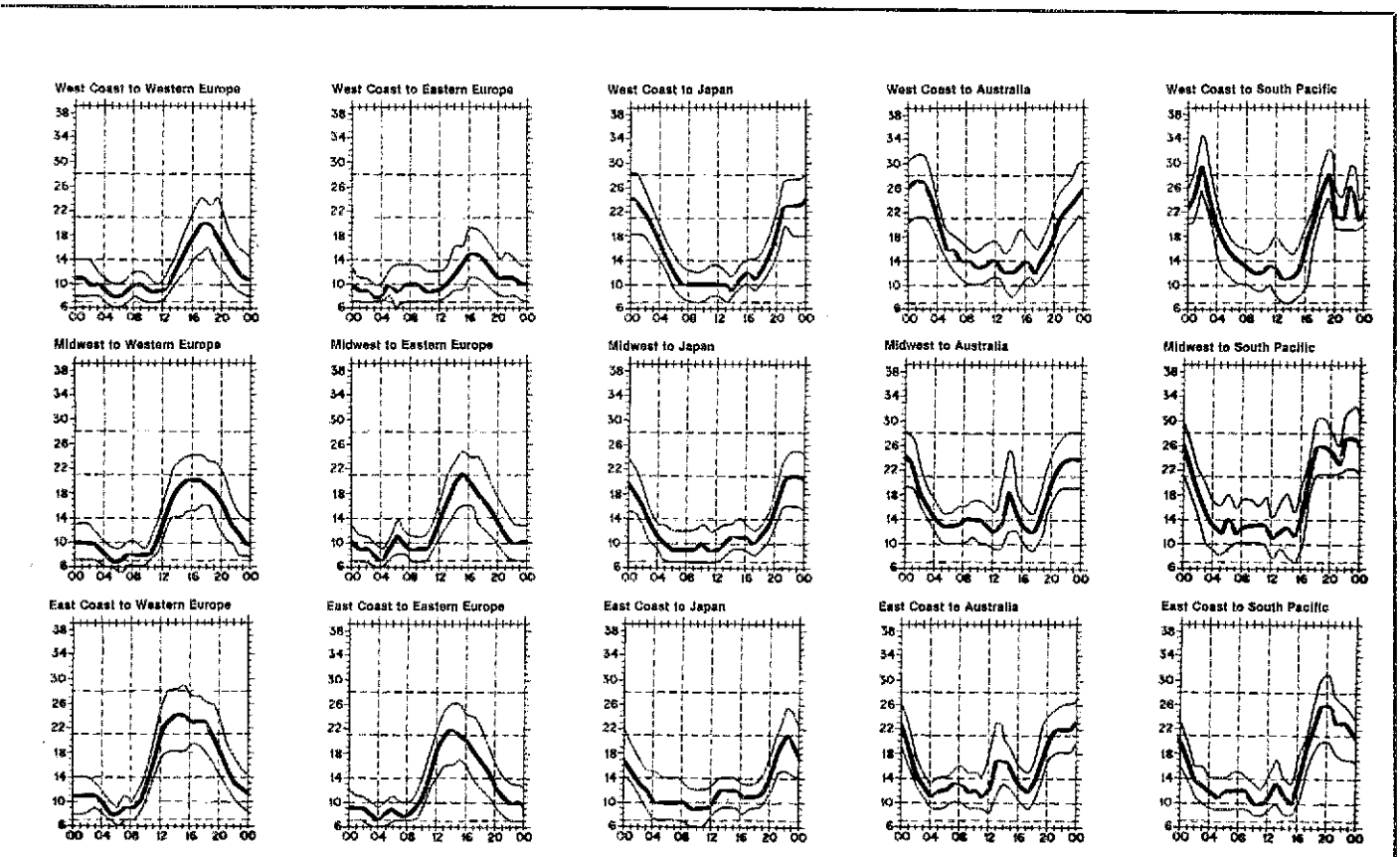
☐ During the CQ WW contest in the fall of 1984, KD5GY will be operating from Belize, V3GY, or possibly another call sign. All QSLs go to KD5GY.

☐ W1BK is not the manager for TA1BK.

☐ WA2MTR is not the manager for 16FLD.

☐ The third call area (W3) is under new management: CCARS, P.O. Box 448, New Kingston, PA 17072-1448.

☐ June 1984 QSL Corner, page 63, contains information on the operation of the Incoming Bureau. For information on bureau operations (Incoming and Outgoing), send a self-addressed, stamped envelope to ARRL QSL Bureau, 225 Main St., Newington, CT 06111.



the lowest curve (optimum traffic frequency, or fot). See April 1983 *QST*, page 63, January 1977 *QST*, page 58, September 1977 *QST*, page 35 and January 1979 *QST*, page 11 for a complete explanation. The horizontal axis shows Coordinated Universal Time (UTC); the vertical axis, frequency in MHz. Data are provided by the Institute for Telecommunication Sciences, Boulder, Colorado. These predictions, for September 15 to October 15, 1984 assume a sunspot number of 41, which corresponds to a 2800-MHz solar flux of 95.

DX Century Club Awards

Administered by Don Search, W3AZD

The ARRL DXCC is awarded to amateurs who submit written confirmations for contacts with 100 or more countries on the official ARRL DXCC list. You may also submit cards to endorse your award in 25-country increments through 250, 10-country increments through 300, and in 5-country increments above 300. The totals shown below are exact credits given to DXCC members from June 1 through June 30, 1984. An s.a.s.e. will bring you the rules and application forms for participation in the DXCC Program.

New Members

Mixed

G3HLF/101 HB9BWP/107 SM6MSG/119 K1ZLA/104 N2CYH/119 KD4NI/203 KT5Y/108 W6YFW/111 AD9G/103
DF5OC/102 I2AYN/102 TG0AA/101 KA1EJ/100 W2NZG/275 N4HHZ/107 N5CNX/103 WA6MEM/100 K9DZG/107
DJ2KR/106 IKØCAJ/118 UP2BAR/301 KB1HY/109 WB3KHR/102 N4HOH/140 NJ5O/102 WB6BWP/110 KD9FB/101
DJØPX/184 JA1BCQ/105 YU3DJR/138 WB1AEL/103 K4FGP/104 N4QN/105 NN5H/114 KB7WD/109 N9CAS/109
DL1SBF/123 JA8GRR/185 VE3NBE/133 K2AD/116 K4NJQ/101 W4ONE/112 KB6XR/103 WA7OEM/110 KØSVZ/106
DLØFI/128 JG3QWP/108 YU1AST/175 KA2JMM/167 KB4EQR/115 WB4MRH/102 N6INJ/108 N8BZK/105 NØEBM/104
G4KZZ/100 OK1MHI/107 ZS6BCR/185 KY2D/103 KB4EXO/141 KE5OG/110 NQ6N/205 W8KMC/226 NDØF/136
G4OBK/109 SM4HVB/105 K1ICM/140

Radiotelephone

A4XJV/161 G4SKI/150 SM6MSG/108 N1BPJ/110 KB4EXO/112 NJ5X/123 W6YFW/109 W8KMC/182 KQ9R/108
CT1AHU/106 HB9BIN/102 VK4BJD/103 KA2JMM/145 KE4TW/104 W5GFM/102 W7CQR/162 WB8VMV/100 WA9OQT/103
DJØPX/180 IK1ABM/110 ZS6BCR/132 N2CYH/115 KR4D/135 WD5HRK/212 WB7OHF/105 K9DGJ/105 WD9FSA/100
EA6MR/214 IK1BOD/106 K1ICM/135 N2EGR/130 WD4LJY/104 WD5IBX/101 K8SGI/111 K8JSK/101 WD9FHK/105
F6CPO/266 JA9GXY/146 KQ1R/103 AJ3N/109 WS4R/100 KF6EN/110 KC8AF/103 KC9LB/107 KØSVZ/102
G3VIE/302 OE3HCS/111 KS1Y/230 KA4HSL/115 KT5Y/105 N6INJ/107

CW

CT4CH/107 F6ELD/258 JA1KYE/236 JA8GRR/156 YU1AST/118 WA1WTP/103 NN5H/100 KJ8G/209 WA8DXU/117
DL5BBT/131 G4MWI/104 JJ1EEA/109 PA3BKZ/140 ZS6BCR/143 W4OMQ/100 NQ6N/137 N8BZK/102 NDØF/106
DL6EK/100 I8YRK/105 JR2FKB/104 PA3BWS/141 KS1Y/204 NC5F/102 KS7P/102 N8RW/110 WØULU/100
DL7HT/234 IØSKK/120 JG3QWP/106 PY2KQ/102

RTTY

KB2VO

160 Meters

K1ZM W1RR

5BDXCC

DK3QJ W5OG WA8YTM SP6CZ KØVZR VE7AHA I1BWI LU8DPM F6ELD
K3EQ WA3CGE K4JLD SV1LK WB2DND AF5K W6MUS VE3LGQ UA3DFK
CE6COR KM5H

Endorsements

Mixed

DJ3NW/318 ISØLYN/299 PY6ABZ/224 KM1D/310 W2VP/183 K4PR/276 K5KX/324 W6JAZ/177 K9MK/308
DJ5AI/327 IT9ZGY/341 SM5EC/254 KS1Y/255 W2YC/274 K4TXJ/292 K5MC/151 W6KPC/335 K9WWT/255
DJ9HX/220 JA1EFJ/302 SP6CZ/204 N1XX/339 WA2CYQ/282 K4WHN/289 K5RJ/325 W6LQC/329 KB9YW/179
DK3FD/317 JA1EMQ/177 SP7AW/179 W1AOQ/200 WA2JBV/328 K4WMB/300 K5VT/322 W6NNV/335 KM9G/149
DK3KD/312 JA1KYE/287 SP7HT/337 W1EOA/326 WA2MTI/305 KB4BH/302 K5XI/233 W6OB/323 KQ9R/126
DK8NG/315 JP1BJR/180 SP7KTE/260 W1JJ/312 WB2CEI/305 KD4OM/175 KA5FUI/274 W6PN/339 KU9C/175
DKØZR/267 JA2BYW/266 SM7BIP/327 W1KDD/125 K3IE/296 KE4UC/175 KB5EK/260 W6TPJ/335 W9CBE/178
DL1DA/317 JR2MWZ/153 SM7QY/351 W1PUO/126 KA3FUU/160 KR4D/251 KD5RP/330 W6YK/358 W9FR/318
DL3ZA/325 JA3BG/335 TG9NX/274 W1SP/346 KB3YJ/130 N4AXR/305 N5AU/328 W6ZO/362 W9IU/344
DL5BAN/290 JI3MZY/126 VE1AST/310 W1WLW/330 KC3EN/180 N4AVB/305 N5DD/307 K7EQM/300 W9JBR/157
DL6CT/260 JJ3WUG/155 VE3BX/337 WA1JMP/314 KC3X/288 N4AYO/301 NA5C/278 N7DDK/149 W9MP/150
DL7HT/288 JR3LGB/200 VE3II/315 K2BXG/311 KE3A/302 N4GFI/225 NJ5V/152 W7CQR/221 W9NUF/297
F3CB/294 JA6AD/340 VE7DP/315 K2EYJ/302 KE3R/175 W4DJJ/308 W5CPI/321 W7QZI/175 W9YCV/160
F6FGW/271 JH6RYY/273 VE7HP/324 K2QIL/282 N3BQS/153 W4DZZ/310 W5LVD/328 W7QK/354 WA9VGY/299
F6HWU/152 JA8EAT/323 XE1OZ/181 K2UFM/320 N3CTB/148 W4GTS/336 W5ZF/317 WA7BEV/329 WB9UIO/203
FY7AN/313 JA8XJF/314 YU3QI/309 KA2GMT/250 N3CYC/127 W4HY/306 AA6EE/152 AB8K/311 WB9ZBE/301
G3TXF/284 KH6CF/311 YU3TFC/239 KC2WQ/187 N3UN/314 W4JVU/338 K6AAW/320 K8LJG/325 WBØALF/276
G3VIE/309 KH6IJ/355 YV3BRF/205 KS2M/155 W3IVG/225 W4SSU/348 K6AC/315 K8MC/283 KØCL/318
G4ISK/227 KL7H/297 ZS2RM/309 K52X/125 W3LB/329 WA4GFG/200 K6ANP/310 K8MN/302 KØIEA/327
GU4EON/244 KP4V/279 6Y5HN/206 K2OWE/290 W3NB/312 WA4JTI/319 K6GXO/300 K8VFV/300 KAØIQR/250
HB9CIP/300 LA1H/295 AG1I/234 KY2Q/335 W3VRT/319 WB4HOK/310 KB6WI/210 N8AQV/300 KCØD/208
HB9IK/342 OE1HGW/320 K1EFI/313 N2CPE/224 W3YQ/270 WB4HSA/265 KG6AM/156 W8CY/308 KYØA/286
HB9MO/341 OH2VZ/330 K1OXD/251 N2DT/310 WA3CGE/293 WB4TDH/312 KN6M/310 W8GIO/310 NØHH/150
HK3DDD/300 OK1DH/306 K1THP/234 N2KW/311 AC4U/250 WD4R/283 N6GG/305 W8LT/208 WØGAX/271
I1BWI/278 ON5NT/324 K1XA/260 W2HKE/266 K4IBP/306 WR4K/324 NG6W/253 W8RV/279 WØPT/339
I3VRV/324 OZ1GRS/141 KB1H/240 W2MOF/262 K4II/334 AK5B/292 W6BJH/327 AG9V/178 WØQQN/151
I4AND/308 PY2TM/317 KG1V/200 W2RSJ/310 K4JLD/286 K5BDX/271 W6DUB/273 K9BIL/302 WAØOAH/333
I4EAT/305 PY4KB/253 KK1J/155 W2VJN/343 K4LSP/326 K5DX/356 W6ERS/341

Radiotelephone

CP1IL/201 I1YG/324 ON5NT/324 W1WLW/285 N3AZU/251 N4AYO/290 NI5D/121 W7EDA/271 KS9R/177
DF7NM/290 IX1BGJ/328 PY2TM/311 K2EYJ/302 N3CQM/252 W4DJJ/303 NJ5V/151 W7GYZ/200 KV9V/132
DJ3CP/300 I3DHN/303 PY4KB/251 K2UFM/318 N3CWP/175 W4DZZ/286 W5LQN/306 W7QK/327 W9FI/203
DJ5RP/238 I3VRV/324 SM5VS/291 KB2MY/261 N3UN/309 W4JVU/337 W5RNG/337 K8CFU/347 W9IU/273
DK8NG/309 I4AND/264 TG9NX/308 KC2WQ/187 W3FZE/300 W4NYN/335 WA5LGI/284 K8LJG/324 W9GBI/305
DL5BAN/287 I4USC/309 VE3BX/326 KQ2O/250 W3JK/338 W4QAW/333 K6JCK/179 K8MN/283 W9NUF/279
DL9XW/200 I6FLD/346 VE3II/313 N2KW/304 WA3CGE/284 W4SSU/342 KI6O/201 K8VFV/300 WA9VGY/292
EA3AOC/307 IØMBX/310 VE7HP/318 N2VW/281 WB3BGI/300 WA4JTI/315 N6DHX/200 N8AQV/290 WB9LEF/231
EA4BKE/225 JA1EF/282 VK6LK/325 W2GBC/330 AA4V/302 WA4WIP/339 NG6W/202 NG8T/206 WB9UIO/203
EA5BWU/211 JA2BYW/252 XE1OZ/181 W2HXF/303 K4FCW/184 WB4HSA/265 W6BCQ/317 W8CY/304 WD9FOE/270
EA5CIX/219 JA3BG/287 YB0BZZ/129 W2MOF/256 K4II/287 WB4YZC/243 W6DUB/216 W8GIO/308 KØCL/277
EA7LM/260 JI3MZY/126 ZL1AV/325 W2NZG/274 K4JLD/273 WD4CRG/226 W6JAZ/177 W8JJK/296 KAØNNF/226
EA8JJ/331 JJ3WUG/155 ZP5JAL/246 W2VP/177 K4KYI/201 WI4R/261 W6LQC/329 W8JXM/329 KN8L/212
EA8LD/311 JA6AD/319 ZP5MJY/240 WA2RTQ/223 K4LSP/325 AE5E/262 W6KUT/341 KB8KW/300 NØHH/150
F6AIO/329 JH6RYY/271 ZS6JM/353 WB2CEI/304 K4WHN/287 K5DX/351 W6MDH/250 WD8MRC/208 WØGAX/229
F6CYV/259 JA8BAR/319 KK1J/152 WB2VEG/330 K4WMB/282 K5RJ/318 WA6SGQ/225 K9BIL/295 WØIKD/177
F9IE/334 JA8XJF/313 KM1D/297 K3RX/311 KC4BX/261 K5XI/233 WD6AFC/133 K9MK/295 WØYMH/318
G3RCA/314 KL7H/287 W1BH/225 K3UA/308 KD4NI/201 KB5EK/250 KT7V/284 K9WWT/205 WAØOAH/333
HB9CIP/284 LU3YL/W4/320 W1JJ/312 KE3A/298 N4AXR/304 KD5RP/307 KU7D/203 KB9LN/205 WD8FSJ/255
HK3DDD/298 OE3WWB/328 W1SP/345 KR3J/157 N4AVB/303 NM5O/175 K7GEX/299 KB9YW/178

CW

DK8NG/301 JA1EF/270 KL7H/250 VE3IRF/125 N2KW/303 NK4L/158 KB5EK/150 K9BIL/237 W9NUF/252
DKØZR/218 JP1BJR/180 OH2BN/290 K1EFI/272 W2LPV/125 W4DJJ/292 NG6W/200 K9MK/225 W9SFR/305
DL3HAH/154 JA2TK/271 ON5NT/311 KM1D/203 WB2KXD/250 W4DZZ/242 W6TVP/151 K9WWT/217 W9ZM/308
F6CRT/280 JA3BG/276 OZ1FRR/285 W1AOQ/175 K3IE/282 WA4JTI/286 WB6ZUC/299 KA9FYZ/126 KCØD/177
G3TXF/226 JA3MNP/288 OZ7BW/304 W1WLW/290 KC3X/220 AK5B/175 K7EC/150 KD9J/126 KSØM/202
HK3DDD/211 JA5SIX/215 PA2CHM/164 WB1GOO/150 K4II/259 K5MC/126 K8LJG/288 KM9G/128 WØCAW/250
I1BWI/224 JR6APX/151 PY2TM/307 K2OWE/249 K4JLD/236 K5VT/311 N8AQV/234 N9AIB/156 WØGAX/199
I4AND/242 JA8EAT/306 VE3II/266 KU2Q/150 KR4D/196 W5ORM/150 W8CY/254 W9IU/225 WØYBV/226
I4EAT/182

DXCC Notes

Corrections: Mixed K1HZ/317. CW KØCVD/270. Honor Roll correction: GM3ITN 315/349.

REMINDER: Those wanting to update their DXCC totals for the December 1984 *QST* DXCC listing must submit confirmations during the month of September. They must reach headquarters on or before September 28, 1984 to be listed. You must comply with DXCC rule 5 including the once-a-year exception to update the listing. QST

IARU News

Conducted By Richard L. Baldwin,* W1RU

Be Proud!

IARU began preparing for WARC-79 in 1964, 15 years prior to the actual date of the conference. As you must know, that preparation paid off, in more ways than one. Sometime in the next decade or so, there is likely to be another general WARC (World Administrative Radio Conference), and once again the spectrum (including the Amateur Radio frequency bands) will undergo hard scrutiny. To prepare for that WARC there is much to do, both from the organizational and the individual sides. What to do on the organizational side is being established by the Administrative Council of the IARU, and you'll hear more about that later.

What can *you* do, as an individual? First and foremost, take pride in being a radio amateur. Flaunt that pride!

In our preparation for WARC-79, one of the major tasks we addressed was establishing that the Amateur Radio Service is a worthwhile service, one which provides a number of benefits to those countries that support it. Through the IARU societies, we hammered constantly on that theme. We wanted Amateur Radio to be publicly recognized as an important service, one that is worthy — nay, one that demands — support by the national administrations.

In too many places in this world radio amateurs are diffident, even apologetic, about being radio amateurs. We have seen too many instances in which important national representatives played down (even concealed!) the fact that they were radio amateurs, because they were apprehensive that being known as radio amateurs would somehow tarnish their professional image.

Surely, the basic problem lies in semantics. There are some who believe that the word "amateur," whatever language we are using, implies a dilettante, a duffer, one who is less than expert — as contrasted to a "professional," which in turn implies a mastery of the subject.

But language (and some prominent dictionaries) has tripped us up, because to be an "amateur" does not have to mean that we are not expert, that we don't "know our stuff." No, the word amateur comes from the Latin "to love," and one who is an Amateur Radio operator or an amateur photographer or an amateur archeologist is so because he loves what he is doing. Through his amateur enthusiasm, he may have become the world's greatest expert on some phase of his chosen field. Conversely, some "professionals," who labor without the burning enthusiasm of a dedicated amateur, may be somewhat less expert.

So, don't be shy about your being a radio amateur. You are a member of a very select fraternity (and sorority!) of radio amateurs who have made and are making substantial contributions in technical and public-service fields. If you are a radio amateur, brag about it — let the world know. Let your professional compatriots know, and urge them to join this select group. Above all, don't be apologetic about being a radio amateur.

Because, when the next WARC rolls around, whether in five years or 10 or 15, we want the world to know that there is an Amateur Radio Service whose enthusiastic practitioners are experts in their field, who are making substantial contributions to the welfare of their countries and who deserve the unstinting support of their administrations at all times, but especially at an allocations conference.

To be an amateur, to love what you are doing, is one of life's greatest rewards. Spread the word!

*President, IARU

IARU Region 2 (North and South America) held an executive committee meeting in Mexico City over the weekend of June 16. Region 2 is a well-organized, cohesive group, and these are the fellows who provide much of the energy for that success (l-r, standing): LU9CN, VP9IM, VE3CDM, YV5BPG (president), HK3DEU (secretary), HI8LC and CP5EC; (kneeling) YN1FL and WØBWJ. *(W4RH photo)*

ANOTHER 10-METER BEACON

In Region 1 (Europe and Africa), 10-meter beacons are particularly popular and well-supported. They serve as propagation indicators, and an exhaustive study and analysis of reception reports could quite probably provide some worthwhile input to the world's knowledge of propagation. The latest beacon to be activated is 9L1FTN, which went on the air in Freetown, Sierra Leone, on April 13, 1984, the last day of the Region 1 conference in Cefalu, Italy.

This beacon was a club project of the Cheshunt and District Amateur Radio Club in England. Project coordinator was Roger Frisby, G4OAA, who had assistance from many members of his club and the Sierra Leone Amateur Radio Society. Alan Taylor, G3DME, is the Region 1 beacon coordinator, while Cassandra Davies, 9L1YL, is secretary of the SLARS and a member of her country's telecommunications administration (she's proud to be a radio amateur and doesn't hide the fact — see the previous paragraphs on this page!). Special attention was paid to environmental conditions in Sierra Leone, such as high humidity, in the design and construction of this repeater.

9L1FTN operates on 28.2725 MHz, with frequency-shift keying to 28.27335 MHz. The antenna is a vertical half-wave, with 10 W from the transmitter. Keying is at 12 WPM with a 20-second interval, signing DE 9L1FTN. When operating on the standby 12-V supply, up to eight dits are sent before the call sign, depending on the state of battery charge. Reports giving date, time and signal strength can be sent to G4ECT via the RSGB QSL bureau, and will be acknowledged with a special QSL.

G4OAA and the 9L1FTN repeater.

The New Frontier

Conducted By Bob Atkins,* KA1GT

New 1296 World Record

As reported in *QST* last month, a new 1296-MHz DX record was set on June 24 with a contact between Chip Angle, N6CA, and Paul Leib, KH6HME. This contact was the culmination of a number of years of effort. Chip, N6CA, built the station used at KH6HME several years ago. It consists of four 25-el Yagis on a 30-ft tower driven by a 25-W air-cooled power amp. The station is located at 8000-ft elevation on the east side of the Mauna Loa Volcano on the island of Hawaii. The N6CA station consisted of a 44-el loop Yagi on a 20-ft mast mounted on a van containing a complete portable station with about 100 W of RF on 1296 MHz available at the antenna. For this contact, Chip was at about 1100-ft elevation near Palos Verdes, California (just south of Los Angeles).

Conditions were very good on the lower bands for the two weeks preceding the contact, with seven openings recorded to Hawaii on 432 (KH6HME beacon on 432 MHz). On the 18th, the beacon was heard about 60 dB above the noise on 432 MHz. It has been observed that signals from Hawaii tend to peak around 5 P.M. and 8 P.M. in California. On the 23rd, 432-MHz signals were again strong, and so in anticipation of a 5 P.M. peak, the 1296 system was readied. Because of power problems on Mauna Loa (volcanic eruptions had taken out some power line to the shack!), the 1296-MHz beacon was not running all the time. At 0035Z (around 5 P.M. local) June 24, contact was made. KH6HME gave a 599 report to N6CA and received a 539 in return. Signals peaked 15-20 dB over the noise, and the opening lasted for about 2 minutes at the Palos Verdes site. Signals were reported received in Orange County at S9. No later peak was heard. The distance between the two stations was 2472 miles (3977 km). The old world record was 1422 miles (2288 km), between VK6KZ/P and VK5MC/P.

EASTERN VHF/UHF CONFERENCE NOISE-FIGURE AND ANTENNA-MEASUREMENT RESULTS AND COMMENTS

The tables at the right list the results obtained for the bands above 902 MHz at the 10th Eastern VHF/UHF Conference held in Nashua, New Hampshire, on May 14, 1984. Thanks to W1JR for sending in this information.

A few points are evident from these results. The loop Yagi still seems to be the antenna to beat at 1296 MHz. It appears that a gain in excess of 20 dBi can be expected from a well-constructed 45-element loop Yagi. This is approximately the same gain expected for a 3.5-ft-diameter parabolic dish. Loop Yagis scaled for other frequencies have also shown good performance in the past. At least one group (G3OUR) has used loop Yagis on 432 MHz for EME work, and designs for 13-cm loop Yagis have appeared (44-el in *The Microwave Newsletter Technical Collection*, published by the RSGB; and 34-el in The New Frontier, Sept. 1981 *QST*, and in Feedback, Oct. 1981 *QST*).

[KA1GT has developed an Applesoft BASIC program that performs a parametric calculation for designing 27- or 38-element loop Yagis for any frequency. For a copy of the program, please send an s.a.s.e. to "Features Editor," ARRL, 225 Main St., Newington, CT 06111. Ask for the KA1GT Loop Yagi program. — Ed.]

The 1296-MHz preamp results show the problems sometimes encountered in measuring very-low-noise preamps, even by experienced operators using professional test equipment. No preamp, however good, can have a 0-dB noise figure. The MGF series of GaAsFETs seem to be very popular and capable of giving excellent results. The MGF 1412 is priced between $21 and $35 (available in three noise-figure grades). The MGF 1402 is $14, and the MGF1202 (which is the same GaAs chip as the 1402 but packaged differently) is around $10.

PACK RATS CONFERENCE

There's always plenty for microwave enthusiasts to see and do at the Mid-Atlantic States VHF Conference, to be held October 6 in Warrington, Pennsylvania. See Hamfest Calendar, this issue, for details.

*103 Division Ave., Millington, NJ 07946

Antenna-Gain Measurements, 10th Eastern VHF/UHF Conference

		Gain
902 MHz		
W1JR	33-el loop Yagi 12 ft long	14.0 dBd
W1EJ	33-el "Super-Yagi" 11 ft long	13.0 dBd
W1EJ	15-el Yagi	10.5 dBd
W1EJ	EIA gain standard	7.7 dBd†
1296 MHz		
W2VC	4- by 45-element loop Yagis spaced 29 in and 28 in	24.3 dBi
W2VC	45-el W1JR design loop Yagi	20.9 dBi
W1JR	45-el loop Yagi	20.8 dBi
WA1TFH	45-el loop Yagi	20.7 dBi
W1JR	45-el K9KFR-built loop Yagi with supporting braces	20.2 dBi
WA2LSE	45-el loop Yagi	20.1 dBi
K1FO	Spectrum International loop Yagi	19.7 dBi††
K1FO	23-el F9FT Yagi	18.7 dBi
WA2LSE	24-el loop Yagi	17.0 dBi
WB1FKF	45-el loop Yagi	16.0 dBi
N1BWT	Reference horn	15.4 dBi†
W1JR	32-el J slot antenna	13.8 dBi
WA1TFH	K2VXO 10 over 10 skeleton slot	13.3 dBi
K3BRS	Double figure "8"	12.2 dBi
WA1TFH	K2VXO 12-turn helix	11.2 dBi
K3BRS	Bowtie	9.1 dBi
K3BRS	Extended sauerkraut can	7.9 dBi
K3BRS	Short horn (green pea can)	7.4 dBi
2304 MHz		
W1JR	32-in dish	22.4 dBi
W1JR	MDS flat Yagi	19.0 dBi
N1BWT	Bognar cigar Yagi	16.0 dBi
N1BWT	15-el Yagi	15.9 dBi
N1BWT	Reference horn	13.5 dBi†

Note: The antennas measured on 70 and 33 cm are referenced to a 7.7 dB over a dipole EIA standard gain antenna, while the 23 and 13-cm antennas are referenced to a standard gain horn calibrated in decibels above isotropic. To compare the antennas, add 2.15 dB to the gain over a dipole for isotropic or subtract 2.15 dB from the antennas measured in dBi to obtain gain over a dipole. The values shown have been slightly scaled above the range measurement since the reference seemed to be lower in gain than measured in prior antenna-measuring contests.

†Reference standard; ††Commercial entry

Noise-Figure Measurements, 10th Eastern VHF/UHF Conference

Call	Preamp/Converter	Gain	Noise Figure
902 MHz†			
W1JR	ALF 1023 GaAsFET PA	13.3 dB	0.43 dB
K3MKZ	Lunar D432 GaAsFET PA	14.6 dB	0.51 dB††
K3MKZ	Lunar D432 GaAsFET PA	14.6 dB	0.70 dB††
1296 MHz†			
WA2LSE	MGF 1412 PA GaAsFET	14.6 dB	0.00 dB
K3MKZ	Parabolic MGF 1402 GaAsFET PA	12.7 dB	0.54 dB††
WA1QHQ	NE72035	19.2 dB	1.01 dB
AJ1E	MGF 1404	20.3 dB	1.06 dB
W1RIL	MGF 1202	16.38 dB	1.38 dB
WA1JOF	MGF 1202	11.39 dB	1.68 dB
WB1FKF	MGF 1402	3.83 dB	1.90 dB
VE2DFO	NE70083 in K2UYH design	15.6 dB	2.70 dB
2304 MHz†			
K3MKZ	SSB Electronics MGF 1412 preamplifier	12.6 dB	0.97 dB††
W1JR	Homebrew converter	12.6 dB	4.45 dB

Note: Although the noise figures shown for 23 cm are probably low, we were unable to come up with any method to change the noise figures measured despite use of cables, no cables or recalibration of the instrument. W1JR converter used with 28-MHz SSB noise figure.

†HB8970 with corrected noise figure; ††Commercial entry

Canadian NewsFronts

Conducted By Harry MacLean,* VE3GRO

Quelques notes sur RAQI

L'Association Radio Amateur du Québec Inc., RAQI, a été fondée en 1951. Le principe d'une association provinciale a commencé à germer dans l'esprit de nos aînés au cours de diverses réunions et rencontres, et notamment au cours d'une pique-nique des amateurs VE2 tenu à Cap Santé, près de la ville de Québec, le 28 août 1949.

Nous trouvions notamment à cette date les noms de Eugène Lajoie, VE2 RA, Gérard Vaillancourt, VE2 VD, premier président de RAQI, Fernand Lanouette, VE2 VT, Georges Desrochers, VE2 ZZ, et Lionel Groleau, VE2 LG.

Les lettres patentes de l'association lui étaient accordées le 24 avril 1951. Depuis 1980, l'association s'est dotée d'une permanence (directrice générale et secrétaire) afin de répondre à la demande croissante de la communauté Radio Amateur du Québec Inc. Depuis cette date, l'autofinancement de l'association a été triple, assurant ainsi de plus en plus de services en faveur des membres individuels et des clubs: journal bimestriel, répertoire des radioamateurs, bulletins express destinés aux clubs, services de cartes QSL, réseaux quotidiens HF et VHF, plaques automobiles, matériel d'exposition et diaporamas. Cette nouvelle gamme de services a permis de doubler le nombre de membres.

Le développement continu de l'association a permis à cette dernière de s'impliquer à de nombreux niveaux (locaux, municipaux, etc.). Ainsi l'association a signé en 1978 un protocole d'entente avec le bureau de la Protection Civile du Québec, afin d'apporter son soutient logistique à la population dans certains cas d'urgence.

Les bureaux de l'association RAQI sont situés au 1415 est, rue Jarry, Montreal, Québec H2E 2Z7, téléphones: 514-728-2119 ou 514-376-4700 poste 310. *Gisele Floc'h Rousselle*

[Editor's Note: Founded in 1951, The Radio Amateur Association of Quebec, Inc. (RAQI) has given French-speaking radio amateurs in Quebec a greater voice on the provincial level. Over the years, RAQI has enjoyed steady growth and has increased the services it provides to members, including a bimonthly journal, club bulletins, daily operating news and QSL services. In 1978, RAQI signed a protocol of understanding with the bureau of Protection Civile du Quebec, to bring about greater participation of radio amateurs in emergencies.]

DOC NEWS

☐ To mark the visit of Pope Paul to Canada, DOC will allow amateurs to use the following special prefixes from September 9 to September 20: XK1 and XK2 in Newfoundland and Labrador, CJ1 in the Yukon, and XJ1 through to XJ8 in the remainder of Canada.

☐ In response to a CRRL request, DOC is allowing Canadian amateurs who wish to take part in the ARRL Antenna Design Competition to transmit on the following four frequencies: 18.073, 18.163, 24.895 and 24.985 MHz. Transmissions must be A0 or A1 emissions only, 250-W maximum power. Two-way communications are not permitted. Transmissions must be for testing of antennas. Amateurs wishing to use these frequencies for this purpose must first contact a DOC district office. Use of the frequencies expires on November 1.

☐ DOC has issued a new Proposed Spectrum Utilization Policy for the 890-960 MHz band. At present, Canadian amateurs may transmit on the 902-928 MHz portion of this band, as secondary users, using A3 or F3 emissions only. Some time ago, CRRL asked DOC to permit other emissions as well. This request has been incorporated into the proposed policy. If the policy is adopted, the only condition would be that amateurs would have to contact a DOC district office before beginning to transmit, to ensure that transmissions would not interfere with primary users of the band. All this could run into some strong opposition from the primary users. CRRL will be making representations to DOC to ensure that Canadian amateurs will have reasonable access to the band.

☐ DOC will hold Amateur Radio examinations across Canada on October 17. If you plan to write, apply to DOC before September 19. Next examinations after this: February 13, 1985.

CRRL NEWS

☐ Many thanks to Doug Holeton, VE6AGV. After seven years and 281,000 cards sorted, Doug is retiring as manager of the CRRL VE6 Incoming QSL Bureau. Best wishes to the new manager, Norm Waltho, VE6VW. Norm recently moved to Alberta from Saskatchewan, where he was manager of the CRRL VE5 Incoming QSL Bureau. Seems you can't keep a good man down. New address for the VE6 bureau is General Delivery, Morinville, AB T0G 1P0.

☐ Thanks also to Ron MacKay, VE1AIC, who has retired as Canadian rep on the ARRL Repeater Advisory Committee. New Canadian rep is David Toth, VE3GYQ. Dave is a physician, a past president of the Southern Ontario Repeater Team and the Southern Ontario-Western New York Repeater Council, and an acknowledged expert on repeaters. He lives in London, Ontario, with his new bride, Sue, VE3NRH.

☐ That 1984 CRRL Canadian *Repeater Directory* is finally available. The new directory incorporates some 160 additions, deletions and changes in call sign or frequency. It's now the most accurate and up-to-date Canadian listing available. For your free copy, send a self-addressed, stamped envelope to CRRL Headquarters, London, Ontario.

☐ The CRRL Board of Directors did meet in Toronto, Ontario, on August 4. Full details of this meeting will appear in next month's Canadian NewsFronts column.

NEW CANADIAN AMATEUR RADIO LICENSING MANUAL AVAILABLE

We've mentioned this before, but fall licensing classes are starting and we want to mention it again. A *new, revised* CRRL *Canadian Amateur Radio Licensing Manual* is now available. It's been designed for use with the new TRC-24, and now contains all you need to know for *both* the Amateur and Advanced Amateur certificates.

CRRL President Tom Atkins, VE3CDM (left), presents IARU Past President Noel Eaton, VE3CJ, with his 50-year League membership plaque and awards from IARU Region 2 and the Radio Club of Argentina at last year's Radio Society of Ontario Convention. This year's convention will be held in Ottawa on October 5-6. *(VE3AND photo)*

The *Manual* comes in an attractive three-ring binder with plenty of room for instructor handouts and student notes. As with earlier versions, it features author Ralph Zbarsky's (VE7BTG) clear explanations and subtle humour. Both make learning a breeze. Users tell us this manual is the best on the market.

Cost of the *Canadian Amateur Radio Licensing Manual* is $18.75 plus $1 for shipping. To order, call or write to CRRL Headquarters.

NOTES FROM ALL OVER

☐ Amateurs everywhere will be saddened to learn of the death of David Lloyd, VE3AW. David was widely known and even awarded the Order of Canada for his work, promoting Amateur Radio among the blind. He will be missed.

☐ At press time it looked as if North York, Ontario, amateurs had been successful in having a new municipal by-law — one that would limit the height and placement of antenna towers and satellite dishes — specifically exclude federally licensed installations. This, of course, would cover amateur installations. CRRL had a lot to do with bringing this about. CRRL people were among the first to become aware of the proposed by-law. CRRL President Tom Atkins, VE3CDM, personally alerted CARF and other Amateur Radio groups, and solicited their support. Tom also spoke on behalf of amateurs at two public hearings, and introduced the idea of specifically excluding federally licensed installations. To support Tom, CRRL Counsel Bob Benson, Q.C., VE2VW, prepared a five-page legal opinion, which appears to have convinced North York planners that, without the exclusion, they might be in conflict with federal law. The by-law was expected to be passed on July 26. North York is one of the largest municipalities in Canada. This by-law will set an important precedent for all parts of Canada.

☐ Canada's largest Amateur Radio gathering, the 1984 Radio Society of Ontario Convention, will be held at the Westin Hotel, Ottawa, on October 5-6. Plan to attend the CRRL Forum on Saturday morning, and to visit the CRRL booth at any time during that day, to watch videotapes of the Owen Garriott, W5LFL, *Ham-in-Space Mission* and the amateur interventions at those CRTC cable television hearings in Vancouver.

☐ Winnipeg Seniors' Amateur Radio Club is organizing a Trans-Canada Seniors Net, to meet on or about 14.130 MHz every Wednesday at 2100 UTC. If you're with a seniors' club anywhere in Canada, try to check in.

☐ Don't forget to join in the fun in this year's CRRL Can-Am Contest — phone portion on September 15-16; CW portion on September 22-23. Complete rules appear in last month's *QST*. Log sheets and entry forms are available from *both* ARRL or CRRL Headquarters.

*163 Meridene Crescent West, London, ON N5X 1G3, Tel. 519-433-1198

The World Above 50 MHz

Conducted By
Bill Tynan,* W3XO

Terrestrial DX Records Revisited

It has been over a year (July 1983) since the terrestrial DX records last appeared in this column. Because of the length of time and new records that have been set, it is appropriate to present them again at this time. It is emphasized that these records are terrestrial (non-EME) and are judged only on the shortest distance between the two stations on the earth's surface without regard to the distance involved in the propagation path.

Once again, I ask that information be furnished on potential new records with as many details as possible. Particularly important are the date of the first contact and the exact geographical coordinates of the stations, at least to the nearest minute. Other useful, but less vital, facts that would be appreciated include signal strengths and quality, a description of equipment used, time of day, best estimate as to kind of propagation, type of modulation employed and the length of time over which the contact took place. Only with your help in providing necessary information can the record box represent a true picture.

The 6-meter record remains with JA5HTP and PY5BAB, who set out to work the antipodes (points on opposite sides of the earth from one another) and came within a few miles of doing just that. The distance that appeared in the July 1983 Record Box was 12,433 miles, or 20,008 km. This was calculated using a TI-SR52 hand calculator program. I have always felt that this program produced reasonably accurate results, as the answers appeared to compare favorably with the calculations of others as well as with several check cases.

Recently, however, I received a letter from JARL External Affairs Manager Yutaka Kasahara, JA1CLN, inquiring about how the distance was calculated and questioning the exact distance. One limitation of the program I have been using is that it assumes a perfectly spherical earth, when in reality our globe is somewhat flattened at the poles. It also makes some other simplifications which, coupled with this deficiency, I now learn, provides less-than-adequate results for distances approaching halfway around the world.

As a result of Mr. Kasahara's question, I set out to get a more accurate calculation of the JA5HTP-to-PY5BAB distance. To this end, I asked an acquaintance at a local research establishment to calculate it with a more sophisticated program. He used the U.S. Naval Observatory's Arc Length Determination Program, and came up with a distance of 12,394.8 miles, or 19,947.5 km — certainly a significant difference from the one I had calculated. Incidentally, the Naval Observatory program yields a distance halfway around the earth at the equator of 12,450.4 miles, and 12,408.8 at the poles, the difference of course being due to the aforementioned polar flattening.

I am indebted to JA1CLN for pointing out the discrepancy, and I am in search of a program that produces better results. If anyone knows of a good BASIC program that can run on a NorthStar Advantage in either Northstar BASIC or CP/M BASIC, I would appreciate hearing about it. Naturally, I would like to have such a program include the correct model for the shape and size of the earth.

No new information regarding record contacts on 2 meters has reached me. Therefore, I conclude that the record is, as published last year, held by I4EAT and ZS3B as a result of their transequatorial two-way completed in March 1979.

The same is true in the case of the 1¼-meter record, so KP4EOR and LU7DJZ reign on this band, thanks to a transequatorial contact in March 1983.

Terrestrial DX Records†

6 Meters	JA5HTP/6 and PY5BAB/5 March 11, 1982	12,394.8 miles (19,947.5 km)
2 Meters	I4EAT and ZS3B March 31, 1979	4903 miles (7890 km)
1¼ Meters	KP4EOR and LU7DJZ March 9, 1983	3670 miles (5806 km)
70 cm	KH6IAA/KH6 and KD6R July 28, 1980	2552 miles (4106 km)
23 cm	N6CA/6 and KH6HME June 24, 1984	2471 miles (3977 km)
13 cm	VK6WG and VK5QR Jan. 17, 1978	1170 miles (1883 km)
9 cm	ZL2ARW/P and ZL2AQE/P March 6, 1983	339 miles (545 km)
5 cm	K5FUD and K5PJR Sept. 20, 1977	267 miles (430 km)
3 cm	I5SNY/EA9 and I0YLI/IT0 July 18, 1983	1033 miles (1663 km)
1.24 cm	I4BER/I4CHY and IW3EHQ/I3SDY April 25, 1984	180 miles (289 km)

†as of July 1, 1984

The 70 cm record remains with KD6R and KH6IAA/KH6 as a result of their trans-Pacific ducting contact of July 1980.

For 23 cm, 1984 does provide us with a new record. The old mark set by VK7KZ/P and VK5MC/P has finally succumbed to the California/Hawaii duct first made famous by W6NLZ and KH6UK. Details of the record-breaking work accomplished by N6CA and KH6HME are carried in the Higher Bands section of this column and in The New Frontier, this issue.

Since nothing to the contrary has reached me as to a new record for the 13-cm band, it must be concluded that this honor still belongs to VK6WG and VK5QR.

The August 1983 New Frontier column carries a story on a new record for the 9-cm band. It quoted the New Zealand Amateur Radio journal *Break-in* as reporting a new record of 339 miles (545 km) between ZL2ARW and ZL2AQE, both operating at specially selected, elevated locations. This betters the 238-mile (383-km) mark between ZL2THW and ZL2TSM, which was published last, or another apparent record of 288 miles (464 km) set by G4BYY and DB5KS in September 1982, and referred to by KA1GT in the same column reporting the New Zealand success.

No new record-breaking activity has been reported for the 5-cm band, so the one previously reported between K5FUD and K5PJR apparently still stands.

October 1983 *QST*, in both this column and The New Frontier, carried news of a new 10-GHz record between I0SNY/EA9 and I0YLI/IT9 of 1033 miles, or 1663 km. That was a mere 26 miles (42 km) farther than the record I0SNY had established a day earlier with 1W0BCU/IT9.

The July 1984 installment of the Microwaves column, carried regularly in the RSGB journal, *Radio Communication*, reports a new 1.24-cm record of 180 miles (289 km) set April 25, 1984 by teams consisting of I4BER and I4CHY on one end and IW3EHQ and I3SDY on the other.

Surpassing any of these records constitutes a formidable challenge, but records are made to be broken. Some enterprising amateurs continue to demonstrate that not all of us are content merely to sit back and do only that which comes easily.

MID-ATLANTIC STATES VHF CONFERENCE

This year's addition of the always first-class VHF conference sponsored by the Mt. Airy VHF Radio Club, known far and wide as the Pack Rats, will be held Saturday, October 6, at the Warrington Motor Lodge, Rte. 611, Warrington, Pennsylvania. The site is about five miles north of PA Turnpike Exit 27.

A day packed with interesting talks by well-known VHFers is planned and, in the evening, the schedule calls for a social hour and buffet dinner. A hospitality suite hosted by the Club will be open both Friday and Saturday evenings. The following day, Hamarama, one of the largest amateur flea markets on the East Coast, will be held just down the road from the conference location. For more details and registration information, see Hamfest Calendar, this issue, or drop an s.a.s.e. to Hamarama, P.O. Box 311, Southampton, PA 18966.

ON THE BANDS

6 Meters — If one asked most 6-meter operators to characterize the 1984 summer E, season as of this first week in July, the response would probably be on the negative side. Many, including this conductor, would comment that both the number and quality of openings have been decidedly down from past years. However, this season has not been without its high spots, some quite extraordinary for those who were fortunate to be in the right place at the right time. For one, W3XO picked up three new countries in the form of VP2EME, KG4AW and YS1ECB. This, at least takes the sting out of missing W6JKV/OX. More on Jim's results in Greenland later.

One of the extraordinary occurrences of 1984 took place just after the completion of W6JKV's Greenland trek. On Saturday evening, June 30, about 2230Z, northern New England stations begin hearing GJ3YHU. It turned out that this was not one of those "here one minute, gone the next" situations. The Channel Island station was in, at some locations, for over two hours and at times reached S9. Before it was over, upwards of 50 Northeast stations had themselves a rare contact. I do not know how far south the propagation reached, but I am told that K2MUB in the New York City area was in on it. A number of New England and nearby Canadian stations reported also hearing the ZB2VHF Gibraltar beacon on 50.035 at the same time that GJ3YHU was in, but apparently no one heard any other Gs, including the GB3SIX beacon on the Welsh coast, which operates 24 hours per day on 50.018. This latter beacon has been reported by several on other occasions this summer, however, including W4CKD here in the Washington area. Bob reported receiving it quite weakly for about five minutes beginning at 1446Z June 21.

So, despite this being a flat session, the band always seems to come up with some surprises. One can only

*Send reports to Bill Tynan, W3XO, P.O. Box 117, Burtonsville, MD 20866, or call 301-384-6736 to record late-breaking information.

70 Cm Standings

For WAS holders, listings and WAS number, call state, call areas worked and grids worked. For others, call, state, U.S. states worked, call areas worked and grids worked. Call areas are the 10 U.S. call areas plus KH6 and KL7, plus each VE and XE call area plus DXCC countries not located within the continental limits of the U.S., Canada or Mexico. Grids are those Maidenhead designators worked since the VUCC Award was instituted January 1, 1983. Those not showing some indication of activity or interest within the past two years have been deleted. They will be reinstated upon providing an indication in writing that they are still interested in being listed. It is not necessary to have worked any new states or grids in order to be reinstated. Compiled July 17, 1984. Deadline for next update is January 1, 1985.

WAS Holders				
1	WØYZS*	MO	—	—
2	K2UYH*†	NJ	48	—
3	K5JL*†	OK	—	—
4	WB5LUA*	TX	41	—
5	W5FF*†	NM	28	—
6	W1JR*†	MA	44	99

AD1C	MA	33	10	—
K1PXE	CT	25	11	—
K1FO	CT	25	8	—
K1LPS*	VT	20	12	—
W1GXT	MA	13	6	—
WA1JOF	MA	13	4	—
W1HDQ	CT	11	4	—
K2RIW*	NY	28	12	—
W2VC	NJ	25	11	50
K2GK	NY	22	9	36
W2DWJ	NJ	22	9	—
W2PGC	NY	20	10	—
W2CNS	NY	20	9	—
WA2FGK	NJ	18	7	—
K2YCO	NY	17	8	—

*Some contacts made via EME
†WAC

K2OVS	NY	16	6	—
W2CRS	NY	16	—	—
N2EO	NY	13	5	—
WA2TIF	NY	13	5	—
NB2T	NY	10	5	—
WA2PVV	NY	10	5	—
W2MPK	NY	9	6	—
WA2ABN	NY	7	5	—
W2WW	NY	7	3	—
K3QCQ*	PA	35	26	—
W3RUE	PA	30	10	26
W3TMZ*	MD	25	9	—
K3WHC*	PA	25	9	—
W3IP	MD	25	7	—
K3HZO	MD	20	9	—
K3IUV	PA	19	5	—
W3UJG	MD	16	6	—
K3HCE	MD	16	6	—
W3ZZ	MD	15	7	—
W3XO	MD	13	5	12
WA3DMF	MD	10	5	6
W3OTC	MD	8	5	—

K4QIF*	VA	39	21	—
W5HUQ/4*†	FL	33	39	—
WA4MVI*	SC	30	19	—
W4FJ*	VA	25	8	—
W4ATC/4	VA	25	8	—
WA4CQG*	AL	25	5	—
W4ISS	GA	23	8	—
W4GJO	GA	23	—	—
K4CAW	NC	23	—	—
WA4SBC	VA	20	8	—
W3IY/4	VA	19	7	—
WB4NMA	GA	17	6	—
K4GL	SC	16	7	—
KC4P	AL	16	5	—
WB4NXY	KY	16	5	—
K4LHB	VA	13	6	—
WD4CXU	VA	11	4	—
K4KAE	SC	8	2	—
KB4CRT	FL	7	2	15
K4KJP	FL	6	2	—
K5FF*	NM	38	29	—
W5UKQ*†	LA	30	11	—
W5HN	TX	23	7	—
W5RCI	MS	22	6	—
K5SW	OK	20	7	—
WA5HNK	TX	16	6	—

K5JRH	TX	15	4	—
N4JS/5	MS	13	5	—
KB5MR	OK	13	4	—
K5LLL	TX	11	6	—
WA5DBY	TX	11	4	—
K5WE	OK	11	4	—
W5DFU	OK	10	4	10
N5BBO	TX	10	3	—
K5DHU	TX	9	3	9
W5UWB	TX	8	3	—
W5NZS	TX	6	3	—
WA5YOU	LA	5	2	—
W6ABN*		43	34	—
K6JYO*		9	6	—
WB6NMT*		8	7	—
W7JF*	MT	15	11	—
W7LUX	AZ	5	3	—
K7ICW	NV	4	2	—
WA7JUO	NV	3	2	—
N7EIJ	ID	2	1	—
K8WW*	OH	45	34	—
WB8BKC	MI	29	9	—
W8IDU	MI	27	8	—
WB8PAT	OH	23	9	—
WB2DIN/8	WV	13	6	—

WB9SNR	IL	33	11	—
W9UD	IL	28	10	—
K9XY*	WI	21	11	—
K9SM	IL	16	7	16
KB9NM	WI	9	3	—
KØTLM*†	MO	47	24	—
WBØTEM*	IA	42	—	—
KAØY*	IA	40	9	—
WØRAP*†	IA	39	30	—
WØPW*	CO	28	10	—
KØALL*	ND	20	12	—
WØOHU	MN	20	6	—
WØFY	MO	20	—	—
WØLER	MN	18	6	—
WØVB	MN	17	6	—
WAØNOK	MO	9	3	—
WBØZKG	IA	9	3	—
WAØRWC	IA	8	3	—
WØSD	SD	7	2	—
VE7BBG*†		39	32	—
VE4MA*		23	28	—
VE2DFO		12	7	—
VE3AIB		11	7	—
VE1RC		3	2	—

hope that when a weak rare DX catch does poke its head above the noise, it won't be obliterated by those who still insist on holding their local and single-hop QSOs in the part of the band frequented by the DX stations. This conductor believes that the group from south Florida who suggested, several years ago, that 50.100 to 50.125 be used only for working, or attempting to work, DX were, and still are, on the right track. The local and single-hop work can be done just as well above about 50.130, and there will seldom bother anyone. Better still, why not begin at the domestic calling frequency of 50.2 and QSY up or down from that spot? In addition to helping reduce QRM, this will serve to populate more of the band and demonstrate to other amateur interests, as well as nonamateur services coveting more space, that the band is being utilized.

Despite marginal conditions, W6JKV's trip to Greenland can certainly be termed a success. In his one week in the capital city of Nuuke, or Godthab, as it is also known, Jim QSOed 80 stations in VE1, VE2, W1, W2, W3, W4 (one station, W4CKD), W5, W7, W8 and WØ (one station, KØSLR). A high point of the operation was an opening to the U.K., where he contacted G3COJ, G5KW, G3NOX, G4CUT, GW3MHW and GW3LDH. Another highlight was working K7KV in Seattle on what was probably auroral E. To the southwest, the best DX was W5FF/K5FF near Albuquerque, however, he was heard by W6UXN during that opening. Two Oklahoma City stations, N5DDB and WB5DSH, were also among the lucky ones. Here in the Washington area, the only night for propagation to Greenland was Monday, June 25. Several stations got in on the fun, including W3WFM, W1DGA/3 and W3IP, the latter running 10 W. This conductor missed the whole thing, choosing that night to be out of town on business! Jim was quite pleased with the operation and vows to return next year. He says that now he knows places to stay where erecting antennas will be less of a problem. He met a number of OX hams, some of whom expressed an interest in 6-meter operation. He was very appreciative of the hospitality he received and the cooperation of the officials who cleared the way for permission for him to operate.

2 Meters — EME takes the spotlight this month, with KB7Q's recently completed trip to Wyoming. Gene set up at a camp operated by WA7GSW at Kelly, Wyoming (Grid DN44), and was active for about four days, from June 30 through July 3. During this interval, 50 different stations were contacted in 15 states and 16 countries. Probably the most important aspect of the operation, and certainly one of its primary objectives was to enable a number of stations, needing only this state, to complete WAS. As a result, the trick was turned for K1FO, WB8PAT and W4DFK. I am sure that they and others who picked up the rare state are very grateful to KB7Q for his effort. Equipment consisted of a specially outfitted trailer on which an array of four KLM 16LBX Yagis were mounted. An 8877 supplied the needed transmit punch. Everything was arranged so that Gene could handle the entire station by himself. He was especially pleased with the performance of the four KLM Yagis, describing them as "super." Notable was the set-up's ability to work a number of other four-Yagi stations.

N5EZK Tulsa, Oklahoma, reports a good tropo opening the evening of June 24. Bob says he heard W4GJO in northwest Georgia when he first turned on the rig for the evening, but thought that he had just caught the end of an opening. Upon lamenting to locals K5WE and KB5MR that he could use an Alabama contact, who should appear with an S9 signal but WB4NJG in the needed state. That was followed by another Alabamian, WA4LIT, and then WA4PCS Kentucky, N5AFL/9 Illinois and four Tennessee stations — W4HHK, WA4VWR, WA4PGJ and WD4DGF. Bob notes that they even tried a crossband experiment. With WA4VWR Jackson, Tennessee, acting as the link, he was able to talk to K5WE and KB5MR with him on 2 and them on 70 cm. The evening's activities brought N5EZK three new states, raising his total to 21 for a little over a year of operation.

Accounts of E_s contacts have been fairly rare this summer, in comparison to past years. This, of course, reflects the situation noted on 6 meters. Some E-layer openings have been reported, however. KB4CRT says that June 20 produced one from his Tampa, Florida, QTH to Puerto Rico. It started out with good signals on 6 meters at 1330Z; whereupon John shifted to 2 meters and was heard by KP4EIT. Unfortunately, the 10 W that station had available on the higher band prevented a two-way, so the best they could do was a 2- to 6-meter crossband. Soon after, however, KP4EKG and KP4EOR were worked on 2 meters.

WAØVJF Wichita, Kansas, tells of a rather unusual E_s occurrence for 2 meters, back on June 5. After working Florida stations K4KCF, WA4YJF and K4DZP at about 0140Z, he heard a WA6. He first believed it to be transplant that wasn't signing/4, but on careful listening, a CM86 grid designator was heard. The station, WA6LHD, was worked a few minutes later and was the only California station heard. Checks with NØLL Smith Center, Kansas, revealed that 6s were worked during the period at that location, but no Florida stations. Other stations in the Tulsa area experienced the opposite result. WAØVJF apparently was situated just right for both. Looks like another time when a double-hop coast-to-coast contact was narrowly missed.

Another interesting propagation account comes from VE5LY Regina, Saskatchewan. Ross says that at 1508Z June 21 he worked KB5MR Tulsa, Oklahoma, in a contact that lasted only about 30 seconds. No other 2-meter signals were heard, nor were 6- or 10-meter signals in evidence. The only other sign of enhanced propagation were strong FM broadcast signals from North Dakota, obviously via tropo. This conductor offers the thought that the contact may have been by an overdense meteor burst. These can last that long, and sometimes longer.

WB4NXY wants it known that he is ready to provide Grid EM77 and Kentucky to anyone who may need either. Greg has ½ kW and good antennas going on both 2 meters and 70 cm. He can be reached at 502-942-3886.

1¼ Meters — The lead in the July column stressed the point that we are not in any immediate danger of losing this band but that, if we are not to suffer that fate eventually, we must build the activity level. The column brought many replies from people whose interests in 220 MHz run the gambit from FM simplex to moonbounce, with CW/SSB tropo work and packet radio somewhere in between. Here are a few samples.

KC4EG and WA4PCS plan to start a net, beginning August 7, to serve Kentucky and surrounding states. It will be held Tuesday evenings, the usual activity night for this band. Beginning at 2200 local time, the procedure calls for KC4EG to start with his beam due north and follow the hands of the clock around through south, where WA4PCS will pick it up following the clock around the rest of the way. Frequency will be 220.120. Both stations have about 350-W output to single Boomers and GaAsFET preamps. WB2WIK writes that they gave the band a real shot at K2XR/2 in Western New York during the ARRL June VHF QSO Party with good equipment and a very good site. Steve says that they made 60 contacts, but thought that they should have done better. He joins the plea for more activity. WB2WIK adds that he is still ready to go at the home QTH with a kW and a 17-element Boomer at 50 feet, and notes that WA1STO is on every Tuesday evening from her excellent site at Burlington, Connecticut, trying to drum up business. Steve urges everyone who has 220-MHz equipment to put it on, and for all of us to write to the manufacturers advising them of our interest in gear for the band, particularly the multi-mode type. N3CX in southwestern Pennsylvania writes that he feels that 220 is a very good band, and also pleads for more activity. Dave is now set up on the band and looking for skeds. Rig is 500 W to two 2.2-wavelength NBS Yagis at 60 feet. He can be reached by phone at 215-679-7293, or write to Box 138, RD 2, Pennsburg, PA 18073.

The Higher Bands — Here's the story on the new 23-cm terrestrial record noted earlier in this column. After several days of 2-meter and 70-cm propagation across the 2500 miles of open water, the 1296.000-MHz KH6HME beacon, which N6CA had built and shipped to Hawaii several years ago, began to be heard in the Los Angeles basin. Whereupon, N6CA contacted the beacon keeper at his QTH in Hilo via landline, and Paul immediately set out for the site some 8000 feet up on Mauna Loa. The record-breaking two-way between the two occurred at 0035Z June 24, with N6CA operating portable 1100 feet above sea level on the Palos Verdes Peninsula, which juts into the Pacific a few miles southwest of Los Angeles. Equipment at N6CA/6 consisted of 100 W to a 44-element loop Yagi. At the Hawaiian end, the rig ran 20 W to an array of 25-element loop Yagis stacked four high. Both ends employed 1.5-dB-noise-figure preamps. The signal from KH6HME was also received by WB6ESQ, but he could not be heard at the Hawaiian end. Thus, one of the world's best and longest tropo ducting paths has been responsible for yet another world-above-50-MHz DX record.

How much higher in frequency it will go, no one knows. But you can bet that a number of microwave enthusiasts intend to find out. See The New Frontier, this issue, for additional information regarding this historic contact.

A very noteworthy contact was made during the June VHF QSO Party by K3MTK/3 operating from Big Pocono State Park, near Tannersville, Pennsylvania, and W8YIO Manchester, Michigan. After the two stations worked first on 23 cm, they switched to the next higher band and completed a 440-mile QSO on 2304 MHz. They both were able to make the grade on SSB as well as CW. Equipment at K3MTK consisted of 100 W to a 16-foot dish, while W8YIO ran an 8-foot dish and 400-W output. Congratulations to all for a fine accomplishment!

YL News and Views

Conducted By Jean Peacor,* K1IJV

Congratulations to a Very Special Amateur

Late last year, Sheila Leilehua Conover, of Newport Beach, California, passed her Novice test and became KB6CZX in the Amateur Radio community. She looks forward to many years of joyous hamming.

It would be nice, but unfortunately impossible, to write about each and every new member to Amateur Radio, as each would be a unique and interesting story. Why has Sheila been singled out? Because Sheila is a United States Olympian who participated in the 1984 Olympics in Los Angeles. Also, this young woman, barely 21, found the time during her Olympic training to continue her studies toward her career ambition of sports medicine, to attend classes in Morse code and theory, and to successfully pass the Novice exam.

Sheila is a kayaker, and is one of four women selected for the United States Olympic Team. She first became involved in this sport when she was 16. After talking with her brother Jeff about his outrigger canoeing, she decided to try out for the women's team. She became the youngest member of the Balboa Bay Outrigger Canoe Club team (Newport Beach, California). They competed and won second place in the annual women's Molokai Channel outrigger canoe race that year, a grueling 42-mile race from Molokai to Oahu, Hawaii.

It was in 1980, however, that fate took a hand and brought Sheila to the sport in which she would one day represent the United States. Her coach and now close friend, Billy Whitford,

Despite a rigorous training schedule, Olympic hopeful Sheila Conover, KB6CZX, managed to find time to study for — and pass — the test for her Technician class license.

KB6CZY, and current Western Regional Coach of the American Canoe Association, competed in the Olympic trials in Vermont that year. After watching the kayakers, he decided that his team of girls could master this difficult sport. Sheila spent that winter training in cold water before school, after school and every weekend. Six months after she first started training in this new form of paddling, Sheila was a world-class Olympic Flatwater Kayaker.

In June 1981, she competed in the Junior World Trials. Held in Oak Ridge, Tennessee, it was the first of many steps toward selection of the U.S. Olympic Team. Sheila finished in first place. Shortly thereafter, as a member of the team for the United States, she went to Sofia, Bulgaria. In the singles event (K1), she finished ninth in the world. From Bulgaria, she went to Canada, where she won the Junior National Canadian Title, the first and only time a competitor from outside Canada had accomplished such a feat.

No longer competing as a junior, Sheila was selected to one of the four spots on the U.S. National Team at Lake Sebago, New York, in May 1982. The team took eighth place in the World Championships, held in Yugoslavia shortly thereafter. Many races, many victories and many honors later, the United States Olympic Women's Kayak team and Sheila Conover, KB6CZX, competed for new laurels at the 1984 Olympic Games in Los Angeles.

By the way, Sheila and Billy found time during the Olympic Trials to upgrade to Technician class, and are heard from time to time on 2 meters in the Orange County, California, area. They hope to upgrade to General class soon so they will be able to communicate with other kayakers throughout the world. Truly special people bringing special honors to the community of Amateur Radio.

Congratulations, Sheila Conover, KB6CZX.
— *Warren Hoffnung, KF6VV*

RESULTS, 1984 DXYL TO NAYL CONTEST

Phone

NA		*DX*
WD4NKP	Gold Cup	DJ2YL
WD5FQX	Second Place	DJØEK
KM8E	Third Place	DJ1TE

CW

WD4NKP	Gold Cup	DJ2YL
KM8E	Second Place	VK4BSQ
VE7BIP	Third Place	VK3KS

Plaque Winners (Combined Scores)

NA	*DX*
WD4NKP	DJ2YL

Phone

NA — WD4NKP, 1610†; WD5FQX, 750†; KM8E, 656†; WA2NFY, 225†; KB8RT, 200†; VE7BIP, 106†; N8FDT, 96†; KA2ESQ, 79†; WB9TDR, 75†; KBØTK, 56†.

DX — DJ2YL, 1056; DJØEK, 882; DJ1TE, 490†; VK3KS, 455†; 4X4NW, 378†; CX5CT, 358†; VK4BSQ, 248†; OX3ZM, 213†; PA3ADR, 120†; G4EZI, 110†; PA3CEB, 75†; CT2VH, 40†; ISØSFZ, 20†.

*Country Club Dr., Monson, MA 01057

CW

NA — WD4NKP, 75†; KM8E, 50†; VE7BIP, 18†; WA2NFY, 15†; VE3GSQ, 10†; WD5FOX, 5†.

DX — DJ2YL, 280; VK4BSQ, 180†; VK3KS, 169†; DF6UI, 60†; CT1YH, 38†.

†Low-power multiplier

RESULTS, 1984 YLRL YL/OM CONTEST

Phone

YL		*OM*
DF9YY	Gold Cup	K4JRB
KØEPE	Second Place	OK3CGP
ON6GQ	Third Place	K2LFG

YL Phone — DF9YY, 85,338; KØEPE, 64,557†; ON6GQ, 58,650†; ON4AYL, 55,931†; ON8IC, 52,394†; WB7FDE, 51,374; IT9JLA, 49,481†; KCØGM, 44,294†; 4X6DW, 25,935†; DJØEK, 19,327; K8ONV/4, 14,560†; Y51ZE, 11,331†; DL2SAP, 10,354†; OK1ARI, 9590†; WDØAKS, 9540†; WD8MEV, 8437†; K6INK, 8007; WA8FSX, 6865; KM8E, 6521†; DK9ZL, 6480†; ON6OW, 6012†; Y44AF, 4425†; F5RC, 1900†; WA8YPY, 1897†; DL4EBE, 1875†; WA2NFY, 1200†; YO4COM, 1100†; DF8XU, 980†; SP2FF, 764†; OZ1FRR, 613†; WA4SRD, 553†; OZ1KLD, 525; N5FIY, 338†; G4EZI, 330†; DF3BN, 280†.

OM Phone — K4JRB, 4070†; OK3CGP, 3700†; K2LFG, 1688†; W9LNQ, 735†; DL1RA, 576; W1HOZ, 450†; W3IEZ, 450†; AA4FF, 440†; I8ZLW, 423†; OH2LU, 325†; KØETA, 298†; W6ZT, 288; W3ARK, 285†; F6HNL, 248†; SP2UUU, 236†; OK3KXR, 236†; F2FQ, 213†; LA2TO, 213†; DL6MCX, 213†; EA3LA, 200; LA2AD, 180†; JH3DPB, 180; Y67YL, 166†; Y22HF, 128†; OK2BQL, 114†; OK2MNV, 113†; Y45ZE, 110†; OZ1CFV, 110†; Y48UJ, 105†; Y47NF, 100†; OK1KZ, 98†; WA3EXX, 90†; OK1XG, 90†; Y34XF, 83†; W7ULC, 80†; Y32WN, 75†; Y55YF, 70†; YU7SF, 70†; Y26SO, 60†; SP6DVP, 60†; Y38UG, 50†; KE4SX/TF, 50†; G4DZI, 45†; W2IP, 42†; Y67YN, 40†; Y79WN, 40†; DF2RG, 34†; YO3ZR, 30†; OK2ABU, 30†; CT1CLR, 24; Y33TL, 23†; OK2YN, 23†; Y75XH, 19†; Y21TL, 15†; Y45SA, 15†; OZ3KE, 12.

CW

YL		*OM*
OK3KEG	Gold Cup	W7ULC
OK3TMF	Second Place	W9LNQ
I2RLX	Third Place	W1HOZ

YL CW — OK3KEG, 65,681†; OK3TMF, 42,075†; I2RLX, 38,463†; KG1F, 14,544†; WA2WHE, 7500†; W8YL, 6694†; DL2SAP, 6213†; KR3L, 6169†; K8ONV/4, 5006†; N7DHA, 4275†; OH6CD, 3031†; WD8MEV, 2516†; N9AIB, 2475†; CT1YH, 2065†; K2RUE, 2015†; VK3KS, 1870†; WA8YPY, 1742†; WA4SRD, 1530†; N5FIY, 1384†; WA2NFY, 1283†; WA8FSX, 1215†; DJØEK, 1018†; K4LMB, 352.

OM CW — W7ULC, 675†; W9LNQ, 489†; W1HOZ, 333†; K2LFG, 309†; W6ZT, 280; W8TSF, 195; W2AAU, 192, W1BNS, 176; WA3EXX, 163†; W9CA, 124†; W2UAP, 110†; VE6UP, 110; W7RD, 110†; DK3OI, 99†; W1OPJ, 75†; WAØCTX, 53†; YU7SF, 49; OK1DLY, 31†; OK2ABU, 31†; W3GN, 16; EA4BV, 8; JA2KPV, 5†; LU1EWI, 5†; JH2XTV, 4; DL6MCX, 1†.

†Low-power multiplier

Amateur Satellite Program News

Conducted By
Bernie Glassmeyer,*
W9KDR

NEW AMSAT-OSCAR 10 BEACON AND TRANSPONDER SCHEDULE

Starting in August, the 145.810-MHz beacon on OSCAR 10 will carry RTTY (50-baud, 170-Hz shift) bulletins, and the Mode B and Mode L times on and off will change. Updating of the CW five-minute bulletin on the hour and half hour began July 13. Everyone is encouraged to monitor the beacon for all the latest information about Amateur Radio satellites. A new beacon operations schedule has been announced as follows:

CW bulletins at 0-5 and 30-35 minutes past the hour; PSK bulletins at 5-15, 20-30, 35-45 and 50-60 minutes past the hour; RTTY bulletins at 15-20 and 45-50 minutes past the hour. AMSAT Hq. is looking for suggestions as to what other operating aids might be included.

Mode B will be on from Mean Anomaly 107 to 217 (301 minutes) and 235 to 089 (304 minutes). Mode L will be on from Mean Anomaly 090 to 106 (44 minutes). Each orbit of 699.5 minutes is divided, from perigee to perigee, into 256 parts. Apogee occurs at Mean Anomaly 128.

The regularity of any satellite schedule is dictated by the spacecraft battery needs. Thus, the schedule is subject to change.

AMSAT Annual Meeting Announced

The Second Annual AMSAT Technical Symposium and the 1984 Annual Membership Meeting have been scheduled for Saturday, November 10, 1984, at the AMFAC Hotel, 8601 Lincoln Blvd, Los Angeles, CA 90045, tel. 213-670-8111. The hotel is near Los Angeles International Airport. AMSAT has arranged for a block of corporate-rate rooms, and requests you make your reservations with the hotel.

Dr. Cleyon Yowell, AD6P, will serve as symposium technical chairman. A call for papers has been issued. Submissions should be sent to Dr. Cleyon Yowell, The Aerospace Corp., Mail Station M4-930, P.O. Box 92957, Los Angeles, CA 90009, tel. 213-615-4234. (tnx W6SP)

Space Shuttle Amateur Radio Launch

Read about the details of the second Amateur Radio Space Shuttle operation on page 46, this issue. Launch is set for 1100 UTC October 1, 1984.

W5LFL To Make Second Flight On Space Shuttle

Owen Garriott, W5LFL, has been selected by NASA to fly on mission 51-H, scheduled for November 1985. More news will be reported as it becomes available.

Second AMSAT Member Recruitment Drive

AMSAT General Manager Bill Lazzaro, N2CF, announced that the second membership recruitment drive will start August 1, 1984 and run until December 31, 1984.

While some modifications to the rules are under consideration by N2CF and KO5I, the basic premise remains unchanged from last year: Sign up new members. Complete rules will be published by AMSAT soon. It's time to extend your hand and welcome aboard new members. AMSAT needs them, and you can benefit by helping to strengthen AMSAT. Come August 1 you should be on your way. Send an s.a.s.e. to AMSAT Hq. for membership applications. (tnx ASR No. 82)

Amateur Satellite Technical Planning Meeting

The meeting was held near Cheltenham, England, from June 30 to July 3. Those attending were G3YJO, W3GEY, DJ4ZC, KA9Q, KE3D, HA5WH, W4PUJ, NK6K, VE1SAT/VE6, G8DQX, DK1YQ, DJ5KQ, ZL1AOX and ZS6BNT.

The group discussed the following topics:

PACSAT — presentation of project status, design summary, schedule.

UoSAT — presentation of program status, attitude-control results, experiment plans.

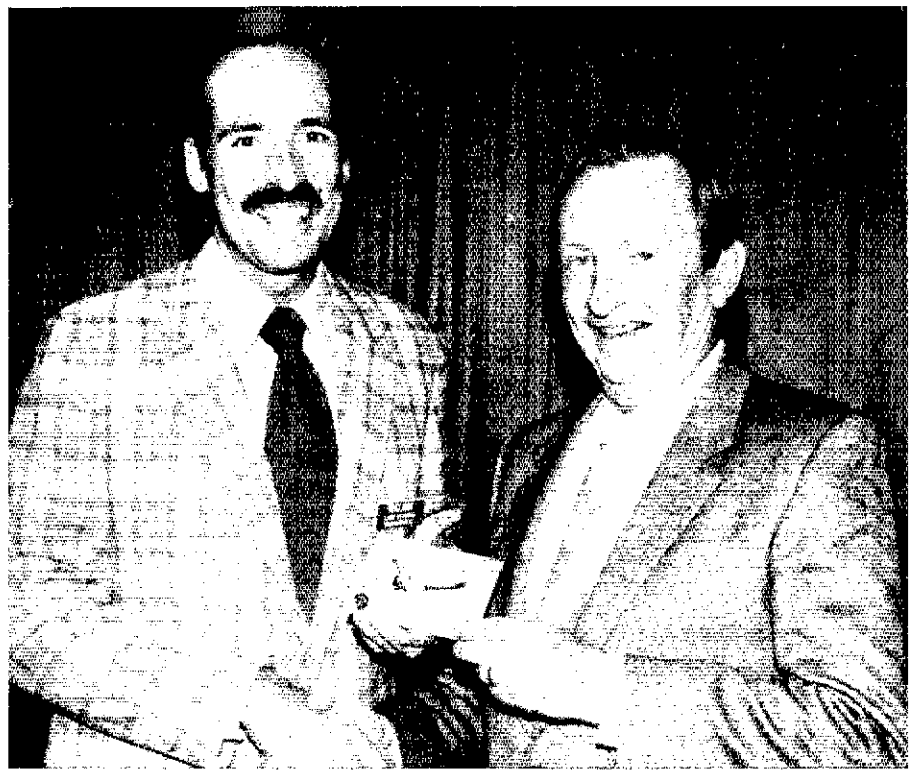
AO-10 — spacecraft status, 1984/5/6 eclipse studies, operating schedules and modes.

ARIANE 4 — launch-opportunity status, Phase IIIC configuration, Phase IV (geostationary) proposal.

Technologies — propulsion technologies, attitude control/stabilization technologies, new processors/controllers, ranging, modulation techniques/protocols/data standards, separation systems for new missions.

Organization — improved international coordination of satellite technical standards, spectrum utilization, launch opportunities, spacecraft operation, information dissemination, fund raising.

The formation of an Amateur Satellite Service Council was proposed to expedite the above with representation from all bona fide amateur satellite groups worldwide. The meeting was considered to have been most fruitful and resulted in the definition of future goals and missions, while ensuring the maximum potential is realized from current programs. (tnx ASR No. 82)



Lance Collister, WA1JXN (left), of Frenchtown, Montana, receives his W5LFL two-way QSL card from Roy Neal, K6DUE, at the ARRL Oregon State Convention. Lance made the first Amateur Radio contact with Owen Garriott, W5LFL, during the STS-9 Space Shuttle flight. *(photo by WB7SIC)*

Satellite Gateways

Cross-country HT QSOs are now a reality using Satellite Gateway stations. "Rip" Riportella, WA2LQQ, AMSAT Executive Vice President, says that Amateur Radio satellite operation is becoming easier and more accessible to those who would like to see what it's like before investing lots of time and money. "The secret of the new ease of taking AMSAT-OSCAR 10 'out for a trial spin around the block' is gateways," he said. The gateway is simply a specially equipped station that ties your local FM repeater to the satellite. One can work the world with a hand-held radio flex antenna!

Anyone wanting more information on gateways, including technical suggestions, should contact AMSAT, P.O. Box 27, Dept. GW, Washington, DC 20044. Please enclose an s.a.s.e. with your inquiry. (tnx ARRL Letter)

Space Shuttle Audio

The Spaceport Amateur Repeater Club (SPARC) has been authorized by AMSAT to transmit Space Shuttle mission commentary for all missions on AMSAT-OSCAR 10 Special Services Channel H2 (145.963 MHz), according to Carl S. Zelich, AA4MI. John Anderson, K4GCC, and John McDonald, WB4ZXS, AMSAT Area Coordinator, will provide mission audio as time permits. All amateurs are invited to submit reception reports to SPARC, P.O. Box 672, Merritt Island, FL 32952.

Monthly Listings

☐ *ASR* (Amateur Satellite Report) is available for $22 ($30 overseas) for 26 issues (1 year) from Amateur Satellite Report, 221 Long Swamp Rd., Wolcott, CT 06716.

☐ AMSAT Membership is available for $24 per year ($26 outside North America). Life Membership is $600. Subscription to six issues of *Orbit* magazine each year is inseparable from membership. Write to or call AMSAT Hq., P.O. Box 27, Washington, DC 20044, tel. 301-589-6062. VISA/MC cards accepted.

☐ ARRL members only send a 4- × 9-in s.a.s.e. with your call sign to ARRL for a complete, monthly orbit schedule for all operating Amateur Radio satellites. Please mark the s.a.s.e. with the month needed, to help us ensure that the envelopes are filled properly. A year's supply of s.a.s.e.'s may be sent in at one time, but be sure to affix 2 units of postage to each s.a.s.e.

☐ The OSCARLOCATOR package second revision is now available for $8.50 U.S., $9.50 elsewhere. This package and *The Satellite Experimenter's Handbook* contain all the information you need to get started using the Amateur Radio satellites.

☐ A free package of information about AMSAT and the Amateur Satellite Program is available from ARRL Hq. This package is intended for those with no knowledge of the program.

*Satellite Program Manager, ARRL

Silent Keys

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

WA1ACI, Harold S. Emery, Milton, MA
N1BLT, Kenneth J. Cote, Holyoke, MA
KA1ILB, Stanley W. Zurek, New Britain, CT
WA1JYH, Leo H. Maxwell, Cambridge, MA
WA1MBC, George W. McElwain, Southampton, MA
W1NKE, Richard W. Houghton, Littleton, MA
W2BYX, Stanley S. Zajac, Buffalo, NY
W2CYV, Harry A. Brinson, Sidney, NY
*KM2E, Beresford Smith, East Windsor, NJ
WB2GPA, Andrew B. Young, Elizabeth, NJ
WA2HLB, Joseph Santos, Sr., Bloomville, NY
K2LA, Charles M. Hughes, Millville, NJ
WA2NZF, Belton "Ted" Campbell, Linden, NJ
WA2ONL, Joseph N. Husch, Rego Park, NY
WB2RWK, Lionel S. Cole, Perth Amboy, NJ
K2TPH, William J. Hauer, Rahway, NJ
W2YJV, Brockenbrou Evans, Cranberry Lake, NY
W2YNN, Richard D. Coleman, Sea Cliff, NY
N3AQY, Edward J. King, Philadelphia, PA
W3CXD, John C. Onda, Lanham, MD
W3GTL, William D. Bowman, Paxtang, PA
W3HBQ, Willard I. Getz, Elysburg, PA
W3KSG, Robert E. Lindberg, Elizabeth, PA
W3VK, Charles A. Weaver, Sharon, PA
W4BDT, Vernon E. Goforth, Spartanburg, SC
WA4CZE, Zachary Botwinick, Lauderhill, FL
WA4DVU, Arthur C. M. Vile, Sr., Laurel Fork, VA
WA4GKK, James G. Goodin, Knoxville, TN
K4GZ, Charles A. Louis, Port Salerno, FL
WB4LWA, Gene P. Klarman, North Redington Beach, FL
W4QCP, Donald Ladd, San Mateo, FL
K5CHS, Charles W. Morrow, Tyler, TX
W5COC, John H. "Hank" Johnston, Elm Mott, TX
WA5ETM, Albert F. Davidson, Tulsa, OK
W5FZN, Kenneth Clapham, San Antonio, TX
WB5GGQ, Horace Whitfield, El Paso, TX
*W5GPQ, William E. Campbell, Elgin, TX
W5LZZ, Albert F. Hintze, Beaumont, TX
KA5NTP, Paul Kernek, Holdenville, OK
KA5POF, Norma D. Braun, Alvin, TX
*W5QNT, William B. Ditmore, Aztec, NM
W5RDD, James W. McMahan, Jr., El Campo, TX
W5RI, Fredrick H. Cooper, Dallas, TX
W5WB, Raymond Morrow, Waco, TX
K5YNE, Edward J. Bundschuh, Sherman, TX
W5YSN, Frank L. Jamison, Sr., Baton Rouge, LA
W6AOR, Francis M. Sarver, Van Nuys, CA
W6BI, Leroy F. Watson, Berkeley, CA
WD6BUV, Terry J. Phillips, Canoga Park, CA
KD6CD, Yves J. Melanson, San Pedro, CA
W6CHY, Gan A. Baker, Santa Monica, CA
KE6HT, Don O. Friend, Sacramento, CA
WA6HUB, Halton S. McQueen, Indio, CA
W6KJ, Russell A. Hanlon, San Francisco, CA
W6NCP, Ira C. Bechtold, La Habra Heights, CA
WA6OPX, Ellis M. Calkins, Panorama City, CA
W6QVI, Alvan L. Mitchell, Hayward, CA
K6RQD, Charles W. Cutshall, Anaheim, CA
W6RYP, Lee E. Dearth, Canoga Park, CA
WA6TIV, Otto H. Kjos, El Cajon, CA
K6UM, Rulon S. Bailey, Rancho Palos Verdes, CA
W6VJN, Ferris W. Hartman, Oakland, CA
KA7BED, Wilfred T. Brown, Auburn, WA
W7CEK, Gerald L. Corkins, Renton, WA
W7CKH, James P. Welborn, Henderson, NV
W7CT, Leslie E. Crouter, Helena, MT
W7IG, Jonas Asplund, Eatonville, WA
W7JUO, Frank L. Long, Jr., Boulder City, NV
WA7RMV, Walter M. Jones, Billings, MT
WB7TGE, Alan H. Bishop, Eugene, OR
W7UIN, William L. Black, Reno, NV
K7UIT, Earl D. Davis, Yakima, WA
W7UO, Howard G. Barton, Seattle, WA
NC7W, Mark T. Johnson, Beaverton, OR
W7WW, Albert R. Bishop, Portland, OR
W8DJI, Harold B. King, Dayton, OH
WB8GAL, John J. Zickes, Parma, OH
W8MFQ, Casper D. Bickerton, Berkeley Springs, WV
W8ZCV, Walter G. Burdine, Waynesville, OH
K8ZKH, Michael "Ray" Engardio, Lansing, MI
WB9BDQ, Russell P. Boggs, Hanover Park, IL
K9BLM, James W. Ramsey, Newburgh, IN
W9BQQ, Clifford C. Penniston, Sr., Argyle, WI
N9DAA, Roger H. Nielson, Milwaukee, WI
W9EEX, John H. Chapin, Caseyville, IL
WN9FZC, David R. Hilgeman, Evansville, IN
W9IJ, Thomas A. Prewitt, Kokomo, IN
KA9JJZ, Richard W. Arens, Paragon, IN
*K9SSI, Robert M. Wampler, Greenfield, IN
K9URD, Herman C. Mootz, Evansville, IN
WA9ZLP, Alexander Suritis, Elkhorn, WI
K9ZTH, Frederick A. Mosser, Park City, IL
WØAXW, Samuel L. Cloud, Saint Joseph, MO
*WØCHM, M. Gerald Arthur, Boulder, CO
KØFLT, J. Keith Kerr, Hibbing, MN
KØGOZ, Carl H. Bruns, Overland Park, KS
KØJOW, Kenneth E. White, Nevada, MO
WØMEK, Emil F. Paur, Jr., Pisek, ND
WØMXQ, James R. Mitchell, Luverne, MN
WØNNI, Roden Rogers, Denver, CO
KØSMJ, Arie Schakel, Bavaria, KS
WBØSOY, Spencer E. Brader, Plymouth, MN
KØUEA, Charley B. Eddy, Kansas City, MO
WBØVXO, Charles A. Humphrey, Mission, KS
WBØZXK, Rowland Eppleston, Sr., St. Louis Park, MN
VE3VI, James A. McIntosh, Nepean, ON
VE4AX, Frank E. Doolan, East Selkirk, MB
VE4ME, William H. Macauley, Winnipeg, MB
F9KX, Julien Luc, Meung-sur-Loire, France
SM5BPI, Eric Thalen, Upplands Vaesby, Sweden

*Life Member, ARRL

In order to avoid unfortunate errors in the Silent Keys column, reports of Silent Keys are confirmed through acknowledgment only to the family of the deceased. Thus, those who report a Silent Key will not necessarily receive an acknowledgment from Hq.

Note: All Silent Key reports sent to Hq. must include the name, address and call sign of the *reporter* as well as the name, address and call of the Silent Key in order to be listed in the column. Please allow several months for the listing to appear in *QST*.

50 Years Ago

September 1934

☐ Rapid growth of the amateur body has caused severe crowding of our bands. The Editor says we've progressed considerably in technical areas, and pleads for an equal improvement in operating techniques, courtesy and consideration of your fellow ham.

☐ R. B. Dome, of General Electric, improves the efficiency of a very short antenna by "top loading" — a metal sphere or disc for capacity, along with a tuning coil, to reduce ground lead current to zero.

☐ Ross Hull points out that currently available tubes will work on 112 Mc., and with minor alterations to variable condensers and other components a signal can be generated on 224 as well.

☐ Lots of us think we know Ohm's law, but still have trouble figuring the simplest kind of voltage divider. Jim Lamb takes us by the hand through a basic problem and its solution.

☐ Thirteen hundred hams took part in the International Relay Competition (DX contest, that is), breaking all previous records in participation and accomplishments.

☐ The Radio Society of Great Britain and the League are sponsoring a year-long 28-Mc. contest, with points for equipment development as well as QSOs — one point for each 100 miles of contact distance.

☐ Various clubs are restructuring their by-laws to conform to the League's new requirements for affiliation — i.e., club majority control strictly in the hands of licensed amateurs who are League members.

☐ W6BJM uses multiple-contact keying relays to switch the headphone leads to an audio tone oscillator for monitoring.

☐ Treasurer Hebert, W1ES, is "on tour" as A.R.R.L. fieldman, undertaking a trip of more than 9000 miles to attend several weekend Divisional conventions and stopping at local radio club meetings during the week.

☐ Twenty members of the United Radio Amateurs of Torrance (California) made top score in the June Field Day — 58 contacts. The Egyptian Radio Club (Illinois) was right behind with 56. Both setups were crystal controlled.

☐ The Department of State has concluded a third-party-traffic agreement with Peru.

25 Years Ago

September 1959

☐ The League continues to run into a stone wall in efforts to get us reciprocal-licensing privileges. American GIs operating postwar in occupied countries with near-kilowatts (compared with 50 watts or so allowed citizens of those countries) and wholesale traffic handling (prohibited to citizens) have helped put a damper on negotiations toward the goal.

☐ W1ICP built a five-band 100-watt rig, making heavy use of parts from a discarded television set.

☐ Apartment-dweller W2BIV enumerates various potential dangers in installing antennas on apartment house roofs, and then offers solutions aimed at greater safety. He recommends insurance, also!

☐ W9ESD returns to the almost-lost art of winding your own transformer with a "cool kilowatt" power transformer built in his workshop. Use of newer-type core material reduces the usual size and weight.

☐ A. L. Budlong, League General Manager, concludes a history of national and international regulation of the amateur radio service, as background for members following the progress of the 1959 world radio conference now starting in Geneva, Switzerland.

☐ W1HDQ makes use of some new Amperex tubes (the 6360 and 6352) to get 40 watts of voice signal on 220 Mc.

☐ Combining various earlier published ideas on break-in, W5ECP has built one unit incorporating an electronic T-R (transmit-receive) switch plus audio muting and keying monitor circuits.

☐ W2PPL has another use for the surplus BC-453, which he revamped into a tunable i.f. for a receiver setup starting with a four-band, crystal-controlled converter.

☐ Some 300 logs were submitted in the 1959 Novice Roundup activity. Extra points were given for qualifying in a code-proficiency training run from W1AW.

☐ W6MMU, who helped set some of the new 1296-Mc. DX records, shows us a crystal converter for that band, with emphasis on some of the special construction techniques necessary for success.

☐ You can convert your fixed/guyed tower to a tilt-over model by following procedures outlined by W4PRM.

☐ Borneo is a mighty rare country, as 2L4JA discovered when he went there as VS5JA, facing the pandemonium and pileups from eager country-hunters.

☐ Despite a last-minute switch in date by the Office of Civil Defense, Amateur Radio Emergency Corps and Radio Amateur Civil Emergency Service groups responded in good numbers to the Operation Alert test of disaster communications preparedness.

☐ After a whirlwind romance at the National Convention in Galveston, League Prexy WØTSN and the "Dew Drop of Texas" (W5DEW) tied the nuptial knot.

☐ Technician class licensees can now use the same portion of 2 meters available to Novices — 145-147 Mc. — *W1RW*

Coming Conventions

By Marjorie C. Tenney,* WB1FSN

September 15-16
Delta Division, New Orleans, LA

†**September 22-23**
Roanoke Division, Virginia Beach, VA

†**September 29-30**
New England Division, Boxboro, MA

†**September 29-30**
Great Lakes Division, Louisville, KY

October 6-7
Texas State, Houston

†**October 12-13**
Iowa State, South Sioux City, Nebraska

†**October 12-14**
Southwestern Division, Santa Maria, California

October 27-28
Tennessee State, Chattanooga

November 24-25
South Florida Section, Clearwater

ARRL NATIONAL CONVENTIONS

October 4-6, 1985
Louisville, Kentucky

September 5-7, 1986
San Diego, California

June 19-21, 1987
Atlanta, Georgia

†At press time, Amateur Radio exams are scheduled to be given at these conventions.

DELTA DIVISION CONVENTION
September 15-16, New Orleans, LA

The 1984 ARRL Delta Division Convention will again be hosted by AMACOM '84, The New Orleans Hamfest-Computer Fest. This year's convention will be held at the Landmark Hotel (I-10 at Severn Drive), 9-5 Saturday and 9-3:30 Sunday.

Attractions include commercial dealer displays, a protected flea market, concessions and abundant off-street parking. In addition to technical seminars, an ARRL forum is planned. Amateur examinations will be conducted at 9 A.M. Saturday morning.

Admission is $5 per person. Flea-market tables will be available at $3 each per day. Motel reservations may be made through the Landmark Hotel. Specify AMACOM '84 for special Hamfest room rates. Talk-in on 22/82. For further information, contact Bill Bushnell, WA5MJM, at 504-887-5022.

ROANOKE DIVISION CONVENTION
September 22-23, Virginia Beach, VA

The 1984 ARRL Roanoke Division Convention and 9th Annual Amateur Radio and Computer Fair will be at the Virginia Beach Pavilion, on Saturday and Sunday, September 22 and 23. Featured are dealers, special displays, forums, computer equipment, gigantic flea market, women's activities and movies for kids.

Bring the family to vacation at beautiful Virginia Beach. Also, visit the fantastic Waterside Festival Marketplace in Norfolk. They'll love the specialty shops and restaurants.

Show time is 9 A.M. to 5 P.M. Admission for both days is $4 in advance or $5 at the door. Flea market tables are $5 one day, $8 both days. For information and tickets, call or write to Jim Harrison, N4NV, 1234 Little Bay Ave., Norfolk, VA 23503, tel. 804-587-1695.

NEW ENGLAND DIVISION CONVENTION
September 29-30, Boxboro, MA

This is the fourth time that the Federation of Eastern Massachusetts Amateur Radio Associations will present the New England Division ARRL Convention at the Sheraton Boxboro Hotel, Rte. 495 at Rte. 111, Boxboro. The expanded flea market will open at 8 A.M., Saturday, Sept. 29 (the exhibits one hour later), and close at 5. Sunday's opening will be 9 A.M. for the flea market and 10 A.M. for the exhibits, but both will close at 2.

Saturday night's features will include dancing to a live orchestra, and other live entertainment. At midnight, a special Wouff Hong ceremony will be presented by the Radio Amateur Society of Norwich, Connecticut. This is the group famous for their theatrical excellence and special Wouff Hong souvenir buttons!

Women's programs will be offered both days so the whole family can enjoy the convention even if one member is not a ham! The alternative programming will feature a fashion show and how-to programs in photography and vegetable gardening, counted cross-stitch techniques and other features.

For the first time in several years, amateur exams will be available. A full range of tests will be offered, from Novice through Extra Class, under the new Volunteer Examiner Program. The hamfest brochures being mailed to every ham in the W1 area will carry the exact procedure that must be followed to sign up for an exam.

As of this writing, there are over 50 exhibitor booths signed up to show the latest in ham radio. Extensive seminars will be offered both days, as well as fox hunts using hand-held rigs on 146.52. Awards will be made throughout both days.

Early-bird registration is $6; full-course roast beef banquet, dance and show, $15.50. Send checks (payable to FEMARA) to Arthur Tomkinson, W1THT, 9 Oliver Terr., Revere, MA 02151. S.a.s.e., please.

GREAT LAKES DIVISION CONVENTION
September 29-30, Louisville, KY

The 1984 Great Lakes Division Convention and the 14th Annual Greater Louisville Hamfest is Sept. 29-30, from 8 A.M. to 5 P.M. both days, at America's largest single-floor exhibition center, the Kentucky Fair and Exposition Center. Take exit 12B off I-264. Gigantic indoor exhibitors area and flea market with over 150,000 sq. ft of floor space, totally air-conditioned.

A full slate of activities include Kentucky nets meetings; ARES meeting; Army, Navy and Air Force MARS; QSL card contest; AMSAT forum; ATV forum; computer forum; home-built equipment contest; DX forum with Lloyd Colvin, W6KG, and Iris Colvin, W6QL, and Don Search, W3AZD, of ARRL; ARRL forum with George S. Wilson, III, W4OYI, Great Lakes Division Director. Special activities include DA SHED House Gang Bash, Friday, Sept. 28, Executive Inn Motor Hotel, Dolphin Room, starting at 8 P.M., Gala Saturday night banquet at the hamfest site, COD bar at 5:30 P.M., banquet at 7 P.M. (advance reservations *only*); ARRL Wouff Hong Initiation ceremony Saturday night, starting at 11:30 P.M., at the hamfest site, sponsored by the ARTS Club of Louisville; full women's program, with many activities for both days of the hamfest.

For room reservations, contact either the Executive Inn Motor Hotel at 502-367-6161, or the Executive West Motor Hotel at 502-367-2251. Both hotels are directly across from the hamfest site.

Hamfest registration is $5 in advance, $6 at the door. Flea Market vendors pay admission plus $4 per space for one day only, $6 per space (total) for both days. Flea market is open for setup *only* after 6 P.M. Friday, Sept. 28, on a first-come, first-served basis. Vendors write for special flyer, c/o Flea Market. Camping is available on the grounds; free at special areas only, no hookups. Pay RV lot with hookups also available.

For exhibitor information, advance registration, hamfest brochure or general inquiries, write to The Greater Louisville Hamfest, c/o Pete Bard, WA4AUN, P.O. Box 34444, Louisville, KY 40232, tel. 502-368-6657.

IOWA STATE CONVENTION
October 12-13, South Sioux City, NE

The ARRL Iowa State Convention/Hamboree No. 7, sponsored by the 3900 Club and SARRA, will be held at the Marina Inn, South Sioux City, Nebraska, on Saturday and Sunday, Oct. 12-13. Friday night "get acquainted" get-together.

The Saturday night banquet will feature Dr. Beverly Mead, whose topic will be "Who Talks and Who Listens." Indoor flea market, commercial exhibitors, women's events. Forums include FCC, QRP, MARS, QCWA, UHF/VHF, antennas, packet radio, John Hearle of MARCO Net fame, Fred Childs on "Amplitude Compandored SSB," Shuttle film, DX session, Novice session and Zero QSL Bureau. There will also be a special seminar on transceivers. Division Director Paul Grauer, WØFIR, and Rick Palm, K1CE, Acting Manager, Membership Services Dept., ARRL Hq., will be on hand to answer questions at the ARRL forum.

Amateur Radio license exams will be given under guidance of ARRL/VEC (See accompanying sidebar for more details).

Flea market and convention: $5; banquet: $10 in advance, $12 at door; Flea market tables: $4. Advance reservations: Dick Pitner, WØFZO, 2931 Pierce St., Sioux City, IA 51104. Pre-registration prior to October 5. Advance flea market reservations: Al Smith, WØPEX, 3529 Douglas, Sioux City, IA 51104. For more information, contact convention chairman Jim Boise, KAØGZY, 22 LaSalle, Sioux City, IA 51104. Talk-in on 37/97 and 31/91.

How to Register for Upcoming Exams

October 12-13, Iowa State Convention (So. Sioux City, NE). Application must arrive by September 13. Mail check for $4 (payable to ARRL/VEC) and completed Form 610 to EXAMS, Dick Pitner, WØFZO, 2931 Pierce, Sioux City, IA 51104.

October 12-14, Southwestern Division Convention (Santa Maria, CA). Exam space limited — only persons submitting completed Form 610 before October 1 will be guaranteed a space. Mail completed Form 610 to Hamcon, P.O. Box 2457, Santa Maria, CA 93455.

SOUTHWESTERN DIVISION CONVENTION
October 12-14, Santa Maria, CA

Spend a relaxing weekend on the beautiful Central Coast and enjoy the state's biggest annual Amateur Radio event. Santa Maria is famous for its temperate climate, clear skies and the world-famous Santa Maria-Style Barbecue.

The Santa Maria Convention Center will be the site of the convention, with the Vandenberg Inn, 1316 S. Broadway, 805-922-6631, as the Hq. hotel. Please make your room reservations direct with the Inn or with the hotel of your choice.

The Southwestern Division convention will feature many commercial exhibitors and technical sessions for amateurs of all interests. Camper and motorhome space is available on the convention grounds, at $7/night. Talk-in frequencies will be 7263 kHz, 34/94, 146.52 and 223.34/4.94.

Bring your old gear and sell it at the Saturday flea market. Exams will be administered at the Convention. Exam space is limited, so please send a Form 610 to address below as soon as possible. VEC: Greater LAAR Group.

Convention goers can pre-register to attend the Great American Melodrama on Saturday night. The Melodrama is located in Oceano, 20 miles north of Santa Maria. Cheer the hero and boo the villain in a Gilbert & Sullivan presentation exclusively for Convention registrants.

The banquet will be held Sunday at 1:30 P.M. Dayton Ham of the Year Dave Bell, W6AQ, internationally known DXer and filmmaker, will present his enjoyable program, "The King and I," detailing his visits with a famous amateur. The banquet will end in plenty of time to allow LA and Bay Area residents to get home for a good night's sleep.

Pre-registration (till Oct. 1): with banquet, $22.50; after Oct. 1, $25; registration (no banquet), $7.50; Great American Melodrama (no transportation provided), $7.50.

For information, write to Hamcon, P.O. Box 2457, Santa Maria, CA 93455, or call Ernie at 805-481-0311.

*Convention/Travel Coordinator, ARRL

Hamfest Calendar

By Marjorie C. Tenney,* WB1FSN

[Attention those who send in items for Hamfest Calendar and Coming Conventions: Postal regulations prohibit mention in *QST* of prizes of any kind and games of chance such as bingo. Hamfest information is accurate as of our deadline; contact sponsor for possible late changes.]

†**Alabama (Mobile) — September 15-16:** *Hospitality Hamfest,* sponsored by the Mobile ARC, will be held at the Texas Street Recreation Center off I-10. Doors open at 9 A.M. Talk-in on 22/82. Admission free! Many activities, swap tables, adequate parking, reasonable overnight rates, good food and good ham fellowship. For information: Porter Chambers, KI4FE, 3320 Emelye Dr., Mobile, AL 36609, tel. 205-661-1160.

Arkansas (Mena) — September 8-9: The Queen Wilhelmina Hamfest Assn. will convene at the Queen Wilhelmina State Park for the 15th annual hamfest and swap meet. Camping in the state park for the standard park rates. Talk-in on 19/79. Come enjoy the mountain and the ragchewing with us. For more information, contact Robert Holbert, K5UWL, Star Rte. 9, Box 168A, Mena, AR 71953.

Arkansas (Hot Springs) — October 6: The Arkansas DX Assn. annual DX meeting and banquet will be held at the Majestic Hotel, Hot Springs. Tentative schedule includes ADXA annual business meeting and election of officers on Saturday morning; DX Forum on Saturday afternoon; annual banquet in the evening with a noted DXpeditioner as speaker. For further information and reservations, write to ADXA Secretary/Treasurer Earl Smith, KD5ZM, Rte. 10, 7 Meadow Cove, Pine Bluff, AR 71602.

California (Sebastopol) — September 15: Sonoma County Radio Amateurs, Inc., will hold their second annual Ham Radio flea market Saturday, from 8 A.M. to 2 P.M., at the Sebastopol Community Center, 390 Morris St., 5 miles west of Santa Rosa, just off Hwy. 12. Admission and parking are free. Large indoor hall has room for 50 tables, with more spaces outside. Tables are $6 at the door, $5 in advance. Vendor set up starts at 7 A.M. Talk-in on 13/73. Radio clinic, exhibits, refreshments, auction around noon. For tickets and information, write to SCRA, Box 116, Santa Rosa, CA 95404.

Colorado (Boulder) — September 23: The Boulder ARC will sponsor its fall swapfest, "Barcfest," at the National Guard Armory, 4750 N. Broadway, Boulder, from 9 A.M. to 3 P.M. Admission is $3 per ham or per family. Price includes one seller's table. Parking is free. Snack bar on premises. Swapfest is both indoors and outdoors. Talk-in on 10/70 and 52. For more information, contact Tim Groat, KRØU, 1000 East 10th Ave., Broomfield, CO 80020, tel. 303-466-3733.

Connecticut (Danbury) — September 23: The Candlewood ARA annual flea market will be held at the Elks Lodge, 346 Main St., Danbury, Exit 5 off I-84, from 10 A.M. to 4 P.M. Admission is $2. Tables are $7. Refreshments available. Talk-in on 72/12. For advance table reservations, send to CARA, P.O. Box 2038, Danbury, CT 06810. For more info, call George, KC2QF, at 914-533-2758; Rose, WA1VQP, at 203-743-6834; or George, AF1U, at 203-438-0549.

†**Connecticut (Willimantic) — September 23:** The Natchaug ARA annual giant flea market will be held at the Elks Home, 198 Pleasant St., starting at 9 A.M. Dealers at 8 A.M. Free parking. Admission $1; under 16 free. Reserved tables, $5; at door, $7. Plenty of food and drink. Talk-in on 90/30 and 52. For information, please call Ed Sadeski, KA1HR, 49 Circle Dr., Willimantic, CT 06226, tel. 203-456-7029 (after 4 P.M.).

Georgia (Augusta) — September 16: The Amateur Radio Club of Augusta annual hamfest will be held at Julian Smith Casino Park. Refreshments, barbecue, entertainment. Dealers welcome. Flea market space in parking lot. Tickets: $1 each, 6/$5 or 13/$10. Talk-in on 144.89/5.49. Hospitality room Saturday evening at Ramada Inn West, Washington Rd., Rooms 108-110. For more info, send an s.a.s.e. to D. F. Miller, WB4YHT, 4505 Shawnee Rd., Martinez, GA 30907, tel. 404-860-3700.

†ARRL Hamfest

*Convention/Travel Coordinator, ARRL

†**Georgia (Gainesville) — September 23:** The Lanierland ARC, Inc., will sponsor its 11th Annual Lanierland Hamfest in Holiday Hall at the Holiday Inn, Gainesville, starting at 9 A.M. No admission charge. Free tables and inside display for dealers reserving in advance. Left-Foot CW contest. Large flea market. Talk-in on 07/67. Country store for family members. For information and reservations, contact Phil Loveless, KC4UC, 3574 Thompson Bend, Gainesville, GA 30506, tel. 404-532-9160.

Illinois (Glen Ellyn) — September 15: The Northern Illinois DX Assn. will sponsor the 32nd Annual W9DXCC Convention at the Glen Ellyn Holiday Inn, 1250 Roosevelt Rd., Glen Ellyn (near Chicago) starting at noon. Advance registration is recommended. DXers worldwide are welcome. An afternoon DX program and evening banquet are planned. Further information from Howard Huntington, K9KM, 65 South Burr Oak Dr., Lake Zurich, IL 60047.

†**Illinois (Peoria) — September 15-16:** Peoria Superfest '84, sponsored by the Peoria Area ARC will be held at the Exposition Gardens, W. Northmoor Rd., Peoria. Gate opens at 6 A.M., commercial building at 9 A.M. Admission is $3 advance, $4 at gate. Children under 12 free. Activities: Amateur Radio and computer displays, huge flea market, free bus to Northwoods Mall on Sunday. Full camping facilities on the grounds. Talk-in on 16/76. Saturday night informal get-together at Heritage House Smorgasboard, 8209 N. Mt. Hawley Rd., Peoria. Info (and reservations): s.a.s.e. to Superfest '84, P.O. Box 3461, Peoria, IL 61614.

†**Illinois (Grayslake) — September 22-23:** RADIO EXPO 84, sponsored by the Chicago FM Club, will be held at the Lake County Illinois Fairgrounds, Rte. 45 and 120, Grayslake, from 8 A.M. to 6 P.M. on Saturday and 8 A.M. to 4 P.M. on Sunday. Advance admission is $3; at the door $4. Manufacturer's exhibits, indoor and outdoor flea market, seminars, women's programs. Free parking and camping, with electrical hookup. Talk-in on 16/76, 222.50/4.10 and 52. For information and advance tickets, write to Radio Expo 84, Box 1532, Evanston, IL 60204, tel. 312-582-6923.

†**Iowa (Cedar Rapids) — October 7:** The Cedar Valley ARC, Inc., 10th annual hamfest will be held at Hawkeye Downs Exhibition Bldg., Cedar Rapids, from 7 A.M. to 3 P.M. Admission is $3 in advance, $4 at the gate. Tables, $7; electricity, $2. Manufacturers and dealers welcome. Ample parking, overnight camping area, picnic facilities, privately run concession stand, Cedar Rapids Airport nearby, ARRL representatives, movies. Talk-in on 16/76, 223.34/4.94 and 52. For advance tickets, tables or general information, write to C.V.A.R.C. Hamfest, 2818 Southland St., S.W., Cedar Rapids, IA 52404. Dick Isard, WBØVVZ, Chairman.

†**Kansas (Wichita) — September 23:** The Wichita Hamfest, sponsored by the Wichita ARC, Inc. will be held at the Salvation Army Camp Hiawatha, 1601 West 51st St. North, from 8 A.M. to 4 P.M. Advance admission is $3.50; at the gate, $4. ARRL forum, flea market, fast-scan TV, dealers, covered-dish lunch, Amateur of the Year Award. RV park (no hookups). For information and reservations, contact Vern Heinsohn, WAØZWW, Treasurer, 550 Backbay Blvd., Wichita, KS 67203, tel. 316-264-2796.

†**Maryland (Gaithersburg) — September 9:** Gaithersburg '84 Hamfest, sponsored by the Foundation for Amateur Radio, will be held at the Montgomery County Fairgrounds in Gaithersburg, from 7 A.M. to 4 P.M. Admission is $4. Flea market, $7 per table (indoors), advance reservations required. Tailgating $5. Large parking area. Dealers and commercial exhibits, seminars, food, first-aid station. Amateur Radio exams, written and code, will be given for Technician, General and Advanced classes. Send completed Form 610 and photocopy of current license and s.a.s.e. to Laurel ARC, Inc., P.O. Box 3039, Laurel, MD 20708. No walk-ins. For further information and reservations, write to Foundation for Amateur Radio-Gaithersburg '84, Attn: R. Moore, P.O. Box 1068, Laurel, MD 20707, tel. 301-776-3571 (after 6 P.M.).

Maryland (Columbia) — October 7: The Columbia ARA will hold its 8th Annual Hamfest at the Howard County Fairgrounds (15 miles west of Baltimore just off I-70 on Rte. 144, 1 mile west of Rte. 32), from 8 A.M. to 3:30 P.M. Admission is $3; women and children free. Tables are $6 additional if payment is received by Sept. 30, $8 after Sept. 30. Outdoor tailgating is $3 additional. Indoor tailgating $6 additional. Food available. Talk-in on 735/135 and 52. For table reservations and information, write to Mike Vore, W3CCV, 9098 Lambskin La., Columbia, MD 21045, tel. 992-4953.

†**Michigan (Mt. Clemens) — September 16:** The L'anse Creuse ARC will hold their 12th Annual Swap and Shop from 9 A.M. to 3 P.M. at the L'anse Creuse High School, Mt. Clemens. Take I-94 eastbound, Exit Metro Beach, Metro Pkwy. to Crocker, left to Reimold, right to last school. Lots of dealers, FCC table, trunk sales, plenty of new and used gear, food and parking. Talk-in on 69/09 and 52. Admission is $1 in advance and $2 gate. For more information, send an s.a.s.e. to Maurice Schietecatte, N8CEU, 15835 Touraine Ct., Mt. Clemens, MI 48044, tel. 313-286-1843.

Michigan (Grand Rapids) — September 15: The Grand Rapids ARA, Inc., will hold its annual Swap and Shop at the Hudsonville Fairgrounds. Dealers, indoor sales area, outdoor trunk swap area, concession. Gates open at 8 A.M. for swappers and public. Talk-in on 16/76. For more information, write to Grand Rapids ARA, Inc., P.O. Box 1248, Grand Rapids, MI 49501.

†**Michigan (Benton Harbor) — October 7:** The Blossomland ARA Blossomland Blast will be held at Lake Michigan College Convention Center, from 8 A.M. to 3 P.M. Advance admission is $2.50; at the door, $3. Brass-pounders contest, Columbia videotape, RC Airplane display, SKYWARN forum, AF MARS. Canteen open for breakfast and lunch. Participants can also tour local wineries, fruit orchards and shopping mall 1 mile away. Talk-in on 22/82. For further information and advance tickets, write to or call Paul Reissmann, WD8MWT, 517 Upton Dr., N., St. Joseph, MI 49085, tel. 616-983-1710.

Minnesota (Waseca) — October 1: The Viking ARS will hold its fourteenth annual Southern Minnesota Swapfest at the Waseca High School, Hwy. 13-North, Waseca. Doors open at 9 A.M. Talk-in on 34/94. For further information, write to VARS, P.O. Box 3, Waseca, MN 56093. Pre-registration available.

†**Mississippi (Biloxi) — October 6-7:** The 8th Annual Ham/Swap Fest sponsored by the Mississippi Coast ARA will be held at the International Plaza (west end of Biloxi/Ocean Springs bridge, Biloxi) Saturday, from 8 A.M. to 5 P.M., and Sunday, from 8 A.M. to 2 P.M. No admission charge. Tour, seafood, shrimp boil, MARS meetings, and ARRL, computer and DX forums. Limited free parking and hookups for self-contained RVs. Talk-in on 13/73 and 52; backup, 144.73/5.33. For additional information, contact Joyce Anderson, WB5LKC, 3877 Pat La., Biloxi, MS 39531, tel. 601-388-2824.

New Hampshire (Sutton) — September 16: The Connecticut Valley FM Assn. will hold its 8th Annual Hamfest and Flea Market at King Ridge Ski Area, Sutton, from 9 A.M. to 5 P.M. — rain or shine. General admission is $2. Dealers and flea marketeers: $3 per tailgate or table. Food available on premises. Overnight camping for self-contained units only (no hookups). Take Exit 11 off I-89. Talk-in on 16/76 or 52.

†**New Jersey (Pennsauken) — September 16:** The SJRA Hamfest, sponsored by the South Jersey Radio Assn., will be held at the Pennsauken High School parking lot, from 7 A.M. to 3 P.M. Advance ticket $2.50; at gate, $3. Tailgating, commercial dealers, cafeteria. Talk-in on 144.77/5.37 and 52. Information and advance reservations from W2EKB, tel. 609-795-0577 (evenings).

New Mexico (Santa Fe) — October 7: The Northern New Mexico Hamfest will be held at the Terrero Group Shelter along the Pecos River, east of Santa Fe, from 8 A.M. to 3 P.M. Tailgate fleamarket, group meetings, games for family members, fishing and picnicking. Admission $3; children $1.50. Includes hotdogs and chips and free Saturday night camping. Soft drinks, coffee available. Talk-in on local repeaters and 52. For further info, please send an s.a.s.e. to Northern New Mexico ARC, c/o Bob, N5EPA, Rte. 3, Box 95-15, Santa Fe, NM 87501, or call on 3.939 MHz at 0100 UTC.

†**New York (Islip) — September 16:** LIMARC Fall Hamfair '84, sponsored by the Long Island Mobile ARC, will be held at the Islip Speedway, Islip Ave., from 9 A.M. to 4 P.M. Sellers may set up at 7:30 A.M. Sellers admission is $5 per space. Buyers admission is

$3 per person (spouses and children free). Food and refreshments available. Talk-in on 25/85 and 52. For additional info, contact Al, WA2FBQ, at 516-796-2965, or Bob, WB2DIN, at 516-221-8116.

New York (Horseheads) — September 29: The Elmira ARA will present the Ninth Annual Elmira International Hamfest at the Chemung County Fairgrounds, from 6 A.M. to 5 P.M. Outdoor flea market, indoor dealer displays of new equipment, technical talks, QSL contest; breakfast and lunch served on premises. Camping. Advance tickets $2; at the door $3. For further information and tickets, write to Steve Zolkosky, 118 East 8th St., Elmira Heights, NY 14903. Make checks payable to "Elmira A.R. Assn."

New York (Yonkers) — October 7: Hams, CBers, SWLers, computer and electronics buffs come see the Yonkers Electronics Fair and giant flea market sponsored by the Yonkers ARC. Two floors of big value sales on new and used equipment at Yonkers Municipal Parking Garage, corner of Nepperhan Ave. and New Main St., from 9 A.M. to 4 P.M., rain or shine (max. height 6' 10"). Live demonstrations all day. Amateur Radio, computers, satellite TV, slow-scan TV, plus much more. Admission $2; children under 12 free. Sellers: $6 per parking space — (1 admitted) bring tables. Giant auction at 2 P.M. For further information, call 914-969-1053.

†**Ohio (Ross) — September 16:** The 48th Annual 1984 Cincinnati Hamfest will be held at Stricker's Grove, State Rte. 128, one mile west of Venice (Ross). Exhibits, food and refreshments available. Flea market (radio-related products only), music, talks, hidden transmitter hunt and sensational air show. Admission and registration $5. For information, contact Lillian Abbott, K8CKI, 317 Greenwell Rd., Cincinnati, OH 45238.

†**Ohio (Cleveland) — September 22:** The Cleveland Hamfest Association Hamfest will be held at Berea Fair Grounds. Opens at 6:30 A.M. for the flea market and 8 A.M. for the exhibits. Admission will be $2.50 in advance and $3.00 at the door. Activities will include flea market, banquet the night before (Sept. 21), a speaker and three exhibits from NASA. Free parking; breakfast and lunch will be available. Talk-in on 52. For more information, contact Tom Chaney, P.O. Box 93077, Cleveland, OH 44101, tel. 216-526-7155 (after 6 P.M.).

Ontario (Ottawa) — October 5-7: Hosted by the Ottawa ARC, this 16th annual convention comes to Canada's capital for the third time. The location is the brand new Westin Hotel, which is part of the Rideau Centre Shopping Complex and adjacent to the Convention Centre, Parliament Buildings, National Arts Centre and Farmers' Market. Papers will relate to microprocessors, AMTOR, WARC bands, antique radio, colour slow-scan TV, DX and more. Demonstrations and commercial exhibits open Friday evening to Sunday. Contact the RSO Convention Committee, P.O. Box 15806, Station "F," Ottawa, ON K2C 3S7, Canada.

†**Pennsylvania (Butler) — September 9:** The Butler Hamfest, sponsored by the Butler County ARA, Inc., will be held at the Butler Farm Show Grounds at Roe Airport, from 9 A.M. to 4 P.M. Admission donation is $1; children under 12 free. Plenty of parking; overnight campers welcome. Free outside flea market. Indoor flea market-vendor's space $5 per 8-ft table. Overnight accommodations available at area motels. Check-in on 96/36 and 52; directions on 84/24. For information, contact Dan Metrick, WA3GDS, 131 Reiger Rd., Butler, PA 16001, tel. 412-283-1719.

Pennsylvania (New Kensington) — September 16: The Skyview Radio Society will hold its annual hamfest at the club grounds, Turkey Ridge Rd., from noon to 4 P.M. Talk-in on 04/64 and 52. Registration fee $2; vendors $4.

†**Pennsylvania (York) — September 22-23:** The York Hamfest, sponsored by Hilltoppers, Keystone VHF, Penmar and York ARCs, will be held at the York Fairgrounds, from 8 A.M. both days. Admission is $3 per day, $5 for both days; women and children under 12 free. Seminars on Saturday; tailgating, displays, contests on Saturday and Sunday. Saturday activities also include historical tours and/or outlet shopping. Free parking, food, overnight camping (fee charged), special motel rates. Talk-in on 37/97 and 93/33. For further information, write to York Hamfest, Box W, Dover, PA 17315.

Pennsylvania (Warrington) — October 6-7: The Pack Rats (Mt. Airy VHF ARC) 8th Annual Mid-Atlantic VHF Conference will be held at the Warrington Motor Lodge, Rte. 611, on Saturday, and the 13th Pack Rat Hamarama on Sunday at the Bucks County Drive-In Theater on Rte. 611, both in Warrington. Admission to flea market is $3; selling spaces $5 each. Gate will open at 6 A.M., rain or shine. Bring your own tables. Advance registration for the Conference, including a Hamarama admission, is $4. Send to HAMARAMA '84, P.O. Box 311, Southampton, PA 18966, or Lee A. Cohen, K3MXM, tel. 215-635-4942.

†**Texas (Wichita Falls) — September 22-23:** The annual Wichita Amateur Radio Society Tornado Alley Hamfest will be held at the National Guard Armory, Wichita Falls, on Saturday, from 9 A.M. to 5 P.M., and Sunday, from 9 A.M. to 2 P.M. Large shopping malls, restaurants and motels nearby. Commercial dealer displays; computer dealers and demonstrations; large, inside flea market (reserve your table *now*); 24-hour security; concession stand open both days. Pre-registration closes Sept. 19. Register early — advance $4, at the door $5. Swap tables $3 each. Talk-in on 34/94, 75/15, 449.30/4.30 and 449.20/4.20. Special motel rates. Mail pre-registration and table reservation with check payable to WARS Hamfest, P.O. Box 4363, Wichita Falls, TX 76308.

Texas (Lubbock) — October 7: The Caprock Repeater Club will host its annual swapfest at Koko Convention Center, 50th and Ave. Q. Plenty of parking, tables, food. Talk-in on 34/94. Further information from Ron Ashmore, WB5DUQ, 6124 35th St., Lubbock, TX 79407.

†**Washington (Milton-Freewater, OR) — September 22-23:** The Walla Walla Valley Radio Amateur Club will hold its 38th annual hamfest at the Milton-Freewater (Oregon) Community Bldg. Free registration, antique and homebrew contests, MINOW Bazaar, swapfest, commercial displays and 20/80 craft sale. Potluck dinner on Sunday at noon. Snack bar open both days. For details, write to W7DP, P.O. Box 321, Walla Walla, WA 99362.

Note: Sponsors of large gatherings should check with League Hq. for an advisory on possible date conflicts before contracting for meeting space. Dates may be recorded at ARRL Hq. for up to two years in advance.

Special Events

Conducted By Edith Holsopple,* N1CZC

Chicago, Illinois: The Dupage and Hamfesters ARCs will operate station W9DUP in honor of the 30th convention of the U.S. Submarine Veterans of WW II. Operation will be *August 29* through *September 1*, from 1100Z to 0300Z daily, on 80-10 meters and 2 meters, from the submarine *USS Silversides*, which is docked as a war museum. Certificate via DARC, P.O. Box 71, Clarendon Hills, IL 60515.

Atlanta, Georgia: The GA Tech ARC will operate station W4AQL from *September* through *December* in conjunction with the centennial celebrations of the GA Institute of Technology. Operation will be on 80-10 meters, with emphasis on the following frequencies: CW — 3.530 7.030 14.030 21.030 28.030; phone — 3.895 7.230 14.230 21.355 28.505; RTTY — 7.085 14.085 21.085. Certificate for QSL to GA Tech, Box 32705, Atlanta, GA 30332.

Riga, New York: Local hams will be operating W2XG to celebrate the 175th birthday of the Town of Riga, Monroe County and New York State on *September 1*, from 1300 to 2100Z. Operation will be in the General portion of 40 meters. Certificate via Billie Robinson, WB2FNF, 270 Palmer Rd., Churchville, NY 14428.

Topeka, Kansas: The 37th Street DX Assn. will operate a special event station from the Kickapoo Nation, near Horton, in conjunction with the Kickapoo Tribe Pow Wow. Operation will be on 80-10 meters, all modes, from 1500 to 0300Z *September 1-2* and *September 2-3*. QSL via J. G. Wallis, WBØYJT, 3605 Humboldt St., Topeka, KS 66605.

Waterford, Connecticut: The Tri-City ARC will operate station KA1BB from the I-95 weigh station to promote safe holiday auto travel. This event is in conjunction with the second annual stay-awake offered by BSA Troop 24, Niantic. Operation will be from 1700Z *September 1* through 1700Z *September 3* on 14.295, 7.245 phone and 146.52 FM, and on 7.130 CW. QSL via Tri-City ARC, P.O. Box 686, Groton, CT 06340.

Tombstone, Arizona: The Old Pueblo RC and KB7KZ are sponsoring operations from the OK Corral in Chochise County in conjunction with the third annual Rendezvous of the Gunfighters. Operation will begin at 1500Z *September 1* and run through 2200Z *September 3*. CW — 21.130 7.130; phone — 28.680 21.380 14.280 7.280. Certificate via KB7KZ, P.O. Box 36032, Tucson, AZ 85740.

Seattle, Washington: On *September 7 and 8*, NØDED/7 will operate from 1600Z to 0400Z daily between Seattle and Bremerton. Operation will be from the ferry on the open ocean on 20-15-40 meters, as conditions warrant. For a QSL, you will receive a QSL from the State Ferry System, a designer's chart of all the ferries in the system and a map of the Puget Sound System. QSL via NØDED/7, 14031 75th Ave., N.E., Bothell, WA 98011.

Hatfield, Pennsylvania: Amateurs in Montgomery County will operate station WB3FIZ in commemoration of the County's Bicentennial from 0000Z to 2400Z *September 8*. Suggested frequencies: CW — 60 kHz up from lower band edges; phone — 28.600 21.380 14.295 7.280 3.980 144.59/145.19 146.52. Certificate via WB3FIZ, 121 Col. Philip Reed Dr., Hatfield, PA 19440.

Santa Fe, New Mexico: The Northern NM ARC will hold its 2nd steam locomotive mobile operation on the Cumbres and Toltec Railroad *September 8* from 1700Z to 2330Z. Frequencies will be 14.225 and 7.225 MHz. Operation will be from between Antonito, Colorado and Osier, Colorado, crossing the New Mexico and Colorado border 10 times. QSL via Daryl Grant, W7LHO, 1865 Camino Lumbre, Santa Fe, NM 87502.

Tuscaloosa, Alabama: The West Alabama ARS will operate KE4TN on *September 8* in memory of football coach Paul "Bear" Bryant. Operation will be from the University of Alabama campus from 1300Z until 2400Z. Novice frequencies will be the lower 25 kHz of the Novice bands. Phone frequencies will be the bottom 25 kHz on the 40-10 meter General class bands. Certificate via West Alabama ARS, P.O. Box 1741, Tuscaloosa, AL 35403.

Phelps, New York: Ganeodiyo Lodge No. 417 of the Order of the Arrow will operate station N2EAW in conjunction with the Western New York State Section II-C BSA Order of the Arrow Conclave, from Camp Dittmar in Ontario County. Operation will be from 1200Z *September 8* to 0200Z *September 9*. CW — 3.550 7.050 14.050; phone — 3.910 7.290 14.290; 160-meter, 30-meter and Novice operations — 20 kHz up from band edges. Commemorative QSL card via Nolan Stephany, N2EAW, 3369 Lake Rd., Williamson, NY 14589.

Clay Center, Nebraska: Members of the Hastings ARC will operate station WØWWV from the Old Trusty Antique and Collectors Show from 2000Z *September 8* until 2000Z *September 9*. Operation will be in the lower 25 kHz of the General portions of 75-2 meters. QSL via Hastings ARC, P.O. Box 128, Hastings, NE 68901.

Center Missouri: The Mark Twain ARA will operate WØKEM from 1400Z to 2300Z on *September 8 and 9*. Operation is in celebration of the dedication of the Mark Twain Lake and Clarence Cannon Dam in East Central Missouri. Novice operation will be on 40 meters. Phone will be in the lower 25 kHz of the 40-20-15 meter General class bands. Certificate via Mark Twain ARA, P.O. Box 56, Center, MO 63436-0056.

Bethlehem, Connecticut: The Hen House Gang ARC will operate *September 8 and 9* in honor of the 60th anniversary of the Greater Bethlehem ARGI Fair, on 40-10-15 meters. QSL via W1FHP.

Kansas City, Missouri: The Ararat Shrine RC will sponsor WAØNQA to benefit children's hospitals. Operation will be from 1500Z to 2300Z daily, *September 8 and 9*, on the lower 10 kHz of 40-20-15-10

*Communications Assistant, ARRL

meters and 40-meter Novice band. Certificate via J. V. Foust, KAØGBK, 5240 N. Palmer, Kansas City, MO 64119.

College Park, Maryland: K3RD will operate from 1400Z until 2100Z on *September 8 and 9* to celebrate the 75th anniversary of the World's Oldest Continually Operated Airport. Frequencies: CW — 7.120; phone — 7.280 14.270. Certificate via K3RD, 9308 Bandera St., Lanham, MD 20706.

Erie, Pennsylvania: The RA of Erie, W3GV, will commemorate Commodore Perry's victory at the Battle of Lake Erie during the War of 1812. Operation will be from 1200Z to 0100Z on *September 8* and from 1200Z to 2100Z *September 9*. Frequencies: CW — 7.090 14.090; phone — 7.235 14.235 MHz. QSL and historical data via W3GV, 4572 Southern Dr., Erie, PA 16506, or the W3-QSL Bureau for DX stations.

Iowa City, Iowa: The Iowa City ARC will operate station WØJV to commemorate their 50th anniversary as an ARRL affiliated club *September 9* from 1800Z until 2200Z. Operations will be 20 kHz up from the bottom of both the CW and phone General class bands. QSL via Box 4, Iowa City, IA 52241.

Recife, Brazil: IARH PY Radio Day will be 1300Z *September 8* to 0300Z *September 9*, sponsored by the IARH-Brasil. Modes will be A1, A3, A3J on 160-2 meters.

Atlantic City, New Jersey: The Southern Counties ARA will operate a special-events station during the Miss America Pageant from *September 9 to 15*.

Cary, Illinois: The McHenry County Wireless Assn. will sponsor their 2nd Annual DXpedition to Cedar Island, Fox Lake. Operation will begin at 1500Z *September 15*, on the lower 20 kHz of the phone portions of 40 and 15 meters. QSL.

Clyde, Ohio: The Clyde ARS will operate station NF8E from 1600Z to 2400Z *September 15* and from 1600Z to 2200Z *September 16*, from the Winesburg Fall Fair. Frequencies: CW — 7.125 21.150; phone — 7.250 21.375 144.750. Certificate via NF8E, 302 Hamer St., Clyde, OH 43410.

Wahkiakum County, Washington: N7CFA and/or KA7JVW will operate portable (phone) from Wahkiakum County during the Washington State QSO Party. Regular contest frequencies on 80-10 meters, as conditions warrant. Times will be 0100Z *September 15* to 0700Z *September 15*, 1300Z *September 15* to 0700Z *September 16*, 1300Z *September 16* to 0100Z *September 17*. QSL via *Callbook* address.

Atlanta, Georgia: The Alford Memorial RC of Stone Mountain will sponsor station W4BOC in conjunction with its first Annual Pig-Out, from 0400Z to 2200Z *September 22*. Operation will be from the Flowery Branch Town Park on Lake Lanier. Phone and CW operations will be 10 kHz above the bottom of the General portions of 80-10 meters, with Novice operations on 7.130 and 21.150. Commemorative cards and/or certificates via Alford Memorial RC, P.O. Box 1282, Stone Mountain, GA 30068.

Monmouth County, New Jersey: Ocean Monmouth ARC will operate KC2Q from 1600Z on *September 22* until 1600Z *September 23* from the Guglielmo Marconi Memorial Tower used during early transoceanic receiving experiments. Frequencies: 3.965 7.265 14.265 21.365 28.565 MHz. QSL and certificate information will be available over the air.

Brainerd, Minnesota: The Paul Bunyan Wireless Assn. will operate from 1800Z *September 22* until 2100Z on *September 23* from the Paul Bunyan Festival. They will be on 40-10 meters in the lower portion of the General phone band. Commemorative QSL via KCØYG.

Logan County, West Virginia: The Logan Co. ARC will operate station W8VEN from 1600Z *September 22* until 0200Z *September 23*. Operation will be from a West Virginia mountaintop in the heart of southern WV's billion-dollar coal fields. Phone frequencies will be approximately 25 kHz from the low end of the General 80-40 meter bands. Certificate via Robert T. Johnson, W8VEN, P.O. Box 320, Stollings, WV 25646.

Beaumont, Texas: The Beaumont ARC will sponsor special-event station W5RIN on *September 29*, from 1400Z until 0200Z; and *September 30*, from 1400Z until 2300Z, to commemorate Spindletop "Glady City" Boom Days. Frequencies: phone — 7.240 14.272 21.380; CW — 7.125 14.050 21.050. QSL via W5RIN, P.O. Box 7073, Beaumont, TX 77706.

East Lyme, Connecticut: AR of Southeast Connecticut will sponsor Novice Sprint special station KA1LDB from the finish line of the East Lyme Marathon. Operation will be from 1300Z to 1800Z *September 30*, 7.130 and 21.130 MHz. QSL via Tri-City ARC, P.O. Box 686, Groton, CT 06340.

Poughkeepsie, New York: N2ESR will operate to commemorate the 47th anniversary of the commissioning of the *USS Yorktown* (CV-5), "Fighting Lady" of WW II. Operation will be 1300Z to 2000Z *September 30*, 7.230 to 7.245 MHz. Certificate via J. Nicalek, Yorktown Park, Red Oaks Mill Rd., Poughkeepsie, NY 12603.

Note: The deadline for receipt of items for this column is the 15th of the second month preceding the publication date. For example, your information would have to reach Hq. by September 15 to make the November issue. For the convenience of those wishing to operate, please include the name of the sponsoring organization, the location, dates, times (Z), frequencies and call sign (if any) of the special-event station. Requests for donations will not be published.

Club Corner

Conducted By Sally O'Dell,* KB1O

SSCs AND A VIABLE PR PROGRAM

Many Special Service Clubs have completed their first year of activity. During this time, these clubs have discovered that many of the programs they were involved in already are more than sufficient to include in the SSC program. Public Relations — one area of Amateur Radio that lets the world know we exist and the good things we do for our communities — can help to make your club even more effective.

Your club may already have a viable PR program; nonetheless you may be interested in improving it. Clubs without programs may wish to include PR as one of their activities. Whatever the reason, public relations is an area that can help your club to grow and prosper.

If you don't have a club member who is well-versed in public relations, ARRL Headquarters has available two packages of information to help improve your club's press coverage. In fact, no matter what level of PR expertise your club has, these materials may be of value. You be the judge.

The first package is the *PI Kit*. This material has been organized for your PR person, the ham, to prepare an Amateur Radio presentation to the press. Among other items, the kit contains facts about Amateur Radio, ARRL and OSCAR, and sample press releases.

The second package is the *Press Kit*. This information, along with your club publicity official's name, goes directly to the media (TV, radio or newspaper reporter) to explain Amateur Radio, and includes background information.

If you are interested in obtaining either of these kits, please send $1.35 (for Third-Class postage) to ARRL, and an adhesive-backed, self-addressed shipping label to facilitate your request. Clearly indicate which kit you want. The *PI Kit* is for your PR person; the *Press Kit* is for the media.

A famous man once said: If you are going to speak on a topic for five minutes, be sure you know enough material to cover two hours or more. Then you will be able to fill your five minutes with knowledge. That man was Dale Carnegie, author of the best-seller, *How to Win Friends and Influence People*. The same approach applies to a press release or written materials. Know 100 times more than you need to write a press release and then condense it to two double-spaced pages.

Many local service clubs and civic groups are constantly looking for speakers for their regular meetings. Amateur Radio is a natural for these get-togethers. Before you volunteer to provide such a program, though, be sure you are adequately prepared. You might want to talk about some of your most memorable QSOs, and demonstrate equipment and capabilities nonhams are apt to be most interested in, such as autopatch. To bone up on public-speaking techniques, the club's PR person might want to join a local public-speaking class or a chapter of Toastmasters.

Public Relations comprises many activities, but generally speaking, any public mention of Amateur Radio can be considered PR. We are mainly concerned with the "good" examples, such as your club's participation in Field Day or public-service events, and hope that these will become part of the newscast for the day. We all want the good publicity; most of the time it is up to us to generate it.

*Club Program Manager, ARRL

Frank Gunja, KAØQVW (Kansas City, Kansas), won the 1984 Heart of America Radio Club ARRL Novice Roundup award. This annual award is given to the Novice or Technician in the six-county Kansas City area who submits the highest score in the ARRL Novice Roundup. With Frank is his wife Gladys.

SSC Kudos and Contacts

Congratulations to the League's newest Special Service Clubs. These clubs are recognized for extended efforts on behalf of Amateur Radio and service to their communities. For further information on these clubs, contact them at these addresses.

Chautauqua County Amateur F.M. Assn.
c/o P.O. Box 81
Jamestown, NY 14701
Club membership — 63

Crystal Radio Club
c/o Route 303
Valley Cottage, NY 10989
Club membership — 36

PHD Amateur Radio Association, Inc.
c/o P.O. Box 11
Liberty, MO 64068
Club membership — 419

Phil-Mont Mobile Radio Club, Inc.
c/o 15 Poe Avenue
Wyncote, PA 19095
Club membership — 142

Portsmouth Amateur Radio Club
c/o P.O. Box 6503
Portsmouth, VA 23703
Club membership — 58

Rocky Mountain Radio League
c/o 7220 S. Penrose Ct.
Littleton, CO 80122
Club membership — 443

Steel City Amateur Radio Club, Inc.
c/o P.O. Box 281
Carnegie, PA 15106
Club membership — 119

Triple "A" Amateur Radio Association, Inc.
c/o 817 Lincoln Place
Beaver Falls, PA 15010
Club membership — 50

Simulated Emergency Test Announcement

SET weekend October 20-21 — new ideas for 1984.

Tornadoes in the Carolinas, Texas and Oklahoma, floods in New Jersey, earthquakes in California ... the list goes on ... all examples of amateurs following the Boy Scout creed: Be Prepared. It has not always been so. *QST* and ARRL propaganda has always preached the motto of radio amateurs organizing and testing their emergency communications capabilities in advance of disaster. But too often in the past such groups tired of conducting drills and disbanded a fortnight before the wicked witch of disaster struck. It was then that the "woodwork" operators would step in and save the world, too often amidst much confusion in getting underway.

Not any more. Today, the "practice makes perfect" philosophy prevails with the "party regulars" more often than not looked to by the amateur community for guidance on what to do in the face of a communications emergency. That's where the ARRL-sponsored Amateur Radio Emergency Service (ARES) and National Traffic System (NTS) have played a significant role in recent real emergency conditions. Also recognized, of course, are the significant efforts of the Federal Emergency Management Agency's sponsored Radio Amateur Civil Emergency Service (RACES). As the public service faithful are aware, ARRL recommends dual ARES/RACES membership for all amateurs.

Our annual "physical" in providing emergency communications is the Simulated Emergency Test (SET), scheduled for the weekend of October 20-21. It is here that we test our capabilities, experiment with some new concepts and locate weak points, the end product being a better emergency response for the real thing.

This year's activity will embrace some major experimentation. The revised scoring format will reflect some of these broad objectives: (1) Strengthen the VHF to HF link at the local level, insuring that the ARES and NTS aspects of the League's official program are working in concert, not at odds, with one another. (2) Encourage greater use of digital modes for handling high volume traffic and point-to-point Welfare reports *out of* the affected simulated disaster area. (3) Operationally implement the recent Memoranda of Understanding between the League, the user and cooperative agencies. (4) Focus our energies on ARES communication at the local level with less emphasis on running the NTS nets "into the ground." This includes increased use and recognition of "tactical" communications on behalf of served agencies, and less amateur-to-amateur formal radiogram traffic (a.k.a. inbreeding) such as "I am participating in the SET."

Emergency communications preparedness was a crucial factor for South Carolina radio amateurs in the recent tornado disaster (see July 1984 *QST*, p. 84). Among the many highly trained and capable amateurs participating was Francis, K4JUG, shown here operating from the McColl, South Carolina, Police Station. *(KB4GJH photo)*

Although this year's SET format will play havoc with some time-honored traditions, other proven procedures remain. Test messages should carry the world "Test" before the precedence; e.g., Test Priority on phone and TEST P on CW. The text of such messages should also begin with the words, TEST MESSAGE. However, the word "Test" is not used in conjunction with Routine messages. Such messages are Routine whether specifically for the SET or not. Also, to prevent LDE traffic during the week after, HXB is translated loosely for the SET to mean, "cancel message if not delivered within the SET period; send a service message to originating station."

Also, although October 20-21 is the official SET weekend, groups are free to conduct their SET anytime during the period September 1 through October 31 if this is more convenient. This may be done to coincide with already planned communications activity such as a parade or festival, to provide greater mass-media exposure. The deadline for receipt of all reports is January 31, 1985.

How do you participate? If you are already an enrolled ARES member or active participant in an NTS net, your ARRL Emergency Coordinator or Net Manager is already making plans for your activity. All League Officials automatically receive the details and reporting forms for conducting a successful SET. If you are standing on the street corner in Winslow, Arizona, with your hand-held and don't know how to get in on the SET fun, contact your local ARRL Emergency Coordinator who will quickly plug you into his SET plans. If your thumbwheels are stuck and you don't know who to call, contact your ARRL Section Manager (page 8 of any *QST*) for direction. ARRL public service officials are planning an interesting weekend for you, so volunteer your services to put Amateur Radio's emergency communications capabilities to the test, The Simulated Emergency Test, October 20-21. Good luck.

Results, Second ARRL VHF/UHF Spring Sprints

By Edith Holsopple,* N1CZC

On the surface, it would appear that the novelty of the ARRL VHF/UHF Spring Sprints has worn off; note the 301 total entries received for the 1984 Sprints and compare that number with the 446 logs received as a result of the '83 Spring Sprints. But, appearances can be deceiving. The decline in number of logs received doesn't necessarily mean the contest is getting stale, it's just that the "merely curious" are making way for the serious competitors.

The 2-meter Sprint was first up (April 16). Logs were submitted by 109 entrants, and when the scores were verified, NF2L (aka WA2DPU) emerged as the top 144-MHz operator with a respectable 172 QSOs and 31 different grid-square multipliers.

One week after the 2-meter competition, it was 220's turn (April 24). Of the 34 entries received on 220 MHz, the 50 QSOs and 16 multipliers worked by K1JX, who operated W1VD, lead the pack for the top 1¼-meter score.

The 432-MHz Sprint came (May 2) and went; in its aftermath, 62 entries were processed here at Hq. On a roll, K1JX (at W1VD) tied WB8BKC's contest-high multiplier total at 22 and found an extra 51 QSOs to claim the 70-cm title.

1296 MHz was the host for the next Sprint (May 10). Among the 17 entrants, W2VC and W3HQT battled it out for the top slot. 'HQT managed 2 QSOs more than 'VC, but Vic (W2VC) found that extra multiplier that gave him the win.

The Sprint finale was held on 6 meters on May 19. This competition produced 79 official entries. WB8IGY, from his Southern Florida QTH, put his 6-element Boomer and pair of 3-500Zs to good use to blow away some stiff competition with an astounding 192 QSOs and 76 grid-square multipliers.

"Grid" Luck!

SOAPBOX

There was simply no one else on 1296 MHz in Oregon. My one contact was over a 60 mile path (K7HSJ). I really enjoy the Sprints (WA2SZY). Conditions on 432 MHz were terrible. One new grid, FN04, made it worthwhile (W1JR). Sure hate to get beat by my good friend, N5ACP, who only got on 220 MHz to give me a contact (K5MAT). WB8ART and I shared the same 2-meter frequency since he is also running a kW less than a mile away. That was kind of fun because every station that we worked, got 2 points real quick. I am always interested in running meteor-scatter skeds on 2 meters with anyone anywhere (WA8ZHE). It would be nice if people spread out from 144.2 (W6RXQ). Band conditions were miserable up to the day of the 2-meter Sprint, with cold windy weather, not conducive to tropo. The evening of the Sprint, something special happened: The wind died down, the stars came out and 2-meters opened. I guess Murphy took the evening off. My best DX was WBØSJL 400 miles away in St. Louis (WAØVJF). These are the greatest little contests (W2VO). There were lots of VE2s on 2-meter SSB for this one. U.S. stations take note and turn the beams north (VE2DUB operating VE2CUA). I had S9 line for two hours of the 2-meter contest. I thought the Woodpecker had migrated to a new habitat (KA8IFC). Why not use the +10 on multipliers? It sure would pump up my score (K4CAW). I had a ball on 6 meters. I had laryngitis and made all 35 QSOs on CW. What a change from 15-20 years ago when K2MUB and I were among the few 6-meter CW ops (WB2PMP/4). My approximate power output on 6 meters was 1.4 W! I didn't realize there was a problem until after the contest (WØUC). Conditions on 6 meters were naturally much better before and after the test (W4WHK). It doesn't take a VHF station located in the Northeast to win a contest, just three or four E-clouds in the right place (WB8IGY).

*Communications Assistant, ARRL

Scores

Scores list call sign, score, number of QSOs, number of grids, ARRL section. The scores are arranged by band, from 50 MHz through 1296 MHz. Under each band heading, the scores are arranged by call area. Within each call area, the scores are listed in descending numerical order.

50 MHz

1

W1VD (K1JX, opr.) 6150- 150-41-CT
WA1OUB 2030- 70-28-NH
AA2Z/1 984- 48-18-CT
K1ISW 774- 43-18-WMA
W1QK 675- 45-15-CT
N1ABY 540- 36-15-CT
W1XX 512- 32-16-CT
K1TOL 306- 18-17-ME
KA1DHO 207- 23- 9-EMA
AC1J 180- 20- 9-NH
WA1JGK 35- 7- 5-VT
W4XP 28- 7- 4-EMA

2

WA2VUN 1500- 80-25-NNJ
N2CEI 1491- 71-21-NNJ
W2EIF 585- 39-15-SNJ
K2BJG 420- 30-14-NNJ
N2BJ 230- 23-10-ENY
KA2BTD 220- 20-11-NNJ
WB2WBT 187- 17-11-WNY
K2GK 170- 17-10-WNY

3

WA3HMK 3663- 99-37-EPA
WA3YON 1200- 50-24-EPA
W3XO 1012- 46-22-MDC
WA2OMY/3 855- 45-19-EPA
W3HDH 580- 29-20-WPA
KI3L 555- 37-15-MDC
KC3CL 551- 29-19-WPA
WB3FYT 528- 33-16-EPA
WA3FYJ 494- 26-19-WPA
W3KJM 294- 21-19-WPA
KB3QI 253- 23-11-EPA
K3AKR 180- 20- 9-MDC
KA3CWR 70- 10- 7-EPA
WB3ILM 64- 8- 8-DE

4

WB8IGY 14,592- 192-76-SFL
WD8ISK/4 5916- 102-58-KY
WB2QLP 4182- 102-41-SFL
K4CKS 3337- 71-47-GA
WD4FAB 2211- 67-33-NFL
K4LVZ 1488- 48-31-SFL
N4MM 880- 40-22-VA
WB4WTC 858- 33-26-VA
N4VC/4 748- 34-22-KY
WB2PMP/4 630- 35-18-SFL
WB4NXY 540- 27-20-KY
W4NTI 475- 25-19-AL
W4WHK 374- 22-17-NFL
K4JSI 180- 20- 9-VA

5

N5DDT 6428- 102-63-STX
WA5IYX 5600- 100-56-STX
WA5VJB 1960- 56-35-NTX
N5GFX 1428- 51-28-STX
KD5RO 1100- 44-25-NTX
K5TA 450- 30-15-NM
WB5MTU 304- 19-16-NTX
W5UCY 99- 11- 9-MS

6

W6RXQ 276- 23-12-SCV
NR6E 78- 13- 6-EB
WA8LLY 56- 8- 7-SF

7

N7DB 280- 28-10-OR
NF7X 217- 31- 7-WA
KB7N 189- 21- 9-ID
WA7ECY 133- 19- 7-OR
K7HSJ 12- 6- 2-OR

8

WB8BKC 1696- 53-32-MI
K8YAH 247- 19-13-OH

9

W3EP/9 966- 42-23-IN
N9DCA 510- 34-15-IN
WB9NTL 480- 30-16-IN
KA9MGR 126- 14- 9-IL

Ø

WBØZKG 943- 41-23-IA
KBØDW 680- 34-20-KS
KØTLM 560- 28-20-MO
NØLL 468- 26-18-KS
W9MHL 273- 21-13-CO
WØUC/9 187- 17-11-WI

VE

VE3BFM 9- 3- 3-ON
VE3OCX 4- 4- 1-ON

CHECK LOG

VE2GDP

144 MHz

1

W1VD (K1JX, opr.) 4928- 176-28-CT
KA1BXB (K1GX, opr.) 2541- 121-21-CT
WA1OUB 2323- 101-23-NH
W1QK 1411- 83-17-CT
WB1BXS 1218- 87-14-CT
N1CGP 1079- 83-13-CT
W1ICH 726- 66-11-CT
AC1J 705- 47-15-NH
AB1U 650- 50-13-CT
K1DIH 600- 50-12-CT
K1VMI 500- 50-10-CT
W1AIM 495- 33-15-VT
K1ISW 473- 43-11-WMA
WA1JOF 270- 30- 9-EMA
W1GXT 248- 31- 8-EMA
K1QGF 132- 22- 6-EMA
AA2Z/1 50- 10- 5-CT
W1JR 28- 7- 4-EMA

2

NF2L 5332- 172-31-SNJ
N2CEI 4176- 144-29-NNJ
WA2TIF 3564- 132-27-ENY
WA2VUM 2266- 103-22-NNJ
K2IJL 1900- 100-19-NLI
W2EIF 1863- 81-23-SNJ
W2HRW 1760- 110-16-SNJ
W2VO 1728- 72-24-WNY
N2BJ 1649- 97-17-ENY
K2GK 1334- 58-23-WNY
WB2ONA 1173- 89-17-NNJ
K2BJG 960- 84-15-NNJ
KA2BTD 938- 67-14-NNJ
W2MX (WB2YEH, opr.) 728- 56-13-SNJ
WB2KMY 688- 43-16-ENY
WA2UDT 252- 36- 7-NNJ
NA2O 200- 20-10-WNY

3

K3ONW 4125- 125-33-EPA
WB3IMS 2108- 68-31-WPA
WA3FYJ 2088- 72-29-WPA
KF3Y 1900- 78-25-EPA
WA3FAE 1788- 85-21-MDC
KC3CL 1495- 65-23-WPA
K3MD 1200- 50-24-WPA
WA3UJE 975- 65-15-MDC
WA3AAJ 910- 70-13-EPA
WB2BJH/3 855- 57-15-EPA
WA3YON 526- 35-15-EPA
N3DUE 507- 39-13-MDC
WB3BGU 444- 37-12-MDC
K3AKR 340- 34-10-MDC

4

K4LHB 1920- 80-24-VA
K2UOP/4 1900- 76-25-VA
KC4EG 1728- 54-32-KY
WB4NXY 1326- 51-26-KY
K4CAW 1071- 51-21-NC
N4MM 799- 47-17-VA
N4VC 435- 29-15-TN
WB4GFO 276- 23-12-AL
WA4MMP 182- 26- 7-VA
W3ZR 170- 17-10-SFL
W4NTI 84- 12- 7-AL

5

K5SW 1225- 49-25-OK
WA5VJB 882- 63-14-NTX
KD5RO 280- 35- 8-NTX
N5BHO 180- 18-10-LA
K5MAT 90- 15- 6-NM
WA5TKU 60- 10- 6-NTX
W5UCY 32- 8- 4-MS

6

W1XX/6 1476- 82-18-SB
K6GSS 928- 58-16-SCV
WA6LHD 555- 37-15-EB
W6RXQ 462- 42-11-SCV
KE6NS 407- 37-11-SV
WA5BNH 340- 34-10-SDG
NR6E 272- 34- 8-EB
K6PFW 108- 18- 6-ORG

7

NF7X 704- 64-11-WA
KB7N 136- 17- 8-ID
K7HSJ 115- 23- 5-OR
WB7ATP 44- 11- 4-WA
N7DB 6- 6- 1-OR

8

WD8ISK 4312- 98-44-OH
WA8ZHE 3872- 88-44-OH
N8FCJ 2380- 85-28-WV
K8DIO 1200- 48-25-OH
N8CKH 946- 43-22-MI
KA8IFC 777- 37-21-OH
K8YAH 150- 15-10-OH

9

WD9HQZ 1960- 70-28-WI
WB9NTL 1378- 53-26-IN
KA9LOS 1122- 51-22-IL
W3EP/9 1118- 43-26-IN
WD9FSA 924- 42-22-IL
WD9IIX 900- 50-18-IL
KA9HKL 612- 36-17-WI
N9NB 448- 28-16-IN
N9TD 392- 28-14-WI

WB9QBU	273	21-13-IL	
N9EEE	153	17-9-WI	
KA9MGR	135	15-9-IL	
0			
KØTLM	888	43-18-MO	
WAØVJF	600	30-20-KS	
WØEMS	408	24-17-NE	
NØLL	374	22-17-KS	
NØEKT	176	16-11-IA	
W3XO/Ø	2	2-1-MO	
VE			
VE3FGU	2652	78-34-ON	
VE3BFM	1078	49-22-ON	
VE2CUA (VE2DUB, opr.)	300	30-10-PQ	
VE3OCX	180	15-12-ON	

220 MHz

1			
W1VD (K1JX, opr.)	800	50-16-CT	
W1JR	336	28-12-EMA	
W1GXT	60	10-6-EMA	
2			
K2GK	627	33-19-WNY	
W2EIF	507	39-13-SNJ	
WA2TIF	363	33-11-ENY	
N2CEI	340	34-10-NNJ	
K2BJG	310	31-10-NNJ	
N2BJ	189	21-9-ENY	
WB2ONA	176	22-8-NNJ	
W2MX (WB2YEH, opr.)	168	21-8-SNJ	
KA2BTD	60	15-4-NNJ	
3			
WA3YON	288	24-12-EPA	
WA2OMY	189	21-9-EPA	
W3XO	152	19-8-MDC	
W3CL	90	18-5-EPA	
WB3IMS	90	10-9-WPA	
K3ARK	1	1-1-MDC	
4			
K4LHB	420	28-15-VA	
K2UOP/4	144	16-9-VA	
K4JSI	98	14-7-VA	
KC4EG	54	9-6-KY	
N3AHI	24	6-4-GA	
5			
K5SW	63	9-7-OK	
WA5VJB	51	17-3-NTX	
N5ACP	3	3-1-NM	
K5MAT	2	2-1-NM	
6			
NR6E	6	3-2-EB	
7			
K7HSJ	8	4-2-OR	
8			
K8DIO	260	20-13-OH	
WD8ISK	200	20-10-OH	
9			
WB9NTL	36	9-4-IN	
VE			
VE3BFM	280	20-14-ON	
VE3OCX	9	3-3-ON	

432 MHz

1			
W1VD (K1JX, opr.)	1914	87-22-CT	
W1JR	600	40-15-EMA	
KA1BXB (K1GX, opr.)	374	34-11-CT	
WA1WXV	150	25-6-CT	
K1ISW	147	21-7-WMA	
W1IGH	138	23-6-CT	
K8CH/1	108	18-6-CT	
AA2Z	40	8-5-CT	
AC1J	27	9-3-NH	
W1GXT	18	9-2-EMA	
2			
W2VC	836	44-19-NNJ	
K2BJG	675	45-15-NNJ	
K2GK	495	33-15-WNY	
KA2BTD	444	37-12-NNJ	
W2TC	407	37-11-NNJ	
WA2TIF	384	32-12-ENY	
K2YGO	360	24-15-WNY	
W1XX/2	351	27-13-WNY	
WB2ONA	280	35-8-NNJ	
W2MX (WB2YEH, opr.)	248	31-8-SNJ	
W2EIF	189	27-7-SNJ	
WA2VUN	182	26-7-NNJ	
N2CEI	156	26-6-NNJ	
WA2SZY	105	15-7-WNY	
WA2UDT	52	13-4-NNJ	
K2QR	30	6-5-WNY	
NA2O	28	7-4-WNY	
3			
WB3ESS	1340	67-20-EPA	
WB3IMS	924	44-21-WPA	
WB3CZG	490	35-14-EPA	
WA3FYJ	459	27-17-WPA	
W3GN	75	15-5-MDC	
K3AKR	64	16-4-MDC	
W3CL	44	11-4-EPA	
4			
K4CAW	288	24-12-NC	
K2UOP/4	192	24-8-VA	
K4JSI	184	23-8-VA	
KC4EG	128	16-8-KY	
WB4NXY	128	16-8-KY	
WA4MMP	36	9-4-VA	
5			
K5SW	154	14-11-OK	
WA5WDB/5	133	19-7-OK	
WA5TKU	48	8-6-NTX	
K5MAT	12	4-3-NM	
W5UCY	2	2-1-MS	
6			
AJ6T	100	20-5-SCV	
W6RXQ	60	20-3-SCV	
NR6E	39	13-3-EB	
K6GSS	28	14-2-SCV	
7			
N7NW	24	8-3-WA	
K7HSJ	18	6-3-OR	
NF7X	14	7-2-WA	
8			
WB8BKC	792	36-22-MI	
WD8ISK	512	32-16-OH	
K8DIO	416	26-16-OH	
K8TL	360	24-15-OH	
K8YAH	42	7-6-OH	
9			
WB9QBU	336	21-16-IL	
WB9NTL	112	14-8-IN	
Ø			
WAØVJF	4	2-2-KS	
VE			
VE3BFM	264	22-12-ON	
VE3OCX	63	9-7-ON	

1296 MHz

1			
W1JR	66	11-6-EMA	
WA1JOF	21	7-3-EMA	
2			
W2VC	152	19-8-NNJ	
WB2ONA	40	10-4-NNJ	
K2BJG	30	10-3-NNJ	
W2EIF	24	8-3-SNJ	
KA2BTD	1	1-1-NNJ	
3			
W3HQT	147	21-7-EPA	
WA3JUF	78	13-6-EPA	
K3HZO	56	14-4-MDC	
4			
K2UOP/4	8	4-2-VA	
WD4JQV	6	3-2-GA	
5			
WA5VJB	10	5-2-NTX	
WA5TKU	4	2-2-NTX	
7			
K7HSJ	1	1-1-OR	
8			
WB8BKC	48	8-6-MI	
VE			
VE3BFM	36	9-4-ON	

Rules, Eighth ARRL International EME Competition

Last year year's EME contest worked well in the fall and was well-received in that time frame. Therefore, we will continue to hold these contests in the fall. This year's contest will be held the weekends of September 22-23 and October 20-21. Thanks to K2UYH, W1JR and WA1JXN for help in picking the dates for this year's contest.

The rules are the same as for last fall. Official forms are available for an s.a.s.e. to ARRL Hq.

Rules

1) **Object:** Two-way communications via the earth-moon-earth path on any authorized amateur frequency above 50 MHz.

2) **Contest Period:** Two full weekends, Sept. 22-23 and Oct. 20-21 full 48-hour period UTC each weekend.

3) **Categories:**

(A) Single Operator: one person performs all operating and logging functions, equipment adjustment and antenna alignment.

(1) *Multiband.*

(2) *Single-band:* Single-band entries on 50, 144, 220, 432, and 1296-and-up categories will be recognized in awards offered. Contacts may be made on any and all bands without jeopardizing single-band entry status. Such additional contacts are encouraged and should be reported. Also see Rule 8, Awards.

B) Multioperator: Two or more persons participate; includes neighboring amateurs within one call area, but with EME facilities for different bands on different team members' premises, as long as no two are more than 50 km (30 miles) apart. Multioperator neighborhood groups cannot use the same call signs at each location; all calls will be listed in the results.

C) Commercial Equipment: Stations using equipment that is not amateur (such as a dish antenna for lab equipment owned by an institution or government agency) will have their scores listed separately.

4) **Exchange:** For a valid contact to occur, each station must send and receive both call signs and a signal report in any mutually understood format, plus a complete acknowledgement of the calls and report. Partial or incomplete QSOs should be indicated in your log, but not for contest credit.

5) **Scoring:**

A) QSO Points: Count 100 points for each complete EME contact.

B) Multiplier: Each U.S. and Canadian call area, plus each DXCC country (not U.S./Canada) worked via EME on each band.

C) Final Score: Multiply QSO points by sum of multipliers worked on each band for your final score.

6) **Miscellaneous:**

A) Fixed or portable operation is permitted. Stations operating outside traditional call areas *must* indicate so, identifying the call area of the operating site.

B) Contacts may be on CW or SSB. Only one signal per band is permitted.

C) A transmitter, receiver or antenna used to contact one or more stations under one call sign may not be used subsequently under any other call sign during the contest, except for family stations where more than one call has been issued, and then only if the second call sign is used by a different operator.

D) There is no specified minimum terrestrial distance for contacts, but all communications must be copied over the moonbounce path, regardless of how strong (or weak) a nearby station's terrestrial signal may be.

7) **Reporting:** Entries must be postmarked no later than 30 days after the contest and must include complete log data. Your summary sheet should show a band-by-band breakdown of QSOs and multipliers, and include details of your station set-up and a photo.

8) **Awards:** Certificates will be issued to the top five stations worldwide in each of the entry categories: single operator, multiband; single operator, single band (separate awards for each band); and multioperator. Additional awards will be issued where significant achievement or competition is evidenced. In addition, each station that successfully completes at least one EME contact during the contest period will receive a certificate commemorating that achievement.

9) **Disqualification:** See January *QST*, page 80.

Results, June VHF QSO Party

By Edith Holsopple,* N1CZC

Three Division Leader records were broken during the VHF QSO Party of June 9 and 10 in spite of the generally mediocre conditions nationwide. Save for a couple band openings and some E-skip reported on 6 meters, conditions were pretty much homogeneous on all the bands; Mother Nature did not choose a favorite section. Logs received numbered 495, down 3% from last year. That is an excellent showing considering that conditions this year were slightly less favorable than last year, ranging from terrible to fair, and in general scores were lower.

AA2Z/3 again graced the number one position on the top ten single-op list, breaking a division record for the second year running. That feat is nothing short of remarkable and can only be attributed to persistence, his hallmark. Another division record broken was by multi-op station K6GSS, who topped the long-standing Pacific Division score set by WA6JUD/6 in 1976. Multiop station AAØL displaced WØIJR who had held the high score for the Rocky Mountain Division since 1972. Way to go!

Although W1VD had more QSOs, W2SZ/1 is still the number one multi-op station for points. K2CBA, operated by WB2DNE, retained the number three spot (single-op). Single-op stations KA2BTD and K3HP showed up again in the top ten listing, as did multi-op station W1TKZ.

The contest weekend was not altogether lacking in moments of drama. W9IP/2 in WNY worked KØALL on Saturday during the only decent, though brief, opening. Likewise, WA7JTM in Arizona was smiled upon by the propagation gods and worked VP2EME and W4UWH/KP2. Kudos and thanks to those DX stations for making the multiplier chasing more interesting. There was an opening on 6 meters Saturday evening from Ohio to the west, and good double-hop to Washington and Oregon from Southern Texas at about the same time. A spotty path from Missouri briefly opened to the West Coast, and Colorado enjoyed an afternoon and evening opening to the north, east and west. Sunday saw more of the same. There was a 6-meter opening to California and Minnesota from the East Coast, from Ohio to Florida in the evening. To wrap things up, this was a fine test. The Northeast seems to have a QSO number advantage because of station density. Conditions were below average everywhere, but operator skill more than made up for it and kept things moving.

Many thanks to those who sent in ideas and votes in the Section vs. Grid controversy. Of the 273 opinions expressed, 189 were in favor of going with the Grid system, while 84 voted to keep the Sections.

Thanks to Bruce Hale, KB1MW, and Ted Beilman for their help in the preparation of this report.

Be sure to join us for the September VHF QSO Party later this month, and the June VHF QSO Party next summer. Good luck!

*Communications Assistant, ARRL

WA2VUN was the 6-meter operator at K2XR.

WAØVJF, KBØDW, and KFØM (l-r) multioped from Kansas.

Division Leaders

Single Operator		*Division*	*Multioperator*	
Call	*Score*		*Call*	*Score*
VE3ASO	22,265	Canadian	VE3LNX	34,040
*AA2Z/3	99,408	Atlantic	K3MTK	165,888
WB9NTL	14,396	Central	K9MRI	53,187
KBØZQ	5616	Dakota	KØALL	17,388
W5RCI	11,387	Delta	N5DL	71,392
WD8ISK	38,548	Great Lakes	W8VP	85,860
KC2PX	45,588	Hudson	N2BOW	71,392
NØLL	21,255	Midwest	W9UD/Ø	62,721
WA1OUB	31,570	New England	W2SZ/1	271,715
KB7WW	13,769	Northwestern	WA7BJU	17,755
W6RXQ	16,796	Pacific	*K6GSS	106,172
K2UOP/4	26,061	Roanoke	K3LNZ/8	100,796
WØETT	16,068	Rocky Mt.	*WØIJR	48,983
KB4CRT	16,555	Southeastern	KA4ULJ	15,250
K2DNR/7	8400	Southwestern	N6CW	46,565
WB5RUS	13,272	West Gulf	K5CM	85,143

*new all-time division record

Top Ten

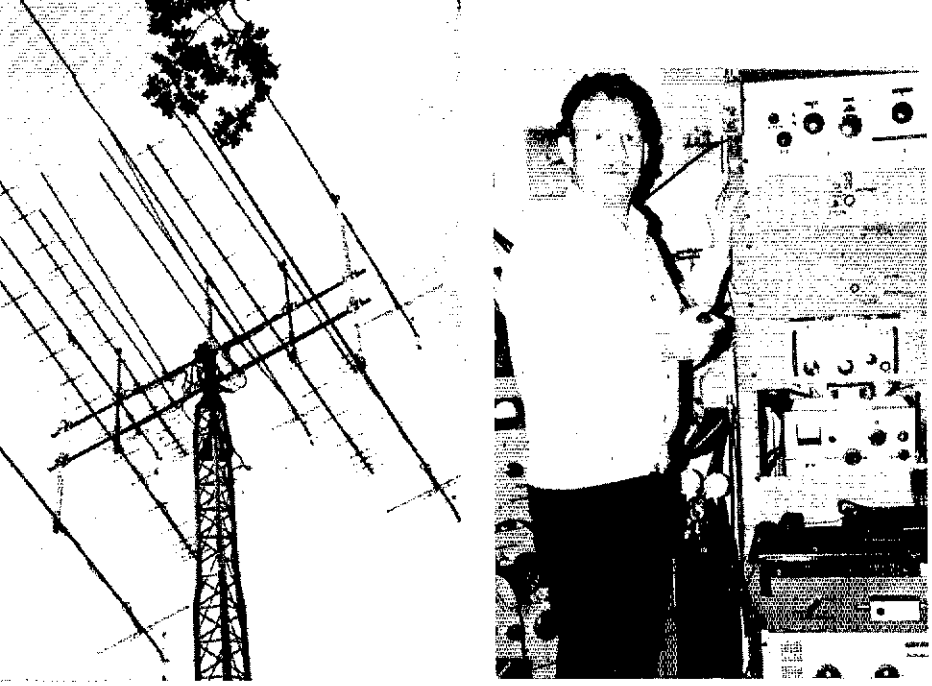
Single Operator		*Multioperator*	
AA2Z/3	99,408	W2SZ/1	271,715
KC2PX	45,588	W1VD	200,136
K2CBA (WB2DNE)	42,222	K3MTK	165,888
WB3IMS	41,025	K3YTL	144,900
WD8ISK	38,548	WB2NPE	133,560
KA2BTD	38,212	W1TKZ	115,668
W3IP	37,730	K1TR	115,154
WA2TEO	36,419	K6GSS	106,172
K3HP	32,695	K3LNZ/8	100,796
W9IP/2	31,790	K2XR	97,647

Grids or Sections?

Call Areas	*Logs Rcvd*	*Votes for Grids*	*Votes for Sections*
1	60	16	15
2	69	29	18
3	52	18	17
4	64	33	6
5	31	13	5
6	48	19	5
7	40	19	6
8	31	11	3
9	34	12	1
Ø	47	16	9
VE	18	3	—
Ck log	1	—	—
Total	495	189	85

SOAPBOX

Erecting a total of 406 elements for 5 bands on 5 towers in 100° heat was just not a lot of fun (K2XR gang). It's the better part of valor to tackle a contest with 5 W at the antenna; it's the worst part of stupidity to do it when everyone else has a KW (KAØKUY)! After comparing this year's effort in CO with the past two years' portable contest operations in UT, I am convinced that we have much better Es conditions on this side of the Rocky Mountains (WØETT). Considering weather on the east coast, I expected good extended ground wave/tropo to prevail, but instead I found average to below average (K2CBA op by WB2DNE). Hot, hot, hot. My wife decided to cut the grass in the middle of the test. It caused ignition noise on 2 meters (NE2Q). Every year I swear I'm not going to enter another one of these things. Where did I go wrong? (W2WW). I ran 10 W on 2 meters into a 19-inch piece of wire and worked 12 sections. I ran 10 W to crossed horizontal dipoles on 432, stuck them on top of the piano on the ground floor and worked 5 stations. Amazing (K2OVS)! It is very pleasant to see WPA, VT and ME Sections well represented on 432. RI could use more operators (K2RIW). For the first time, our multi-op effort was relaxing and easy — a real pleasure (WB2NPE). I caught one long-distance opening to NM, but had to sit and listen to stations south of me working into 7-land and even CA (W9IP/2). I had more 220 and 432 QSOs during the Spring Sprint. Maybe the rules could suggest operating hours for these 2 bands and get more stations together (K2GK). This was my 1st VHF contest. Now I'm sorry I didn't enter for years past. I had a ball (WB2SZY). Do we have to count the snakes in our multi-op effort? (WA2GBG). We had a lot of fun, but thought that 2-meter activity was down



N4JS/5 launched a five-band effort and placed second in Mississippi. The N4JS/5 sky-ware includes: 50 MHz, 8-el at 40'; 144 MHz, 4 Boomers at 50'; a 220-MHz Boomer at 50'; 432 MHz, 4 16-el at 50'; 1296 MHz, 4 28-el loop Yagis at 50'.

Top Single Band Scores

50 MHz		*144 MHz*		*220 MHz*		*432 MHz*		*1296 MHz*	
K4KUZ	13,936	K1KA	12,888	AA2Z/3	2196	K1FO	8694	N6CA	1617
NØLL	13,364	K2TXB	10,580	AF1T	1650	K2RIW	5336	NF2P	1482
KB4CRT	12,348	N8FCJ	8721	WB3IMS	1320	AA2Z/3	3382	W2VC	957
WØETT	11,609	K3ONW	7104	WB2WIH	1260	WB3IMS	3306	AF1T	810
WA1OUB	11,374	AA2Z/3	6292	WA2TIF	1120	W3IP	2924	W3HQT	675
W5FF	11,067	KC2PX	5957	WA2OMY/3	1066	W2VC	2774	K6UQH	672
AA2Z/3	10,672	WB2QOQ	5740	W2EIF	1019	W2TC	2720	WA1JOF	570
WB2QLP	9152	WB2KEC	5302	*K3YTL	4326	W1RIL	2528	*W2SZ/1	2064
WB5DSH	8858	K3HP	5028	*K3MTK	3780	N1BC	2380	*K3YTL	1575
N4MM	8325	WB3IMS	5016	*W1VD	3640	*W2SZ/1	8878	*K3MTK	1488
*K5CM	34,408	*W1VD	15,175			*W1VD	8832		
*WØIJR	23,744	*W2SZ	13,296			*K3MTK	4884		
*W1VD	22,828	*K1TR	12,995						

*denotes multioperator stations

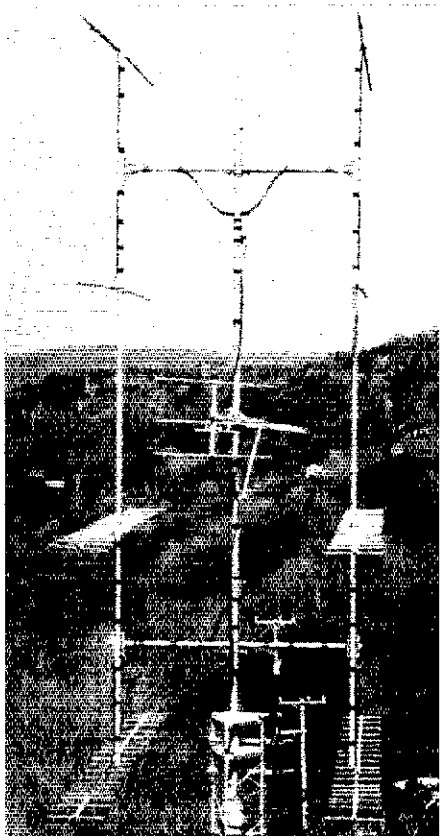
Multiplier Leaders — Single Operator

50 MHz		*144 MHz*		*220 MHz*		*432 MHz*		*1296*	
WA1OUB	47	K1KA	24	AF1T	15	K1FO	23	WA1JOF	10
KC2PX	40	K2TXB	23	WA2TIF	16	K2RIW	23	AF1T	10
AA2Z/3	46	KC2PX	23	AA2Z/3	18	AA2Z/3	19	NF2P	13
K4KUZ	52	K3ONW	24	AB4L	13	WB3IMS	19	AA2Z/3	9
W5FF	51	AB4L	22	W5RCI	9	AB4L	21	W3HQT	9
W6RXQ	44	W5RCI	15	WA6LHD	6	W5RCI	11	AB4L	6
KB7WW	41	WA6LHD	10	W7YOZ	3	K6PVS	7	W5GG	3
WD8ISK	48	K6PVS	10	N7NW	3	W6RXQ	7	K5DHU	3
W3EP/9	39	W6DHO	10	KD8FO	12	K2DNR	6	N6CA	11
NØLL	52	WB7BLF	25	WB9NTL	5	WA8ZHE	13	W7YOZ	4
VE3ASO	27	N8FCJ	27	N9AZC	5	WB9MSV	9	WA8ZHE	3
		WB9MSV	16	WBØTEM	9	WBØTEM	9	WD8ISK	3
		W3EP/9	16	VE3BFM	9	VE3ASO	13	VE3ASO	5
		N9AZC	16	VE3OCX	9	VE3BFM	13		
		WØFY	15						
		VE3ASD	21						

Multiplier Leaders — Multiop

50 MHz		*144 MHz*		*220 MHz*		*432 MHz*		*1296 MHz*	
W1VD	52	W1VD	25	W1VD	20	W1VD	24	W2SZ/1	16
WA2GBG	49	K2XR	24	W2SZ/1	20	WB2NPE	21	WB2NPE	10
K3YTL	45	K3MTK	26	K2XR	19	K3MTK	22	K2XR	10
N4DT	58	K2UOP/4	19	WB2NPE	19	K4CAW	16	K3MTK	16
WD4GXN	19	N4DT	19	K3MTK	21	WB5LUA	14	K2UOP/4	4
K5CM	68	N5DL	15	K3YTL	21	WB6AAG	8	WB5LUA	3
K6GSS	48	K5CM	15	K2UOP/4	13	N6VI	8	N6AMG	5
WA7BJU	41	N6AMG	11	N5DL	9	WAØYPL/7	7	WAØYPL/7	4
WB8GEX	55	N6VI	11	K6GSS	8	W8VP	19	K3LNZ/8	5
WØUC/9	45	WAØYPL/7	7	WA7BJU	2	K9MRI	8	W9UD/Ø	3
W9UD/Ø	56	W8VP	22	W7SAA	2	W9UD/Ø	13	VE3LNX	5
VE3FHK	30	K3LNZ/8	22	W8VP	18	VE3LNX	14		
		K9MRI	16	K3LNZ/8	18				
		NØIS	18	K9MRI	9				
		VE3LNX	18	W9UD/Ø	13				
				VE3LNX	11				

in our area for a June contest (N2WK). I must contribute the successful operation fully to my XYL for allowing me to put in 40 man-hours of preparation of my station in the two weeks prior to this contest, and the actual 32 hours of operating. Her support with meals served at the operating position and crowd control (kids) and Murphy control (kept him away) deserves the highest award I can give (KC2PX). I worked AB4L during the contest and verified he was in FMØ7 making grid no. 50 for VUCC on 432 MHz (W2VC). This contest was a great way to spend a birthday and I enjoyed chasing the stations on 1296 (W2TC). The outside temp. hit 103° on Sun. afternoon. I wanted to work more QSOs but with no air cond. in the shack, I kept going outside and jumping in the pool (N2EJQ). I can't believe I worked VT with a vertical; thanks W1TKZ for staying in there near the end (KA2IRQ). We had fun with 500 mW helium lasers. We made it 4½ miles, but fog closed us down. Next time we want 10 miles and 2 multipliers, SNJ and NNJ (K2NJ). The last two June VHF contests, I have heard more on Fri. night than during the contest (VE1AHM). These were the worst conditions of my 21 years of hamming: no E skip, only scatter (VE2TH). Single antennas, short masts, QRP and battery power equals lots of fun, but we didn't beat anybody (VE3VA). It was sure nice to hear new stations on 1296 since last January. Also, 220 was active and conditions were good into OH from EPA (N3CX). The signals from the mountaintops of the northeast were awesome. I developed "contesters' elbow," a blister from leaning on the bench too much ... (KQ3D). I found the operators to be especially friendly in the VHF part of the spectrum (K3TC). This will be my last contest from WPA. Look for me on 220 from EL87 (KC3CL). There must have been some propagation on 2 since I was able to communicate with SNJ with my small setup of only 10 W and a 5/8-wave ground plane (WA3WAW). I am impressed at the number of stations who are getting on 432 MHz. It's always nice to hear new stations (WA4LIT). 50.110 sounded like the bottom end of 20 M during a DX pileup. I was glad to work VP2EME and the other DX stations through the stateside crud. I hoped to catch a G or GW on double hop; however, with a half dozen or more stations in and around 50.110, the chances of me winning the New York lottery were probably greater (WB4SLM).



WB3IMS used this 432 array to snag a contest-high number of multipliers on 70 cm and in so doing take the top single-operator position in Western Pennsylvania.

Scores

Scores are listed by ARRL section. Within each section, single-operator, multi-band scores are listed first, then single-operator, single-band scores starting with the lowest frequency band, and then multioperator scores. From left to right, each line score lists: call, score, QSOs, multiplier, bands operated (A — 50 MHz; B — 144 MHz; C — 220 MHz; D — 432 MHz; E — 1296 MHz; F — 2.3 GHz; G — 3.4 GHz; H — 5.7 GHz; I — 10 GHz; J — 24 GHz; K — 48 GHz; L — light). Among the single-operator stations, the single-band award winners are indicated by boldface type for the letter(s) denoting the bands won. For example, in Connecticut, W1PV is the single-operator section award winner, and he also had the highest scores on 1296 and above. K1EM had the highest single-band scores on 50 MHz and 220 MHz, while WB1BXS had the highest single-band score on 144 MHz. K1FO had the top score on 432 MHz. W1VD is the highest-scoring Connecticut multiop.

1

CONNECTICUT

W1PV 30,514- 306- 73-ABCDEI
K1EM 24,310- 309- 65-ABCD
WA1ZNT 3069- 99- 31-AB
W1ICH 2288- 74- 22-BD
K8CH/1 1704- 69- 24-ABD
K1ZZ 1044- 49- 18-ACE
WB1BXS 4301- 187- 23-B
K1GX 3620- 181- 20-B
WB1GOO 1066- 82- 13-B
W1WEF 1022- 73- 14-B
W1CNU 708- 59- 12-B
K1XA 1- 1- 1-B
K1FO 8694- 189- 23-D
W1VD (+ K1JX,KA1GD,WA1STO)
200,136- 1327- 124-ABCDIJ
W1QK (+ KA1s JPC,TD,KF8AJ,W1NG, WB1CVW,WB3JYO)
68,370- 692- 86-ABCD

EASTERN MASSACHUSETTS

W1QXX 22,869- 308- 63-ABCD
WA1JOF 15,264- 195- 53-BCDE
WB1FKF 9800- 132- 50-ABCDE
KA1DHO 8874- 147- 51-ABCD
K1SRZ 6984- 152- 36-ABCD
W1GXT 6156- 109- 38-BCDE
W4XP 4860- 104- 36-ABCD
W1JR 3696- 56- 33-ABCDEF
WA1AYS 2625- 98- 25-ABD
K1VZI 2180- 80- 20-ABCD
K1DAT 2461- 107- 23-A
KA1FVG 804- 67- 12-B
N1CHJ 506- 46- 11-B
W1AX 385- 35- 11-B

MAINE

WA1AYT 2581- 89- 29-AB
K1TOL 7310- 170- 43-A
W1PLX 858- 47- 14-B

NEW HAMPSHIRE

WA1OUB 31,570- 450- 70-ABC
AF1T 19,663- 262- 53-ACE
W1EJ 17,480- 223- 60-ABCDE
AC1J 9447- 169- 47-ABCD
N1BC 3927- 102- 21-BD
W1JSM 1540- 70- 20-BD
WA2ITI 990- 44- 18-ABC
(KB1NW, opr.)
KA1CDZ 900- 50- 18-ABC
K1KA 12,888- 537- 24-B
KA1BJ 1972- 116- 17-B

RHODE ISLAND

K1DS (+ K1s CH,JI,PAM,KM1X,WA3FEC)
36,600- 356- 75-ABCDEI
K1MUJ (K1s GNW,GX,UQE,VSC,KB1H, KR1U,WA1s DCP,HYN,IVD,RLV oprs.)
25,020- 341- 60-ABCD

VERMONT

WB1GQR 10,028- 190- 46-ABD
W1AIM 7154- 118- 49-ABCD
W1TKZ (K1s TK,UR, N1s ADY,CPE, W1s GCI,OOP, WA1s POY,YOJ,ZLQ, KB1NJ, WB1BUM, N2AWO, VE3GCL, oprs.)
115,668- 858- 108-ABCDEFI

WESTERN MASSACHUSETTS

KA1APR 27,720- 306- 72-ABCD
W1RIL 17,640- 279- 45-BDE
K1ISW 9812- 193- 44-ABCD
AC1T 2760- 82- 30-ABD
KA1GRX 429- 33- 13-AB
KA1DZV 324- 12- 5-FGHIJ
K1BE 319- 24- 11-ABD
W1PUO (KF1R opr.)
3869- 151- 19-B
K1JG 12- 4- 3-B
W2SZ/1 (AG1M, K1s DH,RQ, KJ1K, KA1DZV, WA1s HCO,UGE,ZAM,ZFK, WB1s EYI,.HJH, K2s EK,MM,UF, KD2S, KA2s TOC,OPG, W2ARQ, WA2s AAU,SPL,ZPQ, WB2OGJ, AK4L, N4CD, WA8USA, oprs.)
271,715- 1318- 155-ABCDEFGHIJ

K1TR (K1s BA,EA, N1s BEM,RC,AFQ, KV1J, W1MJ, WA1s MZG,ONB,PBU,QWF, VFJ, oprs.)
115,154- 1113- 114-ABCDEI
W1NY (AC1T,W1KK,KA1s KBN,KPH,KRJ)
12,052- 243- 46-ABD

2

EASTERN NEW YORK

K2CBA (WB2DNE, opr.)
42,222- 357- 93-ABCDE
WA2TEO 35,419- 379- 72-ABCDEF
N2BJ 25,488- 351- 59-ABCD
WA2TIF 16,100- 235- 50-BCD
WA2ZPX 7440- 240- 31-AB
WA2RUW 720- 38- 18-BC
W2IP 888- 37- 16-BD
NE2Q 4104- 216- 19-B
KA2JUV 855- 57- 15-B
KC2RO 440- 40- 11-B
KG2H 216- 24- 9-B
WB2TIT 162- 18- 9-B
AB2I (+ AB2J,K2DPL,W2JFB,WA2s ENM, IID, WB2s DVV,KMY)
41,138- 540- 67-ABCD
W2YJO (+ KA2Q,W2GXU)
1121- 54- 19-BD

NYC & LONG ISLAND

W2WW 11,000- 176- 44-BCD
WB2CMI 8385- 195- 43-AB
WA2SLY 5973- 181- 33-AB
K2OVS 880- 50- 16-BD
WB2KEC 5302- 241- 22-B
WB2ENW 160- 20- 8-B
WA2OJK 40- 10- 4-B
K2RIW 5336- 116- 23-D

NORTHERN NEW JERSEY

KC2PX 45,588- 468- 87-ABCD
KA2BTD 38,212- 349- 82-ABCDE
WB2WIH 23,104- 273- 64-ABCD
N2BMN 18,328- 253- 58-ABCDE
W2VC 6930- 102- 30-DE
W2TC 4642- 97- 22-DE
WA2UDT 1600- 55- 20-AD
WA2CWA 4- 2- 2-AB
WB2QOQ 5740- 287- 20-B
WB2CUT 3456- 192- 18-B
WB2HVF 1664- 104- 16-B
WA2ALM 1204- 86- 14-B
N2EJQ 966- 69- 14-B
N3AHF 864- 48- 18-B
KA2IRQ 549- 61- 9-B
N2BOW (+ WB2WLM,N2s CEI,EOC)
71,392- 648- 92-ABCDI
WA2SNA (N2s AAZ,BTJ,CJJ,K2BJG, KA2OVK,W2RS,WB2RFB, oprs.)
41,544- 473- 72-ABCDE
K2NJ (+ KA2s LBB,OEE,RBD,RLW,KD2s EL, GY,K1CZY,W2GD,WA2NSD,WB2GWD, KU2C) 39,963- 438- 77-ABCDL
WA2FXB (+ K2QWG,KE9Q,WA2s GEZ,PJZ, WB2QBT) 23,088- 385- 52-ABD

SOUTHERN NEW JERSEY

W2EIF 25,296- 260- 68-ABCDE
KS2T 20,345- 245- 65-ABCD
W2HRW 13,110- 272- 46-ABD
K1TQ 1530- 86- 15-ABD
K2TXB 10,580- 460- 23-B
NF2P 1482- 38- 13-E
WB2NPE (+ N2SB,WA2VYA,WB2RVX, WB4ZAR) 133,560- 857- 120-ABCDE
K2BWR (+ K2ZRJ)
28,431- 238- 81-ABCDE
WA2JSG (+ WA2ZMN)
12,760- 281- 56-ABCD

WESTERN NEW YORK

W9IP/2 31,790- 293- 85-ABCDE
W1XX/2 17,584- 281- 56-ABCD
K2GK 16,472- 216- 56-ABCDE
WA2SZY 2832- 100- 24-BD
KA2ENE 1701- 73- 21-ABD
KA1YE/2 1210- 50- 22-ABD
KC2AW 224- 28- 8-AB
K2POI 1485- 99- 15-B
WB2SZY 1200- 80- 15-B
WA2CBU 1104- 69- 16-B
NA2A 1050- 70- 15-B
W2AWF 396- 33- 12-B
N2BKS 360- 36- 10-B

K2KWK 3- 3- 1-B
K2XR (KC2X,KT2B,W2HWG,WA2VUN, WB2s EGI, TSY, WIK, oprs.)
97,647- 657- 121-ABCDE
WA2GBG (+ N2AU,KX2I,K2QR)
68,340- 568- 102-ABCD
W2RCX (AF2K,N2DRX,NA2O,KA2OQZ, WA2YTM, WB2s DFC,IEY,ODH, oprs.)
24,120- 298- 67-ABCDE
N2WK (+ KA2s HSK,MRP,KX2J,WA2s LAQ, MOP,SHN)
17,168- 235- 58-ABCD
WA2AAZ (N2s CDJ,CSY,DIT,EVZ, K2OEQ,KC2GZ,KD2CO oprs.)
15,390- 264- 54-ABD

3

DELAWARE

AC3T 848- 48- 16-AC
WB3ILM 468- 38- 13-A
KC3BC 1455- 97- 15-B
W3BDP 600- 50- 12-B

EASTERN PENNSYLVANIA

AA2Z/3 99,408- 686- 114-ABCDE
K3HP 32,695- 408- 65-ABCDE
WA2OMY/3 21,266- 263- 62-ABCDE
K3IWK 13,000- 248- 50-ABD
N3CX 11,092- 123- 47-BCDE
N3BHS 10,120- 191- 44-ABCD
N3ET 5379- 132- 33-BD
KA3HTY 4004- 115- 26-BCD
W3CL 3861- 84- 33-ABCD
WA3EYD 1128- 43- 24-ABC
K3ONW 7104- 296- 24-B
KQ3D 2223- 117- 19-B
KK3M 1728- 108- 16-B
WB2BJH/3 1596- 84- 19-B
W3HQT 675- 75- 9-E
WA3JUF 357- 17- 7-E
K3MTK (AA3M,N3CCW,KM3T,WB2s IJT, YEH,WA3s AIS,BRW,GOV,IAO,LBI, NAY,KPP,OTI,WAK,VVG,KA3SN, W3GPY,WB3IYE, oprs.)
165,888- 1021- 128-ABCDEFIJ
K3YTL (+ N3s CXB,DAP,KB3Q,K3MKZ KA3s CWR,EEO,ILE,WA3s JWP,JWV, NVS,YON, WB3s IWZ,FAA,FKQ,FYT,oprs.)
144,900- 853- 126-ABCDE
W3AD (N3s BCZ,BNA,K3HEC,W3OLV, WA3HMK, oprs.)
38,808- 484- 78-ABD
W3LP (WA3CUQ,W3s JUZ,GFN, oprs.)
15,565- 211- 55-ABCD
W3HZU (K3GDI,KA3s CCA,FOO,W3AXC, WB3AWJ, oprs.)
6112- 191- 32-AB

MARYLAND-DC

W3IP 37,730- 348- 77-ABCDE
W3WFM 25,929- 324- 67-ABDE
W3XO 14,880- 202- 60-ABCD
K3AKR 10,500- 160- 50-ABCD
WA3UJE 5568- 163- 29-BCD
KB3GX 5434- 245- 22-BC
N3API 3208- 92- 24-AB
W3GN 1978- 86- 23-ABD
KI3L 2744- 98- 28-A
K3TC 3211- 169- 19-B
N3AM 2610- 145- 18-B
WA3FAE 2057- 121- 17-B
N3DUE 1440- 96- 15-B
NN3SI (W4KM, opr.)
15- 5- 3-B
W3PGA (W3JDF,K3PHH,KO3K, oprs.)
2025- 81- 25-AB

WESTERN PENNSYLVANIA

WB3IMS 41,025- 416- 75-ABCD
KC3CL 29,808- 336- 72-ABCD
W3HDH 688- 43- 16-A
W3KJM 578- 34- 17-A
W3BZN 992- 62- 16-B
KB3L 816- 51- 16-B
KA3KZF 767- 59- 13-B
WA3OJA 410- 41- 10-B
WA3WAW 36- 9- 4-B
KR3C 546- 21- 13-D
W3KWH (AK3J,K3s RYA,TP,KA3s, IVB, KSD,N3s BAW,DOK,W3s IOH,SVJ,UHM, UIUH,WA3s ITM,TTS,TUB,WB3s BRY, EML,LJQ,K4EYQ, oprs.)
15,120- 241- 54-ABD
W3GNR/3 (+ WA3JBV,KA3s AWL,DWR, oprs.)
1771- 77- 23-A

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ALABAMA

KC4P 13,293- 194- 63-ABCD
WA4CQG 12,160- 175- 64-ABCD
W4NTI 6864- 132- 52-AB
WA4LIT 2277- 75- 23-BD
WB4GFO 1449- 69- 21-AB
W4CNQ 217- 26- 7-BD
N4DLE 168- 25- 6-ABD
N4EQZ 156- 23- 6-ABD
WB4NJG 6223- 127- 49-A
WA4VUG 55- 11- 5-B

GEORGIA

K4CKS 11,269- 191- 59-AB
WB4SLM 7632- 158- 48-AB
WS4F 2280- 62- 30-ABCDE
KA4KKF 372- 30- 12-ABD
AK4T 189- 21- 9-AB

KENTUCKY

KC4EG 25,410- 274- 77-ABCD
WB4NXY 17,018- 224- 67-ABDF
N4FFO 1035- 45- 23-A
N4AR 2363- 139- 17-B
WR4F (+ WD4HPL)
1470- 98- 15-B

NORTH CAROLINA

K4CAW 7130- 177- 31-BD
WA4FKI 540- 54- 10-B
K4UWH 45- 15- 3-B
N4DT (+ AJ4N,NE4G,K4PXE,WA4LDU, WB4NNY,WQ4V)
66,912- 582- 102-ABCDE

NORTHERN FLORIDA

W4ODW 10,764- 167- 52-ABCDE
WD4FAB 6380- 139- 44-ABD
W4CSS 1265- 49- 23-ABD
WD4HWO 39- 10- 3-BD
W4WHK 5040- 120- 42-A
KA4YIW 4620- 105- 44-A
N4EFV 1701- 63- 27-A
WA4CAD 468- 52- 9-B
W4DFU (KA3IKE,KB4HSN,KF4s GI,IT, N4s CUF,JGU, oprs.)
9050- 175- 50-ABD

SOUTH CAROLINA

KB4DVN 182- 17- 9-ABD
NB4S 448- 56- 8-B

SOUTHERN FLORIDA

KB4CRT 18,555- 290- 55-ABD
K4KUZ 15,390- 285- 54-AB
W3ZR 8648- 184- 47-AB
N4EJW 8325- 183- 45-AB
N4TL 3783- 97- 39-AB
WA4OFS 192- 40- 4-BD
WB2QLP 9152- 208- 44-A
K4LVZ 1300- 50- 26-A
K4KCF 96- 32- 3-B
KA4ULJ (+ K2RTH, K1FJM)
15,250- 305- 50-AB

TENNESSEE

N4VC 8964- 166- 54-AB
KE4HX 5040- 120- 42-AB
WA4QYK 3978- 81- 39-ABCDE
N4MW 1037- 49- 17-BDF
WA4HGN 812- 35- 14-BD
W4HHK 517- 43- 11-BF
W4FLW 160- 16- 10-AB

VIRGINIA

K2UOP/4 28,061- 276- 73-ABCDE
N4RA 20,100- 268- 60-ABD
N4MM 17,856- 288- 62-AB
WD4GXN 14,592- 227- 57-ABD
K4FTO 6435- 150- 39-ABD
WA4SBC 4108- 128- 26-BD
WA4MMP 300- 23- 12-ABD
N4IXQ 3974- 106- 37-A
KL7GLL/4 1054- 62- 17-A
KB4CMF 320- 40- 8-B
AB4L (+ KA4NZO,KB4s NT,XK,W4AAH, WA4s IVF,PGI,WB4s BSS,W1C,YJC, WD4s BWL,DUT,DUU, oprs.)
95,876- 683- 117-ABCDEI
W4DO (+ KA4LXS,WD4LOU,KB3KJ)
24,364- 344- 59-ABD

5

ARKANSAS

WB5JAR 4633- 113- 41-AB
K5YY 430- 43- 10-B
N5DL (+ K5LG,KD5WD,WA5OOE,WD5s CAN, CAP,N8ACI)
30,504- 331- 82-ABCD
WD4KWD/5 (+ N4FAC,WB4LHD,WD4JHD, WB5BHS) 5670- 116- 42-ABCD

LOUISIANA

KB5PX 902- 66- 11-BD
N5AMA 484- 32- 11-BD
W5FYZ 495- 55- 9-B
N5BHO (+ W5EW)
9520- 153- 56-ABD

MISSISSIPPI

W5RCI 11,387- 146- 59-ABCD
N4JS/5 9006- 135- 57-ABCDE
W5UCY 1188- 45- 22-ABD
WA5WUX 540- 30- 18-AB

NEW MEXICO

W5FF 12,430- 226- 55-**AB**
KA5EBL 4356- 121- 36-AB
W5RKS 180- 18- 10-AB
W5HM (+ K5HMN,W0RMK)
3276- 91- 36-AB

NORTHERN TEXAS

W5GG 3880- 137- 20-**BDE**
K5DHU 1932- 63- 21-ABDE
WB5LUA (+ K5GW, KD5RO, KF5N, W5ETG, WA5s TKU,VJB)
60,996- 532- 92-ABCDEFGHI

OKLAHOMA

W5NZS 12,152- 202- 56-ABCD
K7CW 4092- 117- 31-**ABD**
WD5AGO 3162- 93- 34-AB
K5SW 1743- 59- 21-ABCD
W1GOM 152- 18- 8-ABD
WB5DSH 885B- 206- 43-A
K5CM (+ N5s CG,KW, W0RRY/5)
85,143- 769- 101-ABCD

SOUTHERN TEXAS

WB5RUS 13,272- 237- 56-AB
KC5GB 8450- 154- 50-**ABD**
WA5IYX 1920- 60- 32-A
KA5AYH 848- 106- 8-**B**
W5UWB (+ WA5TBE)
3330- 100- 30-ABD

6

EAST BAY

NR6E 7611- 141- 43-ABCDE
N6EIO 7392- 143- 44-**ABD**
WA6LHD 1547- 76- 17-BCD
KN5S 297- 27- 11-A
N6AMG (+ N6s IG,FRI,NE,W6YKM, WB6s YIY,YKM)
58,078- 652- 71-ABCDE

LOS ANGELES

K7OO 6766- 159- 34-**ABCDE**
W6PFE 284- 71- 4-B
N6CA 1617- 49- 11-E
WB6AAG (+ N6JJI,WA6FWI,WB6s AAG, PZLI 30,668- 394- 68-ABCDE
K6BPG (K6LPF,WB6YVP,WA8s BFH, HXD, oprs.)
6228- 143- 36-ABCD

ORANGE

K6PVS 7980- 182- 35-**ABDEF**
KB6XG 4268- 107- 27-ABCDE
NN6W 2585- 171- 15-BDE
N6ENU 403- 31- 13-AB
K8PFW 70- 14- 5-B
N6ADV 45- 9- 5-B

SANTA BARBARA

WA6IJZ 3663- 111- 33-**AB**
K6HXW 3684- 86- 34-**ABCD**
WD6BCN 850- 50- 17-AB
AA4Q 52- 10- 4-BD
W6DHO 480- 48- 10-**B**
KA6VRW 24- 12- 2-B
K6MEP (N6JH,NS6X,N6HBI,K6VMN,KH6N, KF6CM,WA6DJS,WA6FPX, oprs.)
43,520- 536- 64-ABCDE
N6VI (+ AE6E)
31,144- 373- 68-ABCDEI
WA6OYS (+ KA6JOE,WB6s EVS,KDB, YQN) 12,882- 274- 38-ABCDFGIL
N6CFO (+ KD6JY)
930- 45- 10-BD

SANTA CLARA VALLEY

W6RXQ 16,796- 258- 52-**ABDE**
K6HCP 14,198- 171- 62-ABCDE
KD6PY 6345- 121- 45-ABD
KA6ING 4025- 115- 35-AB
K9TGT/6 1170- 63- 15-ABD
KE6ZE 808- 71- 8-BD
NR6A 330- 22- 11-ABCD
WD6EPV 156- 20- 6-BC
AI8A/6 80- 20- 3-B
K6UQH 672- 32- 7-E
K6GSS (+ KA6IRT,KE6D,WB6KBZ,NU6s P, S,WA6AZP)
106,172- 1108- 78-ABCDE
WB6WLE (+ N6FF)
14,640- 224- 60-ABCD

SAN DIEGO

W6TIK 1197- 53- 21-**ABC**
N6CW (+ K1LI)
46,565- 584- 67-ABCD

SAN FRANCISCO

WA6LLY 4408- 108- 38-**ABD**
WB6YKU 486- 81- 6-**B**
WA0JRB/6 (+ N6BLN, WA6ACX)
8- 4- 2-B

SAN JOAQUIN VALLEY

KB6AMM 3366- 85- 34-ABE
K6JKQ 2054- 50- 24-**ABCDE**
W6HAB 15- 3- 3-BD
WB4QHM 120- 20- 6-**B**
KF6GY (+ KE6NS)
7917- 203- 39-AB

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ARIZONA

K2DNR/7 8400- 175- 48-**ABCDE**
WA7JTM 7644- 182- 42-AB
K1SC 1007- 53- 19-A
WB7BLF 25- 25- 1-B
WB7SAE 1- 1- 1-B

IDAHO

KD7IY 3430- 98- 35-**AB**
N7EIJ 2736- 114- 24-**AB**
WA7FSI 756- 42- 18-AB
W7CVJ 741- 35- 19-ABC
WB7NEZ 175- 21- 7-ABC
N7EDG 80- 16- 4-ABC
WA8DYU 1624- 58- 24-A

MONTANA

KB7Q 21- 5- 3-**BCD**

NEVADA

K7NV 2940- 105- 28-A
W7ABX 420- 28- 15-A
WA0YPL/7 (+ N7BPA, KA7CVV, WA7JUO)
8323- 163- 41-ABCDE
K3ZAP/7 (+ K8RQO,W8VPH)
4995- 124- 37-ABCD

OREGON

K8TWW 13,769- 258- 49-**ABCD**
W7JXU 6567- 180- 33-ABD
W7UDM 4466- 118- 29-ABCDFGHI
W7TYR 3423- 108- 21-ABCDEFGHI
K7HSJ 3366- 129- 18-**ABCDEF**
WB7UNU 336- 21- 8-ABCDEI
W7PUA 88- 16- 4-BD
WA7RZF 280- 28- 10-A
WA7BJU (+ K7RWT,N7DB,WA7s BAC,ECY)
17,755- 304- 53-ABCDE
W7SAA (KB7CW,KD7WA,KA7QQV, WA7ZAJ, oprs.)
439- 53- 6-BCD

UTAH

WA4GPM 351- 39- 9-AB
K7SQD 30- 6- 5-A
K6EIU7 18- 18- 1-**B**
N7BHC (+ KX7V)
1200- 57- 20-ABD

WASHINGTON

W7YOZ 12,600- 276- 40-ABCDEFGI
N7NW 10,865- 229- 41-ABCD
NF7X 9146- 255- 34-ABD
W7ERH 540- 57- 9-ABC
W7FI 5712- 168- 34-A
WB7FAH 68- 17- 4-A
WB7PEK (+ KA7ICT,N7CMR)
10,040- 204- 40-ABCDE

WYOMING

WA7KYM 8865- 184- 45-**ABCD**

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MICHIGAN

WA8FTA 5828- 188- 31-AB
NE8I 3498- 108- 22-**BCDE**
N8AKY 2470- 130- 19-**AB**
WA8MIL 1428- 72- 17-BD
W8CAP 1204- 72- 14-BD
WB8TGY 414- 45- 9-ABD
WD8KLU 144- 14- 8-ABD
N8CCC 558- 31- 18-A
K8OOK 70- 10- 7-A
N8DEJ 1656- 138- 12-B
KA8DDQ 384- 64- 6-B
WB8BKC (+ N8CKH,WA8VPD,WB8KAY)
78,398- 632- 103-ABCDE

OHIO

WD8ISK 38,548- 347- 92-**ABCDE**
WD8CTX 15,732- 248- 57-ABD
K8DIO 6228- 121- 36-BCD
WA8BBR 4263- 133- 29-ABD
WA8ZHE 2470- 46- 26-DE
WA8TXT 627- 27- 11-BDE
WB8TCZ 297- 23- 9-BD
N8BPB 792- 44- 18-A
NI8O 2223- 117- 19-B
N8BJN 1921- 113- 17-B
KD8FO 552- 23- 12-C
W8VP (K8s AL,IOX,KNL,KA8s FRI,SSB, N8s BOZ,CQX,W5UA,W8s PR,ULC,WA8FHF, WB8ERB, WD8s JYL,KPI, oprs.)
85,860- 651- 108-ABCDE
WB8GEX (+ WB8s GEU,GEY,GFA,TCU, N8FBD, WD8BNC)
26,600- 320- 76-ABD
KC8QA (+ WB8s JAY,TEI)
2323- 80- 23-BD
WD8BSA (+ N8s EJW,EKT, WB8HKK, WD8ORI) 2158- 83- 26-AB

WEST VIRGINIA

W8TN 2310- 72- 30-ABD
N8FCJ 8721- 323- 27-B
K3LNZ/8 (K3s DUA,ICH,W3ZZ,K4LHB, WA3s EOQ,NZL,OYW, oprs.)
100,796- 714- 113-ABCDEF
N8DKL (+ KB8ZE,KC8s FW,OQ,KA8RFK, N8s BZS,EIE)
7476- 178- 42-AB

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ILLINOIS

W89MSV 13,104- 256- 42-**ABCD**
WB9WMM 6600- 150- 44-AB
KA9MGR 2080- 80- 26 AB
WD9IIX 1287- 85- 13-BD
W9IVI 1080- 55- 18-ABD
K9PW 72- 12- 6-AB
N9DBB 2816- 88- 32-A
WB9STR 680- 34- 20-A
N9AO 1200- 100- 12-B
WD9AHK 294- 42- 7-B
KA9QPG 172- 43- 4-B
WB9EEA (+ AA9D,KA9BNG,N9DVS)
12,160- 267- 40-ABCD

INDIANA

WB9NTL 14,396- 205- 61-ABCD
W3EP/9 10,560- 192- 55-**AB**
N9AZC 4674- 104- 41-ABCD
K9DZS 2233- 71- 29-ABD
W8UT 784- 41- 14-BD
WA9PKL 372- 31- 12-A
KC9OD 180- 20- 9-A
K9MRI (+ K9TVZ)
33,187- 391- 77-ABCD
W9CSF (AG9S,N8BEY,N9AN,K9DZE, KA9s BWH,PGD,KC9CP,WB9SKL, WD9s CTS,EIX, oprs.)
12,528- 258- 48-ABD
KA8MRI/9 (+ KF4ST,KD8s JV,JW)
8415- 167- 45-ABD

WISCONSIN

KB9NM 6800- 170- 40-AB
WA9KVS 2548- 91- 28-AB
WA1IED 1044- 80- 12-BCD
N9TD 936- 66- 12-**BD**
W9NAW 1856- 64- 29-A
WA9LZM 392- 28- 14-A
N9DWL 180- 20- 9-A
W9NHE 1150- 115- 10-B
N9EEE 364- 52- 7-B
W9YCV 135- 27- 5-B
K9GDF 11- 11- 1-B
W8UC (+ K8GJX,KA9RIH,KB9S,NB9O)
18,240- 288- 80-ABCD

0

COLORADO

W0ETT 16,068- 292- 52-**ABD**
K0OST 3420- 109- 30-AC
W0KJY 3332- 98- 34-AB
WA6ERB 3051- 95- 27-ABD
KD0GS 1940- 81- 20-ABD
W0KJY 112- 14- 4-CD
W9MHL 6842- 162- 41-A
AD0R 944- 59- 16-A
W0OHP/0 120- 20- 3-**D**
W0IJR (+ KA0CDN,KX0O,KY0S,N0COX, W6OAL,W0RSJ)
48,983- 610- 73-ABCDE
N0BRI (+ KA0s MQA,PYH,KC0J,N0DVL W0KEA,WD0HNP)
26,620- 415- 55-ABCD
W0OZL (+ KD0GT)
13,152- 270- 48-ABD

IOWA

WB0ZKG 11,700- 225- 52-**AB**
WB0TEM 10,780- 160- 55-**ABCD**
KA0CSI 5550- 132- 37-ABD
WD0FOY 3441- 92- 37-ABC
N9BD/0 2328- 92- 24-ABD
WB0RWM 2175- 83- 25-ABD
WA0DCB 154- 14- 11-A
N0EKT 726- 66- 11-B
KA0GOA (+ NE0P)
160- 40- 4-B

KANSAS

N0LL 21,255- 327- 65-**AB**
W0QDH 962- 56- 17-AB
WA0GFQ 576- 36- 16-AB
AE0G 480- 60- 8-B
K0DVY 343- 49- 7-B
KF0M (+ KB0DW,WA0VJF,WB0NRV)
28,400- 318- 80-ABCDI

MINNESOTA

KB0ZQ 5816- 130- 39-**ABD**
W0XG (+ KD0HN,VE3FIB)
13,200- 234- 55-ABD

MISSOURI

W0JRP 5117- 119- 43-**ABD**
WB0PKN 3026- 89- 34-A
K9OCU 3- 3- 1-B
W9UDI/0 (+ AE9M,AK0P,K9CHZ,W0OHU, WD9FSA) 62,721- 541- 101-ABCDE
N0IS (+ N9HH,WB9CLN,W0HBH, WB0IUN)
37,367- 405- 79-ABCDE
K0TLM (+ WA0NOK)
24,048- 298- 72-ABCD
W0FY (+ KC0LX, KM0A)
9352- 155- 58-ABD

NEBRASKA

KA0HPK/0 8476- 149- 52-**ABCD**
N0AJU 7740- 172- 45-**AB**
K0US 2560- 80- 32-AB
KC0QR 1883- 86- 17-BCD
W0KAV 1350- 49- 27-ABD
W0EMS 756- 63- 12-BD
KA0GRI (+ WB0GPM)
10,780- 245- 44-AB
KC0OG (+ WB0DGF)
2871- 88- 29-ABD

NORTH DAKOTA

K0ALL (+ KC0W, KN0A, WA0ZAK)
17,388- 235- 69-ABCDE

SOUTH DAKOTA

WA6YBT 21- 6- 3-BD
WB0HMM 216- 27- 8-**B**

VE

MARITIME-NEWFOUNDLAND

VE1UT 1098- 53- 18-**BCD**
VE1AHM 72- 12- 6-B

QUEBEC

VE2FUT 32- 5- 4-BCD
VE2TH 364- 26- 14-A
VE2FYO 27- 9- 3-B
VE2CUA (+ VE2s BTW,DUB,HAK)
7998- 160- 43-ABCDI

ONTARIO

VE3ASO 22,265- 239- 73-**ABCDE**
VE3BFM 15,235- 204- 55-ABCDE
VE3FGU 7137- 183- 39-AB
VE3DCX 5889- 122- 39-ABCD
VE3EYR 4818- A26- 33-ABCD
VE3HCI 980- 45- 20-ABC
VE3AQG 1288- 92- 14-B
VE3LNX (+ VE3s ADJ,NSQ)
34,040- 359- 74-ABCDEF
VE3VA (+ VE3sCDN,FGN)
14,550- 234- 50-ABCDE
VE3FHK (+ VE3s FHU,NPB,OJN oprs.)
3978- 93- 14-B

SASKATCHEWAN

VE5LY 987- 47- 21-A

BRITISH COLUMBIA

VE7ASI 1024- 54- 16-**ABCD**

CHECK LOG

KY0A

Public Service

Conducted By Robert J. Halprin,* K1XA

TOSRV

Just as surely as April in central Ohio means the Dayton Hamvention, so does May mean TOSRV. TOSRV (pronouced "toss-serve") stands for Tour of the Scioto River Valley, a two-day bicycle tour down the 104-mile road from Columbus to Portsmouth, Ohio, and return.

The 1984 TOSRV, which began with only two riders in 1962, attracted over 4200 registered cyclists (plus an estimated 800 unregistered) May 12 and 13. It is now the largest weekend cycling event in the United States, accounting for a million rider miles in the current year.

Since 1972, the Central Ohio Amateur Radio Emergency Service (COARES) has provided the emergency communications that are always necessary for an event of this size. As the event has grown, so have the communications needs. In 1984 TOSRV required the services of the 135-member COARES plus help from other amateur organizations in central and southern Ohio.

Communications needs for TOSRV fall into four general categories. First of all, of course, are communications for the handling of emergencies. Bicycles are tricky vehicles. When they fall the rider sometimes suffers, and first aid from Red Cross volunteers must be summoned. Another type of communications involves network traffic, such as instructions to roving vehicles to take up new positions along the route. A third type is administrative traffic, as in the handling of requests for provisions or equipment repair. A fourth kind of traffic includes the handling of messages for the riders — somebody is lost or has lost something, and a message to that effect must be posted along the route.

To support TOSRV communications in 1984 took four 2-meter repeaters: one 66/06 machine in Columbus, one 78/18 machine in Circleville (at the 30-mile point), a 69/09 portable repeater in Chillicothe (at the 50-mile point) and a 66/06 portable COARES repeater in Portsmouth. All of these machines were linked together, so mobiles and even hand-held transceivers that could access one repeater were heard by the entire network from Columbus to Portsmouth.

Briefing for TOSRV began the Wednesday before the event, when radio operators met to collect their instructions. Included in the instructions were a map of the entire route and individual maps of the five counties through which the tour passes. There were also street maps of the larger cities on the route (Circleville, Chillicothe, Portsmouth) as well as one of Waverly, which contained a food stop. The instructions also included assignments for each operator and, last of all, a TOSRV "patch" symbolizing participation in the 1984 event.

TOSRV communications call for a great many different kinds of radio operators. The net-control operators man the net control station (K8DDG) in Chillicothe. Their job consists of seeing that assignments are handed out to roving mobile stations and Red Cross vehicles, keeping track of where everyone is located, and making sure that the sections of the route on which the cyclists are currently traveling have communications facilities.

The roving mobiles are stationed every mile or so along the route. It is their job to post signs for the riders (messages, weather reports, miles remaining), to report medical emergencies in their areas, and to supply information to cyclists whenever they can. Each mobile operator stays at the assigned post until all cyclists have passed, after which he leapfrogs down the route (using another road) and takes another assignment.

Some roving mobiles are also given assignments in which they are required to warn riders of potential traffic hazards (such as railroad crossings or intersecting roads without stop signs). All mobiles report such things as automobile drivers harrassing or speeding by the cyclists so as to create a possible hazard. The county sheriffs and state highway patrol are notified by net control if such things happen.

Red Cross vehicles have their own dispatcher, who keeps track of where they are and tries to have them posted where the cycle traffic is the densest. (The 1984 TOSRV used 11 Red Cross mobile first-aid units and one ambulance, which were posted at five-mile intervals along the route.) If an accident occurs, a first-aid vehicle is immediately directed to the scene. Should the injury be a serious one (such as a broken bone) net control can call a county emergency squad and have the cyclist moved to a hospital. Of course, a list of hospitals is always available.

The problems involved in feeding some 4200 cyclists over a two-day period can be staggering. There are three food stops along the route each day, and each of these has its own radio station, operating on 75 meters as well as on the 2-meter repeater network. The food stations can thus discuss their own problems (such things as missing cups, malfunctioning toilet facilities and need for volunteer helpers) without interfering with the other traffic going on via 2 meters.

In certain years, food stop stations double as message handling facilities. In the 1984 TOSRV, the stations at the food stops also handled nearly 200 pieces of traffic for the ARRL National Traffic System (NTS), involving both Mother's Day greetings and "I made the TOSRV" type of messages.

Finally, the tour director, while not a radio amateur, is always in touch with everything while he himself makes the tour by bicycle. A COARES member rides at his side on a bicycle equipped with a 2-meter transceiver, constantly monitoring. Whenever he is called, he answers (sometimes breathlessly) and relays the question to the director for a reply or a decision.

Let's suppose we are one of the rovers on TOSRV 1984. We check into the net at 6 A.M. on 66/06 and start for our first stop (which we have been given the previous Wednesday). It is at the 40-mile point, south of a little town called Yellowbud. We travel Rte. 23, which runs parallel to the TOSRV route (Rte. 104). This ensures that we do not interfere with those riders already on the course.

We park at a crossroads, well off the road and facing the riders. We check the location for access into the 69/09 repeater (it is good copy both ways) and begin monitoring. Soon we have signs posted ("Rider 2743 stop here," "Weather partly cloudy, calm, 60 degrees"). We begin to hear the first calls for medical assistance. One rider is stung in the mouth by a bee; another falls and suffers a hip fracture. In every case, the Red Cross volunteers are there in a matter of minutes, thanks to Amateur Radio.

The net is directed, and although it is busy there is no confusion, but rather a no-nonsense air of doing a job properly. The net is there to protect the riders, and a medical alert call receives an immediate response. Once an accident has occurred, those involved switch to yet another repeater (KE8T/R on 144.75/5.35 MHz) to exchange medical information. This ensures that regular net operations are not disrupted.

By noon the bulk of the riders has passed by, and net control permits us a break for lunch. Refreshed and ready for action, we parallel the TOSRV route ahead of the riders to mile 85 in the little village of Coopersville. During the long afternoon (under blue skies and with balmy breezes), we listen to more of the same messages. One rider is down with a bruise on the head, and is dispatched to the hospital for examination for a possible concussion. A father has misplaced his son, and we post a sign (although it is another mobile who finds him).

The ride ends at 6 P.M. with our mobile helping to sweep the route the final 20 miles to Portsmouth. There, the radio and Red Cross crews enjoy an appreciation banquet and a discussion of the day's events. For some it is the end of participation, but most stay in Portsmouth overnight, and begin the next morning to do the same thing over again in reverse.

TOSRV 1984 was relatively uneventful, and of course that is what everyone hopes it will be. The potential for real disaster is there, however, and it is the presence of the trained network of radio communicators that ensures that if disaster should occur, the communications to handle it will be in place and working. TOSRV officials have more than once publicly stated that an event

*Deputy Communications Manager, ARRL

During the 1984 Idaho Special Olympics, held in Boise May 29-31, W7DOH (left) and KK7U were two of the nearly 30 amateurs who used both simplex and repeater (WB7PFO/R) frequencies to help with event coordination and keep paramedics informed of medical emergencies. *(KD7HZ photo)*

of this magnitude would not be possible without the communications provided by this large group of dedicated radio amateurs. — *Jack T. Shepherd, W8OMY, Columbus, Ohio*

MATADOR TORNADO

At 9 P.M. CDT May 1, a tornado struck Matador, Texas, destroying 27 homes and damaging 60 others. All utilities were inoperative for several hours, but electrical power was partially restored in some parts of Matador about two hours later. W5BEY, the only radio amateur in town, was then able to report into the emergency session of the Texas Traffic Net, directed by WA5BXH. W5BEY confirmed the communications emergency with a report of the situation.

District 2 DEC WA5RWW, Northern Texas SEC W5GPO and Northern Texas SM K5PC arrived in Matador about 2 A.M. CDT May 2. They set up an HF station in the Matador Emergency Operating Center (EOC). The station was on the air until 7 P.M. CDT May 2.

Once the Red Cross completed the damage survey and people were allowed into the stricken area, the Texas Traffic Net, which was followed by the 7290 Traffic Net, again went into special session to handle health-and-welfare traffic. This net remained in operation until 6 P.M. CDT May 2, after 50 pieces of health and welfare traffic and one press release had been passed.

Thanks to the incredible work of the Red Cross disaster team from Lubbock and Plainview, we were able to give almost instantaneous replies to inbound health-and-welfare inquiries. — *Phil Clements, K5PC, SM Northern Texas*

PUBLIC SERVICE DIARY

☐ Livingston, Montana — March 10. While driving eastbound on Interstate 90 at night, N7CTF was passed by a car traveling at high speed and without lights. N7CTF called for assistance on the 146.28/88 Bridger repeater (K7CML/R). WB7AZJ answered and notified the Montana Highway Patrol. MHP officers quickly caught up with the speeding vehicle, and arrested the driver for driving under the influence of alcohol. (KF7R)

☐ Northeast Oklahoma — April 26-28. Rough weather was the cause of communications losses in several Oklahoma towns. Nearly the entire town of Morris was destroyed by a storm system. NM5A set up a rig on both 40 and 75 meters to handle long-range emergency and health-and-welfare traffic. In the Mannford and New Prue vicinity, one person was killed and more than 60 homes were destroyed. WB5DIT operated both 40 meters from his car and provided area officials with the only communications for the first five hours after the storm knocked out the telephone service. (W5REC, SM Oklahoma)

☐ Coahoma and Tunica Counties, Mississippi — April 29. While returning home from the Dayton Hamvention, K5AAD, KA5SHT and N5DHF saw a tornado flip a tractor-trailer near Hernando. N5DHF contacted K5VV on the K5VV repeater and reported the emergency while the other two operators gave first aid to the injured truck driver. K5VV alerted authorities, who responded promptly. (N5DHF)

☐ Sarasota, Florida — May 5. At 2:30 A.M., the Red Cross received a call from a fire department that a fire was burning at a migrant worker camp. N4EWR went to the camp and found that 150 persons had been burned out of their homes. N4EWR used 2 meters to call WB3EMQ, who informed Red Cross Headquarters. RC officials arranged for shelter, cots, blankets and food to be provided for the victims. (WB3EMQ)

☐ Louisa, Kentucky — May 6-9. Because of expected severe thunderstorms in the area, the National Weather Service issued a flash flood warning for the Big Sandy River basin along the Kentucky/West Virginia border. An ARES net was set up on the Grayson 146.10/70 repeater (KF4JO/R), but was soon moved to the Louisa 146.13/73 repeater (WA4SWF/R) because of that machine's better coverage and back-up power.

Heavy rains began Monday morning, causing the river to rise very quickly. Local hams passed reports of road closures brought on by the flooding to the Lawrence County Emergency Operating Center (EOC), and provided both HF and VHF communications to the county sheriff, fire officials and the state Department of Emergency Services. The river slowed its rise, finally cresting a foot over flood stage, and assisting amateurs were placed on standby alert. (WA4SWF)

☐ Keene, New Hampshire — May 30. More than 400 homes were damaged in flooding, caused by more than four inches of rain. The Red Cross set up a shelter for evacuees at Keene State College. When officials discovered that neither the phones at the shelter nor their portable radio were functioning, local radio amateurs used both 146.52 MHz and the K1XR repeater to supply communications between the Red Cross chapter house and the shelter for four hours while telephone service was being repaired. (W1FYR, EC Cheshire Co.)

☐ Sarasota, Florida — June 2. At about 10:30 P.M., WA4ORZ encountered a 21-foot boat that had run aground in Sarasota Bay. N4EWR answered WA4ORZ's request for help on 2 meters and notified the Coast Guard. (WB3EMQ)

☐ Ely, Minnesota — May 25. WBØLJQ was staying at his cabin on Echo Lake when he spotted a fire in progress at another cabin site across the lake. A call for help on the WDØGWV repeater (146.04/64) was answered by KAØARP and NBØR, who notified the Orr and Kiwishiwi District Rangers. Firefighters were dispatched to the site and the fire was quickly extinguished. (KAØARP, SEC Minnesota)

ARES REPORTS

☐ York County, Maine — March 29. When a heavy snowstorm hit the area, the director of York County Civil Emergency Preparedness (CEP) requested the assistance of Amateur Radio operators. Seventeen local ARES members used both 75 meters and a 2-meter repeater (WA1GTT/R) to supply CEP and National Weather Service officials with information about power outages and road conditions during the seven-hour storm. *(WA1FBE, EC York Co.)*

☐ Effingham, Kansas — April 26-27. The American Red Cross requested local radio amateurs to provide communications when a tornado touched down, injuring seven persons, destroying several homes and knocking out telephone and electrical service. Eleven hams used the WAØSRR repeater to link Effingham officials with the ARC in Topeka, and to pass the several Health and Welfare messages out of the area. *(WBØYIT, EC Zone 4A)*

☐ San Benito County, California — June 3-4. Two raging forest fires forced the California Department of Forestry (CDF) to request the aid of radio amateurs from a four-county area. ARES operators provided communications for supply and logistic coordination, thus freeing CDF channels for tactical traffic. Three ARES units coordinated their efforts over a wide geographical area via two ARES nets on the W1PW and K6JE repeaters. Mutual aid among the ARES groups worked well. The fires were under control June 4. *(WD6EKR, EC Salinas Valley)*

☐ Nehawka, Nebraska — June 13. During a severe weather net conducted by Midlands ARES at the National Weather Service Forecast Office, WØGRQ reported a wall cloud, which moments later formed a tornado, over southeast Cass Co. Although the NWS did not yet obtain a confirmation of the twister, they immediately issued a tornado warning for the county and vicinity. WØGRQ continued tracking the tornado's path, which extended northwest of Nehawka. Because of the early warning, there were no injuries or fatalities caused by the storm. After the system passed, WØGRQ initiated damage assessment in the affected area, and reported the degree of damage and the immediate needs of local residents. For several hours, WØGRQ was the only communications link for Red Cross and Nehawka officials. *(NØAIH, SEC Nebraska)*

ARRL SECTION EMERGENCY COORDINATOR REPORTS

☐ For June, 36 SEC reports were received, denoting a total ARES membership of 19,804. Sections reporting were: AB, AZ, CO, ENY, IN, KS, ME, MN, MS, MO, NE, NH, NFL, NTX, OH, OK, ON, ORG, PAC, SV, SDG, SF, SJV, SCV, SC, SD, SFL, SNJ, TN, UT, VA, WA, WV, WMA, WNY and WI.

NATIONAL TRAFFIC SYSTEM

The U.S. has entered into a third-party agreement with St. Christopher (also known as St. Kitts) and Nevis (VP2K), and Anguilla (VP2E), effective August 8. WA7GYQ has resigned as manager for TWN/c4. Our thanks go to Tom for over three years as NM, and a hearty welcome to K5DUV, who is the new honcho. Certificates: CAN/c4 — K2ONP, NØCWW, KW9J, WB9NVN, W5CTZ and W5CTZ; 2RN/c2 — KD2AC, WD2AFI, KA2BHR, KA2DBD, N2ESY, WA2FJJ, VE2FMQ, W2GZD, WA2HEB, KB2HM, WB2IDS, WA2KOJ, W2MLC, KA2OIW, WB2OWO, W2PKY, KC2QQ, KX2T, KF2T, KC2TF, K2USA, W2UYE, WB2VUK, K2VX, W2VY, KB2WI, W2XD and N2XJ; 2RN/C4 — KB2QO, KC2ZO, N2AWI, WB2IKL, WB2OHR and W2GZD (1st annual); KB2HM (2nd annual); AA2Y (4th annual); W2GWS (6th annual).

June Reports

1	2	3	4	5	6	7
Cycle Two						
Area Nets						
EAN	30	813	27.1	.554	88.9	
CAN	30	856	28.5	.535	100.0	
PAN*	59	625	10.6	.380	95.6	
Region Nets						
1RN	60	406	6.8	.301	83.1	96.7
2RN	53	228	4.3	.255	69.7	100.0
3RN	30	255	8.5	.448	88.3	96.7
4RN	60	525	8.7	.365	71.9	100.0
RN5	60	830	13.8	.475	94.0	100.0
RN6	60	448	7.5	.326	96.7	83.3
RN7	60	431	7.2	.556	91.9	96.7
8RN	60	228	3.8	.278	92.2	90.0
9RN						100.0
TEN	60	504	8.4	.300	71.5	100.0
ECN						50.0
TWN	57	236	4.1	.234	60.0	96.7
TCC						
TCC Eastern	99†	488				
TCC Central	79†	458				
TCC Pacific	100†	400				
Cycle Four						
Area Nets						
EAN	30	1407	46.9	1.155	92.8	
CAN	30	669	30.0	.879	99.4	
PAN	30	956	31.9	.777	90.6	
Region Nets						
1RN	57	627	11.0	.555	93.8	96.7
2RN	90	532	5.9	.416	90.0	100.0
3RN	60	233	3.9	.512	96.7	90.0
4RN						96.7
RN5	60	809	13.5	.643	91.2	100.0
RN6	60	639	10.6	.608	98.6	95.0
RN7	60	545	9.1	.777	92.9	98.3
8RN	55	300	5.5	.336	88.0	83.3
9RN	59	456	7.7	.983	93.7	100.0
TEN	60	249	4.1	.252	73.3	98.3
ECN						100.0
TWN	42	181	4.3	.266	57.7	78.3
TCC						
TCC Eastern	121†	696				
TCC Central	53†	338				
TCC Pacific	105†	605				
Sections*	5285	18,170	3.5			
Summary	6572	35,343	5.4			
Record	10,319	50,268	18.4			

*PAN operates both cycles one and two.
†TCC functions not counted as net sessions.
*Section and local nets reporting (242): APSN ATN (AB), AENB AEND AENR AENW AENX AENY AENZ ATNM WAEN (AL), ATEN (AZ), SWN (AZ/NM), BCEN (BC), NCN NCTN RTTY/V SCN SCN/V (CA), DEPN DTN SEN (DE), BEN CFRN DEN ENMC FAST FMSN FMTN FPON FPTN GCVTN GN LCEN LSTTN NFPN PEN PRVAN QFN QFNS SEFTN SPARC SVTN SWFTN TPTN VEN (FL), CGVN CSC GCN GSBN GTN RAEN (GA), I75EN I75MN TLCN (IA), ILN ISN ITN (IL), ICN IRN QIN (IN), CSTN KMWN KPN KSBN KWN QKS QKS-SS (KS), 3ARES 7ARES 11ARES BARES KNTN KYN KYPON MKPN NKARC TSTMN WTEN (KY), GITN EM2MN EMRI EMRIPN HHTN NEEPN WMFN WMTN (MA/RI), MEPN MMN MTN WRIN (MB), AEN MPSN PTN SGN (ME), MACS MITN MNN QMN UPN (MI), MSN MSPN MSSN MSSN (MN), ACAN CCAN CMEN CRARES HBN IFN JCC LO2CW LO2MN MON MOSSB PTN RRARN SARN ZAEN (MO), MTN (MS), CNCTN NCEN NCMN PCTN RARS (NC), CN CSN (NC/SC), BRARES BVARES CCN EN2MARES MNARES NCHN NE40 NE75 NMPN NNN NSN PARC PV2MN NSBARES WNN (NE), GSFM GSPN MCEN NHN (NH), NJM NJN NJPN NJSN NJVN SJVN TCETN (NJ), NSN (NV), BAVTN CDN EPN HVN NLIPN NYPON NYS NYS/M SCVHFTN SDN (NY), ALERT BN BRTN BSSN COTN MCTN O6MN OSN WCTN (OH), CARA EATN OLZ ONON OPEN OTWN QCWA-63 STN (OK), KTN OPN OSNOSND TIN (ON), BSN OARES OHNN OSN PDXARES PTTN SOFM THN (OR), ATN (PA),PTN (PAC), QSN (PQ), BR2MN GPD2MN LC2MN SCNTN SCSSBN (SC), BHN PDRN SDEN SDHN SDN SDSMN WCEN (SD), TNCN TNPN TNVN TSRN (TN), DFW NET TEX TSN TTN (TX), BUN DCESN UCN (UT), SSN STARES SVEN VLN VN VSBN VSN VTN (VA), VTN (VT), EWTN NTN NWSSBN PSTS WARTS WSN (WA), WVARN WVFN WVN WVNDN WVNN (WV).

1 — NET
2 — SESSIONS
3 — TRAFFIC
4 — AVERAGE
5 — RATE
6 — % REP.
7 — % REP. TO AREA NET

Transcontinental Corps

1	2	3	4	5
Cycle Two				
TCC Eastern	116	85.3	989	488
TCC Central	90	87.8	918	458
TCC Pacific	100	83.3	846	400
Summary	306	85.5	2753	1346
Cycle Four				
TCC Eastern	150	80.7	1372	696
TCC Central	60	88.3	688	338
TCC Pacific	119	88.2	605	1176
Summary	329	85.7	2665	2210

1 — AREA
2 — FUNCTIONS
3 — % SUCCESSFUL
4 — TRAFFIC
5 — OUT-OF-NET TRAFFIC

TCC Roster

The TCC Roster (June) *Cycle Two* — Eastern Area (KA1GBS, Director) — W1AF AA4AT N1BHH WB1BYR KA8CPS KK3F WA2FJJ WD4FTK KA1GBS WB3GZU KO2H KB2HM WD8LRT K8OZ W8PMJ W8QHB W1QYY KB3UD AF8V W2VY N2XJ W1XX WB8YDZ. Central Area (N5AMK, Director) — N5AMK K9AZS N5BT W5CTZ N5DFO KA0EPY NG5G KW9J W4JL WA4JTE W9JUJ K5KJN W5KLV WB9NVN WB5OXE KD5RC K5UPN WF4X WB5YDD. Pacific Area (W0HXB, Director) — NI6A KT6A N7CSP N0CXI KU6D KB7FE W7GHT W0HXB W5JOV KR7L KB0MB KD6ME K6OWA WA0OYI KF7R ND5T NV6T W7TGU K6UYK-KO7V WB7WOW. *Cycle Four* — Eastern Area (W2CS, Director) — AA4AT VE3AWE K1BA W3BBN KI3C WA4CCK N3COY W2CS N8GW KA3DTE WB2EAG W1EFW W2FR WD4FTK KA1GBS W2GKZ VE3GOL WB3GZU KB2HM WB9IHH W1ISO K4JST KN1K N4KB AH2M W2MTA W1NJM WB4PNY W3PQ W8QHB W1QYY W2RQ K3RZR KA1T KB3UD WB4UHC W4UQ W2VY VE1WF W2XD N2XJ W1XX N8XX WB8YDZ K4ZK W2ZOJ. Central Area (K5GM, Director) — W0AM W9CXY W5GHP K5GM W0HI K5OAF W5RB N5TC W5TFB K5TL K0SU WB9UYU KB9X KV5X. Pacific Area (KN7B, Director) — AD0A WD0AIT K0BN KC0D W7DZX W6EOT W7EP W7GHT N2IC W6INH W5JOV W7LG W7LYA WB7NHR W0OGH ND5T WA7TEH W5UH W7VSE W6VZT KM7Z VE7ZK.

Public Service Honor Roll
June 1984

This listing is available to amateurs whose public service performance during the month indicated qualifies for 60 or more total points in the following nine categories (as reported to their SM). Please note maximum points for each category: (1) Checking into CW nets, 1 point each, max. 30; (2) Checking into phone/RTTY nets, 1 point each, max. 30; (3) NCS CW nets, 3 points each, max. 12; (4) NCS phone/RTTY nets, 3 points each, max. 12; (5) Performing assigned NTS liaison, 3 points each, max. 12; (6) Delivering a formal message to a third party, 1 point each, no max.; (7) Handling an emergency message, 5 points each, no max.; (8) Serving as emergency coordinator or net manager for the entire month, 5 points max.; (9) Participating in a public service event, 5 points each, no max. This listing is available to Novices and Technicians who achieve a total of 40 or more points. Stations that are listed in the Public Service Honor Roll for 12 consecutive months, or 18 months out of a 24-month period, will be awarded a special PSHR certificate from Hq.

273
KC9CJ
245
K7VW
183
K5CXP
179
AL7W
146
WD8LRT
142
WD0EGK
141
KA3DLY
N0AFW
139
K4SCL
138
KV5X
137
KD7ME
KB0Z
130
N8FCQ
129
KA1KML
128
WA7VTD
127
KA0EPY
125
KB2HM
KS5V
122
WF4Y
KA1GBS
120
N2AKZ
WB2MCO
119
WB7WOW
118
KA1EXJ
KC4VK
117
W7VSE
115
WB4WYG
114
WB0TED
KA0ARP
113
K4JST
N4GHI
112
WB1GXZ
VE7BNI
WX4J
111
N2XJ
W9YCV
110
KM9B
WA2FJJ
109
AE5I
108
AA4AT
W1TN
107
W2MTA
WA4PFK
K4ZK
106
WA4CCK
105
WD9FRI
N9BDL
WA2JBO
KC2TF
WD8MIO
WA4JDH
WB1HIH
104
W1KK
WA4QXT
103
WA2KOJ
K4VWK
KT5Y
W6VOM
W2VY
KK1E
WD4ALY
102
KB4WT
KZ8Q
W9JUJ
N0DZA
KA8GJV
101
KA0BCB
KB4OZ
100
WB2OWO
WB4WII
WD8LDY
99
W0OYH
KJ3E
KB7FE
N4PL
98
WB4HRR
K7GXZ
N5AMK
97
KR4V
W1PUO
WB1GLH
KE5PP
W5CTZ
WA0TFC
WB2IKL
KA2BHR
K2ZVI
WD8RHU
96
W7GHT
W3YVQ
KA6BNW
N8AEH
W4CKS
95
N1BJW
WX4I
N0EVC
W7LRB
94
KA4AMC
AG9G
KA0BWM
N6AWH
93
KA4BCM
KA4SAA
AF3S
KC2ZO
92
N1CPX
WB2VUK
W9DM
AK1W
91
VE3BDM
WA4LXP
KA8NCR
KC3LY
90
W0LAE
W2BIW
K0SI
WB2RBA
89
KC3Y
VE3DPO
KD5FR
88
KK3F
KA1EPO
87
K3JL
W1EOF
VE3WM
86
VE3GT
WB6CLD
W2AET
WB2KCR
W0KK
KA9FFO
KI1M
85
W2PKY
N8EVC
K4NLK
KX7T
N5BT
W8UE
84
WB4YQP
W1RWG
NI6A
K2VX
W8QHB
83
WB6DOB
WD4KBW
82
N5TC
KL7IJG
KI5P
K2ZM
N3COY
81
K8JDI
K4KDJ
KA2QIK
W6NTN
80
K6YD
WB2GHN
KA0ODQ
KD9K
79
WB2IDS
WB5MMI
N7CSP
KA8CPS
77
WB5YDD
WD0BOX
W2GJ
W6HUJ
KA4GUS
KR7L
N5EZM
76
WA1DXT
K0PCK
W7LG
N5DFO
AK2E
75
N1BGW
KT6A
KF8J
ND2S
74
KA2MYJ
WA4EIC
WB6HOX
WA6QCA
KC3AV
73
W9NXG
WA1YNZ
KD8KY
KB4GPN
72
K0GP
W0FRC
KB3FW
KB9LT
KZ9V
WA4EYU
AI0O
WD8OUO
71
KC2QQ
N1AJJ
KX7W
N7BGW
N6AUB
70
WB6QBZ
VE2FMQ
KP4DJ
WB2BNA
KA5LQA
KA9EWN
KG2D
WA4GYR
N5GTP
W4LXB
69
K8UXO
K6APW
KA4SKV
N6CVF
KA5AZK
68
K1CB
WD4HBP
N0CFS
KA4BBA
KB4LB
67
WA2NKC
KA8PQH
KA4MTX
N1DED
W4ESH
KD7G
W82PID
66
W9QBH
K8CY
W3DKX
65
KA1T
WD0AIT
KA7AID
64
N7FXM
W4ZJY
VE2EDO
KA1EKQ
KJNNI
63
WB4UHC
WA4RNP
ND0N
KX2T
WA3UNX
62
N4EDH
N9EM
K7OVK
WB4TZR
KA0GOA
W2XD
KA1GWE
KC0OO
61
K6BGD
KA7NMA
WB5LBR
60
WD8EIB
KD2BE
WD4BSC
K0GND
KA4YHS
W9DBO
WD4PBF
WA4JTE
57
KA2OPG/T
51
WB8NHV/T
50
KA6HJK/T
49
KA1HPO/T
46
KA2RGI/T
45
WB1CBP/N
N2EQM/T
44
N5GKF/T
43
N4JOA/T
KA2TOC/T
WB2ANK/T

Brass Pounders League
June 1984

The BPL is open to all amateurs in the United States, Canada and U.S. possessions who report to their SM a message total of 500 or a sum of originations 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
WA0HJZ	0	1905	28	1254	3187
W3CUL	670	1339	981	118	3108
KA9CPA	64	865	119	622	1670
N0AFW	223	523	422	101	1269
N0BQP	17	694	77	347	1130
KA1GBS	2	539	466	21	1028
W3VR	298	201	322	31	852
WF4X	7	228	137	26	698
KT6A	83	324	255	7	669
W1EOF	1	227	387	2	617
W5CTZ	1	293	318	1	613
KC9CJ	6	262	165	157	590
W7VSE	5	330	237	16	588
K0RXK	0	278	13	291	582
KA1KML	32	239	261	23	555
WB5YDD	1	281	220	18	513
AA4AT	26	227	252	7	512
N5AMK	4	284	215	2	505
N4PL	27	206	236	35	504

BPL for 100 or more originations plus deliveries:

KC4VK	137
W0FIR	122
N4EDH	105
K5CXP	103

1 — CALL
2 — ORIG.
3 — RCVD.
4 — SENT
5 — DLVD.
6 — TOTAL

Independent Nets (June 1984)

1	2	3	4
Amateur Radio Telegraph Society	30	367	242
Central Gulf Coast Hurricane	30	153	2446
Early Bird	30	728	298
Empire Slow Speed	30	49	381
Golden Bear	30	137	1690
IMRA	26	878	1389
International Traffic & Assistance	30	79	—
Midwest RTTY	30	51	183
Mission Trail	30	128	930
New England Novice Net	30	166	257
Southwest Traffic	30	119	1059
West Coast Slow Speed	30	54	450
20-Meter ISSB	26	875	327
75-Meter ISSB	30	202	775
7290 Traffic	54	819	2785

1 — NET NAME
2 — SESSIONS
3 — TRAFFIC
4 — CHECK-INS

Contest Corral

A Roundup of Upcoming Operating Events

Conducted By Edith Holsopple,* N1CZC

SEPTEMBER

2

LZ-DX Contest, August *QST*, page 82.

5

West Coast Qualifying Run, 10-35 WPM, at 0400Z September 6 (9 P.M. PDT, September 5). W6OWP prime, W6ZRJ alternate. Frequencies are approximately 3590/7090 kHz. Underline one minute of the highest speed you copied, certify your copy was made without aid and send to ARRL for grading. Please include your full name, call sign (if any) and complete mailing address. A large s.a.s.e. will help expedite your award/endorsement.

5-6

YL Howdy Days, August *QST*, page 82.

8-9

European DX-Contest, phone, July *QST*, page 87.

ARRL September VHF QSO Party, August *QST*, page 82.

11

W1AW Qualifying Run, 10-35 WPM, at 0200Z Sept. 12 (10 P.M. EDT Sept. 11). Transmitted simultaneously on 1.818 3.58 7.08 14.07 21.08 28.08 50.08 147.555 MHz. See Sept. 5 listing for more details.

15-16

Ohio QSO Party, sponsored by the Cuyahoga Falls ARC, from 1400Z Sept. 15 until 0500Z Sept. 16, and 1300Z until 1900Z Sept. 16. 12 hour maximum. Work the same station again on each band or mode for multiplier credit. Exchange RS(T) and QTH (county for OH stations; state, VE province or country for others). Count 2 points for each contact. Work club station W8VPV for 25 bonus points. 5 points for working club members. OH stations multiply score by number of states, provinces and countries. All others multiply by number of OH counties worked (max. 88). All stations output power less than 5 watts, ×3; 5-200 watts, ×1.5. Frequencies will be CW — 1.805 3.530 7.030 14.030 21.030 28.010. Phone — 1.890 3.900 7.230 14.230 21.360 28.510. Novice — 15 kHz from lower edges. Awards and certificates. Include dupe sheets if more than 200 contacts. Mail by Oct. 13 to Anthony Luscre, KA8NRC, 4380 N. Norman Dr., Stow OH 44224.

Scandinavian Activity Contest, CW, sponsored by the Foreningen Sveriges Sandareamatorer (SSA-Sweden), from 1500Z Sept. 15 until 1800Z Sept. 16. (Phone contest 1500Z Sept. 22 until 1800Z Sept. 23.) Work LA-LB-LG-LJ,JW,JX,OF-OG-OH-OI,OHØ,OJØ,OX,OY,OZ,SJ-SK-SL-SM and TF stations on 3.5, 7, 14, 21, and 28 MHz only. Work stations once per band — no crossmode QSOs. Categories are single op, all bands and QRP (max. output 10 watts), multiop single transmitter and SWL. Multi-single stations may have only one transmitted signal at any given time and must remain on a band at least 10 minutes after a band change. Exchange signal report and serial number starting with 001. Non-EU stations count 1 point per Scandinavian QSO on 14, 21 and 28 MHz, and 3 points on 3.5 and 7 MHz. Multiply total QSO points by the number of different Scandinavian call areas worked per band. (LA1 = LB1 = LJ1 and W1XX/OZ = OZØ, etc.) For final score. Avoid contest traffic in these subbands: 3.560-3.600, 3.650-3.700, 14.060-14.125 and 14.300-40.350 except when this conflicts with national regulations. In that case, split operation must be used. Mail entries for both modes by October 30 to SSA Contest Manager, Goran Granberg, SM6EWB, Rosengatan 76, S-434 OO Kungsbacka, Sweden.

Can-Am Contest, phone, August *QST*, page 75.

Washington State QSO Party, sponsored by the Boeing Employees' ARS, from 0100Z until 0700Z Sept. 15, from 1300Z Sept. 15 until 0700Z Sept. 16, and from 1300Z Sept. 16 until 0100Z Sept. 17. All bands except 10 MHz, and all modes may be used. Work stations once per band and mode. CW QSOs in CW subbands only. Work stations again as they change county. WA-to-WA QSOs allowed. Exchange serial number, signal report and QTH (county for WA stations; state, province or country for others). Suggested frequencies: CW — 1.805 3.560 7.060 14.060 21.060 28.160; phone — 1.815 3.925 7.260 14.280 21.380 28.580; Novice — 3.725 7.125 21.150 28.160. Count 2 points per phone QSO and 3 points per CW QSO. WA stations multiply by total states, provinces and countries worked. Others multiply by total WA counties worked (max. 39). Non-WA stations also add one multiplier for each group of eight contacts with the same WA county. Certificates. Mail logs by Oct. 17 to Willis Propst, K7RS, 18415 38th Ave. S., Seattle, WA 98188.

Kansas State QSO Party, sponsored by the Boeing Employees' ARS of Wichita, from 0100Z until 0700Z Sept. 15, from 1300Z Sept. 15 until 0700Z Sept. 16, and from 1300Z Sept. 16 until 0100Z Sept. 17. Work stations once per band and mode. Mobiles/portables may be worked again as they change county. All bands/modes except 10 MHz may be used. KS-to-KS QSOs allowed. Exchange serial number, signal report and QTH (county for KS stations; state, province or country for others). Suggested frequencies: CW — 1.805 3.560 7.060 14.060 21.060 28.160; phone — 1.815 3.925 7.260 14.280 21.380 28.580; Novice — 3.725 7.125 21.150 28.160. KS stations count two points per phone QSO and three points per CW QSO; multiply by total number of states, VE provinces and countries worked. Others count two points per phone QSO and three points per CW QSO with KS stations; multiply by sum of different KS counties worked (max. 105). Non-KS stations may also count one additional multiplier for each group of eight QSOs with the same KS county. Certificates. Mail entry by Oct. 22 to Mike Thornton, WAØTAH, 1645 Lexington, Wichita, KS 67218.

21

W1AW Qualifying Run, 10-35 WPM, at 1300Z (9 A.M. EDT) Sept. 21. See Sept. 11 listing for more details.

21-23

Maine QSO Party, sponsored by the Portland Amateur Wireless Assn., from 2300Z Sept. 21 until 2259Z Sept. 23. Work stations once per band and mode. Exchange serial number, signal report and QTH (county for ME stations; state, province or country for others). Suggested frequencies: CW — 1.810, and 60 kHz up from low end; phone — 1.870 3.930 7.280 14.280 21.380 28.580; Novice — 20 kHz up from low end; RTTY — 3.610 and 90 kHz up. Work stations on CW, phone and RTTY for each band. Count 1 point for phone, 3 points for CW and 5 points RTTY and multiply by number of ME counties worked for final score. (ME stations multiply by ME counties, states, provinces and countries). Trophy to highest aggregate ME club score. Mail entries by Dec. 1 to PAWA, P.O. Box 1605, Portland, ME 04104.

22-23

ARRL International EME Competition, part 1, see p. 69, this issue.

Can-Am Contest, CW, August *QST*, page 75.

Scandinavian Activity Contest, phone.

29-30

Delta QSO Party, sponsored by the Delta Division of the ARRL, from 1800Z Sept. 29 until 2400Z Sept. 30, with a rest period from 0600Z to 1200Z. Work AR-LA-MS-TN stations. Work stations once per band and mode. Portables/mobiles may be reworked as they change county. Exchange serial number, signal report and QTH (county and state for Delta stations; ARRL Section or country for others). Suggested frequencies: CW — 65 kHz up from low end; phone — 3.990 7.290 14.290 21.390 28.590; Novice — 25 kHz up from low end. Count 1 point per QSO. Delta stations multiply by total ARRL Sections worked (max. 74). Others multiply by total Delta counties worked (max. 316). Mail logs by Oct. 21 (include large s.a.s.e. for results) to Butch Magee, KA5MLT, 2120 Belvedere Dr., Jackson, MS 39204.

30 — October 1

Classic Radio Exchange, sponsored by the *Classic Radio Newsletter*, from 2000Z Sept. 30 until 0300Z Oct. 1. See January *QST*, page 87, for complete details.

OCTOBER

2

West Coast Qualifying Run, 10-35 WPM, at 1300Z Oct. 3 (9 P.M. PDT Oct. 2). See Sept. 11 listing for more details.

6-7

ARRL QSO Party, CW, see page 78, this issue.

Worldwide SSTV Contest, sponsored by the German AR Teleprinter Group, from 0600Z Oct. 6 until 0600Z Oct. 7. All entrants must take a 6-hour off-time anytime during the contest. 80-10 meters, SSTV only. Work stations once per band. Exchange call signs, signal report, serial number starting with 001 and GARTG membership number if a member. Count 1 point for each 80, 40 or 20 meter QSO; 2 points per 15 QSO; and 5 points per 10 meter QSO. Multipliers: Countries as defined by WAE and ARRL countries lists (including KL7, KH6 and W/K), and JA, PY, VE/VO and VK call areas. Count multipliers once per band, and multiply by sum of QSO points. Multiply that total by the number of continents worked per band. Add 50 bonus points per GARTG member contacted. Mail logs to be received within 2 months after the contest to: Wolfgang Puenjer, DL8VX, P.O. Box 90 11 30, D-2100 Hamburg 90, Fed. Rep. of Germany.

YK/ZL/Oceania Contest, phone, sponsored by the New Zealand Assn. of Radio Transmitters and the Wireless Institute of Australia, from 1000Z Oct. 6 until 1000Z Oct. 7 (CW contest 1000Z Oct. 13 until 1000Z Oct. 14). Single-op and SWL classes. Work station once per band. No crossband QSOs. Exchange signal report and serial number starting with 001. Count 2 points per YK/ZL QSO. Multiply by total YK/ZL call areas worked per band. Mail entries, to be received by Jan. 31, to NZART Contest Manager, ZL2GX, 152 Lytton Rd., Gisborne, New Zealand.

10

W1AW Qualifying Run, 10-40 WPM, at 0200Z October 11 (10 P.M. EDT Oct. 10). See Sept. 11 listing for more details.

13-14

YK/ZL Oceania Contest, CW.

ARRL QSO Party, phone, see page 78, this issue.

Maryland-District of Columbia QSO Party, sponsored by the Columbia ARA, from 1800Z Oct. 13 until 2100Z Oct. 14. Work stations once per band and mode. Mixed-mode, phone-only and CW-only categories. Exchange serial number, signal report and QTH (county for MD, city for Baltimore and DC stations; state, province or country for others). Suggested frequencies: CW — 60 kHz from low end; phone — 3.950 7.250 14.290 21.390 28.590; Novice — 20 kHz from low end. MDC stations multiply total QSOs by sum of MD counties, states, provinces and countries worked. Others multiply MDC QSO total by sum of MD counties and independent cities (max. 25) worked. Multiply score by 1.5 if running 200 W or less. Mail entries by Nov. 30 to CARA, Inc., Robert K. Nauman, WA3VUQ, 4017 Font Hill Dr., Ellicott City, MD 21043.

Pennsylvania QSO Party, sponsored by the Nittany ARC, from 1600Z Oct. 13 until 0500Z Oct. 14 and from 1300Z - 2200Z Oct. 14. *Classes of entry:* Single-op, mobile (multi-op okay), multi-single, multi-multi, QRP (max. 5 W output). Single-op and multi-single stations may use spotting nets and receivers. Phone and CW. Work stations once per band and mode. No

*Communications Assistant, ARRL

repeater QSOs. Work mobiles again as they change counties. Exchange signal report, serial number and QTH (county for PA stations, ARRL Section for others). Suggested frequencies: CW — 40 kHz up from low end and 1.810 MHz, phone — 1.850 3.980 7.280 14.280 21.380 28.580. Mobile window — 5 kHz below listed freqs. Try 160 around 0300Z Oct. 14. Count one point per phone QSO, 1.5 points per CW QSO and 2 points per 80/160-meter CW QSO. PA stations multiply by total ARRL sections plus PA counties, plus max. 1 DX country. Others multiply by total PA counties (max. 67). Stations on county lines count for 1 QSO credit but multiple county multipliers. Mobiles add 500 bonus points for each county from which 10 or more QSOs are made. Mail entry by Nov. 15 to Douglas R. Maddox, W3HDH, 1187 S. Garner St., State College, PA 16801.

GARTG-RTTY Contest, sponsored by the German AR Teleprinter Group. Shortwave portion is from 1300Z-1700Z Oct. 13. VHF portion is from 0800Z-1200Z Oct. 14. Score shortwave and VHF portions separately. Bands are 80 and 40 meters; 144 and 432 MHz for VHF. No repeater QSOs. Exchange RST, QSO number, name, QTH; VHF add grid-locator. Work each station once per band. Count 1 point per QSO; VHF count 1 point per kilometer. Total of QSO points is the final score. Classes: A — more than 200 W input, B — less than 200 W input, C — SWL, D — VHF. Logs must include all information. Mail within 20 days to Wolfgang Puenjer, DL8VX, P.O. Box 90 11 30, D-2100, Hamburg 90, Fed. Rep. of Germany.

Columbus Day DX Contest, sponsored by the Miami Havana Lions Club, from 1200Z October 13 until 2400Z Oct. 14. Phone and CW, 80-10 meters. Everyone work designated official operators. Official operators will be named and numbered at the start of the contest on the following frequencies: 7.230 14.250 21.250 28.915. The official operators will identify themselves during the contest. Exchange RS(T) and QTH. Make 5 contacts with official operators to qualify for an award. Send log or QSLs and $2 or 6 IRCs to Miami Havana Lions Club, Columbus Day International DX Contest, Box 674, Miami, FL 33135.

Oregon QSO Party, sponsored by the Hermiston ARC, from 1700Z Oct. 13 until 0800Z Oct. 14, and from 1500Z-2400Z Oct. 14. Mixed-mode and CW-only catagories. Suggested frequencies: CW — 60 kHz from the bottom of each Novice band, phone — 1.810 3.929 7.260 14.300 21.370 28.600, VHF — simplex only, excluding 146.52. Work stations once per band and mode. Exchange signal report and QTH (county for OR stations; state, province or country for others). Count 1 point per QSO. OR stations multiply by total OR counties, states, provinces and countries worked. Other multiply by total OR counties (max. 36) worked. Mail logs to be received by Nov. 12 (include a s.a.s.e. for results) to HARC, P.O. Box 962, Hermiston, OR 97838.

Fall QRP QSO Party, sponsored by QRP ARC International, from 1200Z Oct. 13 until 2400Z Oct. 14. Operate max. 24 hours. Choose CW or Phone, not both. Work stations once per band. Exchange signal report, QTH (state/province/country) and QRP number if member. Nonmembers send power output. Suggested frequencies: CW — 1.810 and 60 kHz from low end, phone — 1.810 and 85 kHz from low end, Novice — 10 kHz up from low end. Count 5 points for QSO with ARCI member. Others count 2 points for same continent and 4 points for different continent. Multiply QSO points by states/provinces/countries worked per band by power multiplier (4-5 W output, ×2; 3-4 W output, ×4; 2-3 W output, ×6; 1-2 W output, ×8; 0-1 W output, ×10). If 100% natural power, multiply final score by 2; if 100% battery, by 1.5. Awards. Mail entry to be received by Nov. 12 to QRP ARCI Contest Chairman, Gene Smith, KA5NLY, 8201 Chatham Dr., Little Rock, AR 72207.

Rhode Island QSO Party, sponsored by the East Bay Amateur Wireless Assn., from 1700Z Oct. 13 until 0500Z Oct. 14 and from 1300Z Oct. 14 until 0100Z Oct. 15. Work stations once per band and mode. No repeater QSOs. Exchange signal report and QTH (city or town for RI stations; state, province or country for others). Suggested frequencies: CW — 1.810 3.550 7.050 14.060 21.050 28.050; phone — 3.900 7.260 14.300 21.360 28.600 50.110 144.2 146.52. Novice — 10 kHz up from low end. Count 2 points per phone QSO, 3 points per CW QSO. Novices and Techs count 5 points per QSO. RI stations multiply by total RI cities and towns worked (max. 39). Awards. Mail entry by Nov. 15 (include s.a.s.e. for results) to EBAWA, P.O. Box 392, Warren, RI 02885.

14

21/28 MHz Telephony Contest, sponsored by the Radio Society of Great Britain, from 0700Z-1900Z Oct 14. Single and multioperator categories, 21 and 28 MHz, phone only. Exchange signal report and serial number starting with 001. Work British Isles stations only (G, GD, GI, GJ, GM, GU, GW); contacts with GB stations do not count. Count 3 points per QSO. Multiply by the total number of different British Isles prefixes (G3, GW4, etc.) worked per band. Mail entries to be received by Nov. 14 (DX entries by Dec. 10) to D. Lawley, G4BUO, 220 Shipbourne Rd., Tonbridge, Kent TN10 3EL, England.

17-18

YL Anniversary Party, CW

20-21

Simulated Emergency Test

ARRL International EME Competition, part 2.

Worked All Y2 Contest

20-22

RTTY DX Sweepstakes

21

RSGB 21 MHz CW Contest

World-wide DX Sprint Contest

27-28

CQ WW Contest, phone

28

W1AW Qualifying Run

31-Nov. 1

YL Anniversary Party, phone

ARRL QSO Party Rules

Turnout was excellent for the second ARRL QSO Party held last January. The October exercise will provide a good opportunity to check the station out for the fall and winter operating season, so plan now to get on the air and join in the excitement.

The ARRL QSO Party is similar to the annual open CD Party, formerly held in April. Entry forms are available from ARRL Hq. for an s.a.s.e. Everyone sending in a log will receive a copy of the results. Please note that the deadline for *receipt* of logs at Hq. is November 14; so mail early.

If you're interested in getting involved in the ARRL Field Organization in one of the many areas served by volunteers, contact your Section Manager (listed on page 8 of *QST*) or write to Hq. for more information. We would love to have you take a more active role in Amateur Radio and the ARRL Field Organization.

ARRL QSO Party Facts and Figures

CW	*Phone*
Starts: 1800Z Oct. 6	Starts: 1800Z Oct. 13
Ends: 0600Z Oct. 7	Ends: 0600Z Oct. 14

Eligibles: Member, Life Member, Charter Life Member, President, Vice President, Past President, President Emeritus, Past Vice President, Honorary Vice President, Director, Past Director, Director Emeritus, Vice Director, Assistant Director, Counsel, Canadian Counsel, Treasurer, Secretary, Advisory Committees, Technical Advisor, Intruder Watch, QSL Manager, NTS Official, Section Manager, Asst. SM, SEC, STM, ACC, BM, OO/RFI Coordinator, PIO, SGL, PGL, TC, DEC, EC, NM, OBS, OES, OO, ORS, PIA, Hq. Staff.

Rules: Exchange "status" (MBR, ORS, SM, etc.) and ARRL Section. Overseas members may participate and should send DX for their Section. You may work stations once per band. Operate a maximum of 10 hours; off-times must be at least 30 minutes each and must be marked clearly in the log. Log times must be in UTC, not local time. Number new Sections as worked. Phone and CW contests are separate. Include dupe sheets with entries of 200 QSOs or more total. Entries must be mailed in time to reach ARRL Hq. by November 14, 1984.

Scoring: Final score equals number of QSOs times number of different ARRL Sections plus VE8/VY1 worked (max. 74). "DX" does not count as a multiplier.

Suggested Frequencies: phone — 1.865 3.870-3.910 7.200-7.245 14.265-14.295 21.340-21.360 28.600-28.630; CW — up from 1.815 3.535 3.715 7.035 7.115 14.035 21.035 21.115 28.035 28.115. Try 10 on the hour from 1800-2100 UTC and 160 at 0430 and 0530 UTC. Check the Novice bands frequently. Don't forget 6 and 2 meters.

Strays

I would like to get in touch with...

☐ anyone with information on servicing a VHF Engineering repeater, Model RPT-144. Joel R. Bagley, KJ0I, Box 102, DeWitt, IA 52742, tel. 319-659-9860.

☐ anyone with an owner's and/or a repair manual for a Maritek HF/SSB marine transceiver, Model SB6-80. Kris Partridge, G8AUU, 6 Blagdon Walk, Teddington TW11 9LN, England.

☐ anyone who can provide a wiring diagram for VHF Engineering amplifier Model PA1501H. Joe Barrett, KA1PH, 112 Sunny Cove Dr., Warwick, RI 02886.

☐ anyone familiar with the repair or adjustment of the Hornet TB-750 tri-band Yagi antenna. Rodney B. Lewis, WØEO, P.O. Box 481, Seymour, MO 65746.

☐ anyone who has any repair and alignment data on the Galaxy R-530 general-coverage receiver. Jim Turner, K5YZS, 103 Karla Dr., Whitehouse, TX 75791.

Visitors to the Eastern India Science Camp in Calcutta last February pause to watch and listen as VU2BMT makes a contact. Demonstration of Amateur Radio at the science camp is an annual activity of the Birla Industrial and Technological Museum Amateur Radio Club, led by Curator Thirumurthy, VU2BMT. The club is applying for its own call.

Section News

The ARRL Field Organization Forum

Coordinated By Jim Clary, WB9IHH

CANADA

ALBERTA: SM, E. Roy Ellis, VE6XC. SM/SEC: VE6XC. A/SM: VE6AMM. STM, DEC, NM (APSN & ATN): VE6ABC. The int'l relay race between Jasper and Banff was handled by the NARC and CARA and went off in fine fashion. As the Papal visit draws near more details are being attended to. NARC put on a bang-up FD opn under the direction of VE6ABC and some helpers. The AARCS NCS duties still not confirmed but twisting a couple arms. If you are interested in the job give me a shout. In case you missed it last month I wish to have a replacement for NCS as I have had it for 25 years. Retired from my job this month so want to take it easy for a wee while. That old age bracket catches up with us sooner than we expect it to. Traffic: VE6XC 20.

BRITISH COLUMBIA: SM, H. Ernie Savage, VE7FB — BCEN (3650 kHz): Both Net Manager and His Assistant reports that the check-ins are increasing, but it seems that nobody can originate a QTC to Aunt Suzan. Been a busy month for the SM. He attended the ARRL Convention at Seaside, OR. Enjoyed meeting our new president and many others. He also visited Maple Ridge Hamfest '84, which was both very good and well attended. Visited the QSL Booth and was much impressed with the index system and all QSL cards are on computer so they know what money each amateur has on file in the bureau. Also, went to the Dogwood Chapter QCWA secy Jim Walsh, W7LVN. He presented our retiring President VE7DZ with the fifty-year award. New president is Al Groom, VE7AYN. Traffic: VE7BNI 258, VE7CDF 122, VE7EDN 36, VE7FB 29, VE7DSN 2.

MANITOBA: SM, Peter Guenther, VE4PG — Field activities were slightly down from last year. Seems several key operators were away on holidays. Checkins on all nets still very good despite summer. Some changes in store for *ARLM*, the local ham sheet that is now to represent all in Manitoba. We wish it good fortune. Malcomn, VE4MG/QST, is still doing a tremendous job on all bulletins. Congrats to Charlie, VE4LB, on his appointment as net manager for MTN. Also congrats to Bill, VE4AFO, as new net manager for the Manitoba Evening Phone Net. MEPN QNI 848, QTC 23, sess. 30. WRIN QNI 182, QTC 1, sess. 8. MTN QNI 101, QTC 22, sess. 16. MMN QNI 537, QTC 35, sess. 30. Traffic: VE4JA 32, VE4TE 31, VE4PG 29, VE4AAD 27, VE4RO 22, VE4IX 18, VE4AFO 7, VE4JF 6, VE4ADS 5, VE4DT 5, VE4NE 5, VE4GB 4, VE4CR 2, VE4HK 2, VE4JK 2, VE4CF 1, VE4NM 1, VE4TL 1.

ONTARIO: SM, Larry Thivierge, VE3GT — BM: VE3LST. PGL: VE3AR. SEC: VE3GV. AJ/STM: VE3GT. TC: VE3EGO. Please welcome our new Bulletin Manager, Len, VE3LST, in London. Anyone who is interested in an OBS appointment should contact him for details. Congrats to Jim Swail, VE3KF of Ottawa, who has been named to the Order of Canada for his work in developing priceless implements for the blind. The presentation will take place in Ottawa next month. Among the many persons' lives he has brightened was a blind Inuit man who operates a CBC satellite radio station with the use of voltage meters and VU meters with scales in braille developed by Jim. In 1981, Jim returned to McGill University (class of '46, math, physics) to receive an honorary Doctorate in Science for his years of work with the National Research Council in this field. CRRL is the new sponsor of the CAN-AM contest with the administrative details being done by the Ontario Contest Club and Canadx. Belated congrats to Dave VE3GYQ and Sue VE3NRH on their recent wedding. VE3DSS has been named to the ARRL VHF-UHF Advisory Committee. VE3APC back on the air after a few years absence. VE3WV had excellent results when he tried out the NTS during a trip across the Western US and Canada. The new executives of the Guelph ARC are VE3s BYU NXA ISC FIC CHN EZR. Regretfully I announce VE3AKS and VE3CTT have become Silent Keys. K3CA, of the Nittany ARC, the club that sponsors probably the biggest state QSO party, the annual Pennsylvania QSO party, is offering a special, engraved plaque to the top, single operator entry from Canada to encourage more VE/VO/VY participation. This year the contest is held on Oct. 13 and 14. Good luck. Traffic: VE3KK 288, VE3GT 139, VE3GNW 112, VE3CYR 90, VE3BCZ 84, VE3DPO 81, VE3KCZ 76, VE3AJN 52, VE3KXB 50, VE3BDM 43, VE3FGU 40, VE3GOL 30, VE3BSY 24, VE3WM 23, VE3WV 23, VE3BAJ 15, VE3DZH 10, VE3KLX 10, VE3EWD 7.

QUEBEC: SM, Harold Moreau, VE2BP — STM: VE2EDO. BM: VE2ALE. PIO: VE2YW. TC: VE2ED. NM's: VE2EDO VE2FSA. Most of the clubs were heard on Field Day and everyone is looking forward to November *QST* for results. Les amateurs de la Vieille Capitale ont ete tres actifs lors de la visite des Grands Voiliers. Correction re: "Section News" de Avril, 1984 devrait lire VE2DV au lieu de VE2VD tel qu'annonce. Bienvenue a VE2KID, un nouvel amateur de St-Simon. Traffic: VE2BP 46, VE2EDO 44, VE2EKC 35, VE2EC 31.

SASKATCHEWAN: SM, W. C. Munday, VE5WM — STM: VE5HG. TC: VE5GF. NMs: VE5BAF VE5NJ VE5HG VE5AEM VE5AEJ VE5EX. Field organization appointments in SK will undergo changes in the fall. Our thanks and appreciation to those who are stepping down. Field Day in SK was a success with many clubs participating. Swift Current is to be congratulated on hosting a fine business hamfest enjoyed by 200 plus amateurs, families and friends on June 30th. The 1985 hamfest will be held in Regina with date pending. The dog days of summer will see many public service events taking place throughout the province, keeping those amateurs not on holidays busy.

ATLANTIC DIVISION

DELAWARE: SM, John Hartman, WA3ZBI — STM: W3DKX. SEC: W3PO. PIO: N3DIP. PSHR: K3JL, W3DRX. The Sussex ARA helped again this year with the Delaware Technical and Community College's 3rd Annual Old Fashion 4th of July Celebration. Those helping were K3GUX W3CDY WB3DUG WA3WIY K3JL WA3VIT K3PFW and WA3ZBI. DTN QNI 355, QTC 40 in 21 sess. DEPN QNI 64, QTC 14 in 4 sess. SEN QNI 32, QTC 2 in 4 sessions. Traffic: W3QQ 106, W3DKX 49, WB3DUG 44, WA3WIY 27, K3JL 25, WA3ZBI 20, N3AXH 12, KC3FW 4, N3SJ 4.

EASTERN PENNSYLVANIA: SM, Mark J. Pierson, KB3NE — ACC: KB3NE. PIO: W3AMQ. SEC: WA3PZO. SGL: N3CJP. STM: KB3LF. DECs: K3QXC AA3C W3EEK KB3UD N3BFL KB3LR N3AIA.

Net	Time	Freq.	QNI	QTC	Sess.
EPAEPTN	6 P.M. Dy	3917	390	147	30
EPA	7/10 P.M. Dy	3610	387	148	59
PTTN	6:30 P.M. Dy	3610	183	66	30

Local and VHF net reports: (QNI/QTC/sess.): D5ESN 66/4/4; PWAARES 57/1/3; LUZARES 45/6/8; D2ARES 41/0/3; ATN 37/6/9; D6ARES 26/0/4. OO reports: W3GTN W3KEK W3FAF K3UWJ. OBS report KC3LY K3EBZ W3CL W3VA KO3M. New officers for Mt. Airy VHF RC are: WB2VLA, pres.; WB2RVX, v.p.; AK3O, corr. secy.; W3ITT, rec. secy.; K3GAS, treas. New officers for Warminster ARC are: W3ZAA, pres.; WA3KQC, v.p.; KA3FQQ, secy. AK3O, treas. WARC will also hold its annual picnic Aug. 11, at Masons Mill Park, Upper Moreland. The club had 15 members doing traffic control at the Newtown Annual Firemen's Parade, June 9th. They did an excellent job. New officers for Schuylkill RA are: KC3HH, pres.; K3BWE, v.p.; WB3CRM, secy.; KC3NB, treas. Ephrata ARC and ARES members, about 20 strong, provided communications and traffic control for their local "Firecracker" 5-mile run. It was a great success. Upgrades: WB3FUR to Advanced; KA3IFG to Extra; KA3JFB to Extra; KA3JFA to Advanced; N3DXO to Tech; N3DPH to Advanced. Perkiomen Valley ARC held its annual picnic on July 15, at Mumbauersville Gun Club. Governor Dick Thornburg proclaimed the week of June 19-26 as "Amateur Radio Week." This is owing strictly to the fine efforts of our EPA PIO, W3AMQ. If you should come to Philadelphia during the summer, please try and attend the display the Philmont Mobile ARC has set up in the Franklin Institute, 21st and the Parkway. Traffic: W3IPX 281, KB3DLY 184, N3COY 156, N3CD 103, W3KAG 81, N3AIW 72, KB3UD 70, KB3FW 57, AA3B 56, WB8KPE 53, N2BSK/3 48, KC3LY 45, W3AQN 36, W3TWV 28, W3FAF 21, KO3M 21, W3CL 17, W3ADE 13, WA3CKA 10, W3VA 7, W3SD 6, K3EBZ 5, W3HK 3, WB3AZE 2, AA3C 2, W3KCM 2, W4UQ 2. (May) AA3B 56, N3AIW 52, KB3FW 26. (Apr.) N3AIW 131.

MARYLAND-DISTRICT OF COLUMBIA: SM, Karl R. Medrow, W3FA — FD messages from W3MR WA3VPL W3PZN K3AA K3YNY K3CEZ W3VPR and W3CWC made it! Congrats to WA3FYZ for new novice KA3MZQ. KA3LPC upgraded to Advanced and K2ITG to Extra from the IBM club. Congrats to all. W3AKD earned 5BWAS-good job. KG3M says the bulletins are great on the WB3LAB Bulletin Board System. WA2ERT changed QTH and is back on the air in jig time. W3ZNW shows much RTTY activity on MTN. KA3T is in his last year at U. of Md., W3MR and KA3R are reporting OOs. GARC has KS3Q, pres.; KA3HDO, v.p.; NE2J, secy. and KA3IIF, treas. this season. WB3BFK W3OYY and WA3VDX keep the north and west MDC nets running. W3LDD conducts MEPN nets with great speed. K3NNI is a stalwart on MSN. KA3EWV is covering the northern DC area. N3IT and WB3GZU use one letter abbreviations. KC3DW's reports arrive like clockwork. KK3F was again got by Murphy. WB3FUE made points for the Delmarva RC on Airport Appreciation Day. N4DLA/3 becomes the MEPN reporter. CARA has WA1QAA, pres.; W3CCV, v.p.; K3ERB, secy. and WA3VUQ, treas., WB4OZL and N3ADZ round out the team. KJ3E is the contact for AG3L/MM on a solo trip to Grenada. W3FZV liked the PVRC reunion. KC3AV says join MSN on 3717 daily at 7:30 P.M. local. W3YVQ has the state RACES plan in the mail. It looks real good. KC3Y is into boating. K3MR becomes a new ORS. KA3DRO had lightning back up his ground wires. He is also in training for a new job! W3UT was a greeter at the Frederick Hamfest. W3DQI gets a kick out of listening to some of the goings on! With the nets: Net/Manager sess./traffic/QNI average. MEPN/KJ3E 31/121/27, WCZ-Mtr/WA3VDX 4/1/15; MDC PON/W3CYY 4/3/9.5; WR PON/WB3BFK 21/17/10.5; MSN/KC3AV 30/51/8. Almost 100% QNI W3DKX KJ3E W3FA WA3IHW and W3LDD. Traffic: KC3Y 236, KJ3E 208, W3FA 124, K3NNI 105, KC3DW 94, KK3F 88, WB3FUE 55, W3UT 54, W3YVQ 54, KC3AV 48, WA2ERT 49, WB3BFK 36, W3ZNW 31, K3MR 28, W3DQI 26, KA3EWV 25, W3FZV 20, W3LDD 18, N4DLA/3 17, KA3T 14. (May) WA2ERT 10.

SOUTHERN NEW JERSEY: SM, Richard Baier, WA2HEB — SEC: K2QIJ. STM: WB2UVB. ACC: K2IXE. BM: WB2UVB. SGL: W2XQ. TC: W2IJX. PIO: WB2RVE. Please note the following staff change: Gene Bond, WB2UVB, is the new Section Traffic Manager (STM). Gene is a very active traffic handler and is the current NM of the South Jersey VHF Net. Our SGL, W3XQ, has compiled a list of computer bulletin board systems (BBSs) in our area. I don't know the protocols of these boards, except one, but the most popular is 8-N-1. If that doesn't work try 7-E-1. A couple of these boards have ham-related information on them. An asterisk before the BBS name indicates it's operational 24 hours a day. As space permits, I'll list a few every month.

*Jersey Shore TBBS	609-693-8849 8-N-1
*N2EHM	609-894-4366
*Jersey Devil	609-726-1565

K2JNS of Manahawkin has 90 countries confirmed. While this may not sound like much, John has worked these different countries via OSCAR. Congrats John! Traffic: WB2IKL 228, WB2UVB 219, KC2PB 28, WA4JRB 18, WA2HEB 15, WA2MGV 14, KA2ANJ 8, KA2CQX 8.

WESTERN NEW YORK: SM, William W. Thompson, W2MTA — SEC: W2BCH. ACC: N2EH. PIO: WA2PUU. TC: K2QR. OO/RFI: W2AET. SGL: KO2X. BM: W2GLH. FIELD DAY MESSAGES: WA2AAZ W2AE KD2AL NC2C N2CXU W2CXV KA2DBD K2HE K2IQ KA2IWK W2LZ K2MP W2OFQ K2RN K2SA KA2X. Club Officers: Fulton ARC N2ACQ KA2AON; GRAM WB2DFC WB3JSU KA2ATA WA2AIV; STARS WA2ZFU WB2GIM KA2MJX KA2DDP WB2RAV. COMMS: Erie Co. Fun Run and Regional Hydroplane Races-WB2PID. PSHR: W2AET KA2BHR KG2D WA2FJJ VE2FMQ W2GJ WB2IDS WA2KOJ W2MTA WB2OWO WB2PID KA2QIK KC2QQ ND2S KX2T. Send SASE to W2MTA for Western New York *Wireless*, or get copy at WNY hamfests.

NYS/1*	3677	1000/Dy	WB2EAG	355-167-30
WDN/M*	04/64	1100/Dy	KC2QQ	314-033-30
Mike Farad	3925	1300/M-S	VE2FMQ	190-028-25
NYPON*	3913	1700/Dy	WA2KOJ	577-288-30
NYSPTEN	3925	1800/Dy	WB2HKU	563-056-30
ESS	3590	1800/Dy	W2WSS	381-049-30
OCTEN/E*	34/94	1830/Dy	WB2HLY	540-048-30
Q Net	31/91	1830/Dy	KA2CMQ	358-005-30
WDN/E*	04/64	1830/Dy	KC2QQ	549-100-30
Blue Line	93/33	1900/Dy	WA2SEF	425-022-30
NYS/4*	3677	1900/Dy	WB2MCO	—
JCARCN	10/70	2000/Dy	WA2WAX	458-017-29
OARCN	25/85	2000/Wed	K2VTT	059-000-04
BRVSN	055/655	2100/Dy	WB2OFU	448-007-30
CNYTN*	90/30+	2115/Dy	WA2PUU	—
OCTEN/L*	28/88	2130/Dy	WB2HLY	228-039-30
STAR*	99/39	2130/Dy	N2BLX	—
WDN/L*	04/64	2130/Dy	KC2QQ	630-093-30
NYS/5*	3677	2200/Dy	WB2MCO	—

*NTS Net. Traffic Handlers Information Net 3913 kHz at 1600 Sun. VHF THIN at 2000 Tues. on 04/64 repeater in Western District. WNY EC Net 3955 kHz at 2000 on third Sun. HAMFESTS: Hamburg HAM-O-RAMA Sept. 8, Elmira Sept. 29, Syracuse Oct. 13. Volume 1, No. 1 of the WNY Section tabloid *WIRELESS* is now available, thanks to the efforts of both WA2QFC and W2GJ. Copies are being distributed at hamfests in the section; if you don't have one, send SASE to the Section Manager. APPOINTMENTS: EC: KD2HM Fulton Co.; OBS: WB2DSR WA2ZPE WB2JAB. More appointees are needed. Check it out in a copy of *Operating an Amateur Radio Station*. I'm sure you will find one of interest. Then inquire of the SM. He will forward information to you on how to become appointed. Thanks to all the clubs that are sending their newsletters. Traffic: WB2IDS 269, WA2FJJ 265, WB2OWO 257, W2MTA 218, W2AET 196, VE2FMQ 110, WA2KOJ 98, W2GJ 97, WB2QIX 97, KA2BHR 93, KG2D 81, ND2S 80, W2FR 74, W2ZOJ 59, KX2T 46, W2UYE 46, KA2DBD 41, KC2QQ 40, KA2QIK 38, KU2N 28, WB2PID 24, WA2OEP 20, NF2G 19, WA2RXO 12, WA2FGW 6, KA2DQA 5, K2VR 5, WB2NAO 3, KB2KW 2.

WESTERN PENNSYLVANIA: SM, Otto L. Schuler, K3SMB — SEC: AB3Q. STM: AC3N. ACC: N3EE. OO/RFI: KN3B. PIO: WB3IZJ. TC: W3FE. BM: WN3VAW. SGL: K3HWL.

Net	QNI	QTC	Sess	kHz	T/D
WPACW	270	133	30	3585	7:00P/D
WPAPTN	412	94	30	3983	6:15P/D
WPA2MTN	368	52	30	146.28/88	8:00P/D
NWPA2MTN	406	6	29	145.13/53	0200UTC

One Silent Key W3FTH formerly of WPA. Our condolences to his family. One correction; due to an error KA3FAP was listed as a Silent Key by me. He is still with us, my apology to him. New Novices KA3s MXU MXW MPO MPV MPS AMG & MPR. To Tech KA3LBT. From the PA QSO Party Newsletter, The Nittany ARC and Representative Herman of the 77th Leg. District. Governor Richard Thornburg will proclaim the week of Oct. 13-21 Amateur Radio Week. For more info contact W3HDH or Nittany ARC members. Field Day Reps. from the CMUARC W3VC, North Hills ARC W3XX, Somerset ARC AK3J, Skyview ARC K3MJW, Irwin ARA WB3JSI, Nittany ARC W3YA, Foothills ARS W3LWW, Lawrence City ARA K3FZD, Indiana City ARC N3BMD, Two Rivers ARC W3UST, Tripple "A" ARA K3NPX, Cumberland Valley ARC W3ACH, Huntingdon Co. ARC W3VI and the Beaver Valley ARA W3SGJ. The Blind Golfers Tournament was held again in Allegheny Co. and comm was handled by local hams. The simulated nuclear accident at Beaver Valley Nuclear station was held again under Federal authority. Amateurs in the Beaver Co. area provided operators there under the Radio Officer's (WA3ZJE) direction. Counties surrounding Beaver provided backup. June tfc is way down. I hope it is better next month. Traffic: W3EGK 319, K3CR 112, AC3N 111, N3FM 92, KA3COX 74, W3NGO 68, K3SMB 67, WA3UNX 67, WA3QNT 62, WA3DBW 34, KC3JQ 34, WN3VAW 34, W3OKN 24, K3NPX 23, W3RUL 18, N3CYV 13, W3KUN 12, K3LTV 9, W3KMZ 5, W3SN 5, KB3NV 3, W3ZX 2. (Apr.) N3WS 24. (May) N3WS 31.

CENTRAL DIVISION

ILLINOIS: SM, David E. Lattan, WD9EBQ — SEC: W9QBR. STM: KB9X. OO/RFI: K9MX. BM: K9ZDN. PIO: WD9EED. SGL: W9KPT. ACC: WB9SFT. ASM: K9ORP.

Net	Freq.	Times (Z Win)	QNI	QTC	Sess.
ILN	3690	0030/0400 Dy	551	234	60
ITN	3705	0100 Dy	281	53	30
ILPN	3915	2230 Dy (X Sn)	347	57	(part)
NCPN	3915	1300 Dy (X Sn)	404	64	26
NCPN	7270	1815 Dy (X Sn)	171	113	22
IEN	3940	1500 Sn	106	1	4
IARES	3915	2230 1+3 Sn	36	—	2
ISN	3905	0000 Dy	427	117	30

Illinois was represented 100% to 9RN by stations K9AZS K9BVE N9DR KA9FEZ K9GMZ K9IYP KW9J KD9K WB9NVN W9NXG K9QEW K9SW KW9T and N9TN. Illinois was represented 95% to K9RN by stations W9NXG K9AZS K9EHP KW9J WB9ODN W9HOT KA9FEZ and WB9NVN. D9RN was represented 100% to CAND. Illinois stations were K9AZS KA9FEZ W9HOT KW9J WB9NVN and W9NXG. This month I want to give special thanks to those clubs in Illinois who send me a copy of their newsletter each month. This helps to keep me informed of what is going on around the section, and it is much appreciated. These clubs are: Elgin ARS, Illiana Repeater System, Central Illinois RC, Wheaton Community Radio Amateurs, Shawnee ARA, Western Illinois ARC, Radio Amateur Downstate Illinois Organization, Chicago Suburban RA, Fox River Radio League, Joliet ARS, Starved Rock ARC, Peoria Area ARC and the Sterling Rock Falls ARS. If your club is not among this group, why not ask your newsletter editor to put me on your club's mailing list? If it is in the above list, THANKS! W9DBO was out of report cards this month, so he sent me one of his own design. I think it was a lot more concise than the CD-210, HI! W9TT reports that KY9L has a new KT-34 up. We'll be looking for the BIG SIG! On June 30th, IL SM WD9EBQ attended a region-wide earthquake communications planning conference hosted by the Missouri Section in Jefferson City. SMs KØPCK (MO), KØBXF (KS), and W9UMH (IN) were also in attendance. The session included a comprehensive report on the state of the New Madrid fault, which runs mostly through the Missouri Bootheel. After hearing reports from

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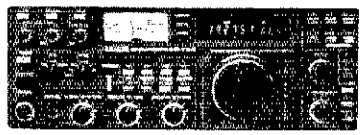

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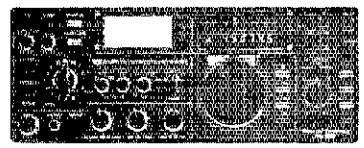

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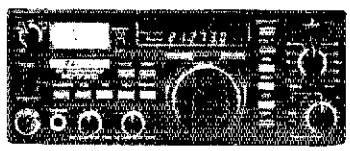

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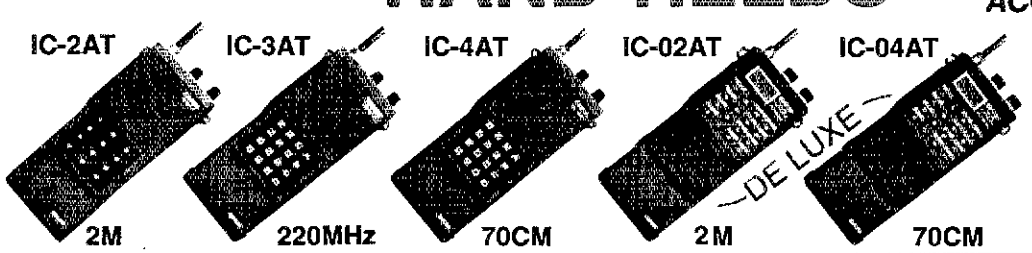

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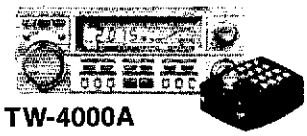
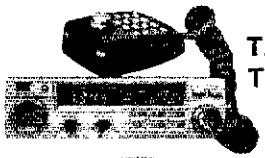


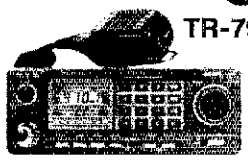
TW-4000A

TS-930S

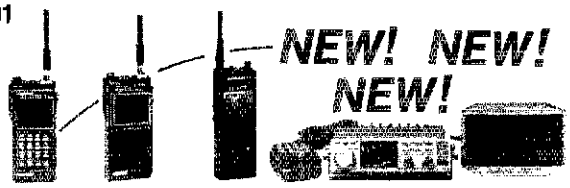


TM-201
TM-401

TS-430S



TR-7950



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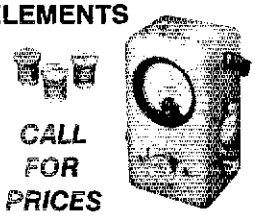

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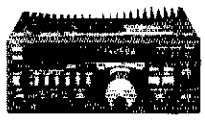

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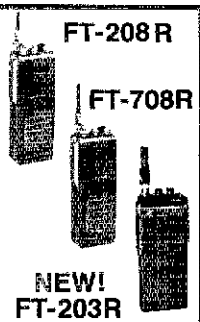

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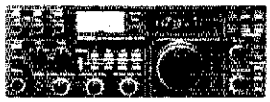

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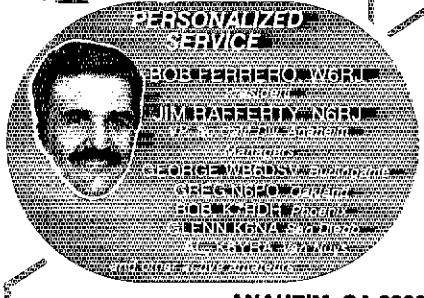

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siesmologists, emergency planners, and state communications personnel, committees were formed and an amateur response plan for Missouri was drafted. Surrounding states should follow Missouri's lead in drafting a standing plan for amateur communications during a disaster. A major quake along the New Madrid is much overdue and is not a matter of if, but when. All existing emergency plans indicate the need for amateur communications to hold the affected area together in the first 72 hours after the quake until Federal assistance arrives. Better keep batteries and generators up to snuff! There will be more on this subject in upcoming months, and it is rumored that the New Madrid Fault may be the Major topic at this year's Illinois ARES seminar. Traffic: W9JIJ 459, KA9FEZ 180, K9BVE 167, W9NXG 141, W9HLX 139, W9HOT 103, K9AZS 80, KB9X 78, W9DBO 72, KD9K 69, WA9SHE 55, K9QEW 54, KA9EWN 42, N9EM 23, W9QBH 20, K9EHP 16, W9RTD 16, KN9BAM 14, W9VEY/M 14, KA9PKG 11, WB8RFB 11, KZ9I 10, KB9QX 10, WD9CJB 9, KA9BBV 7, WD9HQW 7, WA9RUM 7, WD9IBH 6, WD9EED 4, WA9SID 3, KA9RUH 2. (June) KD9K 80, W9NXG 73, KA9EWN 70, W9QBH 66, N9EM 62, W9DBO 60.

INDIANA: SM, Bruce Woodward, W9UMH — SEC: WB9ZQE. STM: W9JUJ. ACC: K9TUS. TC: WD9ADB. SGL: WA9VQO. BM: KC9TA. PIO: K9DIY. SRC N9WB. SHC: WA9FUD. OO/RFI: KJ9G. NMs: ITN-KD9DU; QIN-KJ9J; ICN-KA9CZD; IRN-KB9SU; VHF-W9PMT; IWN-KA9ERC.

Net	Freq.	Time/Daily(UTC)	QNI	QTC	QTR	Sess.
ITN	3910	1330/2130/2300	2612	340	2146	90
QIN	3656	1430/0000/0200	607	255	1668	90
ICN	3708	2315	97	35	705	30
IRN	3629	0000	170	18	691	30
IWN	3910	1310	1762	—	394	30
IWN	VHF	Kokomo	1066	—	205	30
IWN	VHF	Bloomington	1158	—	300	30

Hoosier VHF nets QNI 6715, QTC 215, QTR 6542, bulletins 38, 217 sessions for 24 nets. 9FN Cycle 4 QNI 355, QTC 456, QTR 944 for 59 sess. IN 98%. IN stns N9AEI W9EI N9HZ KJ9J W9JUJ WA9QCF WB9UYU K9WWJ W9XD. D9RN 383 messages in 30 sessions. IN 100%. IN stns. W9JUJ & K9CGS. CAND 856 messages in 30 sessions. D9RN 100%. IN stns W9JIJ AB9A. Appointments: EC N9CQD for Porter Co.; N9AJM, EC for Marion Co.; W9PRD, EC for Decatur Co. KA9EVC, EC for Davies Co.; N9CQD DEC for Northwest Indiana. Silent Keys: W9URQ KA9CZR WB9MPL. I wish to thank N9AJM and W9JVF for the new *Central Indiana Amateur Radio Directory.* This was the first update since 1978. Congrats to the Wabash Valley ARC on their completion of 50 years of ARRL affiliation. A real milestone for one of Indiana's outstanding clubs. Remember to get your Amateur Radio license plates you must order them through your local license branch before December 31, 1984. By the time you read this, the Clark Co. ARC should be in a position to give license tests. Congrats to Almo Jo Head, XYL of WB9ZQE, Dorthea McVickers, XYL of W9JZV, and Jean Woodward, XYL of W9UMH, for their help with section activities though they are not hams. Each was given a cup at the state convention. Congrats to N9AEI for his NTS (QIN) award. NTS (ITN) awards were given to W9URQ and to W9PRD. Congrats to K9IIB on receipt of his ARES award. Certificates of Appreciation were presented to: KA9ERC KM9B WA9OKK KA9FFO KB9SU W9CNE WD9CIV W9RTH WB9ZQE N9AJM KJ9G K9LSB N9WB WA9CWE and W9JZV. WB9ZQE and I traveled to Missouri to find out about the New Madrid Fault and earthquakes. We will have much to say on the subject later. The governor has signed a proclamation proclaiming the week of October 14-20 as Amateur Radio Week in connection with SET. It is hoped that the PIAs can use this and SET for some good PR. Traffic: W9JUJ 628, KJ9J 264, K9OUP 158, W9ZGC 158, KM9B 140, N9AEI 91, N9EI 55, KA9FFO 50, W9UMH 45, W9JZV 42, KB9HH 40, W9UEM 38, W9PMT 36, W9CNE 32, WD9HII 26, W9XD 21, W9FW 21, WB9AWI 18, WA9OKK 17, K9KTB 14, WD9DWD 14, W9RTH 12, K9PS 11, K9BRF 10, N9DHX 10, K9DIY 9, WB9OZZ 8, K9FVN 7, W9OZJ 5, W9DKP 5, K9SBW 3, W9UPI 3, W9BDP 3, WB9AJY 2, KB9DE 1, KB9SU 1, KD9DU 1, WB9ZQE 1, W9IOH 1, KK9N 1, KA9LAU 1, W9PRD 1, AB9A 1, N9HZ 1, WA9QCF 1, WB9UYU 1, KW9C 1, KW9D 1.

WISCONSIN: SM, Roy A. Pedersen, K9FHI — SEC: W9OAK. STM: K9UTQ. BWN 3984 1100Z. QNI 1261, QTC 1497 WD9IID. BEN 3985 1700Z QNI 732, QTC 190 WB9ESM. WSBN 3985 2230Z QNI 787, QTC 314 WA9ZTY. WNN 3723 2300Z QNI 122, QTC 26 KA9OBP. WSSN 3645 2330Z QNI 185, QTC 32. KC9CJ. WIN-E 3662 0000Z QNI 288, QTC 153, WB9ICH. WIN-L 3662 0300Z QNI 206, QTC 93 K9LGU. XPO 3925 1731Z QNI 248, QTC 14 WA9YVC. NWTN .34/.94 2300Z QNI 406 QTC 40 N9BDL. Gr. Bay .72/.12 (Thu) 0145Z WB9NRK. WCWTN .31/.91 2330Z QNI 589 QTC 36 KC9VM. Sorry to report KC9KQ a Silent Key. John will be missed by all. N9BCX has ham license for 25 years; congrats George. W9UCL will be celebrating 50 years of wedded bliss in August; congrats Ed and Ora. Field Day was a big success, hope everyone enjoyed it, had nice WX for it. Don't forget the WNA picnic slated for Sept. 15 at the North Wood Co. Park, camping facilities, very nice place. Hope to see you all there, meet the faces you have been talking to. N9DHT is the new NM effective July 1, give Jim your support. KA9KUG is now KD9JF. BPL to KA9CPA, KC9CJ. The Severe WX Net really did a FB job on the Barneveld tornado, very FB job done. Thank you for putting up with me for the past 11 years. Support you new SM. Traffic: KA9CPA 1670, KC9CJ 590, W3CBE 286, WD9IID 209, W9YCV 194, K9GDF 181, WA9WYS 172, K9UTQ 156, KA9OBP 137, W9UCL 114, WB9ICH 92, AG9G 90, N9BDL 80, WB9ESM 76, K9AKG 71, WA9ZTY 70, KA9AFB 68, W9IHW 66, KC9VM 66, WD9FHI 65, W9SQ 58, W9FDY 51, W9LDO 50, WB9JGA 39, K9FHI 38, W9DND 36, WB9JSW 31, N9BGE 29, KZ9V 26, N9DCF 25, WA9YVC 25, N9BCX 22, KB9B 20, KN9P 18, W9UW 13, KY9P 10, KA9BHK 9, KV9U 9, K9BED 8, KA9NOT 6, W9SQJ 2.

DAKOTA DIVISION

MINNESOTA: SM, Helen Haynes, WB0HOX — ASM: KC0T. SEC: KA0ARP. STM: KD0CI. Hello again. Sorry I was unable to attend Amateur Fair held June 2nd in St. Paul. Understand it was a great event as usual. Another event, of course, was the annual Field Day, I hope you had a chance to work it as I did. The Paynesville ARC is the newest Special Service Club in Minnesota. It seems everyone is travelling to distant places these days. W0CF just returned from a European trip, stopping in such cities as Geneva, Switzerland. KZ0H departed recently for Europe, his itinerary includes stops in Leningrad, Russia Munich, Germany and Paris, France. He will be returning home in July. It is great to know that Ham Radio is a reliable media in emergencies. KA0AJF recently witnessed a traffic accident in Bemidji. She called on the 73 machine for assistance and KA0KWM responded by calling the local authorities. Let's all try to remember our responsibility to serve the public is perhaps the best way we can promote our hobby! The Robbinsdale ARC provided comms for the Bonnie Bell 10-Kilometer Race on June 2nd. Participating stations were: N0BSN KC0BZ KK0C N0CSS N0CRN WB0CYH KN0D KY0H/NCS KA0HFS KZ0I KD0KD W0SBO WB0SNP NA0U. Net News: Ever since I've been STM, it's been my hope that all our sideband nets would agree to consolidate to one single operating frequency, a Minnesota Net Frequency so to speak. We may be close to making this hope a reality. Our target frequency is the present MSPN/E and MNAMWXNT frequency of 3929 kHz. The plan is to move MSPN/N and the Piconet Allday Watch to 3929. It would be to our advantage to consolidate for many reasons and I intend to present my proposal to the PAW folks in hopes they will concur. It's time to start preparing for SET, scheduled for Saturday Oct. 20. We must improve on last year's performance! Upgrades from General to Advanced: K9MBB KA0NQV. Finally, my sincere condolences to the family and friends of W0IN who is a Silent Key. He was active with the Brainerd ARC. NMs (with assistants): MSN/1 W0EHI (W0GRW), MSN/2 KA0EPY (W0OJH), MSSN KA0ODQ (KA0ARP), MSPN/N KA0JUX (WB0JUL), MSPN/E WD0BGS (KA0BFP), MNAMWXNT WD0BAC, PICONET W0HZU (WA0TFC).

Net	Freq	Time	QNI	QTC	Sess.
MSN/1	3685	6:30P	304	75	30
MSN/2	3685	10:00P	255	49	30
MSSN	3710	6:00P	165	23	27
MSPN/N	3945	12:05P	608	93	30
MSPN/E	3929	5:30P	958	130	30
MNAMWXNT	3929	6:15P	0	0	0
PICONET	3925	9:00A	—	—	—

Traffic: N0AFW 1269, WA0TFC 318, KA0EPY 166, KT9I 126, KA0AHP 121, W0EHI 102, WB0HOX 90, N0CLS 86, KD0CI 66, KA0JUX 55, W9DM 42, KA0ODQ 37, WD0BGS 27, N0JP 22, KA0BFP 21, K0OGI 16, K0CVD 15, KN9U 14, KB0WV 14, KA0AJF 12, W0RIQ 11, WB0UKI 6, KZ0H 5.

NORTH DAKOTA: SM, Ron Roche, K0ALL — AK0T and WB0SHD have completed work on their repeater linking project. A 450-MHz remote base at New Salem links Bismarck with all of the repeaters in western North Dakota and Rapid City, S.D. It has already been used for SKYWARN and will be very valuable when the severe weather warnings go out. If you are considering a new repeater, think about 450 MHz. The advantages over 2 meters will amaze you. Many reports from Field Day groups. Activity up from previous years. KC0W has experimental license for 902 MHz. Please send your news items for September to your new SM, KN0A. DATA Net 164 QNI, 6 QTC. Goose River 56 QNI, 3 QTC. Meet the Goose River at 9 A.M. on Sun.

SOUTH DAKOTA: SM, Fredric Stephan, KC0OO — Official bulletins transmitted total of 37 times through the section. Please send me your nominations and donations for the upcoming S.D. Section Public Service Award. All hams are eligible. Want to know more about DTEN? Are you real interested in helping out? Write or radiogram KB0MB AND/OR W0FRC to obtain all kinds of information. The SET will be here sooner than we think. Make preparations now to be ready for the excitement. WA6YBT and W0IT are very active on satellite and are building more equipment. W0RWE has now been licensed for 50 years and an ARRL member for more than 40 years. Congrats. Owing to strict orders from the doctor, W0KJZ has had to resign her position as our STM. We will be hard-pressed to find anyone skilled and patient enough who would be able and interested in replacing her. W0KJZ has always been a staunch supporter of ARRL and our top traffic handler. As usual, we wish her well and many, many thanks for such fine efforts and years & years of work. Please send in all net reports, news items and traffic counts by the 4th of each month to allow inclusion in this column. Contact me immediately if you want to attend this year's official South Dakota Section ARRL Roundup which will be held in October again. This time the location shall be Sabras Peak, northwest of Grin N Bear It, South Dakota. Registration forms are short but still available. Send now. Still looking for volunteers to help with the soon-to-be-released S.D. Amateur Radio Newsletter. We need your help.

DELTA DIVISION

ARKANSAS: SM, Joel Harrison, WB5IGF — SEC: N5BPU. STM: AE5L. ACC: AD5M. TC: W5FD. SGL: W5LCI. PIO: K5DW. Repeater Coordinator: WB5FDP. The Arkansas DX Assn. will hold its annual meeting and banquet on Oct. 6 in Hot Springs at the Majestic Hotel. Guest speaker will be George Atkins, AD1S of KH5 fame. For information contact Earl Smith, KD5ZM, of Pine Bluff. The Arkansas Hamfest and 1985 ARRL State Convention are scheduled for April 13 & 14, pending ARRL Hq. approval. Fall is approaching with a lot of good radio activity forthcoming. See you on the bands.

LOUISIANA SM, John Wondergem, K5KR — SEC: KA5PFB. ACC: K5DPG. SGL: KD5SL. New Orleans Westside ARC election: WD5DWP, pres.; WB5ADU, v.p.; WB5MLH, secy.; WA5OXK, treas. The CENLA Hamfest in Alexandria was great. KB5CX handled the coordination. KD5YU and KE5BC deserve an "attaboy" for their tireless support. KE5MQ claims grave injustice in accepting the "Bilge Pump Award." He said he has worked for years to establish the reputation as a perveyor of the straight skinny and has never indulged in trivia or idle gossip. You just gotta be in New Orleans Sept. 15-16 for the hamfest, the Delta Division Convention and the World Fair. See the details on page 154 of your July QST. The Louisiana Exhibit at the World Fair is exceeding all expectations. They are open 10 A.M. to 10 P.M. operating on SSB/CW/RITTY/VHF/Slow Scan. The biggest suprise is the number of visiting hams that have filled several guest registers. KE5PP is ex - KA5HDT. You're invited to check into the Louisiana emergency net (LEN) at 8 P.M. on Mondays at 3910 kHz.

LTN	3910	6:30 P.M. Dy	N5ANH
LAN	3615	7 & 10 P.M. Dy	N5BFV
LSN	3703	7:30 P.M. Dy	WA5ANV
LEN	3910	8 P.M. Dy	N5ADF

Traffic: W5GHP 521, K5TL 99, KE5PP 59, WB5LBR 56, N5ANH 27, K5WOD 20, WA5TQH 12, WA4MUW 6.

MISSISSIPPI: SM, Tom Hammack, W4WLF — SEC: N5DDV. STM: KB5W. Freq. Coord.: NF5O. Laurel ARC graduated 12 Novices. Tnx goes to W5VKR. N5CCU appointed OBS. AJ0X was honored to be speaker at RTTY DX forum at Dayton Hamfest this year. N5EKR quite active on UHF, VHF and satellite. Congrats to new Novices KA5TRK & KA5TRL. MSBN new net manager of KW5T. Tnx to N5DSK who did a fine job in that position for 2 years. ARRL info Net meets each Tues at 0015Z on 3987.5 kHz. W5EPW and WA4FMR do fine job on reporting wx each

night on MSBN. VARC will sponsor MSBN picnic mid-Sept. DRN5 (WB5YDD) sess. 60, QTC 830. MTN (K5OAF) sess. 30, QNI 116, QTC 62. MMN (WB5RMW) sess. 30, QNI 445, QTC 6. MSBN (KW5T) sess. 30, QNI 2069, QTC 68. Traffic: N5AMK 505, K5OAF 189, KT5Z 186, W5LSG 59, KW5T 29, W5WZ 28.

TENNESSEE: SM, John G. Brown, NO4Q — ASM & ACC: WA4GLS. OO/RFI: W9FZW. PIO: WK4V. SEC: WA4GZQ. SGL: WA4GZZ. STM: NG4J. TC: W4HHK. As can be seen above, we still don't have a Bulletin Manager. We need someone that can check all ARRL bulletins as they are sent from W1AW and copy and send the ones that are applicable to the TN Section. If you are interested let your SM know. We are about to lose some of our members to the relocation of some that are employed by TVA. W4ZJY is one that is moving and he has served in many positions in the section like STM, TN manager and presently the TSN manager. He and the others will be sorely missed. Good luck to all that are moving and visit via the airways with us often. The summer is in its winding down stages and we should start to think about getting ready for the coming winter months and its perils. Still have a few hamfests on the calendar for 1984. Got word that several upgraded at a Nashville FCC session and some new hams. Congrats to all that made the step. Will be looking forward to hearing them all on the bands and having you join into the section activity. By the way, some of you gals and fellows that are so inclined or have done the service in the past, the morning and evening phone net managers still need help with net control and alt. net control jobs. If you have never done the job, don't feel you can't do the job. We all had to go through the learning process and made many mistakes. So how about giving them a call and giving a hand. Your services will be appreciated by all. Nets: LF sessions 88, QNI 3695, QTC 163; VHF sess. 94, QNI 2004, QTC 567; TN CW sess. 54, QNI 345, QTC 97. Honor Roll for TSN was K9IMI and WV4E. Fine job fellows. Sorry to say that seven nets did not send their reports to the STM. How about it? Traffic: KA4RSC 219, W9FZW 193, W4ZJY 127, K4WWQ 61, WV4E 26, W4MRD 25, W4PFP 24, NN4S 13, WA4GZO 12, WD4GYT 10, WB4YPO 9, KI4V 6, WA4GLS 5, W4PSN 4. (May) W4MRD 27, W4PSN 6.

GREAT LAKES DIVISION

KENTUCKY: SM, Ann Jackson, KA4GFU — SEC: WA4JAV. STM: KA4BCM. BM: WA4AGH. OO/RFI: N4GD. PIO: K4TAJ. Welcome KB4IHL and KB4ITS to KNTN. You are doing a fine job, fellas! Net reports: MKPN 1052/124, KYN 145/47, KNTN 271/59, BARES 105/10, KYPON reported, NKARC 47/1. TSTMN 509/44, WTEN 50/1, 3ARES 47/0, 7ARES 55/0, 11ARES 36/5. Traffic: WA4JTE 247, WD4IYI 176, KA4SAA 91, KB4OZ 50, K4MHL 35, WB4ZDU 35, KA4BCM 33, WD4BSC 33, K4HOE 28, KA4SKV 25, KA4GFU 23, WA4AVV 20, WD4IXS 16, WK4D 15, KA4MTX 14, WA4AGH 13, WD4CJQ 8, KA4GBZ 7, N4HZT 7, WD4PBF 6, WD4IYH 5, KA4YIV 5.

MICHIGAN: SM, James R. Seeley, WB8MTD — ASM: WA8DHB. SEC: WA8EFK. STM: WD8RHU. ACC: K8SB. PIO: KC8K. SGL: N8CNY. TC: WB8BGY. BM: KZ8V.

Net	Freq.	Time/Day	QNI	Tfc.	Sess.
QMN*	3663	1800 Dy	758	238	60
MITN*	3953	1900 Dy	554	212	30
GLETN	3932	2100 Dy	751	75	30
MACS*	3953	1100 Dy**	311	66	26
UPN*	3922	1700 Dy	653	54	34
MNN*	3722	1700 Dy	246	44	56
WSSBN	3935	1900 Dy	799	38	30
VHF nets	15 rpts		1031	18	90

*NTS nets. Times local. **QMN late net, 2200; MNN late net, 2000; MACS 5n 1300. ARES net Sn, 3932, 1730. ARRL Info Net, Sn, 3953, 1500. 3932 is MI HF emer. Freq. The traffic workshop will be starting up again sometime in Sept.; details will be announced on the traffic nets. Although there were a few glitches, the convention in Livonia overall earned high marks. It certainly was the best attended one in many years, obviously for its being closer to the population center of our state. W8WOJ is now manager for WSSBN. It is heartening to see the QNI back to normal and then some for this fine old MI net. A question that keeps popping up every so often: "Do I have to be a member of a net to handle traffic?" The answer is an emphatic NO. MI follows ARRL guidelines for NTS net membership standards, but there is no membership requirement for participation in traffic handling or for submitting of monthly activity reports. MI's Lady Amateur of the Year award for 1984 went to KA8CPS. Congrats, Ginny — you earned it! Traffic: WD8LRT 452, KA8CPS 355, W8QHB 317, KA8NCR 140, W8UE 122, AF8V 91, WD8RHU 89, N8CNY 79, K8KOJ 62, WB8MTD 62, WB8YDZ 61, K8UPE 58, WD8GUO 54, WA8DHB 51, W8IHX 48, WD8MJB 47, W8CUP 45, W7LVB 45, K8GXV 38, W8YIQ 37, WD8EIB 34, K9EOJ 24, KA8PAK 21, KI8Q 20, WB8TTA 18, W8VIZ 16, K8EQO 15, WB8ITT 13, WB8YRY 13, WD8BSE 12, W8SCW 12, W8URM 12, W8YZ 12, WD8KQC 11, W8TBP 10, KA8PQH 6, KD8QW 6, N8EBN 4, KB8GT 1. (May) WB8YDZ 59, N8EBG 57, W8YZ 7.

OHIO: SM, Allan L. Severson, AB8P — SEC: K8AN. STM: K8OZ. ACC: K8US. PIO & SGL: N8CVK. TC: KB8MU. Net reports:

Net	QNI	QTC	Sess.	Time (local)	Freq.
BN	327	157	58	6:45/10 P.M.	3.577
BNR	222	77	30	6:00 P.M.	3.605
BSSN	317	167	54	9:45 A.M./7:15 P.	3.927
ONN	84	22	24	6:30 P.M.	3.708
OSN	255	89	30	6:10 P.M.	3.577
OSSBN	1754	628	90	10:30 A.M., 4:15 & 6:45 P.M.	3.9725
OSSN	152	70	30	6:45 A.M.	3.577
O6MN	290	13	30	9:00 P.M.	50.160

From all reports (including my own), 1984 was a bumper Field Day year for Ohio. Maybe not one of the greats, considering the state of the bands, but still very good. The weather cooperated pretty well, the numbers of operators were sufficient for the stations used, and generally the food was superb. My work prevented me from getting an early start, and kept me from sampling some of the steaks which were reported to be large, succulent and juicy. I have several rainchecks, so all is not lost. My heartiest congrats to my successor, Jeff Maass, K8ND. Jeff, who will become Section Manager on Oct. 1st, is extremely involved in all aspects of our hobby, and I'm sure you all join me in welcoming him. So far there have been many, many public amateur displays this spring and summer. Giants Days in Seville, commemorating a married couple of world-class size who lived in that community a century ago while between circus trips, is a unique one. Our Seville major-domo is our STM, K8OZ, and our participation came about in a rather interesting way. For some years K8OZ and others have been involved in operating an Amateur Radio station in Hinkley during Buzzards' Day. (Yes, I said Buzzards' Day! Capistrano may have its returning swallows, but Hinkley has its returning buzzards.) Many of the folks involved in organizing Buzzards' Day are also involved in Giants' Day. Our Amateur Radio activities in Hinkley have been so successful that the Seville principals called K8OZ to invite ham radio participation in their festival of giants. Thus, you never know when one public relations activity will lead to another. Don't overlook opportunities. We need every chance we can get to show what we can do. Upgrade to Extra, KA8POM. Appointments, to EC Wayne & Holmes Counties: WD8BVV. Congrats to you both!

Local Nets	QNI	QTC	Sess.
ALERT	111	8	6
BRTN	289	131	30
MASER	118	4	4
MEDINA CO.	344	48	30
RARA	56	—	4
TSRAC	1070	81	41

Traffic: WD8MIO 542, W8PMJ 370, WD8KFN 296, K8JDI 221, AB8P 218, K8OZ 203, WB8KWD 145, N8FCQ 127, W8QZK 121, W8SKP 105, KA8GJV 102, W8BO 98, N8AKS 88, N8AEH 86, KF8J 82, KA8CGF 81, KA8KHS 79, WB8DMF 76, WA8SSJ 75, W8EK 72, KD8KY 56, WD8KBW 54, WA8GMT 53, K8TVG 52, NE8X 52, NE8X 50, WB8JGW 46, K8AN 46, N8EVC 40, WB8MEK 38, WD8RGP 35, K8VOY 33, N8FPH 30, N8CW 29, KA8ICB 28, WD8IKC 28, W8BHL 27, KV8Q 26, WA8HGH 25, K3RC 21, WA8HED 20, WD8RGS 19, WB8HMI 18, WB8NHV 16, WA8DYX 15, WB8MRL 15, W8FUP 14, K8NJQ 14, K8DXZ 12, K8CMR 9, WD8OYK 8, WD9HDZ 7, WB8SRC 6, N8AJU 5, N8CGM 5, WD8CSP 4, WD8EKI 3, W8RG 3, K8CKY 2, W8OQL 2. (May) W8PMJ 497, K8BXT 10, KV8Q 5.

HUDSON DIVISION

EASTERN NEW YORK: SM, Paul S. Vydareny, WB2VUK — SEC: AK2E. STM: WB2MCO. ACC & TC: N2BFG. BM: WB2EAG. SGL: KB2HD. NET REPORTS: AESN QNI 54, QTC 6; ATEN QNI 15, QTC 3; Schenectady Co. Net QNI 48, QTC 5; NYPON QNI 577, QTC 288; NYS/M QNI 355, QTC 190; NYS/E QNI 428, QTC 224; NYS/L QNI 401, QTC 317; SDN QNI 425, QTC 143; ESS QNI 381, QTC 49. CLUB NEWS: PEARL reports new officers: N2CPX, pres.; N2EGS, v.p.; N2EPT, secy.; N2CSX, treas.; K2AV WA2MPQ WB2HOL, dir. Also reports upgrades KA2UCN/UCS/UCT/UCU to Tech, KA2RHJ to Adv, and KC2TF to Extra. No other club news received. The following groups sent Field Day reports: Poughkeepsie ARA, Greenfield, Magillas Gorillas, Rip Van Winkle ARS, Orange Co. ARC, Adirondack ARC, Albany Co. RACES, WECA, SARA, Crystal RC, CCNR, AARA, Overlook Mt. ARC and Ulster RACES. Hope all enjoyed the summer. The Simulated Emergency Test is in October. Contact your local EC for details. Next month's column will include current net roster, times, days and frequencies. PSHR: WB2MCO WA2JBO KC2TF K2ZVI KC2ZO WB2VUK W2BIW WB2KCR W2PKY K2ZM AK2E KA2MYJ KA2OPG N2EQM KA2TOC. Traffic: KC2TF 280, WB2MCO 276, K2ZM 210, KC2ZO 168, W2PKY 153, WB2VUK 152, K2ZVI 148, WA2JWL 128, W2BIW 84, WA2JBO 71, WB2KCR 51, KA2MYJ 44, N2EQM 32, WA2CJY 30, AA2Y 27, N2AWI 26, AK2E 24, KA2OPG 22, WA8MAZ 20, N2BFG 16, K2HNW 14, KA2TOC 10, WB2SON 8.

NEW YORK CITY-LONG ISLAND: John H. Smale, K2IZ — SEC: WA2SUB. ACC: WB2IAP. OO/RFI: NB2T. TC: W2JUP. PIO: W2IYX.

NLI CW*	3630	1900/2000	N2AKZ
NCVHF	6.145/745	1930 M-F	K2MT
SCVHF	4.77/5.37	2030 M-F	W2GZD
BAVHF	6.07/67	2000 M-F	WB2BNA
ESS	3590	1800	W2WSS
NYS/M	3677	1000	WB2EAG
NYS	3677	1900/2000	WB2EAG

*Denotes section net; all times are local; please try and help out by checking in whenever possible. WB2FXN reports that the old RCA site at Rocky Point has been named "The General David A. Sarnoff Pine Barrens Multiple Use Area." The rhombic antennas are now listed in the N.Y. State listing of historical landmarks, meaning that they won't be taken down as was the case in Riverhead. More info will be printed as it becomes available. Congrats to KA2INN who graduated from H.S. He will attend SUNY Stoney Brook in the fall. WB2ALS is now on the air on the low bands with a vert. and a Swan. If you notice there is no listing for the NYC LI Phone net, owing to a drop off of stations, KS2G has put the net to rest for a while, not dropped forever. Mel will retain all files and when the time is right he will start it again. Contact him for further details. Big Apple Net held its 5th anniv meeting. It was decided that WB2BNA will manage the net until 6/11/85, with N2BQD KC2YZ and KB3BQE/3 as assistants. The following members of Grumman ARC have taken advantage of the "incentive" early retirement program and are calling it quits: KA2JFK WA2TJO WB2NNW WA2TFW N2CPE N2BFY N2CFF (ex-WA2FWV). Suffolk Co. Executive Cohalan proclaimed the week of June 18-24 as Amateur Radio Week. WA2UWF and her OM are providing some used computer equipment for use of the children at the Shrine Burn Inst. in Boston. They are looking for software on cassette for the Atari 800 and video game carts ridges for the Atari 260, if you can help please call De at 516-732-1031. Tu-Boro ARC provided communications for a Mini-Marathon for the Bayside Ambulance Corps and the 111th Police Precinct, stations involved were: NB2Z NB2T N2RB W2YOO W2YSM KZ2W N2CKK WA2MXB. Traffic: N2AKZ 297, K2YQK 145, WB2BNA 79, W2GKZ 40, W2DBQ 36, NB2T 20, KS2G 6.

NORTHERN NEW JERSEY: SM, Robert Neukomm, KB2WI — SEC: WB2VUF. STM: W2XD. BM: N2BOP. ROC: W2CC. SGL: W2KB. PIO: WB2NQV. TC: AD7I. ACCs: KK2U KY2S. NMs: W2CC KB2HM WB2RMJ WB2ANK WB2IQJ KY2D N2XJ W2PSU.

Net	Freq.	Time	Sess.	QNI	QSP
NJM	3695	1000 Dy	30	142	27
NJPN	3950	1800 Dy	34	352	98
		0900 Sn			
NJSN	3735	1830 Dy	30	174	45
NJN/E	3695	1900 Dy	30	246	161
NJN/L	3695	2200 Dy	30	201	120
TCETN	147.255	1930 Dy	25	99	29
OBTTN	147.12	2000 Dy	—	—	—
NJVN	49/49	2230 Dy	30	279	125
NJRTTY	147.51	Autostart			

BARA held its first session for FCC examinations in June at Bergen Community College. Approximately 50% passed. Anyone interested in becoming involved in a "Computer User" group please contact Mike Dolton, K2ZIH. Anyone with a computer having a 6509 CPU like the Commodore series or the Radio Shack Color Computer is welcome to join us. Don't forget Ramapo Mountain ARC Flea Market, Aug. 18th at the American Legion Hall, 65 Oak St., Oakland. The June newsletter from the Tri-County RA listed its editor WA2WDJ is in the Rahway Hospital after a heart attack. At this writing he is recovering and the shortened version of the newsletter was written by none other than our Hudson Division Director W2IHA. TCRA will be 50 years old on October 4 and a big celebration is planned. OO reports from KJ2O and WA2QZD were received. It's time for a lot of us to give serious thought to becoming a part of the team of new "OOs" who will have much more duty at monitoring as the FCC turns over a "lion's share" of monitoring to us amateurs. Anyone interested in becoming an OO in NNJ please contact SM NNJ Bob Neukomm, KB2WI, 891-3064. K6GHG of Elizabeth has joined Union Co. Emergency Management group. YN4RCD, a Christian Brother in Bluefields, Nicaragua, was houseguest at W2NKD. Attention all clubs in Northern New Jersey: We are in need of additional Volunteer Examiners, and ask for those holding Advanced and Amateur Extra class licenses to apply to the League to become Volunteer Examiners. Traffic: KB2HM 514, W2VY 262, N2XJ 221, W2UH 71, K2VX 71, W2XD 61, WB2ANK 58, WB2GHN 35, W2ZEP 34, W2CC 23, W2NKD 18, KD2BE 16, KA2SPH 16, KA2OIW 13, KY2P 9.

MIDWEST DIVISION

IOWA: SM, Bob McCaffrey, K0CY — SEC: WA4VWV. STM: KA0X, SGL: AK0Q. ACC: WB0QAM. PIO: KB0ZP. TC: K0DAS. BM: K0IIR. Congrats to all that participated in The RAGBRAI Message Relay. There was a record number of messages and it was a great public relations effort. The June rains and severe weather have kept the ARES SKYWARN very active. "A job well done" received from Department Public Safety and the National Weather Service, nice going!! There is still time to send in abstracts for the Section Technical Seminar, if you wish to speak or submit a paper. The seminar will be held Sept. 22 in Des Moines. Contact W0RPK or K0DAS for further information. METSCAT exercise being tried by CITS on 50.5 MHz, listen. W0JPJ honored in Waterloo for his longtime AR service. Good turnout for 75-Mtr Picnic at Hampton. Mark your calendars for CR Hamfest Oct. 7 and for the state convention (Sioux City) Oct. 12-13. Watch for details; we'll see you there. If you are an NCS, get your reports to the NM on time, so I will get my reports on time!

Net	Freq.	Time	Day	QNI	QTC	Sess.
75-Mtr Phone	3970	1730/2300	M-S	1773	155	52
TLCN	3560	2330/0300	Dy	374	161	60
ICN	3713	7 P.M.	M-S	117	57	17

Traffic: K0GP 151, W0SS 136, W0YLS 98, W4JL 88, WD0FWB 71, AE0R/KA0X 63, K0CY 45, KQ0I 51, WB0AVW 43, KA0ADF 37, WB0JFF 32, W0HTP 29, KA0GOA 24, NC0R 21, KA0QAH 21, K0BRE 17, WD0GVY 15, KA0JQG 14, W0BW 13, NE0P 11, KD0BG 10, KC0SC 8, KC0XL 4, WB0BHF 4, WD0FOY 2.

KANSAS: SM, Robert M. Summers, K0BXF — SEC: W0KI. STM: W0OYH. SGL: N0BLD. PIO: KD0JM. BM: K0JDD. ACC: K0BXF. We all are sorry to have lost K0EZ to our next door neighbor, Colo. But for sure, our loss is their GAIN. Replacing Lanny as DEC for the SE AREA of KS ARES is W0EB. Jim will very likely accept the TC position in the next month or so. Still looking for an OO/RFI Coordinator. Where is all the interest in the Public Service Honor Roll? Only two stations reported. Net activity (net name (abbrev.) QNI/QTC): KS sideband Net (KSBN) 837/116; KS phone net (KPN) 368/17; KS Weather Net (KWN) 672/491; KS Morning Weather Net (KMWN) 616/548; Central States Tfc Net (CSTN) 1015/120; KS CW Net (QKS) 231/112; KS Slow Speed Net (QKS-SS) 33/8. Was sorry to hear that WB0ZHH is in the hospital just before writing this column. I know he knows we all wish him well. W0OYH N0BLD WB0YLP and K0BXF recently attended a meeting in Jefferson City, MO. The subject was a true and mighty disaster, EARTHQUAKE, more specifically the New Madrid Fault. A video tape of the entire program was made, and should be available for viewing by the time of this publication. If your club would be interested contact KD0JM for more details. In the meantime, if one night you fall out of bed due to an earth tremor, our sister state of Missouri will no doubt really be in need of your and my services, providing emergency communications. Keep in touch with your EC. Traffic: W0FIR 247, W0FRC 171, AC0E 147, WA0LBB 128, WB0ZEN 101, KS0U 98, W0HI 95, W0FDJ 93, W0KL 88, W0OYH 55, K0BXF 36, W0QMT 16, K0GSC 14, W0MYM 12, W0CHJ 6, W0RBO 6.

MISSOURI: SM, Ben Smith, K0PCK — Missouri Governor Christopher Bond proclaimed June 23 to June 30 as "Amateur Radio Week" in Missouri. Amateurs attending the proclamation ceremonies at the Governor's office were: ACC/PIO KT5Y, SGL KA6CSJ, OO/RFI WB0RHK, SM K0PCK, SEC WB0KUW & ND0N. This is the second year the Governor has proclaimed "Amateur Radio Week" in Missouri. An honor Missouri amateurs should be proud of. The amateurs of Rolla received recognition with the Mayor of that city proclaiming "Amateur Radio Week" from June 17 to June 23. Congrats to the St. Peters ARC on becoming the newest ARRL Affiliated Club in the state. The Jefferson Barracks ARC has set March 8 as the date for their Amateur Auction. The amateurs of Audrain Co. now have an ARES net every Thursday evening at 2100 local time on 147.21. N0EHU is net manager. It was great to receive so many Field Day reports this year, a sign of a very active FD weekend in Missouri. Approximately eighty amateurs attended the Communications and Warning Workshop, sponsored by the State Emergency Management Agency, June 26 to 28 in Kansas City. SEC WB0KUW and KI0L represented Amateur Radio on the program for the meeting.

Net	Sess.	QNI	QTC	Mgr
MON	60	359	183	K0SI
MOSSB	29	559	154	KT5Y
HBN	21	314	31	K0DSQ
MTTN	26	114	30	KA0PGN
MEOW	30	333	29	K0DSQ
PHD	5	83	11	WA0KUH
RRARN	28	374	7	KA0BKR
ACAN	4	48	3	N0EHU
CMEN	6	120	2	K0PCK
CRARES	6	55	2	WB0LRF
SARN	4	45	0	W0ENW
CAL	3	24	0	KS0B
LOZFM	5	134	0	W0HTL
LARN	4	34	0	WB0RHC
ZAEN	1	24	0	K9OCU
IFN	3	18	0	W0KNF
JCC	4	42	0	KC0SF
PTN	12	39	5	WB0POQ
LOZCW	4	21	1	W0HTL

Traffic: K0PCK 227, KT5Y 225, K0SI 172, W0BMA 126, N0EVC 84, AI0O 84, W0OUD 52, K2ONP 48, K0ORB 43, ND0N 39, K0DSQ 33, WB0HOP 24, W0NUB 20, KY0U 20, WA0YJX 16, WA0HDQ 8.

NEBRASKA: SM, Reynolds Davis, KØGND — It is July 15 and this will be my last report as your Section Manager. Vern Wirka, WBØGQM, will fill the remainder of my term. Send your reports to Vern at RR 81, Capehart Rd., Papillion 68133. One new appointment this month: NFØN as an OBS. Thank you all for the wonderful support of the ARRL during the past 18 months. The Nebraska section has come a long way with several new nets, increased traffic totals, and several new ARRL affiliated clubs! And more folks working for the section. This month's traffic total of 815 is a new record with 28 participants. Special thanks to KAØBCB NØAIH WAØWRI KØNG WDØEMR KØGNW WBØRJJ & KCØXT who filled the key appointments. My call in Belgium will be ON8TX, and KØSCM will be QSL Mgr. We'll be looking for lots of Nebraska contacts. 73 es tnx. Traffic: KØDKM 237, WØKK 138, WBØTED 104, WDØEGK 68, KAØBCB 50, WDØBQG 38, KØGND 28, KØIXY 26, WAØPCC 26, WBØGWR 24, WAØDXY 14, KAØBOC 12, KAØBWM 10, WAØBOK 9, WBØGMQ 8, KCØDA 6, KAØELI 6, KAØIOM 5, WØRAM 4, KØUDW 4, WDØBOX 3, WØNIK 3, KDØAN 2, KØFRU 2, WØWZR 2, KAØJLH 2, KØRRL 2, KØTUH 2.

NEW ENGLAND DIVISION

CONNECTICUT: SM, Pete Kemp, KA1KD — SEC: K1WGO. STM: K1EIC. OO/RFI: KA1ML. ACC: N1AZF. SGL: K1AH. PIO: WB8TDA. BM: K3ZJJ. TC: W1HAD.

Net	Freq.	Time/Local	QTC	QNI	NM
CN	3640	1900/2000	211	290	K1EIR
CPN	3965	1800 Dy/1000 Sn	94	315	KA1BHT
NVTN	28/88	2130	29	252	WA1EMI
WCN	78/18	2030	76	432	WB1GXZ
RTN	13/73	2100	58	309	KA1JAN

Effective Oct. 1st, Connecticut's new Section Manager will be Bob Koczur, K1WGO. Bob's new address is Whetstone Rd., Harwinton 06791, tel. 485-0338. He has served faithfully as SEC for the last 3 years and I wish him well. I will continue my active association with the ARRL as an Assistant Director, New England Division, working with W1HHR on special projects. Please remember to send all September section reports directly to K1WGO. I will be looking forward to seeing all of you at the New England Division Convention in Boxoboro, MA, Sept. 29/30. The 147.12 machine has a new ID; look for K1LOM. The Nutmeg VHF Traffic Net will be using the 04/64 machine as an alternative frequency. Congrats to KA1KPT, recipient of the American Legion School Award, and to KA1ML upon receiving a plaque from his students at the Jefferson Middle School in Meriden for all of his work as an ELMER, developing the youth in our hobby. Please advise your SM if your club or group will be sponsoring Amateur Radio license examinations. Now that the amateur community has the opportunity to participate in the testing process, thus facilitating the advancement of many, it should be remembered that we have a responsibility to insure the integrity of the exams and to provide an adequate number of testing sessions. A heartfelt thanks to all those Volunteer Examiners who have volunteered their services to our hobby. OBS-KA1XG 10, K1VKO 8, WA1HFE 7, W1GDZ 6, W1LUH 5, KA1XZ 6. Traffic: WB1GXZ 286, W1EFW 229, KA1JAN 174, KA1BHT 148, W1NJM 92, KA1EGE 71, WA1HFE 70, KA1GWE 46, K1EIC 38, WB9IHH 29, W1BDN 23, K1AQE 22, KA1JJX 18, KA1KD 18, K3ZJJ 13, W1QV 12, WB1EFJ 10, W1CUH 6.

EASTERN MASSACHUSETTS: SM, Rick Beebe, K1PAD — STM: KA1GBS. SEC: W1IAY. ASM: K9HI. ACC: K1AZE. OO/RFI & BM: WA4STO: TC: KA1IU. PIO: WA1IDA. SG: K1BCN.

Net	Mgr	Freq	Time(loc)/Dy	QNI	QTC
EMRI	WA1LPM	3.658	1900/2200/Dy	411	350
EMRIPN	N1BGW	3.959	1730/Dy	269	215
EM2MN	KA1AMR	23/63	2000/Dy	454	157
NEEPN	K1BZD	3.945	0830/Sn	63	22
HHTN	KA1MI	04/64	2230/Dy	378	195
CI2MN	N1BYS	045/645	1930/Dy	210	52

Received Field Day messages from the following clubs: North Shore RA, Capeway RC, Wareham ARC, Acton/Boxboro ARC, Wellesley ARS, Greater Lawrence Radio Fellowship, Colonial Wireless, Norwood ARC, Algonquin ARC, Whitman ARC, Middlesex ARC, Billerica ARS and a group that went by the name of Euphoric Amateurs. Thanks all for your messages including the Euphoric group who change their name every year but I know who you are anyway, Hi. SEC W1IAY is looking for a good theme for this year's Simulated Emergency Test in Oct. Please send him your thoughts. By the time you receive this the Boxboro Convention will be right around the corner and I hope to see a lot of you there. Plan to stop by the East Mass Hospitality Suite while you're there. W1VRK and his crew do a bang up job so it's a must on everybody's calendar. Be there! Our State Gov Liaison, K1BCN, helped out with the Mt. Greylock Bill which passed through the state legislature recently. He was active behind the scenes doing the right things at the right times to help it along. The bill's most vocal proponent, of course, was WB1HIH (SEC, WMASS). Greater Lawrence club is planning a Construction Project Night. KA1BD showed the Quannapowitt Club slides of old Field Day activities before this years effort. Concord Civil Defense head gave a talk to the Colonial Wireless Club. Sturdy Memorial Club members helped with a road race in Attleboro. Acton/Boxboro club members did the same thing in Maynard. MMRA Public Service Committee is planning to provide communications for the Bay State Games. Massasoit members N1CGK and W1BY both out of the hospital. There may be a new packet repeater in Vermont to help fill out half of Eastnet. Middlesex Club is planning to move their repeater 96/36 in the near future. Twelve members of the Falmouth ARES were activated recently when a large power outage disrupted the town of Falmouth. SEC W1IAY says earlier drills made a big difference. Traffic: KA1GBS 1028, KA1EXJ 300, KN1K 298, N1BGW 242, KA1EPO 225, N1AJJ 154, WA1TBY 124, N1ER 117, N1BHH 111, K1CB 100, W1CE 94, KA1AMR 90, K1ABO 76, K1GRP 73, WA1DXT 60, K1ZYW 58, WA1LPM 54, K1GN 37, K1BZD 33, WA1SNH 33, WA1FNM 24, W1QLL 20, N1CKN 15, KI1I 15, W1ZHC 13, WA1FCD 10, K1OGF 8, W1MJ 4, KA1EID 2. (May) KN1K 438, KI1I 7. (Apr.) KN1K 376, (Mar.) KN1K 391.

MAINE: SM, Cliff Laverty, W1RWG — SEC: KL7IJG. STM: AK1W. PIO: KA1TJ. TC: KQ1L. OO/RFI: W1KX. BM: W1JTH. ACC: KB1JF. SGL: K1NIT. CMEN provided comms Experimental Aircraft Airshow & Flyin Waterville: N1AII, N1BLZ, W1BFA (ret FAA flight controller handled ham & UNICOMM functions) N1CMZ N1CVZ KA1DLZ KA1GXK KA1HMB WA1ZJP K1NIT W1QAE and W1WCI (NCS). Sandy River ARC comms Bike Race (Farmgtn) KA1TJ KA1GPQ KA1JGF WA1JCN W1KX KA1KXP KA1TE KB1JF. Following clubs held FD checked in w/SM: Mid Coast, Sandy River, Portland AWA, Blackstrap ASSC, Merrymeeting, Ellsworth, Aroostook ARA, Pine State, and an independent group Mountaineers & Clamflatters. Windsor Hamfest (ARRL) Sept. 8, Maine QSO Party Sept. 21-Sept. 23 (entry forms PAWA, Box 1605 Ptld 04104). YL Fall Luncheon (Presque Isle) Sept. 22 N1BCF added to OO group. PIAs now include N1CFL N1CIQ N1BTE N1CST. Maine cabinet meets 1st Sun each month on 3990 kHz 9:30 A.M. Augusta EARU reports 29 of 57 members hold Extra or Advanced. PSHR: WB1GLH N1BJW AK1W W1RWG KL7IJG WA1YNZ WB1CBP.

Net	Sess.	Checkins	Traffic	Mgr.
Sea Gull	26	934	192	K1GUP
Pine Tree	55	429	170	AC1G/WA1YNZ
Me Pub Svc	4	52	6	KL7IJG
Aroostook	4	58	2	WA1YNZ

Traffic: W1KX 162, AK1W 154, W1ISO 114, W1RWG 113, N1BLZ 79, WB1BYR 74, WB1GLH 70, N1BJW 69, KL7IJG 50, W1BMX 44, KA1KFC 40, KA1JOJ 37, WA1YNZ 35, WB1BCP 34, W1JTH 17, N1BME 15, W1EZR 12, KA1FTL 8, K1NIT 3, KA1ENM 3. (May) W1EZR 12.

NEW HAMPSHIRE: SM, Robert C. Mitchell, W1NH — STM: W1TN. SEC: Open. NMs: N1NH KI1M KK1E. EC reports from W1FYR & N1ACB. At Deerfield the Nashua club raised $555 for the Shriner's Burn Center. KA1IDF now General. K1NZJ is NCS on Carroll Co. Emergency Net. K1UWB featured in *Networks* traffic bulletin. W1NH worked KA1LBM & KA1GOZ on FD in Novice band. Watch for November date for Director Sullivan's meeting in the Nashua area. Notice: As of Jan. 1, FCC amateur exams at field offices will be no more. Get to Boston in '84! N7BYL visiting Nashua. WA1PEL & W1YFZ now asst. ECs. W1BJF back on air. Reports are sparce. Everyone must be busy enjoying the summer. Traffic: K1PQV 65, K1UWB 55.

RHODE ISLAND: SM, Gordon F. Fox, W1YNE — Acting SEC: KB1G. STM: W1EOF. TC: AB1D. NM: WA1OSL. ACC: N1BEE. SGL: K1DA. KA1IEK is now N1DED. KA1KML has been appointed Net Manager of the New England Novice Net (NENN). WA1OSL reports RIEM2MTN sess. 21, QNI 172, QTC 35. K1DS reports that K1PAM K1CH KM1X K1JI and WA3EEC worked over 350 stations in the VHF-UHF contest. They were active from 6 meters to 10 GHz. Traffic: W1EOF 617, KA1KML 555, WA1CSO 37, K1AOS 35, N1DED 33.

VERMONT: SM, Ralph Stetson, KD1R — STM: AE1T. SEC: W1CTM. PIO: WA1YOY. SGL: W1KRV. A very special thanks to WB1ABQ for all his help during this transition. Hope to be able to get more help in the future as promised, HI HI. Once again, Reed, thanks for a job well done. A hearty congrats to the Green Mt. Wireless Assn., Central VT ARC and Burlington ARC for work done during floods of May 31. Then a week later both CVARC & BARC were called out for the flooding in Central VT on June 7. Then if all that wasn't enough, BARC was called out to assist RED CROSS relief operations with the AMTRAK derailment in Williston on July 7. Your correspondent was involved as an EMT with MILTON RESCUE Squad at the derailment site. Hope to see you all at Boxbourgh, MA Sept. 29-30. VTN (NTS) 30/101/57; VSBN 30/440/125; VFMTN 30/398/51; GMN 26/331/28; VPN 4/60/5; CVFMN 4/30/2; CVFMN (May) 4/35/1; CARRIOR 26/642/32; RFD 4/76/20. Traffic: N1ARI 101, W1KRV 59, AE1T 50, N1COB 48, KD1R 34, KT1Q 12.

WESTERN MASSACHUSETTS: SM, Don Haney, KA1T — PIO: WB1CJH. SEC: WB1HIH. STM: W1UD. TC: KA1JJM. OO/RFI: N1CM. Welcome back from your summer vacations. WA1MJE spent 3 weeks in W6-land. Congrats to WB1HIH and NoBARC for successful campaign to get long-term lease for Mt. Greylock antenna site. Central Mass ARA has been busy with Webster parade, Charlie's Road Race, YMCA Triathalon, and Worcester bicycle race. Active FD groups who sent messages to SEC/SM were K1FFK W1GZ KF1R AC1T and W1XH. W1PUO finally back on 40 meters and doing substitute TCC skeds. W1ZPB getting ready to be rare DX with purchase of house in Newfoundland for retirement someday. Hope to see many of you at Boxboro. PSHR: WB1HIH W1KK W1PUO KA1T KA1EKQ. Traffic: W1PUO 227, W1UD 124, W1SJV 88, KA1T 88, W1KK 63, WB1HIH 47, WA1OPN 36, K1JHC 34, KA1EKQ 29, W1XH 24, K1IJV 23, W1ZPB 7, WA1MJE 2, WB1HKN 2.

NORTHWESTERN DIVISION

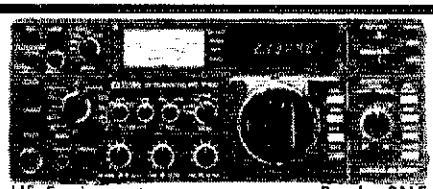
ALASKA: SM, David W. Stevens, KL7EB — STM: KL7T. SEC: KL7QS. PIO: NL7CP. OO/RFI: AL7FL. KL7JKW is the new Net Manager for the Snipers Net. Certificates are being given out for 25 checkins in a calendar month. All are encouraged to check in and handle traffic. July 14-15 was the Motely Group Net picnic, and all had a good time. I was informed that several applicants for ARRL Northwestern Director would be at the Anchorage ARC Flea Market Sept. 15-16. See you there. *Snipers Net* 557. Traffic: AL7FJ 54, NL7BE 8.

IDAHO: SM, Lem Allen, Jr., W7JMH — CLUB NEWS: Rick, K1CE, from ARRL Hq., is scheduled to visit many Idaho clubs in July, bringing with him the latest ARRL news. Boise club had a picnic at K7SD residence. About 50 hams and family members attended. PEOPLE AND THINGS: W7IWU is back from a trip to Wis. K7CXG is back from Hawaii, and W7IGK returned from Ariz. WA7YSO is now a member of the Old Old Timers Club, and says he is learning to enjoy CW again. FIELD DAY: Eagle Bluff RC from Idaho Falls participated with 16 ops. The Idaho Contest Conspiracy Group participated with 5 ops from Lower Deer Point. Idaho SEC's group with 5 ops were near Idaho City. Navy MARS group with 6 ops were at Pilot Peak. If you had sent the SM a radiogram you would have been listed here. ARRL MATTERS: W7QGP W7JMH W7GHT KD7HZ K7TWZ N7BI KA7FAH & W7GNU attended the Coeur d'Alene hamfest. A section meeting was held. New EC appts. went to N7BI for Bonner Co., W7GNU for Kootenai Co., N7DYS for Camas Co. New asst. ECs are WA7HDL in Lemhi Co., K7MLY in Canyon Co., WA7VPW in Ada Co. New ORS is KA7KAI. Congrats to all!

Net	Freq.	Time	Sess.	QNI	QTC
FARM	3935	8 P.M. Dy	30	1926	43
CD	3990	8:10 A.M. M-F	21	760	19
IMN	3635	9 P.M. M-F	20	205	1
SW Idaho 2-M Emerg.	146.34/94	8:30 P.M. Sn	4	187	1

Traffic: W7GHT 177, W7JMH 47, K7TM 25.

MONTANA: SM, Les Belyea, N7AIK — WA7GVT & KA7AGV from Glendive and WA7GQF from Helena took part in what is probably the longest public service event in the history of this hobby, 16,000 kilometers in length, the OLYMPIC TORCH RUN. They report the torch was moving 18 to 20 hours a day. Also they will attempt to visit clubs throughout Montana to speak and show slides on this subject. Please contact them. The Volunteer Examiner program got off to a good start with sessions held in Kalispell, Missoula, Great Falls and Bozeman, thanks to W7JWJ and crew. WA1JXN received his 2-way QSL card from W5LFL via K6DUE. A few members from the Great Falls Area ARC helped with the Oppidan's and the Red Cross "Adult Beach Party." No details available at this time. KB7Q took his EME gear to Wyoming and worked



HF Equipment — Regular — SALE

IC-740* 9-band 200w PEP xcvr w/mic — $1099.00 — 899.95

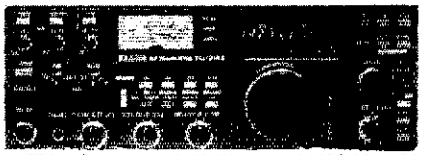
***FREE PS-740 Internal Power Supply & $50 Factory Rebate - until gone!**

PS-740 Internal power supply	159.00	149.95
*EX-241 Marker unit	20.00	
*EX-242 FM unit	39.00	
*EX-243 Electronic keyer unit	50.00	
*FL-45 500 Hz CW filter (1st IF)	59.50	
*FL-54 270 Hz CW filter (1st IF)	47.50	
*FL-52A 500 Hz CW filter (2nd IF)	96.50	89.95
*FL-53A 250 Hz CW filter (2nd IF)	96.50	89.95
*FL-44A SSB filter (2nd IF)	159.00	144.95
SM-5 8-pin electret desk microphone	39.00	
HM-10 Scanning mobile microphone	39.50	
MB-12 Mobile mount	19.50	

**Options also for IC-745 listed below*

IC-730 8-band 200w PEP xcvr w/mic	$829.00	599.95
FL-30 SSB filter (passband tuning)	59.50	
FL-44A SSB filter (2nd IF)	159.00	144.95
FL-45 500 Hz CW filter	59.50	
EX-195 Marker unit	39.00	
EX-202 LDA interface; 730/2KL/AH-1	27.50	
EX-203 150 Hz CW audio filter	39.00	
EX-205 Transverter switching unit	29.00	
SM-5 8-pin electret desk microphone	39.00	
HM-10 Scanning mobile microphone	39.50	
MB-5 Mobile mount	19.50	
IC-720A 9-band xcvr/.1-30 MHz rcvr	$1349.00	899.95
FL-32 500 Hz CW filter	59.50	
FL-34 5.2 kHz AM filter	49.50	
SM-5 8-pin electret desk microphone	39.00	
MB-5 Mobile mount	19.50	
IC-745 9-band xcvr w/.1-30 Mhz rcvr	$999.00	769.95
PS-35 Internal power supply	160.00	144.95
CFJ-455K5 2.8 kHz wide SSB filter	4.00	
HM-12 Hand microphone	39.50	
SM-6 Desk microphone	39.00	

**See IC-740 list above for other options (*)*



IC-751 9-band xcvr/.1-30 MHz rcvr	$1399.00	1199
PS-35 Internal power supply	160.00	144.95
FL-32 500 Hz CW filter (1st IF)	59.50	
FL-63 250 Hz CW filter (1st IF)	48.50	
FL-52A 500 Hz CW filter (2nd IF)	96.50	89.95
FL-53A 250 Hz CW filter (2nd IF)	96.50	89.95
FL-33 AM filter	31.50	
FL-70 2.8 Khz wide SSB filter	46.50	
HM-12 Hand microphone	39.50	
SM-6 Desk microphone	39.00	
CR-64 High stability reference xtal	56.00	
RC-10 External frequency controller	35.00	
MB-18 Mobile mount	19.50	

Options: 720/730/740/745/751 — Regular — SALE

PS-15 20A external power supply	$149.00	134.95
EX-144 Adaptor for CF-1/PS-15	6.50	

ICOM

Options - continued — Regular — SALE

CF-1 Cooling fan for PS-15	45.00	
PS-20 20A switching ps w/speaker	229.00	199.95
CC-1 Adapt. cable; HF radio/PS-20	10.00	
CF-1 Cooling fan for PS-20	45.00	
EX-310 Voice synth for 751, R-71A	39.95	
SP-3 External base station speaker	49.50	
Speaker/Phone patch - specify radio	139.00	129.95
BC-10A Memory back-up	8.50	
EX-2 Relay box with marker	34.00	
AT-100 100w 8-band automatic ant tuner	349.00	314.95
AT-500 500w 9-band automatic ant tuner	449.00	399.95
MT-100 Manual antenna tuner	249.00	224.95
AH-1 5-band mobile antenna w/tuner	289.00	259.95
PS-30 Systems p/s w/cord, 6-pin plug	259.95	233.95
GC-4 World clock	99.95	94.95

HF linear amplifier — Regular — SALE

IC-2KL w/ps 160-15m solid state amp	1795.00	1299

VHF/UHF base multi-modes — Regular — SALE

IC-251A* 2m FM/SSB/CW transceiver	$749.00	549.95

***$50 Factory Rebate - until gone!**

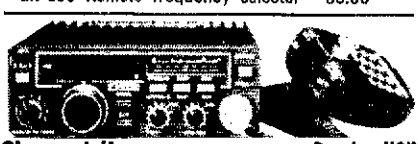
IC-551D 80 Watt 6m transceiver	$699.00	599.95
PS-20 20A switching ps w/speaker	229.00	199.95
EX-106 FM option	125.00	112.95
BC-10A Memory back-up	8.50	
SM-2 Electret desk microphone	39.00	
IC-271H 100w 2m FM/SSB/CW xcvr	899.00	799.95
IC-471H 75w 430-450 SSB/CW/FM xcvr	1099.00	Call
PS-35 Internal power supply	160.00	144.95
PS-15 20A power supply	149.00	134.95
IC-271A 25w 2m FM/SSB/CW xcvr	699.00	619.95
AG-20/EX-338 2m preamplifier	56.95	
IC-471A 25w 430-450 SSB/CW/FM xcvr	799.00	699.95
PS-25 Internal power supply	99.00	89.95
EX-310 Voice synthesizer	39.95	
HM-12 Hand microphone	39.50	
SM-6 Desk microphone	39.00	

VHF/UHF mobile multi-modes

IC-290H 25w 2m SSB/FM xcvr, TTP mic	549.00	489.95
IC-490A 10w 430-440 SSB/FM/CW xcvr	649.00	579.95

VHF/UHF/1.2 GHz FM — Regular — SALE

IC-22U 10w 2m FM non-digital xcvr	299.00	249.95
EX-199 Remote frequency selector	35.00	



Closeout item — Regular — NOW

IC-25H 45w, 2m FM w/up-dn TTP mic	389.00	299.95
BU-1H Memory back-up	38.50	†10.00

† BU-1H $10 purchased with IC-25H, otherwise $38.50

IC-27A Compact 25w 2m FM w/TTP mic	369.00	329.95
IC-27H Compact 45w 2m FM w/TTP mic	409.00	369.95
IC-37A Compact 25w 220 FM, TTP mic	449.00	399.95
IC-47A Compact 25w 440 FM, TTP mic	469.00	419.95
UT-16/EX-388 Voice synthesizer	29.95	
IC-120 1w 1.2 GHz FM transceiver	499.00	449.95

6m portable — Regular — SALE

IC-505 3/10w 6m port. SSB/CW xcvr	$449.00	399.95
BP-10 Internal Nicad battery pack	79.50	
BP-15 AC charger	12.50	
EX-248 FM unit	49.50	
LC-10 Leather case	34.95	

Hand-held Transceivers

Deluxe models	Regular	SALE
IC-02A for 2 meters	$ 319.00	289.95
IC-02AT w/DTMF	349.00	314.95
IC-04A for 440 MHz	TBA	
IC-04AT w/DTMF	379.00	339.95

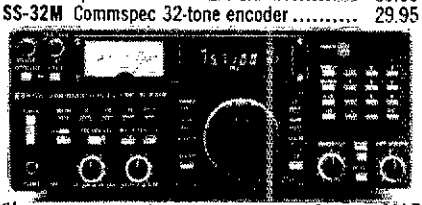
Standard models	Regular	SALE
IC-2A for 2 meters	$ 239.50	214.95
IC-2AT with TTP	269.50	219.95
IC-3A for 220 MHz	269.95	234.95
IC-3AT with TTP	299.95	239.95
IC-4A for 440 MHz	269.95	234.95
IC-4AT with TTP	299.95	239.95

Accessories for Deluxe models — Regular

BP-7 800mah/13.2V Nicad Pak - use BC-35	67.50
BP-8 800mah/8.4V Nicad Pak - use BC-35	62.50
BC-35 Drop in desk charger - all batteries	69.00
BC-16A Wall charger - BP7/BP8	10.00

Accessories for both models — Regular

BP-2 425mah/7.2V Nicad Pak - use BC35	39.50
BP-3 Extra Std. 250 mah/8.4V Nicad Pak	29.50
BP-4 Alkaline battery case	12.50
BP-5 425mah/10.8V Nicad Pak - use BC35	49.50
CP-1 Cig. lighter plug/cord - BP3 or Dlx	9.50
DC-1 DC operation pak for standard models	17.50
LC-2AT Leather case for standard models	34.95
LC-14 Soft case for Deluxe models	17.95
HM-9 Speaker microphone	34.50
HS10 Boom microphone/headset	19.50
HS-10SA Vox unit for HS-10 (dlx only)	19.50
HS-10SB PTT unit for HS-10	19.50
ML-1 2m 2.3w in/10w out amplifier	SALE 79.95
ML-25 2m 2.3w in 20w out amplifier	SALE 179.95
3A-TTN Optional IT Pad - 2A/3A/4A	39.50
SS-32M Commspec 32-tone encoder	29.95



Shortwave receivers — Regular — SALE

R-71A 100 Khz-30 Mhz digital receiver	$799.00	689.95
FL-32 500 Hz CW filter	59.50	
EX-310 Voice synthesizer	39.95	
RC-11 Wireless remote controller	59.95	
CR-64 High stability oscillator xtal	56.00	
R-70 100 Khz-30 Mhz digital receiver	749.00	599.95
EX-257 FM unit	38.00	
IC-7072 Transceive interface, 720A	112.50	
FL-44A SSB filter (2nd IF)	159.00	144.95
FL-63 250 Hz CW filter (1st IF)	48.50	
SP-3 External speaker	49.50	
CK-70 (EX-299) 12v DC option	9.95	
MB-12 Mobile mount	19.50	

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Net	Sess.	QNI	QTC	Mgr.
IMN	20	205	61	KY7I

Traffic: WB7WVD 80, KA7NMA 38, N7AIK 22.

OREGON: Sm, William R. Shrader, W7QMU — STM: W7VSE. SEc: N7CPA. PIO: KC7YN. SGL: KA7KSK. ACC: WB7WTD. RFI: AK7T. OO:N7SC. TC: N7ENI. Upgrades: KD7WA (KA7PVL) Adv.; KA7RNS KA7JOA Gen.; KA8SSF (KA7SOO) KA7SOQ Tech. W7SAA (Salem ARC) had successful endeavor on 144 MHz, 220 MHz, and 432 MHz during the ARRL VHF QSO Party. Memorial Day weekend SARC (Salem) served over 2000 cups of coffee and punch to travelers at the Satiam Rest Area on I-5. KB7CW on 70 cm with Echo 70 SSB rig. Sunset ARC operated Field Day aboard the Lightship Columbia. Umpqua Valley ARC officers are: N7AVN, pres.; W7HKE, v.p.; KA7AID, secy.; W7LNE, treas. K7SGU is Asst. Emergency Coordinator for Portlant area. WA7OEM succeeded in making DXCC and WA7IIM has gotten his 100th DX confirmation. Wes Hayward, W7ZOI, was awarded a Technical Merit Award for contributions to *QST*. WB7QIW, Hoodview ARC, won first place in multiop category for Oregon in VHF Sweepstakes. Portland ARC helped with communications in Rose Parade and Jr. Rose Parade in Portland. Many clubs reported operating in FD. OSN totals: QNI 511, QTC 424. Traffic: W7VSE 588, KN7B 285, W7ZB 180, AL7W 131, KX7W 103, K7OVK 100, KX7T 99, W7LRB 55, WA7VTD 55, KV7F 50, KA7AID 25, N7BGW 20, K7TDX 19, WB7BMY 8, W7MLM 8. (May) KI7Y 95, W7LRB 26, W7DAN 2.

WASHINGTON: SM, Joe Winter, WA7RWK — STM: K7GXZ. SEC: W6IIH. PIO/SGL: W7CKZ. ACC: K7RS. OO/RFI Coord.: KB7WC. BM: KD7G. TC: K7UU.

Net	Freq.	Time(Z)	QNI	QTC	Mgr.
WARTS	3970	0200	3018	212	W7SFT
WSN	3590	0245/0545	548	172	N7CSP
PSTS	145.33	0130/0630	162	127	W7IEU
NTN	3970	2000	966	77	W7UU
EWTN	146.04	0130/0630	170	60	WA7CBN
NWSSB	3945	0230	602	46	K7WNE

Walla Walla Hamfest Sept. 22-23 ends the '84 season. See you there. "Amateur Radio Week" is Sept. 10th thru 16th. Participate in the Washington State QSO Party, sponsored by the BEARS on Sept. 14-16. Let's do our part to uphold this popular national contest. For info. contact the BEARS, c/o K7RS. Inland Emp. VHF N7BGG heads comms. for Wheel Chair Olympics in May. WB7VSZ accepted an award for the ham's contribution to the Red Cross. A WSP speaker told the IEVHF how to properly report emergencies. KA7CSP, working with WSP, is putting the correct procedure on cards for handy use. Spokane hams provided comms for the U.S. Olympic Bicycle Team Trials for the Summer Olympics. WB7RBJ was in charge. W7WIL thanked 41 hams who helped on the Lilac Parade. IEVHF elects new officers: WB7QVH, pres.; KA7LFY, v.p.; KA7DDU, secy.; WB7OAX, treas. WB7VRK, editor of the *Repeater* newsletter and OM WB7VRJ were given an award for work above and beyond the call of duty. Congrats. Clark Co. ARC operates a fireworks stand as a fund raiser, headed up by WA7ZHT. (The Radio Club/Tac. does the same. This can be a profitable activity for your club. Ed.) K7SUQ is planning for a "SUN RUN" in July. But will there be sun? CVARS - The Hiway 508 Bike Race was a success with 10 mbrs. helping. The Criterium Bike Race was also successful but a long 10-hour day for the 17 mbrs who helped. The June No. American Teleconference Radio Net (TRN) was again well received, thanks to the BEARS and IEVHF rptrs. (Any others in the section?) Tune in on Fri. Sept. 14th at 5 P.M. PDT and hear "Mic Equalization for radio comms." SGL W7CKZ has signed, on behalf of ARRL Wash. Section, a cooperative agreement with the Wash. State Disaster Assistance Council. The council is composed of many volunteer organizations who will assist in disasters. YL News: Thirteen MINOW members were installed new officers on June 3rd at KU7F's summer home at Fish Lake near Wenatchee. They are: K7MFS, pres.; WA7TPU, v.p.; WA7FRM, secy/treas. All check-ins are welcome, Fridays at 8 A.M. on 3913 kHz. The TUOLA YLs quarterly meeting was held in Tacoma on June 23rd. Check in at 8 P.M. on 145.47. My thanks to the many clubs and individuals who send me newsletters and info. Could use more. Traffic: W7DZX 479, KD7ME 348, WB7WOW 249, K7GXZ 233, KR7L 197, W7LG 179, N7CSP 131, N7ANE 116, W7HNA 81, KR7F 73, W7GB 52, WA7BDD 46, W7IEU 41, W7APS 33, K7CTP 32, N7FXM 26, K7AJT 10, W7LUP 10, KD7G 7, W7AIB 2, KA7CSP 2.

PACIFIC DIVISION

EAST BAY: SM, Bob Vallio, W6RGG — A/SMs: W6ZF N6DHN. SEC: W6LKE. STM: NI6A. FD messages were received from WA6EUZ W6CUS & WA6YUW. Welcome to new ECs WD6FXR and N6CKO, covering Oakland and Hayward, respectively. A kickoff meeting for a Northern Alameda Co. ARES group was held at the Berkeley Red Cross. Among those in attendance were N6NE WB6DDJ N6HMI KB6BGB WA1MCO KG6HF KB6ADS KB6ADR W6JKZ N6AMV WB6AIH K6APW AI6S KB6P WA6KTL AG1E N6IG W6LKE & KE6CD. Looks like the start of a fine new group. NBARA members who provided comms for the March of Dimes Walkathon were W6GYA KD6T W6LRT KA6ISA WA6OUC KA6QPW W6CLI N6GHR W6ZZF K6UJS & WD6FVF. LARK members who recently upgraded are KB6DXQ & KB6DXR, Tech.; KB6DLN, Gen.; N6FKK N6KDS, Adv. Congrats. Their Novice class had five grads; all are awaiting their new calls. HARC members N6DOC KA6TNY & KA6SXU all upgraded to Advanced. Traffic: WB6DOB 156, W6VOM 128, K6APW 92, K6BGD 77, NI6A 61, NV6T 55, WB6UZX 36.

NEVADA: SM, L. M. Norman, W7PBV — SEC: WB5VDV/7. STM: W7BS. KD7BT presented a program on HF DXing and WA7JUO presented a program on OSCAR III to the LVRAC. W7BS and W7CX attended Pacific Division cabinet meeting in Sacramento. NNARA held their June meeting in Elko. Ely 01/61 covers McGill to Pichoe. 78/18 relocated to Squaw Peak. 66/06 is in process of being installed on Bald Mt, 70 miles north of Ely. K7ZOK KA5AIH in Texas on 2M Sporadic E. LVRAC used call K7UGE for FD. NNARA received letter of appreciation for club's participation in Elko and Winnemucca March of Dimes and walkathons. W7PBV enjoyed dinner with some of the gang at the 76 Truck Stop. WA6AAT/7 WB7WTS W7JMN KA7OHZ W7YDX & KG6JIO/7 participated in emergency exercise directed by White Pine Co. under the direction of WB5VDV. Traffic: W7BS 80, W7PBV 11.

PACIFIC: SM, James Wakefield, AH6CO — Full Field Day participation by all islands. Kauai had KH6LG, BIARC had KH6CC, Oahu had KH6IJ and KH6WO and Maui was on. With regret we report Herbert Chang, KH6FL, of Hilo as a Silent Key. KH6AFS has 12 students in ham class in Hilo. Congrats to KH6MX and KH6AKB for 50 blissful years as man and wife. KH6UU has a new IBM PC. New call sign WH6AZH now NH6BO. WB7UZT/R is moving to new Kula location and from 88/28 to 10/70. Maui Co. ARES received

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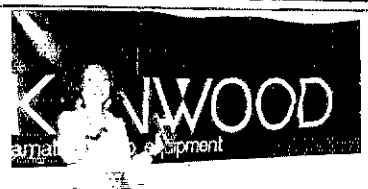

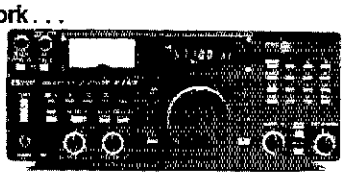

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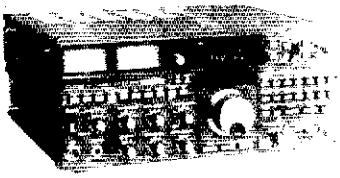

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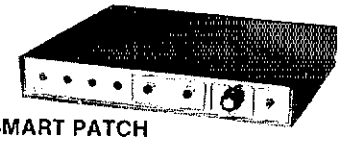

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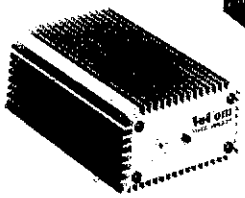

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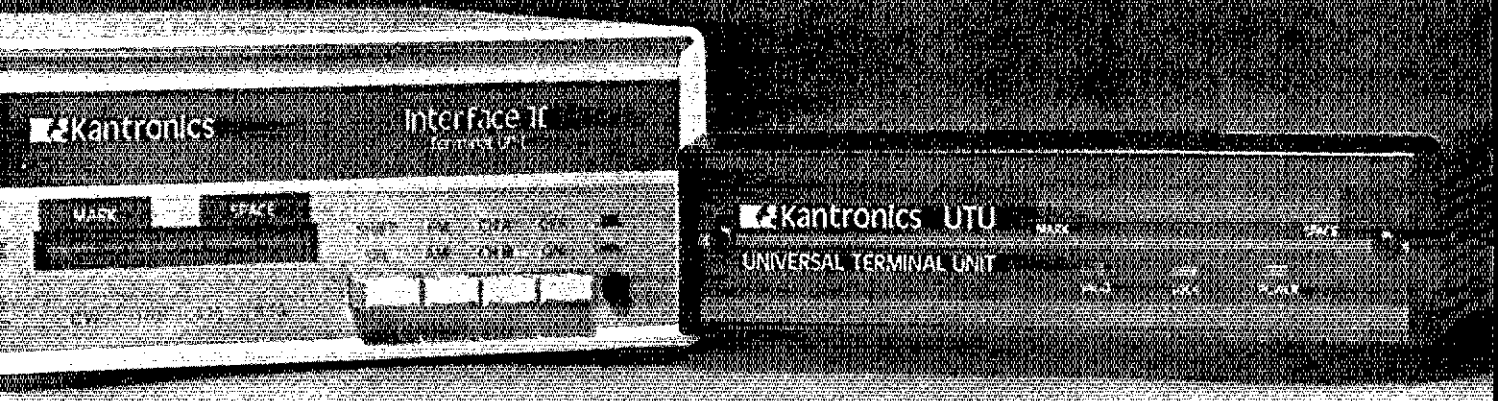

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a plaque from March of Dimes for services rendered. AH6V, wind power, hit by lightning with much damage. Look for ARRL bulletins on Hawaii afternoon net on Thursdays at 0200Z on 7.230 from KH6S. KH6HME and N6CA set new world record on 1296 MHz June 24 of 2470.3 miles. AH6EF now resides in Santa Maria in W6-land. WH6C is into Packet Radio. Let's hear from Guam. Traffic: KH6S 54, KH6RQ 51, KH6B 42, KH6H 37, KH6HIJ 8, AH6CO 4, KH6SC 4.

SACRAMENTO VALLEY: SM, Ron Menet, N6AUB — STM: KY6Q. SEC: WA6ZUD. SGL: WB6WFG. OO/RFI: WB6TNC. FIELD DAY was the big event in June. Many clubs and groups participated. Those sending formal messages to the SM included NCARC, YSARC, GEARS & TCARN. These groups were able to score an additional 100 pts for sending those messages. Traffic handlers, please send your monthly traffic reports to STM KY6Q, 3025 Forest Hill Drive, Redding. Use the 25th of the month as a cut-off date. NCARC handled comms for NC Marathon and Nugget Run/Ride. MVARC gearing up for Heart Assn. Cyclethon 9/7. Late reports: MVARC and YARS Double Century, and MVRC and PARC Bike for Sight. We are now in the midst of fire season. CDF asks that I remind you of the critical danger this year and the $5000 reward for information leading to arrest and conviction of arsonist. Arson is up 100% this year. BOLO!! Traffic: K6SRF 160, N6CVF 140, WB6CLD 50, WA6WJZ 78, WD6BZQ 24, N6AUB 27, WA6ERZ 14, KY6Q 6, WB6SRQ 6, K6CQR 2, N6RA 2, W6RHC 2, WA6ZUD 2.

SAN FRANCISCO: SM, Bob Smith, NA6T — Field Day 1984 was a big success in the SF Section with 9 clubs participating this year. K6ANP was elected pres. and N6BLN was elected secretary of Northern Cal DX Club. The Power moves north! Hope you all get a chance to work WB4OG and K84OG at Stanford U. during the Olympics. SFRC provided communications for the Limo-Shuttle service at the Democratic National Convention. The operation was great public relations for Amateur Radio; congrats on a job well done!! I enjoyed Field Day 1984 with the REDXC fried chicken, scrambled eggs, and radio. Tnx to AE6H and family. AA6DX our ex-SCM has accepted job as Gen. Manager of EEB in Virginia; good luck. Amateur tests will be given at Pacific Division Convention this year by VEs. This is a first in the Division. See you all at the convention. 73, NA6T. Traffic: W6IPL 213.

SAN JOAQUIN VALLEY: SM, Charles McConnell, W6DPD — SEC: WA6YAB. STM: N6AWH. TC: WA6EXV. KB6DXU is the youngest XYL amateur in Kingsburg and perhaps in Cal. Clubs should advise the SM, the Director, and the ARRL Hq. Club and Training Dept. of changes in officers. If you club is not affiliated, it should be considered. The advantages outweigh the disadvantages. Emergency Coordinators are needed in Mono and Mariposa Cos. W6EYO is a SILENT KEY. VS6DO visited in Fresno. KA6MQK and N6KKV are General. N6HWF is WA6U. KD6BE is WA6Z. WB6ZCJ is WB6C. KH6GBX is N6KUO. KA6ACE has another TR-7400A. KA6YNA has a FT-901DM and accessories. WA6UOR has a Santec ST-142. WB6JIT has an IC-02AT. WA6SHO has an IC-1210 repeater for 1296 MHz. W6DPD has an IC-271H. The Simulated Emergency Test (SET) is in Oct. Contact your Emergency Coordinator (EC) to offer assistance in the planning of the test. Traffic: N6AWH 153, WA6YAB 20, W6DPD 14, W6SX 9, WD6FRS 4.

SANTA CLARA VALLEY: SM, Rod Stafford, KB6ZV — STM: W6PHT. SEC: K6ITL. TC: K6HLE. ACC: W6MKN. I am looking to fill two section-level appointments, Public Information Officer and Bulletin Manager. Anyone who is interested in working on the public relations aspects of Amateur Radio should check with me on the appointment as PIO. The Bulletin Manager is responsible for copying W1AW bulletins off the air and disseminating those bulletins and news items throughout the section. If anyone has access to any of the computer bulletin boards that have W1AW bulletins, please let me know. G8PUX and G8HJD spent lots of time at the CDF headquarters handling traffic during the recent rash of brush fires in the section. N6HJJ and WB6OML are just two of the people who spent a great deal of time running the resource net on WB6ADZ/R during those fires. About 20 of the ECs and AECs from Santa Cruz, Monterey and San Benito Cos. met with SEC K6ITL and SM KB6ZV recently in a workshop session in Watsonville to see how emergency communications preparedness could be improved in those areas. I had the opportunity to work Field Day this year as a "One C" station, that is, one transmitter mobile. It was a lot of fun operating mostly 40 and 75 meters phone on the way to No. Calif. for a week of vacation. No. Cal. DX Club has a new set of officers for the coming year. They are: K6ANP, pres.; K6TMB, v.p.; WB6WKM, v.p.; N6BLN, treas. Be sure to listen in to the SCV Section Manager's Net on Tuesday evenings at 9 P.M. on 146.76 and at 9:30 on 146.925 for SCV Section news and ARRL news and information. Traffic: W6YBV 252, W6KZJ 125, W6ZRJ 18, N6IYA 4, W6PHT 3, KH6PP 2.

ROANOKE DIVISION

NORTH CAROLINA: SM, Rae Everhart, K4SWN — SEC: AB4W. STM: K4NLK. BM: K4IWW. PIO: WA4OBR. SGL: AB4W. ACC: K4SWN.

Net	Freq.	Time	NM
NCMN	3927	7:45 A.M.	WB4WII
NCEN	3923	6:30 P.M.	K4NLK
CN	3573	7 & 10 P.M.	K4WJR
CSN	3715/7115	6 P.M.	W0IKT
CNCTN	146.22/82	9:30 P.M.	WA4MNR
PCTN	146.28/88	9 P.M.	NE4J
RARS	146.04/64	8 P.M.	K4ABJ

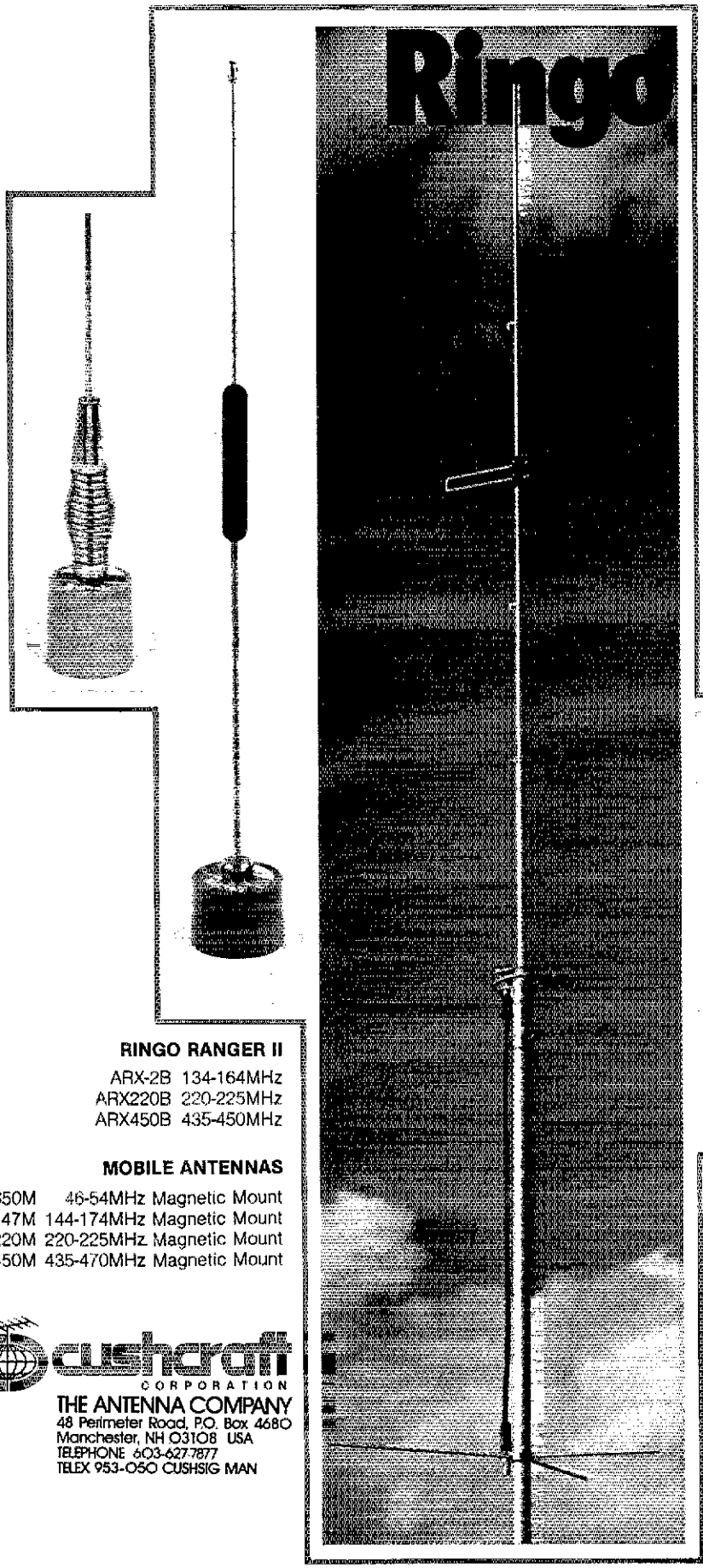
Three-month (April-June) cumulative traffic reports

Net	QNI	Tfc	QTR Sess.	
NCMN	1336	391	2223	91
NCEN	1874	641	2599	91
CN	1387	753	4299	177
CSN	810	173	2726	91
CNCTN	2895	345	1898	91
PCTN	1727	307	1148	91
RARS	665	81	1222	89

Non-NTS Nets:

THEN	30 sess.	and	traffic 46	WD4LRG
PETN	30 sess.	and	traffic 46	WD4CEB
CFARS	30 sess.	and	traffic 19	KE4HW
M2MEN	30 sess.	and	traffic 52	KD4JC

Silent Keys: W4OMW, KA4MMD. Congrats to new NM of CN W0IKT, and for NJ4L thanks for a job well done. The CSN needs more check ins. All club encourage Novices/Technicians to do so. They are our future traffic handlers. Would like to encourage all clubs to get Novice classes ready for fall. The VEC program will be in place so ample exams will be available as never before. If your club needs a VE team, write me for application. The ball is now in our park so lets make the VEC program work.



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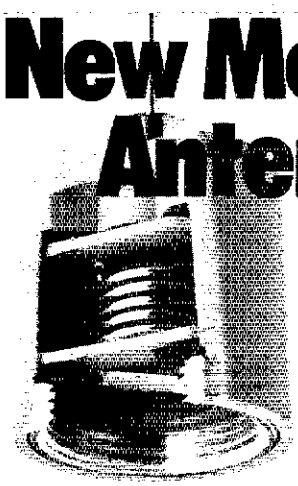

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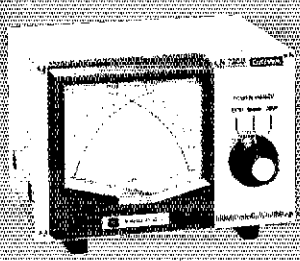

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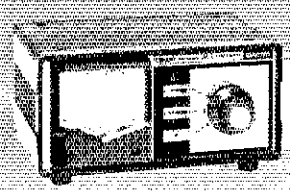
(Reflected, 4/40/400 W)
Dimension: 180×120×130 mm;
7×4.75×5 in.

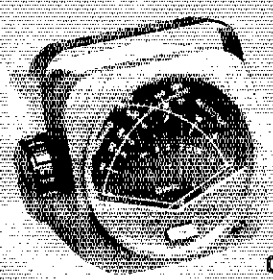
CN-620B

Frequency Range: 1.8-150 MHz
SWR Detection Sensitivity: 4 W min.
Power: 3 Ranges (Forward, 20/200/2000 W)
(Reflected, 4/40/400 W)
Dimensions: 180×85×120 mm;
7.12×3.37×4.75 in.

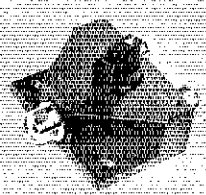


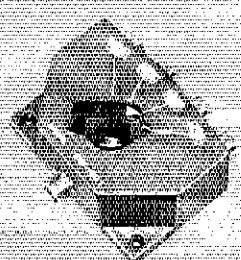
CN-630

Frequency Range: 140-450 MHz
SWR Detection Sensitivity: 4 W min.
Power: 2 Ranges (Forward, 20/200 W)
(Reflected, 4/40 W)
Dimensions: 180×85×120 mm,
7.12×3.37×4.75 in.



	CN-410M	CN-460M	CN-465M
Frequency Range:	3.5-150MHz	140-450 MHz	140-450 MHz
SWR Detection Sensitivity:	3 W min.	3 W min.	3 W min.
Power Range: Forward	15 W/150 W	15 W/150 W	15 W/75 W
Reflected	5 W/50 W	5 W/50 W	5 W/25 W
Dimensions:	71×78×100 mm, 2.8×3.1×3.9 in. all Models Back Lit		



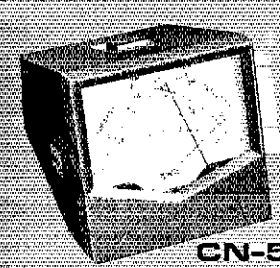


COAXIAL SWITCHES

	CS-201	CS-201G	CS-401
	2position	2position	4position
Frequency:	600 MHz	1.3 GHz	600 MHz
Connectors:	SO-239	N type	SO-239
VSWR:	Below 1:1.2		
Insertion Loss:	Less than 0.2 dB		
Isolation:	better than 60 dB at 300 MHz better than 45 dB at 450 MHz adjacent terminal.		

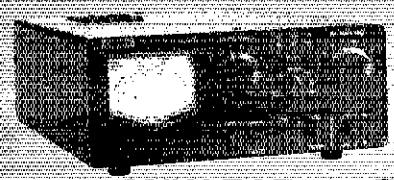
Exclusive agent for above units:

J. W. MILLER DIVISION/Bell Industries
19070 Reyes Ave., Rancho Dominguez, CA 90224
(213)537-5200 TWX 910-346-6740



CN-520 CN-540 CN-550

	CN-520	CN-540	CN-550
Frequency Range:	1.8-60 MHz	50-150 MHz	144-250 MHz
Power Range:	200/2000 W	20/200 W	20/200 W
Dimensions:	72×72×95 mm; 2.83×2.83×3.74 in.		



ANTENNA TUNERS

CNW-518

Frequency Range: 3.5-30 MHz (6 bands)
Power Rating: 1 kW CW (50% duty)
Output Impedance: 10-250/25-100 ohm (On 3.5 MHz)
Dimensions: 225×90×275 mm; 8.9×3.5×10.8 in.

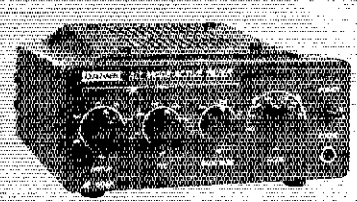
CNW-419

1.8-30 MHz (17 bands)
200 W CW (3.5-30 MHz)
100 W CW (1.8-3.4 MHz)
10-250 ohm
225×90×245 mm; 8.9×3.5×9.6 in.

POWER AMPLIFIER

LA-2035

Band: 144-148 MHz
Input Power: 0.5-3 W
Max. Output Power: 30 W plus
Power Consumption: 13.8 VDC, 4.5 A max
Dimensions: 100×35×125 mm; 3.9×1.4×4.9 in.



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The AF-606K adds PLL Tone Decoder circuitry for the ultimate in CW reception...PLL locks onto the desired CW signal and reproduces it with utmost clarity.

Dimensions: 150×62×150 mm; 5.9×2.4×5.9 in.

Exclusive agent for above units:

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858 Congress Park Dr., Centerville, OH 45459
(513) 434-0031 Telex 288-349

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(213) 530-1888 TLX NO. 887631 DAIWA UD

Interested in helping with the Volunteer Auxiliary? New ARRL/FCC agreement. Write W1XX at Hq. Don't forget Division Convention Sept. 22/23 at Virginia Beach, VA. Final FD reports showed lots of participation but small number of ARES members. Need to sign up new members. School's starting; drive carefully. Don't forget SET and State Fair in October. Traffic: K4NLK 295, NJ4L 200, WB4HRR 199, WB4WII 185, KA4EYF 174, K4JHF 134, WA4SRD 97, K4SWN 68, WA4MNR 67, NT4K 43, WB4CYN 38, NV4F 23, WD4CEB 18, N4CJJ 16, K4GI 14, KF4PV 12, WA4PID 11, K4DDY 9, WB4EQK 9, W4PRG 6, N4UE 5. (May) N4UE 18.

SOUTH CAROLINA: SM, Jimmy Walker, WD4HLZ —

Assistant Section Manager (A/SM)	WB4UDK	Aubrey
Affiliated Club Coordinator (ACC)	WD4HLZ	Jimmy
Bulletin Manager (BM)	WØIKT	John
Official Observer Coordinator (00/RFI)	W4NTO	Fritz
Public Information Officer (PIO)	WD4NMF	Charles
Section Emergency Coordinatory (SEC)	K4SUG	Ray
Section Traffic Manager (STM)	W4ANK	Hunter
Technical Coordinator (TC)	N34G	Ed

It is time to list our section-level officials. They will be glad to talk to your club about emergency communications, traffic, SSC status and technical projects. And if everything else fails, you can invite me. There are several leadership appointments open, so inquire and learn how you can help your fellow amateurs. Anyone interested contact me or WB4UDK. The messages I received from FD indicated clubs were out in force during the weekend. And congrats to the people responsible for the ETV program on Amateur Radio and FD. Traffic: K4WJR 261, K4ZN 248, W4ANK 170, W4NTO 93, W4FMZ 87, WØIKT 57, K4FRX 44, WB4UDK 41, KA4LRM 39, WJ4P 34, KA4AUR 19, WD4FJP 18, K4ZB 14, WA4JWS 8, WA4MIY 3, W4DRF 2.

VIRGINIA: SM, Claude Feigley, W3ATQ — STM: WD4ALY. SEC: WB4UHC. ACC: WD4KQJ. OO/RFI: W4UH. PIO: WN4VAU. BM: AB4U.

Virginia Traffic Net	1 P.M.	7260/3907
Virginia Sideband Net	6 P.M.	3947
Virginia Slow Net	6:30 P.M.	3680
Virginia Net	7/10 P.M.	3680
Virginia Late Net	10:15 P.M.	3947

Congrats to the Portsmouth ARC on becoming the first Special Service Club in the Virginia section. More clubs can qualify for this award. Contact ACC WD4KQJ for details on how you can apply for this recognition for your club. Rick Cook, AB4U, has accepted the job of section Bulletin Manager, effective July 1. Rick will be replacing Ray, K3RZR, who after an outstanding job in this capacity was forced to resign because of work commitments. Sorry to report Larry, K4AET, is a Silent Key. Our condolences to W4JLS on the loss of his daughter and WB4PNY on the death of her father. By this time the ARRL VEC program should be under way all affiliated clubs should have an examining team registered with the League. If your club does not have a team registered, contact ARRL Hq. for VE registration application forms. K4JST and KA4IUM and family visited "G" land. KR4V busy with the VN CW nets. W4UG and N4MM have announced they will run for reelection for director and vice-director respectively of the Roanoke Division. Thanks to those clubs who send me copies of their newsletters. They keep me abreast of their activities. Welcome back to Norfolk to KI4OO, ex-WB4EMC. Dave returns after spending 4 years in Maryland. After many years of faithful service WD4FTK has asked to be relieved as Net Manager of VTN. AA4AT will take over as NM of VTN, effective Aug. 1. Thanks John, you will be missed. Traffic: AA4AT 512, N4GHI 476, WA4CCK 404, W3ATQ 247, N4EXQ 203, WD4FTK 194, KR4V 160, WD4ALY 141, K4KDJ 115, K4JST 107, KA3DTE 91, WB4PNY 91, WD4OCW 80, K4JM 75, KA4IUM 68, K4VWK 66, WB2RBA 58, KB4WT 54, KB4OG 47, WB4UHC 45, NT4S 45, KC4HN 45, WA4TVS 43, KB4PW 42, K4ECD 40, KI4LO 37, K4GR 31, N3RC 27, WB4KIT 27, W4LXB 20, KA4ZTB 20, W4PVA 19, WB4EDB 18, N6ANO 15, N4FNT 12, K4MLC 12, WB2OMZ 9, WB4ZNB 9, WB4DQZ 8, N4IBY 6, WA1VRL 6, W4TZC 5, WB4RDV 4, W4KX 3.

WEST VIRGINIA: SM, Karl S. Thompson, K8KT — SEC: K8QEW, STM: KD8G. SGL: K8BS. TC: K8CG. ACC: WA8CTO. Rptr Coord.: WD4KHL. WA8GYU was selected as Amateur of the Year in WV for 1984. Congrats to Bill. KARC was winner of Field Day award for 1983. Exams were given at the Mill in excellent fashion, thanks to K8JF and those who helped. New rptr in Weston on 145.39 is working very well. 145.47 is back on the air and also working very well thanks to W8WHQ and others. WVN 108 QTC in 30 sessions with 100% 8RN coverage. WVFN 120 QTC, WVMD 44 QTC, WVNN 31 QTC, Hillbilly Net 25 QTC in 4 sess. with 137 QNI. Traffic: KZ8Q 117, WD8LDY 115, KA8OGF 97, WA3NUI 84, K8TPF 78, KD8G 62, K8QEW 59, K8KT 57, W8JWX 56, N8EMQ 40, W8HZA 39, N8AJC 37, W8FZP 28, WA8KCJ 12, WDØAII 4, NC8G 4.

ROCKY MOUNTAIN DIVISION

COLORADO: SM, Bill Sheffield, KQØJ — SEC: WBØFQB. STM: WDØAIT. ACC: WBØDUV. OO/RFI: NCØF. TC: KOØP. SGL: WDØGQL. BM: WØMDT. My thanks to Dave, WDØHNQ, who has resigned as PIO owing to his new job which is taking him out of state. Congrats to RMRL, our newest Special Service Club. RMRL has the largest membership in the state, and is noted for its dedication to public service. If you are interested in becoming a SSC in Colo, you must contact ACC WBØDUV. If wages were paid for handling weather problems the SWN & CWXN would be rich. Compliments to all for the efforts during our spring storms & record breaking hail storm which caused millions in damage on the eastern slope. Field Day this year produced some unusual happenings. In the past high scores were important this year's attitude seemed more towards training & preparing amateurs for emergencies, and that is what it is all about. FD messages to the SM & SEC doubled this year. The VE program is about to go into effect. We can use more VEs in Colo. Let me know if you are interested. Name droppers: KAØBAD WØRSG WBØITG. Reminder that BARCFEST, one of the best will be at the Nat'l Guard Armory in Boulder on Sept. 23rd. 73, KQØJ. NETS Col QNI 465, QTC 22, inf. 74, time 828, 50 sess.; CWN QNI 128, QTC 70, time 502, 29 sess.; CWXN: QNI 2829, QTC 3251, time 2700, 30 sess. Traffic: WAØHJZ 3187, NØBQP 1130, KØRXK 582, KØJAN 400, WØACH 288, NØCXI 216, WAØOYI 195, KBØZ 180, WDØAIT 140, WØLAE 95, NØDZA 88, WØNFW 42, WBØNHA 32, WØEJD 22, WØLQ 14.

NEW MEXICO: SM, Joe T. Knight, W5PDY — DEC: KB5XD. STM: KV5U. NMs: WA5UNO K6LL W5VFQ. TC: W8GY. ACC: W5HD. Southwest Net (SWN) meets daily on 7083 at 1930 local and handled 155 msgs with 170 stations in. New Mexico Roadrunner Net meets daily on 3939 at 0100 UTC and handled 85 msgs with 901 stations in. New Mexico Breakfast Club meets daily on 3939 at 0630 local

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KEY CLICKS-CHIRPS
SUPERIMPOSED HUM
SPURIOUS EMISSIONS
COMPUTERS
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SSTV-SSTV
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RADIO WAVE PROPAGATION
AMATEUR RADIO PRACTICE
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and handled 98 msgs with 735 stations in. Yucca 2-Mtr Net 78/18 & 93/33 handled 12 msgs with 409 checkins. Caravan Club 2-Mtr Net 66/06 handled 4 msgs with 110 checkins. SCAT 2-Mtr Net 66/06 handled 7 msgs with 515 checkins. KA5MEH & WA7BME did a FB job handling emergency traffic while fishing on the San Juan River. N4KB & W5PDY visited the Santa Fe ARC. Good to have N4KB & Pauline visiting NM for 30 days. Traffic W5UH 262, W5DAD 240, W5ENI 103, N5EXC 65, N4KB 7.

UTAH: SM, Ron Todd, K3FR — STM: W7OCX. SEC: NA7G. BM: WA7MEL. OO/RFI: KD7FL. ACC: KB7XO. PIO: N7BHC. TC: K7RJ. Received several FD messages from the area clubs. I am glad to see the northern part of the state active in FD. How about some activity from the rest of you clubs out there. I am looking to compile a listing of the clubs in Utah. Please send me info on non-affiliated clubs that you know of or belong to. Keep an eye on your TV listings; KUED will show the film "Amateur Radio's Newest Frontier" Sept. 7 at 9:30 P.M. MST. I will issue a bulletin to remind you when air time is near. Thanks to PIO N7BHC for the efforts to have this film aired and passed on to the PBS Network. Traffic: WA7KHE 73, WA7JJL 38, W7OCX 34, N7BQE 7.

WYOMING: SM, Dick Wunder, WA7WFC — ASM: KA7AWS. SEC: W7TVK. STM: WØOGH. Congrats to KA7AWS on his appointment to the leadership position of Asst. Section Mgr. Steve brings his past ARES & RACES experience to our Section. The High Plains Rendevous is the Sunday after Labor Day, Sept. 9, at old Ft. Laramie with the Torrington Club as hosts. Congrats to KA7TGH & KA7TGI on their new Technician tickets. Congrats to KD7AN on his appointment as State RACES Officer. Turnout for Field Day was great with many clubs participating. Wyo. Cowboy Net held 21 sessions with 601 QNI & 19 QTC. Wyo. Jackalope Net held 25 sessions with 419 QNI & 2 QTC. Traffic: WB7NHR 191, W7HLA 46.

SOUTHEASTERN DIVISION

ALABAMA: SM, Joseph Smith, Jr., WA4RNP — SEC: N4DMA. STM: N4JAW. SGL: KA4WVU. PIO: WO4W. BM: KF4VV. OO/RFI: K4ELV. The Mobile hamfest will be held this month on the 15th and 16th and volunteer exams will be given early Sat morning from Tech thru Extra class. I will be there, so bone up and show me those interim permits at the ARES "Section Meeting" or at the ARRL "League Meeting" while you find out what is going on in both Ala and Newington. Also, the Anniston-Jackson swapfest will be held on the 29th at the National Guard Armory, northwest of Anniston with FCC exams being given. The new officers of the B'ham club are WB4AYH, pres. K4IR KA4ZEW KA4VIK, v.p.; KA4PDZ, secy.; N4IOG, treas. If your ham tag has gotten mangled you can take it to your license commissioner and get a new one made. Nets: RN5 reports 809 messages in 60 sessions with Ala rep at all sessions; CAND passed 856 messages in 30 sessions with Ala rep by NW4X W4CKS and WX4I. DRN5 had 830 messages passed in 60 sessions with WA4JDH NW4X W4WOF W4CUE WD4IXA W4CKS KC4GS and WX4I on the air. BPL: WA4JDH. PSHR: WA4JDH W4CKS WX4I WA4LXP KB4GPN WA4RNP. Traffic: WA4JDH 726, W4CKS 102, WA4LXP 64, WX4I 64, WX4I 56, KC4GS 53, NW4X 44, K4AOZ 30, WA4RNP 29, W4WJF 23, W4DGH 10, KB4GPN 9, WB4TVY 2.

GEORGIA: SM, Eddy Kosobucki, K4JNL — SEC: WB4ABY. STM: K4VHC. ACC: WA4ABY. BM: W4BIA. OO/RFI: W4RZL. PIO: WA4PNY. SGL: W4BTZ. TC: K4UDR. NWS: WA4PZD. Atlanta Hamfestival once again a huge success even though WX extremely hot & it being Father's Day. Sources tell me sked will be moved to avoid any conflict. Many tnx to W4RA K1ZZ W4RI & W4YWR for being in attendance. W4RH for the first time in many years was absent owing to the conference he had to attend in Mexico City on behalf of the ARRL. Atlanta ARC agn furnished comms for the Peachtree Road Race & the 4th of July Parade. I have appointed former Georgia SCM W4RZL as the section OO/RFI Coordinator. By the time U read this we should have complete FCC approval of the monitoring program. Any of U that are interested in helping clean up our airwaves please contact Howard or me. At the tfc forum we discussed the need for more CW ops on GSN. As U well know the traffic system is of the utmost importance. It was suggested that we agn try to get the Ga Training net reorganized. I know that in this FB GA section there is somebody that will volunteer his or her services to help these new Novices & Techs get their code speeds up & teach them how to handle traffic. Won't one of U step forward & help. For those of U who are planning hamfests in 1985 PLEASE let our SE Director or me know the dates, etc., so that we can help avoid any conflict. Section hamfests in Sept are Augusta on the 16th & Gainesville on the 23rd. Rome on the first Sun. in Oct. If there are any proposed antenna or tower restrictions in ur area please contact our capable SGL W4BTZ. Any complaints with ur local cable system write me or the ARRL directly. We want to help. Each of U out there has a voice abt what's going on. Let's hear from U. Traffic: W4PIM 106, WB4NTW 40, K4NM 39, N4BIM 25, W4BIA 18, K4VHC 11, W4HON 9, K4BAI 9, KA4ATM 5. (May) N4BIM 81, W4JWO 46, K4EV 23, K4VHC 16, N9ECB 15, W4HON 12, KB8GT 7, K4BAI 6.

NORTHERN FLORIDA: SM, Billy Williams, N4UF — The North Florida ARS acting as a volunteer examination point for the Central Alabama VEC (CAVEC). Please call for all grades of exams to be given prior to club meetings so that all area amateurs have the opportunity to upgrade. Pete Nissen, W4PTT, is the Chief Volunteer Examiner and NOFARS will be glad to assist other Florida groups in establishing their program. The first large-scale exams under this new format were scheduled for the Greater Jacksonville Hamfest. Contact W4PTT or N4UF for more details. The traffic frequency bands have been very poor lately but we have a dedicated bunch haning in there to move the messages. And who says the bands would be good if there were an emergency callup. Good communicators are flexible and can adapt to changing conditions. Lots of Field Day activity this year. 40 and 20 were the hot bands with the others way below par. Several operations got good media coverage too. I have appreciated all the fine assistance I have gotten during my four years as SCM/SM and I'm sure our new SM, WF4X will get the same great cooperation. Many interesting events have happended and I hope that the amateur radio operators of Florida will remain on the alert for both emergencies and for threats to their rights and privileges. With the current regulatory environment it is going to take much effort just to keep what we have now. I urge everyone to keep their awareness at a high level and stay in contact with their elected representatives. Traffic: WF4X 698, N4PL 504, WF4Y 340, KC4VK 311, N4EDH 299, WB4ADL 241, WA4EYU 178, KB4LB 154, WD4HBP 153, WA4QXT 133, KB9LT 120, WD4IIO 115, KD4KK 101, K4VND

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BP-4 Alkaline Battery Case	12.50
BP-5 425mA 10.8V Battery	49.50
BP-7 425mA 13.2V NICAD Batt.	67.00
BP-8 800mA 8.4V NICAD Batt.	62.50
HM-9 Speaker Mic	34.50
CP-1 Cigarette Lighter Cord	9.50
DC-1 DC OP Pack	17.50
Leather Case for IC-2AT	34.95
HS10 Headset for HTs	19.50
HS10A VOX Unit for IC-02A & Hdst.	19.50
HS10B PTT Switch Box for Headset	19.50

AEA

CP-1

Computer Patch ™ Interface. For computerized RTTY and CW operation. Call for details.

Suggested Retail $239.95

Call for YOUR Low Price!

Save even more on package with MBA text for VIC20 or Commodore 64.

KENWOOD

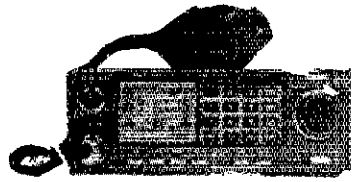
TR 2600A

2M FM handheld with Kenwood's innovative DCS system. Many features.

Suggested Retail $339.95

Call for YOUR Low Price!

KENWOOD



TR 7950

45 Watts! Multi-Featured. Kenwood's Most Popular 2 Meter FM Rig.

Available at Reduced Price!

YAESU FT-757GX

This new Yaesu HF Transceiver has everything!

- General Coverage Receiver
- Full Break-in and CW Filter
- Built-in Keyer & much more!
- Includes microphone

Suggested Retail $859

SPECIAL LOW PRICE!!!

KENWOOD

TM211A/411A

Ultra compact FM mobile transceivers featuring Kenwood's innovative DCS system. 25 watts with many features.

TM211A 2M .... Sug. Ret. $369.95
TM411A 450MHz Sug. Ret. $449.95

Call for YOUR Low Price!

KENWOOD

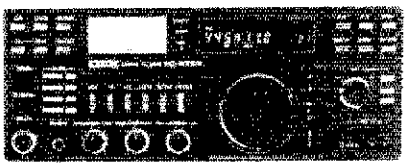
TS 430S

Now a general coverage receiver/ham band transceiver at an affordable price. Ideal for mobile, marine and portable use.

Suggested Retail $899.95

Call for Low, Low Price!

ICOM



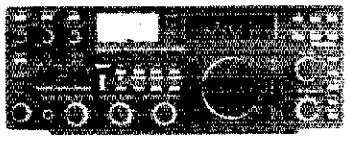
IC-471A/H

All mode, 430-450MHz coverage. Features not previously available. Now available with higher power.

IC-471A .....Sug. Ret. $799
IC-471H ..... Sug. Ret. $1099

Call for Low, Low Price!

ICOM



IC-751

The best filter in the industry is standard with this state-of-the-art high performance rig. Now with 1 YEAR WARRANTY!

OUR LOWEST PRICE EVER!

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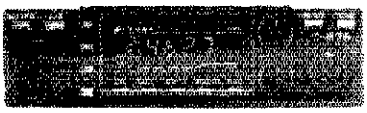
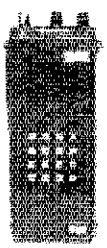


NEW ICOM VHF/UHF MOBILES

Full featured and all are super compact size!

IC-27A (25W, 2M, FM) .....Sug. Ret. $369
IC-27H (45W, 2M, FM) .....Sug. Ret. $409
IC-37A (25W, 220MHz, FM) . Sug. Ret. $449
IC-47A (25W, 70cm,FM) ...Sug. Ret. $469

Call for YOUR Low Price!



ICOM

IC-2AT/ 3AT/4AT

Still the most popular, low cost/top performing handhelds around.

IC-2AT 2M ..... Sug. Ret. $269.50
IC-3AT 220MHz . Sug. Ret. $299.95
IC-4AT 450MHz . Sug. Ret. $299.95

Call for YOUR Low Price!

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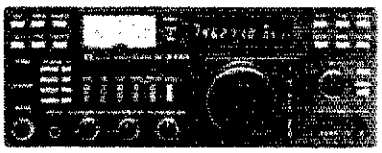


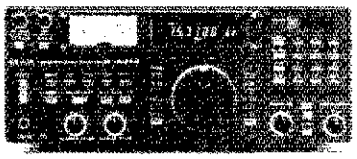
IC-271A/H

2 meter all mode with many new features. Available with higher power.

IC-271A .....Sug. Ret. $699
IC-271H .....Sug. Ret. $899

Call for Your Price!

ICOM



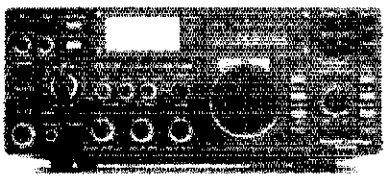
IC-R71A

High performance. General Coverage Receiver with many features. Remote Control Option also available

Suggested Retail $799

Call for YOUR Low Price!

ICOM



IC-745

The IC-740 grows up! Now with general coverage receiver, 16 memories, and scanning makes this one of the most versatile high performance rigs ever.

Suggested Retail $999

Substantial Price Reduction! Subject to stock on hand.

Call the Ham Experts!

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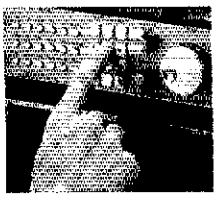

The DX1000 makes tuning in London as easy as dialing a phone.

Direct access keyboard tuning brings a new level of simplicity to shortwave radio. With the Uniden® Bearcat® DX 1000, dialing in the BBC in London is as easy as dialing a telephone. And you can switch from the BBC to Peruvian Huayno music from Radio Andina instantly. Without bandswitching.

Featuring the innovative microprocessor digital technology made famous by Uniden® Bearcat® scanner radios, the DX 1000 covers 10 kHz to 30 MHz continuously, with PLL synthesized accuracy. But as easy as it is to tune, it has all the features even the most sophisticated "DXer" could want. 10 memory channels let you store favorite stations for instant recall —or for faster "band-scanning" during key openings. The digital display measures frequencies to 1 kHz, or at the touch of a button, doubles as a two time zone, 24-hour digital quartz clock. A built-in timer wakes you to your favorite shortwave station. Or, it can be programmed to activate peripheral equipment like a tape recorder to record up to five different broadcasts—any frequency, any mode—while you are asleep or at work.

The DX 1000 also includes independent selectivity selection to help you separate high-powered stations on adjacent frequencies. Plus a noise blanking system that stops Russian pulse radar interference.

There's never been an easier way to hear what the world has to say. With the Uniden® Bearcat® DX 1000 shortwave radio, you have direct access to the world.

For the name of your nearest retailer dial toll-free ...1-800-SCANNER.

Frequency Range: 10 kHz to 30 MHz continuously. **Tuning:** Direct keyboard entry, selectable 3 or 24 kHz per revolution knob tuning, or manual step tuning in selectable 1-99 kHz steps. **Sensitivity:** 1.0 μV AM, 0.5 μV CW/SSB/FM, 1.6-30 MHz **Image and IF Rejection:** 70 dB or more. **Memory:** 10 frequency capacity. **Frequency Stability:** Better than 100 Hz after warm-up. **Modes:** AM/LSB/USB/CW/FM. **AGC:** Selectable Fast/Slow release times **Filter Bandwidths:** 2.7 kHz, 6 kHz and 12 kHz. **Filter Selection Independent of Mode.**

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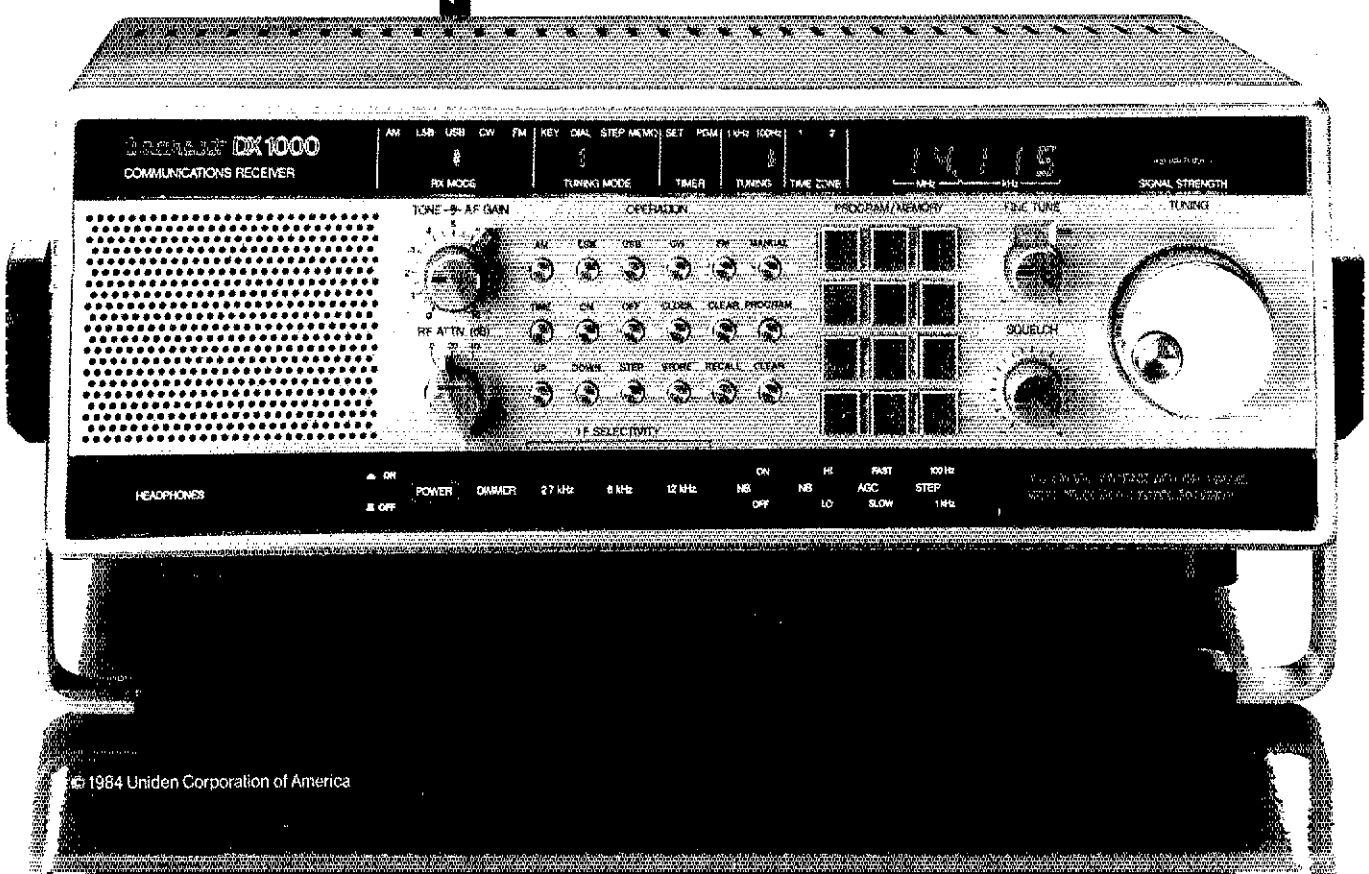


93, WX4J 90, W4MGO 86, NF4O 60, WB4TZR 58, KC4FL 54, WX4H 54, WD4IUI 52, NS4C 26, NO4P 26, N4UF 26, WB4YQP 26, N4JAQ 20, N4ADI 19, N4JHI 18, NA4F 17, KA4ETX 15, KI4CQ 14, KF4GY 14, W8IM 12, WB4AWG 8, KV4HI 8, N4IIP 7, W4FI 6, WA4STZ 6, WA4PUP 3, N4HTU 1.

SOUTHERN FLORIDA: SM, Richard D. Hill, WA4PFK — SEC: W4SS. STM: K4ZL. TC: KI4T. BM: WA4EIC. ACC: AA4WJ. PIO: W4WYR. SGL: KC4N. OO/RFI: W4SS. W4SS notified me that Lou Boehlin, N4EWR, has been appointed as EC for Sarasota Co. BM WA4EIC reports that 101 bulletins were received and 129 sent this month. OBSs reporting were WA4EIC 51, WD4KBW 27, W4DL 40, W4ESH 7, AA4BN 24, WT4F 32, K4IEK 13 and AA4MI 36. WB4AID, manager of FMTN and his XYL were in Germany on vacation this month — the bad news is that Jane, KB4AOO, fell and broke her hip. She spent 21 days in the hospital there but is back now and doing fine. W4BCZ reported on the Florida Phone Traffic Net that his XYL has returned form Cleveland following sucessful heart surgery. AA4WJ told me that he talked to KE4DA/5Z4DU in Kenya this month. He also added 7 new countries to his list. K4SCL reports 150 QSO via Oscar 10. Woody had also planned to be present for Discovery's launch, but no launch! The following Clubs/Groups/Stations sent a tield day message — Metro RA/Clearwater ARS (joint operation), Brandon ARS, KA4EGP, N4KF, Hardee Co. ARES, Key West ARC, Indian River ARC, Hollywood ARC, Polk Co. Civil Defense Amateur Communication Society, Tampa Hillsborough ARC, Martin Co. ARA, Lehigh Acres ARC, N4FL, Motorola ARC, Fort Myers ARC, and N4BLD who was operating mobile from a Datsun 280ZX. W4JM reported that for May he is busy with local club activities and is rebuilding his antenna farm. Band conditions very bad right now, especially for FMTN on 40 meters. Our deepest sympathy goes to George, W1NJM whose son passed away July 1. 73 de WA4PFK. Traffic: W3CUL 3108, W3VR 852, WA4PFK 329, K4ZK 204, K4IA 183, K4SCL 177, WB4WYG 123, KJ3T 120, KA4GUS 118, KA4AMC 97, W4DL 92, W4DVO 92, WA4EIC 86, WB2NVJ 82, WD9AEP 81, WD4KBW 78, KA4FZI 76, W4YCL 66, K4EUK 59, AF3S 57, KF4RL 53, W4ESH 52, NJ4O 51, K4FQS 51, K4JI 48, K5IHH 41, W4PKP 40, KY0T 40, W3TLV 40, KA4NXF 37, K4JLL 35, KA4BBA 35, WA4HXU 35, KF4JA 33, WB4GCK 32, WD4CHO 27, WA4GYR 27, KM4Y 27, WD4AWN 20, AA4BN 19, K4IRT 18, KA4YHS 18, W3IJR 16, N4JOA 16, WK4F 15, WB2OUK 15, KB4KB 14, N4ILN 13, KA4KDD 12, KY4U 12, WT4F 9, W4MFD 9, KA9AKY 8, KF4AX 8, WB4AID 7, WB4F 7, NX4X 7, WB8SNT 7, KA4RWV 6, K7LCA 5, KA4SIH 5, KA4EBO 3, KA4GDU 3, KD4GR 2, WD4MCC 2, KE4O 2, WD4RCC 2, AA4WJ 2, AA4MI 1. (May) W4DVO 97, W4JM 2.

WEST INDIES: SM, Gregorio Nieves, KP4EW — West Indies Net Slow (WINS) daily 7 P.M. (2300 UTC) on 3.710 MHz. West Indies Net Central (WINC) Daily 6:30 P.M. (2250 UTC). West Indies Net Borinquen (WIMB) on 3.930 MHz. LSB (2230 UTC). On the weekend of June 26 the recently organized club "Federacion de Radio Aficionados de Puerto Rico" (FRA) celebrated a Hamfest at the town of Aguadilla, northwest of the island. It was a 3 day event in a vacation resort and the attendance was excellent. Congrats to KP4ANG and KP4CY for this first experience and to all directors involved in this event. The Puerto Rico ARC will be celebrating its 45th annual convention the last week of Sept. The place will be announced soon when the Board of Directors meet on the 11th of July. The Field Day celebrated by the PRARC on the 26th of June promises a good standing according to the operators involved. Good luck to all of you. KP4DJ reports the following totals for WINS: QND 360, QNI 85, QTC 21, 30 sessions. Traffic: KP4DJ 59.

SOUTHWESTERN DIVISION

ARIZONA: SM, Erich J. Holzer, N7EH — STM: W7EP. NMs: WA7FDN WA7KQE K6LL. ACC: N7ECE. Well June has come to an end with a burst of activity for Field Day. I received FD messages from the following clubs: IBM ARC, Coconino Co. ARC, Tonto ARA, AZ ARC, Scottsdale ARC, and the OPRC. I hope all participants had a good time and made lots of contacts. W7KAX reports that the Mohave Co. ARES helped provide communications when Laughlin, Nev. lost telephone service. Those assisting were: W7KAX WN9HGB KB6GG KA6AXO W7GAA KA7BFD W6ELR WA7GFX. With the heat of summer time upon us now the activities happening are few and far between. The big activity of the summer time is the Ft. Tuthill Hamfest. By the time this report gets published Ft. Tuthill 84 will be history. I hope all attending had a good time. I would also like to take this opportunity and ask again for those of you who might be interested in serving the amateurs in AZ as an ARRL volunteer. Please check in with me to see what jobs are available. It is with sorrow that I report the following Silent Keys: K7OBR K7PLR. ATEN: QNI 874, QTC 148. SWN: QNI 170, QTC 155. PSHR: KB7FE. Traffic: KB7FE 266, W7AMM 122, W7EP 116, K6LL 60, WA7KQE 25, K7POF 19, W7KXE 15, K7NMQ 7. WA7NXL 4.

ORANGE: SM, Sandra Heyn, WA6WZN — SEC: W6UBQ. STM: WA6QCA. ACC: KA6NLY. BM: W6DXL. OO/RFI Coord: W6RE. PIO: NS6W. SGL: N6HIQ. TC: AA6DD. DECs (by counties): WB6JBI (Orange); W6KLN (Riverside); WA6IKH (San Bernardino); KA6HII (Inyo). Recent EC appointments are N6JWD Mono/Inyo liaison, WA6FIE Volunteers-In-Prevention (VIP) program for Calif Dept of Forestry and WB6FOL San Bernardino RACES Dist # 6 (Victor Valley). AEC K6JLA reports ARES Red Cross net members that supported Cole Canyon fire communications: W6RE KA6NNU K6VD WA6IWS WA6IWT KA6HWV N6EXV WB6ARK KA6UPL KA6VCT WB6LAR WE8X KA6MOE WA6FOW WA6BHR KD6DA KA6WTA N6EIV. New club officers: Catalina RA. WB6HTU, pres.; W6UFS, v.p.; KA6SJX, treas.; W6JXC, secy.; YL RC of Los Angeles WB6ULU, pres.; N6JX, v.p.; WA6QKC, treas.; WB6VAU, rec. secy.; KF6GW, corr. secy.; LARA of Orange Co. KA6WAH, pres.; KA6NLP, v.p.; KA6TYO, treas.; N6FBI, rec. secy.; WA6IWT, corr. secy.; Western ARA N6ME, pres.; N6DWR, 1st v.p.; K6RUB, 2nd v.p.; WB6BIM, secy.; KB8AQY, treas.; MESAC (of Costa Mesa) KA6GUV, pres.; KA6PBO, v.p.; KA6IGF, treas.; So. Orange ARA KD6MR, pres.; KF6EX, v.p.; KA6BJP, secy.; WA6QCA, treas.; Hughes Fullerton EA ARC NC6U, pres.; AB6R, v.p.; KA6PMT, treas.; NX6U, secy.; So Ca ATV Club NI6R, pres. WB6PJA, v.p.; K6KDO, secy/treas.; N6AZV, freq. coord.; Lake Elsinore ARC WA6TIJ, pres.; KA6IXY, v.p.; KE6EG, secy.; Calif Award Hunters WA6ZAQ, pres.; KB6EX, v.p.; KA6CSS, treas.; W6PCI, secy. Barstow ARC members that provided communications for city "CLEAN UP" project were WD6BNG WB6SAK KE6EQ KA6EPS W6VPR W6HUG N6DWL WB6RAM N6ADV WA6RDR W6TFE. Don't forget the SW Division ARRL convention pre-registration deadline of Oct. 1st. The convention will be held Oct 12-14 at the Santa Maria Convention center with W6AQ as a banquet speaker. PSHR: KA6BNW W6NTN WA6QCA WB6QBZ KA6HJK/T.

Net	Freq.	Time	QNI	QCT	NM
SCN/1 (20+)	3598	7 P.M.	332	263	AI6E

KENWOOD

pacesetter in amateur radio

TM-211A DCS... a new turn in 2 meters/70 cm.

TM-211A/411A

The TM-211A 2 meter and the TM-411A 70 cm mobiles combine ultra compact size with the added feature of a 7 position adjustable front panel, allowing you maximum flexibility in both home and automotive installations! These compact transceivers also feature Kenwood's innovative DCS (Digital Code Squelch) circuit, that allows you to program your transceiver to respond only to transmissions from stations whose radios transmit a pre-selected digital code. Both radios deliver 25 big watts of R.F. power on HI and 5 watts (approximately) on LO power. Dual digital VFO's, built-in, highly visible yellow LED display, five memories plus COMM Channel add to this impressive array of features. The TM-211A and TM-411A each boast high performance receive and transmit specifications and an external high quality speaker that provides unsurpassed sound quality. Mounting flexibility is also a feature. Yes, all these features, plus priority watch, memory and programmable band scan, microphone test function, audible "beeper" for operation confirmation, repeater offset switch and reverse switch. The TM-211A and TM-411A offer you the best in 2 meters and 70 cm operations!

Subject to FCC approval.

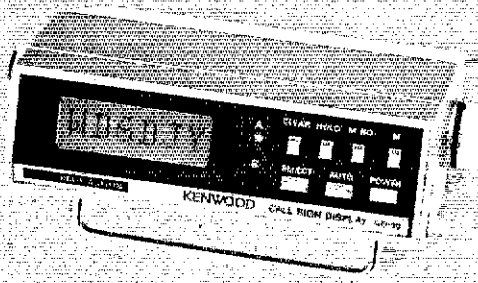
Optional accessories:

- CD-10 Call Sign Display
- PS-430 D.C. Power Supply
- KPS-7A Power Supply
- MC-55 Mobile Microphone with Time-Out Timer
- MA-4000 Dual Band Mobile Antenna with Duplexer
- SW-100A/B SWR/Power meters
- PG-3A Noise Filter

More information on these products is available from authorized dealers of Trio-Kenwood Communications, 1111 West Walnut Street, Compton, CA 90220.

CD-10/DCS

The optional CD-10 helps maximize your use of Kenwood's revolutionary new signalling concept, DCS (Digital Code Squelch). DCS uses digital code information to open squelch on a receiver that has been programmed to accept the specific code being transmitted. Up to 100,000 different 5-digit codes are possible, allowing each station to have its own "private call" code or to respond to a "group call" or "common call" code. Program your call sign (up to 6 digits) in the ASCII code and it is automatically transmitted when the transmit key is depressed. The CD-10 stores the calling station's call sign in its memory for future reference, and it is also displayed on the L.C.D. readout. The CD-10 can store call sign data of up to 20 stations, allowing you to quickly check for calls if you have been absent from your station, and review your contacts for logging purposes. The DCS/call sign data transmission system uses mark and space frequencies within the normal speech band width (compatible w/most repeaters).



TM-201A/401A

The extremely popular TM-201A 2 meter FM (25 watts, 142.000 to 149.000 MHz) and the TM-401A 70 cm FM (10 watts, 440-450 MHz) ultra compact mobile transceivers are also available.

Specifications and prices are subject to change without notice or obligation.

KENWOOD

pacesetter in amateur radio

TS-711A

TS-711A Multi-function all-mode 2 m transceiver.

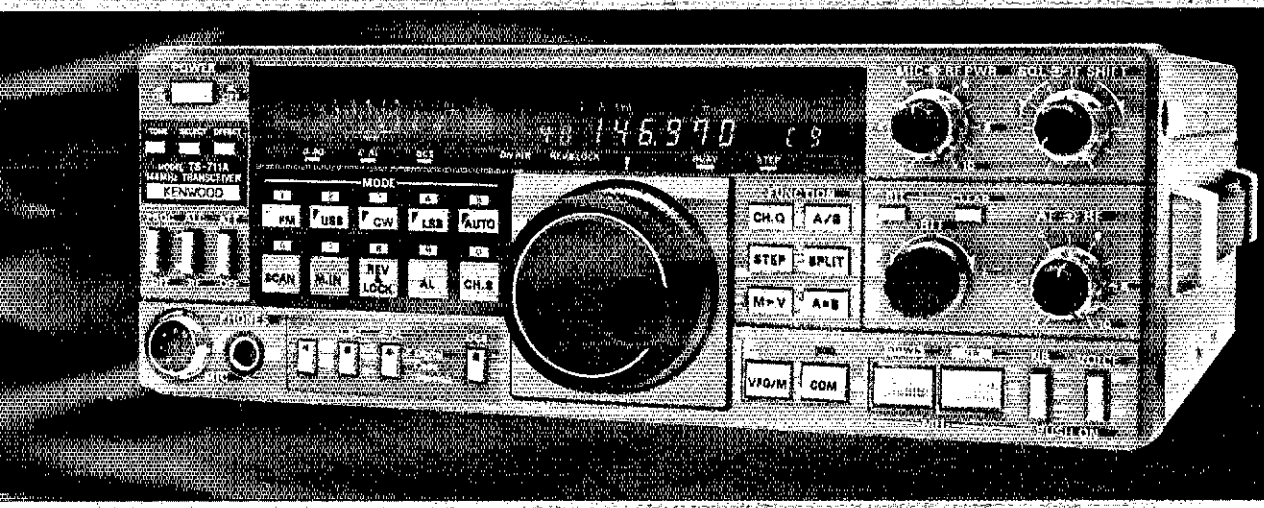
The TS-711A 2 m all-mode transceiver is the perfect base station unit. It features Kenwood's innovative D.C.S. circuitry that allows your TS-711A to respond only to signals that include a pre-selected digital code. The system recognizes 100,000 different 5-digit codes, making it possible for each station to have its own "private call," "group call" or "common call" code. Built-in dual digital VFO's provide commercial-grade frequency stability through the use of a TCXO (Temperature Compensated Crystal Oscillator). The new fluorescent multi-function display shows frequency, RIT shift, VFO A/B, SPLIT, ALERT, repeater offset, digital code, call sign code, and memory channel. 40 multi-function memories store frequency, mode, repeater offset and tone. It has programmable scan, memory scan, and mode scan. The Auto-mode function automatically selects the correct mode for the frequency being used. When a mode key is depressed, an audible "beeper" announces mode identification in International Morse Code.

The TS-711A has all-mode squelch, noise blanker, speech processor (SSB, FM), IF shift, RF power control, alert, and a unique channel Quick-Step tuning that varies tuning characteristics from conventional VFO feel, to stepping action when CH.Q switch is depressed.

Optional accessories:

• CD-10 Call Sign Display • TU-5 CTCSS Tone Unit • VS-1 Voice Synthesizer • MC-60A Deluxe Desk Mic • MC-80 Desk Mic • MC-85 Desk Mic • SP-430 External Speakers • MB-430 Mobile Mount • PG-2J DC Cable

Subject to FCC approval.



TS-670

TS-670 All-mode "Quad Bander."

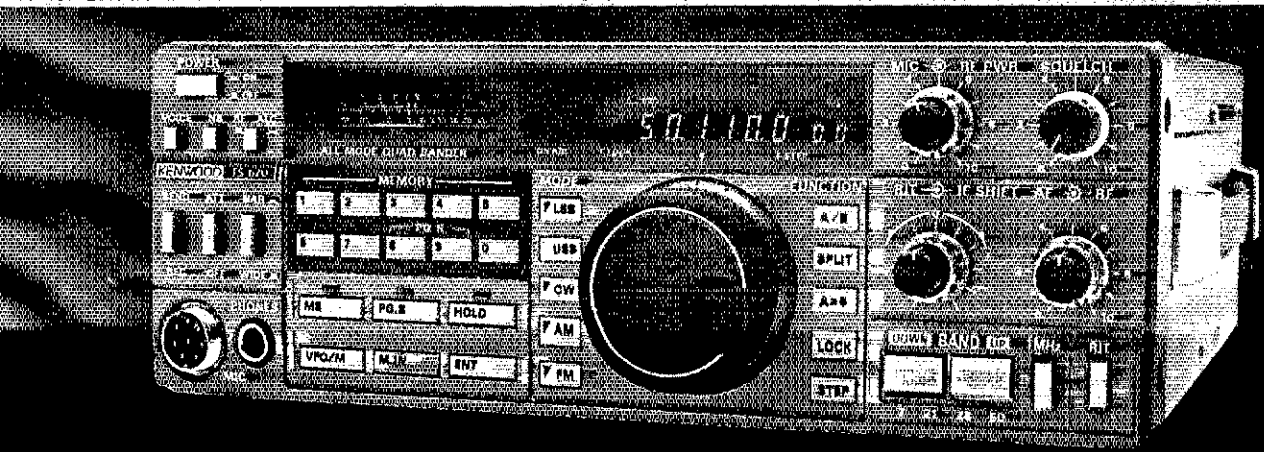
The TS-670 "Quad Bander" is a unique all-mode transceiver that covers the 6 meter VHF band and the 10, 15 and 40 meter HF bands. FM operation may be added with the optional FM-430. Key features include dual digital VFO's, 80 memory channels, memory scan, and programmable band scan. Direct keyboard frequency selection allows you to enter a frequency to either VFO or to a memory channel using the 10-button key-pad on the front panel. The 2-color fluorescent tube display indicates frequency to the nearest 100 Hz (10 Hz modifiable) and includes LED indicators that signal the specific functions in use. The optional GC-10 general coverage receiver unit allows continuous tuning from 500 kHz to 30 MHz. The VS-1 voice synthesizer unit is another popular option available. All this plus IF shift, all-mode squelch, CW semi-break-in with side tone, narrow-wide filter selection, noise blanker, and R.F. attenuator make the TS-670 "Quad Bander" the next transceiver you should own!

Optional accessories:

• GC-10 General Coverage Unit, 500 kHz to 30 MHz • VS-1 Voice Synthesizer • FM-430 FM Unit • YK-88C 500 Hz CW Filter • YK-88CN 270 Hz CW Filter • YK-88A 6 kHz AM Filter • PS-430 DC Power Supply • PS-7A DC Power Supply • MC-60A Deluxe Desk Mic • MC-80 Desk Mic • MC-85 Multi-Function Desk Mic • VOX-4 VOX Unit

More information on the TS-711A and TS-670 is available from authorized dealers of Trio-Kenwood Communications, 1111 West Walnut Street, Compton, CA 90220.

Subject to FCC approval. Specifications and prices are subject to change without notice or obligation.



SCN/2 (13—) 3598	8:15 P.M.	228	104	AI6E	
SCN/V (FM) 146.645	9 P.M.	530	418	WA6OCA	
RTTY/VHF 145.12	9 P.M.	423	67	KA6HJK	

Traffic: WA6QCA 163, WB6QBZ 143, W6RE 139, KA6HJK 91, N6GOT 68, WB6TIF 68, W6NTN 62, KA6BNW 61, N6FRW 44, K6ZCE 15, W6PNS 12, W6TKV 11, WA6WZN 8, KA6HMS 6, WA6WZO 2.

SAN DIEGO: SM, Arthur R. Smith, W6INI — BM: WA6HJJ. STM: N6GW. SEC: W6INI. PIO: WA6CUP. ACC: WA6COE. TC: N6NR. SD Co. Amateur Radio Council has been appointed for Sixth District. Volunteer examiners needed thru out California. Apply to: SANDARC-VEC, PO Box 5023, La Mesa 92041. Tests in SD Co. planned for each Sat. rotating weekly to different areas. Field Day msgs rcvd from: ARC of El Cajon, North Shores ARC, Palomar ARC, Pt. Loma ARC, Poway ARS. ARES holds meeting on second Sat. at Normal Heights United Meth Church, 4650 Mansfield, SD. Breakfast 0800-0845, meetings 0900. All are welcome. Accolades to W6IPQ for coordinating set-up and manning of SANDARC booth at Del Mar Fair. It was the best ever! Palomar ARC picnic featured blue grass music by WA6BCC and company. Traffic reports should now go to STM, N6GW, 1055 Bangor St, SD 92106, by 4th of month, by mail or message. North Co. Tfc Net met 29 times, handled 226 msgs. PSHR: KT6A W6HUJ. BPL: KT6A. Traffic: KT6A 669, KB6AI 147, KU6D 101, KF6TF 63, KM6I 20, N6GW 16, WA6IIK 8.

SANTA BARBARA: SM, Ernie Kapphahn, WB6HJW — Santa Barbara ARC held their annual hamfest on Aug. 19. Santa Barbara hams received kudos from city officials for their good work during the recent poisonous gas evacuation. W6ZHR has corrected some equipment problems and is again sending bulletins on 146.7 at 1830 from SLO. Look elsewhere in this issue for full info on Southwestern Division convention set for Santa Maria Oct. 12-14. Dave Bell, W6AQ, will be the banquet speaker. Dave was recently selected Ham of the Year at the Dayton Hamvention. Exams will be given at the convention!! Please preregister and get a 610 Form in to Jim McDaniel, N6IR, c/o HAMCON Box 2457, Santa Maria 93455. Owing to space and time constraints, we can only administer about 300 exams, so get your 610 in now and assure your place. Anyone wishing information on the convention may reach us by calling 805-481-0311; ask for Ernie. This is a business number so leave your name and number and we'll get back to you. Not too many reports this month. Everyone must be on vacation. Traffic: W6ZRR 81, K6YD 51.

WEST GULF DIVISION

NORTHERN TEXAS: SM, Phil Clements, K5PC — SM/ACC: NI5V. STM: AE5I. SEC: W5GPO. BM: W5OXK. SGL: W5UXP. TC: WB5IIR. PIO: N5FDL. OO/RFI: WB5JBP. Lots of Field Day fun and activity; I received radiograms from Paris, Graham, Nacogdoches, Athens, Abilene, Childress and Dallas. NTX TC WB5IIR has written a book on antennas, feedlines, etc. This will be a terrific addition to your library. It separates the facts from the myths and explains antenna theory in layman's terms. Nice job, John. As most of us in the Metroplex know, John has conducted on-the-air code and theory classes for years on 2 meters, and is responsible for many of us getting licenses and upgrades. Contact him for any technical problems you might have. I am sure he has the answer, or you will find out and get back to you quickly. You can find him daily on 7213 kHz or in any recent callbook. If you are interested in setting up FCC exams in your area or at your club meetings, we have two Volunteer Examining Coordinators so far for our area. Contact W5FC or W5YI for details on becoming a Volunteer Examiner. PSHR: KA5LQA N5GKF AE5I N5BT KA5AZK KD5FR N5EZM. Traffic: N5BT 296, KD5RC 257, KA5AZK 163, AE5I 118, KD5FR 91, KA5LQA 57, W9OYL 52, W5ERT 29, NI5V 24, WA5EZT 19, K5PC 17, N5EZM 10, K2SCU 8, N5GKF 7.

OKLAHOMA: SM, Ray Miller, W5REC — WB5SZP reports Sunfest Celeb. great. Noonday Lions helped upgrade Elk City Repeater — W5VQS says thanks. NB5N got Mayor to proclaim Tulsa Amateur Radio Week June 18-24. K5ENA presented severe WX on Tulsa TV. WA5UJF KA5DTV K5CAY W5LHU NG5P WD5IFB NG5O W5KWG WB5RRR WA7UIB worked in Enid simulated emrgency. W5CCV reports W5VXU WB5KRH and others helped Atlus Public Library present Amateur Radio Emergency Communications. NORA — K5POW WD5CBU KA5MFM WA5IMO and others helped in FREEWHEEL 84 bike venture. K5CKQ and WA5UJF home from Alaska and Ecuador respectively. W5HFV did FB job on VHF dinner at Green Co. Hamfest. WD5DKT organizing emergency group around Cleveland lake area. Congrats to WB5TEX for design of TARC nameplate and logo. Thanks to W5NZS (SGL) for getting Governor Nigh to proclaim July 23-29 as Amateur Radio Appreciation Week for Oklahoma. THANKS! to WN5NWX WB5NDO K2GKK N5BEQ WD0FTM and your staff for a FB Ham Holiday. Traffic: KV5X 286, W5AS 264, K5CXP 263, WB5SRX 148, KB5EK 118, WD5IFB 97, W5REC 95, KC5OU 82, KI5P 81, W5VXU 77, NG5O 71, WA5OUV 65, WA5ZOO 51, NQ5W 50, WA5IMO 44, N5GTP 42, W5SUG 35, W5VHP 35, WD5JCE 32, W5RB 32, W5VOR 23, WA5OGC 22, W5VLW 21, WB5LSW 14, K5CAY 4.

SOUTHERN TEXAS: SM, Arthur R. Ross, W5KR — SEC: Open. STM: K5QEW. Asst SM: N5TC. BPL: W5CTZ WB5YDD. Glad to have two traffic handlers back from press of personal business: Welcome N5CUR and ND5CI. You were missed. CAND Mgr W5KLV reports DRN5 represented 100% by Southern Texas stations W5CTZ WB5YDD KD5KQ W5KLV N5EFG N5DFO N5CRU and N5AMH. Brazos Valley Public Svc Net meets each Wednesday at 8 P.M. on 21.165 MHz; good chance to sharpen CW skills and to hear ARRL bulletins and club news. Branham ARC has reversed its repeater to 147.855/.255 to be in track with others. DRN5 Mgr WB5YDD reports Southern Texas represented 100% by W5TAH K5OWK W5KLV N5DFO WB5EPA WB5FGU W5CTZ N5EFG K5GDX KS5V N5CRU N5AMH WB5ATP KD5KQ K5UPN and WB5YDD. OBS W5KLV gave 10 ARRL bulletins, 4 DX bulletins, 1 CRRL bulletin. 27 satellite bulletins and 4 propagation forecasts 120 readings on 8 nets! Field Day activities seem busier than usual, with about 10 messages in from active FD clubs. Traffic: W5CTZ 613, WB5YDD 513, W5KLV 334, N5DFO 310, N5TC 181, WB5MMI 180, KS5V 180, K5OWK 80, ND5C 38, W5KR 34, K5HZR 33, N5CRU 10, WA2VJL 4. (May) N5TC 182.

Cards and plaque courtesy W6TC

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A data sheet and more information is available from Varian EIMAC. Or the nearest Electron Device Group sales office. Call or write today.

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Package 1 includes a self-contained unit that plugs directly into your Commodore 64 and a spectrum analyzer type tuning indicator that is as good as a scope for tuning.

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AEA CP-1 TU	retail	239.95
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AEA TI-1 Tuning Indicator	retail	119.95
One Mic Connector 4 or 8 pin	retail	4.95
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DON'S CORNER

Well, it seems like the contest season just ended yet here it is again. That means it's time to check out all the equipment and the antennas. Coax seems to be the biggest problem down here this year. So be sure that you check out the coax so you can get the last bit of gain from the antenna. BELDEN has a new affordable professional coax that *is very popular with the guys in this area; it is the 9913 low* loss RG-8 type coax. It is very low loss up to 1.2 Ghz. Loss below 50 Mhz. is less than .9 db/100 feet. At $.45/foot it is a real bargain. It uses the normal connectors and as always, be sure to use COAX-SEAL on all the exposed connections. Til next month. 73.

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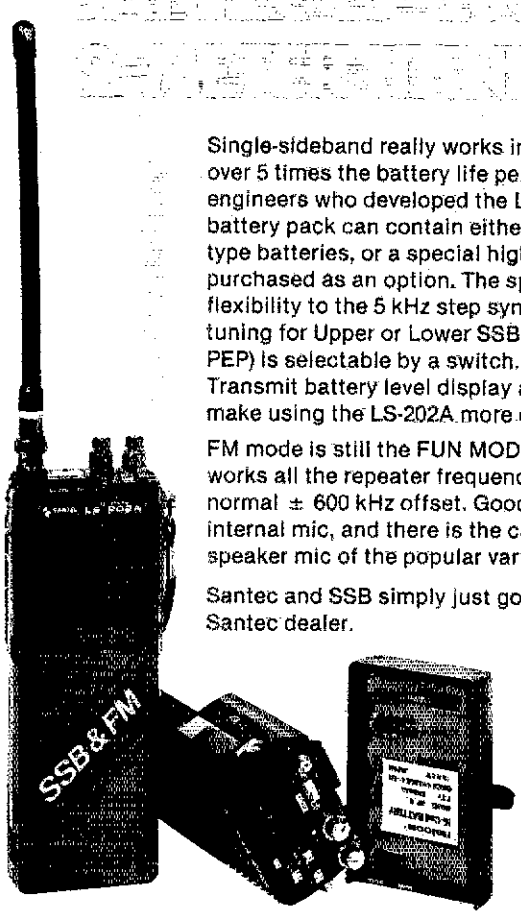

Single-sideband really works in nonrepeater situations and has over 5 times the battery life per battery charge according to the engineers who developed the LS-202A. The slide-on, locking battery pack can contain either Ni-Cd 'AA' cells or 'AA' alkaline-type batteries, or a special higher voltage Ni-Cd pack can be purchased as an option. The special VXO and RIT circuits add flexibility to the 5 kHz step synthesizer to provide continuous tuning for Upper or Lower SSB. High (2.5 W PEP) or Low (0.5 W PEP) is selectable by a switch. Lighted receive 'S-Meter' with Transmit battery level display and thumb-wheel switch lighting make using the LS-202A more comfortable.

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Voltage Range	6–12 VDC
Current Drain	30 mA RX Standby 750 mA TX Peak
Power Output	2.5 W PEP (9 V) 3.5 W PEP (10.8 V)
Receiver Bandwidth	2.4 kHz (– 6 dB) SSB 15 kHz (– 6 dB) FM
Sensitivity	0.25 uV (12 dB S/N) SINAD
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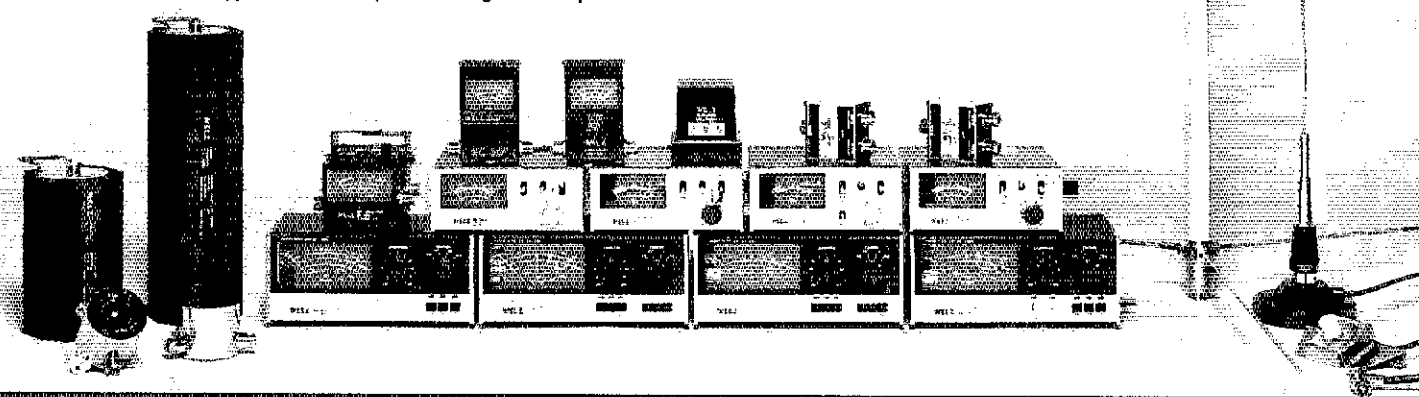

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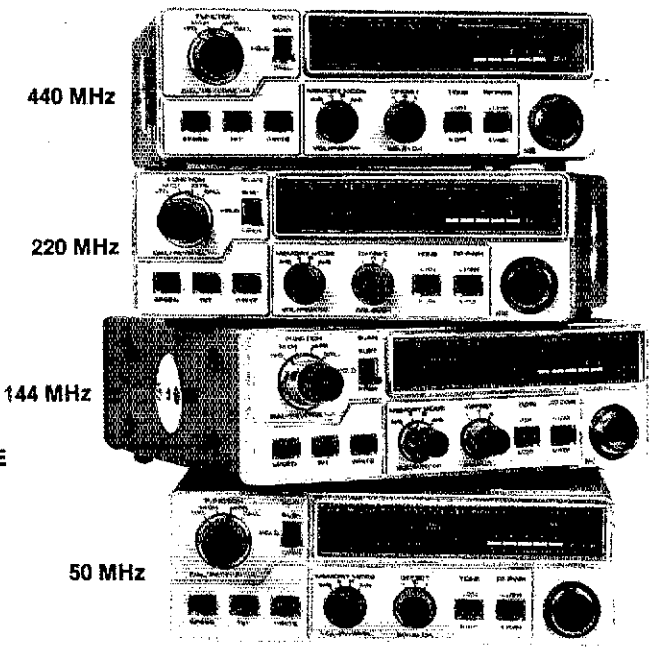

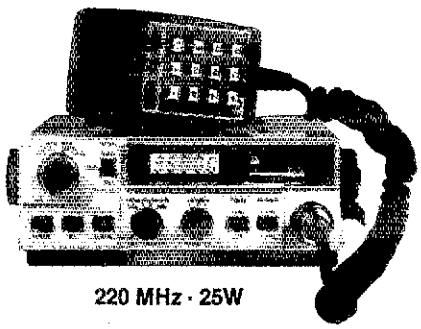

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The THL line of antenna couplers provides fine quality hand crafted antenna matching networks for both low power applications and larger power amplifiers running the legal limit. The THL antenna coupler series has full features like built-in antenna switching for changing antennas or by-passing the coupler and an accurate V.S.W.R./power output indicator on all models. Sturdy construction and honestly rated components and capabilities make the THL series of tuners your best choice.

THL has introduced a unique 440 MHz handheld product, the MICRO-7 utility transceiver. This transceiver can be on the air for less than you would ever guess. THL now has 1 dB GAS-FET pre-amplifier for the 2 m and the 70 cm bands. See your THL dealer for details.

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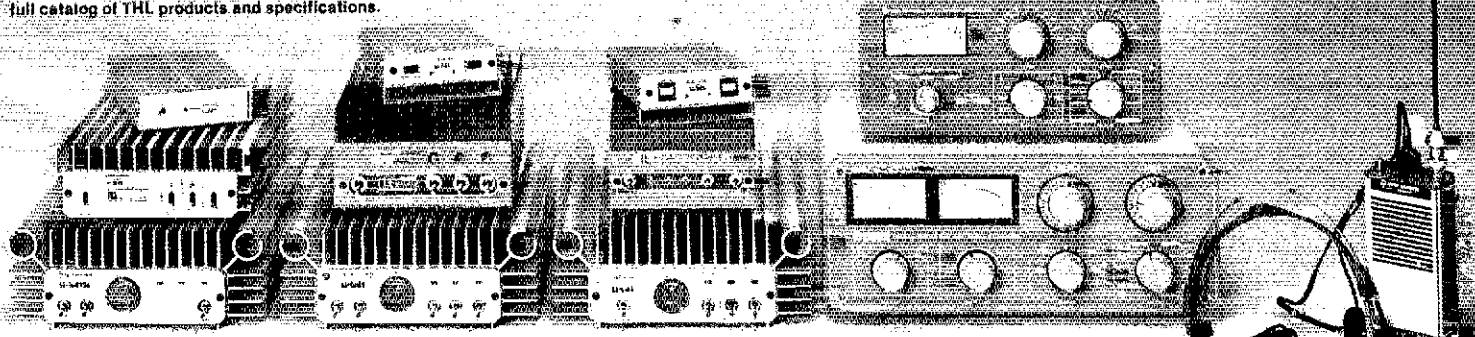

Bottom row: HL-160V25 25W in 150W out 2m • HL-160V - 3 or 10W in for 160W out 2m • HL-90U 10W in 90W out UHF • HC-2000 2KW antenna tuner • Second Row: HL-110 3 or 10W in 100W out 2m • HL-82V 10 in 80W out 2m • HL-45U 10W in 45W out UHF • HC-400 200W antenna tuner and VSWR Power Meter • Third Row: HL-30V economy HT amp 3W in 30W out 2m • HL-32V 3W in 15 or 30W out 2m SSB or FM portables • HL-20U .2 or 3W in 20W out UHF • HC-200 the Economy-With-Quality HF antenna tuner. An HRA2 GAS-FET preamp sits atop the HC-200 • Also shown is the MICRO-7 Utility UHF transceiver and headset.

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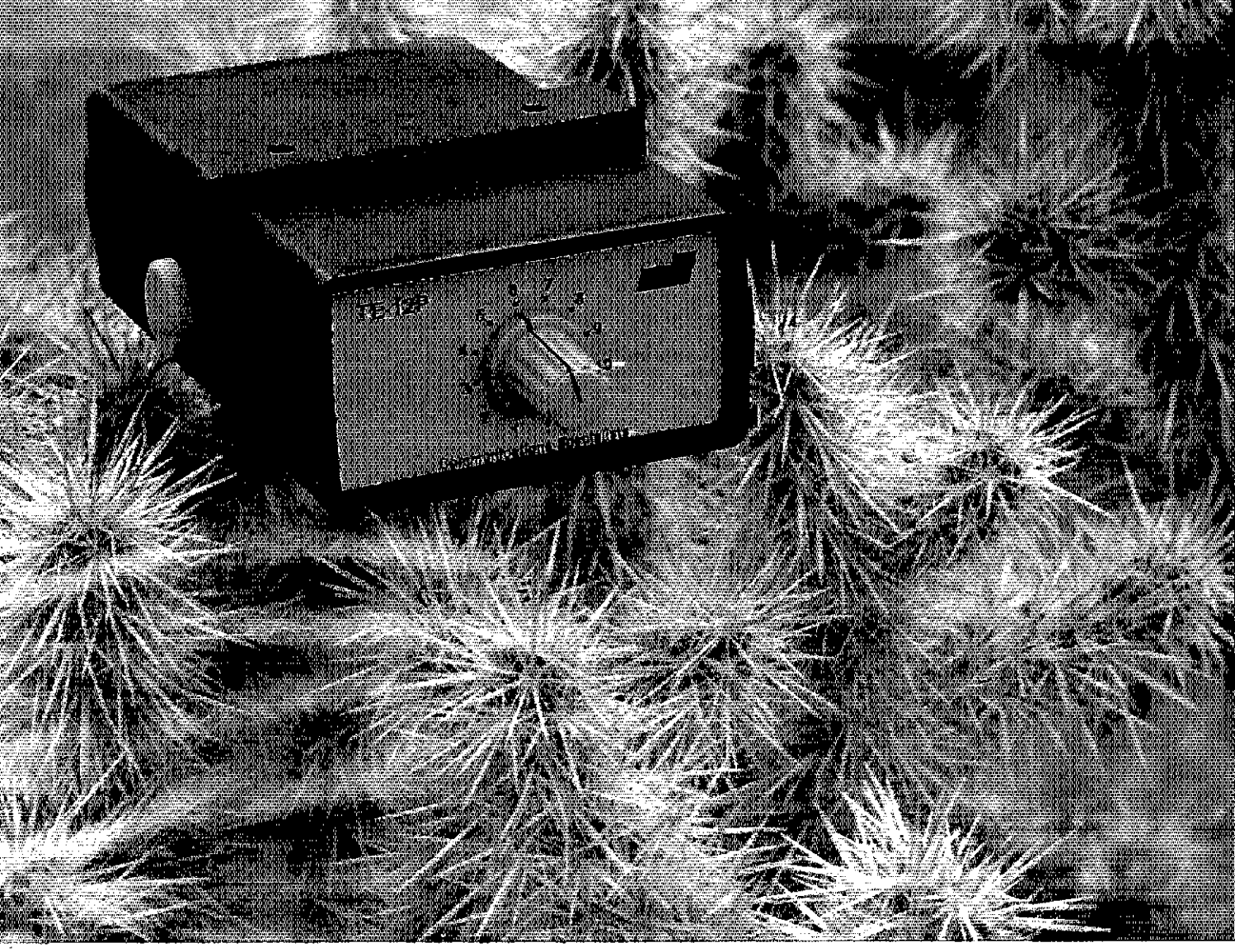
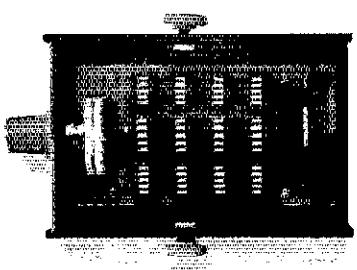


Stuck with a problem?

Our TE-12P Encoder might be just the solution to pull you out of a sticky situation. Need a different CTCSS tone for each channel in a multi-channel Public Safety System? How about customer access to multiple repeater sites on the same channel? Or use it to generate any of the twelve tones for EMS use. Also, it can be used to access Amateur repeaters or just as a piece of versatile test equipment. Any of the CTCSS tones may be accessed with the TE-12PA, any of the audible frequencies with the TE-12PB. Just set a dip switch, no test equipment is required. As usual, we're a stickler for 1day delivery with a full 1 year warranty.

- Output level flat to within 1.5db over entire range selected.
- Immune to RF.
- Powered by 6-30vdc, unregulated at 8 ma.
- Low impedance, low distortion, adjustable sinewave output, 5v peak-to-peak.
- Instant start-up.



TE-12PA

67.0 XZ	85.4 YA	103.5 1A	127.3 3A	156.7 5A	192.8 7A
71.9 XA	88.5 YB	107.2 1B	131.8 3B	162.2 5B	203.5 M1
74.4 WA	91.5 ZZ	110.9 2Z	136.5 4Z	167.9 6Z	
77.0 XB	94.8 ZA	114.8 2A	141.3 4A	173.8 6A	
79.7 SP	97.4 ZB	118.8 2B	146.2 4B	179.9 6B	
82.5 YZ	100.0 1Z	123.0 3Z	151.4 5Z	186.2 7Z	

- Frequency accuracy, ±.1 Hz maximum −40°C to +85°C
- Frequencies to 250 Hz available on special order.
- Continuous tone

TE-12PB

TEST-TONES:	TOUCH-TONES:		BURST TONES:			
600	697	1209	1600	1850	2150	2400
1000	770	1336	1650	1900	2200	2450
1500	852	1477	1700	1950	2250	2500
2175	941	1633	1750	2000	2300	2550
2805			1800	2100	2350	

- Frequency accuracy, ±1 Hz maximum −40°C to +85°C
- Tone length approximately 300 ms. May be lengthened, shortened or eliminated by changing value of resistor

$89.95

COMMUNICATIONS SPECIALISTS

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(800) 854-0547/California: (714) 998-3021

MasterCard VISA

ICOM Handhelds

2 Meter, 220 or 440 MHz

Battery Pack	Nominal Transceiver Power (watts)
BP2	1.0
BP3	1.5
BP5	2.3
BP8	1.5

IC-DC1
DC Regulator
12 VDC in/9.6 out
(comes with DC cord—will not get power from BC30)

IC-BP2
Battery Pack
7.2 VDC 425 mAH
1.5 hr charge

IC-BP3†
Battery Pack
8.4VDC 250 mAH
15 hr. charge

IC-BP4*
Battery Case

10.8 VDC, 425mAH
1.5 hr charge

IC-BC25U
AC Wall Charger
117 VAC in/
12 VDC out

Charger
Battery
Determines
Charge Rate)

IC-ML1 12 VDC
144 MHz Booster
10W out/12 VDC
Comes with 5 feet
Coax, BNC to PL-259

IC-CP1
Cigarette Lighter
Cord w/Fuse
(charges BP3/powers DC1)

Requires BC35 Charger

†Will charge from BC35, BC25U, stet CP1 or 12 VDC Direct (internally regulated)

††Accept 6 AA size batteries - Alkaline or NiCd (Do not attempt to charge Alkaline batteries)

ICOM's reliable, field proven, handhelds have been the most popular handheld on the market. Here's a few reasons why:

The Transceivers. The IC-2AT features full coverage of the 2 meter ham band. The IC-3AT covers 220 to 224.99 MHz, and the IC-4AT has 440 to 449.995 MHz. Each radio is only 2.6in x 1.4in x 6.5in in size. Excellent audio quality is provided by a quality speaker and an electret condenser microphone. All have 1.5 watt output and battery saving 0.15 watt low power. Touch Tone™ pad is included (on "T" models).

Standard Equipment. Each transceiver comes compiete — ready to use — with BP3 rechargeable battery, AC wall charger, flexible antenna, earphone, wrist strap, and belt clip...all standard.

The System. Accessories for the handheld series are interchangeable between transceivers. Slide in removable battery packs allow quick changing of batteries. Batteries may be charged when removed from the transceiver.

NEW Accessories Available:
IC-BP8 long-life 800mAH Battery Pack (rechargeable with BC-35), BC-16U Wall Charger (BP8 only), HS-10 Headset and HS-10SB PTT Switchbox.

ICOM
The World System

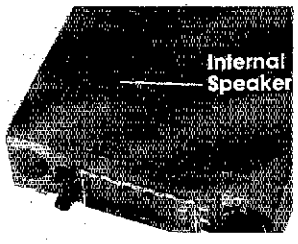
ICOM America, Inc., 2112-116th Ave NE, Bellevue, WA 98004 / 3331 Towerwood Drive, Suite 307, Dallas, TX 75234

All stated specifications are approximate and subject to change without notice or obligation. All ICOM radios significantly exceed FCC regulations limiting spurious emissions. HW786

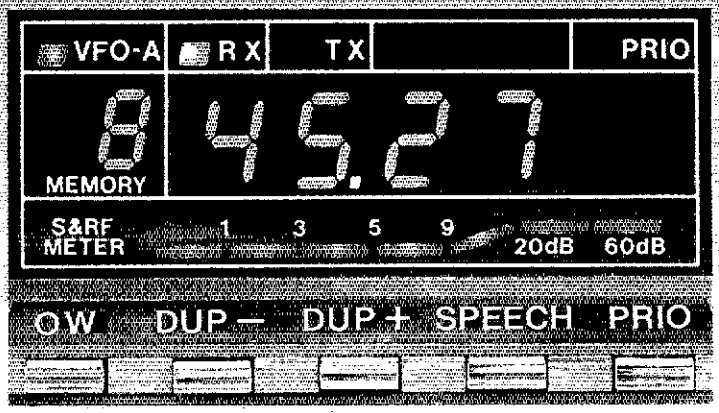
ICOM IC-27H

Ultra Compact 45 Watt 2-Meter Mobile!

Now ICOM offers the best ces in compact 2-meter FM iles. the IC-27H 45-watt com- (1⅝"H x 5½"W x 9¾"D) and C-27A 25-watt super com- mobile. The IC-27A and 7H are the smallest full- ured 2-meter mobile trans- ers available, and feature an nal speaker for easy installa- For the ultimate portable on, the IC-37A 220MHz and 7A 440MHz 25 watt compact iles are also available.



45 Watts. The IC-27H provides atts of output power, while C-27A provides 25 watts of ut power.



32 PL Frequencies. The IC-27A and IC-27H come complete with 32 PL frequencies ready to go and are controlled from the front panel knob. Each PL frequency may be selected by the main tuning knob and stored into memory for easy access along with frequency and offset.

9 Memories. The IC-27A and IC-27H have nine memories available to store receive frequency, transmit offset, offset direction, and PL tone. Memories are backed up by a lithium backup battery, which will store memories for up to seven years.

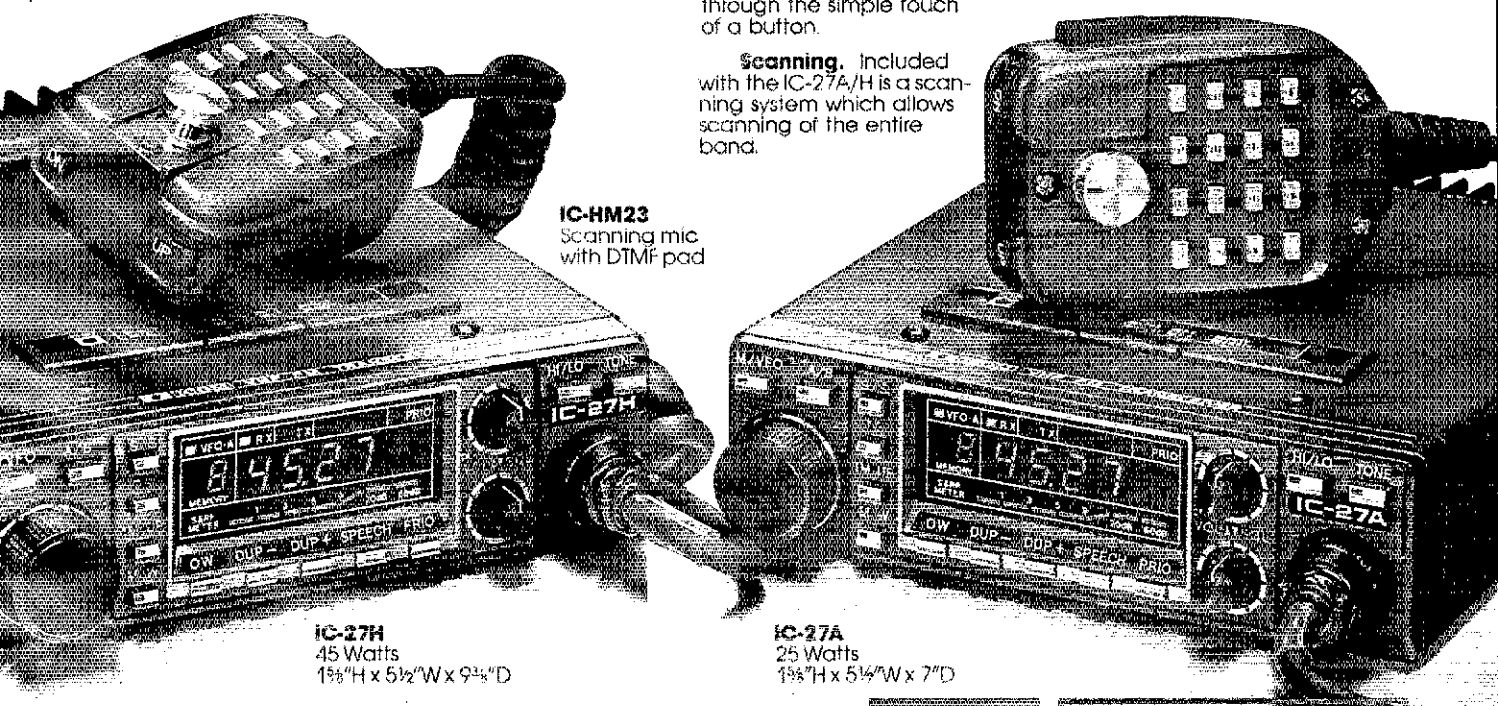
Speech Synthesizer. As an added plus, the IC-27A/H features an optional speech synthesizer to verbally announce the receiver frequency of the transceiver through the simple touch of a button.

Scanning. Included with the IC-27A/H is a scanning system which allows scanning of the entire band.

Priority Scan. Priority may be selected to be either a memory channel or a VFO channel. By using sampling techniques, the operator can determine if a frequency of interest is free or busy.

See the IC-27A/H compact mobile transceivers at your local ICOM dealer. For superb performance, reliability, and the ultimate in a VHF mobile radio, your only choice is an ICOM.

The IC-25A 2-meter 25-watt mobile and its 45-watt companion, the **IC-25H**, are also available.



IC-HM23
Scanning mic with DTMF pad

IC-27H
45 Watts
1⅝"H x 5½"W x 9¾"D

IC-27A
25 Watts
1⅝"H x 5¼"W x 7"D

Also Available: IC-37A 220MHz and IC-47A 440MHz Compact Mobiles

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★ *30 day Warranty*
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RS-10A 7.5A ps $ 49 me
CES
510-SA Smart patch $229 w
COLLINS
75S-3 Ham Receiver $269 f
75S-3A Ham Receiver 299 m
75S-3B Ham Receiver 299 m
32S-1 Transmitter 179 mc
32S-3 Transmitter 329 f
312B-4 Station control 189 f
KWM-2 Xcvr 439 f
516F-2* AC supply 149 mwfc
*Not sold separately
KWM-380 Xcvr sn 2208 3695 e
516F-1 AC ps; KWM-1 75 m
MP-1 DC supply 49 m
DAIWA
AF-306 Active audio filter $ 24 w
CNW-418 Ant tuner 129 v
DENTRON
MT-3000A Ant tuner $229 m
GLA-1000/tuned input 239 v
W-2 Wattmeter 59 v
DRAKE
R-4A Ham Rcvr $149 mf
R-4B Ham Rcvr 219 mwfc
R-4C Ham Rcvr 269 mwv
MS-4* Speaker 19 mwfcv
*Not sold separately
4NB Noise blanker 49 mwv
FL-250 250 Hz filter 35 e
FL-500 500 Hz filter 35 wve
FL-1500 1.5 KHz filter 35 v
SC-2 2m rcv conv 59 m
SC-6 6m rcv conv 59 m
CPS-1 Conv ps 19 m
CC-1 Conv console 29 m
TC-2 2m Xmit conv 275 m
R-7 SW Receiver 799 f
T-4XB Transmitter 219 wcv
T-4XC Transmitter 269 mwfv
TR-3 Xcvr 199 wf
TR-4 Xcvr 229 v
TR-4/NB Xcvr/blanker 249 f
TR-4C Xcvr 269 f
TR-4C/NB Xcvr 289 m
TR-4CW Xcvr 329 m
TR-4CW/RIT Xcvr 369 mw
RV-4 Remote VFO 69 v
AC-3* AC supply 59 mwfv
AC-4* AC supply 89 mwfcv
*Not sold separately
DC-3 DC supply 39 fv
TR-7 Xcvr 649 mwf
TR-7/6 KHz filter/fan 689 w
TR-7/300/500 Hz 699 mf
TR-7/500 Hz/6 KHz 699 w
TR-7/NB/fan 719 w
TR-7/500 Hz/6 KHz/fan 719 m
TR-7/500 Hz/NB 725 f
TR-7/300 Hz/1.8/6 KHz 725 m
TR-7/500 Hz/1.8/6/aux 749 m
TR-7/300/1.8/NB/fan 769 v
TR-7/500/1.8/6/NB/fan 799 m
TR-7/300/500/6/NB/aux 799 m
TR-7/3/5/18/nb/aux/fan 819 e
PS-7* Power supply 199 mwfve
*Not sold separately
PS-75 Power supply 99 m
MS-7 Speaker 29 v
RV-7 Remote VFO 99 mv
FA-7 Fan 19 m
SL-300 300 Hz filter 45 v
SL-1800 1.8 KHz filter 45 v
7077 Desk mic 29 mf
LA-7 Line amp 29 m
L-4B Linear 695 m
7000E Terminal 269 mw
9000E Terminal 469 m
ESR-24 Satellite Rcvr 399 m
E-TEK
FR-4 Dig disp; Drake 4-line $ 59 m
ELECTRA
DX-1000 SW Receiver $299 e
GILLASPIE
7600A Sat Rcvr (Demo) $199 m
HAL
RKB-1 RTTY keyboard $ 49 m
CT-2200 Terminal 599 c
KB-2100 Keyboard 99 mc
DS-2000KSR Terminal 199 m
DS-3000KSR Term vers 2 469 m
DS-3000KSR Term vers 3 569 e
CWR-6700 Rcv Telereader 269 m
HENRY
Tempo One Xcvr $249 f
AC One AC supply 89 f
DFD One Dig display 69 f
1KD-5 Linear 449 m
HY-GAIN/GALAXY
R-1530 SW Rcvr $299 m
IRL
FSK-1000 Demod w/keyer $269 f

ICOM
IC-701 Xcvr w/ps $499 mf
IC-701 w/ps & CW filter 549 m
IC-701PS AC ps only 79 m
IC-720 Xcvr 629 mc
IC-720/FL-32 CW filter 659 w
IC-720A Xcvr 689 fe
IC-730 Xcvr 489 m
IC-730/FL-45 CW filter 519 mw
IC-740 Xcvr 629 f
IC-740/FM Xcvr 649 f
IC-740/ssb/cw/mk/fm/kyr 789 m
IC-740/int ps/FL-44 filt 799 m
IC-745 Xcvr 599 m
PS-15 Power supply 99 mfcve
PS-20 Power supply 159 m
PS-30 Systems ps 179 f
RM-2 Keybd freq control 69 m
AT-100 100w auto tuner 229 m
AT-500 500w auto tuner 299 f
AH-1 Mobile ant/tuner 159 mw
Spkr/patch; 751 99 m
IC-2KL Linear 999 f
R-70 SW Rcvr 459 f
IC-502A 6m SSB port 149 m
IC-551 6m Xcvr/ps 299 m
IC-25A/grn 2m FM Xcvr 219 e
IC-202 2m SSB port 129 w
IC-211 2m Xcvr 329 mwc
IC-255A 2m FM Xcvr 179 m
IC-280 2mFM remote Xcvr 169 mf
IC-451A 430-440 Xcvr/ps 469 mwf
IC-490A 430-440 Xcvr 449 m
SM-5 Desk mic 25 me
HM-12 Hand mic 25 m
KLM
PA15-40BL 2m 15/40w $ 69 w
KANTRONICS
Hamtext for VIC-20 $ 59 w
Field Day 2 Reader 99 m
KENWOOD
R-599D Ham Receiver $199 c
TS-120S Xcvr 389 cv
PS-30 Power supply 99 m
VFO-120 Remote VFO 99 v
TS-180S/DFC Xcvr 469 w
TS-180S/DFC/CW filter 499 mf
PS-430 Compact ps 99 w
AT-230 Ant tuner 129 m
TS-520 Xcvr 399 mfve
TS-520/CW filter 429 e
TS-520S Xcvr 429 mc
TS-520S/CW filter 459 c
TS-520SE Xcvr 449 e
TS-520SE/CW filter 469 m
VFO-520 Remote VFO 99 c
TS-530S Xcvr 489 f
YK-88C CW filter 35 w
YG-455C CW filter 59 w
TS-820/DG-1 Dig Xcvr 529 e
TS-820S Xcvr 549 e
TS-820S/CW filter 579 m
VFO-820 Remote VFO 129 m
TS-830S Xcvr 659 mf
TS-830S/CW filter 689 m
TS-830S/CW/SSB filters 719 m
TS-830S/2 CW filts/KB-1 729 m
DFC-230 Dig freq control 119 wc
DFC-230 (new close-out) 169.95 mwfv
VFO-240 Remote VFO 119 f
TS-930S w/tuner/CW filt 1299 m
BS-8 Pan kit 49 we
R-1000 SW receiver 299 v
TV-502S 2m transverter 189 m
TS-600 6m Xcvr 449 m
TS-700 2m Xcvr 299 c
TS-700A 2m Xcvr 349 m
TR-7400A 2m FM Xcvr 179 m
TR-7625 2m FM Xcvr 189 we
TR-7730/TTP 2m FM 215 e
TR-7950 2m FM Xcvr 289 mf
TR-8400 440 FM Xcvr 269 m
RM-76 Control unit 49 fe
KPS-7 6A power supply 59 mf
TR-2400 2m FM HT 189 m
MC-50 Desk mic 29 v
MFJ
496 Super Keyboard II $189 e
816 SWR/wattmeter 18 v
949B Ant tuner 89 w
16010 Wire tuner 19 v
MACROTRONICS
TA-650 Interface/Apple $ 89 m
CA-650 Interface/Apple 89 m

MICROLOG
ACT-1 Terminal $289 w
NEC
JB-1201M 12" grn monitor $129 m
NYE VIKING
SKM-1 Memory keyer $129 w
046-001 Phone patch 35 f
REGENCY
HRT-2 2m FM HT $ 49 m

ROBOT
70 Monitor $169 v
400 Scan converter 329 m
800 Terminal 289 m
800H/800CH krt Term 389 c
SONY
ICF-2001 SWL Rcvr $149 f
SWAN/CUBIC
102BX Xcvr/PSU-6 ps $569 e
TEN-TEC
574 Century/21 digital $289 m
525 Argosy Xcvr 349 e
276 Calibrator 19 w
225 Power supply 89 e
520 Triton II Xcvr 299 m
544 Triton IV Dig Xcvr 349 w
546 Omni-D series B 429 m
546C Xcvr/2 filts/nb 659 m
560 Corsair Xcvr 789 me
560 Xcvr/CW filter 829 c
263 Remote VFO 139 m
580 Delta Xcvr 429 mc
283 Remote VFO 129 w
252 Power supply 79 m
260 Power supply 139 me
262G Power supply 89 c
280 Power supply 99 m
670 Keyer 19 m
277 Ant tuner/SWR 59 c
214 Desk mic 29 m
215P Desk mic 25 c
TRAC
TE-464 Keyer/CW proc $ 49 m
TRIONYX
TR-1000 Freq counter $ 99 w
VOCOM
Power Pocket Amp $129 m
WILSON
YM-1000 Sat Rcvr $299 m
YAESU
FR-101 Ham Rcvr $269 m
FR-101DIG/6m/2m/FM 299 m
FT-101 Transmitter 269 m
FT-101B Xcvr 389 m
FT-101E Xcvr 449 m
FT-101EE Xcvr 429 m
FT-101EE/CW filter 459 v
FT-101EX Xcvr 399 m
FT-101EX/AM filter 429 m
FT-101Z/CW filt/fan 499 m
FT-101ZD Dig Xcvr 499 mwv
FT-101ZD/CW filt/FM 549 m
FT-101ZD Mk II Xcvr 569 mc
FV-101Z Remote VFO 89 v
FV-101DM Scan VFO 119 m
SP-101B Speaker 19 m
SP-101PB Spkr/patch 49 w
YC-601 Dig display 99 m
FT-301 Xcvr 289 m
FT-301DIG/CW filter 369 m
FP-301 Power supply 99 m
ERB Ext relay box 19 mw
FT-7 20w Xcvr 269 m
FP-4 4A ps 29 m
FT-7B Xcvr 349 c
FT-901DM Xcvr 5[illegible] v
FT-902DM Xcvr 799 mw
SP-901 Speaker 25 v
YO-901P Scope 349 m
FT-107M/DMS Xcvr 529 w
FV-107 Remote VFO 89 m
FT-707 Xcvr 399 m
FV-707DM Dig VFO 99 m
FTV-707 Xvtr unit 89 f
FT-980 Xcvr 1069 mc
FT-757GX Xcvr 589 f
FT-200 HF Xcvr 249 f
FP-200 AC supply 89 f
FV-200 Remote VFO 89 f
FL-2100F Linear 389 v
FRG-7700 SW Rcvr 329 m
FRA-7700 Active ant 19 m
FRV-7700F Rcv VHF conv 89 f
FT-620B 6m Xcvr 289 w
FT-627RA 6m FM Xcvr 229 m
FT-225RD 2m Xcvr 489 f
FT-290R 2m portable 239 w
FT-480R 2m Xcvr 329 m
FT-720RVH 2m FM Xcvr 179 m
S-72/E-72L Box/cable 69 m
FT-730 440/ces 500SA 369 v
FT-780R 430 Xcvr 459 m
FT-404R/TTP 440 HT 129 m
SC-1 Stn console 89 m
FP-80 4.5A ps 69 w
YD-148 Desk mic 19 v
YD-844A Desk mic 19 m

7-26-84

(1) This list was prepared from an inventory taken on the date shown. The letters after the prices indicate in which store the equipment was located at that time. The quantities vary. In some cases there are several of an item; others, only one. Due to the lead and distribution time of this publication, some of the items may have already been sold by the time you see this ad. However, due to the number of trades we are involved in each day, some items are in stock that are not listed. (2) We reserve the right to sell certain power supplies and accessories only with matching transmitters or transceivers, depending on our stock situation. (3) Sometimes used gear is serviced after we receive your order. Please allow for a few days delay in shipping your order. (4) No trades on used gear. (5) Used gear policies do not apply to New Equipment special. Closeouts, etc.

USED AES SHOP TEST EQUIPMENT

HEWLETT-PACKARD
608E 10-480MHz sig gen 1895
8640B .5-1024Mhz sig gen w/options 002/003 5895

SINGER-GERTSCH
FM-10CS w/RFM-10A, FIM-3 & ODM-1 4995
OAM-1 AM module for FM-10C 395

HAL New Equipment Specials

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Portable terminal with 5" CRT/Keyboard
$699.95

CT-2100
Comm. Terminal with **KB-2100** Keyboard
$699.95

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f = Orlando, FL 32803; 621 Commonwealth Ave	(305) 894-3238	1-800-327-1917	1-800-432-9424
c = Clearwater, FL 33515; 1898 Drew Street	(813) 461-4267		
v = Las Vegas, NV 89106; 1072 N. Rancho Drive	(702) 647-3114	1-800-634-6227	
e = Chicago, IL Erickson Communications (Associate)	(312) 631-5181		

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hy-gain®

Rediscover 40 meters with the DISCOVERER SERIES

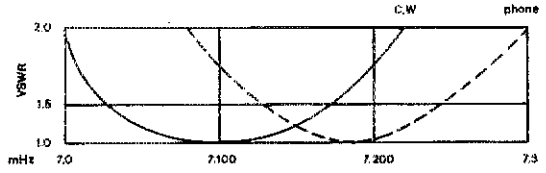
Rotatable Dipole or Monoband Beams

This 40 meter antenna series gives you three choices. The Discoverer 7-1 which is a rotatable dipole. Or the Discoverer 7-2, a two-element beam you can upgrade to three elements with a kit.

Whichever you choose, you'll get Hy-Gain's superior mechanical design. Such as tapered tubing to reduce weight and wind surface area. Maintenance-free stainless steel hardware and preformed clamps for an easy, rugged assembly.

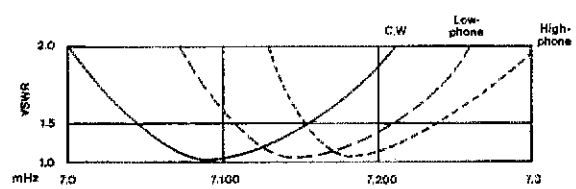
You also get superior performance. Wide bandwidth with SWR of 1.5:1 or less at resonance. High-Q efficiency because there are no high-loss coils. A low voltage feed point that eliminates insulator failure and assures that the antenna can handle twice the new legal power limit.

The Discoverer 7-1 dipole can be added to most existing rotatable beam installations. This model can be tuned to either 30 or 40 meters.

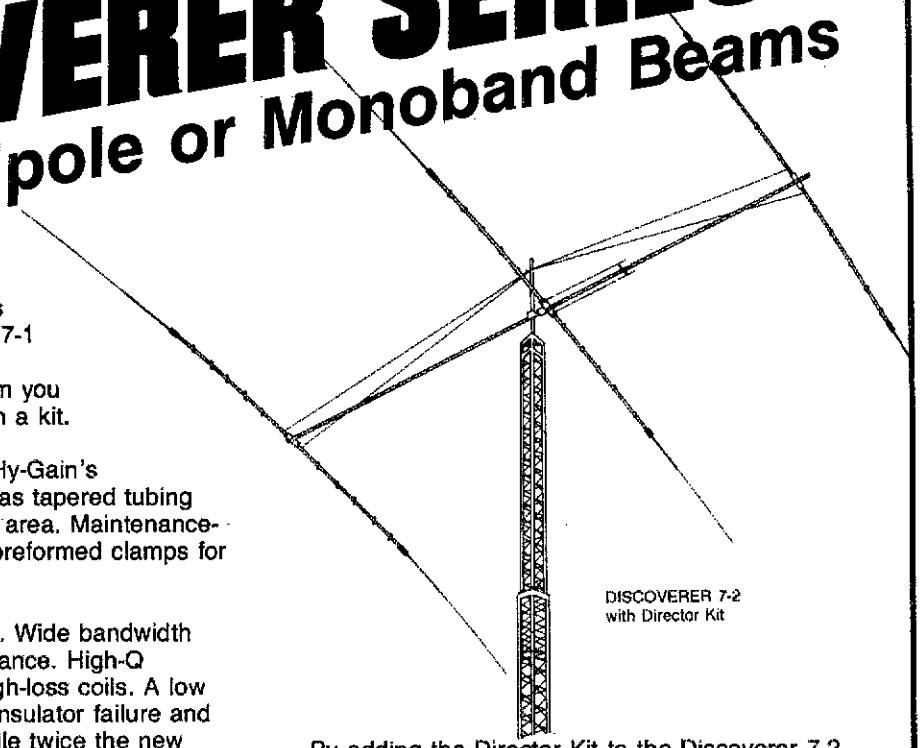


DISCOVERER 7-1

The Discoverer 7-2 requires only a 25 ft. (7.6 m) turning radius and opens communication doors you previously thought possible only on 20 meters. Combining the advantages of high forward gain and a high front-to-back ratio lets you hear and work stations you couldn't read on a dipole or vertical antenna. Best of all, you can upgrade this antenna anytime with the 373S Director Kit.

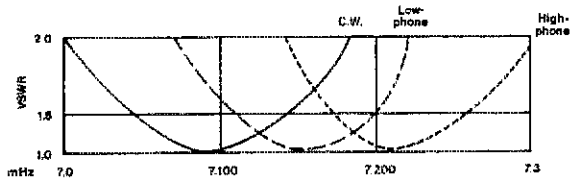


DISCOVERER 7-2



DISCOVERER 7-2 with Director Kit

By adding the Director Kit to the Discoverer 7-2 you create a three-element beam on a boom of only 35 ft. (10.7 m), that outperforms many of the heavy-weight giants with much longer booms. In fact, the kit doubles the effective radiated power of the Discoverer 7-2, and nearly doubles the front-to-back ratio. And, because the antenna is still more compact than a "giant", you only need a medium-duty tower such as the HG52SS. All of which saves you money and space without compromising safety or performance.



DISCOVERER 7-2 WITH 373S KIT

The Hy-Gain Discoverer series gives you three choices, just when declining sunspot activity lends renewed importance to the 40 meter band.

TELEX hy-gain®

TELEX COMMUNICATIONS, INC.

9600 Aldrich Ave. So., Minneapolis, MN 55420 U.S.A.
Europe: Le Bonaparte—Office 711, Centre Affaires Paris-Nord,
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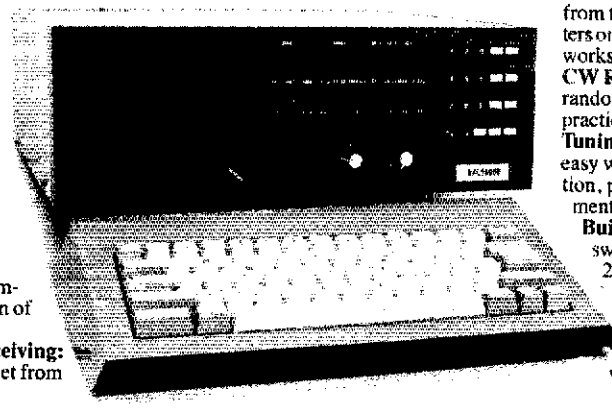
THE STANDARD OF EXCELLENCE

The world of CW, RTTY, and new DUAL AMTOR is as close as your fingertips with the new brilliantly innovative state-of-the-art microcomputer controlled* EXL-5000E.

Automatic Sender/Receiver: Due to the most up to date computer technology, just a console and keyboard can accomplish complete automatic send/receive of Morse Code (CW), Baudot Code (RTTY), ASCII Code (RTTY) and new ARQ/FEC (AMTOR).
Code: Morse (CW includes Kana), Baudot (RTTY), ASCII (RTTY), JIS (RTTY), ARQ/FEC (AMTOR).
Characters: Alphabet, Figures, Symbols, Special Characters, Kana.
Built-in Monitor: 5" high resolution, delayed persistence green monitor – provides sharp clear image with no jiggle or jitter even under fluorescent lighting. Also has a provision for composite video signal output.
Time Clock: Displays Month, Date, Hour and Minute on the screen.
Time/Transmission/Receiving Feature: The built-in timer enables completely automatic TX/RX without operator's attendance.
Selcal (Selective Calling) System: With this feature, the unit only receives messages following a preset code. Built-in Demodulator for High Performance: Newly designed high speed RTTY demodulator has receiving capability of as fast as 300 Baud. Three-step shifts select either 170Hz, 425Hz or 850Hz shift with manual fine tune control of space channel for odd shifts. HIGH (Mark Frequency 2125Hz)/LOW (Mark Frequency 1275Hz) tone pair select. Mark only or Space only copy capability for selective fading. ARQ/FEC features incorporated.
Crystal Controlled AFSK Modulator: A transceiver without FSK function can transmit in RTTY mode by utilizing the high stability crystal-controlled modulator controlled by the computer.
Photocoupler CW, FSK Keyer built-in: Very high voltage, high current photocoupler keyer is provided for CW, FSK keying.
Convenient ASCII Key Arrangement: The keyboard layout is ASCII arrangement with function keys. Automatic insertion of LTR/FIG code makes operation a breeze.
Battery Back-up Memory: Data in the battery back-up memory, covering 72 characters x 7 channels and 24 characters x 8 channels, is retained even when the external power source is removed. Messages can be recalled from a keyboard instruction and some particular channels can be read out continuously. You can write messages into any channel while receiving.
Large Capacity Display Memory: Covers up to 1,280 characters. Screen Format contains 40 characters x 16 lines x 2 pages.
Screen Display Type-Ahead Buffer Memory: A 160-character buffer memory is displayed on the lower part of the screen. The characters move to the left erasing one by one as soon as they are transmitted. Messages can be written during the receiving state for transmission with battery back-up memory or SEND function.
Function Display System: Each function (mode, channel number, speed, etc.) is displayed on the screen.
Printer Interface: Centronics Para Compatible interface enables easy connection of a low-cost dot printer for hard copy.
Wide Range of Transmitting and Receiving: Morse Code transmitting speed can be set from the keyboard at any rate between 5-100 WPM (every word per minute). AUTOTRACK on receive. For communication in Baudot and ASCII Codes, rate is variable by a keyboard instruction between 12-300 Baud when using RTTY Modem and between 12-600 Baud when using TTL level. The variable speed feature makes the unit ideal for amateur, business and commercial use.
Pre-load Function: The buffer memory can store the messages written from the keyboard instead of sending them immediately. The stored messages can be sent with a keyboard command.
"RUB-OUT" Function: You can correct mistakes while writing messages in the buffer memory. Misspellings can also be erased while the information is still in the buffer memory.
Automatic CR/LF: While transmitting, CR/LF automatically sent every 64, 72 or 80 characters.
WORD MODE operation: Characters can be transmitted by word groupings, not every character, from the buffer memory with keyboard instruction.
LINE MODE operation: Characters can be transmitted by line groupings from the buffer memory.
WORD-WRAP-AROUND operation: In receive mode, WORD-WRAP-AROUND prevents the last word of the line from splitting in two and makes the screen easily read.
"ECHO" Function: With a keyboard instruction, received data can be read and sent out at the same time. This function enables a cassette tape recorder to be used as a back-up memory, and a system can be created just like telex which uses paper tape.
Cursor Control Function: Full cursor control (up/down, left/right) is available from the keyboard. Test Message Function: "RY" and "QBF" test messages can be repeated with this function.
MARK-AND-BREAK (SPACE-AND-BREAK) System: Either mark or space tone can be used to copy RTTY.
Variable CW weights: For CW transmission, weights (ratio of dot to dash) can be changed within the limits of 1:3-1:7.
Audio Monitor Circuit: A built-in audio monitor circuit with an automatic transmit/receive switch enables checking of the transmitting and receiving state. In receive mode, it is possible to check the output of the mark filter, the space filter and AGC amplifier prior to the filters.



CW Practice Function: The unit reads data from the hand key and displays the characters on the screen. CW keying output circuit works according to the key operation.
CW Random Generator: Output of CW random signal can be used as CW reading practice. **Bargraph LED Meter for Tuning:** Tuning of CW and RTTY is very easy with the bargraph LED meter. In addition, provision has been made for attachment of an oscilloscope to aid tuning.
Built-in AC/DC: Power supply is switchable as required; 100-120 VAC; 220-240 VAC/ 50/60Hz + 13.8VDC.
Color: Light grey with dark grey trim – matches most current transceivers. **Dimensions:** 363(W) x 121(H) x 351(D) mm; Terminal Unit.
Warranty: One Year Limited

Specifications Subject to Change

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any Hy-Gain rotator plus
any Hy-Gain tower

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If you've ever dreamed of a money saving package deal, this is the time. Order your HF beam antenna + rotator + tower package now.

Rebate offer expires October 31, 1984

Remember, **You** select any Hy-Gain HF beam antenna, rotator and tower
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*Telex/Hy-Gain will pay the freight within the 48 contiguous United States only.

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For orders and quotes call toll free: 800-336-4799

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Terms: No personal checks accepted. Prices do not include shipping. UPS COD fee: $2.25 per package. Prices are subject to change without notice or obligation. Returns are subject to a 15% restocking fee. All items are covered by the manufacturers' warranties.

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Our associate store
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Lacombe, Louisiana 70445
Information & Service: (504) 882-5355

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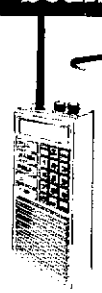

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HX3000 20-ch Handheld . 289.95

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R1040 10-ch, 6-band	126.95
MX3000 30-ch, 6-band mobile	186.95
MX5000 20-ch 25-512 MHz cont.	375.00
MX7000 25 MHz-1.2 GHz	CALL
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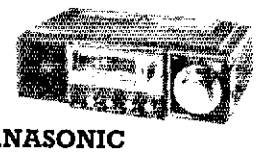
Z10 10-ch, 6-band	136.95



PANASONIC

RF 3100 SWL Receiver	268.00
RF 9 SWL Receiver	79.95
RFB 300 SWL Receiver	194.95

SONY

2002 SWL Receiver	209.95
4800 SWL Receiver	66.00
6500 SWL Receiver	119.95
7600A SWL Receiver	139.95

cushcraft

A3 3-element 10-15-20m	209.95
A4 4-element 10-15-20m	275.95
R3 10-15-20m Vertical	260.95
214B SSB/214FB FM 2m Boomers	75.95
ARX-2B 2m Ringo Ranger	35.50
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424B 24-element 435-437 MHz	76.95
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15-4CD 4-element 15m	118.95
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KT34XA 6-element 10-15-20m	479.95
2M-13LBA 13-element 2-meter	79.95
CS-2 Polarity Switcher	51.70
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2m-16LBX 16-element 2m	91.95

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Pro 37 7-element 10-15-20m	466.95

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G6-144B 2-meter Base Vertical	76.95
G7-144 2-meter Base Vertical	109.95
G6-440 440 MHz Base Vertical	96.95

MOBILE RESONATORS	Standard	Super
10 and 15 meter	10.95	16.95
20 meters	14.50	20.85
30 and 40 meters	16.95	22.95
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Amps

DAIWA

LA-2035 2m Amplifier, 2 in, 30 out	68.95

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B1016 2m Amplifier 10-160	235.95
B3016 2m Amplifier 30-160	199.95
D1010 10-100 Amp for 430-50	269.95
D1010N UHF Amp/N connectors	279.95
B215 2m Amp: 2 in, 150 out	245.95
A1015 6m Amp: 10 in, 150 out	235.95

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KENWOOD TL922 2kW . . . . . CALL

AMP SUPPLY HF AMPS/TUNERS

LA 1000A 160-15m Amp	389.95
AT 1200A 1200 PEP Tuner	169.95

VOCOM AMPLIFIERS

2 watts in, 30 watts out 2m Amp	67.95
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393S TH5DX 5-ele 10-15-20m	386.95
398S Explorer 14 10-15-20m	304.95
203S 3-element 2-meter Beam	21.95
208S 8-element 2-meter Beam	34.80
214S 14-element 2-meter Beam	41.95
BN86 Beam Balun	19.95
V2S 2-meter Vertical	42.95
V4S 440 MHz Vertical	50.95
Other Hy-Gain models available	CALL

CRANK-UP TOWERS

HG37SS 37-feet tall	695.95
HG52SS 52-feet tall	1016.95
HG54HD 54-feet/higher load	1587.95
HG70HD 70-feet/higher load	2589.44

Order Hy-Gain tower, Hy-Gain antenna, and Hy-Gain rotor and receive free shipping on all.

HY-GAIN REBATE

Order by October 31, 1984 to receive factory rebate on Hy-Gain HF beam, rotator, and tower package. Rebates $150 with HG52SS or HG37SS, $200 with HG54HD, and $400 with HG70HD. Free shipping to 48 contiguous states.

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144 2-meter Antenna	41.95
220 220 MHz Vertical	41.95
440 440 MHz Vertical	57.95

MORE ANTENNAS

AVANTI HM 151.3G 2m On-glass	30.95
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BUTTERNUT HF6V 10-80m Vert	114.95
BUTTERNUT 2MCV5 2m	37.50
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Cushcraft A1441OT 10-ele	47.95
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Cushcraft AOP1 Package	137.95
KLM 2m-14C 2m 14-ele Circular	88.95
KLM 435-18C 18-ele Circ Polar	111.19
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Accessories

BENCHER PADDLES

Black/Chrome	37.95/47.95

ASTRON POWER SUPPLY SALE

RS7A	49.95	RS20M	104.95
RS12A	69.95	RS35M	149.95
RS20A	88.95	VS20M	124.95
RS35A	132.95	VS35M	169.95
RS50A	189.95	RS50M	209.95

AEA KEYERS

BT-1 Morse Trainer	79.95
MM-2 Morsematic Keyer	169.95
CK-2 Contest Keyer	149.95
KT-2 Trainer/Keyer	114.95
KT-3 Trainer/Keyer	114.95

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Procom 350 Headset/Mic	84.95
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Self-supporting towers:

HBX40 40-feet with Base	188.95
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Other BX, HBX, HDBX in stock

Guyed foldover towers:

FK2558 58-feet, 25G	891.00
FK4554 54-feet, 45G	1254.00

Other sizes at similar savings. Foldovers shipped freight paid. 10% higher west of the Rockies.

Straight Sections:

20G Straight Section	32.95
25G Straight Section	45.95
45G Straight Section	107.50

Complete Tower Packages:

	25G	45G
40'	467.95	823.95
50'	516.95	933.95
60'	567.95	1042.95

Each package includes top section, mid section, base, rotor shelf, guy brackets, guy wire, turnbuckles, equilizer plates, guy anchors, cable clamps, thimbles. Ask about substitutions and custom designs. Tower packages are shipped freight collect FOB our warehouse.

Tri-Ex

W36 36-feet tall	949.00
WT51 51-feet tall	929.00
LM354 54-feet/higher load	1575.00
DX86 86-feet/motor/highest load	Call

Shipping not included. Shipped direct from factory to save you money.

TOWER ACCESSORIES

3/16" EHS Guywire	18¢/ft
1/4" EHS Guywire	20¢/ft
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1/2 x 12" Turnbuckle	17.50
Insulators 504	3.60
1/2 x 12" Base Bolt	2.90
3/4 x 12" Pier Pin	2.90

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989 3 kW Antenna Tuner	285.95
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949B 300 watt Deluxe Tuner	122.00
941D 300 watt Tuner switch/meter	89.95
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752B Dual Tunable SSB/CW Filter	79.95
Keyers—401, 406, 408, 422, 462, 484	CALL

B & W

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376 5-position Coax Switch	22.50
425 1 kW Low Pass Filter	25.50
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595 6-position Coax Switch	28.95
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370-15 All-band Dipole Antenna	129.95

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CNW-518 Antenna Tuner 2.5 kW	279.95

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Hy-Gain CD45 II	138.95
Hy-Gain Ham IV	220.95
Hy-Gain Tailtwister T2X	265.95
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Kenpro KR500 Elevation Rotator	185.95

Buy any HF Beam and get an HD73 for $89.

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(1) Advertising must pertain to products and services which are related to Amateur Radio.

(2) The Ham-Ad rate is 85 cents per word. A special rate of 25 cents per word applies to hamfest and convention announcements, to individuals seeking to dispose of or acquire personal equipment, and to other advertising which, in our opinion, obviously qualifies for the individual rate.

3) Remittance in full must accompany copy since Ham-Ads are not carried on our books. Each word, abbreviation, model number, and group of numbers counts as one word. Entire telephone numbers count as one word. No charge for postal Zip code. No cash or contract discounts or agency commission will be allowed. Tear sheets or proofs of Ham Ads cannot be supplied. Submitted ads should be typed or clearly printed on an 8-1/2" × 11" sheet of paper.

(4) Closing date for Ham-Ads is the 20th of the second month preceding publication date. No cancellations or changes will be accepted after this closing date. Example: Ads received August 21 through September 20 will appear in November *QST*. If the 20th falls on a weekend or holiday, the Ham-Ad deadline is the previous working day.

(5) No Ham-Ad may use more than 100 words. No advertiser may use more than two ads in one issue. A last name or call must appear in each ad. Mention of lotteries, prize drawings, games of chance, etc. is not permitted in *QST* advertising.

(6) New "commercial" advertisers must submit a production sample of their product (which will be returned) and furnish a statement in writing that they will stand by and support all claims and specifications mentioned in their advertising before their ad can appear.

The publisher of *QST* will vouch for the integrity of advertisers who are obviously commercial in character, and for the grade or characters 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 in 1947. You are eligible for membership if licensed 25 or more years ago, and presently licensed. It is not necessary to have been licensed the entire 25 years. Members receive QCWA publications and participate in QCWA activities. Come grow with us! Write QCWA, 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.

IMRA-International Mission Radio Association Helps missionaries by supplying equipment and running a net for them daily except Sunday, 14.280 MHz, 1900-2000 GMT. Br. Bernard Frey, 1 Pryer Manor Rd., Larchmont, NY 10538.

THE Veteran Wireless Operators Association, a non-profit organization of communications people founded in 1925, invites your inquiries and application for membership. Write VWOA, Ed. F. Pleuler, Jr., Secretary, 46 Murdock Street, Fords, NJ 08863.

JOIN the Old Timers Club, an international non-profit organization. If you operated a radio station, commercial, amateur or Armed Forces 40 or more years ago, and have an Amateur license at present you are eligible. Join the real pioneers of ham radio. Write O.O.T.C. Box AA, Mamaroneck, NY 10543 for details.

HAVE A-M capability? Join S.P.A.M. (Society for Promotion A-M) Membership is free. Write: F.A. Dunlap (S.P.A.M.), 14113 Stoneshire, Houston, TX 77060 (S.A.S.E. please).

FIND OUT what else you can hear on your general coverage transceiver or receiver. Complete information on major North American radio listening clubs. Send 25¢ and S.A.S.E. Association of North American Radio Clubs, 1500 Bunbury Drive, Whittier, CA 90601.

FOX-TANGO Newsletters — Since 1972, the prime source of modifications, improvements, and repair of Yaesu gear, free to Club members. Calendar-year dues still only $8 US, $9 Canada, $12 elsewhere. Includes five-year cumulative index by model numbers, or send $1 for index and sample Newsletter. Fox Tango Club, Box 15944, W. Palm Beach, FL 33416.

FREE QRP info kit. Large S.A.S.E. w/37¢ postage to QRP-ARCI, Box 12072, Austin, TX 78711.

MUSEUM for radio historians and collectors now open. Free admission. Old time amateur (W2AN) and commercial station exhibits. 1925 store and telegraph displays. 15,000 items. Write for details. Bruce Kelley, AWA, Holcomb, NY 14469.

ILLINOIS: Sept. 15 & 16, The Peoria Area Amateur Radio Club presents Peoria Superfest '84 at Exposition Gardens, W. Northmoor Rd., Peoria, IL. Admission $3 advance, $4 gate, children under 12 free. Gate opens 6:00 AM, commercial building 9:00 AM. Talk-in 146.16/76 call W9UVI. Latest Amateur & Computer product displays, huge flea market, free bus to Northwoods Mall on Sunday. Full camping facilities. Sat. night informal get together at Heritage House Smorgasboard, 8209 N. Mt. Hawley Rd. For tickets and info SASE to Superfest '84, P.O. Box 3461, Peoria, IL 61614.

RADIO EXPO 84, sponsored by the Chicago FM Club, will be held Saturday and Sunday, September 22nd and 23rd at the Lake County Fairgrounds, Rts. 120 & 45, Grayslake, IL. Flea market opens 6:00 AM and exhibits open 9:00 AM. Displays by major manufacturers and gigantic outdoor flea market area. Free parking & overnite camping. Reserved indoor flea market tables available at $5 per day. Seminars, technical talks and ladies' programs. Awards every hour. Tickets good both days, $3 in advance, $4 at gate. Talk-in on 146.16/76. Send SASE to RADIO EXPO 84, Box 1532, Evanston, IL 60204, or call 312-582-6923.

ATTEND "The Big Event Of The Summer Hamfest Season." The Original Forty-Eighth Annual 1984 Cincinnati Hamfest: Sunday September 16, 1984 at Stricker's Grove, on State Route 128, one mile west of Venice (Ross), Ohio. Exhibits, many awards. Food and Refreshments available. Flea Market, (radio related products only), Music, Talks, Hidden Transmitter Hunt and Sensational Air Show. Admission and Registration $5. For information: Lillian Abbott, K8CKI, 317 Greenwell Road, Cincinnati, OH 45238.

ONTARIO, CANADA: The Radio Society of Ontario 16th Annual Convention at the Westin Hotel in Ottawa. Friday night eyeball and dance, demonstrations and commercial exhibits. Saturday night banquet and dance. For information — RSO Convention Committee, P.O. Box 15806, Station "F", Ottawa, Ontario, CANADA. K2C 3S7.

QSL Cards/Rubber Stamps/Engraving

TRAVEL-PAK QSL Kit — Converts Post Cards, Photos to QSLs. Stamp brings circular. Samco, Box 203, Wynantskill, NY 12198.

DON'T buy QSL cards until you see my free samples — or draw your own design. I specialize in custom cards. Send black and white sketch: wil give quote. Little Print Shop, Box 9848, Austin, TX 78766.

DISTINCTIVE QSL's — Largest selection, lowest prices, top quality photo and completely customized cards. Make your QSL's truly unique at the same cost as a standard card, and get a better return rate! Free samples, catalogue. Stamps appreciated. Stu, K2RPZ, Box 412, Rocky Point, NY 11778 516-744-6260.

FREE samples — stamp appreciated. Conner, 522 Notre Dame Ave., Chattanooga, TN 37412.

QSLs & rubber stamps. Top quality. QSL samples and stamp information 50c. Ebbert Graphics D-3, Box 70, Westerville, OH 43081.

QSL samples — 25¢ Samcards - 48 Monte Carlo Dr., Pittsburgh, PA 15239.

EMBROIDERED emblems, custom designed club pins, medallions, trophies, ribbons. Highest quality, fastest delivery, lowest prices anywhere. Free info: NDI, Box 6665 M, Marietta, GA 30065.

CADILLAC of QSLs — Completely different! Samples $1. (refundable) Mac's Shack, P.O. Box No. 43175, Seven Points, TX 75143.

QSLs — 1) Famous KØAAB custom collection. 2) Railroad employees and railfan's specials. 3) Front report styles. State your sample wants. 37¢ self addressed business size envelope required. Marv WØMGI, 2095 Prosperity Ave., St. Paul, MN 55109.

QSLs Samples 30c (stamps OK) Fred Leyden, W1NZJ, 454 Proctor Ave., Revere, MA 02151.

INTRODUCING: Beautiful natural full color photo QSL cards, made from your color negative or slide. From $285. for 3,000 cards minimum. Free samples, stamps appreciated. K2RPZ, Box 412, Dept. NC, Rocky Point, NY 11778 516-744-6260.

QSLS, Quality and fast service for 24 years. Include call for decal. Samples 50¢. Ray, K7HLR, Box 331, Clearfield, UT 84015.

NEW KID on block — for QSL free samples write Kings Grove Press, Box 9, Ellerslie, MD 21529. Also custom printing and SWL's. Stamp appreciated.

RUBBER Stamps custom made. QSL card brings Free Literature! J. Glass, WB6ZTI, 14316 Cerecita Drive, East Whittier, CA 90604.

QSL's by W4TG: Prices from $16 per 1000. Send SASE to PO Box F, Gray, GA 31032.

BE SURPRISED - get a variety of cards - 100 for $8 or 200 for $13. Samples $1 refundable. All three colors, fast service, satisfaction guaranteed. Constantine, 1219 Ellington, Myrtle Beach, SC 29577.

FINEST custom QSLs, large cut catalog and samples $1 refundable on first order. Ritz Print Shop P.O. Box 45018, Westlake, OH 44145.

STAMP brings QSL catalog of new designs and samples, from $7 up. 22 years custom printing. WA6SOK, 4056 Acacia, Riverside, CA 92503.

NEW 3-D designs, including Space Shuttle, samples 50¢, 3-D QSL Co., P.O. Box D, Bondsville, MA 01009.

QUALITY QSL's reasonably priced, samples 25¢. QOF Press, P.O. Box 8111, Eau Claire, WI 54701.

QSL CARDS, assorted colors and styles; also YL cards. 2-week delivery. Jim's Printing Service, 2155 Young Avenue, Memphis, TN 38104.

PICTURE QSL cards of your shack, etc. from your photograph or black ink art work. 500 $22; 1000 $32.50. Send stamp for illustrated literature. Generous sample pack $1; half pound of samples $2. Custom printed cards, send specifications for estimate. Raum's, 4154 Fifth Street, Philadelphia, PA 19140. Phone: 1-215-228-5460.

RUBBER STAMPS: Name, Call and Address. $5.95 postpaid. Floyd Durand, W5YZC, P.O. Box 67, Westwego, LA 70094.

FULL COLOR QSL from your slide's $88.50 single thousand. Also B/W. Subject to discount. Samples. Picture-cards, Box 5471, Amarillo, TX 79117 806-383-8347.

General

220 MHz SSB transverters, 28 or 50 MHz IF, 15 watts, 2.5 dBm, BNC connectors $220. SO239 or N connectors available $1.50 each. Hans Peters, VE3CRU, 416-759-5562.

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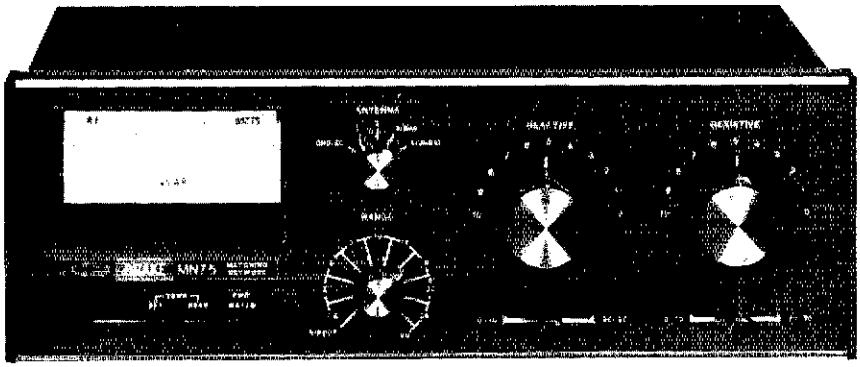

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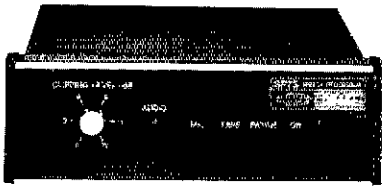

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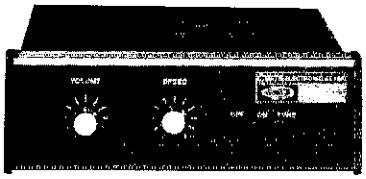

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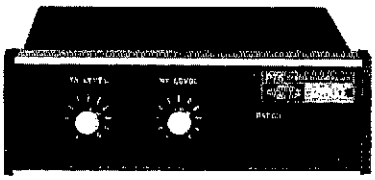

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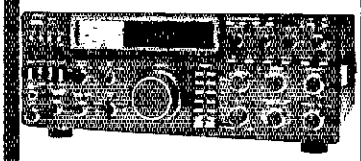

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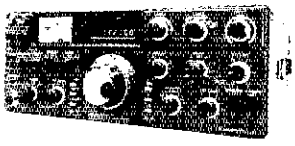

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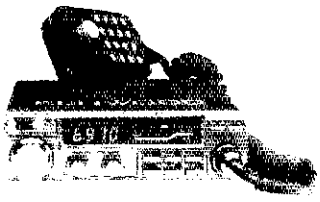

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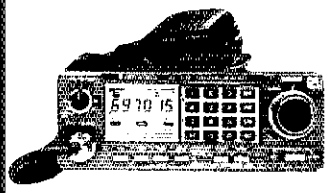

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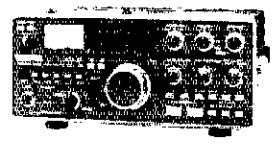

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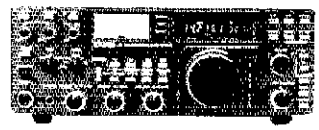

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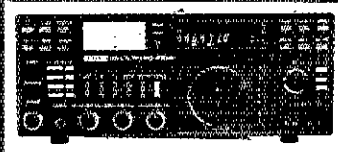

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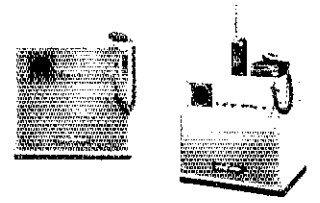

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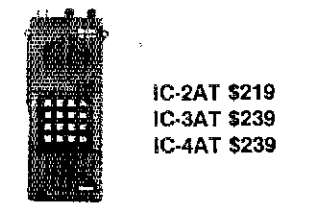

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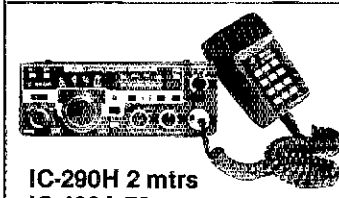

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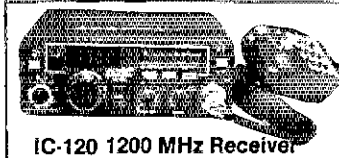

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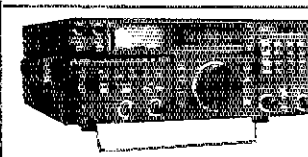

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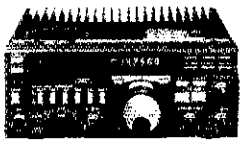

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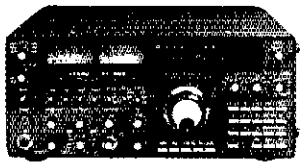

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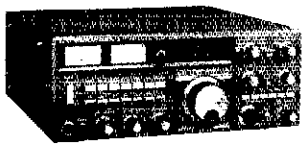

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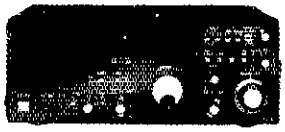

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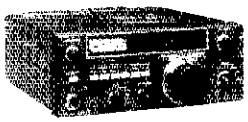

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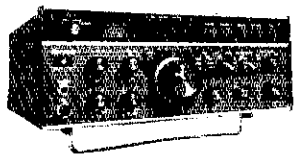

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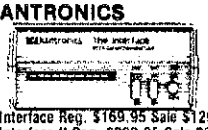

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B215	2M	Yes	2W	150W	20A	$259
B108	2M	Yes	10W	80W	10A	$159
B1016	2M	Yes	10W	160W	20A	$249
B1016	2M	Yes	10W	160W	17A	$199
C22	220	No	2W	20W	5A	$ 79
C106	220	Yes	10W	60W	10A	$179
C1012	220	Yes	10W	120W	20A	$259
D24	440	No	2W	40W	8A	$179
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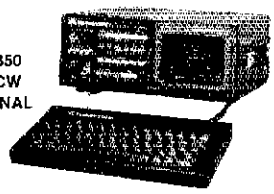

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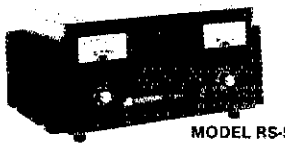
RS20M	16	20	109
RS35A	25	35	135
RS35M	25	35	149
RS50A	37	50	198
RS50M	37	50	229



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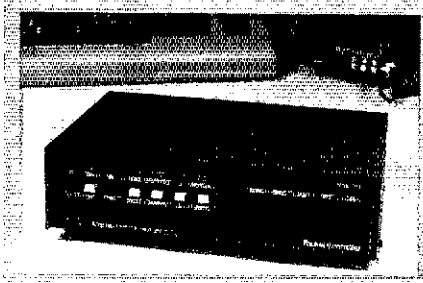

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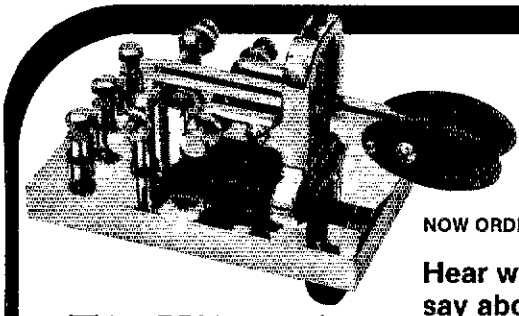

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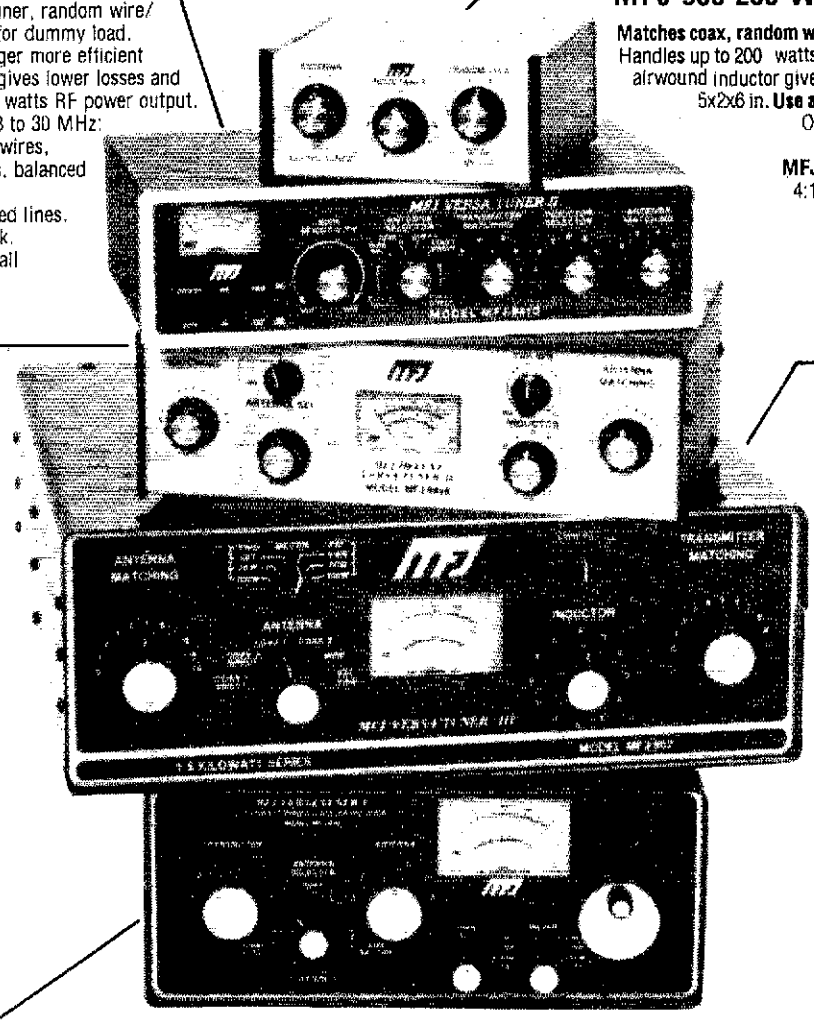

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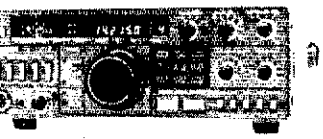

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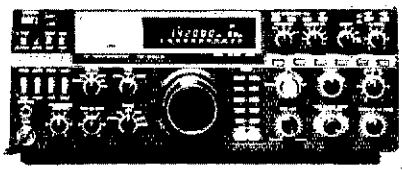

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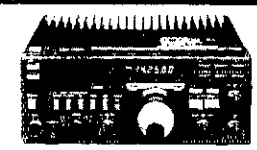

FT-757 GX

Compact General-Coverage Receiver

• General-Coverage Receiver • USB/LSB/CW/AM/FM • Dual VFOs • Memory/Band Scan • Speech Processor • CW Filter and CW Keyer included

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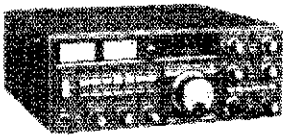

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All Mode Tri-Band Transceiver

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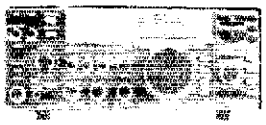

IC-745 HF Base

All ham band HF transceiver, 16 memories, 100KHz to 30 MHz general coverage receiver, and adjustable noise blanker and AGC

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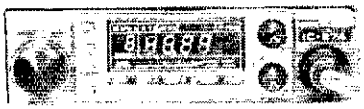

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IC-02AT

The IC-02AT 2 meter LCD readout handheld features 10 memories, 32 PL tones, scanning, keyboard frequency entry, dial lock, 3W std., 5W opt. DTMF

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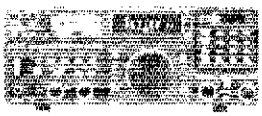

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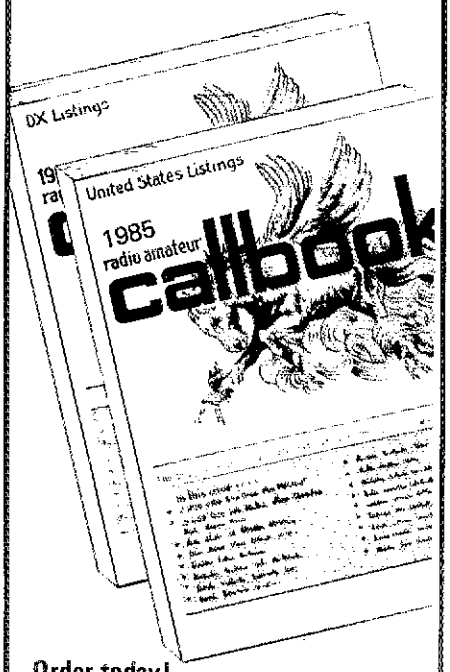

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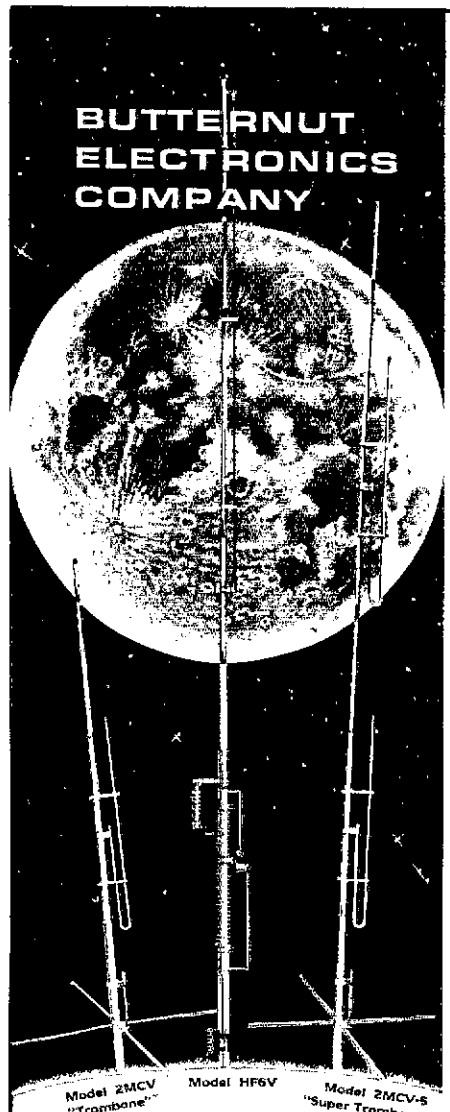

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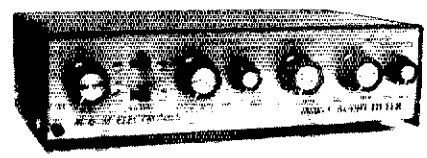

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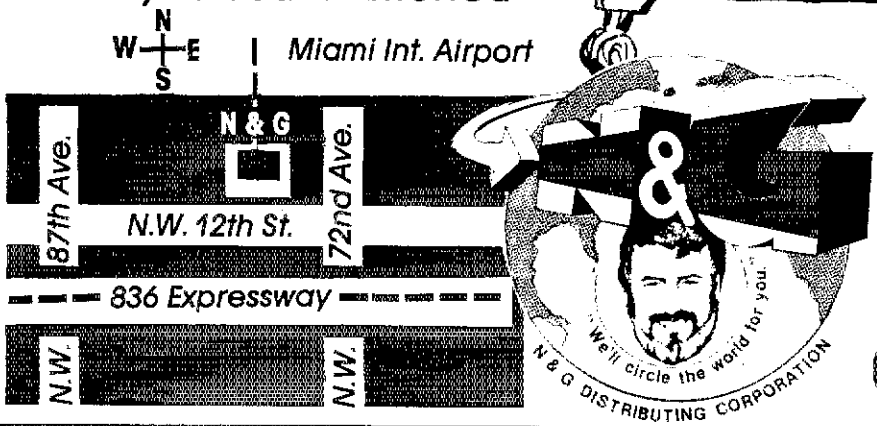

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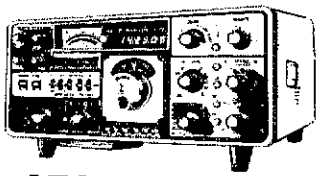

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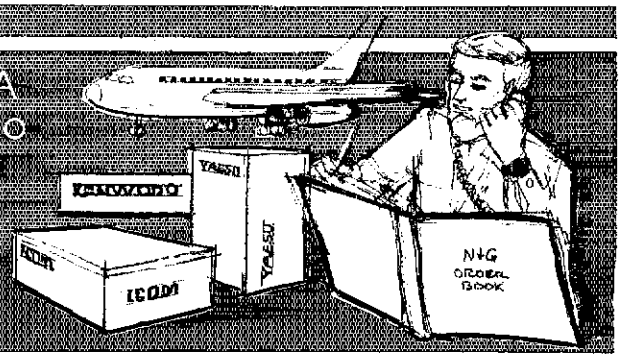

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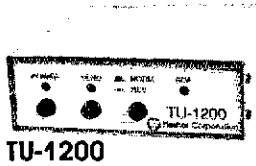

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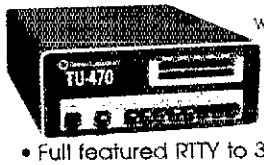

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AM—FT2811 (6000Hz Bandwidth)
SSB—FT2808 (1800Hz); FT2809 (2100Hz)
CW—FT2801 (250Hz); FT2802 (400Hz)

Kits include all needed cables, parts, detailed instructions. **Specify the type(s) desired:**

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Extra tail end I-F filter improves SSB/CW selectivity and dynamic range while reducing RX noise. No effects on TX, AM/FM. Price includes 2.1 FT filter, new PC board, teflon coax, detailed instructions, etc. Shipping: $3, Air, $5 (if COD add $1). Overseas $10. FL tax 5%.

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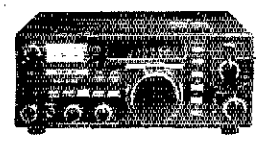

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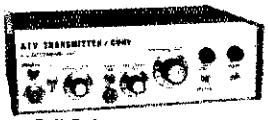

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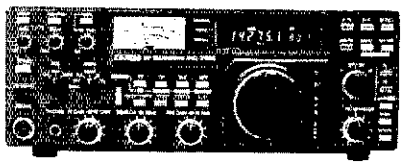
ICOM KENWOOD YAESU



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PS-35 Internal power supply	160.00	144.95
FL-52A 500 Hz CW filter	96.50	89.95
FL-53A 250 Hz CW filter	96.50	89.95
FL-33 AM filter	31.50	
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CR-64 High stability reference xtal	56.00	
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CFS-455K5 2.8 KHz wide SSB filter	TBA	
IC-271H 100w 2m FM/SSB/OW Xcvr	TBA	
IC-271A 25w 2m FM/SSB/CW Xcvr	699.00	Call
IC-471A 10w430-450 SSB/CW/FM Xcvr	799.00	Call
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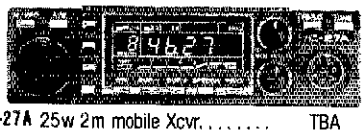
EX-310 Voice synthesizer	39.95	
IC-290H 25w 2m SSB/FM Xcvr		Call
IC-22U 10w 2m FM non-digital Xcvr	299.00	249.95
EX-199 Remote frequency selector	35.00	
IC-25A 25w, 2m, gm leds, up-dn-TTP mic	359.00	319.95
IC-25H as above, but 45 Watts	389.00	349.95



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IC-3AT with TTP	299.95	239.95
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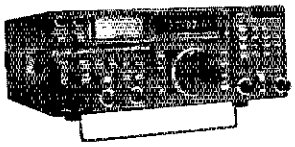
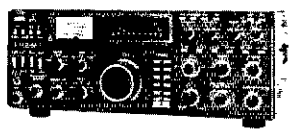


New
IC-R71A Short wave receiver ..... Call



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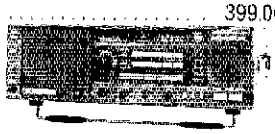

R-2000 Short wave receiver ..... Call

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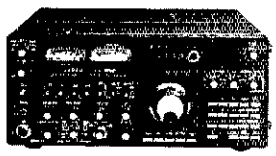

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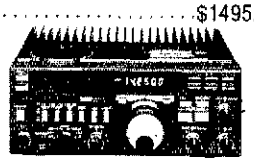
FT-One/All Optional (except key unit)		1995.00
FT-980	$1495.00	Call



FT-757GX	829.00	Call
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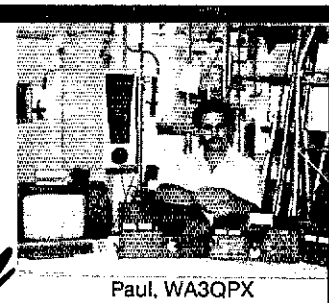

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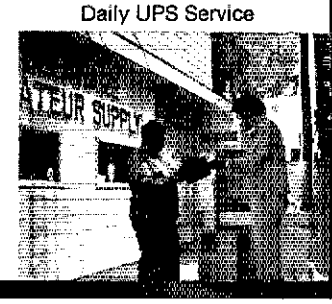

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as featured in

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Introducing the MICRO REPEATER CONTROLLER, a NEW CONCEPT in low cost, easy to interface, micro computer repeater control. State of the art control features HIGH RELIABILITY, LOW POWER, SMALL SIZE. Reconfigurable COR and PTT interface included. Optional USER MODULE allows control personality to be easily changed. INTERFACE GUIDE included.

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- *SIZE 3.2" × 3.2"

RPT-1 A KIT . . . . . $115 plus $2.50 shipping

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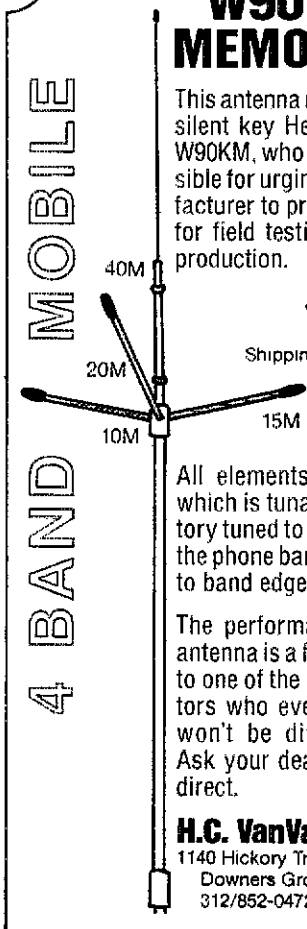

This antenna is a tribute to silent key Henry Kampe, W90KM, who was responsible for urging the manufacturer to produce it and for field testing it before production.

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SELL Hammarlund HQ145X/speaker and Viking Ranger $125, W2KNP, 217A Medford Court, Manalapan, NJ 07726.

SALE: Kenwood scope SM-220, new, $250. Kenwood transceiver TS-120-S, excellent, $385. Dentron Super Tuner, new, $125. TI/99 computor, brand new, unused, $79. Mirage 2 meter linear, brand new 160 watt, $149. 80 watt 2 meter linear, new, $98. 30 watt 2 meter linear, new, $59. Plane, 8 Lake Ave. Ext., Niantic, CT 06357.

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ROSS $$$$ used September specials: Kenwood TS-930S $1069, VFO-820 $129.90, VFO-180 $95, TS-830S $669, TR-8400 $295, RM-76 $39, AT-230 $139, PC-1 $49.90, TS-130S $469.90, TS-180S $529.90, TS-520S $479.90, TS-600 $399, TS-820 $495.90, TS-820S $565, Yaesu FR-101, FL-101 $499.90, FT-620B $259, FT-221 $269, FT-101EE $389.90, FT-107DMS $579.90, FT-127 $189. FT-310D $329, Drake R4,T4X,AC3 $399. If this month's special is not what you are looking for send Call letters name & phone # for personal price quote & used list. Over 6,000 ham related items in stock. Mention ad. Prices cash, FOB Preston. Closed Monday at 2:00. Ross Distributing Company, 78 South State, Preston, ID 83263. 208-852-0830.

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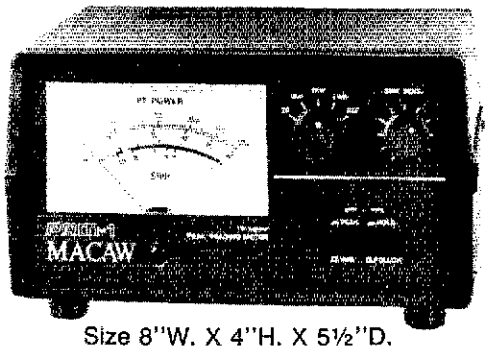

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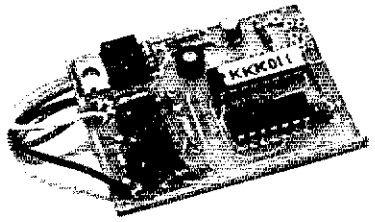

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NEW!

Regency®

Scanners

Communications Electronics,™ the world's largest distributor of radio scanners, introduces new models with special savings on all radio scanners. Chances are the police, fire and weather emergencies you'll read about in tomorrow's paper are coming through on a scanner today.

We give you excellent service because CE distributes more scanners worldwide than *anyone* else. Our warehouse facilities are equipped to process thousands of scanner orders every week. We also export scanners to over 300 countries and military installations. Almost all items are **in stock** for **quick shipment**, so if you're a person who prefers fact to fantasy and who needs to know what's *really* happening around you, order your radio today from CE.

NEW! Regency® MX5000-E

List price $599.95/**CE price $359.00**

Multi-Band, 20 Channel • No-crystal scanner Search • Lockout • Priority • AC/DC Selectable AM-FM modes • LCD display World's first continuous coverage scanner

Frequency range: 25-550 MHz. continuous coverage.

Never before have so many features come in such a small package. The *Regency* MX5000 mobile or home scanner has continuous coverage from 25 to 550 MHz. That means you can hear CB, Television audio, FM broadcast stations, all aircraft bands including military and the normal scanner bands, all on your choice of 20 programmable channels.

Regency® MX3000-E

List price $319.95/**CE price $179.00**

6-Band, 30 Channel • No-crystal scanner Search • Lockout • Priority • AC/DC

Bands: 30-50, 144-174, 440-512 MHz.

The *Regency* Touch MX3000 provides the ease of computer controlled, touch-entry programming in a compact-sized scanner for use at home or on the road. Enter your favorite public service frequencies by simply touching the numbered pressure pads. You'll even hear a "beep" tone that lets you know you've made contact.

In addition to scanning the programmed channels, the MX3000 has the ability to search through as much as an entire band for an active frequency. The MX3000 includes channel 1 priority, dual scan speeds, scan or search delay and a brightness switch for day or night operation.

Regency® Z30-E

List price $279.95/**CE price $169.00**

6-Band, 30 Channel • No-crystal scanner

Bands: 30-50, 144-174, 440-512 MHz.

Cover your choice of over 15,000 frequencies on 30 channels at the touch of your finger.

Regency® C403-E

List price $99.95/**CE price $59.00**

5-Band, 4 Channel • Crystal scanner Channel indicator LED • AC only • Low cost

Bands: 30-50, 148-174, 450-470 MHz.

Regency's basic scanner, the C403 gives you the excitement of police, fire and emergency calls at a budget price. It can tune in to any of five public service bands and brings the signal in loud and clear...on any of four possible channels. It comes with detachable telescope antenna and AC power cord. Order one crystal certificate for each channel you want to receive.

Regency® HX1000-E

List price $329.95/**CE price $209.00**

6-Band, 30 Channel • No Crystal scanner Search • Lockout • Priority • Scan delay Sidelit liquid crystal display • Digital Clock

Frequency range: 30-50, 144-174, 440-512 MHz.

The new handheld *Regency* HX1000 scanner is fully keyboard programmable for the ultimate in versatility. You can scan up to 30 channels at the same time. When you activate the priority control, you automatically override all other calls to listen to your favorite frequency. The LCD display is even sidelit for night use. A die-cast aluminum chasis makes this the most rugged and durable hand-held scanner available. There is even a backup lithium battery to maintain memory for two years. Includes wall charger, carrying case, belt clip, flexible antenna and nicad battery. Order your *Regency* HX1000 now.

Regency® R106-E

List price $159.95/**CE price $92.00**

5-Band, 10 Channel • Crystal scanner • AC/DC

Frequency range: 30-50, 146-174, 450-512 MHz.

A versatile scanner, The *Regency* R-106 is built to provide maximum reception at home or on the road. Rugged cabinet protects the advanced design circuitry allowing you years of dependable listening.

NEW! Regency® R1050-E

List price $179.95/**CE price $109.00**

6-Band, 10 Channel • Crystalless • AC only

Frequency range: 30-50, 144-174, 440-512 MHz.

Now you can enjoy computerized scanner versatility at a price that's less than some crystal units. The *Regency* R1050 lets you in on all the action of police, fire, weather, and emergency calls. You'll even hear mobile telephones.

Programming the R1050 is easy. Merely touch the keyboard and enter any of over 15,000 frequencies on your choice of 10 channels.

Regency® HX650-E

List price $129.95/**CE price $79.00**

5-Band, 6 Channel • Handheld crystal scanner

Bands: 30-50, 146-174, 450-512 MHz.

Now you can tune in any emergency around town, from wherever you are, the second it happens. Advanced circuitry gives you the world's smallest scanner. Our low CE price includes battery charger/A.C. adapter.

NEW! Regency® HX-650P-E

List Price $189.95/**CE price $104.00**

Now, Communications Electronics offers a special packaged price on the *Regency* HX-650 scanner and the following items for only $104.00. You get the *Regency* HX-650 scanner, a set of 4 AAA ni-cad batteries, the MA-506 carrying case, six crystal certificates, AC adapter/charger and flexible rubber antenna for only $104.00 per package plus $10.00 shipping/handling. To order this special package, use CE special order number HX-650P-E.

QUANTITY DISCOUNTS AVAILABLE

Order two scanners at the same time and deduct 1%, for three scanners deduct 2%, four scanners deduct 3%, five scanners deduct 4% and six or more scanners purchased at the same time earns you a 5% discount off our super low single unit price.

NEW! Regency® MX7000-E

List price $699.95/**CE price $449.00**

10-Band, 20 Channel • Crystalless • AC/DC

Frequency range: 25-550 MHz. continuous coverage and 800 MHz. to 1.2 GHz. continuous coverage

In addition to normal scanner listening, the MX7000 offers CB, VHF, and UHF TV audio, FM Broadcast, all aircraft bands (civil and military), 800 MHz communications, cellular telephone, and when connected to a printer or CRT, satellite weather pictures.

The *Regency* Touch MX7000 provides the ease of computer controlled, touch-entry programming in a compact-sized scanner for use at home or on the road. Enter your favorite frequencies by simply touching the numbered pressure pads. You'll even hear a "beep" tone that lets you know you've made contact.

In addition to scanning the programmed channels, the MX7000 has the ability to search through as much as an entire band for an active frequency. When a call is received, the frequency will appear on the digital display.

Regency® Z10-E

List price $239.95/**CE price $138.00**

6-Band, 10 Channel • No-crystal scanner Priority control • Search/Scan • AC/DC

Bands: 30-50, 140-174, 440-512 MHz.

Cover your choice of over 15,000 frequencies on 10 channels at the touch of your finger.

OTHER RADIO ACCESSORIES

B-4-E 1.2 V AAA Ni-Cad batteries (set of four) $9.00
A-135C-E Crystal certificate $3.00
A60-E Magnet mount mobile antenna $35.00
A70-E Base station antenna $35.00
Add $3.00 shipping for all accessories ordered at the same time.
Add $3.00 shipping per scanner antenna.

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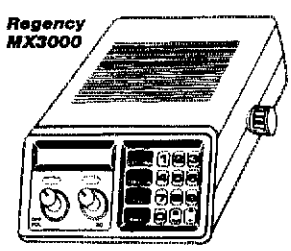

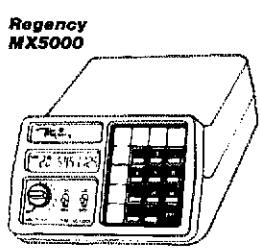

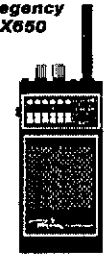

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Consumer Products Division

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Call TOLL-FREE 800-521-4414 or outside U.S.A. 313-973-8888

NEW! uniden® Bearcat® Products

Communications Electronics,™ the world's largest distributor of radio scanners, is pleased to announce that *Bearcat* brand scanner radios have been acquired by Uniden Corporation of America. Because of this acquisition, Communications Electronics will now carry the complete line of Uniden *Bearcat* scanners, CB radios and Uniden *Bandit*™ radar detectors. To celebrate this acquisition, we have special pricing on the Uniden line of electronic products.

Bearcat® 300-E

List price $549.95/**CE price $339.00**

7-Band, 50 Channel • Service Search • No-crystal scanner • AM Aircraft and Public Service bands. • Priority Channel • AC/DC

Bands: 32-50, 118-136 AM, 144-174, 421-512 MHz.

The *Bearcat* 300 is the most advanced automatic scanning radio that has ever been offered to the public. The *Bearcat* 300 uses a bright green fluorescent digital display, so it's ideal for mobile applications. The *Bearcat* 300 now has these added features: Service Search, Display Intensity Control, Hold Search and Resume Search keys, Separate Band keys to permit lock-in/lock-out of any band for more efficient service search.

Bearcat® 20/20-E

List price $449.95/**CE price $269.00**

7-Band, 40 Channel • Crystalless • Searches AM Aircraft and Public Service bands • AC/DC Priority Channel • Direct Channel Access • Delay

Frequency range 32-50, 118-136 AM, 144-174, 420-512 MHz.

Find an easy chair. Turn on your *Bearcat* 20/20 and you're in an airplane cockpit. Listening to all the air-to-ground conversations. Maybe you'll pick up an exciting search and rescue mission on the Coast Guard channel. In a flash, you're back on the ground listening as news crews report a fast breaking story. Or hearing police and fire calls in your own neighborhood, in plenty of time so you can take precautions. You can even hear ham radio transmission, business phone calls and government intelligence agencies. Without leaving your easy chair. Because you've got a *Bearcat* 20/20 right beside it.

The *Bearcat* 20/20 monitors 40 frequencies from 7 bands, including aircraft. A two-position switch, located on the front panel, allows monitoring of 20 channels at a time.

Bearcat® 210XL-E

List price $349.95/**CE price $209.00**

6-Band, 18 Channel • Crystalless • AC/DC

Frequency range 32-50, 144-174, 421-512 MHz.

The *Bearcat* 210XL scanning radio is the second generation scanner that replaces the popular *Bearcat* 210 and 211. It has almost twice the scanning capacity of the *Bearcat* 210 with 18 channels plus dual scanning speeds and a bright green fluorescent display. Automatic search finds new frequencies. Features scan delay, single antenna, patented track tuning and more.

Bearcat® 260-E

List price $399.95/**CE price $249.00**

8-Band, 16 Channel • Priority • AC/DC

Frequency range 30-50, 138-174, 406-512 MHz.

Keep up with police and fire calls, ham radio operators and other transmission while you're on the road with a *Bearcat* 260 scanner. Designed with police and fire department cooperation, its unique, practical shape and special two-position mounting bracket makes hump mounted or under dash installation possible in any vehicle. The *Bearcat* 260 is so ruggedly built for mobile use that it meets military standard 810c, curve y for vibration rating. Incorporated in its rugged, all metal case is a specially positioned speaker delivering 3 watts of crisp, clear audio.

NEW! Bearcat® 201-E

List price $279.95/**CE price $179.00**

9-Band, 16 Channel • Crystalless • AC only Priority • Scan Delay • One Key Weather

Frequency range 30-50, 118-136 AM, 146-174, 420-512 MHz.

The *Bearcat* 201 performs any scanning function you could possibly want. With push button ease, you can program up to 16 channels for automatic monitoring. Push another button and search for new frequencies. There are no crystals to limit what you want to hear.

NEW! Bearcat® 180-E

List price $249.95/**CE price $149.00**

8-Band, 16 Channel • Priority • AC only

Frequency range: 30-50, 138-174, 406-512 MHz.

Police and fire calls. Ham radio transmissions. Business and government undercover operations. You can hear it all on a *Bearcat* 180 scanner radio. Imagine the thrill of hearing a major news event unfold even before the news organizations can report it. And the security of knowing what's happening in your neighborhood by hearing police and fire calls in time to take precautions. There's nothing like scanning to keep you in-the-know, and no better way to get scanner radio performance at a value price than with the *Bearcat* 180.

Bearcat® 100-E

The first no-crystal programmable handheld scanner.

List price $449.95/**CE price $234.00/*SPECIAL!***

8-Band, 16 Channel • Liquid Crystal Display Search • Limit • Hold • Lockout • AC/DC

Frequency range: 30-50, 138-174, 406-512 MHz.

The world's first no-crystal handheld scanner has compressed into a 3" x 7" x 1¼" case more scanning power than is found in many base or mobile scanners. The *Bearcat* 100 has a full 16 channels with frequency coverage that includes all public service bands (Low, High, UHF and "T" bands), the 2-Meter and 70 cm. Amateur bands, *plus* Military and Federal Government frequencies. It has chrome-plated keys for functions that are user controlled, such as lockout, manual and automatic scan. Even search is provided, both manual and automatic. Wow...what a scanner!

The *Bearcat* 100 produces audio power output of 300 milliwatts, is track-tuned and has selectivity of better than 50 dB down and sensitivity of 0.6 microvolts on VHF and 1.0 microvolts on UHF. Power consumption is kept extremely low by using a liquid crystal display and exclusive low power integrated circuits.

Included in our low CE price is a sturdy carrying case, earphone, battery charger/AC adapter, six AA ni-cad batteries and flexible antenna. The *Bearcat* 100 is in stock for quick shipment, so order your scanner today.

Bearcat® DX1000-E

List price $649.95/**CE price $489.00**

Frequency range 10 kHz to 30 MHz.

The *Bearcat* DX1000 shortwave radio makes tuning in London as easy as dialing a phone. It features PLL synthesized accuracy, two time zone 24-hour digital quartz clock and a built-in timer to wake you to your favorite shortwave station. It can be programmed to activate peripheral equipment like a tape recorder to record up to five different broadcasts, any frequency, any mode, while you are asleep or at work. It will receive AM, LSB, USB, CW and FM broadcasts.

There's never been an easier way to hear what the world has to say. With the *Bearcat* DX1000 shortwave receiver, you now have direct access to the world.

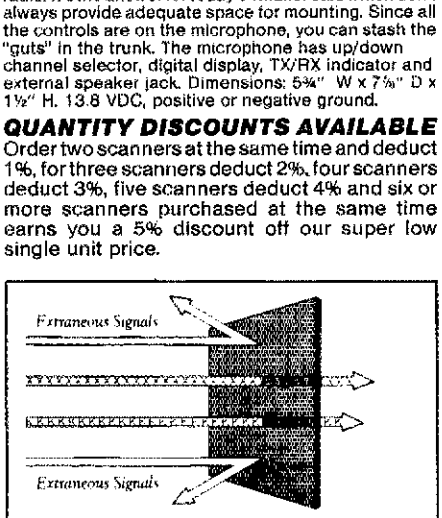
Uniden® PC22-E

List price $159.95/**CE price $99.00**

The *Uniden* PC22 is a 40 channel AM remote mobile CB radio. It's the answer for today's smaller cars which don't always provide adequate space for mounting. Since all the controls are on the microphone, you can stash the "guts" in the trunk. The microphone has up/down channel selector, digital display, TX/RX indicator and external speaker jack. Dimensions: 5¾" W x 7⅞" D x 1½" H. 13.8 VDC, positive or negative ground.

QUANTITY DISCOUNTS AVAILABLE

Order two scanners at the same time and deduct 1%, for three scanners deduct 2%, four scanners deduct 3%, five scanners deduct 4% and six or more scanners purchased at the same time earns you a 5% discount off our super low single unit price.



Both Bandit™ radar detectors feature E.D.I.T.™ the Electronic Data Interference Terminator that edits-out false alarm signals.

Uniden® PC33-E

List price $59.95/**CE price $44.00**

The *Uniden* PC33 boasts a super-compact case and front-panel mike connector to fit comfortably in today's smaller cars. *Controls:* Power & Volume, Squelch; *Switches:* ANL. Other features of the PC33 include Graduated LED "S"/RF Meter, Digital channel indicator. Dimensions: 6" W x 6" D x 1⅞" H. ±13.8 VDC.

Uniden® PC55-E

List price $89.95/**CE price $59.00**

The full featured *Uniden* PC55 front-panel mike connector makes installation easier when space is a factor. It has ANL, PA-CB, Channel 9 and RF Gain switches. LED "S"/RF meter, TX lite, PA & external speaker jacks. Dimensions: 6" W x 6" D x 1⅞" H. ±13.8 VDC.

Bandit™ Radar Detectors

Now that everyone else has taken their best shot at radar detection, the Uniden Bandit™ has done them one better...with E.D.I.T.™ the Electronic Data Interference Terminator that actually edits-out false alarm signals.

The Bandit 55, features a convenient brightness/dimmer control for comfortable day or night driving, plus a handy highway/city control for maximum flexibility wherever you drive. The Bandit 95 Remote, is a two-piece modular unit that lets you mount the long-range radar antenna behind the grill, out of view. The ultra-compact control unit can then be inconspicuously tucked under the dash or clipped to the visor. Order **Bandit 55-E** for $119.00 each or the **Bandit 95-E Remote** for $139.00 each.

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BC-WA-E Bearcat Weather Alert™ $35.00
A60-E Magnet mount mobile antenna $35.00
A70-E Base station antenna $35.00

Add $3.00 shipping for all *accessories* ordered at the same time. Add $3.00 shipping per scanner antenna.

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Mail orders to: Communications Electronics,™ Box 1002, Ann Arbor, Michigan 48106 U.S.A. Add $7.00 per scanner, radar detector or CB or $12.00 per shortwave receiver for U.P.S. *ground* shipping and handling in the continental U.S.A. For Canada, Puerto Rico, Hawaii, Alaska, or APO/FPO delivery, shipping charges are three times continental U.S. rates. If you have a Visa or Master Card, you may call and place a credit card order. Order toll-free in the U.S. Dial 800-521-4414. In Canada, order toll-free by calling 800-221-3475. WUI Telex CE anytime, dial 671-0155. If you are outside the U.S. or in Michigan dial 313-973-8888. Order today.

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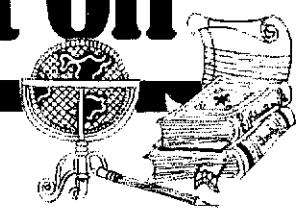

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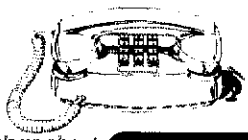

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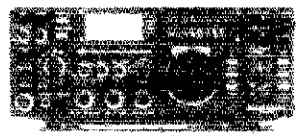

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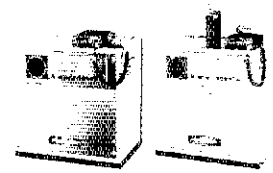

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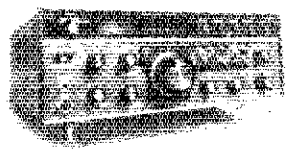
—All Accessories in Stock—

2510 Model B 399.95
Satellite Station for Oscar 10



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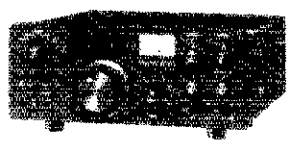
Full line of accessories in stock for Corsair and Argosy: power supplies, VFOs, and filters. Call for Quotes



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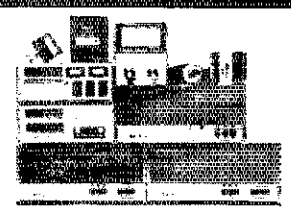

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TP5X Handheld watt meter 18.95
SP10X 1.8-150MHz Watt Meter 38.95
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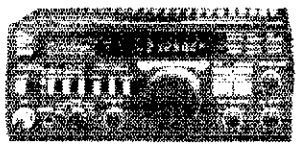
FT One Transceiver .....CALL
All-mode, General coverage RCVR



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includes CW keyer, AM/FM, CW filter

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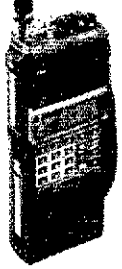

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FT 203 2m HT with VOX ...Special 199.95
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All accessories in stock including:
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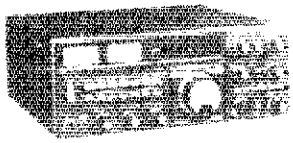

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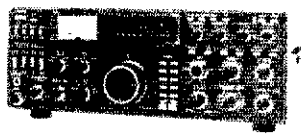

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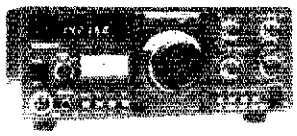
TS-530SP Transceiver .....CALL
160-10 Meter
With Power Supply & Notch Filter



TS-130SE Transceiver .....CALL
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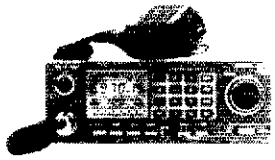

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2-meter Mobile Units, 45 or 25 Watts

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Useable as mobile or base station

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2m FM Transceiver with memories,
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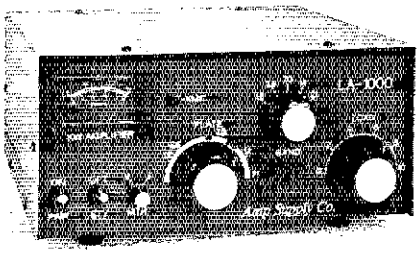
LA-1000A 1200 WATT AMPLIFIER



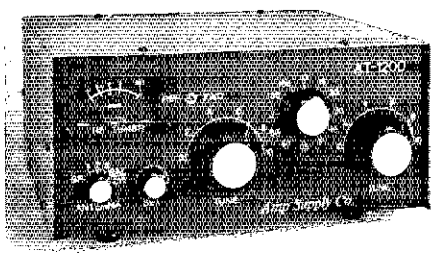
LA-1000A

The LA-1000A is a portable kilowatt now covering 160-15 meters. Typical drive requirement is 100 watts PEP yielding 1200 watts PEP SSB 800 watts CW. The compact linear uses four 6MJ6 tubes, has a tuned input and QSK built in and comes in an attractive gray-on-gray finish.

This is a super linear for all purposes. the LA-1000 excelled during the Heard Island DX pedition with over 30,000 contacts. The rugged design lends itself to continual use during contests and users are even running it on RTTY at 500 watts input.

LA-1000A $449.50*

AT-1200 TUNER



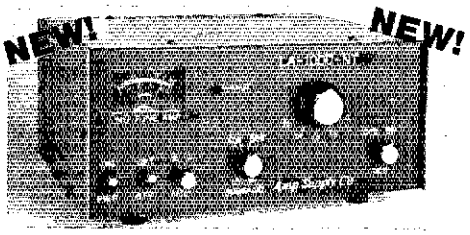
AT-1200

The AT-1200 antenna tuner is the perfect companion for the LA-1000A or any amplifier running up to 1200 watts input. It covers 1.8 to 30 MHz, has an antenna selector switch for 3 coax positions and 1 long wire or balanced feedline, and a built in SWR bridge and meter.

AT-1200 ..... $189.50*

BL-1500 9:1 5 KW Balun $29.50*

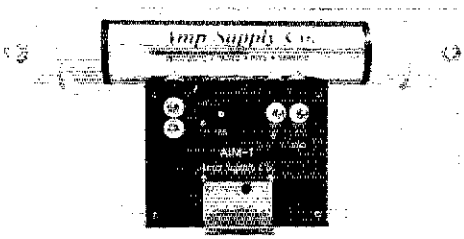
THE NEW NO TUNE — LA-1000-NT



More contacts, eliminate tune-up time, and less tune-up interference are yours with the NEW LA-1000-NT. The NO TUNE LA-1000 offers full coverage of the 160-15 meter amateur bands. A powerful 1200 watts PEP input and 800 watt DC input is the power rating of the LA-1000-NT. As with all Amp Supply Amplifiers, the NO TUNE LA-1000 features QSK, full break-in CW. Computerized CW and Keyboard Operators will love conversation-like full break-in (QSK) CW.

If you desire a compact kilowatt amplifier that needs no tuning and you have a transceiver capable of delivering 100 watts PEP—The LA-1000-NT is the perfect addition to your radio station!!

LA-1000NT No Tuneup $529.50*



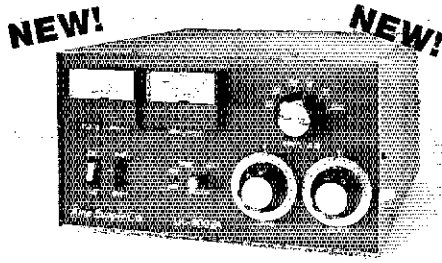
AIM-1™ *Major Antenna break through!*

The AIM-1 is an antenna impedance matching network for random, long wire or loop antennas. It provides continuous coverage from 500 KHz - 30 MHz, is completely *automatic*, no knobs to turn or coils to tap. Installation is simple; hook on wire antenna, ground, coax cable to station and balancing module at opposite end of wire. The antenna is ready for transmission from 1.8 - 30 MHz at up to 3KW PEP.

- SWR max 2:1, 1.5:1 average
- wire lengths should be 1/2 wave on lowest frequency for maximum efficiency
- inverted V, inverted L, rombic, random wire or loop antennas
- weatherproof • 2 year warranty

AIM-1 ..... $139.50*
with 130' antenna wire and insulators $149.50*
Stranded Ant. Wire $.08 ft.

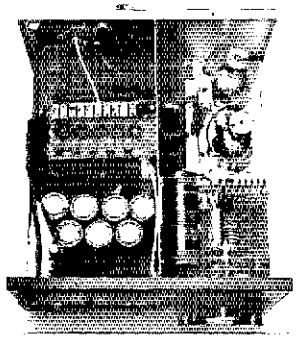
LK500ZA 2.5 KW AMPLIFIER



The all new Amp Supply LK-500ZA 2.5 KW Inp Amplifier is the right amplifier, with the right featur at the right price. The LK-500ZA comes complete assembled and covers 160-15 meters. Two Eima 3-500Z triodes in grounded grid are featured with dual cooling system, one for the power supply and t other cooling the 3-500's. There's only one 2.5 K amplifier with a pair of 3-500Z tubes in the world th sells for under $900.00.

The Amp Supply LK-500Z!

- 2.5 KW SSB PEP Input: 1500 Output
- 1.5 KW Input CW :900 Output
- 1 KW SSTV, RTTY Input: 600 Output
- QSK Full Break-in CW
- 9" H x 15" W x 15" D
- 117/234 AC 50/60 Hz
- New Improved Bridge Power Supply with Computer Grade Electrolytics
- 1500 Watt Output with Hipersil Transformer



Interior view of LK-500ZA with "Peter Dahl" Hipersil Transformer

LK-500ZA
Wired and Tested $889.00
1500 Watt Output
All Mode with Hipersil Transformer . $1099.50

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FOR SALE - Kenwood TS820 xcvr with CW filter, new finals $550. Call 518-371-1625. K2POF.

ROSS $$$$ New September Specials: If this month's special is not what you are looking for send Call letters name & phone # for personal price quote. Over 6,000 ham related items in stock. Rohn HDBX-48 $329.90 Icom # IC-02AT $298.90, IC-471A $689.90, IC-490A $554.90, IC-45A $309.90, IC-25A $279.90, IC-R70 $569.90, IC-R71A $639.90, Kenwood # TS-430S phone, PS-430 $129.90, TR-8400 $379.90, TR-9000 $379.90, TS-530S $539.90, TR-2500 $229.90, VFO-230 $139.90, TW-4000A $597.90, TS-780 $799.90, TR-7950 $358.90, Yaesu # FT-208R $219.90, FT-757GX phone, FT-708R $229.90, FRG-7700 $379.90, FRG-7 $239.90. All major lines stocked, L.T.O. Mention ad. Prices cash, FOB Preston. Closed Monday at 2:00. Ross Distributing Company, 78 South State, Preston, ID 83263. 208-852-0830.

WHAT WILL you pay for fifty-year old National FB7 ham receiver that still operates? W8LAG, 216-256-8105.

R4C w/1.8-1.5-0.25 filters, extra crystals, T4X, MS4, AC4. Manuals, new cartons. Factory reconditioned. $475. W1RAN 203-447-1255.

TEN-TEC ARGONAUT 515, mint, with 208-A notch/CW filter, MFJ 525B RF Speech Processor, 210 power supply. Manuals, $335. Knight V-44 VFO, $25. Vibro-Keyer, $30. UPS inc. Chuck, W6REO, 512-655-1233.

SELL: TEN-TEC 580 Delta, Remote VFO, matching Power Supply. Low hours. No modifications. Mint condition. $725. KA9DNO. 815-233-5646.

SALE: KENWOOD transceiver TS-830 $600, Vertical antenna Buttemut 5BTV 10-80 m $65, Alliance rotator HD-73 with 100 ft cable $65. All equipment in mint condition and never altered, with manuals. Will ship in original packaging. KJ7Y, 509-884-6152.

ESTATE SALE - 75S3, 32S3, 30L1, 312B4 (2), KWM 2, EV664, 75' telescoping, rotating, tiltover Wilson mast, 4 el. quad, HyGain rotator, 2 mtr xcvr Kyokato FM 144 10 SXR II and ac power supply. Call Bruno Puglia, 617-961-3548 weekends only.

WANTED: AMATEUR call plates for a collection I'm trying to start. Need all but OR & TX. M. J. Ault, KO5C/7 12402 SW 14, Beaverton, OR 97005.

SALE: VIBROPLEX Deluxe keyer $40, Panasonic Slimline 12 hrs. tape recorder with automatic voice actuator for logging, $75. Digital multimeter RS Micronta, $40. QST, 1980-1985, 73, 1982-1986, your bid. KJ7Y 509-884-6152.

ATTN EAST Coast Contesters and Drake fans! For Sale: Two (2) Drake C. Lines. R4C/4NB/T-4XC/MS-4/AC4/$400. Both RXs have some degree of Sartori mods. Will sell each line separately but will not break down any further. Michael J. Ault, KO5C/7 503-626-2022.

ESTATE SALE: KWM2 winged, 312B5 winged, 516F2 round. H.P. 608C signal generator, Boonton 250A rx meter. Wilson 77' telescoping, rotating, tilt over mast with HDR300 rotator and triband quad - best offer. KM1A. 203-663-2153.

YAESU FT-901DM with xtal CW filter, SP901P spkr/patch, excellent condition $600. Max, KA1N, 617-944-4508.

TI-99/4A BASIC Cassettes, quality tapes: Send/Receive Code Practice, $8.95; MINIMUF propagation, $9.95; Ham Computations and Design (Yagis, Pi and L Networks, Beam Heading, Line SWR and Input Impedance, Inductors, Dipoles, Ground Reflection Factors) $10.95, A C Buxton, Ham Software Co, 2225 Woodpark, Akron, OH 44313.

COMMODORE 64 "HAMPACK" contest logging, duping, scoring, QSL's, MUF/FOT predictions, beam headings, great circle distances. Requires printer, tape or disk. Large S.A.S.E. for abstracts, sample printouts. KD1O, Bill Giel, 524 Valley Ave., Yonkers, NY 10703.

FOR SALE: Realistic 40 channel SSB. CB. with base mike like new. KA2GRH, Ed. Pfeifer, 516-325-8610.

ALPHA 76 amplifier 160-10 meters $875. Collins CP-1 crystal pack $160, 516F-2 RE $145. K5UR, 501-988-2527.

FOR SALE: Dentron Clipperton "L" 2 kW amp used less than 5 hours $475 - Dentron GLA-1000 kW amp used less than 4 hours $255. Must sell because of TVI. N2EUE, 212-897-0750 after Sept. 1, 1984 area code changed to 718-897-0750.

SELL: R390A, manual and extra tubes $200; PRC-41, needs work, mike, antenna and manual $50; 312B-4 $125; CP-1 $125; DL-1 $100; 3 band vertical $20; TV-7 tube tester $25. KD2ES. 518-563-3861.

SALE - Heath SB400 transmitter. 100W, CW/SSB. Heath SB303 receiver with filters and matching speaker. All manuals and cables. Excellent condition. $450 for all. Bill Bacon, WB1DQT, P.O. Box 277. Durham, CT 06422.

TEKTRONIX 545B/1A1 $225. Motorola S-1329A FM signal generator $275. 35 watt 4F-PL vhf Motran with pre-amp on 449.750 $100. K9MM 312-255-5666.

DRAKE R4-C. Great DX and/or general coverage receiver. $270. Drake SC-6 and CPS-1 $65. K4RV, Rt. 7, Box 168, Lexington, SC 29072, 803-359-3418, 0100Z.

ICOM speaker/patch, $90. HM-10, $25. New Yaesu FC-700, $90. SP-980, $45. f.o.b. K1LEC 802-886-8121.

SELL: Mint, rarely used TS-180S, PS 30, w/DFC, 2nd SSB filter, $599. W4RLS, 106 Federal Courthouse, Birmingham, ALA 35203. 205-254-1795 days, 967-7215 nights-weekends.

HALLICRAFTERS SX-122A, general coverage receiver, mint, with original manual, $200. Heath DX-60B, HG-10 VFO, manuals, $85. Vibroflex Original Deluxe (chrome), mint, $38. Free UPS in 48. Chuck, W6REO, 512-655-1233.

DIGITAL AUTOMATIC displays for FT-101's, TS-520's, Collins, Drake, Swan, Heath and others. Write for information. Grand Systems, P.O. Box 3377, Blaine, WA 98230. 604-530-4551.

NEW CRANK-UP tower - Hygain HG37SS, unopened, unassembled, $549.50. HyGain antenna 153BAS, excellent, original carton, manual, $59.50. Random code generator, MJR410, $69.50. Carl, KI4BG, 1309 Fikewood Dr., Wilson, NC 27893. Tel. 919-243-5388.

KENWOOD TS-820S, VFO-820, AT-200, MC-50, manuals, perfect, $650. Randy Pollard, AK5G, 5507 Braesvalley, Houston, TX 77096.

SELL QST: June 42 to May 69 except June July 44 and Jan 45 missing. Aug 50 to Dec 51 badly water damaged. July 54 to Dec 56 moderate damage. Minor damage Jan 52 to Mar 53. Make an offer. Sparrow, 1360 Hillsdale Drive, Monroeville, PA 15146. 412-372-1175.

SALE: Heath SB101 xcvr, SB600 spkr/ps $325. Wilson M415A 4 element, 15 meter beam $75. WA2LTP 212-359-3233.

FOR SALE: Kenwood TS-830S, Mosley beam, Hallicrafters keyer, Vibroplex paddle, Info-Tech keyboard, Icom 2AT, BP-5, BC-30, Electrovoice 664 mic. WB7NRE, 401-822-1943.

SELL: IC-730, excellent condition, looks new, with manual, shipping container, HM-7 hand mike, $425. Station mike SM-5, $25. KQ4O 803-871-3190.

WANTED, MILITARY surplus radios, we need Collins 618T, ARC-72, ARC-94, ARC-102, RT-712/ARC-105, ARC-114, ARC-115, ARC-116, RT-823/ARC-131, or FM-622, RT-857/ARC-134 or Wilcox 807A, ARC-159, RT-1167 or RT-1168/ARC-164, RT-1299/ARC-186, RT-859/APX-72, APX-76, ARN-82, ARN-84, ARN-89, APN-153, APN-155, APN-171, MRC-95, 718F-1/2, HF-105, Collins antenna couplers 490T-1, 490T-2, 490T-9, CU-1658A/ARC, CU-1669/GRC, 490B-1, CU-1239/ARC-105, CU-1402/ARC. Top dollar paid or trade for new Amateur gear. Write or phone Bill Slep, 704-524-7519, Slep Electronics Company, Highway 441, Otto, NC 28763.

FOR SALE: Icom 502A six-meter transceiver, 3 watts, mint, $195 firm. Brit Hill, 1321 Ida P-9, Tupelo, MS 38801, 601-841-2280.

160/40/15 METER dipole, 115 feet long, coax-fed, NO tuning, $49.50 postpaid. Tom Evans, W1JC, 113 Stratton Brook, Simsbury, CT 06070.

MADISON-USED guaranteed: KWM380, filters, NB, control, processor, mods $2300; FT1, filters, ram $1495; New FT1 demo $1800: FT102 $550; FT901DM $600; IC551/PBT $400; IC551/FM $400; AIR-1 demo $700; 75A4/500 Hz SN3000 $345; IRL FSK1000/1020 AFSK/300A band filter board $350; Alpha 78 $1800; R7/3 filters/NB $900; R7A $1000; R4A $195; TR7/AC $600; TS830S $625; TS520 $395; TS520S $450; New boxed Collins 75A4 filters F455J05 500 Hz $95; Telrex closeout 10M523 $199; 220M1520 $110; 2M814 $60. Items FOB Houston, 90 day warranty. Six month trade against new. Madison Electronics, 1508 McKinney, Houston, TX 77010. 1-713-658-0268 (quotes); 1-800-231-3057 (orders). Mastercard/VISA/COD.

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Index of Advertisers

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hy-gain CRANKUP SALE!

All Models Shipped Factory Direct—Freight Paid*!

Check these features:
- All steel construction
- Hot dip galvanized after fabrication
- Complete with base and rotor plate
- Totally self-supporting—no guys needed

Model	Height	Load	Sale Price
HG37SS	37 ft	9 sq. ft.	$ 719
HG52SS	52 ft	9 sq. ft.	$1049
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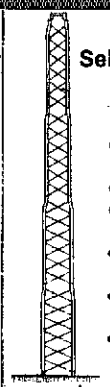
Masts—Thrust Bearings—Other Accessories Available—Call! Prices Shown Are Your Total Delivered Price In Continental U.S.A.!



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FREIGHT PREPAID

- All Steel Construction—Rugged
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- Totally Free Standing—No Guy Wires
- America's Best Tower Buy—Compare Save $
- Complete With Base and Rotor Plate
- In Stock Now—Fast Delivery

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HBX48	48 ft	10 sq ft	303	$399
HBX56	56 ft	10 sq ft	385	$489
HDBX40	40 ft	18 sq ft	281	$379
HDBX48	48 ft	18 sq ft	363	$469

*Your Total Delivered Price Anywhere in Continental 48 States. Antenna Load Based on 70 MPH Wind.

Tri-Ex®

These rugged crankup towers now available from Texas Towers! All models available On Sale for tremendous savings to you!

To save on freight costs, all towers are shipped directly from the Tri-Ex factory to you!

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- **Hot dip galvanized after fabrication**
- **Complete with base and rotor plate**
- **Totally self-supporting—no guys needed**

Model	Height Up	Down	Wind Load	List	Sale
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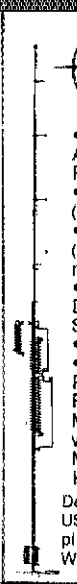
WT51	51.0 ft	20.5 ft	9.0 sq ft	$1154	$999
LM354	54.0 ft	21.0 ft	16 sq ft	$2010	$1599
LM470D (Motorized)	70.0 ft	22.0 ft	16 sq ft	$4195	$2999
DX86 (Motorized)	86.0 ft	23.0 ft	25 sq ft	$7200	Call



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- IN STOCK for IMMEDIATE DELIVERY & LOOK at very SPECIAL PRICES . . .
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$ 29/ft $279/1000 ft Up to 600 ft via UPS

- RG-213/U—95% Bare Copper Shield
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$.19/ft $179/1000 ft

- RG8X—95% Bare Copper Shield
- Low Loss
- Non-contaminating Vinyl Jacket
- Foam Dielectric

Coaxial Cable Loss Characteristics (DB/100 ft)

Cable Type	Imped.	10MHz	30MHz	150MHz	450MHz
RG-213/U	50	.6	.9	2.3	5.2
RG8X	52	.8	1.2	3.5	6.8
RG-58/U	52	1.4	1.9	6.0	12.5
½" Alum	50	.3	.5	1.2	2.2
½" Heliax	50	.2	.4	.9	1.6
⅞" Heliax	50	.1	.2	.5	.9

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Lowest Loss for VHF/UHF!

½" Alum. w/poly Jacket	$.79/ft
½" LDF4-50 Andrew Heliax ™	$1.69/ft
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select connectors below.

HARDLINE & HELIAX ™ CONNECTORS

Cable Type	UHF FML	UHF MALE	N FML	N MALE
½" Alum	$19	$19	$19	$25
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⅞" Heliax ™	$49	$49	$49	$49

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G6-144B 2-mtr Base $89 G7-144 2-mtr Base $119

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400W Standard	$12	$12	$15	$18	$22
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Bumper Mounts - Springs - Folding Masts in Stock!

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MULTI-BAND HF ANTENNAS

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15-3CD	$119	15-4CD	$129
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214FB	$ 79	220HB	$219
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TH3JRS 3-el Triband Beam	$189
TH2MK3S 2-el Triband Beam	$179
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155BAS 5-el 15-mtr Beam	$199
105BAS 5-el 10-mtr Beam	$129
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66BS 6-el 6-mtr Beam	$135
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LC-160 160-mtr Coil Kit for 18HTS	$45
214BS 14-el 2-mtr Beam	$49
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5BDQ 80-10 mtr Trap Dipole	$129
BN86 80-10 mtr KW Balun W/Coax Seal	$22

MOSLEY

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TA-33 3-el Triband Beam	$249
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LIST $182.50 SALE $159

- Wing Span - 11 ft
- Wind Area - 1.5 sq ft
- Boom - 54 in. long
- 1200W P.E.P. Input

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Transi-Trap™ Surge Protectors—In Stock Now!

Model LT 200W UHF Type	$19
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Model HV 2KW Deluxe	$32

KLM

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40m-3 3-el 40-mtr Beam	$459
40m-4 4-el 40-mtr Beam	$649
2m-13LBA 13-el 2-mtr Beam	$79
2m-14C 14-el 2-mtr Satellite Antenna	$89
2m-16LBX NEW-16-el 2-mtr Beam	$99
2m-22C NEW-22-el 2-mtr Satellite Antenna	$119
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10 ft Stack Sections

20G $37.50 25G $46.50
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All 20G, 25G, 45G and 55G Accessories In Stock at Discount Prices - CALL!

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Model	Height	Ant Load*	Price
FK2548	48 ft	15.4 sq ft	$ 829
FK2558	58 ft	13.3 sq ft	$ 899
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FK4544	44 ft	34.8 sq ft	$1159
FK4554	54 ft	29.1 sq ft	$1259
FK4564	64 ft	28.4 sq ft	$1359
25G Foldover Double Guy Kit			$199
45G Foldover Double Guy Kit			$229

*Above antenna loads for 70 MPH winds and Guys at Hinge & Apex.

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3/16" EHS Guywire (3990 lb rating)	$.13/ft
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9/84

YAESU FT-726R TRIBANDER

NEW GALAXIES OF PERFORMANCE ON VHF AND UHF

FULL DUPLEX!!

TELLITES!!

SCATTER!!

!!!

EME!!

The New Yaesu FT-726R Tribander is the world's first multiband, multimode Amateur transceiver capable of full duplex operation. Whether you're interested in OSCAR, moonbounce, or terrestrial repeaters, you owe yourself a look at this one-of-a-kind technological wonder!

Multiband Capability
Factory equipped for 2 meter operation, the FT-726R is a three-band unit capable of operation on 10 meters, 6 meters, and/or two segments of the 70 cm band (430-440 or 440-450 MHz), using optional modules. The appropriate repeater shift is automatically programmed for each module. Other bands pending.

Advanced Microprocessor Control
Powered by an 8-bit Central Processing Unit, the ten-channel memory of the FT-726R stores both frequency and mode, with pushbutton transfer capability to either of two VFO registers. The synthesized VFO tunes in 20 Hz steps on SSB/CW, with selectable steps on FM. Scanning of the band or memories is provided.

Full Duplex Option
The optional SU-726 module provides a second, parallel IF strip, thereby allowing full duplex crossband satellite work. Either the transmit or receive frequency may be varied during transmission, for quick zero-beat on another station or for tracking Doppler shift.

High Performance Features
Borrowing heavily from Yaesu's HF transceiver experience, the FT-726R comes equipped with a speech processor, variable receiver bandwidth, IF shift, all-mode squelch, receiver audio tone control, and an IF noise blanker. When the optional XF-455MC CW filter is installed, CW Wide/Narrow selection is provided. Convenient rear panel connections allow quick interface to your station audio, linear amplifier, and control lines.

Leading the way into the space age of Ham communications, Yaesu's FT-726R is the first VHF/UHF base station built around modern-day requirements. If you're tired of piecing together converters, transmitter strips, and relays, ask your Authorized Yaesu Dealer for a demonstration of the exciting new FT-726R, the rig that will expand your DX horizons!

Price And Specifications Subject To Change Without Notice Or Obligation

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483

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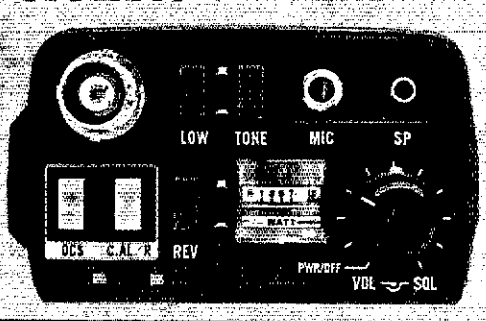
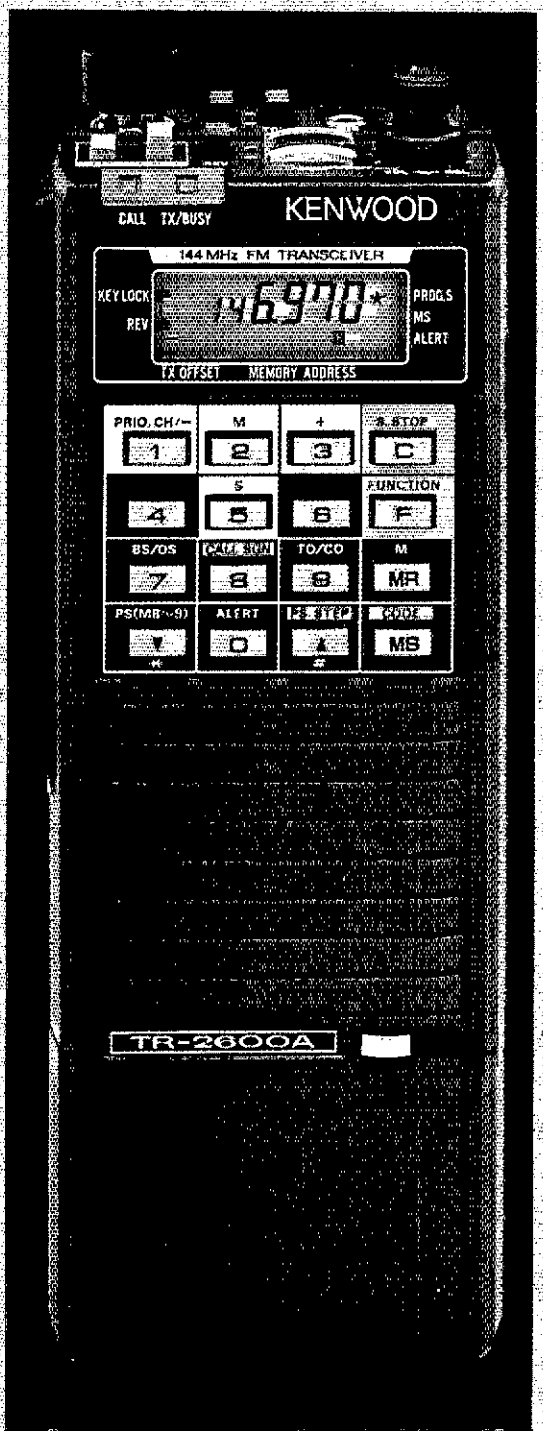
TR-2600A



Kenwood's TR-2600A introduces DCS (Digital Code Squelch) circuitry, a signaling concept developed by Kenwood. DCS allows each station to have its own "private call" code or to respond to a "group call" or "common call" code. There are 100,000 different 5-digit ASCII code combinations possible. You can program in call signs up to 6 digits in the ASCII code. When operating in the DCS mode, this information can then be automatically transmitted each time the transmit key is depressed. This revolutionary feature is only the beginning! The TR-2600A also sports a high impact plastic case, that is extra rugged and scuff-resistant. The molded-in color adds to the attractive appearance. The large L.C.D. display is easy to read in direct sunlight or in the dark with a convenient lamp switch. It displays transmit/receive frequencies, memory channels, and five arrow indicators for "F LOCK" frequency lock, "REV" repeater reverse, "PROG.S" programmed scan, "MS" memory scan, "ALERT.S" alert scan. A star indicates "MEMORY LOCK-OUT" is activated, and repeater offset indicated by "+, –, S and M." The TR-2600A has 10 memories; nine for simplex or transmit with frequency offset ±600 kHz and one (memory 0) for non-standard split frequencies. Memory scan and programmable band scan have the added convenience of "Time operated Resume" that stops on busy channel and holds for approximately 5 seconds, then resumes scanning, or "Carrier Operated Resume" that stops on busy channel and resumes when signal ceases.
Memory scan, scans only those memories in which data is stored, and memory lock-out allows you to skip selected memory channels without loss of data previously stored! Manual Scanning UP/DOWN in 5-kHz steps and programmable automatic band scan are also useful features. The TR-2600A has a built-in "S" meter on the top panel which also indicates battery level when in transmit mode. Extended frequency coverage, 142.000-148.995 MHz allows transmit capability in 5-kHz steps for simplex or repeater operation on most MARS and CAP frequencies. Receive frequency coverage includes 140.000-159.995 MHz.



These features only tell part of the story. The TR-2600A also has keyboard frequency selection, built-in 16-key autopatch encoder, "TX STOP" switch, HI (2.5)/LOW (300 mw) power switch, REV switch, "SLIDE-LOC" battery pack, high efficiency speaker, BNC antenna terminal, and all of this in an extremely compact and lightweight package!

Kenwood's TR-2600A, with D.C.S., leads the way in high technology handheld transceivers!

Optional accessories:

- TU-35B built-in programmable sub-tone encoder
- ST-2 Base Stand
- MS-1 Mobile Stand
- PB-26 Ni-Cd Battery
- DC-26 DC-DC Converter
- HMC-1 Headset with VOX
- SMC-30 Speaker Microphone
- LH-3 Deluxe Leather Case
- SC-9 Soft Case
- BT-3 AA Manganese/Alkaline Battery Case
- EB-3 External C Manganese/Alkaline Battery Case
- RA-3, 5 Telescoping Antenna
- CD-10 Call Sign Display

More information on the TR-2600A is available from authorized dealers of Trio-Kenwood Communications, 1111 West Walnut Street, Compton, CA 90220.

TR-2600A Subject to FCC Approval
Specifications and prices are subject to change without notice or obligation.