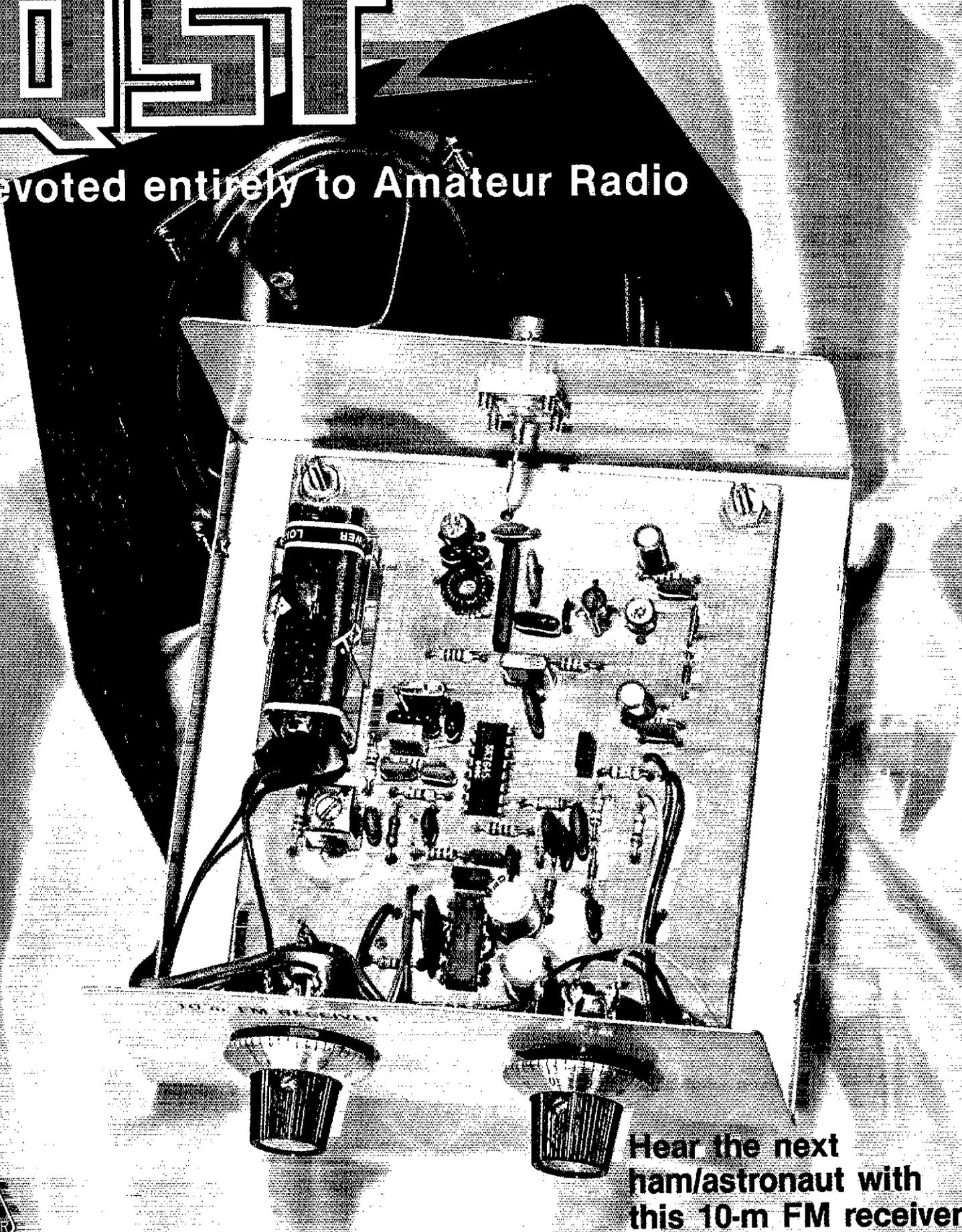


QST

devoted entirely to Amateur Radio



Hear the next
ham/astronaut with
this 10-m FM receiver

Page 19





the tempo S-15

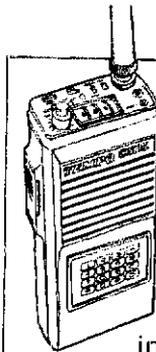
...a no nonsense radio that provides more power, broader frequency range and simplicity of operation

...the kind of hand held most people want...simple, rugged, reliable, easy to use. The S-15 offers a full 5 watts of power...power that extends your range and improves your talk power. Its state-of-the-art integrated circuitry provides far more reliability and ease of maintenance than conventional circuitry.

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- Electrically tuned stages Receiving sensitivity and output power are constant over entire operating range.
- Three channel memory. (1 channel permits non-standard repeater offsets. 200 micro amp memory maintenance (standby)).
- A new "easy remove" battery pack
- One hour quick charge battery supplied (450 ma/HR)
- Plug for direct 13.8 volt operation
- Speaker/microphone connector
- BNC antenna connector and flex antenna
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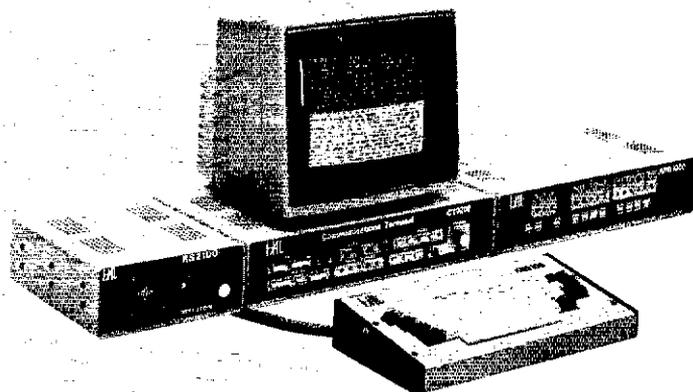


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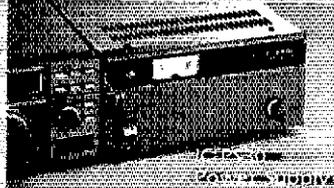
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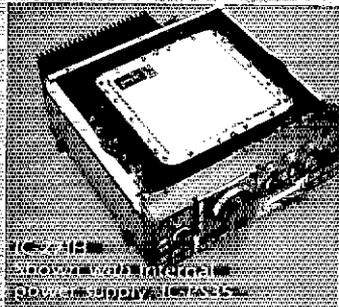
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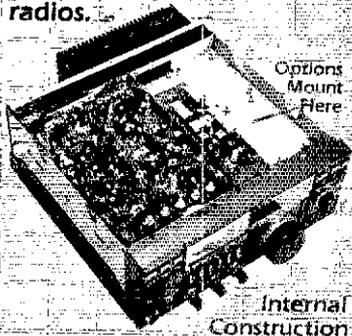
- 32 built-in Subaudible Tones
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- Scanning Systems, Memories, Modes and Programmable Band
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OUR COVER
Don't be left out of the
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ham/astronaut flies aboard
the Space Shuttle. This
receiver is easy to build, and
parts are easy to find. The
article begins on page 19,
and the etching pattern is on
page 41.

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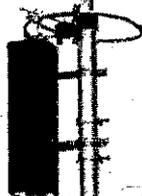
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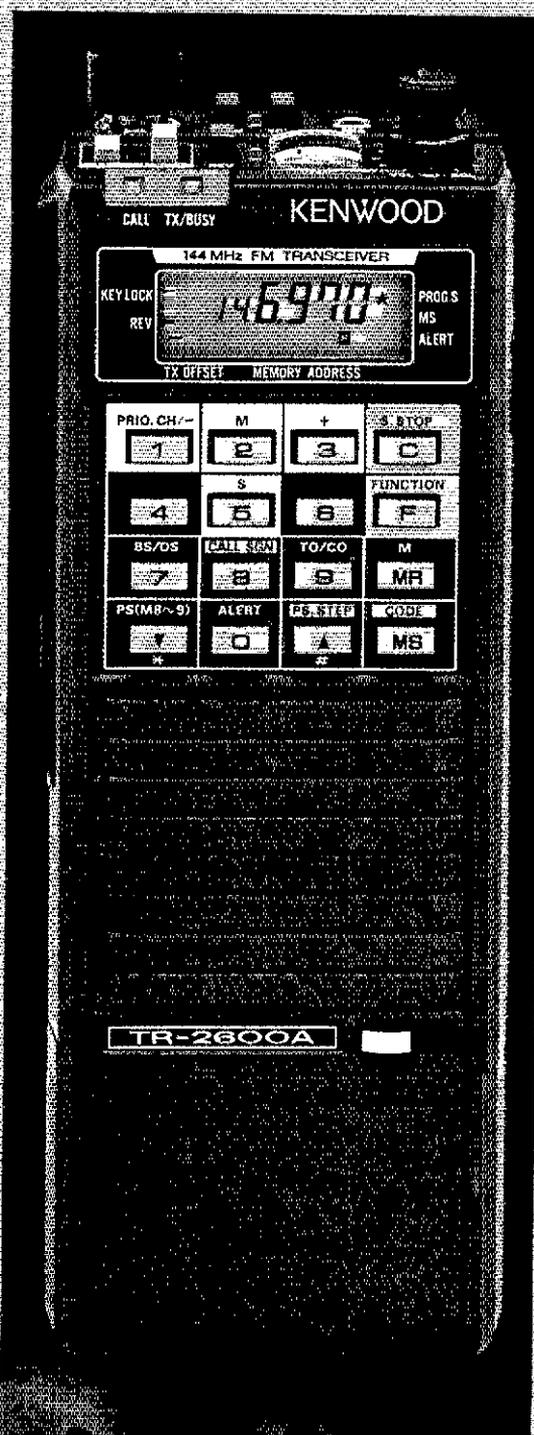
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Digital Code Squelch...

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 "5" 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.

Specifications and prices are subject to change without notice or obligation.

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Kenwood's advanced electronic technology brings you a new standard in pocket/handheld transceivers! The TH-21A/41A 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.)

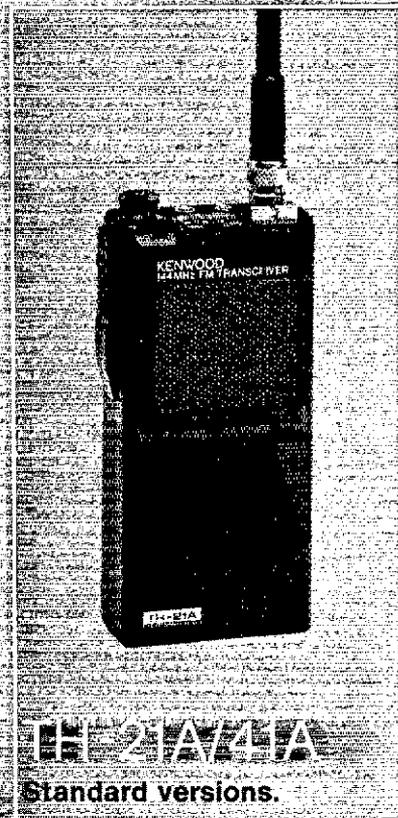
Both the 2 meter and 70 cm pocket/handheld transceivers are available in standard or 16-key autopatch DTMF encoder versions. Kenwood thread-loc antenna connector is also provided.

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-21A/41A
- TU-6 programmable sub-tone unit
- AJ-3 thread-loc to BNC female adapter

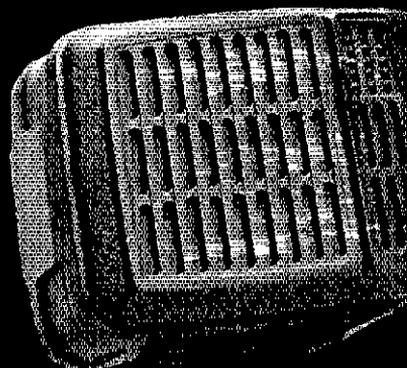
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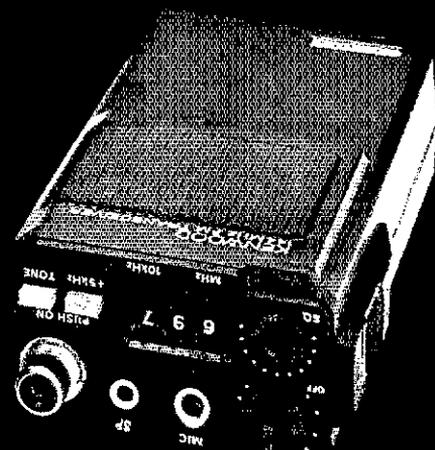
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TH-21A/41A

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Reports Invited: The ARRL Board of Directors (see list at left) determines the policies of ARRL. The 16 divisions of the League are further arranged into 73 administrative "sections," each headed by an elected Section Manager. Your SM welcomes reports of club and individual activity. ARRL Field Organization appointments are available covering a wide range of Amateur Radio volunteer interests. Whatever your license class, your SM has an appointment available. Check with your SM (below) for further information. Section boundaries are defined in the booklet *Operating an Amateur Radio Station*, free to members.

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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

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"It Seems to Us..."

By 1990: 600,000 Radio Amateurs

The FCC operates on the Federal government fiscal year: October 1 to September 30. The 1983 fiscal year began on October 1, 1982; the 1984 fiscal year ended last September 30. FCC keeps its licensing statistics by fiscal year.

FCC records show that in fiscal year 1983, 20,940 people entered Amateur Radio in the United States for the first time. In the same period, 16,601 licenses were allowed to expire. In fiscal 1984, we gained 18,800 newcomers and our losses were 19,644.

In other words, for the past two years the number of radio amateurs in the United States has remained essentially the same, and in the past year has actually begun to trend downward.

In 1980, the average age of the radio amateur in this country was 46. Four years later, it was 49.

These are disturbing statistics for anyone who cares about the future of Amateur Radio. At this rate, by the turn of the century radio amateurs could be a vanishing breed — a bunch of people growing old together.

Are things really that bad? Probably not; after all, every retiree entering our ranks takes the average age a notch higher, but we're glad to have each and every one of them. But if we don't increase the influx of newcomers of whatever age to more than the replacement rate, we could find ourselves in an irreversible downward spiral. In an environment of increasing pressure on the radio spectrum, defending the allocations of a shrinking radio service is likely to be an impossible task. Industry doesn't develop new products for a vanishing market. Communities don't tailor ordinances to fit the needs of insignificant percentages of their citizens.

Recognizing the seriousness of the situation, the ARRL Board of Directors has set an ambitious goal: We are to increase the number of radio amateurs in the United States by approximately 50,000 per year for the next several years, to bring us to a total of 600,000 licensees by the end of the decade. Even coming close to that is going to take a lot of hard work. As always, we'll be depending on the solid support of our members to make it happen. We're also seeking the cooperation of industry, for the goal is equally important to the people who provide products for our use.

Obviously, no one can just wave a magic wand and create a lot of new hams. Nor would we want to. Many League members have misgivings about encouraging growth; they point out that some bands are crowded as it is, so why should we want to make things even worse? Others wonder if this emphasis on growth portends a rebirth of the no-code concept. A couple of years ago, some thought no-code would be such a magic wand. The amateur community said no. We want growth, we said, but we want it on *our* terms. Instead of lowering standards, let's give newcomers the motivation they need to meet the traditional standards. It's been just a year since FCC "buried" no-code "once and for all," and

nothing has happened in that year to call the wisdom of that decision into question.

As for crowded bands, it's true that some bands are overcrowded and that the effects of the sunspot cycle are making things worse, especially in the high-activity evening hours on 160, 80, and 40 meters. What is needed, however, is not less activity, but rather a redistribution of activity to less-crowded portions of the spectrum. For example, in a few months we should have access to the 902-928 MHz band. What use will we be making of this significant new allocation?

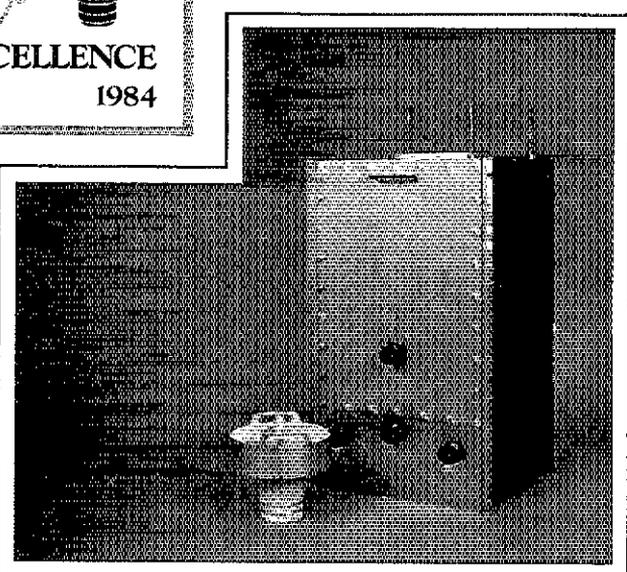
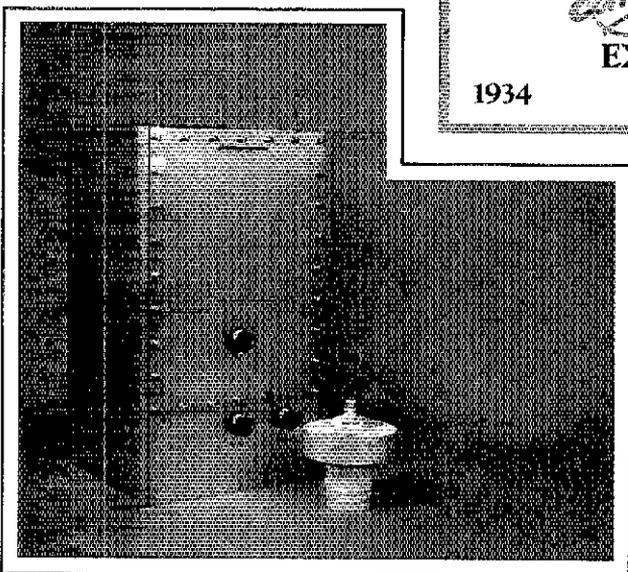
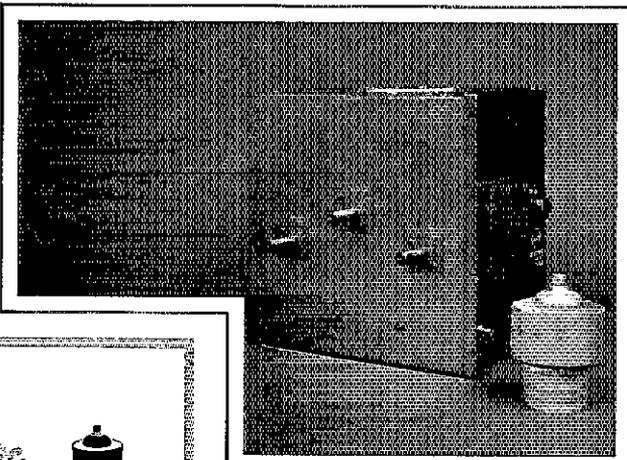
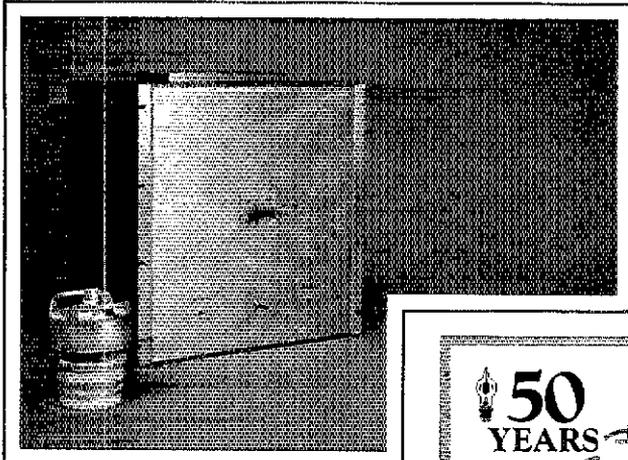
Tripling or quadrupling the rate at which newcomers join us in the Amateur Radio Service is easier said than done. But it's not impossible. For one thing, the Volunteer Examiner Program has made taking the license examinations more convenient and easier than it's been in many years. Already there are more than 200 ARRL-coordinated examination sessions scheduled around the country in the first two months of 1985, and the pace is picking up steadily. The pass rate for volunteer-administered exams is running at about 48%, and should improve dramatically as better study material (such as our just-released 80th edition of the *License Manual*) becomes widely available. It's probable that a growing number of new amateurs will go directly to the Technician license, bypassing the Novice stage; this should ultimately reduce the number of inactive Novices who never go any further, and who let their licenses lapse unused at the end of their term.

Another encouraging trend is the development of packet radio as an effective computer-based communications medium. Packet radio can be far more than an enhanced teleprinter mode, or an automated traffic system; already it has been used in innovative public-service applications. There's more to be done before our packet capabilities can be used to sell Amateur Radio to rank-and-file computer hobbyists, but we already have a great deal to offer a pioneer who is looking for new fields to conquer.

Six hundred thousand radio amateurs may sound like a lot. But, translated to the local level, it means raising the number of licensees in a hypothetical community of 25,000 from 44 to 64 in five years. What's so impossible about that? — David Sumner, K1ZZ

Give Us Your Opinion

On page 69 of this issue you will find a facsimile of a preaddressed postcard that was inserted with membership copies of this month's *QST*. The Board of Directors decided at its meeting in October to try this method of determining membership opinion on an issue of current interest. If it's successful, we may use the technique on other subjects in the future. If you want to let us know what you think of the technique, please put your comments on a separate sheet of paper so they won't be overlooked. We hope to get a *lot* of cards!



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NASA Says "Go" to W00RE Shuttle Operation

Everything appears to be A-Okay for Tony England, W00RE, to operate from aboard the 51-F/Skylab-2 mission, now scheduled for April. In a November 8, 1984 letter to ARRL President Larry Price, W4RA, and AMSAT President Tom Clark, W3IWI, NASA accepted the joint proposal — barring any unforeseen complications. In the letter, NASA Public Affairs Director Frank S. Johnson, Jr., said, "We [have] determined that the space program and the public would benefit from our cooperation . . . At this point we see no reason that we will not be able to meet most, if not all, of your objectives." Scientists at the Johnson Space Center are now assessing technical and

operational aspects of the project. NASA's letter also suggested that arrangements begin for the participation of some schools and clubs in the operation, as ARRL and AMSAT had proposed. Although the mission is scheduled for April, some observers feel that problems with the Shuttle *Challenger* could delay the launch until at least July.

Those interested in communicating with W00RE while *Challenger* circles the earth should check out the helical antenna described in last month's QST (pp. 14-18) and the 10-meter FM receiver project in the article beginning on page 19 of this issue. QST will keep you up-to-date on this next exciting ham-in-space mission.

Japanese Spacecraft in Final Testing Stage

Just as ARRL and AMSAT are cooperating in the upcoming U.S. amateur space mission, their Japanese counterparts, JARL and JAMSAT, are preparing their country's first amateur spacecraft for a January 1986 launch. JAS-1, as it is known, is now making its way down the home stretch — undergoing final testing and fitting.

The 50-kg (110-lb) spacecraft will ride piggyback aboard a National

Space Development Agency of Japan launch vehicle into a 1500-km (930-mile)-high orbit. Once there, JAS-1 will provide amateurs with a reliable means of communication as well as a host of research opportunities. One of the spacecraft's noteworthy features: a digital transponder that will allow storage of messages that can later be relayed to amateurs around the world. (photos courtesy JA1ANG, JAMSAT and JARL)

Federal Preemption Update

Battle lines are being drawn on the question of who has the final word on antenna zoning ordinances — local or federal authorities. In early November, the National League of Cities filed comments with the FCC opposing PRB-1, the League's request for specific limits on local antenna zoning ordinances (see this month's Happenings). More recently, the City of Newport News, Virginia, filed comments with the

Commission in support of PRB-1, arguing that amateurs' emergency communications capabilities, which have helped that city in the past, would be severely hampered by a restrictive zoning ordinance. Next month's Happenings will have details on latest developments in this debate, one that will have far-reaching implications for the Amateur Radio Service in the U.S.



JA1TUR tests JAS-1's electronics



Fits like a glove!

Two Weeks in China

IARU President Richard Baldwin, W1RU experienced Amateur Radio in China firsthand in late October as a guest of the Chinese government for the Sino-Japanese Friendship RDF Championship, held in Chengdu. During his two-week stay, Dick operated from four separate stations — BY1PK, BY1QH, BY8AA and BT8CD. Propagation didn't favor contacts with the U.S., but he managed to work dozens of JAs, UA0s and VKs.

The Chinese Radio Sports Association, now an active member of the IARU, will send a delegation to the IARU Region 3 Conference in Auckland, New Zealand, later this year. A CRSA delegation will visit the U.S. in the next year or so, as well.



W1RU and JARL Director JA1HQG at BY8AA, club station in Chengdu.

Call for Digital-Communications Papers

Have something to add to the ever-expanding body of knowledge in amateur digital communications, including packet radio? If so, you'll want to know that papers are being accepted for the ARRL Fourth Amateur Radio Computer Networking Conference, to be held March 30 in San Francisco. The Conference will be held in cooperation with the West Coast Computer Faire March 30-April 2.

March 1 is the deadline for receipt of camera-ready papers on all aspects of amateur packet radio and other forms of Amateur Radio digital communications. Mail papers to Marian Anderson, WB1FSN, c/o ARRL, 225 Main St., Newington, CT 08111.

If you plan to present a paper, your first task is to request an author's kit and provide the title of your paper immediately.

The Proceedings will be sold at the Conference and by mail from ARRL Hq.



Dick (NF5Z) and Bob (KB6FNP) Powell pause beside the desert buggy Bob designed and built for their bi-yearly two-week trek through Death Valley. Since Bob recently upgraded to General, the two have been able to enjoy another interesting diversion during their travels: searching for "windows," or openings, in the mountains and canyons where they can get out with Dick's 2-W hand-held transceiver. At times they can be as far as 70 miles from fuel, supplies or a phone, so "window-shopping" sometimes becomes more than casual. The homebrew 5/8-wavelength whip on the buggy works so well they have no problems raising a repeater about 100 miles away. What a way to travel!

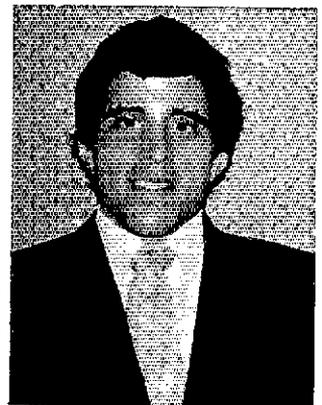
First Goldwater Scholarship Recipient: KI6U

At the Pacific Division Convention last fall, a particularly noteworthy presentation took place: Paul Sargis, KI6U, of Modesto, California, was awarded the first ARRL Scholarship Honoring Senator Barry Goldwater. The \$5000 annual award is given to a deserving young amateur pursuing higher education in the electronics field.

A senior at California Polytechnic State University, Paul is majoring in electronics engineering. He is a straight-A student, and is a member of two engineering honor societies, Tau Beta Pi and Eta Kappa Nu. When not studying, Paul spends some time at the active and well-equipped Cal Poly radio club, of which he is currently vice president. He also manages to keep weekly skeds with his home QTH on 75 meters, and enjoys 20-meter CW and SSB, 2-meter FM, transmitter hunts and Field Day.

Paul earned his first amateur license six years ago, at the age of 15. A year later, he upgraded to Extra Class.

"My experience in Amateur Radio was influen-



tial in my decision to study electronics, and has been beneficial to me in several courses," Paul says. Not content to keep the benefits to himself, Paul adds that he's "found it especially rewarding to assist others in qualifying for their amateur licenses."

Donations of any size are welcome. Send your check, payable to ARRL Foundation Goldwater Scholarship Fund, to ARRL Foundation, 225 Main St., Newington, CT 08111.

League Lines...

"Hands off 220" MHz. Senator Barry Goldwater, K7UGA, sent this letter to FCC Chairman Mark S. Fowler:

"More and more, I am getting word that the Federal Communications Commission might be considering a rulemaking aimed at reducing the 220 MHz allocation used by amateurs on a shared basis with the government. Now, this isn't going to set well and I think the Commission would be wrong in doing this.

"There is an increasing demand for more services to the public which use the radiowaves, and most importantly, some new technologies being developed through experimentation permit more signals to coexist within the present bands. I think we especially need to encourage these. But, let's not knock down amateur radio once again in our efforts. The 220 MHz band is where we amateurs can do a lot of experimentation with these new technologies that will benefit all spectrum users. Removing these frequencies from amateur use is unnecessary and would be shortsighted.

"So, I ask you to keep hands off 220. It's needed for continued amateur experimentation, like the hams always have done."

The City of Newport News, Virginia, has filed supportive comments on PRB-1, the League's request for preemptive relief from local zoning ordinances. Newport News praised the public service support rendered by amateur and Civil Air Patrol radio operators in emergency situations. The comments also said that "Although the City is in a position to control our own local zoning or other restrictions, we have no control of other jurisdictions with whom our radio operators might have to communicate to provide us with emergency services." Reply comments on PRB-1 are due by January 25.

The lawsuit involving radio amateurs and the City of Burbank, Illinois finally came to an end on November 30. Federal Judge Nicholas J. Bua accepted a settlement between the City of Burbank and the named plaintiffs in the class action suit. The settlement will enact a new ordinance allowing amateur and citizen's radio antennas, "grandfather" existing antennas, and permit towers to 65 feet. Details will be in an upcoming issue of QST.

Judging of the ARRL Antenna Design Competition is complete. The winners in the six-band category are: First place, Eugene C. Sternke, K6AH; second place, G. A. "Dicky" Bird, G4ZU; third place, Frederick A. Hauff, W3NZ. The five-band winners are: First place, Bob Milbert, KFØP; second place, Robert T. Hart, W5QJR; third place, James W. Fisher, Jr., W8JF. Follow-up articles will appear in future issues of QST.

NABER, the National Association of Business and Educational Radio, will begin to offer the Two-Way Radio Technician Certification Examination (for service technicians who install, repair and maintain commercial radio equipment) to new candidates at 70 locations around the country. More information on this Technician Certification Program is available by calling NABER at 202-833-3956 or 202-887-0920.

ARRL needs material for our monthly newsletter, Amateurradio, which goes to important government officials. We need positive, upbeat stories with photos of Amateur Radio in action. Clippings from local newspapers are a good source. Because it is frequently impossible to return photos please do not send them if you must have them back. Send the articles and photographs to the ARRL Public Information Office.

The ARRL is planning to publish a new book on UHF and microwaves sometime early in 1986. We are searching for amateurs who wish to contribute articles and projects to the book for payment. Interested? Contact the Microwave Book Editor, ARRL Technical Department.

ARRL Public Information Office has copies of Amateur Radio Public Service Announcements -- both TV and radio. If you can place them with a local station, write today. There's no charge, and it's a great way to let the public know about ham radio.

Radio Aurora

By Richard Miller,* VE3CIE

The Northern Lights were going to town on the night of February 24th. I got on 56 MHz at about 8:20 P.M. I sent a CQ on ICW and was rewarded with a call from W8VO in Akron, Ohio, also on ICW ... I swung over to phone, and he advised me that phone was unintelligible ...
— W2AMJ, May 1939 QST, p. 78

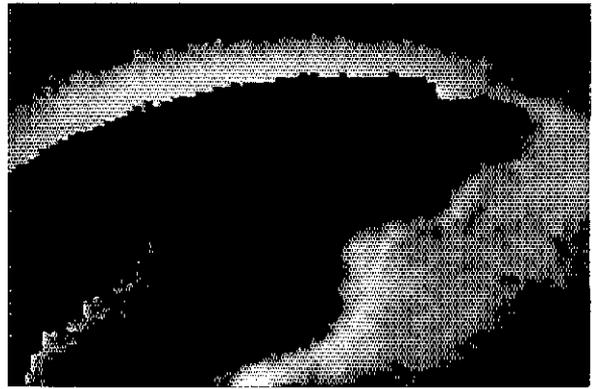


photo courtesy Dr. L. A. Frank, University of Iowa

Radio amateurs have contributed much to the science of radio communication in the area of auroral propagation (reflecting VHF signals off the aurora). During an auroral event, amateurs have provided a great deal of information from studying the manner in which signals from many stations over a wide geographical area are propagated by the aurora.^{1,2} It was not until the International Geophysical Year (IGY) in 1957-58 and the advent of earth satellites, however, that a more complete understanding of auroral propagation was achieved.³ If you work auroral propagation, or would like to try, knowledge of how and when this phenomenon occurs will allow you to predict auroral openings and enhance your enjoyment of this fascinating mode of communication.

What Causes the Aurora?

The aurora is caused by the large-scale interaction between the earth's magnetic field and the solar wind. The earth is surrounded by a magnetic field in much the same fashion as a bar magnet. The field about a magnet can be illustrated by sprinkling iron filings around the magnet; they line up along the field's lines of force. The field lines intersect the magnet at its north and south poles. When a compass points north, it points along the magnetic field lines of the earth toward the North Magnetic Pole. If you were to look at the earth from space, you could imagine a set of magnetic field lines similar to those of the magnet about the earth. These magnetic lines leave the earth's South Pole and enter the earth's North Pole.

This magnetic region around the earth is known as the *magnetosphere*. There are

several important differences. The magnetosphere is distorted by a flow of charged particles, mainly electrons and protons, which move away from the sun and form the solar wind (Fig. 1).⁴ The distortion is in the form of a bow shock on the solar windward side (dayside) and an elongated tail on the leeward side (nightside). As you can see from the illustration, there are two distinct regions in the magnetosphere where solar-wind particles can enter the earth's upper atmosphere. These are the polar cusps on the dayside and the area of the plasma sheet on the nightside. Solar-wind particles can enter directly via the cusps or, having been trapped and stored in the plasma sheet, they can enter via the enclosed magnetic field lines at the poles on the nightside.

The illuminated aurora that we see as the "northern lights" is a fluorescent luminosity

produced by the collision of oxygen and nitrogen molecules in the upper atmosphere, plus the incoming solar-wind particles that are guided along the field lines of the magnetosphere. When the molecules and atoms are struck by the solar-wind particles, they are ionized (stripped of one or more electrons) to such an extent that the ionized area is capable of reflecting radio signals at VHF frequencies. This ionization occurs at an altitude of about 110 km (70 mi), very near the E layer of the ionosphere (Fig. 2). If you were in space looking down at the north polar regions, you could imagine that the auroral zone forms a ring or oval around the pole. In fact, recent photographs taken by the spacecraft *Dynamics Explorer 1* show the auroral oval (see photo above and Nov. 1983 QST, p. 15). By understanding the geometry of the auroral oval and the effect of solar activity

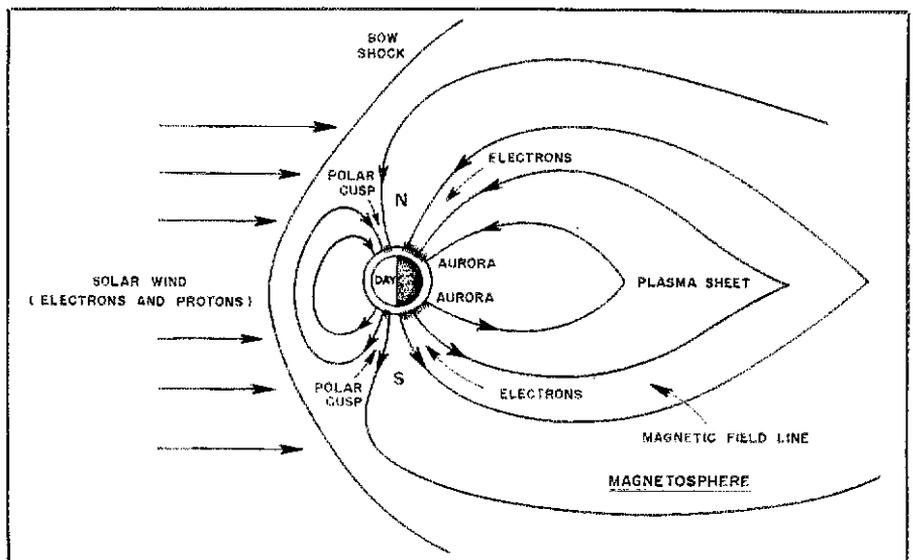


Fig. 1 — Details of the magnetosphere, showing the presence and effects of solar wind.

*Notes appear on page 18.

*Oldstore House, Cedar Valley, RR 1, Hillsburgh, ON N0B 1Z0, Canada

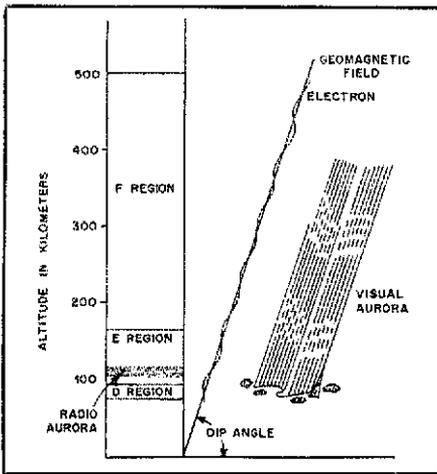


Fig. 2 — Relationship of the aurora and the ionosphere.

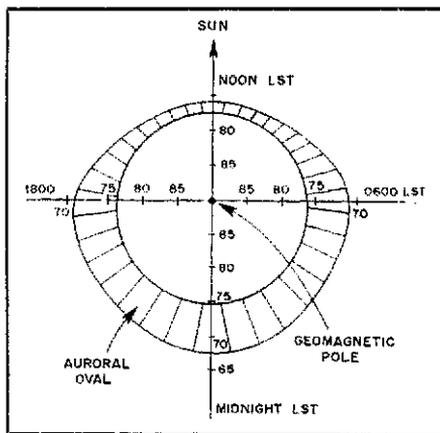


Fig. 3 — The auroral oval is shown here.

upon it, you can appreciate the complexity of VHF propagation via the aurora.

The Auroral Oval

Fig. 3 illustrates the concept of the auroral oval (see note 4). This region of activity is more or less fixed in space above the earth. It is centered on the geomagnetic pole rather than on the geographic North Pole or the magnetic North Pole. This is important for later discussion of auroral-effects prediction. The geographic North Pole is located at 90° N lat. and is the point where the lines of longitude converge. The magnetic North Pole is located at 73.5° N lat. and 100° W long., near Resolute Bay, Canada. This is the point where magnetic medians converge. The geomagnetic pole, which is the center of the auroral oval, is located at the northwest tip of Greenland at 78.5° N and 69° W. It is the northern axis of the mathematical field of closest fit to the actual magnetic field of the earth. Using the geomagnetic pole, it is possible to define a new set of latitude and longitude coordinates — geomagnetic coordinates that are used to reference positions of auroral activity on the earth's surface. In

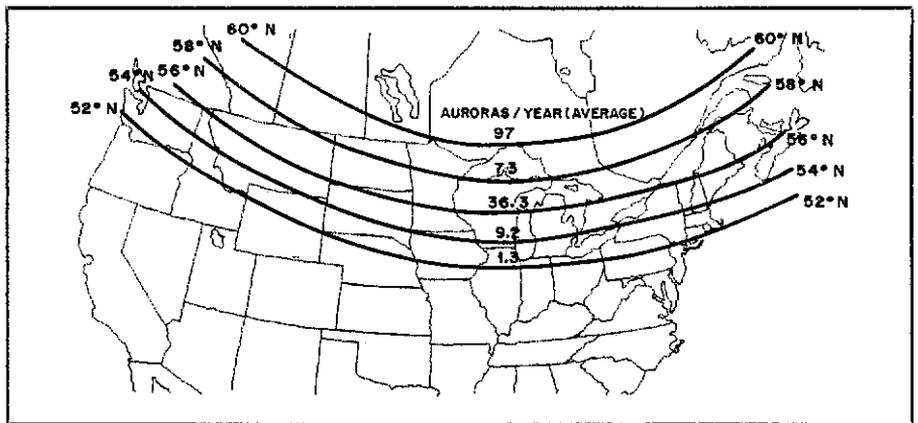


Fig. 4 — The geomagnetic latitude is referenced to the geomagnetic North Pole, which is located at the northwest tip of Greenland. This pole is the center of the auroral oval.

Fig. 4, some geomagnetic latitude lines are shown over North America (see note 1).

Refer to Fig. 3. It can be seen that the auroral oval extends farther south on the nightside than on the dayside. This means that as the earth rotates beneath the aurora, a given location will be nearer the oval at night than during the day. Note also that the width of the oval is greater on the nightside, where the magnetic lines of the plasma sheet intersect the upper atmosphere, than it is on the dayside. Although you cannot see the aurora on the dayside because the sun is too bright, the ionization is still there. The intensity of auroral ionization and the width and overall diameter of the auroral oval are all affected by solar activity, which influences the intensity of the solar wind.

Solar Activity and the Auroral Oval

There are two main types of solar activity that affect the production of aurora: solar flares and corona holes. Solar flares are bursts of energy that occur in the chromosphere of the sun near sunspots. These bursts consist of three principal types of emissions: (1) electromagnetic radiation,

(2) cosmic ray particles and (3) charged particles. Fig. 5 illustrates the relationship among these emissions and shows their principal effects on the earth.⁵ Electromagnetic radiation, traveling at the speed of light, reaches the earth in 8.3 minutes in the form of ultraviolet radiation, X-rays, visible light and radio waves. These emissions may cause an increase in the ionization of the D, E and F layers, and cause such phenomena as shortwave fadeout and sudden ionospheric disturbances. Solar cosmic-ray particles reach the earth in a couple of hours or less. Of particular interest to this discussion are the charged particles that reach the earth 20 to 40 hours after the flare occurs. These particles cause magnetic storms and aurora.

Coronal holes were discovered during the 1973 *Skylab* missions (Owen Garriott, W5LFL, was aboard Skylab 2).⁶ Previously, it was known that mysterious M regions, as they were called, were associated with disturbances in the geomagnetic field. These disturbances tended to recur at 27-day intervals, the rotational period of the sun. The *Mariner 2* spacecraft discovered that high-speed bursts in the

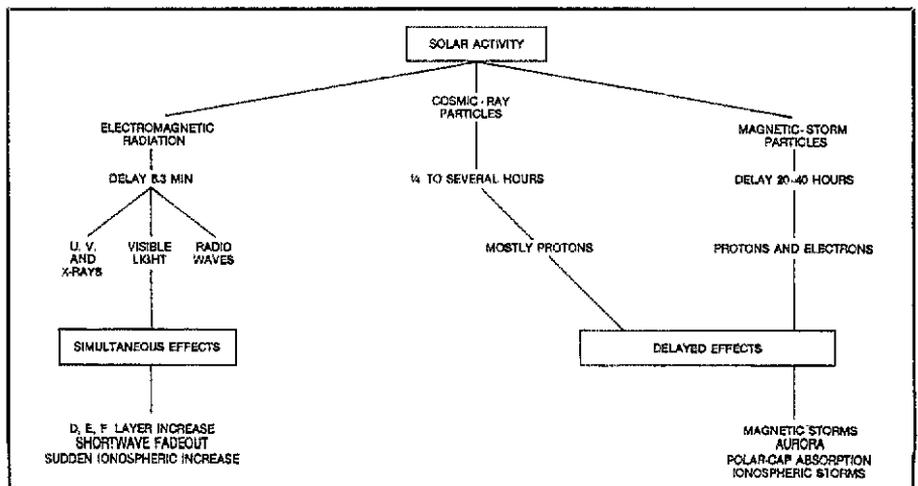


Fig. 5 — The terrestrial effects of solar activity.

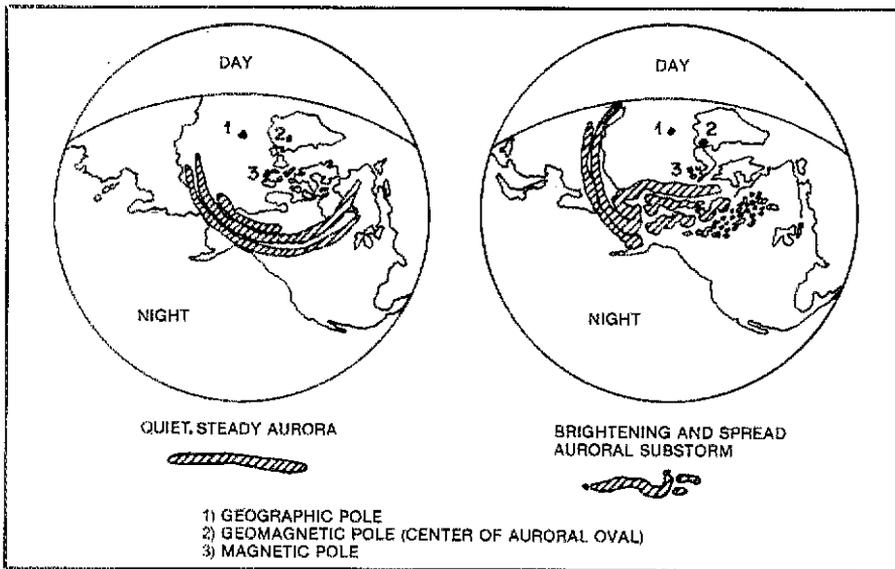


Fig. 6 — Auroral substorms.

solar wind also recurred at this same 27-day interval. Study of the *Skylab* solar data indicated that the newly discovered coronal holes were the source of the solar-wind bursts, and corresponded to the M regions. The interaction of the solar-wind bursts from coronal holes with the earth's magnetosphere also causes magnetic storms and aurora. Thus, there are two solar-aurora dependencies. Solar flares tend to have peak activity at times of sunspot maxima and have an 11-year periodicity. The maximum flare-associated auroral activity usually occurs about two years after a sunspot maximum. Coronal holes have a 27-day periodicity because they are features on the surface of the sun. Their effects tend to be most pronounced near the sunspot minima when they are not overshadowed by flare activity.

During average solar activity, the auroral oval usually lies in a ring between 70° and 75° N geomagnetic latitude (lat_g) (Fig. 3). After major solar activity, the oval expands rapidly toward the equator. The most dynamic auroral activity occurs during major magnetic storms. These violent displays are called *auroral substorms*. They originate in the night portion of the auroral oval. During a substorm, the oval increases in width and tends to break up into folds, loops and patches (Fig. 6). See note 4. The southern edge of the oval may move far south of 50° N lat_g during major disturbances.

Monitoring Auroral Activity — WWV

The National Bureau of Standards (NBS) provides information regarding solar activity and the state of the earth's magnetic field, via broadcasts from WWV on 2.5, 5.0, 10.0, 15.0 and 20.0 MHz. These Geolert broadcasts are in voice at 18 minutes after each hour. The messages are changed approximately every six hours

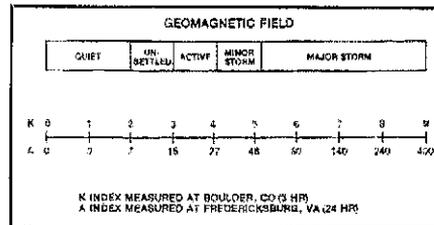


Fig. 7 — Details of the geomagnetic field. Activity is a function of the geomagnetic indices.

at 1800, 0000, 0600 and 1300 UTC. The message format is

Part A

1700 UTC solar flux from Ottawa, Canada, measured at 2800 MHz. The solar flux is related to sunspot activity and, hence, flare activity.

A index for Fredericksburg, Virginia. The A index is a geomagnetic index for 24 hours.

Current K index for Boulder, Colorado.

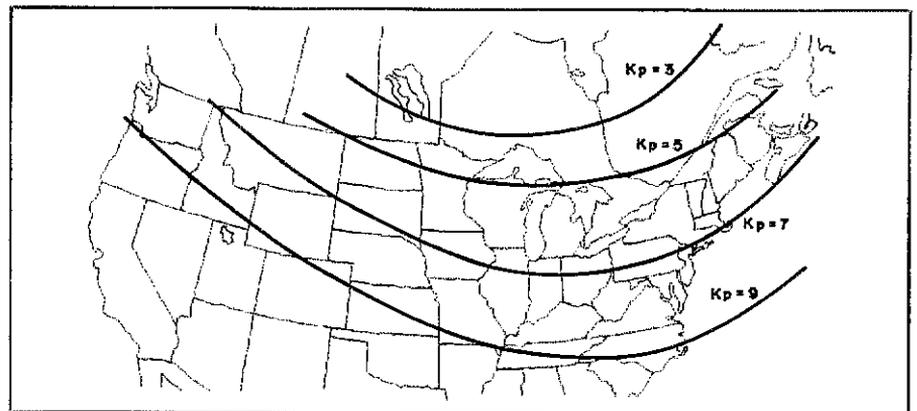


Fig. 8 — Average southern limit of southern edge of an aurora condition for various values of K index.

The K index is a three-hour index of geomagnetic activity.

Part B

Solar-terrestrial conditions for the past 24 hours.

- 1) Solar activity
- 2) Geomagnetic field state
- 3) Solar flare and geomagnetic field events

Part C

A forecast of solar-terrestrial conditions for the next 24 hours.

- 1) Solar activity
- 2) Geomagnetic field state
- 3) Solar flare and geomagnetic field events

A complete description of these messages is available in *NBS Time and Frequency Dissemination Services*, NBS Special Publication 432.

These messages can be extremely useful in predicting auroral activity. The WWV bulletins announce the occurrence of solar flares and indicate the intensity. When particles from these flares enter the earth's magnetosphere some 24 to 40 hours later, they may produce geomagnetic disturbances and auroral substorms. Geostationary satellites monitor the flow of particles in the solar wind, and when certain levels are reached, a proton flare or satellite proton event is announced. Some 12 to 24 hours later, a geomagnetic disturbance may occur.

The A and K indices may be used for predicting auroral activity. The A index is calculated by converting the eight K indices obtained at a station in a day to A indices, and then averaging the A indices for the day. The relationship between the K and A indices is given in Fig. 7 as well as in the corresponding description of the associated condition of the geomagnetic field. During geomagnetic storms, the auroral oval expands and moves southward. Fig. 8 indicates the extent of southern expansion of the leading edge of the oval with an increasing K index.

Daily monitoring of the WWV bulletins will allow us to predict the periods when

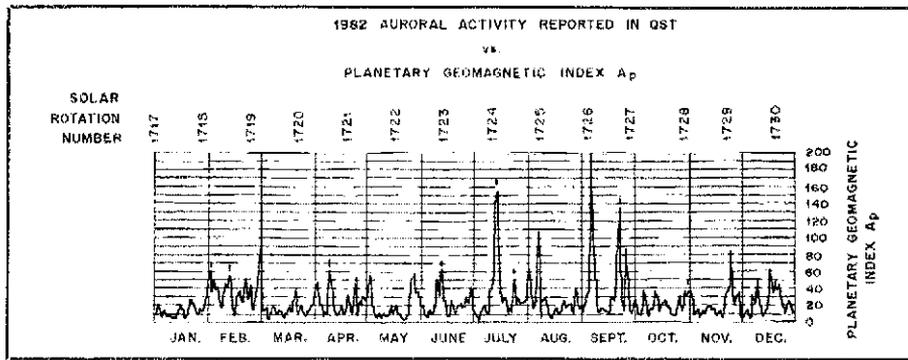


Fig. 9 — Reported auroral activity (amateur contacts). The A_p values are from *Geomagnetic and Solar Data*, NOAA, Boulder, Colorado, *Journal of Geophysical Research*, 1983. The marks above the A_p value peaks indicate dates of auroral activity reported in *QST*.

auroral activity is most likely to occur. An increase of over 10 units in the 10-cm solar flux in one day usually indicates the onset of new solar activity.⁸ The announcement of a flare and subsequent proton event would be indicative of increased geomagnetic activity within the next 24 to 40 hours. The K index values may then be used to determine the intensity of the geomagnetic disturbance and the extent of auroral oval expansion.

The A index may be used to monitor the occurrence of geomagnetic disturbances that are associated with coronal holes. They have a 27-day periodicity. Fig. 9 summarizes the A indices recorded in 1982, plus the auroral activity reported in the *QST* column, *The World Above 50 MHz*. If a high A index is recorded, and the coronal hole persists into the next solar rotation, a similar period of high values will likely follow 27 days later. It should be remembered that solar flares and coronal holes do not always produce auroral activity, but monitoring these events provides the best indicator available.

Radio Aurora

VHF radio waves may be reflected from ionization associated with aurora. We will define this ionization as *radio aurora*.⁹

While a correlation exists between visible and radio aurora, there are some differences. In this section, we will review the morphology of radio aurora: time and spatial characteristics, wavelength dependency and polarization characteristics. The correlation with geomagnetic latitude and geomagnetic activity also will be discussed. We will confine our discussion to regions between 50° N and 60° N geomagnetic latitude.

Seasonal Variation

The seasonal variation of occurrence of VHF radio aurora contacts is shown in Fig. 10.¹⁰ The echo occurrence is greatest during the spring and fall equinoxes with the maximum occurring in the fall. Fig. 4 shows the yearly average number of aurora overhead at various geomagnetic latitudes.

Diurnal Variation

Fig. 11 shows the diurnal variation of the frequency of auroral contacts (see note 10). Two strong maxima occur. The first is near 1800 local time, and the second occurs around midnight.

Spatial Characteristics

Study of VHF auroral echoes has shown that these echoes can only be obtained from

a restricted area of the sky where the signals from the transmitter intersect the local geomagnetic field lines at specific angles (see note 10). The ideal conditions for VHF auroral propagation are shown in Fig. 12. The increased ionization of the radio aurora occurs parallel to the geomagnetic field lines. The angle of these lines with a horizontal plane at the earth's surface is called the *magnetic dip angle*, I . The angle I can be determined from the geomagnetic latitude by the relationship¹¹

$$I = \tan^{-1} (2 \tan L_g) \quad (\text{Eq. 1})$$

where

L_g = geomagnetic latitude in degrees

As can be seen in Fig. 12, the angle, ϕ , of the incident signal must equal the angle, ϕ_2 , of the reflected signal. This condition need not be met exactly, but the greater the deviation from the condition $i = r$, the greater the transmitter power required to establish communications. In fact, studies have shown that the reflected energy decreases by 10 dB/degree deviation from this condition (see note 10).

Radio aurora is observed almost exclusively in a sector centered around magnetic north. It occurs at heights of approximately 110 km (70 mi) (see note 9). For the latitudes of our discussion (50-60° N), these restrictions mean that the radio aurora must be located approximately 300 km (190 mi) north of the transmitter for signal elevation angles of 14° to 1300 km (800 mi) for elevations of 0°. Calculations have been made, taking into account all of these restrictions, for several locations within the zone 50 to 60° N to determine the area of occurrence of useful aurora and the area of possible communications.¹³ An adaptation of these results for my QTH is shown in Fig. 13.

Wavelength Dependency and Polarization

The strength of signals reflected from the aurora is dependent on the wavelength when equivalent power levels are used. This dependency can be expressed as $P \propto \lambda^1$,

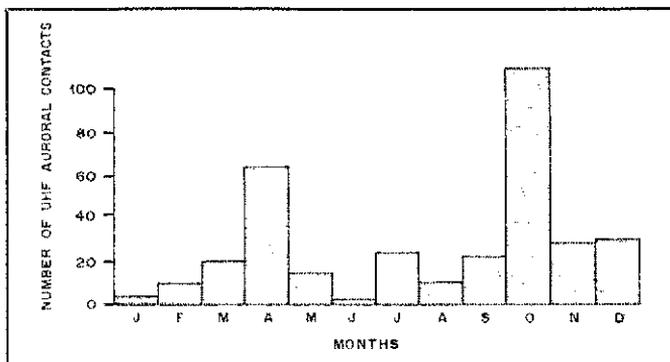


Fig. 10 — Seasonal variation of auroral contacts based on Amateur Radio observations in Germany. Geomagnetic latitude 48°-55°, 144 MHz, January 1957-February 1962.

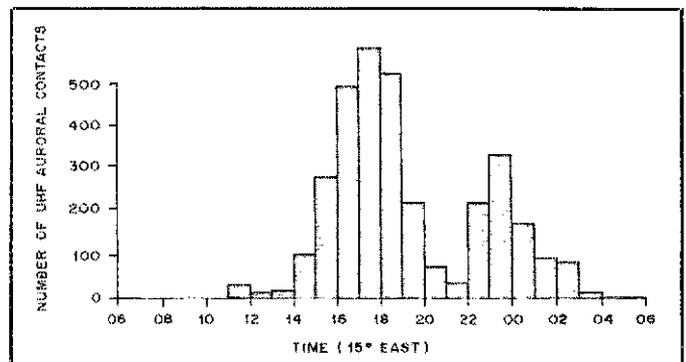


Fig. 11 — Diurnal variation of auroral contacts from Amateur Radio observations in Germany, January 1957-February 1962. Geomagnetic latitude, 48°-55°, 144 MHz.

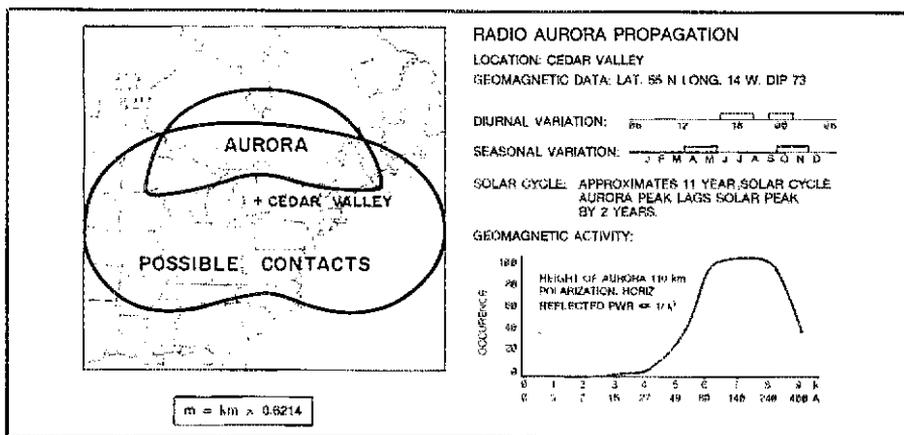
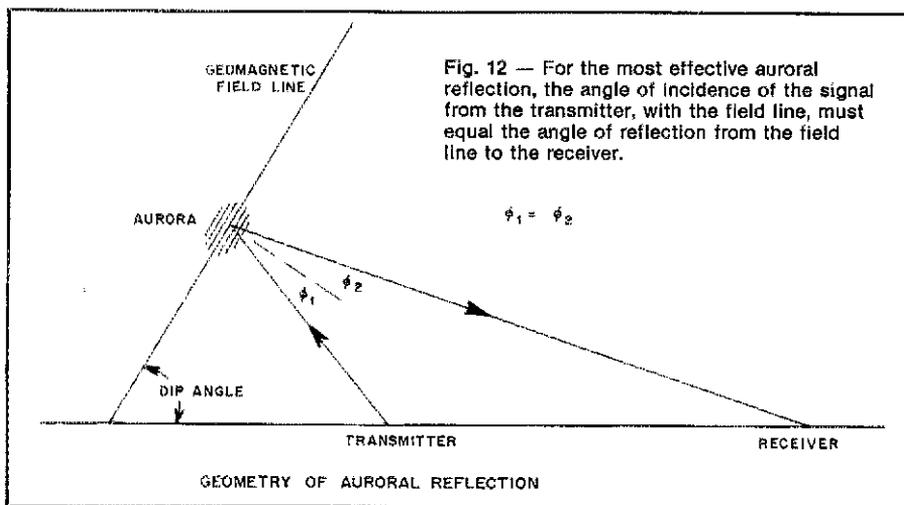


Fig. 13 — Radio aurora propagation summary for the VE3CIE OTH.

where P is the reflected power and λ is the wavelength (see note 10). Thus, 6-meter reflections can be expected to be stronger than 2-meter reflections for the same transmitter output power. The polarization of reflected signals is nearly the same as that of the transmitted signal (see note 9).

Geomagnetic Activity and Radio Aurora

As discussed earlier, the auroral oval expands and moves southward in response to geomagnetic disturbances that produce

auroral substorms. This expansion may be monitored via the K index transmitted from WWV. Data from Amateur Radio observations, taken in Germany on 144 MHz, were compiled and the results are reproduced in Fig. 14 (see note 10). This shows the highest probability is for $K_p = 8$ and 9, while below $K_p = 3$ no auroral contacts were observed. K_p is the planetary average value of K taken over several locations. Also, notice that signal strength increases with increasing K_p . If these results

are interpreted according to geomagnetic latitude or dip angle of the communicating stations, it is apparent that the radio aurora shifts southward with increasing K_p (see note 10). For stations in the zone 50-60° N geomagnetic latitude (dip angle 67-74°) maximum occurrence of radio aurora is for K_p values of 6 to 8.

Conclusion

VHF auroral propagation offers exciting opportunities to increase your grid-square count. It is a challenging form of VHF DXing. The information presented in this article should help you meet this challenge and can bring you closer to that coveted VUCC!

Notes

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- ²R. Dyce, "More About VHF Auroral Propagation," *QST*, Jan. 1955, pp. 11-15.
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- ¹³R. L. Leadabrand and I. Yabroff, "The Geometry of Auroral Communications," *IRE Transactions on Antennas and Propagation*, Jan. 1958, pp. 80-87.

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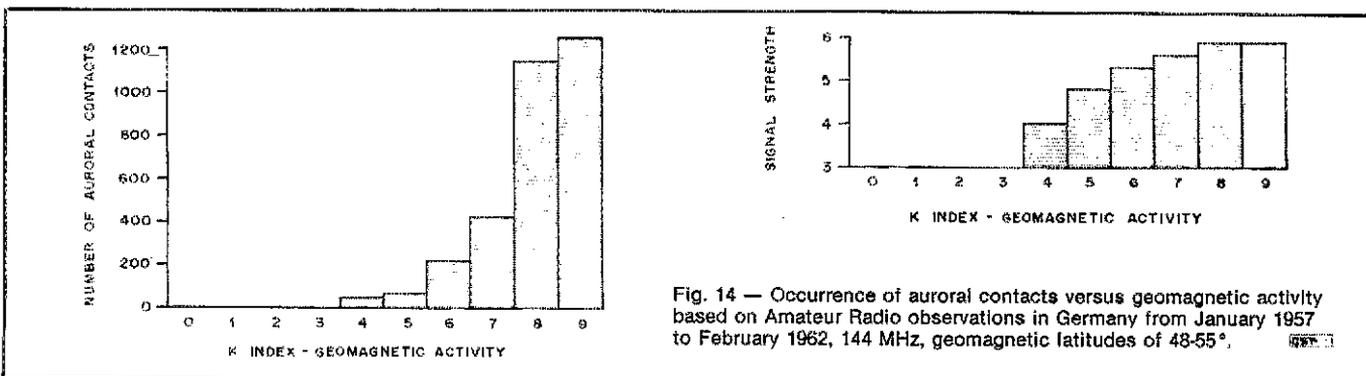
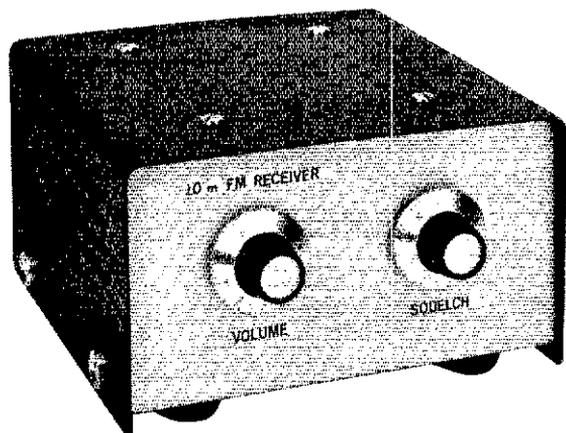


Fig. 14 — Occurrence of auroral contacts versus geomagnetic activity based on Amateur Radio observations in Germany from January 1957 to February 1962, 144 MHz, geomagnetic latitudes of 48-55°.

A Simple 10-Meter FM Receiver



Need a 10-meter FM receiver for the SSTV signals WØORE will be sending back from the Shuttle? Build this simple, inexpensive receiver and you'll be ready for "Live, from space, it's ham radio!"

By Jonathan F. Towle,* WB1DNL

When Astronaut Tony England, WØORE, lifts off the launch pad later this spring and heads for space, he'll be using SSTV equipment and a 10-meter FM transmitter along with the regular 2-meter FM gear. If your station equipment is not capable of receiving FM signals on the 10-meter band, here's a simple FM receiver that can be built at home.

The only active circuit components are three ICs. Most parts are available from your local electronics supply house or your local Radio Shack. The second-LO crystal, the crystal filter, the RF coil in the front-end and the coil in the first LO are available from Semiconductors Surplus, Mouser Electronics or Amidon Associates (see Table 1).

A single 9-V supply was chosen to keep the project simple. Lower voltages limit the range of the audio amplifier, and higher voltages required more extensive regulation to operate the RF front-end IC.

General Description

The block diagram in Fig. 1 may appear incomplete because many of the discrete parts you might expect to find in a typical FM receiver are contained within the ICs. The local oscillators are shown as separate blocks to indicate the frequency mixing that occurs in the circuit. The active components, however, are contained in the ICs.

The signal from the antenna is amplified and then mixed with a 39.7- to 40.4-MHz signal produced in the first LO. This creates a 10.7-MHz intermediate frequency (IF). This signal passes through a 10.7-MHz crystal band-pass filter into the narrow-band FM IC.

A second mixing process converts the 10.7-MHz IF to 455 kHz. The second IF

Table 1
Parts Suppliers

Radio Shack (RS).
Semiconductors Surplus (SS), 2822 No. 32nd St. Unit 1, Phoenix, AZ 85008, tel. 602-958-9423.
Mouser Electronics (M), P.O. Box C, Lakeside, CA 92040, tel. 619-449-2222.
Amidon Associates, 12033 Otsego Street, North Hollywood, CA 91607, tel. 213-760-4429.

is routed through a band-pass filter and then to a limiting amplifier to remove any AM signal components. Audio is recovered by a quadrature FM detector and sent to the squelch circuit and the audio amplifier. The squelch circuit is activated by noise when no audio signal is present. When the squelch circuit is triggered, the audio mute output grounds the audio amplifier input.

The audio amplifier is a high-gain device that provides more than enough output to drive an 8-ohm speaker. Frequency response is determined by the values of the components coupling the audio amplifier to the narrow-band FM IF IC.

Circuit Details

Refer to Fig. 2. Because all the active

components in this receiver are contained in the three ICs, only four parts of the circuit must be tuned. Two are in the first LO, one in the front end, and the fourth is the coil in the quadrature discriminator.

The first LO uses a parallel LC circuit. L1 is a Zenith Radio coil of 6½ turns on a molded plastic form with an adjustable slug. A fixed-value silver mica and a trimmer capacitor, C1, complete the circuit. Tuning is accomplished by adjusting the trimmer capacitor after the circuit is brought into the correct range by adjusting the inductor.

The RF front-end coil, L2, consists of 18 turns of no. 28 enameled wire, center tapped, wound on an Amidon T-37-10 black ($\mu = 6$) toroid core. Again, a fixed capacitor and a trimmer capacitor, C2, are used to resonate the circuit to the input frequency.

The SK7669 front-end chip is a low-power device that provides about 20 dB of conversion gain. The series diodes in the 9-V supply lead drop the voltage to the correct value for the device.

RF from the antenna is coupled into the device through a 0.01- μ F capacitor coupled to pin 1. The output from pin 6 is connected to the crystal filter; filter bandwidth is approximately 15 kHz. The insertion loss

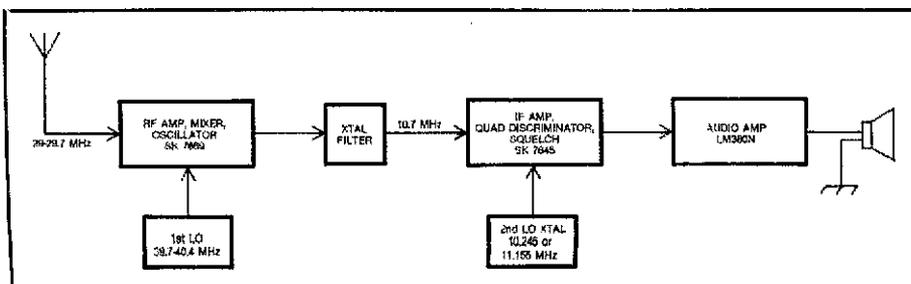
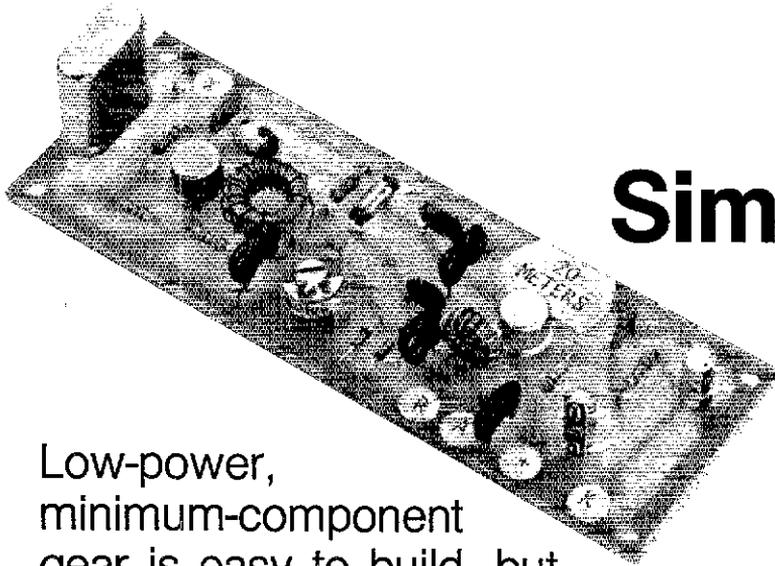


Fig. 1 — Block diagram showing frequency-mixing scheme of 10-meter FM receiver.

*ARRL Laboratory Engineer



Simple QRP Gear Versus Good Performance

Low-power, minimum-component gear is easy to build, but performance is often below that which can be obtained with careful design. Let's consider some design pitfalls and the practical project offered here.

By Doug DeMaw,* W1FB

I'm sure you've heard a number of chirpy or buzzy signals from homemade QRP transmitters. In fact, you may have unwittingly turned loose a "super blooper" on the airways yourself! I'd be shading the truth if I did not confess to being guilty of a similar misdemeanor once or twice in my amateur career. It seems that the simpler the transmitter the more prone it is to chirp and related ills. Once we understand the causes of inferior performance, preventive steps can be taken in the design period to avoid generating "lid" style signals.¹

Although we are addressing simple transmitters in this discussion, the general approach to design can be applied to most oscillators and VFOs that are part of a larger circuit, such as a multistage high-power transmitter. Since the oscillator is the heart of a transmitter or receiver, it deserves special care in the design and construction stages.

Profile of an Oscillator

There have been many discussions of what oscillators are and how they function. Certainly, *QST* and the *ARRL Handbook* have carried a wealth of data on this subject over past decades. But for the purpose of quick review, let's look at Fig. 1. The circuit example at A shows a Pierce oscillator that has an untuned output circuit. Feedback to make the circuit oscillate is between the base and collector of Q1.

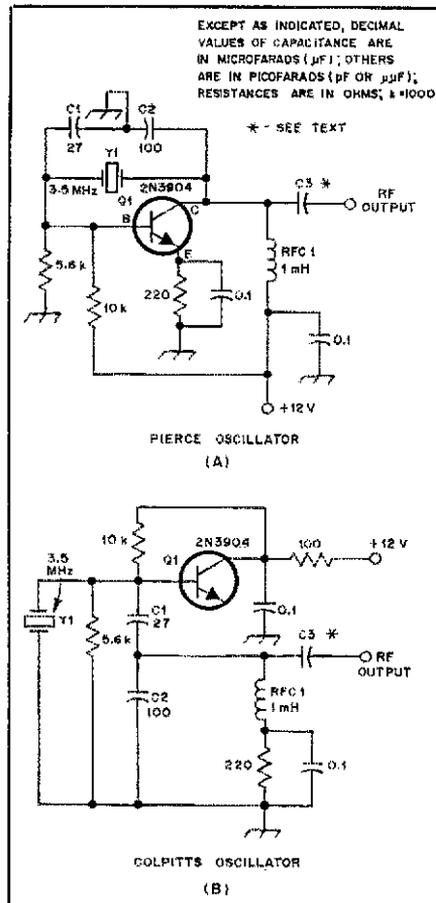


Fig. 1 — Example of a Pierce solid-state oscillator (A). C1 and C2 control the feedback in the circuits at A and B. A Colpitts oscillator is found at B of this drawing.

This positive feedback is provided by C1 and C2. The capacitance ratio is adjusted to ensure fast starting of the oscillator when it is turned on or keyed. Remember that an oscillator is actually an amplifier. Part of the power output is routed back to the input circuit to cause oscillation. Therefore, C1 and C2 are chosen to ensure just enough feedback energy to provide reliable oscillation. Typically, a ratio of 4:1 in the feedback capacitors is a good starting value during initial design. In other words, we should attempt to use one fourth the output power as feedback energy.

We need to remember, also, that this feedback power is taken from the output power available for delivery to the load. It is for this reason that an oscillator is not as efficient (dc input power versus RF output power) as a straight RF amplifier. In the interest of best efficiency, we should use no more feedback power than is required for reliable circuit oscillation. There are other reasons why too much feedback is undesirable. It can cause a chirpy output signal and oscillation at frequencies other than the desired one, and may harm the crystal from the effects of excessive current. The high current can cause the crystal to heat up or even fracture. This danger is more pronounced as the operating frequency is increased (raised) because the higher the crystal frequency the thinner the quartz element in a crystal. An overheated crystal will drift in frequency, just as a VFO will with changes in component temperature. Some amateurs attempt to generate substantial power by using a power

¹Notes appear on page 26.

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

oscillator in a one-stage transmitter. The results are often dismal, owing to excessive crystal current and drift.

Further examination of Fig. 1A shows that the emitter of Q1 is at RF ground by virtue of the 0.1- μ F emitter bypass capacitor. Fundamental-frequency oscillators (output frequency the same as the crystal frequency) have only two terminals that are "hot" at RF. Attempts to have all three terminals "alive" with RF energy will result in unstable performance, or no oscillation at all. The exception is when the oscillator serves also as a frequency multiplier, as in Fig. 2.

RFC1 of Fig. 1A is selected to be self-resonant well below the desired oscillator frequency. In our circuit, we find a value of 1 mH. We can assume approximately 10 pF of stray circuit capacitance at the output of Q1. Therefore, the self-resonant frequency of RFC1 is on the order of 1.6 MHz — well below 3.5 MHz, the oscillator frequency. Owing to the nature of this circuit, the output circuit of our oscillator is broadband. It would be suitable also for use above 80 meters if the values of the feedback capacitors were changed.

The amount of feedback energy needed is dependent mainly upon how active the particular crystal is, plus the beta of the transistor we happen to connect to our circuit. The beta (gain) of a transistor varies considerably between one transistor and another from the same manufacturer's production run. This is why the data sheets list the beta with a "typical" value. In reality, it can be above or below that value by a fair margin. Because of unknown crystal characteristics and the so-called "beta spread," we need to adjust the feedback for each circuit we build — if optimum performance is desired.

Colpitts Oscillator

Thus far we have considered only the Pierce oscillator. There are countless other types of crystal-oscillator circuits, and each is named after the person who developed it. The Pierce and Colpitts circuits seem to be the most common in amateur circuits, and that is why I have selected them for this discussion. The basic form of Colpitts oscillator is shown in Fig. 1B. In this example, we find that the collector is "cold" in terms of RF energy by means of the 0.1- μ F bypass capacitor. The base and emitter terminals of Q1 are hot with regard to RF energy. C1 and C2 comprise the feedback divider. They can be adjusted in value to provide the required amount of feedback power.

RF output is taken from the oscillator emitter circuit. The output voltage is quite low compared to that of the Pierce circuit of Fig. 1A because of the low impedance of the Colpitts oscillator output tap point. Both oscillators require the smallest practical value of output coupling capacitor (C3) to minimize loading of the oscillator, which can cause chirp (when keyed) or no

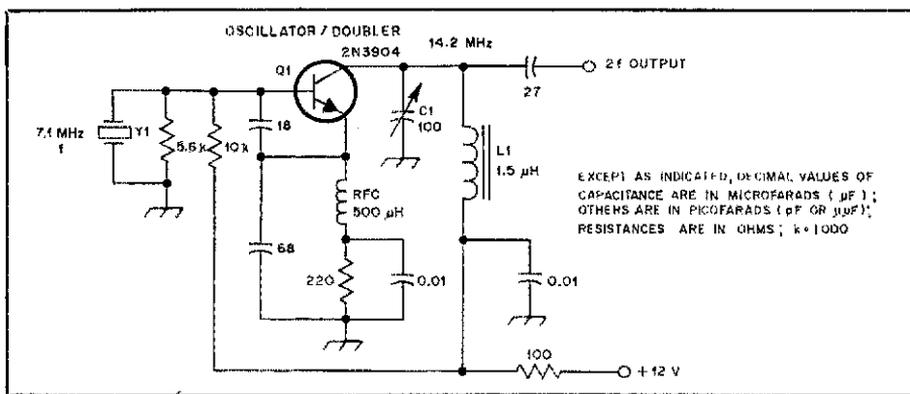


Fig. 2 — A crystal oscillator may be used as a frequency multiplier, as shown here. The collector circuit is tuned to the desired harmonic of the crystal.

oscillation at all. A typical value for C3 at 80 meters is 50-100 pF. Smaller values are recommended for 7 MHz and higher. The larger the value of C1 in Fig. 1B, the greater the feedback amount. In some circuits, we may eliminate C1 completely. This is because there may be sufficient capacitance within the transistor to serve as C1. This will depend on the transistor type we select for Q1.

We can conclude from the previous discussion that there are many variables that dictate how we select component values for a given crystal oscillator circuit. Experimentation has long been the motto of amateurs, so this requirement should be a matter of course for most of us who manipulate a soldering iron in the small hours of the morning! The variables that apply to crystal oscillators do, of course, relate to VFO (variable-frequency oscillator) circuits as well. Because of these variations in transistors and crystals, it is not unusual to find that a circuit we duplicate from an amateur journal does not perform as specified — or perhaps not at all! The author may have chosen the proper component values for his or her crystal and transistor, but they may be incorrect for your components.

Oscillators That Change the Frequency

Earlier, we touched upon an oscillator that serves also as a frequency multiplier. We would not want to use such a circuit in a one-transistor QRP transmitter, but we could use it to drive a straight-through amplifier in a low-power transmitter. The reason we should avoid oscillator/multipliers directly into an antenna is because they are quite inefficient, and they would cause subharmonic energy to be radiated. The exception in the case of subharmonic radiation would be when we use well-designed filters in the transmitter output. The filters would have to reject the oscillator frequency as well as harmonics of the desired output frequency. This would call for a quality band-pass filter rather than the customary low-pass filter. In other words, we would need to reject frequencies above and below the

desired output frequency.

An example of an oscillator/multiplier is shown in Fig. 2. The basic circuit is a Colpitts oscillator of the kind we saw in Fig. 1B. The difference is found in the collector circuit. C1 and L1 comprise a tuned collector tank that is adjusted for resonance at twice (2f) the crystal frequency. The collector of Q1 is no longer cold at RF, but has 14.2-MHz RF current present. Output from this circuit will be lower than that from the oscillator of Fig. 1B. This is because the efficiency of any multiplier is lower than that for a straight-through amplifier. Most oscillator/doublers exhibit an efficiency of approximately 33% after being optimized. Were we to triple or quadruple in the collector circuit (which is entirely acceptable), the efficiency would be correspondingly lower. The technique is useful when we are willing to amplify the oscillator/multiplier output by means of straight-through amplifiers. Generally, the CW note will be less prone to chirp if we multiply in the oscillator or in the stage immediately after the oscillator. For the most part, our cost will be minimal when we add an amplifier after a frequency-multiplier stage: Transistors and resistors are quite inexpensive these days!

Aids to Frequency Stability

Voltage regulation is important in an oscillator if the main power supply is not regulated. How can we achieve oscillator regulation simply and at low cost? A Zener diode regulator is the answer. The circuit of Fig. 3 illustrates the simplicity of Zener diode dc regulation. D1 is a 9.1-V, 400-mW regulator. It will hold the oscillator base and collector voltage constant during key-down conditions. R1 is the dropping resistor for the diode. Without this resistor, the diode would draw excessive current and burn up. If the resistor has too much resistance, the diode will not regulate at 9.1 V. Information on selecting the correct value of resistance is presented in the ARRL Handbook. We need to recognize that the Zener diode must draw a certain amount of current if it is to provide regulation. This current can range from 10 to

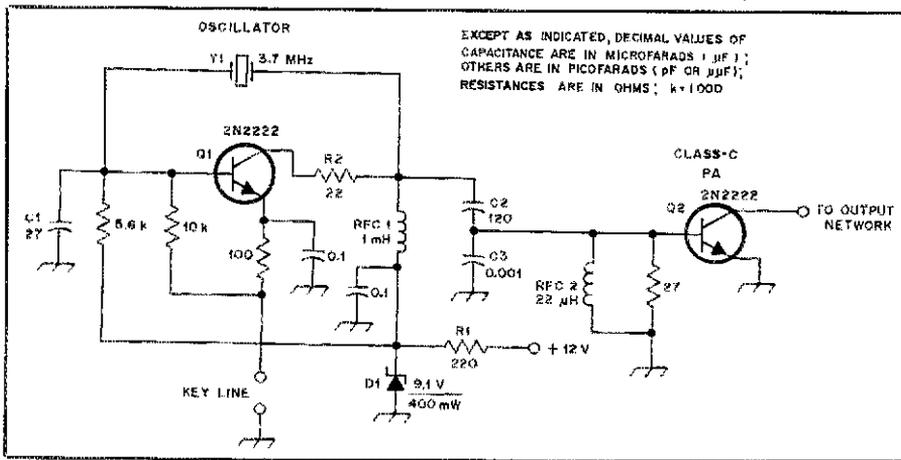


Fig. 3 — An example of how a Zener diode (D1) can be used to ensure stable operating voltage (see text).

Table 1
Values of L and C for the One-Stage QRP Transmitter (Fig. 4)

Band	C1 (pF)	C _s (pF)	C2 (pF)	C3 (pF)	C4 (pF)	L1 (μH)
3.5 MHz	1000	330	100	1200	100	4.2, 29 turns no. 26 wire on T50-2 toroid core
7.0 MHz	560	180	100	600	47	2.12, 20 turns no. 26 wire on T50-2 toroid core
10.1 MHz	470	100	100	430	33	1.48, 19 turns no. 26 wire on T50-6 toroid core
14.0 MHz	470	68	100	300	27	1.0, 13 turns no. 26 wire on T50-6 toroid core

Note: C2 is a Mouser no. 24AA034 (page 76) 10-mm-diameter trimmer, 15-100 pF. C2, C3 and C_s should be polystyrene or silver mica. All others are disc ceramic.

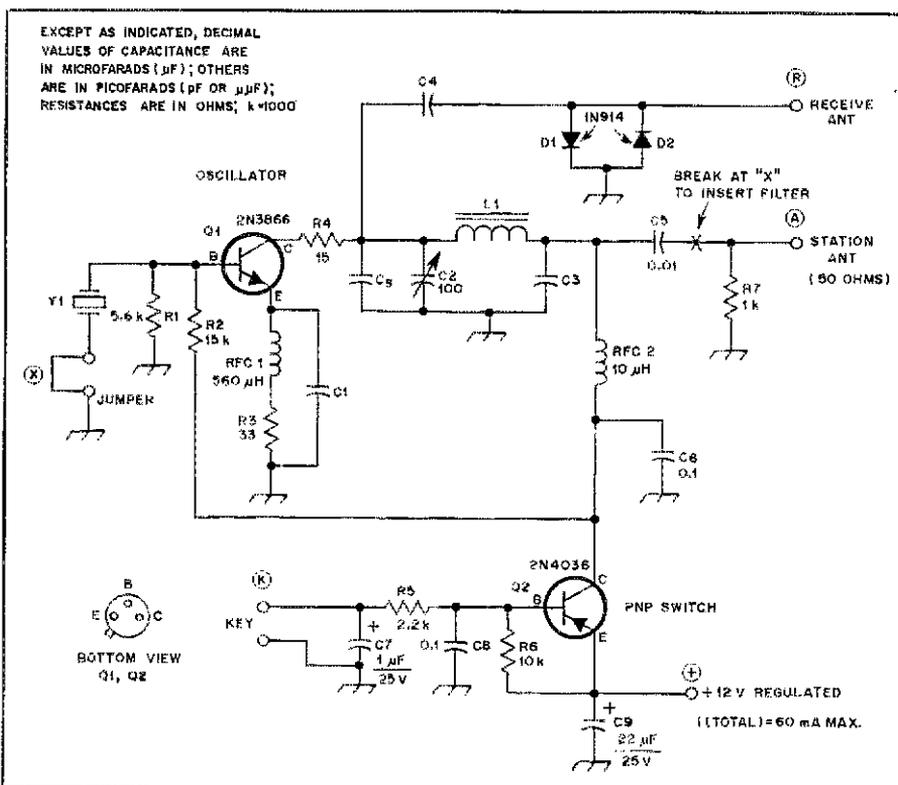


Fig. 4 — Schematic diagram of a practical QRP transmitter. Resistors are 1/4-W carbon composition. Fixed-value capacitors are disc ceramic. Capacitors with polarity marked are electrolytic or tantalum. C2 is a ceramic trimmer capacitor. See Table 1 for coil and capacitor data for the bands from 80 through 20 meters. Y1 is an International Crystal Mfg. Co. type GP, 20-pF load capacitance. Other fundamental crystals will be suitable (see text).

18 mA in this type of circuit, depending on the value of R1. For portable operation from a battery power supply, therefore, this added current must be taken into account when considering the discharge rate of the battery.

You will notice also that we have added R2 in the circuit of Fig. 3. This 22-ohm resistor is located close to the collector of Q1 to prevent unwanted parasitic oscillations that may occur at VHF. It is not unusual for a high-frequency transistor to self-oscillate in the VHF range when the circuit board is laid out with long copper elements. R2 serves as an inexpensive preventive device. Parasitic oscillation can impair the efficiency of the oscillator, encourage spurious radiation, and cause the CW note to be unclear. R2 may not be necessary in circuits that are laid out carefully.

Our circuit in Fig. 3 is a Pierce oscillator. C1 is a feedback capacitor, and C2-C3 in series provide the remaining part of the feedback divider. The effective value of C2 and C3 in series is 107 pF. These two capacitors function as an impedance-transformation circuit as well. The impedance at the top end of RFC1 is quite high compared to that of the base of Q2. The Q1 collector impedance is stepped down by virtue of the ratio of C2 and C3. The *ARRL Electronics Data Book* contains the equations and examples for using capacitive dividers to transform one impedance to another.

Simple Transmitter Performance

Some builders of homemade QRP transmitters are unmindful of the importance of proper impedance matching and output network design. It is not unusual to find some hams using one- or two-stage QRP rigs with output tank circuits that follow vacuum-tube concepts. That is, a single tuned output circuit is used, without regard for the collector and load impedance. Maximum power transfer can't be had without suitable matching of the impedances. Under some conditions of mismatch, the PA (power amplifier) stage may break into self-oscillation. This can cause spurious radiation, and it may even destroy the PA transmitter.

Take, for example, a tube QRP rig that has 150 plate volts and draws 10 mA when operating at 1.5-W dc input power. The plate impedance is 15,000 ohms. Conversely, a 1.5-W solid-state final amplifier that uses a 12-V collector supply will have a collector impedance on the order of 96 ohms. Attempts to use a tube type of output tuned circuit will be met with dismal results when dealing with a 96-ohm collector impedance! Furthermore, the transistor collector will load the high-impedance tank circuit and destroy the Q. This will permit harmonics to be radiated from the antenna, thereby causing TVI and interference to other services. The transmitting chapter of the *ARRL Handbook* contains detailed data

on impedance-matching networks for solid-state transmitters.

A Practical One-Stage QRP Transmitter

An uncomplicated circuit for QRP transmitting from 80 through 20 meters (see Table 1) is shown in schematic form in Fig. 4. Dc power input is 250 mW ($\frac{1}{4}$ W), which is ample for worldwide communications under good band conditions if an effective antenna is used (beam antenna, vertical radiator or dipole high above ground). This transmitter permits full break-in (QSK) without the use of antenna relays. The receiver antenna-input line is simply connected to point R of Fig. 4. When the key is up, the receiver is effectively attached to the station antenna. Upon closure of the key, the antenna line to the receiver is shorted to ground by means of D1 and D2. This transmit-receive (TR) circuit permits instant changeover from transmit to receive.

Q2 is a dc switch that serves as a keying transistor. When the terminals at K of Fig. 4 are shorted by the key or keyer, Q2 saturates and supplies +12 V to Q1, thereby turning on the oscillator. C2 is adjusted for maximum power output (100 mW), consistent with a chirp-free CW note. (The best note should occur at the dip in Q1 collector current — approximately 30 mA of total transmitter current.)

R5, C7 and C8 form a shaping network to soften the trailing edge of the CW waveform. The purpose of R7 is to provide a light load at the output of C5 under all conditions. I observed that the transmitter tended to be unstable before R7 was added, particularly when the SWR was higher than 2:1. The instability was observed while I was adjusting the Transmatch for an all-band antenna. Stability was fine when a low SWR was present while using a dipole fed with 52-ohm coaxial cable.

VXO Operation

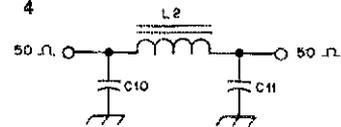
The pair of terminals marked with an X in Fig. 4 identify the location of a jumper wire that can be removed to permit variable crystal oscillator (VXO) operation through insertion of a coil and variable capacitor. This modification is shown in Fig. 5. C_{VXO} can be a broadcast-band variable with half of the rotor plates removed; a 100- or 140-pF miniature variable capacitor may be used.

L_{VXO} is a small inductor wound on a toroid core. The greater the inductance, the more you will be able to shift the crystal frequency. Too large an inductance, however, will cause Q1 to function as a VFO rather than as a crystal oscillator. This will cause instability and chirp. Typical frequency swings are 2 kHz at 80 meters, 6 kHz at 40 meters, 9 kHz at 30 meters and 12 kHz at 20 meters. Experimental values for L_{VXO} are 12 μ H (20 meters), 15 μ H (30 meters), 20 μ H (40 meters) and 30 μ H (80 meters). Experiment with the number of coil turns until you obtain frequency

Table 2
Low-Pass Filter Components

Band (Meters)	C10, C11 (pF)	L2 (μ H)	Filter Cutoff (MHz)
20	220	0.5 13 turns no. 24 enam. on Amidon T37-6 toroid	15
30	270	0.72 16 turns no. 24 enam. on T37-6 toroid	11
40	390	1.0 15 turns no. 24 enam. on Amidon T37-2 toroid	8
80	820	2.0 22 turns no. 26 enam. on T37-2 toroid	4

Values for use in building a single-section harmonic filter that can be added at the output of the QRP transmitter. C10 and C11 can be disc-ceramic, silver-mica or polystyrene capacitors.



shifts on the order of those listed.

The recommended crystals for VXO and standard use in this transmitter are plated AT-cut fundamental crystals in HC-6/U holders. A load capacitance of 20 pF is suitable for the crystals. Surplus crystals in FT-243 holders may not offer good activity, and they probably won't do too well for VXO operation.

Construction Notes

Keep the leads of all components as short as possible when soldering them to the PC board. Also, when winding L1, be sure to spread the coil turns around 2/3 of the toroid core. Bunching them too close together will increase the inductance, and spreading them over all of the core will decrease the inductance.

You may wish to add a single pi-section harmonic filter to the transmitter output in the interest of spectral purity. I have used this circuit with and without the filter, and have found the output (without the filter) to be clean enough to prevent TVI or harmonic radiation that could be detected on the air. Table 2 contains a circuit that can be added. The photograph of the transmit-

ter shows the three added components for the filter. I made six holes with a no. 60 drill and soldered the filter in place. If you choose to follow this approach it will be necessary to sever the circuit-board foil between C5 and the antenna output terminal. A Moto Tool[®] or knife blade will be suitable for cutting the copper. Alternatively, you may mount the parts on a piece of perforated board and glue the subassembly to the main circuit board near the antenna output terminal. Spectral photos of the transmitter output before and after the

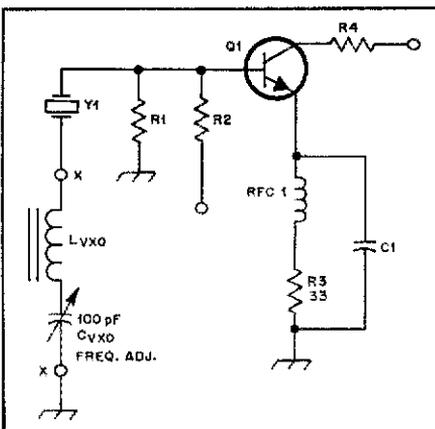
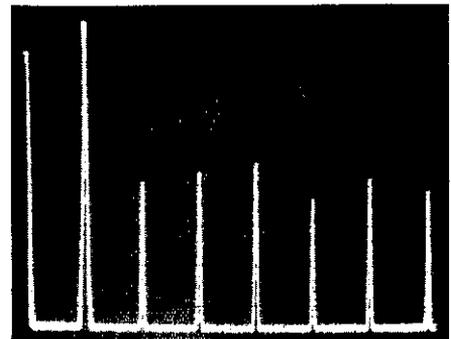
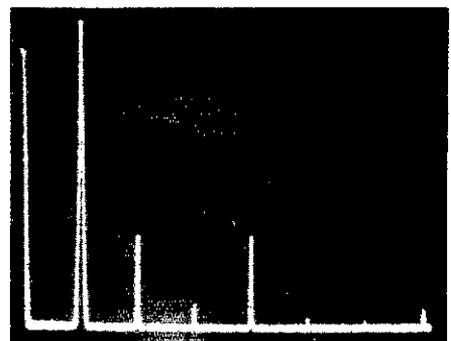


Fig. 5 — The jumper across terminals X of Fig. 4 may be removed to add these components. A coil (L_{VXO}) and a tuning capacitor (C_{VXO}) are used to shift the crystal operating frequency (see text).



(A)



(B)

Fig. 6 — Spectral display of the QRP transmitter, without the filter (A) and with the filter (B). Horizontal divisions are each 10 MHz; vertical divisions are each 10 dB. Power output is approximately 0.25 W on 20 meters. At A, all spurious output is at least 34 dB down from peak fundamental output; at B, at least 52 dB down.

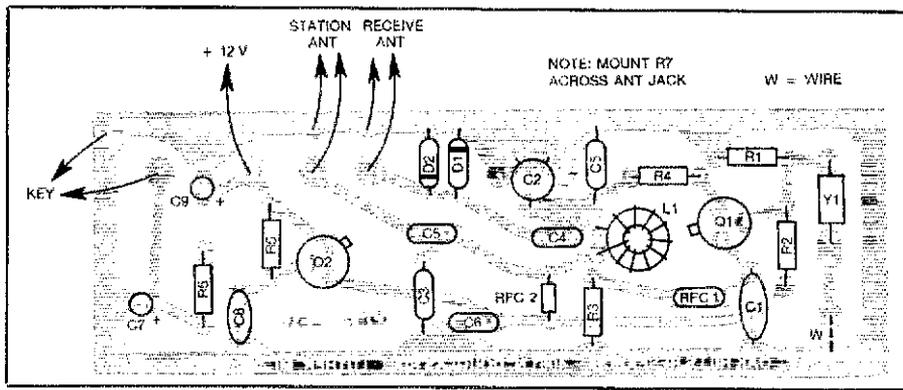


Fig. 7 — Component-side view of the PC board showing placement of the components.

addition of the simple filter are shown in Fig. 6.

The completed assembly can be mounted in a cabinet or box of your choice. A nice homemade box can be fashioned from pieces of double-sided PC board that are soldered together where the sections join. The circuit need not be completely enclosed. Rather, you may prefer to mount the board on short standoff posts on an L-shaped piece of aluminum stock. The vertical part of the L can then serve as a panel for the jacks and VXO tuning capacitor. Adhesive-backed plastic feet can be affixed to the bottom of the L chassis. Your 12-V power supply can be packaged in the same box that contains the transmitter.² A parts placement guide is provided in Fig. 7. A scale etching template

is given in the Hints and Kinks column.

Adjustment and Use

Attach a 56-ohm resistor at the transmitter output to serve as a dummy load. Apply operating voltage and plug in your key. Hold the key down and tune your receiver to the transmitter frequency. Send some CW and monitor the note. If it is chirpy, adjust C2 until the CW note sounds proper. You can observe the S meter on your receiver while tuning C2 for maximum power output, consistent with a good-sounding CW note.

With an antenna connected (it should have an impedance of 50 ohms), look for a clear frequency and call CQ. It is wise to have two or three crystals available if you do not use VXO control. Don't despair if

you don't receive an answer on the first few calls. That can happen even when running QRO (high power)! Eventually you will receive a response to your CQ, and the fun will commence. When answering someone on or near your crystal frequencies, try to respond to loud signals. This will mean that your signal will probably be fairly loud in the other station's receiver, assuming the operator is not running high power.

In Summary

If you haven't had the courage to work with transistors, this article may be the stimulant you've needed. On the other hand, if you've been building simple QRP rigs and have had poor results, the design tips we've discussed may get you headed down the right path.

There are many QRP operators in the world, so why not join them and face the exciting challenge of low-power operation. If you want to use this little transmitter in the field, take along a 12-V motorcycle battery, a lantern battery or 10 size-D cells connected in series. Of course, you will need a battery-operated receiver to use with your transmitter for field work. Numerous circuits for QRP receivers are described in the ARRL book, *Solid State Design for the Radio Amateur*.

Notes

- ¹A "lid" is a poor operator, or one with a bad-sounding signal. The term comes from the early days of Amateur Radio and is rumored to have been inspired by a bad CW signal that sounded like the lid on a kettle of boiling water.
- ²Complete kits for 80, 40, 30 or 20 meters (minus crystal) are available from State Street Sales, P.O. Box 249, Luther, MI 49656. Small, regulated, 12-V power supplies are also available; write for information.

Strays

FORUM ON AMATEUR ROLE IN NCS

□ "Amateur Radio Support for the National Communication System" will be the subject of a forum at the Armed Forces Communications and Electronics Association luncheon on January 31 at the Disneyland Hotel in Anaheim, California. For more information, contact John W. Browning, W6SP, 6202 Lochvale, Palos Verdes, CA 90274, tel. 213-544-2543.

ATTENTION ANTENNA DESIGNERS

□ If you are thinking of writing an antenna article for *QST*, you'll be interested in this note about submitting antenna radiation patterns. Patterns are based on a decibel scale, and made on a log-periodic coordinate system where the graduations vary periodically with the logarithm of the signal strength (in voltage units). To get a better understanding of using these patterns, refer to July 1980 *QST* ("The New Look for *QST*'s Antenna Patterns," p. 26).

Antenna pattern worksheets are available from the ARRL — 100 sheets for \$3 (homemade charts are not always proportioned accurately). — *Maureen Thompson, KA1DYZ*

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 December issue were:

- Learn the "Theory, Limitations and Adjustment of Reflectometers and other SWR Meters," from Albert E. Weller, WD8KBW.
- The VHF+ Technology column by Geoff Krauss, WA2GFP, offers some suggestions on frequency stability.
- Texas Instruments recently announced a new, low-cost GaAsFET. Read about it in BITS.

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 ad-

ditional postage surcharges for mailing outside the U.S.; write to Headquarters for details.

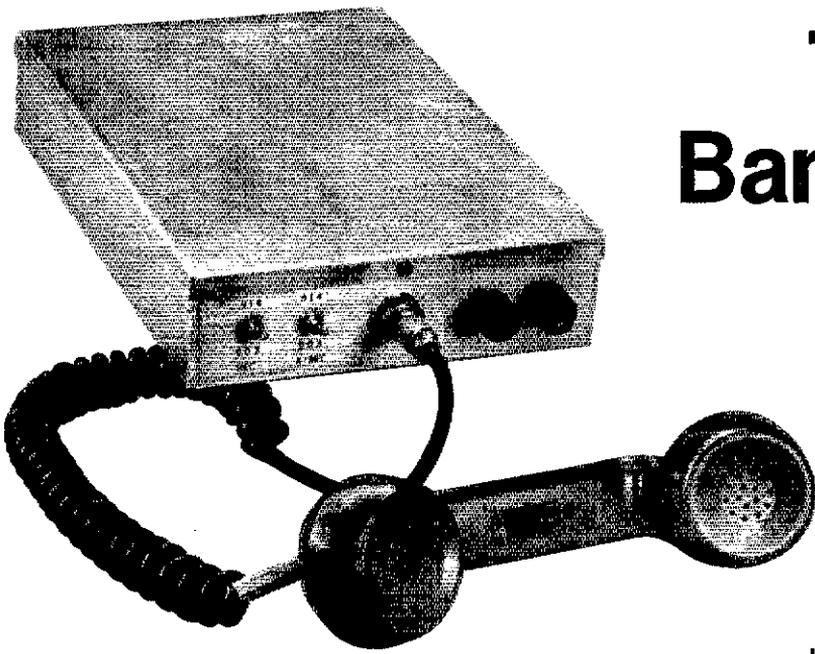
Next Month in QST

Those who read about the no-noise, digital VFO described in April 1984 *QST* will want to check out its follow-up project in February *QST*: a Z-80-based controller that provides the frequency information for the VFO.

Elsewhere in February *QST* you'll find:

- a Beginner's Bench installment that deals with ways to beat the high cost of parts
- a wire array for 160 that provides vertical polarization; simple and inexpensive, it'll be an outstanding top-band performer
- wrapping things up is the annual year-in-review — all the highlights of the Amateur Radio year just ended.

The 900-MHz Band — What's in Store for Amateurs?



Here's an overview of what you may find on the band and ways to use it, and a look at the ARRL's interim band plan.

By Albert D. Helfrick,* K2BLA

The 902-928 MHz band will soon be available for amateur use. (See Dec. 1984 Happenings, p. 61). The FCC has proposed, in PR Docket 84-960, to allow powers of up to 1500-W PEP output with emission types A0, A1, A2, A3, A4, A5, F0, F1, F2, F3, F4, F5 and pulse (P), subject to some conditions (see Table 1, note 1). When the band becomes available, we'll share it with several other services, including government, auto-vehicle monitoring and the industrial, scientific and medical (ISM) services. There are some other radio services using this band. Those stations currently operating in the 902-928 MHz band will have to endure probable interference from the ISM services or relocate to another frequency.

It is true that amateurs already have a band in the 1-GHz region that has been available for some time. What is unique about the slightly lower frequency that will make it attractive to radio amateurs? First, the frequency is adjacent to the new mobile cellular-telephone band (discussed later). This means the enormous strides in cellular technology can be adopted for the Amateur Service. In the future, surplus equipment that can be modified for use in the amateur segment will appear. Also, the upper UHF TV channels that are used primarily for translators in remote areas are close to the cellular mobile-telephone band. Since the

upper limit of the UHF TV band is 890 MHz, the most likely items to carry over from UHF TV are antennas. Many UHF TV antennas may be made to work at 900 MHz with only slight modifications.

Cellular Mobile Service

The core of the cellular mobile-telephone service is a base station that provides communication within a "cell" (hence the name of the service) having a radius of eight miles (about 13 km). Each base station is linked to other base stations. A set of channel frequencies is available, and frequency-agile mobile units search for an unused frequency. Relatively low power (typically less than 10 W) is used at the mobile end, and is controllable from the base station. Therefore, only as much power as is necessary to establish reliable communications is used, permitting the frequency to be reused in a nearby cell. This is a totally new concept in mobile-to-base station communications.

When a base station realizes that use of the maximum power available does not provide reliable communications, the base station will determine which adjacent cell has a better signal from the mobile transmitter. The mobile is then handed off to that cell. As long as the mobile unit is within the service area of a cell, the service is continuous.

The transmit and receive frequency difference is 45 MHz. Mobile transceivers typically have a 45-MHz first IF and use a common synthesizer for the transmitter and receiver. Of course, being a commercial telephone service, the cellular

transceivers operate full duplex — another reason for the different transmit and receive frequencies.

What's Up There?

The nature of the radio services currently occupying this frequency range should be understood in order to appreciate some of the potential problems of using the band. The ISM services are essentially assigned one frequency, 915 MHz, and are restricted to the 902-928 MHz range. This results in a 13-MHz tolerance for the carrier for narrowband sources and a tolerance-plus-bandwidth for broadband sources. Some applications of the 900-MHz frequencies are industrial heating, motion and position detection for assembly lines, burglar or intrusion alarms, and electronic door openers. There has been some discussion of operating microwave ovens at this frequency.

Most of the industrial applications of the frequency involve the transmission of a 915-MHz carrier. For example, the automatic door opener and the intrusion alarm transmit a 915-MHz carrier and receive reflections from nearby objects. The sensor unit transmits and receives simultaneously using the transmitter oscillator as a conversion signal for what amounts to a zero IF superheterodyne. Normally, the reflection frequency is precisely the same as the transmitter oscillator frequency, and when the received signal is heterodyned with the transmitter oscillator, the result is dc. When the received reflections are from moving ob-

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Table 1

ARRL Interim 900-MHz Band Plan¹

Frequency (MHz)	Type of Use
902-904	Narrow-bandwidth, weak-signal work
902-902.8	SSTV, FAX, ACSB, Experimental
902.8-903	Reserved for EME, CW expansion
903-903.05	EME, exclusively
903.07-903.08	CW beacons
903.1	CW, SSB calling frequency
903.4-903.6	Crossband linear translator input
903.6-903.8	Crossband linear translator output
903.8-904	Experimental beacons, exclusively
904-906	Digital communications ^{2,8}
906-907	Narrow-bandwidth FM simplex services, 25-kHz channels ⁶
906.5	National FM simplex calling frequency
907-910	FM repeater inputs, paired with 919-922 MHz outputs; 119 pairs, every 25 kHz (e.g., 907.025, 907.050 MHz); uncoordinated test pair 908-920 MHz ^{2,4}
910-916	ATV ^{2,3}
916-918	Digital communications ^{2,8}
918-919	Narrow-bandwidth FM control links and remote bases
919-922	FM repeater outputs, paired with 907-910 MHz inputs ^{2,4}
922-928	Wide-bandwidth experimental, simplex ATV, spread spectrum ^{5,7}

¹Extracts of *FCC Rules and Regulations*, Paragraph 2.106, Table of Frequency Allocations, as modified by General Docket 80-739, December 8, 1983.

²US267: "In the band 902-928 MHz, Amateur Radio stations shall not operate within the States of Colorado and Wyoming, bounded by the area of: latitude 39° N to 42° N and longitude 103° W to 108° W."

³US275: "The band 902-928 MHz is allocated on a secondary basis to the amateur service subject to not causing harmful interference to the operations of Government stations authorized in this band or to Automatic Vehicle Monitoring (AVM) systems. Stations in the amateur service must tolerate any interference from the operations of industrial, scientific, and medical (ISM) devices, AVM systems and the operations Government stations authorized in this band." (Note: Since the secondary allocation of 902 to 928 MHz to amateurs is confined to ITU Region 2, this band will not be available to amateurs in American Samoa, Baker Island, The Commonwealth of Northern Mariana, Guam, Howland, Jarvis, Palmyra and Wake Islands.)

⁴Coordinated assignments required.

⁵ATV assignments should be made according to modulation type (for example, VSB ATV, SSB ATV or combinations thereof). Coordination of multiple users of a single channel in a local area can be achieved through isolation by means of cross polarization and directional antennas.

⁶Coordinate assignments at 100 kHz until allocations are filled, then assign 50-kHz channels until allocations are filled before assigning 25-kHz channels.

⁷Simplex services only; permanent users shall not be coordinated in this segment. High-altitude repeaters or other unattended fixed operations are not permitted.

⁸Voice and no-voice operations.

⁹Spread-spectrum operation requires FCC authorization.

¹⁰Consult *FCC Rules and Regulations*, Paragraph 97.69, for allowable data rates and bandwidths.

jects, a Doppler shift of the received-signal frequency occurs. For small velocities, such as those experienced by a person walking, the Doppler shift is only a few hertz, but this can be separated easily from the dc component gathered from fixed objects and used to trigger a burglar alarm or open a door. These motion and position sensors are used in various configurations for production line and process monitoring.

Power Levels

There is no limit to the amount of power that may be radiated by any one of the 900-MHz devices. The FCC rules and regulations that control ISM devices (Sec. 18.14) states, "the energy radiated shall be reduced to the greatest extent practicable." This implies that if a great amount of radiated energy is needed for the task at hand, it is legal to radiate the necessary amount, but not more. At first, it might seem that such lack of restrictions would doom the 900-MHz band before it is ever implemented. There are some important considerations, however. Although the FCC does not limit the emission levels, other regulatory agencies do. This is because high levels of RF energy at 900 MHz are dangerous. Industrial heating devices must be well shielded to prevent harmful radiation.

In the case of motion and position detectors, it is desirable to have a narrow beam and to use low power so that the detector is sensitive to nearby motion but not to distant activity. Using high power would interfere with other sensors used in the vicinity, since all motion sensors are licensed for the same 915-MHz frequency. Protecting large areas with motion-sensing equipment has been only marginally successful because the 915-MHz signal can easily penetrate walls and be falsely triggered from motion *outside* the protected building!

Although it is not good practice to radiate megawatts at 915 MHz, there will be signals in the band that have to be overcome. Most of the systems in the band use unstabilized oscillators operating at the output frequency. This explains the ± 13 MHz frequency tolerance for ISM equipment. We must assume that after time, although the ISM equipment is adjusted initially for a frequency of 915 MHz, the units will have drifted and will be distributed about 915 MHz. We must further assume that no units have violated the law by drifting beyond the 13-MHz limit and, therefore, the distribution of frequencies is such that very few units are operating within a few megahertz of the 902-928 MHz limits. (Assuming that all units are legal may be a bit optimistic. If we assume that a small percentage are il-

legal, the analysis is still valid.)

Life at 900 MHz

Amateur coexistence with other 900-MHz signal sources can be improved in several ways. One of them could be FCC restriction of broadband emissions. If the signal bandwidth is limited to, for example, 50 kHz, there will be less interference to voice communications from TV and pulse transmissions. Many applications and experimental emissions can operate with bandwidths of less than 50 kHz.

One method of avoiding interference is to use spread-spectrum techniques. With this system, the operating frequency within the band is selected rapidly in a random fashion. The existence of interfering signals on the chosen frequency adds to the receiver noise level rather than creating a debilitating situation, which would occur if the interfering signal happened to be exactly on the operating frequency.

Yet another possibility is to use a switchable carrier frequency that changes only when an interfering signal appears close enough to the operating frequency to cause harmful interference. ISM devices, because of their free-running oscillators, tend to drift with temperature and supply voltage variations. If a repeater or transceiver is frequency agile, the operating frequency can be changed to avoid interference.

Equipment

Already there are several cost-effective items developed for the cellular telephone service that are usable in the 900-MHz amateur band: transistors for various power levels, hybrid power amplifiers and even affordable GaAsFET transistors made specifically for use on the cellular telephone frequencies. As mentioned earlier, surplus cellular-telephone equipment, such as antennas, duplexers and other suitable hardware, is also available, as well as the UHF TV antennas.

Amateurs who are only occasional VHF operators and seldom venture into UHF construction may find the techniques used at 900 MHz to be a bit odd. The higher-frequency circuits use a construction technique called "microstripline." These striplines appear to be nothing more than copper PC-board traces to the unknowing eye, but are, in fact, transmission-line sections that act as capacitors, inductors, transformers and directional couplers. Some components, such as leadless chip capacitors and transistors with broad, flat leads and flat packages (rather than "cans" with wire leads), are made specifically for microstripline construction.

Some Experiments

To gain a bit of insight into 900-MHz operation, I obtained an experimental license from the FCC, built several pieces of 900-MHz equipment and performed some tests. A single-channel and a synthesized multichannel transceiver were

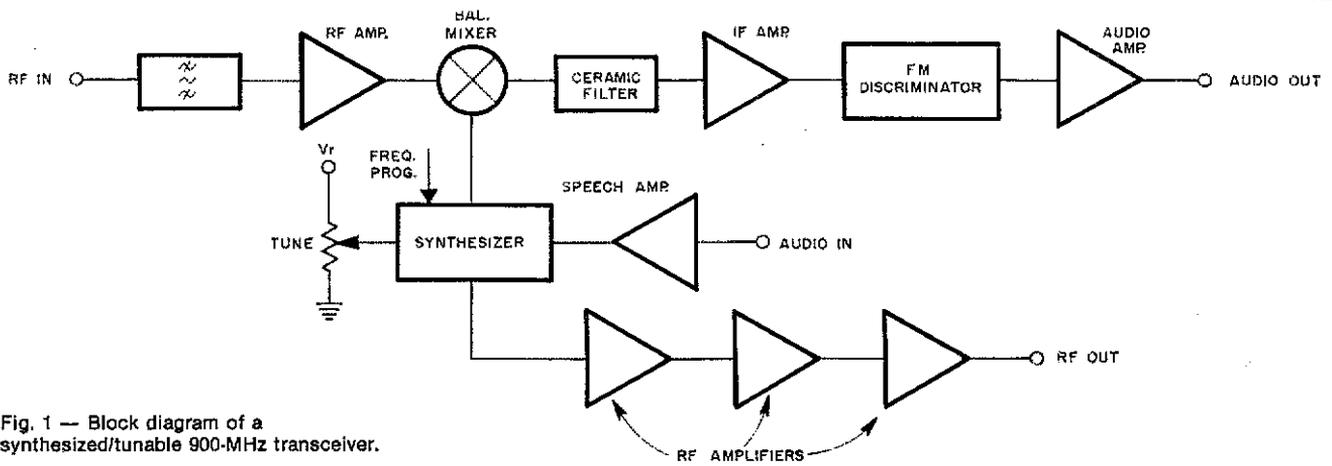


Fig. 1 — Block diagram of a synthesized/tunable 900-MHz transceiver.

assembled. Fig. 1 is a block diagram of the multichannel transceiver. The homemade equipment is shown in Figs. 2 and 3. The synthesizer provides only one output frequency, which serves as the transmit frequency and the receiver LO. Therefore, the transmit and receive frequencies differ by the IF — in this case, 10.7 MHz. A switch disables the synthesizer and permits the VCO (voltage-controlled oscillator) control voltage to be varied by means of a potentiometer. Doing so makes the receiver tunable over the range of 850 to 1050 MHz.

Receiving

I first listened to the 902-928 MHz band to assess the amount of interference from

ISM equipment. At my home, which is at the very bottom of a river valley, no interference was ever heard. Although checks with a calibrated signal generator showed the receiver sensitivity to be $2 \mu\text{V}$, *nothing* was ever heard in the tuning range of the receiver. (No matter what the generator shows, it is encouraging to actually hear *something*!)

The receiver was transported to a nearby hill. This hill is only 900 feet (275 meters) above sea level, but it is line-of-sight to New York City (35 miles, or 56 km, distant) and most of the metropolitan area. Tuning across the band (850-1050 MHz) now revealed hundreds of signals! A large number of mobile radio units, repeaters,

digital data and paging services were heard as well as several STLs (studio-transmitter links) for New York radio stations. The STLs originate in downtown Manhattan and produced full-quieting signals in my receiver (about $10 \mu\text{V}$ or more) with a simple corner-reflector antenna. Most important, tuning through the 902-928 MHz portion still uncovered no signals.

The initial tests were conducted during the weekend, but it was necessary to repeat the tests during the week when industrial plants were operating. The results of several weekday tests showed increased operation of the land-mobile services. This was expected since these services are used primarily by industry. But no activity in the 902-928 MHz region was noticed. This came as a complete surprise and is very encouraging.

Transmitting

I then tried some basic two-way transmissions using two transceivers and simple antenna systems. Each transceiver uses FM with a peak deviation of 15 kHz and a receiver with a $1\text{-}\mu\text{V}$ sensitivity. The transmitters have a power output of about 500 mW. A corner reflector was used for the fixed-station antenna, and a quarter-wave vertical for the mobile installation. Operation was conducted on two frequencies: 903.3 and 914 MHz. Both transceivers could transmit or receive on either frequency, simplex or full duplex. The transmit/receive frequency split (10.7 MHz) placed one frequency in the center of the band, where the interference was expected to be the worst, and the other frequency at the band edge, where interference was expected to be minimal.

Separate transmit and receive antennas were employed. Although a large physical separation is not required, it is necessary to place the antennas so the transmitter/receiver isolation is on the order of 32 dB. This is because transmitter energy, being phase coherent with the LO, can combine with the LO energy in the mixer.

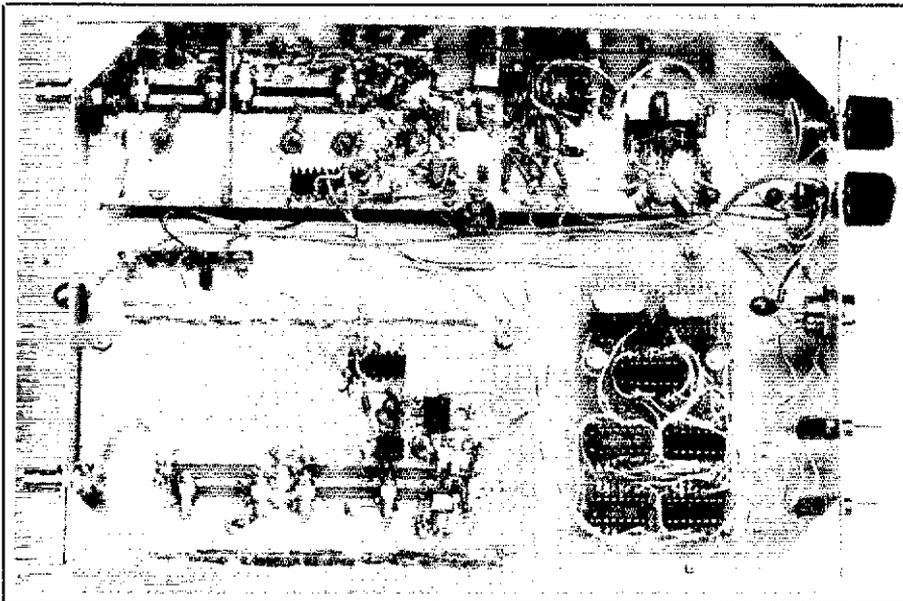


Fig. 2 — An inside view of one piece of the author's homemade 900-MHz gear. The transmitter and receiver sections can be used individually or integrated into a transceiver (as they are here) for simplex or duplex operation, or for use as a repeater. For the LO, a free-running oscillator is employed. Its frequency is divided by means of a high-speed ECL frequency divider and is phase-locked to a crystal oscillator. A single 8-pin IC is required for frequency division in lieu of several stages of frequency multiplication, associated tuned circuits and accompanying spurious signals.

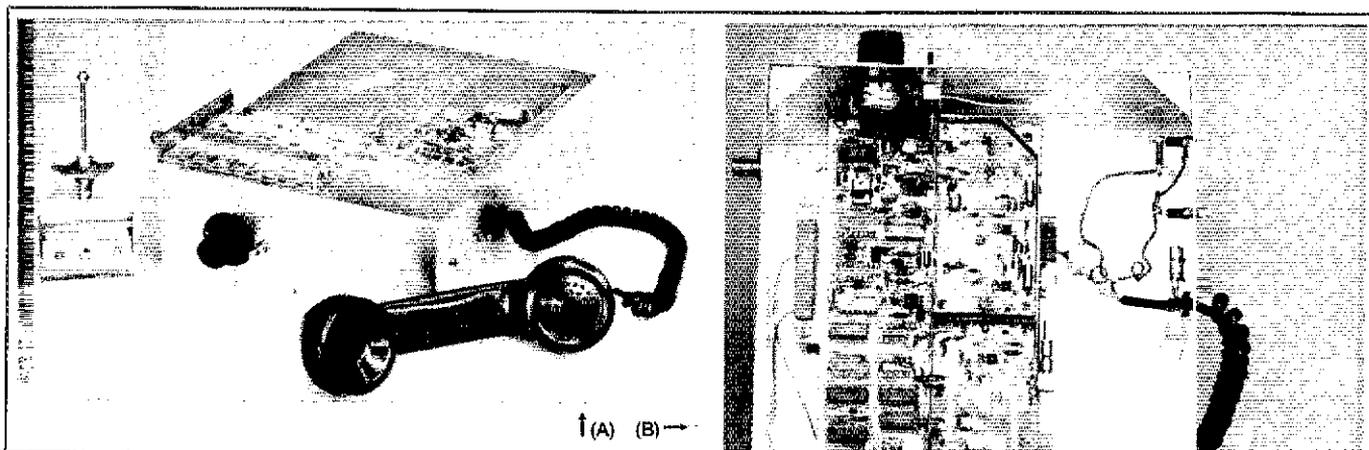


Fig. 3 — External and internal views of another homemade 900-MHz transceiver. This particular unit uses surplus avionics boards.

This energy will add or subtract from the LO power, and possibly degrade mixer performance. A typical situation would include an LO power of +13 dBm (1 V), and a transmitter power of +27 dBm (500 mW). The receiver RF amplifier has an overall gain, including the RF filter losses, of about 8 dB. This increases the amount of transmitter power reaching the receiver mixer by a like amount. Unless high-Q filters (such as cavity resonators) are used ahead of the receiver RF amplifier, it will provide very little transmitted-signal rejection. In the mixer, it's desirable to maintain at least a 10-dB ratio between the LO power and the transmitter power arriving from the antenna. This requires a +3 dBm maximum mixer gain and, because of the 8-dB gain ahead of the mixer, a -5 dBm input to the receiver. For a transmitter-power level of 500 mW, this equates to a 32-dB antenna isolation. This measure of isolation is not difficult to obtain, and is accomplished easily with corner reflectors and many other directional antennas.

Results

The first lesson I learned from the transmission tests is that 900-MHz FM propagation is definitely line-of-sight: If you can't see it, you can't hear it! During one test, approximately one mile from the transmitter, the signal went from full quieting to nothing within a few hundred feet as the vehicle passed behind a small hill. In a similar situation, I recaptured a faded signal by using the corner-reflector antenna and pointing it at a nearby hill to receive a signal reflection. Those of us who are familiar with 2-meter mobile fading will find 900 MHz unique, as the fading rate is much more rapid.

Another important fact is that at 900 MHz, losses are everywhere. The lowest-loss RF cable must be used, along with the shortest length required. Also, *calculated* dimensions for antennas are not close enough; the antenna must be trimmed using a network analyzer or an SWR indicator. In general, anything done in a shoddy manner will result in a system that will not work.

Summary

In the final analysis, is there any hope for amateur use of 900 MHz? Decidedly,

yes. Its line-of-sight nature limits mobile communications, and the band is more suited to point-to-point links. The band is ideal for remote base and repeater control. If full duplex operation is authorized, the 900-MHz band will be ideal for linking Field Day sites, emergency communications sites, command centers, and so on.

Although difficulties will be encountered with mobile communications, they are not impossible to overcome. For reliable communications, a repeater or base station with a good antenna location is a must. Whereas a few hundred milliwatts and a gain antenna are suitable for a remote link, more power is required for reliable mobile operation. This is because the mobile unit cannot use a high-gain antenna and, when the mobile unit is shadowed, a reflected signal is required; there is signal power loss associated with reflected signals. A particular coverage area should be defined, and a gain antenna with the narrowest possible beam width (the highest possible gain) should be used to cover the area by

VUCC on 902

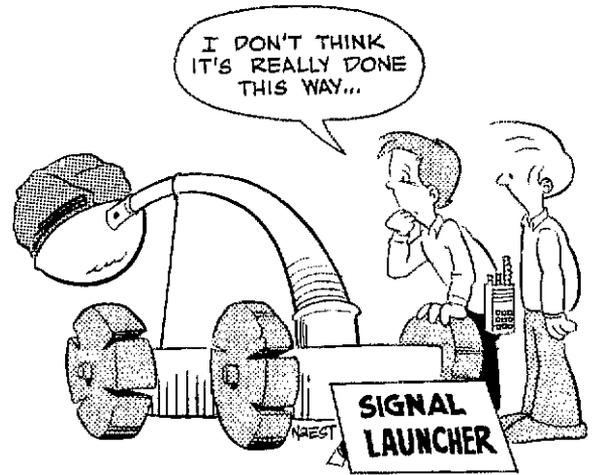
The popular VHF/UHF Century Club award (VUCC), instituted in January 1983, anticipated future occupancy of the 902-MHz band by amateurs. Thus, the minimum qualifying level for working different grid-square locators on that band was set at 25. It will be quite a challenge to be the first to make 902-MHz VUCC!

the base station or repeater. Mobile and base station receiver sensitivity should be better than 1 μ V, and the transmitter power should be on the order of 10 W or more.

Perhaps one of the more promising challenges — and a solution to the rather limited range of the 900-MHz band — is the establishment of an amateur cellular network. This network could operate on the 900- and 1200-MHz bands using linked, low-power, local repeaters. An ambitious undertaking, certainly, but it wouldn't be the first time the amateur community met a challenge.

An amateur cellular network would be somewhat different from the commercial network since considerably fewer users would be involved. Amateurs are used to waiting their turn and sharing a frequency, whereas commercial telephone users wouldn't appreciate someone constantly using their telephone! Another significant difference between the commercial and amateur networks is that amateur operation is from radio to radio, whereas the commercial operation is from radio to land line. Telephone companies use land lines to link cellular systems. Amateurs, on the other hand, have several radio bands available for the task of linking cellular repeaters. It is not the intent of this article to propose cellular standards, and the cellular concept is left to future development. The 900-MHz band affords new challenges to the radio amateur, and will be gladly welcomed.

Radio Waves and Communications Distance



Part 13: It is important to choose the correct amateur band and the right time of day for communications over great distances. Other important factors in amateur communications are the time of year and the sunspot cycle.

By Doug DeMaw,* W1FB

Most new ham radio operators are confused about which band they should use at a given time of day to communicate with certain parts of the country or the world. Have you been confused about these matters? No doubt you have pondered this subject while deciding which band to concentrate on for all-round coverage in terms of distance.

Communications over long distances, such as from the U.S. to Europe or Asia, are referred to as "DX" contacts. Since the word "distance" is relative with regard to miles or kilometers, it is best that we define DX as relating to Amateur Radio contacts over paths in excess of 1000 miles in the high-frequency bands (3.5 to 30 MHz).¹ DX takes on a different meaning (in terms of distance) when we consider the VHF (30-300 MHz), UHF (300-3000 MHz) or microwave parts of the amateur spectrum: We may consider those frequencies above 3000 MHz as the microwave region. At VHF and higher, DX may be an appropriate term when we consider communications distances as short as 100 miles, for example. This is because the higher the operating frequency, the shorter the effective signal path over the earth's surface. This is not true of space communications, where there is acceptable attenuation (power reduction) between the transmitting

and receiving antennas.

The new amateur is concerned mainly with HF (high-frequency) communications, since the Novice license is restricted to use of the 80, 40, 15 and 10-meter CW bands. A Technician class licensee has these frequencies available, along with privileges from 6 meters upward.

When you first receive your license and go on the air, chances are you will be thrilled to contact just "anybody" for the first few days. But, as you hear other hams discussing the DX they "worked" (made contact with), your appetite for DX will be stimulated! Knowledge of band characteristics for a specific time of day or year are vital if you are to be successful in talking to stations around the world. Let's examine the various parts of the HF spectrum and

learn when we should use them for various communications distances.

Close-In Contacts

There are many occasions when we may desire to have good, solid communications across town or out to, say, 100 miles. If this is our desire, we need to select a frequency band that is best for *ground-wave* communication. A ground-wave signal is one that follows a path along the earth's surface between two antennas. The signal wave may or may not touch the ground, but it remains within the lower atmosphere during the period of travel. The lower the frequency of the HF band, the greater the ground-wave distance. Fig. 1 shows the typical ground-wave range versus frequency from 2 to 30 MHz. A vertical antenna works best for ground-wave communications. This is why commercial AM broadcast stations use vertical antennas (towers): The broadcaster wants maximum signal coverage from the station for a given transmitter output power. The amateur 160-meter band is in the MF (medium-frequency) spectrum, as are the AM broadcast stations. At 160 meters (1.8-2.0 MHz), we can expect very good ground-wave distances, compared to the bands from 80 meters through 10 meters.

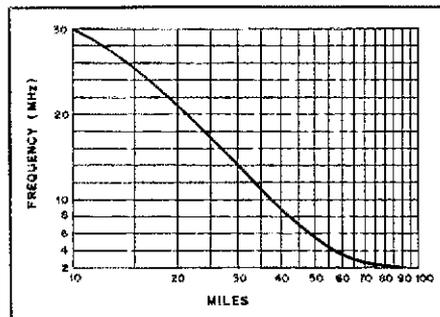


Fig. 1 — Typical high-frequency range, in miles, for ground waves compared to frequency. km = mi × 1.609.

Field Intensity of Waves

We have just considered the effective strength of ground waves versus frequency (Fig. 1), but we should recognize that

¹km = mi × 1.609

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the signal strength at the receiving antenna is measured in terms of voltage. Radio signals are very weak, so they are measured in microvolts (μV) rather than volts, as would be the case when measuring the ac from a wall outlet. A microvolt is 1/1,000,000 of a volt. Radio waves are of the ac (alternating current) type. The intensity of a signal from a transmitting antenna is always measured in terms of microvolts per meter at a distance from the antenna or signal source. The receiver S meter does not yield accurate signal-intensity readings, and is not calibrated in microvolts. An S meter is useful only for making relative measurements of signal strength, such as comparing the signal strength of two or more amateur stations, or the relative difference between two or more antennas at a given station with which you are communicating.

Sky Waves

Distant communications may take place by means of sky waves. Sky waves travel in that area above the earth where there is no atmosphere. This region is the *ionosphere*. The condition of the ionosphere is subject to countless changes that are caused by the activity of the sun and associated changes in the earth's magnetic field. Therefore, we cannot rely on having the same sky-wave conditions from hour to hour, or from day to day. Communications by means of sky-wave propagation are often referred to as "skip communications." This is because our signals are refracted off one of the ionospheric layers and returned to earth. This is similar to bouncing a ball off a bumper in the game of pool. Fig. 2 illustrates this principle. A signal can bounce more than once, as shown.

The Ionosphere Defined

The ionosphere is a region where the air pressure is so low that free ions and electrons can move about for some time without combining to form neutral atoms. Rather lofty talk for beginners, to be certain, but I know of no other way to describe the condition. When a radio wave enters this rarified atmosphere, which is a region of numerous free electrons, it encounters a barrier, in effect, and its direction of travel is changed. This causes it to bend and deflect earthward.

Ultraviolet radiation from the sun causes the outer atmosphere to become ionized. Relatively dense areas of ionization take place, and these are called *layers*. They lie parallel to the earth's surface and occur at well-defined distances of 25 to 200 miles. Some radio waves penetrate an ionized layer deeply and then bend back toward earth. Others penetrate the layer slightly before bending downward.

Ionization is not constant within a given atmospheric layer. It tapers gradually, either wide of the maximum-intensity area of the layer. The total ionization caused by

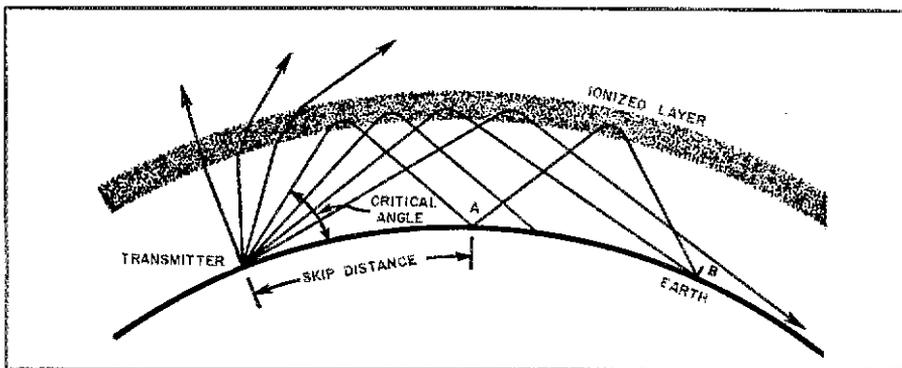


Fig. 2 — Radio signals as they are affected by the ionosphere. Some waves penetrate the ionosphere or are absorbed, while others are refracted earthward from these ionized layers (see text). Points A and B on the earth's surface in this drawing illustrate multi-hop skip.

the sun is never constant at a given spot for the time of day or season of the year. Because of this, there is an almost constant variation in long-distance communications effectiveness.

Ionospheric Layers

The D layer is situated 37 to 57 miles above earth. The ionization of this layer is related directly to sunlight. It commences at daybreak, peaks at noon and vanishes at sunset. During this period our 160- and 80-meter signals suffer high *absorption* loss, which limits us pretty much to ground-wave communications. At times of high solar activity (sun spots and solar flares), these bands can become completely dead. Under severe solar storms we may even find the 40-meter band severely affected. It is easy to get the false impression that our receivers are defective, for we may tune one or two bands and find no signals present!

The D layer is ineffective for refracting HF signals back to earth. Therefore, it is not useful for DX communications. We can think of it more as a nuisance than a benefit.

Now that we have properly vilified the D layer, let's look at the next layer — the E layer, some 62 to 71 miles above the earth. The E region is useful for DX work at the upper end of the HF spectrum and

the lower end of the VHF spectrum. MF and lower HF signals are absorbed by the E layer in a manner similar to that of the D layer. Maximum E layer intensity occurs near the noon hour, and commences and declines in the same manner as does the D layer. The sun is not the sole ionizing agent. Ionization occurs also from solar X-rays and meteors entering the earth's atmosphere.

Our most useful layer for DX communications in the HF bands is the F layer. The height may be from 130 to 260 miles above earth. This can be compared to the E layer (see Fig. 3). The F layer may split into two layers during the daytime. If this happens, the weaker, lower layer is called F1. It is about 100 miles high and acts somewhat like the E layer. The upper F layer (F2) remains the useful one for long-distance communications. The F1 layer dissipates after sundown. DX prediction charts appear regularly in *QST*. You may also monitor W1AW bulletins for information on propagation conditions for the immediate time period.

Skip Zone and Skip Distance

Under certain critical propagation conditions there is a distance between the limits of ground wave and the beginning of skywave refracted to earth, respective to the

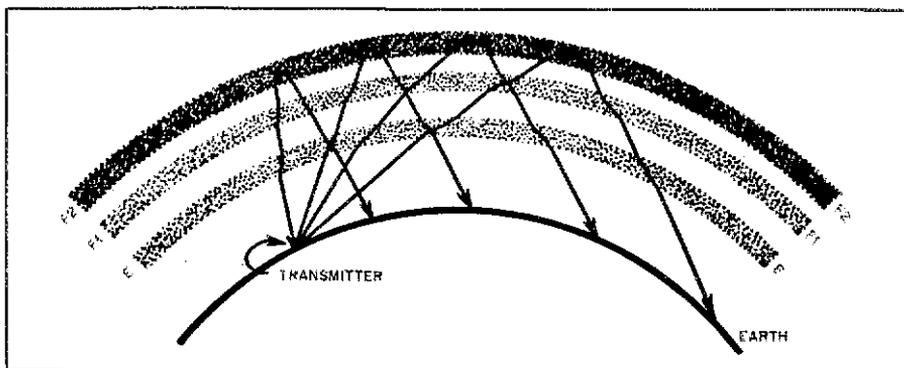


Fig. 3 — Typical daytime wave propagation at high frequency as compared to the ionospheric layers. The F2 layer is the most useful for long-range communications. The E layer is excellent for short-range skip communications at the high end of the HF spectrum and the lower part of the VHF spectrum.

location of the transmit antenna. This area between the two propagation paths is virtually dead, although there may be weak signal energy heard from the refracted wave. This ineffective communications area is called the "skip zone."

Skip distance is quite unlike the skip zone in definition. It can be described as the distance between the location of the originating signal and the point on earth where it returns to ground from the ionosphere. Therefore, with signal refraction from the F layer, the skip distance can be thousands of miles in length.

Single and Multihop Propagation

We learned earlier that a refracted signal can have more than one bounce from earth to the ionosphere and back, as illustrated in Fig. 2 at points A and B. We must understand that when we send our signal into the sky it does not follow a narrow-beam-like path in the manner of a flashlight beam. Rather, it is dispersed over a wide area, and it becomes further dispersed when it refracts from the ionosphere. When it returns to ground it is further dispersed, becoming weaker and weaker as it hops along. For this reason, multihop propagation will usually result in weak signal readings at the distant point, even though the signal may be completely readable by the other operator.

Antenna Radiation Angle

As the radio wave is launched from our antenna, it has a particular launch angle (radiation angle), respective to the horizon. Some antennas have more than one radiation lobe (in fact, most do), and each lobe has a different intensity and radiation angle. Our concern is for the *major lobe*. The remaining lobes are referred to as *minor lobes*, but even these lobes can be used for effective communications under certain propagation conditions.

The lower the radiation angle from the antenna, the better our chances to work DX. This is because a high-angle signal may require two or more hops to reach a distant point, which will weaken the signal, as we learned while discussing dispersion. On the other hand, a very low radiation angle may enable us to work the distant station with only one hop. Launch angles between, say, 10 and 20 degrees are considered good for DX communication. The higher radiation angles are much better for shorter distances, such as we encounter at 10 and 6 meters when using the E layer for our refractive medium. Fig. 4 shows how a radiation lobe from an antenna might appear if we could see the RF energy.

The most important factor, other than the design of an antenna, is the height above ground, respective to the angle of radiation. The higher the antenna the lower the radiation angle, generally speaking. Heights in excess of 0.5 wavelength are

Glossary

attenuation — reduction of signal power.
 band — a range of frequencies, such as 3.5 to 4.0 MHz, allocated for amateur use. The bands are designated in meters — for example, the 80-meter band.
 D layer — an ionized layer in the atmosphere 37 to 57 miles above the earth.
 DX — long-distance in radio communications.
 E layer — an ionized layer in the atmosphere 62 to 71 miles above the earth.
 F layer — an ionized layer some 130 to 260 miles above the earth.
 ground wave — a signal wave from an antenna that follows the earth's surface, or slightly above the surface, for a limited number of miles.
 ionosphere — the region high above the earth that has no atmosphere, but contains free ions and electrons and very low air pressure.
 lobe — a concentration of radio-frequency energy that leaves a transmitting antenna and is directed toward the sky a certain number of degrees, respective to the horizon.
 QRM — interference from other radio stations.
 QRN — interference from atmospheric and man-made noise.
 radiation angle — the angle at which a wave departs from the antenna, referenced to the horizon.
 skip — the process of a radio wave bouncing off the ionosphere and returning to earth at a distant point.
 skip zone — a dead signal area on earth that occurs between the limits of ground-wave signals and the beginning of the useful sky-wave signal.
 sky wave — a radio wave that uses the ionosphere as a refracting medium.

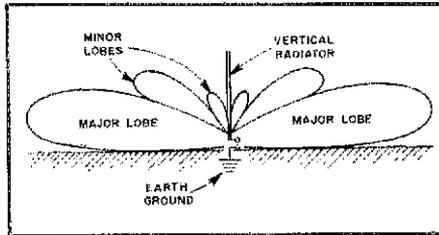


Fig. 4 — Illustration of various radiation angles versus major and minor lobes for a vertical antenna. Minor lobes occur also with most horizontal wire and beam antennas. All of these lobes are useful, depending on band conditions at a given instant and with regard to the desired communication distance (see text).

strongly recommended. Therefore, a horizontal antenna for 40 meters should be 70 feet or greater in height. The exception is when we use a vertical antenna with a good ground system (buried or on-ground radial wires). A vertical antenna has a low angle of radiation. The trade-off is that this antenna responds equally well to signals from all directions, which can create problems from QRM (signal interference) originating in some region apart from the direction of interest. A vertical antenna is, therefore, omnidirectional in response. Furthermore, a vertical antenna is more prone to pick up man-made noise than is the horizontal antenna. If you live in an electrically noisy neighborhood, the noise (QRN) in your receiver may be so great that weak-signal reception is nearly impossible.

Horizontal antennas exhibit directivity when they are high above ground. Some have nulls off the ends (dipole antennas), while beam antennas have deep nulls off the sides and back of the array. This aids in reducing QRM from undesired directions. Man-made noise is vertically polarized, and horizontal antennas reject much of that noise since the

Table 1
Suggested DX Bands

Band (MHz)	Typical Distance (Day)	Typical Distance (Night)
1.8 (160 meters)	0-50 miles	0-3000 miles
3.5 (80 meters)	0-100 miles	0-3000 miles
7.0 (40 meters)	0-1000 miles	0-3000 miles
10.1 (30 meters)	0-2000 miles	0-4000 miles
14.0 (20 meters)	0-4000 miles	0-100 miles
21.0 (15 meters)	0-4000 miles	0-100 miles
28.0 (10 meters)	0-5000 miles	0-100 miles

These distances versus time of day are based on either daylight or total darkness. Average band conditions are assumed. The actual distance worked will depend on the antenna used, the amount of transmitter power and the condition of a band at a given moment. The mileage may be greater or less than stated above. Single-hop communications are assumed here. Multihop skip will provide worldwide communications under ideal band conditions.

polarization is not the same.

Sporadic E Skip

There is a form of E layer skip that is called "sporadic E." The E layer is ionized in patches rather than solidly, forming "clouds" of highly ionized atmosphere. These so-called clouds form and dissipate rapidly at times, and this is why the term "sporadic" is used. Skip from these clouds is over relatively short distances, 100 to 1000 miles. The 10- and 6-meter bands are affected the most by sporadic E skip. However, the useful effects of sporadic E have extended as high as 148 MHz at times. I experienced this while living in Connecticut some years ago: I worked a W0 station in Minnesota on 2-meter SSB while running 10 watts to my 10-meter Yagi antenna!

Best Bands Versus Time of Day

It is not possible to produce a list of bands, effective communication distances

(Continued on page 38)

ICOM IC-751 HF Transceiver

Billed in the press release as "the most advanced, highest performing HF transceiver with general-coverage receiver for the amateur world today," the IC-751 is ICOM's top-of-the-line amateur HF transceiver. The IC-751 features a 100-W output, solid-state transmitter, a high-performance receiver (including general coverage) and an elaborate frequency control/memory system. It may be operated from either of the optional 13.8-V dc power supplies: the IC-PS35, which fits inside the '751, or the external IC-PS15.

Describing every one of the '751's features would fill many pages. Accordingly, Table 1 lists the various front, top and rear-panel controls and connections. This review will highlight some of the unusual and not-so-obvious features of the radio.

Frequency Control

The main tuning knob of the '751 serves several functions. The TS switch sets the tuning speed to approximately 200 kHz per turn for quick QSY within a band. Normally, the tuning rate changes in 10-Hz increments, but if the knob is rotated quickly, the tuning rate jumps to a higher speed. This speed is specified as 50 or 100 Hz per step in different parts of the manual.

The second function the tuning knob performs is band switching. When the BAND switch is pressed, the main tuning knob switches the band up and down. In the HAM mode, the '751 tunes to a factory-preset spot on the next higher or lower band (for example, 14.050 or 7.050 if you were on the 10-MHz band). In the GENERAL mode, the frequency shifts up and down in 1-MHz increments when the BAND switch is pressed.

The dial-lock switch disables the tuning knob, preventing accidental frequency changes. This feature is especially handy during mobile operation.

Another function of the main tuning knob is switching among the memory channels. There are 32 memory channels available in the IC-751, so no ordinary switch would do! (Just try to remember what frequency is stored in which channel.)

The memory system is versatile. Each memory recalls not only the stored frequency, but also the mode of operation. For example, recalling memory 7 may put you on 14.003 CW, while memory 15 might store 3.830 LSB. Frequencies and modes may be written into the memories right from the dial. Similarly, by pressing the M TO VFO switch, you may turn frequency control over to the VFO at the memory channel selected.

The IC-751 has two built-in VFOs. These VFOs may be used to operate split (DUPLX) while DX chasing or to switch rapidly between two different nets or roundtables. The VFOs need not be set to the same band or even to the same mode, so the effect is similar to having two transceivers in one box.



Table 1
IC-751 Controls and Connections

Front Panel

General

POWER switch
TRANSMIT/RECEIVE switch
METER switch
SPEECH synthesizer switch
Mode switches
VOX GAIN control
VOX DELAY control

Frequency Control

HAM/GENERAL coverage switch
SCAN start/stop switch
MODE selective scan switch
Dial lock switch
TS tuning rate switch
dial function select switch
BAND select switch
RIT/XIT control
RIT switch
XIT switch
RIT/XIT CLEAR switch
VFO A/B switch
VFO A=B equalizing switch
DUPLX (split) switch
VFO/memory switch
memory WRITE switch
memory to VFO switch

Transmitter

Mic connector (8 pin)
MIC-GAIN control
RF PWR control
COMP speech-processor switch
MONITOR switch

Receiver

PHONES jack (1/4-in)
AGC switch
AF GAIN control
RF GAIN control
SQUELCH control
TONE control
FILTER switch
NOTCH filter switch
pass band tuning control
NOTCH filter control
Noise blanker WIDE switch
NB LEVEL control

Top Panel

PREAMP/ATT switch
MARKER switch
CALIBRATOR control
MONITOR control
ANTI-VOX control

Rear Panel

Antenna connector (SO-239)
KEY jack (1/4-in)
EXT. SPEAKER jack (1/8-in)
ALC jack (phono)
TR RELAY control (phono)
RECEIVE ANT IN jack (phono)
RECEIVE ANT OUT jack (phono)
SPARE jack (phono)
X-VERTER jack (phono)
GND terminal
DC 13.8V jack (molex)
ACCESSORY jack (molex)

The transmitter and the receiver frequency may be offset up to ± 9.9 kHz from the operating frequency. The RIT/XIT control, continuously variable, sets the offset. The amount of offset is displayed next to the main frequency readout. The RIT/XIT CLEAR switch resets the offset to zero.

The IC-751 features a scanning system similar to that usually found in VHF transceivers. There

are three scanning modes. The first scans through the memory channels from highest to lowest. The second, activated by the MODE-S switch, scans only those memory channels programmed with the specified mode (for example, only those memory channels with CW). The third function scans those VFO frequencies between specified start and stop points. For example, you might set it to scan from 28.500 to 29.000 if you were

*Senior Assistant Technical Editor

ICOM IC-751 HF Transceiver, Serial No. 1982

Manufacturer's Claimed Specifications

Frequency coverage: Receive — 0.1 to 30 MHz; transmit — 1.8-2.0, 3.45-4.1, 6.95-7.5, 9.95-10.5, 13.95-14.5, 17.95-18.5, 20.95-21.5, 24.45-25.1, 27.95-30.0 MHz.

Modes of operation: CW, SSB, FM, AM, RTTY (FSK)

kHz/turn of knob: Not specified.

Frequency display: 6 digit.

Frequency resolution: 100 Hz.

S meter sensitivity (μV for S9 reading):

Not specified.

Transmitter power (input): SSB, CW, RTTY, FM — 200 W; AM — 40 W.

Harmonic suppression: More than 40 dB.

Spurious suppression: More than 60 dB.

Third-order IMD: -32 dB.

Receiver sensitivity: SSB, CW, RTTY (1.6-30 MHz)

— less than 0.15 μV for 10 dB S/N; FM — less than 3 μV for 12-dB SINAD.

Measured in ARRL Lab

As specified.

As specified.

2/200.

5/16 in high white fluorescent digits.

As specified.

Preamp in (preamp out): 160 m, 22 (50); 80 m, 16 (48); 40 m, 17 (40); 30 m, 25 (46); 20 m, 28 (57); 15 m, 25 (82); 10 m, 25 (84).
Power output (SSB, CW, RTTY, FM): 160 m, 96; 80 m, 98; 40 m, 99; 30 m, 100; 20 m, 102; 15 m, 101; 10 m, 103 W. Power output (AM): 25 W all bands.

60 dB. See Fig. 1.

60 dB. See Fig. 1.

-33 dB. See Fig. 2.

Receiver dynamics measured with optional 500-Hz 9-MHz IF and 250-Hz 455-kHz IF filters installed.

	80 m Preamp In/out	20 m Preamp In/out
Noise floor (MDS) dBm:	-142/-134	-138/-134
Blocking DR (dB):	Noise limited	Noise limited
Two-tone 3rd-order IMD DR (dB):	91/93	93/93
Third-order intercept (dBm):	-5.5/5.5	1.5/5.5
Receiver quieting (μV for 12-dB SINAD):	0.4/0.85	Not measured.
Squelch sensitivity:	Preamp in: 0.24 min., 0.48 max. Preamp out: 0.30 min., 0.95 max.	

Squelch sensitivity: Less than 0.3 μV

Receiver audio output @ 10% THD: More than 3 W.

Color: Two-tone green.

Size (HWD): 4.5 x 12 x 14 in (115 x 306 x 355 mm).

Weight: 18.75 lb (8.5 kg).

looking for activity on a "dead" 10-meter band.

Transmitter

The IC-751 delivers approximately 100-W output in all modes but AM. The transmitter is all solid-state, and it features SWR protection that reduces output power as the SWR rises. A fan is provided to cool the final transistors. The fan comes on in transmit after the heat sink reaches a predetermined level. A few minutes of CW or RTTY operation will heat the IC-751 to this level. If the heat sink reaches 50°C during extended operation, the fan will run continuously. If the temperature reaches 90°C, the fan shifts into a higher speed and the transmitter power output decreases to 50 W.¹

On-the-air checks indicate that the built-in speech processor makes a marginal difference in intelligibility when signals are weak. You can get an idea of the difference between processor-in and processor-out by listening to your signal in the headphones with the MONITOR switch on.

ICOM has included QSK for the CW operator. This feature works reasonably well at speeds below about 20 WPM. There is no popping or clicking in the headphones during QSK operation; the only sound is the relays cycling at high speed.

Above 20 WPM, the QSK circuitry truncates the characters, making copy difficult. Above

30 WPM or so, the QSK feature is unusable because the dots are shortened so much that they are barely perceptible. See Fig. 4 for the keying waveform.

FSK is included for the RTTY operator. All necessary modem connections may be made through the multipin accessory socket on the rear panel. The '751 will not key high-voltage equipment directly, but instructions for connecting a keying relay or a level converter are included. The manual also provides information on hooking up an AFSK generator, if that is your preferred mode of operation.

For the VHF operator, a transverter hookup is offered. When +8 V is applied to pin 11 of the accessory socket, approximately 30 mV of 28-MHz drive is available. Connection between the transverter receive converter and the IC-751 receive converter is also made at the X-VERTER jack.

Receiver

ICOM has taken an interesting approach to the old problem of allowing the operator to select the right amount of front-end gain for given band conditions. Most transceivers have an attenuator switch that allows you to switch in a fixed pad ahead of the front end when necessary. Some of the better rigs allow selection of two or three fixed values. The '751 has a top-panel switch that allows the operator to turn the front-end preamp off if necessary. If conditions warrant, the next switch position allows the operator to add a fixed 20-dB attenuator ahead of the mixer.

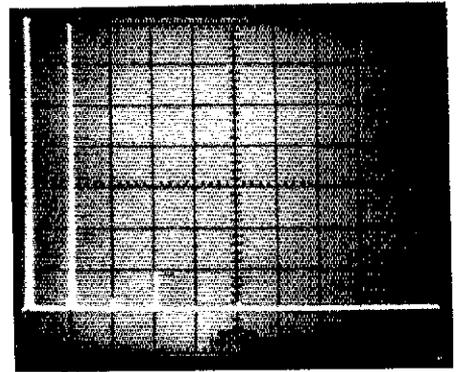


Fig. 1 — Worst-case spectral display of the ICOM IC-751. Vertical divisions are each 10 dB; horizontal divisions are each 10 MHz. Output power is approximately 100 W at a frequency of 10.125 MHz. All spurious emissions and harmonics are at least 60 dB below peak fundamental output. The IC-751 complies with current FCC specifications for spectral purity.

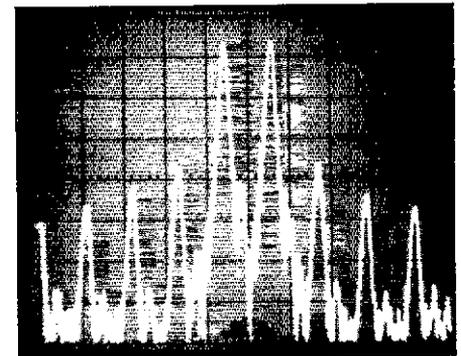


Fig. 2 — Spectral display of the IC-751 output during transmitter two-tone IMD test. Third-order products are approximately 36 dB below PEP, and fifth-order products are 44 dB down. Vertical divisions are each 10 dB; horizontal divisions are each 1 kHz. The transceiver was being operated at rated input power on the 20-meter band.

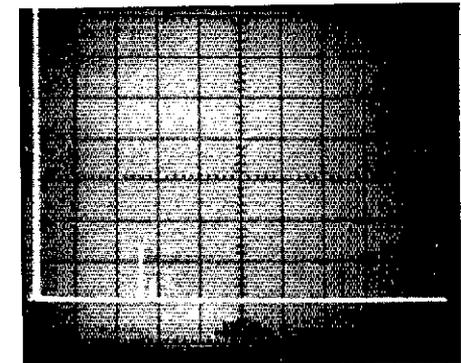


Fig. 3 — Spectral display of backwave emitted by the IC-751. Frequency is 28.050 MHz. Vertical divisions are each 10 dB; horizontal divisions are each 10 MHz. This signal is present with the IC-751 in the CW mode, the CW key open and the TR switch on the front panel closed. This signal is approximately 56 dB below the fundamental, and is audible in a receiver. Backwave is present on all bands.

The review unit came equipped with an optional 500-Hz filter at the 9-MHz IF and a

¹F = $\left(\frac{9}{5}C\right) + 32$; mm = in x 25.4.

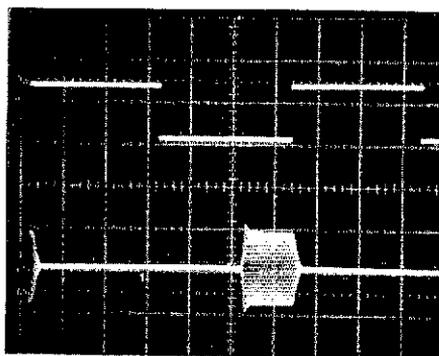
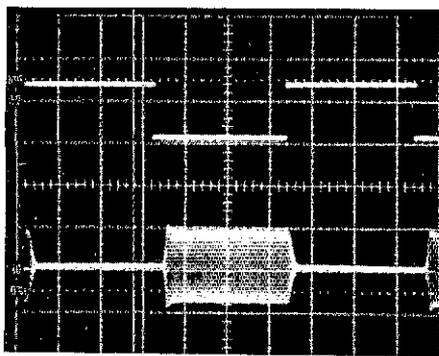


Fig. 4 — CW keying waveform of the IC-751. Upper trace is the actual key closure. Lower trace is the RF envelope. Each horizontal division is 50 ms. Both photos are of a string of dots sent at the same speed, approximately 35 WPM. The photo on the left shows the waveform with the IC-751 set up for semi break-in operation. The photo on the right shows the waveform with the transceiver set up for QSK operation. In the QSK mode, dots are shortened to approximately 50 percent of the proper length. See text for details.

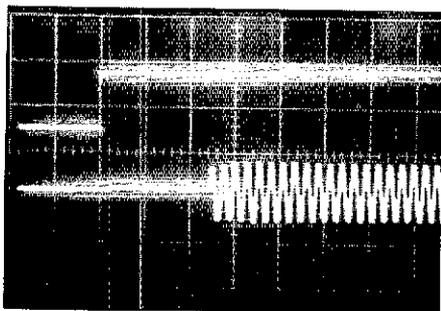


Fig. 5 — Receiver turnaround time for AMTOR. Upper trace is the TR relay opening. Lower trace is receiver audio. Each horizontal division is 5 ms. Turnaround time is less than 15 ms.

250-Hz filter at the 455-kHz IF. These filters worked very well, even under crowded band conditions. Selecting CW on the mode switch places the wide SSB filters in the line, while selecting CW NARROW puts the optional narrow filters into action.

Additional selectivity is available from the notch filter and passband-tuning controls. These two features are helpful in reducing QRM on SSB, CW or RTTY signals. The passband tuning is most effective on CW and RTTY if optional narrow filters are installed.

The noise blanker is very effective against impulse noise. When the blanker is on, however, strong signals tend to overload the receiver. The wide noise blanker switch is designed to help when the "woodpecker" is on, but during my operation with the review unit this feature was not effective.

To facilitate connection of an external preamp or a separate receive antenna (for example, a Beverage for the low bands), ICOM has included RECEIVE ANT IN and RECEIVE ANT OUT jacks on the rear panel. These jacks may also be used to hook up an external receiver for use along with the '751 or to hook up an external receiving converter without worrying about transmitting through it (if it were connected to the antenna jack).

Operation

The IC-751 has the quality "feel" that I have associated with ICOM equipment since I first used an IC-701 several years ago. The switches and controls provide the operator with just the

right amount of feedback. The front-panel controls are spread out enough that the rig is easy to use, and most of the controls seem to be in the right place.

The general-coverage receiver is excellent. With an assortment of amateur antennas, it is possible to enjoy reception of music and news from all over the world. Although the optional AM filter is not necessary, the serious SWL will probably want one.

The IC-751 is a compact, full-featured transceiver that is at home anywhere. It is small enough to be used as a mobile rig. With the internal PS-35 power supply, it is an ideal portable or DXpedition radio. If you own other ICOM equipment, you can use one of the PS-15 external power supplies with several different pieces of equipment.

Reliability Problems

Although the review transceiver worked flawlessly during the review period, obtaining a working IC-751 proved to be a real task. The following is a log of the problems we encountered with various IC-751 transceivers.

On August 11, 1983, we received IC-751 serial no. 1114 from ICOM on loan for review. During lab testing, we discovered that an IF section was out of alignment and returned the unit to ICOM on August 16. ICOM sent us IC-751 serial no. 1227 on November 21, 1983. During lab tests, we discovered that this unit suffered from reduced power output as frequency increased. Power dropped from full output on 160 meters to zero output on 10 meters after the rig was on for a few minutes. We returned the unit to ICOM for repair on November 23. The problem turned out to be defective final power amplifier transistors. After this repair, the unit operated normally.

Meanwhile, we purchased an IC-751 from an authorized ICOM dealer on December 27, 1983. During lab testing, we discovered that this unit (serial no. 1982) would not go into transmit. We returned the rig to the dealer, who found a burnt-up resistor. Serial no. 1982 was returned to us January 24, 1984. Again, lab testing revealed a problem. This time, the IC-751 would not transmit FM properly — the output power dropped rapidly in transmit. We again returned the rig to the dealer, who found a defective 8-V regulator. On March 5, 1984 we were able to perform the necessary laboratory testing and begin the review.

Although the review transceivers worked well

after repair, it was disconcerting to see three different transceivers of the same model defective right out of the box. The transceiver has some nice features, and, once working, performs well, but a prospective buyer would do well to seek out other IC-751 owners and ask about their experiences, and purchase the rig from a dealer who provides after-sale support.

Manufacturer: ICOM America, Inc., 2112-116th Ave., N.E., Bellevue, WA 98004. Price class: IC-751, \$1400; IC-PS35 internal power supply, \$160; IC-PS15 external power supply, \$150; FL-32 filter, \$60; FL-53A filter, \$97. — Mark Wilson, AA2Z

HEATH GR-740 SCANNER

Heath's GR-740 is a microprocessor-controlled 40-channel scanner that allows you to monitor several frequencies including the 2-meter and 70-cm amateur bands. With the '740, you can receive frequencies that carry police, fire, aircraft, marine, weather, hospital, ambulance and other communications. It's a versatile unit that can be used for base station, mobile or portable operation — an ideal adjunct to any amateur station.

Description

Documentation

An assembly/instruction manual and pictorial booklet are supplied. As usual, the writers have generally done a good job, and each instruction is clearly spelled out. You're also provided with two large, easy-to-read (no magnifying glasses needed!) schematic diagrams. One diagram is for the RF circuit board and chassis wiring; the second covers the keyboard, display and controller circuit boards.

The assembly and adjustment sections are followed by an installation and operations chapter. Although the scanner is capable of being powered by an external dc supply, the information presented focuses on ac-line operation, attachment of an external antenna, use of an external speaker and a couple of paragraphs discussing the use of memory-backup batteries. It certainly is possible to use the GR-740 in a mobile environment, but nothing about that is mentioned.

Approximately four pages are devoted to explaining how to use the scanner, and three more pages contain lists of frequency allocations for the 30-50, 146-174 and 420-512 MHz bands. (Information concerning the operating frequencies of your local police and fire departments can usually be obtained easily; many electronic-parts suppliers and Radio Shack stores have that information.) Some troubleshooting information, alignment instructions, manufacturer's specifications for the scanner and a theory-of-operation section complete the manual.

Physical

The GR-740 is enclosed in a brown-vinyl-covered steel cabinet equipped with a sloping color-coordinated plastic front panel. An 11-position alphanumeric display is situated in the center of the panel. Immediately below the display is a 24-key keyboard. Function labels beneath each key, and color coding of the keys, identify each key function. A slide switch (A/B) at the bottom right-hand side of the keyboard selects one of two sets of 20 memory channels to be scanned. The ON/OFF/VOLUME and SQUELCH controls are positioned to the right of the front panel. An AUTO SQUELCH position

Heath GR-740 40-Channel Scanner

Manufacturer's Claimed Specifications

Frequency coverage: 30-50, 118-136, 144-174, 421-512.45 MHz.

Sensitivity (μ V): \pm 5-kHz deviation, 12-dB SINAD:

30-50 MHz, 0.4; 144-174 MHz, 0.4; 421-512 MHz, 0.8.

Aircraft: 1 μ V for 10-dB S/N, 60% modulation.

Scan/search speed: 5 or 15 channels per second.

Audio output (8-ohm load): 0.75-W RMS, 10% THD.

Squelch sensitivity: Not specified.

Power requirements: 120-V ac, 50/60 Hz, 20 W; or 13.8-V dc, 9 W.

Size (HWD): 3-1/4 \times 10-5/8 \times 7-3/4 in (83 \times 270 \times 197 mm).

Weight: 5 lb (2.3 kg).

Measured in ARRL Lab

As specified.

Worst cases: 30.75 MHz, 0.24; 146.34 MHz, 0.19; 421.5 MHz, 0.58.

118 MHz, 0.66.

As specified.

1.02 W.

Min/Auto (μ V): 31 MHz, 0.14/0.24;

46 MHz, 0.06/0.15; 145.2 MHz,

0.1/0.28; 432.2 MHz, 0.27/0.6.

0.56A @ 13.8-V dc (7.7 W).

This kit is designed to go together quickly — assembly-line fashion. I'm glad to say mine worked the first time power was applied! Definitely, the GR-740 can be assembled by beginners.

Adjustment

No difficult alignment procedures are involved. You need nothing but a VOM and a single alignment tool; the latter is supplied by Heath. You have two coil slugs to adjust — that's it! Should the scanner need alignment at some later date, Heath has thoughtfully supplied a complete alignment procedure. Such alignment requires a calibrated AM/FM signal generator, however.

During the adjustment procedure, I noted what I thought was a conflict of information. Pages 29 and 43 refer to a voltage level at a test point (TP1). The tolerance given for the measurement is \pm 0.05 V, but one procedure says a 0.1-V potential should be measured there, and the other procedure calls for 0.4 V! Actually, both values are correct. According to Heath, the voltage measured at TP1 depends on the alignment procedure being used. If a general alignment is being done — as if all adjustments were thrown off — the 0.4-V value is measured early in the procedure. On a factory-aligned board (as you receive it in the kit), it's necessary only to tweak the coil slug to optimize the value at 0.1 V.

In Operation

After I spent a few moments studying the operations instructions, the scanner was providing me with weather information, 2-meter repeater, air-to-ground, taxi and paging-service chatter. While scanning, left-to-right rolling zeros appear on the display. When a busy frequency is found, the scanner stops and displays data pertinent to that channel.

A "P" in the first display position indicates the PRIORITY channel is active. Channel 1 of each bank of 20 channels is the priority channel. When the PRIORITY key is pressed, the scanner samples channel 1 every two seconds and, if active, switches immediately to it, regardless of other activity. To disable the PRIORITY func-

(click stop) provides a factory-set, fixed squelch level.

The speaker is located at the bottom left of the front panel. Provisions for a 19-inch (measured from the cabinet top), removable telescopic antenna are made at the top left rear of the scanner. The antenna passes through an insulator and screws into a receptacle mounted on the internal PC board.

On the rear panel are jacks for an external antenna, external dc power, external speaker, a two-wire ac plug (the line cord is removable) and a grounding screw. The antenna jack accepts automotive-type (Motorola) plugs; one is supplied with the kit. A 1/8-in plug is required for external-speaker hookup (none is supplied). When using an external speaker, the internal speaker is muted. No mating dc connector is provided.

The back panel also allows access to the memory-backup battery holder. Two AA cells (not supplied) are required. Without the batteries, you'll lose the keyed-in scanner frequencies each time power is removed — purposely or inadvertently — from the '740. Note that the ON/OFF switch does not switch the ac-line (primary) side of the power transformer; it switches the dc bus.

Basic Circuit Description

Two parallel RF amplifier stages are employed: A bipolar transistor is used for the 420.45 to 512.45-MHz amplifier, and a dual-gate MOSFET provides amplification at 32-50, 118-136 and 144-174 MHz. RF-stage networks are varactor-tuned.

Following the RF amplifiers are separate mixers producing a common 10.8-MHz first IF. A four-pole crystal filter is used at 10.8 MHz. The second IF is at 400 kHz, where the signal is passed through a ceramic filter before being limited and demodulated. Two IC demodulator subsystems are used: one for FM, the other for AM (aircraft-band signals). Demodulated output is amplified and fed to the speaker. All internal reference frequencies are derived from a crystal-controlled synthesizer. A microprocessor does the "housekeeping," and receives its input from the keyboard and channel-memory IC.

Construction

It took me 3½ hours to make three minor manual updates and build the '740, and about 15 minutes to go through the adjustment

procedures. There's virtually no PC-board "component stuffing" to do; almost all of that's been done for you.

Three factory-preassembled PC boards are used in the scanner: the RF, controller and display boards. Construction consists primarily of attaching wires to and from the boards, and then securing the boards to the chassis. Probably the toughest part of assembly is attaching the display board to the bezel bosses. A pair of small, circular clamps are used to do this, and access to the area is restricted. Heath cautions that patience is required to place the clamps properly and, believe me, they're not kidding!

This kit is a bit different from the many other Heath kits I've assembled since my first (the DX-40/VF-1 of eons past). The chassis is gray steel. Sheet-metal screws are used plentifully, as opposed to the "machine screw/washer/nut" fasteners I'm used to. Even the "control lock washer/flat washer/control nut" assembly doesn't apply; you twist mounting tabs to secure the potentiometer/switch combinations in place.



tion, press the PRIORITY key again.

The second and third display positions show the active-channel number. To identify which bank of channels is active, a dot in the upper-left corner of the second display position is illuminated for channels 1-10. For channels 11-20, a dot in the upper-left corner of the third display position is lit. The position of the A/B switch determines which of the two banks of 20 channels is chosen.

Pressing the DELAY key results in a scan delay of two seconds. This allows time to catch replies when two or more stations are operating on the same channel. Pressing DELAY a second time defeats the function. When a delay is in effect, the fourth display position shows a "d."

An "L" in the fifth display position shows that LOCKOUT of that particular channel is active. Selected by pressing the LOCKOUT key, this function locks out a channel during scanning periods. An "A" in the fifth position indicates the AIRCRAFT key has been pressed to request scanning of the aircraft band (118-136 MHz). Similarly, pressing the MARINE key initiates scanning of the frequencies between 156.05-157.48 and 160.625-162.025 MHz. A dash (-) in the fifth display position is illuminated at this time. Display positions 6-11 indicate the frequency of

the channel being received.

The SCAN key starts a scan of the selected channels. SEARCH initiates a scan for signals between two operator-selected frequencies, and restarts a scan after HOLD has been pressed.

LIMIT/HOLD allows you to enter two selected frequencies as upper and lower search limits and stops a search between the selected frequencies. Lastly, the SPEED key permits selection of scan/search rates of five or 15 channels per second.

Should you enter a frequency outside the range of the GR-740, ERROR is displayed. Simply entering the proper frequency corrects the error condition.

Comments

Although the manual makes no mention of it, there are threaded receptacles on each side of the cabinet to accept gimbal-bracket mounting screws. In the finishing stages of assembly, they're plugged with plastic inserts for the sake of appearance.

The dc-power jack is a type you don't ordinarily see in a ham shack — a circular jack with a flat blade in the center. Heath did not supply a mating female connector for use with an ex-

ternal dc-supply cable. I didn't have any such connector in my supply of parts, and Radio Shack doesn't list them as a catalog item. That being the case, I'd suspect at least some other hams would have difficulty obtaining a matching connector as I did. There's enough rear-panel space to mount another type of connector in parallel with the existing one, however.

I live a few miles from two airports, and much of the air traffic passes overhead. On a few occasions, I've noticed that air-to-ground signals will interfere with 2-meter repeater monitoring. At times, I can listen to both conversations at once! Also, when monitoring the aircraft band, the GR-740 is subject to overload from strong air-to-ground signals, resulting in distorted recovered audio. These have proved to be only minor annoyances.

A GR-740 complements any ham shack. With it, you'll not only be able to monitor 2-meter and 70-cm repeaters, but fire and police department, aircraft, marine and a host of other services as well. The latest weather information for your area is readily available, too.

The GR-740 is available from the Heath Company, Benton Harbor, MI 49022; tel. 616-982-3411. Price class: \$250. — Paul K. Page1, N1FB

(Continued from page 33)

and ideal times of day. We can only generalize because of the continual change in solar activity. We can, however, suggest the bands on which to concentrate for working local or DX contacts, day versus night. This data is presented in Table 1 for your assistance in setting up your antennas for favored bands.

Summary

Your best source of detailed information concerning the ionosphere and radio propagation is *The ARRL Antenna Book*. I have attempted here to provide a simplified, plain-language introduction to

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the propagation phenomenon, and to suggest steps you can take to make your first on-the-air experience a pleasant and rewarding one. Also, you will need some knowledge in this subject area if you are

to pass your amateur license examination. The mysteries of the sky are many, and we have ignored a host of them in the interest of keeping this article short. I encourage you to engage in further study of this fascinating subject.

Strays

I would like to get in touch with...

anyone who has built or used a VHF/UHF to HF Crossband Link. Andrew Rothschild, KA2TFF, 115 Central Park West, New York, NY 10023.

anyone with a wiring diagram for a Superior Instruments Co. Industrial Analyzer, Model 630. Howard G. Wacker,

W3BRK, 4513 Cerise St., Pittsburgh, PA 15214.

anyone with a schematic diagram or manual for a Teletype Corp Communications Teletype Model 39506JC and associated power-supply/electronic unit WE5U001. Joe Morgan, W5PRV, 624 Kerrville So. Dr., Kerrville, TX 78028.

anyone having an instruction manual or schematic diagram for a Navy CTU-60018 Oscilloscope or a Triumph Model 830 Oscilloscope-Wobbulator. Sam Beverage,

W1MGP, Box 858, North Haven, ME 04853.

any radio amateur who has the 600, 900, 1200 MMF Special Mica Condenser, part no. 22.1316, for a Johnson Valient transmitter. Bill Gentile, W5VRO, 416 Skyline, Van Buren, AR 72956.

anyone with a schematic diagram or alignment instructions for a 1948 Model RME-45 Communications Receiver. Albert L. Harmon, W1KBH, Rte. 3, Box 282, Conway, SC

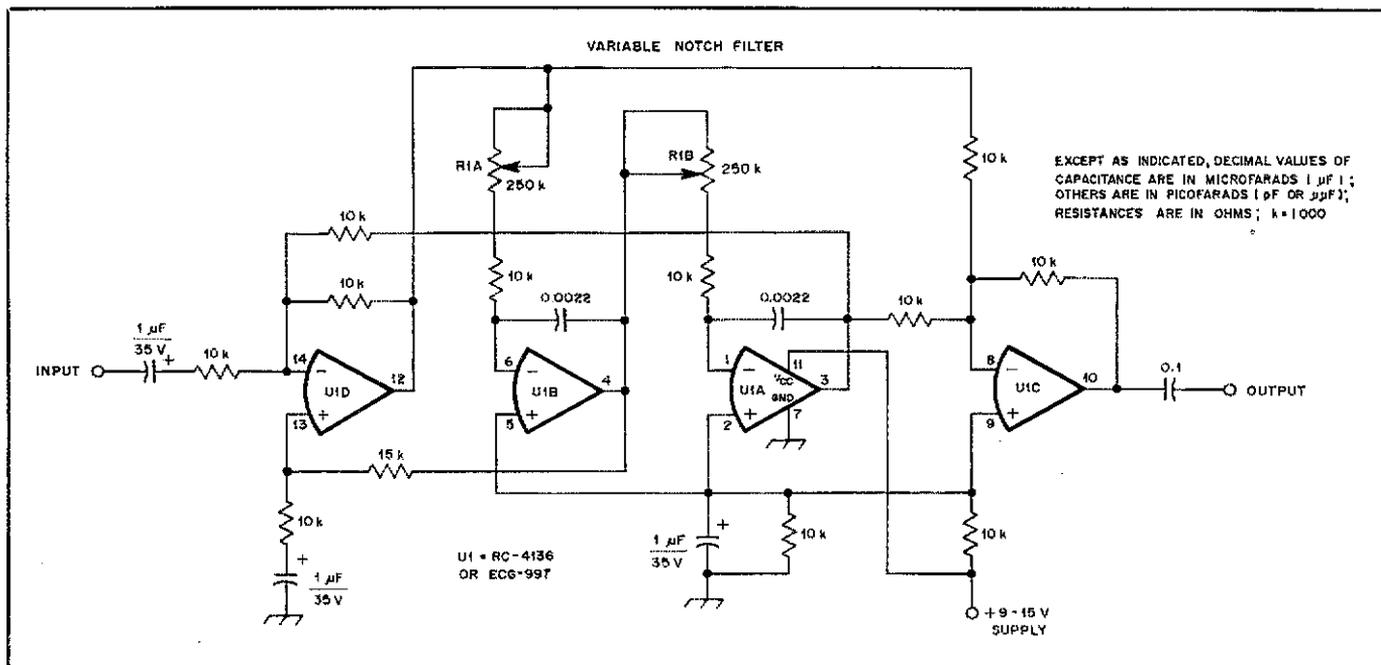


Fig. 1 — Schematic diagram of the variable notch filter that K4VIZ installed in his Kenwood TS-530. This same circuit should prove useful for other receivers. R1 is a dual, 250-k Ω , linear-taper potentiometer, such as a Clarostat D53C1-250K-S. U1 is an RC-4136, ECG-997 or equiv. quad op amp.

VARIABLE-NOTCH FILTER FOR RECEIVERS

□ One night before CW net time, I was tuning around the specified frequency using my Kenwood TS-530. I came across some lid giving his finals a "life test." This prompted me to think about how nice it would be to have a notch filter in the '530 similar to the one in my Ten-Tec Argosy. A variable-notch filter can be quite effective for listening to a signal that is very close to a strong, interfering station.

I checked the manual for my Argosy, and found that Ten-Tec uses a simple circuit that employs a quad op amp IC and a few resistors and capacitors. A dual-section, 250-k Ω , linear-taper potentiometer serves as the tuning control. Based on my study of the Ten-Tec circuit, I decided to use it as a basis for my modification. See Fig. 1. A circuit-board etching pattern is given in Fig. 2, and Fig. 3 is a parts-placement diagram. Notice that all resistors are mounted on end to save space and to allow for a smaller

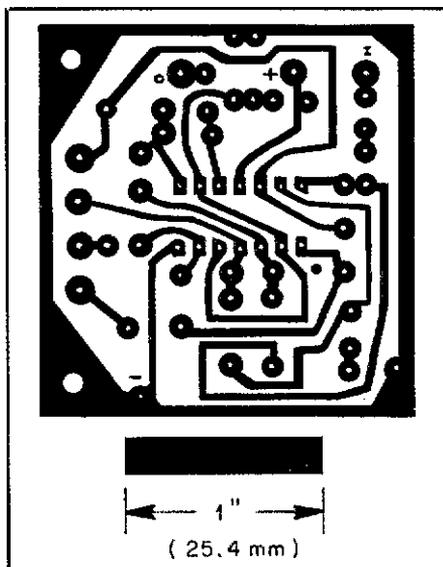


Fig. 2 — Full-size circuit-board etching pattern for the notch filter, shown from the foil side. Black areas represent unetched copper.

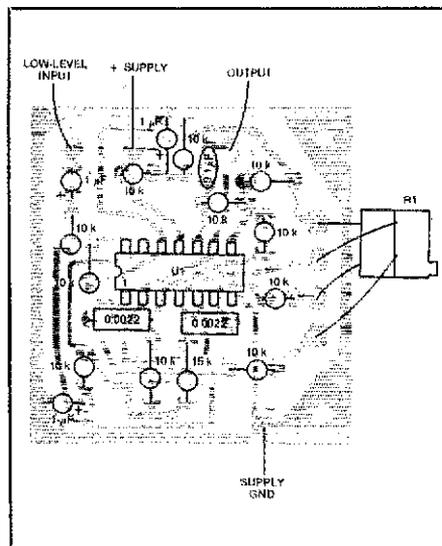


Fig. 3 — A parts-placement diagram, shown from the component side of the board. Gray areas show an X-ray view of the copper pattern.

*Assistant Technical Editor

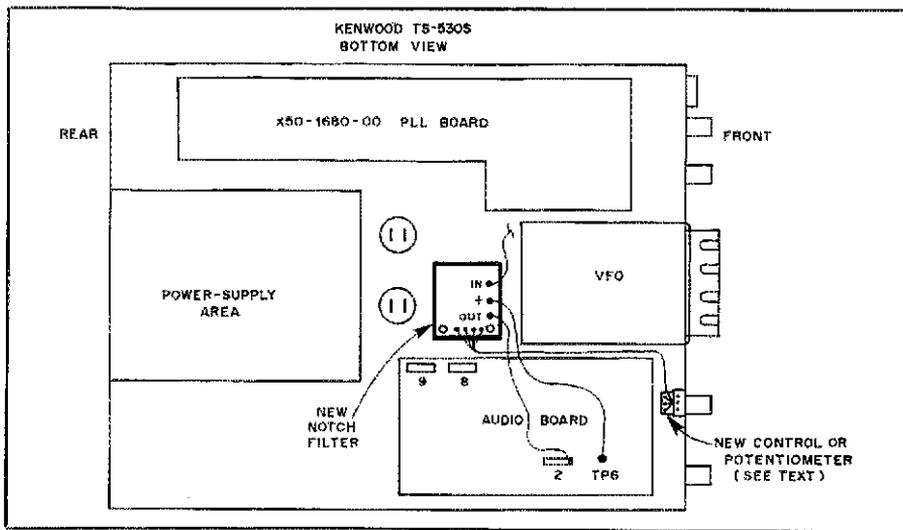


Fig. 4 — Inside view of the Kenwood TS-530 showing the notch-filter wiring and mounting.

board layout. I mounted my circuit inside the TS-530 and connected it as shown in Fig. 4.

Since I never used the RF gain control on my rig, I replaced it with the notch-filter potentiometer. The Clarostat D53C1-250K-S potentiometer I used is a tight fit in the chassis hole; I had to enlarge the hole slightly to fit the bushing on the new control. The RF gain potentiometer is a 10-k Ω unit that I replaced with a fixed resistor.

I filed a flat on the shaft of the new control so the original Kenwood knob would fit and make the new control look like it belongs. I did not try to relabel the front panel to indicate the function of the new control. That way, I can return the rig to original form, should I ever wish to.

To mount the filter board in my Kenwood TS-530, I replaced a screw found near the edge of the audio board, between plugs 8 and 9, with a longer one. A few washers help space the filter board from the chassis. I obtained power for the filter at test point 6 on the audio board. There is a small, red coaxial cable coming from the top side of the rig and going behind the VFO. This cable carries the audio from the detector to the audio amplifier. Cut this cable and connect it to the input and output pads on the filter board, as shown in Fig. 4.

Four small wires connect the filter to the dual potentiometer on the front panel. You will have to remove the screws holding the audio board so you can lift it out of the way while replacing the RF gain control. The front panel will have to be removed to get at the nut that holds this potentiometer in place; that involves removing four screws.

With the control turned fully clockwise, the notch frequency is about 2800 Hz; it is about 300 Hz when fully counterclockwise. Both these frequencies are nearly out of the Kenwood audio-system passband. When you don't need the filter, just set it to one end or the other.

I have found this to be a worthwhile project and a handy addition to my rig, especially for CW operation. You should be able to complete the modification in an evening or two. Actually, the task sounds worse than it is! It took more time to type it up than to perform the operation. One word of caution: Wire the new control so that maximum resistance on both potentiometer

sections occurs when the shaft is rotated counterclockwise. — Tom Desaulniers, K4VTZ, Leeds, Alabama

APPLICATIONS FOR DISPOSABLE SYRINGES

□ I have found several applications in my Amateur Radio station for pieces of disposable syringes used by doctors and dentists and in hospitals. See Fig. 5A. The neoprene inserts on the end of the plunger can be used as grommets to protect wires going through a hole in a metal chassis if you cut a hole in the tip. They also make excellent rubber feet for equipment or shock mounts for circuit boards, transformers, relays, blowers or other sources of hum and vibration.

Fig. 5B shows one of these inserts. The head of a no. 6 screw is just the right size for a snug fit into the insert. These can be fastened to the bottom of a project case to serve as feet. Secure the screw with a lock washer and nut. To use the insert as an insulated shock mount, drill a ¼-inch hole in the chassis. Then insert the grommet into that hole, add a no. 6 machine screw and attach the circuit board or other device. Fig. 5C illustrates this technique. You may want to use a nut and lock washer above and below the board for extra security.

I have also found that the barrel of the syringe makes a nice coil form. If you use a sharp knife to cut off a section of the tube, it will fit nicely over the outside of a phono plug. I have made plug-in coils for my GDO using this method. Fig. 5D shows an example of how that is done.

Probably the nicest thing about these syringes is that they are free for the asking. [I found my family doctor reluctant to give me syringes that he uses to give my wife her allergy shots because he thought the allergen extract would be too hard to clean out. You will have to explain what you want the syringes for and, perhaps, ask him or her to save some that you can clean up with soap and water. Some doctors may be more willing to save just the neoprene inserts for you. — Ed.] — George B. Bean, D. O., W3MY, Little Rock, Arkansas

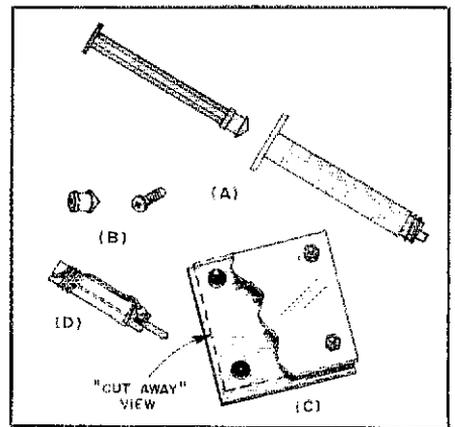


Fig. 5 — A disposable plastic syringe is shown at A. B shows the neoprene insert from the end of the plunger and how a no. 6 machine screw can be used to make rubber equipment feet. These inserts can also be used to mount a circuit board, transformer or other devices to a chassis, as illustrated at C. The syringe barrel makes a nice coil form, and D shows how W5MY fashioned a plug-in coil for a GDO using a piece of the tubing and a phono plug.

A Simple Method of Oiling Cooling Fans

□ Cooling fans can be oiled very easily without removing them from the chassis or even removing the covers if they are in an accessible position. I use a 3-cc plastic syringe and a long metal needle.²

Needles that fit on the hub of a syringe are available in many bore sizes and in lengths from 1 to 6 inches in increments of ½ or ¼ inch. The necessary size depends on the physical structure of the equipment. Measure from the area of the motor to a convenient height that allows freedom of operation. These needles are flexible enough to bend slightly for various working angles.

Filled with a few milliliters of very light machine oil, the needle can be placed right on the motor shaft, keeping the bevel toward the motor and applying gentle pressure on the plunger until an adequate amount of oil has been "injected." You should be able to obtain used syringes and needles from your local hospital or medical practitioner. In some areas you can buy them at a pharmacy without a prescription. [Herbach & Rademan, 401 E. Erie Ave., Philadelphia, PA 19134 has syringes (but not needles) for this purpose. A pack of six costs \$2.10 plus shipping, with a \$10 minimum order amount. — Ed.] — Maurice Sasson, M.D., W2JAJ, Bronx, New York

OLD-TIMER'S NOTEBOOK

Grid-Dipping Toroidal-Wound Inductors

□ Because of the self-shielding properties of toroid coils, it is either difficult or impossible to check for resonant frequencies with a "dipper." In some instances it may be possible to obtain a reading on the dipper by virtue of stray capacitive coupling, but the dip will be rather broad and difficult to discern. Fig. 6 shows a simple way to check tuned-circuit resonance

²cc means cm³, which is the same as 1 ml; oz = ml ÷ 29.57.

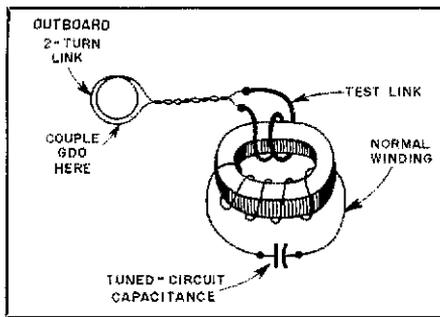


Fig. 6 — Using a test link to obtain a dip-meter indication of the resonant frequency of a tuned circuit with a toroid inductor is shown.

when working with toroidal inductors.

The toroid coil under test is connected to its circuit points, and whatever series or parallel C it is used with should be included in the circuit. A one- or two-turn link is looped through the toroid core, then connected to an outboard link of the same number of turns. The dipper is then coupled to the outboard link to obtain a resonance check. — *Doug DeMaw, W1FB*

(Reprinted from *Hints and Kinks for the Radio Amateur*, 9th ed. (Newington: ARRL, 1974), p. 63.]

Dip-IC Unsoldering Jig

□ Here is a method for removing dual-in-line ICs from PC boards. Use 0.1-inch perf-board as a guide and any convenient small drill. Drill the pin pattern of the IC in a piece of copper approximately 1/16 inch thick. Cut the copper to a final dimension of 1/2 × 1 inch, as shown

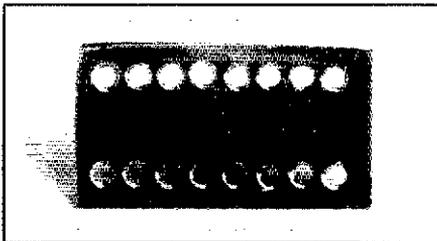
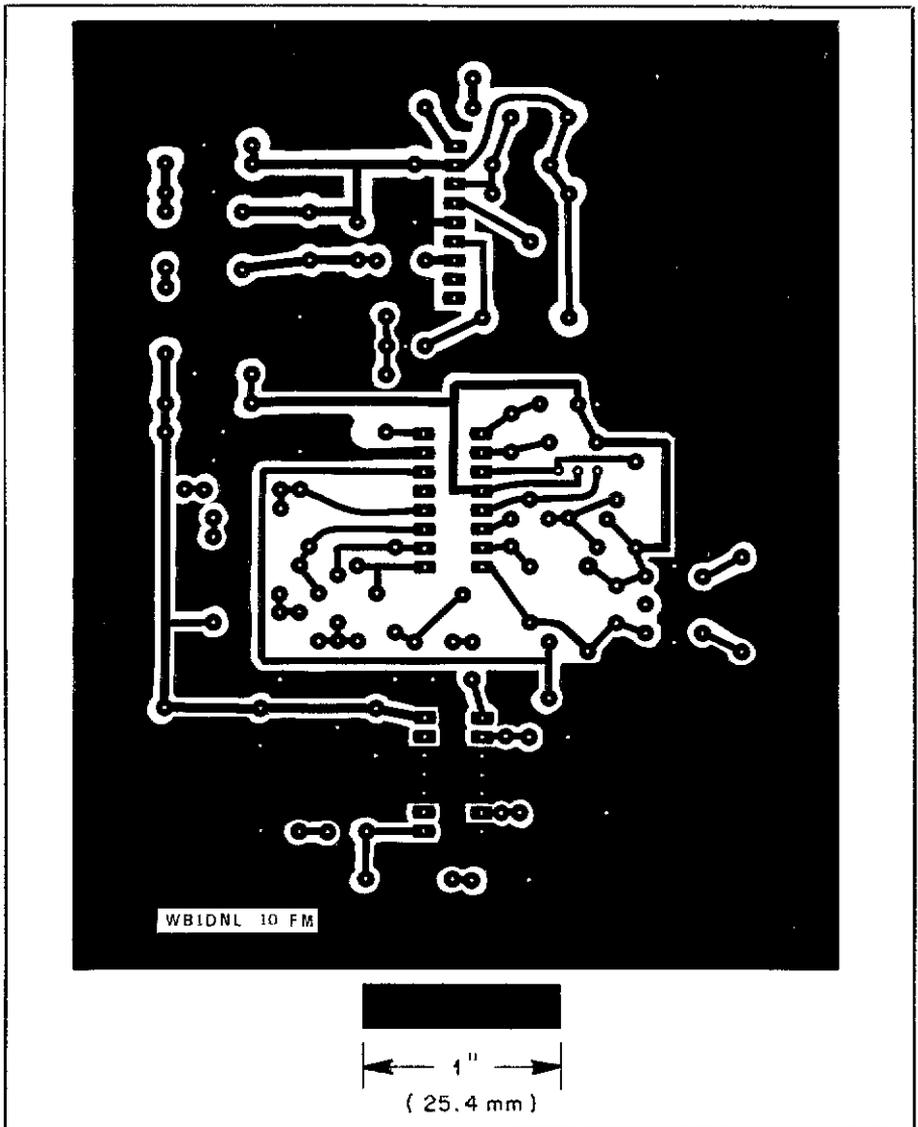


Fig. 7 — A piece of copper sheet drilled to match the pins on an IC can be used as a heat sink to evenly distribute the heat from a soldering iron for IC removal.

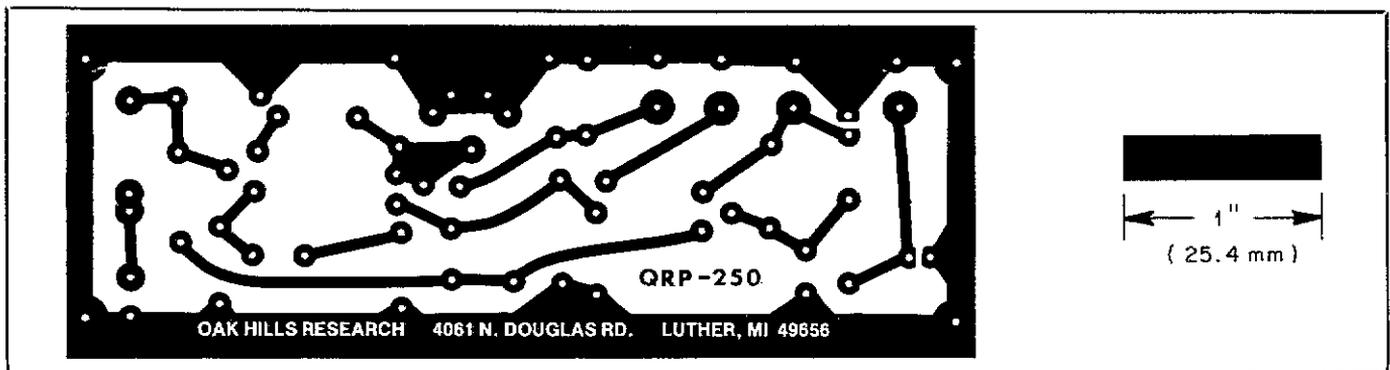
in Fig. 7. Be sure that each pin of the IC is vertical to the base. The pins can be straightened by heating them with a small iron and then aligning them with a pair of long-nose pliers. Lay the copper over the pins of the IC. Heat the copper with a large iron (100 to 200 W). Gently apply pressure to the IC as the solder is melted around

the pins, pulling the IC off as it is loosened from the solder. Heat will spread rapidly if the copper IC jig is tinned. — *Ralph V. Anderson, KØNL*

[Reprinted from *Hints and Kinks for the Radio Amateur*, 9th ed. (Newington: ARRL, 1974), pp. 81-82.]



Circuit-board etching pattern for the 10-m FM receiver. The pattern is shown full-size from the foil side of the board. Black areas represent unetched copper foil. The component side of the board is unetched and is used as a ground plane. Refer to the text.



Circuit-board etching pattern for the QRP transmitter. The pattern is shown full-size from the foil side of the board. Black areas represent unetched copper foil.

Technical Correspondence

Conducted By
Bob Schetgen,* KU7G

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

NO AGC!

□ It is a well-known fact that the brain of a trained operator is the best filter for extracting signals among noise and interference. The best CW operators usually prefer rather wide receiving filters when working high-density traffic, as in pile ups. Similarly, I have noticed a surprising effect when casually comparing the reception quality of a sophisticated SSB transceiver with that of a modest one (a hybrid model composed of only nine bipolar transistors and three tubes), which lacked AGC and an AF gain control. (Gain is adjustable only in the RF stages.) On that occasion, the atmospheric noise was high and it was quite difficult to copy the desired station with the "best" receiver; surprisingly, the signals were almost solid copy with the "poor" receiver. It was useless to adjust the first receiver carefully (including the use of "fast" AGC). Clearly, the recovery of the human ear from loud noise is far better than that of electronic AGC. I suggest that the HF-transceiver manufacturers include a "NO AGC" switch, as on older receivers. — *Jorge Naveiro, LU8DLK, Quilmes Oeste, Argentina*

A NEW SWITCHED-CAPACITOR-FILTER IC FROM MOTOROLA

□ Motorola Semiconductors recently sent me some samples of their new MC145414 IC. The device is a CMOS, LSI, dual-channel, tunable, fifth-order, elliptical, low-pass, switched-capacitor filter. Apparently, this chip is a newer version of the MC14413-MC14414 series that I originally used as an "implant" modification in a communications receiver.¹

The MC145414 comes in a standard 16-pin plastic package for general-purpose audio-frequency filtering applications. Radio Amateurs can adapt it for use as a superb "brick-wall" communications filter. An appropriate clock frequency, easily generated from a 100-kHz crystal oscillator, and a few flip-flops allow low-pass filtering for phone, CW or RTTY operation. The device operates from either a single or split power supply: typically, ± 5 -V dc to ± 15 -V dc at less than 10 mA. There is also an external control line to "power-down" the device when it is not in use.

A block diagram of the MC145414 is shown in Fig. 1. There are two individual fifth-order elliptic filters: One has unity gain, the other has 18 dB gain. Each filter (A and B) operates as a tunable low-pass filter governed by an externally clocked (CLK 1 and CLK 2) sampling rate. The filters may be used independently or wired

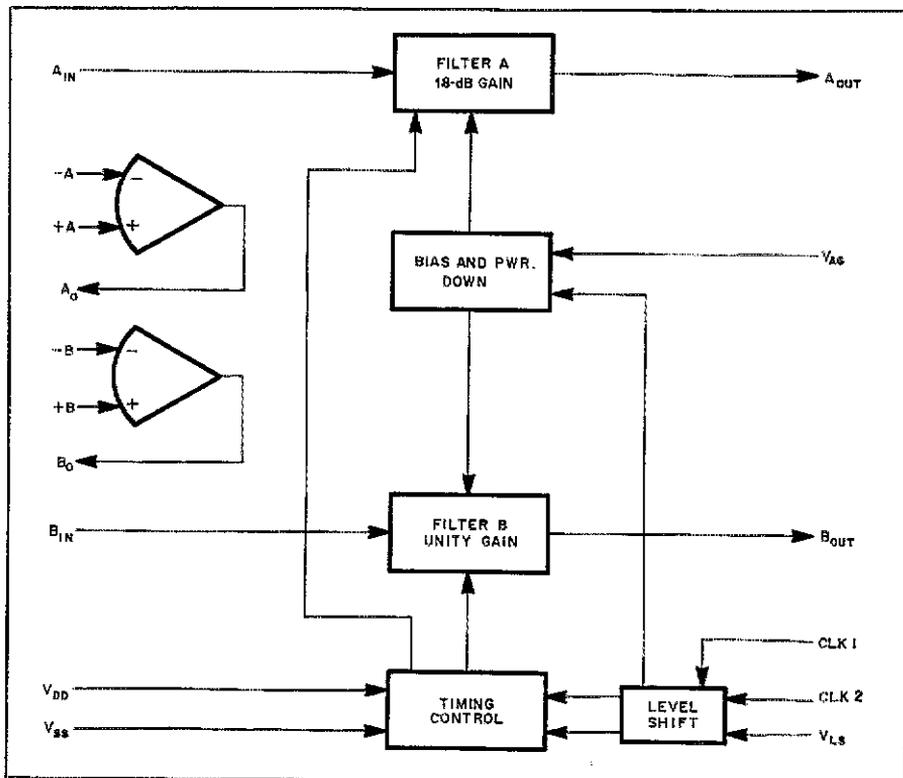


Fig. 1 — A block diagram of the MC145414 from Motorola Data Sheet DS-9557.

in cascade, for a 10-pole, low-pass characteristic. The clock signals, however, must be tied together and used by both channels. The chip also includes two op amps that are independent of the SCF circuits and may be used as amplifiers, buffers or auxiliary filters.

The single-phase clock input is converted internally to a two-phase clock signal that controls the data-sampling rate for each filter. The cutoff frequency of each filter channel is a direct function of the clock-input frequency. For example: A 100-kHz square-wave clock signal results in a 2800-Hz cutoff; a 50-kHz clock yields a 1400-Hz cutoff; and a 25-kHz clock 700 Hz. The external clock frequency may be varied continuously from 25 kHz to 400 kHz in order to meet broader requirements.

Like all switched-capacitor filters, the MC145414 produces some switching noise. This noise appears at frequencies near multiples of the switching rate, and is called clock residue. If objectionable, it may be reduced by addition of a simple RC filter at the SCF output or by using one of the uncommitted op amps as an active low-pass filter with a 3- to 4-kHz cutoff frequency.

The uncommitted op amps can provide additional gain when needed. As notch filters, they

can eliminate noise such as power-supply ripple and power-line hum. A design to eliminate 60-Hz hum is shown in Fig. 2A. Fig. 2B shows a tunable notch filter and isolation amplifier for use ahead of the SCF, to remove an unwanted noise or interference between 40 and 4000 Hz. Place the notch filter ahead of the SCF to minimize SCF overload from the unwanted signal. R1 of Fig. 2B, offers an easy way to implement a variable-frequency audio notch filter that covers a range from 40 Hz to 4000 Hz with adjustment of a single control.

A complete filter system, incorporating the ideas presented, is diagrammed in Fig. 3. Although this design may not fill every requirement or application, it is offered to stimulate interest in switched-capacitor filters. It is somewhat more economical than the earlier system described by Frank Noble, W3MT, and myself.² — *Richard R. Schellenbach, W1JF, Reading, Massachusetts*

¹R. R. Schellenbach, "Versatile Switched-Capacitor Filter with Automatic Level Control," Technical Correspondence, QST, Nov. 1982, p. 52.

*Technical Editorial Assistant

²R. R. Schellenbach and F. Noble, "Digital Switched-Capacitor Filters — A Practical Construction Project," QST, July 1984, pp. 11-15.

Feedback

✘ There is an error in "Electronic Switching and How It Works" (Sept. 1984 QST). The 10-kΩ resistor in Fig. 4E (p. 21) should be connected from the base of Q1 to ground, not to the +12-V line as shown.

✘ There has been a lot of response to Barry King's article in October 1984 QST, "A Complete Morse-Code System for the VIC-20™ Computer." Many readers have not been able to type in the program from the listing and make it work. As far as we can tell, there are no errors in the listings for the VIC-20 or the C64. In fact, the QST listings were printed from working versions of the program at ARRL Hq.

We do have two corrections to report, however. In Table 2, the proofreading section for the VIC-20, the check value for line 240 should be 611, not 609. Fig. 2, the schematic diagram of the interface circuit, incorrectly shows S1 and S2 ganged together like a single 3PST switch. S1 is an SPST switch, and S2 is a DPST unit. King installed the interface circuit board inside his VIC-20 with the various jacks and switches mounted on the back panel, as shown in the title photo. That was not clearly stated in the article, and has led to some confusion. There is no reason the interface circuit could not be built into some type of enclosure external to the computer.

✘ Belated Season's Greetings from one of the ARRL Hq. gang accidentally left off the list in last month's QST. Mary Davis, who has been referring potential amateurs to local clubs and instructors for us since February 1984, has forgiven us in the holiday spirit and wishes you all a Happy New Year!

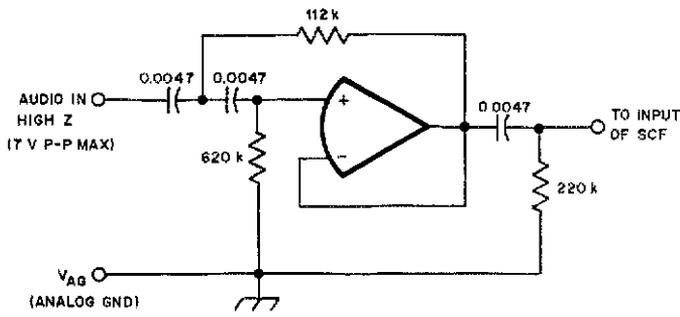
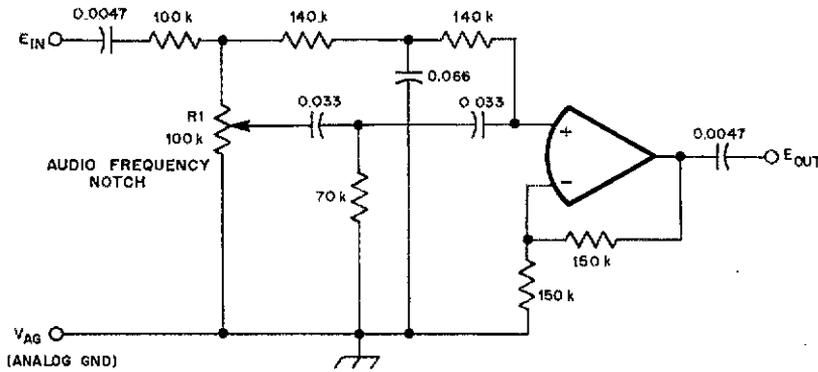
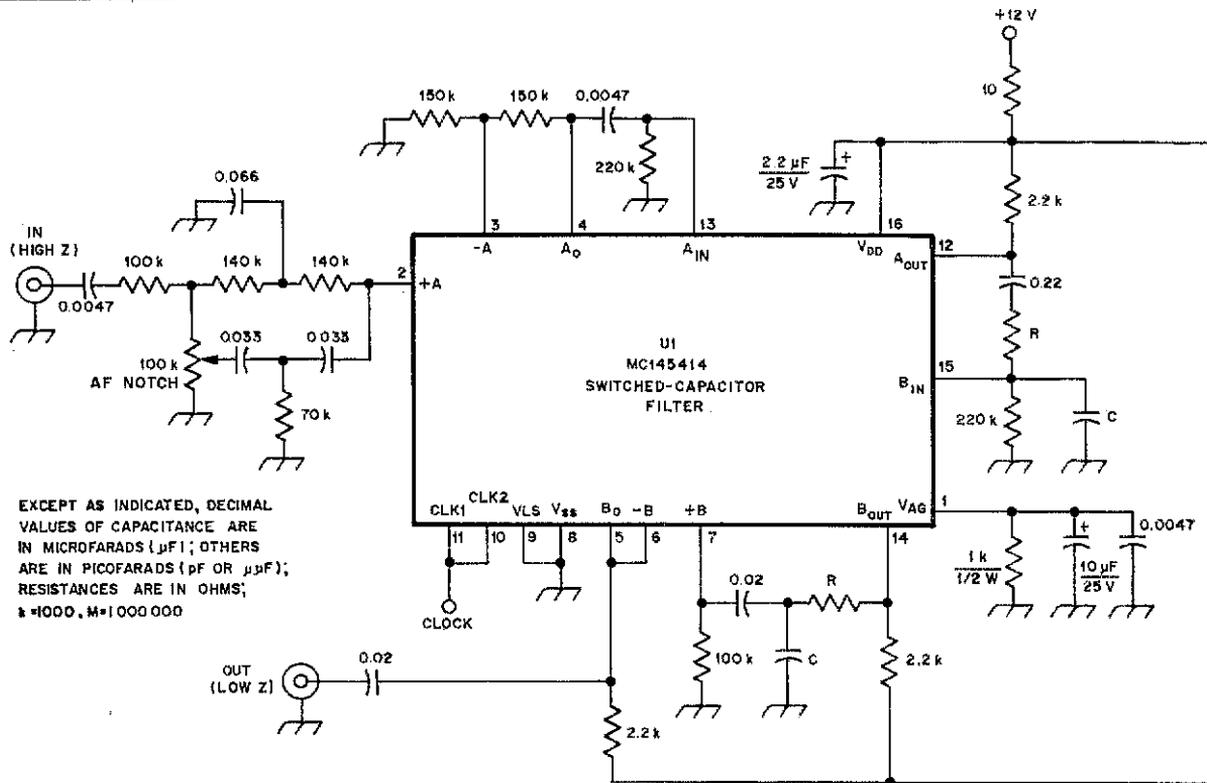


Fig. 2 — A 60-Hz rejection filter (A) and a tunable notch filter/isolation amplifier (B) using an uncommitted op amp of the MC145414.

(A) EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (μF); OTHERS ARE IN PICOFARADS (pF OR μμF); RESISTANCES ARE IN OHMS; k=1000



(B)



EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (μF); OTHERS ARE IN PICOFARADS (pF OR μμF); RESISTANCES ARE IN OHMS; k=1000, M=1000000

Fig. 3 — An economical filter system with notch, cascaded elliptical low-pass filters and an output buffer. The maximum input to pin 13 is 1 V peak to peak before clipping. Clock signals, pins 10 and 11, should be square waves with full V_{CC} to V_{SS} swing. R and C should be chosen for desired attenuation of clock residue.

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.

MAXBUCKS

□ Congratulations on the FB article in November *QST* about the Maxcom Antenna Matcher (Product Review)! Jerry Hall's review is great, hi. It would be great if other publications were as careful as *QST* regarding advertised items.

I had planned to market a "grid leak drip-pan" some time ago, but solid-state technology made me abandon that idea. You'll recall that this was quite a saying back in the '30s, hi.

My dad's favorite was the "great bug killer." One sent in \$2 for it. The device was two blocks of wood with instructions to "catch a bug. Place it on one block and strike firmly with the other block." I think someone should strike Maxcom like this. God help us if the Government is using their device, per their full page ad you know where! — *Jim Gundry, W4JM, Lakeland, Florida*

□ You and your technical review staff are to be commended on the fine exposé in November *QST* of a truly questionable product.

I received a brochure from Maxcom about their "Antenna Matcher" several weeks ago and was amazed at the device, its claims and its price. Since its price was out of my range, I discarded it without much thought.

Perhaps those who unwittingly purchased the product should write to *QST* and a list be made of those persons, and a class-action suit could be considered by these people. Again, thanks for your good review. — *Dean Summers, KQ0C, Mandan, North Dakota*

UP WITH UPFRONT

□ I like Up Front in *QST*. Expand it! — *Harry Adelman, K6IB, Chatsworth, California*

□ I have just received November *QST*. The addition of color is great. The addition of a more people-oriented section is even greater. I can only commend your efforts, and encourage you to expand these ideas. Amateur Radio is people! Technical aspects are nice, but people are nicer. — *Merrill J. Mirman, KT3Z, Springfield, Pennsylvania*

COMPUTERS? NO! YES!

□ Among my amateur friends there has been a lot of discussion as to your covering so much "computer" in your recent issues. It is not appreciated, and some have said they were questioning their renewals. I hesitated about ordering for the three years. — *William P. Borden, WA7EMH, Portland, Oregon*

□ *QST* has been printing some fine computer programs lately. For some time now, my station has been computer-assisted 90% of the time. So, I feel that a comment on *QST*'s endeavor is in order. For example, the Smith chart in BASIC

could really be useful to some hams, but it is printed so small that I had trouble reading it. Now, my eyes aren't what they used to be, so I called on some friends to help me out. Nine out of 10 gave up, and I would like to ask, why can't *QST* use larger type? Instead of jamming the whole program on one page, why couldn't two pages be used? Give the older hams a chance to read it! Look at the programs printed in the computer magazines — we have no trouble reading those. Just for the heck of it, try reading those lines in the November issue one by one with a magnifying glass. See what I mean? — *Kurt R. Schmeisser, W8LZV, Detroit, Michigan*

KEEP THE LETTER UNCLUTTERED

□ Enclosed please find my check in the amount of \$6 for membership dues for three years. I do receive *QST* on Talking Book records and enjoy it a lot.

I am pleased to serve Paul Grauer, W0FIR, as an Assistant Director. I also enjoy receiving *The ARRL Letter*. Please do not change the format of this publication. I read it with an Optacon, a device that the blind use to read print. The straightforward format and noncluttered appearance makes it very easy to read. Also, if someone wants to use something from the *Letter*, it is camera-ready and easy for photocopying. The type is good and provides good contrast for the Optacon. A publication with different type styles, photos and symbols, and pretty artwork might look pleasing to the eye, but for the Optacon reader, all it does is slow you down and make it harder to read. I enjoy being able to read the *Letter* myself without having to ask someone to read it to me. — *Steve Bauer, KC0HF, Wichita, Kansas*

BETTER THAN MOST

□ I just finished working a ham on 20-meter CW (14.064 MHz) I think you will be glad to hear about. His call is KT3O (Bob) and he lives near Philadelphia. He does not have the use of his arms or legs, yet he sends code better than most of us. He uses a tube that he sucks on for dashes and blows on for dots. He copies in his head, completely. Now, if that's not something special in ham radio, I've never heard of anything in my 25 years of being a ham.

I've been off of CW for over 23 years, and the last few months I've been trying to relearn it with not too much progress. I told Bob that I was discouraged and about ready to get the mike back out. However, after hearing what Bob told me (and good copy, too), I'm reminded of something my Dad used to say: "I complained about not having any shoes until I met a man that had no feet."

Please ask one of your feature writers to let the ham fraternity hear about this courage that Bob has shown. It's sure to give many of us a shot in the arm.

I'm 68 years old and was thinking that this code for me to up-grade was just too hard. Now

you bet that W1AW will have this old ham on every day. — *Dudley L. Pope, Jr., K5Z0Z, Baton Rouge, Louisiana*

THE BETTER END

□ Over the last few years I've noticed a strange practice becoming common, particularly in the Novice CW bands. What I've heard is many Novices (and not a few higher-class Hams) ending each and every exchange with the phrase "so back to you," followed by call letters.

This is a terrible time waster, and seems interminable when sent at six or seven WPM. If you are really interested in how well a station is still copying you, a simple "HW?" or "HW NW?" will suffice. If all you want to do is let the station you're in QSO with know that you're finished with your turn and are preparing to turn it over to him, the appropriate signal is AR (meaning end of message) followed by BK or call letters. AR conveys your meaning perfectly, takes a heck of a lot less time, and is just plain better amateur practice. — *J. Lincoln Thorner, KS2H, Brooklyn, New York*

A CAT, A DUCK, A CHICKEN?

□ Nick, W1DXR, OM ... (November Correspondence) just what are you telling us about yourself? In exposing your way of combating unhappiness with ARRL "management" by writing "several nasty letters," then pulling out and enrolling your dog, Mandy Hund, you did not exactly "fight the good fight." I'm afraid Mandy Hund's years of membership were of more value to Amateur Radio than your own ... and I'd bet Mandy was a better ragchewer!

When you get sore again — are you going to sign up your cat? Duck? Chicken? — *Alan Peers, KQ2L, West Islip, New York*

GJ3DVC

□ With reference to your cover of October 1984 *QST*, I felt compelled to write to mention the hams behind GJ3DVC. During my four-year assignment with the U.S. Navy in London, I had the pleasure of visiting Jersey on several occasions — on my own and also as part of a group from Cambridge University Wireless Association (GJ6UW). The hams on Jersey — folks like GJ3YHU, GJ2LU, GJ6OZB, and others too numerous to mention — always made me feel exceedingly welcome as a visitor to their island community. Theirs is a class act from start to finish, and the quintessence of the true spirit of friendship that is ham radio. It's a great location for a ham holiday. I hope that I am truly fortunate enough to be able to visit Jersey again some day.

Besides the stamp featured on page 77 of the October *QST*, the shack of GJ3DVC also appears on a special commemorative issue of the Jersey one pound sterling coin. — *Brian D. Robertson, G5DSD/WA3NGL, Springfield, Virginia*

*Public Information Coordinator, ARRL

License Renewal Information

1) Attach a photocopy, or the original, of your license to the FCC Form 610 (available from ARRL Hq.; s.a.s.e., please).

2) Mail to FCC, Gettysburg, PA 17325.

3) Retain copies of everything, if possible, as proof of filing before expiration. If you file before the license expiration date, you may continue to operate beyond the expiration date and until the new license arrives.

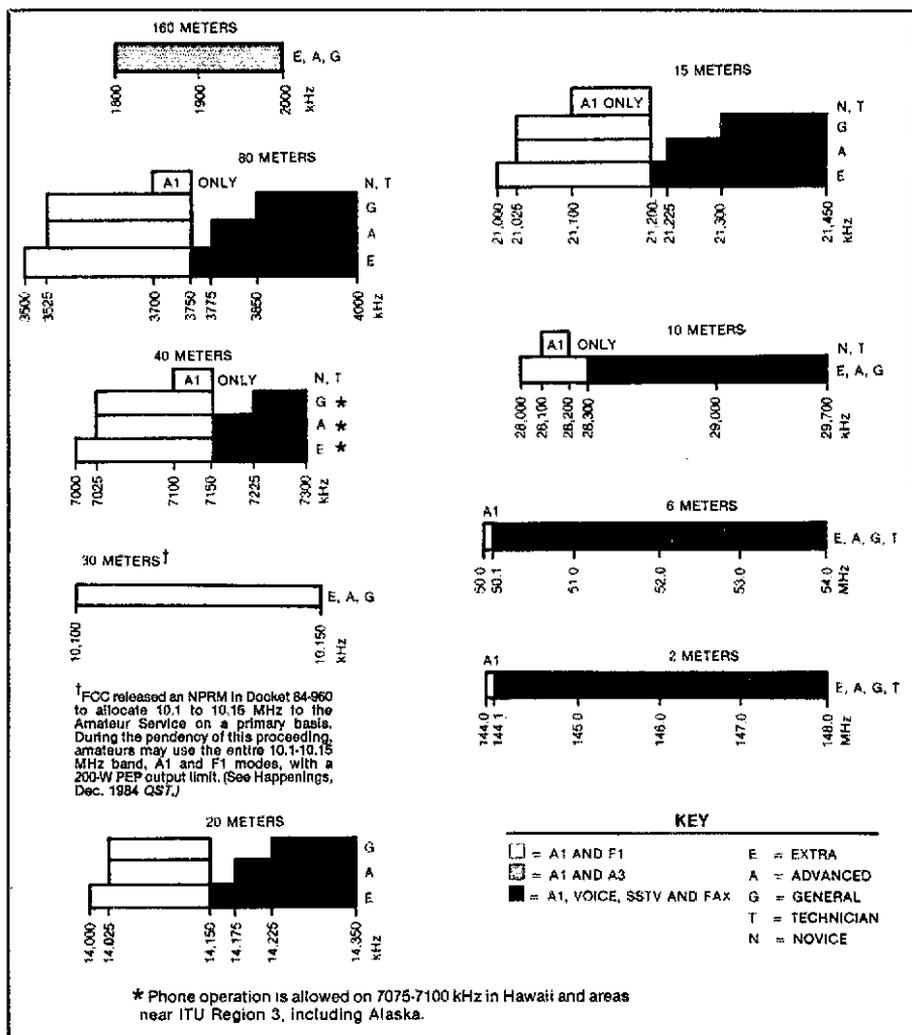
After expiration, there is a two-year grace period under which you may still renew and keep your call sign without retesting, but you must wait until the new license arrives to operate. After this two-year grace period expires, you must be re-examined for a new license. Normally, application should be made approximately 90 days before expiration; however, renewal can be applied for at any time during the

term of the license.

4) If you are simply modifying your license (change of address, for example), you must fill out the Form 610; a letter is no longer sufficient. Incidentally, your license will also be automatically renewed for 10 years at this time.

5) If you have any questions or problems, drop a note to the Membership Services Department, ARRL Hq.

U.S. Amateur Frequency and Mode Allocations



The "Considerate Operator's Frequency Guide"

Some frequencies that are generally recognized for certain modes or certain activities (all frequencies are in MHz):

- 1.800-1.825 CW only
- 1.825-1.830 "DX window" (no W/VEs)
- 1.850-1.855 "DX window" (no W/VEs)
- 3.590 RTTY DX
- 3.610-3.630 RTTY
- 3.790-3.800 "DX window"
- 3.845 SSTV
- 7.040 RTTY DX
- 7.080-7.100 RTTY
- 7.171 SSTV
- 10.140-10.150 RTTY
- 14.080-14.100 RTTY
- 14.100 NCDXF beacon
- 14.230 SSTV
- 14.313 Maritime mobile
- 21.080-21.100 RTTY
- 21.340 SSTV
- 28.080-28.100 RTTY
- 28.200-28.300 Beacons
- 28.680 SSTV
- 29.300-29.500 Satellite downlinks
- 29.520-29.580 Repeater inputs
- 29.600 FM simplex
- 29.620-29.680 Repeater outputs

ARRL band plans for bands above 29.300 MHz are shown in the ARRL Repeater Directory. FCC PR Docket No. 84-960 proposes to allocate the 24.890-24.990 MHz band to General, Advanced and Extra Class licensees, with A1 and F1 emissions permitted on 24.890-24.930 MHz and A1, A3, A4, A5, F3, F4 and F5 emissions on 24.930-24.990 MHz. Amateur usage is expected to be as follows:
 24.890-24.920 — CW
 24.920-24.930 — RTTY
 24.930-24.990 — phone, SSTV, FAX.

U.S. Amateur Power Limits

At all times, power level should be kept down to that necessary to maintain communications. All U.S. amateurs are limited to 200-W PEP output in the Novice

segments. On all other segments, with certain exceptions in the 10- and 420-MHz bands, 1500-W PEP output is permitted. (AM operations will use old power limits

and standards until June 1, 1990.) Present restrictions limit 10-MHz PEP output to 200 W. See December 1984 QST, p. 61. (Revised as of December 1984.)

MAJOR ARRL OPERATING EVENTS AND CONVENTIONS — 1985*
(Check QST Monthly for updates)

JANUARY	FEBRUARY	MARCH
1 Straight Key Night 2 West Coast Qualifying Run 5-6 ARRL QSO Party, CW 12 W1AW Qualifying Run 12-13 ARRL Hamfest (Sarasota, FL) 12-13 VHF Sweepstakes 13 ARRL Hamfest (Richmond, VA) 17 ARRL Hamfest (Honolulu, HI) 19-20 ARRL QSO Party, phone 20 ARRL Hamfest (Arlington Heights, IL) 22 W1AW Qualifying Run 26-Feb. 3 Novice Roundup 27 ARRL Hamfest (Yonkers, NY)	2-3 Southeastern Division Convention (Miami, FL) 5 West Coast Qualifying Run 10 ARRL Hamfest (Mansfield, OH) 10 W1AW Qualifying Run 16-17 International DX Contest, CW 17 ARRL Hamfest (Elkin, NC) 17 ARRL Hamfest (Melville, NY) 20 W1AW Qualifying Run 22-24 Ohio State Convention (Sharonville) 24 ARRL Hamfest (Davenport, IA) 24 ARRL Hamfest (Vienna, VA)	2-3 International DX Contest, phone 6 West Coast Qualifying Run 9-10 ARRL Hamfest (Orlando, FL) 9-10 Louisiana State Convention (Lafayette) 11 W1AW Qualifying Run 16-17 ARRL Hamfest (Fort Walton Beach, FL) 16-17 Roanoke Division Convention (Charlotte, NC) 17 ARRL Hamfest (Toledo/Maumee, OH) 21 W1AW Qualifying Run 24 ARRL Hamfest (Winchester, IN) 30-31 Nebraska State Convention (Kearney) 31 ARRL Hamfest (Grayslake, IL) 31 ARRL Hamfest (Timonium, MD) 31 ARRL Hamfest (Madison, OH)
APRIL	MAY	JUNE
2 West Coast Qualifying Run 9 W1AW Qualifying Run 13-14 Missouri State Convention (Kansas City) 14 ARRL Hamfest (Bedford, PA) 26-28 DAYTON HAMVENTION (Dayton, OH)† 28 W1AW Qualifying Run	1 West Coast Qualifying Run 4-5 ARRL Hamfest (Albany, GA) 5 ARRL Hamfest (Centralia, IL) 5 ARRL Hamfest (Kankakee, IL) 8 W1AW Qualifying Run 17-18 Alabama State Convention (Birmingham) 18-19 Atlantic Division/New York State Convention (Rochester, NY) 20 W1AW Qualifying Run	1 ARRL Hamfest (St. Paul, MN) 2 ARRL Hamfest (Princeton, IL) 4 West Coast Qualifying Run 8-9 VHF QSO Party 9 ARRL Hamfest (Willow Springs, IL) 13 W1AW Qualifying Run 22-23 Field Day 25 W1AW Qualifying Run
JULY	AUGUST	SEPTEMBER
3 West Coast Qualifying Run 5-7 Dakota Division Convention (Rapid City, SD) 6-7 Georgia State Convention (Atlanta) 12 W1AW Qualifying Run 13-14 Indiana State Convention (Indianapolis) 13-14 IARU Radiosport Championship 20-21 Iowa State Convention (Des Moines) 21 ARRL Hamfest (Washington, MO) 24 W1AW Qualifying Run 28 ARRL Hamfest (Belvidere, IL)	3-4 UHF Contest 6 West Coast Qualifying Run 9-11 Southwestern Division Convention (Long Beach, CA) 10 W1AW Qualifying Run 11 ARRL Hamfest (Willow Springs, IL) 15 ARRL Hamfest (Bluefield, WV) 18 ARRL Hamfest (Warren, OH) 23 W1AW Qualifying Run 25 Illinois State Convention (St. Charles)	4 West Coast Qualifying Run 6-8 Florida State Convention (Melbourne) 6-8 Midwest Division Convention (Omaha, NE) 6-8 West Gulf Division (San Angelo, TX) 7 ARRL Hamfest (Windsor, ME) 8 W1AW Qualifying Run 14-15 ARRL Hamfest (Mobile, AL) VHF QSO Party 21-22 Virginia State Convention (Virginia Beach) 21 W1AW Qualifying Run 22 ARRL Hamfest (Willimantic, CT) 27-29 Canadian Division Convention (London, ON) 28-29 ARRL Hamfest (Grayslake, IL)
OCTOBER	NOVEMBER	DECEMBER
1 West Coast Qualifying Run 4-6 ARRL NATIONAL CONVENTION (Louisville, KY) 5-6 ARRL QSO Party, CW 12-13 ARRL QSO Party, phone 14 W1AW Qualifying Run 19-20 Simulated Emergency Test 26-27 Delta Division Convention (Chattanooga, TN) 27 W1AW Qualifying Run	2-3 Sweepstakes, CW 6 West Coast Qualifying Run 12 W1AW Qualifying Run 16-17 Sweepstakes, phone 18 W1AW Qualifying Run	3 West Coast Qualifying Run 7-8 160 Meter Contest 11 W1AW Qualifying Run 14-15 10 Meter Contest 28 W1AW Qualifying Run

*Hamfests/Conventions of record as of November 1, 1984

†Not an ARRL event



- **New ARRL Policymakers**
- **ARRL On Commercial Broadcast of Ham Signals**
- **National League of Cities Files On Federal Preemption**
- **Automatic Control for VHF RTTY Mailboxes?**

ARRL Election Results

Counting of votes for ARRL Division Directors and Vice Directors took place at Headquarters on November 20, 1984. Newly elected representatives and those who were unopposed will take office on January 1, 1985, and will serve two-year terms.

Here are your newly elected representatives:

Central Division

For Director: Edmond A. Metzger, W9PRN (unopposed)

Director Metzger has been reelected to the Central Division post. A former Assistant Director and Vice Director, Ed lives in Springfield, Illinois, and is active in the Sangamon Valley Radio Club. He is an Advanced class operator and, in 1976, won a special award from the Starved Rock Radio Club for his numerous public services. Ed served as General Chairman of the Central Division ARRL Conventions in 1961 and 1968, and holds the following positions and awards: OBS, ARES and A1 operator certificates. He is a life member of the QCWA and a charter life member of the ARRL. Chairman of the League's Management and Finance Committee, Ed was instrumental in the modification of the current budget to give the Board a better understanding of fiscal policies. Ed has been licensed since 1941, and is employed as a comptroller.

For Vice Director: Howard S. Huntington, K9KM — 2924; Kenneth A. Ebnetter, K9EN — 1217.

Howard returns as Vice Director of the Central Division. Continuously licensed since 1959, he lives in Lake Zurich, Illinois, and is an Engineering Section Manager at Motorola. Howard holds a BSEE from Purdue University and an MSEE from the Illinois Institute of Technology. Past Contest Advisory Committee Chairman and presently CAC liaison to the ARRL Board, K9KM is also president and chairman of the Board of the Northern Illinois DX Association. He holds various contest and operating awards, including DXCC. Howard is active as an Amateur Radio speaker for numerous clubs and civic organizations.

Hudson Division

For Director: Linda S. Ferdinand, N2YL — 1940; George A. Diehl, W2IHA — 1642.

Licensed since 1962 and holder of an Extra Class ticket, Linda Ferdinand lives in Clinton Corners, New York. She received a BS in Computer Science from Union College, and is currently working toward her Master's degree at

Marist College. She is employed by the IBM Corporation as a programmer, specializing in compiler design and development, and by Union College as a teaching assistant.

Linda was Vice Director of the Hudson Division from 1980 to 1982, an architect of the current National Traffic System, and the first Cycle Two Transcontinental Corps Director, from 1978 to 1982. She is past president of the Poughkeepsie Amateur Radio Club, and a member of PEARL, Dutchess County RACES NTS, Brass Pounders League and Old Timers Club. Her operating appointments include ORS, Eastern Area Net control, Second Region Net control, liaison to Eastern Area Net and Transcontinental Corps. She is active in public service and received an ARRL Public Service Commendation for activity during hurricane Frederick.

For Vice Director: Stephen A. Mendelsohn, WA2DHF (unopposed)

Steve, a resident of Little Ferry, New Jersey, repeats his term as Vice Director of the Hudson Division. He has been licensed since 1959, holds an Advanced class license and is a life member of the ARRL. He is a member of the A1 Operator Club and is Board Liaison to the ARRL Public Relations Advisory Committee. Steve is Hudson Division Public Information Officer, and has been involved with communications for the 1980 and 1984 Olympic Torch runs and the New York City Marathon. He is active in many area radio clubs, including LIMARC.

New England Division

For Director: Thomas Frenaye, K1KI — 2752; John C. Sullivan, W1HHR — 1398.

Tom Frenaye, elected to his first term as New England Division Director, lives in Unionville, Connecticut. He is presently employed as a Management Information Systems Analyst for Phoenix Mutual Life Insurance, and was Assistant Communications Manager at ARRL Hq. from 1977-1981. He holds an MA in Political Science.

Tom was first licensed in 1964, and presently holds an Extra Class license. He has several operating awards, including A1 Operator, SBDXCC and Honor Roll. He is President of the Yankee Clipper Contest Club, and former member of the ARRL Awards Committee.

For Vice Director: Richard P. Beebe, K1PAD (unopposed)

Rick Beebe, a resident of Billerica, Massachusetts, returns as New England Vice Director. Rick was first licensed in 1960, when he was 14 years old. He holds BS and MS degrees in Electrical Engineering and is presently employed at Hewlett Packard, where he is an

Engineering R&D Section Manager. Vice Director for four years, Rick has served on the Forward Planning Committee and the Ad Hoc Committee on Volunteer Monitoring.

Rick's Amateur Radio activities have included DX, traffic handling, contesting, slow-scan television, OSCAR and local club affairs. In the past year, he became active on packet radio, and he worked W5LFL in the Space Shuttle.

Northwestern Division

For Director: Mary E. Lewis, W7QGP — 1535; Joseph N. Winter, WA7RWK — 1179; M. L. Gibson, W7JIE — 1091.

Director Lewis, reelected to her third term, is a resident of Seattle, Washington. She holds an Advanced class license, and has been employed as a freelance electronic technician, co-owner of an electronic service agency and as an electronics instructor at Seattle Community College.

Director Lewis's Board activities include the Membership Affairs Committee and the Plans and Programs Committee. She was Washington Section Communications Manager from 1973 to 1977; a past president, secretary and trustee of the North Seattle ARC; and chairperson for the Puget Sound Council of Amateur Radio Clubs. She is a member of the Society of Broadcast Engineers, QCWA, QCWW, YLRL and Northwestern Division clubs and traffic nets.

For Vice Director: Rush Drake, W7RM — 1839; Robert S. Orr, KB7CC — 1364; Armand R. Pilotte, WA7IIM — 576.

Rush Drake, beginning his first term as Northwestern Division Vice Director, is a resident of Hansville, Washington. A retired electrical engineer, he brings 50 years of Amateur Radio experience to the post of Vice Director. He is a life member of the ARRL, and an Extra Class licensee. His main interests in Amateur Radio are contesting and antenna experimentation and construction. He has shared his antenna skills with many groups and would like to see the ARRL create youth-oriented, live demonstrations of packet radio and satellite communications for club use, and encourage clubs to develop scholarship programs for amateur high school graduates toward college or technical school training. W7RM would also like to help establish a Northwest Foundation for Amateur Radio.

Roanoke Division

For Director: Gay E. Millus, Jr., W4UG (unopposed)

Gay returns as Roanoke Division Director, and is an Extra Class licensee. He is a retired lawyer and a retired commander in the U.S. Navy Reserve. Gay served as Vice Director of

*Membership Services Assistant

the Hudson Division from 1950-51 and Vice Director of the Roanoke Division from 1977-80. Licensed since 1940, W4UG is a life member of ARRL. He has held positions of responsibility in many Amateur Radio clubs and organizations, such as the Washington (DC) Mobile Radio Club, the Virginia Beach ARC and the Virginia Century Club. He was also co-organizer of the Maritime Mobile Service Net. Among his many awards are DXCC Honor Roll (mixed and phone), SBDXCC, WAC, WAS, Bicentennial WAS, WPX Honor Roll, A1 Operator Club and a National Certificate of Merit.

For Vice Director: John C. Kanode, N4MM (unopposed)

Returning as Vice Director, John lives in Boyce, Virginia, and does electronic circuit research and development for IBM. An Extra Class licensee, he became an Assistant Director in 1975, and is a former ARRL QSL Bureau manager for W4, K4 and N4 calls. He has served on the ARRL DX Advisory Committee and the CQ Contest Committee. N4MM holds DXCC Honor Roll, DXCC (phone and CW), 5BWAS, 5BDXCC, 6-meter 600 Club, WAZ and WPX awards. Licensed since 1952, John is a member of AMSAT, QCWA and IARC.

Rocky Mountain Division

For Director: Lys Carey, K0PGM (unopposed)

Lys returns as Division Director. Residing in Lakewood, Colorado, Lys is a retired machine shop foreman. He was a Vice Director from 1979 to 1980 and Assistant Director from 1974 to 1978. He is a current member of the Executive Committee, and has served on the Membership Affairs and Plans and Programs Committees. Lys has been editor of *The Roundtable* and has been active in ARRL conventions. He holds WAS, WAZ and WAC, and is a life member of the ARRL.

For Vice Director: Marshall Quiat, AG0X — 1601; Robert Scupp, WB5YYX — 311

Marshall, reelected to the post of Vice Director, is a practicing attorney and a former district judge and state legislator. He is a past president of the Denver Radio Club, an editor of *The Roundtable*, and legal and regulatory committee chairman of the Colorado Council of Amateur Radio Clubs. He is presently Board Liaison to the ARRL Ad Hoc Digital Committee, which deals with packet radio and amateur digital communications. A life member of ARRL, AG0X was also the legal committee chairman of the 1976 ARRL National Convention.

Southwestern Division

For Director: Fried Heyn, WA6WZO (unopposed)

Fried Heyn, a resident of Costa Mesa, California, is a high school mathematics teacher. He holds an MA degree in Education, and his professional experience includes Collins Radio production coordinator from 1965 to 1968.

Fried, an ARRL life member, is involved with AMRAD, AMSAT, HANDI-HAMS, MARS and a host of other Amateur Radio organizations. His ARRL awards include a National Certificate of Merit, Certified Official Instructor, Public Service Honor Roll, Brass Pounders League, 5BWAS, DXCC Honor Roll and various contest awards.

Twice a Section Communications Manager, Fried was also Vice Director of the Southwestern Division and an Assistant Director. He holds an Extra Class license, and is active in contests,

DXing and net activities.

For Vice Director: Wayne Overbeck, N6NB — 3064; Karl Pagel, N6BVU — 490; Adrienne Sherwood, WA6YEO — 420; Katherine F. Schaffstein, WA6FAH — 272.

Wayne Overbeck returns as Division Vice Director. A resident of Garden Grove, California, Wayne holds a PhD from UCLA and a JD from Loyola Law School. He has written three college textbooks, two of them on communications law. He is a professor at California State University-Fullerton and USC, and a part-time attorney.

Wayne is former chairman of the ARRL Contest Advisory Committee, board liaison to the VHF-UHF Advisory Committee and coordinator of the 1977 and 1980 West Coast VHF Conferences. First licensed in 1957, N6NB holds an Extra Class license. He won the ARRL Technical Excellence Award for designing the "quagi" antenna, was named Radio Amateur of the Year at Dayton in 1980, and won the John Chambers Memorial Award of the Central States VHF Society. Wayne has published some 25 articles in Amateur Radio magazines, and recently coauthored a book of computer programs for Amateur Radio. He has given approximately 75 talks at clubs and conventions on antennas, VHFing, portable operating, computers, and other topics. He has been active in every phase of Amateur Radio at one time or another, and is a life member of ARRL and AMSAT.

West Gulf Division

For Director: Raymond B. Wangler, W5EDZ (unopposed)

Ray, of San Antonio, Texas, continues in office as Director. Having previously served as a Vice Director, he is an Advanced class amateur and a life member of ARRL. He serves as Chairman of the ARRL Committee on the Bioeffects of RF Energy. An amateur since 1952, Ray operates from 80 meters to 70 cm. He is a member of AMSAT, SWOT, SMIRK, 10-10 International, QCWA, the Central States VHF Association, the Texas VHF Society, Alamo DX Amigos, the San Antonio Radio Club and TTN. Ray is a senior member of the IEEE, and holds a BS in chemistry and a BA in physics.

For Vice Director: Thomas W. Comstock, N5TC (unopposed)

Tom, of College Station, Texas, is a life member of the League. He teaches at Texas A&M University, and is very active in Amateur Radio public service, having been a member of the Transcontinental Corps, a liaison for NTS region-to-area net, a liaison for section-to-region net, and an NCS for the region and section phone and CW nets. Tom holds the BPL, A1 Operator Club, Public Service Honor Roll and DXCC (mixed and CW) awards. He is active on most Amateur Radio bands.

ARRL SUPPORTS COMMERCIAL BROADCAST OF AMATEUR TRANSMISSIONS

On October 24, the ARRL filed comments in FCC docket 79-47 (see Happenings, Sept. 1984, for details on this proposal). Broadcast radio and television stations are presently required to obtain permission from the FCC before broadcasting messages transmitted by nonbroadcast radio stations. Such permission has been routinely granted by FCC staff, and ARRL sup-

ports the Commission proposal to delete the requirement for FCC approval for broadcast. However, the ARRL requested that FCC retain the provisions in Part 73 (the commercial broadcast rules) and Part 97 (the amateur rules) that require the express permission of the nonbroadcast radio station before retransmission can take place. ARRL asserts that "Some case-by-case control over broadcast transmission of amateur signals is needed to insure that the non-commercial nature of Amateur Radio is preserved," and that "The importance in the Amateur Radio Service of the requirement of prior consent of the amateur for retransmission authority is based on the inherent conflict between the obligations of amateur licensees to maintain the non-commercial character of the service and the commercial nature of broadcasting."

The League also asked that the FCC retain the phrase "by automatic means" in Section 97.113 concerning the retransmission by amateurs of signals originating outside the amateur service. The removal of this phrase from 97.113 would prohibit the manual retransmission of space shuttle audio, and occasional manual retransmission of NOAA weather broadcasts during weather emergency situations. The Commission also proposes to delete Section 97.91 and incorporate that section into the new Section 97.113. 97.91 provides for one-way emergency communications, including bona fide emergency drill practice transmissions. ARRL requests that the FCC retain Section 97.91, and feels that prohibition of one-way transmissions during such tests will serve to handicap the tests to a significant extent. ARRL comments have been forwarded to the Commission, and further action will be reported in Happenings.

LEAGUE FILES PETITION TO AMEND TESTING RULES

By direction of the ARRL Board, the League Counsel filed a Petition for Rule Making with the FCC seeking to amend Section 97.26 of the Commission's rules. The petition seeks to change the length of time an applicant must wait before retaking an amateur examination element from 30 days to 27.

The reason for this change is that several groups of Volunteer Examiners have established regular monthly schedules of examinations on, for example, the first Saturday of each month, or the last Friday night. The present 30-day rule precludes an applicant retaking a failed test element two months in a row from a VE team following a monthly schedule. A change to a 27-day waiting period would allow an applicant to retake a failed element at the next month's session, while still retaining the original purpose of 97.26: preventing repeated exposure to the same examination questions in a short period of time and passage of the examination element by rote memorization.

PRB-1 DRAWS FIRE FROM NATIONAL LEAGUE OF CITIES

On November 5, the National League of Cities filed comments opposing PRB-1, the ARRL Request for Issuance of a Declaratory Ruling concerning limited federal preemption of state and local antenna zoning ordinances (see Happenings, Nov. 1984 QST, for details on PRB-1).

The NLC, claiming to represent over 15,000 cities and municipalities nationwide, requested

that the FCC dismiss the petition, stating that ARRL failed to establish any clear federal interest in Amateur Radio beyond licensing, signal interference and frequency allocation. NLC asserts that the FCC has no preemptive authority under the Communications Act of 1934 unless state and local regulation is clearly an obstacle to the attainment of the objectives of Congress, and states that "the Petitioner must do more than assert that local regulations which affect the installation of radio amateur antennae frustrate national communications objectives." NLC claims "The Petitioner has failed to demonstrate that compliance with local zoning ordinances is not possible." In short, NLC states that preemption would constitute an improper exercise of federal jurisdiction, and that since "The Petitioner has failed to cite any case in which the courts have sanctioned the zoning out of amateur radio antennae, the League Petition does not adequately show how local ordinances affecting the installation and use of amateur radio antennae are harmful."

ARRL ASKS FOR ADDITION TO PART 97 TO ALLOW AUTOMATIC CONTROL OF DIGITAL COMMUNICATIONS SYSTEMS

On November 14, the League filed a Petition for Rule Making with the FCC requesting the addition of a new Section 97.80 to the FCC Rules to allow for automatic control of an amateur station on frequencies above 30 MHz when utilizing digital communications as defined by and in accordance with Section 97.69. This addition to the Rules would permit the operation of Computer-Based Message Systems (CBMSs) on the amateur VHF bands under automatic control. Present FCC Rules require that a control operator be present for CBMS operation. The proposal specifies several provisions to ensure adequate compliance with the rest of Part 97. The proposal states that "Such automatic operation would be subject to the inclusion of adequate circuitry to assure (1) the detection of transmitter malfunction and, upon detection thereof, automatic transmitter shutdown; (2) the capacity to prevent transmission of improper message traffic, such as business communications; (3) means to prevent transmission while the channel is occupied; and (4) compliance with all other applicable technical and operational standards for amateur radio stations."

The proposal also lists several guidelines for use of automatically controlled digital communications systems. The guidelines, while not actually written into Part 97, would assist in assuring responsible use of the automatic control sought by the petition. As the petition states, "The level of amateur experimentation with digital communications has progressed to the point that automatic control of digital communications is both feasible and necessary to facilitate further development of such experimentation."

SECOND ANNUAL GOLDWATER SCHOLARSHIP TO BE OFFERED

The ARRL Foundation plans to award the second Goldwater Scholarship for the academic year 1985-86 this fall. Senator Goldwater, K7UGA, represents the spirit of achievement and dedication that is the essence of Amateur Radio. Through his Amateur Radio involvement, the Senator has brought joy to thousands of members of the armed services stationed



Golden W. Fuller, W8EWS, is the most recent \$1000 contributor to the Goldwater Scholarship Fund. FB, OM!

overseas. Through his professional career, he has exemplified the principles of commitment and service to one's country and fellow citizens.

The ARRL Foundation will award a \$5000 scholarship to a licensed radio amateur pursuing studies in electronics, communications engineering or a related field. The applicant must be accepted for enrollment in a baccalaureate or higher degree program in a regionally accredited institution of higher education. Academic merit, involvement in public service and financial need will be considered in selecting the winner. Deadline for applications is June 1, 1985. For more information and application forms, write to ARRL Foundation Goldwater Scholarship, 225 Main St., Newington, CT 06111.

ARRL FOUNDATION SCHOLARSHIPS AVAILABLE

The ARRL Foundation announces the availability of two scholarship awards for the 1985-86 academic year. Based on high academic standing, financial need and dedication to public service through Amateur Radio, these awards are provided through the generosity of individual sponsors and donors.

The Perry F. Hadlock Memorial Scholarship of \$500 will be awarded to a student of electrical engineering. It is open to licensed radio amateurs of the General, or higher, class.

The Paul and Helen L. Grauer award of \$500 will be given to a student of electronics, communications engineering or related fields who resides in and attends an accredited college or university in the Midwest Division of the ARRL.

Further information and application forms for these awards may be obtained by writing to ARRL Foundation Scholarships, 225 Main St., Newington, CT 06111.

AMATEUR LOSS OF 2310-2390 MHz FINALIZED

The FCC released an Order on November 8 deleting 2310-2390 MHz from the Amateur Radio Allocations Table, effective immediately. In June 1984, the FCC denied a League Petition for Partial Reconsideration requesting geographical sharing of this band segment. (See Happenings, Sept. 1984 QST.)

The segment 2310-2390 MHz is now allocated to aeronautical flight test telemetry operation. Although this allocation was implemented in the Aviation Service Rules, the changes were not

made to the Amateur Radio Service Rules until now.

SECTION MANAGER ELECTION NOTICE

To all ARRL members in the Nevada, Rhode Island, Northern New Jersey, San Joaquin Valley, Utah, Maryland-DC and New Hampshire Sections: You are hereby solicited for nominating petitions pursuant to an election for Section Manager. Incumbents are listed on page 8 of this issue.

A petition, to be valid, must contain the signatures of five or more Full ARRL members residing in the Section concerned. Photocopied signatures are not acceptable. No petition is valid without at least five signatures *on that petition*. It is advisable to have a few more than five signatures on each petition.

Petition forms (CD-129) are available on request from ARRL Headquarters, but are not required. The following form is suggested:

(Place and date)

General Manager, ARRL
225 Main St., Newington, CT 06111

We, the undersigned full members of the ... ARRL Section of the ... Division, hereby nominate ... as candidate for Section Manager for this Section for the next two-year term of office
(Signature ... Call ... City ... ZIP ...)

Any candidate for the office of Section Manager must be a resident of the Section, a licensed amateur of Technician class or higher, and a Full member of the League for a continuous term of at least two years immediately preceding receipt of a petition for nomination.

Petitions must be received at Headquarters on or before 5:30 P.M. Eastern Local Time, March 8, 1985.

Whenever more than one member is nominated in a single Section, ballots will be mailed from Headquarters on or before April 1, 1985. Returns will be counted May 21, 1985. SMs elected as a result of the above procedure will take office July 1, 1985.

If only one valid petition is received for a Section, that nominee shall be declared elected without opposition for a two-year term beginning July 1, 1985.

If no petitions are received for a Section by the specified closing date, such Section will be resolicited in July QST. An SM elected through the resolicitation will serve a term of 18 months.

Vacancies in any SM office between elections are filled by appointment by the General Manager.

You are urged to take the initiative and file a nominating petition immediately.

David Sumner, K1ZZ
General Manager

SECTION MANAGER ELECTION RESULTS

The following elections were conducted for a two-year term of office beginning January 1, 1985:

Balloting Results: In the New York City-Long Island Section, John H. Smafe, K2IZ, received 690 votes and Robert Reed, WB2DIN, received 503 votes. Mr. Smafe was declared elected. In the Western Pennsylvania Section, Otto L. Schuler, K3SMB, received 469 votes and Thomas F. Peluso, KF3V, received 426 votes. Mr. Schuler was declared elected.

Moved and Seconded...

MINUTES OF EXECUTIVE COMMITTEE No. 416 November 19, 1984

AGENDA

1. Approval of Minutes of August 26 meeting (No. 415)
2. FCC matters
 - 2.1 Report of the President and General Manager on November 16 meetings with FCC personnel
 - 2.2 Consideration of ARRL petition with respect to PR Docket 84-959 (160-meter emissions)
 - 2.3 Consideration of ARRL position with respect to PR Docket 84-960 (WARC-79 allocations)
 - 2.4 Review of draft filing proposed in response to Minute 104 of the October Board Meeting
 - 2.5 Status of PRB-1, the ARRL request for declaration of limited federal preemption over state and local zoning regulations
 - 2.6 Status of other ARRL filings with FCC
3. Local antenna/RFI matters
 - 3.1 Borowski v. Burbank, Illinois
 - 3.2 Other matters
4. Report of Management and Finance Committee in response to Committee of the Whole
5. Discussion of study of Board committee structure (Minute 104, March 1984 Board Meeting)
6. Request for additional funding for VHF-UHF Advisory Committee
7. Consideration of band plan for 2300 MHz in light of reallocation of 2310-2390 MHz
8. Recognition of new Life Members
9. Affiliation of clubs
10. Approval of conventions
11. Assignments to the Executive Committee from the October Board Meeting
12. Consideration of alternative language for legal caution in QST advertising of simplex autopatches
Pursuant to due notice, the Executive Committee of the American Radio Relay League, Inc. met at 9:27 A.M. Eastern Standard Time, Monday, November 19, 1984, at the League's administrative headquarters in Newington, Connecticut. Present were President Larry E. Price, W4RA, in the Chair; First Vice President Leonard M. Nathanson, W8RC; Directors Lys J. Carey, K0PGM, Paul Grauer, W0FIR, Gay E. Milius, Jr., W4UG, and Hugh A. Turnbull, W3ABC; and General Manager David Sumner, K1ZZ. Also present were Directors Edmond A. Metzger, W9PRN, and William J. Stevens, W6ZM, and Counsel Christopher D. Imlay, N3AKD.
 - 1) On motion of Mr. Milius, the Minutes of the August 26 meeting were accepted in the form in which they were issued by the Secretary.
 - 2) Mr. Price reported on a meeting held the previous Friday with Ray Kowalski, Chief of the Special Services Division of the FCC's Private Radio Bureau. The meeting provided an opportunity for a healthy exchange of views on a number of subjects, including progress in implementing the Volunteer Examiner Program, the Executive Committee reports to the Board on nets and simplex autopatches, and spectrum management matters. A brief meeting was held the same day with personnel of the FCC Treaty Branch, in the Office of Science and Technology, which processes reports of harmful interference to amateur stations submitted by the ARRL Interference Reporting System (AIRS).
 - 2.2) An ARRL petition for type F1 emission to be added to the permissible emissions in the 1.8-2.0 MHz band resulted in an FCC proposal to add F1, F3, F4, F5, A4 and A5 emissions to the A1 and A3 emissions that are already permitted. After discussion, on motion of Mr. Carey, it was unanimously voted that comments be filed in the Notice of Proposed Rule Making in FCC PR Docket 84-959 supporting the League's original proposal, and stating that on the assumption that a band plan will be developed that will focus such operations on spot frequencies that will be compatible with existing operations, there is no basis for an objection by the League to the introduction of the other modes.
 - 2.3) After discussion of the FCC Notice of Proposed Rule Making in PR Docket 84-960, the following actions were taken with respect to the filing of comments in this proceeding on behalf of the League:
 - a) On motion of Mr. Grauer, it was unanimously voted that the comments reaffirm Board policy with respect to the power limit for the 10 MHz band, i.e., that the limit remain 200-watts output.
 - b) On motion of Mr. Milius, it was unanimously

voted that the Commission be requested to amend §97.112(b)(2) of its Rules so as to permit W1AW to be operated by paid control operators if it is transmitting bulletins and code practice on "at least six" medium- and high-frequency amateur bands, as opposed to the present requirement for "all" medium- and high-frequency amateur bands.

c) On motion of Mr. Milius, it was unanimously voted that the League's comments support the Commission proposal for a power limit of 1500-watts output in the 24-MHz band, and reaffirm support for the subband allocations proposed by the League and the Commission.

d) On motion of Mr. Carey, it was unanimously voted that the comments request a clarification of the waiver process by which amateurs north of "line A" near the Canadian border may request permission to continue operating in the 420-430 MHz segment, with the objective of ensuring that anyone whose operations may be affected by the withdrawal of this allocation along the border be afforded the opportunity of applying for a waiver.

2.4) The Committee then reviewed a draft Petition for Rule Making requesting FCC authorization of Amateur-Satellite Service operation in bands above 438 MHz that were newly allocated at WARC-79. After discussion, on motion of Mr. Carey, Counsel was authorized to file the petition subject to editorial amendment. During the course of the discussion, the Committee was in recess for lunch from 12:18 to 1:22 P.M.

2.5) Mr. Imlay reviewed the status of PRB-1, the League's request for an FCC declaration of limited preemption over state and local zoning regulations affecting Amateur Radio antennas. Approximately 500 comments have been filed to date, mostly in support of the ARRL request.

2.6) With respect to other FCC matters, the following reports were rendered and actions taken:

a) At Minute 65 of the October Board Meeting, a petition was directed seeking a change in the waiting period before a failed examination could be retaken from 30 to 27 days. This petition was filed November 9.

b) At Minute 70, a petition was directed seeking authorization for amateurs to conduct digital communications above 30 MHz under automatic control. This petition was filed November 14.

c) Minute 69 instructs the General Manager, with the assistance of Counsel, to pursue the issuance by FCC of a Public Notice advising manufacturers of their obligation pursuant to the Communications Amendments Act of 1982 to incorporate satisfactory RF filtering and shielding features in video cassette recorders and other home entertainment equipment. After discussion, it was agreed that the timing of this effort should be coordinated with the RFI Task Group.

d) Minute 64 calls for a petition to be filed requesting that FCC permit F2 emission on 10 meters for identifying Amateur Radio repeaters. After discussion, to clarify the Board's instruction, on motion of Mr. Grauer it was unanimously voted that the petition seek authorization for F2 emission only in the band segment 29.5-29.7 MHz, this being the extent of the present repeater subband.

3) Mr. Imlay reviewed local matters as follows:

3.1) *Borowski v. Burbank, Illinois* appears to have been resolved in a manner satisfactory to the amateurs of Burbank. The court has adopted a Consent Decree, to become final toward the end of the month, under which the city agrees to adopt a reasonable ordinance to replace the unreasonably restrictive ordinance which precipitated the suit. The ordinance will permit towers to a height of 65 feet, with higher towers available through a variance procedure. Existing towers will be "grandfathered" provided the owners file certain documents with the city within 90 days. Since the case did not go to trial there is no favorable precedent established.

3.2) In the case of *Thernes v. the City of Lakeside Park, Kentucky*, which was decided in favor of the city, an appeal to the U.S. Court of Appeals is being contemplated and League assistance in the form of an additional *amicus curiae* brief has been requested.

4) At this point Mr. Sumner and Mr. Imlay were excused from the meeting, at 2:10 P.M., and a report was received from the Management and Finance Committee in response to the instruction of the Committee of the Whole which convened at the October Meeting of the Board. They were invited to return to the meeting at 3:00 P.M., at which point Mr. Nathanson departed owing to travel commitments.

5) The Executive Committee has been instructed to submit its recommendations for improvements in the

Board committee structure for consideration at the 1985 Annual Meeting of the Board. At the request of the Chair, Mr. Sumner presented the results of a study of the ARRL Headquarters organizational structure, and planned changes that might serve as a useful model for reorganization of the Board committees. It was agreed that Mr. Price and Mr. Sumner would prepare a draft report for circulation to the Executive Committee. During the course of the discussion, Mr. Milius and Mr. Imlay left the meeting at 4:03 P.M. owing to travel commitments.

6) After discussion, on motion of Mr. Turnbull, a supplementary authorization of \$300 for the VHF/UHF Advisory Committee for 1984 was approved.

7) On motion of Mr. Carey, it was unanimously voted that the VHF/UHF Advisory Committee is instructed to develop a band plan for 2300-2310 and 2390-2450 MHz that takes into account the withdrawal of the 2310-2390 MHz allocation and the need to accommodate all operating interests in the remaining allocation.

8) On motion of Mr. Carey, the names of 39 newly elected Life Members were recognized, and the General Manager was directed to list their names in QST.

9) On motion of Mr. Carey, the affiliation of the following clubs was approved (Category I, unless otherwise noted):

- Camden County Autopatch Repeater Assn., Inc., Cherry Hill, NJ
 - Elite ARS, Lowell, MA
 - Liverpool Amateur Repeater Club (LARC), Bridgeport, NY
 - Lockheed Electronics ARC, Plainfield, NJ
 - Mid-State Amateur Radio Club, Indianapolis, IN
 - Montgomery-Tuskegee Technicians ARS, Inc., Montgomery, AL
 - Northern Alameda County ARES, Albany, CA
 - Northern CA Traffic & Emergency Assn., Scotts Valley, CA
 - Radio Amateurs of Texas Tech, Lubbock, TX (Category III)
 - Relay Repeater Club, Arcadia, CA
 - State University of NY at Albany ARC, Albany, NY (Category III)
 - South Brevard ARC, Inc., Melbourne, FL
 - Villages Communications Club, San Jose, CA
- With this action, the League has the following number of active affiliated clubs: Category I, 1708; Category II, 11; Category III, 172.

10) On motion of Mr. Turnbull, the Committee approved the holding of the following ARRL conventions:

Ohio State	February 22-24, 1985	Cincinnati, OH
Roanoke Division	March 16-17, 1985	Charlotte, NC
Alabama State	May 17-18, 1985	Birmingham, AL
Atlantic Division/ New York State	May 18-19, 1985	Rochester, NY
Georgia State	July 6-7, 1985	Atlanta, GA
Indiana State	July 13-14, 1985	Indianapolis, IN
Iowa State	July 20-21, 1985	Des Moines, IA
Illinois State	August 25, 1985	St. Charles, IL
West Gulf Division	September 6-8, 1985	San Angelo, TX
Southeastern Division	July 19-20, 1986	Atlanta, GA

It was noted that the Pacific Division Convention scheduled for August 16-18, 1985, in Reno, Nevada, had been cancelled. It was further noted that the date of the 1985 Southwestern Division Convention has been changed from August 31-September 2 to August 9-11 to accommodate scheduling at the convention site, the RMS Queen Mary. Finally, it was reported that the date of the 1987 National Convention in Atlanta has been changed from June 19-21 to July 10-12, and the location changed to the Georgia World Congress Center.

11) Mr. Sumner presented the work done to date in response to Minutes 44 and 45 of the October Board Meeting, concerning the recruitment of new amateur licensees and League members. After discussion, on motion of Mr. Turnbull, the General Manager was authorized to proceed with implementation of a plan to provide incentives for affiliated clubs to promote League membership during 1985, and was further authorized to develop a presentation for representatives of the Amateur Radio industry in conjunction with an ARRL convention early in 1985 to acquaint industry with the Volunteer Examiner Program and with the

(Continued on page 70)



Ham Radio Comes of Age in Taiwan

It was Sunday morning, October 21, 1984, and in Taiwan's telecommunications building 85 hopeful applicants gathered for the first examinations in Amateur Radio licenses. With the age limit at a low of 18 years (and no limit at the high end), the spread ranged from 18 years to a 60-year-old commercial operator from the news service in Southeast Asia. All applicants were restricted to Chinese nationals, and included one YL from the Technical Institute.

The government did not take lightly this job of making sure that ham operations reflected credit on the Republic of China. Weeks were spent formalizing the regulations and then more time was spent in setting up the examination papers. Tim Chen, BV2A/B, had a large part in this phase, resulting from his 25 years experience as a ham operator in Taiwan.

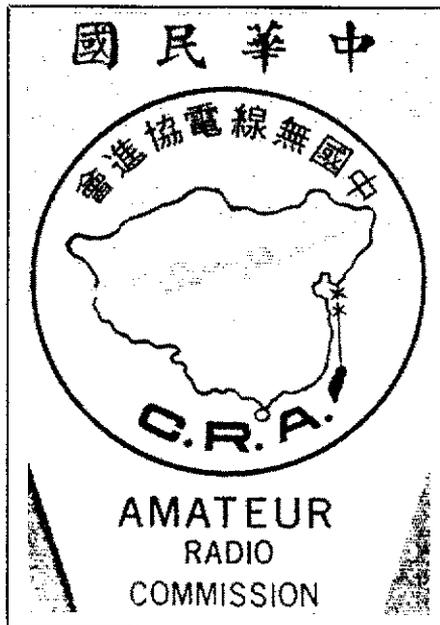
Most of the regulations were patterned after the United States General class examination (there will be only one license class in Taiwan). The government spent \$5000 (U.S.) to set up the program, and it is expected that there will be only one examination per year. The program itself was set up and supervised under the direction of Mr. James Chu, Director, Department of Licensing and Regulations.

The examination took a full day. It started at 9 A.M. with a section on electricity and radio principles; at 10 A.M., international regulations; and at 11 A.M., English communication and geography. After lunch, a four-hour period furnished group code practice followed by the code test, which mandated 3 minutes perfect code, both received and sent. A minimum of 10 stations will be licensed, some on a club-like basis, as soon as the operators are certified.

The importance of this event to Taiwan was emphasized by TV coverage and news reports, followed by a TV documentary filmed at BV2A/B. With this broadening of Amateur Radio, Taiwan has taken another step in the direction of a developed country. (*Special thanks to W9ZNY, a frequent commuter on the Miami-Taipei circuit!*)

BVØW AMERICAN DXPEDITION TO TAIWAN

In January of 1984, W9ZNY of Taipei and Miami circulated a letter to members of his club, the South Florida DX Association, to see if there was any interest in the club sponsoring an expedition to Taiwan. A positive reaction started the wheels turning, with SFDXA members W4WJ, N4NJ, WD4IYS, W9ZNY and long-time member BV2A/B planning attendance. October was selected because the Electronics Show



and the double-ten (October 10) national holiday occurred in the same week. BV2A/B, W9ZNY's friend of many years, was contacted and agreed that the time was propitious. It took two days to set up the equipment. By 1200Z October 6, BVØW was on the air. Their antenna location was ideal — a flat roof 100 ft wide by 600 ft long, 12 floors up, clear in all directions, with freedom from both line and ignition noise. Operating positions were on the 12th floor, with relatively short cables. The group was able to operate two positions most of the time and thus used a 40-meter dipole 30 ft above the roof running E-W. From one pole they had a sloping dipole for 20. A 2-L tribander was erected to the north of the dipoles at a height of 25 feet. This was rotated with a rope.

Gear used included a Yaesu 757 with a 30-L linear and a Kenwood 930S with a 2001 linear. About one third of the 7000 contacts were worked on phone with minimal interference from CW on the other bands. Propagation wasn't good, but the location and low noise level proved to be a good balancer. 40 was open to all parts of the world every night, and 15/20 meters open days. 20 appeared best in the late afternoon, dying abruptly after dark.

The group notes special courtesies by the JA multitudes — always strong, regardless of con-



BVØW: L-R (seated) W9ZNY, BV2A; (standing) W4WJ, N4NJ, aide-de-camp George, WD4IYS. (tnx W4WJ)

ditions. Whenever BVØW requested a standby, every JA complied.

W4WJ's personal comments indicate he felt this event was a "DXers's delight, being a new one and being on the other end." (Don had a taste of *that* particular brand of fun in his 1965-1968 ET3FMA stint.)

Operating from a location half-way around the world (a 12-hour jet flight from Miami) resulted in operators with jet lag and a realization that the sun was indeed rising at very strange UTC hours! It proved a real challenge to become rapidly familiar with band openings and to know *when* to look for Europe and North America. This particular problem was neatly solved with Xantek's DX Edge. With this operating aid, the group was able to "see" the terminator (sunrise/sunset time) and know when to change bands, and when to turn the tribander.

Permission was available for 40, 20, 15 and 10-meter operation. As it turned out, the operating hours were from late afternoon to mid-morning their time (0800-0000Z). Don notes that working Europe from BV is similar to working a JA from the U.S., about the same beam heading and distance. Working the U.S., on the other hand, is about like working UG6 from the States.

Special thanks to W9ZNY and W4WJ for their interesting recount of a fitting end to one era of DXpeditioning to Taiwan, and the start of another and even more exciting occurrence, with local licensing and the soon-to-appear nationals hitting our short-wave bands. Nice going, SFDXA!

[The BVØW operation, complete with slides, will be a highlight of the February 2-3, 1985 Miami Hamboree. Don't miss it! — Ed.]

CYPRUS

ZC4AB furnishes the following resume of the Amateur Radio situation in Cyprus. The Cyprus Amateur Radio Society, located in Limassol, together with the Ministry of Communications in Nicosia, oversees and ad-

ministers Amateur Radio (i.e., 5B licenses). The ZC4 license is an entirely separate institution, being administered by the Joint Signals Board, Cyprus. License holders can only operate within the Sovereign Base areas and must have passed the Radio Amateur Examination, or equivalent, before being issued a license. Most, if not all, of the license holders are already licensed in the U.K., holding G licenses.

There are three types of ZC4 licenses in Cyprus: (1) ZC4** (with two letters) denotes an amateur license holder (e.g., ZC4AB); (2) ZC4*** (with three letters) denotes a club or special-events station (e.g., ZC4EPI,

the Amateur Radio Club in Episkopi); and (3) ZC4Z*, reserved for visitors to the Sovereign Base Areas. Further information may be obtained direct from the Joint Signal Board or via the U.K. Bureau in Bodnant Gardens, London.

As of mid-year, ZC4 calls issued include AAB AM AP BI BU CW CZ FE GH GO HA ID JE JM MR PM RP RT SR SM TH WW.

A THIRD CHOICE

"A DX contest is a good opportunity to find new,

*19620 SW 234 St., Homestead, FL 33031

needed band-countries on 40 and 75 meters. The night was still young, but there didn't seem to be anything more of interest. So, off to bed and some needed sleep.

"The coffee consumed earlier caused me to wake in the very early hours. Might as well check the bands for anybody new. A South American with a good signal calling 'CQ Contest' on 40 was an easy catch, despite the loud local who started calling him on his frequency. I continued hunting on both bands.

"About a half hour later that local was still calling insistently. He was not only transmitting out of band, but he'd never get him. The South American was only listening up.

"I could continue to ignore him. On the other hand, my selector switch was still set for transceive from the last contact on 75. Just press the footswitch and utter those often-heard and inimitable words: 'You're out of band, Buster.' I could not do it.

"There was, however, a third choice if he wasn't too recently minted. Yes, the *Callbook* provided the data needed to get his telephone number from information. He wasn't *that* local, but the time was certainly right for minimum rates. I was as cordial as possible and he was seemingly contrite, saying, 'Oh my, I've been calling for quite a long time.' I couldn't resist commenting, 'I know, I know.'

"There was nothing else for me, so back to bed. I fell asleep immediately." — *Marty Levin, W6BDN*

SUNSPOTS

The October issue of W8ZCQ's classic, *Carascope*, talks in layman's terms of the bottom of the sunspot cycle. Dan notes: "Starting with 1878, the sunspot bottoms were 1878, 1889, 1901, 1913 (that year there were twin peaks in 1905 and 1907), 1923, 1944, 1954, 1965 and projected 1976. This shows spacing of 11, 11, 12, 10, 10, 11, 10, 11 and 11 years, bottom to bottom of each cycle. If the 11-year spacing holds, the cycle we are in will not bottom out until 1987, give or take a year. If past history holds, things won't start looking up until 1989. It has been noted that conditions seem to recover much faster than they decay. At this time, that is the only good news in the whole situation. By the time they hit bottom it will be difficult to get injection into the receiver mixer from the BFO."

On the other hand, Dan's evaluation — at least of the San Felix CW operation — is equally right on: "Renaldo, the CW operator, is sharp. He trots along nicely at 20 WPM, gets calls the first time, and handles the key like a pro. He tosses out Q signals right and left, and uses them in the right places. He didn't pick all this up in the normal six weeks transition from Novice to Extra. The whole thing boils down to indicate

the sideband mess is being created by those on the *outside*, and the problem does not lie with the operator on San Felix. The quicker he tells everybody to get lost and takes over the show himself, the better."

THE CIRCUIT

□ SK: Several months back, W-DXing lost a strong participant when longtime CW artist W2AIW joined Silent Keys. Charlie enjoyed his DXing to his very end, and will be sorely missed by North Jersey DX Association members as well as his friends worldwide. Additional sad news in this vein: When W4AAV of the South Florida DX Association left us on that October day, his SFDXA club members returned from Taiwan. Larry (also W3JTC) was a former active member of the Potomac Valley Radio Club and longtime DXer as SV0WP, DX1AAV, etc. Gentlemen DXers both, of the highest order.

□ Congratulations! The peripatetic K4YT tied the knot with KG3R on July 21, 1984 in Falls Church, Virginia. About a third of the wedding attendees were hams. See accompanying photo. Kneeling (l-r): WB4NFO, LU2DX, WB2GQK, K1CTK, WB1DTG, WB2HKS, W4MBD, WB2GDN, W4HU, 3B8CF, Standing (front): VE3JGC, WA6CCA, W8LMB, LU3YL, KY2J, KA2TIP (KG3R's sister), KB4GQT, K4YT, KG3R. Standing (rear): K3ZJ, K3ZO, K3TW, WA2WMR, WA3NKW, W2TK (K4YT's brother). Karl has been transferred to Manila for a 2-4 year assignment, and Janie hopes to join him soon.

□ 30 Meters: As of October 10, while FCC pending changes to Part 97 of rules governing the Amateur Radio Service, the entire segment of 10.1-10.15 MHz (no window) became available, on a temporary basis, to U.S. General class and higher amateurs, for both A1 and F1 use, 200-W output limit. The NPRM addresses 17 and 12 meters, additionally. Keep checking QST and W1AW for Docket 84-960 news.

□ DX Master's Award: At the inception of 5BDXCC, clever DXers of the W1AX caliber thought it would be a "neat trick" to make 5BDXCC working just 100 different stations. Though there is nothing "formal!" (vis-a-vis a real award), thanks to WIRAN we can report that OH5PT lays claim to fame as having worked 113 countries with the same station on each of five bands, CW, 106 confirmed. Nice going, Eero!

□ YS9HH: Hutch, who operated under YS9HH and HP1XHH, suggests you use his new address: H. C. Hutchison, NØDWU/4, 727 Stoneykirk Dr., Fayetteville, NC 28304. He notes that he would be interested in handling cards for a DX station and thinks he knows how!



The July 21 wedding party of K4YT and KG3R included 25 hams. See The Circuit.

□ Botswana: With the end to law school hopefully imminent, WA5MIN is of a mind to venture to Africa in the summer of 1985. Ken is no stranger to the continent, having been in Namibia several years ago. Inquiries, etc. go to Ken Bishop, WA5MIN, Box 514, Lake Jackson, TX 77566.

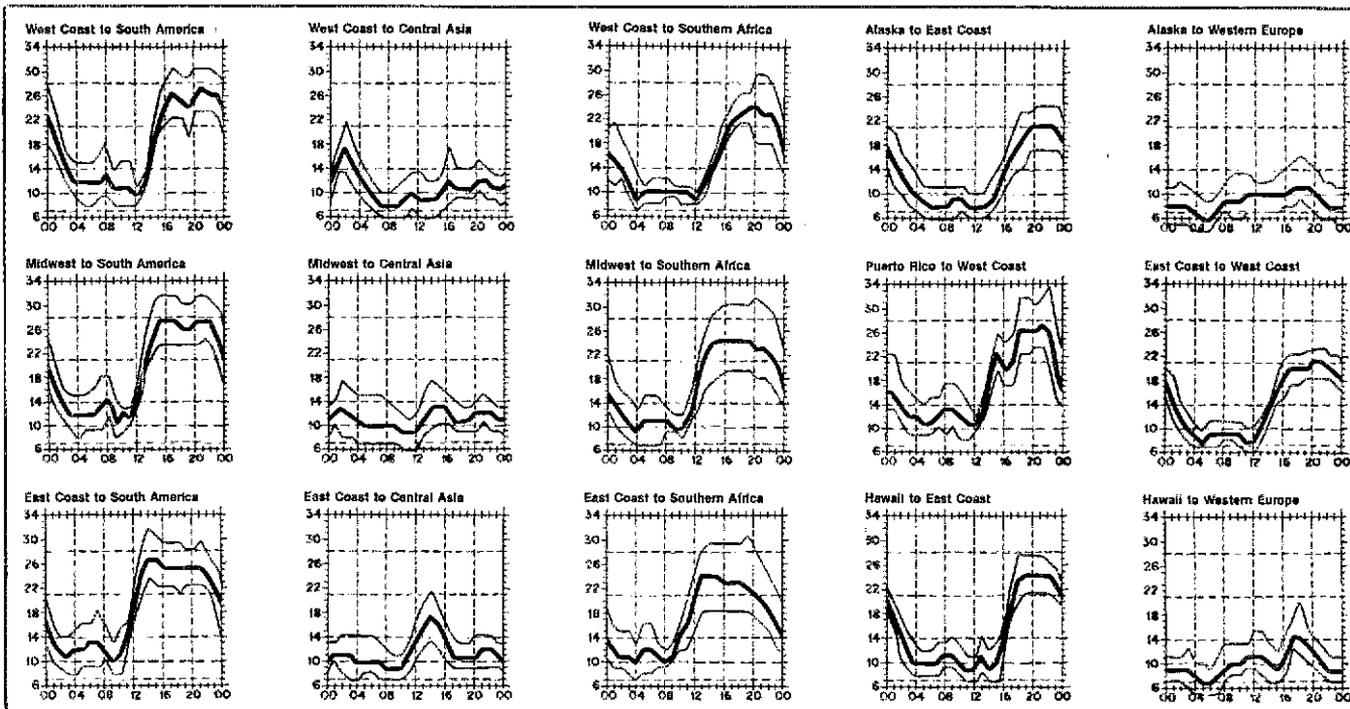
□ DX Family Foundation: One of the neatest DX newsheets is produced by the DXFF, capturing a wonderful spontaneous feeling for DXing and the international brotherhood of man. Editor JH1KRC's September issue dealt with CE0AA, JH1WXH's possible operation in Bhutan in October, BV0W, the commencement of operation by BY5RA and a hilarious report of the group's September barbecue at JH1GTV. Nice going, Mike, JH1KRC!

□ XT: Upper Volta has a new name. Burkina Faso has been adopted as the new country name for Upper Volta. An acceptable short form of the new name for this nation is Burkina. (tnx to NTEDV for forwarding the mid-October U.S. *Postal Bulletin* containing this late info.)

□ KA4SBE/SU: W3AZD notes that the way is now clear to accept credits for this operation.

□ Caymans: Cards for the ZF2IM foray from the east end of Grand Cayman Island, October 23-28, should be sent to W8JTH.

□ A4: The Royal Omani Amateur Radio Society held a 40-hour nonstop operating event, A4XND, commemorating their National Day November 18-19. The ROARS club contest took place December 17, and their individual operators contest occurred December 20-21. The Oman Field Day special operating event is scheduled for sometime either this month or in February. At this writing, dates/times were yet to be announced.



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

Troster's Tips for Easy Listening

During the ARRL National Convention (last July in New York City), I had the opportunity to talk with W6ISQ (love them difs, remember?). Our conversation dealt at length with the "art" of listening. Jack kept reiterating, "Listen for what?" There had to be some starting point enroute to solving a question like that, and I felt it started with the ear; hence "Operating Aid No. 1" in the November issue of this column.

Inventerate DXer that he is, Jack came up with a series of short and cogent answers to some of the very basic questions involved under the broad category of "Listen for what?" Thanks to W6ISQ, this column will feature short tips geared to easy listening for DX.

First, get a "feeling" for the band. Is it alive or dead? Are there a lot of signals coming through or is the entire West Coast USA chasing one weak DL? What part of the world are the signals coming from? Long path or short path? Do the DX signals sound "watery" or "bubbly"? How were conditions the last time you heard signals like you hear them this time? Ask yourself, what should I be hearing, given these conditions?

Listen (for example) to the NCDXF 14.1-MHz beacon net and compare the signals you hear with what you have heard when the band is in great condition, as well as poor condition, and to get an idea what part of the world is "open."

No matter what you hear and what "feeling" you get for the band, don't ever completely discount the DX possibilities. But your expectations may certainly soar or decline based on that "feeling" — based on your listening experience factor.

— More next month.

□ Line of the Month (from *The Totem Tabloid*, Western Washington DX Club, Inc., by K7ZR): "Russian Cosmonauts could reach Mars in 1992 — but only the East Coast will have propagation!"

□ QSL Manager's Guide: This slick listing of over 7000 stations/managers is produced by the QSL Management Association. The 1984-85 edition is available by air for 9 IRCs via Hiromichi Katsurashima, J1H1WN, 5-2236-33 Iriya, Zama-city, Kanagawa, Japan.

□ FOC: Special kudos to G3FXB for his 1938-83

historical compilation of the First Class C.W. Operator's Club, respectfully dedicated to the memory of Bill Windle, G8VG.

□ Dominica: K4LTA/J7 and XYL N4FKO, accompanied by others from Oak Ridge, Tennessee, will make it trip no. 6 to the Caribbean February 15-March 5. Bill will be active in the ARRL DX Contest, CW, hopefully using J73LTA; he and N4FKO will go multiop in the phone portion. Outside contest times he'll be on CW primarily, 25-30 kHz "up," and 7005/3505/1827 kHz. Novices will find him an attractive offering around 21,123 at 2230Z daily. This couple made over 10k contacts from P17 in February 1984 and hope to equal or better this record from Dominica. QSL to their *Callbook* address.

ZP5XGG (N4DW)
3D6AN (WK4Y)

4V2I (W5VUX)
8P6BSN (N4CTC)

QSL Manager Volunteers

KY2P

W4MV

KA9LBQ

Special Notes

□ WK4Y is not the manager for HH2MC.

□ K9IL is not the manager for VK9MR.

□ December 1984 QSL corner, page 66, contains information and addresses for the Incoming Bureaus. September 1984 QSL Corner, page 53, contains information on the operation of the ARRL Outgoing Overseas QSL Service. For information on bureau operations (Incoming and Outgoing), send a self-addressed, stamped envelope to ARRL QSL Bureau, 225 Main St., Newington, CT 06111.

QSL Corner

Administered By Joan Hushin, KA1IFO

Here is some information for those of you who would like to QSL direct to the station location. It is passed along as we receive it and, therefore, may not be accurate. The call sign in parentheses is the QSL manager.

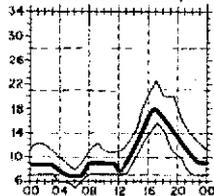
A22ME (AK1E)
CE0ZIJ P.O.B. 1,
Easter Island
CS9D1 (CT3BM)
CT2FI (W8GY)
BY5RA P.O. 730,
Fuzhou, Peoples
Republic of China
CE0AA P.O.B. 700,
Santiago, Chile
ED2EIL (EA2AMU)
F0AHY/FC (DL4FF)
F0BDCW (W6AM)
F0BGAD (K8ZH)
F0B1LE (W6GC)
F0B5IW (W6MI)
FY9IS (FY7AN)
FV4VAR (F6GFC)
GJ4/DJ3TU (DJ3TU)
HB0AON (DJ3YE)

HB0NL (HB9NL)
HC1OT (W2KF)
HI0A (HI8LC)
HZ1HZ (N7RO)
K1K1/PJ4 (K1AR)
LX1BI (K3BMC)
P57AAW/PY0
(PT7BZ)
P44A (K1AR)
YN4RC (WB8SSR)
T1IC (K6VNX)
Y03CD (JA5RH)
VE2USA (K8SEW)
VE3LKU/HI8 (KY2P)
VK9YJ (K9IL)
VK9YR (K9IL)
VP2VCW (N6CW)
VP8BA1 (GM4RPO)
V2ARS (K8BA)
XU1SS (JA1HQG)

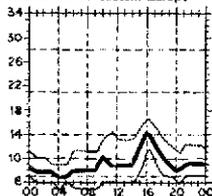


Atlantic Division Director W3ABC (left) looks on approvingly as ARRL Outgoing Overseas QSL Service Manager KA1IFO signs the Memorandum of Agreement between ARRL and C-CARS. N3CWD (center) and K3KK, the new managers of the Third Call Area Incoming Bureau QSL Service, look on. C-CARS assumed management of the Bureau September 1.

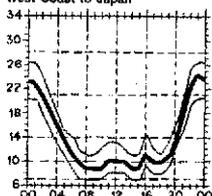
West Coast to Western Europe



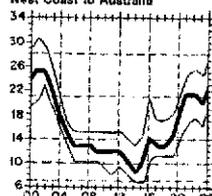
West Coast to Eastern Europe



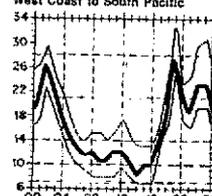
West Coast to Japan



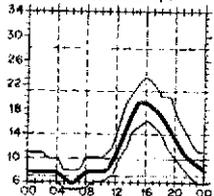
West Coast to Australia



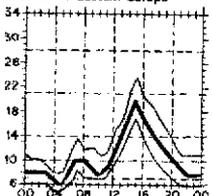
West Coast to South Pacific



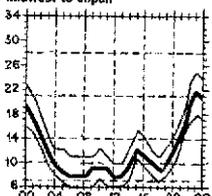
Midwest to Western Europe



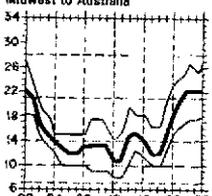
Midwest to Eastern Europe



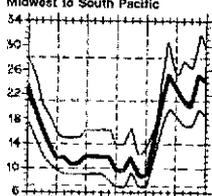
Midwest to Japan



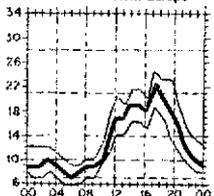
Midwest to Australia



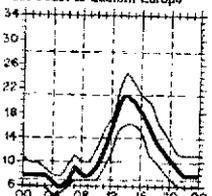
Midwest to South Pacific



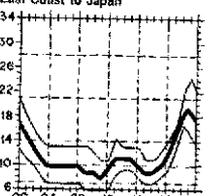
East Coast to Western Europe



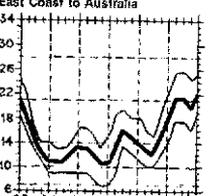
East Coast to Eastern Europe



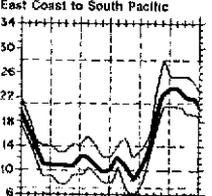
East Coast to Japan



East Coast to Australia



East Coast to South Pacific



the lowest curve (optimum traffic frequency, or FOT). See April 1983 QST, page 83, 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 January 15 to February 15, 1985, assume a sunspot number of 35, which corresponds to a 2800-MHz solar flux of 90.

Canadian NewsFronts

Conducted By Harry MacLean,* VE3GRO



CRRL Officers and Directors

President: Thomas B. J. Atkins, VE3CDM
Vice President and Secretary: Harry MacLean,
VE3GRO

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CRRL Outgoing QSL Bureau, Box 113, Rothesay, NB E0G 2W0

Honorary Vice President: Noel B. Eaton, VE3CJ

Directors: G. Andrew McLellan, VE1ASJ
Albert G. Daemen, VE2IJ
Raymond W. Perrin, VE3FN
William A. Gillespie, VE6ABC
William Kremer, VE7CSD

Counsel: B. Robert Benson, Q.C., VE2VW
1010 St. Catherine St. West
Montreal, PQ H3B 3R5

RESULTS, CRRL ELECTIONS

The CRRL Committee of Tellers met in London, Ontario, on November 20 to count ballots in elections just concluded for CRRL Regional Directors. The number of votes credited to each candidate is as follows: Atlantic Region: G. Andrew McLellan, VE1ASJ, 162; and Ronald J. Hesler, VE1SH, 71. Ontario Region: Raymond W. Perrin, VE3FN, 643; and William W. Loucks, VE3AR, 360. Prairies Region: William A. Gillespie, VE6ABC, 260; R. J. Bert Anderson, VE4AP, 132; and John A. T. Gowron, VE4ADS, 55. Andrew McLellan, Raymond Perrin and William Gillespie were declared elected.

Candidates previously declared elected were Quebec Region: Albert Daemen, VE2IJ; and Western Region: William Kremer, VE7CSD. All begin new two-year terms of office on January 1.

SECTION MANAGER ELECTION RESULTS

Congratulations to Harold Moreau, VE2BP, of Bagot, Quebec, and William Munday, VE5WM, of Regina, Saskatchewan, who were re-elected Section Managers for two-year terms of office that begin on January 1.

DOUG LOCKHART: 1984 CRRL AMATEUR OF THE YEAR

Congratulations to Doug Lockhart, VE7APU, of Vancouver, who was recently named 1984 CRRL Amateur of the Year. Doug was the man who introduced bit-oriented protocols to packet radio and developed the first terminal node controllers — computers dedicated to packet radio. Through his leadership in the Vancouver Amateur Digital Communications Group, Doug helped make the new technology available to amateurs all over North America and beyond, thus helping lay the foundation for future packet radio networks. Doug was presented with his award in December.

CARF NATIONAL SYMPOSIUM

About 60 amateurs, mostly VE7s, attended the CARF National Symposium held in Kelowna, British Columbia, on October 27. Western Director Bill Kremer, VE7CSD, and Wally Garrett, VE7CJT, represented CRRL. Here are some of the recommendations from the final plenary session: (1) expand the Canadian 75-metre phone band down to 3675 kHz; (2) oppose moves in the U.S. to have all or part of the 220-225 MHz band transferred to the Land Mobile Service; (3) re-arrange subbands in the 220-225 MHz band to make them more compatible with subbands in the U.S.; (4) adopt, with minor changes,

a new proposed CCA-CARF-CRRL joint resolution aimed at resolving cable television interference; and (5) introduce a new entry-level amateur licence with reduced code and theory requirements and limited CW privileges on HF bands. Holders of this licence would need sponsors who were Advanced Amateurs, and they would be required to upgrade to an Amateur licence within one year.

DOC's soon-to-be-released proposals on deregulation of mode subbands were almost missed by the plenary session. However, the issue surfaced and, in a 16-7 decision, those at the session voted to oppose deregulation of mode subbands and asked that the CARF executive withdraw all submissions to DOC in favour of the concept. It is interesting to note that CRRL has been dealing with many of the issues raised at the symposium. CRRL has written to both FCC and DOC opposing any takeovers on the 220-225 MHz band. CRRL has also been surveying Canadian amateurs, all 22,697 of them, on expansion of the Canadian 75-metre phone band and on deregulation of mode subbands.

DOC NEWS: CHANGES COMING; NO 75-METRE EXPANSION

□ DOC didn't let out many secrets at the 1984 RSO Convention held in Ottawa in October. Concrete proposals on "deregulation of mode subbands" were not expected to be released until summer. It seems that the Privy Council Office must now approve proposals *even before* they are sent out for public comment. This takes six to eight months for high-priority items, and changes in Amateur Radio regulations just aren't in that category. On "restructuring of the Amateur Service," DOC admitted it was considering a variety of approaches, including some form of "communicator's licence" for those who want to become radio amateurs but may not have a need for technical knowledge at the level required for the Amateur licence or for Morse code.

□ DOC has said "no" to a CRRL request that DOC issue a *Canada Gazette* notice calling for expansion of the 75-metre Canadian phone band. In a letter to CRRL, DOC indicated it preferred a once-and-for-all change so that requests for expansion of phone bands and the like would never again be necessary. That change, of course, is complete deregulation of mode subbands.

□ Through DOC, CRRL has learned that, in the U.S., General Electric has withdrawn an application for a 900-MHz Personal Radio Service. This service was to be an enhanced CB-type service with provisions for selective calling and autopatch. DOC now expects that proposals for a similar service in Canada will also be scrapped. They speculate that if this happens, there could be additional pressure to implement some form of "communicator's licence" in the Amateur Service.

□ According to latest figures, DOC has issued licences for 531 amateur repeaters. That works

out to one repeater for every 43 amateurs in Canada.

CRRL NEWS

□ If you didn't read last year's ARRL Board minutes closely, there are a few items you may have missed. As of January 1, all ARRL-affiliated clubs in Canada are deemed to be affiliated with CRRL. A CRRL committee has been working on guidelines for a CRRL affiliated-club program. Recommendations look good and will be presented to the CRRL Board for approval at its next annual meeting. Yes, Charters of Affiliation are ready. One would look good on the wall of your club's meeting place. Also as of January 1, ARRL will no longer accept Life Membership applications from Canadians. ARRL has agreed to provide all Canadians who are presently Life members with *QST* and membership services in perpetuity. This year, CRRL will be developing its own Life Membership program. Finally, ARRL is lending CRRL \$10,000. The money, repayable in five years, will be used to purchase a microcomputer to maintain CRRL inventories, accounts and membership records. 1985 is the year in which CRRL begins to retain all CRRL members' dues in Canada, "buying" *QST* and certain other membership services from ARRL. It's all part of "That Five Year Plan" outlined in 1984 March *QST*.

□ Many thanks to Frank Davis, VO1HP, who is retiring as Manager of the CRRL VO Incoming QSL Bureau. Best wishes to new Bureau Manager Roland Peddle, VO1BD. The address of the bureau will remain unchanged.

□ The 1985 *ARRL Net Directory* is now available. For a free copy, send a 9- x 12-inch self-addressed envelope bearing \$0.85 postage to the CRRL Headquarters office in London, Ontario.

NOTES FROM ALL OVER

□ Yuri Blarovich, VE3BMV, is editor of a fine new Amateur Radio publication, *Radio-sporting*. This journal is devoted exclusively to contesting and DX. The first issue has 40 pages and features articles on DXers and DX, a product review, propagation forecasts, rules for upcoming contests, and more supplied by no less than 14 contributors from Canada, the U.S. and overseas. If you're into contesting or DX, *Radiosporting* is a must. Cost is \$16 U.S. a year, \$30 U.S. for two years; add \$3 U.S. a year for overseas. Send to *Radiosporting*, Box 65, Don Mills, ON M3C 2R6.

□ Richmond Amateur Radio Club has announced a new Pacific Gateway Award. Work six Richmond stations — any time, any band, any mode — from outside of British Columbia and send your list of contacts to Richmond Amateur Radio Club, Box 94164, Richmond, BC V6Y 2A3. There is no charge for this award.

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

The New Frontier

Conducted By Bob Atkins,* KA1GT

SILVER PLATING FILTERS

I recently had an inquiry about the effectiveness of silver plating filter cavities. The Q of a cavity is inversely proportional to the skin depth of the construction material. Approximate skin depth for the microwave bands in copper is as follows (in microinches): 1296 MHz — 72; 2304 — 54; 3456 — 44; 3670 — 35; 10,368 — 26.

For different materials, these depths must be multiplied by the following factors: silver — 0.98; copper — 1.00; aluminum — 1.3; brass (70% Cu) — 2.0.

Therefore, silver plating a brass cavity could produce a significant increase in Q, whereas silver plating a copper cavity would have little effect. The depth of silver plating required is less than 0.00001 inch, even at the lowest frequency.

1296-MHz NEWS

Al Ward, WB5LUA, has written with details of the first Texas-Iowa contact on 1296 MHz. At noon (local time) Saturday, November 3, Al was in contact with W0RAP. Since conditions were very good on the lower bands (144, 220 and 432), he suggested an attempt at a 1296-MHz contact. Unfortunately, though W0RAP had 60 W of transmit power and a working receive system, his antenna system was down. Despite sub-zero temperatures and a 20-mi/h wind, however, W0RAP assembled an array of four F9FT Yagis and strapped them to his patio deck. The contact was made at 1745 GMT, with 339/559 reports exchanged. This is believed to be the first Texas-Iowa contact, and was state no. 17 for Al on 1296 MHz (no. 12 on tropo). The distance was 678 miles.

2304-MHz NEWS

□ Please note that on November 8, 1984, the final FCC order deleting the frequency range 2310-2390 MHz from the Amateur Radio Service was issued. Operation at 2300-2310 MHz and 2390-2450 MHz remains unaffected.

□ Last month this column reported W4HHK's reports of reception of a signal on 2304 MHz that seemed to come from an orbital satellite. I suggested that the source might be COSMOS 1217, which had been identified with signals received in Europe several years ago. It now seems that the source is not COSMOS 1217, as the observations of the signal source do not correlate with the predicted orbit of that satellite. The signals do, however, seem to follow the same type of telemetry pattern and are of similar strength to those previously observed from COSMOS 1217. See *The World Above 50 MHz*, this issue, for details.

□ News of terrestrial activity also comes from WB5LUA. He worked WA5VJB and WA5DBY

on both 1296 and 2304 MHz while they were operating a portable station in Texoma, Oklahoma (EM14 square). The portable station consisted of a 1-W transmitter and loop Yagi antennas. Al also reports a contact with WA5VJB/mobile on 2304 using a loop as the mobile antenna. There was a lot of mobile flutter, but signals could be copied, especially on FM. W5DFU in Tulsa, Oklahoma, is reported to be copying signals from Al at a distance of 220 miles using a homebrew converter and a loop Yagi. There are now five stations in the Dallas-Fort Worth area that are operational on 2304 MHz (WB5LUA, W5HN, K5GW, WA5VJB and WA5DBY).

DEVICE NEWS

□ Sony has introduced a new series of low-cost GaAsFETs designed for use at X-band frequencies. They are designated 2SK574, 2SK575, 2SK576 and 2SK577. The '574 is intended for oscillator (10 mW out) or amplifier use, and exhibits a typical noise figure of 2.2 dB with 6.5-dB gain at 12 GHz. The price is around \$7. The '575 is the best performer, with a typical noise figure of 1.4 dB and a gain of 10 dB at 12 GHz. Price is expected to be in the \$22 range. The '576 and '577 are similar, with the '576 having slightly more gain (10 dB vs. 8 dB) but a slightly poorer noise figure (1.8 dB vs. 1.6 dB). Both are priced around \$13. Also available is a low-noise Schottky diode, type 1T377, with a typical mixer conversion loss of 5 dB at 12 GHz; priced at \$4.35. The prices quoted are commercial sample prices and may be representative of quantity pricing. More information may be obtained from the Semiconductor Information Center, 15 Essex Rd., Paramus, NJ 07652; 201-368-5020.

□ AvanteK has announced three new monolithic microwave integrated-circuit amplifiers for use in the 0.05-2 GHz region (they have a maximum usable frequency of 3 GHz). Type numbers are MSA-0420, MSA-0435 and MSA-0470. They have typical output powers of +19 dBm, +13 dBm and +13 dBm, respectively. All show a typical gain of 8.5 dB and a noise figure of 6 dB. Quantity prices run from \$7 up. AvanteK Inc. is at 3175 Bowers Ave., Santa Clara, CA 95051.

GOVERNMENT PUBLICATIONS

A report entitled "An Error Analysis for the Use of Presently Available Lunar Radio Flux Data in Broadbeam Antenna-System Measurements" (TN 1073) has been released by the National Bureau of Standards. It gives equations for lunar brightness, temperature, diameter, flux density and shape factor for use when using the moon as a standard reference source in calibrating antennas from 1 to 10 GHz. The report may be of use to those involved in microwave EME. It is available for \$2 from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, and is designated as stock number 003-003-2555-1.

COMMERCIAL MICROWAVE PARTS AVAILABLE

□ Fair Radio Sales Co. (1016 E. Eureka St., Lima, OH 45802) is selling a waveguide-(WR187)-to-coax (type N) adapter (Waveline 30065) suitable for use on the 5.6-GHz band. Price is \$14.95 (quote catalog WS-84, p. S84-38).

□ JVL Electronics (26 Fernhurst Close, Hayling Island, Hampshire PO11 0DT, England) is selling a number of specialist microwave parts designed by Mike Walters, G3JVL. These include loop Yagis for 1296 and 2304 MHz and image-recovery mixers (as used in narrowband transverters) for 5.6 and 10 GHz. Also available are Alford Slot antennas and interdigital filters for a wide range of frequencies. □

Strays

QST congratulates...

□ Joseph L. Czerniak, W8NWU, of Muskegon, Michigan, on receiving a 1984 IEEE Centennial Medal.

□ Central Division Vice Director Howard Huntington, K9KM, on receiving an MSEE from the Illinois Institute of Technology.

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	This issue, p. 45
Major ARRL Operating Events and Conventions — 1985	This issue, p. 46
MARS Information	April 1984, p. 86
Pending Dockets	Dec. 1984, p. 63
QSL Bureaus	
Incoming	Dec. 1984, p. 66
Outgoing	Sept. 1984, p. 53
QSO Party Rules	Dec. 1984, p. 92
QST Abbreviations List	Jan. 1984, p. 53
Reciprocal-Operating Countries	Nov. 1983, p. 71
Third-Party-Traffic Countries	Oct. 1984, p. 73
U.S. Amateur Frequency and Mode Allocations	This issue, p. 45
VHF Sweepstakes Rules	Dec. 1984, p. 91

*103 Division Ave., Millington, NJ 07946

The World Above 50 MHz

Conducted By
Bill Tynan,* W3XO

ACSSB — A New Challenge for Amateur Radio

Every few years, an opportunity that permits Amateur Radio to demonstrate anew its ability to make contributions to the radio communications art presents itself. It might be in the area of propagation, or be an innovative equipment development such as a new modulation technique. These innovations do not all come from within our own ranks, although many do. In either case, their development into a form useful to our particular needs usually involves a large helping of ham ingenuity. In many instances, Amateur Radio's utilization of a technique leads to its adoption by other services. This is frequently the pattern by which our hobby makes significant improvements in man's ability to communicate, and promotes its own cause at the same time.

In the years following World War I, we converted from spark to CW by applying the vacuum tube to our basement-built gear. The "knowledge" widely held by the professional radio "experts" that the short waves were no good for anything so those amateurs might as well be banished to them led the way to our exploration of the no-man's-land extremities of the radio spectrum: the likes of 80, 40 and even 20 meters. It wasn't long before amateur exploits on these bands were noticed, and the experts decided that those frequencies were valuable for commercial and government use after all.

In the '30s, one of our major innovations was single-signal reception — the term applied to the use of the crystal filter to significantly narrow a receiver's passband. This made possible much more efficient use of our bands, made narrower with each international frequency conference, despite a steadily increasing ham population. That same period, just before the Second World War, saw our advances to what were then called the Ultra High Frequencies above 30 Mc. Here, again, lay a part of the radio spectrum considered useless by those same "experts," except for local line-of-sight work.

As amateur activity on these stratospheric reaches of the electromagnetic spectrum increased, previously unobserved propagation anomalies were noticed. Sporadic E and aurora were two such surprises. With the advent of better equipment and the use of directional antennas, we demonstrated the practicality of consistent UHF communication far beyond line of sight. The work of Ross Hull at Selden Hill, near Hartford, establishing regular 5-meter contacts with Boston-area stations over 100 miles distant, was a historic event in the annals of Amateur Radio. Similarly, in the early '40s, just before we were shut down for World War II, many amateurs in several parts of the country began consistent 5-meter communication over beyond line-of-sight paths. An example was the regular schedules held between Mel Wilson, W1DEI, near Boston, and Frank Lester, W2AMJ, in Bergenfield, New Jersey — a distance of about 250 miles. Consistent communication over such paths represented an astounding achievement in those days, when no one had even heard of noise

figure, much less tried to build receiver front ends to minimize noise.

During the war years, numerous hams joined research laboratories, where their practical background helped make many vital contributions to the war effort and the radio art. With the arrival of peace, these people were ready to bring our hobby into the post-war era. Our VHF bands, as they were then designated, were shifted from 56 to 60 Mc. to the present 50-54, and the old 2½-meter band of 112-116 Mc. gave way to the present familiar allocation at 144. Soon, W1HDQ, who originated this column in late 1939, was working across the Atlantic Ocean on the new 6-meter band, and many were getting on 2 meters to find that contacts over distances of 200-300 miles were quite possible.

As the '50s got underway, Amateur Radio embraced a technology that would have profound impact on our hobby and on other users of radio communication. It was the development of single-sideband suppressed carrier, or SSBSC. We now know it simply as SSB. The basic technology had been around since the late '20s, but was used only in large commercial point-to-point radiotelephone installations. Our contribution was to show that the mode could be adapted to much more compact equipment. When the U.S. Air Force wanted to evaluate single sideband in the Arctic, where HF radio had always been a problem, the amateur community was there with dozens of stations to participate in the tests. In our world above 50 MHz, it would be a few years before substantial numbers would take advantage of this clearly superior voice mode, but we would make advances nevertheless. Using old reliable CW, we would demonstrate that communication is possible via the ionized trails left by meteors as they crash into the earth's atmosphere. The phenomenon had been known for a number of years and was studied by several radio amateurs, including Mel Wilson, W1DEI, but it had not been used to provide communication. This pioneering step was made by Tommy Thompson, W2UK, in northern New Jersey, and Paul Wilson, W4HHK, in western Tennessee. The two worked numerous times on 144 MHz via the meteors to blaze a trail for the rest of us to follow.

Following the demonstration, in 1954, by Ross Bateman, W4AO, and Bill Smith, W3GKP, of the feasibility of bouncing amateur signals off the moon, it was six years before Sam Harris, W1FZJ, conductor of this column from 1960 to 1967, and Eimac Amateur Radio Club station W6HB completed the first amateur two-way EME contact. Interestingly, this QSO took place on 1296 MHz, a band just now beginning to be used on a wide-scale basis for EME. The first successful work on 2 meters was not until several years later, when Bill Conklin, W6DNG, and OHINL made numerous contacts on that band, so popular with EMEers today.

Beginning in the mid-'60s, VHF was brought to the general amateur population by the advent of FM and repeaters. Amateurs trailed considerably behind the commercial operators in this area, but we did, nevertheless, add some wrinkles of our own. A significant one for our application was the ability to operate at common sites

with inputs and outputs within a mere 600 kHz of one another.

This column is not intended to be an exhaustive and complete history of the many technical advances in the radio art that have been pioneered by radio amateurs. There are many others, such as the discovery of transequatorial propagation and mid-latitude FAI. This brief sketch is intended to set the stage for a new challenge in which we can participate with potential benefit to ourselves and the nonamateur world as well. That challenge is the exploitation of a technique known as amplitude companded single sideband, or ACSSB. It is not brand new and was not developed by amateurs, although WB6JNN published an early article on the subject in the December 1980 issue of *Ham Radio* magazine. It is already being used on a limited basis in the Land Mobile Service. However, its widespread use could greatly reduce the need for more frequencies for that service.

This need is presently one of the significant threats to some of our bands above 50 MHz. The recent proposals with respect to our 1¼-meter band is one example. What can we do? We can embrace the use of ACSSB, which appears to have some significant advantages over FM, universally used in that service. For our specific application, it also appears to be superior to conventional single sideband, especially in mobile work and under moderately weak signal conditions. Tests of ACSSB conducted at WIAW and by several other amateur stations through OSCAR 10 using equipment provided by Sideband Technology, Inc. indicate significantly better signal-to-noise ratio and overall intelligibility than with SSB. The same should be true for terrestrial paths when signals are of about the same strength as those experienced on the satellite. How ACSSB behaves when confronted by very weak signals is still an unknown, however.

Aside from improvement in our own communication, one of the benefits we may gain from the use of ACSSB is that our widespread use of the mode may show the way for its mass commercial use as well. With 5-kHz-wide channels, ACSSB offers the potential for cramming many more land-mobile systems into existing bands than the spectrum-hungry FM now uses. This would relieve some of the pressure we are currently experiencing on our VHF bands. The current use of ACSSB in this industry is minimal at best. I know of one ACSSB system operating here in the Washington area that does not have a single user. Why? Not because it doesn't perform better than an equivalent FM system; it provides coverage into areas where an FM system on the same tower does not. The reason users are scarce is that no one will make the commitment of money for equipment under the threat of revocation of the Developmental License, under which all ACSSB systems must operate with present FCC rules. Amateurs are in a position to demonstrate, as we did in the '50s with single sideband, that ACSSB is a viable mode with substantial advantages over FM in terms of range, power needed to cover a specific area and efficient use of precious frequencies.

Next month's column will be devoted to a description of ACSSB and how it operates.

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

2-Meter Standings

For WAS holders, listing is 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 areas 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 1983. In order to make the Standings a true reflection of stations currently active on 2 meters, those not reporting activity within the past two years have been dropped. They will be reinstated upon written presentation of continuing activity. WAS holders are listed in any case. Compiled November 15, 1984. Deadline for next update is May 10, 1985.

WAS Holders

1	K6MQS*	IA	---	49	W7CI*	AZ	28	---	NB2T	NY	35	12	---	W3ZR/4	FL	30	9	77	W8CAP	MI	26	11	---	
2	K5CM*	OK	---	50	N5KW*	OK	13	---	W2ZFGK	NJ	35	11	---	KC4P	AL	30	9	---	W9UD	IL	45	12	---	
3	NJJA*	MO	---	51	WB0TEM*	IA	23	---	K2GK	NY	34	11	91	K1FJM/4	FL	29	9	---	K9EFX*	IN	44	13	---	
4	K9HMB*	IL	---	52	WD6FOY*	IA	23	---	W2MPK	NY	31	11	---	NA4I	GA	24	10	---	K8SNM	WI	43	14	---	
5	K1VHS*	ME	---	53	W0RWG*	MO	16	---	W2HRW	NJ	29	---	---	K4LFF	FL	14	---	47	W8MSV*	IL	42	12	158	
6	WA4MVI*	I	---	54	WB6ERD*	TX	---	---	W2DWJ	NJ	27	11	---	K5WE*	OK	47	21	130	W3EP/9	IN	41	13	105	
7	K5JL*	OK	---	55	W4WD7*	UT	---	---	N2BJ	NY	26	11	---	W0RRY/5*	OK	47	13	---	W9WZB	IN	41	13	---	
8	WA9DOT*	WI	---	56	KE5C*	TX	---	---	KA2BTD	NJ	26	10	---	K5SW	OK	47	12	128	N9KC	IL	41	11	130	
9	WB6ZXU*	IA	---	57	WA4CQG*	AL	---	---	K2YCO	NY	26	10	---	W5RCI	MS	46	10	---	N9AQ	IL	40	10	124	
10	K9CA*	IA	---	58	WB9CAS*	IL	---	---	KE2N	NY	25	11	55	KR6F*	TX	44	36	---	K9SM	IL	36	8	---	
11	W8SD*	SD	---	59	W2CNS*	NY	28	---	W4ZABN	NY	25	10	---	W5HN	TX	42	12	---	N9CUE	IN	27	10	28	
12	W8RRY*	2	---	60	Deleted				W2WW	NY	24	10	44	W5UW/B	TX	41	15	---	W8EMS	NE	48	11	---	
13	K5GJ*	TX	---	61	K8ALL*	ND	19	---	WA2DKB	NJ	23	11	---	K85MR	OK	38	11	124	K8DAS*	IA	47	13	---	
14	WB5LUA*	TX	23	62	K9XJ*	WI	29	---	AB3D*	DE	48	22	---	W5HFV	OK	38	10	---	N6LL	KS	46	10	140	
15	K4GL*	TX	23	63	K1FC*	CT	18	---	WB3JUSC*	MD	47	18	---	W8SJAR	AR	37	10	---	W8JLU	MN	45	12	---	
16	W0VB*	MN	14	64	W4DFK*	VA	---	---	WB3JHP*	MD	45	19	---	W4SDBY	TX	36	11	---	W8JN	MN	43	11	52	
17	WB5LBT*	LA	20	65	W8CRK*	OK	---	---	K3MD*	PA	42	26	112	W4SHNK	TX	35	12	---	W8BDGF	NE	43	10	85	
18	K4PKV*	NC	---	66	WB8PA*	OH	39	---	W3XO	MD	37	12	27	K5VVV	TX	31	10	---	W8BJR	MO	41	9	---	
19	W8RWH*	MO	23	67	KX80*	CO	30	103	W3RUE	PA	37	11	24	N5BBO	TX	31	10	---	K8CQR	NE	40	11	113	
20	W8IDU*	MI	23	---	K1GVM*	MA	48	34	K3QCC*	PA	37	8	---	N4J55	MS	31	8	---	W8QAP	IA	39	10	---	
21	K1MNS+*	NH	48	---	K1BKK*	VT	43	14	WA3HMK	PA	37	---	100	K5YJ	AR	30	8	30	W8PBR	IA	39	10	---	
22	WB9VEN*	IL	---	---	WA1JOF*	MA	40	19	W3IWI	MD	36	36	---	K5DHU	TX	29	10	---	K8AOD	MO	38	11	---	
23	K5FF*	NM	18	---	WA1OUB*	NH	39	15	100	W3ZZ	MD	35	12	89	W4SIXX	TX	26	9	---	K8TLM	MO	38	10	94
24	W5FF*	NM	16	---	K1PXE	CT	35	13	---	WB3LJK	MD	35	11	45	W5DFU	OK	26	7	---	K8MA	MO	38	10	70
25	W7FN*	WA	---	---	N1AIS	MA	34	12	---	W3CLO	PA	35	10	---	W5NZS	OK	25	7	---	W8PW	CO	38	9	---
26	W1JR*	MA	27	96	W1AIM*	VT	32	11	---	W43DMF	MD	32	11	54	W4SGZ+*	47	46	141	W8BIUT	NE	37	10	---	
27	WB8QMN*	CO	---	---	K1VMI	CT	31	12	---	K3MWW	PA	32	10	---	W6XJ	29	12	---	W8BSL	MO	36	13	---	
28	WB4EXW*	NC	18	---	W1GXT	MA	30	11	---	K3HCE	MD	29	11	---	W8BNT*	26	13	---	W8BZKG	IA	36	10	---	
29	K9KFR*	IN	---	---	KA1YQ	MA	30	11	---	W30TC	MD	29	9	---	K6PV5*	24	7	---	K8FM	KS	35	9	---	
30	K3VGX*	PA	---	---	K1FWF	MA	29	11	---	W3LNA	PA	29	8	43	W8LHD	16	6	35	W8VJF	KS	34	11	59	
31	SM7BAE*	21	---	---	KA1DHO	MA	28	11	33	W3WU	PA	28	11	---	K6JYO*	23	7	---	W8VJW	IA	34	8	---	
32	WA7BJU*	OR	---	---	K1SF	MA	27	11	---	W4ADGF	TN	41	11	---	K6QXY	11	4	---	K8UDZ	SD	33	10	---	
33	VE7BQH+*	57	---	---	WA1LOU	CT	25	11	---	W4APCS	KY	40	11	---	K8GAG	9	5	---	K8CQR	NE	31	10	---	
34	W6PO*	CA	---	---	KA1BRD	CT	24	11	---	WB4NMA	GA	40	10	---	W4BL/6	8	4	---	N8AJU	NE	30	9	64	
35	WA3V8J*	PA	27	---	W1HDQ	CT	24	7	---	W4GJO	GA	39	11	---	N8CA	8	3	---	W8BZAH	MN	29	9	79	
36	WA9LPK/CL7	AK	20	---	W2QO*	NY	49	17	---	W4ADKH	KY	39	11	---	W7HAH+*	MT	46	35	---	K8BOG	NE	25	8	60
37	WB0YSG*	NE	---	---	W2PGS*	NY	47	16	---	K4CAW	NC	38	12	---	W47JW*	NV	45	16	---	W8BYZ	NE	23	8	44
38	N7NW*	WA	---	---	WA2GSX+*	NY	46	27	---	W4HHK	TN	38	9	---	K7ICW	NV	23	9	---	W8KEA	CO	18	6	---
39	W5LUJ*	TX	---	---	K2QR*	NY	45	27	---	W5HUQ/4	FL	38	9	---	W47JTM	AZ	21	6	---	VE1UT	NS	38	17	---
40	W4HJQ*	KY	---	---	WA2PJV*	NY	40	13	---	W4CPZ	SC	37	11	19	N7BHC*	UT	21	6	---	VE1AHM	NB	21	10	---
41	K5UGM*	TX	---	---	W2BLV	NJ	37	12	---	W4ISS	GA	37	8	---	N7EJ	ID	13	6	---	VE2DFO*	48	30	---	
42	W5UN*	TX	---	---	W2ORI	NY	37	10	---	K4KAE	SC	36	13	---	W4TEPU	AZ	12	6	---	VE3EMS	38	11	---	
43	WA4LYS+*	FL	49	---	W2CRS	NY	37	8	---	W4LNG	GA	36	8	---	N7AKB	NV	12	4	---	VE3FN	37	11	---	
44	WA1JXN7+*	MT	58	---	W2RS	NJ	35	13	---	WD4CXU	VA	35	8	---	K8EJR	OH	41	11	---	VE3DSS*	37	12	---	
45	W5JTL*	MS	14	---	K2QVS	NY	38	12	---	W4FJ	VA	34	8	---	K8RZB	OH	39	10	---	VE3ASD*	35	12	---	
46	WA8ANH*	MN	---	---	WB2CUT	NJ	36	12	---	W4AOWC	FL	33	10	---	K8WKZ	MI	38	12	---	VE3FKX	35	10	---	
47	WA4NJP*	GA	---	---	WA2TIF	NY	38	11	---	W9IY4	VA	32	8	---	W7EKU	OH	38	8	---	VE3DTQ	31	12	---	
48	W5HM*	NM	---	---					W44SBC	VA	31	12	---	WB2DIN/8	WV	36	13	---	VE3EQQ*	20	16	---		
									WB4KNF*	TN	31	11	33	K4BS	MI	34	10	---	VE4MA	14	9	---		
									WB4NXY	KY	31	9	---	K8BSG	MI	27	8	---	VE4UX	8	5	---		
									N4VC	TN	31	8	---						WA1JXN/C6A*	23	28	---		

*Indicates that one or more contacts were made via EME.

†Indicates WAC.

WAS no. 1 completed in NC; now in SC. WAS no. 2 completed in IA; now in OK.

WA4HGN A SILENT KEY

Just at press time, the sad news comes from W4HHK that Amateur Radio has lost one of its most active 13-cm operators with the sudden passing, from a heart attack, of Bill Byrd, WA4HGN, of Savannah, Tennessee. Only in the past year had Bill gotten the 28-foot dish, obtained from the widow of W3GKP, mounted and operating to suit his exacting standards. He had also obtained and installed a VA-802B Klystron, and had recently completed 13-cm EME QSOs with W4HHK and DF0EME. Bill had also become active on 70-cm EME and was well started on that band. The VHF/UHF community will sorely miss WA4HGN.

ON THE BANDS

6 Meters — It's hard to believe, as this is being written early in November, that this was the exciting time of year only two short years ago. But as sun spot counts plummet and the 10.3-cm radio flux hovers in the low 70s, it is not surprising that not too much is going on. Those who don't give up are rewarded from time to time, and it is they who provide the vital data on those few anomalies that do occur occasionally. It comes as no shock that one of those is WAS1YX. Pat writes from San Antonio that, for the first time since April, he heard the HC2FG beacon for about an hour, beginning at 2120Z October 20. He notes that there did not appear to be any evidence of an E₁ to F₂ linkup, so it appears that it was all F₂. He speculates that the propagation was associated with the geomagnetic activity that occurred during the period. I would agree. It always pays to check the North-South Path preceding or during disturbed geomagnetic conditions. WAS1YX also observes that it is hard to find anyone on 28.885 these days, even when the MUF is clearly above 28 MHz. VE5XU is one who is looking for his old 6-meter friends on the OSCAR 10 satellite, as suggested in this column several months ago.

In other DX news: Here is more information on the Chinese operation reported last month. JA1VOK writes that BY5RA will continue on 6 meters following the

August 13-19 period under the special VHF call of BT5RA. Hatsuo notes that BY5RA contacted VK8GB September 28. He also reports that he was one of the lucky JAs to work the station during its six days as BT5RA. Signals were 5 × 9 in both ways.

2 Meters — KT2B northern New Jersey writes a long letter covering a number of subjects. Pete says that he is now ready to go on all bands through 23 cm. Current equipment includes a kW to a single 13-element KLM at 45 feet for 2 meters, 130 W to a 14-element KLM at 50 feet on 1 1/4 meters, 300 W to four 21-element F9FTs at 45 feet for 70 cm and 20 W to four 22-elements also at 45 feet above ground. Antennas for the two higher bands can be elevated. Plans call for a power increase to 500 W on 1 1/4 and the 100-W class on 23 cm. He and WB2WIK are considering putting on a 70 cm, and possibly a 1 1/4-meter beacon. They would be interested in comments on the idea. The two have been making some measurements of losses for the new 9913 coax. Their results show 1.64 dB at 144 MHz, 2.0 dB at 220 MHz and 2.78 dB at 432 MHz. Even at 23 cm, the new line exhibits a loss of only 5.22 dB. Their major complaint is the need to file the center conductor in order to assemble "N" connectors to it.

K7ICW Las Vegas writes that during the September ARRL VHF QSO Party he made what is thought to be the first 2-meter contact between his area and the vicinity of Pismo Beach, California. The station on the other end was K6HXW. Al says that signals peaked about S2 over the 400-mile obstructed path, enabling him to manage a CW contact.

A surprise October 2-meter E₁ opening is reported by WB0WMO in the *Lincoln* (Nebraska) *Communications Society Newsletter*. WB0WMO Princeton, Missouri, reports working five Florida stations, beginning about 0025Z October 17. Incidentally, that club newsletter looks like a very good source of VHF news. The editor is WB0DFG.

The annals of the world above 50 MHz are full of tales of hams who keep trying in spite of long odds. One such individual is LU7MEC. Franco says that he makes a habit of monitoring 144.200 to 144.210 with

his antenna aimed west of north for U.S. contacts.

The Higher Bands — The burgeoning activity on 13 cm has produced reports of a satellite, the identity of which is not known to the amateur community. In the U.S., three stations have reported reception of a signal near 2304 MHz, apparently of satellite origin. W4HHK notes that it may be a few kilohertz above or a few below, the variation presumably caused by Doppler. Paul says that the signal level runs up to about 20 dB above noise on his 18-foot dish and GaAsFET preamp. At his location in Collierville, Tennessee, azimuth varies between roughly 45 degrees and 90 degrees, and elevation can reach up to about 20 degrees. There are two general times of day the signal can be heard: from about 1500 to about 1900Z, and around 2300 to 0200Z. Most of the time, the signal is simply a carrier, but a pulse-type of modulation is detected occasionally. Paul's observations are confirmed by WA4HGN, about 85 miles to the east, who is tracking it with a 28-foot dish. WB5LUA McKinney, Texas, about 500 miles to the south, also confirms the observations and has frequently heard the signal on a coffee-can-type horn. According to the November issue of the *432 and Above Newsletter* put out by K2UYH, OE9PMJ is also receiving the signal. He is quoted as saying that he picks up the satellite in the morning when its bearing is roughly northeast. He says that it passes overhead at about 1530Z and sets about 2100Z. What people are hearing may actually be two satellites. Incidentally, the newsletter reminds us that it carried similar reports in December 1981. [It has since been learned that there are two satellites, both Russian. They have been identified as Cosmos 1547 and Cosmos 1604. — Ed.]

Remember how good tropo was along the East Coast during the September VHF QSO Party? On his Standings Box update form, W4ISS Augusta, Georgia, provides another piece of the story that helps illustrate how good conditions were. Frank reports picking up 70-cm state no. 24 by working W1TKZ in Vermont. What is unusual about this is that he was running only 9-W output at the time.

Coordinated Effort

The ARRL is taking an active role in addressing the frequency coordination "chaos" that is prevalent in some areas of the country. On October 25 and 26, the ARRL Board of Directors met in Hartford and directed the ARRL Headquarters staff to send letters to all known repeater frequency coordinators requesting copies of their frequency-coordination policies and practices. After receiving a sufficient number of responses, the staff will prepare a draft of "Standards of Frequency Coordination Practice" for submission to the Executive Committee of the ARRL and to the frequency coordinators for comments. (An accompanying letter will make it clear that the ARRL is not trying to impose standards on the individual coordinators, but is only attempting to aid in arriving at a uniform policy.)

What's the Problem?

The primary problem area is 2 meters, where there are a number of different band plans in operation. When the population of 2-meter repeaters took off in the 1970s, the "universal" band plan was that each repeater would be separated by 30 kHz. However, in some areas of the country, 30-kHz channel spacing was not enough, so they split 30 kHz in half and used 15-kHz channel spacing instead, thus doubling the number of repeaters that could be squeezed into the band. The new 15-kHz channels between the old standard 30-kHz channels became known as "splinter" channels.

Here is where the problem began. Some areas of the country chose to invert the inputs and outputs of the splinter channels; that is, the splinter-channel pair of 146.355/146.955 would have an input of 146.955 and an output of 146.355 (high in, low out), while the adjacent standard pair of 146.34/146.94 would be the normal low in, high

out (an input of 146.34 and an output of 146.94). These splinter channels became known as the "inverted" splinter channels. The reason for their existence was that they would reduce adjacent channel interference, and that they did. The problem was that they raised havoc with neighboring areas that used the "upright" splinter channel band plan.

Up in the great northwest corner of 7-land, they decided to try something completely different. They abandoned the 30-kHz channel spacing and adopted 20-kHz channel spacing. This increased the number of available frequency pairs by approximately 50% while avoiding the potential adjacent-channel interference of 15-kHz channel spacing. And that worked, too.

Remember when repeaters were banned below 146 MHz? Back in 1978, the FCC opened 144.5 through 145.5 MHz to repeaters. The band plan that was universally adopted was 20-kHz channel spacing. It worked so well in 7-land, why not everywhere below 146 MHz . . . and so it went.

Today, there are four major variations of the channel-spacing theme: 30-kHz channel spacing, 20-kHz channel spacing, upright 15-kHz channel spacing and inverted 15-kHz channel spacing. And there is an ongoing effort to spread 146-148 MHz 20-kHz channel spacing to parts of the country beyond the Northwest. Some areas that are presently using 30-kHz channel spacing are considering 20-kHz channel spacing, while other areas that are using 15-kHz channel spacing see 20-kHz channel spacing as a threat.

What does 20-kHz channel spacing have to offer? As mentioned above, replacing 30-kHz channel spacing with 20-kHz channel spacing increases the number of available repeater channels in the upper 2 MHz of 2 meters by approxi-

mately one-third, while avoiding the adjacent channel interference often found where 15-kHz channel spacing exists.

On the other hand, 15-kHz channel spacing proponents argue that if they were to implement 20-kHz channel spacing in their area, it would reduce the number of repeater channels. Those repeater operators who would lose channels would form lynching parties with the frequency coordinator's call sign engraved on the noose!

Another argument is that the main cause of 15-kHz adjacent-channel interference is misuse of radio equipment. Often the problem is the repeater user who buys a new 2-meter box, opens the cover, cranks up the deviation (by ear) and merrily splatters away. Or the repeater user who buys a new 2-meter box and never opens it up, assuming that the correct deviation was set at the factory, and he merrily splatters away, too. Worse yet is the repeater owner who cranks the deviation of the repeater up so that everyone on the repeater splatters merrily away.

(A personal aside: There are two repeaters here in 15-kHz channel-spacing land that are both approximately the same distance away from this writer's base antenna. Why does the one with the lower transmitter output and lower antenna height wipe out repeaters 30 kHz plus and minus its operating frequency, whereas the other repeater has insignificant effect on its adjacent neighbors? When someone complains, they howl, "There's nothing wrong with our repeater." I agree there's nothing wrong with your repeater; it is just being misused.)

The effort to formulate a uniform frequency coordination policy is now in motion, and with the cooperation of the coordinators throughout repeaterland we might be able to make some order of the present chaos.

REPEATER LOG

According to reports received between April 10 and November 10, repeaters were involved in the following public-service events: 59 weather emergencies, 10 crimes, 36 medical emergencies, 499 vehicular emergencies, 22 fires, 8 search and rescues, 166 public safety events, 128 drills/alerts and 11 power failures.

*75 Greger Dr., Wolcott, CT 06716
CompuServe ID no. 70645,247

The following repeaters were involved (followed by the number of events): WIAW 1, WA1DGW 55, K1FFK 3, WA1GTT 2, KB1JF 5, W1PW 1, K2BFO 1, N2GG 1, N2MD 1, WB2NHD 1, W2ODV 1, WB20XB 1, WB2RUH 6, W2VDX 3, W2VL 76, WB2ZCM 2, WB2Z1Y 1, WA2ZWP 12, N3BFL 41, W3CWC 1, WA3JDX 2, K3PSP 1, VE3TTT 2, W3UER 5, W3VRZ 6, N4CKE 5, WB4EHT 1, WK4F 1, WA4GIC 2, W4HHB 3, KD4JL 1, WB4QES 99, WA4SFW 14, WB4UPS 18, K4VUW 1, KD4XX 1, KA5L 1, N6APB 1, W6APZ 1, W6ASH 5, WD6AWP

37, WB6BJO 1, WB6CAN 1, W6CX 1, KH6H 3, KH6HHG 10, W6HUK 2, N6IN 1, K6JE 13, WB6LSC 1, K6LY 1, WB6MFV 1, KA6MNA 1, WB6OQS 11, W6OYF 1, WA6UGY 1, W6WUZ 1, W7EX 218, W7HSG 3, W7MLJ 1, K7OMR 7, WB7PFO 1, WA7PQU 2, K7SKW 1, W7WGW 9, K8DDG 95, WA8EFK 2, WD8IEL 34, W8JI 2, KA8OFE 1, K8PE/Ø 3, K8QYL 5, WA8ULB 22, K9AAJ 1, WDØBQM 15, WØCET 1, WØES 1, KØKKV 2, WØKUJ 3, WØMXW 4, WAØPEZ 1, WØSBH 2, KØSCM 15, WAØVRS 1.

Strays



QST congratulates . . .

□ Alan D. Kline, KB1DJ, of Lynn, Massachusetts, on his election to the American Ladder Institute's Executive Board of Directors.

□ Arthur S. Westneat, W1AM, of Durham, New Hampshire, for being awarded the Centennial Medal by the IEEE.

□ Gwyn Arrafield, KA4SJV, and Keith Nelson, KB4DJU, of Winston-Salem, North Carolina, for win-

ning first place and third place, respectively, at the National Aviation Explorer Fly-in.

□ Steven J. Rich, WA1DFL, of Revere, Massachusetts, on being appointed Director of the Revere Commission of Handicapped Affairs.

□ Van "Allen" Wimmer, Jr., KA4VXN, of Salem, Virginia, on receiving an appointment to the U.S. Air Force Academy in Colorado Springs, Colorado.

Recognition for 11 years of service as ARRL SCM/SM went to Roy Pederson, K9FHI, at the Wisconsin Nets Association picnic. Net manager Dennis Rybicki, K9LJU, presented Roy (shown with his wife, Beryl) a commemorative plaque and other gifts.



YLRL's 46th Year

It was 46 years ago, in 1939, that Ethel Smith, K4LMB, read an advertisement designed to attract the notice of YLs. Bordered in black face, the ad noted that the contributions women had made to the service of Amateur Radio were going unrecognized, largely because no one even knew "how many of you YL key-twitchers there are."

Ethel replied to this ad with an open letter to YLs, published in the July 1939 issue of *QST*. It read, in part: "Perhaps we should band ourselves together in a YLRL, or something to that effect, and make these women-ignoring editors sit up and take notice." Twelve other YLs agreed and responded to Ethel's letter.

By September of that year a constitution had been drafted, and was approved the following month. Ethel Smith became the founder of the Young Ladies' Radio League.

Primary Purposes

YLRL was formed to further cooperation among women radio amateurs; to develop proficiency in the art of Amateur radio operation; and to further the interest of Amateur Radio. In keeping with these goals, YLRL has introduced over the years several certificates that may be earned by all. They sponsor the Worked All States-YL, Worked All Continents-YL, DX-YL, YLCC and DX-YLCC awards. In addition, YLRL also sponsors the following contests: the YL-OM Contest, usually in February or early March; DX-YL to North American YL, in April; Howdy Days, held in September; and the YL Anniversary Party, in October.

"33"

"YL" was adopted as a general term denoting any licensed female operator, regardless of age or marital status. "33" was originated in 1939 by Clara Reger, W2RUF, and was adopted by YLRL for exclusive YL use. It means "Love sealed with friendship between one YL and another YL."

YLRL Scholarship

The YLRL Scholarship is one of 15 scholarships administered by the Washington, DC Foundation for Amateur Radio. Licensed Amateurs may compete for any one or more of these awards if they plan to pursue a full-time course of studies beyond high school and are enrolled in or have been accepted for enrollment in an accredited university, college or technical school. Most of the scholarships require the applicant to hold at least an FCC General class license or equivalent. The scholarships range from \$350 to \$900, with preference given in some cases to residents of specified geographical areas or in the pursuit of certain study programs. Additional information and application forms for the 1985 scholarships may be requested by letter postmarked prior to May 31, 1985 and sent to FAR Scholarships, 6903 Rhode Island Ave., College Park, MD 20740.



Rose Ellen Bills, N2RE, holding the President's Plaque for 1984. It was presented to her at the ARRL National Convention in New York last July.



Marty Silver, NY4H, will serve her second term as YLRL Vice President in 1985. Licensed since 1979, Marty has had her Extra Class since 1981. With 265 countries confirmed, Marty is a most avid DXer.

The winner of the 1984 YLRL Scholarship is Diane E. Willemin, N8CAY, of Elyria, Ohio. First licensed in 1980, she holds a General class license. She entered the University of Notre Dame in the fall to study Electrical Engineering.

Diane, 18, had an outstanding scholastic record in high school and graduated fourth in her class. A recipient of a number of honor awards, she was active in music and other extra-curricular activities.

YLRL is proud to have Diane Willemin as recipient of the \$500 1984 YLRL Scholarship.

1985 Officers

Rose Ellen Bills, N2RE, of Pennsville, New Jersey, has been elected to a second term as

YLRL President. A member of YLRL since 1968, Rose Ellen has served as New Member Editor of *YL Harmonics* (the official publication of YLRL), Receiving Treasurer, Secretary and Vice President. She is the only member to have held all offices. Rose Ellen has selected "Progress" as her motto for her second term.

Progress is already well underway for YLRL's 46th year with the confirmation of convention plans in June 1985. "Come Alive in '85" is the theme for the YLRL convention to be held in Las Vegas.

Other 1985 officers include: Vice President Martha Silver, NY4H; Secretary Jeanette Ellis, WO4U; Disbursing Treasurer Karla Holmes, WA1UVJ; Receiving Treasurers Dot Bedford, K4AOH (Districts 1, 2, 3, 4); Mary Lou Brown, N7DHA (Districts 5, 6, 7); and Connie Hamilton, WD8MIO (Districts 8, 9, 10, KH6, KL7, VE). District Chairmen — (1) Mariana Armstrong, WB1DJL; (2) Minerva Fronhofer, WB2JNL; (3) Betsy Robinson, WB3FQH; (4) Carol Shrader, WI4K; (5) Richea Gayle Brigance, KU5L; (6) Betty Bravin, AG6C; (7) Phyllis Douglas, K7SEC; (8) Donna Burroughs, KB8YS; (9) Ann Arnholt, K9RXX; (10) Marjorie Tiritilli, KB0ZC; (KH6) Val Von Holt, KH6QI; (KL7) Betty Marsh, KL7FJW; (VE) Thelma Woodhouse, VE3CLT.

Come Alive in '85

YLRL's 10th International Convention will be held June 20-23 at the Sahara Hotel in Las Vegas, Nevada. Jan Weaver, N7YL, is chairman of this event. Marte Wessel, K0EPE, is serving as cochairman. Registrations are already being accepted. For hotel and convention information, send a business-size, self-addressed, stamped envelope (54¢ postage) to either of the convention chairmen. Or, tune in each Wednesday on 14.288 MHz at 1900 UTC to YL Open House, or each Thursday on 14.295 MHz at 1800 UTC, for the latest convention information.

Membership

Membership in YLRL is open to all licensed YLs. Further information may be obtained by writing to N2RE, 17 Craig Pl., Pennsville, NJ 08070.

RESULTS OF 1984 HOWDY DAYS

The 1984 YLRL Member Winner is K4AOH; the non-member Winner is SV1VH. Scores: K4AOH, 102; WD4NKP, 101; WD8MEV, 66; VE2BWP, 58; WA1UVJ, 51; WB0ZQZ, 48; KA2ESQ, 46; WB0JFF, 41; DJ1TE, 40; KU7F, 38; AGIU, 36; KD7YB, 36; CT1YH, 34; KK5L, 34; K5AVX, 32; WA2NFY, 32; KA6SOC, 29; VK4BSQ, 27; DF4JX, 18; G4EZI, 13; SV1VH, 25.

Strays

I would like to get in touch with...

any amateurs who are also professional clowns. James A. Payne (Tiny the Musical Clown), W6JCR, 903 Mission St., Santa Cruz, CA 95060.

*Country Club Dr., Monson, MA 01057

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

WA1CAB, William S. Reineck, East Hampstead, NH
 W1DJQ, Herbert L. Anderson, Gardner, MA
 KA1GZB, Adrien H. Lachance, Athol, MA
 W1HHM, John A. Anderson, Milford, CT
 W1KVS, Lawrence E. McGrath, Westbrook, ME
 W1NRZ, M. Clayton Cunningham, Gloucester, MA
 W1RSE, Albert E. Taylor, West Bridgewater, MA
 WA1VMD, Stanley B. Tannenbaum, Newington, CT
 KA2AFA, William A. Galletti, New Hyde Park, NY
 W2CDX, Elmer W. Ahrens, Dunkirk, NY
 W2EKC, Charles A. Nuebling, Tallahassee, FL
 W2EKU, Carl A. Erbacher, Somerset, NJ
 W2GBH, Daniel C. Morris, Brooklyn, NY
 W2HAE, Arthur C. Ford, Melbourne, FL
 WA2HBE, Robert D. Glascock, Jackson Heights, NY
 W2ISN, Harrison E. Chapman, Brentwood, NY
 KA2JTS, Bruce L. Sherman, Chester, NY
 WA2OZN, Anthony C. Degutis, Basking Ridge, NJ
 WA2RXY, Carl A. Terry, Binghamton, NY
 W3AXH, John F. Carbrey, Philadelphia, PA
 W3FNF, Arthur S. Morris, Coatesville, PA
 W3MWK, Paul D. Washington, Harrisburg, PA
 K3JQJ, Alfred A. Giuliano, Sewell, NJ
 K4AVE, Rudolph N. Youngblood, Spring Hill, FL
 K4BFS, Charles E. "Butch" Nichols, Jr., Marietta, GA
 WB4CIT, William H. Walker, Savannah, TN
 K4CQE, Joseph W. Crawford, Jr., Virginia Beach, VA
 WB4CQL, Jesse E. Duncan, Monterey, TN
 N4DNA, Robert R. Mosher, Ormond Beach, FL
 N4DZZ, Essie L. Myers, Chattanooga, TN
 K4EYQ, Fred H. Stening, Pittsburgh, PA
 WA4FYT, Henry K. Hannah, Jr., Pompano Beach, FL
 WB4GRJ, Eugene Williams, Nashville, TN
 KE4OD, Archibald C. Dear, Hendersonville, NC
 K4PM, Richard G. Hays, Bradenton, FL
 W4RWX, George E. Theil, Newport News, VA
 W4SBR, William C. Wilcoxson, Charlotte, NC
 W4SWI, Carl A. Meneley, Ormond Beach, FL
 WA4TCT, Neville B. Baldwin, Lakeland, FL
 K4TSD, Thelma W. Kleinau, Chattanooga, TN

WA4UIR, Thomas A. Dobson, Onancock, VA
 KS4V, Bill J. Webb, Paducah, KY
 WB4YTC, George H. Schneider, Raphine, VA
 W5APM, Tom Serur, San Marcos, TX
 W5BDN, Olyer J. "Oly" Runnels, San Antonio, TX
 K5BUX, Obert T. Cox, Tulsa, OK
 W5DRE, Kenneth A. Snarr, Jr., Oklahoma City, OK
 W5DSE, Victor H. Cobb, Hope, AR
 KA5EJO, Carl A. Nichols, Moss Point, MS
 KD5KK, James K. Aymond, Alexandria, LA
 W5WVL, G. Byron Webb, San Antonio, TX
 WA5ZYF, Harry E. Leggans, El Paso, TX
 N6ADG, Keith C. Ainsworth, El Segundo, CA
 W6APD, Marcel Fanning, Bishop, CA
 W6EDN, Warren L. Kern, La Canada, CA
 KA6ENH, Arvid "Art" L. Murman, Long Beach, CA
 *W6IC, George L. Meek, Fort Bragg, CA
 K6IW, Elmer E. Callies, Castro Valley, CA
 WA6LIV, Wesley L. Taylor, Monrovia, CA
 WB6MOK, Max L. Raskoff, Los Angeles, CA
 W6MPA, Frank D. Baker, Ben Lomond, CA
 KD6MS, Forrest W. Lundy, Escondido, CA
 W6SOZ, William H. Johnson, Solvang, CA
 KB7AM, Christian C. Gorder, Poplar, MT
 K7AOR, Charles T. "Shorty" Lydic, Harrisburg, OR
 W7CEG, Howard V. Graves, Spokane, WA
 W7EYC, Willard R. Maxwell, Vashon, WA
 W7FT, Sam S. Zuckerman, Cheyenne, WY
 WA7HX, John R. Johnson, Anaconda, MT
 W7LND, Theodore R. Welch, Lacey, WA
 W7RJR, John W. Storms, Lakeside, MT
 K7YBX, Beuford N. Thompson, Port Orchard, WA
 W8BJB, Raymond E. Offord, Bridgeport, OH
 KF8I, Richard A. Bert, Pontiac, MI
 KA8IYH, T. A. "Art" Ward, Jr., Huntington, WV
 KA8JZ, Clayton A. Murray, Jackson, MI
 W8LCY, David L. Lyman, Oberlin, OH
 W8MBJ, Wilfred A. Hueglt, St. Clair Shores, MI
 W8MFV, Gerald D. "Duke" Bettelon, Tipp City, OH
 *W8RE, Chester O. D. Thompson, Sr., Zanesville, OH

W8UKT, Paul W. Kindy, Sun City Center, FL
 W8VMJ, Lowell A. Dittmer, Dayton, OH
 K8YXJ, Robert J. Zavada, Crystal Falls, MI
 W9CQU, Norval J. Hofferbert, Marion, IN
 N9DPD, Robert M. Virkus, Western Springs, IL
 W9FE, Edward H. Heppert, Morris, IL
 K9HLC, Herbert Quilter, Ohio, IL
 WB9HTM, Virgil E. Weissmiller, Rock Island, IL
 W9JBA, Robert K. Lockhart, Indianapolis, IN
 K9JKS, Kenneth E. Trueblood, Speedway, IN
 W9KKG, Stephen Meskan, Lincolnwood, IL
 KA9NDR, Robert J. McCracken, Indianapolis, IN
 W9PFT, Donald A. Mandelco, Grant Park, IL
 KA9PUG, Wayne W. Hassee, Evansville, IN
 W9QUO, Irwin Drucker, Chicago, IL
 W9SO, William P. Gainer, Milwaukee, WI
 W9VY, David E. Hudgins, Peoria, IL
 WA9VZW, Henry M. Godlove, Kokomo, IN
 KF9W, George "Sonny" Barger, Jr., Montello, WI
 W0DDY, William G. Dostal, Decorah, IA
 A10E, Steven R. Nelson, Bloomkest, MN
 W0GYW, John H. Bozarth, St. Louis, MO
 WD0GZG, Richard E. Rogers, Clinton, WI
 W0IRC, Daniel O. Modrow, Vergas, MN
 WA0LCI, Calvin D. Venable, Westminster, CO
 W0OHJ, James D. Love, Wichita, KS
 WB0TVX, Glenn A. Burdick, Edina, MN
 K10Y, Stephen J. Popp, Jr., Hazelwood, MO
 KH6J, Jack K. Shibata, Honolulu, HI
 VE3AM, Eric H. Kirby, Brockville, ON
 VE3CGK, Stanley I. Epple, Simcoe, ON
 VE3OX, Melville D. Jones, Hepworth, ON
 VE7GQ, John W. Christopher, Vernon, BC
 OK1FF, Vladimir "Mirek" Kott, Havanska, Praha
 Czechoslovakia

*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

January 1935

- The Editor foresees short-wave broadcasting as a major threat to amateur bands. Warner points up the complete ineffectiveness of its true objective: propaganda.
- Hooray! After long and strong pressure by the League (and others) the Radio Manufacturers Association has established a special committee to deal with radio interference caused by electrical appliances, power distribution systems and automobile ignition.
- W2HLM is experimenting with carrier control, making it proportional to voice input, so that modulation percentage remains fairly constant.
- Engineers W1HRX and W1BZR disclose their solutions to matching, tracking and stabilizing problems in multi-tuned circuits, used in the popular National HRO receiver.
- There are 46,390 amateur station licenses in effect, 4835 more than a year ago.
- W1DF's 50-watt transmitter is designed on the principle of using the smallest number of stages, consistent with output and drive requirements, aiming at keeping trouble to a minimum and pleasure to a maximum.
- RCA engineers have developed a "V" cut crystal that possesses the high activity of the "Y" cut and the temperature stability of "X" cuts.
- W9BKO takes a different approach to the stability problem — his "Y" cut holder uses a large block of brass as the bottom electrode, which helps dissipate the heat.
- W9ON has his choice of crystal cuts, using a cutting and grinding rig he and W9IGF built to process raw quartz.

- Frequency stability seems an underlying theme of this issue — W3LW gives us more information on gaseous voltage regulators for "B" supplies.
- W8ZC found that a separate transmission line to a 600-foot distant receiving antenna cut local noise more than the line attenuation of signal, and thus facilitated his duplex/break-in operation.
- The standard frequency transmissions from WWV are now made twice weekly, instead of once, on 5, 10 and 15 Mc.
- W8LUQ outlines factors in the design of a twisted-pair 72-ohm feedline to reduce dielectric loss, moisture absorption and arc-over.
- Growth in the total of ham licenses has increased the size of the *Call Book*, and the price to \$1.25 (the good old days!).

25 Years Ago

January 1960

- Reviewing an eventful 1959, the Editor says that apparent success at the world telecommunications conference, still in session, is undoubtedly the high spot of the year. A last-minute insert at press time confirms the good news: General Manager Budlong announces from Geneva that our bands (in this hemisphere) are retained in full.
- W1IJD and W1WFFJ, on the Navy's Underwater Sound Lab's expedition to Fletcher Ice Island in the Arctic, found time to work 6-meter DX with continental U.S. stations. *Nautilus* veteran W1FVY provided plenty of advance advice and guidance.
- Smith charts are hieroglyphics to most of us, but K6CRT explains some of the practical applications to

help simplify transmission line problems.

- W3PYW is no longer rockbound on 6 meters — he built a converter for his h.f. exciter.
- Amateur license totals have reached the 200,000 mark.
- Two-tone audio shift is a common and the simplest method of RTTY reception, but W6LQV says the shaping and keying advantages in f.s.k. detection using a discriminator in the i.f. stages is worth the extra complication and expense.
- W1SNN found good basics in W6TEV's sideband design, but for his version chose a mechanical instead of crystal filter, a slide-rule dial and an improved keying system.
- Surplus BC-454 receivers were built to end at 6 Mc., but W2AWH pared some tuning coils to extend coverage to the 40-meter band.
- Those of us beyond the Novice stage will still find W1ICP's audio limiter helpful in getting rid of neighboring key clicks.
- Get ready for the DX contest next month! For beginners, there is the Novice Roundup month-long competition. And W3EIS, president of the contest-winning Potomac Valley Radio Club, sweetens things with advice on operating techniques to improve your score.
- W2LYH's break-in system combines keying wave shaping, antenna T.R. switching, receiver muting and side tone.
- W1JLN's half-kilowatt amplifier, complete with power supply on one chassis, fits into a receiver-size cabinet and can sit on the operating table.
- Amateurs in the Southeast performed consistent emergency and backup communication during the rampages of storms "Gracie" and "Irene" during the autumn.
- In Russia, beginning amateurs have lost 160-meter privileges but have gained 40- and 10-meter band segments. — W1RW



President: Richard L. Baldwin, W1RU
Vice President: Leonard M. Nathanson, W8RC
Secretary: David Sumner, K1ZZ
Assistant to the Secretary: Naoki Akiyama, JH1VRQ/N1CIX

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10 Knightlow Rd.
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Greenwich, CT 06830
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Masayoshi Fujioka, JM1UXU
Secretary, IARU Region 3 Association
P.O. Box 73, Toshima
Tokyo 170-91
Japan

The International Amateur Radio Union — since 1925 the federation of national Amateur Radio societies representing the interests of two-way Amateur Radio communications.

IARU and the ITU — 1985

If, perchance, you read this column regularly, you may have noticed that occasionally we mention something about the possibility of a future General WARC — that is, a World Administrative Radio Conference at which frequency allocations will again be considered. One of the ways in which IARU prepares for such a conference is to maintain as much contact as is possible with those decision-makers in each country who can be expected to attend ITU conferences as delegates. We rely to a great extent on our individual member-societies to maintain such contact within their respective countries — indeed, that is clearly one of their responsibilities. But in addition, the officers of IARU and the regional organizations regularly attend (finances permitting) various conferences and other

meetings of the ITU. We of IARU attend these conferences and meetings as observers, at the invitation of the ITU and with the approval of the delegates at the particular conference. Quite often, the agendas of the meetings show that there is no direct impact on the Amateur Radio Service, but the importance of our being there is to establish visibility for IARU and to make the personal acquaintance of as many of the delegates as possible.

As a recognized international organization and as an accredited observer at the conferences, IARU has the valuable privilege and opportunity of attending the conference meetings and mingling with the delegates there and during coffee breaks. In addition, IARU generally sponsors an evening reception to which are invited,

depending upon the size of the conference, all heads of delegations, other influential delegates, radio amateurs who may be on the various delegations, members of the International Amateur Radio Club (headquartered at ITU Geneva) and, of course, IARU officials.

There are a number of these ITU meetings during 1985, and IARU expects to be represented at the following:

- (a) Region 1 Maritime Mobile/Aeronautical Conference in Geneva in February
- (b) Region 1 Maritime Beacons Conference in Geneva in March
- (c) ITU Telecommunications Exhibit and Forum in Singapore in May
- (d) Geostationary Satellite Conference in Geneva in August.

REGION 2 IARU RTTY BULLETIN

We want to remind all readers of the weekly Region 2 IARU RTTY Bulletin, transmitted over WIAW at 2330 UTC Wednesdays at 45.45 Baudot on 3.625, 7.095, 14.095, 21.095 and 28.095 MHz. (For the complete WIAW schedule of operation, see page 77 of December 1984 QST.)

This bulletin is first transmitted in English and then immediately repeated in Spanish, and brings you region-wide IARU news of interest to all amateurs and IARU societies in North and South America. Our correspondence shows that its popularity is increasing, which is a tribute not only to the recognition of IARU

and the number of amateurs who regularly listen to WIAW, but also to the excellent content of the bulletins, which are prepared weekly by Alberto Shaio, HK3DEU, Secretary of IARU Region 2.

WAMEc

Maine is one of those areas settled early in the beginnings of the United States, and many of its towns have the same names as cities and countries in other parts of the world. Maine has, for example, towns with such names as Falmouth, Calais, Stockholm, Paris, Moscow, Frankfort and Bremen. It also has towns with the overseas country names of China, Denmark, Peru, Sweden, Norway, Lebanon, Poland and Mexico.

Although there are surely other states with similar sets of place names, because the current president of IARU happens to live in such an "international state,"

we thought it might be fun to issue a special certificate to any amateur who can submit proof having worked one station in each of those eight "Maine countries." This is a just-for-fun award, with no complicated list of rules, no endorsements and no (well, not yet, anyway) advisory committee to guide its future.

Although it won't be an easy award to come by (except for locals, who can work most of those places via 2-meter repeater), there is at least one amateur in each of the eight "Maine Countries" listed. You can learn their call signs by reference to the ARRL Geographical Call Directory, or by sending WIRU an s.a.s.c.

This award is sponsored by the Augusta (Maine) Amateur Radio Emergency Unit, and will be administered by its member WIRU. Unless the thing gets out of hand and we are swamped with applications, there will be no fee. That eleemosynary status could change without notice. □

*President, IARU

Coming Conventions

SOUTHEASTERN DIVISION CONVENTION/25th TROPICAL HAMBOREE

February 2-3, Miami, Florida

Amateur Radio operators from around the world will gather under the tropical skies of Miami, Florida, to celebrate 25 years of great camaraderie during the 1985 Southeastern Division Convention/Tropical Hamboree. All major manufacturers of Amateur Radio equipment will have displays; over 400 loaded swap tables will tempt the bargain hunter; and Hamboree dealers will have tantalizing specials for all. Numerous countries will have international

- February 2-3
Southeastern Division, Miami, FL
- February 22-24
Ohio State, Sharonville
- March 9-10
Louisiana State, Lafayette
- March 16-17
Roanoke Division, Charlotte, NC
- March 30-31
Nebraska State, Kearney

ARRL NATIONAL CONVENTIONS

- October 4-6, 1985
Louisville, Kentucky
- September 5-7, 1986
San Diego, California
- July 10-12, 1987
Atlanta, Georgia

At press time, Amateur Radio exams are scheduled to be given at this convention. For other exam opportunities see Hamfest Calendar.

exhibits, and programs will cover the entire field of Amateur Radio.

A Packet Radio Seminar has been scheduled for Sunday, and experts in the field, led by Paul Rinaldo, W4RI, will explain and demonstrate this fascinating mode of communications. Other speakers include Doug DeMaw, W1FB; Curt Holsopple, K9CH; Lew McCoy, W1ICP; Bill Henry, K9GWT; Tom Ingram, K4OOV; FADCA members; and national and regional FCC personnel. There will be programs and exhibits for nonhams. An inaugural meeting of the Florida Section of the Radio Club of America will be held at the Ramada Hotel; speaker is Fred M. Link, W2ALU. South Florida DX Assn. has prepared a top-notch DX forum and will sponsor a DX Dinner followed by "The SFDXA Orient Express, A Tale of Taiwan BV0W." Southeast Chapter QCWA will have a QCWA-OTC-SOWP Hospitality Corner in the exhibit area; all members are invited to drop by. The

How to Register for Upcoming Exams

March 9, Louisiana State Convention (Lafayette, Louisiana). Amateur exams will be given Saturday, March 9, at 1 P.M., in the Banquet Room of the Holiday Inn North. Novice through Extra Class. Mail check for \$4 (payable to ARRL/VEC), completed Form 610 and a photocopy of your license to: "EXAMS," c/o Jim Britch, NF5I, Rte. 1, Box 110J, Broussard, LA 70518. Applications must arrive by February 5.

traditional Traffic Handlers Breakfast will be held Sunday morning at the Ramada Hotel.

Site of the Convention/Hamboree is Fabulous Flagler Dog Track, corner N.W. 37 Ave. & N.W. 7 Street. Headquarters hotel is the Ramada Hotel-Int'l. Airport, 3941 N.W. 22nd St., with special rates of \$47, single; \$49, double, triple or quad. Registration for both days of convention is \$4 before Jan. 29, \$5 after. Swap Tables are \$14 each before Jan. 29, \$16 after. DX dinner tickets are \$16 each (usually a sellout). Free over-

night parking for self-contained RVs is provided at convention site; advance reservation recommended. For further information, registration tickets, swap tables, hotel reservation cards, maps of Miami, RV parking reservation, write to Dade Radio Club, P.O. Box 350045, Miami, FL 33135-0045. DX dinner tickets: send check payable to South Florida DX Assn. to P.O. Box 4541, Margate, FL 33063. Make checks for registration and swap tables payable to Dade Radio Club.

Hamfest Calendar

Administered 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.]

Florida (Sarasota) — January 12-13: Sarasota Hamfest, Inc. 1985 will be sponsored by the Sarasota ARC, Inc. at the Sarasota Exhibit Hall, Civic Center and Sarasota Adult Recreation Center on Jan. 12, from 8:30 A.M. to 4:30 P.M., and Jan. 13, from 9 A.M. to 3 P.M. (setup, Jan. 11). Admission is \$3 in advance and \$4 at the door. ARRL and other forums, technical subjects, commercial displays, flea market. Food, beverage, snacks available in exhibit hall. QCWA luncheon on Jan. 12. Talk-in on 31/91 and 13/73. For further information, contact Art Herrald, AA4AN, 5161 Oxford Dr., Sarasota, FL 33581, tel. 813-349-1367.

Illinois (Arlington Heights) — January 20: The Wheaton Community Radio Amateurs will sponsor the Wheaton Hamfest from 8 A.M. to 4 P.M. Admission is \$3 in advance, \$4 at the door. Forums, VEC exams. Talk-in on 01/61. For further information, call 312-231-7497 (recording).

Iowa (Davenport) — February 24: The Davenport Radio Amateur Club will hold their 14th annual hamfest at the Davenport Masonic Temple, Brady St. (Hwy. 61) and 7th St., from 8 A.M. to 4 P.M. All indoors. Food and drink. Admission: \$2 advance, \$3 at the door. Tables are available and must be reserved for \$7, with \$2 extra for ac hookup. Table setup begins at 7 A.M. Talk-in on 28/88, W0BXR. For table reservations and advance tickets, contact Dave Johannsen, WB0FBP, 2131 Myrtle St., Davenport, IA 52804. FCC exams will be given. Completed Form 610, with copy of license and check for \$4 (payable to ARRL/VEC) must be sent to Al Broendel, N8OK, 2712 38th St., Rock Island, IL 61201, to arrive by Jan. 25.

Louisiana (Hammond) — January 19: The Southeastern Louisiana University ARC (SLUARC) and the Southeast Louisiana ARC (SELARC) are jointly sponsoring a hamfest from 9 A.M. to 3 P.M., at the old men's gym on the Southeastern LA University Campus. Free admission. For further information, write to SLUARC, Box 402, SLU, Hammond, LA 70402.

Michigan (Southfield) — January 20: The Southfield

High School ARC is sponsoring their 20th annual Swap & Shop at Southfield High School, 24675 Lahser, Southfield. Doors open at 6 A.M. for exhibitors; open to public from 8 A.M. to 3 P.M. Admission is \$2.50. Reserved tables are \$20 for two 8-foot tables (paid in advance). Additional reserved tables \$10 each. Tables will be available at the door. Plenty of parking. Food available. All profits from this affair go toward Electronic Scholarships and to support the activities of Southfield High School ARC. Please reserve tables and tickets in advance. Indicate with your reservation whether you will need wall space and/or electrical outlets. All table reservations will be confirmed. For more information and/or reservations, write to Mr. Robert Younker, Southfield High School, 24675 Lahser, Southfield, MI 48034.

New York (Yonkers) — January 27: Hams, computer and electronic wizards, CBers: Come to the Yonkers

Electronics Auction, indoors at Lemko Hall, 556 Yonkers Ave., Yonkers. Plenty of seats and parking. Bring equipment (new or used) you want to auction off; bid on equipment you want to buy. Sunday, Jan. 27, 9 A.M. to 3 P.M. Inspection from 9 A.M. to 10 A.M., auction starts at 10 A.M. sharp. Admission: \$3 each (buyer and seller); children under 8 free. Club commission on successful sales only: 10% on first \$100, 5% on remainder. Sponsored by the Yonkers ARC. Talk-in on 146.265/865, 440.15/5.15 and 52. For further information, write to YARC, 53 Hayward St., Yonkers, NY 10704, tel. 914-969-1053.

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.

Strays

the following radio amateurs on their performance in the 1984 National Hammer Dulcimer Championships:

- Steve Smith, KC5F, of Tulsa, Oklahoma: Champion
- Paul Goelz, WA9PUL, of Evanston, Illinois: Fourth Place

Stan Obritski, WB2TTY, of Jackson, New Jersey

on being New Jersey's rehabilitant of the year. Stan is an artist, teacher, lecturer, and Amateur Radio operator.

I would like to get in touch with...

anyone familiar with the Aurora Ultra 5 motoring racing set. Clarence Grimm, W9NJZ, 193 S. Mason, Bensenville, IL 60106.

 **GIVE US YOUR OPINION**

Check one box, sign below, affix postage and mail this pre-addressed card to express your opinion to the ARRL Board of Directors with reference to U.S. SSB operation on some segment of the 40-meter band below 7.1 MHz:

I favor some subband allocation for SSB operation for U.S. Amateur Radio operators on the 40-meter band below 7.1 MHz.

I do not favor any subband allocation for SSB operation for U.S. Amateur Radio operators on the 40-meter band below 7.1 MHz.

The American Radio Relay League, Inc.
225 Main Street
Newington, CT 06111

CALL	YRS LICENSED	CLASS LICENSE	AGE	SIGNATURE
Family Member may use a facsimile of this card				

PLEASE PRINT
 NAME, PHONE NUMBER
 ADDRESS, CITY, STATE, ZIP
 MAIL TO: ARRL
 POST OFFICE

*ARRL Hamfest

*Convention/Travel Coordinator, ARRL

As you read through this issue, you should come across a preaddressed postcard like the one shown here. The ARRL Board is asking your opinion on SSB subbands in the U.S. 40-meter band below 7.1 MHz. If your postcard is missing, just send a facsimile to ARRL Hq.

Affiliated Clubs in Action

Conducted By
Steve Place,* WB1EY1

CLUBS ESSENTIAL IN VOLUNTEER EXAMINER PROGRAM

From the very first days of ARRL's formal work toward a viable Volunteer Examiner Program, Amateur Radio Clubs have pitched in. Many, many clubs stepped forward to point the emerging program in the right direction when they felt it had strayed off course. More recently, a number of clubs signed with the FCC to serve as regional VECs at the first opportunity, while the ARRL/VEC worked to get cost recoupment provisions on the books and otherwise gear up to serve all 13 FCC-defined regions for the long haul. When the ARRL/VEC was up and running smoothly back in September, clubs again offered their support. The Dayton ARA (an ARRL-affiliated club) was one of the clubs that took up the reins as a regional VEC until the ARRL came on line; it has recently wrapped up its commitments and joined forces with the ARRL/VEC — virtually all of its VEs had also been accredited by ARRL. Other clubs have responded in other ways.

Several have asked to be accredited under the ARRL/VEC as clubs that would then be responsible for providing VEs for local exam sessions. Others wanted to accredit Volunteer Examiners (VEs) locally for us and run the program in their locales. Still others sought exclusive rights to serve under ARRL as coordinators in their ARRL Sections. Their spirit is encouraging. Unfortunately, their proposals reflect a misunderstanding of what is permissible.

VEs, by definition, must be individuals; to become a VE, an individual must be accredited by a *Volunteer Examiner Coordinator*. The ARRL/VEC (an administrative entity at Headquarters), having signed an agreement with the FCC to serve in all 13 regions, must accredit its own VEs — it must accredit only qualified individuals. It does not have the authority to delegate that responsibility to clubs, regional coordinators or anyone else.

*Manager, Club and Training Dept., ARRL

Special Service Clubs

A growing number of ARRL-Affiliated Clubs have pledged to serve their communities and Amateur Radio more actively as Special Service Clubs in the coming year. We welcome our newest SSCs and encourage you to get in touch with them. (Number of members is in parentheses.)

Jackson County ARC (19)

305 Edgewood Circle, Ripley, WV 25271

Portage ARC (70)

9971 Diagonal Rd., Mantua, OH 44255

Virginia Beach ARC (176)

297 Citation Dr., Virginia Beach, VA 23462

For information on ARRL's Special Service Club program, contact the Affiliated Club Coordinator in your ARRL Section; your Section Manager (page 8) or Hq. has the address.

A number of those clubs who had offered their services were disappointed. But they now realize that accreditation is not an end in itself; it's only a small step toward achieving the ultimate objective of the program: frequent, convenient and fair exam opportunities.

What role will radio clubs play? The most important role of all in ensuring the success of Volunteer Examining — they'll make it work! Local radio clubs will identify the collective need for upgrade exams in their communities; plan and schedule locally convenient exam sessions; publicize the opportunity as thoroughly as possible so that everyone who is interested can sign up for an exam; and provide the necessary local support and coordination before, during and after testing.

It sounds simple. It's not. Some work is involved — lots of work. An ongoing commitment and consistently high performance are needed. *You*, the local club, will ultimately make Volunteer Examining a success. That's a responsibility not to be taken lightly! But it's one that many clubs are now meeting effectively. The ARRL/VEC already has hundreds of exam sessions registered across the country this year. And more clubs call the ARRL/VEC staff every day to get the ball rolling in their areas.

The next time you ask, "What's left for clubs?" ask what the FCC, the VEC and the VETs would do without clubs' support! Very little. Each of them has meticulously defined and limited responsibility and authority. Each plays a role. But without the local clubs — the people who know what's needed in their communities, who know their local resources, who know how to get things done at the local level and who care enough to do it — there is no Volunteer Examiner Program. And now that the FCC has folded its Amateur Radio exam tents, without volunteer-administered exams Amateur radio would suffer. Radio clubs will make a significant contribution — they must!

CORRECTION

Our apologies to the Volunteer ARC, a Special Service Club erroneously listed in November's "Affiliated Clubs in Action" as hailing from Texas. Though we know the West Gulf Division would love to call the Volunteer ARC gang its own, the club carries the brand of the "Volunteer State" — Tennessee! Congratulations once again — this time to the Volunteer ARC of Burns, Tennessee.

In Training

PROGRAMMED INSTRUCTOR TRAINING: PROS AND CONS

Programmed texts have been popular for the past couple of decades in many fields, including electronics. Your League is considering preparing such textbooks for its instructional program. They are effective teaching tools, but they require more time and money to prepare than do standard textbooks. Are they worth it?

The format for programmed instruction is a brief paragraph or two of instructional material in each "frame," followed by a question and several answers, only one of which is correct. Each answer is followed by a page number. The student turns to the page indicated for the answer he has chosen to learn if that answer is correct (in which case, the next frame follows) or incorrect, and why it is so. If the answer is incorrect, he can reread the previous frame, choose another answer and turn to the appropriate page for that answer. Eventually, the student arrives at the correct response and proceeds to the next frame. A typical programmed lesson consists of 20 to 40 frames, each containing one question with two to five possible answers. A course consists of, perhaps, 15 such lessons. Programmed textbooks are generally considered more appropriate for self-study than for classroom instruction, so their usefulness depends in part on how they'll be used.

As the new year begins, your Training staff is evaluating projects to be accomplished during 1985. Several new textbooks are among the projects being considered. We need some input from you, our members. What instructional material do you need the most? Have you had any experiences with programmed instruction? Is programmed instructional material appropriate for your purposes? Is it worth the additional

time and expense required for its preparation?

Most of the money your League allots to the Training program comes from membership dues and publications sales. Therefore, your input is needed on how your money is to be spent. Please drop us a line at ARRL Hq. and tell us what instructional material is most needed, and whether you think programmed instruction is the way to go.

Please tell us, too, now that the new 60-page *Instructor's Guide* for Novice courses has been published, how we might improve the next edition. Because it represents an entirely new approach to instructor training, we need your suggestions. Do you like it? Don't like it? Could

it have been done better? Did it answer the beginning instructor's questions? Fail to answer them? Was it too long? Too short? Too detailed? Not detailed enough? Did it give a realistic and usable breakdown of the Novice course into 11 sessions? Are there too many sessions? Not enough sessions? Is this new *Novice Instructor's Guide*, quite frankly, in a trial balloon. Only you can tell us if it meets your needs.

If you have registered a Novice course with Headquarters scheduled to begin in September 1984 or later, you should have received a copy of the *Guide*. If not, copies are available from ARRL Hq. for \$3 each postpaid. Let us hear from you.

Moved and Seconded...

(Continued from page 50)

need for their support of efforts to recruit new amateur licensees.

12) Mr. Sumner next presented a proposal for a slight modification of the notice now required to be included in *QST* advertising of simplex autopatches that discusses the features of the device, the objective of the modification being to make the language appropriate for devices that include a simplex autopatch as one of a number of features. After discussion, on motion of Mr. Grauer, it was voted to defer the matter to another time.

The next meeting of the Executive Committee was tentatively established for the Washington, DC vicinity, on Saturday, March 23, 1985. There being no further business, the Committee adjourned at 5:20 P.M. Respectfully submitted,
David Sumner, K1ZZ
Secretary

LIFE MEMBERS ELECTED

November 19, 1984

Billy R. Bean, WB7SNO; Thomas J. Beary, III, N9BXW; Byron R. Berg, KA0QNY; Richard Bernard, WA8RRR; Timothy Edward Berry, WB4GB1; Bo Bjarno, OZ1BRD; James A. Denny, Jr., K7EG; Hugh L. Faulk, II, K4GVG; Fred A. Fitch, KA6FLF; Mary Sue Fuller, KB6DSA; Thomas K. Gardiner, KD9LC; Kenn Glenn, KN3O; Barrie Greenwood; Timothy D. Gustafson, KC9IW; Raymond L. Henry, Jr., AA4LL; Glenn A. Jewell; Marc C. Johnson, WA5ROT; Stephen L. Kahle, WA0RMW; Jack Kettering, KE6UX; Howard M. Krawetz, N6HM; Gerald W. Moore, WA8LAJ; Jack R. Mullen, W6ACQ; J. Robert Myers, K9KTH; James W. Nessen, Jr., KD6LC; Chester M. Nibby, Jr., N1BNX; Kenneth L. Norton, N7DCY; M. A. Petty, N6EHA; Robert P. Priddy, KA0SSE; W. Glen Read, KB7GZ; John Reilly, KA0ODB; Jane B. Renz, KG3R; Karl J. Renz, K4YT; Robert A. Renz, W2TK; Daniel W. Smitha, KA6RUX; Joan M. Spencer, WB8RSM; John T. Stevens, Jr., KC3MM; Walter L. Thomas, NB0E; Leonard Victor, WA6RNA; Graeme P. Welch, W6JZR.

1985 Novice Roundup Announcement

Now that you have your ticket, are you hesitant to get on the air at only 3-5 wpm? Are you spending hours tuning up and down the dial listening for a CQ that's slow enough to copy? Relax. All new hams, from old to young, are in the same boat of new-ham-awkwardness. Novice Roundup is your chance to dive into the airwaves and drown yourself in QSOs. If you're a really shy person, find a ham buddy and jump in together as a multiop station.

Although the Novice Roundup is aimed primarily at Novices and Techs, the more hams participating, the merrier the game will be. All amateurs are encouraged to join the fun. The good news for Novices and Technicians is that you are eligible for the handsome certificate awarded to each single-operator station who submits a valid entry of 200 or more QSOs. If the rules seem complicated at first glance, try reading them two or three times. They need to be followed with precision if your entry is to qualify. Feel free to contact us here at ARRL Hq. if you have any questions. When you're ready to put your contest entry form and logs in the mail, double check to make sure all the information is included and your handwriting is legible.

FUN-damentals of the Novice Roundup

The 1985 Novice Roundup lasts an entire week, including two weekends: 0001 UTC Saturday, January 26 (Friday local time), to 2359

UTC Sunday, February 3. To keep contesters from killing themselves, participants are limited to 30 hours at the most. Write to ARRL for your entry forms, and put a bookmark in your QST so the rules will be easily accessible when the forms arrive. Entry forms include three or more (specify quantity) log sheets with room for 100 contacts on each, a summary sheet (one needed) and a CD-77 form dupe sheet to keep track of the stations you've worked. Run your self-addressed, stamped envelope to the mailbox now, and you'll have the forms in time to start the Roundup. The address is ARRL, 225 Main St., Newington, CT 06111.

Your goal in the contest is to work as many stations as possible, in as many different ARRL Sections and DXCC countries as possible. ARRL Sections are listed on the Novice Roundup entry form and on page 8 of every QST. (If you're not sure which Section you're in, write to ARRL for a free copy of *Operating an Amateur Radio Station*, which breaks down each Section by county.)

Each station you work may be counted only once. Short QSOs work best, so don't discuss grandma's rhubarb pie with another contesteer or repeat anything unless asked. Here's a typical Novice Roundup QSO:

CQ NR CQ NR DE KAIKQR/N KAIKQR/N K
KAIKQR/N DE KA9PUB/T AR
KA9PUB/T DE KAIKQR/N 579 CT KN

KAIKQR DE KA9PUB R 569 IN KN
KA9PUB R 73 DE KAIKQR/N K

To streamline the QSO, the license class can be dropped after the contact has been established.

Happy Contesting!

Rules

1) **Object:** For Novice and Technician operators in the United States (and possessions and territories) to exchange QSO information with as many stations as possible on the 3.5, 7, 21 and 28-MHz Novice/Tech bands. Others work Novices and Technicians only.

2) **Contest Period:** The week that spans the end of January and the beginning of February, including both weekends. Begins 0001 UTC Saturday, January 26, 1985, and ends 2359 UTC Sunday, February 3. Operate no more than 30 hours. Off periods must be at least 15 minutes; listening time counts as operating time. Times on and off must be indicated in your log.

3) **Categories:**

(A) **Single Operator:** One person performs all transmitting, receiving and logging functions.

(B) **Multioperator:** Single transmitters only. Those obtaining any form of assistance, such as relief operators or logging.

4) **Exchange:** Signal report and ARRL Section or country for DX stations. Novices should send /N and Technicians /T after their call sign so

Do not write above this line



NOVICE ROUNDUP

(Low beam licensed for less than 2 years
 more than 2 years)

CALL SIGN KAIKQY/N ARRL SECTION OR COUNTRY CT

CHECK ONE: Single Operator Station Multioperator Station

If multioperator, show calls of all operators: log

1455 QSOs (10) (41 Sections + Countries) (5)

30690 Claimed score Hours of operation 22

*Do not list 1-5-4 on a card here

Transmitter TS-830S Power output 180 Watts
Receiver TS-830S Antenna dipole, beam

I hereby declare all information on this form to be true and correct to the best of my knowledge. I agree to be bound by the decisions of the ARRL Awards Committee.

Date 5 Feb 1985 Signature Larry Evans Call KAIKQY

Please enclose log, photos, comments, ideas, etc. with your entry and mail promptly to: ARRL Communications Department, 225 Main Street, Newington, Conn. 06111

	1	2	3	4	5	6	7	8	9	0	VE	DX (EU)
Alaska	AK	Ala	Ala	Ark	Cal	YV						
Arizona	AZ	Ark	Cal	LU								
California	CA	Cal	YL									
Colorado	CO	Cal	OK									
Connecticut	CT	Cal	DL									
Delaware	DE	Cal										
District of Columbia	DC	Cal										
Florida	FL	Cal										
Georgia	GA	Cal										
Idaho	IA	Cal										
Illinois	IL	Cal										
Indiana	IN	Cal										
Iowa	IA	Cal										
Kansas	KS	Cal										
Kentucky	KY	Cal										
Louisiana	LA	Cal										
Maine	ME	Cal										
Maryland	MD	Cal										
Massachusetts	MA	Cal										
Michigan	MI	Cal										
Minnesota	MN	Cal										
Mississippi	MS	Cal										
Missouri	MO	Cal										
Montana	MT	Cal										
Nebraska	NE	Cal										
Nevada	NV	Cal										
New Hampshire	NH	Cal										
New Jersey	NJ	Cal										
New Mexico	NM	Cal										
New York	NY	Cal										
North Carolina	NC	Cal										
North Dakota	ND	Cal										
Ohio	OH	Cal										
Oklahoma	OK	Cal										
Oregon	OR	Cal										
Pennsylvania	PA	Cal										
Rhode Island	RI	Cal										
South Carolina	SC	Cal										
South Dakota	SD	Cal										
Tennessee	TN	Cal										
Texas	TX	Cal										
Utah	UT	Cal										
Vermont	VT	Cal										
Virginia	VA	Cal										
Washington	WA	Cal										
West Virginia	WV	Cal										
Wisconsin	WI	Cal										
Wyoming	WY	Cal										

Print name: NAME Larry Evans CALL KAIKQY
ADDRESS 225 Main St
Newington CT 06111

CD-49 (R977) Printed in U.S.A.

CALL	BAND								MODE	
	AA-AL	KA-KZ	K	N	W	WA	WB	WD		VE
1	KAIKQY KAIKQY KAIKQY KAIKQY									1
2	KA200W KA21CV KA36WV KA36WV KA36WA	196 VN	SEP RD			ADWA				2

Novice Roundup

CALL SIGN KAIKQY/N SECTION CT

50 QSOs per side
Number each new multiplier as worked

PROG.	CATEGORY	STATION	EXCHANGE		POINTS
			SENT	RCVD	
1	28.125	KAIKQY/N	579 CT	579 CT	1
2	21.150	WA3RQD	579 CT	579 IN	1
3	28.125	WA4RIS	579 CT	579 VA	1
4	28.125	WA4RIS	579 CT	579 VA	1
5	28.125	WA4RIS	579 CT	579 VA	1
6	28.125	WA4RIS	579 CT	579 VA	1
7	28.125	WA4RIS	579 CT	579 VA	1
8	28.125	WA4RIS	579 CT	579 VA	1
9	28.125	WA4RIS	579 CT	579 VA	1
10	28.125	WA4RIS	579 CT	579 VA	1

others will know their license class.

5) Scoring:

(A) QSO Points: Count one point for each complete two-way QSO. Work each station once, regardless of the frequency band.

(B) Multiplier: Each ARRL Section (listed on page 8), plus VE8/VY1, plus each foreign country.

(C) Code Proficiency: Additional points can be earned if you have qualified for an ARRL (not FCC) Code Proficiency certificate. CP credit equals the speed in words per minute indicated on the latest certificate or sticker held by the entrant. For more details on the Code Proficiency program, see Contest Corral, this issue.

(D) Final Score: Add your Code Proficiency credit to your total number of QSO points.

Multiply that by your ARRL Section/country total for your final score. For example, if you work 100 stations in 31 Sections + 3 foreign countries and have an ARRL Code Proficiency credit of 10 WPM from WIAW or W6OWP, then your score is $100\text{-plus-}10 \times \text{total multipliers}$ ($31 + 3$) or 34, for a total of 3740 points.

6) **Miscellaneous:** Crossband contacts are not permitted. Novices and Technicians work any amateur stations; others work Novices and Technicians only.

7) **Reporting:** Contest forms (log sheets, summary sheet, dupe sheet) are available from ARRL Hq. for an s.a.s.e. Official forms are recommended. Any entry making more than 200 QSOs must submit duplicate checking sheets (alphabetical listing of stations worked). Incomplete or late entries will be classified as check

logs. Logs should include dates, QSO times, on and off times, complete exchange sent and received, and band. Postmark your entry within 30 days after the contest (March 5, 1985).

8) **Awards:** Certificates to the top Novice and Technician in each ARRL Section and each single-operator Novice or Technician who submits a valid entry with 200 or more QSOs. Multioperator or General class licensees and above are not eligible for awards.

9) Conditions of Entry:

(A) Each entrant agrees to be bound by the provisions as well as the intent of this announcement, the regulations of his/her licensing authority and the decisions of the ARRL Awards Committee.

(B) Disqualifications: See below. □

Club Competition Rules and Contest Disqualification Criteria

The 1985 contest season is upon us. Three of the ARRL-sponsored contests during 1985 include an ARRL-affiliated club competition — January VHF Sweepstakes, February/March International DX Contest and November Sweepstakes. There are a few ground rules to follow to ensure that your club's scores are properly credited (and to ease the log checker's burden). These are detailed below.

From time to time it becomes necessary to consider disqualifying an entry to an ARRL contest. The particulars are listed below. Most of the time the reason is simply that the person submitting the entry was not accurate in copying call signs or contest exchanges. As long as you are careful only to log QSOs when you are sure of the information, you should have nothing to worry about. [The use of standard ARRL contest forms will help to ensure that your score is figured properly and speed up the publication of contest results in *QST*.]

Don't hesitate to call or write if you have a question about the rules listed here or the rules for any particular contest. The time to ask is before the contest, not afterward.

Club Competition

Only ARRL-affiliated clubs may participate in the club competition. A member must be listed in the regular score listings to be counted for a club.

For a club to be listed, two conditions must be met:

1) At least three different entries from members of the club must be submitted.

2) All members wishing to be included in the club scores must indicate the club name on their summary sheet, and the club secretary must send a list of all club members eligible to compete for the club and which level (unlimited, medium, local) they wish to enter for each competition. Remember to meet the mailing deadline!

There are three levels of club competition:

1) *Unlimited.* Any club submitting 51 or more entries is in this class. (One station can submit

two entries — one on phone and one on CW in the November Sweepstakes and the DX Contest.) All stations and all operators must reside within 175 miles of the club's center. All members more than 50 miles from the club's center must attend at least 50 percent of the club's meetings to be eligible to submit an entry. If, however, they have not been a member for a year's time, they must have attended at least 50 percent of the meetings since becoming a member. There is no attendance requirement for those members within 50 miles. However, to be considered bona fide, a member must be active in club affairs. Members living outside of 175 miles and/or members operating stations outside of 175 miles may not compete in the club competition. The club must be ARRL-affiliated.

2) *Medium.* Any club submitting fewer than 50 entries falls in this class, except as noted in local club criteria, below. The same mileage and attendance requirements apply as the unlimited class club. The club must be ARRL-affiliated.

3) *Local.* Any club submitting 10 entries or less is in this classification. All members must reside within 20 miles of the club's center. There is no attendance requirement. Again, the club must be an ARRL affiliate.

Single- and multioperator-station scores may be counted. At a guest-operated single-operator station, both the guest operator and the station licensee must be members of the same club in order to count the score for that club. At multioperator stations, at least 66 percent of the operators must be members of the same club for the score to count for that club.

In conjunction with the 50-percent attendance rule, the club must hold at least four in-person meetings per year. A club's entry classification may be changed if, in the opinion of the ARRL Awards Committee, the club has manipulated its number of entries to fall into a lower classification (e.g., if a club with 100 members submits only the 50 highest scores, even if more than 50 of its members wish to compete.)

It is not within the intent of these rules that

a club should vote out a member or a member resign and then be voted back into the club later so the 50-percent attendance rule can be met.

The highest affiliated-club entry will be awarded a gavel in each category (unlimited, medium, local).

The highest single-operator CW score and the highest single-operator phone score in any club entry will be awarded with a club certificate when at least three single-operator CW and/or three single-operator phone scores are submitted.

Disqualification

If the claimed score of a participant is reduced by two percent or more, the entry may be disqualified. Score reduction does not include correction of arithmetic errors.

Score reductions may be made for taking credit for unconfirmed QSOs and/or multipliers, duplicate contacts, and/or other scoring discrepancies.

An entry with more than two-percent duplicate contacts left in the log or an entry in which more than two-percent "rubber clocking" (altering the actual time to increase the operating time so that it is greater than the allowable limit) is detected will be automatically disqualified.

If a participant is disqualified, he or she will be barred from submitting an entry in the next annual running of that specific contest, e.g., disqualification from the 1984 phone SS prohibits submission of an entry for the 1985 phone SS, but 1985 CW SS participation is okay.

The calls of all disqualified participants will be listed in the *QST* contest report.

Any participant on the borderline of disqualification, but not actually disqualified, may receive a warning letter.

For each duplicate contact or miscopied call sign that is removed from the log by Hq., three additional contacts will be deleted as a penalty. The penalty will not be considered part of the two-percent disqualification criteria.

In all cases of question, the decisions of the ARRL Awards Committee are final. □

Rules, 1985 ARRL International DX Contest

To the serious DX contester and the casual country hunter alike, the third full weekend in February (16-17, for CW) and the first full weekend in March (2-3 for phone) bring the challenge and excitement of the ARRL International DX Contest. For these two weekends each year, the bands spring to life with DX aplenty. An operator can choose to go all out in the competition for a top score, or leisurely chase those last few countries needed to finish the requirements for the 5-Band DXCC award.

If you participated in the 1984 ARRL International DX Contest, you are that much ahead of the pack. The rules for the '85 contest are similar to those of the '84 test with one exception: the District of Columbia (DC) now counts as a separate state multiplier.

Use of official entry forms makes the post-contest paperwork a snap for you and makes the job of compiling the results a lot easier at our end. To receive your set of entry forms, send a self-addressed, stamped, business-size envelope (for W/VE amateurs) or a self-addressed envelope and 2 IRCs (for DX amateurs) to ARRL Hq. Mail early and avoid the last-minute delay.

Complete contest rules are listed below. If you have any questions on any aspect of this contest, get in touch with us at Hq., and we'll do our best to help you out. Good DX!

Rules

1) **Eligibility:** Amateurs worldwide.

2) **Object:** W/VE amateurs work as many amateur stations in as many DXCC countries of the world as possible on 1.8 to 30 MHz, excluding the 10-MHz band. Foreign amateurs work as many W/VE stations in as many states and provinces as possible.

3) **Dates:**

(A) **CW** — Third full weekend in February (February 16-17, 1985).

(B) **Phone** — First full weekend in March (March 2-3, 1985).

4) **Contest Period:** 48 hours each mode (separate contests). Starts 0000 UTC Saturday; ends 2400 UTC Sunday.

5) **Categories:**

(A) **Single Operator** — One person performs all operating and logging functions. Use of spotting nets (operator arrangements involving assistance through DX-alerting nets, etc.) is not permitted. Single-operator stations are allowed only one transmitted signal at any given time.

(1) **All band.**

(2) **Single band** (one only). Single-band entrants who make contacts on other bands should submit logs for checking purposes.

(B) **Multioperator** — More than one person operates, checks for duplicates, keeps the log, etc.

(1) **Single transmitter.** One transmitted signal at any given time. Once the station has begun operation on a given band, it must remain on that band for at least 10 minutes; listening time counts as operating time. Multioperator, single-transmitter stations must keep a single, chronological log for the entire contest period. Violation of the 10-minute rule or improper logging will result in an entrant's reclassification to the unlimited multi-multi class (see below).

(2) **Two transmitter.** A maximum of two transmitted signals at any given time, on different bands. Once either station has begun operation on a given band, it must remain on that band for at least 10 minutes; listening time counts as operating time. Both transmitters may work any and all stations; the second transmitter is *not* limited to working new multipliers only. Each of the two transmitters must keep a separate, chronological log for the entire contest period. Violation of the 10-minute rule by either or both transmitters or improper logging will result in an entrant's reclassification to the unlimited multi-multi class (see below).

(3) **Unlimited.** A maximum of one transmitted signal per band at any given time. Unlimited multi-multi stations must keep a separate, chronological log for each band for the entire contest period.

(C) **QRP** — Single operator, all band only. QRP is defined as 10-W input or less (or 5-W output or less).

6) **Contest Exchange:**

(A) W/VE stations (includes 48 contiguous United States and does not include Canadian islands of St. Paul and Sable) send signal report and state or province.

(B) DX stations send signal report and power (three-digit number indicating approximate transmitter input power).

7) **Scoring:**

(A) **QSO Points** — W/VE stations count three points per DX QSO. Foreign stations count three points per W/VE QSO.

(B) **Multiplier** — W/VE stations: sum of DXCC countries (except U.S. and Canada) worked per band. Foreign stations: Sum of U.S. states (except KH6/KL7) and District of Columbia (DC), VE1-7, VO, VE8/VY1, worked per band. Maximum of 58 per band.

(C) **Final Score** — QSO points \times multiplier = final score.

8) **Miscellaneous:**

(A) Call signs and exchange information must be received and logged by each station for a complete QSO.

(B) All operators must observe the limitations of their operator licenses at all times.

(C) Your call sign must indicate your DXCC country station location (KH6XYZ/W1 in Maine; FG0AAA/FS on St. Martin, etc.).

(D) One operator may not use more than one call sign from any given location during the contest period.

(E) The same station may be worked only once per band — no crossmode, crossband or repeater contacts.

(F) Aeronautical and maritime mobile stations outside the U.S. and Canada may *not* be worked for QSO or multiplier credits by W/VE stations.

(G) All transmitters and receivers must be located within a 500-meter-diameter circle, excluding directly connected antennas. This prohibits the use of remote receiving installations. Exception: Multioperator stations may use spotting nets for multiplier hunting only.

9) **Reporting:**

(A) All entrants are encouraged to use official forms available from ARRL (s.a.s.e. or 2 IRCs) to report contest results.

(B) Logs must indicate times in UTC, bands,

calls and complete exchanges. Multipliers should be clearly marked in the log the first time worked. Entries with more than 500 QSOs total must include cross-check sheets (dupe sheets).

(C) All operators of multioperator stations must be listed.

(D) Entries must be postmarked within 30 days of the last contest weekend (April 2, 1985). Logs not postmarked by the deadline will be classified as checklogs; no extensions, no exceptions. All stations are requested to send their entries in as early as possible. Entries received after mid-July will not make QST listings.

10) **Awards:** Plaques will be awarded in the following categories for both the CW and phone contests.

(A) Top W/VE scorer in each entry category — single operator-all band, single operator-single band (1.8-28 MHz), QRP, multioperator-single transmitter, multioperator-two-transmitter and multioperator-multitransmitter.

(B) Top scorer in the single operator-all band category worldwide and on each continent. In addition, worldwide leaders in the single operator-single band, QRP, multi-operator-single transmitter, multioperator-two transmitter and multioperator unlimited categories will receive plaques.

(C) Additional special plaques will be awarded as sponsored. See October 1984 QST for the current list and February 1985 QST for any additions.

(D) Certificates will be awarded to top single-operator, all-band entries from each country and ARRL Section; top single-band entries in each U.S. call area and each country; top multioperator entries (both single and multi-transmitter) in each country, U.S. call area and in Canada. Additional single-band and multioperator certificates will be awarded if significant effort or competition is displayed. DX entrants making more than 500 QSOs on either mode will receive certificates.

11) **Club Competition:** ARRL-affiliated clubs compete for gavels on three levels: unlimited, medium and local clubs. Details are listed in this issue.

12) **Conditions of Entry:**

(A) Each entrant agrees to be bound by the provisions, as well as the intent, of this announcement, by regulations of his or her licensing authority and the decisions of the ARRL Awards Committee.

(B) Disqualification: An entry may be disqualified if the overall score is reduced by more than two percent. Score reduction does not include correction of arithmetic errors. Reductions may be made of unconfirmed QSOs or multipliers, duplicate QSOs or other scoring discrepancies. An entry *will* be disqualified if more than two-percent duplicate QSOs are claimed for credit. For each duplicate or miscopied call sign removed from the log by ARRL, a penalty of three additional QSOs will be deleted. The penalty will not be considered as part of the two-percent disqualification criterion. If a participant is disqualified, that operator will be barred from entering the contest on that mode the following year. The calls of all disqualified participants will be listed in the QST contest results.

N4DT Vs. Murphy and the "Roan Roar"

All week long, as we tried to tie up loose ends prior to the September, 1984 VHF QSO Party, Don, WQ4V, had been pumping me up with magnificent propagation reports for the weekend. As a participant and not an enthusiast on VHF/UHF, little did I know how prophetic he was!

Friday, September 7, was spent erecting towers, mounting antennas, putting up tents and readying for the contest. A gorgeous day left us all with sunburns. There was no pain, though excitement may have been the anesthetic.

Roan Mountain is a series of three bald peaks known as Roan Peak, Roan Bluff and Cloudland. The three peaks straddle the North Carolina/Tennessee State Line. Our operation position was a grassy bald on Cloudland near the Appalachian Trail just inside North Carolina. Cloudland is named after a hotel that was on the mountain and burned down in the early 1900s. It is aptly named because it seems that dusk is always accompanied by a lowering of the clouds until the peak is covered. The name Roan Mountain is derived from the masses of rhododendron that bloom there and give the mountain a brilliant roan color. The operating site, about 6300 feet above sea level, provided a clear shot in all directions.

Because there is no commercial power on the mountain and because all gasoline for generators must be carried up, we knocked off at dusk Friday, although we were not through. Our "advance party" — N4DT, WQ4V, AJ4N, KB4DVN and I then spent the evening alternating between talk-in for the rest of the group and going down the mountain to a Tennessee State Park for much-needed showers.

Talk-in was necessary because of the descended clouds. Turns were impossible to find without a guiding hand. Friday evening brought all but one of the group up the mountain. WB4CTW, WD4GYN and KJ4X made it up as operators. In addition, my XYL, Donna, and our sons came up. Although Donna is a ham (N4HIN), she elected not to operate with us. She volunteered (I know better than to ask) to serve as breakfast cook, and the boys (I can ask them) helped out as runners between stations for schedules, etc.

Saturday morning, we put the last of the antennas up. While some of us were getting them up, others were hooking up stations and testing. First was a report from 2 meters of 1- and 2-land "booming in." Then one of the guys who had been trying to get back home on 2-meter FM from his car reported a QSO with Indiana. The excitement mounted! We hurried.

As 1800Z rolled up, I sat down at the 432-MHz position. I was a little downhearted because our new Henry 2004A amplifier had failed during testing, but hoped somehow to make up for it. Was I in for a shock! The conditions were tremendous! Not only did we not miss the amp, we worked more than we hoped for without it. At no time during the test, regardless of beam direction, could I not hear 1-land!

Slightly delayed by priorities, we were about an hour or two late getting on 1296. Joe at W2SZ/1 had told me to "get on with 100 mW of exciter and a dipole." He said the band was *that* good. When we got on, it was with 2 W to a 4 bay of helices up almost 30 feet. When the guys on 1296 called "CQ", their first call was answered by W1TKZ in Vermont. I think the fellows in Vermont could have heard the resulting celebration without radios!

Saturday evening brought with it the winds of Hurricane Diana. What we affectionately called the Roan Roar blew in at dark. Winds gusted at gale force and may have peaked higher. Although I was somewhat protected inside the 432 tent, I knew it was becoming critical. The tent was inflating and deflating, moaning and groaning at the seams, and the wind was howling. Suddenly, Frank, K4ADI, called from the 6-meter tent. He yelled for help and I took off. His tent was going fast. The aluminum frame had snapped and its jagged edge had torn the tent. I helped him get a grip on the tent to hold it up until I could get more help.

Danny, N4DT, was operating 2 meters from a van, our most secure station. I got him out and we yelled for the others. The wind was so loud that nothing else could be heard. Danny decided to collapse the 6-meter tent and secure it as a cover for the equipment. To prevent the inevitable, the 432 tent was also collapsed and held down with heavy rocks.

While we were protecting the equipment in the 432 tent, the 2-meter tower came down in a heap. Although secured in six places, two guys (1/4-in nylon/cotton) snapped. The four boomers were a mess. The H-frame snapped like balsa. Since we had seen what the wind could do, we decided to add guys to the other towers. The 432 tower was already leaning at about 30 degrees when we caught it! Danny decided to shut down 220 and 1296 to protect against injury should one of the towers fall onto the tent. Ralph, WB4CTW, and Steve, WD4GYN, hooked onto the Ringo Ranger from Ralph's car to work some FM. Ralph is also equipped for 6-meter mobile, and they made a few QSOs with his whip. The rest of the group went to bed to get some sleep — maybe the wind would end by morning.

While the wind did let up, it was far from over on Sunday morning. We were able to salvage one boomer and get back on 2-meter SSB/CW. The 432 tent was reconstructed and examination showed no serious antenna damage. Two of the four 16-element Yagis were skinned on the H-frame. A few taps with a long pole and we were back on the air.

The 6-meter tent required a lot of "engineering" to get it back up, since the frame had broken. Steve, AJ4N, led that project to completion. The tent was a real sight! The 220 and 1296 tent and antennas made it fine. That location is slightly shielded by trees and may be the site for all antennas the next time we go up there.

While Murphy ended up with a pretty good score, we beat him. We all had a tremendous time in spite of the problems. We worked half way to VUCC on 432 alone. We made a QSO into Maine (K1WHS) on 1296 that may be an "overland" record and certainly ranks high on the list. We chit-chatted for long periods with W2SZ/1 on 1296. We enjoyed the beauty of the mountain instead of being saddened by the problems it caused.

Final Score: Murphy — a lot; N4DT — much, much more! — G. E. Grooms, NE4G



N4DT and WQ4V survey damage to the four boomers on Sunday morning.

calling me, but I couldn't make it. Thank you, stationary high-pressure area and Hurricane Diana (VE1AHM). I heard K4MSK from Florida, but couldn't get through the pileup (VE1APA). It was nice to work five grid squares on 432 with half a watt and five elements (VE2BTW). We had a super time working from Maryland to Los Angeles (W0IA). The gods of propagation must have been looking down on this contest. There hadn't been a decent opening for at least a month, and on Saturday night, it was a beaut. The South was coming in like gangbusters (WB0GPM). I had some nice surprises — KC2TX in Maine to KB9S in Wisconsin on a "dead" band (W3HDH). I could sum up the contest in one word — frustrating! This huge tropo opening was too much. Even VE2DFO at the eastern edge of my FN-25 grid was well in it, but all I got out of it was an enhancement. And with all the DX rolling in, those NJ stations weren't interested in a VE3 (VE3FN). Glad to have been at least a little part of this fabulous gift of nature (K1DS). This was my 89th VHF contest, not counting the UHF contests in August. The activity is still fascinating with new experiences in each event (W1EJ/W1EJJ). With band conditions as they were, we would have traded all our beer for 1 W on 1296 MHz. Boy, did we miss the boat (WA2FXB)! We were amazed to work so far with so little, especially when we worked W2SZ/1 and W1VD with only the barefoot 3-W rig on 432 MHz. The 432 quad was mounted at the center of the 144-MHz quad array. We found amazingly little interaction, desensing or interference even with the harmonic relationship of the frequencies in use (K8CQA). AFIT operated 1296 and we had to tie rocks to each of his legs after his N4DT QSO so that he wouldn't float away (K1WHS). We had double-hop E skip on 6 meters, which is quite rare this time of year. Grids DM-26 and CM-95 were worked for our first time ever on terrestrial propagation. K6HXW's QTH is located close to the Pacific Ocean, on a very obstructed mountainous path over California at its widest point (K7ICW). On 2 meters, instead of "where's the beef?" ... Where was Minnesota? I worked over, under, around and through, but no MN. It seems like the locals hibernated on 6-meters (WA9BTY). Obviously, the Midwest was the wrong place to be. Not only was the 2-meter band open up and down the East Coast, but we had difficulty working stations in the Southeast because their antennas were pointed northeast. There is no justice (K9AKS). There should be a limit on power. Many stations were running 300-plus watts when not required. I had to limit my operation to periods when a 350-W station nearby was not operating (KA9QIK). Conditions were quite average on 2 meters. We here in the Midwest had no idea of the Great Opening along the East Coast. Of course, perhaps you fellows did not

Top Ten

Single Operator		Multioperator	
Call	Score	Call	Score
N8FCJ	99,528	W2SZ/1	660,951
WA2QMY/3	85,386	W1VD	487,418
W1XX/2	83,640	WB4NMA	351,237
WA2FGK			
(K2LNS,opr)	71,272	W1TKZ	327,864
WA1OUB	60,180	K3YTL	308,256
WA2TEO	57,673	N4DT	271,431
WB2WIK	53,872	WB2RVX	228,732
K1PXE	50,730	W3SJI	201,292
K3HP	50,255	WB8VP	192,720
W3IP	47,700	K1WHS	135,468

Sweepstakes, January 12-13. See December *QST* for the significant rules changes. September certificates will be in the mail around February 15. — W1XX

SOAPBOX

This was my first attempt at contesting at home, and I was very surprised at the results using my modest sta-

tion. My operating time was cut very short by work and children's activities, so I decided to concentrate on grid squares. 144 MHz was great all through the contest and even 50 MHz opened once. Since many ops now hunt grids, I think it drew many to the event who would not have any interest otherwise (N8DKL). I worked one grid square further on 432 than on 2 meters — using 1/8 of the power and 1/8 of antennas. This was approx. 1200 mi vs. 1100 mi (VE1UT). I worked five new states and 11 new grids during the opening. I heard Georgia

WA2FBX (+ N2s AAM, DWA, DXP, WA1PDK, WA2a CRF, GEZ, PUJ, RYC, VKH, WB2s KBI, NTP, QBT) 69,732-496-117-ABCD
N2WWM (+ N2s CJS, ERH, EWW, WA3WUD) 30,360-345-88-AB
W2LI (KA2JRC, KC2RZ, W2DQA, WB2ZMU, oprs.) 3950-158-25-B

Southern New Jersey
W2EIF 25,128-234-74-ABCD
KA2JKI 24,482-222-78-ABCD
W2HRW 20,884-296-64-ABD
WB2YEH 15,540-169-60-ABCD
KS2T 8346-110-38-ACD
K3GYs 3910-84-34-ABCD
NC2Y 4090-116-39-B
KA2MUV 484-44-11-B
NF2P 1968-41-16-E
WB2RVX (+ N2Sb, WA2VYA, WB2NPE, WB2ZAR) 228,732-871-198-ABCD
K2BWR (+ K2ZJ) 40,875-245-109-ABCD

Western New York
W8IPiZ 40,252-347-116-ABCD
K2GK 29,010-221-93-ABCD
WA2SZY 5292-102-42-BD
NA2O 2720-87-32-BD
KC2JFL 2074-54-34-ABD
WB2JFL 1275-51-25-AB
WB2MKN 972-39-27-AB
WB2WBT 924-44-21-A
K2LWR 23,014-311-74-B
N2BKS 3900-100-39-B
K2JIO 3074-108-29-B
WB2ODH 2541-77-33-B
WA2CBU 2088-72-29-B
WB2NJD 1920-64-30-B
K2KWK 578-34-17-B
KU2A 56-8-7-B
WB2QCJ 1540-38-22-C
WB2IEY 930-31-15-C
K2QR 759-27-14-D
N2WQ (+ KA2MFP, K2ZJ, WA2s LAQ, MOP) 27,918-230-99-ABCD
WB2ELB (+ KA1YE) 13,984-162-76-ABD
K2IQ (NA2A, WB2SZY, oprs.) 1390-60-23-B

3
Delaware
K4CHEs 18,200-231-65-ABCD
K3SXA 1950-64-25-BD
KA3JO 588-42-14-B
AC3T (+ KA3B, N3DIP) 21,373-284-67-ABC
K3QBD (K3ONO, KA3HZ, KC3AM, KQ3G, K8MF, W3s LQE, URR, WA3s HDS, TNP, oprs.) 3611-157-23-B

Eastern Pennsylvania
WA2OMYs 85,386-499-133-ABCD
K3HP 50,255-398-95-ABCD
WB3JYO 42,282-406-81-ABCD
WB3LZN 18,438-243-65-ABD
KA3HTY 11,308-200-44-BCD
N3BHS 10,450-174-50-ABCD
KS3HE 9656-173-49-ABCD
N3CX 8556-693-44-BCDE
W3CL 6318-123-39-ABCD
KA3MHE 2689-91-28-ABC
WA3EYD 1102-48-19-ABC
AA3W 340-29-20-BC
WA3DNM 12,510-298-42-B
K3IWK 6808-184-37-B
AK3M 2070-90-23-B
N3CDI 208-10-11-B
W3GPY 4480-80-28-C
K3LDD (N3QDZ, opr) 6282-121-28-D
WA3JUF 359-26-11-E
K3YTL (KM3KZ, KA3EEO, N3s AVZ, CXB, DAP, WA3s JWP, JVV, NVS, YON, WB3s CAL, FAA, FKQ, oprs.) 308,258-1031-228-ABCD
W3SJJ (K3YD, KF3Y, KQ3P, KQ3R, N3s AIN, DPN, JI, WB3EGG, oprs.) 201,792-780-196-ABCD
W3LPL (W3s GFN, JUZ, UH, WA3QCU, oprs.) 51,834-373-106-ABCD
WB3FNZ (+ KB3X) 8970-195-46-B
KM3E (K3s EBL, SQO, N3COT, WB3FET, oprs.) 6988-123-52-ABD

Maryland & D.C.
W3IP 47,700-325-106-ABCD
W3ZZ 38,897-321-97-ABCD
W3XO 20,904-211-78-ABCD
K3AKR 19,276-183-79-ABCD
WA3UJE 8316-185-44-BCD
N3API 1215-45-27-AB
W3MSN 902-38-22-ABD
W3IFM 1976-76-28-A
K3CQ 12,738-257-8-B
K3TC 3323-203-41-B
WB3BGU 1474-87-22-B
KA3CHM 420-30-14-B
WB3LJK (+ K3ONW) 80,858-373-126-ABCD
W3PQA (K3PHH, KA3QWD, KB3EWL, KB3EL, KO3K, W3JDF, WB3s AXP, BIT oprs.) 4158-89-42-AB

Western Pennsylvania
WA3FVJ 46,139-337-118-ABD
W3H0H 1305-45-29-A
W3KJM 459-27-17-A
KB3L 551-29-19-B
K1PLR 396-33-12-B
W3GNR (KA3DWR, WA3JBV oprs.) 6250-90-50-AC
W3KWH (W3IOH, WB3EML, WN3VAW oprs.) 6206-98-58-ABD
KR3C (+ WA3DBW) 2980-55-40-AD

4
Alabama
WB4NJG 12,040-140-88-AB
WA4CQG 3535-71-43-BC
WB4GFO 2720-69-40-B
WA4VUG 54-9-6-B
WB4VHF (+ WA4UAU) 396-22-18-A

Georgia
WA4RJP 32,125-221-125-ABCE
WS4F 7694-85-68-ABCD
WA1SS 3024-51-42-BD
W4VHH 1800-36-30-BDE
WB4WKE 1180-40-29-A
AK4T 25-5-5-A
WB4RUA 130-13-10-B

Kentucky
KC4EG 25,296-195-102-ABCD
WB4NXY 13,122-138-81-ABD
N4KCM 5089-96-53-AB
N4JTY 108-12-9-B

North Carolina
K4CAW 21,409-212-79-BD
N2CJP 1755-62-27-ABD
WD4ODS 2282-58-39-A
WB4NMA (KA4MSK, N4AH, NAHSM, NT4T, WB4SLM, WD4s IIS, JOV, MBK oprs.) 351,237-999-291-ABCD
N4DT (+ A4JN, K4AD, KB4YN, KJ4X, NE4G, WB4CTW, WD4GYN, WQ4V) 271,431-912-943-ABCD
WB4FB (KA4P, KA4NY, KE4Y, KF4ND, KS4S, KU4V, NA4JEV, JU4, SJE, WA4s GM, UNZ, VCC, WB4PCS, oprs.) 18,840-203-80-ABD
W4CQ (KA4CG, WA4TJ, WB4s ETF, MCI, WD4LGN oprs.) 6360-111-53-ABD

Northern Florida
W4ODW 8379-95-83-ABCD
WD4FAB 912-37-24-ABD
W4ZGS 777-37-21-AB
WA4JW 494-26-19-A

South Carolina
WA4LDU 2580-51-43-ABD
K4KAE 258-16-18-ABD

Southern Florida
NA4EJW 2178-64-34-AB
K1FJM4 805-35-23-AB

Tennessee
WA4QBE 2457-63-39-AB
NA4MW 2331-48-37-BDF
W4HHK 1696-47-37-BF
WA4HGN 1456-32-28-BDF
WD4DGF (+ NA4VC) 16,898-155-98-ABC

Virginia
W3YI4 28,593-235-81-ABCD
K3UOP4 20,875-229-97-ABCD
WD4GXN 25,578-225-98-ABD
KA4HWG 22,328-256-73-ABD
NA4MM 12,033-191-63-AB
WA4MMP 10,530-143-65-ABD
WA4SBC 9440-142-58-ABCD
K4JSI 7938-124-49-ABCD
W4DO 6900-150-46-AB
K4FTO 6579-119-48-ABD
KX4V 832-32-28-AB
KO4YN 540-40-16-AB
W4CKD 3367-91-37-A
KB4CMF 825-95-15-B
NA4KEQ 286-32-9-B
AB4L 3196-59-27-D

5
Arkansas
K3YY 3690-74-45-BD
WB5JAR 1170-39-30-AB
WD5AGO 630-30-21-A
WA5WJFS 1440-36-20-D
N5DL (+ AD5M, KA5NTT, KD5WD, NISA, WA5ODE, WD5s CAN, CAP) 32,798-215-212-ABCD

Louisiana
WB5LBT 4002-87-46-ABCD
W5EW 169-14-12-B
KB5PX (+ K5SM, N5MA) 12,710-134-82-ABCD
N5BHO (+ W5EVI) 10,640-120-78-ABCD

Mississippi
W5RCI 16,896-194-96-ABCD
NA5S6 3478-59-47-ABCD

New Mexico
W5FF 13,817-153-89-AB
KA5EBL 6798-103-66-AB
K1JL5 4950-90-55-A
WB5TCO 12-2-2-D

Northern Texas
WA5VJB 38,290-294-95-ABCD
KE5EP 23,310-212-90-ABDE
WB5KYC 22,368-226-96-ABD
KS5 10,467-164-103-ABD
W5GG 14,198-229-62-BDE
K5DHU 5304-70-52-ABDE
WB5KYK 1053-39-27-AB
K5YN 490-35-14-AB
K5GW (+ K5RSO, W5ETG, WA5STU, WR5LUA) 39,325-254-121-ABCEFD

Oklahoma
W5NZ 23,100-175-110-ABCD
K5B1 20,384-167-98-ABCD
W5SBKV 20,358-186-87-BD
K7CW 4234-84-44-AD
AA5V 3132-89-36-8D
WB5DSH 12,798-158-81-A
K5WE 805-35-23-A
NR5O 1580-52-30-B
K15P 1440-48-30-B

Southern Texas
WB5RUS 8142-118-69-AB
W5RYH 1014-39-36-A
NS5GB 945-45-21-B
N5EAR 77-11-7-B
W5UWB (+ W5STBE) 1474-49-22-ABDE

6
East Bay
WA5LHD 1872-70-24-BC
KN5S 279-31-9-A

Los Angeles
WB5DTA 3200-89-32-ABCD

Orange
K6BY 1058-31-23-ABCD
WB6AJZ 380-26-18-BD
K6PHE 297-27-11-A
N6ENU (+ WA6s OTU, PZL, WB6CIA) 27,830-294-90-ABCD

Santa Barbara
WB6RCN 476-28-17-AB
KABVRW 7-7-1-B
K6MPE (K6VMN, K6BN, N6HBI, WA6s DJS, FFX oprs.) 22,397-281-81-ABCD

Santa Clara Valley
WB6XQ 12,936-205-49-ABCD
K6GING 420-42-10-AB
K6GSS 4600-230-20-B
K6CB 400-44-10-B
WB6KBZ (+ KABIRI, NUBS, WA6AZP) 37,051-416-67-ABCD

San Diego
WA6TBO 224-32-1-B
N6DG (+ WA6SNH, WB6FHS) 2835-29-21-BCD

San Francisco
WA6Lly 680-44-15-ABD

San Joaquin Valley
NR6E 3000-100-25-ABDE
WA6SLF 195-12-7-BC
WB6PD 80-10-8-AB

Sacramento Valley
W6YKM (K6NS, K6GY oprs.) 14,500-237-50-ABCD

7
Arizona
K6LMN7 5592-87-54-ABCD
K7NN 1650-51-30-ABD
N7BUP 240-24-10-AB
W7DTL (+ K07DR, W7LHA, W7NSN) 16,038-208-60-ABCD
WA7JTM (+ NTAMA) 5760-128-45-AB

Idaho
WB7NEZ 126-21-6-ABC
N7AUV 9-3-3-B

Nevada
K7ICW 1838-83-41-AB
K7CY 408-24-17-AB

Oregon
K7HSJ 3192-84-24-ABCD
W7UDM 1026-54-19-ABCD
W7A0H 62-5-8-ABD
W7JUX 198-18-11-A
K6VIZ 90-15-6-B
W7SAA (KA7QQU, KB7CW, KD7WA, NT7OC, WA7ZAJ oprs.) 4810-107-37-ABCD

Utah
WD6AUP7 (+ K6PVS, WA7JUU) 3388-94-28-ABDEI

Washington
WB7UUP 7687-145-41-ABCD
W7ZSL 360-33-10-ABC
W7ERH 150-15-9-ABCD
W7KQU 493-29-17-A
W7IDZ 80-10-6-A
N7FXQ 378-54-7-B
N7FX (+ K7ND) 12,300-208-50-ABCD
WB7PEK (+ KA7ICT) 3564-83-33-ABCD

Wyoming
WA7KYM 216-18-8-BCD

8
Michigan
WA8FTA 16,874-194-82-ABD
W8CAP 3072-96-32-BD
K8LZF 104-8-8-ABCD
W8CQI 270-18-15-A
N8CKH 6162-144-43-B
N8DEJ 8108-142-43-B

Ohio
WBULC 37,620-304-110-ABCD
K8DIO 18,105-159-85-BCD
WD8CTX 10,920-167-60-ABD
K8TL 9840-115-60-BDE
K8VW 9310-85-49-DE
N8BJN 1896-53-29-BC
N8CCO 1282-52-22-ABCD
WB8TCZ 796-32-21-BD
WA8SUV 859-39-22-A
K8BPB 12-4-3-A
WB8HJG 3080-90-34-B
WB8JR 2555-73-35-B
W8LVC 180-16-10-B
W8VY (K8w AL, IOX, N8s BOZ, EKA, FXL, W8UA, W8PR, W8FHF, W8Ss DQE, ERB, WB9YCZ, WB8KPI oprs.) 192,720-648-240-ABCD
K8CQA (+ N8FY, WB8s JAY, TED) 15,222-169-86-ABD

West Virginia
NBFCJ 99,528-542-156-ABD
WBLSG 5555-82-63-ABD
N8DKL 1462-43-34-AB
WB8DRR 3520-80-44-B

9
Illinois
WB9MSV 35,329-272-103-ABCD
WB9BTY 12,222-191-63-ABD
K9RK 9487-150-53-ABCD
WB9SNR 7097-73-47-CD
WB9SD 6324-95-66-ABCD
WB9UWA 6120-114-51-8D
AA9D 4836-148-38-BCD
K9NV 2960-71-37-8D
W9V1 2600-75-35-ABD
KA9MGR 2035-55-37-A
K9AKS 11,712-192-61-B
N5AFL9 8940-149-60-B
K9SQC 8984-188-43-B
W7D6FA 7701-151-51-B
K9LDS 6016-128-47-B
N9AQ 4323-111-39-B
N9DMT 3096-85-35-B
W9DARK 2573-83-31-B
WB9GQU 1820-70-26-B
KA9KJ 788-42-19-B
KA9CLP 44-11-4-B

Indiana
WB9NTL 17,878-181-82-ABCD
KA9PK9 14,018-131-96-ABD
W9EP9 13,050-174-75-AB
KA9KH 8123-98-47-8D
K9DZS 3239-79-41-ABD
WB9UT9 2482-51-34-8D
K9MR (+ K9TVZ, W9BE) 51,880-332-140-ABCD
K9MR9 (+ KF4ST) 24,206-201-98-ABCD

Wisconsin
WA11E 7178-115-52-BCD
W9YCV 1812-56-26-BD
N9TD 817-36-19-8D
N9DWL 588-28-21-A
KA9HL 3264-96-34-B
N9EE 1472-64-23-B
K9GDF 12-4-3-B
N9DU 12-4-3-B
WBUC9 (+ K9s VFV, GJX, V9SFB) 38,088-252-137-ABCD
K1TMM (+ KA9RFR, K9GZ, KC9BY, KD9GS, N9KS) 9184-164-56-AB

10
Colorado
KA9MQA 15,975-187-75-ABCD
WB9ERB 11,536-159-66-ABD
W9KUY 1022-49-14-BCD
K7CJY 350-27-10-ABD
WBETT 17,388-189-32-A
WBZL 4608-98-47-A
WBKEA 203-28-7-B
WBIA (KA8s DXM, QPT, KR8U, W1XE, W9JF, oprs.) 12,444-175-61-ABCD

Iowa
WB9ZKG 18,303-199-97-AB
K8DAS 18,444-159-87-ABCD
WB9WV 12,716-161-68-8D
WB9VW 9578-131-57-8D
K8CC 6780-83-60-ABD
N8CH 2548-86-28-BC
WA8DCB 758-36-21-AB
N8EKT 2888-76-38-B
WB9AP 1386-33-21-D

Kansas
WB9DH 3688-81-48-AB
WB9SV 1701-55-27-8D
WB9CFQ 1123-40-28-AB
K9FC 805-35-23-B
N8LL (+ KB9WV, KF9M, KX9D, WA9PWE) 84,600-423-200-ABDEI
WB9DRL (+ N8UJ, WA9TKJ) 29,632-234-113-ABD

Minnesota
WB9CQ 3320-88-40-ABD
K9MP 458-28-17-ABD
WB9PN 1856-72-23-B

Missouri
WB9NDK 35,712-237-128-ABCD
WB9VH 11,285-154-81-ABD
WB9Y 8122-113-82-8D
WB9RP 7412-86-68-ABD
WB9PP 1860-43-31-8D
K8GB 1828-46-22-ABCD
WB9MS 943-40-23-BC
K1TY 536-24-14-B
N8TLM (+ K8DEJ) 44,789-472-143-ABCD
KMDA (+ WA7ADK) 2812-74-88-AB

Nebraska
K8US 12,410-148-85-AB
K8CDB 8208-106-57-BCD
WB9DGF 4578-96-42-8D
K8BCI 3686-78-47-AB
WB9MS 2080-58-32-8D
WB9VW 952-33-28-ABD
WB9GPM 2135-81-35-A
WB9ZY 345-23-15-B
WB9BQM 60-8-5-D

South Dakota
WB9D 2849-63-37-BCDE

VE
Maritime — Newfoundland
VE1UT 16,982-227-58-BCD
VE1AHM 3287-121-27-B
VE1AFA 1430-65-22-8D
VE1ADS 184-23-8-B

Quebec
VE2FT 6250-125-86-ABCD
VE2BTW 1003-49-17-ABDI
VE2BU 792-44-18-AB
VE2FTR 448-28-18-AB

Ontario
VESASO 40,120-264-118-ABCD
VE3FGU 20,690-220-84-AB
VE3FR 11,958-158-57-8D
VE3FR 8785-130-68-ABCD
VE3CRU 8720-100-54-BCD
VE3FGN 8295-118-85-ABCD
VE3CFM 8280-120-39-AB
VE3BFM 8120-145-56-ABCD
VE3BOY 7898-107-58-ABCD
VE3BYO 3589-81-37-8D
VE3AQG 3084-91-34-B
VE3DDW 2720-80-34-B
VE3CE 480-32-15-B
VE3DJ 42-7-3-D
VE3LNX (+ VE2AM, VE3s ADJ, NSC) 50,910-407-155-ABCEFD
VE3GRC (+ VE3s AUI, MGU, OCT) 14,175-222-63-ABCD

Saskatchewan
VE5LY 30-6-5-A

Alberta
VE6AFO 258-19-8-8D

British Columbia
VE7ASI 1219-40-23-ABCD

Checklog
AA2ZM1

5760-MHz CW: Used on this band was a homebuilt 5.595-MHz receiver. The receiving converter used a circulator as a junction to connect the transmitter and the receive mixer to the common antenna lead. The first mixer was a double-balanced hot-carrier diode mixer, and the transmitter provided the local oscillator power in an offset IF scheme similar to the way Gunnplexers are used at 10 GHz. We have exciter crystals to receive and transmit both the offset and normal 5760-MHz signals so we can work conventional stations as well as our own. This system was designed by WA1UGE. The exciter was a mobile-radio exciter similar to the one used on 2304, but this time driving a quintupler to 5760 MHz mounted in a box at the feed together with the receiver front end. WA1UGE also modified a surplus X5 step-recovery multiplier for this station that delivers 5 mW to an amplifier delivering about 100 mW. The antenna was a 3-foot dish mounted on a rotating tower used on 5.7, 10 and 24 GHz. The feed was a length of 1.5-in copper drainpipe.

10-GHz FM: The transceiver used was a Gunnplexer with a homebuilt IF receiver by WB1CBH and WB2PKO. We used wide-band

FM with 75-kHz deviation. We were able to use both 30-MHz and 10.7-MHz IF offsets, and have worked stations not associated with our group on both offsets. The Gunnplexer was mounted at the focus of a 4-foot dish on a rotating tower 35 feet tall. The tower could easily be pointed to an accuracy of less than a degree even when the wind was blowing at 50 MPH!

24-GHz FM: The transceiver was a Gunn oscillator with a circulator junction designed by WA1UGE. We used wide-band FM with 75-kHz deviation. The Gunn transceiver was mounted at the focus of a 13-in dish on a 35-foot rotating tower. The tower could be pointed to an accuracy of less than one degree.

Thanks to all who entered and helped to make this contest a success. See you next year.

SOAPBOX

Conditions were average all weekend on tropo, although some extended range QSOs were made by brute force (K2UJH). Conditions were poor on all the bands, and apparently activity was low on 220 MHz. I was glad most stations were working CW (K2GK). You could easily tell the guys who also run EM. They had the memory keyers with an endless CQ (WA3YON). I thought 432 was really down. Compared

to the QSO party, I had a lot less contacts this time. This time I was using an amp, while during the QSO party I was only running 10 W with no amp (KR3C). My 10.250-GHz system failed the 40-ft drop test Saturday A.M. so I didn't make it on that band (VE3BFM). Conditions were only fair, but lots of fun (VE3OCX). My first 10-GHz contact with FN45 was also a new Canadian record of approximately 100 miles, between Mt. St. Hilaire and Mt. Megantic (VE2DUB). One must learn humility and patience when your QSO rate is slightly above 2 per hour over the entire contest... however, half way to VUCC on 432 MHz in one weekend isn't too bad (WB9MSV). I made solid QSOs on 432 out to 300 miles, despite running only 10 W and average tropo conditions (WA8VJF/5). 432 MHz maintained the normal conditions we have had for several months—terrible (KB5PX). I was impressed with the activity on 1296 MHz during this contest (KD8SI). These were the worst conditions ever for this contest (KC4EG). I had thunder storms almost all the time Saturday. The rotator died aimed east at 10 P.M. Overall, it was much better than last year with 10 W to a satellite antenna on a picnic bench (K8TL). Too many people were on vacation (K2LNS). Many regulars were missing. Were they all watching the Olympics? (W1JR). Activity seemed very slow at times. For the first time in many years, Murphy visited everywhere in my system (K1LFS). W2VC was the loudest ever on 432 MHz (K1FWF).

FEEDBACK

K7RUN should have been listed in the 1983 results as K7RUN 234-7-3-C and -6-3-D instead of as a checklog.

Scores

Call sign, total scores, QSOs, multipliers, bands operated (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) and ARRL Section. Example: K2UJH had a total score of 16,095, with 3 QSOs and 1 multiplier on 220 MHz, 88 QSOs and 28 multipliers on 432 MHz, and 27 QSOs and 8 multipliers on 1296 MHz. He is located in the Southern New Jersey Section. Among the single-operator stations, the overall Division winners and single-band winners are indicated by bold-face type for the call sign of the Division winner and for the one letter(s) denoting the bands won.



Atlantic Division

K2UJH	16,095	3-1-C-SNJ	- 88-28-D
			- 27-8-E
W3IP	15,360	19-10-C-MDC	- 69-21-D
			- 20-9-E
K2GK	10,179	25-11-C-WNY	- 46-23-D
			- 8-5-E
WB3IMS	7650	75-34-D-WPA	- 33-14-D
AAZ2/3	6789	34-16-C-EPA	- 3-1-E
			- 31-11-D
W2EIF	6630	32-11-C-SNJ	- 11-4-E
			- 28-10-D
W3GPY	5256	73-24-C-EPA	- 7-3-E
WA2OMY	4781	27-10-C-EPA	- 0-4-E
			- 2-1-F
WB3ESS	4290	39-17-D-EPA	- 20-9-D
			- 1-1-E
WA3YON	3519	29-13-C-EPA	- 31-12-E-SNJ
			- 20-16-C-EPA
			- 23-6-D
KA3HTY	1806	9-3-C-EPA	- 34-11-D
			- 18-11-D-WPA
WA2ABN	495	15-11-D-WNY	- 315-15-7-D-DE
K3SXA	315	15-7-D-DE	
W1QX2 (+WA1WXV)	8541	21-15-C-WNY	- 41-21-D
			- 4-3-E

Canadian Division

VE3CRU	20,313	26-19-C-ON	- 81-31-D
			- 12-11-E
VE3BFM	13,680	18-14-C-ON	- 57-26-D
			- 10-8-E
VE3OCX	3780	18-14-C-ON	- 26-16-D
VE2FUT	1500	10-8-C-PQ	- 15-12-D
VE3CKU	821	4-3-C-ON	- 19-9-D
			- 9-9-D-ON
VE2DUB	144	4-34-PQ	
VE3DJ	106	9-4-D-ON	
VE3LNX (+VE3s ADJ,NSQ)	21,735	32-24-C-ON	- 55-27-D

Central Division

WB8SNR	6840	11-10-C-IL	- 39-23-D
			- 5-5-E
W9UD	4038	6-8-C-IL	- 37-20-D
			- 3-2-E
WB9MSV	3750	50-25-D-IL	
WA9JFM	3564	36-23-D-WI	- 4-4-E
WB9NTL	1653	13-7-C-IN	- 16-12-D
			- 594-18-11-D-WI
WA9FWD	594	18-11-D-WI	
N8TD	420	14-10-D-WI	
WA1ED	84	7-8-C-VI	
WB9EDP	36	4-3-D-IL	

Dakota Division

K8ALL	390	3-3-C-ND	- 8-6-D
			- 1-1-E

Delta Division

W5RCI	1296	4-4-C-MS	- 18-13-D
			- 1-1-E
WA8VJF/5	390	13-10-D-AR	
K85PX	210	10-7-D-LA	
W5UCY	36	4-3-D-MS	
WD4DGF (N4VC, WA4CBX,opr)	1710	19-11-C-TN	- 11-8-D

Great Lakes Division

WB8BKC	27,885	33-18-C-MI	- 72-35-D
			- 19-12-E
K8WW	23,978	90-37-D-OH	- 29-17-E
			- 37-22-D
K8DIO	7182	26-16-C-OH	- 30-17-D
			- 9-6-E
WB8DU	5394	10-8-C-MI	- 30-17-D
			- 6-5-E
KD8SI	4050	38-23-D-OH	
WA8TXT	3402	22-11-D-OH	- 10-7-E
			- 2-2-F
			- 1-1-G
WA8FTA	2160	35-20-D-MI	
KC4EG	2079	18-10-C-KY	- 17-11-D
			- 10-6-C-MI
NE8I	1785	10-8-C-MI	- 15-8-D
			- 5-3-E
K8TL	1674	31-18-D-OH	
WB8CAP	759	23-11-D-MI	
WB8TCZ	720	16-8-D-OH	- 1-1-F
			- 1-1-G

Hudson Division

K2LNS	16,580	24-9-C-NNJ	- 64-20-D
			- 25-11-E
W2VC	10,494	66-23-D-NNJ	- 20-10-E
W1XQ2	10,098	20-8-C-ENY	- 79-26-D
			- 39-9-D
N2BJ	6006	32-8-C-ENY	- 10-5-E
N2BMN	4028	13-6-C-NNJ	- 40-14-D
			- 4-2-E
W2WW	2499	30-9-C-NL	- 19-8-D

K2BJG (+WB2RFB)

	11,880	40-15-C-NNJ	- 80-16-D
			- 10-5-E
N2CEI (+N2EOC)	8835	49-18-C-NNJ	- 46-15-D

Midwest Division

WB8TEM	5930	4-4-C-IA	- 25-15-D
			- 3-3-E
W8RAP	2160	36-20-D-IA	
K8TLM	2070	7-7-C-MO	- 23-16-D
W8JRP	12	2-2-D-MO	
K8FM (+K8BDW)	810	3-3-C-KS	- 15-12-D

New England Division

K1PXK	17,082	29-11-C-CT	- 75-21-D
			- 21-7-E
W1JR	13,104	34-13-C-EMA	- 44-20-D
			- 17-6-E
WA1JOF	7938	25-8-C-EMA	- 35-12-D
			- 19-7-E
W1EJ	5175	31-10-C-NH	- 24-11-D
			- 7-4-E
W1GXT	2703	27-9-C-EMA	- 16-5-D
			- 5-3-E
K1LPS	2484	23-9-C-VT	- 23-9-D
WA1AYS	1050	35-10-D-EMA	
K1IISW	810	30-9-D-WMA	
K1FWF	780	9-7-C-EMA	- 11-6-D
K81KM	720	30-8-D-EMA	
AC1J	672	10-3-C-NH	- 18-5-D
W1QXX	624	28-8-C-EMA	
K1VZI	462	22-7-C-EMA	

K1DS

W1AIM	390	2-2-C-VT	- 11-8-D
W1JOT	342	7-2-C-EMA	- 8-2-D
			- 2-2-E
KT1K	210	14-5-D-EMA	
W1AW (K1TR,opr)	180	12-5-D-CT	
W1QXX	624	26-8-C-EMA	
WA3EEC/1	12	1-1-WMA	
W2SZ1 (AG1M,WB1CBH,NF2B, W2ARQ,WA2s AAU,SPL,ZPO, WB2QCJ,AK4L,WA8USA,G3SEK, oprs.)	113,469	73-28-C-WMA	- 128-40-D
			- 32-13-E
			- 5-7-F
			- 5-7-G
			- 4-6-H
			- 6-7-I
			- 1-1-J

K1FO (+WA1RWJ)

	45,435	59-20-C-CT	- 114-35-D
			- 30-10-E

KA1OJ (+K1ME)

	3150	11-5-C-ME	- 14-5-D
			- 5-2-E
WA1YKN (+WA4STQ)	528	22-8-D-EMA	

Northwestern Division

K8DW	3240	10-7-C-OR	- 27-13-D
			- 4-4-E
K7HSJ	780	9-4-C-OR	- 11-4-D
			- 3-2-E

Pacific Division

W8RXQ	2370	47-6-D-SCV	- 16-4-E
			- 5-3-C-EB
N8EE	664	5-3-C-EB	- 13-3-D
			- 7-3-E
W8HAB	0	0-0-D-SJV	
N8AMG (+K8QXY,WA8MXX)	2988	8-3-C-SF	- 47-5-D
			- 14-4-E

Roanoke Division

K4HWG	1974	47-14-D-VA	
K4QIF	1630	20-13-D-VA	- 5-4-E
K4CAW	1311	23-19-D-NC	
W3CCX/8 (K2EVI,W2SB,WB2s NPE,RVX,N3CX,WA3s AXV,JUF,NUP,KD6KG,opr.)	59,080	84-28-C-WVA	- 88-36-D

AB4L (+KB4NT,WA4s IVF,PQI, WB4WTC,WD4DUJ)

	20,010	20-14-C-VA	- 67-33-D
			- 8-5-E
			- 3-5-I

Rocky Mountain Division

W6KJY	108	1-1-C-CO	- 5-4-D
KC7QJ	99	11-3-C-CO	
WB5TCO (+KA5CEB,W5LTR)	8	1-1-E-NM	

Southeastern Division

WB4NMA	6390	21-17-C-GA	- 26-20-D
			- 3-3-E
W4ODW	1056	2-2-C-NFL	- 16-12-D
			- 2-2-E
W4JQV	585	1-1-C-GA	- 8-10-D
			- 3-2-E
WD4MBK	429	13-11-D-GA	
W4ISS	284	11-8-D-GA	

Southwestern Division

K8TZ (KA8SFN,W1UQU,WA6s GNG,M8Z,VNN,WB6HOZ,opr.)	6984	61-7-C-SB	- 24-10-D
			- 4-5-E
			- 1-2-I

West Gulf Division

W6GG	3087	25-13-D-NTX	- 12-8-E
WA5VJB	2310	22-5-C-NTX	- 15-8-D
			- 5-2-E
			- 2-1-I
K5SW	2070	5-4-C-OK	- 25-19-D
K5DHU	1260	16-11-D-NTX	- 6-4-E
KE5EP	1188	23-11-D-NTX	- 5-1-E
			- 5-4-D
			- 0-0-E
W5NZS (+KJ5Q)	162	1-1-C-OK	- 8-5-D

Checklog

W3HQT/M			
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Amateur Radio at the PGA

Shelby County nestles in the rolling hills of central Alabama, about 20 miles south of Birmingham. Its population is congregated mostly in several rapidly growing suburban communities situated in the northern third of the county, while the rest of the area is dotted with typical Southern farming towns. The lifestyle in Shelby County is, as we say in the South, "laid back." Very little goes on to attract much attention to the area, and that's usually the way we like it.

This was not the case, however, this past August. For four days, the population of the county surged to more than twice its norm. People came in droves to a little area in the northeast corner of the county called Shoal Creek. They came to watch people like Trevino, Player, Nicklaus and Greene chase a little white ball around a few acres that, just a few years ago, had been fertile pasture land. They, along with millions of others worldwide through the American Broadcasting Company, came to Shelby County to watch the 1984 Professional Golfers Association (PGA) Tournament.

The anticipation of an expected 100,000-plus golf fans flooding Shelby County caused a bit of a commotion in the 18-man County Sheriff's Department. Calls for volunteer assistance went out everywhere. Off-duty firemen, municipal police officers, street and sanitation workers, and anyone else who could walk or crawl found a place in the reserve deputy force. The Shelby County Amateur Radio Club (SCARC), through its emergency communications wing, the Shelby County Amateur Radio Emergency Service (SCARES), volunteered their services. The offer was readily accepted.

The primary concern of the Sheriff was control and routing of vehicular traffic into and out of the Shoal Creek area. The course is located about four miles east of U.S. 280, near Double Oak Mountain, just south of Birmingham. There are only two routes over which traffic can move from U.S. 280 into Shoal Creek — County Highway 41 and Hugh Daniel (HD) Drive. The latter, a narrow, twisting three-mile stretch of two-lane asphalt, was considered the primary route since it was closest to Birmingham, from where most of the traffic would come. Highway 41 was to be used as an alternate if HD Drive became clogged or impassable.

After a meeting with the Sheriff, a decision was made that SCARES members could best be utilized as traffic monitors on HD Drive. Mobile units were to be stationed at safe off-the-road

points along the blind curves and hills of HD Drive, as well as at each of the three major intersections and in the Sheriff's Mobile Command Post, just inside the course gates. With this arrangement, any problems on the primary route could be reported to the law enforcement officers at the intersections, and traffic could be rerouted accordingly.

The first problem was identification of the SCARES radio units. The Sheriff wanted the units to be readily identifiable to both police and public. Large black-on-yellow placards with the words "EMERGENCY RADIO" in large, bold print, and the club name in smaller print, were obtained for use on the windshield and rear window of each unit. These signs proved to be well worth the investment since several times throughout the event, passersby would come to us to report problems that occurred out of our sight. The signs also facilitated easy access to otherwise-restricted areas we needed to be, without a lot of time-consuming explanation to an already busy traffic cop.

Once the commitment to assist had been made, our next concern was, could we live up to our promise? This was of particular concern to us since this was our first opportunity to work directly with the Sheriff in the four years of the club's existence. His first impression of Amateur Radio would be a lasting one. The tournament was held over a four-day period, Thursday through Sunday. The first two days being normal workdays for most caused fears that we would not be able to supply sufficient units to properly cover the necessary points as promised. However, to the credit of the SCARC membership — with some assistance from the nearby Birmingham ARC — the operation was well staffed throughout the event. Several club members even took vacation days to be of service.

There was some initial concern about our ability to communicate in the hilly terrain around Shoal Creek. Fortunately, the club's 2-meter repeater on 146.43/147.03 MHz is located on top of Double Oak Mountain. The area we would be serving is situated around its base. Still, with the type of terrain in the area, there were plenty of opportunities for VHF shadows, especially when operating with hand-held transceivers. Tests were run in the area prior to the event to verify the coverage. Points were also picked for relay stations in the event of repeater failure. Though some shadowing was noticed, virtually in sight of the repeater antenna 1200 feet above, there was not enough to cause any real problems. Several of the state and reserve police who came in to assist brought their own radio equipment. They quickly found that the granite mass of the mountain made simplex communications impossible, and their repeater stations were too dis-

tant to be of any use. They were heard several times screaming futilely into their microphones, "Find a ham so I can talk to you!"

The first day of the tournament began at 6:30 A.M. for SCARES. We had to have our units on station before the traffic rush began. Units were placed approximately every one-third mile down HD Drive and at each intersection as planned. As the traffic rush began, HD Drive was closed to traffic at the Shoal Creek end. Ham radio units reported when all outbound traffic had cleared, and the road was opened as a one-way inbound. When HD Drive would begin to backup, it would be closed temporarily and all traffic rerouted to Highway 41 until the jam cleared. All went as planned throughout the morning inrush. The afternoon proved to be not as simple.

About 3:30 P.M., "Ole Mother Nature" decided to park a rather isolated but very wet thunderstorm over Shoal Creek, halting tournament play. The majority of spectators decided all at once that they had seen enough golf for one day, and a mass exodus down a now very wet and slippery HD Drive began. Almost immediately, radio units began reporting near misses as the rain-soaked spectators, traveling too fast for road conditions and anxious to get home to dry clothes, found little traction rounding the unbanked turns and topping the blind hills. Miraculously, though several vehicles left the road and there were uncountable near collisions, the day ended with only two cars requiring assistance and, above all, there were no injuries!

Friday morning brought a new set of problems. The previous day's rain had soaked into the grassy parking lots around the course. As cars began to try to get into them, the lots quickly became a muddy quagmire. The backup at the lots rippled back down the access roads and onto U.S. 280. By mid-morning, traffic was backed up as far as the eye could see. Those who had decided to drive out that morning to watch a little golf but forgot to check their fuel gauge soon found themselves sitting beside the road. Others, trying to beat the hot, humid August weather by running the car air-conditioning system, found themselves just as stranded with their radiators blowing geysers of steam. This compounded the problem further by partially blocking the already-clogged roads. SCARES units reported these problems as they occurred, having wreckers dispatched to stranded motorists. Even some of the touring golf pros found themselves caught in the jams and running very late for their appointed tee times. Amateur Radio was used to dispatch a ham operator/helicopter pilot to a prearranged pickup point and airlift these stranded pros to the course.

*Deputy Communications Manager, ARRL

On Saturday, traffic jams were, once again, the major problem. This time they were complicated even further by the sheer volume of traffic. Shoal Creek maintenance crews had worked all night hauling gravel to the devastated parking lots. Their efforts helped some, but by mid-morning some lots had to be closed. At the height of the rush, some SCARES communicators found themselves doubling as traffic cops, and additional turn lanes were opened to try to keep U.S. 280 clear for through traffic. As access roads became clogged, getting assistance to breakdowns became a lengthy process. Some golf fans waited up to two hours for assistance to arrive.

Sunday, the final round of the tournament, brought more of the same. Traffic did not seem to be quite as heavy, however, possibly because of news reports of tie-ups the day before or the experience gained on Saturday that allowed traffic police to move the traffic more easily. Late in the afternoon, Mother Nature decided once again to water Shoal Creek. This time, since it was the final round, not everyone tried to leave at once. Most seemed to want to stay and see the outcome despite the rain. Darkness was rapidly settling on Shoal Creek before Lee Trevino finally proved that he was the best of the best. Then the final exodus began in earnest. Only one accident occurred on the still-slippery HD Drive: one motorist, trying to beat the rush, lost control on a turn and went off the road. Again, fortunately, there were no injuries. Stars were shining brightly before the SCARES Net Control Station finally closed the operation and thanked all amateurs for their participation. Shelby County began the slow process of returning to the sleepy Southern community it had been just a week before.

During the four days of the 1984 PGA Tournament, over 138,000 people from all over the country — a near-record attendance for the tournament — poured into Shelby County. During this time, 25 SCARES operators provided 436 man-hours of volunteer service. They did their best to make the visitors' stay a safe and pleasant one. They delivered messages, sent assistance to stranded motorists, coordinated medical aid and did everything they could to be of assistance. Wherever they went and whatever they did, the signs on their cars told the public that Amateur Radio was at the PGA.

In an interview with the *Birmingham News*, the Chief Deputy Sheriff of Shelby County said of the hams, "They're a very professional group. We've seen them work before. We know we can count on them. We wouldn't use them if we couldn't." The members and volunteers of SCARC/SCARES proved that they are worthy of his confidence. — *Carl Weeks, NADMA, ARRL SEC, Alabama*

AMATEUR SATELLITES AND EMERGENCY COMMUNICATIONS

Since the early days, public service — in the form of emergency communications, formal message handling and tactical message handling — has been a very important part of Amateur Radio. This is one of the reasons the Amateur Radio Service exists in the United States and certainly is an important factor in determining international frequency allocations.

Almost every mode of amateur communication and every resource have been used at one time or another for emergency communications and message handling. There is, however, one valuable resource that has not been practical to use until recently: Amateur Radio satellites. In the past, satellites have not been used for these purposes for one simple reason: very short ac-

cess times. It just was not practical to use a satellite that was only available for 5 to 10 minutes a pass for emergency and message-traffic communications. But now, with the successful operation of AMSAT-OSCAR 10, a medium exists for a reliable satellite emergency-communication system.

This valuable resource should be developed for a number of reasons. First, to continue the tradition of public service, one of the justifications for the existence of Amateur Radio that can also help justify the existence and growth of the Amateur Satellite Service. Second, this is a valuable and very reliable medium for communication that should be utilized to its fullest potential. OSCAR 10 is really a new band that is open for 8 to 10 hours at predictable times each day. With plans now being made for Phase IV geosynchronous satellite systems, amateurs will, in the not-too-distant future, have a band that is conceivably open 24 hours each day to almost anywhere in the world. Finally, with many new modes of communication being developed — such as packet networking and the use of gateway stations — amateurs have the ability to assemble a working model of a national and international emergency communications system second to none.

A new subgroup within AMSAT is being formed: the AMSAT Satellite Emergency Communication System (ASECS). This group will be developing a communications and operational plan to be implemented on OSCAR 10 and future satellite systems.

The purpose of ASECS is to provide a working satellite communications system available for handling of emergency communications and formal message traffic. In times of communications emergency, this system should be conducted as a formal traffic network. At other times, the system should be used as a medium for the handling of routine message traffic and emergency drills.

Initial Goals

1) Establishing an international reservoir of operators trained in satellite communications, emergency communications and formal message traffic handling.

2) Immediate utilization of existing satellite communications resources (primarily AO-10 at this time). One of the first steps in this process would be to designate one of the existing special-service channels (SSC) to be used as a primary network channel for ASECS use during communications emergencies and drills. This SSC would be used for routine AMSAT operations at other times.

3) State-of-the-art digital communications techniques (i.e., packet networking) will be utilized for formal message handling whenever possible on the ASECS SSC.

4) Tactical and other types of informal communications should normally be handled within the normal transponder passband. If necessary, another SSC could be temporarily utilized for this type of communication.

5) The use of gateway stations will be encouraged for both packet communications and informal tactical communications.

6) Direct interface and cooperation with government agencies (NCS, FEMA, etc.) will be a primary goal.

7) ASECS should be interfaced as a communications tool by the ARRL National Traffic System the Amateur Radio Emergency Service and similar organizations in other countries.

8) Active use of ASECS in emergency-communications drills sponsored by government agencies and amateur groups should be encouraged.

9) Formulation of an efficient plan for use of ASECS is now underway. This plan will be comprehensive and flexible, to allow the most efficient use of existing resources while looking ahead to the use of future satellite systems.

At this time, AMSAT is looking for amateurs who would like to be involved in the organization of ASECS. Interested amateurs should have expertise in satellite communications, formal traffic handling or emergency communications. However, the most important qualification is the desire to design and implement an emergency-communications system that is second to none both technically and operationally. Those interested in participating in ASECS can contact me at 4866 Drusilla La., Baton Rouge, LA 70809. — *David C. Eanes, N4AZI, AMSAT Emergency Communications Manager*

PUBLIC SERVICE DIARY

□ Morro Bay, California — September 15-16. Estero ARC members (of Los Osos) assisted with communications during the Morro Bay Challenge, a fireman's muster program drawing participants from fire departments throughout the state. Ten amateurs provided communications during the kick-off parade and related activities during the two-day event. (W6JTA)

□ Odem, Texas — October 19. A shelter for residents and stranded motorists opened after nearly 20 inches

of rain fell during a short period of time in the Odem area. When telephone service was disrupted, AK5T stepped in and setup a 2-meter station in the shelter, establishing a communications link in nearby Corpus Christi. Messages were relayed from those in the shelter to their friends and families, advising of the situation. (W5GEL)

□ Rosemont, Pennsylvania — October 19. The Mid-Atlantic ARC was called in to provide communications for the Red Cross during an apartment fire that resulted in the evacuation of 67 people. Five amateurs responded and assisted the Red Cross until the fire marshal allowed the residents to return to the complex. (WA3PZO, SEC EPA)

□ Clearwater, Florida — October 27. While driving in heavy rain, WD4COL and N4APZ witnessed a single-car accident and immediately notified the Florida State Police via autopatch. Noticing a man flee the scene, they gave a complete description and location of the man via the autopatch. The individual was apprehended minutes later. (WD4COL)

AMATEUR RADIO EMERGENCY SERVICE REPORTS

□ Calaveras County, California — August. Amateurs provided auxiliary communications for the California Department of Forestry during a wildland fire August 9-10. Later that month, on August 24, amateurs were called out again when a helicopter crash started another wildland fire. (KA6CUJ, EC Calaveras Co.)

□ Columbus, Ohio — September 22. Fifteen Central Ohio ARES (COARES) members provided communications for Red Cross first-aid teams at the Ohio State Univ. vs. Univ. of Iowa football game. There were 53 calls for Red Cross assistance, two of which were serious enough to require transport to a local hospital. (W8BKO, DEC COARES)

□ Salinas, California — September 22-23. Three Amateur Radio nets were activated during the Fourth Annual California International Airshow. The three nets provided timely and proper routing of information between the many volunteer and governmental organizations sponsoring the show. A total of 12 amateurs participated during the two-day affair. (WD6EKR, EC Salinas Valley)

□ Stanislaus County, California — September 26. At 1:46 P.M., an earthquake measuring 4.6 on the Richter scale struck a large section of northern California. WA6OYF, emergency services technician, immediately manned the Stanislaus County Office of Emergency Services, monitoring local repeaters to get an initial appraisal of the damage. With the assistance of K6SNA and WA6KJL, it was determined that damage was very slight, and emergency operations were able to secure shortly thereafter. (WA6YOF, EC Stanislaus Co.)

□ Biwabik, Minnesota — October 13. Five area amateurs provided communications on the race route during the Giants Ridge Triathlon 1984. Seventy-nine participants entered the canoe, bicycle and foot race. (WD8GUF, EC Northern St. Louis County)

ARRL SECTION EMERGENCY COORDINATOR REPORTS

For October, 38 SEC reports were received, denoting a total ARES membership of 21,591. Sections reporting were: AK, AB, AZ, AR, CO, CT, ENY, EPA, IN, KS, KY, ME, MI, MN, MS, MO, NE, NLI, NTX, OH, ON, ORG, PAC, SV, SDG, SJV, SCV, SC, SD, SFL, SNJ, TN, UT, VA, WA, WMA, WNY and WV.

NATIONAL TRAFFIC SYSTEM

N2YL has been appointed assistant manager for 2RN/cycles 3 and 4. Also, congrats to Linda on her recent election to Director for the ARRL Hudson Division. K4JST is the new assistant net manager for RN4/c4. Certificates were awarded to the following: 2RN/c2 — K2GCE, KC2PB, ND2S, KA2SPH; RN7/c2 — KR7L KD7ME (2nd annual); 8RN/c4 — N8EPV.

October Reports

	1	2	3	4	5	6	7
Cycle Two							
Area Nets							
EAN	31	731	23.6	823	93.0		

CAN PAN*	31	848	27.4	586	100.0
	62	546	8.8	390	97.3
Region Nets					
1RN	62	496	8.0	378	93.0 100.0
2RN	59	247	4.2	252	85.5 100.0
3RN	31	258	8.3	461	92.7 96.8
4RN	62	623	10.0	453	92.5 100.0
RN5	62	666	10.7	450	94.6 100.0
RN6	60	440	7.3	654	— 91.2
RN7	64	348	5.4	326	90.4 100.0
8RN	62	323	5.2	337	94.6 87.1
9RN					100.0
TEN	62	532	8.6	392	92.8 100.0
ECN					74.2
TWN	62	288	4.6	253	77.8 96.8

TCC					
TCC Eastern	99'	432			
TCC Central	80'	382			
TCC Pacific					

Cycle Four Area Nets					
EAN	31	1508	48.6	1,279	97.8
CAN	31	908	29.3	1,035	100.0
PAN	31	928	29.9	860	99.5

Region Nets					
1RN	60	680	11.3	544	91.7 100.0
2RN	92	533	5.8	424	93.0 93.5
3RN	61	320	6.55	504	97.8 100.0
4RN	57	569	10.0	443	90.8 96.8
RN5	62	766	12.4	697	91.4 100.0
RN6	62	484	7.5	556	98.2 100.0
RN7	62	472	7.6	633	90.3 100.0
8RN	63	297	5.0	317	85.0 96.8
9RN	57	519	8.2	575	93.6 100.0
TEN	61	338	5.5	382	75.2 100.0
ECN					100.0
TWN	61	352	5.8	351	— 100.0

TCC					
TCC Eastern	57'	293			
TCC Central	113'	657			
TCC Pacific					
Sections ¹	8802	25,945	3.8		
Summary	11,342	42,699	3.8		
Record	9039	59,630	16.4		

*PAN operates both cycles one and two.
 1 TCC functions not counted as net sessions.
 2 Section and local nets reporting (235): AENB AEND AENX AENY AENZ ATNM WAEN (AL), AEN HARC (AZ), SWN (AZ/NN), BCEN (BC), NCN NCTN RTTY/V SON (CA), DEPN DTN SEN (DE), CFRN ENMC FAST FMSN FMTN FPN FPN FTN GCVTN GN LSTTN NFPN PBTN PEN PRVAN QFN QFNS SPARC SVTN SWFTN TPTN VEN (FL), CGVN CSC GGN GSNB GSN GTN RAN (GA), I75EN I75MN ICH (IA), IMN IMNS (ID/MT), ISN ITN (IL), IRN ITN QIN (IN), JARE5 ZARES 11ARES CARN KNTN KTN KYN KYPPN MKPN NKARC PAWN TSTMN WTEN (KY), CSTN KMWN KPN KSNB KWN QKS QKS-SS (KS), LTN (LA), MEPN (MD), CITN EM2MN EMRI EMRIPN EMRISS HHTN NEEPN WMFN WMN WMTN (MA/RI), MEPN MMN MTN WRIN (MB), AEN MP5N OXRACES PTN SGN (ME), MNAMWXNT MSN MSPN MSSN PICO (MN), ACARN CMEN HBN IFN JCCC LARES LOZMN LOZCW MEOW MOPON MON MOSSBN MTTN PHD PTN RRARN SARN SLARN ZEN (MO), GSFN GSPN MCEN NHN (NH), JSARS MCN MEN NJM NJN NJPN OBTTN SJVN SJVN220 TCETN (NJ), CNCTN NCEN NCMN PCTN RARS (NC), CN CSN (NC/SC), BRARES BVARES MARES MARES220 MN2MN NCN NCCN NE40 NMPN PV2MN SBARES WVN (NE), CDN CNYTN EPN HVN NYPON NYS NYS-M OCTEN SDN WDN (NY), ALERT BN BNR BRTN BSSN COARES COTN LCNWOARES MASER MCTN O6MN ONN OSN OSSBN OSSN RARA T5RAC VVEN WCTN (OH), CARA EATIN OCVN OLZ ONON OPEN OTWN QCWA-63 STN (OK), KTN OLN OPN OSN OSND TIN (ON), BSN LBLARES OARES OHNN OSN PDXARES PTTN SOFM THN (OR), PTN (PA), QSN (PO), GPD2MN LC2MN SCNTN SCSSBN (SC), BHN PDN SDEEN WGEN (SD), DFW NET TEX TSN TTN (TX), BUN DCSN UCN (UT), STARES SVEN VLN VNS VSN VTN (VA), VTN (VT), EWTN NTN NWSSBN PSTS WARTS WSN (WA), WVARN WVFN WVMN WVN (WV).

1 — NET	4 — AVERAGE	7 — % REP.
2 — SESSIONS	5 — RATE	TO AREA NET
3 — TRAFFIC	6 — % REP.	

Transcontinental Corps					
1	2	3	4	5	
Cycle Two					
TCC Eastern	114	86.8	899	432	
TCC Central	93	86.0	828	382	
TCC Pacific					
Summary	207	86.4	1727	814	
Cycle Four					
TCC Eastern	65	87.7	630	293	
TCC Central	128	88.3	1222	657	
TCC Pacific	193	88.0	1852	950	
Summary					

1 — AREA	4 — TRAFFIC
2 — FUNCTIONS	5 — OUT-OF-NET TRAFFIC
3 — % SUCCESSFUL	

TCC Roster
 The TCC Roster (October) Cycle Two — Eastern Area (KW1U, Director) — AA4AT N1AWX N1BHH K1CB WA4CCK N3COY KA8CPS KA1EPO KK3F WA2FJJ WD4FTK NAGHI WB3GZU WA2HEB KB2HM KN1K WDBLRT KT1Q W8QHB W1QZY KW1U AF6V N2XJ W1XX W8BYDZ, Central Area (N5AMK, Director) — N5AMK N5BT W8CITZ N5EFC KA8EYF KA9FEZ NG5G KW9J WA4JL WA4JTE W9JUU W5KLV KD5KQ WB9NVN WB5OXE KD5RC K5UPN WF4X WB5YDD, Pacific Area (W0HXB, Director) — N16A KT6A NT0SP N0CXI KU6D KB7FE W7GHT W0HXB W5JQV KR7L KB0MB KD6ME K6OWA WA8OVI KF7R ND5T NV6T W7TGU K6UYK KO7V WB7WOW, Cycle Four — Eastern Area (W20B, Director) — AA4AT VE3AWE K1BA W3BBN K13C WA4CCK N3COY W2CS N8CV KA3DTE WB2EAG W1EFW W2FR WD4FTK W2GKZ VE3GOL WB3GZU KB2HM W0H1H W11SO K4JST KN1K N4KB AH2M W2MTA W1NUM W8PMJ WB4PNY W3PQ W9QHB W1QZY W2RQ K3RZR KA1T KW1U KB3UD WB4JHC W4UJQ W2VY VE1WF W2XD N2XJ W1XX N8XW W8BYDZ K42K K2ZM W2ZQJ, Central Area (K5GM, Director) — N5BB WB5CIC W9CXV W5GHP K5GM W6HI A25L K5OAF N5TC K5TL K5U WB9UYU KB9X KY5X, Pacific Area (KN7B, Director) — AD0A KB8N KA2CPT K09D W7DZX W6EOT W7EP W7GHT N2IC W6INH W5JQV W7LG W7LYA W87NHR W8OGH ND5T W7VSE W6VZT KM7Z VE7ZK.

Public Service Honor Roll October 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. 5; (9) Participating in a public service event, 5 points, 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.

223	114	N4EDH	89
K6CXP	WB2MCO	W6RNL	AG9G
156	113	WA7VTD	KB8BWM
KA8EYF	W8OYH	W1KK	KW9C
W9FZW	KB2HM	100	K2VX
155	112	K2GCE	WB44XP
WB7WOW	N4GHI	KT1Q	N5BT
151	W7JMH	N9BDL	W5GHP
K4SCL	111	WB6TIF	N4PL
W9YCV	W2MTA	99	K0JAN
149	KC2ZF	KA4BCM	WF4Y
WA4QXT	110	W6A2UD	WX4H
145	AL7W	N3COY	KB0MB
W3YVQ	109	98	151
140	KA2MJJ	KF8J	35
WB4WYG	108	W9KQ	2
K7VW	AF8V	87	5
134	K4ZK	K2YQK	141
KA3DLY	W7VSE	VE3KK	121
133	WA4CCK	WX4I	118
WX4Y	WB1GXZ	88	111
130	KC2ZO	W9FZW	115
WF4X	107	VE7BNI	106
128	AA4AT	KB5EK	104
KC9CJ	KA1EXJ	1 — CALL	4 — SENT
127	KJ3E	2 — ORIG.	5 — DLVD.
124	106	3 — RCVD.	6 — TOTAL
WB4HRR	KA0ARP		
123	WA4JDH		
KB5EK	W9JUU		
121	WD4ALY		
KW1U	W4ANK		
N4HMD	105		
120	KA9FFO		
K4KDJ	N1AKS		
K55V	WA2ERT		
WB2OWO	WA4PFK		
119	104		
N8FCQ	KC3Y		
W1EOF	N1CPX		
118	103		
KB0Z	WA8TFC		
117	KA4AMC		
WB1HIH	KB4WT		
115	KB7FE		
K4JST	WB8MIO		
KA8GJV	102		
WB2VUK	K3JL		
WB2EAG	KB0MB		
N2XJ	N2AKZ		
	WA2FJJ		
	W2PKY		
	101		
	K0S1		
	KB4OZ		

K2ZVI	74	WA8MAZ	WA4JTE
80	W3DKX	WA3UNX	WA8DHB
K4NLK	73	WB4VMX	WD4KBW
K6UXO	A100	WBAMZA	62
79	KB4LB	67	N2BGP
WA6QCA	KG2D	N1BYS	W4HON
WA8HGH	N8CV	WA2K0J	W2RRX
WD9IID	WB5YDD	WB8TEJ	WB2IDS
78	72	W2VY	WB5LBR
KD5FR	K4LPT	68	WD9GUF
WD55GKH	KA8PQH	KB1PA	KA1T
77	KB4OG	WD4HBP	61
AE1T	KD4KK	WA4RNP	KA8GOA
K2YAI	W4LXB	65	WB8EIB
KV8Q	71	KN1K	AK2E
WB4YQP	KA1GWE	N5DFO	60
K2ZM	K11M	N5EZM	KA0BCB
76	W8QHB	VE3GOL	KA4SKV
K9ND	WB4UHC	KA1EKQ	KD0CI
W7LG	N2EQM	VE2FMQ	KX7T
N1BJW	70	WB9ZQE	KX7W
N6CVF	KA1KML	WD4PBF	KA2OPG
W8FRG	K21D	WD6BZU	
WB1GLH	KX2T	64	KA8HJKT
WB4ADL	VE2EDO	AF3S	KA8GZT
K4ZN	N7FXM	K0PCK	55
75	69	KA4IUM	WB1CBP/N
K8JDI	KA8ODQ	NC0R	50
KB0LT	N5DYC	WB1PL	WB8NHV/T
KY4U	W1TN	WA1FCD	WD4CEB/T
N8EVC	KY4U	WB7OXE	
N7BGW	WA4EYU	WB8KBW	48
WBNTN	WB8MTD	63	N8FWGT
W7LNE	W4FMZ	KA8KWM	42
WB8JW	68	N5SJ	KA7RFD/T
WD9DNQ	WB1DXT		

Brass Pounders League October 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 or 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 AARRL form.

1	2	3	4	5	6
W3CUL	872	1061	1506	151	3590
N8BQP	32	1562	180	878	2652
KA8CPA	23	1140	80	228	2071
WA6HJZ	0	1183	31	434	1648
W1EOF	1	410	633	23	1087
W3VR	318	239	378	12	945
KW1U	1	457	313	20	791
WB4UJ	4	390	373	5	772
WF4X	9	354	269	29	681
WD8MIO	41	332	257	19	649
W7VSE	2	324	301	7	634
W5GHP	4	190	412	6	812
N4PL	63	211	261	37	572
K0JAN	0	333	31	205	569
WF4Y	30	310	198	26	584
WX4H	0	290	230	7	527
KB0MB	151	118	213	32	514
WA4QXT	35	192	237	47	511
W1EOF (Sept.)	2	492	889	23	1206
W1EOF (Aug.)	5	437	569	43	1054

BPL for 100 or more originations plus deliveries:

K5CXP	141
KA4RSC	121
KH6B	118
W7CLT	111
KD8KY	115
W9FZW	110
VE7BNI	106
KB5EK	104

Independent Nets (October 1984)

1	2	3	4
Central Gulf Coast Hurricane			
Empire Slow Speed	31	110	2808
Golden Bear	31	61	395
Hit and Bounce Traffic	31	94	1868
IMRA	27	805	1586
Midwest RTTY	31	45	141
Mission Trail	31	135	986
New England Novice	31	134	263
North American SSB Traffic	25	38	121
Southwest Traffic	31	108	1212
Vermont Sideband	31	112	521
West Coast Slow Speed	31	154	506
20-Meter ISSB	27	595	243
75-Meter ISSB	31	265	921
7290 Traffic	50	570	3223

1 — NET NAME	3 — TRAFFIC
2 — SESSIONS	4 — CHECK-INS

Contest Corral

A Roundup of Upcoming Operating Events



Conducted By Edith Holsopple,* N1CZC

JANUARY

Dec. 31-Jan. 1

ARRL Straight Key Night, Dec. QST, page 92.

2

West Coast Qualifying Run, 10-35 WPM, at 0500Z Jan. 3 (9 P.M. PST Jan. 2). W6OWP prime, W6ZRJ alternate. Frequencies are approximately 3590/7090 kHz. Underline one minute of the highest speed you copied, certify that your copy was made without aid and send it 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 or endorsement.

5-6

ARRL QSO Party, CW, Dec. QST, page 92.

12

WIAW Qualifying Run, 35-10 WPM, at 0300Z Jan. 13 (10 P.M. EST Jan. 12). Transmitted simultaneously on 1.818 3.58 7.08 14.07 21.08 28.08 50.08 147.555 MHz. See Jan. 2 listing for more details.

12-13

ARRL January VHF Sweepstakes, Dec. QST, page 91.

12-14

Hunting Lions in the Air Contest, Dec. QST, page 92.
World 40-Meter and 75-Meter SSB Championship Contests, Dec. QST, page 92.

13

Rats Nest & Crooked Stick QSO Contest, sponsored by the Issaquah ARC, from 1800Z until 2300Z Jan. 13. Contact 3 or more IARC members. Suggested frequencies: CW — 21,060-21,200 MHz; phone — 21,350-21,450 MHz. Exchange name, QTH, antenna type, IARC membership. Certificates. Send log by Feb. 1 (and s.a.s.e. if interested in more info) to Steve Pack, WB7VAS, 4609 158th Ave., S.E., Bellevue, WA 98006.

19-20

ARRL QSO Party, phone, Dec. QST, page 92.

160 Meter World SSB Championship, sponsored by 73, from 0000Z Jan. 19 until 2400Z Jan. 20. Work stations once only. Entry classes: single op, single transmitter; multiop, single transmitter. Single ops may operate 32 hours max.; multiops may use entire 48-hour period. Exchange signal report and QTH (state, province or territory for W/VE stations; DX country name for others, including KH6 and KL7). Count 5 points per W/VE QSO, 10 points per DX QSO. Multiply by number of states (48 max.), VE provinces/territories (13 max.) and DX countries worked. Stations in the District of Columbia count as Maryland for multiplier purposes. Suggested frequencies are 1.808-1.825 and 1.830-1.900 MHz. All W/VE entrants are expected to observe the DX window, 1.825-1.830 MHz. Official entry forms are available from the sponsor. Mail logs by Feb. 20 to Harry Arsenault, K1PLR, 603 Powell Ave., Erie, PA 16505.

HA-DX Contest, sponsored by the Hungarian Radioamateur Society, from 2200Z Jan. 19 until 2200Z Jan. 20. 80-10 (excluding WARC bands), CW only. Work stations once per band. Exchange signal report and serial number. HA stations will also send a two-letter code corresponding to their location (country). Possible codes: BA BE BP BN BO CS FE GY HA HE KO NO PE SA SO SZ TO VA VE ZA. Count 6 points per HA QSO, 3 points per QSO with non-HA stations on other continents. Multiply by sum of HA countries worked per band. Mail entries within six weeks to Hungarian Radioamateur Society, P.O. Box 86, Budapest H-1581, Hungary.

Texas QSO Party, sponsored by the West Texas ARC,

from 0000Z Jan. 19 until 1800Z Jan. 20. All bands and modes. Work stations again as they change county. Single operator only. CW QSOs in CW subbands only. Exchange serial number and QTH (county for TX stations; state, province or country for others). Suggested frequencies: phone — 3,940 7,260 14,280 21,370 28,600; CW — 65 kHz up from lower band edges; Novice — 10 kHz up from lower band edges. TX stations count 1 point per phone QSO and 2 points per CW QSO; multiply by number of states, provinces and countries worked. Others count 1 point per phone QSO, 2 points per CW QSO; 7 points per CW QSO and 5 points per phone QSO with TX mobile stations. Multiply by total number of TX counties worked (max. 254). Logs must be received by March 15. Mail to Tom Horton, K5IID, 2708 Halifax Ave., Odessa, TX 79762.

North Dakota QSO Party, sponsored by the Red River Amateurs, 0000-0800Z and 1600-2400Z Jan. 19 and 0800-1600Z Jan. 20. Work stations once per band and mode. Exchange signal report and QTH (county for ND stations; state, province or country for others). Suggested frequencies: phone — 1.835 3.905 7.280 14.295 21.380 28.500; CW — 1.810 3.540 and 35 kHz up from band edges; Novice — 25 kHz up from band edges. Count 10 points per phone contact, 20 points per CW contact and 50 points per RTTY contact. ND stations add 250 bonus points for working 5 Novices on each mode and score each mode separately; multiply by number of states/provinces/countries worked per band and mode. Others multiply by total ND counties worked (max. 53). Mail logs by Feb. 28 (include a large s.a.s.e. for results) to Mike Beaton, KD0A, 2267 Flickertail Dr., Fargo, ND 58103.

21-27

WAS SSTV Contest, sponsored by A5 Magazine. Contact Mike Stone, WB0QCD, P.O. Box H, Lowden, IA 52253-0408, for complete rules and further information.

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WIAW Qualifying Run, 10-35 WPM, at 2400Z (7 P.M. EST). See Jan. 2 and 12 listings for more details.

25-27

CQ WW 160-Meter Contest, CW, sponsored by CQ Magazine from 2200Z Jan. 25 until 1600Z Jan. 27. CW only (phone, Feb. 22-24). W/VE stations count 2 points per W/VE QSO, 10 points per DX QSO. DX stations count 2 points per QSO with own country, 5 points with another country and 10 points for W/VE. Multiply by sum of states, provinces and DXCC countries (incl. KH6/KL7). Exchange signal report and QTH; W/VE stations also send state/province. Avoid the 1825-1830 and 1850-1860 DX windows. Mail entry by Feb. 28 (phone, March 31) to Don McClenon, N4IN, 3075 Florida Ave., Melbourne, FL 32901.

26-27

World 15-Meter and 20-Meter SSB Championships, sponsored by 73. 15-Meter Contest 0000Z to 2400Z Jan. 26, and 20-Meter Contest 0000Z to 2400Z Jan. 27. Contests are separate. Work stations once. No crossmode QSOs. Single op, single transmitter and multiop, single transmitter classes. Single ops may operate 16 hours max.; Off-times must be at least 30 minutes each and clearly noted in the log and on the summary sheet. Multiops may use the entire period. Exchange signal report and QTH (state, province or territory for W/VE stations; DX country name for others, including KH6 and KL7). Count 5 points per W/VE QSO, 10 points per DX QSO. Multiply by number of states (48 max.) and DX countries worked. Stations in the District of Columbia count as Maryland for multiplier purposes. Official entry forms are available from the sponsor. Mail entries by Feb. 26 to Chuck Ingram, WA6R, 44720 North 11th St., E., Lancaster, CA 93535.

REF French Contest, CW, sponsored by Reseau Des Emetteurs Francais, from 0600Z Jan. 26 until 1800Z Jan. 27 (phone, 0600Z Feb. 25 until 1800Z Feb. 26). 80-10 meters. Single and multioperator; multioperators must remain on a band for a minimum of 15 minutes.

Work French stations, including overseas territories and DA1/2 French military stations. Exchange signal report and serial number. Count 1 point for QSOs with own continent, 3 points for other continents. Multiply by total of French departments (max. 96 — F6GGG/76 is in Dept. 76), French overseas countries (max. 39), Belgian provinces (max. 9) and DA1/2 per band. Mail entries by March 1 (phone by April 1) to REF French Contest, Square Trudaine 2, 75009 Paris, France.

West Virginia QSO Party, sponsored by the West Virginia State AR Council, from 1700Z Jan. 26 until 1700Z Jan. 27. Single operator only. Exchange signal report, serial number and QTH (county for WV stations; state or country for others). Suggested frequencies: phone — 10 kHz up from lower General band edges; CW — 35 kHz up from low edges. Novice — 35 kHz from lower band edges. Count 1 point per QSO. WV stations multiply by total WV counties, states and countries worked; others multiply by total WV counties worked. Multiply score by 1.5 if running 200 W or less. Mail logs by Feb. 11 (include large s.a.s.e. for results) to K8BS, P.O. Box 1694, Charleston, WV 25326.

UBA Trophy Contest, CW, sponsored by the Union of Belgian Amateurs, from 0600Z Jan. 26 until 1800Z Jan. 27 (phone, 0600Z Feb. 23 until 1800Z Feb. 24). 80-10 meters. Entry classes: single-operator, all bands (may operate only 26 hours); single-operator, 80 and 40 meters only (may operate only 16 hours); multioperator-single transmitter (may operate 36 hours). Exchange signal report and serial number. Belgian stations add province abbreviation. Log by band. Count 10 points per QSO with ON station and Belgian Military station in Germany, 1 point for QSO with stations in one of the French countries (see French Contest rules above). Multipliers are Belgian Provinces plus BSD or FBA for a maximum of 10 per band. Final score equals total number of QSO points times total number of multipliers. Entries must be postmarked by March 1 (April 1 for phone). Mail to UBA HF Contest Committee, Galicia Jan, ON61G, Oude Gendarmeriestraat, 62, B-3100 Heist Op Den Berg, Belgium.

26-Feb. 3

ARRL Novice Roundup, this issue, page 71.

27-28

Classic Radio Exchange, sponsored by the Southeast ARC from 2100Z Jan. 27 until 0400Z Jan. 28. Object is to restore, operate and enjoy old equipment built since 1945 but at least 10 years old. Exchange name, signal report, state/province/country and receiver and transmitter types. The same station may be worked with different equipment combinations on each band/mode. Suggested frequencies: phone — 3,910 7,280 14,280 21,380 28,580; CW — 60 kHz up from lower band edges; Novice — 20 kHz up from lower band edges. Add the number of all the different transmitters and receivers worked plus the different states/provinces/countries worked per band. Multiply that number by total number of QSOs. Multiply that total by total years old of all your transmitters and receivers used (minimum three QSOs per unit). For transceivers, multiply years old by 2. Mail logs (include s.a.s.e. for results) to Stu Stephens, K8SJ, 1407 Hollywood Rd., Sandusky, OH 44870.

FEBRUARY

2-3

New Hampshire QSO Party, sponsored by the NH ARA, from 1900Z Feb. 2 until 0700Z Feb. 3 and from 1400Z Feb. 3 until 0200Z Feb. 4. Work stations once per band and mode. Exchange signal report and QTH (county for NH stations; state, province or country for others). Suggested frequencies: phone — 1.875 3.975 7.235 14.280 21.380 28.575 50.115 144.205; CW — 1.810 and 55 kHz above band edges; Novice — 30 kHz above band edges; RTTY — 3.625 and 85 kHz up from lower band edges. NH stations count 1 point per QSO and multiply by total NH counties/states/countries worked. Others count 5 points per QSO and multiply by total NH counties worked. Count 20 bonus points

*Communications Assistant, ARRL

each for working WBICAG, WIOC, WBIFFZ, KIRD and WIWQM. Logs must be postmarked by March 15 (include s.a.s.e. for results). Send logs to Great Bay RA, P.O. Box 911, Dover, NH 03820.

Zero District QSO Party, sponsored by the Davenport RAC, from 1900Z Feb. 2 until 0100Z Feb. 3, and 1500Z-2400Z Feb. 3. Zero District stations may work anyone; all others work 0-district stations. 80-10 meters only, phone and CW. Work each station once per band and mode. Mobile stations may be worked again as they change counties. Exchange signal report and ARRL Section. 0-district stations also send county. Suggested frequencies: CW — 60 kHz up from lower band edges; phone — 3.900 7.270 14.300 21.370 28.570. Novice — 25 kHz up from lower band edges. Count 1 point for phone QSOs, 2 points for CW QSOs. Zero District stations multiply QSO points by total of ARRL Sections, 0-district counties and DXCC countries worked. Others multiply QSO points by number of 0-district counties worked. Mail logs by March 9 to W0BXR, P.O. Box 10304, Davenport, IA 52803.

Vermont QSO Party, sponsored by the Central Vermont ARC, from 0000Z Feb. 2 until 2400Z Feb. 3. Stations may be worked three times per band (once each on CW, phone and RTTY). CW and RTTY QSOs must take place in the appropriate subbands. Signal report and QTH (county for VT stations; state, province or country for others). Suggested frequencies: phone — 3.910 7.230 14.260 14.320 21.360 28.570 50.1100 144.2; CW — 3.540 3.720 7.040 7.120 14.040 21.240 28.040; RTTY — 3.620 and 90 kHz from lower band edges. Count 1 point per phone QSO, 5 points per CW or RTTY QSO. Multiply by number of states plus provinces plus DXCC countries for VT stations; others multiply by number of VT counties worked (max. 14). Official log sheets available for s.a.s.e. to sponsor. Mail entry by March 1 to D. Nevin, KK1U, W. Hill, Northfield, VT 05663.

YU WW DX Contest, sponsored by the Savez Radio Amatera Jugoslavije, from 2100Z Feb. 2 until 2100Z Feb. 3. No rules received this year; these are last year's. CW only, 80 and 40 meters. Suggested frequencies are 3.520-3.590 and 7.010-7.040 MHz. Exchange signal report and serial number. Count 5 points per YU QSO (10 points on 3.5 MHz), 4 points for other DX QSOs (5 points on 3.5 MHz). Multiply by the number of DXCC countries plus YU prefixes worked per band. Single ops must remain on a band for at least 30 minutes; multiops at least 10 minutes. Band changes to work new multipliers may be made at any time. Mail

logs by March 15 to Savez Radio Amatera Jugoslavije, YUDXC, Box 48, 11001 Beograd, Yugoslavia.

3

North American Sprint, CW, sponsored by the National Contest Journal, from 0000 to 0400Z Feb. 3 (phone contest, 0000-0400Z Feb. 10). Contests are separate; 80, 40, 20 meters only. Suggested frequencies: CW — 3.530-3.550 7.030-7.050 14.030-14.050; phone — 3.870-3.910 7.210-7.240 14.260-14.290. For a valid QSO, you must send and receive all of the following information: other station's call, your call, serial number (consecutive starting with 001), your name and state (or province/country). An operator may use only one call sign during the contest. Multiply valid QSOs by sum of states, provinces and North American countries (not W/VE). KH6 is not counted as a state or as an NA country. VE multipliers are Maritimes (VE1, VO1, VO2) and VE2 through VE8 (8 max.). Non-NA countries do not count as multipliers. Special QSY rule: Stations soliciting a call by sending CQ, QRZ, etc., are permitted to work only one station in response to that solicitation. They must thereafter move at least 1 kHz before working any other station, or at least 5 kHz before again soliciting calls. Team competition: Each team has a maximum of 10 members as a single-entry unit. Clubs having more than 10 members may submit more than one team entry. To qualify, the name and call sign of each operator (and station operated if a guest op) must be registered with W6OAT. The team information may be contained either in a letter received by W6OAT before the start of the Sprint or in a Western Union mailgram dated at least 24 hours before the start of the Sprint. There are no distance or meeting requirements for a team entry. CW and phone teams are separate. Entries must be received no later than 30 days after the Sprint. Mail CW entries to Rusty Epps, W6OAT, 948-H Kiely Blvd., Santa Clara, CA 95051. Phone entries go to Rick Niswander, K7GM, 1914 W. Cortez Circle, Chandler, AZ 85224.

5

West Coast Qualifying Run, 10-35 WPM, at 0500Z Feb. 6 (9 P.M. PST, Feb. 5). See Jan. 2 listing for more details.

9-10

QCWA QSO Party, CW

West Coast 160 Bulletin SSB Contest, from 0000Z Feb. 9 until 2359Z Feb. 10. Single operators only,

subscribers and nonsubscribers. Exchange signal report and QTH. Count 10 points per QSO and multiply by total states, VE provinces and countries worked. Categories for various PEP ratings: 3 kW, 2 kW, 1 kW, 250 W and QRP. To calculate PEP rating, multiply output power by 2. Send logs to R. Koziomkowski, KA1SR, 5 Watson Dr., Portsmouth, RI 02871.

YL-OM Contest, phone, sponsored by YLRL, from 1800Z Feb. 9 until 1800Z Feb. 10 (CW portion will be 1800Z Feb. 23 until 1800Z Feb. 24). Phone and CW are separate contests. YLs work OMs; OMs work YLs only. Use all bands; no cross-band operation. No net contacts or repeater contacts. Work stations once only. Exchange QSO number, signal report and ARRL Section or country. Count one point for each station worked and multiply by the total number of ARRL Sections and countries worked. Suggested frequencies: phone — 3.940-3.970 7.240-7.270 14.280-14.310 21.380-21.410 28.580-28.610; CW — 3.540-3.570 7.040-7.070 14.040-14.070 21.180-21.210 28.180-28.210. Awards. Logs must be postmarked by March 15. Mail them to Marty Silver, NY4H, 3118 Eton Rd., Raleigh, NC 27608.

10

WIAW Qualifying Run, 10-40 WPM, 0300Z Feb. 11 (10 P.M. EST, Feb. 10). See Jan. listings for more details.

North American Sprint, phone, see Feb. 3 listing.

16-17

ARRL International DX Contest, CW, this issue, page 73.

20

WIAW Qualifying Run, 10-35 WPM

22-24

CQ WW 160 Meter DX Contest, phone

23

RTTY World Championship Contest

23-24

YL ISSB QSO Party, phone.

YL-OM Contest, CW.

REF French Contest, phone.

UBA Trophy Contest, phone.

Special Events

Conducted By Edith Holsopple,* N1CZC

Tuscaloosa, Alabama: To commemorate the 63rd anniversary of the Tuscaloosa Jaycees, KE4TN will operate 1300-2300Z *January 12*. To receive the certificate, send your QSL card to the Tuscaloosa Jaycees, P.O. Drawer L, Tuscaloosa, AL 35404.

Apache Junction, Arizona: Superstition ARC will operate WB7TJD 10 kHz up from the low end of the Novice and General band edges (40-10 meters) 1500-2300Z *January 25-26* to commemorate Lost Dutchman Days. Certificate via WB7TJD, P.O. Box 1551, Apache Junction, AZ 85220.

Pine Bush, New York: The Orange County ARC will operate WB2ENA from "Freedom Road" to commemorate the return of the Iranian Hostages. Operation will be 1500-2200Z *January 26 and 27*, approximately 10 kHz up from the General class band edges on 20-80 meters. Certificate for a QSL via OCARC, c/o N2BOK, RD 3, Box 294, Pine Bush, NY 12566.

Novice, Texas: The North Texas High Frequency Assn. will operate NSNT on the Novice bands from Novice, TX. Operation will be from 1800Z *January 26* until 1800Z *January 27*. QSL for certificate to NSNT.

Valencia, Venezuela: Radio Club Venezolano Valencia will sponsor station 4M4SS during *January 26, 27* and

28 to correspond with the visit of the Pope. All bands, phone and CW, will be used. QSL for a special QSL card via P.O. Box 510, Valencia ZF2001, Venezuela.

Houghton, Michigan: Michigan Technological University ARC and the Copper Country RAA will be operating between 0000Z *January 29* and 0000Z *February 5* to celebrate their Winter Carnival. Suggested frequencies: CW — 3.705 7.085 7.125 14.085 21.085 28.185; phone — 3.930 7.285 14.305 21.385 28.500; RTTY — 3.630 7.090 14.095. Certificates available via Howard Junkin, N8FHF, 106 W. South Ave., Houghton, MI 49931.

Monterey, California: The Naval Postgraduate School ARC will operate K6LY during the 44th Bing Crosby National Pro-Am Golf Championship at Pebble Beach overlooking the 18th Green. Operating hours will be 1800-2400Z *January 31* through *February 3* in the lower part of the General class phone band on 15 and 40 meters. Send your QSL card to NK6H, 96 Cuesta Vista Dr., Monterey, CA 93940.

Kwajalein: The Kwajalein ARC is sponsoring KX6BU from 0600Z *February 1* until 0600Z *February 9* to commemorate the 41st anniversary of the Battles of Kwajalein and Roi-Namur. Suggested frequencies: phone — 14.250 21.350 28.600; CW — 7.050 14.050 21.050 28.050. Requests for QSLs should be sent to KX6BU, Box 444, APO SF 96555-0008.

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 January 15 to make the March issue. For the convenience of those wishing to operate, please be sure that the name of the sponsoring organization, the location, dates, times(Z), frequencies and call sign of the special-event station are included. Requests for donations will not be published.

QSLing Special Events Stations: To get your QSL or certificate from any of the special-events stations listed here, follow these simple guidelines. (1) After working the station, carefully fill out a QSL card for the QSO. Show the date and time accurately, using UTC. (2) Prepare a stamped, self-addressed envelope. If sending for a certificate, use a 9- x 12-in envelope if you want an unfolded certificate, or a no. 10 envelope if folds are okay. Include enough postage for return of your envelope. (3) Mail both your QSL and your s.a.s.e. to the address listed, or to the address given on the air by the station you QSO. Be patient. Special-events stations will often print their cards and certificates after the operation is over so they will know how many to order.

*Communications Assistant, ARRL

Section News

The ARRL Field Organization Forum

Coordinated By Jim Clary, WB9IHH

CANADA

ALBERTA: SM, E. Roy Ellis, VE8XC — SEC: VE8XC, A/SM: VE8AMM, STM, DEC, NM (ASP/N & ATN): VE8ABC. Our SET was held on 27 Oct and failed to match previous efforts owing to poor HF sig and little traffic passed. Some errors that showed gave us something to discuss. Early winter caught many with antenna work undone. Net open (HF) didn't do so well this month because of signal conditions. AARCS net expecting some gov't surplus in near future — just what and when is not known at present. Hams are to regain license with callsign by end of year with little or no extra charge. This has come about with the continual efforts of hams to advertise their worth to the gov't and community. Traffic: VE8CHK 20, VE8ABC 32, VE8CPE 11, VE8XC 8.

BRITISH COLUMBIA: SM, H. Ernie Savage, VE7FB — BCEN CW, 3650 at 0300Z, reports another increase in check-ins, but QTC is still down. BCARRPSC, 3755 at 0200Z, check-ins 5296 and up from past month. BCEN knows of one lefthand CW op; who else besides VE7FSP Bob. In hospital, VE7SH Edna for operation; VE7HM, Hammy, heart problems. Out and recovery from stroke, VE7CO, Algje, Boy Scout's Jamboree, VE7BJA VE7DH VE7EG and 20 participates. Poor band conditions; no scout contact. Another good report from our OOs, they do mention care is not being taken before transmitting on nets and causing much problems sorry to say most US stations on their new band expansion. Traffic: VE7BN 395, VE7CDF 99, VE7CGJ 47, VE7FSP 22, VE7EGM 17, VE7PFM 14, VE7BZ 13.

MANITOBA: SM, Peter Guenther, VE4PG — A/SM: VE4AJ. SEC: FK, NMS: VJ AFO LB. Poor band conditions in Oct. There is now some interference developing on the Manitoba Evening Phone Net, since the band expansion came into effect. There are a number of hams who are giving no consideration. There has been some discussion on deregulating the entire 80-meter band, or moving only the phone stations to 3650 or lower. It will probably be done if interference gets any worse. We regret reporting the loss of John Inglis, VE4AAX. We all share in the sorrow. SET was almost a washout during poor propagation conditions on both the 80- and 40-meter bands. It was mostly done on VHF. Our thanks to both Bill, VE4TL, and Malcolm, VE4MG, for doing a great job on the swap and shop, and ORRL bulletins. MTN QN1 218, QTC 31, sess, 30. MEPPN QN1 1103, QTC 35, sess, 31. MMN QN1 480, QTC 36, sess, 31. VRIN QN1 321, QTC 1, sess, 9. VHF SSB 39 in 5 sessions. Traffic: VE4E 61, VE4FO 61, VE4GR 57, VE4FK 47, VE4JA 36, VE4JA 35, VE4LB 33, VE4P 25, VE4AAD 18, VE4AED 7, VE4DT 7, VE4IX 7, VE4FO 5, VE4HK 5, VE4XN 5, VE4AAU 4, VE4AKO 4, VE4CR 4, VE4ADS 3, VE4MG 2, VE4JK 1.

ONTARIO: SM, Larry Thivierge, VE3GT — BM: VE3LST. PGL: VE3AR. SEC: VE3GV, A/SM: VE3GT, TC: VE3EGO. Sadly I announce the following have become Silent Keys: VE3BSY, who was a well known "snow bird" in Florida where he originated a great deal of formal traffic on behalf of Canadians there, ex-VE3DPN and VE3FAM. Our PGL, VE3AR, who is a member of the FOC (First Class CW Operator's Club, recently attended their annual banquet in London, England, where he renewed many friendships from previous years. Go to hear VE3GNW back on the air after a nasty tumble off the tower while he was performing some maintenance work. COMSONT net manager VE3KLC missed this year's Net Directory and advises the net frequency is 7.074 kHz daily at 1500 hours local winter months and 1400 hours local during the summer. The net handles traffic, weather info and emergency preparedness. Guests at the recent QCWA Chapter 73 luncheon were VE3JHR VE3JQS VE3VE VE3CYP VE3BF VE3LRD VE3BPO VE3WU VE3BNN. Arnold, WB3DAO, who collects radio station stickers, would appreciate receiving some from Canada. His address is Box 700, Jessup, MD USA, 20794. Under the direction of VE3AAS, VE3FVN VE3BRT VE4UH VE3FHF VE3MSP VE3DDN held a successful Global Field Day in Almonte, the Southern Ontario Repeater Trust (SRT) busy working on the RSO/CRRL '85 Convention in London; it promises to be a good one. Congrats to the top three Field Day winners for 1984: VE3WE, Scarborough ARC (9A); VE3NAR, Nottawa ARC (17A); and VE3SPC, South Pickering ARC (7A). Congrats to VE3MSW on receiving his Advanced. New EC for Geraldton is VE3JAU; welcome to the ARES. Cam, VE1RO, active from the east coast passing Lions Club traffic, has moved to Ottawa and will be active with a new call on the various Section's traffic nets. From all your Field Organization Officials, Happy New Year 1985. Traffic: VE3AK 369, VE3DP 146, VE3EG 127, VE3KFN 65, VE3BUN 62, VE3G 61, VE3B 57, VE3K 57, VE3AW 36, VE3FGU 34, VE3VM 34, VE3V 34, VE3KX 30, VE3KX 19, VE3BAJ 15, VE3HSF 11, VE3EWD 6, (Sept.) VE3BCZ 12B.

QUEBEC: SM, Harold Moreau, VE2BP — STM: VE2DEO. BM: VE2ALE. PIO: VE2YV. TC: VE2ED. NMS: VE2FSA VE2EDO. Change of call: VE2GFH is now VE2CP. Amateurs from all parts of the province also from VE1 and VE3 lands, gathered at the West Island RC auction, on the 4th of November. VE2CP is giving information on traffic net operation on VE2TA repeater every Tuesday evening at 2000 hrs. It is with regret that I have to report VE2VV, silent key. Prompt reestablishment a VE2FJR apres un sejour a l'hopital. Le bulletin en RTTY par VE2ED, tous les vendres soir a 2100 hrs sur 3650 MHz. Traffic: VE2CP 39, VE2ED 13, VE2EKC 35, VE2FKZ 35, VE2BP 28, (Sept.) VE2ED 87, VE2CP 84.

SASKATCHEWAN: SM, W. C. Munday, VE5WM — STM: VE5HG. SEC: Vacant. TC: VE5GF. NMS: VE5EX VE5HG VE5NJ VE5AEJ VE5AEM VE5BAF. Net reports: MJARC 2-Meter — 30 sessions, 223 QN1; RARA 2-Meter — 30 sessions, 486 QN1, 5 QTC; PWNX — 31 sessions, 518 QN1; SPN 30 sessions, 1277 QN1, 18 QTC. Oct. this month of Halloween, ham classes and early snow in SK. Adverse band conditions hampered SET exercises, but nobody said it was going to be easy. Hamfest 1985 will be hosted by the Regina ARA and takes place in Regina August 2 to 4. See you there. Traffic: VE5ADZ 40, VE5WM 9.

ATLANTIC DIVISION

DELAWARE: SM, John Hartman, WA3ZBI — STM: W3DKX. SEC: W3PQ. PIO: N3DIP, PSHR: K3JL W3DKX. Elections were held for DARC. The following were elected: AE3H, pres.; N3DIQ, v.p.; WA3GXU, treas. K3HBP, secy. Co. The Kent Co. ARC's all new 146.37/97 repeater is up and doing well. Bob, N3DIP is doing an excellent job of keeping us informed of the Amateur Radio activities in the state, with his bi-monthly newsletter, DTN: QN1 420. QTC 62 in 23 sess. DEPN: QN1 62, QTC 14 in 4 sess. SEN: QN1 47, QTC 5 in 5 sess. Traffic: W3PQ 115, W3DKX 71, WB3DUQ 49, K3JL 21, N3AXH 20, WA3WVY 19, WA3ZBI 16, KA3IXV 12, KC3JM 10, KC3FW 4.

EASTERN PENNSYLVANIA: SM, Jim Post, KA3A — ASM: WA3ZPO KA3BT KC3LM. ACC: KC3NE. PIO: W3AMQ. SEC: WA3ZPO. TC: W3FAF. STM: KA3GJT. DECS: K3QXG AA3C W3EEK KB3UD N3BFL KB3LR N3AIA.

Net	QN1	QTC	Sess.
Dist. 5 Emer	64	6	5
PTFN	184	72	31
EPN	271	62	30
EPA	468	176	61
EPAEPTN	453	172	31
Dist. 5 ARES	46	0	0

Congrats to our new ECs: N3BHF, Northampton; K3EKK, Cumberland; KA3DUY, Bucks; KA3MLV, Sullivan; KB3JK, Luzerne; KC3AX, Wayne; KB3TS, Monroe. This gets EPA over the 50% mark with EC slots filled, but we still have a long way to go, especially in District 9 counties, Perry, Snyder, Union and Juniata, where we need a DEC and all EC volunteers. Contact WA3ZPO or KA3A for more new positions. TC has been filled by John Thomas, W3FAF. Both he and Paul, K3UWJ, have earned the gold sticker by passing the Auxiliary Certification examination. All clubs should send a copy of their newsletter to our Assistant Newsletter Editor, Kay Craigie, K3LML. She hopes to have the first EPA quarterly newsletter ready in January. Please give her your help. W3AMQ, PIO, has presented a Certificate of Merit to Rep. Gregory Snyder in appreciation of his efforts to have the first amateur week in Penna. recognized by Governor Thornburg. Congrats to MARC for their efforts and help to Red Cross during the Chetwyn Apts. fire in Rosemont. Sixty-seven people evacuated. Communications set up by WA3ZPO K3YPO KA3IME K3MHM WA3HPG WA3RIZ. Reports say Rick, WB2NPE and Bob N2SB, from the Pack Rats, are preparing for VHFSS. C-CARS has been doing a great job handling the incoming QST chores. If you have not done it yet, get them some 5 x 7 SASEs. You'll be surprised with the excellent results. August 84, BPL to WA3DFU, Warminster ARES. Traffic: N3GQY 27, KA3DLY 228, WA3GLX 96, KA3IME 86, N3CD 82, AA3B 72, WB8KPE 71, W3AQN 63, N3AIW 55, KC3LY 44, W3KAG 42, W3ADE 17, N3BFL 11, W3VA 10, K3EBZ 8, AF3Z 5, KA3A 3, AA3C 2.

MARYLAND - DISTRICT OF COLUMBIA: SM, Karl R. Medrow, W3FA — Public Service Month: The Anne Arundel RC picked up 170 messages on Chesapeake Appreciation Days. The BARC handled the Baltimore Regatta. Eastern ARC did the Annual Oxford Triathlon. K3OMN and the Mt. ARC gave exams: New Generals K3TWW KA3LQN KA3EPH KA3LQO. New Techs: WB3FUM KA3DXH KA3JOY. Congrats, K3JE says 40 clinics on emergency power in the SET. The Eastern Shore was alive with the Wilcomco ARES and KA3MTZ reporting thru K3JE. And just to let you know of other concerns — K3KBR K3NNI and W3HWZ all had heart bypass surgery. All doing fine now! W3YVQ had Red Cross and RACES traffic to make the SET more than a Test Message Drill. KC3Y and KC3AV did most to the CA Day work. W3FVZ skipped a class to surprise the net! N4DR is doing 30 meters. KC3DW had his gang send SET messages to W3FA. W3DFW made a fine report of Allegany Co. EC activity. All in all a big turnout with 2-meter link up circuits a proven success. K3GM's RTTY OBS going great. W3ZNV and WA1FPF are also RTTY types. KA3R qualifies as Amateur Aux. W3JPT is doing the contests with a computer. W3KJT is a really early bird. QTC reports from K3CHP KA3R and W3MR; appreciated. KC3D tried Arizona R & again. W3FX was pleased with 160-meter DX. N3EBQ W3LDD W3DQI N3QA KA3EWW and K3MR all quietly doing their ORS jobs. KK3F got his report in on 2 meters. WB3BFK manages the WR/PON. W3OYY does it for the MDC PON. With the nets (Net/Manager sessions/traffic/QN1 average) MEPN/K3JE 30/177/32 (Top Ten: W3FA K3JE WA2ERT W3DKX KA3CDQ W3YVQ WA3DUM N4DLA K3GUX and W3LDD); W3C-Mtr/KC3DW 51/1013; WR/PON/W3BFFK 22/30/12; MDC PON/W3OYY 4/5/13.5; Wilcomco 2-Mtr/K3CHUT 4/6/10. Traffic: K3JE 272, KC3Y 282, KC3V 24, KC3W 24, W3YVQ 15, KC3L 149, W3A 141, KC3DW 134, WA2ERT 79, W3ZNV 52, WB3BFK 35, WB3FUE 31, K3MR 26, W3DQI 25, N3QA 24, W3FVZ 17, KA3EWW 16, N3EBQ 15, W3LDD 14, KA3HUT 11, KC3D 6, KA3MTZ 6, WB3KJT 5, KA1FPP 2.

SOUTHERN NEW JERSEY: SM, Richard Bajer, WA2HEB — SEC: K2QJN. STM: WB2UVB. ACC: K2IXE. TC: W2LJX. SGL: W2XQ. PIO: WB2RVE. OO/RFI: WA2HEB. BM: WB2UVB. Our SEC, who also doubles as Burlington Co. EC, and his very capable staff conduct an interesting and informative emergency services net every Wednesday evening at 7 P.M. local time. With the Mt. Holly repeater (147.75/15 MHz) and the Chatsworth link on 144.875/47 MHz, a good portion of our section should be able to listen in. Our emergency stations are encouraged to check in. After the administrative part of the net is completed, the current Westlink taps is run. Give a listen; I think you'll enjoy it. Our Bulletin Manager now runs a bulletin net every Thursday evening at 5:45 and again at 7:30 P.M. local time on a frequency of or about 3950 kHz. Current League bulletins are read and news from our section will be given. Please feel free to check in. Any information about current club news, VE sessions and special events for use on this net would be most welcome. HPE to CU there. 73. Traffic: WA2HEB 136, KC2PB 64, KA2ANJ 5, W2U 2.

WESTERN NEW YORK: SM, William W. Thompson, W2MTA — SEC: W2BCH. ACC: N2EH. BM: W2GLH.

OO/RFI: WA2ET. PIO: WA2PUU. SGL: KO2X. STM: Open. TC: K2QR. OBS reports: WB2DSR WA2ZPE K2KWK 146.37 Sundays 2045 alternating on 146.88, and Tuesdays 145.51 at 1930. PSHR: K2QD KA2DQA VE2FMQ W2QJ WA2I9S WA2KQJ W2MTA WB2OWO WB2RBA ND25 K2ZT R2YAI Club Officers: ARATS W2VCI K2LRL K2UD; Orleans N2CUK K2ZR N2CWW WA2FRO; RARA WA2SSU K2RJ KA2KVF N2BNE; Fulton ARC N2ACQ KA2AON KA2RRY KA2LBG. UNYREPCO semi-annual meeting at Rome; WA2FLX chaired, other officers WA2SAF WA2CAV KF2S W2ODC. Novice Classes: Tompkins Co. ARC-KC2YF, Ogdensburg ARC-WA2RXO; Rome RC-KA2NIL; Syracuse-N2CQE; Liverpool ARC-NA2C; RAWNY-KA2IWI; STARS-KC2LE Volunteer Examiner Tests: Rochester ARA-K2NC; Binghamton-WB2FX; Syracuse-K2NY; Rome RC-K2GVI; Ithaca-K2VD; RAGS-WA2FUJ. WNY DX Assn. recently formed in Buffalo Area, contact WB2YQH. Technical Coordinator K2QR reports ionospheric storms had their impact on EME contest.

NYS/1*	3877	1000/Dy	WB2EAG	311-193-30
WDN/1*	04/84	1100/Dy	WB2OWO	350-075-33
Mike Farad	3925	1300/M-S	VE2FMQ	222-051-27
NYPON*	3913	1700/Dy	WA2KQJ	855-319-31
NYSPTEN	3925	1800/Dy	WB2HKU	705-069-31
ESS	3590	1800/Dy	WB2WS	395-061-31
OCTEN/E*	34/94	1830/Dy	WB2HLY	713-105-31
Q Net	31/91	1830/Dy	KA2CMQ	328-005-31
WDN/E*	04/84	1830/Dy	WB2OWO	668-154-34
Blue Line	93/93	1800/Dy	WA2GSO	397-029-31
NYS/4*	3877	1800/Dy	WB2MCO	455-205-30
JCARCN	10/70	2000/Dy	WA2WAX	
OARCN	25/85	2000/Wed	K2VTT	064-001-05
BRVSN	058/655	2100/Dy	WB2OFU	321-006-31
CNYTN*	90/30+	2115/Dy	WA2PUU	343-043-30
OCTEN/L*	28/88	2130/Dy	WB2HLY	386-056-34
STAR*	99/39	2130/Dy	TBA	
WDN/L*	04/84	2130/Dy	WB2OWO	639-169-33
NYS/5*	3877	2200/Dy	WB2MCO	415-255-31

*NYS Net. ARES Nets: CDECN LCARES NARA SLVARES and WNY Emergency Coordinators Net third Sunday 2000 and 3955 kHz. COMMS: Crop. Walks in Cortland and Endicott-N2AGF and WA2ZSC; Boonville Elk Walkathon-WA2OEP; Canton Bicycle Marathon-WA2RXC; Wingsless Marathon-W2GJ; Central NY Skywalk supported KA2DQP DPO N2AGO BOV WA2MCM OEP OFK WB2LCP YGN and others. Oswego Co. Pathfinder Net 147.15 at 2045 daily. Congrats: W2LOG and W2PHQ awarded fifty year ARRL membership plaques. K2CS is recovering from hospital visit; Bill is in his 73rd year as a radio ham. Traffic: WB2OWO 423, WA2HSS 241, W2MTA 207, WB2QIX

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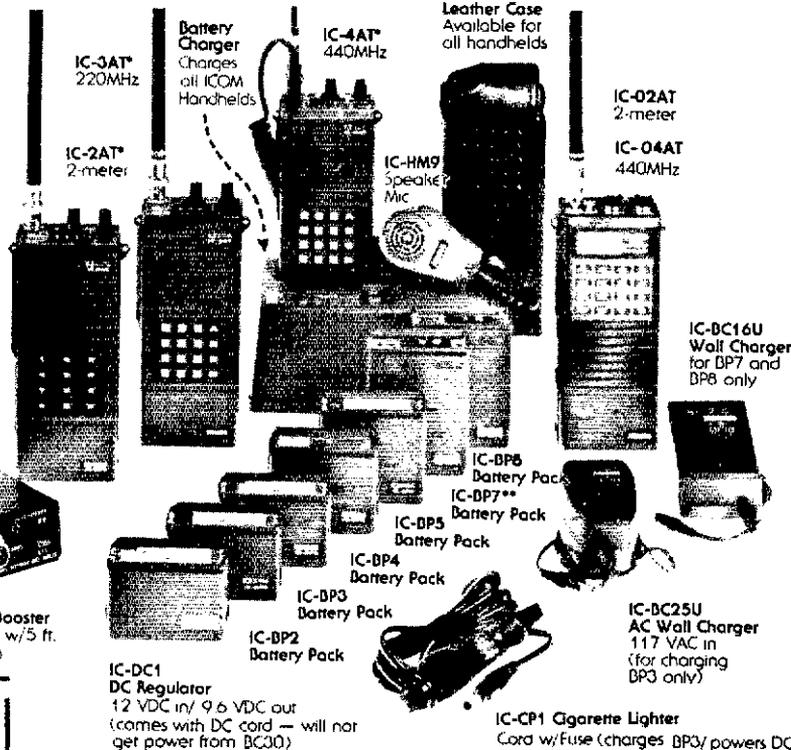
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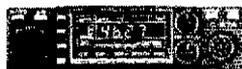


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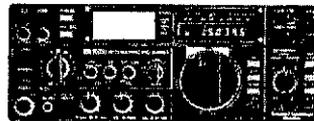
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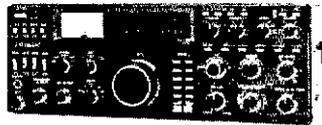
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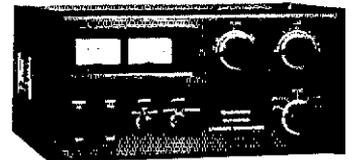
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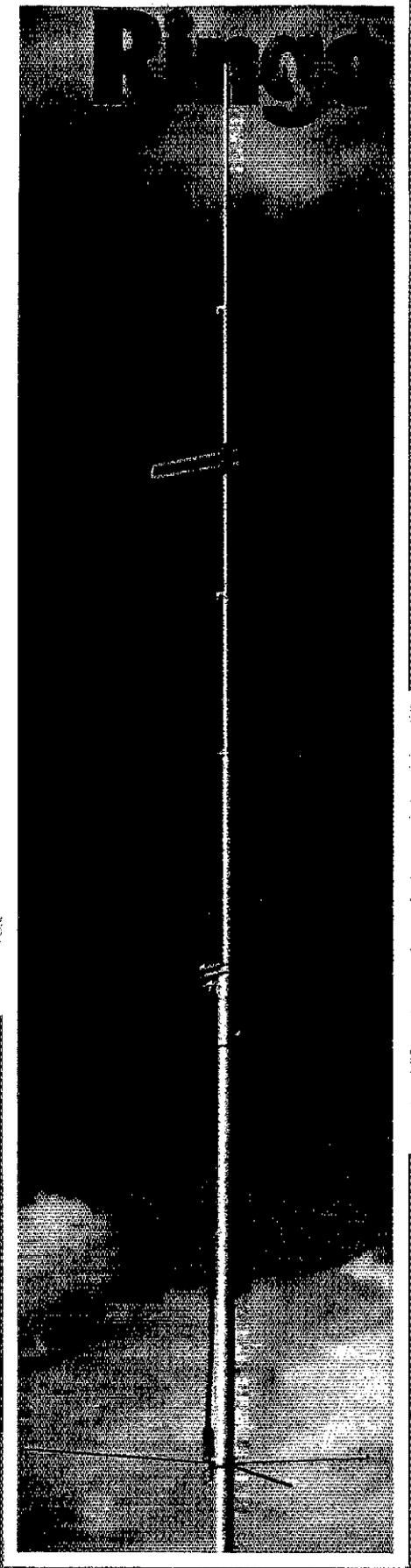
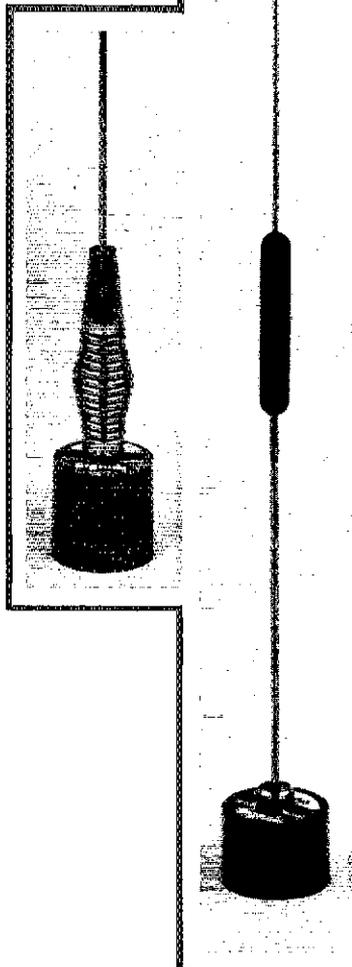
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RM 30	30m mobile resonator (std)	15.25
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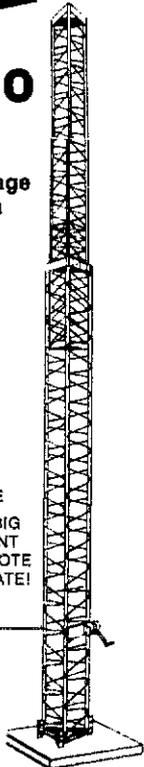
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16AVT/WBS	5 band trapped vert.	104.95
14 AVQ/WBS	4 band trapped vert.	64.95
V2S	2 meter omnidirectional	44.95
V4S	70 cm omnidirectional	54.95

HY-GAIN ROTORS

HDR-300	25 sq. ft.	499.95
T2X	20 sq. ft.	259.95
HAM IV	15 sq. ft.	219.95
CD4511	8.5 sq. ft.	139.95

TET

HB433SP	3 Ele 7/14/21/28	276.95
HB433DX	3 Ele 7/14/21/28	374.95
HB33SP	5 Ele 14/21/28	247.95
HB435P	4 Ele 14/21/28	274.95
HB33M	Mini 3 Ele 14/21/28	260.00
HB23M	Mini 2 Ele 14/21/28	205.00
SO22	14 element 2 meter boomer	79.00
SO10	28MHz Swiss Quad	134.00
SO61	50MHz Swiss Quad	87.00
M4-A	Loop 3.5/7/21/28	157.95
MV4BHR	Vert. w/Radials 7/14/21/28	107.00
MV4B	Vertical 7/14/21/28	67.00
MV3AH	Vertical 7/12/28	85.00
MV3BH	Vertical 7/14/21	55.00

CUSHCRAFT

A-4	4 element tribander	279.00
A-3	3 element tribander	210.00
R-3	10, 15, 20 remote tuned vert.	265.00
AV-5	5 band trapped vert.	98.00
32-19	19 element 2 meter boomer	91.00
214B/FB	14 element 2 meter boomer	77.00
424B	24 element 70 cm boomer	77.00
418-TB	18 element OSCAR 435MHz	58.00
A144-10T	10 element OSCAR 145.9MHz	49.00
ARX-2B	2 meter vert.	35.00
ARX-2	2 meter vert. 'ringo ranger'	28.00
AR-2	2 meter vert. 'ringo'	23.00

KENPRO ROTORS

KR400	Azimuth 12 sq. ft.	149.95
KR500	Elevation 12 sq. ft.	189.95

ALLIANCE ROTORS

HD73	10.7 sq. ft.	105.95
U110	3 sq. ft.	44.95

VAN GORDEN

PD8010	80-10 meter dipole kit	32.50
PD4010	40-10 meter dipole kit	28.75
PD2040	20-40 meter dipole kit	30.00
SD80	80 meter shortened dipole	26.25
SD40	40 meter shortened dipole	23.75

MINI PRODUCTS

HQ-1	mini quad 6/10/15/20	148.30
B-24	mini beam 10/15/20	110.95

CABLE & CONNECTORS

COAX

Belden 9913 New Super Low Loss only .45/ft.

Cable	100MHz	200MHz	400MHz	SALE
9913	1.0db	1.8db	2.5db	45/ft.
RG213	2.1	3.1	5.0	32/ft.
RG8	2.1	3.1	5.0	29/ft.
RG8 Foam	1.8	2.8	3.8	29/ft.
RG8X (Mini)	4.0	5.3	9.0	14/ft.

PL259 N Type UG218/U in stock.

SOUTH RIVER HDT-15KD \$58.00

EXCLUSIVE SWING LOCK MAST/ROCKET

MAST SUPPORT BRACKET SAVES ANNY TO LOWER MAST

TURNBUCKLES

TB-12	3/8" to 9/16"	51
TB-14	5/8" to 7/8"	62
TB-15	9/8" to 9/8"	106
TB-16	7/8" to 10/8"	172

GUY WIRE CABLE CLAMPS

GT-25	For Cable up to 1/2" Diameter	44
GT-30	For Cable 1/2" to 3/16" Diameter	51

U BOLT & SADDLE ASSEMBLY

UBS	Galvanized Steel U Bolt is 1 1/2" wide	69 each
-----	--	---------

GROUND RODS

GND-4CP	4 x 4" Copper Plate/Steel Rod	3.00
GND-6CP	6 x 6" Copper Plate/Steel Rod	5.00
GND-85C	8 x 8" Copper Plate/Steel Rod	6.00

GUY WIRE RING & COLLAR

GRA-140	Up to 1 1/2" O.D. Cast Aluminum	5.05
GR-1	Up to 2" O.D. Steel	3.96

* Mast can be rotated freely

176, WA2FJJ 138, VE2FMQ 137, KA2DBD 106, KQ2T 94, ND28 82, W2ZQJ 86, WB2IDS 85, KG2D 82, KA2DQA 80, W2FR 73, W2GJ 73, W2UJE 68, WB2BBA 81, K2YAI 55, WA2KQJ 48, AF2K 47, WB2KCT 39, N2FBS 38, WA2SMZ 32, WA2GCT 19, K2JRN 17, K2C2S 16, W2PFA 14, W2RKO 13, K2OAR 11, K2LUT 10, KA2FEZ 7, W2K3R 7, K2V3R 1 (Sept.), W2AET 153, N2FBK 10, K2VFR 3 (Aug.), N2FBK 13; WESTERN PENNSYLVANIA: SM, Otto L. Schuler, K2SMB - SEC: AB3Q, STM: AC3N, AC: N3EE, OVR/RFI, KN3B; PIO: WB3IZJ, TC: W3FE, EM: W3FE, SGL: K3HWL

Net QNTC Sess. Freq. T/D
WPACW 349 121 31 3585 7 P/D
WPAPTN 530 96 31 3983 6:15 P/D
WPA2MTN 589 76 31 148.28/88 8 P/D
NWPA2MTN 417 7 31 145.13/53 0200 UTC
PFN 184 72 31 3988 5 P/D

With regrets I announce three Silent Keys this month. They are W3LSW WB3IAB and WA3OBD; our sympathies are extended to their families. KA3YR is now a General; congrats. Clubs with VE programs are Footills ARA, Steel City ARA, Crawford County ARA, Quad counties ARC, Fort Armstrong WA. I will have more as received. More info will be appreciated. Two Rivers officers for 1984/85 are: KS3R, pres.; KC3GK, v.p.; W3OFM, secy.; WA3I2H, tres.; WB3GWS, act.; K3QHM KD3W WA33PB, trustees. Skyview RS officers for 1985 are: KA3JJJ, pres.; N3DDZ, v.p.; KA3IXY, secy.; K3VVR, tres.; W3GVI WB3YT, trustees. KC3NY is reported to have started a slow speed CW net on 21.145 MHz 7:00P, speeds 7 to 10 WPM, Nov. 1. The Triple "A" ARC had a nice dinner meeting in Beaver Falls on Nov. 2. W3ABC was the main speaker. The Irwin ARA had Swap and Shop on Oct. 20 it was a nice event. On Sat. Nov. 3, the Footills ARC had their hamfest in Greensburg, it was well attended. It was indeed a nice day as the weather gets cold. With this issue of QST, I would like to wish all the Section members and their families a very Happy and prosperous New Year. I hope we can work together to batter our hobby. Traffic: W3EGK 275, W3OKN 183, AC3N 130, KQ3T 93, N3FM 66, W3NGO 65, K3NPW 64, WA3DBW 56, K3SMB 56, WA3UNJ 53, WA3QNT 51, K3KM 50, W3KZM 27, KC3JQ 25, W3RUL 24, W3KUN 21, W3MML 20, WB3GUK 12, W3XZ 6, N3KB 5, KC3HR 4, K3LTV 4, W3SN 3, KB3NV 3, KN3B 4. (Sept.) K3NPW 61, WB3GUK 19, KN3B 2.

CENTRAL DIVISION

ILLINOIS: SM, David E. Lattan, WD9EB --- SEC: W9QBH, STM: KB9X, OVR/RFI: W9TT, BM: KB2DN, PIO: WD9EED, SGL: W9KPT, ACC: W9SFT, ASM: K9ORP.

NET Freq. Times (Z Wnt) QNTC Sess.
ILN 3690 0030/0400 Dy 651 284 83
ITN 3705 0100 Dy 316 57 31
ILPN 3915 2230 Dy(X Sn) 767 56 NR
NCPN 3915 1300 Dy(X Sn) 449 64 27
NCPN 7270 1815 Dy(X Sn) 357 66 28
IEN 3940 1500 Sn 112 2 4
IARES3915 2230 Sn 603 234 38
IAR3905 0000 Dy 603 234 38

Illinois was represented 98% by GRN by stations K9AZB K9BVE N9DR K9BEVN K9FEZ K9GEM K9ZJ W9JNZ KW9J KD9K W9BNVN W9NWX K9QEW KW9T N9TN K9SX and K9CYN. Illinois was represented 100% to D9RN by stations K9FEZ W9HOT W9BNVN W9NWX KW9J K9EHP W9HLX K9AZS and W9BODN. D9RN was represented 100% to CAND. Illinois stations were K9AZS W9NWX W9JLT K9EHP KW9J K9FEZ and W9BNVN. Special thanks to W9HRF, editor of the *Big Thunder Chatter* newsletter, for his fine write up of the Third Annual ARES seminar. October was a busy month for ARES members with both the SET and the week later the ARES Seminar. This year's statewide earthquake seminar for the SET encompassed a number of firsts for Illinois. One of the most tangible rewards is a renewed commitment on the part of Illinois ESDA toward utilizing Amateur Radio to support their networks. Special credit goes to SGL W9KPT, IESDA Comm Ofc W9NXX, and SEC W9QBH for the renewed interest and progress in this area. Local SET reports are just starting to come in, but it is known that Platt Co. was active with WD9EED W9NYK and K9MZZ helping out with the NCS duties. NA9X, EC for Madison Co., says that SET participation there was low for a good reason. Amateurs had just participated in a simulated plane or helicopter rescue on the 17th with the ESDA police, fire, EMS and the hospital. Ten Madison ARES members were directly involved. Another seven were on standby. The following weekend at the Third Annual ARES Seminar hosted by Platt Co. EC and PIA WD9EED, and conducted by SEC W9QBH, we heard an excellent presentation on earthquake potentials in the Illinois area by Paul DuMontelle of the Illinois Geological Survey. This was most interesting and very timely considering the thrust of the SET this year. We were also treated to a "sneak preview" of the new NWS preparedness film TERRIBLE THUESDAY which documents the events of the Wichita Falls (TX) tornado. The film is very done and indicates the reliance of the NWS SKYWARN program on Amateur Radio operators who are also trained spotters. Thanks to Ray Hughes, OIC of the National Weather Service Office at Springfield, for his presentation of the new film. DEDICATION PLUS! K9EHP sent in his monthly traffic report/4 from Florida. OOs, please note the new triplicate monthly report form. Please send the HQ copy to me for forwarding by the 6th of the month following the reporting period. Send the SM-OVR/RFI copy to W9TT, EC W9SOWE and ARES members K9GZ and K9LWE participated in the activities and also have a new UHF repeater on the Lincoln area. The next time you call with the call W9A9UYR. Also this month the Montgomery Co. ARES provided communications for the road rally that covered four towns. Tnx to WA9URM W9BOUF N9ANX and WD9DKY. Traffic: WB9UEA 510, K9FEZ 449, KW9J 343, W9JLT 216, W9HLX 165, K9AZS 155, W9NWX 152, W9HOT 138, K9XJ 134, K9BEVN 89, KD9K 74, K9QEW 71, W9VEYM 58, W9QBH 47, WD9BD 42, WA9SJE 41, K9NEZ 40, N9DJX 37, W9BRRF 36, KB9QX 25, N9TN 22, W9NYK 22, W9EHPH 18, K9SPK 17, K2JL 18, K9M2J 18, WD9EED 17, K9BVB 13, WA9SSD 11, W9STUD 6, AA9D 7, W9BHI 7, W9D9HJ 7, W9D9CJ 7, WA9URM 6, W9D9BI 5, W9LNG 4, W9RTD 3.

INDIANA: SM, Bruce Woodward, W9UMH --- SEC: W9BZQE, STM: W9JLJ, ACC: K9TUS, TC: WD9ADB, SGL: WA9VCO, BM: KD9TA, PIO: KD9Y, SRC: N9VB, SBC: WA9FUD, OVR/RFI: K9JGN, NMA: ITN: KD9DU, ICN: K9JLJ, ICN: W99D; IRN: K9SSU; VHF: W9PMT; IWN: K9ERC.

Net Freq.	Time (UTC)/Daily	QNTC	QTR	Sess.
ITN 3910	1330/2130/2300	3291	518	2758 93
QIN 3656	1430/0000/0300	718	398	1848 93
QCN 3708	2315	91	29	610 31
IRN 3829	0000	238	193	3398 93
IWN 3910	1310	1829	2	408 31
IWN VHF Bloomington		1283	3	305 31

NO COD — we ship UPS daily
Allow two weeks for delivery
Shipping cost is NOT included except where noted
We reserve right to limit quantities
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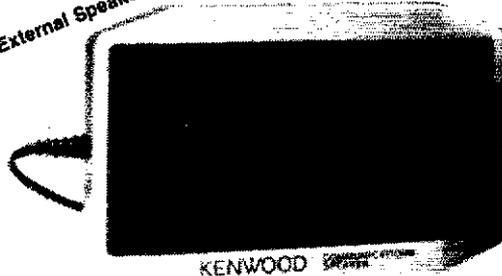
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440 MHz FM **Closeout - \$299⁹⁵** 440 MHz FM

External Speaker INCLUDED!



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16-key autopatch
UP/DOWN Microphone
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TM-201A shown - TM-401A looks the same

Loaded with Outstanding Features:

- Ultra compact and light weight: 5.6" w x 1.6" h x 7.3" d, 2.8 lbs.
- 12 watts RF output (HI), 1 watt (LO)
- Dual Digital VFO'S
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- Memory Scan and Programmable Band Scan
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- LED S/RF Meter (+ Busy Indicator)
- GaAs FET RF Amplifier
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15 mln. from O'Hare!

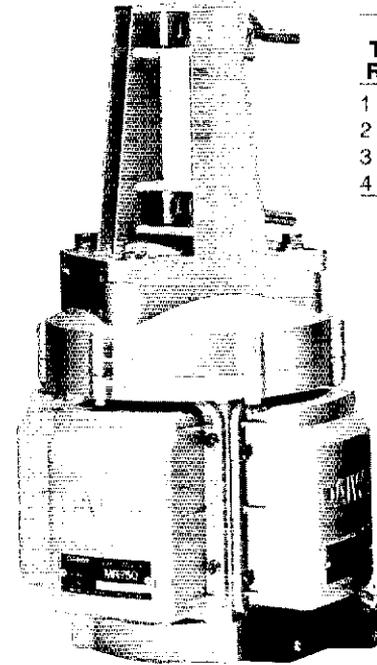
New Multi Torque

Check These Features:

1. The rotator frame can house up to 4 motors to increase the torque and load capacity of your antenna system.
2. Each motor is equipped with a Super Wedge and Clutch brake system which works independently from the main frame gear train.
3. Maximum brake power is 18,300 lbs/in when 4 motors are installed. The main frame and reduction gear train have been designed to withstand maximum wind loading.
4. The motor unit can be dismantled easily for maintenance if required.
5. A 1½" to 2½" diameter can be installed and aligned easily with the rotator center.
6. Low voltage (24VAC) motors are used to ensure safety during installation work on the antenna tower.
7. Low cost 6-wire control cable can be used for the low voltage motors.
8. The control panel can be removed easily for calibrating the direction indicator.
9. Balanced type control knobs have quick lock mechanisms on both sides.
10. The advanced Super Wedge and Clutch brake system (Slip clutch type) provides exceptional holding power and protects the rotator mechanism from excessive torque.
11. Lower mast bracket MS-1 is available (optional).

MR-750E/MR-750PE

Multi Torque Rotator	Output Torque lbs/in	Brake Power lbs/in
1 Motor	610	5,200
2 Motors	1,200	9,600
3 Motors	1,800	13,900
4 Motors	2,400	18,300



MR 750E Rotator
Standard Model
(58 sec/rotation)

MR 750PE Rotator
For use with
Pre-Set Controller
(58 sec/rotation)

MR-300E
High Speed Model

For rotating VHF/UHF
antennas at high speed

SWR & POWER CROSS-NEEDLE METERS

Top Quality

CN-720B

Frequency Range: 1.8-150MHz
SWR Detection Sensitivity: 4 W min.
Power: 3 Ranges (Forward, 20/200/2000 W)
(Reflected, 4/40/400 W)
Dimensions: 180 X 120 X 130 mm.
7.12 X 4.76 X 5.1 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: 165 X 75 X 97 mm.
6.5 X 2.9 X 3.8 in.

CN-830

Frequency Range: 140-450 MHz
SWR Detection Sensitivity: 4 W min.
Power: 2 Ranges (Forward, 20/200 W)
(Reflected, 4/40 W)
Dimensions: 180 X 85 X 120 mm.
7.12 X 3.37 X 4.76 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 16 W/150 W 16 W/150 W 16 W/150 W
Reflected 5 W/50 W 5 W/50 W 5 W/25 W
Dimensions: 71 X 78 X 100 mm; 2.8 X 3.1 X 3.9 in.
All Models Back Lit, with mobile bracket

CN-520 CN-540 CN-550

Frequency Range: 1.8-60 MHz 60-150 MHz 144-250 MHz
Power Range: 200/2000 W 20/200 W 20/200 W
Dimensions: 72 X 72 X 86 mm; 2.83 X 2.83 X 3.74 in.

ANTENNA TUNERS



CNW-518

Frequency Range: 3.5-30 MHz (8 bands)
Power Rating: 1 KW CW (50% duty)
Output Impedance: 10-250/25-100 ohm
(On 3.5 MHz)
Dimensions: 226 X 90 X 276 mm.
8.9 X 3.5 X 10.8 in.

CNW-419

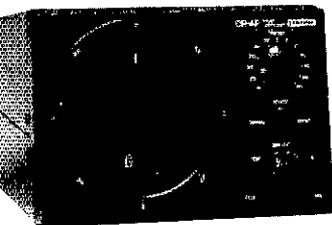
Frequency Range: 1.8-30 MHz (7 bands)
Power Rating: 200 W CW (3.5-30 MHz)
100 W CW (1.8-3.4 MHz)
Output Impedance: 10-250 ohm
Dimensions: 226 X 90 X 245 mm.
8.9 X 3.5 X 9.6 in.

CL-680

Frequency Range: 1.8-30MHz (7 bands)
Power Rating: 200W CW (3.5-30 MHz)
100W CW (1.8-3.4 MHz)
Output Impedance: 10-250 ohm
Dimensions: 165 X 75 X 97 mm.
6.5 X 2.9 X 3.8 in.

Antenna Rotator (Pat. Pending)

Up To Four Motors For Extra Torque and Braking

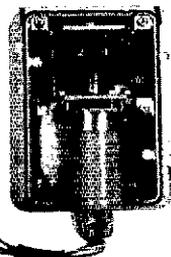


CR-4 Manual Controller for use with MR-750E and MR-300E Rotators

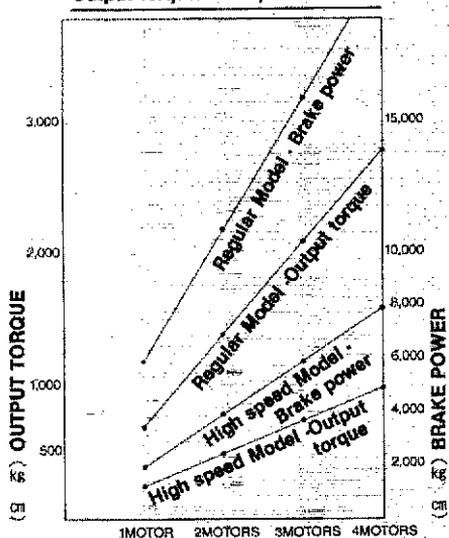
CR-4P Controller with Pre-Set function for use with MR-750PE Rotators

MR-750U Motor For use with MR-750E and MR-750PE Standard Rotators

MR-300U Motor For use with MR-300E High Speed Rotator



MULTI TORQUE ROTATOR — Output torque/brake power



SPECIFICATIONS

CONTROLLER UNIT

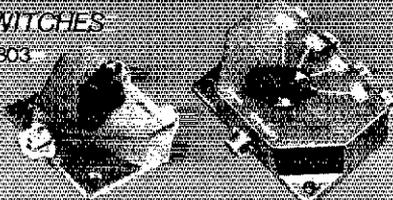
	CR-4 (for MR-750E/MR-300E)	CR-4P (for MR-750PE)
Power source	117 V AC (50/60 Hz)	
Power consumption	200 W (with 4 drive motors)	
Motor running voltage	24 V AC	
Dimensions	180 mm (W) x 125 mm (H) x 175 mm (D)	
Weight	9 lbs (4 kg)	
Operation	Manual	Manual/Pre-set

ROTATOR UNIT

	MR-750E/PE	MR-300E
Rotation time	60 Hz: 58 seconds (60 Hz input) 50 Hz: 70 seconds (50 Hz input)	33 seconds (60 Hz input) 39 seconds (50 Hz input)
Output torque	610 lbs/inch (700 kg/cm)	220 lbs/inch (250 kg/cm)
Brake power	5,200 lbs/inch (6,000 kg/cm)	1,700 lbs/inch (2,000 kg/cm)
1 motor	1,200 lbs/inch (1,400 kg/cm)	440 lbs/inch (500 kg/cm)
2 motor	9,600 lbs/inch (11,000 kg/cm)	3,500 lbs/inch (4,000 kg/cm)
3 motor	1,800 lbs/inch (2,100 kg/cm)	650 lbs/inch (750 kg/cm)
4 motor	13,900 lbs/inch (18,000 kg/cm)	5,200 lbs/inch (6,000 kg/cm)
	2,400 lbs/inch (2,800 kg/cm)	870 lbs/inch (1,000 kg/cm)
	18,300 lbs/inch (21,000 kg/cm)	7,000 lbs/inch (8,000 kg/cm)
Rotation angle	375 degrees	
Permissible mast size	1-1/2 ~ 2-1/2 inch (38 ~ 63 mm) < diameter >	
Control cable	6-wire cable 0.5sq ~ 1.25sq (AWG16/18/20 etc.)	
Continuous running	5 minutes Max. permissible	
Unit weight	16.5 lbs (7.5 kg) < with 1 motor unit fitted >	

COAXIAL SWITCHES

PAT. No. 59-000803



CB-201 CB-201B CB-401 CB-401B

2 position 2 position 4 position 4 position

600 MHz 1.3 GHz 300 MHz 1.3 GHz

SO-239 N type SO-239 N type

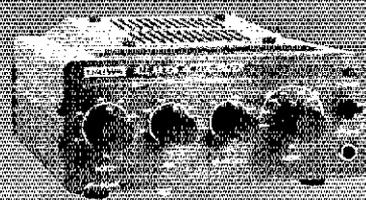
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Insertion Loss: Less than 0.2 dB

Isolation: better than 50 dB at 300 MHz

better than 45 dB at 450 MHz

adjacent terminal.



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AF-606K & AF-406K

Four stages of filtering... variable bandwidth over broad range... remarkably improved reception for all modes... razor sharp CW reception... built-in speaker.

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 X 62 X 150 mm, 5.9 X 2.4 X 5.9 in.

ELECTRONIC KEYS DK-210

CW is both communication and art. Sharpen your "fist" with Daiwa precision!

Dealer Inquiries Invited



POWER AMPLIFIERS

LA-2035

144-148 MHz

0.5-3 W

30 W plus

13.8V DC, 4.5 A max

100 X 38 X 125 mm

3.9 X 1.4 X 4.9 in.

Pre-Amp. Built-in

LA-2035R

144-148 MHz

0.5-3 W

30 W plus

13.8V DC, 8A max

100 X 38 X 125 mm

3.9 X 1.4 X 4.9 in.

Pre-Amp. Built-in

LA-2085R

144-148 MHz

0.5-5 W

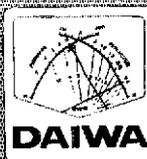
80 W plus

13.8V DC, 5A max

122 X 49 X 175 mm

4.8 X 1.7 X 6.9 in.

Pre-Amp. Built-in



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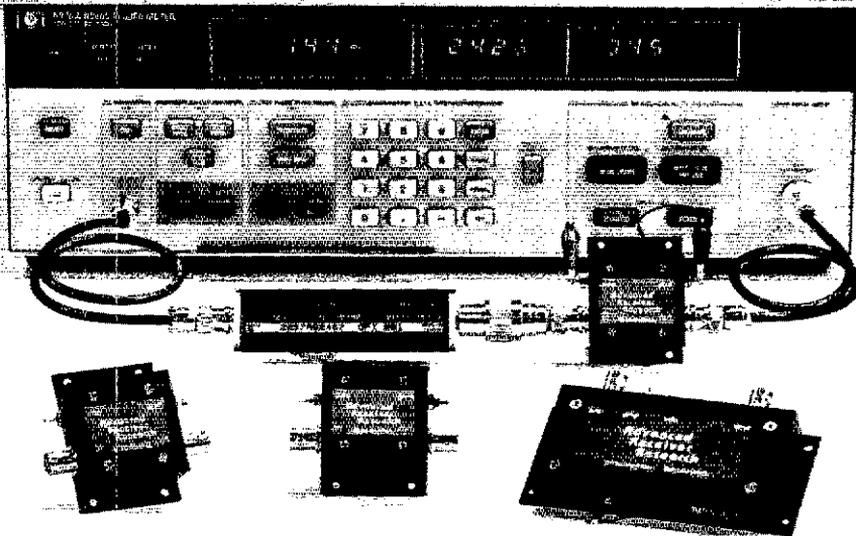
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High Performance vhf/uhf preamps



Receive Only	Freq. Range (MHz)	N.F. (dB)	Gain (dB)	1 dB Comp. (dBm)	Device Type	Price
P28VD	28-30	< 1.1	15	0	DGFET	\$29.95
P50VD	50-54	< 1.3	15	0	DGFET	\$29.95
P50VDG	50-54	< 0.5	24	+12	GaAsFET	\$79.95
P144VD	144-148	< 1.5	15	0	DGFET	\$29.95
P144VDA	144-148	< 1.0	15	0	DGFET	\$37.95
P144VDG	144-148	< 0.5	24	+12	GaAsFET	\$79.95
P220VD	220-225	< 1.8	15	0	DGFET	\$29.95
P220VDA	220-225	< 1.2	15	0	DGFET	\$37.95
P220VDG	220-225	< 0.5	20	+12	GaAsFET	\$79.95
P432VD	420-450	< 1.8	15	-20	Bipolar	\$32.95
P432VDA	420-450	< 1.1	17	-20	Bipolar	\$49.95
P432VDG	420-450	< 0.5	16	+12	GaAsFET	\$79.95

Inline (rt switched)						
SP28VD	28-30	< 1.2	15	0	DGFET	\$59.95
SP50VD	50-54	< 1.4	15	0	DGFET	\$59.95
SP50VDG	50-54	< 0.55	24	+12	GaAsFET	\$109.95
SP144VD	144-148	< 1.6	15	0	DGFET	\$59.95
SP144VDA	144-148	< 1.1	15	0	DGFET	\$67.95
SP144VDG	144-148	< 0.55	24	+12	GaAsFET	\$109.95
SP220VD	220-225	< 1.9	15	0	DGFET	\$59.95
SP220VDA	220-225	< 1.3	15	0	DGFET	\$67.95
SP220VDG	220-225	< 0.55	20	+12	GaAsFET	\$109.95
SP432VD	420-450	< 1.9	15	-20	Bipolar	\$62.95
SP432VDA	420-450	< 1.2	17	-20	Bipolar	\$79.95
SP432VDG	420-450	< 0.55	16	+12	GaAsFET	\$109.95

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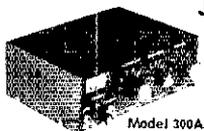
IWN VHF Kokomo 1152 — 225 31
 Hoosier VHF nets: QNI 5920, QTC 187, bulletins 91, QTR 6361 in 92 sessions for 20 nets. 9RNN/4 QNI 338, QTC 519, QTR 502, in 100% srs N9AE, N9SE, N9HZ, K9JL, W9JUJ, W9JOC, W9JCF, W9JW, D995, N9V on tech. W9JCF was presented a special award for his continued service to ham radio while a broadcaster for WOWO by the Fort Wayne ARC. Congrats to W9BZQE, all nets, all ECs and all stations who helped make this year's SET a success. Please: all ECs send in your annual reports. Congrats to the new officers of the IRCC: K9BRF pres.; K9ET, v.p.; W9B1GY, secy.; W9JUJ, treas. They plan to reactivate the awards program, particularly the Hoosier Courtesy AWARD. If you have this award, please let me or K9BRF know. K9FVN and W9NDDV are the newest members of the Amateur Auxiliary. This brings Indiana's total to 23. Officer: W9JUJ, 72, K9JL, 24, W9BZQE, 23, W9JOC, 23, W9JW, 180, KA9FFQ, 130, W9CNE, 115, N9AE, 98, KD9UD, 95, N9DYC, 85, W9DHI, 84, WA9QCF, 71, W9UEM, 64, W9JZY, 62, K9PS, 60, W9PRD, 57, K9HH, 50, K9N, 47, W9RTH, 46, W9BAW, 45, W9UMH, 45, W9PMT, 43, W9DART, 42, KA9EIV, 41, N9HZ, 40, K9W9D, 39, W9BZZ, 38, K9ET, 34, W9D9DWD, 29, K9KTB, 28, K9DIY, 24, K9FW, 23, K9KTE, 20, K9BRF, 18, K9FVN, 15, K9OUP, 15, K9WC, 15, A99A, 11, W9BAJY, 11, W9YEW, 11, W9DKP, 10, KD9ER, 10, N9DHX, 10, WA9OKK, 10, K9GK, 8, W9UFI, 8, WA9JNC, 8, W9GCV, 8, W9ZGC, 8, KA9LAU, 8, K9D, 6, N9DOK, 5, K9SBW, 5, W9KMY, 4, W9BDP, 3, W9RS, 2, W99VPG, 1.

WISCONSIN: SM, Richard R. Regent, K9GDF — SEC: W9OAK, STM: K9UTQ, ACC: A9K, BM: KA9CPA, OO/RF: KA9K, PIC: K9JL, SGL: AG9V, TC: K9GDF. Working with the news media? Ask Public Information Officer K9ZZ for a free packet of Amateur Radio promotional literature. Make a New Year's resolution to participate in the 1985 Wisconsin QSO Party or to help a newcomer in Amateur Radio. West Allis RAC Swapfest, Jan. 12th at the Waukesha Exposition Center. WNA 25th Anniversary QSO Party, Jan. 12th; N9BYK has rules. Kettle Moraine Radio Amateurs' Hamfest had good turnout despite fog and drizzle. K9GDF's ARRL information table assisted by K9EN. New officers W/K ARC: WA9TZE, pres.; KD9ET, secy./treas. New officers Greater Milwaukee DX Assn.: K9SK, pres.; N9AJ, v.p.; W9JJKZ, secy./treas. Milwaukee RAC to have VE Feb. 8th; post card to KD9AJ, Welcome KA9OCK, New Rock Co. Ed: K9JW, retired after many years of FB volunteer work. Milwaukee ARS supplied several pages of info for new ARRL EC Handbook. KA9OBP won the 1984 Rappach Championship, having six-hour QSO with W9BLDY. K9BD also knows American Morse Code. N9AW completed 5BDXCC. ROBOT RST QSL finally received by W9YCV for QSO year ago. Silent Key W9ZGJ. Wisconsin RTTY traffic net had first session Oct. 7th; check-ins were K9UTQ/NCS, W9CBE and W9ZBD, with K9GDF and KA9OBP on CW. W9CBE copies CW traffic with typewriter fed by a roll of paper. Hate only stops when his ribbon gets a hole and needs to be changed. How about sending me some news? KA9CPA BPL

BWN 3984 6:00 A.M. W9SHD 1072-1247-27
 WBSB 3985 5:30 P.M. WA9TY 900-289-31
 BEN 3985 Noon W9ESM 743-146-31
 WIN-E 3662 7:00 P.M. W9B1CH 296-136-31
 WIN-L 3662 10:00 P.M. KC9CJ 208-81-28
 NWTN 34194 6:30 P.M. W9JIF 423-53-31
 WSSN 3645 6:30 P.M. N9BDL 178-44-30
 WNN 3723 6:00 P.M. KA9OBP 139-33-30
 WICWTN 3191 6:00 P.M. N9DHT 562-23-31
 XPO 3925 12:31 P.M. WA9YVC 261-17-24

DAKOTA DIVISION

MINNESOTA: SM, George Frederickson, Jr., K0BT — SEC: KA9AR, STM: KD0CI. Seasons Greetings to all of you. Our new SM, K0BT, is moving as quickly as possible to fill in vacant appointment posts. He has appointed KB0MB to be our Bulletins Mgr., however the PIO, ACC and OO/RFI posts remain to be filled. If you are willing to help fill these vacancies, please contact K0BT ASAP. For your information, here is a listing of Dakota Division appointments: Director, Todd Johnson, K1RGT; Treasurer, Howard Mark, W0ZC; Assistants, WA9XG KB5UJ, W0MGI W0TN and KD0Z. I will list the section appointments next time. W9GUF informs me the new Virginia area rpt is now in operation on a new frequency, 147.75/15 MHz. WA9ZDE could be chosen by NASA to be on a future space flight. It would be great to work a Minnesota ham in space! He is a school teacher in the Delano area. New news: The Minnesota Section RTTY Net has been organized and is scheduled to begin operation on Sunday Nov. 11th at 8 P.M. Now is a chance for RTTY buffs to get in on the action! 3685 kHz is the place to be. I have assigned KB0BT to handle the net mgr's duties until I can determine how the net will go, and name a permanent mgr. KB0MB has commenced reading ARRL and section bulletins on Saturday evenings prior to MSPN/E as a service to keep us informed both locally and nationally. I'm still looking for a net mgr for MSPN/E! If you're interested, contact me (KD0CI) ASAP! New Novices: KA0TII, KA0TII, KA0TIK, KA0TII, KA0TIM, KA0TJS, KA0TOP and KA0TQ. Upgrading from Advanced to Extra was W9KYG, and KD0NZ is now NG0Y. Congrats to all of you! The Marshall ARC provided communications support for SSU's Homecoming on Oct. 27th. Sioux District DEC W9BZU also reports fine participation on the Marshall Rptr Emergency Net from several towns in the area. On that note, KA9ARF continues to sign up ECs and is hopeful of filling the remaining void in our section soon. He's done a FB job so far as our SEC. The VEC program seems to be catching on as several clubs have scheduled exams. Listen to the bulletins on or before MSPN/E to find out where exams will be held in your area. Plans are in the works to begin a "Ham of the Month" and "The Year" program beginning in 1985. After the criteria for such an award(s) is worked out, an announcement will be made. You may still have time to get in on the Sky Blue Waters Chapter of 10/10 "Frozen Lake Award". The contest continues thru December. QNI the 10/10 net at 28.715 MHz for details. Tnx to all clubs who send me newsletters! They help make this job alot easier. Tnx to all of you for your continued support in 1984 and may you have a blessed



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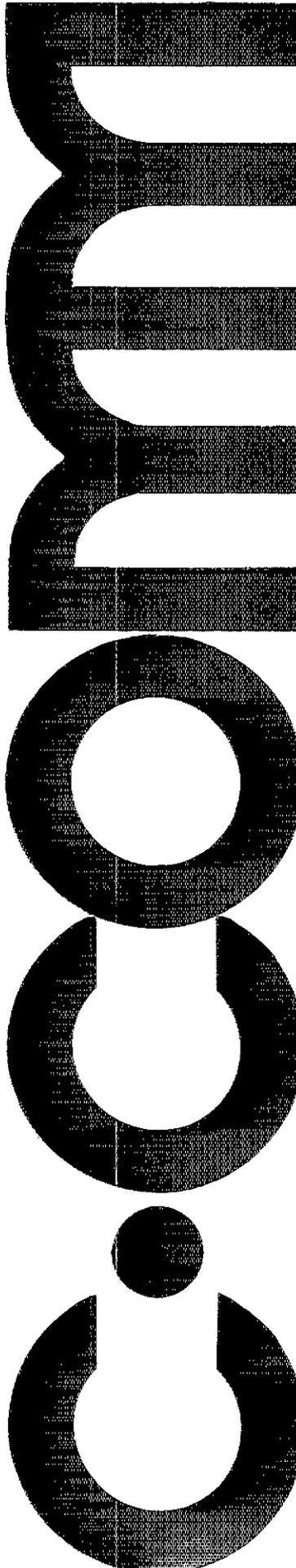
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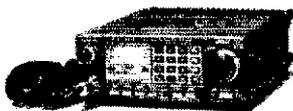
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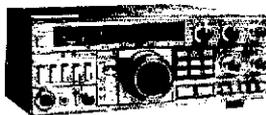


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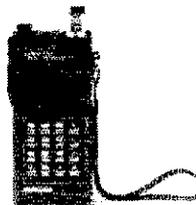
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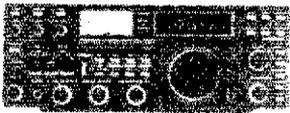
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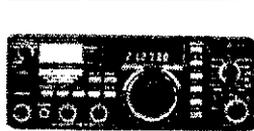
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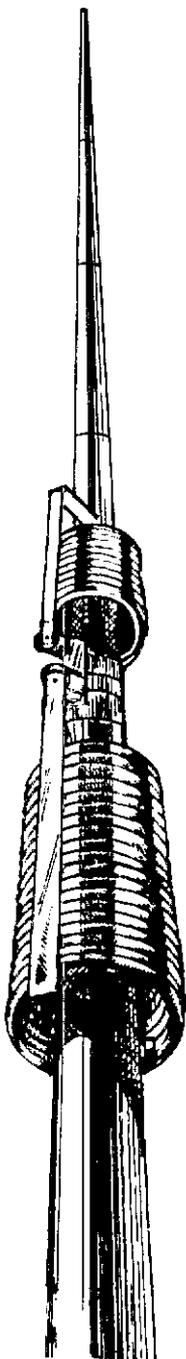


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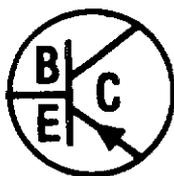
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MSPN/N	3929	12:05P	657	85	31
MSPN/E	3929	5:30P	1129	182	31
MNAMWXNT	3929	6:15P	384	225	22
PICONET	3925	9:00A	3454	224	27

Traffic: KB0MB 514, WA0TFC 346, KA0EPY 253, WD0JZU 244, KA0ARP 200, W0BHI 123, KD0C1 109, WA0ONJ 103, N0B 75, K0CPT 75, W0BNUJ 72, W0BNUJ 65, W0BNUJ 55, K0T01, K0T01 41, KA0ODQ 35, WD0BGS 33, W0BXP 31, KB0CD 30, W0GRW 28, K0BNL 28, K0OGI 26, W0BUK1 25, N0JP 24, KA0AJF 21, W0MFW 20, KA0KWM 15, W0SDM 14, K0CVD 12, N0EWA 9, WA0MIF 6, KA0BFP 3.

NORTH DAKOTA: SM, Joseph Gregg, KN0A — Congrats to KA0SYT, Keith Seaver, editor of *The Prairie School Letter*. Letter No. 5 was devoted entirely to the art of Amateur Radio, and the contributions of North Dakota hams. Congrats, too, to Jason, KA0SID, pres. of Dickinson Jr. High ARC and Net Mgr of the North Forty 2M net, Kudos to all involved in the repeater linking project in Bismarck area. Thanks to BARK, TRARC and RRRC for monthly newsletters. Hope you are ready for winter. Merry Christmas and Happy New Year. Goose River Net 4 sessions, 84 QNI, DAA Net: 14 sessions, 260 QNI, 9 QTC. Thanks for good net participation!

SOUTH DAKOTA: SM, Fredric Stephan, KC900 — Even though this winter so far has been very tough, we do have the opportunity for some good DX on all bands, believe it or not. How are your club activities this month? We usually hear from the Moberge Area ARC and the Prairie Dog ARC. What are the rest of you doing? One good project would be to work with the grade school children to interest them in the fun and service of Amateur Radio. STM NB0D needs help with traffic, traffic reporting, net management, traffic reps, and various other coordination activities. Please volunteer your help now, before it is too late. I hope this report does not fall by the wayside because of the post office and the ARRL mailroom high line; as did our report of several months ago. Wonder where that SA ever landed? Send your comments to us on the attempts for federal antenna regulation and on section wide frequency coordination. It is important. Have you found the Emergency Coordinator for your county yet? Contact SD SEC W0YMB.

DELTA DIVISION

ARKANSAS: SM, Joel M. Harrison, WB5IGF — SEC: N5BPU, STM: AE5L, TC: W5FD, ACC: AD5M, PIO: K5DW, SGL: W5LCI, Repeater Coordinator: WB5FDP. I would like to take this opportunity to wish each of you a very happy New Year. If you hold an ARRL appointment in Arkansas and aren't receiving the Section's Newsletter, contact me. A lot of plans have been made for Arkansas ARRL in the coming year, and I am looking forward to sharing them with you. Make plans now to attend the ARRL State Convention and Arkansas Hamfest April 13 & 14. A very special recognition to our net managers: OZK CW W5MYZ, Phone Net KA5DFT, Razorback Net W5TUM, Mockingbird W5ZWZ, EC N5BPU, Weather Net W5RXU. Thank you, Ark traffic handlers: W5TUM W5UAU W9OK W9YCE W5QFU W5SFC WA4ZJ N5EJE AE5L.

LOUISIANA: SM, John "Wondy" Wondergem, K5KR — ACC: K5DPA, SGL: K5SSL, OO/RFI: WB5TPG, TC: N5JM. South Louisiana was fortunate that the 1984 hurricane season passed us by with a single damaging storm. Amateurs in several communities were organized and well prepared, but generally there was an absence of wide area organization or participation. Loss of two Section Emergency Coordinators within six months owing to employment transfers contributed. So did complacency and a lack of interest. ARRL recently distributed, "The Emergency Coordinator's Handbook," an outstanding and detailed publication for the Amateur Radio Emergency Service. The publication provides guidance in organizing, administering and conducting readiness exercises. Still needed is someone to take charge as the Section Emergency Coordinator for Louisiana. Wouldn't you like to be involved in this interesting and important part of Amateur Radio public service? Contact K5KR listed on page 8 of your QST. W5GHP and W5K5I transmitted 2401 messages for K5WF, World Fair Amateur Station, from 11 May to 11 Nov. Traffic: W5GHP 612, KE5PP 112, WB5LBR 82, N5ANH 40, WA5TQA 31.

MISSISSIPPI: SM, Paul Kemp, KW5T — SEC: N5DDV, STM: KB5W, VHF Coord: NF5Q, New appt. N5DDV now OD. N5GDV net mgr. MLEN. Call sign changes: WA5OKI now N5SM, KA5TGI now KE5ST. Congrats to upgrades new Extra, N5DUZ and WA5VFP. K5AKM heard on 3882.5 kHz. Need reports from all appointees. Summer is now behind us and the long days of winter gives us time to get our programs back on line. Still have openings in SGL, ACC and TC. If you are interested in one of these, let me know. Clubs around the state are engaged to pass along your activities and accomplishments. CAND (W5KLV) 31 sess., QTC 848, DRN5 (WB5YDD) 62 sess., QTC 666, MTN (K5OAF) 31 sess., QNI 94, QTC 34, MSBN (KW5T) 31 sess., QNI 2329, QTC 62, MMN (WB5RMW) 31 sess., QNI 537, QTC 6, GCSBN (W5JHS) 31 sess., QNI 1651, QTC 26, MLEN (N5GDV) 4 sess., QNI 60, QTC 0. Traffic: N5AMK 374, K5OAF 214, KT5Z 63, W5WZ 60, KW5T 43, W5L5G 40. (Sept.) KT5Z 127.

TENNESSEE: SM, John C. Brown, N04Q — ASM & ACC: WA4GLS, OO/RFI: W9FZW, PIO: WK4V, STM: WA4GZQ, SGL: WA4GZZ, STM: NG4J, TC: WA4HK. There seems to be an ever increasing number of cities and towns around the section that are attempting or are adopting some sort of ordinance or law that severely restricts the erection of satellite or TV receiving dishes. It is strongly suggested that each amateur in the section get themselves either involved or familiar with what the various city fathers are attempting to do. It is also suggested that a copy of any effort to prohibit hams from affecting our hobby in a presentation be forwarded to your State Government Liaison WA4GZZ. We are hopeful that the FCC will get the appropriate rules for that area out soon. It has been noted that several of the other sections have moved their net operations down below 3800. It just might be wise for the TN section to look into this matter as a way to get out of the foreign broadcast problem that has bothered us for years, so the net is now 3800. Let your net mgr or net manager know what you think. Most that visited the various hamfests throughout the past season know that your Section Manager made available most of the ARRL publications. It might interest you to know that XYL and he sold almost \$2,000 worth of them during the hamfest season. Newest items being the *FCC Rule Book*, new and updated *License Manual*, the new *Call Directory* and the "bigger and better" *ARRL Handbook*. The net activity is beginning to show the seasonal growth again. Nets: low frequency phone - sessions 75, QNI 3700, QTC 148; VHF

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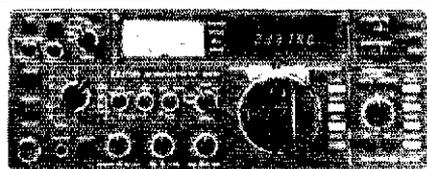
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| *FL-52A 500 Hz CW filter (2nd IF)... | 96.50 | 89 ⁹⁵ |
| *FL-53A 250 Hz CW filter (2nd IF)... | 96.50 | 89 ⁹⁵ |
| *FL-44A SSB filter (2nd IF)..... | 159.00 | 144 ⁹⁵ |
| SM-5 8-pin electret desk microphone | 39.00 | |
| HM-10 Scanning mobile microphone | 39.50 | |
| MB-12 Mobile mount..... | 19.50 | |
- *Options also for IC-745 listed below**
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| FL-44A SSB filter (2nd IF)..... | 159.00 | 144 ⁹⁵ |
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| EX-203 150 Hz CW audio filter..... | 39.00 | |
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| HM-10 Scanning mobile microphone | 39.50 | |
| MB-5 Mobile mount..... | 19.50 | |
| IC-720A 9-band xcvr/1.30 MHz rcvr | \$1349.00 | 869 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 | 789 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 (*)**



- | | | |
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| IC-751 9-band xcvr/1.30 MHz rcvr | \$1399.00 | 1199 |
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| 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 | |
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| SM-6 Desk microphone..... | 39.00 | |
| CR-64 High stability reference xtal | 56.00 | |
| RC-10 External frequency controller | 35.00 | |
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| PS-15 20A external power supply..... | \$149.00 | 134 ⁹⁵ |
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ICOM

- Options - continued**
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| 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 |
| 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 |
| OPC Optional cord, specify 2 or 4-pin | 5.50 | |
| GC-4 World clock..... | 99.95 | 94 ⁹⁵ |
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| IC-2KL w/ps 160-15m solid state amp | 1795.00 | 1299 |
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| 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 | 759 ⁹⁵ |
| PS-35 Internal power supply..... | 160.00 | 144 ⁹⁵ |
| PS-15 external power supply..... | 149.00 | 134 ⁹⁵ |
| CF-1 Cooling fan for PS-15..... | 45.00 | |
| EX-144 PS-15/CF-1 fan adaptor | 6.50 | |
| AG-25 Mast mid GaSfET preamp | 84.95 | |
| IC-471H 75w 430-450 SSB/CW/FM xcvr | 1099.00 | 989 ⁹⁵ |
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| PS-15 20A power supply..... | 149.00 | 134 ⁹⁵ |
| CF-1 Cooling fan for PS-15..... | 45.00 | |
| EX-144 PS-15/CF-1 fan adaptor | 6.50 | |
| AG-35 Mast mounted preamp..... | 84.95 | |
| IC-271A 25w 2m FM/SSB/CW xcvr... | 699.00 | 619 ⁹⁵ |
| PS-25 Internal power supply..... | 99.00 | 89 ⁹⁵ |
| AG-20/EX-338 2m preamplifier.... | 56.95 | |
| IC-471A 25w 430-450 SSB/CW/FM xcvr | 799.00 | 699 ⁹⁵ |
| AG-1 Mast mounted 15dB preamp | 89.00 | |
| PS-25 Internal power supply..... | 99.00 | 89 ⁹⁵ |

Common accessories for 271A/H and 471A/H

SM-6 Desk microphone.....	39.00
EX-310 Voice synthesizer.....	39.95
TS-32 CommSpec encode/decoder....	59.95
UT-15 Encoder/decoder interface....	12.50
UT-15S UT-15S w/TS-32 installed....	79.95

- VHF/UHF mobile multi-modes**
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| 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 |
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| IC-37A Compact 25w 220 FM, TTP mic | 449.00 | 359 ⁹⁵ |
| IC-47A Compact 25w 440 FM, TTP mic | 469.00 | 419 ⁹⁵ |
| UT-16/EX-388 Voice synthesizer.... | 29.95 | |
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| ML-12 10w amplifier..... | 339.00 | 299 ⁹⁵ |
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| BP-15 AC charger..... | 12.50 | |
| EX-248 FM unit..... | 49.50 | |
| LC-10 Leather case..... | 34.95 | |
| SP-4 Remote speaker..... | 24.95 | |



- Hand-held Transceivers**
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| Deluxe models Regular SALE | |
| IC-02AT for 2m..... | 349.00 299 ⁹⁵ |
| IC-04AT for 440 MHz | 379.00 339 ⁹⁵ |
| Standard models Regular SALE | |
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| IC-2AT with TTP..... | 269.50 199 ⁹⁵ |
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| IC-4AT 440 MHz, TTP | 299.95 239 ⁹⁵ |

- Accessories for Deluxe models** Regular
- | | |
|--|-------------|
| BP-7 425mah/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-60 6-position gang charger, all batts | SALE 359.95 |
| BC-16U Wall charger - BP7/BP8..... | 10.00 |
- Accessories for both models** Regular
- | | |
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| 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 |
| CA-2 Telescoping 2m antenna..... | 10.00 |
| CA-5 3/4-wave telescoping 2m antenna..... | 18.95 |
| FA-2 Extra 2m flexible antenna..... | 10.00 |
| CP-1 Cig. lighter plug/cord - BP3 or Dlx..... | 9.50 |
| DC-1 DC operation pak for standard models | 17.50 |
| LC-02AT Leather case for Dlx models w/BP-7/8 | 39.95 |
| LC-2AT Leather case for standard models..... | 34.95 |
| LC-11 Vinyl case for standard models..... | 17.95 |
| LC-14 Vinyl case for Deluxe models w/BP-7/8 | 17.95 |
| RB-1 Vinyl waterproof radio bag..... | 30.00 |
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- Shortwave receivers** Regular **SALE**
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| R-71A 100 Khz-30 Mhz digital receiver | \$799.00 | 689 ⁹⁵ |
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| EX-310 Voice synthesizer..... | 39.95 | |
| RC-11 Wireless remote controller.... | 59.95 | |
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| R-70 100 Khz-30 Mhz digital receiver | 749.00 | 569 ⁹⁵ |
| EX-257 FM unit..... | 38.00 | |
| IC-7072 Transceiver interface, 720A | 112.50 | |
| FL-44A SSB filter (2nd IF)..... | 159.00 | 144 ⁹⁵ |
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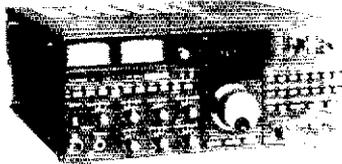
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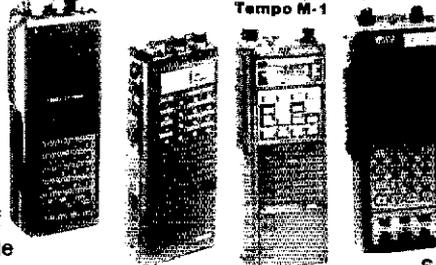


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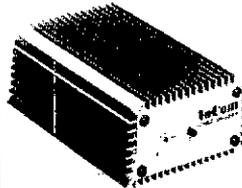


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PI Network. Low Pass PI Network tuning - 1.5 to 30MHz. Heavy duty, silver plated continuously variable inductor with 25.1 vernier dial. 1000 volt variable capacitor and 15,000V switch selected fixed capacitors on output side. Tunes 40 to 2000 ohm antennas. Also provides harmonic suppression.

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Antenna Switch. New! PUSH-BUTTON antenna switching to 4 antennas (2 coax, single wire and twin lead). Tuner bypass on first coax output. We designed this rugged switch to handle the power.

3KW Balun. Tantalum wound, triple core toroid gives balanced output to twin feeders from 200 to 1000 ohms and unbalanced output down to 20 ohms.

Model Options. MB-V-01 includes all MB-V features less antenna switch and balun. MB-V-02 is identical to MB-V-01 with the addition of a double core balun.

OTHER NYE VIKING PRODUCTS: Straight Keys, Squeeze Key, Coax Practice Set, Electronic and Memory Keys, Phone Patches, 3KW Low Pass Filter, Automatic SWR and Power Meters for HF and 2m (plus a model for the blind), 20kw PEP antenna tuner, and more!

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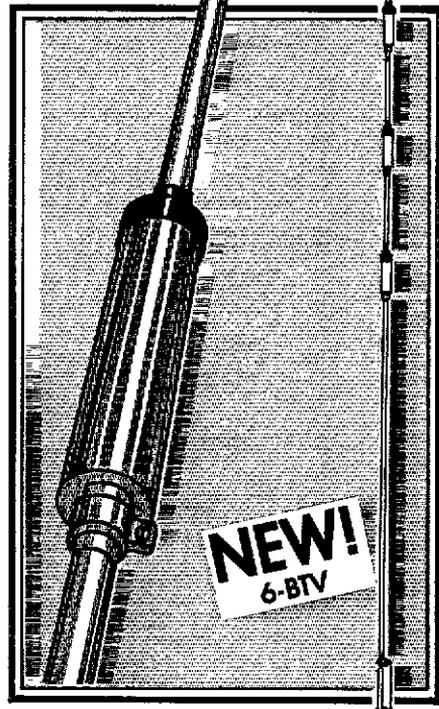
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Our exclusive Kūlrod® whip minimizes RF loss regardless of the watts applied, so you can talk farther. It stays cool to the touch even at high power.

The stainless steel rod is first plated with nickel, then with copper for high

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phone - sessions 86, QNI 2344, QTC 508; CW Nets - sessions 50, QNI 298, QTC 82; RTTY - sessions 30, QNI 251, QTC 13. The CW Net Honor Roll for this time is K9IMI N4JBL and W8DK. Congrats to them for the great effort. BPL: W9FZW KA4RSC. Traffic: W9FZW 276, KA4RSC 270, W4DDK 102, K4WVQ 88, K4WOP 50, W4WVX 48, NV4Z 48, W4MRD 35, W4TDB 34, W4PPF 24, NN4S 23, K4JGW 15, KE4L6 12, K4IV 10, W4PSN 8, W4YPO 8, N4KQX 7, W4EWR 6, K4UMW 6, W44HKU 5, N4KQX 4, W4TYV 3. (Sept.) W4MRD 9, N4KQX 4. (Aug.) W4MRD 41.

GREAT LAKES DIVISION

KENTUCKY: SM, Ann Jackson, KA4GFU — SEC: WA4JAV, STM: KA4BCM. TESTS: All clubs please inform the STM of test dates for publication here. Need 4 month lead. Call STM at 502-883-2289 for test date information. Next tests: Jan. 28, Owensboro, KA4BCM; Feb. Evansville, IN, KA9KRE. S4 and FCC 610 by 30 days before test date. EARTHQUAKE: "DES will rely heavily on Amateur Radio during disaster," says DES Chief, Gen. Buntin. HF/VHF units will be needed at all population centers in the disaster area, at staging areas (possibly Bowling Green or Elizabethtown), at the disaster site control center and at Frankfort. A 7.5 magnitude earthquake is expected within the next 25 years and will require ham operators on duty 24 hours for a minimum of three weeks. ECs are to organize 4-man HF/VHF equipped teams to be airlifted into the disaster area — about 15 initially, then 15 more for relief and another 10-plus within 8 hours. Submit your teams and their availability (2 hours & more) to the SEC. For more information contact the STM about plans and the SEC about teams. This is serious business. Many many lives will be at stake. Organize now and we'll work out the details at the 1985 Hamfests. Traffic: WA4JTE 294, KB4OZ 75, N4JLT 63, KA4BCM 81, WD4YI 56, KA4SKV 36, WA4SWF 21, W4WQV 21, WA4AVV 20, WK4D 20, K4HOE 19, K4MHL 19, WD4PBF 18, WD4CQF 12, WD4IXS 12, WA4NOG 12, WA4YPO 12, W4ZDU 11, KA4GBZ 9, KA4YIV 8, WD4YH 4.

MICHIGAN: SM, James R. Seelye, W8BMTD — ASM: W8BDHB, SEC: W8BEFK, STM: W8BRHU, ACC: K8SB, PIO: K8BK, SGL: N8CNY, TC: W8B9YG, BM: KZBV.

Net	Freq	Time/Day	QNI	Tic	Sess.	Mgr.
MITN*	3520	Dy	713	—	—	W8EIB
QMN*	3653	1800 Dy**	985	24	93	W8UE
UPN*	3922	1700 Dy	857	76	35	W8BDHB
GLETN	3932	2100 Dy	727	57	31	W8BAJ1
WSSBN	3935	1900 Dy	765	36	31	W8BEYM
MNN*	3722	1730 Dy**	—	—	—	K8BTPX
MACS*	3953	1100 Dy**	—	—	—	K8LNE
VHF nets 10 reports			718	19	68	W8CUP

*NTS nets. **QMN late net, 2200; MNN late net, 2000; MACS 8n, 1300, Times local. APES net 8n, 3932, 1730. ARRL Info net, 8n, 3953, 1500. MI Traffic Workshop, 8n, 3953, 1800. 3932 is MI HF emer. freq. Silent Keys, with deep regret: W8GP K8HHX K8BX K8Z8. My apologies for the missing data in the net summary. I have been on my "Get em in on time" soapbox again, and I trust that there won't be any repeats on this matter in the future. New officers for Hiawatha ARA (Marquette): K8EZ, pres.; KA8BT, v.p.; NJ8H, secy.; W8IOC, treas. I am especially pleased with one line from Hiawatha's Nov. newsletter: "The Marquette Co. EC holds a permanent board position." If only all clubs had that good a rapport with ARES. I see by the newsletters I get that many ARRL affiliated clubs try to promote membership by regularly pointing out the financial advantage (for the club) of joining or renewing through the club. All OK, as far as it goes. But we should be doing more. Let's point out all of the advantages of league membership — at even a minimal cost. The figures I give are a little disturbing these days, but at least they should be to you too. After a lapse of several years, MI once again has a RACES ID card that will be recognized statewide. To lessen the chance of abuse that the last card suffered, the form is different. Controls are tighter and a bit of effort is required for qualification. If you are involved with ARES/RACES and haven't heard about the new card until now, ask your EC. Traffic: AF8V 302, W8QHB 275, W8BDHB 97, W8DKOC 95, W8DOLJO 87, K8UPE 82, K8GVJ 77, W8AYMH 76, KA8NCR 73, W8BMJB 70, W8BMTD 70, W8BY 41, N8BY 41, K8VPS 36, W8VQV 34, W8B8E 30, K8A0D 30, W8YIQ 27, W8YZ 24, W8VIZ 23, K8BTP 21, W8HX 19, W8BHP 17, K8O 16, K8ZJU 13, K8PQH 12, W8CUP 11, KA8OVH 11, W8WJV 11, K8EQO 9, W8BTT 9, W8YY 9, N8E8N 8, W86SIW 6, W8TBP 6, W8URM 3, K8HAP 2.

OHIO: SM, Jeffrey A. Maass, K8ND — ASM: KF8J, SEC: K8AN, STM: W8BMZZ, ACC: K8US, BM: W8ZM, TC: K8BMU, OOIRF: AD8I, PIO & SGL: N8CVK.

Net	QNI	QTC	Sess.	Time(Local)	Freq.
BN	413	218	62	1845,2200	3,577
BNR	480	248	41	1800	3,605
BSSN	417	262	21	1915	3,685
ONN	139	43	27	1830	3,708
OSN	312	135	31	1810	3,577
OSSBN	2401	946	101	10,1815, & 1945	3,9725

OSSN	121	37	31	0845	3,577
O6MN	230	13	31	2100	50,16

I appreciate the many expressions of good wishes received when I assumed the duties of SM. I plan to be very active, and hope to do justice to a very tough job. Thanks to my predecessor Allan Severson, AB8P, for his exemplary four years of service to Amateur Radio and to the Ohio Section. Thanks also to Jerry Spencer, K8OZ, who is stepping down as Section Traffic Manager, and whose dedication to the NTS has been unflagging. New section leadership appointments are as noted above. Welcome to new section-level leadership appointments: W8B8E, KF8J AD8I and W8ZM. Thanks to the continuing K8AN K8US and K8BMU. Reports from the Simulated Emergency Test are beginning to arrive: more later. We did note that it was difficult to get traffic passed into two large metropolitan areas — Dayton and Cincinnati! W8ZM reports that DARA will turn over its large pool of Volunteer Examiners to the ARRL VEC program, effective Jan. 7. Thanks to DARA and its VEC Chairman Judy Frye, KG8P, for their excellent support of the program in its infancy! Recent upgrades are too numerous to mention here: I have a list of over 25 months gleaned from the pages of newsletters received! Perhaps this is one result of our having more opportunities to meet new appointees: K8BY/OR8, N8FNP/OE8. Congrats all! I am saddened to note the passing of K8HDV and W8BVOA. The Ohio Area Repeater Council is scheduled to meet January 12: every repeater club should plan to send representation. Contact K8BDF at 419-845-2745 for details. Make a resolution for 1985 to recruit two new amateurs, and to recruit two more members for YOUR ARRL!

Local Nets	QNI	QTC	Sess.
ALERT	96	10	5

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LA-1000A 1200 WATT AMPLIFIER



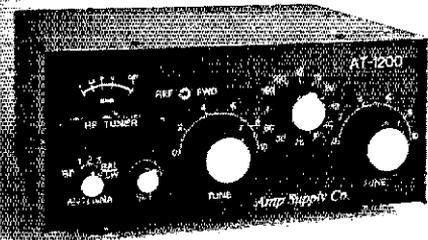
LA-1000A

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



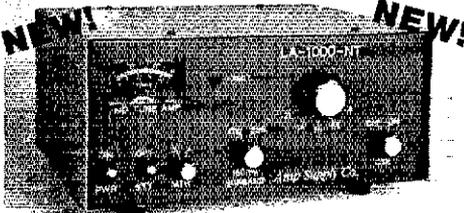
AT-1200

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*



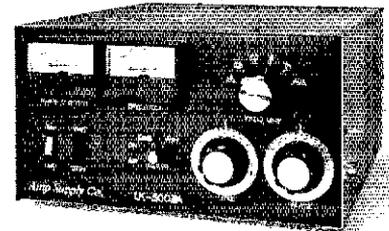
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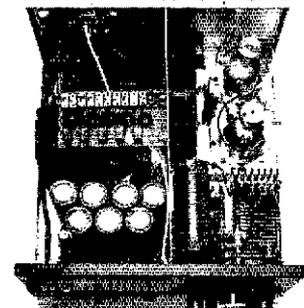
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The all new Amp Supply LK-500ZA 2.5 KW Input Amplifier is the right amplifier, with the right features at the right price. The LK-500ZA comes completely assembled and covers 160-15 meters. Two Eimac 3-500Z triodes in grounded grid are featured with a dual cooling system, one for the power supply and the other cooling the 3-500's. There's only one 2.5 KW amplifier with a pair of 3-500Z tubes in the world that sells for under \$900.00.

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Interior view of LK-500ZA with "Peter Dahl" Hipersil Transformer

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Lucas Co. 167 34 19
MASER 108 31 —
MEDINA 422 63 31
RARA 55 — 5
TSRAC 985 189 49
VWCEN 13 2 2
Wayne Co. 169 50 30
Traffic: WD8MIO 649, W8EK 378, WD8KBW 315, K8JDI 288, W8PMJ 257, K8BY 217, W8BDMF 211, W88RIB 202, W88JGW 184, K8ND 162, N8FCO 155, A8BP 132, KA8GJ 122, N8AKS 117, W8SKP 114, W8BMEP 112, K8TVG 111, K8CGF 108, N8EX 103, N8AEX 98, K8O 97, N8EVC 94, N8CV 91, K8BQ 89, W8BHG 82, N8EFB 77, W8SS 71, W88KBW 70, W88KWD 68, K8CMR 64, W88GMT 61, K8RIB 39, W8CXM 38, K8DYX 38, W8HED 38, W88RSM 37, K8DL 36, W88HMI 32, W88RGP 32, K3RC 31, W88HHZ 30, W88SI 30, W88RGS 29, W88EKI 28, N8FP 25, K8VOY 24, W88IKC 24, K8CKY 23, K88SAC 22, K8LQM 21, N8AJU 18, W88DYX 15, W88NHV 15, W88HL 13, K88GZ 11, N88Q 11, W88G 11, W88MRL 10, W88TRK 8, K88XT 7, W88UBR 6, W88M 5, N8CGM 4, W88YF 4, W88FUP 3, N8CJS 2. (Sept.) W8SKP 107, W88G 2, W88YF 2.

HUDSON DIVISION

EASTERN NEW YORK: SM, Paul S. Vydarany, WB2VUK
— STM: WB2MCO, SEC: AK2E, ACC & SC: N2BFG, BM: WB2EAG, SGL: K82HQ, TC: KC2ZO, ASM: K2ZM. News Ed: WA8MAZ.

Net	Time-Z (Days)	Freq. (MHz)	NM
EPN	2300Z	3.902	KC2TF
ESS	2300Z	3.590	W2WSS
NYS	0000/0300Z	3.677	WB2MCO
NYS/M	1500Z	3.677	WB2EAG
NY/ON	2300Z	3.913	WA2KJ
CDN	2300Z	144.34/94	N2BDM
HVN	0030Z S-M-T	144.335/135	N2BDM
HVN	0030Z W-S	146.37/97	N2BDM
SDN	0230Z	147.68/06	K2ZVI
SCRN	0100Z	147.735/135	KV2U

Net reports: AESN QNI 76, QTC 5; CDN QNI 733, QTC 89; EPN QNI 136, QTC 68; ESS QNI 395, QTC 61; NY/ON QNI 855, QTC 319; NYS/E QNI 455, QTC 205; NYS/L QNI 415, QTC 255; NYS/M QNI 211, QTC 147; SDN QNI 278, QTC 90. CLUB NEWS: Rip Van Winkle ARS new officers for 1985: N2EBG, pres.; KA2QYG, v.p.; KA2DKJ, secy.; KA2MYJ, treas. SARA had talk of "roots" of Amateur Radio in Dec. ARIA had action in Nov. & they report new members. KA2OHX/WB2FOB, CCNR had talk on antenna basics. OMARC new officers: NA2N, pres.; N2FS, v.p.; KA2OYL, treas.; KA2IP, secy.; AK2H, K5NA, K2HA, dirs. OMARC & Ulster RACES provided comm. for bike race w/N2MU, K2IWW, KA2KLV, K13Q, WA2KPF, NA2N, K2TGX. PSHR: WB2EAG, WB2VUK, WB2MCO, KC2TF, KA2MYJ, KC2ZO, W2PKY, K2ZVI, K2ZM, N2EQM, WA8MAZ, AK2E, KA2OPG. Traffic: WB2EAG 411, KC2ZO 286, WB2MCO 266, KC2TF 211, K2ZM 200, KA2MYJ 181, WB2VUK 132, W2PKY 109, W2VJR 94, K2ZVI 88, WA2JBO 49, WA8MAZ 44, N2EQM 42, K2HNW 38, KA2AQV 35, KA2OPG 28, N2AWI 23, AK2E 22, N2BFG 21, AA2Y 13. (Sept.) KA2AQV 29. (Aug.) KA2AQV 12. (July) KA2AQV 37.

NEW YORK CITY — LONG ISLAND: SM, John M. Smale, K2IZ — SEC: KA2RG, ACC & SC: WB2AP, CO/RFI: NB2T, TC: W2JUP, PIO: W2VX, STM: WA2ARC.
NLI CW* 3630 1900/2200 N2AKZ
NCVHF 6.145/745 1930 M-F K2MT
BAVHF 6.07/57 2000 M-F WB2BNA
SCVHF 4.77/5.37 2030 M-F W2G2D
ESS 3690 1800 W2WSS
NYS/M 3677 1000 WB2EAG
NYS 3677 1900/2200 WB2EAG

* Denotes section net; all times are local; please try and help out by checking in whenever possible. Harry Lesander, N2AWM, founder of Radio Central ARC is now a resident of Ft. Lauderdale, Fla. Lots of luck in the new QTH. Hamy Wangtigh, ARC had WA2DMF, Vice Dir. Hudson Div. as a speaker at their Sept. meeting. Radio Central's new ptr is on the air, on 444.525/448.525 with PL-2A access. N2BGP is the EC for the Bronx, and is looking for members for ARES. Art also participated in the Indian Point Emergency Siren Test. It is with deep regret that we list WB2NDI, "Doc" Levitt, as a Silent Key, Oct. 7, 1984. Bob set up a station at Governor's Island for the 1984 Boy Scout Jamboree on the Air. One of the highlights was a QSO with K2BSA, Headquarters in Dallas, Tex. Suffolk Co. VHF Net is meeting on Sunday evenings at 8 P.M. local to help alleviate the weekend buildup of traffic. Metroplex has a computerized "Shop Remote Bulletin Board System (RBBS). It can be accessed by 300 or 1200 baud by dialing 201-367-2658, hit a return or two and then answer the questions, the system is up from 1900 to 0700 local. KK2E and his XYL N2CIMO are proud to announce the completion of their "homebrew" project: Russel Patric Muller, born Oct. 16. The Larkfield ARC tube bank is looking for the following tube types: 7716, 7717, 884 and 6D4, if you can help or can donate anything else, contact Lloyd, WB2ZIT. Thanks to the many stations who helped with the NYC Marathon and helped to provide communications. Remember, if you are an OC, you must have completed the Vol. Monitor exam given by the ARRL or your appointment will be cancelled. Traffic: N2AKZ 269, KC2E 211, K2YQK 178, W2DBQ 56, W2GKZ 40, N2BGP 32, K2MT 3. (Sept.) K2MT 17. (Aug.) K2YQK 108.

NORTHERN NEW JERSEY: SM, Robert Neukomm, KB2WI — SEC: WB2VUF, STM: W2XD, RCC: W2CC, PIO: WB2NCV, TC: AD7L, ACC: KK2U, KY2S, NMS: W2CC, KB2HM, WB2RMI, N2XJ, WB2QHP, W2PSU.

Net	Freq.	Time	Days	Sess.	QNI	QSP
NJM	3695	10A	Dy	31	199	84
NJNE	3695	7P	Dy	31	321	127
NJN/L	3695	10P	Dy	31	202	68
NJSN	3735	6:30P	Dy	31	342	82
NJPN	3950	6P	Dy	31	445	98
		9A	Sa	5		
OBTN	147.12	10P	Dy			
NJVN	49/49	10:30P	Dy	31	241	107
TCETN	147.255	7:30P	Dy	27	136	24
NJRTTY	147.51	Autostart		31		

W2ZEP has set quite a record of 36 years as a member of NJN. This is his last report, as he is making Phoenix, AZ, his new QTH. Very best wishes for a job well done. Can you imagine the quantity of traffic he has handled! OO report from KJ2O received. We still need OOs to take over the FCC's job of monitoring. If you are interested, please contact KB2WI. QCWA's Elmer of the Year Award goes to William H. Rawson, K2AX, at the 10th Anniversary Dinner, Oct. 26th. Eighty-five members were present and they heard W2GKH, National President of the QCWA. New Providence ARC is working to develop an

Inter-club VE program which will make possible monthly license exams available to amateurs in the area. The desire is to have a regularly scheduled Saturday each month for the exams. Did you know that the incident ARC runs a 450-MHz repeater? The repeater is located on the roof of Bell Labs in Holmdel and has a fairly good coverage, especially to the south and west. Its frequency is 443.125/448.125 with no tones required to access it. This info courtesy JSARS. New Providence ARC reports the following election results: WA2KRZ, pres.; KA2DDG, v.p.; K2AGI, treas.; KA2UGR, secy. Neptune ARC's latest newsletter lists all the weekly meetings for the next two months and has a complete listing of club membership. A great idea for each club's annual newsletter. Fort Monmouth ARC is presently holding a Novice course under the guidance of KDCE. Attention all clubs in NJ: PLEASE try to get your plans for any courses to be offered to me at least two months in advance of starting date. I'd like to provide the amateur community with notices far enough in advance so that those interested in upgrading can plan ahead. BARA is holding its officer's elections. Sandy, N2BOT, has planned the Fifth Annual BARA dinner to be held at the Old Hook Inn. The Jersey Shore Chaverim reports they all enjoyed hearing Westlink's history of "Chaverim." They also advise that they meet on the Allaire repeater at 9 P.M. 145.11. The Cherryville RA has a top-notch newsletter called *The Uplink*. They were active in a disaster drill where 11 rescue squads and 6 fire companies throughout Hunterdon Co. participated. I hope you have all had a Merry Christmas and Happy Hanukkah. Traffic: N2XJ 313, KB2HM 294, K2VX 131, W2VY 75, W2RRX 59, W2ZEP 58, W2RO 48, W2XD 38, KA2SPH 32, W2UH 11, KD2EE 6. (Sept.) W2RQ 108. (Aug.) W2RQ 100. (June) KB2WI 46. (March) WB2KLF 99, WB2GHN 60.

MIDWEST DIVISION

IOWA: SM, Bob McCaffrey, K0CY — SEC: WA4VWV. STM: KA0X. ACC: WB0AM. PIC: KB0ZP. SGL: AK0Q. TC: K0AS. SM: K0IR. Hope everyone had a good holiday season. We expect to hear a lot of new rigs on the air now. NMs and ECs should have their annual reports in by now! Congrats to NFOYO for upgrading to Advanced. A new RTTY repeater up and running on 8.70 (KB0V/R), open to all. The Iowa QSO Party is slated for March 16 & 17. Watch for details. WA4VWV received the Iowa Contest Award for 1984. If you're interested, participate in the CD parties as well as the Zero District and Iowa QSO parties. The Waterloo club provided communication for the Red Cross 10K Run. CVARC has purchased a new rig for the Red Cross. The 35th Annual Operation Santa Claus was a success in DSM. KA0YZ is another 100% reporting EC; thanks. Special recognition to K0BI for his excellent leadership of the Iowa Code Net. N0CB is replacing his net. Please act as a host at the Iowa with demos at Ft. Dodge and Iowa City. Get involved.

Net Freq. UTC Day QNI QTC Sess.
 75M Phone 3970 1830/2330 M-S 2103 175 54
 TLCN 3560 0030/0400 Dy 388 227 82
 ICN 3713 7 P.M. (CST) M-F 126 58 23
 Congrats to PSHR recipients N0CR K0GP and KA0GOA
 Traffic: W0SS 184, K0GP 164, W0DFWB 89, W0LYS 89,
 WA0AUX 83, KA0ADF 76, KA0X 62, WA0JL 55, K0BI 54,
 N0CR 53, WB0AVW 41, K0BRE 34, KA0JRO 32, K0CY 30,
 K0BSC 27, K0CXL 25, W0HTP 24, W0WBW 22, W0BFF 19,
 K0BGC 12, K0BQJ 25, W0BOAC 12, N0EFC 11, KA0BTE
 7, KA0GA 5, KA0GA 5, WB0AM 4.

KANSAS: SM, Robert M. Summers, K0BFX — Let's start off with the news and hope we do before any bad hits the fan! New manager for the Central States Traffic net (of KANSAS Post Office Net) is Stu Milia, W0DE, a Kansan at heart. Effective immediately, Sundays 1 P.M. local time on 3610 kHz KRITTY, the new Kansas teletype net is in swing. Get those computers working right and check in for news, traffic, etc. Net Manager is Jim, AC0E. Alternate freq. will be 7030 kHz. Owing to vacation time, several reports were not received by Oct. 8 last month when I left. Net activity: K0BN 1159/139; KPN 409/16; KWN 990/739; KMWV 713/653; CSTN 209/475; QKS 303/109; QKS-SS 52/20; Sept. (CSTN) QNH 104, QTC 133; KPN 318/76; KMWV 838/62; KMWV 584/519; CSTN 183/77; QKS 314/103; QKS-SS 82/20. W0KRL reports a good SET this past month and wishes you all continued success in all your emergency communications efforts. We could be called upon at any moment for assistance. BE PREPARED!!! Traffic: K0BU 295, W0FRC 248, W0KJL 194, K0BU 191, W0FIR 180, W0QBK 135, AC0E 122, W0HI 110, W0OYH 104, W0FDJ 75, K0BFX 73, W0CHJ 34, W0QMT 27, W0BP 17, K0AJM 15, KA0E 14, NB0Z 14, W0MVM 13, N0BDG 11, W0RBO 10, K0GSC 7, WA0OWH 3. (Sept.) W0FRC 209, W0KJL 170, W0QBK 138, WA0LBB, K0BU 126, W0OYH 96, AC0E 76, W0HI 73, W0FDJ 70, W0BZEN 70, W0RBO 14, K0GSC 10, K0GSC 9, WA0OWH 8, W0CHJ 6, KA0E 4.

MISSOURI: SM, Ben Smith, K0PCP — Don Blenden, W0KULW, who has been Missouri SEC since Jan. 1, 1983, resigned the SEC position Oct. 15. Steve Vay, W0B7OK has been appointed SEC. We are very grateful for Don's work in putting together a very active ARES program. Steve is looking forward to working with the ARES members in the Section. As of Oct. 15, Missouri has a new Bulletin Manager. We are happy to announce that Ann Guptill, W0B7EG has accepted that position. All OBS should report to Ann at the first of each month. Anyone interested in an OBS appointment should contact Ann. Officers for 1985 of the Kansas City ARC are: WA0ITU, pres.; K0RM, v.p.; K0CAN, K0CWX, mem. secy.; K0LYL, treas.; Board members, K1BA, W0FXD, K0MZZ, W0BKIA, starting Jan. 24. The Heart of America ARC will be conducting Novice classes at Penn Valley Community College. The Heart of America Club also received recognition in *Underline* magazine, an area publication. W0DE has been named net manager of the Central States Traffic Net. A new repeater assn. has been formed in northeast Missouri. Known as the Mark Twain Repeater Assn. Its officers are KA0LLO, pres.; W0RTY, v.p.; KA0JQE, secy.; WA0KGT, treas. The Mexico repeater has a new frequency of 147.255. Section clubs were active in community projects the past month. The Indian Footprints Club provided communications for the State Communion Contest. Club members assisting were: W0KNP, W0BSZ, W0BSZ, W0B7OC, K0B7B, W0B7Y, KA0ZLH. The St. Peters ARC operated a Special Event Station at Daniel Boone Days near St. Charles and the Jefferson Co. ARC operated a special event station near DeSoto the U.S. Population Center. KT5Y and I attended the St. Peters ARC meeting and presented their Affiliated Club Charter.

Net	Sess.	QNI	QTC	Mgr.
MON/MON2	62	389	192	K0SI
MOSSB	31	674	110	KT5Y
MTTN	23	103	35	KA0PGN
HBN	23	332	34	K0DSQ
MEOV	31	390	31	K0DSQ

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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.

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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.

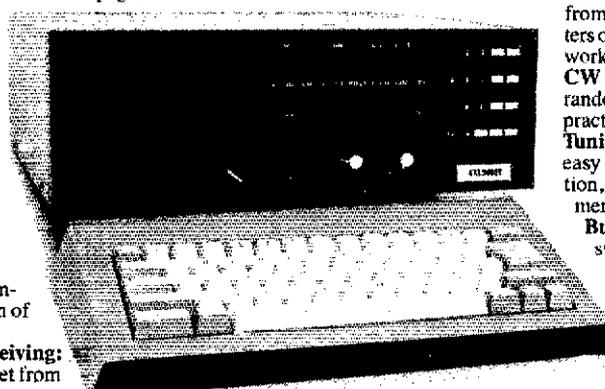
CW Random Generator: Output of CW random signal can be used as CW reading practice. **Bargraph LED Meter for Tuning:** Tuning of CW and RTTY is very easy with the bargraph LED meter. In addition, provision has been made for attachment of an oscilloscope to aid tuning.

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ZAEN	7	83	23	K9OCU
PHD	5	131	19	W8KHU
PTN	19	51	16	WB8RQ
RRARN	26	321	1	K8BKR
LOZFM	4	102	1	W8RTI
ACARN	4	51	1	N8EHU
MOFON	4	19	1	A1DC
LOZCW	4	17	1	W8RTL
SLARN	5	275	1	K8WEX
CMEN	7	116	0	K8PCK
IFN	4	75	0	WB8ZI
JCCC	5	61	0	W8ORI
SARIS	5	57	0	W8ENW
LARIS	4	41	0	W8RHC

Traffic: KTSY 244, K8SI 12, K8PK 170, W8BMA 164, K8BS 155, A1B0 127, K2ONP 82, N8EVC 86, K8CQ 39, W8OLD 38, K8ORB 35, ND8N 32, W8YJX 23, W8HOP 20, W8NUB 12, N8BKE 10, W8KHU 7, W8CJB 5, W8HDC 5, K9OCU 5.

NEBRASKA: SM, Vam J. Wirka, W8QGQ — SEC: N8AIH. The Nebraska section has a new traffic manager (STM), Jerry Kohn, W8EGK, of Lincoln. Net managers should have their reports to W8EGK, 5321 Stonecliffe Dr., Lincoln 68516 by the 5th of the month. A special thanks to former STM Shirley Rice, K8BCB, of Scottsbluff for all of her dedicated work. Many volunteer examiners have received their accreditation, as shown by the three exam sites set for January. Exams will be given in Omaha, Lincoln and McCook. Some amateurs from Northeast Nebraska will be assisting with exams in Sioux City, IA. (Application deadlines for these exam sites have passed.) Nebraska CW Net manager, W8TED, needs more NCS stations for the nightly net on 3837 kHz 0100 UTC. Lyman Nelson, W8EEN, wants to form a section-wide packet radio group in Nebraska. Contact Lyman Nelson, W8EEN, Rt. 2, Hooper 68031. The section needs some volunteers for the Amateur Auxiliary program. Thanks to all of the stations picking up traffic for the Section Manager. Your help is greatly appreciated. 73, W8QGQ. Traffic: K8DKM 113, W8KK 100, W8TED 50, K8EVH 45, K8BCB 31, W8BOK 22, K8IXY 20, K8BVM 14, K8BOC 12, W8GQM 12, W8QGQ 11, W8PFC 9, W8CQX 8, K8FRU 6, K8ODF 2, K8TUH 2, W8WZR 2, W8NIK 1.

NEW ENGLAND DIVISION

CONNECTICUT: SM, Robert J. Koczur, K1WGO — STM: K1EIC. SEC: KA1ECL. BM: K3ZIJ. ACC: KG1M. OO/RFI: KA1ML. TC: W1HAD. PIO: KX1B. SGL: K1AH. Net Freq. Local Time QTC QNI NM
 CN 3640 1900/2200 223 305 K1WIR
 CPN 3965 1800 m-s 171 423 KA1BHT
 NVTN 22/88 2130 37 307 WA1EMI
 WCN 78/18 2030 133 636 WB1GXZ
 RTN 13/73 2100 53 278 KA1JAN

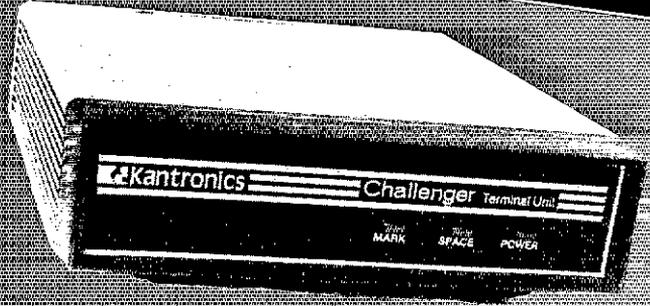
A very Happy New Year to everyone in the Connecticut Section. Congrats to our new section appointee KX1B, and a big like to W8TDA for her fine job as PIO. From all indications it appears that the 1984 SET was a complete success and well done to all who participated. The OO/RFI program is in full swing. Anyone interested in gaining membership should contact KA1ML for details. The CC Club of Torrington will be starting the spring Novice and Technician class. Contact W1YZA for details. If you are interested in bringing Amateur Radio into the classrooms of elementary and middle schools contact ARRL for your HROTR kit. Congrats to Pete Kemp, KA1KD for receiving Instructor of the Year award for 1983. His efforts at the Bethel Middle School have promoted Amateur Radio public service in many creative ways. Congrats to W1QV for 50-year appt. as OBS and 60 years as OBS. Thank you from all of us in the Connecticut section and keep up the good work, Bob. The Connecticut section nets are to be commended for their fine work in handling the numerous amounts of traffic each month. During the simulated emergency test each year as well as actual emergencies, the net managers and net control stations and operators have demonstrated a superior abilities to function well under all circumstances. For the month of October, there was 100% representation of the 1RN Net, a superb achievement. Congrats to you Mary, WB1GXZ, 1RN NM for a job well done. 73, OBS reports: KA1XG 10, K1WKO 8, W1GDZ 6, W1LUH 4, KA1XZ 3.

EASTERN MASSACHUSETTS: SM, Rick Beebe, K1PAD — STM: KW1U. SEC: W1IAY. ASM: K9HI. ACC: KA1ZE. OO/RFI & BM: W8ASTO. TC: KA1IU. PIO: WA1DA. SGL: K1BON.

Net	Mgr.	Freq.	Time(loc)/Dy	QNI	QTC
EMRI	WA1LPM	3.658	1900/2200/Dy	396	410
EMRIPN	N1BGW	3.830	1730/Dy	321	287
EM2MN	KA1AMR	23/63	2000/Dy	489	172
NEEPEN	K1BZD	3.945	0830/Sn	72	32
HHTN	WB1CMQ	04/84	2230/Dy	471	242
EMRISS	N1AJJ	3.715	2030/Dy	219	99
C12MN	N1BYS	045/645	1930/Dy	232	171

Wellesley club newsletter, *The Spark Gap*, won 1st place in New England at the Division Convention. Also the 1979 newsletter received second place. Word from headquarters is that the Volunteer Examination session at the convention is and will probably stay the largest examination session on record. Over 250 people were examined. Whitman club is considering SSC status and they are planning their annual Thanksgiving Day operation from the Plimoth Plantation and their Xmas Message Fair. Falmouth Club member K1GN was commended for his taking care of an overheated runner in the recent Falmouth Road Race communications event. His solution? A garden hose! Action-Boxboro newsletter had an interesting two part article by N1ASFIAA on how to take a volunteer examination. Cape Ann club is holding an on the air net to survey their club members emergency preparedness. Quansapowit club is holding an on air net on cooking and transmission lines. Greater Lawrence club now meeting on the first Thursday of the month at the Greater Lawrence Technical School. Middlesex Club members helped the local police with a Halloween patrol. 1979 group is running a Novice class at Chelsea High. Massasoit club is now enjoying the fruits of a lot of hard work on their repeater. Concord hams helped insure that the Concord cable TV agreement excluded the use of channels in the ham bands. This can only be changed by approval of the Board of Selectman. Good job! Packet radio continues to boom in EMA. If your club hasn't had the memo of this yet it will knock your socks off! Contact KA1ML. Traffic handlers take note: Mass. Maritime is planning a cruise in January. Framingham club is planning its annual banquet. Wellesley club provided communications for Veterans Day Parade. Traffic: KW1U 791, KN1K 37, KA1EXJ 277, K1GXP 244, W1TBY 242, N1AJJ 203, K1C05 179, K1ZYW 177, KA1EFO 177, W1NWM 155, KA1AMR 138, N1BHH 128, K1BA 119, W1ICE 100, W8ASTO 94, N1BYS 70, WA1FCD 59, WA1LPM 59, W1QLL 46, KB1AF 43,

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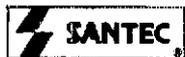
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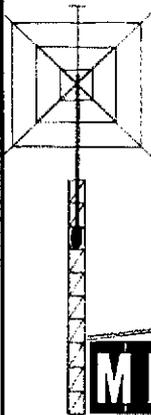
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WA1DXT 43, WA1FNM 31, W1XZHC 31, WA1SNH 30, KB1PA 29, K1BZD 26, KA1EID 26, N1DDC 25, K1ABO 22, KA1DJV 20, K1LCO 10, N1CKN 6, N1CVK 4. (Sept.) N1BHH 126.

MAINE: SM, Cliff Laverty, W1RWG — SEC: KL7JG, STM: AK1W, PIC: KAITJ, TC: KQ1L, QO/RFI: W1KX, BM: W1JTH, ACC: KB1JF, SGL: K1NIT, Congrats N1BME N1CST upgrade Extra 11/6 Boston, Augusta ERU elect: KA1FKS, pres.; N1CQ, v.p.; KA1FTO, secy.; KA1DLZ, treas. Pine State ARC elect: KA1GIM, pres.; K1AG, v.p.; K1TOK, secy/treas.; N1CSN W1YTO WB1DKS, directors. W1RWG W1KX KB1JF KAITJ attended FCC/DO Auxiliary mtg at Kingston MA. Elisworth AWA & Yankee ARC sked lic exam on Jan. 26. PSHR: W1RWG WA1YNZ KL7JG N1BJW WB1GLH WB1CBP

Net	Sess.	QNS	QTC	NM
SeaGull	27	1062	224	K1GUP
PineTree	31	299	140	AC1G
Late PTN	23	121	28	WA1YNZ
MePubSvc	14	119	44	W1JIG
Aroostook	8	96	7	WA1YNZ
RACES	4	51	15	W1RWG

Traffic: W1RWG 160, KA1AVU 133, W1KX 85, WB1CBP 83, AK1W 82, KA1JOJ 80, KL7JG 78, N1BLZ 75, WB1BYR 68, WB1GLH 53, N1BJW 52, W1ISO 45, WA1YNZ 42, W1BMX 35, KA1KFP 31, KA1FTL 26, KA1UPR 26, W1OTQ 13, KA1CNG 11, W1JTH 10, KB1PB 7, KB1JF 5, N1BME 5, KA1ENL 4, KAITJ 3.

NEW HAMPSHIRE: SM, Robert C. Mitchell, W1NH — STM: W1TN, NMs: N1NH K1M N1AKS, GBARA looking for articles for newsletter; contact WA1PEL. Portsmouth Red Cross presented Port City club with communications award in recognition of Amateur Radio support. Nashua Area RC raffie for Shriners Boston Burn Unit was very successful. Don't forget the New Hampshire OSO Party Feb. 2 & 3. Contact K1HM for details. EC W1FYR and five others assisted Keene area Red Cross Run, North Country gang giving exams on Jan. 13 at the North Conway Community Center. Contact them on Mt. Washington repeater. Happy New Year to all from Helen and me. Traffic: N1CPX 26, N1NH 183, N1AKS 187, K1M 113, K1KE 112, W1GUX 109, W1TN 98, KB1UV 98, K1QV 71, K1LWB 65, W1ALE 58, KV1S 50, W1FYR 41, K1TOY 37, WB1GXM 30, W1CUE 29, KA1GDZ 20, KA1HPO 19, W1MHX 18, KA1QF 11, N1ALM 9.

RHODE ISLAND: SM, Gordon F. Fox, W1YNE — STM: W1EOP, TD: AB1D, NM: WA1OSL, ACC: N1BEE, SGL: K1DA. You may have noticed that there has been no column for the last couple of months. This has been because of two factors: (1) Nothing has been received except tlc reports; and (2) I have been bogged down with work. N1DED has a new tri-bander in service and has taken an NCS post on EMRIS. Newport Co. RC provided comms for the Tri-athlon at Fort Adams. Taking part were WB1FMB, WB1GVH, WA1CSO, WA1OSL, W1JFF, W1LO, W1RDH, W1YD1, K1VPK and W1B5E traffic: W1EOP 1087, KA1KML 345, WA1CRY 70, WA1CSO 37, K1AOS 266, (Sept.) W1EOP 1206, KA1KML 402, K1AOS 127, N1DED 59, WA1CRY 30, WA1CSO 26, (Aug.) W1EOP 1054, KA1KML 220, K1AOS 58, WA1CRY 40, WA1CSO 31.

VERMONT: SM, Ralph Stetson, KD1R — Happy New Year everyone. After six months as your SM, I've had the pleasure of meeting quite a few VT hams, in the next year I hope to meet more of you. 1984 has been good to the Radio Amateur community with the new phone segments on HF, the VEC program implemented, the Amateur Auxiliary approved, the new statement of understanding with FEMA and the list goes on. Let's hope that 1985 can bring us the rest of the WARC-79 bands, and no further loss of spectrum, such as the 20 CM band loss, and the attempts to take away 220 MHz & the top of 30. Hear us on the grapevine that we can look forward to another great harvest in Milton this March. Contact WB2JSJ for further info. Also heard that K1OAJ is being considered for the Magellan award for his unique ways of finding the longest distance between any two short points. In closing let's take a moment to remember our fellow amateurs who are no longer with us. Sorry to report Wally Edwards, W1OHU became SK on 11/04/84. Trx to W1KVK for report. Traffic: K1TQ 150, W1KRV 117, AE1T 109, W1OAK 22, KD1M 14, KD1R 14, (Sept.) W1KRV 135, AE1T 120, N1ARI 80, K1TQ 78, N1COB 48, W1OAK 26.

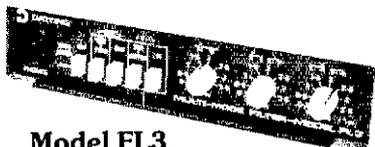
WESTERN MASSACHUSETTS: SM, Don Haney, KA1T — QO/RFI: N1CJG, SEC: K1JH, STM: W1UD, TC: KA1JUM, WB1DLZ, finished up 1984 in style passing Extra class. Central Mass ARA very active with 13 members operating at Boy Scout JOTA and 28 more helping MS Bicycle Tour. W1ZPB has been totally solar powered for a month; HF and VHF to date. Visible spectrum comes next. Have seen N3ADQ, KA1KPH and K1FFK-1 on packet so far. KA1KPH plans a digipeater for Springfield area. Club nets getting active with HCRA Thursdays at 9 P.M. on 28.650 and Central Mass Wednesdays at 7 P.M. on 146.97. Harvard has a brand new machine on 145.41. K1EAA helped put WMA on contest map. Was in number 103 in CW sweepstakes and still had two hours to go. PSHR: WB1H1E, QO/RFI: W1EKO, KA1T. Traffic: WB1H1H 204, KA1T 174, W1S1 165, W1UD 162, K1EKO 97, W1KX 78, WA1OPN 51, K1LJV 43, K1FFK1 31, W1ZPB 22, K1JHC 18, WB1HKN 5.

NORTHWESTERN DIVISION

IDAHO: SM, Lem Allen, Jr., W7MHM — SEC: KD7HZ, STM: W7GHT, PIC: WB7PFG, QO/RFI: KUTY, CLUB NEWS: The Boise club and the BEARS VEC held FCC Exams on Oct. 2. Out of 8 candidates, 1 upgraded, 1 got a 13 WP/CM Certificate, and 1 came from scratch. Congrats to: New Generals W7FEJ, KATZANM, KA7NLQ, N7GJT, KA7FRA; New Techs KA7RFJ, KB6BFU and Sidney Reed, KA7IKK got the 13 WP/CM Certificate. ARLR MATTERS: WA7SHH new EC Shoshone Co., N7GHV new EC Kootenai Co. ADA, LEWIS, BONNER, KOOTENAI, CANYON Cos. held SET exercises Sat, Oct. 20, BONNEVILLE Co. held a Civil Defense/SET exercise the following Tuesday. PEOPLE AND THINGS: K67UR now NUTS, W7ORB now KC7MQ, KB7MZ had heart attack, recovering at home. KD7HZ had a back injury just prior to the SET, was hospitalized, had surgery and is now recovering at home. WA7RUT has a new 5 ft. Vetric antenna. WA7FWP took long motor home trip to WA, OR, CA, AZ, NM, TX, OK, KS, RI, WY, used a 5BTV to keep in touch all the way. K7CXG spent a week with daughter in Winston-Salem NC, and is back home now.

Net	Sess.	QNI	QTC
FARM	3935	7 P.M. Dy	31 1633 66
ICD	3990	8:10 A.M. M-F	24 803 18
IMN	3635	8 P.M. M-F	30 299 132
TV EMG	145.44/s	9 P.M. Sn	4 195 30

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MONTANA: SM, Les Belyea, N7AIK — Upgrades reported: to Adv-N7BJS N7FUB N7GMR. More test sessions will be held in Butte (Jan), Great Falls (Feb), Bozeman (Mar). The exact dates are not known at this time. Thanks to ECs W7IXD Havre, KA7LLI Kalispell, KB7BJ Bozeman and K57R Helena for reporting SET activities. The Butte ARC has a repeater in operation on Mt. Higher mountain near Dillon on a freq. of 146.0868. The Big Sky Net is in operation on Mon-Tue & Thr 10 A.M. local time on 7240 kHz. Sorry to get the word that W7IRD is a SK. DX note: W7LRL is up to 296 countries worked on CW.

Net Sess. QNI QTC Mgr
MTN 31 1864 143 KB7SE
IMN 30 299 132 KY7I
IMNS 8 33 4 KY7I
MSN 3 30 0 K6PP

Traffic: WB7WVD 76, N7AIK 40, WA7TUW 19.

OREGON: SM, William R. Shrader, W7QMU — STM: W7VSE. SEC: N7CPA. PIO: K7YIN. SGL: KA7KSK. ACC: WA7WTD. RFI: AK7T. CO: N75C. TC: N7ENI. Upgrade: KA7BNX, technician. Get there way more, but that's all that reported. Lyle Nelson, W6OFF, is the newest FCC Amateur Auxiliary member. W7OLT made Brass Pounder's League in October. WA7VTD was elected as Recording Secretary for the Portland ARC. New officers for the Willamette Valley DX Club are: KW7N, pres.; KW7M, v.p.; KA7FEF, secy.; W7FY, treas.; N7AKQ K7Y, directors. For those of you who don't know already, the WVDXC is the 7th area QSL bureau, and do a real fine job handling QSL cards for all of us. If you don't have envelopes on file with them, you should do it. Refer to QSL info in QST "How's DX?" News this month is real light, but a hearty congrats to all the above DC'ers and to those who "DID" without recognition. The NorthWest Radio Council will sponsor amateur examinations in Portland on the first Saturday of each month after the first of the year. Contact WA7IIM or KA7HJT for further information. This is quite a huge undertaking for any group and NWARC should be commended. OSN totals: QNI 416, QTC 308. Traffic: W7VSE 634, W7OLT 295, AL7W 247, W7LRB 202, W7ZB 132, K7OVK 129, WA7VTD 119, KX7W 65, N7BGW 61, KX7T 38, W7LNE 18. (Sept.) W7ZB 180, N7DOC 60.

WASHINGTON: SM, Joe Winter, WA7RWK — STM: K7GXZ. SEC: W6IHH. PIO/SGL: W7CKZ. TC: K7UUL. OO/RFI Coord.: K7FA. BM: K7G. ACC: WB7QNS.

Net Freq. Time(Z) QNI QTC Mgr
WARTS 3970 0200 1311 159 W7SFT
WSN 3590 0245/0545 501 140 N7CSP
PSTS 145.33 0100/0630 177 103 W7IEU
N7N 3970 2000 61 W7LU
EWTN 146.04 0130/0630 82 80 WA7CBN
NWSSB3945 0230 806 51 W7HFN

From the WVDXC Totem Tabloid: Early in Sept. the State of Washington required motorists to replace their license plates if older than five years because the plates reflective qualities diminished badly during that time. W7YF, author of the article, wrote the state and was told that ham plates will also need to be replaced. Their computer records are being updated to show when the last plates were issued. It appears that they will notify us when our plates are to be replaced. WVDXC mbrs. viewed a slide program on Alaska by K7ZBB, Issaquah ARC. The Issaquah Salmon says Parado, a huge success, was made possible by the club members. The club's annual banquet is set for Feb. 9th. Join in on their Flat's Nest and Crooked Stick QSO Party on Jan. 13. Details in Dec. QST. Mt. Baker ARC: Eight members furnish comms. for the Mt. Baker Motorcycle Club's Cowbell Enduro. W7DHB won the Challenge Cup for MBARC. This annual bunny hunt event is between the Radio Amateurs of Skagit Co. and MBARC. At the Oct. 23rd meeting of the Riverside Rounders, K7MY gave a slide show on the Tri-Met Banfield Light Rail Project in Portland. The Radio Amateurs of Skagit Co. plan long term improvements for their 144.595.19 repeater. First a low altitude repeater will be put on-the-air on 591.19 as back up to Lyman Hill. A redundant machine will be installed on Lyman Hill in the summer of 1985. An autopatch is planned for the local machine if a coordinated frequency can be found. Finally in 1988, a link is to be made to cover the entire No. Cascades area. On Oct. 13th, the Pierce Co. ARES assisted the Tacoma Police Dept. with an evidence search in the Puyallup River near the Lincoln Ave. bridge. It was one of the most comprehensive and coordinated of its kind. Fifteen different volunteer groups were linked together by ham radio to provide a secure, successful effort. Divers from Puget Sound Sea Rescue found the evidence. Pierce Co. EC N7DRT and Asst. EC N7BXI coordinated the 20 ARES members. I was happy to be one of them. Ham Radio provides the great public service value. Traffic: WB7WOW 503, KD7ME 362, K7GXZ 350, W7LG 201, KR7L 116, KR7F 59, W7HNA 55, N7DDP 54, W7GB 50, W7IEU 40, WA6CBN 37, K7CTP 36, N7FXM 36, WA7BDD 35, KD7TJ 29, K7AJT 28, KD7G 20, W7LUP 26, KD7MW 18, K7OXL 9, WA7RWK 5, W7AIB 2.

PACIFIC DIVISION

EAST BAY: SM, Bob Vallio, W6RGG — ASMs: W6ZF N6DHN. SEC: W6LKE. STM N6A is now also OES. Other new appointees are K6T1, CO & OBS: WA6TGF. CO, OES & OBS: Welcome aboard. HARC's Novice class has started under the direction of Pres. N6BNY. Their members participated in a medical exercise using the club repeater, K6EAG/R, 144.53/145.13. MDARC's election is near at hand, and their nominating committee has fielded a slate of 13 candidates. LARK is reorganizing under its new officers, and has established new priorities and committees to carry them out. Their members K8YEO & WA6OHB will be operating as VR6EO & VR6HB while on a Pacific vacation. EBARC welcomed new members N6EK W6VJT, W6JZR & N6PT. Pac Div Vice Dir. W6SZN recently spoke to them on the legal problems facing amateurs today. Their nominating committee is working on next year's proposed slate of officers. NBARA is included in the Vallejo Fire Dept's Hazardous Material Disaster Plan. Their ARES net meets each Thur at 1930 local on WA6YXV/R, 144.71/145.31. ALCO RACES held a drill in support of the Alameda Co. Sheriff's Dept on Halloween. Traffic: W6VOM 104, NV6T 91, WB6DOB 84, K6APW 36, WB6UZX 36. (Sept.) K6APW 178.

NEVADA: SM, Leonard M. Norman, W7PBV — SEC: E. J. Silve, K7HRW, 3780 Hummingbird Dr., Reno 89506. STM, W7BS. KFTJ active from Beatty. W7HMM and WB5VDV now Extra; K7RBM now Tech after an enjoyable trip to Denver. K7BL active from Sparks. W7HQT celebrated his 99th birthday anniversary. Good luck, Joe, and many more of them. W7NCR out of hospital and doing FB. W7CFF WA7BWF and WA7SDO provided communications for the MAN-MUEL sponsored by the Elko Lions Club. N7EAG has ordered badges for NNARA Club members. TARA repeaters 147.24 East Peak, 148.85 Angel's Peak, 442.475 East Peak. Las Vegas HAC volunteer exams were a suc-

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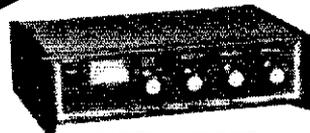
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TS-930S "DX-traordinary"

TS-930S

We call it "DX-traordinary" because the TS-930S has now become the favorite rig of the serious contesters! Its superior capability for full break-in split-frequency operation, the speed and convenience with which its eight memory channels can be accessed, its unsurpassed receiver dynamic range and its remarkable ability to select the desired signal during periods of heavy QRM, utilizing VBT, Slope tuning, IF Notch filtering, and tuneable audio filtering, have all combined to make this the rig that gives you the EXTRA EDGE!

The TS-930S is loaded with all the special features that you always wanted in an HF transceiver. Full coverage of the 160 through 10 meter bands, including the new WARC frequencies, (easily modified for HF MARS), plus a general coverage receiver that can tune any frequency from 150 kHz to 30 MHz. Operation in the SSB, CW, FSK, and AM modes, with selectable full or semi CW break-in. All solid-state, with 250 watts PEP input on SSB,

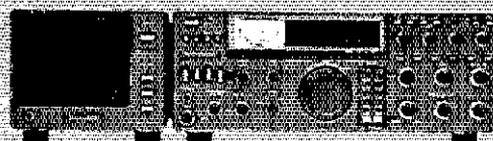
CW, FSK, and 80 watts input on AM. SWR/power meter. Triple final protection circuits plus two cooling fans built-in. 10-Hz step synthesized frequency control. Available with optional automatic antenna tuner built-in, another industry first! Dual digital VFO's. Eight memory channels that store both frequency and band information, with internal battery back-up, (batteries not supplied). Dual mode adjustable noise blankers, especially effective in eliminating "woodpecker" type interference. SSB IF slope tuning, for maximum rejection of interference. CW variable bandwidth, with pitch and side-tone control. IF notch filter. Tuneable audio peaking filter. Unique six digit white fluorescent tube digital display is easy-on-the-eyes during those long contests. RF speech processor, for higher average "talk-power". SSB monitor circuit. 4-step RF attenuator. VOX. 100-KHz marker. AC power supply built-in. 120, 220, or 240 VAC.

TS-930S Optional Accessories:

AT-930 automatic antenna tuner
SP-930 external speaker, with selectable audio filters, YG-455C-1 (500 Hz), YG-455CN-1 (250 Hz), YK-88C-1 (500 Hz) CW filter, YK-88A-1 (5 kHz) AM filter, all plug-in type. SO-1 commercial stability TCXO, MC-60A deluxe desk microphone, MC-80 and MC-85 communications microphones, MC-42S mobile hand microphone, 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, and HS-7 headphones.

Isn't it about time you stepped into the winner's circle?

More information on the TS-930S is available from authorized dealers of Trio-Kenwood Communications, 1111 West Walnut Street, Compton, California 90220.



Specifications and prices are subject to change without notice or obligation.



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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.

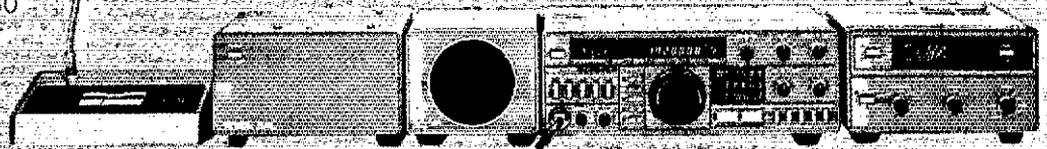
Eight memories store frequency, mode, and band data, with Lithium battery memory back-up. Memory scan and programmable automatic band scan help speed up operations. An IF shift circuit, a tuneable notch filter, and a Narrow-Wide switch for IF filter selection help eliminate QRM. It has a built-in speech 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:

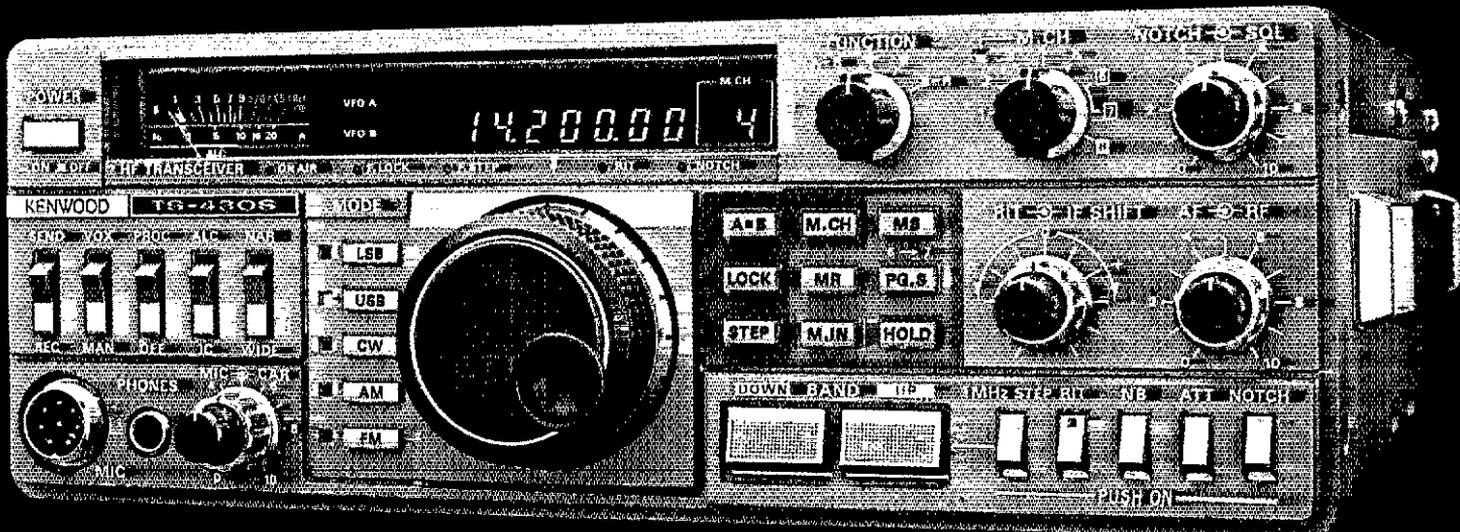
In typical KENWOOD fashion, there are plenty of optional accessories for this great HF transceiver. There is a special power supply, the PS-430. An external speaker, the SP-430, is also available. And the MB-430 mounting bracket is available for mobile operation. The

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 Iko-Kenwood Communications, 1111 West Walnut Street, Compton, California 90220.



Specifications and prices are subject to change without notice of obligation.



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TS-711A/TS-811A

Multi-function all-mode 2 m and 70 cm transceivers.

The TS-711A 2 m (142-149 MHz) and TS-811A 70 cm (430-450 MHz) all-mode transceivers are perfect base station units, designed to complement your present HF station. Both feature Kenwood's innovative D.C.S. circuitry. 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. They have 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/TS-811A also feature 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 CHQ switch is

depressed.

Combine all these features with built-in AC power supply and a hefty 25 watts RF output power and you have your ideal base station.

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



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 RF 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
- KPS-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/TS-811A and TS-670 is available from authorized dealers of Trio-Kenwood Communications, 1111 West Walnut St., Compton, CA 90220.

Specifications and prices are subject to change without notice or obligation.



KENWOOD

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TM-211A DCS... a new turn in 2 meters/70 cm.

IMPRESSIVE

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!

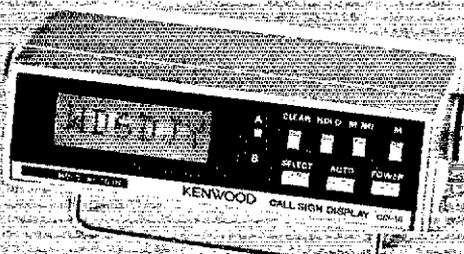
Optional accessories:

- 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.

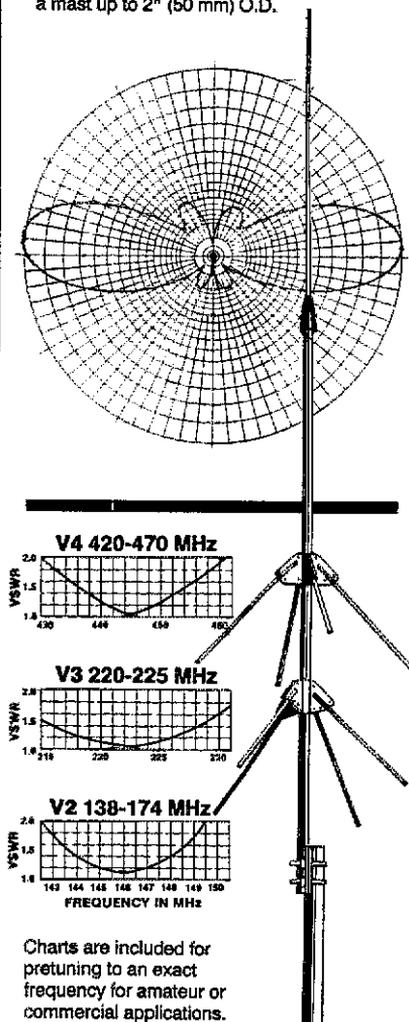
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hy-gain

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cess without too many problems. K7HRW reports the Reno exams went extremely well. All had nothing but positive comments. Another session is coming up. 50th ANNIVERSARY HOOVER DAM CELEBRATION IN 1985. Traffic: W7PBV 5, WA7GE 3, K7HRW 3.

PACIFIC: SM, James Wakefield, AH6CO — VEC programs in state underway as of Nov. 3 on Oahu and Big Island with 16 applicants for testing. WH6BAF got Notice in Sept., upgraded November 3, and made QSO with his father, K4OQP that same day. Maui VE tests scheduled for January. KH6BFS had 2-meter contact with WA8MIZ in San Diego at 1510Z 10/3. He heard K6DYD but no contact. KH6B reports all islands represented in SET '84 on Oct. 20. Big Island, thru AH6P had over 30 participating. KH6S reports Kauai participated with cooperation with Civil Defense and Statewide Emergency Net. Code classes are offered by WH6F for those wanting to upgrade. KH6S has a packet radio "digipeater" station on with hours of 1900 and 0700Z daily. Appointments are available at your request. AND need information from Guam the rest of the Pacific Basin. Aloha. Traffic: KH6B 238, KH6S 84, KH6H 43, KH6HI 42, KH6RZ 28.

SACRAMENTO VALLEY: SM, Ron Menet, N6AUB — Holiday Greetings to all of the members in the section, Nevada Co. ARES in the section. Nevada Co. ARES has been heard little about SET participation. Sacramento RACES/ARES has had several successful tests. More are planned. Upgrades: Extra, WC6F; General, N6KMM. Most clubs are holding elections now. Please send me a list of names, addresses, call signs and phone numbers of all newly elected officers. Don't forget. Annual ARRL reports will be due shortly after the first of the year. Maintain your affiliation by promptly completing your report. Ending the calendar year, let me thank all of you who assisted the section in the past year, whether as an active part of the section leadership team or in some other way. You are the folks who make the wheels turn and you know who you are. Traffic: N6CJ 140, N6S 36, W6GCLD 82, WA6WJZ 78, KA6PDG 39, W6BZQ 31, WA6ZUD 19, W6BSRQ 18, WA6ERZ 5.

SAN FRANCISCO: SM, Bob Smith, N6AT — MARC is the newest SSC Club within the SF section. I attended their Nov. meeting and enjoyed the club and after club entertainment. Gud to see you all. The VE program is in full swing in the section, MARC, SCRA and HARC will be giving exams in Jan. 1985. Listen for dates and times on the local repeaters, or better still, get out and attend their club meetings and support the club and VE programs. Tom, W6GGH, is retiring again! He is stepping down from being secy/treas of HARC after holding the post for the past NINE CONSOLIDATE YEARS! (That's a long time.) VOMARC participated in the Sonoma SET and provided communications between local hospitals and county EOC. ARRL DX TEST 1984 results: Top CW in Section K6ANP; Top Phone in Section N6CJ. SFRC has had some very interesting spkrs recently. Dave Smith, senior engineer from FCC in Livermore, and a very interesting talk on AM stereo. DNARC is now an active member of Del Norte Cost "Operational Area Emergency Communications Committee." tnx to Forrest, K6HY. See you all next month. Merry Xmas & the best of 1985 to all. Traffic: W6BFL 231, W6RNL 224, W6NL 174, K6TP 136, K6TWJ 87, N6FWG 74.

SAN JOAQUIN VALLEY: SM, Charles McConnell, W6PDD SEC; WA6YAB, TRM; N6AVH, TC; WA6EXV, ACC; N6ECH, AISM; W6TRP and K6YK, Club should contact him for assistance. Be sure to include him on your mailing list along with the Director and Vice Director. New officers of the Stockton ARC are WA6KOR, pres.; KA7AJJ, v.p.; WA6KXM, secy/treas. New officers of the Fresno ARC are WA6HXW, pres.; K6PKO, v.p.; KA6EME, secy.; AJ6X, treas. N7EGW and N6JXU are Advanced. KB6DXX, KB6CDI and KA6LAC are general. Congrats to all recent upgrades. K6BGL is Novice. W6D8ET is WC6U. WA6AFV and WA6BXA have computers. KA6ORJ has a PCS-4000. N6AVH has a TS-590. W6BFR has a new tower. W6BINO has an IC-37A. W6XP is installing new beams including a KT34XA. The Fresno Hamfest is May 3-5 at the Tropicana Inn in Fresno. Save your goodies for the swap meet. Traffic: N6AWH 134, WA6YAB 12, W6PDD 11, W6SX 8.

SANTA CLARA VALLEY: SM, Rod Stafford, K6BZV — SEC: K6ITL, STM; W6PHT, TC; K6HLE, ACC; W6MKM, PIO; N6BIS, AEZ and NS6N are in charge of the ARRL/VEC sponsored testing session to take place at Stanford Linear Accelerator Center on January 12th. All Amateur Extra Class license and Advanced Class license holders are encouraged to contact AEZ or NS6N to get signed up to help out with the testing sessions that are currently being planned to take place in the SCV Section this coming spring and summer. W6GFFJ is back in the area for a while and says he is available to give talks and a slide presentation to clubs about his recent trips to Tahiti, Cook Islands, New Zealand and Australia. Including Amateur Radio operations in those locations. W6BGFJ and a number of the other section amateurs who are active in AMSAT and working OSCAR are planning a presentation on techniques of satellite communications to be held sometime in January in the Bay Area. Emphasis will be placed on the basics of satellite work. The exact time and place are unknown at the time of this writing, but be sure to listen to the Section Managers' Net on Tuesday evenings on 148.75 at 9 P.M. for details or drop W6BGFJ a note stating you would like to attend and you'll be notified of the time and place. The Northern California Traffic & Emergency Assn. (NCTEA) is still looking for amateurs interested in traffic handling for appointments as Official Relay Stations (ORS). You don't have to be able to copy CW at 35-40 wpm in order to be appointed an ORS. A great deal of traffic is handled on the VHF and HF phone bands. There is also a great deal of interest among the traffic people in packet radio. Contact STM W6PHT for an explanation of what is involved in being an ORS. This is the time of the year when many of the clubs elect new officers. If your club has recently had an election, let me know who the new officers and newsletter editors are so that information can be directed to them. New West Valley ARA offices for 1985 are: NV6Z, pres.; W6TWO, v.p.; KA6FVA, secy.; W6YLL, treas. North Peninsula Electronics Club of

ficers are: W6EGU, pres.; KA6ZAK, v.p.; N6JEV, secy.; WA6QOQ, treas. W6KXJR (147.255) just received one of the new voice synthesized repeater controllers built by WA6AXX. W6BBDZ/R (148.715) is now equipped with a 440 MHz remote that has been put to good use on Wednesday evenings for the SCV Section ARES net. Net control K6ITL can now take check-ins at DECS, ECA, AECs and ARES members through the W6BBDZ/R or K6BF repeater (145.45). By linking with some of the repeaters in the Santa Cruz Mountains, a reliable communications link can be established between the northernmost part of San Mateo Co. to Monterey and San Benito Cos. All section appointees and club presidents, or club representatives, should plan on attending the upcoming sectionwide meeting. Purposes for the meeting: to give input to the SM and the section-level appointees as to what is and is not being done in the SCV section and to bring before the meeting proposals which, if passed at the section meeting, will be introduced at the Pac. Division Director's meeting in February. PIO N6BIS has appointed three new Public Information Assistants in various areas of the section. They are: N6HMC (Santa Clara Co.), W6BDCD (Go. Santa Clara Co., San Benito and Salinas Valley) and N6FAD (Santa Cruz Co.). N6HMO is the editor of a new newsletter for two of the ARES groups in the section, SPECS and SVECS. Traffic: W6YBV 214, W6KZJ 62, W6PFI 23.

ROANOKE DIVISION

NORTH CAROLINA: SM, Rae Everhart, K4SWN — SEC: AB4VTH; K4NLK, RM; K4IWW, ACC; WC4T, PIO; WA4OBR, SGI; AB4W, Happy New Year 1985 will see Amateur Radio grow in numbers. ARRL Roanoke Division Convention March 16-17 in Charlotte. FCC exams will be given. Contact WC4T for more information. Mark your calendar now for Division League Planning Meeting (LPM) May 11-12 in Raleigh. Contact K4HF for info. Have received info that the Volunteer Examiner Program is off to a great start in NC. A compliment to those who are participating. Exam schedule: Winston-Salem Jan. 19, WF4J; Fayetteville Jan. 19, K4MN; Raleigh Feb. 16, WM4P; Greensboro Mar. 9, WV4K; Charlotte Mar. 16-17, WC4T. All League members and Field appointees don't forget the ARRL QSO Party this month. New officers: WA4NC; W625MR, pres.; W6BY, v.p.; N4DCA, treas.; K63GVJ, secy.; New Officers: KA4R9, v.p.; K4CCO, v.p.; WA4SLC, treas.; KB4FWL, secy. Congrats to new upgrades: WA4JVD, KB4IVV, KB4LTE; to new League member WA4JJ. HAM WATCH Officials would like to meet with every club in section. Please contact Joe Sherrill, Dept. of Crime Control & Public Safety, P.O. Box 27687, Raleigh 27611. Telephone 919-733-5522. This program will benefit your club and community. Contact officials today. Thanks reports indicating heavy participation in SET. With WINTER snows upon us be ready in every way for any emergency. All amateurs in NC were presented the Order of the Long Leaf Pine by the Governor's office for our public service and emergency communications during the tornado and hurricane disasters. AB4VTH was awarded the award for all amateurs. This is a very high honor given to amateurs by state government. Want to reduce fee on your Amateur Radio state license plate? Contact your newly elected representatives and make your plea. W4JEC organizing emergency communications program in Henderson Co. If you are planning a hamfest, send me the dates to be included in column. Traffic: K4NLK 397, WB4HRH 230, WB4VII 202, KA4EYF 174, NJ4L 184, WA4OBR 154, KB4FWL 141, WB4DAR 129, WB4N 108, K4JHF 107, K4M4G 71, W6B8G 71, WA4MNF 61, WA4TT3 60, WA4SRD 55, NE4J 38, K4SUN 33, WB4R 34, WD4CEB 31, KA4KJ 25, NA4JE 21, N4CJ 20, KA4QX 17, WA4PDI 17, WD4EQK 15, WB4CVN 14, WD4HTE 14, W4PRG 9, KA4YMY 9. (Sept.) N4JEO 17.

SOUTH CAROLINA: SM, Jimmy Walker, WD4HLZ — Amateur Radio in South Carolina received a lot of publicity during the last year. Some was as a result of communication emergencies (tornado, flash flood, train wreck, hurricane), and other publicity was because of the diligent work of individuals in clubs to persuade the news media to report their activities (Field Day, hamfest, etc.). News reports were seen on TV, heard on radio and articles appeared in newspapers and magazines. In addition, NOAA Eastern Region presented SC amateurs with a SPECIAL SERVICE AWARD for their activities during the March tornado disaster. R. F. Auglin, Director, said "We have no doubt that many lives were saved and personal injury reduced because of the efforts of the ARES and the other amateur participants." Let us not bask in our glory and become complacent. Amateur radio in SC is on a roll. Keep it that way by becoming INVOLVED. Programs for the coming year are Ham Watch, SKYWARN and MOU EPD. Contact me for details. Traffic: K4ZN 245, WA4NK 179, W4FWMZ 120, W4KJT 96, W4NTO 84, KB4BZA 66, K4ZB 42, WB4UDK 35, WB4VB 29, WD4FJP 24, KA4LRM 20, W4JP 4, W4DRF 1.

VIRGINIA: SM, Claude Feigley, W3ATQ — STM: WA4ALY, SEC: WB4UHC, ACC: WD4KQJ, OO/PFI: W4HU, BM: AB4U, PIO: WB4UJ.

VTN	6 P.M.	3907	AA4AT
VSBN	6 P.M.	3947	WB2OMZ
VSN	8:30 P.M.	3680	KB4WT
VN (Early)	6 P.M.	3680	K4JST
VN (Late)	10 P.M.	3680	KR4V
VLN	10:15 P.M.	3947	KA4IUM

Congrats to the Virginia Beach ARAC for qualifying as the second Special Service in the section. There are many other clubs in the section who could receive this appointment. See the ACC or SM for details. There was excellent participation in the Section's first SET exercise in several years. Thanks to SEC WB4UHC and his assistants for planning the event. Reminder to all ECs: send in your SET and ANNUAL reports. Report forms are needed contact the SEC or SM. NK4JU has been named the new manager of the 4th call area 2-letter prefix QSL bureau replacing Ken, K44NX, who resigned owing to heavy work schedule. Mailing address remains the same. K44LO and WB4EDB are new ORS. The Tidewater Area has coordinated exams for the months of Feb, March, May, June, July, Sept, Nov and Dec. Contact AA4AT WB4B4B KA4JUN or W3ATQ for details. Exams will be held in conjunction with the Frostfest and Winterfest contact WB4JUI and NK4JU. OOs W4HU, KE4EQ and KB4WT report activity. We welcome Mark, AA6DX, a former SCM and AD, to the section. Mark lives in Vienna. All ARRL field appointments have been renewed. Those who have failed to report in the last 6 months have been dropped. K4KDJ, K4JST, N4GHI, WA4CCQ, AA4AT, WD4ALY had over 100 PSHR points. Start planning for the Virginia QSO Party in March. Hope to see you all at the Frostfest and Winterfest. Traffic: N4GHI 429, W3ATQ 314, N4EXQ 276, WA4CCK 258, AA4AT 256, WD4ALY 196, KR4V 190, K4KDJ 184, WD4OCV 151, K4JST 145, WB4PNY 114, KB4WT 94,

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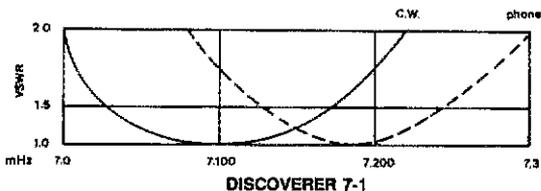
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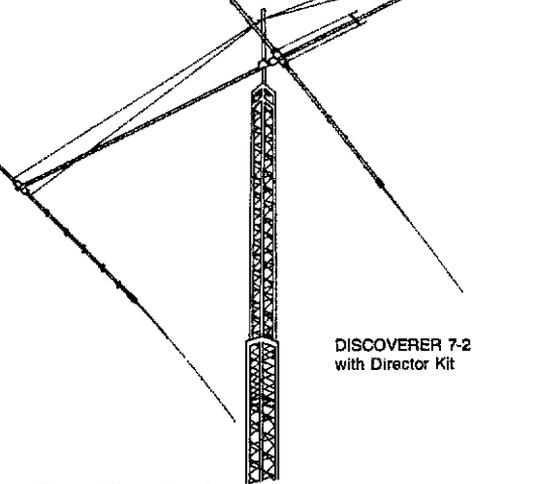
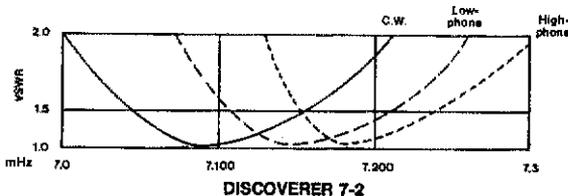
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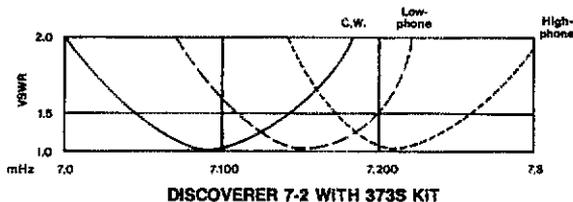
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ROCKY MOUNTAIN DIVISION
COLORADO: SM: Bill Sheffield, KOA — SEC: WB0FQB. STM: WDBAT. COORFI: NCR. ACC: WB0DUV. SGL: W0GOL. PIO: KA8FYH. TC: KO2P. BM: WBMDT. 1995 is a new year, one that could make or break the hobby of Amateur Radio. With the advent of our VE program & CO program, we will do our own testing & most of the policing of our frequencies. I believe that all of us are up for the task & will handle this new system with the utmost integrity. Join in and help, as we need more COs & VEs. I visited the southern part of our state for a meeting in La Junta with the Arkansas Valley ARC a very active progressive & dedicated group, had stops in Colo Springs & Pueblo. Schedules are coming together in the state for VE testing. Pueblo was the first with December & they plan to test each month. Pueblo (WB0YES); Jan 19th La Junta (WB0ZQ); Feb. 14th Aurora (&K0Q); March AFA Swap (W4URJ) pri (not firm); May 9th Aurora (&K0Q); June Boulder (WB2ZD). More tests are now in the process so contact K0PGM or me for info. We want to have at least one test a month somewhere in the state. Congrats to name droppers: W0ZCX N0FS KR8K N0AWD and to the many upgrades across the state, too numerous to mention. Happy New Year & 73, KOA. NETS: Col QNI 970, QTC 74, Inf 220, time 944, 27 sess.; CWN QNI 152 QTC 11E, 9TP 68R time 585, 32 sess.; CWXN QNI 3068, QTC 3515, time 2790, 31 sess.; HNN QNI 1777, QTC 100; Inf 479, time 1699, 31 sess.; NCTN QNI 325, QTC 11E, 24TP, 80R, time 585, 29 sess.; CCTN QNI 59, QTC 77P, JR, time 110, 8 sess. Traffic: N0BQP, 2052, W4HJZ 1648, KOJAN 569, W0ACH 490, K0RJK 446, W4BPT 241, W0BZY 239, KB2Z 180, N0DZA 115, W0LAE 88, KJ0G 68, W0DSSZ 57, W0NFW 55, A0W 42, N0CYR 6.

NEW MEXICO: SM: Joe T. Knight, W5FDY — ASM: W5HD. DEC: K85XD. STM: KV5U. NMs: WA5UNO K5LL W5VFO. TC: W8GY. ACC: W5HD. Southwest Net (SWN) Meets daily on 3583 at 1930 local and handled 144 msgs with 148 stations in. New Mexico Roadrunner Net meets daily on 3939 at 0100 UTC and handled 81 msgs with 1238 stations in. New Mexico Breakfast Club meets daily on 3939 at 0630 local and handled 70 msgs with 826 stations in. Yucca 2-Mtr Net 7818 & 9333 handled 5 msgs with 449 checkins. Caravan Club 2-Mtr Net 6806 handled 19 msgs with 137 checkins. SCAT 2-Mtr Net 6806 handled 6 msgs with 714 checkins. Early Birds 812 checkins. Sorry to report the passing of K5BVP & W5PFT. The UNM West Albuquerque Swap Meet was a great success. VE Exams tentatively planned as follows: Las Cruces, Dec. El Paso, Jan.; Albuquerque, Feb.; Alamogordo, March. Traffic: W5DAD 146, N5EXC 88.

UTAH: SM: Ron Todd, K3FR — STM: W7OCX. SEC: NA7G. BM: W4MEL. COORFI: KD7FL. ACC: KB7JO. PIO: N7BHC. TC: K7RJ. Since this is reaching you during the holidays, let me take the time to wish you all the very best this season and to say thank you for the support you have given this year. Silent Keys reported are K7NTR and R7SQD. New stations on VHF packet radio are KD7YK and W4YAZ. N7BHC now on 1286 MHz. New officers of Cedar W4YAZ are: WB7AC, pres.; KA7AJE, v.p.; N7GKL, secy.; KA7JCO, treas. NTIE and WA7JUI are now coordinating exams in northern Utah for BEARS. 7th region VEC, and expect to provide exams at least quarterly. ARRL exams are being coordinated via OARC and UARC. We still need someone to coordinate exams in central and southern parts of state. Upgrade conclusions can catch K7HLR code practice on following schedule: 1030 on 7098 kHz and 146.58 MHz, 1700 on 146.58 MHz, and at 2200 on 3698 kHz. Times are local. Section nets are: Believe Utah Net 7272 KHz, 1230 local time daily; Utah Code Net 3710 KHz, 1930 local time daily. Traffic: W4MEL 56, W47KHE 51, W7OCX 15, K07H 9, W7RO 9.

WYOMING: SM: Dick Wunder, WA7WFC — ASM: KA7AWS. SEC: W7WTC. Campbell Co. ARC operated a special events station concerning the Wyoming Oil and Gas Centennial, on Oct. 27th & 28th. Support of the ARRL VEC program is picking up steam with three cities now with Volunteer Examing Teams: Torrington, Casper & Cody. Please check with amateurs in these locations for the next exam in your area. Much of Wyo. is still not covered by an exam team. LET'S GO OUT THERE!! Amateur Radio will be only as good as WE make it be. KC7AR reports that Wyo Cowboy Net held 23 sessions with 889 QNI & 13 QTC. W0PFP reports the Wyo Jackalope Net held 27 sessions with 530 QNI & 1 QTC. Traffic: W87NHR 225, W7HLA 52, K7SLM 15.

SOUTHEASTERN DIVISION
ALABAMA: SM: Joseph E. Smith, Jr., WA4RNP — SEC: N4DMA. STM: NA4JAW. SGL: KA4WVU. BM: KF4VV. COORFI: K4ELV. It's the beginning of a new year, although we did "more in 84." I think we can "come alive in 85." Let's double our public service efforts this year and show everyone what Amateur Radio is, and what it has to offer as a viable human resource. Also, let's upgrade our minds, our tickets, and our shacks this year. I have a report of a Silent Key: WA4EB, Thomas H. Todd of Tuscaloosa. There were three new section officials added this month: N4GEG, Judd as EC of the EC of Calhoun Co.; KA4KJK, Randall as EC of Blount Co. From Enterprise comes a report of these new EARS club officers: KA4AFJ, pres.; NA4JAG, v.p.; K4HKR, secy.; W4FOS, treas. PSHR: WA4JDH W4CKB KB4GPN WA4LXP WX4I WA4RNP. BPL: WA4JDH. CAND reports 848 mess. passed in 31 sessions with Aia rep 100% by W4CKB & WX4I. CAND reports 668 mess. passed in 62 sessions with Aia rep 100% by WA4JDH WB4IXA W4CKS N4WAX WX4I & KC4G3. 73, remember, let's "come alive in 85," de Joe, WA4RNP. Traffic: WA4JDH 556, W4CKB 134, WX4I 127, W4NAX 68, WA4LXP 43, WA4RNP 43, WD4NYL 35, KA4OZ 20, KB4CJ 20, W4D3H 14, WB4TVY 14, W4WJF 6, KC4AF 5, KC4G3 5.
GEORGIA: SM: Eddy Kosobucki, KA1JL — SEC: WB4ABY. STM: K4VHG. ACC: WA4BYB. BM: W4BIA. COORFI: W4RZL. PIO: WA4PNY. SGL: W4BTZ. TC: K4UDR. NWS: WA4PDZ. PLEASE, if your club or group is planning a HAMFEST this year, now is the time to send dates, etc., to both W4RH & to the ARRL Hq. If U plan to have an ARRL sanctioned hamfest U must fill out the proper forms & send them to W4RH, the SE Division Director, so that they can be voted on by the Board of Directors. U can obtain the forms from Frank or me. So please do this ASAP. As we commence this New Year I am hoping that each of U who read my column will endeavor so get at least one of ur ham friends to join the ARRL. The Georgia section never has had an ARRL President until this past year.

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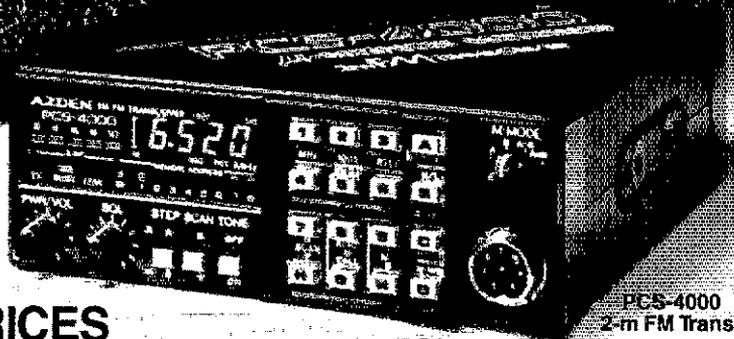
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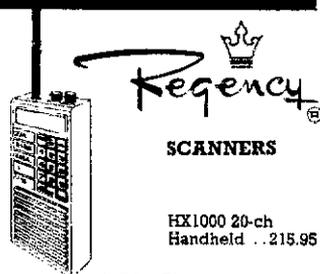
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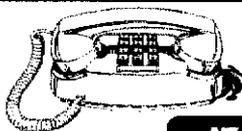
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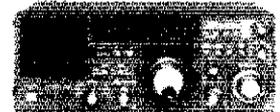
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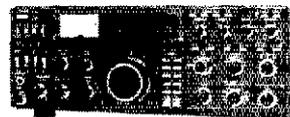
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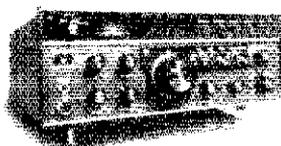
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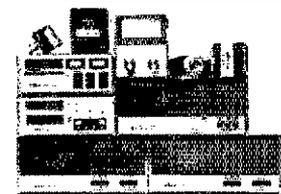
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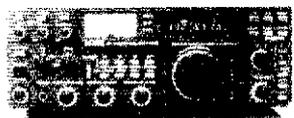
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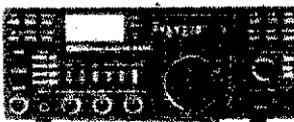


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I received a note through our QSL bureau from KP4BSH. He reads this column as do most of this section amateurs living in the States. News is released as they come. Elliot and I will like to receive our news from our absent amateurs, too. They are welcome. My address is at the bottom of page 8 of QST issues under Southeastern Division. Regards, KP4AM submitted a petition for rulemaking requesting the privileges of phone operation for Puerto Rico and Virgin Islands on 7.075 and 7.100 segments. Your comments will be appreciated when requested. KP4DJ reports the following totals for WINS: QND 372, QTC Q, QNI 100, 31 seers. Traffic: KP4DJ 9.

SOUTHWESTERN DIVISION

ARIZONA: SM, Erich J. Holzer, N7EH — STM: W7EP, NM: KATHEY WB7CAG K6LL. For some unknown reason the month of October has slipped by without much fanfare. The Green Valley ARC reports the following provided communication for the Green Valley County Fair parade: KB6KP W6EVL K6HCD W6R0D W6BPGY W6TFCX K47EDJ K47EVL K47KOR W7IHR W670RC W8QYM W8SXX. The Arizona RA reports the following participated by providing communication for the Fourth Annual Fountain Mountain Triathlon: N7FHA K47NEM N7AJY K672M N7ADA K67KY K67XP K67DR K47PTW W6BTIX K47DT W6T0EC W6TBTY. The list of past SOBs of the AZ section with appeared in the *Fast Asst Ariz Waves* was quite interesting. Thanks to KC6EH for compiling it. I would like to take this opportunity to wish all the very best of holiday greetings and all the best for the upcoming New Year. SWN: QNI 175, QTC 144, A TEN: QNI 947, QTC 154, PSHH this month goes to KB7FE. Traffic: W7AMM 24, KB7FE 220, K6LL 108, W7KCM 57, W7LVB 51, K7NMQ 45, K47HEY 34, K7POF 22, WB7CAG 14, K7JKM 10, WA7NXL 2, W7DGS 1.

ORANGE: SM, Sandra Heyn, WA8WZN — ASM/SEC: W6UBQ, STM: WA8QCA, ACC: KA6NJ, BM: W6DXL, OO/RFI Coord: W6RE, PIO: N88W, SGL: N6HIO, TC: OA8DD, DEC (by counties): W68JB (Orange); W6LKN (Riverside); W68JK (San Bernardino); KA6HJ (Inyo). Congrats to W6UBQ on Assistant Section Manager appointment. Thanks to all that helped in compiling it. I would like to SET for the section; all ECs are reminded to send in their reports. Also SW Division convention was a success; we had meetings of the Section leaders and ARES/NITS breakfasts. An electronic awap meet has been started at the Anaheim Drive-In (near Lemon St. at 91 freeway) on the 3rd Sat and Sun every month. Starting Feb 9, the Pikes Peak group will be giving FCC tests at the Hawthorne Christian School in Fountain Valley. For info contact W6IBR. For latest T-Hunt info contact W68GZT. W68QQM was elected pres to finish the term of the Citrus Belt ARC. W68GHR, EC for 8th San Bernardino District, appointed K68ET deputy EC with W68LD remaining as Red Cross liaison. West Coast ARC started their night net at 7:30 P.M. except meeting nights on their NOB/repater 146.745 (-.8), PL 4Z (138.5 Hz), Barstow ARC provided communications for the Toys for Tots Triathlon and the Mardi Gras parade with W68BNG WA6RDR N6DWL W68SA K68QW W68UW K68EQ K68EP5 N6ADV N68D N68HJ W68RAM W68YVP N8KTE N6KUU N6HXO W68EY W68FDP WA8ZNC & W68PVR. Tri-County Area announced QSO Party winners W68UFX and WA8CZZ tied for 1st with KF0E third. Catalina ARA A8ADP/rt 147.09 (+.6) has established an annual membership fee; for info contact pres W68TU. HAMCON 1985 was formed by associated Radio Amateurs of Long Beach, Downey ARC, West Coast ESEA ARC, Southern Calif AR Computer Club, West Coast ARC, TRW ARC. HAMCON elected K68QC as chairman of the board and the 1985 chairman of the SW Division Convention August 9-11 aboard the Queen Mary. PSHH: W68TF KA6BNW (Sept), KA6BNW W68QBZ WA8QCA W6NTN KA6HJK/T.

Net	Time	QNI	QTC	NM
SCN1 (20+) 3598	7 P.M.	309	249	A18E
SCN9 (FM) 148,845	9 P.M.	442	340	WA8QCA
RTTY/VHF	145,122	9 A.M.	480	80 KA6HJK
Traffic: WA8QCA 198, K68GS 185, W68BTI 177, KA6HJK 176, AD8A 148, W68QBZ 124, W68RN 120, KA6BNW 111, W68NTN 94, A18E 47, N68GT 32, W6TKV 6, K6ZOE 6. (Sept.) KA6BNW 125.				

SAN DIEGO: SM, Arthur R. Smith, W6INI — TC: N6NR, BM: WA6HJ, STM: N6GW, SEC: W6INI, PIO: K6GLF, ACC: WA8COE. Urgent! If you haven't filed comments with the FCC on PRP-1 (Nov. 84 QST, page 65), do so immediately. While the Dec. 24 deadline has passed, FCC will probably accept comments submitted within a reasonable time. Our future in Amateur Radio depends on federal preemption of local restrictive ordinances. Newcomers to Amateur Radio are invited to visit any of their local clubs, 2nd Sat: ARES, Normal Heights United Methodist Church, 4850 Mansfield, bldg 0800, meeting 0900. 2nd Thur: Imperial Valley ARES, Imperial Co. Airport, 1800, 4th Wed: SD DX Club, Hinduaster Restaurant, 7040 N. Main Rd., 1830. See this column in Dec. QST for others. W7HR assisted in a medical emergency by patching a physician (K68UJ) to N6CIS/MM on a ship near the Cook Islands for treatment of a seriously ill crewmember. Coronado ARES assisted in evacuations during 20 million dollar 3-alarm condo fire in Coronado. NCTN held 30 sessions, handled 118 msgs. ARES 4 sessions, 14 checkins. Traffic: KU8D 450, K6A1 117, WA6IK 18, N6GW 18.

WEST GULF DIVISION

NORTHERN TEXAS: SM, Phil Clements, K5PC — ASM/ACC: N15V, SEC: W5GPO, STM: A5E1, PIO: N5FDL, SGL: W5UXP, BM: W5QXK, OO/RFI: W5JBP. The annual Simulated Emergency Test came off very well in our Section. Lots of reports from many ARES groups. It is very important to test our capability and response at least once a year. This also gives us a chance for some local publicity, and establishes or maintains our credibility with public safety officials. ECs: your 1984 annual reports must be sent to W5GPO prior to Jan. 1, 1985. This is a mandatory report, and you will be dropped if your report is not received by the deadline. Take a few minutes right now, and get it out of the way! I am sure I speak for the entire Section in wishing you and yours the happiest of holiday greetings, and a most happy and healthy 1985! PSHH: KA5AZK A6E1 N5E2M N5BT K5UPN K6B5L K5DFR. Traffic: K5UPN 339, N5BT 338, KA5AZK 189, K5DFR 178, W5QU 114, A6E1 108, K6B5L 107, W9OYL 92, K5DFR 77, K5SPT 44, N15V 28, WA5E2T 28, K2SCU 25, N5GVJ 20, N5EZM 14, N5FDL 14, W5ERT 13, K5PC 13.

OKLAHOMA: SM, Dave Cox, N85N — SEC: W5ZTN, STM: KV5X, ACC: K5CAY, BM: W5AS, PIO: NJ5Y, OO/RFI: K5WG, SGL: W5NZS, TC: W6QMJ. Many tx for confidence everyone showed in me during the election. I hope I am able to surpass your expectations. The OK Section owes a debt of gratitude to Ray Miller, W5REC, for the exceptional job he did during his brief tenure as SM. His

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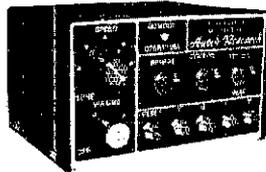
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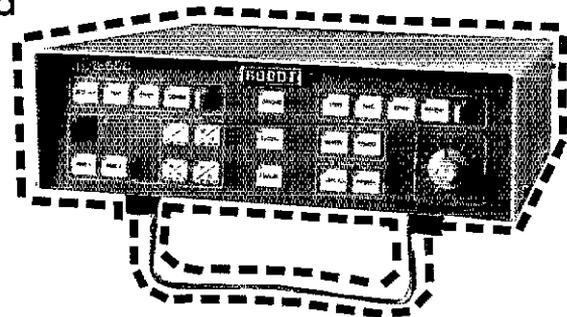
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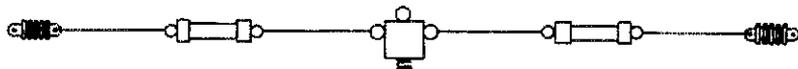
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countless hours of service have made Oklahoma one of the most dynamic sections in ARRL. Congrats to the new appointees: Bill Goawick, K5WQ, OORFI Coordinator; ECs: K5HXK, KD5VQ, N5PT; KD5RQ, OO; KA5SHC PIA. FB hamarama at Texoma this year. Congrats to new Board members: W5ATB, N5JY, N5SG, K5JFJ, N5BN. New net: TRO (Tulsa) Tues., 7 P.M. 34/94. Accredited VEs too many to list. FB to Great Plains ARC for first ARRLVEC Exam in OK. Bartlesville hams enlisted police in successful search for missing child who was found unharmed. Everyone have a safe and wonderful holiday season. Traffic: K5CXP 381, W5AS 250, KB5EK 218, W5VXU 191, W5REC 148, W5RB 110, WA5OUV 87, K5GBN 64, KC5OU 60, WD5IFB 47, KA5FUU 42, W5VLW 40, NQ5W 39, WA5OGC 38, NR5L 34, K5CAY 28, WD5JCE 28, W5VOR 25, WA5WHV 25, W5LSW 22, WA5ZOO 18, W5FW 15, KB5NA 14, KX5W 10, W5SSRX 7, ND5S 4, W5JJ 2. (Sept.) N5SG 94.

SOUTHERN TEXAS: SM, Arthur R. Ross, W5KR — STM: K5QEW. SEC: KA5KRI. ACC: K55V. Texas Southmost ARC, Harlingen, gave good service to a biathlon (running and cycling) for a charity. Houston ARC now meets in the Museum of Science. An Amateur Radio station there is operational and draws much interest when positions are manned. OBS W5KLV kept busy with 14 bulletins, 4 DX bulletins, 28 satellite bulletins and 5 propagation forecasts given 115 readings on 6 nets. Beaumont ARC has Amateur Radio booth at South Texas State Fair, Chairman KA5LAR did good job setting up special event station. OO K5DL talked to Brazos Valley ARC about the present OO program and the Amateur Auxiliary to the FCC Field Operation Bureau. OO WA2VJL passed the General Radio telephone commercial license exam; he's studying computer controlled tolerance inspection in Houston. CAND Mgr W5KLV reports 848 messages handled in 31 sessions; DRNS represented 100% by South Texas stations. W5BYDD, W5TFB, N5CRU, K5WOB, K5DKM, N5DFO, W5EPA, W5FQU, W5KLV, KD5KQ, N5EFG, K5EWW, KC5MM, DRNS Mgr W5BYDD reports 666 messages in 82 sessions; South Texas represented 100% by N5DFO, W5CTZ, W5EPA, W5FQU, W5KLV, KD5KQ, W5URN, K55V, N5CRU, N5GKM, K5GDX, N5EFG, N5AMH, K5OWK, K5WOB, W5TFB and W5BYDD. Traffic: W5YDD 370, W5CTZ 325, W5KLV 287, N5DFO 237, K55V 144, W5EPA 73, N55J 63, W5FQU 47, WD5GKH 39, N5GKM 38, KK6L 25, K5OWK 23.



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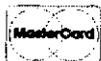
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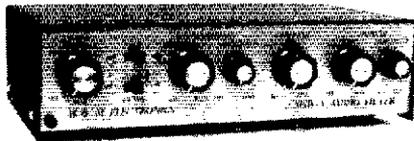
DON'S CORNER

Another year has gone by. I would like to thank all
of our customers, new and old, for keeping us in
mind this past year. I hope that Santa is good to
you this Christmas and that the New Year brings
prosperity to you and your family.

MERRY CHRISTMAS AND HAPPY NEW YEAR
FROM DON AND THE CREW

MSB-1 AUDIO FILTER

SSB/CW/RTTY
\$84.95



If your transceiver lacks some of the latest conveniences for circumventing QRM, then solve your problem both economically and effectively with the MSB-1 Audio Filter. You will be astounded at what the tuneable 8-pole hi-pass filter section alone, can do for you, considering its incredible 48 dB/octave cutoff rate! The notch filter has both variable frequency and selectivity controls, and is very effective in removing heterodynes and SSB splatter. Notch depth is 90 dB. For peaking, there is a variable bandpass filter with both frequency and selectivity controls. Highly useful on CW, the controls can be adjusted to emphasize voice on SSB signals. This filter can be switched in or out, independently of the other filters. By the way, there is also a fixed 6 pole hi-pass filter with 300 Hz cutoff. All three tuneable filters cover 300 Hz to 3kHz.

Insert the MSB-1 between your phone jack and phone or speaker. Delivers 2 watts of clean, crisp audio. Requires 12 VDC @ 300 mA. 115 VAC adaptor available @ \$8.95.

ORDER TODAY. If not completely satisfied, return within 15 days for a prompt refund (less shipping and handling). Add \$2.50 shipping and handling. SEND TODAY for complete list of products. Dealer inquiries welcome.

M&M ELECTRONICS, INC.

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Ham-Ads

(1) Advertising must pertain to products and services which are related to Amateur Radio.

(2) The Ham-Ad rate is 85 cents per word. This includes firms or individuals offering products or services for sale. A special rate of 25 cents per word applies to individuals seeking to dispose of or acquire personal station equipment, and to hamfest and convention announcements.

(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" x 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 firms or individuals offering products or services for sale must submit a production sample (which will be returned) for our examination. Dealers are exempted, unless the product is unknown to us. Check with us if you are in doubt. You must furnish a statement in writing that you 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/8 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 Fryer Manor Rd., Larchmont, NY 10638.

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.

ATTENTION MORSE Telegraphers. Join Morse Telegraph Club. Meet old wire friends, swap experiences. Where and when do we meet? Contact John Holman, W3INV, 1 Beth Circle, Malvern, PA 19355. 215-844-2471.

THANK YOU for attending Warren, Ohio Hamfest. See you August 18, 1985.

INDIANA: South Bend Swap & Shop, Jan. 6 at the Century Center downtown, on U.S. 33, ONEWAY north between St. Joseph Bank Building and river. Half-acre on carpeted floor. Industrial history museum in same building. Four-lane highways to door from all directions. Talk-in 52.62 & area repeaters. Sponsored by Repeater Valley Hamfest Committee. Contact: Wayne Wertz, K3IXU, 1889 Riverside Dr., South Bend, IN 46616, Telephone 219-233-5307.

FLEMINGTON, N.J. Hamfest by Cherryville Repeater Association will be held Saturday, April 20 at Hunterdon Central Field House. For table reservations or other information write Bill Inkrote, K2NJ RD10 Box 294, Quakertown-Croton Rd., Flemington, N.J. 08822 or call 201-788-4080.

LIMARC INDOOR HAMFAIR '84 will be held on Sunday, February 17th, 1985 at the Electricians Hall, 41 Pinelawn Road, Melville, N.Y. Table spaces are only being sold in advance costing \$10 each. Send table reservations to Bob Reed, WB2DIN, 2970 Valentine Place, Wantagh, NY 11793.

BUYERS ADMISSION is \$3 per person. NO EXCEPTIONS. Doors open to buyers at 0900 local. Food and refreshments will be available. For additional information contact Al Flapan, WA2FBQ @ 516-796-2995 or Hank Wener, WB2ALW @ 516-484-4322.

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Available from: **ARRL**, 225 Main St.
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2-Meter Mobile

IC-27H



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IC-27A
25 Watt

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Now ICOM offers the best prices in compact 2-meter mobiles...the IC-27H 45-watt compact and the IC-27A 25-watt ultra compact mobile.

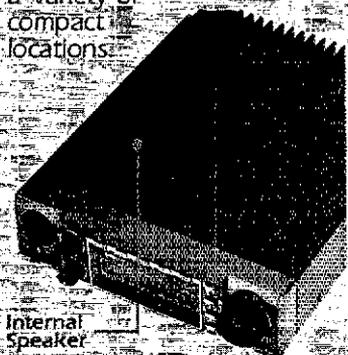
Small Size. The ICOM IC-27A and IC-27H measure only 2 1/2" W x 1 1/2" H x 7" D (IC-27H is 7 1/2" deep).

Easy to Operate. Even though the IC-27A and IC-27H are the smallest mobiles they have large operating knobs which are easy to use in the mobile environment.

32 PL Frequencies. The IC-27A and IC-27H come ready to go

with 32 PL frequencies.

Internal Speaker. The IC-27A and IC-27H feature an internal speaker which allows the mobiles to be mounted in a variety of compact locations.



Internal
Speaker

9 Memories. The compact mobiles have 9 memories which will store the receive frequency, transmit offset, offset direction and PL tone. All memories are backed up with a lithium battery.

Speech Synthesizer. To verbally announce the receive frequency, an optional UT-16 voice synthesizer is available.

Scanning. The ICOM compact mobiles have four scanning systems...memory scan, band scan, program scan and priority scan. Priority may be a memory or a VFO channel, and the scanning speed is adjustable.

More Features. Other standard features include a mobile mount, IC-HM23 DTMF mic with up/down scan and memory scan and internally adjustable transmit power. An optional IC-PS45 slim-line external power supply and IC-SP10 external speaker are also available.

See the IC-27A/H compact mobile transceivers at your local ICOM dealer. For superb performance and reliability your only choice is an ICOM.

Also Available are the IC-37A 220MHz and IC-47A 440MHz 25 watt compact mobiles.



First In Communications

ICOM America, Inc., 2380-116th 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. 27-11084

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)
**Requires BC35 Charger*
†Will charge from BC35, BC25U, stat CP1 or 12 VDC Direct (internally regulated)
‡Accept 6 AA size batteries - Alkaline or NiCd (Do not attempt to charge Alkaline batteries)

IC-BC25U AC Wall Charger
117 VAC in/12 VDC out

IC-CP1 Cigarette Lighter Cord w/Fuse
(charges BP3/powers DC1)

IC-ML1 12 VDC 144 MHz Booster
10W out/12 VDC (comes with 5 feet coax, BNC to PL-259)

IC-BC35 Battery Charger
117 VAC (Battery Determines Charge Rate)

IC-BP5 Battery Pack
10.8 VDC, 425mAh
1.5 hr charge

IC-BP4* Battery Case

IC-BP3 Battery Pack
8.4VDC 250 mA
15 hr. charge

IC-BP2 Battery Pack
7.2 VDC 425 mA
1.5 hr charge

IC-4AT 440 MHz

IC-3AT 220 MHz

IC-2AT 2 meter

Leather Case Available with or without cut out for Touchtone™ pad

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 complete — 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

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ICOM 220MHz Mobile

IC-37A



Join the Excitement on 220MHz!

Join the excitement on 220MHz with ICOM's IC-37A full-featured 25 watt ultra compact mobile.

Size. The IC-37A measures only 5 1/2" W x 1 1/2" H x 9" D allowing it to be mounted in a variety of tight spaces. Yet the IC-37A has large operating knobs which enable easy operation of the unit in the mobile environment.

9 Memories. The IC-37A has 9 memories which will store the receive frequency, transmit offset, offset direction and PL tone. All memories are backed up with a lithium battery.

Speech Synthesizer. To verbally announce the receive frequency, an optional UT-16 voice synthesizer is available.

32 PL Frequencies. The IC-37A comes complete with all 32 standard PL frequencies installed. Each PL frequency is selected by turning the main tuning knob, and may be stored into any memory position. Also included is an internal PL level adjustment.



Internal Speaker. The 25 watt IC-37A super compact mobile contains an internal speaker which makes it easy to mount.

Scanning. The IC-37A has four scanning systems... mem-

ory scan, band scan, program scan, and priority scan. Priority may be a memory or a VFO channel, and the scanning speed is switchable.

More Features. Other IC-37A standard features include a slide-in mobile mount, IC-HM23 DTMF mic with up/down frequency and memory scan, and internally adjustable transmit power. An optional IC-PS45 slim-line external power supply and IC-SP10 speaker are also available.

See the IC-37A 220MHz mobile at your local ICOM dealer and join the excitement on 220MHz.



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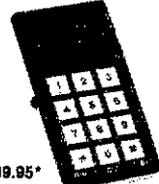


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ELECTRONIC KEYS



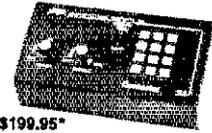
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BT-1 Basic Morse Trainer

- Teaches code at 20 wpm.
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- 01-99 WPM.
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- 10 soft-partioned™ memories.
- Automatic serial number.
- Stepped variable speed.
- Two speed memories.



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- Built-in speaker with switch for quiet monitoring.

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Unmatched Software For C-84 And VIC-20 Computers

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FINEST custom QSLs, large cut catalog and samples \$1 refundable on first order. Flitz Print Shop P.O. Box 45018, Westlake, OH 44145.

NEW 3-D designs, including Space Shuttle, samples 50c, 3-D QSL Co., P.O. Box D, Bondsville, MA 01009.

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QSL samples — 25c Samcards — 48 Monte Carlo Dr., Pittsburgh, PA 15239.

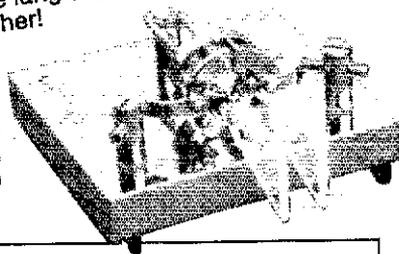
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Discerning CW operators world-wide have long recognized the Bencher Iambic Paddle as the finest paddle available at any price, but at Bencher we kept trying to make the best even better. And we've succeeded!!

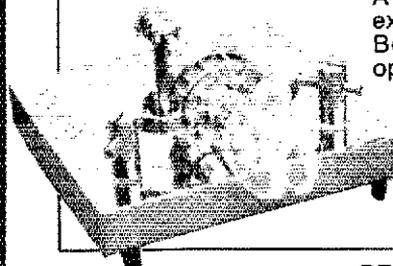
Bencher paddles now feature stainless steel needle bearings, all stainless fasteners and a stainless steel lifetime spring. And of course, gold plated pure silver contact points, polished Lucite finger pads, the massive leaded steel base and a full range of locking adjustments that made the Bencher paddle the hallmark of fine CW. Old-timer or new novice, you can't find a smoother, more responsive paddle for flawless keying, certain to make your CW operating a real pleasure. Remember, CW is the language of amateur radio - and no one speaks it better than Bencher!



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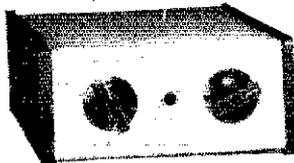
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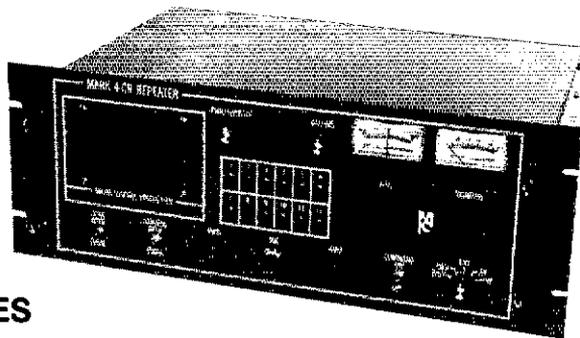
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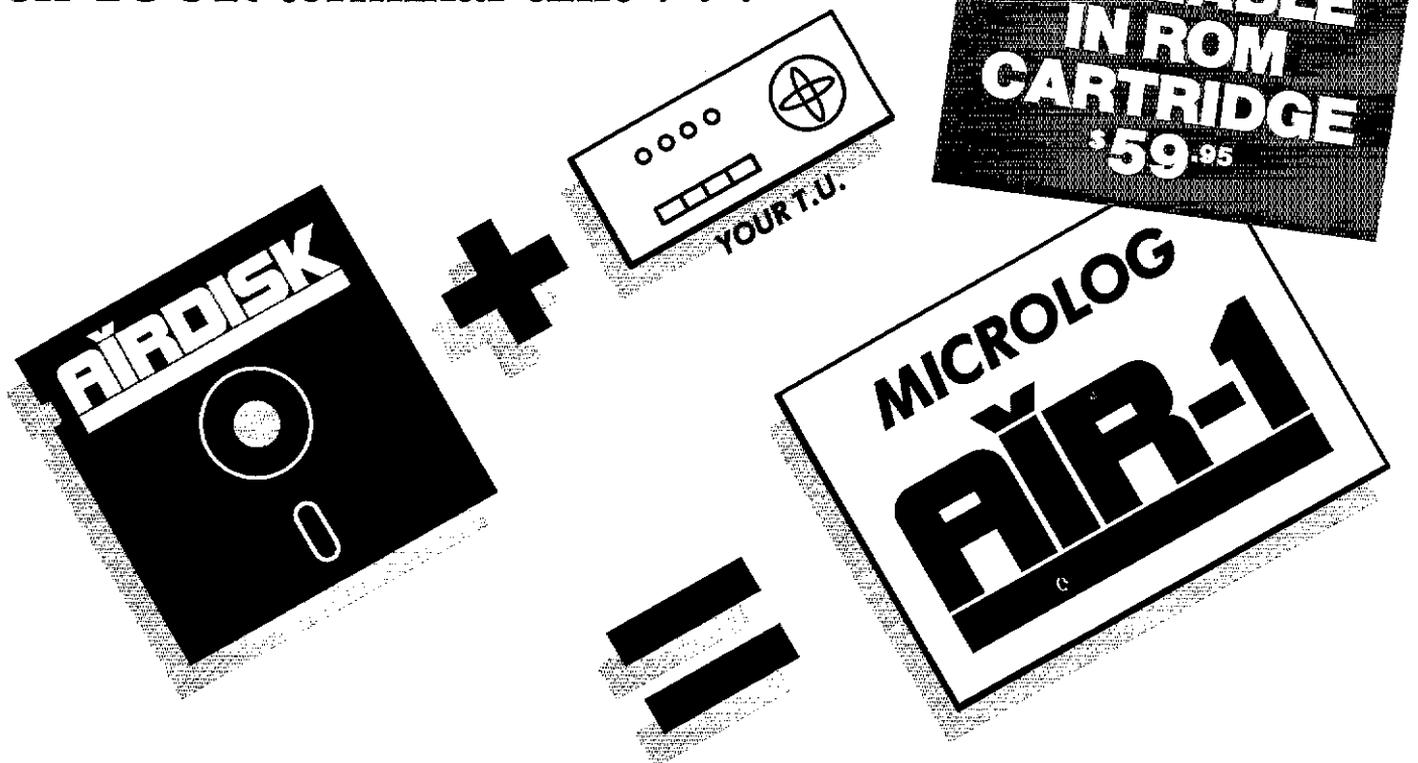
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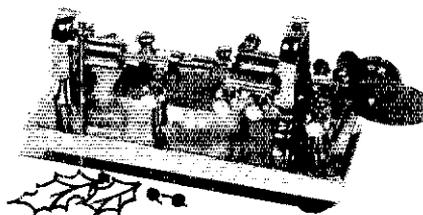
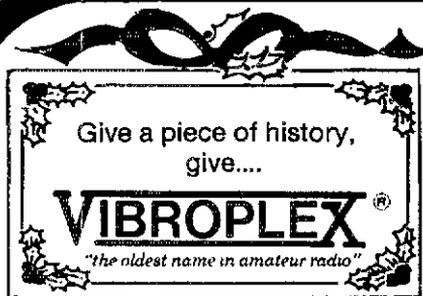
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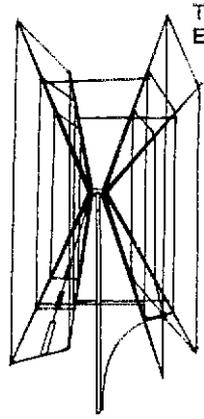
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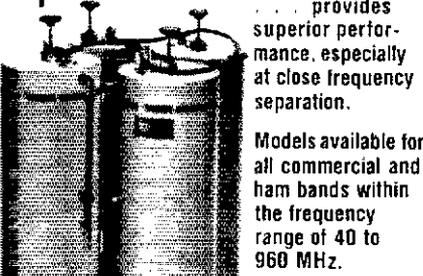
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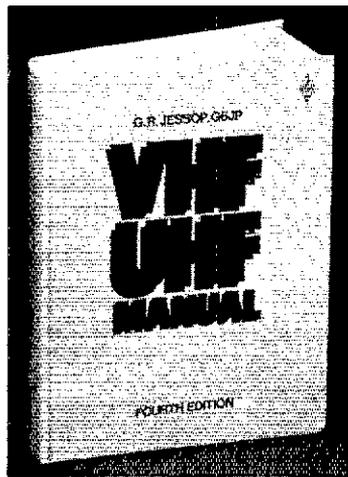
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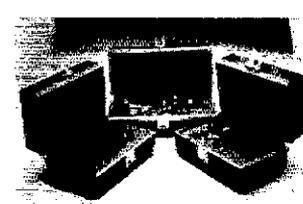


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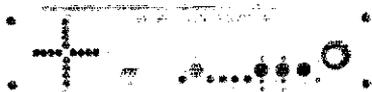
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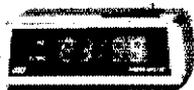
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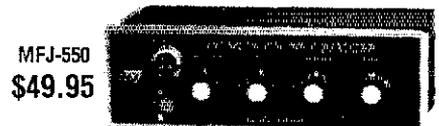
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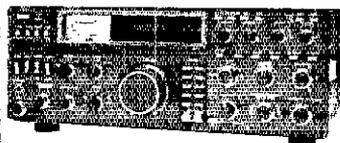
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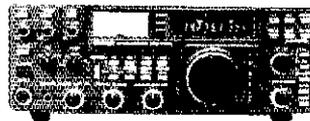


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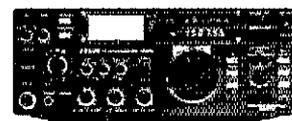
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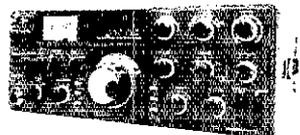
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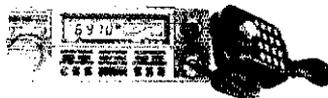
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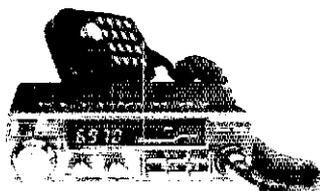
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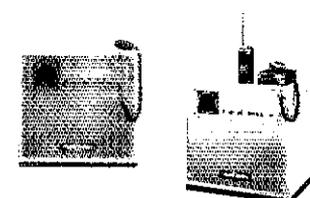
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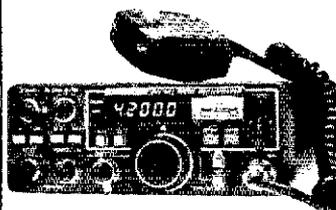
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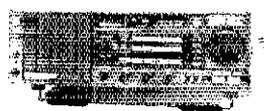
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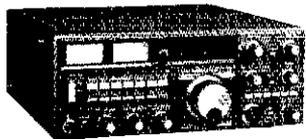
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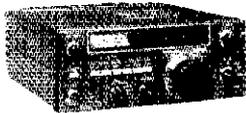
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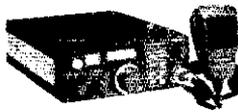
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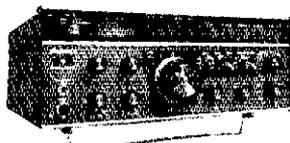


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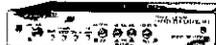
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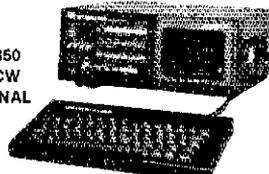
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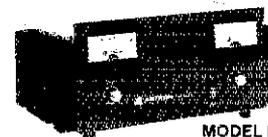
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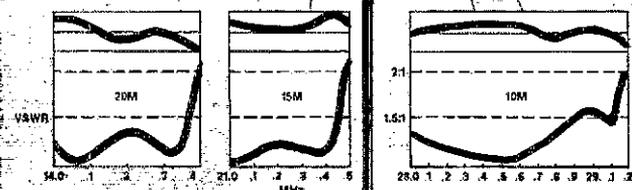
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H8X-48	48' self supporting [10 sq. ft.]	\$255.00
H8X-56	56' self supporting [10 sq. ft.]	\$339.00
H08X-40	40' self supporting [18 sq. ft.]	\$249.00
H08X-48	48' self supporting [18 sq. ft.]	\$319.00
FK-2548	48 25G foldover [Freight Paid]	\$795.00*

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3/16	EHS guy wire [3990 lbs.] - 1000'	\$148.50
1/4	EHS guy wire [6650 lbs.] - 1000'	\$165.00
5/32	Cable - 100'	\$36.00

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A-3	3 Element Triband Beam	\$204.00
A743	7 & 10 mhz add on kit for A3	\$69.00
A744	7 & 10 mhz add on kit for A4	\$69.00
A3219	19 Element 2 mtr. "Boomer"	\$88.00
A4	4 Element Triband Beam	\$269.00
AV-4	40-10 mtr Vertical	\$88.00
AV-5	80-10 mtr Vertical	\$95.00
ARX2B	2 mtr "Ringo Ranger"	\$34.00
ARX450B	450 mhz "Ringo Ranger"	\$34.00
A144-11	144 mhz 11 Element VHF/UHF	\$44.00
A147-11	11 Element 144-148 mhz. Beam	\$44.00
A147-22	22 Element "Power Pack"	\$122.00
A144-10T	10 Element 2 mtr "Oscar"	\$47.00
A144-20T	20 Element 2 mtr "Oscar"	\$68.00
214B	14 Element 2 mtr "Boomer"	\$74.00
214FB	14 Element 2 mtr. FM "Boomer"	\$74.00
220B	17 Element FM "Boomer"	\$88.00
228F-R	28 Element 2 mtr "Boomer"	\$204.00
424B	24 Element "Boomer"	\$75.00
R-3	20-15-10 mtr Vertical	\$257.00
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TH13RS	3 Element Triband Beam	\$185.00
385S	Explorer 14-triband beam	\$304.00
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105BAS	5 Element 10 mtr. "Long John"	\$129.00
153BAS	3 Element 15 mtr	\$85.00
155BAS	5 Element 15 mtr. "Long John"	\$199.00
28DO	40 & 80 mtr Trap Doublet	\$59.00
204BAS	4 Element, 20 mtr.	\$254.00
205BAS	5 Element, 20 mtr. "Long John"	\$345.00
214S	14 Element, 2 meter	\$45.00
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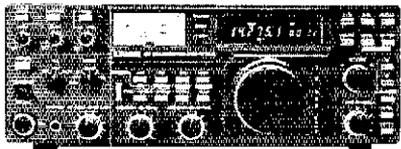
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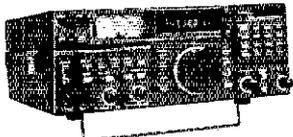
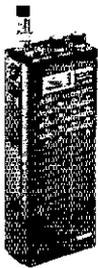
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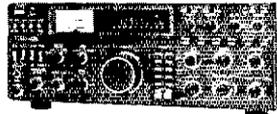
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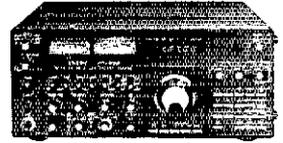


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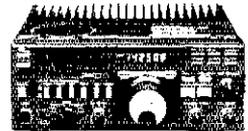
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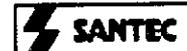
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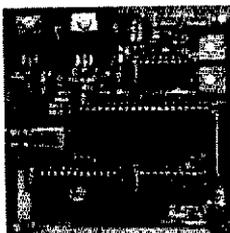
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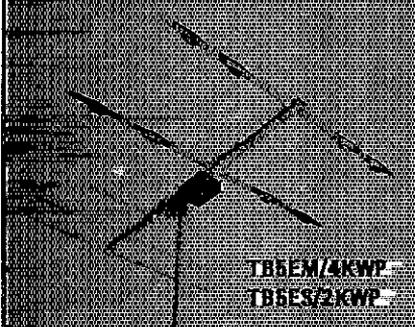
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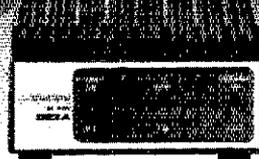
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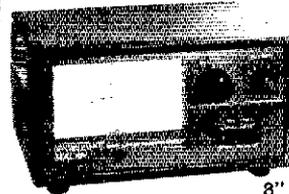


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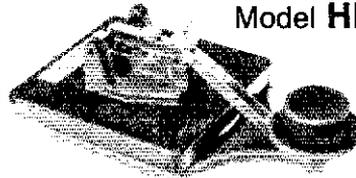


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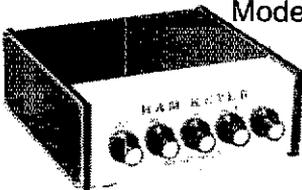


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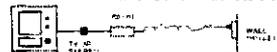
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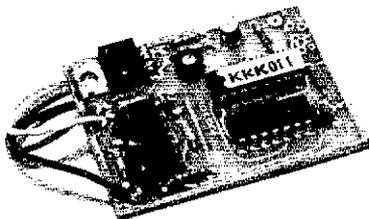
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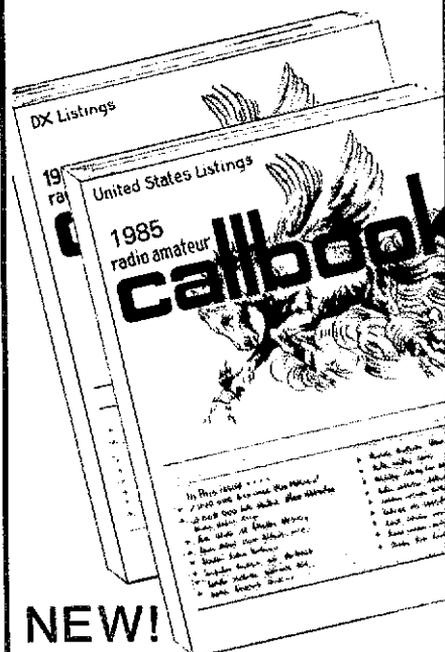
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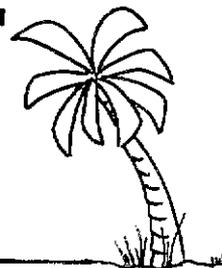
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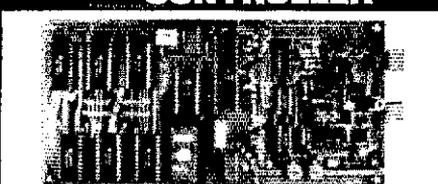
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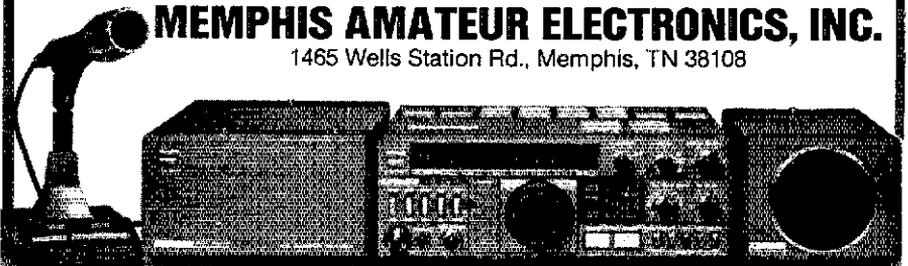
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Communications Electronics™, the world's largest distributor of radio scanners, is pleased to announce that Bearcat brand scanner radios have been acquired by Uniden Corporation of America. Because of this acquisition, Communications Electronics will 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.

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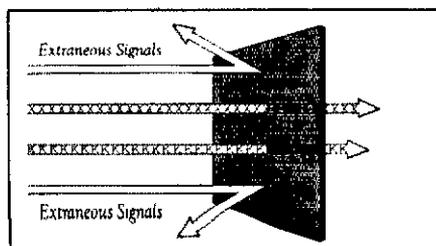
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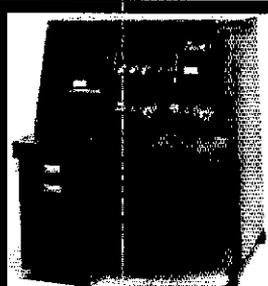


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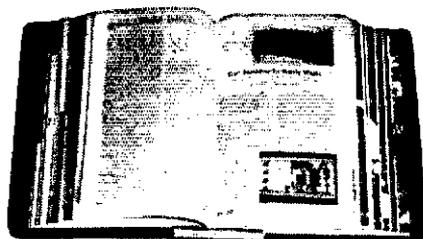
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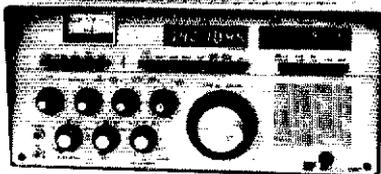
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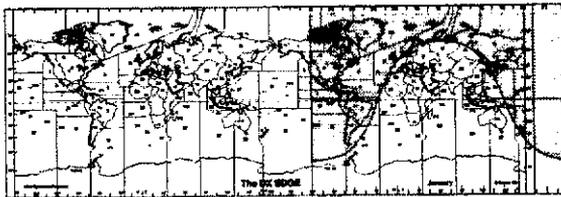
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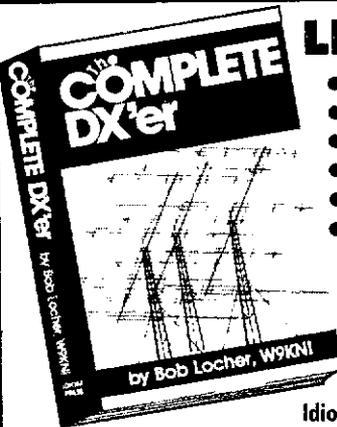
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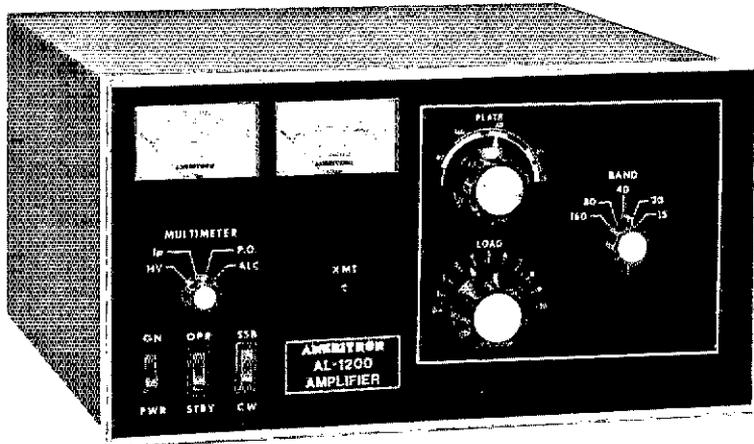
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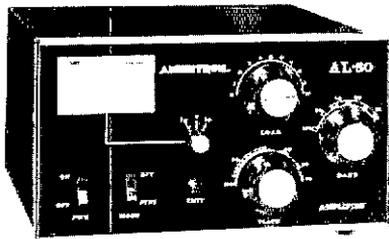
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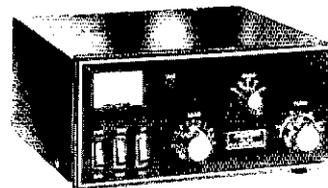


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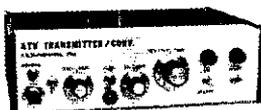
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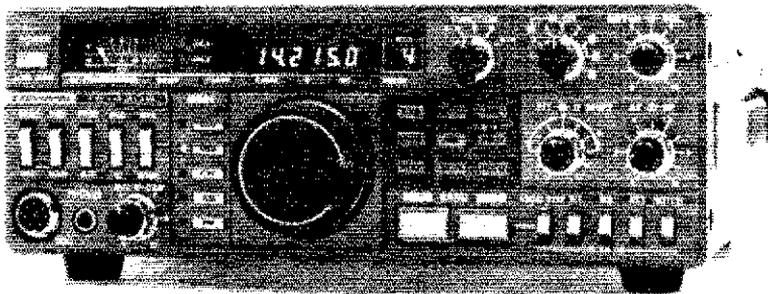
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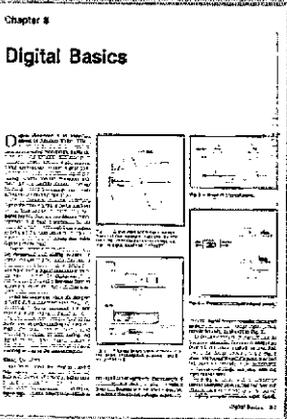
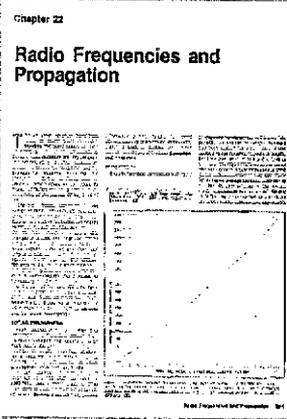
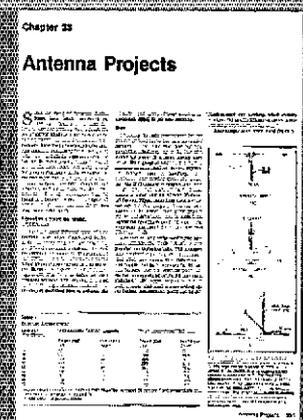
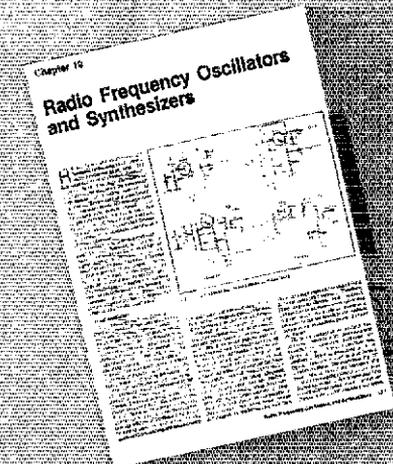
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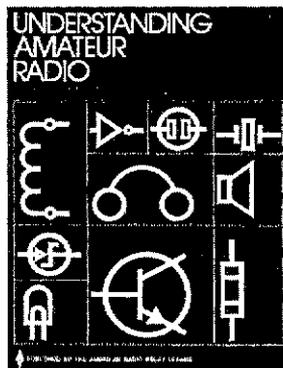
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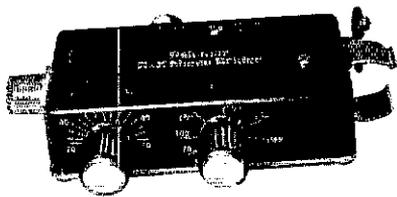
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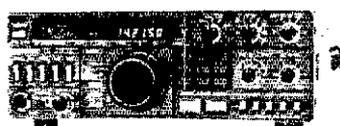
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All ham band HF transceiver, 16 memories, 100KHz to 30 MHz general coverage receiver, and adjustable noise blanker and AGC.

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IC-27A Compact Mobile

A breakthrough in 2-meter mobile communications! Most compact on the market (5 1/2" x 1 1/2" H x 7" D), contains internal speaker for easy mounting, 25 watts, 32 PL frequencies, 9 memories, scanning and touchtone mic.

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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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IC-R71A General Coverage Receiver

The IC-R71A 100KHz - 30 MHz supercr-grade general coverage receiver features keyboard frequency entry, 32 memories, SSB/AM/RTTY/CW, selectable AGC and noise blanker, and wireless remote controller (optional).

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Presenting two small cases for a lot of mobile power.

You won't find a 45-watt, 2-meter FM mobile rig that's built smaller than the Yaesu FT-270RH.

Nor will you find a dual-band FM mobile that offers the crossband full-duplex capability found in the 25-watt Yaesu FT-2700RH.

It shouldn't be surprising. We've been coming up with a lot of innovative concepts lately.

The FT-270RH measures just 2 x 6 x 7 inches. Conveniently fitting its high-power punch into many small spaces of your car. Places where other 45-watt mobiles just won't fit.

The FT-2700RH is small too. Smaller than other dual-banders. But with one big difference: a "DUP" button. Push it, and you're operating full duplex, 2 meters on one VFO, 440 MHz on the other. Each at 25 watts. So you can simultaneously

transmit and receive in true telephone style.

Once installed, you'll find the FT-270RH and the FT-2700RH equally simple to operate. Just turn the rig on, dial up a frequency, select offset or duplex split, and you're on the air.

Each rig gives you 10 memories for storing your favorite frequencies. Dual VFO capability. A clean, uncluttered LCD display for easy readout. Push-button jumps through the band in 1 MHz steps. Band scanning with programmable upper and lower limits. And priority channel operation.

You don't even have to take your eyes off the road to determine your operating frequency and memory channel. An optional voice synthesizer announces them both at the push of a button on the microphone. The FT-2700RH announces both your

2-meter and 440 MHz operating frequencies.

Also, tone encode and encode/decode capability is programmable from the front panel, using an optional plug-in board.

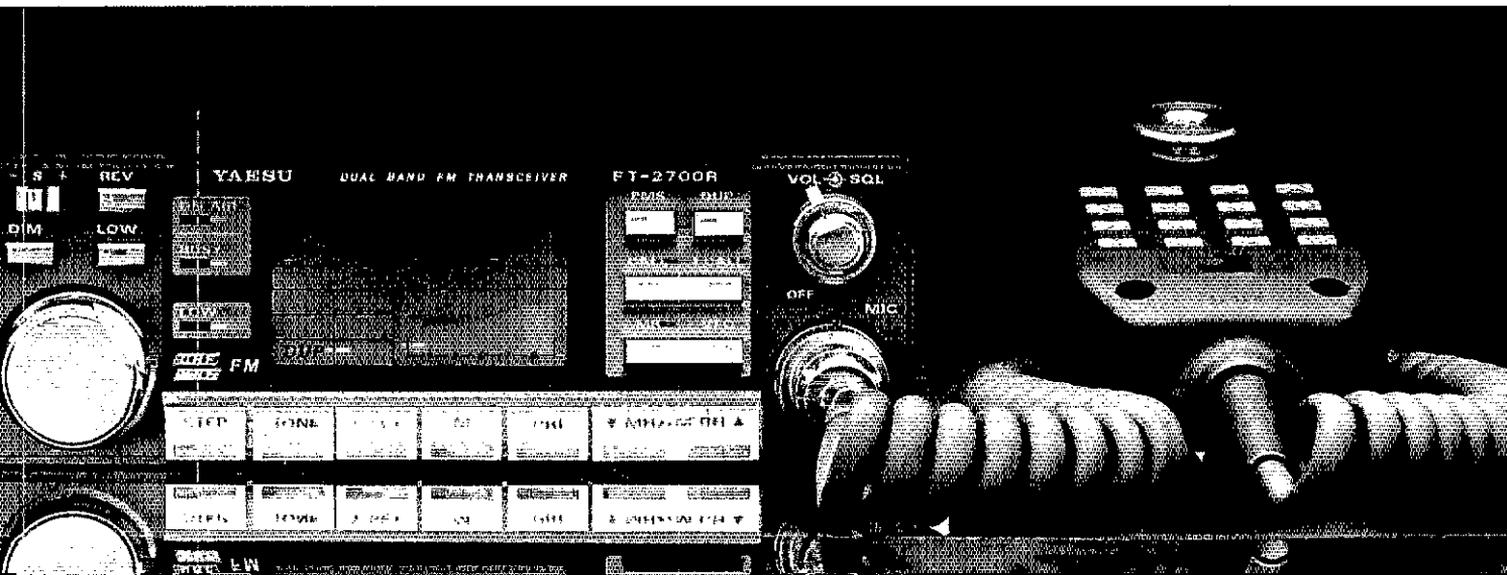
So when you need a lot of power in a compact mobile radio, discover Yaesu's FT-270RH and FT-2700RH. There's nothing else like them on the road.

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pacesetter in amateur radio

TR-7950, watts to see!

TR-7950/7930

The TR-7950/7930 has become the unanimous choice of the 2 meter FM operator! It stands alone in features, performance and reliability, with no other rig even close!

The TR-7950/7930 features a large L.C.D. display that is easy to read in direct sunlight and is back lighted for comfortable night-time viewing. It displays TRANS/REC frequencies, memory channel, repeater offset (+, S, -), sub-tone number (F-0, 1, 2, 3) tone, scan, and memory scan lock-out. It includes an LED S/RFB bar meter, and LED indicators for reverse, center TUNING, PRIORITY and ON AIR. The 21 multi-function memory channels store frequency, repeater offset, and optional sub-tone channels. Memories 1 through 15 are for simplex or ± 600 Hz offset. Memory pairs 16/17 and 18/19 are paired for non-standard repeater offset. Memories "A" and "B" set upper and lower scan limits, or are for simplex or ± 600 kHz offset. In MEMORY mode, a circle of light appears around the memory selector

knob. When the memory selector knob is rotated in either direction to channel 1, an audible "beep" sounds.

With 45 big watts, the TR-7950 is the most powerful 2 meter FM rig you can buy. The TR-7930 with a modest 25 watts is also available.

A HI/LOW power switch allows power reduction to approx. 5 watts.

Other key features include: Programmable band-scan width, Center stop during band-scan, with indicator. Scan stops on busy channel and resume scan is automatic (time 5 sec. adjustable) or carrier operated. A scan delay of approx. 1.5 sec. is built-in. Scanning can also be accomplished with UP/DOWN microphone or "SC" key on front panel. Programmable priority alert can be set into any of 21 memory channels. With Alert switch ON, a dual "beep" sounds when signal is present. The microprocessor is pre-programmed for simplex or ± 600 kHz offset in accordance with the 2 meter band plan, with an

"OS" key to allow manual changes in offset. The keyboard functions as a 16-key autopatch encoder during transmit. Frequency coverage is 142.000-148.995 MHz, and it has a repeater reverse switch and mobile mounting bracket. All these features are available in one compact, lightweight rig.

Yes, Kenwood is on top with the TR-7950! Its field proven reliability and matchless performance makes the TR-7950 the rig of tomorrow, today!!

TR-7950 optional accessories:

- TU-79, three frequency tone unit,
- KPS-12 fixed-station power supply (7950), KPS-7A fixed-station power supply (7930), SP-40 mobile speaker, SP-50 mobile speaker, MC-55 mobile microphone with time-out timer, MC-46 16-key autopatch UP/DOWN mic, SW-100A/B power meters, PG-3A noise filter.

More information on the TR-7950/7930 is available from authorized dealers of Trio-Kenwood Communications, 1111 West Walnut Street, Compton, CA 90220.

Specifications and prices are subject to change without notice or obligation.

