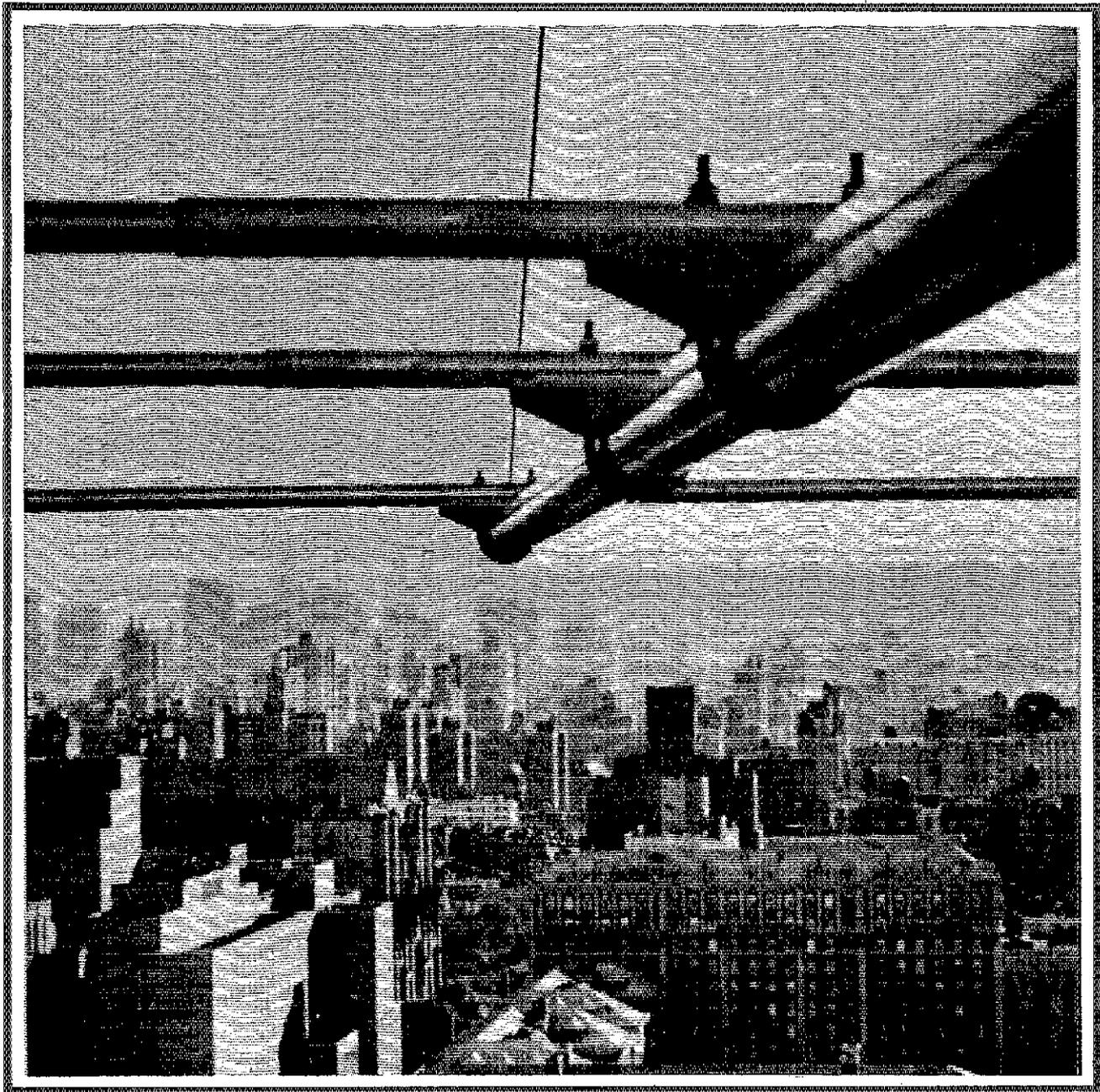


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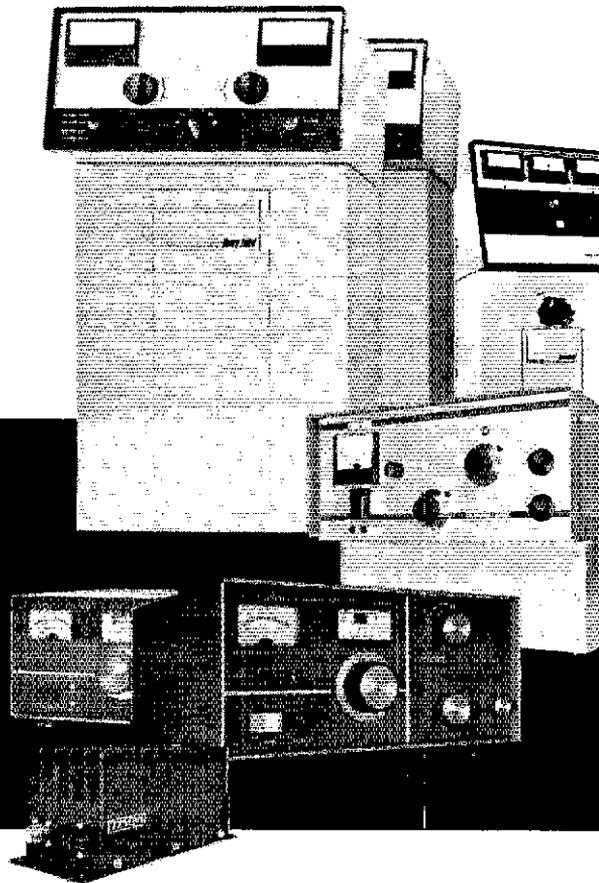
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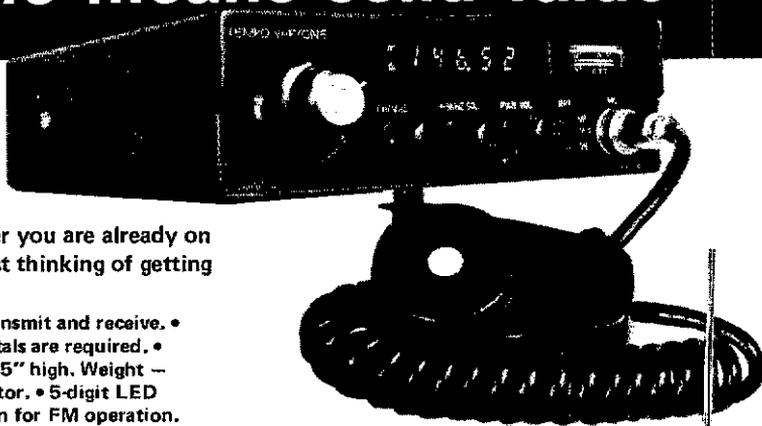
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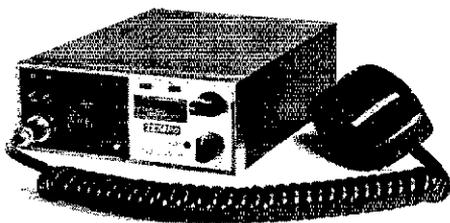
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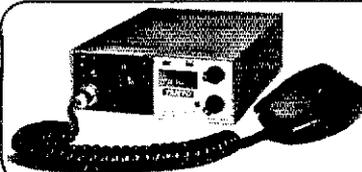
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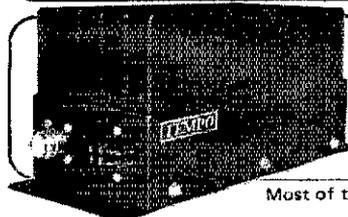
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30W	130W	130A30	30W	70W	70D30
2W	80W	80A02	2W	40W	40D02
10W	80W	80A10	10W	40W	40D10
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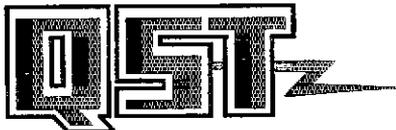
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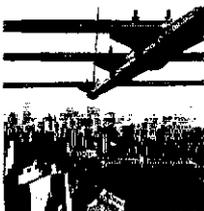
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THE COVER

WB2DZL took this photo from atop the tower at W2AEE, Columbia University.



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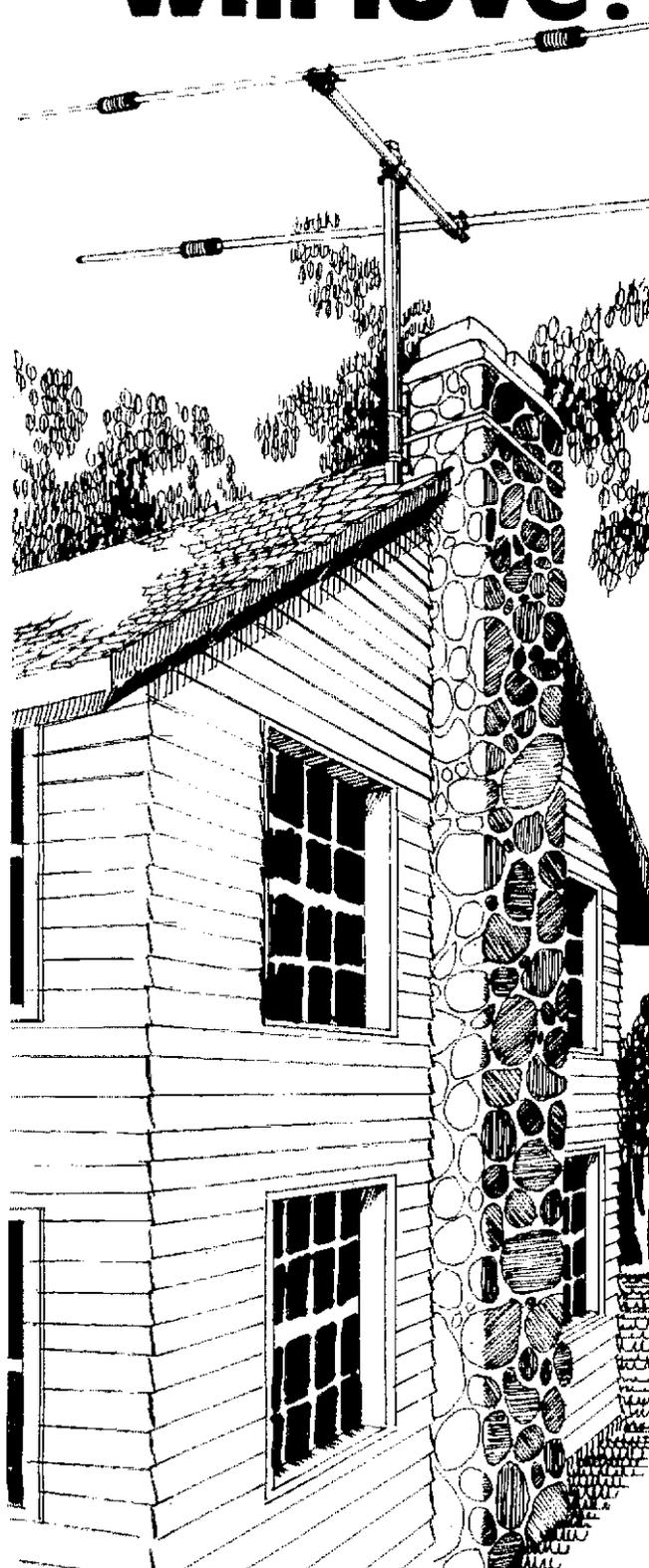
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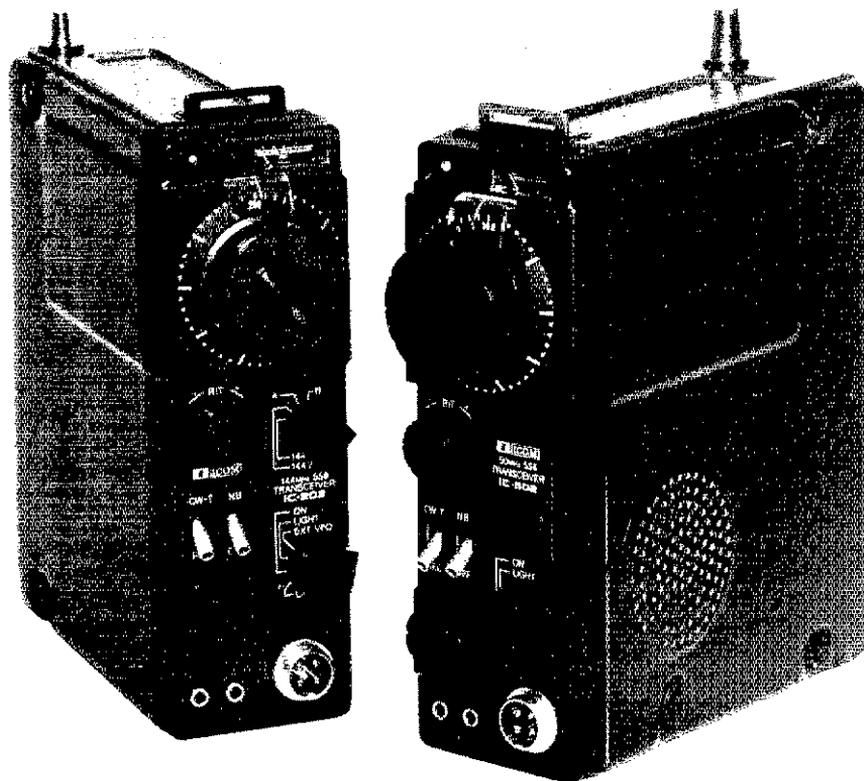
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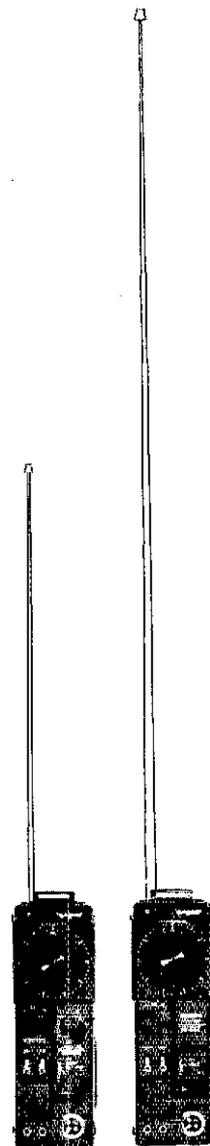
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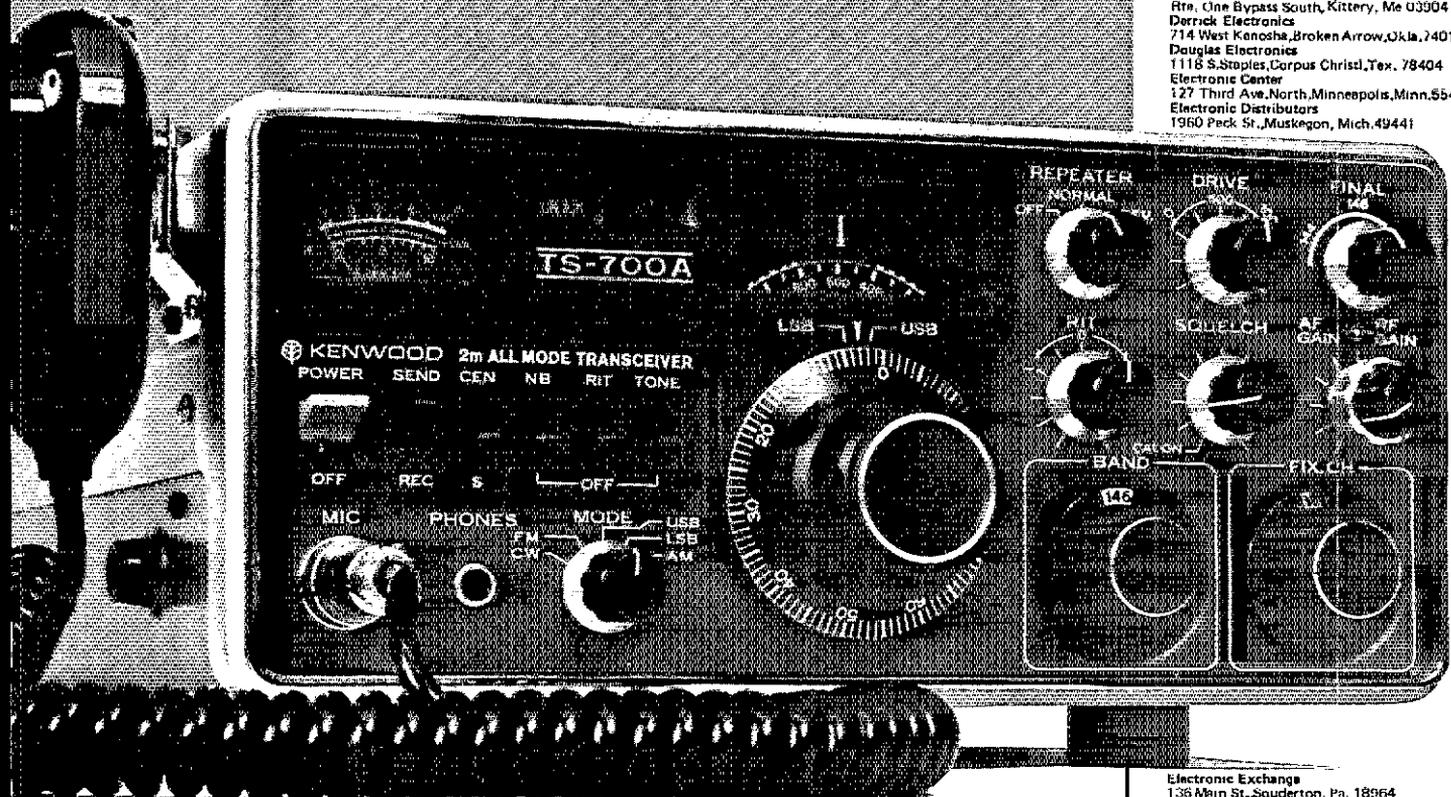
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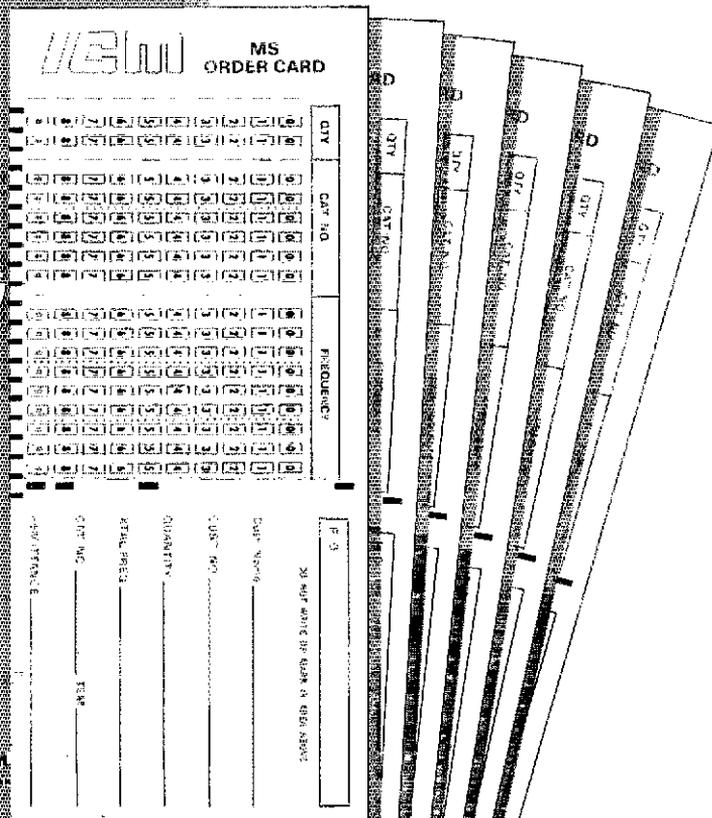
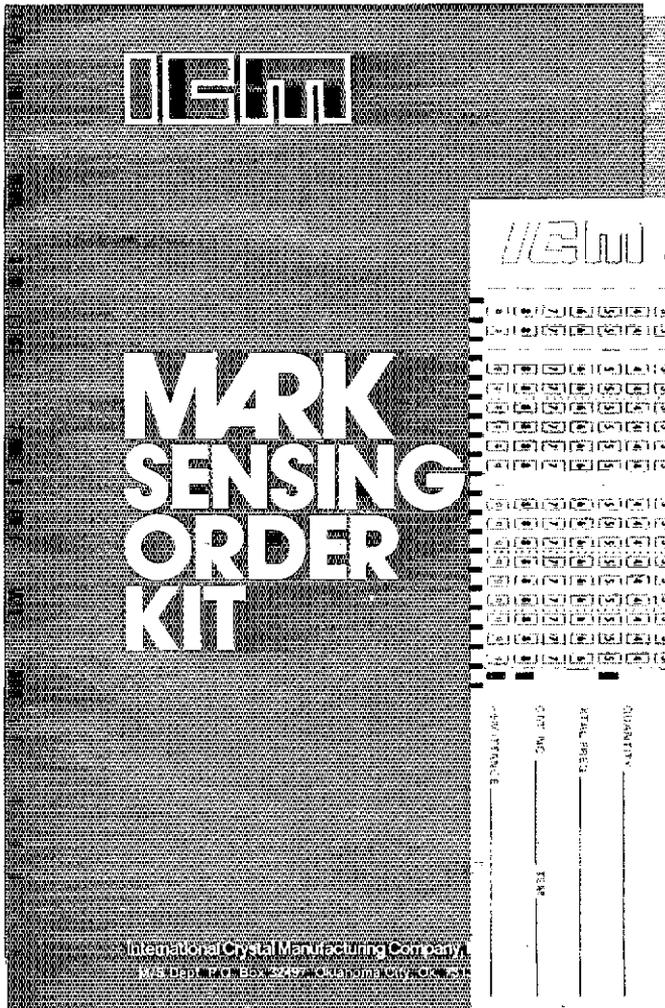
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*Members Executive Committee

Section Communications Managers of the ARRL

Reports Invited: All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired by SCMs for inclusion in QST. ARRL Field Organization station appointments are available in areas shown to qualified League members. General or Conditional Class licensees or higher may be appointed ORS, OPS, OO and OBS. Technicians may be appointed QVS, OBS, or VHF PAM. Novices are eligible for ORS - II. SCMs desire application for the leadership posts of SEC, EC, RM and PAM where vacancies exist.

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*Official appointed to act temporarily in the absence of a regular official.



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

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

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

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

All general correspondence should be addressed to the administrative headquarters at Newington, Connecticut 06111.

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*Executive Committee Member

A New Growth for Amateur Radio

One hundred thousand new amateurs by 1979. Sixty thousand new members of the League by 1979. Those were the goals the Hq. staff set in a report to the Board at the January meeting. The Board endorsed the program that was described, and we're underway. And, with your help, we can succeed!

Why the emphasis on growth? Because there's a World Administrative Radio Conference coming in 1979, and because the amateur service has not grown the way it should have the past few years, and because there are heavy pressures in many areas of the spectrum for additional frequencies for other services. Although the amateur service has continued to fulfill the basis and purpose for which it has been respected for so many years, and although membership in the League has shown a healthy increase the past couple of years, it is essential that we establish even more firmly our position as a vital and worthy occupant of the spectrum.

A year ago, we looked for increased growth through the medium of a new class of amateur license with lower entrance requirements, which might have been known as the Communicator or Basic Amateur license. But the unexpected explosion of citizens band license applications has created such a workload at the Commission that they are not able at this time to tackle the additional work that would be caused by such a new amateur licensing structure.

In discussions with the Commission during late 1975 there was developed the concept of a new approach to amateur licensing, whereby the League would conduct, through its affiliated clubs, training courses. Provided the content and conduct of these courses were satisfactory to FCC, the graduates of such courses would be certified by ARRL as being eligible for amateur licenses, and licenses would be issued forthwith by FCC. One of the great advantages of such a system is the swiftness of licensing. We know that at the present time, the issuance of amateur licenses is taking as long as twelve weeks. Unfortunately, a newcomer can lose much of his enthusiasm if he has to wait for three months to go on the air.

We are going to seize upon this opportunity, not only to expedite the licensing process for those who might have already succumbed to the lure of amateur radio, but also to launch an

aggressive program to expand the club training programs and to encourage greater numbers of people to become interested in amateur radio.

The mechanism for this new approach has already been set up in Newington. The affiliated club program has been transferred from the Communications Department to a separate and independent status directly under the General Manager. Charles Harris, WB2CHO, a professional educator who has taken an extended leave of absence from his teaching career to work on the project, will be in charge of what we are calling the Task Force for the Development of Amateur Radio. He will be assisted by Rosalie Cain, WA1STO, who also is an educator. We expect to be adding more staff people as the program develops.

We are going to approach this opportunity from several directions simultaneously. For one thing, there will be a nationwide publicity and promotion program, largely through affiliated clubs but also hopefully through radio retailers and others where those with a latent interest might be exposed to the excitement of amateur radio. There'll be more display materials, more public service announcements, and other material and participation in order to help the affiliated clubs attract larger numbers of would-be amateurs.

There'll be new publications and training materials aimed specifically at making it even easier to become a Novice. The training program will have to be certified by the Commission, and the League will have to establish the mechanism to supervise the efforts of the clubs so that the graduates of the courses can be issued amateur licenses.

We're going to examine a large sample of former Novices, to find out why they dropped out and how we can reduce that drop-out rate.

The League has always been dedicated to the promotion of amateur radio, but nothing of this scale has ever been attempted before. We believe we can make it work, but we know that we are going to need the help of every member of the League and of every affiliated club. Very soon, clubs will begin receiving further information on this program to develop amateur radio, and we'll be asking for your active support. The stakes are high — the continued and perhaps even expanded occupancy of the spectrum by the amateur radio service. — W1RU

League Lines...

HELP WANTED: an amateur with technical and educational training/experience, to develop and manage an extensive amateur training aid program at ARRL Hq. Contact Chod Harris at Hq.

A vacancy exists in the Contest Branch of the ARRL Communications Department for a qualified contest checker. Interested amateurs should write to headquarters with full personal background data including contest experience and salary required.

First qualifiers for the Bicentennial WAS Award, as of January 28, and in order of issue: K4PUZ, K1DRN, W4CHK, WA1STN, WAINNC, K4BBF, AA4OQO, WA1WEM.

Staff of FCC's Amateur Division are turning down all requests for their appearance as banquet speakers at hamfests and conventions, because this doesn't give them the person-to-person contact they feel to be important. But, they are eager to appear at FCC forums where there is a question-and-answer session, and to set up FCC information booths at hamfests/conventions.

In a joint effort between the RFI Task Group and the League's technical staff, the ARRL will shortly present two professional papers on RFI/EMC problems as they concern electronic home-entertainment devices. Dr. Theodore J. Cohen, W4UMF, will lead off in June with an invited paper to be given at the IEEE International Conference on Communications (14-16 June 1976; Philadelphia, PA). A month later, staffer Anthony Dorbuck, W1YNC, will address the IEEE 1976 International Symposium on Electromagnetic Compatibility (13-15 July 1976, Washington, D.C.). Presentation of these papers testifies to the continued high level of activity within the League which is being directed toward resolving RFI problems as they affect the Amateur, the consumer, and the manufacturers of electronic equipment.

Hearing is believing. A new training aid cassette is now available from Hq's Training Aids Library which explains Section Phone Net operation in a very unique way. It could help your club's Traffic Night become a success. Want more check-ins on your net? -- Check this out.

Effective March 1, the W0QSL Bureau will be handled by the Ak-Sar-Ben Club, P.O. Box 291, Omaha NE 68101. All cards and envelopes from previous bureau will be transferred automatically. For further details, see "Happenings."

FCC has proposed elimination of portable and mobile identifiers, and of advance notice of portable operation, in Docket 20686. Deadline for comment was February 27, but ARRL has asked for a sixty-day extension.

FCC has deregulated some more, deleting the requirement for specific authorization based on a showing of need with respect to repeaters on 29.5-29.7 MHz. Those in need of details may send s.a.s.e. to Hq., asking for "29 MHz Repeater Order."

W.H. Parker, VE5CU, has been appointed by President Dannals, to the Emergency Communications Advisory Committee, replacing VE3DV. Canadians with suggestions for ECAC may wish to send the to VE5CU, 214 McMaster Crescent, Saskatoon, Saskatchewan S7H 4E3.

Code prax proliferates! A new format code practice tapes is now available from Hq. Thirty minutes each of 15 wpm and 20 wpm code, 2/3 straight text and 1/3 cipher groups, on standard cassette, \$5.00 postpaid, First Class Mail.

Once again a reminder: current amateur band restrictions for certain license classes are by frequency not by mode. In other words, a General Class operator may not use even c.w. on 3790 kHz, for instance. Old Timers have trouble with this rule, because it was different in the "Class A" days!

On one of the Novice examinations presently in use there is a bum schematic in which the plate circuit of a tube is grounded, adjacent to a meter. FCC is aware of the problem and is compensating for it as the exams are graded.

The FCC office in Los Angeles moved out, January 19, to 3711 Long Beach Blvd., Suite 501, Long Beach, CA 90807.

The FCC's Field Operations Bureau's Office in Atlanta, GA., has moved from 235 Peachtree St., N. to Room 440, 1365 Peachtree St., N.E., Atlanta, GA 30309. Phone number is 404-526-6381.

RFI Primer

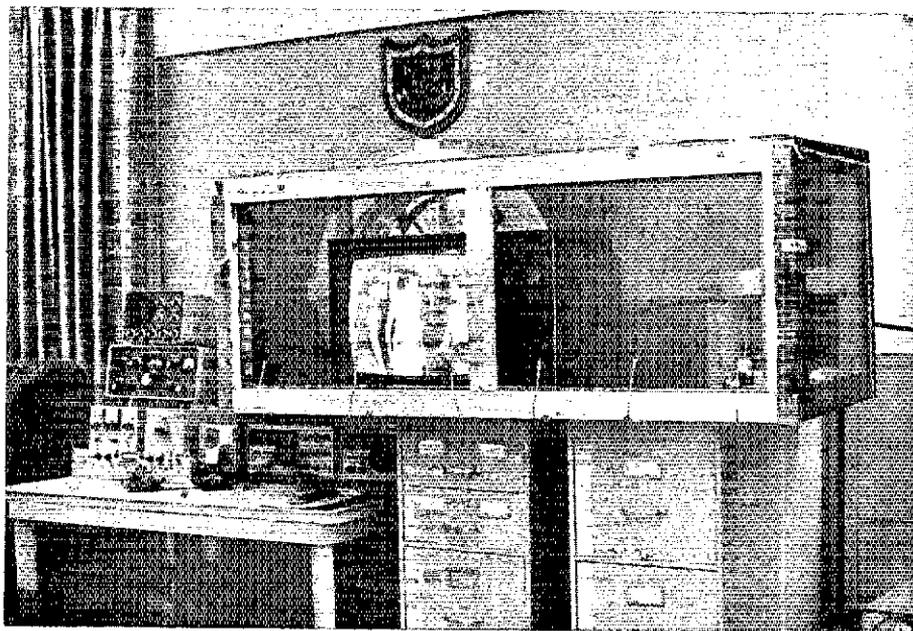
Not for beginners only. Some new ideas for TVI committees too.

By Tony Dorbuck,* W1YNC

Is a balun necessary? "I'm using a low-pass filter but there is still some TVI." One could list a number of similar questions garnered from club talks, correspondence, and other inquiries concerning the subject of RFI. The term RFI (radio frequency interference) is somewhat obsolete nowadays and the more generally accepted one is EMI (electromagnetic interference). But no matter what you call it, the end results are the same . . . headaches for the amateur. And they are getting worse.

The ARRL is trying to do something about the problem through such means as setting up task groups, supporting legislation that would require *all* the manufacturers of home-entertainment equipment to include adequate RFI-proofing measures in their gear, and through laboratory studies. This article deals with the results of some of those studies. It is also intended to answer some of the more commonly raised questions concerning RFI. The basis for the selection of topics is a thought utmost in the minds of many amateurs. Does my station conform to good technical standards, and can anything be done to improve it from an RFI standpoint? While important, the subject of fixing up existing gear being troubled by RFI will not be stressed. As a popular TV character might say, "It's not my job, man." Constructing a good amateur installation is a tough enough task in itself. Also, including RFI measures *after* a piece of equipment (particularly home-entertainment gear) has been fabricated is costly and sometimes impractical.

As the title implies, the discussion will be limited to a basic level. By way of introduction, perhaps the best place



to start is review of the fundamentals of radiation. The phenomenon of radiation is responsible for the fact that communication can be carried on by means of radio but radiation is also the cause of the problems with RFI. Or is it? Are there factors associated with the production of radiation that should be considered? The following will treat this area in detail.

Antennas and Radiation

The subject of radiation is a very deep one, indeed, and many aspects of it still have scientists baffled. Fortunately, the areas dealing with the topics of concern here conform to well-known and predictable laws. While the mathematics behind these laws may be difficult to master, there are many simple physical

pictures based on them that permit qualitative ideas at least.

Consider the parallel-plate capacitor shown in Fig. 1. For the moment, assume that the voltage applied between the plates is dc. As a consequence, an electric field will be set up between the plates as indicated by the arrows. Most of the field lines will be contained between the plates but at the edges, the situation is somewhat more complicated. An implication of the laws mentioned in the foregoing is that the electric field cannot change abruptly over a small separation *in free space*. This means the field dies away slowly after the edge of the plate is reached rather than ending there. Such an effect is called "fringing." From a circuit standpoint, the effect of fringing is to

*Assistant Technical Editor, *QST*

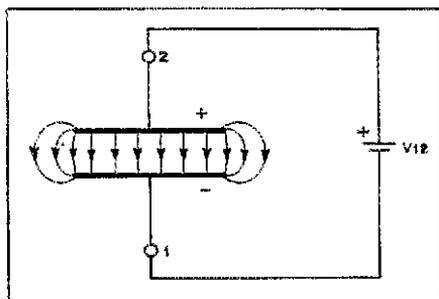


Fig. 1 — Parallel-plate capacitor with close spacing.

increase the capacitance of the parallel-plate configuration over the value it would have if it were assumed that the field terminated at the edge of the plates.

If the plates are very close together, the fringing effect is small and can usually be neglected. However, as the separation is increased (Fig. 2), the effect becomes more pronounced. Here, the capacitance caused by the fringing effect may be an appreciable fraction of the total capacitance of the entire system.

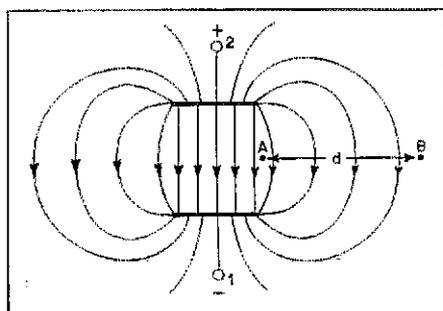


Fig. 2 — Parallel-plate capacitor with wide spacing. Note expansion of fringing field.

So far, it has been assumed that dc only has been applied to the capacitor. Even for the dc case, when the capacitor was first charged up, the field at a distance from it couldn't change at the same time since to do so would imply that the disturbance had to travel faster than the speed of light. Consequently, the change in field at B (Fig. 2) is delayed by an amount d/c in relation to point A where d is the distance in meters and c is the speed of light (approximately 3×10^8 meters per second). However, eventually the field will build up throughout space and a static condition will be approached.

If the source of the voltage is removed, a potential difference across the plates will still remain (as anyone who has accidentally come in contact with a charged-up power supply capacitor can verify!) and if the plates are connected to an external circuit, a current will flow. Where does the energy for this

current come from? It is actually stored in the electric fields between the capacitor plates and in those fields in the space around it.

Next, assume that an ac voltage is applied across the plates (Fig. 3). If there were no fringing, again, all the energy would be contained between the plates and the capacitor would act the same as it did at dc. However, if fringing is present, the field will tend to spread out from the capacitor at the speed of light; as it does so, the fields near the capacitor will be changing. As a consequence, the field lines for an observer at point A (Fig. 3) will appear to be heading in one direction at one instant and in the opposite direction during a later time.

Now assume that the source of the ac is shut off. The observer at A wouldn't know that this happened at first and could actually extract power from the traveling disturbance until the effect of the voltage shutoff reached him! A simple method of extracting the power would be to place another capacitor in the presence of the field as shown and allow the field to build up a voltage on the plates. If the plates were connected to a resistor, a current would flow and energy would be dissipated continuously.

It appears that a paradox of sorts has been reached since the position of point A has not been specified. Conceivably, if the ac source was operating for a long period of time and if the point at A were at a great distance from the source, power could be extracted indefinitely after the source was turned off. The only logical conclusion is that at least part of the energy is *irretrievably lost* from the capacitor by means of the fringing fields. If there were no fringing present, an equivalent circuit for the system would be pure capacitance (Fig.

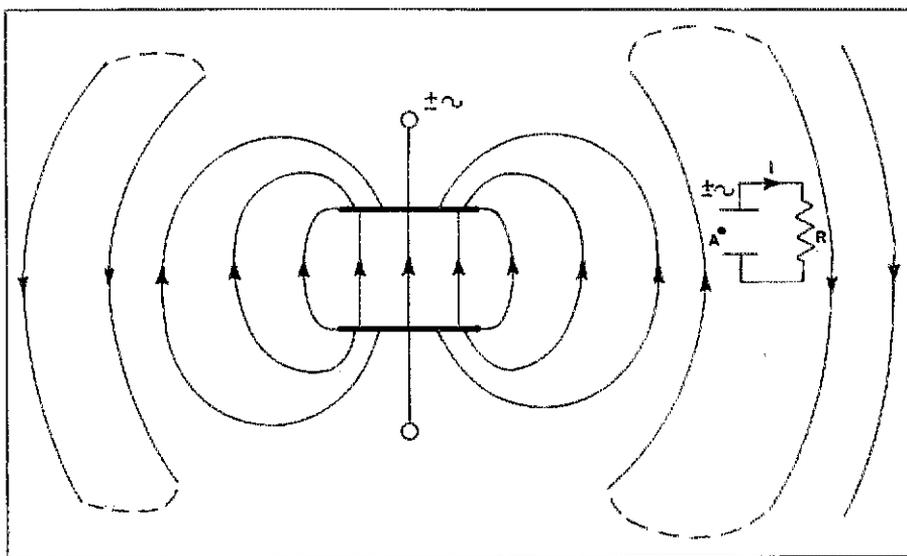


Normal TV picture with set out of screened enclosure and connected to outside antenna. Conditions with power input of 1 kW at 1/3 TV frequency.

4A). The effect of the power loss caused by the fringing fields would appear as a resistance (R_a) in series with this capacitance (Fig. 4B).

If the goal is to design a high- Q capacitor, evidently this fringing capacitance is undesirable. On the other hand, an antenna is intended to radiate so a configuration with a large fringing field is desirable. That is, most of the field should extend to points in space away from the proximate region of the conductors rather than being closely confined between them. In this respect, a parallel-plate capacitor with close spacing would be a poor choice for radiation purposes. (Even "poorer" still, is a coaxial capacitor or "feedthrough" type since all the leads are shielded essentially. Therefore, it is not surprising such devices are superior for bypassing purposes.) A single vertical wire over a ground plane has considerable fringing field (Fig. 5). If the ground plane is removed and if a wire of length equal to the other one is substituted, the field pattern for either half is the same as a single wire over a ground plane (Fig. 6). The configuration in Fig. 6 is that of a

Fig. 3 — Radiation and induction fields around an ac-excited capacitor.



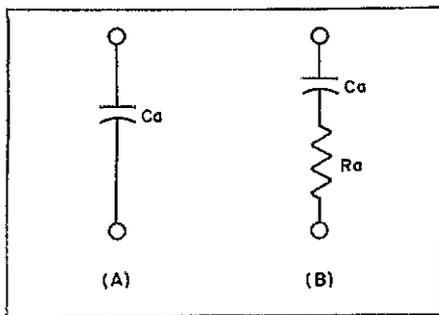


Fig. 4 — Equivalent circuit of capacitor at dc (A) and the effects of radiation (B).

neighbor is experiencing TVI at a distance up the street from the transmitter. Because of the separation, it is tempting to conclude that the problem is one of direct radiation. However, high-pass filters at the TV set and low-pass filters at the transmitter prove ineffective. Furthermore, measurements indicate a high harmonic level at the neighbor's location.

In this case, the real culprit is the close proximity of the transmitting antenna to a power line. Energy is coupled from the antenna into the power line and conducted up the street (with little loss) and then into the neighbor's house. Along the way, there is ample opportunity for rectification to occur at corroded connections, junctions with dissimilar metals, and a host of unknown causes. In RFI terminology, the "indirect path" of Fig. 7 represents the one for *conducted interference* while the "direct path" represents the path for *radiated interference*. The sensitivity of a piece of equipment to conducted emissions is referred to as its *conducted susceptibility* and its sensitivity to radiation is its *radiated susceptibility*.

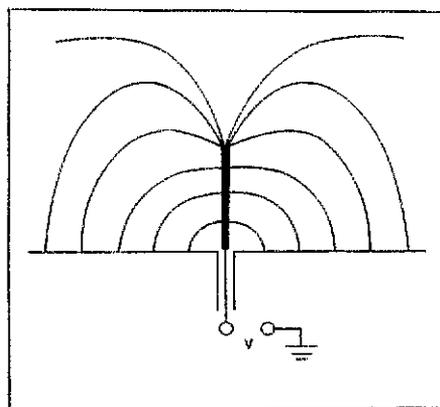


Fig. 5 — Electric field lines of vertical wire over conducting ground plane.

The solution would be to reorient the antenna away from the power line. If this wasn't practical because of space limitations, a shortened loaded antenna should be used. Generally speaking, the problems caused by such coupling effects will decrease with increasing frequency. For instance, TVI caused by a 15-meter Yagi or quad on a high tower would likely be the result of direct radiation rather than stray coupling. Going the other way, interference to amateur receivers is often of a conducted nature.

A dipole or random-length wire antenna is connected to a receiver and the 160-, 80-, and 40-meter bands are loaded with "broadcast harmonics." Filters prove ineffective and the frustration deepens.



TV set in screened enclosure with poor antenna (1-kw input to transmitter).

dipole and it is not surprising that both types (Fig. 5 and 6) are very popular in antenna applications. A question that might be asked is whether or not there is any advantage to be gained by making the antenna bigger in order to increase the fringing field. The answer is no if ohmic losses in the conductors are neglected. Increasing the fringing field will cause the value of R_a in Fig. 4B to become larger. But 100 watts of power dissipated in 10 ohms results in the same radiation as it would for 72 ohms. From an efficiency standpoint, a small antenna is just as good as a larger one if losses are neglected. However, the energy stored per rf cycle compared to the energy lost per rf cycle will be higher for the small antenna. The ratio of the former divided by the latter is recognized as being proportional to circuit Q . Hence, a small antenna will have a higher Q than a larger one and the bandwidth over which retuning is not required will be less.

Near and Far Fields

Because of the complicated nature in the region immediately around the antenna, with energy being stored and partly being radiated, it's understandable that the electric fields are also going to be very complex. However, this region is very important from an RFI standpoint. For instance, the capacitor shown at A in Fig. 3 could be the antenna of a receiver at a point many miles away from the transmitter. But it could also represent the ground beneath the transmitting antenna, nearby power lines, or a neighbor's TV set. Generally speaking, the area where energy is being stored is quite close to the physical region of the antenna. In antenna parlance, this area is referred to as the *near-field* or *induction-field region*. At distances a few wavelengths away from the antenna, all the energy in this region represents energy lost from the system and the fields from then on are called *far fields* or *radiation fields*.

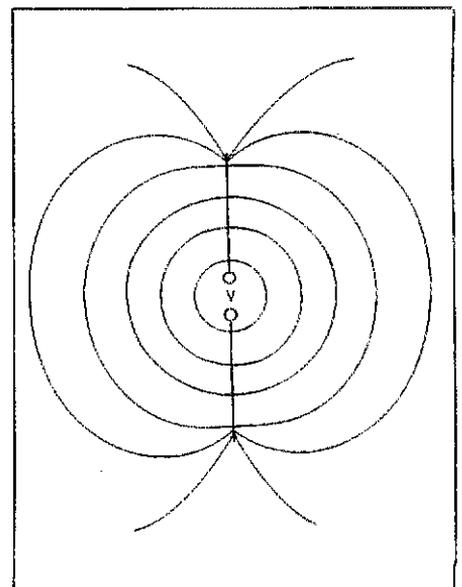
The hypothetical situation shown in Fig. 7 indicates why *near-field* considerations are important in RFI problems. A

Quite often the solution involves using a matching network or transformer in which only mutual magnetic coupling is used. (The old link-coupled coil-and-capacitor system for open-wire lines is an example. For receiving purposes, a toroidal transformer could be substituted.) With this system, there is no direct-conducting path between the antenna and the power service. Consequently, harmonic currents caused by stray rectification are isolated effectively and will not flow on the receiver chassis.

Baluns . . . Myth or Fact

Isolating the antenna from the transmission line and transmitter has received considerable discussion over the past years. As mentioned previously, a link-coupled system is one of the simplest ways of achieving this goal. The method has one disadvantage (for some amateurs) and that is the matching function is performed by means of reactive components. Consequently, the system is a narrow-band one and retuning is required if the frequency of operation is changed.

Fig. 6 — Electric field lines surrounding a dipole antenna.



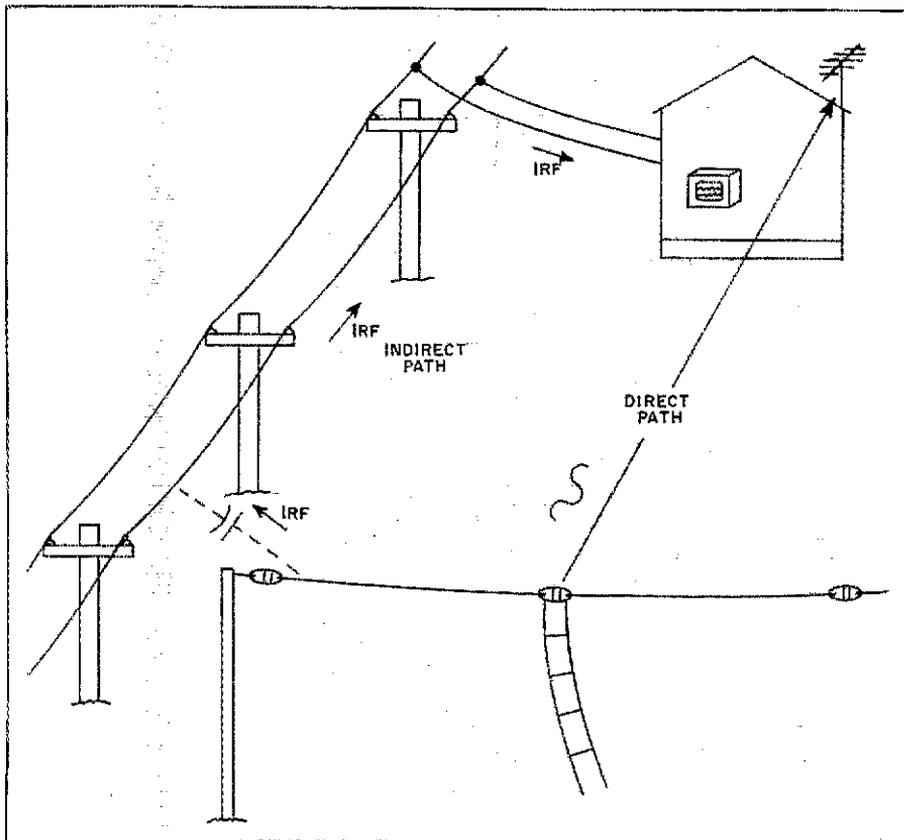


Fig. 7 — Paths for conducted and radiated interference.

Broadband transformers have been developed that overcome this defect, but unfortunately these devices have been misapplied in many instances. A schematic diagram of a typical transformer is shown in Fig. 8. An ideal case is assumed. This means a voltage applied across the input of the transformer will appear with the polarity shown at the secondary for all values of load impedance from a short circuit to open conditions. Note that the input voltage is in series with the secondary voltage. As a result, the voltage across R_L is $2V$ where V is the input voltage. For a 1:1 turns ratio, the current in the primary must be the same as the secondary current. Consequently, the input current splits equally between the two branches and is equal to $2I$, where I is the current in each branch. One can solve for the input impedance by the formulas:

$$I = 2V/R_L$$

$$2I = 4V/R_L$$

$$Z = V/2I = V/4V/R_L = R_L/4$$

and it can be seen that the input impedance is 1/4 of the load impedance. Hence, this transformer could be used to match two impedances with a 4:1 ratio. For instance, 300-ohm Twin-Lead could be matched to 75-ohm coaxial cable.

The transformer will work with any set of impedances with a 4:1 ratio provided certain conditions are met.

This is illustrated in Fig. 9. Two mutually coupled coils such as those in a transformer can be represented by a primary inductance, L_1 , and secondary inductance, L_2 , and a mutual inductance, M . The circuit shown at the right in Fig. 9 is an exact equivalent and the use of this one simplifies analysis considerably. The factor k is the coefficient of coupling and approaches 1.0 in the ideal case. In good power transformer design, k is nearly 1.0 and M is very large and can be neglected. With broadband rf transformers, k may be close to 1.0 but the value of M is low enough to be of concern in some instances. This is shown in Fig. 10.

If a 1:1 turns ratio is used (which is the usual case with bifilar or twisted-pair windings), L_1 and L_2 in Fig. 9 will be the same. Then k will just be M/L . The broadband transformer can be represented by an ideal 1:1 transformer with the appropriate "parasitic" inductances shown in Fig. 10. Normally, the series inductors indicated as $L(1-k)$ will be very small and can be neglected. Their effect will be felt mainly at the higher frequencies but the winding capacitance will begin to show effects also. This phenomenon can be used to advantage, and the upper frequency range can be extended with proper design.

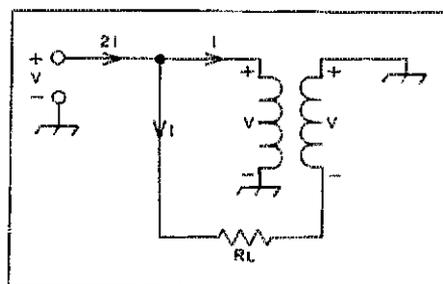
However, the lower frequency range along with the greatest value of permis-

sible load impedance is governed by the shunt inductor denoted by kL in Fig. 10. Unless its reactance is high enough, there will be a tendency to "load down" the input circuit and instead of a pure resistance, the input of the transformer will appear to have a reactive component as well. Consequently, a transformer designed for low-frequency operation will require more turns than one designed for the higher bands. This is necessary in order to increase kL and keep the ratio of shunt reactance to load resistance high. While the foregoing is for a 4:1 transformer, a similar analysis can be applied to all such types.

Earlier applications for broadband transformers primarily involved impedance transforming applications. Some types are also suitable as transitions between balanced and unbalanced systems as well. This is shown in Fig. 11. The desired mode on a dipole is represented by C_a in series with R_a . However, there is also coupling between the antenna and ground or to other objects such as house wiring which results in an undesired path back to the transmitter. This is shown as C_{e1} and the radiation and ohmic losses are indicated by R_{e2} . (R_{e1} represents a loss by coupling between one half of the dipole and the other half through the ground. Little can be done about this component except increase the height of the dipole.) There is also coupling between the dipole and the transmission line. While great importance is attached to this latter fact by some hams, the effects at hf considered from an RFI standpoint are not usually as severe as those from C_{e1} and R_{e2} .

A device that serves as a transition between an unbalanced system and a balanced one is often referred to as a balun. The effect of the balun circuitwise is indicated in Fig. 12. A balun should offer a high impedance to undesired coupling modes including those between the antenna and surrounding objects as well as between the antenna and the feed line. The effect of the balun on the desired mode should be negligible except for the case where some desired impedance transformation is required.

Fig. 8 — Equivalent circuit for a 4:1 broadband transformer.



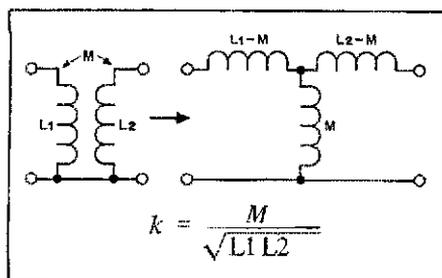


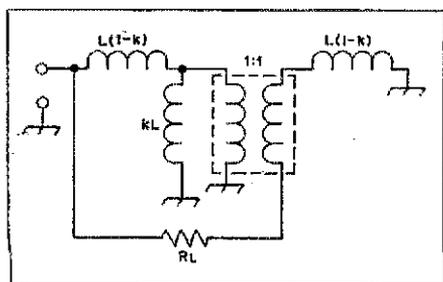
Fig. 9 — Equivalent circuit of two mutually coupled inductors.

Suppose a balun is not used with a balanced antenna such as a dipole? In many instances, the impedance of the undesired modes will be high in comparison with the desired one and can be neglected. In such a case, the only problem is apt to be an aesthetic one on the part of some, but there is no valid technical reason for not feeding a balanced system with coaxial cable directly. Indications that undesirable coupling effects are present include a chassis "hot" with rf energy while transmitting, changes in SWR with different feed-line lengths, broadcast harmonics in the receiver and perhaps the existence of RFI problems in the building housing the shack. The use of a broadband transformer *suitable* for balun purposes may help, but in this writer's opinion only a few types fall into this category. One would be the trifilar-wound 1:1 toroidal transformer and the older dual air-wound bifilar model. The reason for this view is that there is no direct connection between the center conductor of the coaxial cable or transmitter output and either half of the balanced load. While other types may help in suppressing coupling effects between the antenna and transmission line, the direct connection and common ground offer little help in situations such as those shown in Fig. 11. In fact, a balun might be harmful since the natural canceling effect of the path from the opposite half of the antenna ($R'e2$ and $C'e1$ in Fig. 11) might be destroyed.

SWR and Related Topics

Up to now, the antenna has been treated as a radiation resistance in series

Fig. 10 — Equivalent circuit of broadband transformer with parasitic inductances.



with a capacitor representing the energy stored per rf cycle in the surrounding electric fields. This model is most accurate for electrically short monopoles and dipoles but begins to break down as electrical length increases. The magnetic fields associated with the antenna currents have also been neglected, and for a short radiator energy is stored and radiated through them in a manner similar to the case for electric fields. However, magnetic field patterns are much simpler. In the far-field region, both the electric and magnetic fields play an important role. The two fields are always at right angles to the direction of propagation and the ratio of the electric to magnetic component is equal to a constant. Also, the field strengths die away as the inverse of the distance from the source.

Perhaps the most important factor with increased electrical length is the effect of the finite velocity of propagation. In free space, the velocity of propagation is equal to approximately 3×10^8 meters per second. (The velocity is lower in materials where the dielectric constant and magnetic permeability are different from those of space.) As a consequence, there is always a time delay between the voltages and currents at a point some distance from a generating source and the voltages and currents at the source itself. As seen in a previous section, it is this effect that gives rise to radiation. There is an *irreversible* energy flow emanating from the fields surrounding the antenna that appears as a resistance at the antenna terminals rather than a reactance.

The conditions on open-wire and coaxial transmission lines that amateurs are familiar with are very similar to those of free space. In fact, space can be considered an infinite transmission line of sorts with the antenna acting as a transition. The only difference is that the presence of the conductors modifies the electric and magnetic field configurations. In the terms of physics and mathematics it would be said that the fields must satisfy the *boundary conditions* presented by the conductors. Except for the field geometry, phenomena characteristic of waves traveling in space are *identical* to those occurring on transmission lines. Lack of understanding in this matter has caused no end of confusion among the amateur ranks. For instance, few people would deny that light reflected from a mirror actually represents radiant power and is little different from light radiated directly from a source. But this is identical to the case of a radio wave being reflected from a mismatch on a transmission line. The power in the reflected wave is just as real as the power in the wave being propagated toward the mismatch, but it is really surprising how many balk at this concept.

Antennas can also be considered as transmission lines even though the geometry is considerably different from ordinary lines with uniform spacing between conductors. If a parallel-wire transmission line is opened so that the conductors now run off in opposite directions, the dipole configuration results. A wave emanating at the center propagates outward to the ends of the antenna and is reflected back to the center. If the round-trip path for a wave is equal to a half wavelength (quarter wavelength on each leg) the voltage in the forward and reflected wave just cancel. Ordinarily, this would mean the impedance at the input terminals of the transmission line would appear to be zero. (This effect is used occasionally in filter applications. A quarter-wavelength stub can be used to provide a short circuit at some harmonic frequency while offering a relatively high impedance at other desired frequencies.) However, because the fields extend a considerable distance from the "transmission line" now, radiation will result as was the case with the fringing fields around the capacitor. Instead of a short circuit, the half-wavelength dipole presents a resistance of approximately 73 ohms at the terminals. Just as the short radiator acts as a "lossy" capacitor, the half-wavelength radiator acts as a lossy transmission line. Because of the time-delay effects mentioned previously, the reactive components are zero.

A high SWR is often erroneously presented as an intrinsic cause of RFI. There is no justification for this belief since a properly designed system may have a high SWR on the transmission line feeding the antenna and still be just as good from an RFI standpoint as one with a "flat" line. However, it is advisable to contain the rf energy as close to the feed system as possible and to avoid undesirable paths through the power service back to the transmitter.

Grounds

A wide strap made from a good conductor attached to an extensive radial system might be considered the best ground system obtainable. Bonding all of one's equipment together and connecting it to this ground system might seem the ideal situation from an RFI standpoint. While this might be true of the conditions in the low-frequency range, such is not the case at higher frequencies. On 20 meters for example, a quarter wavelength is approximately 16 feet. If the distance from the equipment to the ground system was greater than a few feet on 20 meters, the effects of the time delay mentioned in the last section would immediately become evident. Instead of being at ground potential, an impedance between the equipment and ground would exist. In

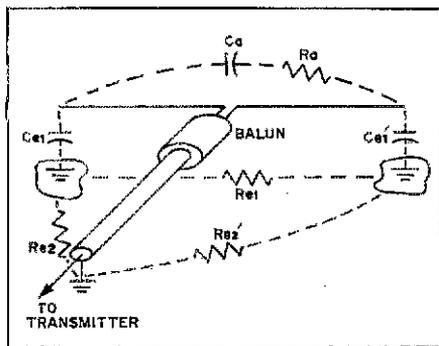


Fig. 11 -- Horizontal dipole over imperfectly conducting ground plane.

effect, the equipment would be sitting on top of a quarter-wavelength vertical as the length approached 16 feet! It would be as if there were no ground system at all! Increasing the width of the strap or running out more radials wouldn't help.

Using house plumbing or wiring for *rf* grounding purposes is asking for trouble. It's conceivable that such a ground might act as a "shunt feed" system with the entire building behaving as a very undesirable radiator. This writer has actually observed such effects. A receiver was connected through a matching network to a random-length wire antenna with a cold-water pipe acting as a ground. Forty meters was useless because of "broadcast harmonics"; even though the matching network only used mutual inductive coupling and provided good isolation between the receiver chassis and antenna system. The problem was eliminated completely by switching the antenna ground from the plumbing system to a stake driven in the ground just outside the shack window. Equipment should be grounded for shock-preventive considerations. But if an antenna system that requires a ground is used, and a good one is not practical, a balanced configuration such as a dipole should be considered as an alternative.

Leakage from Transmitters

For those a bit skeptical about the similarity between waves on a transmission line and waves in free space, a rather curious mode of propagation might be considered. Only *one* conductor is required and a return path for current flow is unnecessary. If this doesn't disturb the pundits whose transmission-line concepts are limited to conventional voltages and currents, the fact that corrosion on the conducting surface *reduces* line loss surely will. Energy is propagated in the electric and magnetic fields surrounding the wire in a manner similar to a plane wave in free space. However, the fields remain close

to the conducting surface and will travel around bends unlike a free-space plane wave that must travel in a straight line. Another difference is that there is a component of electric field in the direction of propagation while the fields are always at right angles to this direction in the plane-wave case. This unusual mode is referred to as a surface wave and a transmission line that utilizes it is called a Goubau line (G line).¹ A very old antenna type that makes use of the fact ground losses permit a component of electric field in the direction of travel to exist is the Beverage antenna. The manner in which this antenna operates is very similar to the propagation mechanism of the G line.

An undesirable effect associated with surface-wave propagation is coupling of harmonic energy from inside a transmitter to the transmission line. This is illustrated in Fig. 13: Leakage from an improperly shielded transmitter cannot be eliminated by a filter since the surface wave propagates on the outer case and *around* the filter circuitry. The only cure is proper shielding and unfortunately, many rigs are deficient in this respect. Whether or not a TVI problem will exist depends upon local TV signal strength, transmitter location, and other factors. In order to determine if leakage is causing an RFI problem, the transmitter can be connected to a well-shielded dummy load and operated at rated input. There should be no RFI whatsoever — if the shielding is adequate.

Other transmitter defects include spurious radiation from parasitic oscillations and feedthrough of harmonic energy from driver stages. The latter is especially serious with vhf rigs. This is shown in Fig. 14. An 18-MHz oscillator chain is a potential source of TVI on channels 2, 8, and 11 unless suppression of energy at the spurious frequencies is sufficient. Such interference is often attributed to "fundamental overload" at

¹ G. Goubau "Single-Conductor Surface-Wave Transmission Lines," *Proceedings of the I.R.E.* pp. 619-624, June, 1951.

TV set out of screened enclosure with poor antenna. (1-kw input to transmitter).

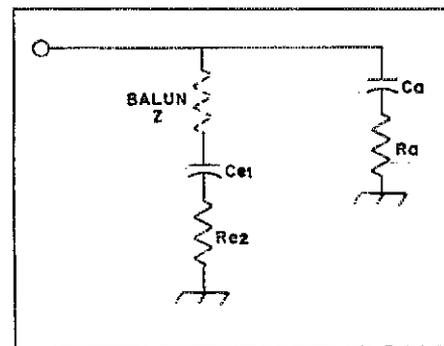
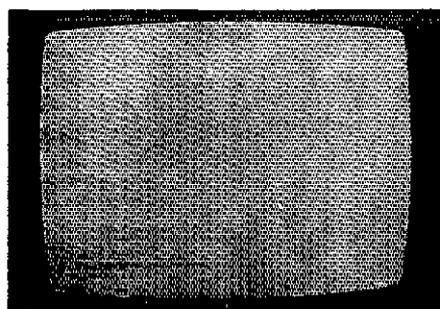


Fig. 12 -- Desired effect of balun impedance upon parasitic antenna modes.

the TV set when actually the transmitter is at fault.

The Other End

Awareness of an RFI problem usually begins with a phone call from a neighbor or "feedback" from other household members. It might also begin with a notice from the FCC. If a neighbor experiences TVI and believes you are the cause, he may decide to write the FCC directly. In such cases, the FCC will send out a form letter (FCC Form 762) to both you and the complainant. There is also a request that you report back to the FCC explaining what you have done about the problem. A series of steps is suggested in the form letter to help eliminate the interference. Much of the reasoning behind these suggestions has been presented in the foregoing theory section of this article.

Assuming that measures have been taken to insure the amateur station conforms to good technical practice, suppose an RFI problem still exists. In the case of TVI, there is the possibility that external conducting paths resonant at the operating frequency are producing harmonics if rectification is present. This effect has been simulated in the lab with semiconductor diodes and a half-wavelength dipole. Without the diodes, coupling to the antenna with a dip oscillator produced no TVI. However, with the diodes in the circuit, considerable TVI could be generated at the third harmonic of the oscillator frequency.

There are also indications that TVI can be generated from direct illumination of the TV set by the fields of the transmitting antenna. For instance, the color circuitry has oscillators that operate in the 80-meter band (3.5795 kHz). If a strong enough signal from a nearby 80-meter transmitter is present, this circuitry will malfunction. The set may lose only the color with no other signs of TVI such as cross-hatched picture or loss of contrast. Even though TV tuners are shielded and the newer models in-

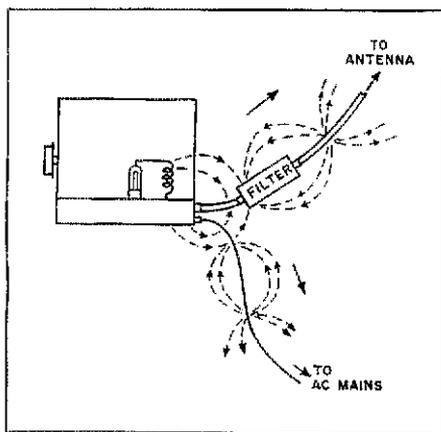


Fig. 13 — Surface-mode propagation caused by transmitter leakage.

desirable. After the frame is constructed, the entire enclosure is covered with bronze window screening and all seams then soldered. The door is constructed in a similar manner and fastened to the cabinet by means of hinges and six hasps to secure a conducting overlap. An aluminum plate at the back of the enclosure is used to mount a commercially made line filter, uhf bulkhead connectors, bypassed feedthrough connectors for controls, and a high-pass filter.

While other dimensions could be used, the foregoing ones are convenient since there is ample room for most equipment, yet the enclosure is portable enough to fit through a standard door frame. (It also makes quite a sight going down the highway atop the luggage rack of the writer's compact car!) Most such enclosures are double shielded; however, any advantage to be gained by this procedure is likely to be lost unless complicated doors are also included in the design. Attenuation of the model (single shield) described proved adequate for most test purposes up to the uhf range.

corporate high-pass filters into their design, there are enough points of entry that allow rf energy to leak in and be rectified. Consequently, a signal at the fundamental frequency of the transmitter produces a harmonic in the tuner.

Pinning Down the Problem

Transmitter, receiver, external environment . . . any of these three factors can be at fault in a particular TVI problem or even a combination of all of them. It is evident that some means are necessary that allow isolation of the exact cause before a cure can be effected; that is, if a cure is possible. In some unfortunate cases, a solution to the problem may be a very difficult one, indeed.

The first step is to provide ideal conditions for testing. Since radiation from transmitting equipment or entry of rf energy into malfunctioning consumer gear at points other than desired ones are the most common causes of RFI, the problem has to be eliminated completely. For this reason, the shielded enclosure shown in the title photograph was constructed. It is made from 1 X 3-inch pieces of wood for a frame and is 2 X 5 X 2 feet (HWD). A 2 X 5-foot piece of 1/4-inch plywood serves as a floor although thicker material would be

Some Tests

Suitable TV reception with the lab color TV set is possible in the shack at W1AW with eight transmitters running and with the set connected to the outside TV antenna. Depending upon propagation conditions from day to day, reception is either interference free or low enough not to be objectionable (see photo). The principal vhf TV station in the area is Channel 3 which operates on a frequency that is the third harmonic of the 21-MHz band. The 15-meter Yagi for the 1-kW W1AW rig is approximately 30 feet above the TV antenna (65 feet above the ground floor of the shack) and 25 feet away horizontally.

Severe interference occurs with poor antennas (see photo) such as indoor dipoles with the lab set (a solid-state model) but not with a tube-type black-and-white set. Putting the solid-state set in the shielded enclosure improved its weak-signal performance considerably as can be seen in the last photograph. The

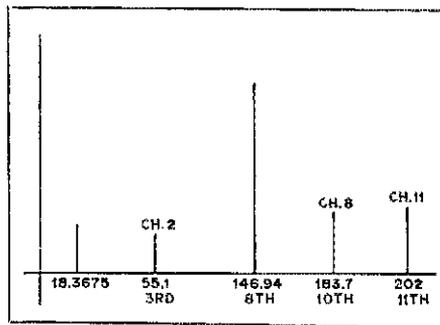


Fig. 14 — Spectrum of 2-meter transmitter with improper filtering of oscillator harmonics.

code-practice rigs at W1AW are home-made and are very well shielded. Probing around in the operating room with a dipole connected to a coupling loop in the enclosure indicated the TV-signal-to-harmonic ratio was high. The tip of the dipole could be touched to the cabinet of the 15-meter rig without ill effect.

TV signal strength at the W1AW location is perhaps above average. Tests performed at locations in areas where reception problems existed were less encouraging. Commercially made amateur gear currently on the market is often insufficiently shielded for fringe-area reception and severe interference occurs even with the rig connected to a dummy load. With a good antenna and a low-noise-figure tuner, suitable picture quality can be obtained at signal levels much lower than with earlier model TV sets. On the other hand, shielding measures incorporated into present amateur transmitters are inferior to those found in some older commercially made models.

As a consequence, the tests proved inconclusive as far as external environmental considerations are concerned. Two separate enclosures are necessary in order to shield both the TV set and transmitter. Further tests along these lines will be required. The approach is an effective one and might be considered by TVI committees in areas where the solution to interference problems is most elusive. QST

Strays

WHAT ARE THE ODDS?

□ When W6RQ worked W7RQ on New Year's Day that was a coincidence, not a record. But when their logs showed that on their previous QSO, in 1955, they were signing W6GQA and W5GQA, respectively, that set some sort of record, didn't it?

QST congratulates . . .

□ Edgar F. Johnson, founder and board chairman of E.F. Johnson Company, who has been selected as the 1975 recipient of the Sarnoff Citation which is awarded by the Radio Club of America, Inc. The award is named in honor of David Sarnoff, radio pioneer and one time head of the Radio Corporation of America (RCA). With a membership scattered throughout the world, The Radio Club of America, Inc. is the

world's oldest radio electronics technical society.

□ Ray F. Cowan, WA4BJK, (Army MARS ACM4BJK), who has been named a Harold Stirling Vanderbilt Scholar. He plans to pursue a doctoral program, following undergraduate study in mathematics and physics at Vanderbilt.

□ Bill C. Willmot, K4JPF, who will be included in the forthcoming edition of the book *Men of Achievement*.

Mobile Marine Under Sail

Combining boating and ham radio can be both useful and fun. Here is how one ham gets his kicks.

By Brandon Wentworth,* K6UJ

This story is aimed at offering a few ideas and suggestions which might be helpful to those amateurs who contemplate combining radio operating with small-boat sailing. The information is derived through experience gained from a transceiver installation made several years ago aboard my little 27-foot fiberglass sloop *Flicka*. Ham radio has been great fun to operate and once proved most useful in a near emergency.

Ground Problems

Since an efficient, low-resistance ground system on any vessel can be a key to strong signals on the high frequencies, it is, indeed, a pity that the *China Clipper* era was born too soon, over a century before the heavy copper sheathing on those long sleek wooden hulls would have made the ideal salt-water ground. Today, because of the high cost of copper, the ready availability of effective antifouling bottom paint and the fact that fiberglass is impervious to teredos (sea-going termites!), we must devise other means for affixing a good ground system to a nonmetallic hull.

Regretfully perhaps, my expertise on this subject is quite limited. My only other confrontation with marine-radio installations goes back to the 1920s. I recall that one of my last ships was an oil tanker equipped with a 2-kW Federal arc transmitter and a single-tube (detector) receiver! Therefore, my "words of wisdom" herein are necessarily confined to the lessons learned aboard *Flicka*.

Of the relatively few ground-system options open to a fiberglass hull, I chose

the one which consists of trailing copper astern. It is made up of two 2-foot lengths and one 18-inch length of 5/8-inch copper tubing projected under water by three hard-drawn copper bars, raked aft to avoid snagging seaweed when the boat is underway. The tubing is fastened to the bars with copper rivets. The bars are attached to the lower edge of a 1/2-inch aluminum plate with 1-inch aluminum brackets. This plate serves primarily as a mount for the outboard-motor suspension bracket. The aluminum plate in turn is supported by two solid stainless-steel rods which are built into and project through the top part of the transom. The inboard end of these rods is connected beneath the deck by No. 6 stranded copper wire to the after pulpit bolts and to a deck-mounted copper-pipe flange and 1-inch copper pipe which support the antenna.

The Antenna Installation

The antenna is installed on the extreme stern, port side, where it is clear of the main sheet and other running rigging. It is a Hy-Gain 14 AVQ, 10-through 40-meter trap vertical. This model was selected because of its rugged, seamless aluminum tubing construction. During the many months it has seen service, it has often been subjected to the boat's rather violent pitching while beating to windward in a short, steep chop. It has withstood this "crack the whip" punishment with no permanent bending or buckling of any kind. Other than an additional support bracket installed between the antenna base section and the pulpit rail, there has been no need for guy lines or other extra supports. Actually, the pulpit

bracket is primarily to prevent the copper-pipe flange from being literally pried off the deck by leverage which would otherwise be exerted by the swaying antenna during rough going.

The antenna is adjusted as to length (height) and trap spacing in accordance with the manufacturer's specifications for "ground" mounting as against "roof" mounting, except that the base is 28 inches above the vessel's load water line. This exceeds the recommended maximum distance above "ground" by 16 inches. However, no variations in VSWR have been detected in very rough seas when the recommended 12 inches above "ground" varies from a few inches to three or four feet. The same holds true in a heavy swell when the height of the antenna base varies that much or more with respect to "mean sea level" of the ocean.

Corrosion Problems

To protect the antenna from corrosion which occurs quite rapidly to un-anodized aluminum in a salt air atmosphere, all aluminum components were well treated with a zinc chromate primer followed by several coats of first-quality marine top-side paint. Also, to hold rf power leakage to a minimum, the antenna insulator sections are copiously sprayed periodically with Krylon acrylic spray. However, corrosion due to dissimilar metals is admittedly a problem, particularly where the copper bars are fastened to the outboard motor support plate and where this plate is joined to the stainless steel rods. As a deterrent, these joints are heavily painted over, or "sealed" with zinc chromate.

On the other hand, corrosion caused

*460 Oak St., Laguna Beach, CA 92651.

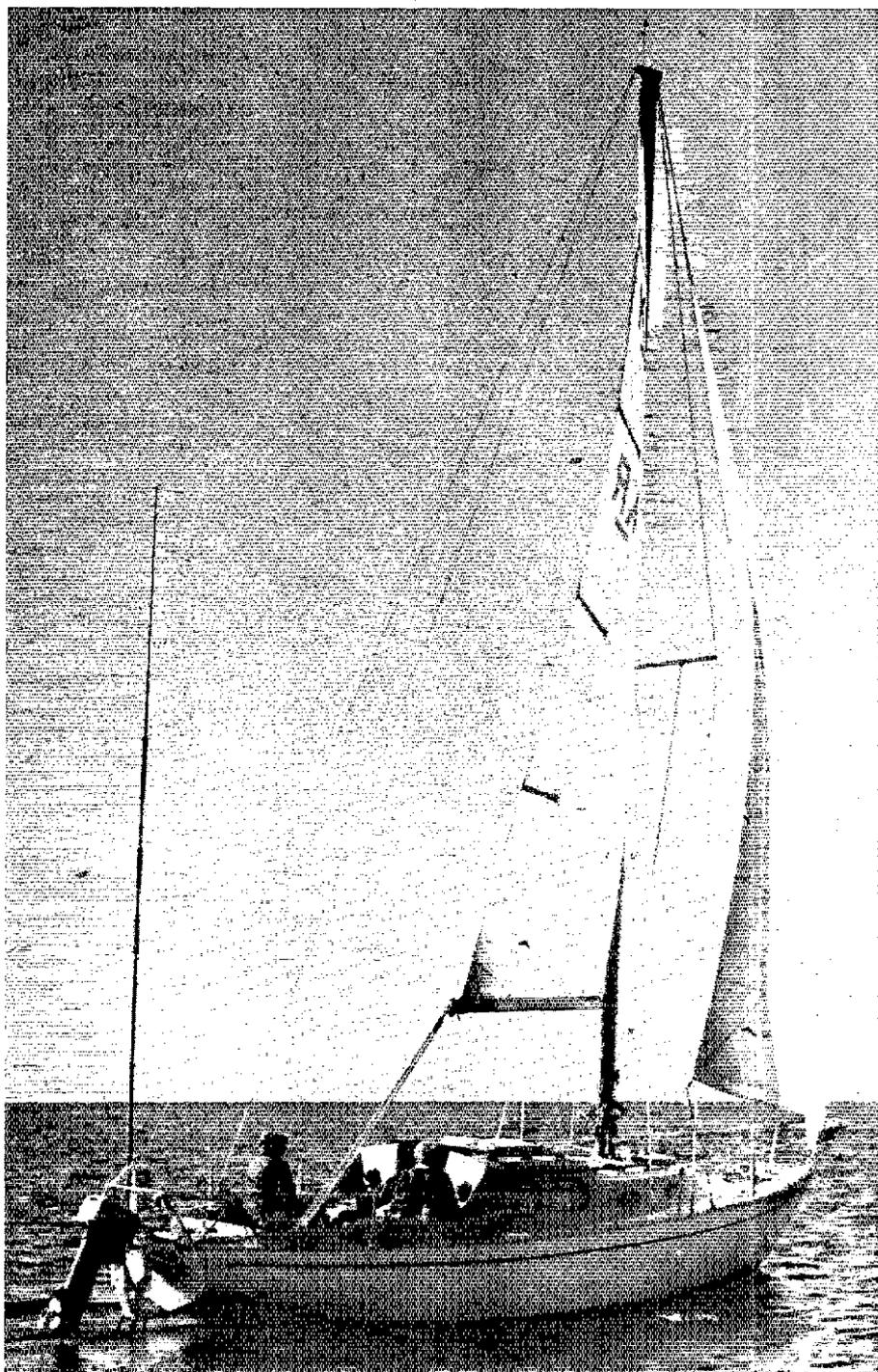
by galvanic action (electrolysis) between the trailing copper tubing, the brass rudder post and the depth-finder transducer copper housing is not evident. The propeller assembly of the outboard is in the water so seldom it is not considered a factor. Were there an inboard motor propeller and shaft, plus other metallic fittings protruding from the hull below the water line, then a small zinc plate or two, fastened near the rudder would be very much in order as a protective measure. Incidentally, *Flicka's* 2,650-pound lead keel is a casting molded inside the fiberglass. Hence, it is not in contact with the salt water.

The electric starter, ignition system and alternator of the outboard motor and the depth finder operate from a negative ground. The negative terminal of the 12-volt battery, which may be charged from dockside power or the motor's alternator, is grounded to the brass rudder-post sleeve bearing inside the hull, as is the transceiver. The radio direction finder carried aboard is portable and operates from self-contained dry cells, so it's not involved in this discussion. Although we don't worry too much about electrical storms along the south coast of sunny California, nevertheless the 14 AVQ is reasonably protected from lightning damage by its "built-in" dc ground. That's about it for the boat's ground system(s), except, that for anyone planning a ham-rig installation aboard a similar vessel with an *inboard* auxiliary motor, I believe I would suggest copper sheathing the fiberglass rudder *only*, in lieu of trailing copper tubing astern. It certainly would make a much "cleaner" ground system and also avoid the dissimilar metals problem described above, although the initial fabrication could be a bit more expensive.

The Transceiver Installation

The radio set installed aboard *Flicka* is a Ten-Tec Triton II all solid-state 200-watt transceiver. The reason this particular rig was chosen is because of the low power drain — 18 A at 12 volts with the key down — and its instantaneous break-in feature on cw. I became accustomed to full break-in many years ago and simply can't break the habit now.

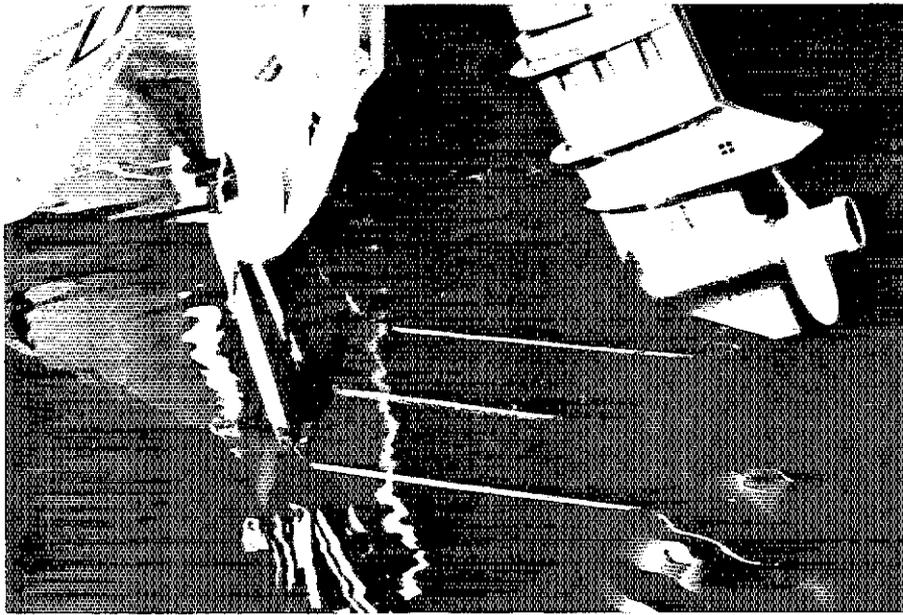
The transceiver's 50-ohm output impedance is matched to the antenna's 50-ohm rated impedance via a 46-foot length of RG-8/U coaxial cable. The SWR is less than 1.3:1 over the cw segment of each band. Actually, the SWR on 7025 kHz and 14,025 kHz is 1.25:1 which coincides almost exactly with the typical SWR curves given by the antenna manufacturer. It may be gathered that the antenna is adjusted for the cw mode of operation per the



specifications. Despite this adjustment, operation in the phone-band segments is entirely satisfactory. For example, the SWR on 7300 kHz is only 2:1. Thus, 7255 kHz, the ham's unofficial Mayday frequency, is well within the vessel's capability if ever needed.

There is a reactance characteristic with respect to *Flicka's* antenna installation which could well be common to other vessels of her design. It was found that when the aluminum mast and boom, the stainless-steel standing rigging and the forward pulpit were directly connected by the port and starboard stainless-steel life lines to the antenna

ground system described above, the SWR on 14,025 kHz, for example, increased from 1.25:1 to 2.25:1. Furthermore, when these contiguous metallic elements were also connected to a separate salt-water ground opposite the mast, the SWR soared out of sight. The transmitter fuse would blow before a reading could be taken on the SWR meter! Obviously, the standing rigging, and so forth, when grounded in parallel with the antenna ground, produced a capacitive reactance way out of tolerance. This intolerable condition was corrected by inserting insulators where the lifelines join the after pulpit.



The trailing copper-tubing ground system as described in the text is visible in this photograph of the stern mount.

Let me hasten to add, however, that the vessel's standing rigging, either with or without grounding, *does* serve as an efficient ground plane for a mast-head-mounted whip antenna. A base-loaded vertical was test operated there with excellent results. The SWR on 40 and 20 meters averaged 1.4:1. But, unfortunately or not, the mast-head location on a sloop is best reserved for a vhf marine radio antenna due to the line-of-sight characteristics of vhf wave propagation. Then too, the mast head on most sloops supports a wind vane, an anemometer, and an anchor light which must be visible through 360 degrees, per Coast Guard regulations. Also there is another objection, though not serious — the job of fastening coaxial cable to the mast. Last but not least, unless one has a trained monkey aboard, changing antenna loading coils atop the mast could be a neat trick, especially during a small gale. Of course, there are mobile whips made with remote-controlled band switching. Oh well . . .

The mast back stays (there are two on *Flicka*) were never considered as a possible antenna due to the requirement for a transmatch, which means another piece of gear to require tuning when changing bands and to take up valuable space in a small cabin. Incidentally, operation on 80 meters was never considered either since FCC regulations state in effect that amateur radio stations aboard vessels sailing within International Regions — Region 2 in this case — are not permitted to operate below 7 MHz.

The operating position aboard *Flicka* is built into the after end of the main cabin on the port side. This location has

proved most convenient for both cw and ssb contacts while at sea. Actually, with a long microphone cord and headphone extension, net QSOs are readily possible while the operator mans the helm. But perhaps most important, the location is clear of the main "alleyway," the navigation table and *especially* the galley!

Does It Work?

As to operating, *results* are what count. When conditions are right, all continents are easily worked on 20-meter cw while *Flicka* is docked at her slip in the Oceanside (California) marina. Signal-strength reports compare most favorably with those logged at my home station at Laguna Beach where I operate another Triton II, but with an inverted V on 40 meters and a 3-element trap beam on 20, 15 and 10 meters. Better yet, signal-strength reports and strength of received signals average a good three or four S units higher when the vessel is cruising off shore under sail than at dockside. The reason for these improved results while at sea is probably because there is no power absorption or shielding by masts and rigging of other sailing yachts, such as those which jam the Oceanside marina. But best of all, the real joy of operating at sea is the total absence of obnoxious power leaks and other frustrating man-made QRN!

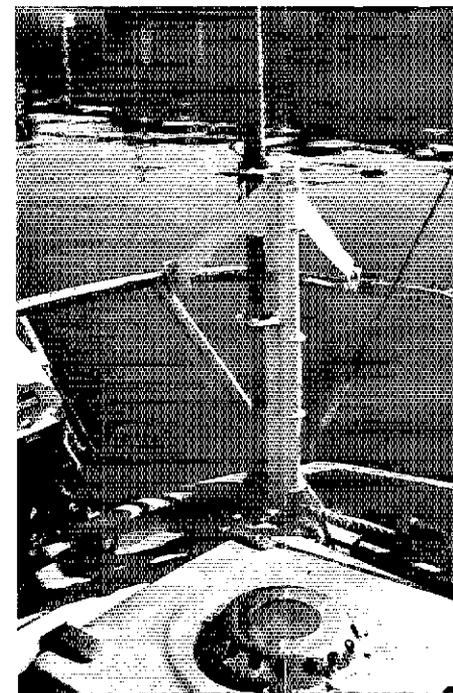
The near emergency mentioned at the beginning of this article occurred as follows. Very early one October morning my first mate, W6KHA, and I were sailing *Flicka* down San Diego Bay bound for Oceanside. We had barely rounded the kelp beds off Point Loma and were headed northwest when the

breeze quit. We started up the trusty outboard and continued under power. Then, as we were passing La Jolla, the outboard quit too.

For the next two hours we slatted around helplessly in a dead calm while speculating on whether the strong tidal current would carry us into the dense kelp beds, or onto Point La Jolla's rocks. Fortunately, a light air came to our rescue and we were able to claw off shore a safe several miles. After a while a northwester set in, which slowly but steadily increased to at least eighteen knots (so we estimated). But a northwester gave us a long, tough beat to windward over the remaining 25 nautical miles to Oceanside. The one and only comforting feature of this adventure in discomfort was that we enjoyed ship-to-shore radio communication with a group of most unsympathetic old-time brass pounders, namely K6SA, WB6DUC, W6QA, W6AAK, W6SRI, W6AW and W6YD. To play it safe, we set up an hourly schedule on 7084 kHz with W6YD over in Vista, with K6SA in Los Gatos and W6QA in Santa Rosa both standing by in the event short skip should set in.

By telephone, W6YD checked the Oceanside WX for us. He also attempted to appease any worry on the part of our wives by reporting our progress and adding confident assurances (his) as to the well-being of their ever-loving husbands. He thoughtfully failed to mention the conked outboard. Nor did he mention the Oceanside WX. But the

This is the support bracket installed between the antenna base section and the pulpit rail on the stern of the boat.



Harbor Patrol did! They advised our wives (who'd asked) that unusually heavy seas caused by a hurricane in the South Pacific were now breaking over the Oceanside bar, thus making the entry into the harbor extremely hazardous. We figured they should know, as the year before they lost their 30-foot, \$35,000 patrol boat when it broached to, capsized and sank while attempting to run in over the same bar under the same sea conditions.

To make a long tedious voyage short, finally at 9:00 P.M., 14 hours out of San Diego, we advised W6YD we were a-

beam Oceanside. He immediately relayed the report to our wives who were anxiously standing by a pay phone on our boat dock. He added, "Don't worry, they'll probably be there in a couple of minutes."

We had every confidence in *Flicka*. The 18-knot breeze would be in our favor. Visibility was good. So we decided to give it a try. We came about and headed for the harbor on a broad reach. We crossed the bar just as a huge roller loomed up out of the darkness astern. We watched it break into boiling foam. Luckily, we kept ahead of it and ran in

between the harbor entrance jetties to safety — and then sailed leisurely up to the dock.

No doubt our wives would have panicked beyond belief were it not for the reassuring reports of W6YD. Sure, we could have used vhf marine radio. But what impersonal telephone company operator would have shown the same loyalty and concern over our predicament as a fellow amateur? Besides, ship-to-shore communication via ham radio — compared to commercial — is one whale of a lot more fun. We think so anyway. QST

Strays

AMATEURS ASSAULT THE ARCTIC, AGAIN

□ When a group of local scientists is doing geophysical research in polar regions north of Alaska, how do you keep in touch with hometown folks?

Amateur radio and Oscar.

After my continually needling WTIC News Director Paul Kuntz about the achievements of amateur radio, he handed me a story of our local expedition and challenged, "If your ham radio is so good, why don't you set up to interview our scientists while they are up on the Braufort Sea?"

And what ham could resist a challenge like that?

A team of University of Connecticut marine scientists have spent the past two summers studying the continental shelf and slope in the Braufort Sea, north of Alaska. They've been making geophysical measurements, charting the force of gravity and developing bathymetric charts of the area.

Teams from Connecticut and Oregon were scheduled aboard the U.S. Coast Guard icebreaker *Glacier* this past summer.

Why not record interviews by ham radio for rebroadcast over WTIC a-m/fm? There were a half-dozen reasons why not. One by one, they were reconciled.

The Federal Communications Commission cleared the idea provided certain rules were observed. The permission of the hams involved is required. It cannot be for commercial purposes. And there can be no mention of the rebroadcast in the part of the interview to be rebroadcast. The use of informal, third-party messages as would be sent to families

and friends would be permitted.

U.S. Coast Guard headquarters in Washington, DC was delighted and offered to help in any way they could. Electronics Officer CWO I.F. Nuzman at 11th District Headquarters in Long Beach, California, answered questions about the ship's communications capabilities. But he was concerned that ungrounded superstructure might prove a problem. It did.

Propagation had been such that even the military had troubles getting their 10-kw signal up into the Arctic. Twenty meters offered little chance of successful contact between the Arctic and the East Coast.

WTIC Engineer Richard Zwirko, K1HTV, suggested Oscar.

There wasn't time to consider the government buying a ham station to work the amateur satellite. Mike Stahl of KLM Electronics agreed to put an Echo II two-meter transceiver aboard for the voyage. The trip gave a tough field test also for KLM's new two-meter antenna.

Amsat sent up a 432-band transmitter so the ship could operate Mode B.

UConn's Spencer Trombley, W1GAK,

built a 10-meter pre-amp for the ship's receiver. He was the electrician for the scientific expedition. In California, Spence and WA7NMF of the ship's company set up the gear.

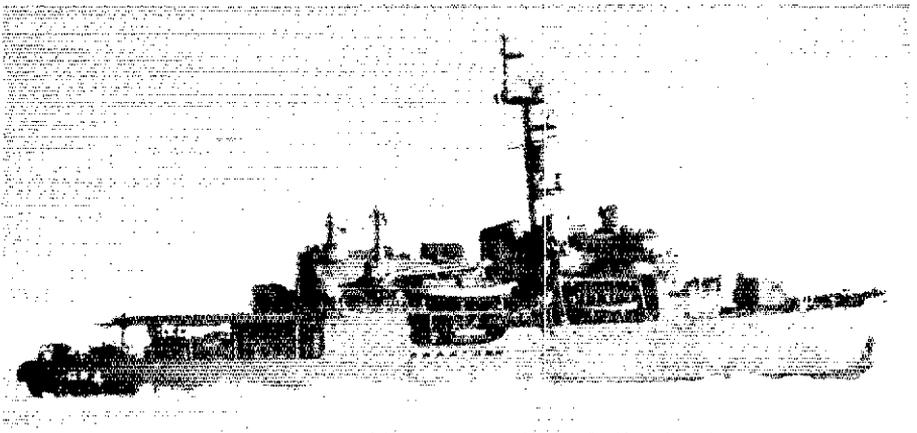
Enroute north, WA7NMF made a number of contacts through Oscars 6 and 7. Our primary station in Connecticut, K1HTV, made contact, checked out his recording equipment and set schedules for contacts once the local scientists were aboard. WA1RZA was set to record the same QSOs in the Hartford area.

Then nature proved again she's more powerful than all of man's technology.

A north wind shoved the pack ice against the northern coast of Alaska holding the ship near port. While trying to escort supply barges into Prudhoe Bay, the *Glacier* lost a propeller and the reduced capability ended the expedition.

The scientists were taken off the ship by helicopter and they returned home.

While the mission failed, the system proved out. Oscar can work where other modes can't and when the expedition resumes next summer, we'll be ready. — Bill Clede, WA1RZA



Make Friends with a dB

Understanding and using a convenient unit of measure.

By Charles Henry,* VF2AH

Decibels are such pleasant, lovable and easy to get along with chaps that it is a shame they are so little understood by some hams. DBs are everywhere, from the "20 dB over S9 report," to "the Whoopendooper has a gain/rejection/attenuation of X dB."

The purpose of this article is not to teach you how to speak dB but rather to give an understanding of basic conversation — somewhat like learning how to order a meal in a foreign language, very useful. Why do so few hams invite dBs into their shacks? Perhaps the reason is because whenever one tries to become friendly, he is given a definition — something about a ratio coupled with a formula that somehow does not look as though it has much practical usage.

DB as a Ratio of Power

Fact No. 1: Every time you increase your power by 3 dB you double it.

Fact No. 2: When you increase your power by 10 dB, you multiply by 10.

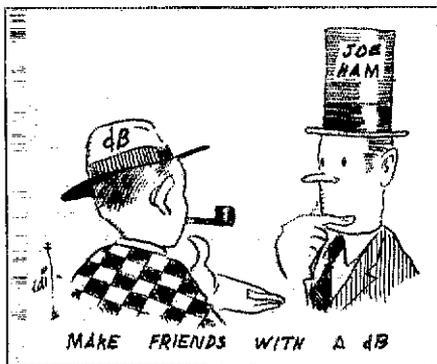
Example

Transmitter power	100 watts
Increase by 3 dB	200 watts
Increase another 3 dB	400 watts
Increase another 3 dB	800 watts
Increase by 1 dB	1000 watts

Fine, you say, but how come the last increase of 1 dB pushed the power from 800 to 1,000 watts?

1 dB increase	— multiply by	1.25
2 "	"	1.58
3 "	"	2.00
4 "	"	2.51
5 "	"	3.16
6 "	"	3.98
7 "	"	5.01

*112 Lakeshore Rd., Pointe Claire, Quebec, Canada.



8 "	"	"	"	6.31
9 "	"	"	"	7.94
10 "	"	"	"	10.00

It is reasonable to assume that someone reading this will ask, "Great, but what if I want to increase my power by 3.5 dB?" For dB values not listed above, the multiplier will have to be calculated using a slide rule or electronic calculator. On a slide rule find the *L* and *C* scales. Divide the dB value in mind by 10 and find this number on the *L* scale. For example, suppose you wish to know what multiplier an increase of 3.5 dB would yield. Simply set the cursor on the *L* scale at 0.35 and read the multiplier, 2.24, on the *C* scale. Thus if you have 100 watts, an increase of 3.5 dB is 100×2.24 or 224 watts.

Example

Suppose you are running 100 watts and have an antenna with 4 dB of gain. On the *L* scale set the cursor on 0.4 and read 2.51 on the *C* scale. The effective power is now $100 \text{ watts} \times 2.51$ or 251 watts.

DBM

If you are still following, you will know that if a person were lucky in the

stock market and increased his wealth by 3 dB, he had doubled his money. However, you don't have a clue as to whether he is a millionaire or has a total wealth of a few bucks. This is because there is no reference point to which the 3-dB increase may be compared. In the previous examples we were using the dB to find a multiplier; however, in this case it is more useful to talk dBm (decibels relative to a milliwatt) instead of watts. DBs can be simply added and subtracted from the dBm unit.

A standard reference for rf work is 0 dBm which is equal to 1 milliwatt, through, say, 50 ohms. From this the following is calculated:

0.001 watt	=	0 dBm
0.01 "	=	+10 "
0.1 "	=	+20 "
1 "	=	+30 "
10 "	=	+40 "
100 "	=	+50 "
1000 "	=	+60 "

Note that the rules did not change since each 10-dB increase multiplied the power by 10 times. Assume your transmitter is running at the +50-dBm (100-watt) level and you increase the power by 3 dB. The transmitter is now running at +53 dBm. If you wish to convert back to watts, the +50 dBm is equal to 100 watts and the multiplier for 3 dB is 2. Therefore the transmitter is running 200 watts.

Example

You have kept a sked with your buddy Joe for years, and invariably he is one S unit (5 or 6 dB) stronger than you. This being a hypothetical case, let's say that you don't want a stronger signal than his but do want your signals to be

equal. You are running 180 watts to a dipole, and Joe runs 280 watts to a 3-dB-gain antenna. What must you do to get your signal up on a level with his? Obviously run 280 watts and a 3-dB-gain antenna, right? Not necessarily! Let's convert this problem into dB language so we can understand what is going on:

180 watts	+52.6 dBm
Dipole (reference)	0 dB gain
280 watts	+54.5 dBm
Beam antenna	3.0 dB gain

It appears that you must increase your signal by approximately 5 dB to match things up, right? Not quite. Calculating the signal levels at Joe's receiver, disregarding losses, we get:

Transmitter power	+52.6 dBm
Your antenna gain	0 dB
His antenna gain	3.0 dB
Total	+55.6 dBm

The signal level that is transmitted from Joe's station and received at yours will be:

Transmitter power	+54.5 dBm
His antenna gain	3.0 dB
Your antenna gain	0 dB
Total	+57.5 dBm

Remember that a gain antenna not only increases your effective radiated power but also increases the level of signals received in the favored direction of the beam. From the foregoing it can be seen that an additional 1.9 dB of gain at your station would be required to equalize the two received signal levels. If you were to put up an antenna with 1.9-dB gain your signal level would increase; however, Joe's signal would also increase by 1.9 dB at your end. In keeping with our hypothetical case where we want the two received levels to be the same, it would be necessary to increase your transmitter power by 1.9 dB and not your antenna system. In other words, you would have to run approximately 280 watts to equalize the two signals.

Antennas

One often sees antenna advertisements quoting miraculous dB-gain figures. Gain relative to what? A paperclip,

perhaps! Once again a reference is needed; otherwise the number is meaningless. Two standards of reference when dealing with gain in the antenna field are *gain over an isotropic radiator* (dBi) † or *gain over a dipole* (dBd). The gain of a dipole over an isotropic radiator is 2.1 dB. Thus a particular antenna could be rated as having a gain of 3 dBi or 5.1 dBd. Either is perfectly correct, but beware if the "d" or "i" is not there, as you could be buying an antenna with a 10-dB gain over an orange pit!

The next time you're given a 59 plus 20-dB report try reducing your power by 100, for example from 1000 to 10 watts or from 100 to 1 watt and see if you are S9 on the other guy's meter. Whenever you read a specification sheet, give a little consideration to the dB figures and consider if you are getting your money's worth or if the manufacturer has reinvented the laws of physics.

† Editor's Note: An isotropic radiator is a hypothetical antenna that radiates equally well in all directions. The solid pattern of an isotropic radiator, therefore, would be a sphere. In any plane the pattern is a circle with the antenna at its center. The isotropic antenna has the simplest possible directive pattern; that is, it has no directivity at all. Although such an antenna does not exist, it is useful to assume that one does as it can be used as a "measuring stick" for comparing the properties of actual antenna systems. QST

Strays

□ Looking for a good place to combine vacationing and amateur radio? Barbados may be one of the many West Indies islands worth investigating. Licensing is not difficult or expensive. Living costs on the island are comparable with those 8P6AR.



of most West Indies countries.

Licensing is handled in person at the Electrical Inspector's Office, Old Hospital Building, Bridgetown. The chief inspector is Mr. Cecil Sampson, 8P6AR (shown in accompanying photograph). The current fee for one year is \$5 U.S. currency. You must show your current valid U.S. amateur license, plus one official U.S. document which bears your photograph. Licenses are not obtainable in advance by mail.

Clearance through local customs is relatively uncomplicated. No passport is needed, but a U.S. birth certificate is needed to enter and acquire a visitor's visa. No proof of vaccination is necessary.

Barbados has an active radio club (Amateur Radio Society of Barbados — ARSB), which is a member of IARU. The club address is ARSB, Mr. Allan Watson, 8P6ES, (Secretary), P.O. Box 814E, Bridgetown, Barbados, W.I. The second photograph shows (left to right) Doug DeMaw, W1CER/8P6EU, Jean DeMaw, W1CKK/8P6FJ, and Bill Martinek, W8JUY/8P6GU, who were visi-



tors to the island and the ARSB in October of 1975.

DXing from that part of the world is superb. With QRP equipment and sloping dipoles over the sea shore one can work the world on 40, 20 and 15 meters with as little as 2 watts! 8P6FU and 8P6FJ have done it three times from Barbados. Anyone else who wishes to give it a try?

I would like to get in touch with . . .

□ Novices around the country interested in forming a novice traffic net. WN2BBS/F.

□ OMs from the cities or villages of Minden in the USA. VE7BYP

A VOX for a Very Small Box

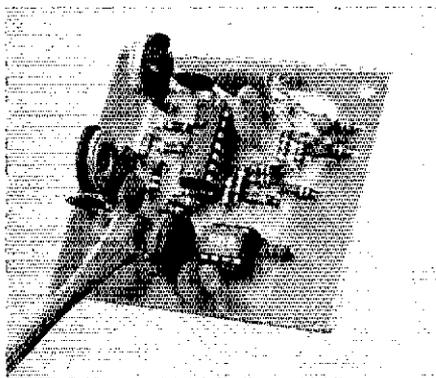
Pop goes the VOX, but smoothly and with modern circuit techniques. Add this module to your existing non-VOX ssb transmitter.

By Douglas A. Blakeslee,* W1KLLK

In *QST* for March, 1964, Campbell¹ described a simple and inexpensive voice-operated relay (VOX) device which he called "a VOX in a box." Today, most manufactured ssb transceivers include a VOX function. It would seem that insufficient time or effort has gone into the design of some commercial VOX circuits, because performance is often poor. The VOX unit described in this article retains OM Campbell's concepts of a small, low-cost device, but ICs and modern circuit techniques have been employed to improve operational characteristics.

Circuit Description

Two integrated circuits, an LM3900 (a quad of Norton operational amplifiers) and an NE555 timer, have been used in the VOX circuit. Each IC is currently priced at one dollar. A description of the NE555 has previously appeared in *QST*² and will not be repeated here. The Norton circuit is an unusual type of operational amplifier in which the differential input transistors of a conventional op amp have been replaced by a "current mirror" circuit to obtain a non-inverting input directly from the inverting input. One advantage of this circuit arrangement is operation from a single supply voltage. A simplified diagram of the input portion of the Norton amplifier is shown in Fig. 1A. CR1 and



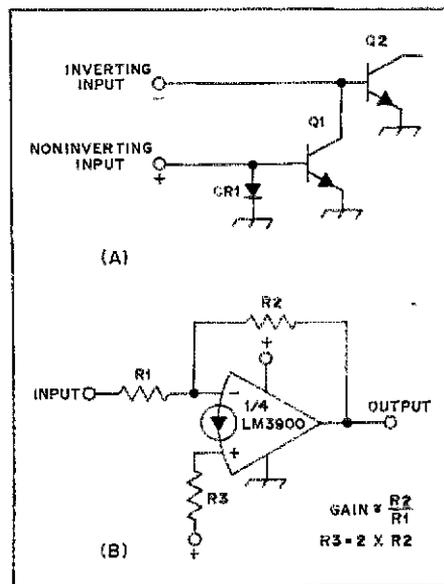
the base-emitter junction of Q2 clamp the maximum input voltages at approximately 0.5 volt. External series resistors are employed to convert voltage changes to current differences which are applied to the input terminals. CR1 and Q1 form the mirror circuit which assures that the bias current at both inputs will be the same; whatever bias voltage is applied to the noninverting input will be reproduced for the inverting input.

The basic design data for the LM3900 amplifiers are given in Fig. 1B. At audio frequencies, the maximum gain of a single stage is 40 dB, while the open-loop gain is specified at approximately 70 dB. Input bias current is rated at 30 nanoamperes (nA). Each of the four op amps in the LM3900 may be operated independently.

The schematic diagram of the VOX device is shown in Fig. 2. Three of the LM3900 sections have been configured

as high-gain audio amplifiers. U1A and U1B amplify the signal from the microphone. For applications where a high-output microphone is employed, or when the audio signal is sampled after a preamplifier stage, the builder may wish to reduce the gain of U1A. This can be accomplished by changing the values of R1 and R2 in accordance with the

Fig. 1 — (A) Simplified input circuit for a Norton operational amplifier such as used in the National Semiconductor LM3900. (B) Design equations for an audio amplifier using the LM3900.



*5 Petticoat Ln., Broad Brook, CT 06016.

¹This and all subsequent footnotes will appear at the end of this article.

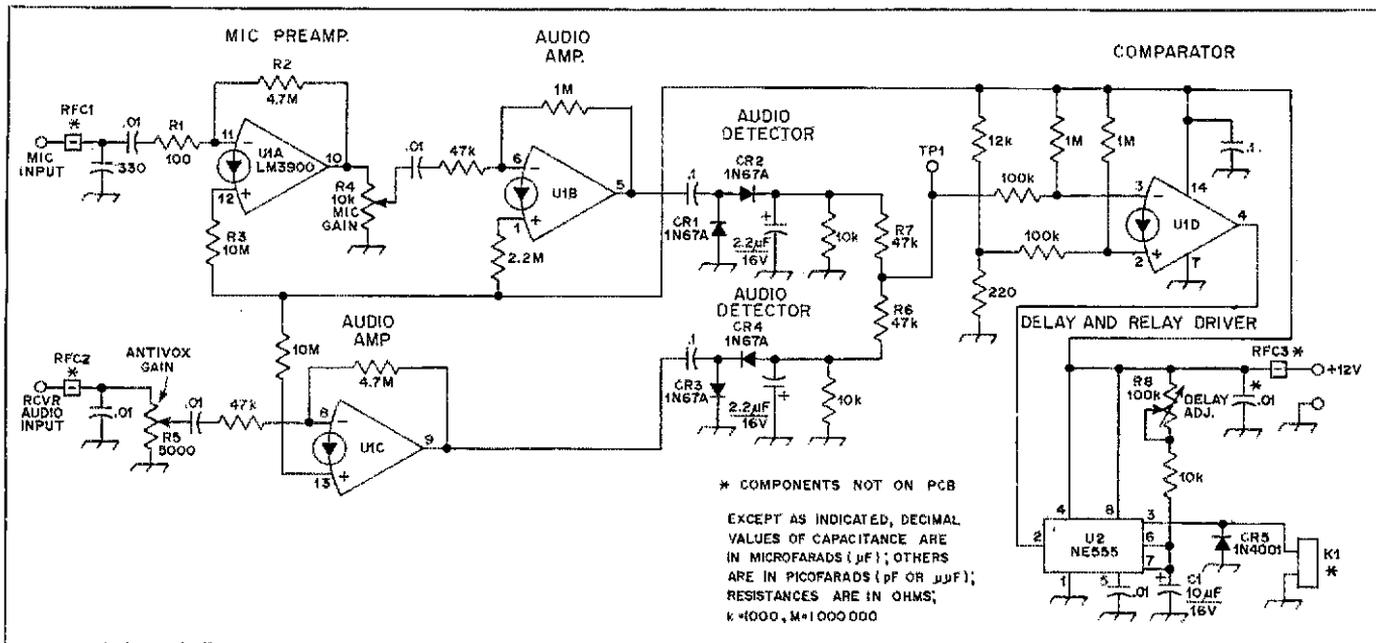


Fig. 2 - Schematic diagram of the VOX unit. Unless otherwise specified, resistors are 1/4-watt composition. Capacitors with polarity marked are plastic-encapsulated tantalum; others are disk ceramic.

C1 - For text reference.
 CR1 to CR4, incl. - Germanium diode, 1N34A, 1N67 or equivalent.
 CR5 - Silicon diode, 50 PRV or more, 1N4001 or similar.
 K1 - Miniature type, 12-volt coil (see text).

R1-R3, incl., R6, R7 - For text reference.
 R4, R5, R8 - Miniature control (see text).
 RFC1-RFC3, incl. - Ferrite bead.
 U1 - National Semiconductor LM3900.
 U2 - Signetics NE555 or Motorola MC1455.

design equations of Fig. 1B. If R2 is changed, the value of R3 must be modified so that R3 is twice the resistance of R2. U1C functions as an amplifier for audio sampled at the station speaker. Coupling capacitors in the audio stages have been chosen to reduce response below 300 Hz. This will minimize hum problems.

Outputs from the microphone and speaker amplifiers are capacitively coupled to rectifier stages which convert the audio signals to varying dc voltages. Germanium diodes, because of their lower threshold voltage, have been used as audio rectifiers instead of silicon units. The outputs of the two rectifier stages are summed resistively by means of R6 and R7 and applied to the inverting input of a voltage comparator, U1D. The output of U1D remains high (approximately 0.5 volt less than the supply voltage) so long as the voltage at the noninverting input is less than the 0.2-volt reference applied to the inverting input. Whenever the input exceeds the reference, the output of the comparator goes low - to near the ground or common potential. Voltage output from the microphone-signal rectifier is positive and, thus, will cause the comparator to switch as soon as the reference is exceeded. Because the speaker-signal rectifier produces negative voltage, it will not trigger the comparator. If the outputs of the two rectifiers are equal, as will happen when the microphone is picking up audio from the speaker, the resulting voltage from the summing net-

work will be zero and the comparator will not trigger. The ability to reject speaker audio is usually called the ANTIVOX function.

The positive-to-ground transition of the comparator output starts the timing cycle of the NE555. The length of the time cycle is determined by the values used for R9 and C1. The time delay produced is identical each time the microphone signal stops. One of the major difficulties of earlier VOX circuits was that capacitor discharge circuits were used where the capacitor would not always be fully charged, so the time delay produced would vary. Operators compensated for the uncertain time delay by using a modified version of the English language where an ahhh, oohh, or errr was inserted after each word to assure that the VOX relay would not drop out prematurely.

The NE555 has a current-switching capability of 200 mA, sufficient to directly drive either a relay or a solid-state switching arrangement. CR5 is included to protect the IC from transients generated when switching an inductive load such as a relay coil.

Components and Construction

The VOX unit is constructed on a 2-3/8 x 2-3/4-inch etched circuit board. The photo indicates that one third of the board real estate is unused, so a smaller version is possible. The type of controls and relay employed will be determined by the builder's individual requirements. This writer's unit uses

pc-mount controls which are aligned on the board so that they may be accessed through small holes in the rear panel of the transceiver. If panel-mount controls are desired, Mallory MLC units may be used for R4, R5 and R8.

The VOX device is small enough so it can be mounted inside most rigs. If a separate VOX unit is needed, a small utility or Minibox will make an appropriate housing. Rf interference can cause trouble, so the unit should be shielded in any application where rf fields may be present. The bypass capacitors for the audio inputs are located on the circuit board. If the leads from the audio connectors are more than a few inches long, the bypass capacitors and their associated ferrite-bead chokes should be mounted at the connectors.

No provision has been made for mounting the relay on the circuit board, as the type of relay will depend on how the VOX device will be used. Any 12-volt relay which requires less than 200 mA of current can be employed. When the VOX relay must drive a second relay - such as the antenna relay in a transceiver - the fast operating time of a reed relay is needed to prevent clipping of the first syllable spoken. The total close time of all relays connected in tandem should be 10 milliseconds or less. If the VOX relay will perform all switching functions directly, a miniature control relay such as the Potter & Brumfield R10 series is appropriate. These relays are available in 2-, 4- and 6-pole versions, part numbers R10-E1-

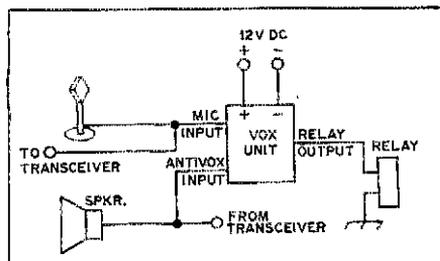


Fig. 3 — Typical connections to the VOX unit.

Y2-185, R10-E1-Y4-V185 and R10-E1-Y6-V90, respectively.

The circuit board is designed for 1/4-watt resistors which are mounted flat. If 1/2-watt units are used, they must be positioned vertically. Care must be employed when mounting and soldering the germanium diodes. If the leads are bent too close to the body of the diode, breakage can result. If excessive heat is applied to the diode, it can be damaged, so use a heat sink (such as a small alligator clip) when soldering. Assure that proper polarity is observed

when installing the diodes and tantalum capacitors.

Installation and Operation

Typical connections for the VOX unit are shown in Fig. 3. Shielded cable should be used for all audio connections. Audio for the ANTIVOX function can be sampled at the station speaker or at the phone-patch output (which is a feature of many commercial transceivers). If VOX operation of a cw rig is desired, connect the output of a sidetone monitor to the microphone input of the VOX unit. The mic gain control should be set so that the VOX relay closes each time a word is spoken. The delay control should be adjusted to fit individual speech patterns and operating habits. The delay time must be long enough that the VOX relay will drop out only during a pause in speech. There are two methods of setting the ANTIVOX gain control. The first way is simply to advance the control until audio from the speaker does not trip the VOX unit. A more scientific approach is to connect a voltmeter to TP1. With no

audio input, the meter should read only the comparator reference voltage, approximately 0.1 volt. Tune the receiver to provide a steady tone signal, such as the heterodyne note from a crystal calibrator. Advance the ANTIVOX control until the voltmeter registers only the reference voltage. The ANTIVOX gain should be set with the audio from the speaker slightly louder than is necessary during normal operation.

VOX control can be a helpful operating aid. It can speed up traffic handling and contest operation. It might make round-table discussions more natural. The unit described here will help to eliminate some of the operator idiosyncrasies that have become associated with VOX operation. The operators themselves can cure the rest.

References

- ¹ Campbell, "A VOX in a Box," *QST* for March, 1964.
- ² Technical Topics, "Time — IC Controlled," *QST* for June, 1972.
- ³ Blakeslee, "Some Thoughts on Station Control," *QST* for January, 1966.
- ⁴ Blakeslee, "A Solid-State VOX," *QST* for September, 1970.

50 Years Ago

March, 1926

□ Zero resistance and infinite area are the Utopian objectives for shielding material, D.R. Clemons tells us in a classic on the subject. A variety of coil shapes and winding methods was used in the exhaustive tests providing background for the evaluations here reported.

□ ARRL has just successfully negotiated for the removal of some Navy and other government stations from our bands, and now the Editor is worried over possible repercussions because

some of us are becoming very sloppy about our own band edges.

□ You can multiplex two receivers with the same power supply and antenna, says J.K. Clapp, so long as they are not on the same frequency or a multiple thereof.

□ If your UV199 rig gets weak reports during a QSO, Rufus Turner has a power amplifier design you can drive by coupling its grid coil to the oscillator inductance.

□ Readers can drool over the pictures of W6HM, the station of Col. Foster outstanding in both design and performance.

□ You can use more than the induc-

tance of a Ford spark coil for filtering rectified a.c., says 6DAO; there are also condensers in the box which can be wired for additional current smoothing.

□ The "detector and two step" circuit is so widely used by amateurs that, in response to many requests, *QST* describes the construction of a simple such rig for the broadcast band.

□ If your grid leak is noisy, it could be moisture getting into the gummed label and providing a second resistance in parallel.

□ Capt. MacMillan is going north again, of course with amateur gear, and readers are asked to keep an ear on the wavelength.

25 Years Ago

March, 1951

□ Revised regulations resulting from Docket 9295 will create new Novice and Technician classes, available July 1. But FCC has decreed no more Advanced Class licenses will be issued, and those amateurs wishing to work 75- and 20-meter phone will have to bring their code speed up to 20 w.p.m. and pass the new Extra Class exam — despite ardent, repeated opposition by the League.

□ Much progress has been made in modifying electronic gear for use by the blind, and W2J10 takes us on a tour of the NY Institute where as the instructor he has a laboratory of special equipment for his sightless students.

□ The trend to voice use is so rapid that many of us are behind in understanding some of the fundamentals of modulation; Technical Editor Grammer attempts to set us straight with a treatise complete with waveform illustrations.

□ A treaty has been signed between Canada and the U.S. which will shortly allow portable/mobile amateur operation in each other's country.

□ Lots of interesting gear described for home construction: W1DBM has a "lightning calculator" box for measuring inductance and capacitance; W1JEQ shows a one-tube converter for WWV reception; W1DF's dummy antenna uses a flatiron element for the load; K2AX's subject is an all-band mobile; and W3HH covers the portable field with a complete 40-meter packaged rig.

□ W2CBK says the pi-section coupler should get more attention in ham rigs, and outlines some of the advantages, including an eyebrow-raising claim of good harmonic attenuation.

□ The 1950 SET was the most successful ever. — *WIRW*

Learning to Work with Integrated Circuits

Part 3: With digital logic you can get there from here, but it's a lot easier if you go to a Ouija board first. A truth table is the Ouija board of digital-circuit designers.†

By Jerry Hall,* K1PLP and Charles Watts,** WA6GVC/1

There always seems to be an aura of mystery, an atmosphere of mystique, surrounding the entire occasion whenever a Ouija board is consulted to seek telepathic or spiritualistic messages. The events transpire in a solemn and sedate mood. Indeed, most believers feel that the board has little or no power except under such circumstances. Frivolity and levity are taboo. Must it be so when one goes about working with integrated circuits, especially digital ICs? No, not really. We were tweaking your imagination a bit when we earlier compared a truth table with a Ouija board. But the truth table does have tremendous powers to divulge information about the mysterious and sometimes intriguing inner workings of an integrated circuit. We'll be talking more about truth tables in later paragraphs, but for now let's review some of the things that we discussed in earlier parts of this series.

In Part 2 of this series, we talked about binary-coded decimal or BCD values, where four digital circuits are used to represent decimal numbers. The BCD information is written in 8-4-2-1 form but using binary notation, combinations of 1s and 0s. For the sake of simplicity, we mentioned that the number 0 could be represented by a circuit which was cut off (no current flowing), and the number 1 by a circuit which was conducting. However, modern digital ICs have an array of direct-coupled transistors, and for a given state or condition of such a digital circuit

some of its individual transistors may be conducting while others are cut off.

"Oh, oh!" you say, "Then that current/no-current idea doesn't always hold water." Right. Actually two different *voltage levels* are used to represent 1s and 0s, instead of the presence or absence of current. The exact potential which represents a 0 or a 1 depends on a number of things — the family of ICs in use, whether *positive* or *negative* logic is being used, the supply voltage powering the ICs, and whether the potential is referenced to the positive or negative side of the power supply terminals. In positive logic a 1 is defined as the more positive of the two voltages and a 0 is defined as the less positive. Negative logic is just the opposite, where the more negative (less positive) voltage represents the 1 state and the less negative (more positive) the 0 state. To avoid confusion between positive and negative logic, many writers and some manufacturers in their data sheets use the terms *high* and *low*, rather than 1 and 0 to discuss logic levels. In this case the term high applies to the more positive of the two levels.

TTL Family Traits

Negative logic is less commonly used in literature written for amateurs. In this series of articles we'll stick with positive logic altogether, where the more positive voltage represents a logic 1. For the present let's consider only the TTL family, because the digital ICs used in the DVM/frequency counter belong exclusively to this family. The supply potential required for these ICs is 5 volts, with an absolute maximum rating of 7 volts. The input threshold potential is in the neighborhood of +1.7 volts. Anything above this value can be con-

sidered a logic 1, and anything below, a 0. The absolute maximum positive input voltage rating is +5.5 V. Actual circuit voltages will range from 0 to perhaps +0.7 V for a logic 0, and from +4 to +5 V for a 1. These voltages are usually called 0 and +5 V for a 0 and a 1, respectively, even though actual circuit voltages may depart from these values by a small amount. The departures are caused by voltage drops across circuit elements contained inside the IC.

The voltages mentioned above, of course, are referenced to the negative or "common" side of the power supply, which we may on occasion call ground. In the DVM/frequency counter this "ground" does not represent an electrical connection to the metal chassis enclosure. As we mentioned earlier in this series, isolating the circuit from the chassis permits connecting the test prods of the DVM to the circuit under test in the proper polarity, without disrupting operation of either circuit.

In the preceding paragraphs we've talked about a number of terms that mean the same thing. It may help us keep things straight if we take a look at them again, all together:

logic 0 = 0 volts = low = common
 = ground
logic 1 = +5 volts = high

What about unused inputs and outputs? What happens to them? Unused outputs of the TTL family may be left unterminated. Inputs are a different story. It is a trait of the TTL family that an unconnected input behaves as if it was connected to a logic 1. Sometimes, if the rest of the circuit will work as intended with a 1 at such inputs, you will see unused input pins merely left

† Parts 1 and 2 appeared in *QST* for January and February, 1976.

*Associate Technical Editor, *QST*.

**Technical Assistant, *QST*.

open. However, for optimum switching speeds and minimum susceptibility to noise, such pins should be wired to a positive level, 2.4 V or more (up to the maximum rating, 5.5 V). These pins may be connected directly to the positive supply terminal, although sometimes you'll see a series resistor in use to limit current flow. If a logic 0 is required at an unused input to make the rest of the circuit work as intended, it should be grounded directly.

So you see, working with digital ICs is quite straightforward. There are only two voltage levels to worry about. Seldom will you see discrete components, and most such components will be either resistors to limit the flow of the current or bypass capacitors. The output of one digital circuit is usually connected directly to the input of the next, and so on. You can almost think of a digital IC as a building block, and you simply stack up the blocks to do the job you want.

Can the output of one IC be used to drive more than one input of other ICs? Yes, certainly. Sometimes this is desirable, such as when a train of *clock* or timing pulses might be generated and distributed throughout the overall circuit. But there is an important consideration here. Digital circuits are like any others; there is a limit to the load they can handle. The term *fanout* is used to describe the load capacity of an IC output. Fanout actually takes more into account than merely supplying load current, however, because of the way the circuits work. When the output is a logic 1, it does supply current to the input it drives. But when the output is a logic 0, it must draw current from the input of the stage which follows to pull the voltage level down to the 0 level. Drawing current in this manner is called *sinking* current. TTL IC outputs can

supply or sink current for 10 loads. A load is one TTL input.

To Tell the Truth

"Ah," you say, "all this general information stuff is alright, but you still haven't told me why those funny symbols are used on IC diagrams instead of showing what's really inside." Okay, fine. Let's talk about those symbols. Actually there are only four different shapes used in digital circuits. Three are used to represent the three types of logic gates which exist. The fourth is a rectangle or sometimes a square, and represents all other logic circuits. Inside or adjacent to the rectangle is given the circuit function, either spelled out or abbreviated. Of the gate symbols, one is a triangle and two are slightly different shield-shaped symbols.

Now take a look at Fig. 5. At B is the schematic diagram of an inverter, probably the simplest digital circuit there is. This is sometimes called a *not gate*, for the level at its output is always just the opposite of that presented at its input. In other words, if a logic 0 is presented at the input, the output will be a 1, and if the input is a 1, the output will be a 0. The inverter is called a not gate because the word *not*, in digital-IC parlance, means the same as complementary. In binary terms the complement of 0 is 1, and the complement of 1 is 0. There is also a symbol for the term not — an overscore. Thus, CLOCK on a diagram would mean, literally, a not-CLOCK signal, or the complementary or inverted clock signal.

It is convenient to put the above input and output information for the inverter in the form of a table. If we label the input A and the output B, the table would look like this:

A	B
0	1
1	0

This table tells us the exact same information as the words in the above paragraph do — what the output is for every possible set of input conditions. And, would you believe, *that* is a truth table — no more, no less. Each type of digital circuit will have its own truth table, but all tables do no more than list all the outputs for all possible combinations of inputs.

The circuit of Fig. 5B is typical of all TTL inverters. It is actually the diagram of a section of a 7404 hex inverter. There are six such circuits with independent inputs and outputs in one IC package. Even though this is a relatively simple circuit with its four transistors, four resistors, and two diodes, you can see that six such circuits to represent

one IC would take up a fair amount of space on a diagram. The symbol for this circuit, Fig. 5A, takes up only a tiny fraction of the space. The little circle at the point of the triangle indicates that inversion takes place in the output of the section. This is called a *negating circle*. Sometimes you'll see a negating circle at the input side of a symbol, meaning inversion takes place at the input, ahead of the circuit elements which perform the logic.

A very similar circuit is shown in Fig. 6B. In fact, you'll have to look quite closely to discover the difference. Ah yes, there it is — a multiple-emitter input transistor with an added input clamping diode is the difference. This is the circuit of an inverting AND or not-AND gate, most often contracted to NAND — four transistors, four resistors, and three diodes. This diagram represents one fourth of a 7400 IC, which is a quad NAND gate. The symbol for this circuit is shown in Fig. 6A, with its inputs identified as A and B and its output shown as C. Here is the truth table for this gate.

A	B	C
0	0	1
0	1	1
1	0	1
1	1	0

"What in the world is a NAND gate?" you exclaim. Well, let's forget the inverting function of this one for a moment and consider only an AND gate. In an AND circuit the output is high if, and only if, all inputs are high. With a NAND gate, therefore, the output is *low* if and only if all inputs are high. Hey, how about that! That's exactly what the truth table above shows; C is a 0 only when A and B are both 1s. If either A or B is low, C stays

Fig. 5 — At A, the symbol for an inverter, and, at B, the schematic diagram of the inverter in TTL form. Resistance values shown are nominal. Six such inverters, with independent inputs and outputs, are contained in a type 7404 IC.

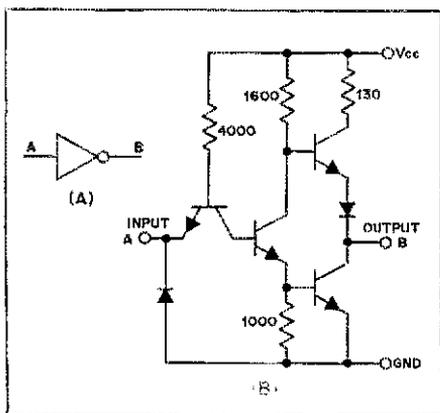
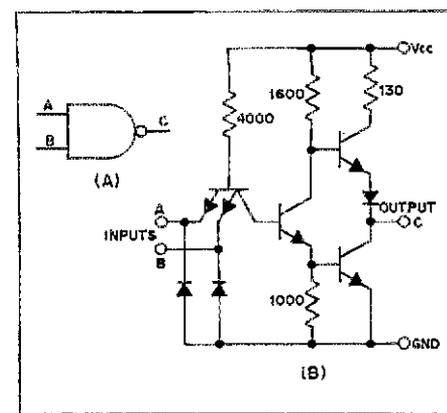


Fig. 6 — At A is shown the symbol for a 2-input NAND gate, with the schematic diagram at B. Resistance values shown are nominal. This circuit represents one fourth of a type 7400 TTL IC.



high. What can we do with it? Well, it's a great circuit for providing an output only when two different input signals occur in time coincidence. We'll want to remember that idea for later use. Actually a NAND gate can have several inputs, not being limited to just two. The same rule applies: the output is low only when *all* inputs are high.

Now let's move up to the big time and take a look at Fig. 7. This is a representative circuit of a 7447 decoder-driver IC. Four such ICs are used to illuminate the four LED read-outs in our DVM/frequency counter. The decoder portion of each IC converts BCD input information into the seven-segment code necessary to indicate the correct decimal digit. The driver portion serves to illuminate the appropriate segments. Wow! At first glance it looks like there's an awful lot of stuff in Fig. 7. But look closer. See, there's nothing more there than a collection of gates like we've been talking about. We're not able to publish the schematic diagram of this IC, for it would require more space than a double-page spread here in *QST*. Let it suffice to say there are in the order of 200 transistors and associated resistors and diodes represented by those 44 symbols of Fig. 7.

7447 — Functional Analysis With Truth Table Applications

Now let's take a look at what this IC does and just how it goes about doing it. Referring to the representative circuit diagram, Fig. 7, it is easy to see that there are a number of subcircuits which make up the whole circuit of the IC. Operation of each subcircuit has already been discussed, but it is important to note that the proper operation of the IC depends on the correct operation of *all* the individual subcircuits.

To understand the operation of the 7447 IC, let's take a typical operational sequence and observe what happens

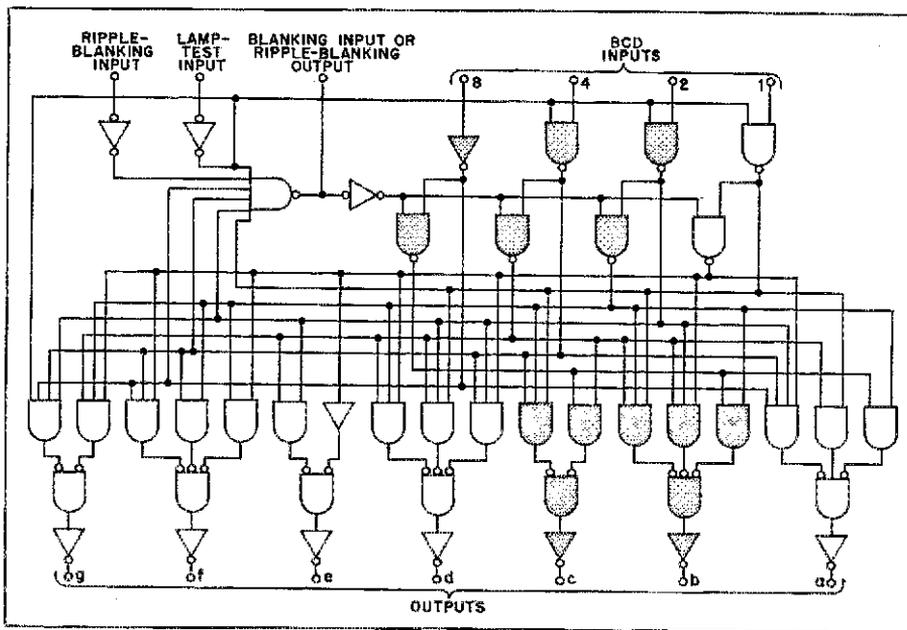


Fig. 7 -- Logic diagram of a 7447 BCD to seven-segment decoder/driver IC. The symbols shown with shading are to aid text discussion.

inside the chip. Circuits of the 7447 accept 4-bit BCD information and decode this information into outputs which turn on the desired segments of the 7-segment display. Assume that BCD inputs 2, 4, and 8 of Fig. 7 are grounded (logic 0). The shaded symbols in Fig. 7 show which circuits are now affected. Actually *all* the circuits have something to do with the operation, but those which are shaded lead most directly to the output end result. By following the rather complicated maze of interconnections and the logic within the IC, it is possible to see that the final outputs which are low are for segments b and c of the 7-segment display. This will illuminate a decimal figure 1. We're not going to attempt to lead you through this maze, but believe us, it works out okay. The shaded symbols generally show you this flow of logic.

Ugh! It sure would be difficult to design something with ICs in it if we had to try to follow the flow of logic inside the IC each time we wanted to see what number would result from the grounding of an input. There just *has* to be a simpler method for determining the results we want! Yep, there is, and we've already mentioned it. Reading like the *Who's Who* of digital logic, the truth table is the designers number one tool for designing and building digital logic circuits. Since we have discussed the use of simple truth tables, now let's look at Table 1, the truth table for the 7447 IC. Assume that BCD inputs 2, 4 and 8 are grounded. Find the column on the left of the table entitled *Decimal or Function*. Move your finger down the column until it reaches the number 1. Then

move your finger horizontally across the columns to the right of the decimal/function column until your finger is under the column marked A (1). (These columns are under the heading of inputs.) There is a logic 1 in this column, corresponding to a *high* (ungrounded) condition or state of logic. Now move your finger to the left from column A, and note the logic state under each of the remaining columns, B (2), C (4) and D (8). The resultant binary number obtained from the input columns is 0001; this represents the decimal number 1 as we know from our discussion on binary math. Now check columns a through g under the heading of outputs. In columns b and c a low logic state exists (this is the state required to light the individual LED segments), and a high state exists at the remaining outputs (unlighted). This is a lot easier than following the maze on that diagram, isn't it!

Now try the binary number 1000. Can you determine the proper logic states for inputs D, C, B and A? Which segments, a through g, are on; which are not? What decimal number does the binary number 1000 equal? Well, if you can figure out the answers to these questions, then you have a pretty good understanding of the binary system, and how to interpret the information contained in a truth table.

All digital ICs have truth tables, and these will be most helpful when one designs digital electronic equipment. As the equipment one designs becomes more complex, so do the truth tables, as we've just seen for the 7447. Often one will be working from one truth table to

Table 1
Truth Table, 7447

DEC. OR FUNC.	INPUTS				OUTPUTS						
	8	4	2	1	a	b	c	d	e	f	g
0	0	0	0	0	L	L	L	L	L	L	H
1	0	0	0	1	H	L	L	H	H	H	H
2	0	0	1	0	L	L	H	L	L	H	L
3	0	0	1	1	L	L	L	L	H	H	L
4	0	1	0	0	H	L	L	L	H	H	L
5	0	1	0	1	L	H	L	L	L	H	L
6	0	1	1	0	H	H	L	L	L	H	L
7	0	1	1	1	L	L	L	L	H	H	H
8	1	0	0	0	L	L	L	L	L	L	L
9	1	0	0	1	L	L	L	L	H	H	L
10	1	0	1	0	H	H	L	L	H	L	L
11	1	0	1	1	H	H	L	L	H	H	L
12	1	1	0	0	H	L	H	H	H	L	L
13	1	1	0	1	L	H	H	L	L	L	L
14	1	1	1	0	H	H	H	L	L	L	L
15	1	1	1	1	H	H	H	H	H	H	H

another, and so on. It's really a big help to the person who wants to work with ICs if he'll learn to understand how the truth table works and how to apply the information contained in it. As we said at the very beginning of this part, you can get there from here without a truth table, but most often you'll do a lot of wheel spinning in the process.

Integrating the Parts

Now that we understand a little bit about the 7447 IC, let's put this information to practice by building and testing the readout display board. The circuit diagram for this board is shown in Fig. 3, Part 2 of this series. The parts placement guide, Fig. 4 of Part 2, shows the locations for components on the board. (The unused area at the left edge of the board will be described in a later part of this series.) Ready-made circuit boards are available for this project; see the list of suppliers at the end of series Part 2 in February, 1976, *QST*. If you wish to etch your own circuit boards, etching templates are available.⁸

For the moment, do not install the wire jumpers shown between pins 5 and 8 of U3 and between pin 5 of U4 and pin 4 of U3. These will be installed after some preliminary testing is completed. Also for the moment, do not install any external connecting wires to the board.

The 5- and 12-volt power supply lines should be color coded on the display board, as in the power supply. In other sections of the DVM/frequency counter, this color coding will become very important. Several line runs will be used in the final stages of wiring, and the coding will help eliminate confusion. Stranded wire is preferred over solid, to avoid lifting the terminal pads off the circuit board with unavoidable wire flexing during handling. The resistors may be either 1/4 or 1/2 watt, composition type. If 1/2-watt resistors are used, they will have to be mounted vertically on the pc board; 1/4-watt resistors will lie flat as shown in the photograph of Fig. 4. The IC 14-pin layout also fits the LED pin spacing. Use IC sockets for both the ICs and the readouts to eliminate the need to solder these parts directly to the board. This helps if you come up with a device which is defective — a strong possibility if you use bargain components.

⁸ Full-size templates showing the etching patterns for the five circuit boards used in the construction of this project are available from ARRL headquarters, 225 Main St., Newington, CT 06111. Enclose \$1.00 U.S. or the equivalent in IRCs to cover handling, and a self-addressed business-size envelope bearing a U.S. 13c stamp for return postage. (No stamps required for foreign addresses.) Boards are identified as follows: CW-LW1, power supply; CW-LW2, display; CW-LW3, 60-Hz clock; CW-LW4, counter; CW-LW5, voltage-to-frequency converter. Patterns for optional accessory boards will be available later.

After you've wired the power supply and checked it out as described in Part 2, connect the +12, +5, and common lines to the display board. Apply power. If the circuit is wired correctly, nothing visible will happen; the displays will remain dark. (Don't worry, we'll light them up in a few moments.) Recheck the +12 and +5 regulated output voltages with the voltmeter. They should read the same as they did before, during power supply checkout. If they don't, remove power immediately and investigate. If all is well, proceed.

Next fashion a test probe, attached to common. This can be something as simple as a nail or the point of a soldering aid and a clip lead. With power applied to the circuit, carefully touch the probe to pin 3 only of one of the ICs. This is a lamp-test input, and should cause an 8 to be displayed on the associated readout. Try each of the ICs in this manner. If you don't get each of the four LED displays to show 8s, you'll have to do some detective work to find out why. Interchanging ICs and readouts will help to locate faulty parts. Bad ICs or "blown" segments on a readout are possibilities if bargain parts were purchased. Also check soldered connections, look for solder bridges (shorts between adjacent copper sections), and be certain the components inserted in IC sockets have all pins mated properly. Of course they should also be oriented correctly.

Before we go on, we'll test the decimal points on the readouts. These are not driven by any electronics, and will merely be wired to switch contacts later. However, a 1000- Ω current-limiting resistor must be used. Connect this resistor in series between the test probe and common. Now touching the decimal-point connecting pad with the probe should cause the associated decimal point to illuminate.

BCD — It Really Works!

For the next bit of testing, remove power and install short connecting leads to the BCD inputs of each IC. These inputs are shown at the bottom of the diagram in Part 2, Fig. 3, and are identified inside the rectangles representing the ICs. The leads should be 3 or 4 inches long, and will later be used to interconnect the display board with the frequency counter board. We'll be connecting various combinations of these wires to common, so it'll help if you strip 1/4 inch or so of insulation from the loose end of each.

All set? Okay, reapply power. All displays should remain dark. Now, remember the bit earlier in connection with a discussion of Fig. 7, where we talked about grounding the 2, 4, and 8 inputs? We said that the number 1

should be illuminated on the display. Well, let's try that. Carefully select the 2, 4, and 8 wires from one of the ICs and twist them together. Now connect the three to common; this can best be done with a clip lead. Eureka! The 1 does light! (If it doesn't, you've got a problem, and more detective work is in order.) Try this on each of the other three ICs to get a 1 on each display.

Do you feel experimentally inclined? Why not try various combinations of the inputs to common? Look at Table 1 so you can compare what the display indicates with what the truth table says should happen. Ungrounding an input is the same as connecting it to a logic 1. When an L appears in the right-hand portion of the table, this means that particular segment should light. Hey, this is fun, right?

Now connect all 16 BCD-input leads together and connect them to common. This should produce four 0s, one on each LED readout. We do this now to be sure everything is working correctly. Next remove power and install the wire jumpers between indicated pins of U3 and between U3 and U4. The jumpers are shown on the parts placement guide, Fig. 4. These jumpers are connected to IC terminals identified as RBi and RBo — meaning ripple blanking input and ripple blanking output. The term ripple doesn't mean the kind you encounter for lack of filtering on a power supply voltage, but is more like the way waves ripple along in the water. An even closer analogy is the ripple of a string of standing dominoes falling, each pushing the next. In ripple blanking, one IC "trips" the next, and so on down the string. With the jumpers installed as shown, these connections provide for the suppression or blanking of leading zeros for U3 and U4. Let's put it another way. Say we were reading a value on the display of less than 100 like 79. Without leading-zero suppression, the digits 0079 would be illuminated. The suppression feature turns off the two left-hand zeros, so only 79 is illuminated.

Let's check this out. After the jumpers have been installed, reapply power, with all 16 BCD input leads still connected to common. The two left-hand readouts should now remain dark, with only 00 displayed. Now locate the 1 BCD-input wire from U3 associated with the left-hand LED. Disconnect this wire from common, but leave the remaining 15 wires connected. The display should now read 1000. Touching this wire to common and then removing it should cause the display to alternate between 00 and 1000.

In Part 4, which will appear in a subsequent issue of *QST*, we'll talk about frequency counting. QST

A Cure for Intermod Alley

Adjacent-channel intermodulation products find themselves "banned in Boston" — thanks to compensated coaxial notch filters.

By George Downs,* W1CT

I have been driving through an area known as "intermod alley" for several months now, and it seems just like any other location. What makes this possible is a 30-dB notch filter that nulls out the signal from the Telco (Telephone Company) transmitter near Bear Hill. The notch alone will not do the job; it must be combined with an antiresonant circuit to emphasize the amateur frequencies.

For those not in the know, the Bell System operates a relay transmitter for the mobile telephone service near the junction of routes 128 and 20, near Boston, Massachusetts. The transmitter operates on several channels between 152.4 and 152.9 MHz. When these signals are present, and particularly when the nearby 146.04/64 repeater is active, many amateur mobile units within a mile or more are swamped by the intermodulation products.

When I established the Weston c.d.

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Fig. 1 — An open-ended stub across a transmission line reflects an effective short circuit across the line at the rejection frequency.

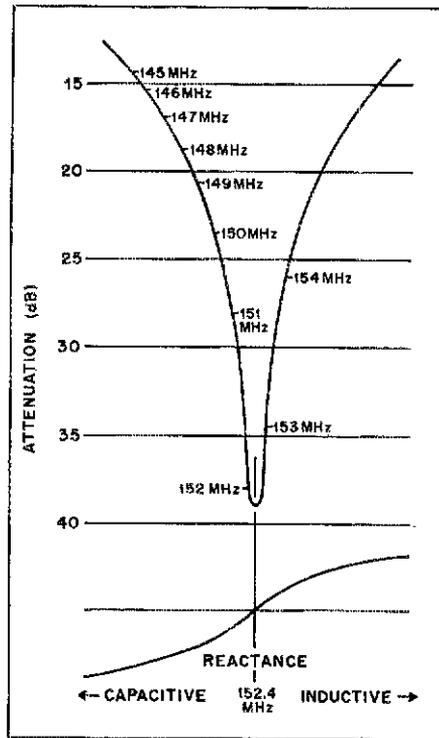
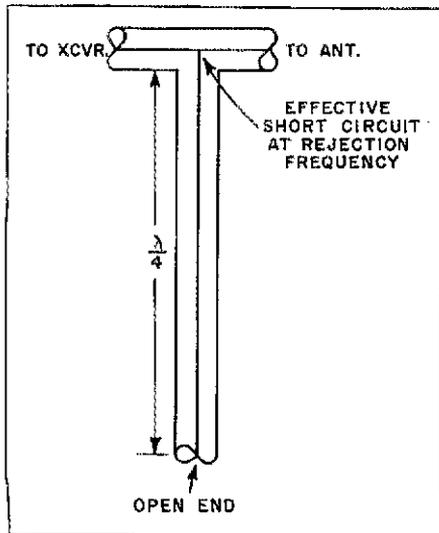


Fig. 2 — Attenuation curve of a typical 1/4-wavelength stub, top, and a reactance vs. frequency curve, bottom.

station this year at the new police headquarters, conditions on two meters were intolerable. The station is three miles from Bear Hill and has a 5/8-wavelength ground-plane antenna 60 feet up. Both a-m and fm signals were beset with telephone conversations, squeals, and assorted noises; something had to be done.

Dick Hughes, W1GTJ, suggested a solution and provided a prototype trap. It worked very well, indeed — but would it also work in mobile units? The prototype was transferred to the VW, and I found that I could drive right up and shake hands with the Bear Hill problem and have the intermod barely break the squelch. Thus encouraged, I made up four "production" units of the W1CT

Intermod Notch Filter, all assembled in my cellar using imprecise equipment.

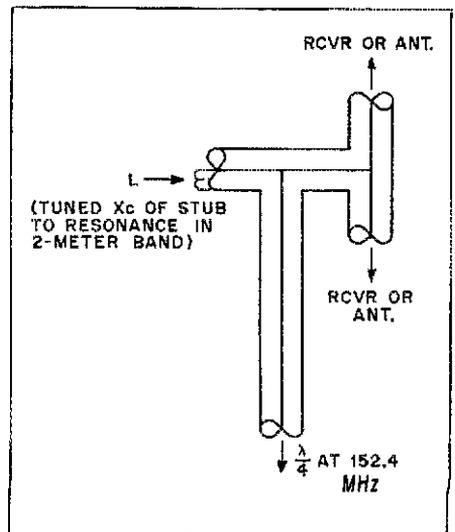
How it Works

Let us insert a T-fitting in the transmission line, and attach a quarter-wavelength open-ended stub section tuned to 152.4 MHz, illustrated in Fig. 1. Such a stub will reflect a short circuit across the line and will attenuate the Telco signal approximately 30 dB. You will also see, in Fig. 2, that the signals in the two-meter band are attenuated to an unacceptable degree.

Fig. 2 shows something else that is very important. The apparent short circuit at the T-fitting has the characteristic of a series-resonant circuit. That is to say at frequencies below resonance, capacitive reactance is seen at the T, as shown by the reactance vs. frequency curve at the bottom of Fig. 2.

The idea is this: Since we have a few ohms of capacitive reactance at 148 MHz, we can add an equal amount of inductive reactance at the T-fitting to construct an antiresonant circuit tuned

Fig. 3 — An antiresonant circuit is formed by placing an inductance across the stub near its junction with the transmission line.



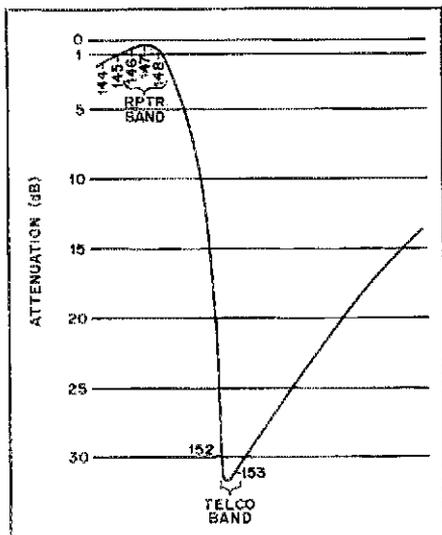


Fig. 4 — Typical response curve obtained from compensated notch filters.

to the amateur band. Fig. 3 shows how the arrangement can be altered, and Fig. 4 shows a typical response curve obtained from actual filters.

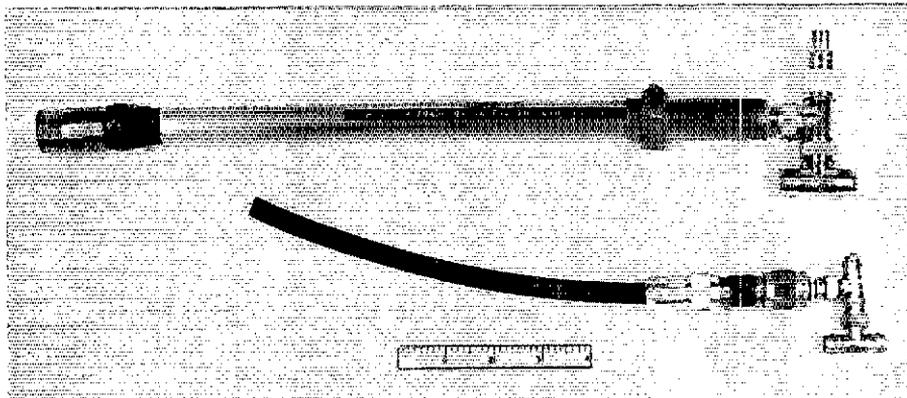
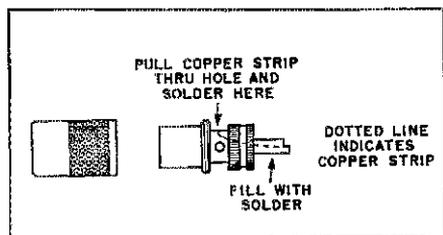
Practical Construction Considerations

The ideal impedance for a coaxial stub is approximately 77 ohms. This is not critical, but does indicate that it is slightly better to use 70-ohm cable, rather than 50. The best type to use, if you can get it, is the aluminum-jacketed Foamflex or equivalent. You will need about 20 inches of it. For connectors I used the uhf type because they have lower inductance than BNC and are usually less expensive.

The photograph will give you a good idea of how things fit together. The following steps will guide you in the assembly:

- 1) Put a uhf female connector on the end of the stub. I made the assembly by using a single-hole mount uhf fitting, a copper spacer, a slotted piece of 3/4-inch copper pipe, and a hose clamp.
- 2) Prepare the shunt inductor. Cut a 3/32-inch wide strip of copper (0.005-inch thick) about 1-1/2 inches long. Solder this strip into the center pin of a PL-239 plug. Fill the entire center pin of the plug with solder. The free end of the strip extends up into the body of the

Fig. 5 — The shunt inductor is assembled by soldering a loop of copper strap in a PL-259 plug.



The shorter assembly is the prototype by W1GTJ, using flexible cable and BNC fittings. The longer one is a "production" model made from aluminum-jacketed line. A plastic pill bottle is taped over the open end of the stub for protection.

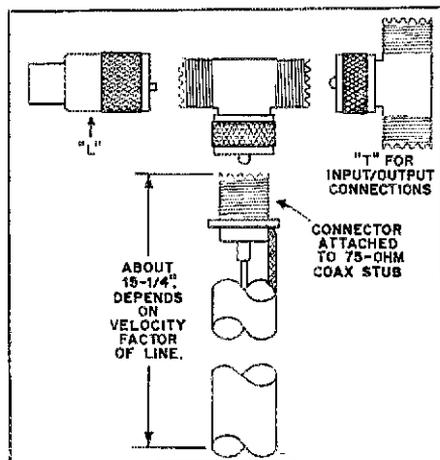


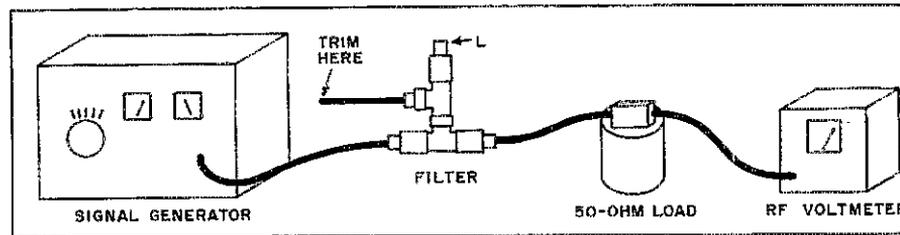
Fig. 6 — An exploded view of the entire assembly. "L" is the plug shown in Fig. 5.

plug. Fish out this free end through the nearest hole in the plug body and solder to the outside (see Fig. 5).

3) Obtain two T-fittings and assemble as shown in Fig. 6.

4) Adjustment: The setup is shown in Fig. 7. You must have enough amplitude range in the generator output, and in the meter, to measure voltage levels 30-dB apart. Stub adjustment is made by trimming pieces off the end of the line. I used a tubing cutter, a razor blade to cut the insulation, and a jeweler's saw to part the inner conductor. A 1/8-inch change moves the frequency 1 to 1-1/2 MHz. Because of the shape of the response curve, try to get the amplitude at 146 and 148 MHz equal —

Fig. 7 — Test equipment setup for adjusting the stub and inductor for proper response.



this will put a peak at 147.2. Also try to get the maximum rejection at the low end of the Telco band, 152.4 MHz. This means that the delta — or difference — frequency between peak and null will be 5 to 5.2 MHz. As you trim the line, the peak and null will both increase in frequency. However, as they do so, they will get farther apart.

There is interaction between the length of the line and the amount of inductance. A change in either one will change both the peak and null frequencies. Therefore it is important to watch the spread between them as you go through successive trimmings. I found that it was difficult to make the inductance low enough, but it was easy to increase by melting the solder and pulling a little more strip out of the center conductor of the plug.

The Price We Pay

The penalty is called "insertion loss." The units I made covered 146 to 148 MHz with a loss of no more than a dB at the band edges and considerably less in between. This may bother you a bit on the periphery of a repeater area. A compromise might be to leave the filter in while driving in a problem area and take it out when on trips. It is worth the price to me to have the intermod problem solved near Bear Hill.*

*Editor's note: A follow-up article using the notch-filter principle to decrease 6-meter interference from Channel 2 TV stations will be presented in a subsequent issue of QST.

A Homomorphic Speech Compressor

Ho hum — another speech processor. Look again. This one is different!

By John E. Kaufmann,* WA1CQW and Gary E. Kopec,** WA8WNU

From the standpoint of communications engineering, the human voice is not very well suited to making the most efficient use of a-m or ssb transmitter power capability. The natural speech waveform is characterized by a rather large dynamic range, exhibiting both high, sharp peaks and low "valleys." The disparity between peak and average signal levels tends to limit the communications effectiveness of a voice transmission since the final stage of a transmitter is usually restricted by the peak amplitude of the signal it can produce, rather than the average level. Thus the average output power from a speech transmitter can be quite low compared to the peak power.

Over the years various schemes have been used to modify the speech signal in order to raise its average-to-peak power ratio. The methods generally fall into one of two categories — compression or clipping. In the former, a portion of the speech signal is rectified, filtered, and used to control the gain of an early amplifier stage in the transmitter. By making the stage gain inversely proportional to the control signal, the amplitude variations of the output waveform can be minimized. This is the principle behind the alc system found in nearly every modern ssb transmitter. In clipping systems the voice signal is amplified and allowed to saturate a diode or active-device limiter. The resulting waveform has an average-to-peak power ratio greater than the original-speech signal. Before transmission the clipped signal is filtered to restore the proper bandwidth. The two

methods may be employed either in the audio or rf stages of a transmitter.

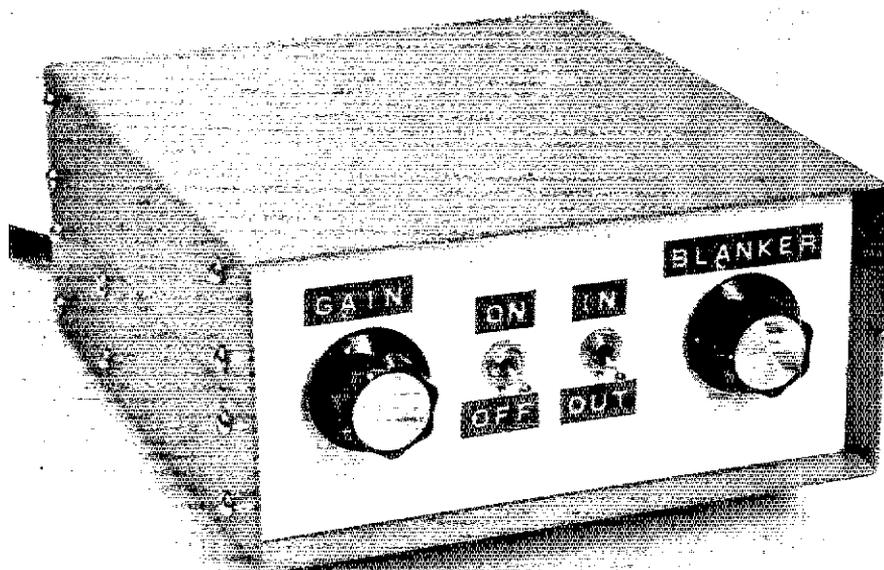
The processor to be described here represents a departure from previous approaches. Processing is done at audio frequencies, but in a unique fashion. The unit is used between the microphone and the transmitter so that no equipment modifications are required. Information about the compressor has been available in the professional literature for several years.^{1,2,3,4} However, to the authors' knowledge this is the first time it has been described in an amateur radio publication. In addition,

the specific circuit details differ substantially from those published previously.⁵

Theory of Operation

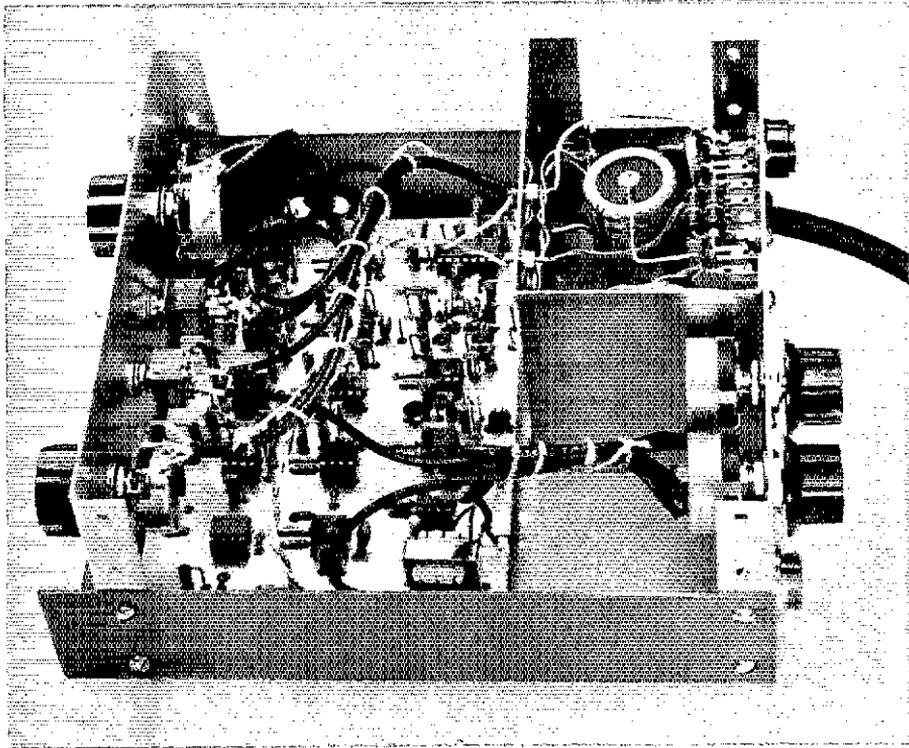
The homomorphic processor is based on the view that speech waveform is the product of two components. One is a slowly-varying envelope whose energy lies mostly below 100 Hz. This component, produced by the conscious and unconscious modulation of one's voice, causes the amplitude variations of the speech waveform. It has a large dynamic range and is responsible for the peaks and valleys we see in a speech waveform. The other component is a voice-frequency carrier (300-3000 Hz) which is similar to an fm signal — its frequency continuously changes but its amplitude

¹This and subsequent references can be found at the end of the article.



*Kimberly Lane, So. Glastonbury, CT 06073.

**164 E. 200th St., Euclid, OH 44119.



Shown here is an inside view of the speech compressor. The power supply is located at the rear of the enclosure. Mounted on the rear panel (at the right in this view) are the monitor volume control, the output level control, headphone monitor jack, input and output connectors.

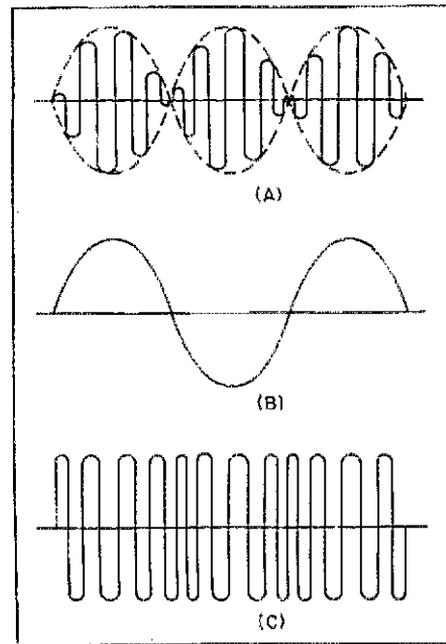


Fig. 1 — (A) A voice signal can be represented as an a-m waveform, which results from multiplication of a relatively slowly varying envelope (B) with a carrier, (C). Note the carrier peak amplitude is constant. The speech processor separates components B and C, and filters out B, leaving the carrier portion only.

is constant. This situation is analogous to what happens in a conventional a-m modulator where a low-frequency signal (the applied modulation) is multiplied by a higher-frequency, constant amplitude carrier. Note, however, that the a-m carrier is fixed in frequency, unlike the fm voice carrier.

The idea behind this compressor is to process the two speech components separately, suppressing the envelope as much as possible while reproducing the constant-amplitude carrier. This is possible because the two components occupy different frequency bands — the envelope is a low-frequency signal and the carrier is high-frequency. However, because these two components are multiplied together, they cannot be separated by simply passing the speech waveform through a high-pass filter. It is necessary first to transform the speech waveform into a different type of signal in which the envelope and carrier are added together rather than multiplied. When this new signal is high-pass filtered, the speech envelope component will be attenuated. Then, by reversing this transformation, the original voice carrier can be recovered. (See Fig. 1)

The first step of this process is accomplished by passing the speech signal through a logarithmic amplifier. This performs the mathematical operation of taking its logarithm and converts the product of the envelope and the carrier into a sum of two components. As indicated above, the original speech sig-

nal, S , may be represented as: $S = E \times V$ where E is the envelope and V , the voice carrier. At the output of the logarithmic amplifier, we then have: $\log S = \log (E \times V) = \log E + \log V$ where we have applied a well-known property of logarithms. Thus the transformed signal, $\log S$, is a sum of a low-frequency component, $\log E$, and a higher-frequency component, $\log V$. This signal is run through a high-pass filter with an appropriately chosen cutoff frequency and the output from the filter is just the carrier component, $\log V$. This signal then goes through an inverse-logarithmic or exponential amplifier which produces at its output the desired constant-amplitude signal, V .

Circuit Description

Additional operating details must be considered in implementing the preceding scheme. The reader is referred to the block diagram, Fig. 2, and the circuit diagram, Fig. 3.

Speech amplifier U1 boosts the incoming audio signal to a convenient, workable level. Before taking logarithms, the output from U1 must be full-wave rectified so that all of the waveform will be positive as the logarithmic amplifier works only for positive signal input. This corresponds to the fact that the logarithm of a number is defined only for positive numbers. U4 and U5 serve as a full-wave rectifier whose output proceeds to the logarithmic amplifier, U6 and U7. Matched

silicon diodes are recommended here for CR1 and CR2 for best results. If none are available, individual 1N914 silicon diodes may be substituted. The logarithmic stage separates the voice-frequency and envelope components of the speech waveform as described earlier and the envelope is filtered out by an active RC high-pass filter, U8, with a cutoff frequency (lower half-power frequency) of approximately 50 Hz. Those who are experimentally inclined may wish to try lower or higher cutoff frequencies by changing the RC network values. The expression for cutoff frequency f_c in terms of the filter components is:

$$f_c = \frac{1}{2\pi\sqrt{R3 \times R2 \times C1 \times C2}}$$

where it is required that $C1 = C2$ and $R3 = 2R2$ for proper filter response. Varying the cutoff frequency is analogous to changing the compression level setting of a conventional speech compressor. Lower cutoff frequencies result in reduced "compression." In the original model constructed by the author the cutoff frequency was made adjustable by using a dual ganged potentiometer with appropriate values in place of fixed resistors R2 and R3. It was found that a filter cutoff of 400 Hz or higher produced essentially constant amplitude output from the processor (complete compression). Harmonic distortion was quite noticeable in this case, however. Thus 50 Hz was chosen as a compromise between maximum

"compression" and minimum distortion. The distortion that is inherent in this processor occurs for signals which have considerable energy in the neighborhood of the high-pass filter cutoff frequency. With a 50-Hz setting, the perceived harmonic distortion is quite low. One word of caution: It is very important that the voltage gain of the high-pass filter be exactly unity for frequencies above cutoff. Otherwise, distortion of the speech signal will result, and under certain circumstances it is possible that some expansion, not compression, of the signal will occur. No difficulties should be encountered, however, with the filter configuration shown in Fig. 3, if filter component tolerances are kept reasonably tight.

The filtered signal proceeds to an exponential amplifier, U9 and U10. As with the logarithmic amplifier, matched diodes for CR3 and CR4 will produce best results, but individual 1N914s should serve satisfactorily. The signal at the output of U10 is still in full-wave rectified form (all positive). To be converted to its proper bipolar form, the signal is multiplied by the correct sign information — either positive or negative. The effect is to invert (make negative) portions of the signal which should be negative, leaving the remaining parts positive. The sign information is obtained by hard-limiting the voice signal at the processor input. Output from U1 is amplified by U2 and then limited by a diode clipper, CR5 and CR6. Because of the very high gain of the U1-U2 cascade and the relatively low clipping threshold of the diodes, the clipper produces almost pure square-wave output. Any positive audio input to U1 produces a positive clipped signal of approximately one volt at the clipper output, and any negative audio input, an output of approximately minus one volt. The square-wave output is multiplied with the signal from the exponential amplifier by analog multiplier U14. The LM1595, used at U14, produces an output voltage which is linearly proportional to the mathematical product of its two input signals from U2 and U10. Output is taken from buffer amplifier U11. The processed signal is finally routed through a low-pass filter, U12, with sharp cutoff above 3 kHz to eliminate unwanted high-frequency energy.

Because the processor is inherently sensitive to even the smallest input signals, undesired background noise or induced ac hum will be processed along with the speech and will appear as a loud disturbance at the output. To eliminate this problem, noise blanker U3 is included in the design. It consists of a free-running multivibrator with square-wave output at about 20 kHz, which is beyond audibility. When this signal is

added to the output of U1, the effect is to mask, before processing, any noise which is lower in amplitude than the 20-kHz signal.

An audio amplifier, U13, at the processor output, provides a convenient means of monitoring the processed audio output. It will drive low-impedance (8-ohm) headphones. If high-impedance headphones are to be used, T1 may be omitted entirely and output to the phones can be taken directly from pin 6 of U13 through a 5- μ F coupling capacitor.

Construction Details

An etched circuit-board template pattern is available from ARRL for \$.50. Builders who use this layout should experience no problems. Those attempting their own layout should be aware that because of the relatively large number of active devices, some operating with high gain, the potential for instability (oscillation) exists in a haphazard layout. Arrangement of circuit components should generally be in a straight line from input to output. The shortest possible leads must be used in all cases. Particular attention must be paid to the positions of U1 and U2 with respect to each other. Because of the very high gains associated with each, the input of U1 should be kept as far apart as possible from the output of U2. Mounting the circuit board inside a metal chassis, such as a Minibox, is recommended for rf shielding.

Procurement of parts should present no particular problems. As of the time of this writing, the 741 and LM301 operational amplifiers used in the circuit can be purchased from mail-order houses for about 30 cents apiece. The LM1595, probably the single most expensive item in the processor, was bought from one mail-order outlet for under two dollars. A pair of matched diodes (for CR1, CR2, CR3, and CR4) cost 75 cents.*

The circuit is powered by a dual dc-power supply capable of providing plus and minus 15 volts with respect to

*One source for this item is Tri-Tek Inc., P.O. Box 14206, Phoenix, AZ 85031.

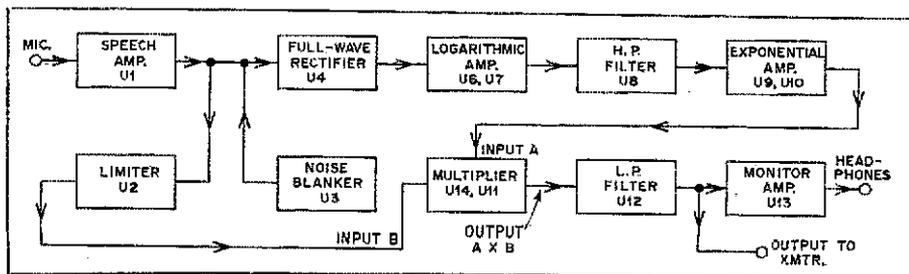
a common ground, as is typically used with many operational amplifiers. Current consumption is approximately 50 mA from each side of the supply.

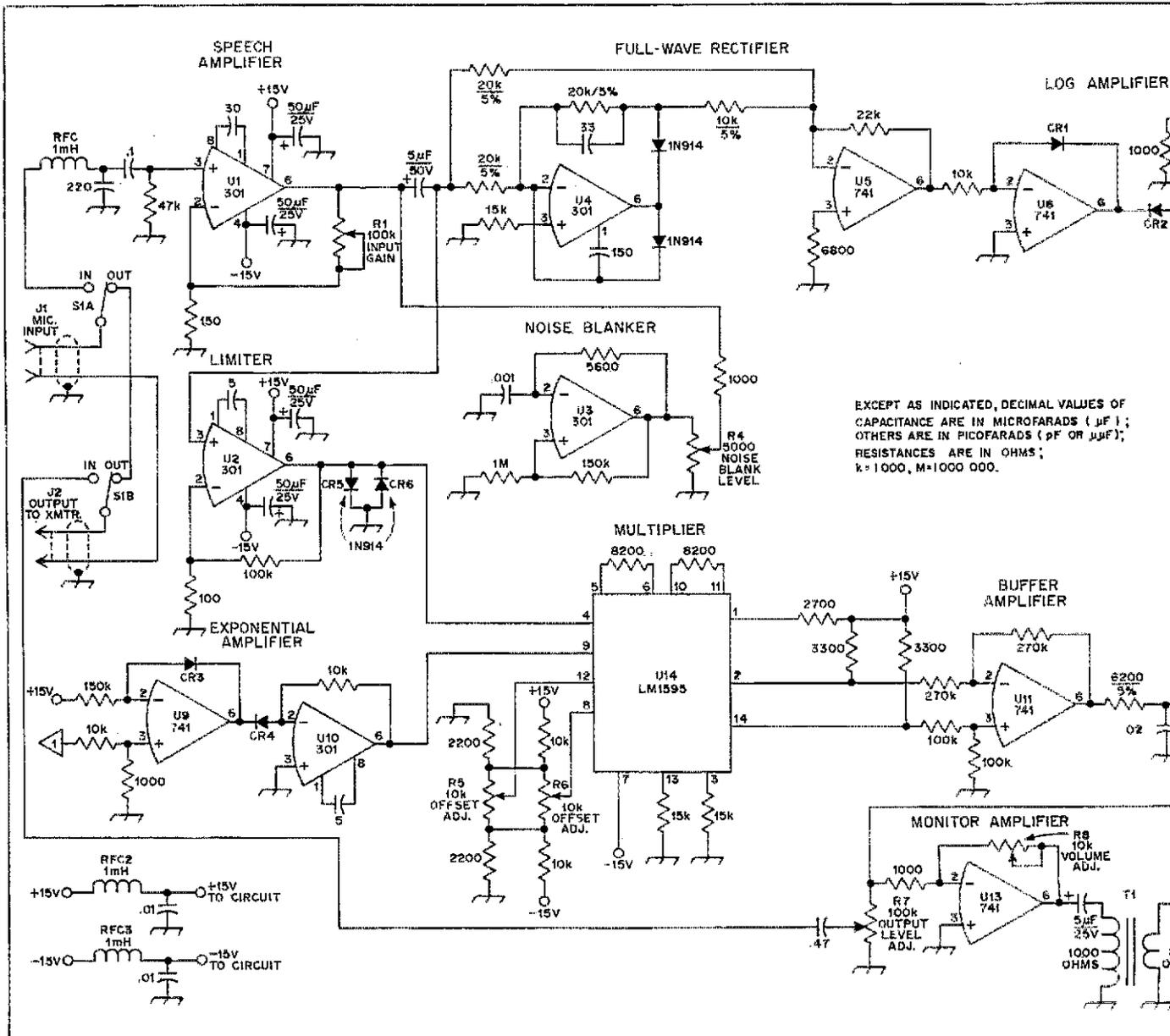
Initial Adjustments

If an oscilloscope and audio sine-wave generator are available, the following alignment procedure should be followed: Set R4 to minimum resistance. Connect a microphone to J1 and the oscilloscope probe to pin 6 of U1. Adjust R1, the input gain control, while speaking into the microphone so that the voice peaks viewed on the oscilloscope are slightly below the output clipping level of U1 (approximately 28 volts peak-to-peak). Remove the microphone and connect the signal generator to J1. Set the generator frequency to about 1000 Hz and adjust its output level so as to produce a 20-volt peak-to-peak signal at pin 6 of U1. Place the oscilloscope probe on pin 6 of U12. Adjust offset controls R5 and R6 for the best looking sine wave. The effect of these controls is to shape the positive and negative portions of the sine wave and to cause them to "meet" properly. It should be possible to produce a nearly perfect sine wave. Varying the level of the signal from the generator over a wide range should produce absolutely no change in the amplitude of the processed signal (provided the input stage U1 is not driven into saturation). This indicates that compression of the input signal is indeed taking place. Disconnect the generator, reconnect the microphone, and plug a set of headphones into J3. Advancing volume control R8, one should now be able to hear himself talking into the microphone, although background noise and ac hum will probably be very high. Adjust the noise blanking control R4 for the desired degree of background noise suppression.

Those who do not have access to an oscilloscope and signal generator may do the following: Set R4 to the approximate center of its range. Connect a microphone to J1 and headphones to J3. While speaking into the microphone, advance input gain control R1 and monitor volume control R8 to the point

Fig. 2 — Block diagram for the processor.





EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (μF); OTHERS ARE IN PICOFARADS (pF OR μMFD); RESISTANCES ARE IN OHMS; k: 1,000, M: 1,000,000.

Fig. 3 — Circuit diagram for the speech processor.
 CR1, CR2 — Pair of matched silicon diodes or 1N914s (see text).
 CR3, CR4 — Same as CR1, CR2.
 R1, R4, R7, R8 — Panel-mount type potentiometers.
 R5, R6 — Circuit-board-mount type potenti-

ometers.
 RFC1, RFC2, RFC3 — Rf choke, 1 mH. low current.
 S1 — Dpdt toggle.
 T1 — 1000-ohm to 8-ohm audio transformer, 250 milliwatts.
 U5, U6, U8, U9, U11, U12, U13 — 741 op

amp (Fairchild uA741, National Semiconductor LM741, Motorola MC1741, or equivalent), 8-pin mini DIP package.
 U1, U2, U3, U4, U7, U10 — National Semiconductor LM301 op amp, 8-pin mini DIP package.
 U14 — National Semiconductor LM1595 or Motorola MC1595, 14-pin DIP package.

where the speech becomes audible in the headphones. Adjust offset controls R5 and R6 for minimum distortion as monitored in the headphones. The final setting of R1 is not critical — it should be set high enough that the circuit functions properly (if set too low, the audio output may sound broken up or “grainy”) but not so high that the speech amplifier itself clips the speech signal, producing audible distortion. Adjust R4 to suppress background noise as desired.

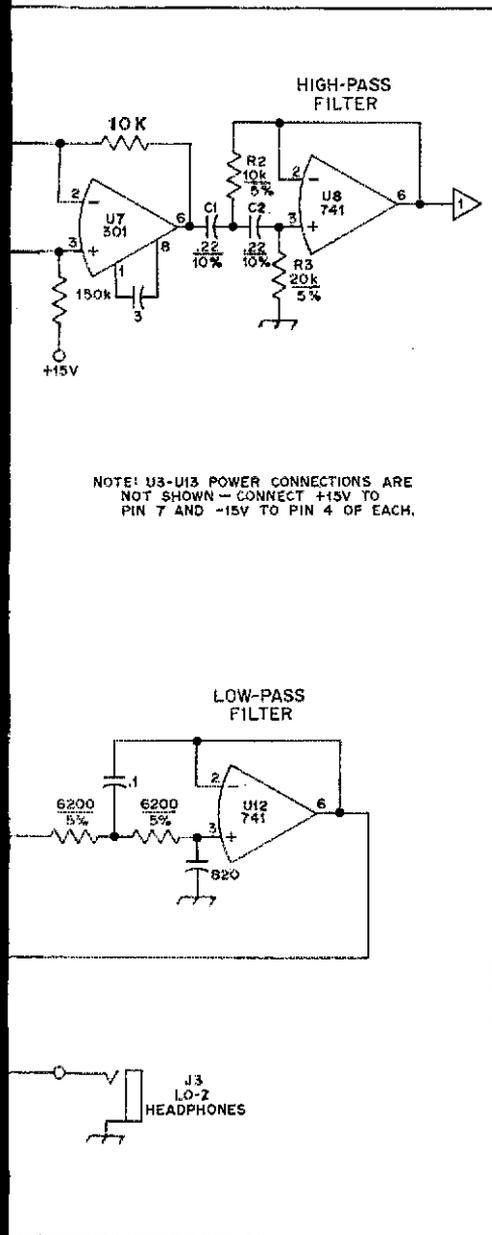
Finally, connect the processor output at J2 to the transmitter microphone

and adjust R7 to obtain the same peak reading. Switch the processor out of the line by means of S1. If a monitor scope is available to view the transmitter rf output, speak into the microphone and note the maximum level of voice peaks. Switch the unit in and adjust the output level control, R7, for the same maximum peak levels. Lacking an oscilloscope, the transmitter alc meter readings may be used instead. With the processor switched out, speak into the microphone and increase the transmitter microphone gain control until the alc meter starts to deflect. Note the peak readings. Switch the processor in and

adjust R7 to obtain the same peak reading.

Additional Remarks

One will realize the maximum benefits from this processor only when certain conditions are fulfilled. The audio quality of the processed speech depends greatly upon the quality of the input signal. It is the nature of this unit to make even small deficiencies in microphone response glaringly apparent in the processed audio output. Unless a good quality microphone is used, results will likely be disappointing.



almost always to blame, causing the transmitter output stage to clip and produce splatter. A Monitor scope displaying rf output must be used to determine proper operation in all cases. If one allows an over-drive condition to exist, however, the splatter produced by a processed signal tends to be more severe because the relatively high average signal levels will cause the transmitter to be driven into clipping a relatively large percentage of the time. Once the drive level is set properly, a processor will insure against flat-topping since it limits voice peaks which might otherwise cause splatter.

With regard to audio quality, it should be noted that a certain amount of distortion is produced by every type of speech processor. With the better units, however, worthwhile improvements in intelligibility are obtained before distortion becomes objectionable. One should be aware of the limitations of these devices and avoid the temptation to run them wide open. Such misuse is more a reflection on operator judgment (or lack thereof) than on the speech processor itself. On the other hand, one should realize that a processed signal will not sound exactly like the original. The object is to improve communications effectiveness which necessarily implies some loss of fidelity. This is not to say that the processed signal must sound unpleasant.

The processor described here has been used successfully on the air by the author. Signal strength and intelligibility improvements of up to 6 dB have been noted with the unit in use. A voice signal that is marginal copy will stand out among the noise and interference when the processor is switched in. The value of such improvements for DXing, contesting, or weak-signal work is obvious. Comments on the audio quality have been favorable. One amateur, who was unaware that a speech processor was in use, remarked that he had never heard better sounding audio on the air before. Rf feedback problems with the unit have been nonexistent, even when running one kilowatt input from 3.5 to 50 MHz.

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- ⁵ See reference 3.

QST

□ A generation of New England Division convention-goers will be saddened to learn of the death of Ernie Coons, WA4SIO, ex-W1JLN founder and guiding spirit of the Swampscott gatherings at the New Ocean House, Florida since his retirement from Browning Labs; he was 63.

BICENTENNIAL AWARD EVENTS

□ Station WB9GLQ is offering three bicentennial awards:

- 1) American Bicentennial Activities Award (ABA), a worked-all-states award
- 2) Bicentennial Prefix Award (PBX), for working 40 different bicentennial prefixes

3) American Bicentennial Districts Award (ABD), for working all 10 American districts during 1976.

For rules and other information write: Bicentennial Awards, P.O. Box 981, Oakbrook, IL 60521.

□ In January the mayor of Miami kicked off the Miami Bicentennial QSL Card Contest which will end midnight, July 4, 1976. The winner will receive from the City of Miami a plaque which he may have mailed to him. Or, he may opt to go to Miami to stay at the Barcelona Hotel for a week, free of charge, European plan, to attend the ceremony and receive his plaque from the mayor. Send inquiries to: Ms. Nora Swan, Bicentennial Chairwoman, Miami Bicentennial, Miami City Hall, Miami, FL.

□ Close upon the heels of the national bicentennial celebration, the City of San Jose, CA, celebrates its bicentennial during 1977. To observe the event, radio amateurs of the Santa Clara County Amateur Radio Assn. (SCCARA) invite hams worldwide to participate in an awards contest which begins July 1, 1976. For additional details contact: Club Secretary, SCCARA, P.O. Box 6, San Jose, CA 95103.

QST Congratulates . . .

□ Paul D. Pender, K8KBX, for being promoted to vice president and general manager of the Fisher Body Division of the General Motors Corporation.

□ Robert B. Weinstock, WB2TJR, named to the 42nd Edition of *Who's Who Among Students in American Universities and Colleges*, 1975-76. Totally deaf, Bob was cited for his academic performance and leadership participation. He is a life member of ARRL and the Potomac Valley Radio Club.

Furthermore, background noise should be minimized as much as possible since the processor will respond to very small input signals. A noisy environment, which might include a loud amplifier cooling fan or reverberation within the shack, may present problems. The noise blander will help suppress such noise, but when it is set to a high level, it will also suppress the voice signal, which in turn reduces the effect of the processing.

Because of the widespread misunderstanding in amateur circles about the operation of speech processors, a few comments are in order. Common complaints about processors are excessive transmitted signal bandwidth and poor audio quality. Excessive bandwidth can occur with or without the use of a processor. Too high a setting of the transmitter microphone gain control is

Product Review

Kenwood TS-700A 2-Meter Transceiver

In the midst of all the two-meter fm boxes that have flooded the amateur market recently, someone finally remembered that there were other modes of communication still in use on the vhf bands. Ssb and cw are popular for rag-chewing, tropospheric and scatter DX work, and earth-moon-earth communications. Near the larger population centers across the country some pockets of a-m activity can be found. There was a time when a single piece of equipment, that would encompass all of these modes plus fm, would have been a monster — both physically and circuit-wise. The recent offering by Trio-Kenwood shows that their engineering staff has done their homework. The TS-700A is a compact, self-contained box that requires only connection to the antenna, application of power (117 V ac or 12 V dc), and the plugging in of a key or microphone to be ready to partake of any of the modes mentioned above.

In size, it is readily portable — almost small enough to fit into an average briefcase — yet it seems quite at home when placed on the desk of a fixed station. For operating flexibility it offers full VFO coverage of the 144- to 148-MHz band, both transmitting and receiving. In addition to the VFO, it has switch positions for up to 11 crystals which can be selected for the more popular fm channels.

Ease of operation is one of the most noticeable things about the TS-700A. For cw, a-m, or ssb operation the unit is remarkably similar to the popular hf band transceivers made by the same manufacturer. All that is necessary is to tune in the station you would like to chat with and give him a call. A 100-kHz marker can be activated to provide dial calibration, and the RIT (Receiver Incremental Tuning) feature allows a fine adjustment to be made while listening to the other fellow. An S meter gives an indication of received signal strength or, when transmitting, relative power output. A noise blanker is available at the touch of a switch in case your neighborhood is not too quiet.

In the fm mode, the dial is accurate enough (after calibrating at the 100-kHz points) to make it easy to locate repeater output frequencies. A switch enables the selection of either simplex or offset operation. The offset is either 600 kHz below the received fre-

quency for normal operation, or an equal amount above for reversed use.

An interesting commentary on the planning that went into the transceiver is that when operating above 147 MHz, the *normal* position of the switch automatically places the transmitter frequency *above* the receiver, which is "normal" for that part of the band. Good thinking!

The S meter provides an indication of signal strength on fm, but at the flick of a switch it becomes a zero-center meter to allow accurate tuning of the receiver to the repeater (or other) station. Activation of a switch marked *tone* permits the use of a tone burst attachment for access to repeaters requiring such. The tone module is not furnished with the transceiver, but can be ordered as an internal plug-in accessory.

A study of the schematic diagram for the transceiver shows that it is a complex piece of equipment, indeed. Two features attract one's attention — liberal use of mixers and a neat application of variable capacitance diodes for electronic tracking of various stages. As an example of the mixing that takes place to obtain (or receive) a signal at 144.1 MHz, the VFO frequency (or one of 11 fixed-channel crystal frequencies) at 8.3 MHz is mixed with 125.1 MHz (the third harmonic of a crystal selected by the band switch) to produce 133.4 MHz. This latter is the injection frequency to the receiver first mixer, producing an i-f at 10.7 MHz. For transmitting, the procedure is reversed for all practical purposes, with an ssb signal being developed at 10.7 MHz, to be heterodyned with the VFO/crystal product for an output at 144.1 MHz. Normally, the use of multiple mixers in a transmitter would produce a large number of spurious signals of objectionable amplitude. However, a look at the transmitter output on our Hewlett Packard 8554B Spectrum Analyzer showed that this rig was indeed "sanitary" (see photograph). Any spurious mixing products are so far below the main carrier as to be difficult to find. This can be attributed to the excellent filtering and buffering throughout the critical stages of the transceiver.

There are separate i-f and detector stages for fm and cw/ssb/a-m. For the fm mode, a second conversion is used to bring the signal down to 455 kHz for further filtering and limiting before detection. The squelch action seems to be unusually crisp, almost a "snap-action" type of response. Signals that were readable would open the squelch; those that were not, would not.

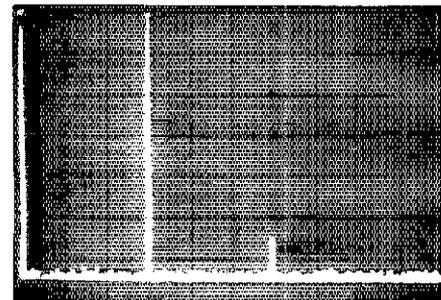
Audio quality on both transmit and receive is excellent. One experienced two-meter operator, accustomed to the asthmatic-duck sound typical of too many vhf ssb signals, listened to the receiver a few minutes and said, "Hey, even my wife would like the way that sounds."

Following the microphone preamplifier, voice signals take separate paths to the circuitry to generate fm or a-m/ssb. Separate

level controls in each path allow the operator to compensate for any differences in operating technique, as for instance the higher noise level in a typical mobile installation might require that transmitted fm audio gain be set lower, and that the operator talk closer to the microphone. At the moment, most ssb activity is conducted from the relative quiet of the ham shack, so that extraneous-noise pickup is not a great problem.

A thorough reading of the operating manual is recommended, since some pitfalls for the unwary are discussed therein. Example: if a crystal is used to provide operation at 145.0 MHz, but the bandswitch is set to 144, out-of-band emissions could result. Other aids to proper operation are given in the manual, as well as a reasonable discussion of the theory behind the entire transceiver circuitry.

In addition to the tone module mentioned earlier, an external VOX circuit (VOX-3) is available as an accessory. It is easily connected by means of a convenient socket on the back of the TS-700A. — WISL



Spectrum-analyzer display of the TS-700A output. Vertical scale: 10 dB/div. Horizontal scale: 50 MHz/div. Power output: 10 watts.

Kenwood TS-700A 2 M Transceiver

Dimensions (HWD) and Weight: 5-3/8 × 11-1/2 × 15 inches, 22-1/4 lbs.*

Power requirements: 117/220 V ac, 95 W or 12 to 16 V dc, 4 A (transmit).

Frequency range: 144 to 148 MHz.

Modes of operation: Cw, a-m, fm, usb, lsb.

Power output: Cw, fm, 10 watts minimum; a-m, 3 watts min.; ssb, 20 watts dc input min.*

Receiver sensitivity: 0.18 μ V for 20 dB quieting on fm; 0.21 μ V for 10 dB S/N ratio on ssb.*

Image rejection: Better than 60 dB.*

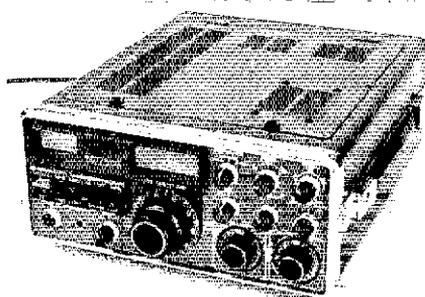
Receiver i-f bandwidth: 12 kHz for fm, 2.4 kHz for other modes.

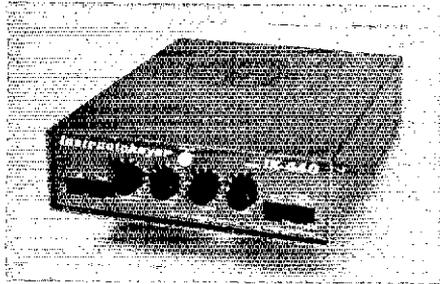
FM transmitter deviation: \pm 5 kHz.

Price class: \$700.

Distributor: Imported by Trio-Kenwood Communications, 116 E. Alondra Blvd., Gardena, CA 90248 (available from authorized Kenwood dealers nationwide).

* Measured in ARRL laboratory.





CURTIS IK-440 INSTRUCTOKEYER

Someone is probably wondering what new keyer feature could justify a review of another Curtis product, for the product line has become fairly standard — until now, that is! With respect to the IK-440, the manufacturer has packed a lot of “goodies” into the gray box which reposes on the reviewer’s ham-station desk. The current model is not only a high-quality keyer, but is a cornucopia of code-practice sessions which are available when needed.

An instrument such as the IK-440 is not likely to be found among the ham-station items of those who strive to send cw with a “Lake Erie” or “banana boat” swing. Well-designed keyers are for those who appreciate the skill which goes with the sending of proper, easy to read Morse. The latter is a joy to copy at any speed, and good keyer electronics, a precision paddle, and the pride needed to learn how to send “clean” cw is all that is needed to help the operator at the other end of the QSO effect Q5 copy. Although it can be done with a keyer, your CQs aren’t likely to come out as “NN MA NN MA NEE” instead of “CQ CQ DE.” The IK-440 has the kind of electronics which contribute to the sending of precision cw — the variety that is most easy to copy and comprehend, especially at high speeds.

The basic keyer is identical to the EK-430 CMOS unit which was described in an earlier *QST* review.¹ However, the ‘440 has a built-in self-test feature that permits code-sending practice without unhooking the keyer from the station equipment. A front-panel switch is actuated to provide this facility. The instant-starting feature of the ‘440, plus the self-completing dots, dashes, and spaces make it difficult for the user to abuse Morse code by developing a “characteristic fist.” That is, about all that can be done to make The Old

Man fitful in his grave is to employ excessive spacing between letters or words, misspell words, or send a cliky, chirpy, buzzy signal — all of which are beyond the control of the keyer. The same is true, of course, when using a keyboard keyer.

A weighting control is included in the IK-440 and is a useful feature when used correctly. The instruction manual states that “weighting” of the code characters will help the operator to make “more of a dent in QRM” with his signal, or to make the cw signal sound more “silky.” This reviewer isn’t sure quite what is meant by the latter definition, but too much weighting can make a signal *more difficult* to copy in QRM, as the characters then run together in an undecipherable blur. When properly employed, a weight control can be beneficial in lengthening the dots and dashes to *compensate* for shortening of the characters caused by the keying circuits in some transmitters. The code characters should never be made longer for a given speed than is proper. When the weighting control is fully counterclockwise, zero added weight is assured.

Code Generator

The feature which sets the IK-440 apart from its EK-430 cousin is the built-in code generator. This profoundly useful facility should be of interest to groups engaged in teaching code to newcomers, for upgrading club members to a higher license class, and for transmitting code practice over the air. Individuals can practice copying code at home as time and mood permits.

This writer can attest to the value of the IK-440 in the latter sense, for despite an ability to copy cw in his head at speeds in excess of 30 wpm (if sent properly) for several years, getting the stuff on paper was another matter — an impossible task for this poorly coordinated block-letter printer! That Extra Class license seemed beyond realization. WIAW code practice was useful, but the 20-wpm and higher-speed sessions weren’t frequent enough to allow sufficient practice. Furthermore, the higher speeds were often sent when the writer was too tired from a day’s work to take advantage of them. Then came the IK-440 for *QST* review. It was garnered almost immediately by the reviewer and sequestered at the home QTH for personal use and performance evaluation. Code practice was carried out nightly at times when the mood was appropriate, and 25 wpm was the speed chosen to learn how to put it on paper. At first the random-code output from the unit changed from clear cw to a frustrating collection of gibberish when the pencil was taken in hand. After a few nights of working with the IK-440, an encouraging trend developed — coordination between mind and body, and the copy on paper became meaningful.

A switch on the rear apron of the keyer provides for selection of alphabet characters only (alpha-numeric switch), which is a feature that should be of interest to Novice study groups. When the switch is set for numeric output of the keyer, continuous mixtures of letters, numbers and punctuation marks are produced. Word spaces are included in the output information, and the same order of numbers, letters and punctuation marks is never repeated. Therefore, it is impossible to memorize the output data. The punctuation marks include the following: period, slant bar,

question mark, comma and BT. A typical string of output information might be: LYZ?/4T780 BT XL., 5G MQ99V3/.

Accuracy of one’s copy can be checked by tape recording the keyer output while practicing. The tape can be played back for checking the material that was written on paper. The writer taped several minutes of random cw from the IK-440 and took the cassette player to the town in which the FCC examination was given. It provided a means for last-minute practice before taking the test. The Extra Class examination was passed successfully. Practice time with the IK-440 occurred over a two-week period. Approximately one hour a day was devoted to using the unit.

Generator Circuit

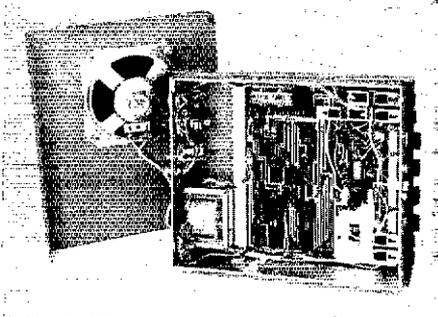
The circuit consists in part of a six-bit binary counter and is clocked by means of a free-running 2.5 MHz oscillator. A selection of 2-1/2 million character addresses is provided each second at the inputs of two latches. Upon completion of the previously sent character, a pulse from a one-shot IC enables the latch ICs for approximately 30 nanoseconds, at which time a new set of addresses is latched in for a new character. Because of the variable length of the transmitted characters, and resulting from the characteristic instabilities of the 2.5 MHz and keyer clock oscillators, this strobing action provides a random selection of the 64 possible character addresses. The instruction booklet gives a detailed description of how the code generator works and provides a block diagram of the circuit.

Performance Observations

During several weeks of daily use at WICER, the keyer has performed faultlessly, both as a keyer and a code-practice facility. Errors have not occurred for any reason other than lack of operator agility and coordination. The unit has been used with a home-made 100-watt solid-state transmitter on 160, 40, and 20 meters, and no evidence of rf interference with the circuit of the IK-440 has been observed. Significant changes in line voltage occur periodically at the reviewer’s home, but no adverse effect could be seen in keyer performance as a result. It will be a difficult task, indeed, to return to using the old homemade solid-state keyer now that this review has been completed. — WICER QST

Curtis IK-440 Instructokeyer

Dimensions (HWD): 2-1/2 x 7 x 10 inches.
 Weight: 2 pounds, 10 ounces.
 Power requirements: 75 to 135 V ac, less than 5 W.
 Color: Light gray with white lettering.
 Speed range: 4 to 50 wpm, upper speed limit adjustable.
 Key-line rating: Plus or minus 300 V dc at 200 mA or less. Solid-state switching.
 Circuit type: Instant starting, dot memory, iambic, self-completing dots and dashes.
 Price class: \$225. Manufacturer: Curtis Electro Devices, Inc., Box 4090, Mountain View, CA 94040.



¹ *QST* for March, 1971.

Hints and Kinks

SOME IDEAS ON STATION LAYOUT AND HELPFUL ACCESSORIES

Desk drawers with stops: "Second" or "reject" doors, finished and mounted on legs with flaps underneath, have come into common use as desks. Two-drawer filing cabinets on each end, beside the legs or in place of them, further extend the usefulness of the gimmick. There is a need for more carpentry to make shallow drawers for installation under the length of the front of the desk. An easy trick is to use shallow aluminum baking pans of the type that are made with a rolled lip around the top. Strips of wood can be grooved, then glued and screwed underneath the door. The pans are simply slipped by the lip into the grooves. For a nice finishing touch, varnished strips of wood are secured to the front side of the "drawers." Both front and back slide stops are made by placing a stick-on rubber foot on the underside of the table. For the inside stop, simply reach inside the open drawer at its intended maximum pull, and stick the stop in place.

Step-to-talk: For those who haven't discovered the ease of using a foot switch, here's a quick application for a relay from the junkbox. Select one that will sit flat on the floor, wire the push-to-talk circuit through a length of line cord to the contacts, and place the assembly on the floor under your operating table. A mic on a boom makes for hands-off operation in the absence of VOX as well as the professional studio look for the station.

Centralize your switches: A friend of mine,

This operating position features many of the hints described, including a relay for the foot switch, power panel, boom mic and Kleenex box speaker cabinet as well as the custom-crafted baking pan drawers under the table.



told me how he stops worrying about wearing out the switches in his various units. He has them wired through a master control panel which can be rigged to include master switch, fused circuits, and individual circuit switches labeled for various pieces of equipment. Wire such a unit with a three-wire system for maximum shock protection. The installation might also include a voltage-monitor meter, and the position would be a good place to put your SWR meters.

Speakers the easy way: New poly-planar foam cone speakers are being marketed by Lafayette Radio Electronics in a 5 x 8-inch size and will fit marvelously into a plastic Kleenex tissue box, the oval opening serving as the cabinet sound exit. Drill four holes in the front, spaced to fit the speaker mounts; mount the speaker with a double layer of grill cloth, and drill two more holes in back, where you prefer, for hanging the speaker cabinet on the wall.

Doorstop/bookend: I just can't bring myself to throw out that old transformer that burned out in my af amplifier. It makes a fine bookend or doorstop. Be sure to put a strip of felt on the feet so you don't mar the bookshelf. — Harrison Leon Church, WØKXP

AMSAT-OSCAR 7, MODE B OPERATION MADE EASIER

One way to generate a signal of any mode at 420 MHz is to high-level-mix two signals in the final amplifier stage of a Motorola, RCA, General Electric or any of the other commercially manufactured 460-MHz Business Band equipment. These units are usually rated for a minimum output power of 15 watts, with the final output stage operating in the Class C mode. A very cooperative unit for conversion is the RCA CMU-15 which uses a 5894 as the output tube.

Here is one procedure for converting this type of rig for use as a high-level mixer:

- 1) Secure a copy of the manufacturer's

instruction manual for the tuning procedure and general information on the particular piece of equipment to be modified.

- 2) Obtain a crystal of the proper fundamental frequency so that the unit can be tuned up on 460.45 MHz, the original design center frequency.

- 3) A power supply which will provide 330 volts at 400 mA, 330 volts regulated (for use with the oscillator) and -105 volts for bias is required.

- 4) Remove the modulator-limiter tubes from their sockets.

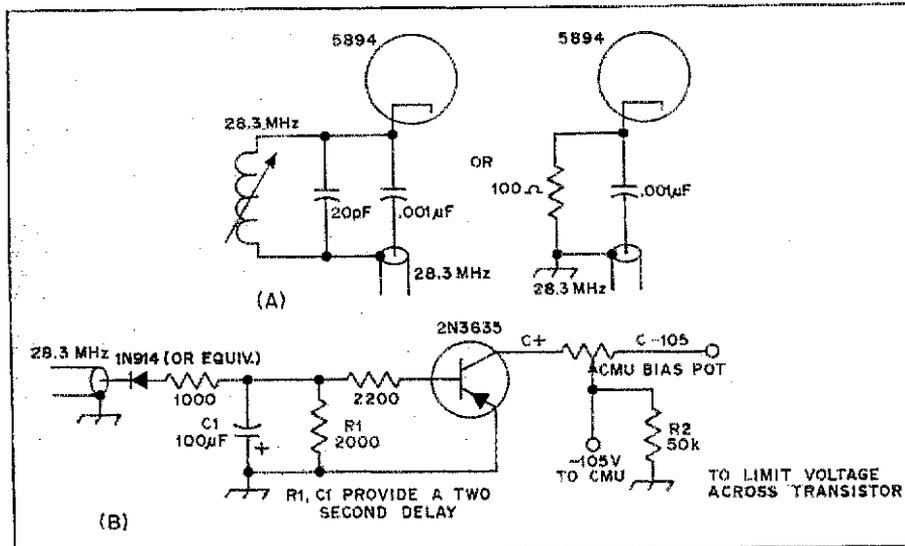
- 5) Tune the "strip" as if for operation on 460 MHz; about 18 watts of 28.3-MHz energy will be required for proper mixing. Mixing can be accomplished by applying the 28.3-MHz signal to the 5894 grid or cathode circuit. The circuits at A show two methods for mixer input. The cathode circuit is the suggested since it is the easiest of the two methods.

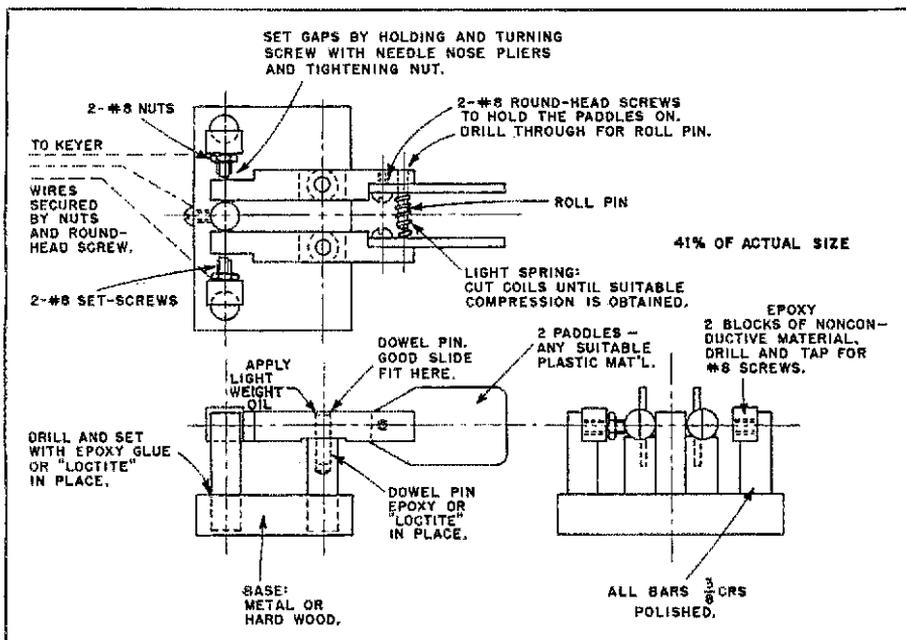
- 6) Apply a 28.3-MHz signal as shown and readjust the output tuning capacitor for maximum output at 432 MHz. A strip-line filter should be used to attenuate the unwanted mixer products. Under key-up conditions the 5894 output circuit is out of resonance since the plate tank circuit is tuned to 432 MHz and the excitation to the tube is at 460 MHz. To minimize damage to the strip (and for cooler operation) the circuit shown at B provides for the last three stages of the strip to be biased to cutoff during key-up conditions.

The CMU-15 provided about 10 watts of output power after the above modification was performed. This output power is used to drive a 4CX250B linear amplifier for use with Oscar 7. It has performed very satisfactorily. — Ben Stevenson, W2BXA

VE3CJB KEYSER PADDLE

The Canadian amateur who buys parts which are manufactured in countries other than





Canada naturally has to pay import taxes; when faced with the cost of purchasing a keyer paddle plus the tax, I balked! One solution to this problem seemed to be to come up with a scheme to build a keyer paddle. I finally made one that looks and feels as good as the commercially manufactured units. I got to thinking that maybe there are other hams who, for one reason or another, would be interested in my design layout.

The paddle's construction is such that it does not require the use of any uncommon household workshop tool. The only power tool required is a hand drill (naturally a drill press would be preferred, especially if a steel base is used). The main parts are made of 3/8-inch cold-rolled-steel rod, cut and filed to fit as called for on the drawing. — *Jim Baker, VE3CJB*

KEYER WEIGHTING

Charlie, an old friend who just received his Novice license, asked me a question: "How fast can you copy?" As I started to reply, I realized that there was no simple pat answer. There was no unqualified number I could give him. It required a little discussion that went something like this:

My cw receiving speed is almost wholly dependent on the sender's quality of articulation, his rhythm, spacing, and keyer weighting. I can read a super operator such as F10, W7QYA, at 50 words per minute and there are some hams I strain to copy at 10 words per minute. And some of the hard-to-copy hams are not beginners, either, but old timers who have exacerbated their bad habits. And the trouble is that it takes a lot of courage to tell a friend that he has a lousy fist — sort of like telling him he needs a deodorant.

A few years ago, I was involved in some rather elaborate measurements of speech intelligibility conducted by Cruft Laboratory of Harvard University. The "articulation percentage" was the percent of words understood with different amounts of noise and with various frequency responses. From these tests came an understanding of just what was

required for accurate, articulate speech under various conditions.

The same general observations apply to cw. The pitch, for one thing, should be centered around 1 kHz where the ear is the most sensitive, especially at low levels of sound. It acts as a band-pass filter of sorts.

An all-important factor in producing easy-to-read cw is the "weighting" of the keyer or the setting of a bug. This is the ratio of the dit and dah length to the space between them. The classical ratio is 1:3, in which the dit is 1/3 the length of a dah and equal to a space. However, in practice, it is a bit choppy in the range of 15-20 wpm where most of us work. Increasing the character length about 15% gives about the same readability but is a lot more pleasant to read for it is smoother and a little musical.

For speeds above 25 wpm, weighting becomes extremely important. Shortening the characters with respect to space increases the articulation and the greater the speed, the shorter the bit lengths should be to make it easy for the ham at the other end. The greatest problem for an operator of a DX station is to read the call signs of stations calling in a pile-up, especially under "wide open" band conditions. Sometimes a call is discernible only for a second or so. To be read, it must be clean. If the signal is fairly weak, (in a pile-up of loud signals, all often appear weak) the right combination of moderate speed and short weighting will often bring a reply to the station that is several "S"-units below the others who are pounding away with slurred signals.

An easy way of visually determining proper weighting is to connect an ohmmeter across the keyed output. When the dit side is actuated, the meter will read half scale for a 1:3 ratio. This is, of course, because a dit is equal to a space. This is the basing point.

Some electronic keyers have variable weighting; others have factory preset weighting. Most can be modified to provide the ideal weighting for your particular style of operating. If your normal operation is in the 15-20 wpm range, you will find that an increase of about 15% will give you the best balance of

articulation and smoothness. You will sound great, be easy to copy. If, however, you are QSOing some pretty fast company, reduce the characters by the same amount and you will be doing a favor for the ham at the receiving end. If your keyer has a preset factory adjustment, by changing a resistor or installing a variable control, you can tailor it to your individual preference.

With the increased interest in higher code speed these days, perhaps we need a new Q signal to request advice on optimum setting. Or to suggest a change. If it was in general use, it would be a help in producing more legible cw at any speed as well as less strain and tension. — *Albert Kahn, K4FW*

REVITALIZING NICAD BATTERIES

Nickel-cadmium batteries of the kind used in Motorola P-33 hand-carried fm transceivers are prone to becoming relatively lifeless after a few years of charging and discharging. Though the old batteries will take a charge, the capacity of the units is very small. A fired battery will reveal its condition by allowing only a few minutes of transmitting time after being fully charged. However, the receiver will perform fine under the same conditions, mainly because the dc-to-dc converter which supplies operating voltage to the transmitter strip consumes considerable current.

Those wishing to renew battery life can place a pellet of industrial potassium hydroxide (ACS pellets) in each cell bank of the batteries, after removing the plugs. The chemical carries the number FW-56.11, and sells for approximately \$1 per pound in most areas of the USA. — *WICER*

POLAR/RECTANGULAR PLOTTER REVISITED

WB2NAG's calculator to convert polar to rectangular coordinates [*QST* for Dec., 1975] brings to mind the fact that most of us hams who are also pilots already possess a similar device used to solve "wind triangle" problems.

The circular "wind side" found on circular slide-rule type computers is used by pilots to find vector sums of wind, aircraft flight path and ground course. Determining the cross-wind component of a quartering wind at the runway is a good example of converting polar to rectangular coordinates.

The same plotter can be used to work "impedance triangle" problems involving X, R, Z, and phase angle ϕ . — *A. A. Speer, W0BOA*

ANOTHER CLIF-DWELLER ANTENNA

Most transmitters are designed to work into 50-ohm loads. Some amateurs, particularly newcomers, don't realize that a simple antenna that provides a low-impedance load in the 50-ohm region is an end-fed wire that is a quarter wavelength or odd multiple of a quarter wavelength for the desired band. When using such an antenna, simply connect one end to the output terminal on the rig, and get the other end as high as possible. Be sure to use an earth ground on the transmitter. —

W1ICP

QST

Working Toward WARC

WARC – The World Administrative Radio Conference – will be held in 1979. Already, Amateur Radio is up to its headphones in preparation.

By Victor C. Clark,* W4KFC

An increasingly valuable international resource, the radio frequency spectrum is shared by a growing number of services in every part of our globe. In 1979, delegates from 147 member nations of the International Telecommunication Union (ITU), an agency of the United Nations, will meet in a World Administrative Radio Conference (WARC) at Geneva, Switzerland, to examine, debate, and reallocate the entire radio spectrum from 10 kHz to 275 GHz – almost from dc to the visible wavelengths. This will be the first such all-encompassing appraisal of spectrum uses and needs since 1959, when the bands now occupied by the Amateur Radio Service were assigned or reconfirmed for our use by the ITU.

Changes Since 1959

Radio amateurs are well aware of the variety of technological developments which have served to change earlier and

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IARU vice-president Vic Clark, W4KFC, confers with president Noel Eaton, VE3CJ, on WARC preparation for the Amateur Radio Service.



traditional forms of radio communications during the past two decades. Most are cognizant, too, of the spectacular increase in spectrum occupancy which has taken place in recent years, particularly in the vhf and uhf regions. Stabler frequency control devices and new narrow-band techniques have enabled more efficient spectrum occupancy. The shift to satellites and cables for long distance communications and broadcast relay, and to vhf, uhf and microwaves by services once found only in the lf-mf-hf (30 kHz to 30 MHz) regions, has tended in particular to relieve hf (3 to 30 MHz) spectrum loading.

Although these developments have benefited the remaining users of the lower frequencies in the radio spectrum, activity has increased manifold in the vhf and uhf. Moreover, new users in great numbers have appeared in the hf, as reflected in the upsurge of intruders in our worldwide exclusive amateur allocations and the growth of non-amateur activity in shared segments of our bands.¹

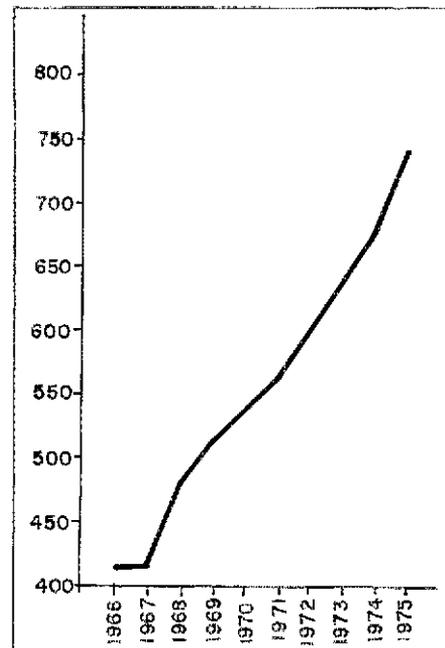
While many question its usefulness, short wave broadcasting has continued to grow throughout the world, and the broadcast services will be pressing at the WARC for substantial increases in exclusive hf allocations for its further expansion. Unfortunately for competing services, the belief apparently persists in high government circles both here and abroad that a clique of high power short-wave broadcast stations is in some way related to international influence or prestige. Until the wastefulness of this concept becomes more widely apparent, the interests that thrive on the growth of high power hf broadcasting will be lobbying vigorously for additional frequencies.

¹This and all subsequent footnotes will appear at the end of this article.

Another fact to note is that many of the communications services which have shifted their circuits to cable, satellites and microwave relay will undoubtedly seek to retain hf allocations for emergency back-up purposes, and there are still many countries in Africa and Asia where hf radio is the only economically viable communications link for many locales. Obviously, competitive pressure by the various radio services for allocations in all parts of the radio spectrum will continue to be intense in the years ahead.

What then of amateur radio? Should the Amateur Radio Service, which is growing and thriving worldwide, seek merely to dig in and cling to its existing assignments, some of them already

Fig. 1 – Number of Amateur Radio Stations Worldwide (in Thousands)



rendered only marginally useful by illegal intruders and superpowered short-wave broadcasters?² In the years since 1927, when the hf allocations to the Amateur Radio Service were established near their present limits, amateur radio has been able to grow only because of our willingness to convert to frequency-conserving techniques such as single-sideband and to employ our allocations without channelization, resulting in an efficiency matched by no other service. Notwithstanding its exceptional record of spectrum conservation and disciplined operation, the amateur service will require additional exclusive frequencies if it is to continue to perform its vital roles as technical educator of a growing segment of the populace, a medium for international amity, and public benefactor in communication emergencies.

U.S. Preparations

To this end, work was begun more than two years ago to develop a recommendation for the United States position on amateur radio for use at the 1979 conference. In 1973, a working group of the Spectrum Planning Subcommittee of the Interdepartmental Radio Advisory Committee (IRAC) developed a set of proposals calling for exclusivity of use by radio amateurs in internationally shared portions of certain of our hf bands, and the assignment of additional frequencies for worldwide amateur use at 10, 18, and 24 MHz.³ These proposals must survive a number of tests before becoming a part of the U.S. national position, however.

Preparatory work for the WARC now is underway in some twenty-odd working groups, formed by the Federal Communications Commission to investigate the spectrum needs of the United States to the year 2000. The recommendations of these specialty teams, one of which represents the Amateur Radio Service, will be reviewed by one or more of four functional committees and their recommendations submitted to an FCC steering committee. The steering committee, composed of high level members of each of the Commission's bureaus and offices, will have responsibility for formulating the FCC's basic spectrum recommendations for use at the 1979 WARC.

The Advisory Committee for Amateur Radio (ACAR) draws its membership from government, industry, and the amateur fraternity.⁴ Several task forces have been established which function along lines suggested by their titles (see Fig. 2). ARRL members, officials, and staffers, along with representatives from FCC and other government agencies, comprise the bulk of its membership. The chairman is John Johnston, K3BNS, Chief of FCC's Amateur and Citizens

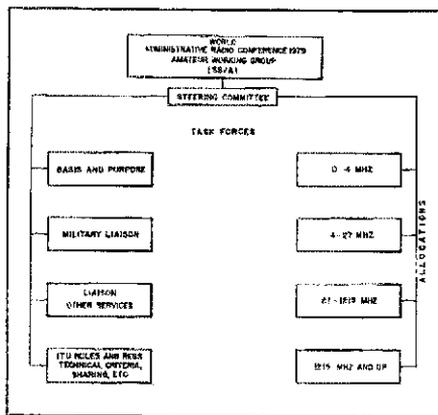


Fig. 2 — Structure of the FCC Advisory Committee for Amateur Radio

Division. It will be the work of this committee to prepare and present a set of recommendations and supporting documentation for evaluation and, hopefully, adoption as part of the United States position for the 1979 WARC. This work is now proceeding on a deliberate and exacting schedule, and the resources of ARRL are being provided on a continuing basis to facilitate its timely completion.

International Realities

A hard fact of life is that any country, however supportive its commitment to the cause of amateur radio may be, has but a single vote to cast at this international forum. There will be as many as 150 other nations voting, as well.

Unfortunately, not all of the governments to be represented at the WARC comprehend or necessarily sympathize with the purposes or objectives of the worldwide Amateur Radio Service. Particularly, in certain areas of the world where modern technology has but recently made its appearance, neither the need for technological training of the citizenry nor the other potential benefits represented by a national Amateur Radio Service are recognized or understood. Indeed, some governments appear to believe that it is essential merely to establish powerful short-wave broadcast stations to proclaim their presence among the family of nations. Through inexperience or nescience they will neglect to encourage and develop a far more impressive and credible international radio image . . . an Amateur Radio Service of their own.

One may rightly conclude, therefore, that the selling job on behalf of amateur radio is a formidable one, and that it must proceed on a worldwide basis.

The IARU

The International Amateur Radio Union (IARU) is an organization in

which the national amateur radio societies of 89 countries of the world hold membership. Formed just over 50 years ago, this Union has grown steadily. The American Radio Relay League serves as the headquarters society for IARU, and the Union's international officers are selected from among the officers of the headquarters society. The current IARU president is Noel Eaton, VE3CJ, who is also an ARRL vice president. Communications are maintained among the IARU member societies by means of the semi-annual *Calendar*, correspondence, and personal visits. Additionally, monthly newsletters are now being issued, in three languages, expressly to aid member societies in making their preparations for the 1979 WARC.

The IARU organization functions on a regional basis which corresponds to the three world regions of the ITU (See Fig. 3):

Region I — Europe (including all the USSR), the Middle East, and Africa

Region II — North and South America, plus Hawaii

Region III — The countries of the Pacific and Asia except those in Region I. IARU member societies generally hold membership as well in the respective regional organizations. Each IARU regional organization elects an executive committee, which typically includes the regional president, vice president, secretary, treasurer and three members-at-large, to conduct the day-to-day affairs of the organization. Delegates from the member societies of each of the three regional organizations generally meet once every three years to transact business and elect its complement of officers.

During the next three years a principal function of each IARU member society will be to assure that its government provides maximum support to the Amateur Radio Service at the 1979 WARC.

While the interests of amateur radio are thus receiving increased organizational attention and support on a worldwide basis, several of the countries of the world as yet have no viable national amateur radio organization. Indeed, of the 147 voting member nations of the ITU, only 81 are represented by corresponding IARU societies. It should be noted, too, that a number of these societies are small or of comparatively recent origin, and some of these have not yet been able to develop a close and cooperative working relationship with their regulatory agencies.

Much work must be done, therefore, to support new societies in their early organizational efforts, and to extend the cooperative assistance of the IARU to areas of the world where amateur radio now lacks an effective spokesman.

It is vital that the radio amateurs of

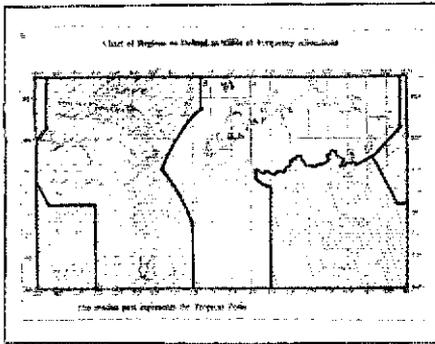


Fig. 3 — ITU Radio Regions

the ITU member nations agree upon and join together in support of a reasonable and practical amateur radio position for the WARC and that efforts to gain governmental endorsement for this position go forward in concert throughout the world. The obvious mechanism for achieving such a coordinated approach to this objective is the International Amateur Radio Union.

Progress is being made toward this end among the active member societies in Regions I and III; significant agreements were reached in the course of regional conferences held in Warsaw and Hong Kong, respectively, during 1975. This work will go forward during the Region II Triennial Conference to be held in Miami, Florida, in April of this year. At this time meetings also will be held among the representatives of the three world IARU regional organizations to further assure a unified approach to

preparatory work for the 1979 WARC.

No task of this magnitude and importance has confronted the world amateur organization heretofore, and the responsibility which it carries is keenly felt. Amateurs currently charged with responsibility for carrying out the work of the IARU have been elected to their positions by the members of their respective national societies. The costs of IARU-related activities are borne by those societies — in our case, of course, the ARRL. It follows, therefore, that the ultimate success of our preparations for the WARC, and thus the future of the Amateur Radio Service, depends upon the continuing support of their IARU-member societies by individual radio amateurs throughout the world.

At no time in all the history of this useful and rewarding pursuit known as amateur radio has there been a greater need for unity and for cooperative support by its participants of all interests and persuasions. The stakes are much too high to permit us to enjoy the luxury of either apathetic detachment or abusive criticism. *Every amateur can help*, and here are a few suggestions for starters:

- 1) *Belong* to and support your national amateur IARU member society.
- 2) *Be active* on the air and conduct your activities in such a way as to reflect creditably upon the Amateur Radio Service.
- 3) *Be aware* of and assist with, as your circumstances permit, the organizational affairs of your society and your society-affiliated club.

4) Examine your amateur radio activities and strive to maximize those producing visible benefits to the public.

5) In your international radio contacts or travel abroad, conduct your affairs in such a way as to foster good will and understanding of the benefits of the Amateur Radio Service. Observe explicitly the regulations of the host government, especially those related to third-party traffic and permitted transmitter power.

Some amateurs have commented: "Yes, I've heard about the World Administrative Radio Conference, but is there really any danger of *our* bands being affected?"

The answer is a resounding "Yes!"

The demand for radio frequencies has never been greater than it is today, and the pressure continues to build. We would be foolhardy, indeed, to ignore or to underestimate the many forces which are maneuvering for an assault on the radio spectrum at the 1979 conference.

But we have a lot going for us, too, with *your* help, and with the assistance and cooperation of radio amateurs, and the friends of amateur radio throughout the world, the needs of the Amateur Radio Service will be convincingly presented at this critical forum.

Footnotes

- ¹ The bands 3.5-4.0, 7.1-7.3, and 14.25-14.35 MHz are shared with other services.
- ² Figure 1 illustrates the growth of the Amateur Radio Service worldwide since 1966.
- ³ See *QST*, December, 1974, p. 9.
- ⁴ See *QST*, September, 1975, p. 9.

Silent Keys

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

W1ARH, Spencer C. Howes, Bernardston, MA
 WA1BQJ, George S. Tajima, Pinehurst, MA
 W1CCY, John Caskey, Chester, CT
 W1CMB, Mendon A. Chapman, Manchester, NH
 W1FSG, Daniel D. Brown, Centerville, MA
 K1IPU, John M. Collins, Halifax, MA
 W1LWO, Maurice W. Flynt, Waterville, ME
 W1NNE, Myron R. Currier, Newburyport, MA
 K1SVK, Maurice E. McCann, Sharon, CT
 WA2AHW, Roger C. Abson, Fair Haven, NJ
 K2GPK, Charles S. Bunnell, Park Ridge, NJ
 W2HAM, William K. Brown, Moorestown, NJ
 K2KJX, James J. Harkens, Sr., Lindenhurst, NY
 W2PLE, Albert L. Lang, Waterport, NY
 W2RO, Harry Stenger, Glendale, NY
 W2RTV, Charles E. Maass, Short Hills, NJ
 W3CWO, Robert H. Marshall, Washington, DC
 WA3ETM, Jean M. Sturgis, Sinking Spring, PA
 WA3POL, David W. Faust, Silver Spring, MD
 W3QLC, Joseph H. Hibberd, West Chester, PA
 W3TF, Stewart H. Resch, Temple, PA
 W4ATM, Edwin M. Renfro, Jacksonville, FL
 W4BK, George P. Rankin, Macon, GA
 W4FO, Geddie R. Smathers, Charlotte, NC
 WA4GKE, Dr. Fred K. Robinson, Atlanta GA
 W4GSO, Albert M. Austin, LaGrange, GA
 WA4GZP, Charles D. Miller, Lexington, KY
 W4OGB, William T. Rudy, Henderson, KY

WA4SJO, Ernest A. Coons, Ft. Myers, FL
 WB4TPX, Marion H. Traylor, Jr., Norris, TN
 WA4UAP, Dr. Robert M. Blackman, Selma NC
 W4WXX, Dr. J. Vernon Pace, Paducah, KY
 W5CZ, Matthew H. Gaston, Alexandria, LA
 WB5DSJ, Henry James Camp, Houston, TX
 WB5KHF, Leonel J. Fortier, Port Arthur, TX
 WA5MXY, Frank Haynes, Harlingen, TX
 WA5QQW, Howard W. Parrett, Clenton, OK
 W5TNW, James F. Watson, Norman, OK
 W5WNA, Earl L. Groves, Corpus Christi, TX
 WA5WYF, Dr. Thomas O. Wilson, Alvin, TX
 W5ZVO, Earl E. Struve, Biloxi, MS
 W6CCF, Austin A. Glass, Yucca Valley, CA
 W6FUL, Harvey C. Cameron, Pioneer, CA
 W6LGW, Oscar W. Peterson, Alamo, CA
 W6NCA, John H. Kantrowe, Malibu, CA
 W6QDO, Phil W. Goodson, San Mateo, CA
 WA7AHL, Col. G. Preston Grant, Phoenix, AZ
 K7CWG, William C. Stutzman, Beaverton, OR
 W7KVV, Clyde E. Dawson, Martinsdale, MT
 K7MUX, Cheryl A. Stutzman, Beaverton, OR
 WA7YLU, Wilbur R. Carnes, Sun City, AZ
 W7YVS, John A. McMurtrey, Rigby, ID
 W8CCH, Chester D.M. Hersh, Dayton, OH
 W8DNY, Robert W. Westcott, Jackson, MI
 WA8OVP, Virgil S. Sullenger, Mentor on the Lake, OH
 W8QLJ, Donald E. Volk, Mentor, OH

W8SAY, Jerry L. Beetley, Allegan, MI
 WA8VRH, Truman J. Dodge, Jr., Allegan, MI
 W9CNK, Walter H. Bornholdt, Peoria, IL
 W9CTI, Chester Y. Sakura, Milwaukee, WI
 K9DDQ, Elmer Franke, Batchtown, IL
 W9ILL, Paul B. Bellamy, Mt. Vernon, IL
 W9KBP, John F. Nelson, River Bluff, IL
 W9PFG, Herbert Fearman, Indianapolis, IN
 W9SYS, George D. Craig, Knightstown, IN
 W9TXF, Norman G. Lewis, Milwaukee, WI
 W9VBM, Martin L. Charley, Oaktown, IN
 W9VNO, William N. Long, Warsaw, IN
 K9BXO, Elmer M. Isaacson, Sioux City, IA
 W0GDN, Warren Algire, Kansas City, MO
 W0OKZ, Lee B. Walter, Chautauqua, KS
 WA0VAQ, William L. Hammarquist, Miltona, MN
 W0WBC, Gene E. Stewart, Forsyth, MO
 VP2GV, W. D. "Pip" Lyder, Grenada, West Indies
 VE3DKU, C. Westgarth-Taylor, Barrie, ON
 Ex-VE6CN, Gerald Kincaid, Calgary, AB
 K6MKU, Ellen Armstrong, Calgary, AB
 VE7DT, O. G. Thomas, Coquitlam, BC
 VE7PW, Marvin H. Thoreau, Vancouver, BC
 VE7PW, J. H. Hemmingway, Nanaimo, BC
 Ex-W8GOS, George S. Friedlander, Rehovot, Israel

The ARRL Bicentennial Celebration

1976 will have plenty of one-time events, many of which will be soon forgotten. We hope the ARRL Bicentennial Celebration activity will be long-remembered as a highlight of the 1976 operating year.

It isn't exactly a contest unless you want to make it one. It's an "operating activity" highlighted by a super-attractive award within reach of everyone. It's an opportunity to polish off those final states for the special ARRL Bicentennial WAS award. It's a chance to work both neighbors and DX, on hf and vhf, direct and through the satellites, on phone, cw, RTTY, SSTV, FAX, moonbounce, and anything else you can think of. It's the ARRL Bicentennial Celebration, and there won't be anything like it for a long, long time (2076?). The weekend of July 24-25, 1976, should produce some spectacular fireworks like the amateur bands have never seen. The simple rules outlined below are the only guidelines; entry forms will be available in May. CQ USA!

The ARRL Bicentennial Celebration

- 1) Date: July 24-25, 1976.
- 2) Eligibility: Amateurs world wide are eligible to participate.
- 3) Object: Amateurs in the 50 United States will try to work as many stations as possible; amateurs outside the 50 United States will try to work as many stations as possible within the 50 United States *only*. U.S.-to-U.S. contacts are permitted.
- 4) Conditions of entry: Each entrant agrees to be bound by the provisions of this announcement, by the regulations of his licensing authority, and by the decisions of the ARRL Awards Committee; all decisions of that committee will be final.
- 5) Entry Classifications: Single operator for U.S. entries, single operator and multi-operator for all others. Multi-transmitter prohibited.
- 6) Activity period: 0000 UTC Saturday, July 24, to 2359 UTC Sunday,

July 25, 1976. Each entrant may operate no more than 36 hours; "time-outs" must be at least 15 minutes in length and no more than eight time-outs allowed.

7) Valid contacts: Each station may be worked once on voice and once on another mode. No repeater contacts allowed, except via the Oscar satellites. Oscar itself does not count as a distinctive mode; i.e., a contact via Oscar on voice precludes any other contact with the same station on voice. The same station may not be worked with counterpart call sign; i.e., a voice contact with WIAW followed by a voice contact with ACIAW constitutes a duplicate (invalid) contact. This rule does *not* apply to situations where more than one individual have licensed call signs at the same location.

8) Exchanges: U.S. amateurs send signal report, state name, and state entry number into the Union (see list below). Non-U.S. participants send signal report and consecutive serial number, beginning with number 001.

9) Scoring: Final score equals number of contacts. *No* multipliers.

10) Reporting: A summary sheet, log sheets, and check sheets are required from all U.S. entrants; summary sheet

and log sheets required from all non-U.S. entrants. Special summary and log sheets will be available on request from ARRL Hq. in May; such requests must be accompanied by s.a.s.c. with appropriate postage affixed.

11) Reporting: Entries must be post-marked no later than September 1, 1976, in order to be eligible for *QST* listing and awards. All logs become the property of the American Radio Relay League and none can be returned.

12) Awards: Amateurs in the 50 United States are eligible for the following: 1776 or more QSOs, 200 or more QSOs, 50 or more QSOs made exclusively on 50 MHz or above (excluding Oscar), ARRL section-high score (all bands), all 50 states worked, and 200 or more QSOs with stations outside the 50 United States. Amateurs outside the 50 United States are eligible for the following awards: 1776 or more QSOs, 200 or more QSOs, 50 or more QSOs made exclusively on 50 MHz or above (including Oscar), country-high score (all bands), all 50 states worked, and the original 13 colonies worked (see chart below).

13) Disqualification: Standard ARRL criteria apply; see *QST*, January, 1976, page 73.

QST

Order of State Entry into the Union

1	2	3	4	5	6	7	8	9	0
CT-5*	NJ-3*	DE-1*	AL-22	AR-25	CA-31	AK-49	MI-26	IL-21	CO-38
ME-23	NY-11*	MD-7*	FL-27	LA-18	HI-50	AZ-48	OH-17	IN-19	IA-29
MA-6*		PA-2*	GA-4*	MS-20		ID-43	WV-35	WI-30	KS-34
NH-9*			KY-15	NM-47		MT-41			MN-32
RI-13*			NC-12*	OK-46		NV-36			MO-24
VT-14			SC-8*	TX-28		OR-33			NE-37
			TN-16			UT-45			ND-39
			VA-10*			WA-42			SD-40
									WY-44

*Original 13 colonies.

New Tricks for Old Club Program Nights

Same old programs year after year? Think your club has done it all? Insights are offered herewith to prove you wrong.

A little bit of brain storming mixed with many ideas found in club bulletins received has produced a bag of new tricks for "program nights." Activities and materials for twenty-five areas have been considered. A few of these areas will be reported on from time to time. This issue will cover "Old Timers' Night," "Homebrew Night" and "Novice Night."

"Old Timers' Night" is an annual event for many clubs and is a favorite of their members. All known old timers (including non-members) in the area are sent special invitations. *200 Meters and Down*, *50 Years of ARRL* or other handbooks on antique gear could be used as door prizes. Ideas members can work on for this program are:

1) Meet at a state or radio museum displaying old equipment.

2) Have members bring antique equipment and give an explanation of it. (The Des Moines Radio Amateur Asso-

ciation, IA, lined up a 5-meter receiver used in the mid-thirties for their display.)

3) Read items from an old club bulletin or old files and pass around an old club scrapbook.

4) Display old tubes and hold a contest with a prize for the person who can name the most.

5) Have an old timer speak on spark gap and other early devices or what amateur radio was like when he first started operating.

6) Pass around an early *QST* or other publication.

7) Award certificates to any of the following — oldest member in age, longest licensed, earliest club member, earliest president, member with the oldest confirmed QSO/WAC/WAS/DXCC.

Suitable "blank" certificates are available from Hq. to award as prizes.

"Homebrew Night" usually includes a contest with various categories of competition. Some descriptive words that can be combined to make a half-dozen categories include: Novelty, ingenuity, originality, usefulness, economy, use of surplus parts, use of readily available parts, operating convenience, neatness, workmanship, sophistication of function, and simplest. Clubs often pit holders of the same class of license against each other. Penn Wireless Association (PA) even awards the best mistake, best unfinished project and best "pipedream." Circuit diagrams and documentation or proof of operation may be required. Utah Amateur Radio Club allows their members to enter antennas and towers, that is, pictures and diagrams of them. Award certifi-

cates which can be filled out appropriately are obtainable from Hq.

A tour can be planned to those area stores carrying surplus parts. Possible club construction projects might be displayed and voted on as to which one to take up for the year. An area expert on homebrewing could give a talk. Bibliographies listing surplus stores or past *QST* articles on equipment built from surplus parts can be requested from Hq.

"Novice Night" is often held by clubs that have a licensing class comprised of many non-club members in order to stir these peoples' interest in joining the club. Other guests could include Novice friends of old timers and non-ham friends of Novices. Door prizes (such as a year's membership dues for the club) are given to the oldest and youngest Novices. Construction projects that the Novices have built can be displayed. A Novice corner can be set up for the exchange of crystals, making skeds, and so on. An award can be given to the best student in the class. Or for a different twist, have the Novices plan the program to present their fields of interest, such as Novice nets, DX in the Novice bands, the Novice Roundup or Worked-All-States.

Materials that can be used for the meeting, all obtainable from Hq., are: Novice Roundup sample logs, the Technical Department bibliography on the "Novice Gallon," Quiz 10 covering Novice license questions and the following booklet and pamphlets of use to Novices — *Operating an Amateur Radio Station*, "Your Novice Accent," and TAS-1 "Curing Signal and Operating Difficulties." — *WA1STO*

Early devices can be displayed at Old Timers' Night.



XYL-TV1

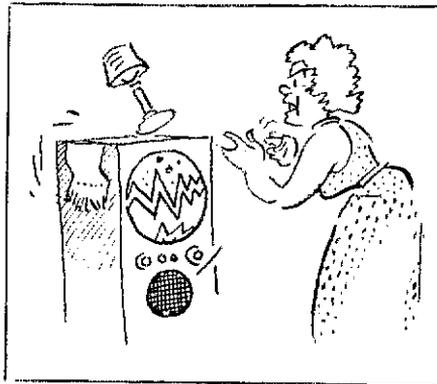
TV interference — another stone in the rocky road of matrimonial bliss.

By Paul C. Crum,* W9LC

Although the first location of W9LC on the family farm in west central Illinois had certain obvious disadvantages, one thing that it did *not* have was TVI. Some may say this was due primarily to the fact that we did not have television then. There were, of course, other reasons. The populous Sauganash area, where the station is now located, is loaded with dozens of television sets, all vigorously susceptible to interference from an amateur radio transmitter. On the farm, however, "neighbors" were largely limited to the domestic animals. It is not probable that much trouble would be experienced by upsetting the horizontal hold on a couple of hogs, or knocking out the burst on the family bull. Even if we had had television then, neighboring farms were so far apart that TVI would not have been a serious problem. One cannot help speculating upon the impact of the transmitter used in those early days, which used raw ac from the secondary of the spark coil on my mother's Maytag washing machine for the plate supply on the single tube oscillator, if it were used at W9LC's present location in a forest of all-band Yagis.

In all academic humbleness, I believe that W9LC's operator has read virtually every book written on the subject of TVI and has tried substantially everything known to the amateur fraternity to locate, then eradicate, the pest. Results in this area have been consistent. All bad. When one considers that Chicago has five vhf and four uhf stations, it becomes evident that they can cause an awful lot of problems for radio amateurs.

Since with his kids married he needed less room, 9LC purchased a town house in a nice, but very "sticky," part of town. Unless one is of reasonably ad-



vanced age, with unflawed character, and of a solidly established conservative posture, he has small chance of being accepted into this austere area. In this environment determination of which of two characteristics is scowled upon more vigorously is difficult: having kids or being an amateur radio operator. Having been given a pass on the former qualification by reason of my progeny having reached the age of legal maturity, I faced the second hurdle. Under such severe sociological pressure, I dared not seriously consider installing anything such as a quad on my building. The only reasonable thing left was a trap vertical. This, it seemed, was as good a way to get started with TVI as any.

Even the erection of the ten through eighty trap vertical posed certain problems. Neighbors stopped to look at the unusual contraption going up on 9LC's roof. Most speculated that it must be a new TV antenna of some kind because they knew that its owner earned his living at a local radio/television station. Most wondered at the structure being vertical, rather than horizontal as all of their antennas were; at the various bulbous enlargements along its length, and at the spikes sticking out from its top.

As old trap vertical addicts will remember, one does not just stick a

vertical on the roof, squirt rf into it, and lean back and break records. Two weeks and two telephone calls to the manufacturer later, good SWR was obtained near the middle of all phone bands. It was even reasonably flat at both ends of the bands. Seventy five yielded the traditional fifty-kHz bandwidth. W9LC was getting out . . . and into a good number of television sets in the neighborhood.

Evening employment at the local radio/TV facility gives one plenty of nice late operating time, so the bother was not too great, except on some very late shows. Even then, some people seemed to like my cross hatch almost as well as some of the automobile commercials that were on the air at that hour. The 32S-3 (with the small linear) was supposed to be, and probably is, as clean for TVI as the state-of-the-art permits. The "good" commercial filter in the transmission line was supposed to absolutely finish the mean old TVI. But it didn't. Now, as members of our medical ham fraternity know, detection and diagnosis are first requirements in treating any major difficulty. It is pretty hard, for instance, to know why a fellow has developed a limp, if you don't know that his left leg just fell off.

Attempting to detect, much less diagnose, the problem, with the help of only the XYL whose credentials included having been a nurse for premature babies before we were married, and in my opinion, the best cook in Chicago afterward, did provide certain handicaps. Terminology in these instances provided our biggest difficulty. Determining whether one has knocked out the color on seventy five or whether he is giving cross hatch when he is on fifteen (and then only when he is using his linear) is difficult when the parties involved embrace different forms of nomenclature peculiar to their own areas of work. When the picture washed

*6272 N. Cicero Avenue, Chicago, Illinois, 60646.

out completely, it did not seem to work out to state that "its metabolic rate had been diminished." And when the loss of vertical sync caused the picture to race by in crazy fashion, to say that "it has been determined that this difficulty has been caused by a virus that has been established as filterable and the low-pass filter in the line should eliminate it completely" only drew blank stares. Such helpful bits of information as "Johnny Carson's necktie is all funny again," or "there's that thing at the bottom right of the picture that I told you about," was as close as I got to getting communication from my hausfrau.

The last memorable time that my wife and I attempted to track down the interference to my wife's viewing (and that of ten of our nearer neighbors) came one sultry evening in July.

"Now look," I told her, "the burst is often knocked out when I operate on seventy five. I'm going to check that now. You watch for a change in color. Try to get a bright commercial and watch it. OK?"

"OK. Paul?"

"Yes?"

"It has a ketchup bottle on the screen now. Is that OK?"

"That's OK."

"It's really not a very big bottle, Paul. It's just a smallish to middle size. Will that do?"

"That will be just fine. Anything from a small to a middle size bottle will be all right. I had in fact just as well confess right now that I am particularly partial to middle size ketchup bottles. Some people have security blankets. Me, I have a ketchup bottle. I've been on them ever since I was a kid."

"What was that? Were you talking to me, Paul?"

"Well, you might say yes, and you

might say no. Just disregard."

After seeming eons of: "Testing. Testing. This is W9LC testing for television interference," then aside from the mic: "What's happening? Is there any interference?"

"How can I tell whether there is any interference," she called upstairs, "you've knocked out the picture." Then thoughtfully, "I didn't notice which side it went out on."

"Well, no one is perfect. We all slip here and there. Don't worry about it. Now, I want to see if the interference is worse on vhf or uhf."

"If you're talking to me," she was at the stairs again, "I can't hear you. The audio is so loud that I can't hear you."

"Whose audio? Mine, or the TV set's?"

"Why the TV set is what I'm listening to. How am I supposed to hear *you* when the TV set is so loud?"

"If the TV set is so loud, then why don't you turn it off," I yelled back, attempting to be heard over the television set below.

"How can I turn it off? *You're on it!*"

"Now let's get this straight," I pleaded. "You are hearing my audio on the TV set, right?"

"Well not now. You had me turn it down."

"Well what do you say we just *forget* the audio? Let's try the video. OK?"

"All right, but I don't know how we can try the video. Everytime I try to see something, you ruin the picture."

"Now then let's *play* like we are going to watch the picture. As we used to say when we were kids, you be the mommy and I'll be the poppy (in fact, I'll play *two* roles; I'll also be the neighborhood bum who ruins Johnny Carson's necktie with his ham rig) and we'll let mommy watch television. OK?"

"OK. But I told you that you won't let me. Every time you ask me to watch, you put that thing on upstairs, and I can't see anything. How can I tell what kind of interference your outfit is causing, when I can't even see the picture?"

"Frankly, kid, you've got me. I don't believe I'll ever be able to figure that one out. I'll tell you what let's do. When I came by the video tape room last night, Wally (W9LOR) said he'd come over some night after work and help me. Do you think you could whip up something for us to eat?"

"Yes, I could do that all right, if you'd keep that ham outfit off while you were testing, so that I could watch television."

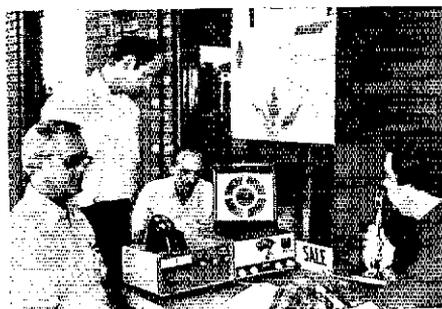
Wally came over two nights later. We found what we had expected. W9LC knocked out two channels on ten. I completely knocked out the burst on seventy five, and he confirmed that I really did ruin Johnny Carson's necktie on twenty cw. It was supposed to be striped, but everytime I made dots, his necktie had dots on it. He also said (although this did not really have much to do with television interference) that my wife made the best peach pie in Chicago, and that if he ever had any kids born prematurely, he'd certainly ask her how to take care of them. I don't think Wally is too apt to have any kids, premature or otherwise, however. He has escaped matrimony a long time, although he confided in me that he has been getting pretty serious with a girl in his building lately. But after helping me with my interference problem, he said he'd taken another look at the whole thing. He thought that he could handle almost anything in marriage, except television interference, but he thought that TVI just might be too big a problem for any husband and wife to handle.

Q57

Strays



When the twin cities of Fulton, KY, and South Fulton, TN, celebrated their annual International Banana Festival this fall, members of the Reelfoot Amateur Radio Club (in nearby Union City) set up a booth and maintained contact between the festival and Equador, from which many visitors attend the festival each year. Operating the booth were: (from left) Rev. Bob Armour, WB4TPS; Ottis Barron, K5BSE; Jimmy Lawrence, K4MVE and Willie Pope, K4VDQ.



I would like to get in touch with . . .

others in the Minnesota or 5-state area interested in an 80-meter phone net for schools. Scott Holisky, WBØATR. Webster Elementary "West" St. Paul, MN 55102.

any Philadelphia area volunteer firemen, ambulance/rescue personnel, or fire police who would like to start a 10-meter net. Marc H. Schlessinger, WA3TMP/WA2ATW.

those in the PA area interested in the 1750-meter experimental band. Harold Peters, WN3WTG.

other hams with implanted electronic cardiac pacemakers. W6KBD.

Straight Key Night

Wrists limber up while elbows stiffen up. Where were you while the keys kept on?

By Ellen White,* W1YL

It doesn't seem so very long ago that K4MD presented his idea for a New Year's Eve operating activity with a different twist. January 1, 1971, was the date and SKN joined the League's calendar of operating events with a flavor that has remained undiminished. In fact a few years ago a summer session was added to shorten the year-long wait! (Watch for the July 4 SKN announcement in the June issue of *QST*.)

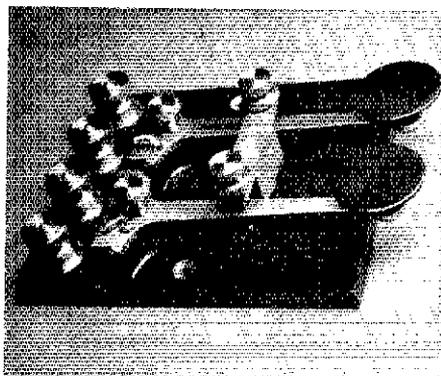
Participation was brisk on January 1, followed by 150 enthusiastic reports in the days immediately following the affair. It wasn't the biggest reported SKN and certainly not the smallest, with 889 people having SKN QSOs! This seems to be the one for good Novice participation, 172 Novice calls reportedly in SKN two-ways.

Voting for "best fist" was brisk. The champ, with 3 votes, was K8MFO. Runners up, with two votes apiece, include W2ABE WB2WRT WN2ASQ WN3AXN W4DL W4BAA W4NG WB4BTP K6OS W6FU WN7AUE WB8ITB and W8GMH.

You've got about 3 months to practice. Break out that straight key, limber up your arm, and start planning ahead for the next Straight Key Night.

Side Swipes

Conditions were excellent and it was good to hear so many hams proficient in the really basic skill of sending with a straight key. — W2LYH. One person asked me if I was using a keyer but the only thing I use on the air is a J-38. — WN5PIP. My first SKN and I enjoyed it tremendously. — WN2WPI. As NCS for ILN cw-traffic net, I had a special SKN session and the gang all sounded good but pace was a little slower than normal! — WB9DED. Lots of activity — but



W2TE worked SKN on 40 with this collector item submarine cable key. Walt says the key has a great feel and makes an excellent SKN conversation item.

where does the time go? — WA3UNX. I would like to support the suggestion to change the time from New Year's Eve to New Year's Day. — K4ON. Best fist I heard was from 15-year-old WB8TEE in WVA. — WB8RFB/4. After 14 QSOs I realize why keyers and bugs were invented. — WB5NBC. It was a real pleasure to hear fists with individuality rather than synthetic, faceless, monotonously perfect cw (since the advent of keyers/keyboards). That half hour spent was like a trip to Brigadoon. — W6DTJ. It was a good idea but must you choose two such impossible dates as Jan. 1 and July 4? — WA3GSB. [We're open for suggestions! — ED.] I loved SKN. There should be one at least once a month. — Lisa, WA1TYP. It would be difficult to nominate a best fist. Perhaps a most interesting QSO might also be in order. — WB6VVS. I nominate WB5KHU for best fist. Easiest to copy through two six packs! — WB4OSN. Used a Mac Stream Key, a beautifully balanced key. — K4QF. One thrill was a QSO with W7CX who was first licensed in 1919

(the then VE5CE) and the QSO thirty minutes later with VE7CJT (just licensed six months!). Who said cw was dead? — VE7ZK. My vote for best fist goes to WA1SLX. This youngster really held up well for our one-hour and 18-minute QSO. I wonder if anyone equaled or bettered that time. — W3AZR. Congratulations on having an event on the air where I don't have to worry about my usual low number of contacts. — W2NG. Didn't hear anything like a "bum boat" swing or a Norwegian freighter coming by Fire Island this year. Must have been lack of skip. — W6VPV. The fists got more limber and loose as the evening progressed. Possibly a direct result of some sort of liquid intake by the operators. — WB6JUC. After getting the hand pump out of the closet and mounting it to the desk, it fell apart on the third QSO! — WB4QGN. Nothing wrong with December 31, P.M. I vote to keep it there. — WN2ALY. Instead of having set hours for SKN, why not have it start after supper (New Year's Eve) and end when you go to bed? — WB2LQW. My XYL and I were out for dinner at a neighborhood party, excused ourselves early so I could get home and put in some long-anticipated SKN time. Just as I finished my first QSO, the juice went off in the whole area and stayed off until after two A.M. Some inebriate (probably a phone man) apparently wiped out a light pole somewhere. Sigh. — W4KFC. Best SKN ever! Both 40 and 80 were in good condition and most ops wanted to talk. Lotsa' fun. — W9RC. Forty meters sounded like one large Novice band, and the Novices had the best fists. — WA2BYX. Used a Boston key and a crystal controlled 1936 transmitter. Had a great time. — W2QY. One of the most pleasurable evenings in 19 years of hamming. — K8KXE.

*Deputy Communications Manager

A Leap Toward Tomorrow

It was barely 1976 on the calendar, but it was 1979 inside the Holiday Hartford. The dates were January 15 and 16; the occasion was the Annual Meeting of the ARRL Board.

By Perry Williams,* W1UED

"Amateur radio is suffering from a large number of threats upon our frequencies, because the number of licensed amateurs has not increased significantly over the past few years, while the demand for spectrum has increased at remarkable rates in other services. Thus, our position in retaining these valuable bands becomes more untenable every day. We need to show substantial growth and an increasing rate of licensing, if our requests for additional bands are to be taken seriously at the World Administrative Radio Conference in 1979."

With these words from the report of General Manager Dick Baldwin, ARRL leaped toward tomorrow. The formal words were at Minute 31: "On motion . . . unanimously VOTED that the Board endorse the concept, development and implementation of a promotion and training program . . . to increase the growth of Amateur Radio . . ." The goal is to increase the number of licensed amateurs 50 per cent by 1979. Along the way, we'll reduce the dropout rate of Novices from the present 50% to 33% and attract more of the enthusiastic young to our service.

(The program is already underway at Hq., a scant week, as we write, from the decision. Chod Harris, WB2CHO, until now an assistant secretary doing membership services work and Rosalie Cain, WA1STO, an assistant communications manager doing training aids work —

*Assistant Secretary, ARRL.

. . . and Tod Olson, W0IYP and Jesse Bieberman, W3KT, listen carefully.



Charles A. Higginbotham, W3CAH, (left) chief of the Safety and Special Radio Services Bureau and John Johnston, K3BNS, chief of the Amateur and Citizens Division, brief ARRL officials before the Board meeting . . .

both professional educators — head up the task force, which has its own area of the Hq. building. Lesson plans are being written; publicity plans and a new closeness between ARRL and its affiliated clubs have been outlined.)

(On Wednesday, before the meeting, Charles Higginbotham, W3CAH, Chief of FCC's Safety and Special Bureau and John Johnston, K3BNS, Chief of Amateur and Citizens, put on a "show and tell" for Board and ARRL staff which outlined the twin constraints of a fixed budget and a wildly expanding licensee population. Deregulation will be a necessity; the Communicator license concept, at least for now, is a casualty of staff shortage; growth of the amateur service, however, remains vital. Would it be possible for ARRL to develop a program where it could certify to the Commission that specific people were qualified for Novice licenses? This last question has not yet been fully answered in the legalistic sense — but it is provided for in League plans!)

More directly concerned with the World Conference — may we call it WARC hereafter for brevity? — was a

motion (No. 9) transferring \$44,559 to the Reserve for the Defense of Amateur Frequencies, bringing it back to its original \$100,000 level. The President will prepare an estimate of further funding assistance which may be required (minute 49) for the ARRL Foundation to act on. The Foundation itself gets new boosts with a solicitation of League members (No. 50) and the help of professional development assistance for "heavy money," (minute 38). New directors of the Foundation are John C. Sullivan, W1HHR, John H. Sanders, WB4ANX and Herbert Hoove III, W6APW (No. 29). Speaking of WARC, there's a separate story in this issue by W4KFC, detailing amateur efforts to date in preparation for it.

Meanwhile, the regular affairs of amateur radio must go on. Harry J. Dannels, W2TUK, was reelected (No. 18) to a third term as President. The vice-presidential team also was reelected: First Vice President Victor C. Clark, W4KFC, Vice Presidents Noel B. Eaton, VE3C (who also serves as President of the International Amateur Radio Union) and Carl L. Smith, W0BJW (minutes 1

through 21). General Manager Richard L. Baldwin, W1RU, was additionally named as Secretary (No. 23), while his predecessor, John Huntoon, W1RW, was elected as Treasurer (No.24). David H. Houghton, who has been associated with the League since 1922 and has been Treasurer since 1941, declined the nomination. In gratitude for his 54 years of service, however, the Board named Dave as an Honorary Vice President and elected both Dave and another IIVP, F.E. Handy, W1BDI, as Honorary Life Members (minutes 24, 25, 71, and 95). Executive Committee members W5EYB, W7PGY, W4WHN and W6KW were all reelected (No. 26).

On the regulatory front, the Board asked the General Manager to explore informally with Commission staff possible rule changes to permit multiplexing of control and audio signals on the control link of a remotely controlled station, deleting the requirement of tape recording for repeaters under automatic control, extending 16F3 to 52 MHz, narrow F4 on repeaters, and relief from height above average terrain and effective radiated power restrictions (tabled, minute 11, altered and adopted, minute 35). The Board also supported the concept of reduced-bandwidth, fast-scan repeaters, and requested that FCC issue special temporary authorizations for that purpose, to qualified applicants (minute 39). A filing was ordered in Docket 20672, the FCC Notice of Proposed Rulemaking, which sought to curb some abuses by requiring amateurs to submit their original licenses rather than photocopies when applying for modification or renewal, (minute 84.) (The deadline was January 22, so the comments have already gone to FCC. Members especially interested may obtain a copy by sending an s.a.s.e. to Hq., mentioning the docket number.) The Board also ordered comments in Docket 20679 which would require volunteer examiners to send photocopies of their licenses with their requests for license papers for Novice, Technician (C) and Conditional applicants; the League view is that the potential hardships should be minimized (minute 85). The League is also to take continued close looks at petitions pending before the Commission to determine priorities (No. 62), at ways to solve jamming problems on nets and repeaters (No. 65), at a code of ethics for phone patches and auto-patches (No. 66), at frequency coordinating committees (No. 81) and at various repeater problems (No. 82).

There was more — much more, well worth reading by the active amateur. It all appears under the banner, "Moved and Seconded," the adjoining new column where Board and Executive Committee minutes henceforth will be found.

Moved and Seconded...

MINUTES OF THE 1976 ANNUAL MEETING OF THE BOARD OF DIRECTORS THE AMERICAN RADIO RELAY LEAGUE, INC.

January 15-16, 1976

1) Pursuant to due notice, the Board of Directors of The American Radio Relay League, Inc., met in annual session at the Holiday Inn, Hartford, Connecticut, on January 15, 1976. The meeting was called to order at 9:30 A.M., with President Harry J. Dannels, W2TUK, in the Chair, and the following directors present:

Roy L. Albright, W5EYB, West Gulf Division
Garfield A. Anderson, W0KE, Dakota Division
Max Arnold, W4WHN, Delta Division
Charles M. Cotterell, W0SIN, Rocky Mountain Division
Richard A. Egbert, W8ETU, Great Lakes Division
J.A. Gmelin, W6ZRJ, Pacific Division
Paul Grauer, W0FIR, Midwest Division
John R. Griggs, W6KW, Southwestern Division
Philip E. Haller, W9HPG, Central Division
Ron J. Hester, VE1SH, Canadian Division
Harry A. McConaghy, W3SW, Atlantic Division
Larry E. Price, W4DQD, Southeastern Division
John C. Sullivan, W1HHR, New England Division
Robert B. Thurston, W7PGY, Northwestern Division
L. Phil Wicker, W4ACY, Roanoke Division
Stan Zak, K2SJO, Hudson Division
Also in attendance, as members of the Board without vote, were Victor C. Clark, W4KFC, First Vice President; Noel B. Eaton, VE3CJ, and Carl L. Smith, W0BJW, Vice Presidents; and Richard L. Baldwin, W1RU, General Manager. Also in attendance, at the invitation of the Board as non-participating observers, were the following Vice Directors: Jesse Bieberman, W3KT, Atlantic Division; W.W. Loucks, VE3AR, Canadian; Edmond A. Metzger, W9PRN, Central; Tod Olson, W0IYP, Dakota; Malcolm P. Keown, W5RUB, Delta; George Diehl, W2IHA, Hudson; C. Richard Dyas, W0JCP, Midwest; John Lindholm, W1DGL, New England; and Maurice O. Carpenter, K0HRZ, Rocky Mountain. There were also present Honorary Vice President F. E. Handy, W1BDI; Secretary John Huntoon, W1RW; Treasurer David H. Houghton; General Counsel Robert M. Booth, Jr., W3PS; Canadian Associate Counsel B. Robert Benson, VE2VW; Communications Manager George Hart, W1NJM; Senior Assistant Secretary Perry F. Williams, W1UED; QST Tech-

nical Editor Doug DeMaw, W1CER; Assistant Secretary David Sumner, K1ZND; and Public Relations Consultant Don Waters.

2) On motion of Mr. Griggs, seconded by Mr. Gmelin, unanimously VOTED that the Minutes of the 1975 Second Meeting of the Board of Directors are approved in the form in which they were issued by the Secretary.

3) At this point, extensive oral reports were offered by the officers of the League, with particular attention to preparation for the 1979 World Administrative Radio Conference. During the course of the above, Pacific Division Vice Director W.W. Eitel, WA7LRU/W6UF, entered the meeting at 10:20 A.M. The Board was in recess from 10:33 to 10:53 A.M., and again for luncheon from 12:22 P.M. to 1:33 P.M.

4) Mr. Albright, as Chairman, read the report of the International Affairs Committee. On his motion, seconded by Mr. McConaghy, unanimously VOTED that the General Manager make available to amateurs traveling overseas, a packet of material which would enable those persons to more adequately explain the origin and purpose of the IARU and the Sister Cities program. In addition, the packet would contain information helpful to those who contemplate contacting foreign amateurs, and for those who plan to operate their radio station in the countries visited.

5) Mr. Thurston, as Chairman, reported briefly for the Plans and Programs Committee. Mr. Haller, as Chairman, read the report of the Membership Affairs Committee.

6) Mr. Egbert, as Chairman, read the report of the Management and Finance Committee. Moved, by Mr. Wicker, seconded by Mr. McConaghy, that effective February 1, 1976, the rate for reimbursement of automobile travel on League business is increased to 15¢ per mile. After discussion, moved, by Mr. Egbert, seconded by Mr. Wicker, to amend the motion to provide that this rate apply through the first 1,000 miles, and 13¢ thereafter. A roll-call being requested, the result was a tie, 8 votes in favor and 8 opposed. Those voting in favor were Messrs. Albright, Anderson, Egbert, Gmelin, Haller, Hester, Wicker and Zak; those voting opposed were Messrs. Arnold, Cotterell, Grauer, Griggs, McConaghy, Price, Sullivan, and Thurston. The Chair voted in favor, so the amendment was ADOPTED. The question then being on

The whole gang at the Board meeting (except for W4KFC who was doing League business elsewhere at this moment). Sitting: W5EYB, W9PRN, W1HHR, W7PGY, W2TUK, W1RU, W6ZRJ, W6KW, W0SIN, W3SW. Second row: W1RW, K1ZND, W4DQD, W0KE, W4ACY, W0BJW, W3KT, W1CER, K2SJO, W0FIR, W0JCP, W2IHA, VE3CJ, W3PS, Don Waters. Third row: W0IYP, W5RUB, W6UF, W1DGL, W9HPG, W4WHN, W1BDI, W1NJM, K0HRZ, W1UED, David Houghton, W8ETU, VE2VW, VE3AR, VE1SH.



the original motion as amended, the same was ADOPTED.

7) On motion of Mr. Arnold, seconded by Mr. Griggs, VOTED that the firm of Ernst & Ernst is appointed ARRL auditor for the year 1976. Mr. Price requested to be recorded as voting opposed.

8) On motion of Mr. Arnold, seconded by Mr. Egbert, after discussion, VOTED that the General Manager is authorized to purchase *key man insurance* in amounts approximating one and one-half times annual salary, with the League to be the sole beneficiary, in those cases where the death of the employee and the subsequent hiring and training of a replacement would, in the opinion of the General Manager, cause the League more than ordinary hardship.

9) On motion of Mr. Egbert, seconded by Mr. Thurston, unanimously VOTED that in view of the extensive preparations for WARC-79 facing amateur radio in the next four years, the General Manager is authorized to transfer the sum of \$44,559.00 from the unappropriated balance of the General Fund to the appropriation for the Defense of Amateur Frequencies, in order to restore that *Defense fund* to its original level of \$100,000.

10) Mr. Cotterell, as Chairman, reported briefly for the Legal and Regulatory Committee. The Board was in recess from 3:03 P.M. to 3:20 P.M.

11) Mr. Smith, as Liaison, presented the written report of the VHF Repeater Advisory Committee. After discussion, moved, by Mr. Smith, seconded by Mr. Thurston, that the General Manager is directed to explore informally with Commission staff the resolution, in line with previously established Board policy, of certain problems relating to: (1) rule changes to permit multiplexing of control signals on the input frequency to a repeater; (2) deleting the requirement for tape recording as a form of logging for repeaters under automatic control; (3) extending 16F3 operation to 52.0 MHz; (4) SSTV operation through repeaters on frequencies above 420 MHz; (5) removal of ERP/HAAT specification. After discussion, moved, by Mr. Cotterell, to amend the motion by striking item (3) concerning 16F3 operation; but there was no second, so the motion to amend was lost. After further discussion, on motion of Mr. Price, seconded by Mr. Sullivan, VOTED that the matter is laid on the table.

12) Mr. Zak, as Liaison, presented the report of the Contest Advisory Committee. Mr. Price, as Liaison, presented the report of the DX Advisory Committee. Mr. Arnold, as Liaison, read the report of the Emergency Communications Advisory Committee. Mr. Smith, as Chairman, presented the report of the Sister Cities Program Committee.

13) Mr. Clark, as Liaison, presented a report for the RFI Task Group. On motion of Mr. Wicker, seconded by Mr. McConaghy, after discussion, unanimously VOTED that the *Board of Directors endorses the work of the RFI Task Group* and reaffirms its support of vigorous efforts by ARRL both to publicize and seek solutions in this increasingly difficult problem area.

14) Mr. Zak, as Liaison, reported briefly for the Ad Hoc Committee on QSL Bureaus. Mr. Egbert, as Chairman, reported briefly for the Ad Hoc Committee on Data Processing.

15) Mr. Smith, as Chairman, presented a detailed report of the Committee to Study the Communications Department, and then moved, seconded by Mr. Thurston, that the Communications Manager shall *revise the Section Communications Manager (SCM) election procedures*, including the creation of a new elective office of Deputy Section Communications Manager (DSCM), so the elective procedures at Section level conform to the present system in the election of director and vice director. The new election schedule shall become effective on or after January 1, 1977. After discussion, moved, by Mr. Price, seconded by Mr. Sullivan, to amend the motion by striking the words, "including the creation of a new elective office of Deputy Section Communications Manager (DSCM)," and the words "and vice director." After further extensive discussion, moved, by Mr. Albright, to lay the matter on the table; but there was no second, so the motion to table was lost. The question then being on the motion to amend by striking reference to DSCM, the same was ADOPTED, 10 votes in favor to 6 opposed. The question then being on the original motion as amended, the same was ADOPTED.

16) Mr. Clark, as Chairman, read the report of the Committee on World Wide Alerting. Mr. Smith, as Liaison, read the report of the Amateur Satellite Service Council.

17) The Board was in recess for dinner from 5:15 to 8:02 P.M.

18) The Chair announced the opening of nominations for the office of President, and named Messrs. Metzger and Eitel as Tellers. Mr. Griggs nominated Mr. Dannals. On motion of Mr. Egbert, seconded by Mr. Gmelin, unanimously VOTED that the nominations are closed and that *Harry J. Dannals, W2TUK, is elected President of the League for the ensuing term.* (Applause)

19) The Chair announced the opening of nominations for the office of First Vice President. Mr. Gmelin nominated Mr. Clark. On motion of Mr. Griggs, seconded by Mr. Wicker, unanimously VOTED that the nominations are closed and that *Victor C. Clark, W4KFC, is elected First Vice President of the League for the ensuing term.* (Applause)

20) The Chair announced the opening of nominations for an additional Vice President. Mr. Hesler nominated Mr. Eaton. On motion of Mr. McConaghy, seconded by Mr. Sullivan, unanimously VOTED that the nominations are closed and that *Noel B. Eaton, VE3CJ, is elected a Vice President of the League for the ensuing term.* (Applause)

21) The Chair announced the opening of nominations for an additional Vice President. Mr. Thurston nominated Mr. Smith. On motion of Mr. Griggs, seconded by Mr. Wicker, unanimously VOTED that the nominations are closed and that *Carl L. Smith, W0BWI, is elected Vice President of the League for the ensuing term.* (Applause)

22) The Chair announced the opening of nominations for Honorary Vice Presidents. On motion of Mr. Thurston, seconded by Mr. McConaghy, unanimously VOTED that *Wayland M. Groves, W5NW, is elected an Honorary Vice President of the League for the ensuing term.* On motion of Mr. Albright, seconded by Mr. Arnold, unanimously VOTED that *Roemer O. Best, W5QKF, is elected an Honorary Vice President of the League for the ensuing term.* On motion of Mr. Zak, seconded by Mr. McConaghy, unanimously VOTED that *Robert York Chapman, W1QV, is elected an Honorary Vice President of the League for the ensuing term.* On motion of Mr. Sullivan, seconded by Mr. Albright, unanimously VOTED that *Francis E. Handy, W1BDI, is elected an Honorary Vice President of the League for the ensuing term.* On motion of Mr. McConaghy, seconded by Mr. Griggs, unanimously VOTED that *Charles G. Compton, W0BUO, is elected an Honorary Vice President of the League for the ensuing term.* On motion of Mr. Grauer, seconded by Mr. Sullivan, unanimously VOTED that *Robert W. Denniston, W0DX, is elected an Honorary Vice President of the League for the ensuing term.* (Applause)

23) The Chair announced the opening of nominations for the office of Secretary. Mr.

Egbert nominated Mr. Huntoon, who expressed his appreciation but withdrew his name as a candidate. Mr. Sullivan nominated Mr. Baldwin. On motion of Mr. Gmelin, seconded by Mr. Wicker, unanimously VOTED that the nominations are closed and that *Richard L. Baldwin, W1RU, is elected Secretary of the League for the ensuing term.* (Applause)

24) The Chair announced the opening of nominations for the office of Treasurer. Mr. Egbert nominated Mr. Houghton, who expressed appreciation but withdrew his name as a candidate. Mr. Wicker nominated Mr. Huntoon. On motion of Mr. Arnold, seconded by Mr. Zak, unanimously VOTED that the nominations are closed and that *John Huntoon, W1RW, is elected Treasurer of the League for the ensuing term.* (Applause)

25) Mr. Houghton addressed the group briefly, citing some of the highlights of the League's history during his fifty-four years of association with the Headquarters staff, and was given a standing ovation by the assembly.

26) The Chair announced that the Board would now proceed to the election of four directors to the Executive Committee for the ensuing year. Mr. Grauer nominated Mr. Griggs. Mr. Gmelin nominated Mr. Price. Mr. Thurston nominated Mr. Albright. Mr. Arnold nominated Mr. Thurston. Mr. Sullivan nominated Mr. Zak. Mr. Albright nominated Mr. Arnold. On motion of Mr. McConaghy, seconded by Mr. Haller, unanimously VOTED that the nominations are closed. The Tellers announced the results of the balloting as follows:

Mr. Griggs	9
Mr. Price	6
Mr. Albright	14
Mr. Thurston	14
Mr. Zak	7
Mr. Arnold	13

Whereupon Roy L. Albright, W5EYB, Robert B. Thurston, W7PGY, Max Arnold, W4WHN, and John R. Griggs, W6KW, were declared elected as members of the Executive Committee for the ensuing term. (Applause)

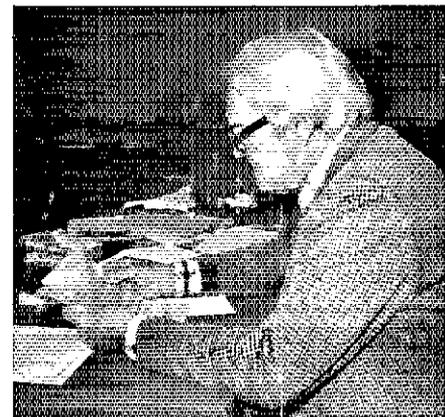
27) On motion of Mr. Gmelin, seconded by Mr. Haller, unanimously VOTED that the reports of the officers and directors of the League are accepted and the same placed on file.

28) At this point the following committee appointments were announced: International Affairs Committee
Mr. Albright, Chairman
Mr. McConaghy
Mr. Hesler
Plans and Programs Committee
Mr. Price, Chairman
Mr. Grauer
Mr. Gmelin
Membership Affairs Committee
Mr. Sullivan, Chairman
Mr. Griggs
Mr. Thurston
Management and Finance Committee
Mr. Egbert, Chairman
Mr. Wicker
Mr. Arnold
Mr. Anderson, Alternate

The Top Team Re-elected: First Vice President W4KFC, President W2TUK, Vice President VE3CJ (Vice President W0BWI also was re-elected).



W3SW studies the tons of paper.



Legal and Regulatory Committee
Mr. Cotterell, Chairman
Mr. Haller
Mr. Zak

29) The Chair announced the opening of nominations to fill the vacant directorships for the ARRL Foundation. Mr. Gmelin nominated Mr. Price, who expressed appreciation but withdrew his name as a candidate. Mr. Price nominated Mr. Sullivan. On motion of Mr. Gmelin, seconded by Mr. Arnold, unanimously VOTED that the nominations are closed and that John C. Sullivan, W1HHR is named a Director of the ARRL Foundation. Mr. Arnold nominated John H. Sanders, WB4ANX. On motion of Mr. Sullivan, seconded by Mr. Egbert, unanimously VOTED that the nominations are closed and that Mr. Sanders is named a Director of the ARRL Foundation. Mr. Griggs nominated Herbert Hoover, III, W6APW. On motion of Mr. Thurston, seconded by Mr. Zak, unanimously VOTED that the nominations are closed and that Mr. Hoover is named a Director of the ARRL Foundation.

30) The Board was in recess from 8:54 to 9:06 P.M.

31) On motion of Mr. Sullivan, seconded by Mr. Zak, after discussion, unanimously VOTED that the Board endorse the concept, development and implementation of a promotion and training program, as outlined by the General Manager, to increase the growth of amateur radio, with the Board to be kept apprised of progress and a suitable status report to be presented at the July meeting of the Board.

32) On motion of Mr. Thurston, seconded by Mr. Sullivan, unanimously VOTED that the 1980 ARRL National Convention be held in Seattle, Washington, during the last weekend in July.

33) On motion of Mr. Gmelin, seconded by Mr. Price, unanimously VOTED, at 9:16 P.M., that the Board does now resolve itself into a Committee of the Whole for the purpose of discussing problems relative to League election procedures and eligibility of candidates. The Committee rose at 9:52 P.M. and reported to the Board.

34) The Board recessed at 9:53 P.M., reconvening at the same place at 8:00 A.M. on January 16, with all persons hereinbefore mentioned present except Messrs. Handy, Houghton and Huntoon. Mr. Williams assumed the recording of minutes.

35) On motion of Mr. Price, seconded by Mr. Egbert, unanimously VOTED to take from the table Mr. Smith's motion concerning various VHF and repeater problems. On motion of Mr. Smith, seconded by Mr. Thurston, after discussion, unanimously VOTED (Canadian Division Director Hessler abstaining) to strike the text and substitute therefor the following: That the General Manager is directed to explore with the FCC staff, informally and in line with previously established Board policy, the resolution of certain problems relating to: (1) rule changes to permit multiplexed control and audio signals on the control link frequency with a remotely controlled station; (2) deleting the requirement for tape recording as a form of logging for repeaters under automatic control; (3) extending 16F3 operation to 52.0 MHz; (4) bandwidth changes necessary to accommodate F4 (facsimile) on repeaters where such emission would occupy no greater bandwidth than F3; (5) relief from present ERP/HAAT restrictions. The question then being on the motion as amended, the same was ADOPTED (Mr. Hessler again abstaining).

36) On motion of Mr. Griggs, seconded by Mr. Grauer, after discussion, unanimously VOTED (Mr. Hessler abstaining) that the Board does hereby reaffirm its stand on Minute 60 of the Jan. 16-17, 1975, Board meeting and Minute 25 of the July, 1974, Board meeting, and further directs the General Manager to obtain from established organizations that are proficient in the operation of remotely-controlled stations such technical information as may be necessary to proceed promptly to negotiate with FCC for the further authorization of such operations.

37) On motion of Mr. Albright, seconded by Mr. Egbert, unanimously VOTED that the Management and Finance Committee investigate the possibility of developing an improved procedure for determining the dis-



Honorary Vice Presidents, Honorary Life Members W1BDI and David H. Houghton: 106 years of service to ARRL!

tribution of operating expenses authorized by the Board.

38) On motion of Mr. Egbert, seconded by Mr. Zak, after discussion, VOTED that in response to the request of the ARRL Foundation for support to obtain professional fund development assistance, the Board of Directors authorizes transfer to the Foundation of a sum not to exceed \$20,000 as an interest-bearing loan. Mr. McConaghy requested to be recorded as voting opposed.

39) On motion of Mr. Zak, seconded by Mr. Sullivan, after discussion, VOTED that the Board support the concept of reduced bandwidth fast-scan ATV repeaters and requests that, upon satisfactory application, the FCC issue temporary authorization to those stations requesting authorization to operate this mode and frequencies in the 420-450 MHz band. Mr. McConaghy requested to be recorded as voting in favor, and Messrs. Albright and Price requested to be recorded as voting opposed. Mr. Huntoon entered the meeting at this point, 8:49 A.M., and resumed recording of the minutes.

40) Moved, by Mr. Grauer, seconded by Mr. Thurston, that the General Manager obtain the services of expert educators in order to develop a Programmed Learning Course for use by clubs or individuals in teaching amateur radio classes. After discussion, moved, by Mr. Zak, seconded by Mr. Gmelin, to refer the matter to the Plans and Programs Committee for study. After further discussion, on motion of Mr. Gmelin, seconded by Mr. Thurston, VOTED that the matter is laid on the table.

41) Moved, by Mr. Sullivan, seconded by Mr. Zak, that Public Relations Assistants be allowed reimbursement also for telephone communications that are necessary for the operation of their post within the established \$150 limit for each division. After discussion, moved, by Mr. Griggs, seconded by Mr. McConaghy, to amend the motion to provide reimbursement up to the amount of \$50 for each PRA. After further discussion, moved, by Mr. Thurston, seconded by Mr. Sullivan to further amend the motion to require director approval of such reimbursed expenses. After additional discussion, on motion of Mr. Albright, seconded by Mr. Price, VOTED that the matter is laid on the table. Messrs. Cotterell, Sullivan and Thurston requested to be recorded as voting opposed. During the course of the above, Messrs. Handy and Houghton entered the meeting, at 9:13 A.M.

42) On motion of Mr. Smith, seconded by Mr. Clark, unanimously VOTED that the Rules and Regulations of the Communications Department are amended as follows:

(1) Delete the words "the conduct of recruitment, training, and other programs for societies affiliated with the League" (lines 10, 11 and 12 of paragraph (3) (2) Delete the words "clubs or" in (line 1) paragraph 12, and all of the balance of paragraph 12 following the second sentence.

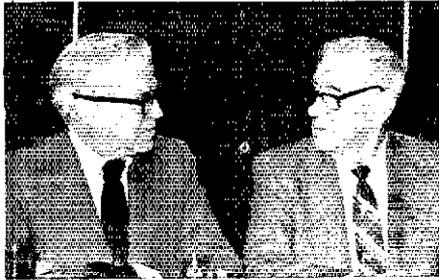
43) On motion of Mr. Smith, seconded by Mr. Thurston, unanimously VOTED that the Rules and Regulations Concerning Affiliated Societies are amended as follows: (1) In paragraph 2 and paragraph 5 the references to "Communications Manager" shall be deleted and "General Manager" shall be substituted therefor; (2) Add a new paragraph 7, "The League list of clubs is not available for commercial solicitations or advertising purposes. On petition of an affiliated club, on request of the members signing petitions to nominate for ARRL elected office, or on petition of ten or more full ARRL members, lists of not more than a division in scope may be furnished. Lists of more than a division in scope must have authorization of all division directors concerned."

44) The Board was in recess from 9:30 A.M. to 9:58 A.M., at which time Mr. Clark assumed the Chair.

45) Moved, by Mr. Gmelin, seconded by Mr. McConaghy, to amend By-Law 13 so that the first portion would read "On any date not later than noon of the tenth day of September of an election year in any division . . ." and that By-Law 14 be amended so that the 4th sentence would read, "If there be more than one eligible nominee, then on or before October 1 of each year, the Secretary shall send by mail to every person who on the tenth day of September of that year . . ." A roll-call being required, the question was decided in the affirmative, 16 votes in favor to none opposed. All the directors voted in favor. So the By-Laws were AMENDED.

46) Moved, by Mr. Gmelin, seconded by Mr. Griggs, to further amend By-Law 13 by replacing the words "August and September issue of QST" with the words, "July and August issue of QST." After discussion, a roll-call being required, the question was decided in the affirmative, 16 votes in favor to none opposed. All the directors voted in favor. So the By-Law was AMENDED.

47) On motion of Mr. Wicker, seconded by Mr. McConaghy, after discussion, unanimously VOTED that the ARRL General Manager establish a library of recordings to preserve the on-the-air sounds of amateur radio through the years; this undertaking is to employ volunteer assistance insofar as possible.



W9PRN and W9HPG discuss the Central Division viewpoint.

48) On motion of Mr. Cotterell, seconded by Mr. Grauer, after discussion, unanimously VOTED that in order that the League move forward in its goal to be of service to as many deserving organizations needing its services, the President assign to an appropriate standing committee a study of the possibility of aligning the League with the *National Association of Search and Rescue Coordinators* in search and rescue communications.

49) On motion of Mr. Price, seconded by Mr. Zak, unanimously VOTED that the President is directed to prepare and submit to the ARRL Foundation Board an estimate of funding assistance which will be required to support WARC preparatory activities.

50) On motion of Mr. Arnold, seconded by Mr. Gmelin, after discussion, unanimously VOTED that the Board directs the General Manager to provide such administrative support and assistance as may be required by the ARRL Foundation in connection with a *general membership funds solicitation*, timing of any such solicitation to be coordinated with the ARRL Executive Committee.

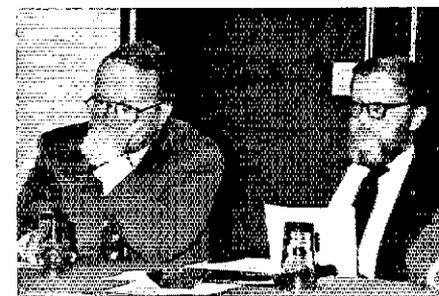
51) Moved, by Mr. Griggs, seconded by Mr. Albright, that the Board directs the establishment of Family Life Memberships in the League by requiring the payment of family member dues for a 20-year period, or \$40.00, with the stipulation that all existing requirements for family membership continue to be met, but including provisions for Full Life Membership to be acquired eventually upon the additional payment of the differential amount of dues normally required, should the principal Life Member die, become divorced or separated from the family concerned. After discussion, on motion of Mr. Price, seconded by Mr. Sullivan, unanimously VOTED that the matter is laid on the table.

52) On motion of Mr. Albright, seconded by Mr. Price, after discussion, unanimously VOTED that any reports and recommendations of Advisory Committees, insofar as possible, shall be submitted for Board consideration 30 days prior to each scheduled meeting of the Board.

53) On motion of Mr. Price, seconded by Mr. Zak, unanimously VOTED that certificates issued by League Headquarters for operating achievement awards and for awards in major contests shall bear the name and signature of the President of the American Radio Relay League.

54) Moved, by Mr. Egbert, seconded by Mr. Arnold, that *By-Law 8* be amended to read as

New Secretary W1RU and new Treasurer W1RW listening carefully.



follows: "No person shall be President, Vice President, Secretary, Treasurer, Director or Vice Director of the League unless, at the time of nomination, he has reached his 21st birthday and is a member of the League and the holder of at least a General Class amateur license, or a Canadian Advanced Amateur Certificate." A roll-call being required, the question was decided in the affirmative, 16 votes in favor to none opposed. All the directors voted in favor. So the By-Law was AMENDED.

55) On motion of Mr. Zak, seconded by Mr. Egbert, after discussion, unanimously VOTED that the Membership Affairs Committee study *reduced membership fees* for the handicapped or elderly, retired, longtime ARRL members.

56) On motion of Mr. Grauer, seconded by Mr. Price, unanimously VOTED to take from the table the motion concerning programmed teaching. On further motion of Mr. Grauer, seconded by Mr. Price, unanimously VOTED to amend the motion by striking the text and substituting therefor: "The General Manager is directed to continue the development of the programmed teaching course in amateur radio now being prepared. He shall obtain the assistance of professionals in the field of programmed learning as necessary." The question then being on the original motion as amended, the same was unanimously ADOPTED.

57) Moved, by Mr. Sullivan, seconded by Mr. Price, to *amend By-Law 6* by deleting all after the word "elected" in the last sentence, so the amended By-Law will read, "Every officer, director and vice director of the League shall serve and continue in office until his successor shall have been elected and qualified. One or more honorary officers may be elected." After extended discussion, a roll-call being required, the question was decided in the affirmative, 13 votes in favor to 3 opposed. All the directors voted in favor except Messrs. Griggs, Haller and Zak, who voted opposed. So the By-Law was AMENDED.

58) On motion of Mr. Gmelin, seconded by Mr. Thurston, unanimously VOTED that the following items are referred to the *Contest Advisory Committee for study*: (1) The possibility of reporting contest results in *QST* so that only the top ten scores in each contest class be reported with their scores, and that all other entries be listed by call only in declining order of scores; (2) A possible change in the Sweepstakes rules to start and end the contest earlier in the weekend; (3) The possibility of establishing frequency segments in each band for all League contests, with operation only in these segments counting for contest score; results of these studies to be reported back by the January 1977 Board meeting.

59) On motion of Mr. Price, seconded by Mr. Griggs, after extensive discussion, VOTED that the standing order of the Board that the Communications Manager prepare a separate annual report to the Board is rescinded.

60) Moved, by Mr. Griggs, seconded by Mr. Albright, that the General Manager investigate and report to the Board on possibility of *reducing Life Membership fees to those members above age 60* as may be determined from life expectancy charts. After discussion, moved, by Mr. Price, to amend the motion by striking the words "General Manager" and replacing them with the words "Management and Finance Committee;" but there was no second, so the motion to amend was lost. After further discussion, on motion of Mr. Gmelin, seconded by Mr. Sullivan, VOTED that the matter is referred to the Management and Finance Committee for study.

61) On motion of Mr. Albright, seconded by Mr. Smith, after discussion, VOTED that the General Manager is requested to develop a *standardized format for use by committees*, in submitting reports to the Board.

62) On motion of Mr. Zak, seconded by Mr. Griggs, after discussion, unanimously VOTED that the Legal and Regulatory Committee obtain information on the various rule-making petitions pending before the FCC and report to the Board those that are considered to have priority.

63) Moved, by Mr. Grauer, seconded by Mr. Sullivan, that the Bicentennial WAS certificate bear an appropriate colored seal marked with a figure indicating that WAS was accomplished on a single band. After ex-

tended discussion, on motion of Mr. Gmelin, seconded by Mr. Price, VOTED that the matter is laid on the table.

64) Moved, by Mr. Sullivan, seconded by Mr. Gmelin, to *amend By-Law 31* so that the first sentence would read: "Each such committee shall consist of at least three directors, one of whom shall be specifically designated as Chairman." After discussion, a roll-call being required, the question was decided in the affirmative, 16 votes in favor to none opposed. All the directors voted in favor. So the By-Law was AMENDED.

65) On motion of Mr. Gmelin, seconded by Mr. Griggs, unanimously VOTED (Mr. Hesler abstaining) that the ARRL continue to place highest priority on continued cooperation with the FCC and various amateur groups to find ways of *solving jamming problems* on nets and repeaters.

66) Moved, by Mr. Cotterell, seconded by Mr. Albright, that the Legal and Regulatory Committee make recommendations, for consideration at the July 1976 Board meeting, concerning a possible "*Code of Ethics*" governing the use of phone patches and auto-patches. After discussion, moved, by Mr. Albright, to amend the motion to include "on-the-air conduct of repeaters;" but there was no second, so the motion to amend was lost. The question then being on the original motion, the same was ADOPTED.

67) Moved, by Mr. Price, seconded by Mr. Albright, that in accordance with By-Law 2, authority to approve (but not reject) applications for Life Membership is hereby delegated by the Board to the General Manager. But, after extended discussion, the motion was rejected, 6 votes in favor to 10 opposed.

68) The Board was in recess for luncheon from 11:55 A.M. to 12:42 P.M. Mr. Dannals resumed the Chair.

69) On motion of Mr. Griggs, seconded by Mr. Price, unanimously VOTED to take from the table his motion concerning *Family Life Membership*. On further motion of Mr. Griggs, seconded by Mr. Price, after extended discussion, unanimously VOTED to amend the motion by striking the text and substituting therefor: that a new By-Law 1(d) be added to read, "A paid-up Family Life Membership in the League shall be available to any family member of a Life Member's family upon the payment of a fee twenty times the annual family dues rate, and including provision for regular Life Membership to be acquired upon the additional payment of the difference in dues normally required, if otherwise qualified, should the principal Life Member die, become divorced or separated from the family member concerned." The question then being on the motion as amended, and a roll-call being required, the same was decided in the affirmative, 15 votes in favor to none opposed, with one abstention. All the directors voted in favor except Mr. Cotterell, who abstained. So the By-Laws were AMENDED.

70) On motion of Mr. Egbert, seconded by Mr. Zak, unanimously VOTED, at 1:07 P.M., that the Board does now resolve itself into a Committee of the Whole to consider ARRL pensions, and that the Headquarters staff, exclusive of the General Manager, be excused. The designated people departed from the meeting. The Committee rose at 1:32 P.M. and reported to the Board, whereupon the absentees returned. On motion of Mr. Egbert, seconded by Mr. Price, unanimously VOTED that the General Manager is directed to increase current *monthly benefits to retirees* of the ARRL who had retired on or before January 1, 1976 by 20%, or \$50.00, whichever is greater, implementation date to be February 1, 1976.

71) On motion of Mr. Eaton, seconded by Mr. Baldwin, the following resolution was adopted by a standing VOTE of applause: WHEREAS, David H. Houghton has served the American Radio Relay League since April 10, 1922, as employee and officer, a record of nearly 54 years unlikely ever to be surpassed by any other person and WHEREAS, David H. Houghton has continued as a volunteer worker on behalf of the League for more than a decade past retirement and WHEREAS, David H. Houghton has for all of that time been a living symbol of integrity and devotion to duty, and

WHEREAS, David H. Houghton has completed nearly 35 years as Treasurer of the League, now therefore,

BE IT RESOLVED, by the Board of Directors, of the American Radio Relay League, Incorporated, assembled in Annual Meeting at Hartford, Connecticut this 15th day of January 1976 do hereby warmly thank and heartily commend David H. Houghton for his long, faithful, devoted and enlightened service to the League and to the Amateur Radio Fraternity.

72) On motion of Mr. Egbert, seconded by Mr. Price, unanimously VOTED, at 1:45 P.M., that the Board does now resolve itself into a Committee of the Whole to consider staff matters, and that the attendees be limited to members of the Board (except the General Manager) and vice directors. The designated people departed from the meeting. The Committee rose and reported to the Board at 2:25 P.M., whereupon the absentees returned. On motion of Mr. Egbert, seconded by Mr. Arnold, unanimously VOTED to adopt the report of the Committee. During the course of this proceeding, the Board was in recess from 2:25 to 2:37 P.M.

73) On motion of Mr. Sullivan, seconded by Mr. Gmelin, VOTED to take from the table the motion concerning reimbursement of Public Relations Assistants. The question first being on the second amendment relating to director approval, the same was rejected. The question then being on the first amendment which was to provide \$50 per PRA, the same was also rejected. After discussion, the question then being on the original motion, the same was unanimously ADOPTED.

74) Moved, by Mr. Sullivan, seconded by Mr. Cotterell, that the General Manager upon request, provide prominent QST coverage to input from a director for the purpose of recognizing amateurs in a division for outstanding contributions to amateur radio. After extended discussion, on motion of Mr. Gmelin, seconded by Mr. Albright, VOTED that the matter is referred to the Membership Affairs Committee for study.

75) On motion of Mr. Thurston, seconded by Mr. Price, after discussion, unanimously VOTED that the Board instructs the President to employ whatever means he may deem necessary to investigate and report to the Board at the July meeting on the feasibility of creating an ARRL outgoing QSL Bureau.

76) On motion of Mr. Eaton, seconded by Mr. Griggs, unanimously VOTED (by standing applause) that in recognition of his long and devoted service the Board does elect David H. Houghton an Honorary Vice President, and confer upon him Honorary Life Membership.

77) On motion of Mr. Gmelin, seconded by Mr. Zak, unanimously VOTED that the Emergency Communications Advisory Committee study possible ways of establishing better lines of communication and cooperation between amateur radio emergency operating groups and similar citizen band groups such as REACT.

78) Moved, by Mr. Cotterell, that the Communications Department prepare a program for increased participation of Official Observers in the VHF band, and present it at the July 1976 meeting. But there was no second, so the motion was lost.

79) On motion of Mr. Price, seconded by Mr. Smith, after discussion, unanimously VOTED that the General Manager is hereby authorized to reimburse the President for actual expenses incurred during the year 1976 in the proper performance of his duties in an amount not to exceed \$7,500.

80) Moved by Mr. Price, seconded by Mr. Thurston, to amend By-Law 15 by inserting in the first sentence between words "tellers" and "and" the words, "including at least one director member of the Executive Committee." After discussion, a roll-call being required, the question was decided in the affirmative, 13 votes in favor to 3 opposed. All the directors voted in favor except Messrs. Grauer, Hesler and Zak. So the By-Law was AMENDED.

81) Moved, by Mr. Griggs, seconded by Mr. Grauer, that the General Manager is directed to pursue the matter of establishing ARRL authorized frequency coordinating committees in conjunction with the FCC as necessary to develop an improved repeater frequency coordination plan for VHF. After extended discussion, on motion of Mr. Price,

seconded by Mr. Sullivan, unanimously VOTED to amend the motion by striking the word "pursue" and substituting the word "study," and to request that a report be made at the July 1976 Board meeting. The question then being on the motion as amended, the same was unanimously ADOPTED.

82) On motion of Mr. Smith, seconded by Mr. Albright, unanimously VOTED that the VHF Repeater Advisory Committee is requested to (1) evaluate and report any recommended changes in the ARRL band plans for the 6-meter and 70-centimeter repeater sub-bands; (2) submit recommendations regarding the establishment of tertiary frequency channels in the 146-148 MHz band; (3) re-evaluate existing rules and regulations governing repeater operations and propose changes where appropriate; (4) assist the Hq. staff in collecting information for consideration of a frequency coordination plan.

83) On motion of Mr. Clark, seconded by Mr. Smith, unanimously VOTED that Rule 4 of the Rules and Regulations Concerning Affiliated Societies be amended to require that "In a Category 1 or 2 society, at least 51% of the voting membership must be Full or Associate members of the League, and at least 51% of the voting membership must be licensed amateurs."

84) On motion of Mr. Clark, seconded by Mr. Thurston, unanimously VOTED (Mr. Hesler abstaining) that the General Manager file comments with the Federal Communications Commission in response to Notice of Proposed Rulemaking (Docket 20672) seeking to assure that amateurs will be permitted to retain original license documents in their possession.

85) On motion of Mr. Clark, seconded by Mr. McConaghy, after extended discussion, unanimously VOTED (Mr. Hesler abstaining) that the General Manager file comments with the Federal Communications Commission in response to Notice of Proposed Rulemaking (Docket 20679) seeking to minimize, insofar as possible, the cost and administrative burden imposed upon volunteer examiners for amateur radio licenses.

86) The Board was in recess from 3:35 to 3:48 P.M.

87) On motion of Mr. Thurston, seconded by Mr. Griggs, unanimously VOTED that the General Manager is hereby authorized to reimburse the division directors for actual expenses incurred by them during the year 1976 in the proper administration of ARRL affairs in their respective divisions, up to amounts as follows:

Canadian Division	\$4000
Atlantic Division	4800
Central Division	2400
Dakota Division	1600
Delta Division	3300
Great Lakes Division	3500
Hudson Division	3000
Midwest Division	3000
New England Division	3400
Northwestern Division	3000
Pacific Division	4200
Roanoke Division	2750
Rocky Mountain Division	1900
Southeastern Division	4000
Southwestern Division	4800
West Gulf Division	4000

88) On motion of Mr. McConaghy, seconded by Mr. Zak, unanimously VOTED that the additional sums of \$546.97 for the Canadian Division, \$212.00 for the Atlantic Division, \$251.01 for the Delta Division, \$36.23 for the Hudson Division, and \$355.93 for the Pacific Division, are authorized as additional reimbursable expenditures during the year 1975.

89) On motion of Mr. Griggs, seconded by Mr. Haller, unanimously VOTED that to continue the Board's policy of reimbursing Section Communications Managers and QSL Managers of the League for certain travel in furthering ARRL organizational activities, the General Manager is hereby authorized to pay during the year 1976 a total amount not to exceed \$17,000 under terms prescribed by the Communications Manager for SCMs, and the General Manager for QSL Managers, following the general pattern established by the Board.

90) On motion of Mr. Gmelin, seconded by Mr. Smith, unanimously VOTED that, to continue the Board's policy of reimbursing Section Emergency Coordinators for certain



WØFIR and WØJCP are the Midwest team.

travel in furthering ARRL organizational activities, the General Manager is hereby authorized to pay during the year 1976 a total amount not to exceed \$9,000 under terms prescribed by the Communications Manager following the general pattern established by the Board.

91) On motion of Mr. Haller, seconded by Mr. Gmelin, after extended discussion, unanimously VOTED that, to continue the Board's policy of reimbursing National Traffic System officials above the section level for certain approved travel in furthering ARRL organizational activities, the General Manager is hereby authorized to pay during the year 1976 a total amount not to exceed \$6,000 under terms prescribed by the Communications Manager following the general pattern established by the Board.

92) The Board was in recess from 4:30 to 4:40 P.M.

93) At this point the President announced the appointment of Mr. Anderson as a full, rather than an alternate, member of the Management and Finance Committee.

94) On motion of Mr. Haller, seconded by Mr. Sullivan, VOTED that the DX Advisory Committee be consulted when the country status of any area is to be determined.

95) On motion of Mr. Gmelin, seconded by Mr. Haller, unanimously VOTED that in recognition of his many years of dedicated service to the League, Francis E. Handy, WIBDI, is made an Honorary Life Member of the ARRL.

96) Whereupon, on motion of Mr. Thurston, seconded by Mr. McConaghy, the Board adjourned, sine die at 6:11 P.M. (Time in session as a Board, 14 hours, 16 minutes. As a Committee of the Whole, 1 hour, 41 minutes. Total direct authorizations, \$146,311.14.)

Respectfully submitted,
JOHN HUNTOON, W1RW
PERRY F. WILLIAMS, W1UED
Secretaries.

QST

W8ETU, K2SJO and WØKE follow the discussion.



Happenings

Conducted By Perry F. Williams,* W1UED

Canada Update

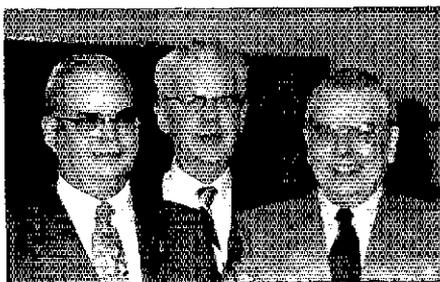
Calling all amateurs in Canada: *Happenings* is here to serve you as well as the amateurs below the border. We want to hear from you about news items, official happenings, presentations and awards, text and photographs of what's happening in Canada as well as in the States. Meanwhile, here is a collection of short VE/VO items for a first installment.

Canadian Elections

In the November issue we reported on the uncontested election of Ron J. Hesler, VE1SH, as Director from the Canadian Division. Because of the postal strike, balloting among three candidates for vice director was disrupted. Several weeks were allowed after the strike ended for the ballots to arrive at Newington; on January 8 the count was made: 1245 for William W. Loucks, VE3AR; 398 for Henry W. Thel, VE7WJ and 295 for William L. Skidmore, VE3AUI.

Bill Loucks is already well-known among VE/VOs generally and Ontario amateurs in particular. He's immediate past president and a director of the Radio Society of Ontario; Ontario delegate to the Canadian Amateur Radio Federation; honorary member past president, past vice president, and past secretary of the West Side Radio Club of Toronto; Sponsor, VE3SVS, Sunny View School for the Handicapped and a member of FOC (First Class CW Operators' Club). Bill was first licensed in 1936 as VE4ABR, was VE3BFP in the '40s, and VE3AR since then. A registered

The new team poses with the old hand — Canadian Director Ron J. Hesler, VE1SH (right) and Vice Director William W. Loucks, VE3AR, are welcomed by Past Director Noel B. Eaton, VE3CJ, President of the International Amateur Radio Union and Vice President of ARRL.



WØ QSL BUREAU

One of the most time-consuming volunteer tasks in the ARRL firmament is that of QSL Bureau manager, particularly if you try to do it single-handedly, as Dr. Phil Rowley, KØZFL, has been doing for the past several

*Assistant Secretary, ARRL.

professional engineer, he's manager of the IBM Computer Centre for Ontario Hydro and lives in Toronto.

Third-Party Communications

The countries of Guatemala and Uruguay have been added to the list of those countries which permit amateur radio operators of either country to exchange messages or other communications on behalf of third parties with Canadian amateurs.

Novices for Canada?

A proposal for a Novice license in Canada has been supported by the Canadian Division, ARRL. It would be for AI (Morse code) operation only, in the bands 3,700-3,725, 7,100-7,150, 21,100-21,200 and 28,100-28,200 kHz bands, with 150-watts input. The two-year ticket would require 5 words per minute in the code, knowledge of regulations and knowledge of adjustment, operation and care of radio apparatus. The tests would be administered by two Advanced Amateurs not related to the applicant.

A proposal for an Extra Class license was not supported by the Division.

Updating the Exams

Last year the Department of Communications embarked on a course aimed at introducing significant changes to Amateur and Advanced Amateur examinations with the objective of updating the content to reflect the state-of-the-art in a more streamlined manner.

The multiple choice examination for Amateurs has been in use since last January and reports indicate that the new format is working quite well and has generally gained acceptance. The pass mark is 70%. New 10 wpm Morse cassettes were supplied to the DOC offices in the summer. And a new syllabus has been published as Telecommunications Regulation Circular 24 — TRC-24 for short. The list of study guides in TRC-24 includes the ARRL's *Radio Amateur's Handbook* and the *License Manual* (though of course the regulations portions thereof should be bypassed by Canadian students).

Similar steps are underway for the Advanced Amateur, and may already be on the scene as you read this.

years. Originally, he had just a third of a divided bureau, but gradually the rest of the operation has piled up on the table, desk and bookcases in Alamosa. And DX-chasing time at KØZFL has gotten smaller and smaller! He now retires from the task with, we are sure, the warm thanks of all amateurs in Zero-land for a job well done.



Earle F. Porter, VE3 EPP, has retired as Director General, Telecommunications and Electronics Bureau, Ministry of Transport, after more than 34 years of government service. His last assignment was as MOT representative at the Aerosat Council meeting in London. Earle has traded in VE3EPP on VE1EFP as he takes up residence in his native province of Nova Scotia. The new man at the old desk is another amateur — Frank E. Lay, VE3ZN. Congratulations all around! — (Pix from a MOT publication, via VE4BJ)

Spark Ignition Rules

Things should gradually get quieter between Canadian headsets over the next few years: The Department of Communications has published new federal requirements for the control of interference with radio reception caused by spark ignition systems of internal combustion engines, to become effective September 1, 1976, for all engines (except aircraft) manufactured in Canada or imported after that date. The rules have teeth; any seller or user of a device covered by the rule must make it available to the Department on demand to insure that it continues to meet the standards. Copies of the new radio interference regulations are available from Information Canada bookstores and from regional offices of DOC.

The Department is also working on two remaining sources of noise, power lines and appliances.

The bureau for all prefixes in the zero call area will be operated by the Ak-Sar-Ben Radio Club, P.O. Box 291, Omaha, Nebraska 68101. All cards and envelopes have been transferred from Colorado, and bureau users in good standing need do nothing. But if you don't have at least one envelope on hand, or if you have not yet sent extra postage to bring

your envelopes up to the 13c, etc., rates now in effect, please do so right away. — *WB2CHO*

BEHIND THE DIAMOND

It has often been said that an interest in amateur radio in one's early life will lead to a successful professional career later on. This was certainly the case for a sixteen-year-old highschool student in Little Rock, Arkansas who, in 1951, received one of the first Novice licenses ever issued and who, today, is the chairman of the Department of Finance and Law at Georgia Southern College in Statesboro, Georgia. We're talking about *Larry E. Price, W4DQD*, ARRL Southeastern Division Director. Larry represents League members in Alabama, the Canal Zone, Florida, Georgia, and the West Indies. Prior to becoming director, he served as assistant director from 1970 to 1971, and vice director in 1972.

When talking with him, you'll find that Larry is quite modest about his accomplishments, but we don't share his modesty, so we'll tell you that he has three degrees: a Bachelor of Science in Electrical Engineering, a Master of Business Administration, and a Doctor of Philosophy in Finance — all from the University of Arkansas. He was an engineer for the Missile Division of Bendix Aviation from 1956 to 1958, spent some time in graduate school, and then joined the staff of Georgia Southern College in 1960. In 1966 he became Department Chairman.

Larry's amateur radio credentials are also impressive. He is a past president and vice president of the University of Arkansas Radio Club, past faculty sponsor and secretary of the Georgia Southern College Radio Club, and present trustee of club station WA4DTF. He holds an OPS appointment, is a member of the AREC, and is communications officer for the Statesboro-Bulloch County Civil Defense. He has served as a member of the Board's Management and Finance Committee and Membership Affairs Committee, and as chairman of the Legal and Regulatory Committee. He was one of the original incorporators and served as Director of the ARRL Foundation. He still serves as secretary of the Foundation and has been since 1975 the Board Liaison to the ARRL DX Advisory Committee.

Larry resides in Statesboro, GA, with his wife Barbara. They have three children, Jane, Carol, and Steven. Their backyard sports an 80-foot tower with a four-element beam for 20 meters and a three-element duo-band for 10 and 15. He is very active on the air and almost qualified for the first Bicentennial WAS, but unfortunately for him the winning entry arrived while he was attending the January Board meeting in Newington. Well, Larry can console himself with his newly earned Extra Class ticket — which raises another question! After being a professor, department chairman, and Extra Class licensee, what's next? — *K1FHN*

ORIGINAL-LICENSE RULEMAKING

Last month in this space we mentioned one small exception to FCC's general policy of deregulation: The proposal in Docket 20672 to require amateurs to send the original of a license being renewed or modified rather than a photocopy.

Knowing that many amateurs value a complete collection of license documents over the years, the ARRL Board of Directors at its January meeting (minute 84) ordered comments seeking to assure that amateurs will be permitted to retain original licenses in their possession. The comments were indeed filed on the deadline, January 22, and here are a few extracts:

“ . . . The League is aware of a very limited number of instances over a period of many years in which . . . alterations in the original license apparently had been made. However, it respectfully submits that the number of such attempts to defraud the Commission have been so small as to not justify adoption of the proposed amendments and procedures. . . . It appears that changes in the Commission's internal procedures will provide the same benefit as the current proposal without negative impact upon the amateur community. . . . In the event that, for reasons not presently known to the League, it is impractical for the Commission to use its computer records in connection with applications for renewal or modification of amateur licenses, then, in the alternative, the League respectfully proposes that the Commission henceforth issue two copies of each license document . . . one of which would be available for filing. . . . Every amateur should be permitted to maintain permanent, legally-admissible files of documents . . . including especially the original of each amateur license. . . . Particularly in the past few years there have been instances of lost or long-delayed mail at least as numerous as the proven cases of fraud by applicants. . . .”

Amateurs wishing a full copy of the response should send a self-addressed envelope to Hq., marked “Docket 20672 Comments.”

EXAMINER'S LICENSE

Another FCC rulemaking proposes that volunteer examiners furnish photocopies of their licenses when requesting examination papers on behalf of an applicant for a mail examination. The ARRL Board voted to file comments, “. . . seeking to minimize, insofar as possible, the cost and administrative bur-



The Russell brothers, Jim, W8BU and David WB8QYZ, each received a 60th Anniversary award from the Quarter Century Wireless Association at a banquet in Cleveland. Their operation dates back to 8AL in 1915. Jim incidentally, was part of history in 1921 when his cw station 8BU was one of 26 heard by Paul Godley in Scotland during the Transatlantics. (Photo via WBALI)

den imposed upon volunteer examiners for amateur radio license.” Comments were due at FCC on February 2 and reply comments on February 12. However, amateurs just learning of the matter, Docket 20679, as they read these words may still submit informal comments including a request for waiver of the filing date due to the short notice given by the Commission.

IGNITION NOISE INQUIRY

The good old days were sometimes not so good in a number of ways, and one of them was in the ignition noise a single motor vehicle could cause in a radio receiver. The problem is not nearly so severe now as it once was, with respect to just one car, but the total is still pretty bad, when you consider all the cars and trucks on the road. Accordingly, the Federal Communications Commission has issued a Notice of Inquiry, with comments due March 19, looking into the problem again.

One of the questions being asked is: To what extent are other kinds of radio services, such as television, microwave and amateur degraded by ignition interference. ARRL will, of course, be making a response.

If you'd like a copy of the Notice, please send a self-addressed envelope with 13c postage to ARRL and ask for Docket 20654.

MORE DEREGULATION: EXTRA CLASS

The Commission, by simple order on its own motion, has deleted the one-year experience requirement for Extra Class. Section 97.9 now reads:

“Eligibility for new operator license. . . .(a) Amateur Extra Class. Anyone except a representative of a foreign government.”

Thus, a sufficiently skilled and knowledgeable amateur could appear at a Commission office, take all the amateur examination elements in one sitting, and conceivably achieve Extra Class as his first amateur license!



Correspondence

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

SHOCKING COVER

□ I would hope that some safety-minded person there at Hq. would have a little talk with our "cover girl." I note that she appears to have her hands well anchored on the chassis of that piece of equipment and doesn't seem to be concerned that she might get to be a conductor herself. At least that's not the way I would do it. Hope she is still around come 1977. — *James A. Matby, W9KRH, Clinton, IL*

□ I wonder whether the picture on the front cover of January QST is the work of Larson E. Rapp, or is it a "How Many Things can You Find Wrong with this Picture?"

Assuming that the multimeter is a Simpson model 260, let me enumerate:

1) The leads are in the 10-amp jacks of the meter, but the switch is in the 2.5-volts position instead of where it should be to measure current.

2) The transmitter is off, as indicated by the position of the power switch and the meters on the front panel. One cannot measure amperes with the transmitter off, nor ohms with the prods in the jacks for amps.

So tell us what Donna is really doing. — *Laurence B. Stein, Jr., WB1Y, Hingham, MA*

□ For shame, exposing the young lady to possible electrical shock by having both hands in contact with the amplifier while making a test. Wouldn't it set a better example for young people if she held the test leads only? While only a picture, it does imply that this is the recommended procedure for testing.

I love the new QST, including the size, type size and the full-color photo. Keep up the excellent work on our behalf. — *Paul Klein, K9VJJ, Rockford IL*

SIZED UP

□ It isn't very often that I sound off, but after perusing my January, 1976 issue I just had to tell you what a wonderful change has come over QST. I'm probably one of the staunchest hide-bound traditionalists, but the whole aspect of the magazine has changed for the better, really the best I've seen it in my 46 years as a ham.

When I first looked at the table of contents, I thought it was the chapter index of a book, rather than the monthly index of QST. There should be enough now to satisfy the demands of all facets of our wonderful hobby. In a single word, the new QST is stupendous. And to top it all off, \$100,000 a year less — Wow! — *John E. Pitts, Jr., W6BD, Redwood City, CA*

□ I have just received my copy of the "new look" QST and after the first 15-20 minutes my impression went from looks better, reads better, to great, to fantastic. I was able to read entire articles without eye strain, bright lighting or magnifying lens.

I have not been a subscriber for very long, so probably cannot understand the withdrawal and/or new birth pains that you and the other old timers have had to suffer in making this change; and I'm not much of a note writer, but just felt I'd like to let you know one person's opinion of the "new" publication.

So many thanks and let's hope that others can also see and read what they have been looking at over the many past years. — *John F. Strenme, WB0KHJ, Wheat Ridge, CO*

□ Having been an ARRL member for the majority of my eighteen years of ham radio activities, I have watched the League grow and go through many changes. I can remember the building fund and the contrasting groans and cheers with the incentive licensing proposals. I can clearly remember sitting for hours with stacks of my father's QSTs when I was eight or nine years old and just getting interested in radio.

Fellow hams have protested, cursed, and terminated their membership in the League, all obviously having little overall effect. I guess there will always be those, in any society, that can't see the real and main purpose of a fine organization like ARRL.

I was primarily prompted to write this letter when the January '76 QST arrived. I'd been anticipating the new size from previous announcements, so that alone was no great surprise. Your whole new format is simply outstanding, especially with the full-color cover. The larger type, schematics, halftones, etc. are easier to read and make the magazine much more enjoyable.

As long as I'm involved in ham radio, you can rely on my membership and support. Keep up the fine work. — *Donald E. Gilbeau, K6OZI, Stockton, CA*

□ The QST new look is very dissatisfying. The size is just too inconvenient compared to the old. The portion of page area taken up by advertising has jumped from 32.5% to 40.5%. If you are saving so much money on the new size, why sell more ads? Maybe to have money to blow on useless color covers?

However, that is minor compared to the fact that you have thrown tradition out the window entirely by changing the cover layout and dropping the use of Phil Gildersleeve's artwork at the top of the "department" pages. Nothing could have been gained by doing so: Only destruction of a traditional style loved by hundreds of thousands over the last 60 or so years. I demand reinstatement of the old cover and other artwork. The precious few traditional aspects of ham radio remaining must be preserved. — *Tom L. Hedges, WB6DSK, Modesto, CA*

□ Congratulations on the new format for QST. It is pleasant to look at, comfortable to handle and easy to read.

I have been a licensed amateur for more than forty years, and a reader of QST for longer than that, so it cannot be said that I am one of the avant-garde.

As an old timer, therefore, I say thanks for making the change; it has been long overdue. — *Carl H. Harris, W1SVH, Old Lyme, CT*

□ I think the new QST format is terrific! It is obvious that you gave a great deal of time and thought to the type of articles you presented as well as the physical changes in the magazine. I was delighted to see that you have placed more emphasis on basic topics relating to amateur radio as well as presenting the more technical subjects. These innovations will, in my opinion, insure the continued success of QST. — *Harry M. Campbell, WN9RVX, Brownsburg, IN*

□ Just a note to let you know I like the new size of QST. The larger print, schematics, and pictures are welcome. Glad to see you found a way to keep from raising the cost of subscribing to QST by saving on paper costs. In my opinion the advantages of the new size surely outweigh the disadvantages. — *Ken Stuber, WB4CQJ*. The new format, contents, and size are great. Keep up the good work! — *H. W. Porter, WB0FTM*. Congratulations. The new January QST is just wonderful. I joined ARRL in 1929 and I waited all these years for such a great issue. — *Paul L. Stumpf, W3AQN*. I am really pleased with the new look of our QST. It is very pleasant to read. — *Nelson E. Burbank, W9JUM*. We appreciate and have enjoyed the January QST new design. The larger print and pictures make for better reading. Thank you. — *Hazel I. Goodrich, W9PNK*. Congratulations on the new look! — *W. A. Monahan, Jr., K6KH*. After receiving my January issue of 73, I awaited your January QST with apprehension. Much to my surprise, a new QST has been born, reflecting changes at Hq. I approve wholeheartedly! The best way to describe the new QST is to say that after 60 years QST has removed its tie, unbuttoned its collar, rolled up its shirt sleeves, and let its hair grow over its ears! — *David R. Klimaj, W4JVN*. I would like to take this opportunity to express my appreciation and enjoyment of the new format and size of QST. Surely the many advantages far outweigh the few disadvantages that some folks might encounter. — *Jon Q. Groth, W9MCH*. As a reader of QST since 1917, I want to congratulate you on the new format. It's great! — *James R. Curtis, K5CP*. Congratulations! The January QST is beautiful. Well done! Easy to read. Excellent photos. Good articles. — *Richard E. Huddleston, W6DLN*. Forgot about the new QST until this morning when I found it in my mailbox. Going to have to get used to it (one of these days). — *Bobby L. Brownlee, WNSOSD*. The new size, format, and content of QST should just about satisfy everyone. Those responsible at Hq. should take a low bow. Hiram Percy Maxim would indeed be pleased. — *J. Warren Cox, W2EGL*. January 2, received QST. Didn't like it. Read it. Liked it. Congrats! — *Arnold King, Jr., W2ZT*. When I first heard of the size change in QST several months ago, I wrote a letter of protest thinking that I would not like the new size. After receiving the January issue, I find I like it very much. I withdraw my protest and congratulate the League on a good move. — *Ronald C. Williams, W9JVF*. Congratulations on the new QST format. I think the overall improvement is tremendous and I shall look forward to each issue with even more anticipation than I have in the past if that is possible. — *Dick McIntyre, K4BNI*. The only thing I find wrong with the new QST is that the words "devoted entirely to Amateur Radio" on the cover are too small. Let's push amateur radio every chance we get including on the cover of QST! — *Robert W. Myers, WA2ZXX*. My congratulations to the staff for an absolutely super job. What can you do for an encore? — *Jim Maxwell, K6AQ*. The January QST arrived today. As usual it was most interesting . . . but I do not like the new size. It is not convenient to read nor will it fit with the other QSTs in my 25 year collection. Here's to a fast return to 6-1/2 X 9-1/2. — *J. A. Wright, WAUEB*. I would like to compliment you on the new QST format. I didn't like the idea at first, but since I have had a chance to examine it all I can say is, "Keep up the good work!" — *F.M. Kelly, WBSDYR*. Just wanted to say that the new look of QST is terrific! Really up with the times. Hope you keep it up! — *Raphael J. Lyman, WB4FAI*. I'm going to turn in my Life Membership . . . if QST ever goes back to the old format. It looks great! — *Paul M. O'Brien, K1OJQ, Quincy, MA*

Hamfest Calendar

Florida: The Treasure Coast Bicentennial Hamfest is Saturday and Sunday March 20, 21. For info write: K4QM, P.O. Box 3088, Vero Beach, FL 32960.

Florida: The Key West Amateur Radio Club's first annual Conchfest is March 27, 28. For info write: Steve E. McCallum, K4URX, P. O. Box 1423, Key West, FL 33040.

Maryland: The FM Assoc.'s Electronic Swapfest is on March 14 from 8:30 to 3:30 at High Point High School, 3600 Powder Mill Rd., Beltsville. Donations are \$2 with tables available for \$3. For advance tickets or tables send remittance to: David McCrory, WA3TKW, P. O. Box 111, College Park, MD 20740. Make checks payable to Maryland FM Assoc., Inc.

Maryland: The Greater Baltimore Hamboree is April 4 at 8 A.M., Calvert Hall College, Goucher Blvd. and La Salle Rd., Towson, MD (one mile south of exit 28 Beltway-Interstate 695). Food service, contests, and flea market, all inside. Over 250 tables in gym. Over 1000 in attendance last year. Tail-gate outside parking lot. Info: Contact Brother Gerald Malseed at school address or call 301-825-4266.

Massachusetts: The University of Lowell Wireless Society will be holding their annual auction on Friday, March 12, in Cumnock Hall on the University campus in Lowell, MA. The auction begins at 7:30 P.M. Free parking will be available nearby. For information, write to WA1PDI, 175 Endicott St., Dracut, MA 01826.

Massachusetts: The Wellesley Amateur

Radio Society's annual hamfest/auction is March 20. The auction is in the main hall of the Wellesley Hills Congregational Church, Wellesley Hills. Opens at 11 A.M. Talk-in on two-meter fm 36/96, 04-64 and 146.52 direct.

Michigan: The Blossomland ARA hamfest is Saturday, March 13, Berrien Co. Youth Fairgrounds, Berrien Springs. Advance registration \$1.50; \$2 at gate. For info write: BAKA, P. O. Box 345, St. Joseph, MI 49085.

Michigan: The Annual SEMARA Swap n' Shop is April 4 from 8 A.M. to 3 P.M., South Lake High School in St. Clair Shores on the southwest corner of Nine Mile Rd. and Mack Ave.

New Jersey: The Livingston Amateur Radio Club's annual hamgear auction is Friday, March 19 at 8 P.M. at the Memorial Park recreation building across the street from Town Hall and by Livingston High School. Building opens at 7:30 P.M. All gear must be tagged with seller's name or call and minimum opening bid; otherwise, floor bid used. For info write: Secretary, LARC, 25 Fieldstone Dr., Livingston, NJ 07039 or (201) 992-0552.

New Jersey: The Knight Raiders VHF Club's auction and flea market is Saturday, March 20 at St. Joseph's Church of East Rutherford, Hoboken St., East Rutherford. Free admission, free parking, refreshments available. Talk-in on 146.52 and 146.94. Doors open at 11 A.M. Flea market tables \$5; \$3 for half. Reserve in advance by writing: The Knight Raiders VHF Club, K2DEL, P. O. Box 1054, Passaic, NJ 07055.

New Jersey: The Trenton ham radio auction is Saturday, March 20 from 9-5 at the DAV building on Arena Dr. in Trenton. (Take exit 7-A off the NJ Turnpike to I-195, then to exit 2, Arena Drive, and right 1.6 miles on Arena Dr.) No admission charge. A 10% fee to seller, 3% on buy back, \$1 minimum. Talk-in on 84/24 and 52. For more info call Carl, 609-599-1868. Proceeds to benefit Lawrenceville Repeater group.

New York: The annual Amateur Radio Assoc. of the Tonawandas auction is March 16 in the Payne Ave. Christian Church in North Tonawanda at 8 P.M.

North Carolina: The Metrolina Hamfest is March 13, 14 at the Carolina Trade Mart, 531 S. College St., Charlotte, in the third floor exhibit hall. On Saturday the hours are 12-6 and Sunday 8-4. The Mecklenberg Amateur Radio Club, W4BFB, are sponsors of the hamfest.

Ohio: The 21st annual ham auction is March 13 at Lucas County recreation center, Toledo. Auction, flea market, commercial displays all from 8-5 P.M. \$1.50 advance. \$2 after March 1. Talk-in 146.52. Send s.a.s.e. Toledo Mobile Radio Assoc., Box 273, Toledo, OH 43696.

Texas: The Midland Amateur Radio Club, W5QGG, will hold its annual St. Patrick's Day Swapfest on March 20 & 21 at the County Exhibits building, East Highway 80. Door prizes, contests. Preregistration, \$2.50; \$3 at door. Talk-in on 16/76. Info: Write MARC, P.O. Box 4401, Midland, TX 79701.

Washington, DC: The 1976 ARRL Technical Symposium on Mobile Communications is Wednesday, March 24 at the Statler Hilton Hotel, in conjunction with the IEEE Twenty-Sixth Vehicular Technology Conference (March 24-26). The technical symposium is sponsored by the Northern Virginia Amateur Radio Council (NOVARC) and managed by the Amateur Radio Research Development Corporation (AMRAD). Presentations include mobile operation, repeaters, mobile Oscar communications, spectrum utilization and related topics, starting at 7:30 P.M. Between 3 and 5:30 see IEEE exhibits at no extra charge. Advance registration \$3 payable to NOVARC with name, call and address. Mail: NOVARC, P. O. Box 682, McLean, VA 22101. At door \$3.50. Make hotel reservations direct, mentioning conference. Tickets held at the door.

Coming Conventions

March 20
Michigan State, Muskegon, MI

April 3-4
ARRL Hamfest, Mobile, AL

April 9-11
Southwestern Division, Tucson, AZ

April 10-11
North Florida Section, Jacksonville, FL

April 23-25
West Indies Section, Dorado, PR

April 25
Delta Division, Jackson, MS

May 21-23
New York State, Rochester, NY

June 5-6
ARRL Hamfest, Salina, KS

June 11-13
Southeastern Division, Atlanta, GA

July 2-4
West Virginia State, Jackson's Mill, WV

July 9-10
Central Division, Milwaukee, WI

July 16-18
ARRL National, Denver, CO

July 24-25
Atlantic Division, Philadelphia, PA

July 31-August 1
Roanoke Division, Norfolk, VA

August 7-8
ARRL Hamfest, Concordia, KS

*August 20-22
Maritime Section, Halifax, NS

September 3-5
Pacific Division, San Jose, CA

September 10-12
New England Division, Boston, MA

October 8-10
Midwest Division, Omaha, NE

November 6-7
South Florida Section, Clearwater, FL

November 13-14
Hudson Division, McAfee, NJ

*Indicates change in Halifax convention.

MICHIGAN STATE CONVENTION

March 20, 1976

The Muskegon Area Amateur Radio Council is sponsoring its seventh annual hamfest in Muskegon, Michigan, on March 20, 1976. The Michigan State Convention and Hamfest will be held at the Muskegon Community College, a modern facility that offers parking for over 1500 cars -- free -- and complete dining facilities which are open all day long. Doors open at 8:00 A.M. (not before). Tickets are available at the door for \$2.25; no advance mail sales.

Just a few of the events to be featured: Technical forums covering all facets of the current state of the art in amateur radio, manufacturers' displays, and NETS hold all their state meetings at this event.

The MAARC sponsors the Ham-Hospitality at the Muskegon Ramada Inn on Friday

evening, March 19. Eye-ball QSOs and libation for all. Also at the Inn, at midnight on Friday evening, the club will put on the annual Wouff Hong initiation to induct ARRL members.

Further information is available from the MAARC, Box 691, Muskegon, MI 49443 or Hank Riekels, WA8GVK, Event Coordinator., telephone (616) 722-1378.

NOTE: Sponsors of large ham gatherings should check with League Headquarters 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.

Feedback

□ Several errors were noted in the schematic for an Audio Speech Processor on page 396 of the Radio Amateur's Handbook, 1976 edition. The corrected schematic is shown on page 36 of this issue.

□ Here is the parts list for the Scanning Decoder, pg. 34 January QST, Fig. 1 - U1, U2 - Motorola MC1310P; U3, U4, U8 - 7473; U5, U6 - 7426; U7 - 7402; U9 - Signetics NE 555 V timer; U10 - 7440; U11 - 74154; U12, U13 - 7404; U14, U15, U16, U17 - 7430, Fig. 2 - U18, U19 - 7473; U20 - 7408; U21 - 7400; U22 - 7472; U23, U24 - 7474; U25 - 74145; U26 - 7410; U27 - 7420; U28 - 7416.

□ In the February issue under "Strays," p. 68, the call sign "W1HUM" should read "W1HWM." Thus, W1CEN and W1MAR should be QSLed (with s.a.s.e.) via W1HWM.

YL News and Views

Conducted By Louise Moreau,* W3WRE



We Were There

The reenactment of the 1775 Arnold Expedition to Quebec was a part of the Bicentennial celebration with the Stricklands, Joan (WA3UNI) and Bob (WA3HNZ) and Dennis O'Ryan (WA3UNE). As the only YL operator, Joan tells us that it was parades in every town, with life and drum and "Yankee Doodle." Accounts from her diary indicate that it was General Arnold, Dan Morgan and Aaron Burr and that there were amateur radio operators in mob cap and panniers, in tricorne and home spun, operating WZ1AEQ/WI and WZ1AEQ/VE2.

Joan's diary reads: "9/28/75. Arrived and set up but had power troubles. 9/28. WIPIE

went off the air to loan his equipment for the expedition. Many contacts all evening. So much activity that operating is curtailed. 9/29. Arrived in Madison, ME, and paraded through town. "Yankee Doodle" is the top tune here. Through radio helped one family find a lost tent after a lot of calls to locate it. 9/30. After parade found European DX booming in on 20 and 40. Now I know what a pile up really is. Too bad our operating is erratic due to crowded schedule. 10/1. Arrived Canada; understand we are the only special events FCC call authorized for use by a foreign government. Entire town turned out and gave us key to the city. Having troubles

with French but manage to get along. "Yankee Doodle" on bagpipes from the Canadians sounds great. 10/2. Quebec. Set up right on the Plains of Abraham and despite an unbelievable schedule worked 20 and 40, and fm on 2 meters. The hospitality is wonderful here. 10/3. A free day and boy are we operating! Despite the 30 story hotel blocking the path to Europe, we are snowed with contacts. 10/4. Reenacted the Battle of Quebec plus parade and banquet. The Canadians are terrific hosts. Started back home on the fifth, and returned WIPXE's gear. We can't thank him enough for making WZ1AEQ a success with over 400 contacts."

1975 YLAP RESULTS

Cw winners: YV5CKR, 1056, gold cup; DK0EK, 861, certificate; 13MQ, 630, certificate. Phone winners: K6KCI, 5635*, gold cup; W2GLB, 5249, certificate; K6DLL, 4772.50*, certificate. Combined Scores: K6DLL, 5356.25*, Corcoran Award; YV5CKR, 4839, Hager World DX Award. WAINXR, 3796; DK0EK, 2933; WA9TVM, 2485; DK5TT, 2047.50; 13MQ, 1296; WA2DMK, 1237.50*; DF7SL, 892.50*; WB0LFO, 737; WA2NFY, 702; G8LY, 454; SM5CXC, 374. Cw results: YV5CKR, 1056; DK0EK, 861; DK5TT, 828; 13MQ, 630*; DF2SL, 288.75*; WA2DMK, 288.75*; WA9TVM, 235; WA2NFY, 252; K8ONV, 250; YV4NO, 153; G8LY, 130*; K6DLL,

126.75*; SM5CXC, 113.75; WA0LFO, 90; WAINXR, 16. Phone results: K6KCI, 5696*; K6DLL, 5232.50*; W2GLB, 5049; FG7XL, 4746; F5KC, 3910*; WA1UVJ, 3827; YV5CKR, 3783; WAINXR, 3780; W7RVM, 3570; DJ1TE, 3412.50*; K4RNS, 2898; W4HWR, 2767.50*; DJ1EC, 2600*; K8NGR, 2537.50*; WA9TVM, 2232; DK0EK, 2072; WA8AHU, 1980*; K5OPT, 1972; K8ITF, 1938; HB9ARC, 1850; W6QPG, 1650*; WB4NKO, 1632; DL3SL, 1381.25*; KL7FJW, 1312.50*; W4EHN, 1254; DK5TT, 1218.75*; WA6HG, 1202.50*; WA1JYO, 1110*; WB9MFC, 1093.75*; DK5RU, 1085*; DK1HH, 1067.50*; W4TVT, 1066; WA2DMK, 948.75*; W6JZA, 936; DJ2RZ, 756.25*; W2EBO, 700; WA9HWL, 687.50*; WB0LFO, 665*; 13MQ, 646; DJ7UAC, 605*; JA1YL, 600*; DF2SL, 563.75*; JR3MVF, 551.25*; YZ2CVB, 525*; DK2KD, 462.50*; DK6VY, 461.25*;

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



Gail, WN2CIH and OM WB2PPE very busy cw operators on 40 and 15. (K2LKH photo)

Evelyn Fox, WN9QZA, came into amateur radio at the age of 78. Evelyn is an active member of the Yellow Thunder ARC. (K9PKQ Photo)



JA1AQE, 450*; VE2JZ, 450*; WA2NFY, 450; G8LY, 324; W7NJS, 304; DK9CA, 277.50*; SM5CXC, 261.25*; DK8LO, 210*; SM0FT, 180; WA7TLL, 178.75*; WA6AGE, 165*; JA2VIO, 113.75*; DM2YLJ, 30*; PA0HIL, 13.75*. *Indicates low-power multiplier. Note, no one qualified for the NA-Central American DX Hager Award.

1976 YLRL DISTRICT CHAIRMAN CHANGE

Myrtle Cunningham, WA6ISY, 1976 YLRL president, announced that the Penn Jersey YL Club will be the 3rd District chairman, YLRL, for 1976, instead of W3HEN as previously announced. PJ YL will also host the women's program of the Atlantic Division ARRL Convention in July.

YL OM REMINDER

All logs for the 1976 YL OM Contest should be sent to the contest custodian Beth Newlin, WA7FFG, 826 Prince Edward Rd., 06, Tucson, AZ 85705.

1976 YLISSB OFFICERS

President, Phyllis Shanks, W2GLB; vice presidents, Sister Lauren, WA0RRJ; Violet Barrett, W6CBA; Al Hintze, W5LZZ; executive council chairman, V. Mayrce Tallman, K4ICA, Co-Chairman, Mary Ann Grider, WA3HUP; vice chairman, Andrea Parker, K1WLX. Executive, Emeritus, and Starlight Council members were also named.

Norwegian Hams Aid the Disabled

Realizing that amateur radio can be of tremendous help and encouragement to a disabled person, the Norsk Radio Relae Liga (NRRL) decided in 1966 to include this work in its program. For the handling of this activity, the LA5LG Aid Fund was founded as a division of the NRRL. LA5LG was the call sign of a former president of the NRRL who was one of the founders of the project of assistance to disabled persons.

There are currently in Norway some 3740 licensed amateurs, of whom 270 are disabled. Most disabled live an isolated life, unable to take part in normal activities. Amateur radio can overcome this isolation and be an interesting hobby, but we have to take into account that most disabled are, by the nature of their handicap, unable to attend normal radio classes. They are also generally of limited economic means and only a few can afford to buy their own equipment. These are the problems we are faced with and which we must overcome.

It is far beyond our capacity to give private training to everyone who wants to become an amateur. Nothing could, however, be more natural in our long and thinly populated country than to make full use of amateur radio. We have, therefore, organized a radio course giving instruction in radio theory as well as in cw. It acts as a normal class, four days a week and two hours every day. The course lasts from September till May and includes a final two-week gathering with active personal training. After this training the candidates are well prepared for the final examination. The results prove that this training can fully compete with the ordinary one.

Instruction by radio works very well in southern Norway but unfortunately not so well in the north. This is due to distances of more than 1000 km, the small number of amateurs and the unstable propagation conditions in the Arctic. For disabled amateurs in this part of the country we are, therefore, providing, at no cost, a correspondence course in radio theory and a cw course recorded on tape.

It is always difficult to present technical material to blind people, and especially difficult when the blind are living in isolated places, unable to attend a normal class. The problem has been solved by modifying the normal textbook, recording it on 20 tape reels together with 255 plastic sheets with elevated drawings and symbols suitable for fingertip

reading by a blind person. Training material is normally only provided during the period of training. The blind, however, are permitted to keep the tapes and drawings for future reference.

The Fund is working in close co-operation with the Telecommunications Administration. Without the support and understanding shown by the Administration, it would not have been possible to fulfill the objectives of the Fund. One problem is that some disabled just cannot pass all tests required for an A license. Accepting that amateur radio has a social as well as a technical aspect, the Telecommunications Administration is granting dispensations based upon a personal and medical examination. For all amateurs, however, it is compulsory to pass tests relating to handling, procedure and safety. Amateurs with a dispensation of some sort can only work the 80- and 40-meter bands.

The Fund has a considerable stock of transceivers and other radio equipment. This is lent free of charge to disabled amateurs for as long as they are active or until they can afford to buy their own stations. When necessary, the stations are equipped with gadgets enabling severely disabled or blind amateurs to operate them. Most of the gadgets have been developed and are produced by

the Fund itself. Maintenance is an essential service to disabled amateurs. With the active help of certain government-owned radio stations, we have organized a country-wide service working at no cost to the amateurs. In order to simplify maintenance and to reduce our stock of spare parts, we have introduced a rigid standardization. The Fund has today only two types of transceivers, a single band and a five-band type.

All amateurs engaged in the activities of the Fund are doing this work in their own spare time and at no cost to the Fund. Even so, costs are quite considerable, \$20,000 to \$30,000 a year. Half of this comes from private contributions, the other half from the State, represented by the Department for Social Welfare and the Department for Education.

Norway is a long, sparsely populated country. It is difficult to reach, train and assist the disabled who want to become radio amateurs. It is made possible through the active support and co-operation of more than 250 licensed amateurs. These are scattered all over the country and are often enduring a lot of hardship to bring our services to isolated invalids. They do an important job for a fellow citizen which shows another aspect of amateur radio. (TNX *Telecommunications Journal*)

Shozo Hara, JA1AN, president of JARL, visited ARRL/IARU Hq. in early December. During the course of his weekend visit JA1AN was presented with a replica of the famous Wouff Hong by ARRL General Manager W1RU.



*Assistant Secretary, ARRL.

Public Service

Conducted By Robert J. Halprin, *WA1WEM

Close To The Edge

Close to the edge of the Advanced Class phone band or maybe close to the edge of good taste; we're talking about the Christmas day "emergency" on 75 meters. For this purpose, put the hoax aspect aside. Let's examine the actions of the licensed amateurs.

The kibitzing on the frequency was unbelievable; some of it intentional, some unintentional. Actually, kibitzing is a charitable way to describe the deliberate jamming that went on. What kind of impression do you think this made on the Coast Guard? They were also handling communications on 3803 and had to repeatedly request that the frequency be kept clear. Your push-to-talk switch may be very tantalizing, but in an emergency (or an assumed emergency) all unessential transmissions should be eliminated.

This unfortunate incident happened not long after the *Kluanne* emergency, in which the crew of a sloop in the Atlantic Ocean were rescued by the Coast Guard, thanks to amateur radio communications.

Communication, not catcalls. — *WA1WEM*
The following utterings and mutterings are adapted from a bulletin of the same name, produced by Arizona SCM W7DQS:

PICON — that's a word which used to be, and still needs to be, a watchword of amateur radio. It's a concise way to sum up one of the principles upon which our activities are based: to serve the "public interest, convenience and necessity." Providing public service communications in emergencies is one of the ways we can do this. Unfortunately, this too often has

become a crutch to which many holders of amateur licenses pay lip service only. "We can provide emergency communications whenever needed" has become a blanket statement that gets treated much like Will Rogers' observation about the weather: "Everybody talks about it, but nobody does anything about it."

Well guys and gals, we need to *do* something about it. Providing emergency communications is not something that we can do at the drop of a hat. To be effective, it must be organized and practiced beforehand, so that when an emergency occurs, we are ready to go to work on it without undue delay to get organized. Routine communications exercises, done on a fairly regular basis, serve very well for this practice. One of the often overlooked purposes of daily traffic nets is to provide this practice in accurate, rapid, competent communications. By handling lots of routine messages, net participants get practice so that when messages of urgency come along, they can take these in stride and handle them easily.

Another important preparedness function is served by amateurs who belong to the AREC — the Amateur Radio Emergency Corps, or who at least participate in AREC drills and preparations. Each county is supposed to have an emergency coordinator, an EC as he's usually called, who organizes the amateurs in his county and leads them in regular exercises so they will be ready when needed to serve in an emergency. It doesn't have to be a spectacular holocaust either; anything requiring radio

communications to serve the public in some sort of potentially hazardous situation may produce the need for AREC service.

If you live in an area that doesn't have an EC, get together with some of your fellow amateurs, work up a plan for your area, and recruit one of your group to be the EC. If you would like to tackle the EC job yourself, please don't be bashful; being seriously interested in doing this important job is something to be proud of. The pay is zilch and the hours may be long on some occasions, but the satisfaction from accomplishment can be immense. — *W7DQS*

Does anybody really need us? Ask the guy who ran his bike full speed into a road sign, or the parents of the children we brought back when they couldn't go on, in a walk-a-thon. Ask the boy scout leaders looking at a thousand boys and wondering how they're going to get them into an organized parade. How about the kids we've bandaged up because we had the medical supplies and the trained people when nobody else had thought of it? Most of the time, nine out of ten people did "nothing special." Just one person in the right place, but he was needed.

Then, too, our projects are the only practice we get toward emergency net communications; how to get a message through as clearly as possible, in as few words as possible, and how to work in an efficient net. When we really need to be organized, we will be while most others will still be trying to "get their act together." — *WB4SIZ*

PUBLIC SERVICE DIARY

□ Esterhazy, SK — August 18. Campers at a YMCA survival camp were running out of food, and several were ill. VE5KN/4 called for aid on 75 meters. Five amateurs assisted, including VE5UK, who notified the YMCA. — (VE5UK)

□ Palm Springs, CA — October 14. Seven amateurs provided communications on 75 meters for a mountain rescue team. — (W7DML)

□ Bogota, Columbia — HK3DKX used 20 sideband in an effort to locate a drug for children stricken with lead poisoning. Four U.S. amateurs assisted in securing the drug and sending it to Bogota. — (K4JRV)

□ San Diego, CA — November 28. While operating on 40 meters, K6DBJ received a report of an auto accident from K6NTD/mobile, and notified the highway patrol. — (W6GBF, SEC SDgo)

□ Baja, Mexico — November 29. WA6KAU/air mobile, assisted by five other amateurs, provided communications during an air search for 28 stranded hikers, and the rescue of an injured person. — (W6GBF, SEC SDgo)

□ Fort Lauderdale, FL — December 8. K4EHE and K4ETS received a MAYDAY from K4ICG/mobile aboard the sailboat *Vestra*. *Vestra* was alongside the yacht *Miss Behave*, which had lost power and was taking water. The Coast Guard was notified and responded. — (WA4FMJ)

□ Owensboro, KY — December 21. Fourteen

radio amateurs provided communications for local authorities during a fire. — (W4OYI)

□ Granby, CO — December 26. Members of the Castle Rock Repeater Group provided communications during the search for a downed airplane in the Corona Pass. — (W0JGL)

□ Idylwild, CA — December 28. The Riverside County Amateur Radio Service assisted the Riverside Mountain Rescue Unit in their efforts to save a hiker who became ill and was stranded in the mountains. — (W6KIJ)

□ Special Activities, October. The Hall of Science Radio Club set up an amateur radio display at a large bicentennial celebration held in Queens, NY, on Oct. 13. It was estimated that thousands of area residents were made familiar with amateur radio. — (WB2FHN). The Huntington, NY, AREC provided communications for a Columbus Day Parade on October 11, which was the largest parade ever held in Suffolk Co., NY. — (W2GLE, EC). The Atlanta (GA) Radio Club assisted in handling communications for the Scottish Highland Games at Stone Mountain, GA, on Oct. 18-19. — (ARC). On October 19, RARS furnished communications for the Tarheel Sportscar Club during their rally through Wake and Johnston Cos., NC. — (W4FMN, EC). November. Under the direction of RO K1PJQ, several Hartford, CT, area amateurs handled communications for a walk-a-thon on behalf of the Connecticut chapter of the Arthritis Foundation, on Nov. 1. A mobile parked at the police station was designated as the base station and constant communication was maintained with various check-points along the route. — (K1PJQ).

□ Repeater Log. Reports received to date show repeaters were used to report one train wreck, one fire, one tornado, 11 auto accidents and related occurrences, secured medical aid for an injured woman, and assisted in three searches. Repeaters involved were: WR1s ACI AFC, WR2s ACV ADL AGC, WR3ADG, WR4s ACB ACO ALM, WR5AHN, WR6s AHZ AGH, WR7ACY and VE3KIN.

Last year, 426 SEC reports were received from 50 sections. In 1974, 27 SECs reported every month, while only 22 sent monthly reports this year. 18 sections sent no reports in 1975. They are: Ark, C.Z., Ga, Ida, Iowa, La, La, Man, NH, NMex, NDak, SC, SDak, Tenn, Vt, W.I., Wisc, Wyo. This is 3 more than in 1974. Those reporting every month since at least July are: EMass, Ky, NFla. The following sections had 100% reporting for the year, the number in parenthesis showing how many years of complete reporting has occurred: Ariz (1), Colo (10), Conn (1), Del (2), Ind (2), Kans (3), Mich (7), Miss (3), NLI (1), NC (2), NNI (1), Okla (4), Org (6), SDgo (5), SCV (2), Sask (11), SFla (24), SNJ (1), Utah (8), Va (5), WMass (3), WPa (1). SFla's 24, Sask's 11, and Colo's 10 years of steady reporting are worthy of special mention. There were five fewer sections reporting 100% in 1975 than in 1974, though several sections missed 100% by only one or two reports.

SEC reports received in December totaled 35, compared with 42 this time last year. Reported AREC members totaled 13,288 compared to 14,688 in December, 1974. The following sections reported: Ala, Ariz, Colo, Conn, Del, EBav, EMass, Ind, Kans, Ky, Me, Mich, Miss, Nebr, NLI, NC, NFla, NNJ, NTex

Ohio, Okla, Org, SV, SDgo, SBar, SCV, Sask, SFla, SNJ, STex, Utah, Va, Wash, WMass, WPa.

NATIONAL TRAFFIC SYSTEM

Poor conditions hampered efficiency during the Christmas rush, but some nets managed to do a land-office business, PAN, DEAN and D2RN in particular. K2KIR has joined the chorus for 160-meter usage. 8RN is passing traffic on 160. Due to foreign broadcast QRM, DCAN is moving to 7235 kHz. TEN has moved to 3679 kHz. WA1SQB is looking for New Hampshire representation on D1RN. DTWN will continue meeting at 2300Z until May 31. W2MTA reports that band conditions were "Occasionally a pleasant surprise; we could hear each other - sometimes." He also announced that the annual Bill Shaw (WB2VEJ) Award went jointly to WA2PIL and WB2LZN for their outstanding ability and dependability on 2RN during 1975. VE6FS writes that "December showed a very decided increase in activity and we are hoping this trend will continue and propagation favors us a wee bit" on DNR7. The following earned net certificates: VE7DKY (DRN7), W3EGJ W3LDD K3YHR WA3THT (D3RN), K2BHL W2BW W2ET W2MLC K2TTG WA2AML WA2DSA WB2FLF WA2PCF WB2PYM WB2TDX WB2TSS WB2UBW WB2VND WA2VPA WB2VTT WB2WBH (D2RN).

December Reports

1	2	3	4	5	6
EAN	31	2776	89.5	1.596	93.5
CAN	31	2287	73.9	1.323	99.5
PAN	31	2112	68.1	1.259	100.0
DEAN	61	1343	22.0	.558	94.2
1RN	56	677	12.0	.377	80.4
D1RN	31	331	10.7	.450	78.8
2RN	89	950	10.6	.592	91.8
D2RN	62	1127	18.1	.887	99.0
3RN	60	592	9.8	.428	92.7
D3RN	31	401	12.9	.576	89.2
4RN	58	1109	19.1	.573	89.8
D4RN	52	437	8.4	.456	52.1
RN5	62	1404	22.6	.557	92.6
DRN5	31	218	7.0	.268	86.2
DRN6	31	419	13.5	.305	83.0
RN7	59	726	12.3	.602	88.7
DRN7	38	80	2.1	.177	37.8
8RN	50	432	8.6	.330	75.0
D8RN	31	169	5.4	.401	93.5
D9RN	31	372	12.0	.411	88.7
TEN	60	772	12.9	.473	77.2
ECN	62	706	11.3	.447	95.0
TWN	62	714	11.5	.358	98.4
DTWN	22	104	4.7	.202	65.8
CTN	31	851	27.4	.571	95.3

TCC	Eastern	159 ¹	1462
TCC	Central	117 ¹	1145
TCC	Pacific	149 ¹	1462
Sections ²		3764	20766
Summary	4977	45944	9.2
Record	5528	51705	28.5

¹ TCC functions not counted as net sessions.

² Section and local nets reporting (98): AENB AEND AENJ AENM AENR AENW SMRA (AL), ASN (AK), ATEN HARC (AZ), NCN NEN SCN (CA), CCN (CO), CN CPN (CT), DEPN DTN (DE), FAST FMTN FPTN (FL), GSSBN (GA), IMN (ID, MT), ILN (IL), INN (IN), I75MN TLCN (IA), KPN KSNB KWN QKS (KS), KNTN KSN KTN (KY), LAN LRN LSN LTN (LA), SGN (ME), MDCTN MDD (MD), WMN WMPN (MA), MACS M16MN MNQ QMN WSNB (MI), PAW (MN), MSBN MSN MTN (MS), NAN WNN (NEB), NHVTN (NH, VT), BARTEN NJN NJPN (NJ), SWTN (NM), NLI NLS NYS (NY), CN NCSBN (NC), BNR BRN OSSBN O6MN OSN (OH), OAN OLZ ONN OPEN OTWN STN (OK), BSN (OR), EPAE&TN PTTN WPA (PA), SCNN (SC), TTN (TX), BUN UCN (UT), VN VSNB (VA), WVN (WV), BWN WIN WNN WSNB WSSN (WI), MTN (MB), GBN ODN OPN OSN (ON), WQV/UHF (PQ).

1 - NET	4 - AVG.
2 - SESSIONS	5 - RATE
3 - TRAFFIC	6 - % REP.

Transcontinental Corps

"We were saddened by the passing of Hank, K3CB, after a long ordeal in the hospital. Hank was a quiet, reliable guy who simply kept doing a great job for TCC/NTS with no fanfare. A very great loss!" - W2FR.

TCC doubled up skeds during the Christmas traffic season.

1	2	3	4	5
Eastern	178	89.8	3908	1462
Central	117	89.7	2416	1145
Pacific	163	91.4	3156	1568

Summary 458 90.3 9480 4175

1 - AREA	4 - TRAFFIC
2 - FUNCTIONS	5 - OUT-OF-NET
3 - % SUCCESSFUL	TRAFFIC

TCC ROSTER

The TCC roster (December): Eastern Area (W2FR, Dir.) - W1s NJM QYY TM, K1s EIR GMW, WA1s FCM MSK STN WEM, W2s FR GKZ KAT/3, K2s HI/VE2 KTK, WA2s DSA ICB PJL UWA, WB2s PYM RKK UBW, W3EM, K3MVO, W4UQ, K4KNP, WA4VFW, W8PMJ, K8KMQ WA8HGH, WB8ITT, VE3s GOL SB, Central Area (W5GHP, Dir.) - WB4DXN, W5s GHP MI QU RB UGE UJJ, WA51QU, W9s CXY DND NXG, WA9EED, WB9NOZ, W9s HI INH LCX QMY, K9AEM, K9CVD, WA9TNM, Pacific Area (K5MAT, Dir.) - W5RE, K5MAT, WB5KSS, W6s BGF EOT MLF TYM VZT, K6HW, WA6DEL, WB6s AKR DJP EWP PKA, W7s DZX GHT KZ VSE, K7s IWD NHL NHV QFG, WA7WXY, W6s ETT LQ LRN, K0DRL WA0KKR/7, WB6s HCK QOT, VE7ZK.

Independent Nets (December)

1	2	3	4
Clearing House	27	659	703
Hit & Bounce	31	1848	501
Hit & Bounce Slow	31	276	348
IMRA	27	498	1100
North American SSB	26	480	525
Washington Region PON	13	72	202
20 Meter ISSB	21	847	246
75 Meter ISSB	31	987	1570
7290 Traffic	44	861	2056

1 - NET	3 - TRAFFIC
2 - SESSIONS	4 - CHECK-INS

Public Service Honor Roll December 1975

This listing is available to amateurs whose public service performance during the month indicated qualifies for 40 or more total points in the following nine categories (as reported to their SCM). Please note maximum points for each category: (1) Checking into cw nets, 1 point each, max. 10; (2) Checking into phone/RTTY nets, 1 point each, max. 10; (3) NCS cw nets, 3 points each, max. 12; (4) NCS phone/RTTY nets, 3 points each, max. 12; (5) Performing assigned liaison, 3 points each, max. 12; (6) Phone patches, 1 point each, max. 20; (7) Making BPL, 3 points regardless of traffic total; (8) Handling emergency traffic directly with a disaster area, 1 point each message; (9) Serving as net manager for entire month, 5 points.

59	60	VE3GJG	WB2RMK
WB5AMN	WA4EPJ	55	WA3DUM
67	59	WA6TVA	WB4EKJ
WB6BDL	WA1FCM	53	W5UJJ
66	WA2DSA	WB2WRT	W7GHT
W2MTA	WB2RKK	WA0GLI	WA7MEL
WB2VTT	WB2SHL	WB8MCR	WB9MDS
62	WB2UBW	52	WA3QOZ
WB0CZR	WB0HOX	51	WA51QU
61	VE3FQZ	50	K0CVD
WA1MSK	56	W9MFG	K0MR1
K1PAD	W2MLC	WB5MFG	VE3FRG
WB2EMU	WA2PCF	K9LGO	VE3GFN
WA2PJL	WA2UJH	WB0NNI	48
WB2PYM	WA2VPA	51	K3YHR
WA3PHQ	WA2WKH	50	WB0OAG
WA4FBI	WA5TQA	47	WA1MJE
K4VHC	WA5YEA	50	WA3WPY
W5GHP	WA5ZZA	49	WB5EKU
K5TTC	W6RNL	49	WB8NCD
W7OCX	W7VSE	49	KL7JDO
W8IBX	WA8HGH	49	VE3DPO
WB8JGW	K8LGA	W2FR	VE3GOL
WB0BHM	W9MMP/0	WB2LZN	

VE3SB	WA2UYK	WA6VEF	WB0QOT
VE4EA	K3KAJ	WB9ICH	40
46	WA3OGM	WA0FMD	W1E1H
WB6MXM	WA3VBM	42	WA1SQB
W6RFF	WA3WRN	42	WA1SXU
W0OTF	WB4DJU	WIDMS	WB5MTQ
VE3GT	WB4TPR	WA4ECY	W7DAN
45	W4WXZ	WB5KQJ	W7KEI
WB4DXN	WB5FMA	WB0JYT	W7LG
WA9QVT	WA6DEI	41	W8DL
44	K7NTG	WA1PSI	WB9NME
WB1VR	WB9KTR	WA3UKZ	K0JTW
WB2RUZ	VE4PG	WB4FDT	WB0LOR
WB2TDX	43	WB9KPK	W9NXG
	WB5NUM		

Brass Pounders League December 1975

BPL Medallions (see December, 1973 QST, p. 59) have been awarded to the following amateurs since last month's listings: WB8KQJ.

The BPL is open to all amateurs in the United States, Canada and U.S. possessions who report to their SCM a message total of 500 or a sum of originations and delivery points of 100 or more for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL form.

Winners of BPL Certificates for Dec. traffic

1	2	3	4	5	6
W3CUL	367	1398	1471	39	3275
K3NSN	330	245	845	212	1632
W0WYX	46	718	316	402	1482
W3VR	547	241	673	19	1480
K0ONK	37	594	648	17	1296
W6RSY	11	476	486	20	993
W8PTT	0	484	482	2	968
WB6EIG	7	453	450	3	913
WB2VTT	397	142	273	5	857
AB0HOX	32	445	350	15	842
WB2UBW	26	388	359	45	818
WB2RKK	2	400	301	95	798
K9CPM	1	127	433	233	794
VE3GOL	67	325	348	46	786
K0YFK	0	377	4	372	753
W8PMJ	15	367	340	3	724
WA3THT	40	281	262	130	713
WA2DSA	10	312	355	6	683
WA2UYK	6	266	298	111	681
K6HW	17	331	330	1	679
VE3SB	9	309	328	20	666
KH61QU	94	269	245	46	654
K7NHL	2	320	282	29	633
WA4EPJ	11	283	273	62	629
WA1RPL	26	334	251	13	624
WA1MJE	13	342	211	57	623
WA1FCM	6	285	322	8	621
WB9NOZ	0	283	331	6	620
WA1MSK	0	327	288	4	619
W9DND	12	290	283	15	600
K4SCL	4	305	273	17	599
VE4PG	0	325	244	0	569
WB9NVN	0	279	274	3	566
WA1MHJ	5	262	273	11	551
W2FR	0	325	218	2	545
WB0QOT	29	218	271	26	544
VE1A0	15	259	260	10	544
WB2EMU	11	292	209	25	537
W2MTA	59	263	208	0	530
WIPEX	3	272	240	14	529
K4SJK	15	244	254	14	527
WA4KKP	23	252	233	19	527
WA0VRE	110	205	205	5	525
WB4TRI	20	241	241	18	520
WB4OBZ	8	236	272	1	517
W6YBV	37	218	227	30	512
K0ZSQ	0	255	1	253	509
WA51QU	0	278	213	11	502

More-Than-One-Operator Station

W2ZQ 505

BPL for 100 or more originations-plus deliveries

WA3ATQ	239	WA3UYF	1201
WA2RMZ	177	W2KUJ	119
VE4UL	151	VE4EA	119
W9NJZP	148	VE3FQZ	109
W4YZC	141	WB2YKG	107
W7DAN	131	K0YFK (Nov.)	236
WB6ETB	124	K7IFG (Nov.)	160

More-Than-One-Operator Station

K31QG 265

1 - CALL	4 - SENT
2 - ORIG.	5 - DEL.
3 - RECD.	6 - TOTAL

QST

The World Above 50 MHz

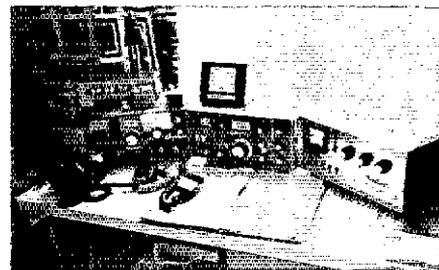


Conducted By
William A. Tynan,* W3KMV

Why Not Make It Legal?

Everyone is aware that EME is a tough way to work stations, but it's the only way if we are to take full advantage of the capabilities of our vhf/uhf bands. Unfortunately, unless there is a significant breakthrough in techniques, it takes all we have in the way of power, antenna gain and receiver performance to do the job. Indeed, most moonbouncers find that, at 1-kW input, the results are extremely marginal. More power seems to be the only solution. We all know that U.S. amateurs are limited to a maximum *input* of 1 kW (2-kW PEP on ssb), but all too often this basic rule is ignored in our zeal to succeed at this very changing endeavor. One recent letter from a 432-EME participant complained of his low output "even though he was running 1.5-kW input." It is unfortunate that we must break the rules in order to take part in one of the most exciting of pursuits that the world above 50 MHz has to offer. This situation may be alleviated by action of FCC on Docket 20282, since the Commission's proposal includes a 2-kW output limit. In the

meantime, it isn't necessary to break the law by exceeding our power limit since provisions already exist for obtaining special temporary authority to do various things not covered by present FCC rules. Examples of STAs run the gamut from the operation of a fast scan ATV repeater here in the Washington area to the use of ASCII through the Oscar satellites and include, in a few cases, authority to use higher than the 1-kW maximum input power. At present two well-known moonbouncers have secured STAs to run higher power than would otherwise be permitted. There is no reason why others engaged in similar operation, who feel that they cannot properly accomplish the job under present power limits, should not seek similar authority. It sure beats illegal operation and its inherent problems. FME-ers and others engaged in vhf/uhf propagation investigation might drop a letter to FCC outlining their intended experiments, present station equipment and means by which power, frequency and other operating parameters are to be measured. The letter should



The neat set-up of 50 MHz and Oscar operator T12NA, San Jose, Costa Rica.

SECOND ANNUAL EASTERN VHF/UHF CONFERENCE

This year's Eastern Vhf/uhf Conference is scheduled to be held May 15 and 16 somewhere in the Boston area. The place will be announced shortly. The particular dates selected were chosen so that the conference would follow the IEEE Electro 76 which will convene in Boston, May 11 through 14. Program plans for the conference are being handled by Joe Reisert, W1JAA, and will include technical seminars, equipment displays and noise figure measurements. Joe can be contacted at 17 Mansfield Dr., Chelmsford, MA 01824 for details. For registration information, drop an SASE to Chuck Benevides, W1KIR, 103 Peabody Dr., Stow, MA 01774. If what we hear about last year's affair is any indication of what to expect, this conference should be well worth attending.

POSSIBLE NEW WA6LET TESTS

We are informed that, if suitable equipment can be obtained and the necessary permission secured, EME tests from the 150-foot dish at Stanford may be held sometime this spring on 222 and/or 1296 MHz. Listen to WIAW for information as we receive it.

ON THE BANDS

6 Meters — Those 6-meter operators who had their Christmas preparations out of the way a few days before Santa's arrival were fortunate because Dec. 23 seems to have been one of the best days for the winter's E_s season. WA4MMP of Chesapeake, VA, recorded via the telephone answering machine an account of the doings of the E clouds. At 0200 UTC (evening of the 22nd local time) WA5JEO, WASUUD and W5UVG of the New Orleans

area were putting good signals into Tidewater VA. An hour and a half later, the band moved east to the Alabama-Florida panhandle area with WA4VSH, WB4BSZ and W4CSS workable. The next afternoon the Midwest was in along with double hop to 6-land. Bill managed QSOs with WA6BXR and K6ODV. That evening, it was Louisiana again with W5JVG and W5LHD along with Memphis station, WA4ENG. Dec. 28 brought Louisiana again in the form of W5NXXD, and on Jan. 8 at 0210 UTC K0WLB and K0WYN of the Kansas City area were worked. The widespread nature of the Dec. 23 opening is attested to by WA1EXN in Maine. Art says that he worked 14 stations in the 8, 9 and 0 call areas. He notes that, especially in these winter E_s sessions, it takes awhile for word of the opening to get around. At the beginning, it's hard to find stations to work but after a while the QRM sets in. [Maybe beacons would help, Ed.] Another report concerning Dec. 23 has K7ZOK, Lost Wages, working a South Carolina station, call not given.

New Year's Day was a red letter day for some 70, 6-meter operators who were lucky enough to catch WB2RLK/C6A on the island of Eleuthera in the Bahamas. Bob hopes to go back next summer or possibly operate from 6YS. Efforts like this sure help 6-meter country totals.

WA9DOT, Grafton, WI, makes the point that the band doesn't have to be open to work good hauls on 6 meters. Jim has been holding regular schedules with WA1EXN at 1300 UTC Mon. thru Fri. Since these skeds began on Oct. 28 last year, they have never failed to exchange at least calls, reports and rogers. In December, seven day per week ssb skeds were initiated with WIBOM, WIQWJ and W3JMY with 100% success as of Dec. 22. Jim's setup, consisting of a pair of 3-500Zs and 10 elements at 82 feet, is of help in these scatter efforts.

Apparently 6-meter conditions last fall were off all over the world. From Chiba, Japan, JA1VOK reports poorer DX than usual but does cite reception at 0600 UTC Oct. 12 of Australian stations VK4RO, VK4RX and VK4ZMS. Hatsu also mentions openings

include the specific power level, or other departure from present rules, sought and the mode or modes of transmission to be employed. In other words, the request should be as complete as possible. The fewer unanswered questions left by the first letter, the better the chance of receiving a favorable response.

Oct. 17, 18, 23 and 25 from KC6SZ, Yap Island, to Japan. While on the subject of far-off places, ZL2BJO passes along word concerning a beacon down New Zealand way. The call is ZL2VHP, which is sent in Morse Code via 1sk. The beacon is located at 175° 29' East, 40° 13' South on Mt. Stewart and runs 10 watts to a horizontal turnstile antenna. The frequency is 52.50 MHz.

An OVS report from WA9MRH contains a very interesting compilation of E_s and aurora openings during 1975 from his particular QTH of Omaha, NE. The number of days which John noted openings was as follows:

Month	Days on which E _s was noted	Days on which aurora was noted
Jan	3	2
Feb	2	0
Mar	0	1
Apr	1	0
May	11	0
Jun	14	0
Jul	10	0
Aug	15	0
Sept	1	0
Oct	0	0
Nov	4	3
Dec	7	0

2 Meters — A large percentage of the mail this month deals with m.s. This isn't too surprising since the winter months usually do not produce much in the way of tropo in most of the country and some rather good meteor showers occur during December and early January. The Geminids in mid-December seemed to have been kind to many stations with states totals edging up. Reports are just now starting to come in, as this is being written the second week of January, on results obtained during the Quadrantids which

*Send reports to Bill Tynan, W3KMV, P.O. Box 117, Burtonsville, MD 20730 or call (301) 384-6736 and record your message.

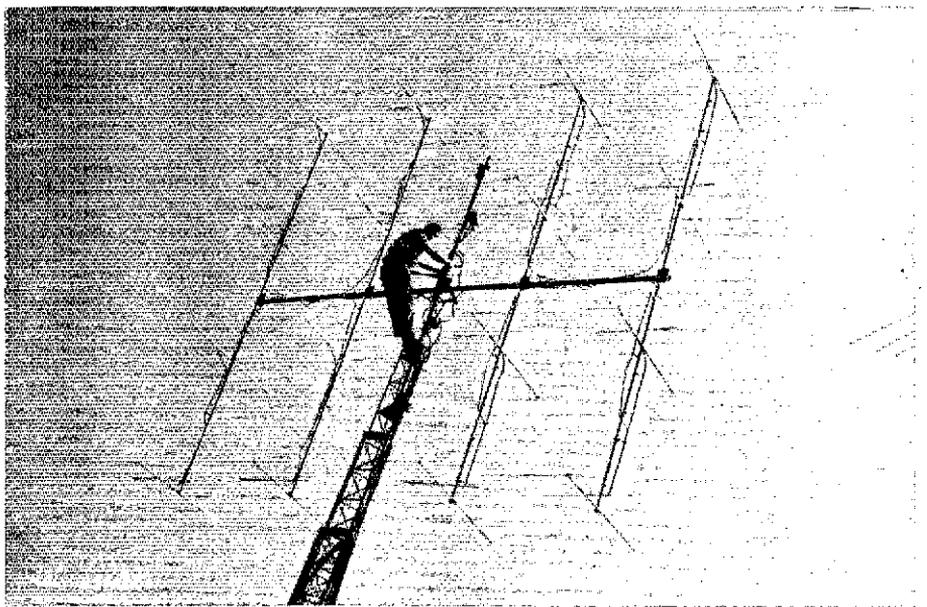
peaked last weekend. Some fellows relatively new to the band profited well from the showers. An example is WA4GPM of Norfolk, VA. Buzz batted 4 for 4 during the Geminids with skeds and QSOs with WA4COG AL, K4IXC FL, W0PMN KS and W0LFR MN. This brings the WA4GPM state total to 20 which is impressive for having been on 2 meters only since last August. WA4COG of Auburn, AL, also reports good luck with the December m.s. festivities. Dale had QSOs with K0DAS IA, K5WVX OK, WA9LEF IL, W9CAW IN, WA8UPD and WA8HTL MI in addition to working WA4GPM. A letter from K0DAS, IA, lists successful two-ways with the following as a result of the Geminids: K4EJQ TN, WA4MVI NC, WA1FFO CT, W3BHG DE, WA1OUB NH, WA4COG AL and a near miss with K3ARN MD. One of these, WA4MVI of Hendersonville, NC, was also happy with his results. Jim is ready for more skeds. Address Jim Stewart, Rte. 8, Box 92, Hendersonville, NC, if you are interested. Jim is also active on 6 meters and 70 cm. K1WHS is another 2-meter stalwart who found the Geminids to his liking. Dave netted two new states. W0EMS NE and WA4MVI NC. Other contacts included WB8IGY OH, WB4JGG TN, WA8VPD MI, W0KRX MN, W4WDH GA and WA9LEF IL. The Quadrants were productive for WA1OUB. Bob managed QSOs with W9CAW IN and WA9WHJ IL on Jan. 4 after running the skeds for only 10 to 15 minutes. Unfortunately skeds with W0EMS NE and K5MUH AR were not successful. WA1OUB is looking especially for West Virginia. Any takers?

The vhf gang has been looking for a good aurora session for some time now and on Jan. 10 their prayers were answered with one of the best buzz sessions in years. Here in Maryland it began at 1900 UTC with the 6-meter signal of WA1MAG of VT breaking through. A ssb contact with him by yours truly was followed by exchanges with WA1NB also VT, W1QWJ MA, W9NKQ IL, and WA8PAG OH. Frequent checks of 2 meters revealed nothing until 1935 when a few signals started to appear on the band. Finally at 2004 a contact with W1YTW of ME started the ball rolling for this station. Other stations worked were: WA8HTL MI, W9CAW IN, WA9WHJ IL, WB9DZJ IN and K1HTV CT, all on cw. Ssb contacts were made with: WA8TPH OH, WB8NWX MI, WB8IGY OH and WA1OUB NH. Perhaps the thing most outstanding about this particular aurora opening, other than the fact that it was the first good one in a long time, was the many 2-meter ssb signals which were copied with comparative ease. As an example of what the big buzz session did for some state totals, WA8HTL's jumped from 20 to 27 in just a few hours! The aurora was not limited to 2 and 6 meters. The 1-1/4 meter and 70-cm bands were affected also. A few, early details on this are recounted in the 70-cm section.

W4WNHJ/8 passes along a copy of his "Lunar Information for Loony Hams." This consists of a calendar indicating the moon's apogee, perigee and declination. I am sure that Shelby will be glad to send a copy to anyone interested enough to drop him an s.a.s.e. Speaking of EME, I have never heard a tale so full of the work of Murphy and just about every other source of bad luck as the one recounted by W7RUC in his attempts to work WA2BIT. Well, they finally made it and, under the circumstances which ran the gambit from shorted plate transformers to cut coax, the successful QSO is a tribute to the perseverance of both of these intrepid EME-ers.

70 Cm - As reported above, Jan. 10 produced one of the best aurora openings in quite sometime. In addition to 2 and 6 meters 1-1/4 meters and 70 cm were treated to more than their usual share of DX. K1PXE reports contacts on both bands as well as on 2. On 1-1/4 WA8PKB of OH and W8IDU of MI were worked, the latter being a new state for Pete. Even more incredible were QSOs with K8UQA and K8DEO OH as well as K2LGJ western NY on 432 MHz. The signal from K8UQA ran 59A at K1PXE.

The Veron Bulletin dated Dec. 17 includes a lot of 70-cm EME data furnished by K2UYH and other sources. One interesting tidbit concerns an EME QSO made on 70 cm by I4BER with SK6AB. The Italian station was using just 100-watts output but had the



WA7BBM, Tucson, AZ working on his 2-meter EME array.

use of part of the Northern Cross radio-telescope at Bologna. A gain of 45 dB helped achieve 559 reports in both directions. One has to be quick, however. The moon goes through the antenna's window in just 2 minutes. A new member of the 70-cm EME contingent is K4VOW in Alabama. Ben entered the club on Nov. 19 with a QSO with K2UYH. On the 23rd he made the grade with W0YZS and WA6LET. Incidentally, Alabama was state number 31 for K2UYH. It is also reported that K2CBA has re-entered the fray. Jud has a 7213 final, feeding a 28-ft. dish and is reported to have worked W0QOI, K0TLM and K2UYH as well as WA6LET.

To illustrate that all 70-cm operation is not via EME, W6PBC of Roseville, CA, reports in his OVS summary that his 5 watts provide regular contacts with the San Francisco Bay area on 432 MHz during regular meetings of the "5 o'clock Shadow Net." The net meets nightly at 1700 and 2000 local with W6VSV, W6SPB, W6NBI, W6VQV, WA6UAP, W6AJF, W6UAM and the reporter, W6PBC, in regular attendance. In the Pacific Northwest, W7MCU reports that another group is active promoting uhf. Their organization is called the Northwest Uhf Society which sponsors a net on 432.1 MHz every night at 2000 local time. So far about 10 members are active. Those interested in participating can address the Society at 10538 S.E. 323rd, Auburn, WA 98002. From Iowa, K0DAS wants us to know that he is ready and willing on 70 cm. Rod's setup consists of 100 watts to a W0EYE Yagi at 55 feet. Receiving is helped by a 2N5031 front end.

OSCAR DOINGS

Both Oscars 6 and 7 have been taking quite a pounding in recent months with more and more uplink power being employed by users. This situation has even led to a fear that permanent damage could be done to the spacecraft's nickel cadmium batteries because of the heavy current drawn. The gang are reminded to listen to their own downlink signal and adjust power accordingly. Amsat reminds us that there is no need to produce more than a good readable signal through the satellite. This is one mode of communication where you don't have to be the loudest signal on the band to get contacts, and you can hear how well you are getting out.

ZK1DX in the Cook Islands is stirring up a lot of satellite interest in the Pacific area with

Oscar 6 and Oscar 7 Mode A operation on both cw and ssb. He is due to return to ZL sometime late this spring so work him while you can. From the Veron Bulletin we learn that JA9BH is active on all satellite modes. Kimio has worked 18 countries and 4 continents and heard G3IOR and PA0LQ on the 10-meter downlink. KH6HP expects to be on Mode B by the time this appears in print. Steve will have available high power which he will use only for over-the-horizon tests. **QST**

Standing

Figures are states, call areas and best DX in miles.

K1PXE	18	7	1210	K4IXC	5	2	800
K1HTV	17	5	610	K4VOW	4	4	2000
W1AJT	16	5	680	W4AWS	4	2	750
W1JAA	17	8	2670	W5RCI	19	6	880
W1SL	15	7	2600	W5ORH	15	5	1200
WA1MUG*	15	5	740	WA5JG	9	3	1010
K3EAV/1	14	6	700	WB5LJA	8	—	1485
K1BFA	13	5	710	W5LDV	7	2	950
K1JIX	13	5	620	W5GVE	7	3	963
WA1FFO	13	5	470	K8LLL	6	2	860
WA1JTK	11	4	715	W5UKQ	6	2	590
W1HDQ	11	4	380	K5UGM	5	2	956
K2UYH	31	9	1000	W5SXO	5	2	850
K2ACQ	24	8	925	WA6FKW	6	4	7500
W2AZL	21	7	1000	W6DQJ	4	2	360
K2CBA	20	8	2670	K7JCW	4	2	225
W2BLV	20	6	812	W7JRG	3	2	420
W2CLL	20	6	790	K8DEO	24	8	775
K2RIW	19	6	812	K8UQA	25	8	6500
K2YDK	18	6	750	WB7YO	12	7	450
W2OMS	18	6	725	W8HVX	19	7	660
WAREMB	18	6	720	W8CVQ	13	7	625
WA2FGK	17	6	745	W8MNT	13	7	600
K2ARO	17	6	740	W8RQI	10	6	425
W2DWJ	16	4	570	WA8VHG	10	6	625
K2QVS	15	5	734	W8QOB	8	5	300
K2VCO	15	6	670	W8FWF	8	5	450
K2LGJ	14	7	650	W9WCD	22	9	1725
W2CNS	14	6	525	K9HMB	21	8	836
K2BF	12	4	325	WA9HUV	19	7	780
WA2EUS	10	4	330	K9UIF	16	7	695
W3RUE	21	7	850	W9JUY	15	6	550
K3ILV	18	5	720	W9AAG	15	5	800
W3JMU	15	7	790	VE2HW	6	3	750
W3TMZ	16	6	2410	W0DRL	24	9	1425
W3OMY	11	7	850	K0TLM	21	6	1250
W3CJG	10	5	450	W0LER	18	6	1000
W3UJG	9	4	400	W0PW	15	5	1700
K4QIF	23	7	1065	W0LCN	13	4	700
W4NUS	22	8	2400	W0YZS	9	4	8000
W4FJ	22	7	995	VE2HW	6	3	750
K4EJQ	20	7	800	VE2HW	19	7	940
W4HJZ	15	5	560	VE2EVW	12	6	520
K4SUM	15	5	462	VE3ONT*	11	7	390
W4VHH	15	4	750	VE3AIB	9	5	600
K4GL	11	5	720	VE3EJC	7	—	510
K4NTD	9	2	963	VE7BBG	12	—	—

*Club station.

How's DX?



Conducted By Rod Newkirk,* W9BRD

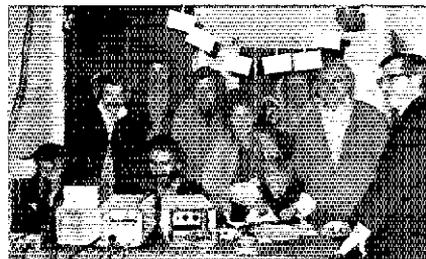
AJ3A Digs DX Masquerade Ball

We're nearly used to 'em now, those Bicentennial "A" calls, but the first few weeks were a battle. Suddenly doubling the number of prefixes prevalent in January's ARRL CD Party almost popped our top. Oh! for the simpler days of forty years ago when all Statesiders were Ws, all Canadians VEs, and anything else was DX. We got some idea of what was in store for participants in the annual ARRL International DX Competition now under way. Hang in there!

Generally speaking, you can spot the moss-backed conservatives among us, those stubbornly sticking to their regular W-K-WA-WB labels. A vast number, too. Perhaps the

clerical complications of an identity crisis boggle them. As we rather repetitiously insist in these pages, anyone signing a "special" call ought to pay special attention to the highest traditions of the game. This includes thorough QSLing.

One superactive OT undaunted by QSL complexities is AJ3AA. In the new year's dawning we found him logging fistfuls of QSOs near 14,080 kHz. His big sig and effortlessly precise telegraphy easily blew his Bicentennial cover. Could only be the indefatigable KV4AA. Dick figures on at least twenty AJ3 kilo QSOs by the time '77 rolls around. And don't omit the s.a.s.e.



HB9AMY's DX installation provided the first close-up view of amateur radio for numerous visitors during recent Scouting festivities at Lugano.

WHERE

NORTH AMERICA: For DXceptionally rapid and reliable response these "QSLers of the Month" are saluted in mail from Ws 1CDC 21YX 7HPI 0EEE 0PRY, Ks 1ATY 4DAS 4KCK 6ARE, WAS 1SQB 4BTC 4FVT 4HHG 6HXR, Ws 2NOM/1 8FLE 9NME 0GQP, WN0QNX, DL8WX and VE3GSC: A35AK, BV2B, C31IL, CR9AK, DA2QW/HB0, DK6NN/C6A, Du's 1TOM 6BG, EAs 1JI 9EO, E17CC, Fs 5HE 0BCR, FB8YC, FO8EH, GD5DZ, GIBOLI, HB9TX, HC8GI, H8XKP, HP7XJS, HR1DH, IS0PJP, K7AL, KG6SW, KP4AXM, KS6PF, LX1s BW JH, MIC, OA4AGR, OD5IO, OE2WSL/5B4, ON6RR, OZ1HX, SM6EUZ, SP5FLA, SV0WZ, TF3AW, TG8KT, UK2BAS, VEs 1ATJ 6NH/KL7, VK2EO, VPs 2LAW 5GS 9AD, VQ9D, W6OAL/VQ9, WL7IFP, WP4s EBJ ECE EDT, ZD8TM, ZSS6P, 3D6BG, 4U1TU, 4X4QG, 5B4AU, 5T5CJ, 5Z4LW, 6D2MX, 9G1AT, 9M2DQ and 9V1RQ, plus efficient QSL aides Ws 3HNK 4BAA 4BRB 6KLI 6WX 7PHO 7YBX 0GX, Ks 6A0V 90TB, WA8TDY, DL7FT, F9HD, HB9AYX, 1E4AT, OE3NH and OK3HM. Anyone we missed? . . . W7HPI, WB4VHY and WN0QNX volunteer their services to DX ops in need of Stateside QSL agents. . . . I keep s.a.s.e. (self-addressed stamped envelopes) on file at ARRL's Fiveland Bureau branch for W50JZ (my former call) K5CM and PJ8CM call signs but it may be more expeditious to QSL my Sint Maarten QSOs direct to my home QTH. (K5CM) . . . I'll be answering VP1MPW QSL requests until June when my Belize research work will interfere with correspondence. Thereafter, I would appreciate the help of some DX club in managing my confirmations. (WB8LJY) . . . All VP2MCT QSL requests bearing s.a.s.e. have been answered but some five hundred other petitioners will have to be patient. (W6KXT) . . . My Bermuda contacts usually are QSLd 100 percent but our FPO ran out of U.S. postage around Christmas. Pardon the delay, gang; I normally answer every card immediately on receipt. (K4BR/VP9) . . . Those still needing W6GBY/6Y5 confirmations should consult me via my new address: 4174 NW 79th Av., Apt. 1D, Miami, Florida, 33166. (W4MLA) . . . Commemorative station HIS0RCD confirms contacts 100 percent with impressive QSLs. (HI8LC) . . . Be sure to name the operator on your QSL to any multiperated club-type station. Helps establish responsibility. (WB0GQP/0) . . . K3BSY QSLs FY7AK contacts only for his French Guiana visit of March 15-16, 1975. F2QQ apparently handles the others. (W5FXQ) . . . QSOs by HP3XWB in last year's ARRL 160-Meter Test may be

confirmed through KZ5s AA or BB. (KZ5AA) . . . VE7BXG's QSL labors for VP2M include only last October's contest contacts. (VE7BD) . . . Attention WA4-WB4-WN4 DXers large or small. Sterling Park ARC, P.O. Box 599, Sterling Park, Virginia, 22170, takes over your portion of the Fourland ARRL QSL Bureau branch and holds 1600 lbs. of DX QSLs for you. Please forward s.a.s.e. for your share of the 300,000 cards on hand. (WA4HPF, W4WSF) . . . The new management at the League's WA4-WB4-WN4 Bureau branch gets my vote for QSLers of the Month. Just received eight envelopes filled to capacity with cards dating back to early '73. (WB4ZNH) . . . For 160-meter operation only, QSOs in 1974-75 with FP0JD, HP1XJB, VP2LBJ, W2DEO/HR2/VP2D /VP2S/BR1, YN1DEO/5, ZF1WO, 6Y5LA and 8P6GL can be confirmed via my QTH. (W2DEO) . . . My first Cuban QSL arrived via Moscow's Box 88, of all routes, from UP2CG/CO2. (WB8FLE) . . . Undeliverable QSLs can sometimes be put to work for you by marking them "address correction requested." (WWDXC) . . . Remember that PJ1-2-3-4-9-0 calls are used in the Netherlands Antilles. PJ5-6-7-8 on Sint Maarten. (WCDXB) . . . W7OK can confirm VP2KC contacts made only during December of '74. (DXNS) . . . The unsung heroes of "How's DX?" are readers who take time and trouble to answer "Alp!" requests. I've received four such responses in the past. By the way, WA1QHB still manages my VX1KE and XN1KE QSLing. (VO1KE) . . . 'ALP! Parenthesized colleagues plead for a push toward the pasteboards of holdouts indicated: (W1CDC) HK0AA '75; (W21YX) FG7AR/FS7, 7Q7AG '74; (W0DYK) CE3HN, HK4ATG, WB8SJ/HR1, SK3HY, ZS6ARS: (W0PRY) VR4CR, VS9ASP, ZC4GB, ZD5X, all '67; (K6ARE) CP6s FE FG '71, HA5KJW '72, HR1AT '74, SP7HF '71; (WA4BTC) YK5CDL '74; (WA4HHG) EP2FR, FG0MM, VP2M; (WA4WEX) CPs 1JV 6FG, CT2AT '70, H18s DLN '69, XAW, HL5B0 '70, HM5BZ '69, MP4BGX '69, SV0WP, 4X4TI all on 28 MHz, mostly cw; (WB8FLE) GM3DJS, YS1CHE; (KP4BDL) CR7AE, FG7AK, HS4AFD, LU2DZ/SU, PY0AA '73, 3D6AU, 4S7SW and 9V1SI. Any 'alp?

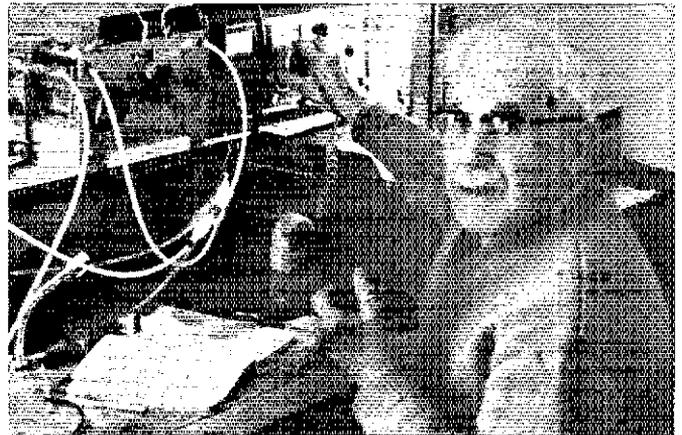
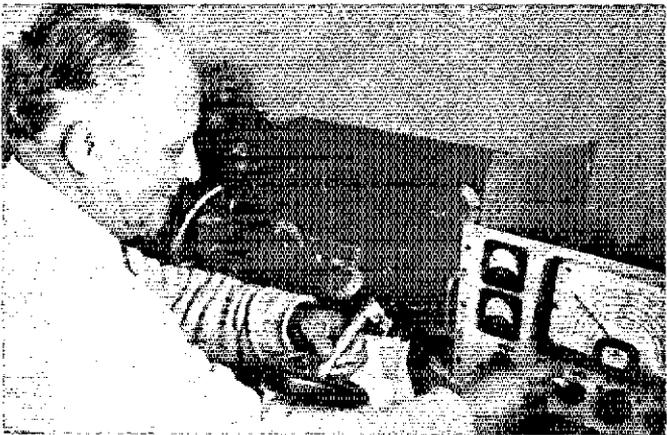
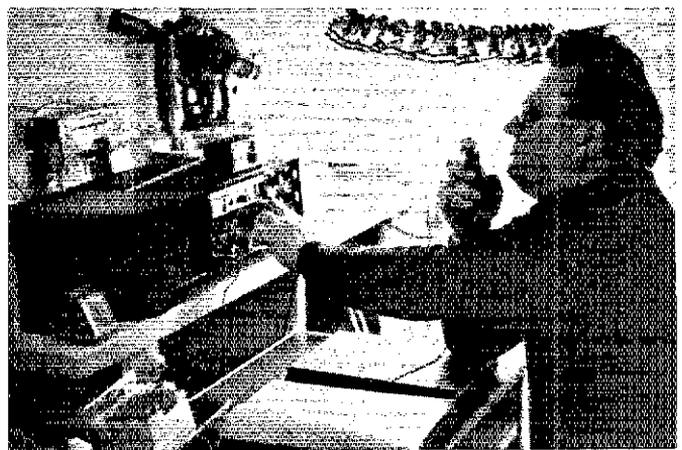
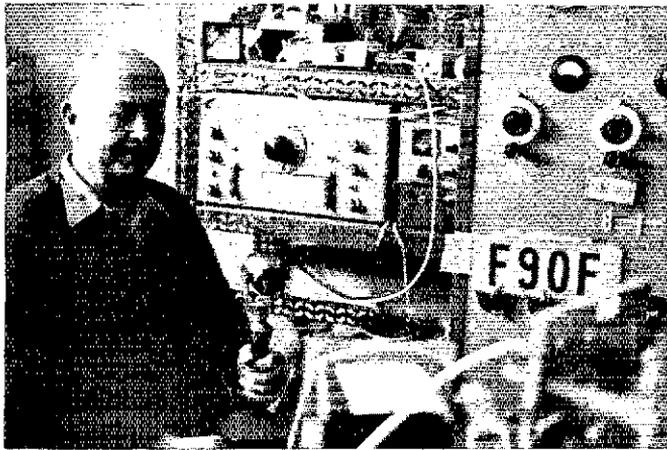
ASIA: Effective this year our licensing authorities have allotted the prefix VU7 to amateurs in the Andamans, Nicobar and Laccadive Islands. Former VU2s there retain their usual suffixes. Sikkim, furthermore, now has the VU prefix and India's licensing authority. (VU2CZ, ARSI) . . . Contrary to earlier misinformation I do not have the former AC3PT's logs, cannot assist with QSLs and have no idea whether he still sends and receives mail freely. Interested parties might try registered return-receipt-requested airmail

direct to the Chogyal. (ex-W1FLS) . . . I wish HL9KW from December 10, 1966, to January 10, 1968, and invite s.a.s.e. QSL inquiries to my Indiana QTH. (K9UWA) . . . O happy day - wallpaper from UJ8AC! And thanks reader W7OK for VX2AB QSL inf. (WA3DMH) . . . Despite spurious contra-evidence AP2KS works no cw and employs Stateside manager. QSL direct only, as Khalid cautions against use of radio terminology on outside covers. (DJ1US) . . . 4S7WP logs stopped coming through W2KV 'way back in the '60s, reason unknown, and W6LV still awaited overdue 9K2DK logs in mid-January. W6FF reports recent receipt of Y12AM's pasteboard for 1955 QSO. Never surrender. (WCDXB)

AFRICA: Because of the erratic post in my area I desire no QSLs direct to Gaboron. Cards sent to W3EKT will be relayed to me; route that should be handy for W/K (A2CED, ex-9J2ED) . . . Thanks to research by OK3HM I just received 7G1A's QSL for QSO ten years ago. I need eight more QSLs for 5BWAS despite profuse tear-drenched pleas. (W0PRY) . . . Anyone still owed QSLs for TU2DD contacts should henceforth to Michel direct. (K2QHT) . . . Logs for the ET3ZU/a Jabal at Tair DXpedition September '71 are still producing QSLs via Umberto, Via del Prati Fiscali 236, int. 8, C, I-00141, Rome, Italy. (DXNS) . . . 3D6A has agreed to have his address used as a QSL route to new or unlisted Swaziland amateurs. (WCDXB) . . . The former Dahomey Republic takes its new name very seriously so make sure your TY-bound cards are properly addressed People's Republic of Benin (VERON) . . . Reminder: CR4s are no D4As, suffixes unchanged. (DXNS)

F6AGI supplies your QTH of the Month, quaint Isle of Sein some fifteen kilometers off Finistere. Jean finds it a fine fixed-portable retreat. Population just a hundred or two, no noisy internal-combustion conveyances allowed and a clear skywire shot





Fs 90F 6AXO 8BX and 2SR, clockwise from upper left, obviously enjoy their DX. These photos of Jean, Georges, Jean

and Raymond were snapped by WB3JO on his recent visit to France.

EUROPE: After two U.K. postage rate increases in less than twelve months, G16VU regrets that he no longer finds it possible to answer QSLs direct unless they are accompanied by IRCs (International Reply Coupons). (W8SJS) . . . As CT2BB's QSL rep I just had a thousand cards printed. He expects to be quite active. (W1EP) . . . It should be kept in mind that not every German ham is a member of DARC whose bureau handles QSLs on a members-only basis. QSL any DX station via bureau only when instructed to do so. (DL8WX) . . . Work now keeps me so busy I've turned over future Kerguelen QSL clients to F5VU who will welcome your cards for FB8X-land. I will, however, retain all logs for previous Kerguelen operators and will continue to answer QSL inquiries. (F2MO) . . . My namesake PA0ATY tells me he chose the suffix because his wife's name is Aty. One way to soothe the XYL, perhaps, if you're on the air too much! (K1ATY)

OCEANIA: Now that I'm firmly planted in my newest *Callbook* QTH I can help VE3GUS complete QSLing for last year's Pacific tour. So far I'm surprised by the number of ops who thanked me for a new country but haven't yet QSLd KX6ZZ, VE3E2M/C21, VK2BZM, VK2BZM/VK9, VR4AZ, ZK1DD, ZL1BCG and 3D2DD. (VE3E2M) . . . Early ZK2AP QSL receipts were so slow I'm wondering if everybody has Niue confirmed already. (W0JRN) . . . Central & Southern Line Islands (VR7) and Tuvalu (VR8) display fresh ham prefixes in Oceania. (VERON) . . . Antarctic VK9s now include IN at Mawson base, CC CG GW at Casey, AL at Dover and DA on Macquarie. (DXNS) . . . Foiled by other logistics in his attempts to maintain a spotless QSL record among Japanese amateurs, KH6IJ carried four years of logs to Tokyo where a select group of JAs will disseminate Nose's confirmations for 16,225 contacts. (WCDXB)

SOUTH AMERICA: Since YV0AA activity January 10-12, 1973, no Aves Island QSOs

have occurred with our Ministry of Communications' authorization despite claims by one "YV8AL/YV0" The call YV8AL expired fifteen years ago (YV5CEP, RCV) . . . Hope you'll notify my wireless friends that I've dropped the last letter in my old call sign LU8BAJ. (LU8BA) . . . Palmer station mail service is nonexistent from March to October so K7ODK has a crucial task as my KC4AAC QSL manager. (WB6KIL) . . . All HC8GI logs now are said to be in the possession of QSL aide W3HMK. (DXNS) . . . Now our periodic QTH rundown conditional on the fact that each item is not necessarily accurate, complete or "official" . . .

A4XGH, P.O. Box 980, Muscat, Sultanate of Oman
 C31IU (to F0AXP via REF)
 EA9FG, A. de Salazar, P.O. Box 70, Cartagena, Spain
 F2QQ, R. Gemehl, 18 rue Jean-Jaures, 92270, Bois-Colombes, France
 FG0CGV/FS7 (via K4GKD)
 FP8DX, P.O. Box 41, St. Pierre, St. Pierre Island (or via K9OTB)
 FP8s HL ML (via K9OTB)
 FR7BE, Box 137, Tampon, Reunion Island
 H0LPY/TZ, Box 34, 1-04024 Gaeta, Latina, Italy
 JT0OAO (to UY5LK via CRC)
 JY5MB, Box 299, Amman, Jordan
 JY9DGC, P.O. Box 87, Amman, Jordan
 K4WVI/KH6, J. Martin, 910 Murray dr., Honolulu, Hawaii, 96818
 KC4AAA, D. Seeley, USARP South Pole Stn., c/o FPO, San Francisco, CA, 96692
 KC4USX, Hamshack, VXE-6, FPO, San Francisco, California, 96601
 OA4ASN, P.O. Box 1426, Lima, Peru
 OX3PN, Box 10, Julianehaab, Greenland
 P29s AJ DW HC UC (via WA7ILC)
 P29AZ, Box 6666, Boroko, Papua-New Guinea
 P29CC, P.O. Box 195, Mt. Hagen, Papua-New Guinea (or via W2NHZ)

PJ8CM, F. Jerome, K5CM, 908 Holoway, Midwest City, Oklahoma, 73110
 PR0ITU, F. Khouri, Box 22, Sao Paulo, Brazil
 PY0s BXC PO (to PY7s BXC PO)
 SM0AGD/TA2 (via SM3CX5)
 TA1SK/4X (via DL7LV)
 VP1JW, P.O. Box 257, Belize, Belize
 VP2AJ, Box 550, St. Johns, Antigua, W.I. (or via WB2TSL)
 VP2GAO, P.O. Box 35, Grenada, W.I.
 VP2LCT, P.O. Box 489, Castries, St. Lucia, W.I.
 VP2s MBD MEX MICA MSV (via VE7BXG)
 VP5MD, Marilyn Dennis, Rt. 1, Box 365-B, Valrico, Florida, 33594
 VP8s HA LC (via W3HMK)
 W2DEO/HR2/VP2D/VP2S/8R1 (to W2DEO)
 WA2KGY/4X (via W5TXK)
 WA6LRG/KB6 (to WA6LRG)
 WB2SFF/H18, M. Vargas, P.O. Box 277, New York, New York 10032
 WB4SJK/6Y5, S. Reichlyn, P.O. Box 9096, Columbia, South Carolina, 29290
 XJ3CDA/YV6 (to VE3CDA)
 ex-XW8FA, R. Broadway, U.S. Embassy (USAID), APO, New York, New York 09526
 YC2QE, P.O. Box 88, Semarang, Indonesia
 YJ8GH, G. Huckin, P.O. Box 888, Port Vila, New Hebrides
 YJ8YD, Hotel des Castors, Santo, New Hebrides
 YN1DW/YN4 (to Ws 4BRB or SUSM)
 ZB2s DO WO (via W4NJF)
 ZC4AU, S/Sgt. G. Brennan, ATLO, RAF Akrotiri, BFPO 53, England
 ZC4CG, Cpl. H. Girvan, Adm. Trp., 259th Sig. Sqdn., Episcopi, BFPO 53, England
 ZC4s DH EJ GE GH HH LC PK RC TV (via ZC4CG)
 ZE1EK, H. Kramer, P.O. Box HG-496, Salisbury, Rhodesia
 ZF1s CC DG RF (via VE7BXG)
 ZS1s AMB ANT (via ZS6BMV)
 ZS2MI, Box 3656, Pretoria 0001, South Africa

ZS5SH, Box 12, Pennington, Natal,
South Africa
ZS6BMV, Box 4301, Pretoria 0001, South
Africa
3A2HB, P.O. Box 383, Monte Carlo,
Monaco
JD6s AJ AK, Box 735, Manzini, Swaziland
4Js 2A 3A, CRC, Box 88N, Moscow,
U.S.S.R.
4L3MK (to UA3JD via CRC)
8P6BBS, Fourth Caribbean Jamboree,
Oxnards, St. James, Barbados
8P6GG, Box 141, Bridgetown, Barbados
ex-9K2DC, W. English, H&MS-20, GSE,
MCCRTG-20, Cherry Pt., NC, 28533
9L1SL, Amateur Radio Club of Sierra
Leone, P.O. Box 16, Freetown, Sierra
Leone 9Q5GR, P.O. Box 8456, Kinshasa,
Zaire

The following may be reached as shown
parenthetically:

A2CAB (WA2LOR) PY1ZBA (W4FOA)
A2CED (G3WKJ) ST2AY (K3RLY)
A4XVI (GM4DLG) SV1GA (W1GZI)
A6XP (DK3NK) TA2ES (SM3CX5)
AC3PT (see text) TF3ST/4U (TF3ST)
AP2KS (see text) TU2DD (see text)
BY3SG (JALAN) VP1BJ (G4CZJ)
C31LZ (C31LF) VP2EEF (8P6GG)
C5AJ (DL7AH) VP2EEG (W3HMK)
C5AR (G3LOP) VP2KC (see text)
CE9AT (CE2MZ) VP2KK (W3HMK)
CP1BCC (WA2ZDF) VP2LBJ (see text)
CT2BB (W1EP) VP2M (see text)
CT2BLM (W1FXD) VP2MKJ (K4CKJ)
CT7ZG (CT1ZG) VP5GS (W4BRB)
CW3BR (W3HMK) VP5SF (WB4SHB)
D2ASW (K4UTE) VP8OA (RSGB)
D2AZB (CR6ZB) VP9HZ (RSGB)
DJ3KR/OA (DARC) XW8HS (WA4LPF)
DJ6QT/CT3 (DJ6QT) YB7AAA (W1YFC)
DM7WI (DM2CWI) YB9AAG (DL6FF)
DU6BG (WA7RFH) YN1DE0/5 (see text)
EP2FR (W3YMB) YU1AJF (W1CDC)
F0AXP (REF) ZB2X (OH3XZ)
FB8XM (F5VU) ZD9GF (ZS5SH)
FB8XX (see text) ZF1AU (WA4BTC)
FC2CD (W4KA) ZF1GI (W0GI)
FM7AQ (K4KQB) ZF1VB (WA4TAF)
FM7AV (F6BFH) ZF1WO (see text)
FM0CGV (K4GKD) ZS2MI (ZS6BBF)
FP0JD (FG7TD) 3A2GX (16ALX)
G5BNW (WA1TDQ) 3D6BH (W3KLE)
GC3DVC (GC2LU) 3V8OM (W4NIF)
GD5BOY (W5ZSX) 3V0DQ (W2GHK)
HC5EE (WA8TDY) 4S7DA (W3HMK)
HI50RCD (RCD) 5B4AU (OE3SPW)
HL9KW (see text) 5B4CD (SM5EEI)
HP1XJB (see text) 5B4PW (G3CZY)
HP3XWB (see text) 5B4TD (OH1TD)
HS2AIG (WA4BKC) 5B4YK (OH2BCA)
HS2AKZ (WB6RAD) 5L8N (SM4CWY)
HS3AJC (WA5DXI) 5N2AAX (HB9AAX)
HU1DX (W2KF) 5U7AG (W3HMK)
JY9EK (WA5LMG) 6Y5LA (see text)
KC4AAC (K7ODK) 7Q7LB (10DG6)
KC6AO (WA6AHF) 8P6FU (W3HMK)
LU8BA (LU8BAJ) 8P6GL (see text)
OZ3SK/CT3 (OZ3SK) 8R1J (W4MXL)
OZ5DX/CT3 (OZ5DX) ex-9GIAR (W4ACN)
P29DM (VK5TM) 9G1JX (DL7SI)
PE3NOS (PA0JR) 9J2CJ (DK6XF)
PJ8QM (W2QM) 9J2LL (I2SB)
PJ9KR (DJ3KR) 9M6AW (G3EAS)
PRIITU (PY1CC) 9Y4VT (W3DJZ)

DX Century Club Awards

Administered by R.L. White, W1CW

The following listings show DXCC Awards issued by Headquarters during the period from
December 1, through December 31, 1975.

New Members

CW/F

219	163	CT1VX	114	107	104	VE3AKG	100
PY5YC	YU3TDX	130	I2BJS	DK9FY	DK5NL	101	K3UOC
215	143	SM0EVK	109	JH3BRG	K6LLE	W7MPZ	TG4SR
VQ9M	G3PVA	127	OE3FLA	105	103	/HK3	W3HDX
210	133	F5ST	W9NGA	JA2DLM	DJ6FK	PY2AN	WB8LWV
IT9PUG					102	WA4HPF	YU3TKT
						W9YH	

Radiotelephone

178	135	114	111	15ZSS	WB6CZO	104	103
HK3CLX	ZL110	K9IYT	DJ2EE	109	W9EHU	110KC	WB4QGI
137	125	113	WA2HQH	TU2EI	105	WA2SPG	100
K2UXW	K7LAY	JR1BLX	110	106	JA2DLM	ZL1BD	WB4RJG

CW

108		W1AB		OZ6XT		IT9RAN
F2IU		101		W0PRY		SM5BHV
102		K4LRO		100		

5BDXCC

#469	#470	#471
UK2PAF	W0AO	WA6KZI

Endorsements

In the endorsement listings shown, totals from 120 through the 240 level are given in increments of 20, from 250 through 300 in increments of 10, and above 300 in increments of 5. The totals shown do not necessarily represent the exact credits given but only that the participant has reached the endorsement group indicated.

CW/F

330	300	WA5EEM	JAIWSA	KH6CF	WA4ENJ	SM3DMP	K7LAY
K2SHZ	OZ7BG	250	K3LWM	W0PRY	W6MTJ	WA1EQT	K9IYT
315	290	W4HNW	W7KI	180	WA6DNM	WA3BRW	WA2HQH
W0GNX	WB5BD	W8BDO	210	WB4EDD	WA6NBY	W4EDB	WA3ERG
310	280	240	F6CDJ	160	W7JAC	WA4GQJ	WA3SZV
I2SM	W1AB	DK3SF	200	DL8DC	YU1NPG	W8WCW	WB4ASV
305	260	WB8BTU	DL2QB	JA6RIL	140	120	WB6JOD
K9PPY	DJ4AX	220	JH1AGU	K2IJ	K4YOE	K4GPX	WB9KWI
			K6RSY	W1BMR	K0SVW	KP4BDL	

Radiotelephone

325	PY3BXW	WA6WXP	OZ3PZ	W3IF	200	K6RSY	140
K8CFU	WA4MUB	280	W2EV	W4HNW	DU1EJ	160	JAIWSA
W6HYG	310	W6JKJ	W2MPK	220	CP1DN	DL8DC	WB4VBL
320	I2SM	W4OPW	CX6AM	W8BDO	JA6RIL	W46NBY	WA6NBY
W7KH	290	W5FFW	WA9YEW	G3YBH	180	K6JT	120
315	WA6EPQ	260	240	W4EPZ	JH1AGU	W7OK	WA6EVK
							K6G6
							KP4BDL

CW

140		OZ1VY
K4YFQ		W6PT

Corrections to the December, 1975, DXCC List: CW/F — W5PWW 337, W6QNA 325, K4YFQ 316. Radiotelephone — W5PWW 302.

Strays

STOLEN EQUIPMENT

- A Drake fm transceiver, Model ML-2, Serial No. 10823 was stolen on Jan. 10, 1976, from locked car. W2CYS. Contact Freehold, NJ, Police Dept.
- Theft from auto at Lake City, FL. SR-C 826M, Serial No. 208120. Notify Columbia County Sheriff, Lake City, FL or F.M. Loughlin, WB4NOZ, 2501 Newport Dr., Ft. Pierce, FL 33450.
- Stolen from home on Dec. 4, 1975. R.L. Drake TR-22C, Serial No. 940416, with mating Drake AC-10 power supply. Mike Davis, WA1UJV, 64 Brookside Dr., Stamford, CT.

□ IC-22 SN 12483 stolen Richmond, VA 9-9-75 from car. Contact Richmond Police Dept. or K4E0F.

□ Stolen in the Belle Vernon, PA, area on Dec. 2, 1975. Swan 270 B, Serial No. 10949 with dc power supply, Serial No. 16659, and mic, M201. Contact Belle Vernon Police Dept., Belle Vernon, PA or Lois C. Felter, WN4JHV/9, 176 Wilson Dr., Marion, IN 46952.

□ ICOM, Model IC-22A, Serial No. 3405499, taken from car on Dec. 6, 1975. Robert L. Devine, WA1SZY, 99 Howland Road, Stoughton, MA 02072.

□ Swan 500-C, Serial No. 1472938; power supply, serial No. 4805; inverter, serial No. 5277, taken from car. Contact San Diego City Police, Case No. 75-79153 or John Durham, K6TRT, 1707 Madison Ave., San Diego, CA.

□ Theft from car on Nov. 19, 1975. Kenwood TS-520, Serial No. 231023; ICOM

IC-22, Serial No. 10718; KW107 supermatch Contact Metropolitan Toronto Police, 52nd Div., or James Knott, VE3CUM.

□ RF Communications, Inc., 2-meter 4-channel fm rig, Model RF-403. Gary Hendrickson, W3DTN, 1419 Larch Rd., Severn, MD 21144.

□ ICOM-230 with SS-488-24-4600 and W2HBL inscribed. Serial No. 2402561. Contact William Fischer, W2HBL, 7 Whitebird Ct., Schenectady, NY, 518-355-9735 or the Rotterdam, NY Police Department.

□ Stolen from garage on Dec. 20, 1975, the entire communications setup of WA9Y0Z Tempo FMH H.T., with accessories; HR2 with touchtone; SX-100 with speaker; Seneca and 2 meters; Lafayette 6 meter XCVR UTICOM 2 meter XCVR; PCL Nuvistor pre amp; Sencore MU-150 tube checker/analyzer; Anthony Bodo, WA9YOZ, 4380 Hays Street, Gary, IN 46408.

HONOR ROLL

The DXCC Honor Roll consists of the top ten numerical totals in the DXCC. Position in the Honor Roll is determined by the participant's total countries credited less any credits given for deleted countries. The number shown following the call is the participant's total countries credited. The number shown at the start of each group indicates the participant's total when deleted countries, for which credit has been given, is subtracted.

CW/F

319 G3FKM/347 G3FNB/347 GW3AHN/349 K2BK/344 K2BZT/347 K4LNM/344 K6ZO/354 LU6DJX/354 VE2NV/348 W1BIH/353 W1DK/347 W1HX/350 W1NU/344 W2AGW/354 W2BXA/354 W2CFO/350 W2DX/356 W2NUT/346 W2QKM/348 W2RGV/346 W2SSC/346 W2TP/339 W3KT/353 W3LMO/343 W3MP/352 W4EX/354 W4QXB/351 W4QM/352 W4VFD/347 W5KC/353 W5MMK/351 W6AM/355 W6ANN/349 W6CYV/348 W6KZL/346 W6NJJ/344 W6PT/347 W6ZO/351 W7KH/353 W7MB/354 W7PHO/348 W8BF/351 W8BT/346 W8DAW/354 W8GZ/353 W8JBI/349 W8MPW/348 W8PHZ/345 W9BG/355 W9BW/351 W9DU/352 W9ELA/353 W9KF/346 4X4DK/348	OE1ER/351 W1AX/352 W1AZ/343 W1HZ/347 W1MV/346 W2AO/346 W2BOK/346 W2CR/346 W2GLF/342 W2LV/348 W2QM/344 WA2DIG/334 W3CGS/348 W3EVW/350 W3NKM/346 W3WGH/344 W4AIT/352 W4BY/347 W4DQS/336 W4LRN/341 W4MCM/340 W4QCV/345 W5AO/347 W5UX/344 W6BZE/348 W6OSU/341 W6WVQ/346 W7AQB/341 W8EWS/353 W8LKH/348 W8OK/340 W8ZCC/348 W9DWG/342 W9GFF/341 W9HB/343 W9LNM/352 W9MLY/345 W9PGI/345 W9SQI/345 W9SYK/347	W2JUV/349 W2PV/330 W2QHH/349 W2YY/336 WA2RAU/329 W3AFM/338 W3GRS/340 W4BJ/340 W4NJF/331 W4SSU/336 W5PQA/346 W5QK/339 W5TIZ/339 W6ABA/330 W6CHV/346 W6KTE/329 W6ZM/338 W7SGN/344 W9GIL/345 W9LW/334 W9JUV/346 W9RCJ/340 W9RKP/345 W9SFR/343 W9GKL/340 ZL1HY/352 ZL3IS/341	W6RKP/341 W6TZD/347 W6BOOP/333 W7OF/343 W8KBT/340 W8KIT/333 W8QJR/344 W8WZ/349 W9FKC/347 W9CJZ/331 W9LW/337 YV5AB/345 YV5ANF/325 4X4JU/342	315 D17ZG/327 DL7EN/342 DL7HU/335 G2BVN/344 G8KS/344 H9RJ/350 K1SHN/330 K2PXX/330 K2UVU/337 K2YXY/334 K4JC/330 K4RPK/335 K6AN/347 K6WR/332 K8DYZ/326 K8OHG/331 K9BGM/326 OK1ADM/331 PA0FX/346 PY2CQ/327 PY2PA/327 PY2SO/327 PY7Y5/336 W1BPW/334 W1DGJ/330 W1GL/329 W1GYE/341 W2AX/342 W2CY5/348 W2GT/345 W2HO/342 W2MJJ/337 W2ZTV/327 W82HXD/327 W9DZJ/333 W5GC/335 W5GO/339 W5IO/345 W5NOP/336 W6EL/329 W6EPZ/347 W6EUF/325 W6FF/339 W6FZJ/331 W6GPP/347 W6GK/338 W6RGG/327 WA6GLD/327	W7ADS/344 W7CMO/336 W7ENW/348 W8ARH/329 W8CT/330 W8DMD/347 W8KPL/343 W9WYB/339 W9BN/331 Y51O/349 YV5BBU/325 Z56LW/339	CE3AG/348 DJ5DA/326 DJ5ZU/326 K6CH/343 D0JQ/326 G3AAE/314 G4MJ/342 G13JIM/337 H89KB/339 IT9ZG/Y/338 JA1BRK/328 K2YLM/325 K4LD/326 K4IKR/323 K4WV/325 K4YYL/325 K6AHV/329 K6EV/327 W5GJ/331 W5KTW/327 W5NMA/341 W5OB/334 W6KNH/320 W6KZS/326 W6UQG/336 WA6MVG/325 W8BVF/325 W8DA/333 W8JQ/324 W8KA/347 W9CH/332 W9QLD/326 W9ZTD/331 W9AUB/332 W9BK/333 W9NK/348 YV5AIP/333	W9NDA/349 W9TKD/335 W9TKV/341 W9AIH/340 YV5BPJ/326	313 DL7AA/348 I2KMG/324 I8KDB/337 JA1BN/329 JA1DM/339 JA2JW/335 K1RQE/323 K1YZW/323 K4MZU/324 K6CH/343 D0JQ/326 K8EHD/323 K8RTW/333 OH2GV/329 ON4QJ/328 UR2AR/333 VE2WA/335 W1BAN/337 W1HH/335 W2AYJ/343 W2PN/325 W3RNR/342 W4BFR/332 W4ZXI/321 W5GJ/331 W5KTW/327 W5NMA/341 W5OB/334 W6KNH/320 W6KZS/326 W6UQG/336 WA6MVG/325 W8BVF/325 W8DA/333 W8JQ/324 W8KA/347 W9CH/332 W9QLD/326 W9ZTD/331 W9AUB/332 W9BK/333 W9NK/348 YV5AIP/333	K9LUI/330 OZ3Y/337 PY2PE/324 PY4AP/321 SM6AEK/322 SM6CKS/319 SM7ANB/331 VE1VR/322 VE3BWY/327 VE3MJ/332 VE3WT/323 W6MIJ/330 W2GQN/324 W2WVG/334 W2ZX/341 W2ZFMK/324 W3GAU/346 W4HJ/338 W4JDR/338 W4LY/343 W4TM/345 W5FT/340 W5QL/344 W5PM/336 W6DD/322 W6DZ/345 W6HYG/335 W6ONZ/335 W6SQP/338 W8CUT/330 W8EVZ/326 W8JUN/348 W8UAS/343 W9BL/319 W9CKC/327 XE1AE/332 YV5AHR/326 YV5BNW/320	WA3ATP/318 W4MR/341 W5HE/323 W5KX/338 W5MMD/341 W6HQC/335 W6JKJ/327 W6LN/342 W6TA/335 W6YMY/328 W7JG/330 W7QPK/327 W8MB/333 W8ONA/338 W8NYB/317 W9HJ/332 W9JQD/318 W9QQN/323 W9BFB/340 ZL3OY/321
318 DJ2BW/346 DL3RK/346 DL6EN/344 DL9OH/340 HB9MQ/347 K2FL/345 K4KC/347 K6DC/345	DL1KB/348 G2BDO/346 G3HCT/339 G5VT/348 I1ZL/339 I0AMU/346 JA1BK/336 K2LWR/342 K3BW/342 K4EZ/334 K6EC/342 K6LGF/340 K6RQ/338 K7GCM/336 K8LSG/338 OH2NB/349 V4KMB/351 W1JNV/343 W2BWK/340 W2CP/334 W2DOD/346 W2GKZ/330 W2HTI/344	DL1HH/336 DL1JW/339 G6TA/342 G13VJ/342 IT9TAI/333 K1IXG/334 K2TQC/334 K4MQG/330 K4PDV/339 K6NA/348 K6OW/334 K8IKB/338 K8ONV/336 K9ECE/336 LA7Y/349 ON4NC/347 PY2CK/350 W1CBZ/342 W1CKA/337 W1FZ/345 W2BHM/341 W2FXA/340 W2FZY/340 W2PDB/338 WA2RLQ/328 W3LMA/349 W4BQY/340 W4IF/338 W4ML/347 W5FFW/343 W5PWZ/338 W5PWW/334 W6GPP/347 W6HX/350 W6ID/346 W6ISQ/334 W6REH/333	316 DL1HH/336 DL1JW/339 G6TA/342 G13VJ/342 IT9TAI/333 K1IXG/334 K2TQC/334 K4MQG/330 K4PDV/339 K6NA/348 K6OW/334 K8IKB/338 K8ONV/336 K9ECE/336 LA7Y/349 ON4NC/347 PY2CK/350 W1CBZ/342 W1CKA/337 W1FZ/345 W2BHM/341 W2FXA/340 W2FZY/340 W2PDB/338 WA2RLQ/328 W3LMA/349 W4BQY/340 W4IF/338 W4ML/347 W5FFW/343 W5PWZ/338 W5PWW/334 W6GPP/347 W6HX/350 W6ID/346 W6ISQ/334 W6REH/333	314 DL7FT/325 DL7HU/331 F2MO/327 I8KDB/337 K4JC/334 K4YYL/322 K6WR/330	312 F9RM/332 I2KMG/324 I6FLD/333 I8AA/321 I8ZV/330 IT9GAI/319 IT9JT/319 JA1BK/329 K5QHS/319 K7GCM/328 K8IKB/322 K9KYF/331 K9LUI/330	LU9DAH/335 OK1ADM/323 ON4DM/341 PY2PC/321 SM3BIZ/339 VE3MJ/322 VE3MR/326 W1BRN/335 W1ONK/339 W2GKZ/324 W2LV/336 W2ZX/341 W2ZHXD/324 W3AZD/326 W3GRS/327 W3JK/322 W4UWC/325 W5LZ/330 W6CHV/335 W6CUO/327 W9SFR/329 W9AAA/323 XE1AE/332 Y51O/331 YV5AHR/326 YV5BNW/320 YV5BPJ/324	ZL3NS/322	311 DL1IN/336 DL8NU/316 EA4JL/317 EA7ID/332 HB9J/342 HB9TL/337 I2KMG/322 K4HJE/318 K4TJL/330 K5AWR/332 ON4DH/337 OZ3SK/327 PY2CYK/320 PY2PE/323 PY7YS/332 VE3WT/322 WA2EOQ/322 W4PDL/332 W5NMA/334 W5PQA/336 W5SZ/320 W6YMY/327 W7ADS/327 W7QPK/326	W9HB/334 W9HPS/325 W9JF/337 ZL1KG/337	
317 DL6EN/340 G5VT/347 I0AMU/346	K5JEA/335 W2HTI/343 W2YY/331 WA2RAU/329 W3NKM/344 W3WGH/337 W5JWV/339 W9LW/334 W9GKL/339	ZP5CF/343 4X4JU/338	DJ2YI/341 K6LGF/335 K9ECE/334 PY2CQ/348 PY2PA/327 VE3QA/340 W2ZTV/326 W3DJZ/330 W3KT/343 W4NJF/329 W4OM/342 W4SSU/331 W5GC/335 W5IO/344 W6NJJ/334 W6REH/328 W6RKP/335 W9CM/343 YV5BBU/325 Z56LW/338	313 DL7FT/325 DL7HU/331 F2MO/327 I8KDB/337 K4JC/334 K4YYL/322 K6WR/330	310 DL1KB/333 EA2HX/326 G3JEC/319 G13JIM/331 ISTDJ/325 K2BZT/331 K4RTA/316 W2CKY/330 WA3ATP/316 W4UWC/321 W5LZ/319 W6KNH/317 W6PT/325 W6RGG/320 W6YMY/324 W7CMO/324 W9WHM/338 WA9NHQ/319 W9MLY/333 W9PGI/327 W9QGI/327 YV4UA/316					

Radiotelephone

319 G3FKM/342 W2BXA/352 W2RGV/344 W2TP/336 W4EX/351 W6AM/353 W8BF/351 W8BT/346 W8GZ/353 4X4DK/348	K5JEA/335 W2HTI/343 W2YY/331 WA2RAU/329 W3NKM/344 W3WGH/337 W5JWV/339 W9LW/334 W9GKL/339	ZP5CF/343 4X4JU/338	DJ2YI/341 K6LGF/335 K9ECE/334 PY2CQ/348 PY2PA/327 VE3QA/340 W2ZTV/326 W3DJZ/330 W3KT/343 W4NJF/329 W4OM/342 W4SSU/331 W5GC/335 W5IO/344 W6NJJ/334 W6REH/328 W6RKP/335 W9CM/343 YV5BBU/325 Z56LW/338	315 D17ZG/327 DL7EN/342 DL7HU/335 G2BVN/344 G8KS/344 H9RJ/350 K1SHN/330 K2PXX/330 K2UVU/337 K2YXY/334 K4JC/330 K4RPK/335 K6AN/347 K6WR/332 K8DYZ/326 K8OHG/331 K9BGM/326 OK1ADM/331 PA0FX/346 PY2CQ/327 PY2PA/327 PY2SO/327 PY7Y5/336 W1BPW/334 W1DGJ/330 W1GL/329 W1GYE/341 W2AX/342 W2CY5/348 W2GT/345 W2HO/342 W2MJJ/337 W2ZTV/327 W82HXD/327 W9DZJ/333 W5GC/335 W5GO/339 W5IO/345 W5NOP/336 W6EL/329 W6EPZ/347 W6EUF/325 W6FF/339 W6FZJ/331 W6GPP/347 W6GK/338 W6RGG/327 WA6GLD/327	LU9DAH/335 OK1ADM/323 ON4DM/341 PY2PC/321 SM3BIZ/339 VE3MJ/322 VE3MR/326 W1BRN/335 W1ONK/339 W2GKZ/324 W2LV/336 W2ZX/341 W2ZHXD/324 W3AZD/326 W3GRS/327 W3JK/322 W4UWC/325 W5LZ/330 W6CHV/335 W6CUO/327 W9SFR/329 W9AAA/323 XE1AE/332 Y51O/331 YV5AHR/326 YV5BNW/320 YV5BPJ/324	ZL3NS/322	311 DL1IN/336 DL8NU/316 EA4JL/317 EA7ID/332 HB9J/342 HB9TL/337 I2KMG/322 K4HJE/318 K4TJL/330 K5AWR/332 ON4DH/337 OZ3SK/327 PY2CYK/320 PY2PE/323 PY7YS/332 VE3WT/322 WA2EOQ/322 W4PDL/332 W5NMA/334 W5PQA/336 W5SZ/320 W6YMY/327 W7ADS/327 W7QPK/326	W9HB/334 W9HPS/325 W9JF/337 ZL1KG/337	
318 DL9OH/340 TI2HP/351 W1IFG/344 W2GLF/342 W4QCW/341 W6GVM/350 W7PHO/347 W9BW/344 5Z4ERR/350	K5JEA/335 W2HTI/343 W2YY/331 WA2RAU/329 W3NKM/344 W3WGH/337 W5JWV/339 W9LW/334 W9GKL/339	ZP5CF/343 4X4JU/338	DJ2YI/341 K6LGF/335 K9ECE/334 PY2CQ/348 PY2PA/327 VE3QA/340 W2ZTV/326 W3DJZ/330 W3KT/343 W4NJF/329 W4OM/342 W4SSU/331 W5GC/335 W5IO/344 W6NJJ/334 W6REH/328 W6RKP/335 W9CM/343 YV5BBU/325 Z56LW/338	313 DL7FT/325 DL7HU/331 F2MO/327 I8KDB/337 K4JC/334 K4YYL/322 K6WR/330	310 DL1KB/333 EA2HX/326 G3JEC/319 G13JIM/331 ISTDJ/325 K2BZT/331 K4RTA/316 W2CKY/330 WA3ATP/316 W4UWC/321 W5LZ/319 W6KNH/317 W6PT/325 W6RGG/320 W6YMY/324 W7CMO/324 W9WHM/338 WA9NHQ/319 W9MLY/333 W9PGI/327 W9QGI/327 YV4UA/316				
317 DL6EN/340 G5VT/347 I0AMU/346	K5JEA/335 W2HTI/343 W2YY/331 WA2RAU/329 W3NKM/344 W3WGH/337 W5JWV/339 W9LW/334 W9GKL/339	ZP5CF/343 4X4JU/338	DJ2YI/341 K6LGF/335 K9ECE/334 PY2CQ/348 PY2PA/327 VE3QA/340 W2ZTV/326 W3DJZ/330 W3KT/343 W4NJF/329 W4OM/342 W4SSU/331 W5GC/335 W5IO/344 W6NJJ/334 W6REH/328 W6RKP/335 W9CM/343 YV5BBU/325 Z56LW/338	313 DL7FT/325 DL7HU/331 F2MO/327 I8KDB/337 K4JC/334 K4YYL/322 K6WR/330	312 F9RM/332 I2KMG/324 I6FLD/333 I8AA/321 I8ZV/330 IT9GAI/319 IT9JT/319 JA1BK/329 K5QHS/319 K7GCM/328 K8IKB/322 K9KYF/331 K9LUI/330	LU9DAH/335 OK1ADM/323 ON4DM/341 PY2PC/321 SM3BIZ/339 VE3MJ/322 VE3MR/326 W1BRN/335 W1ONK/339 W2GKZ/324 W2LV/336 W2ZX/341 W2ZHXD/324 W3AZD/326 W3GRS/327 W3JK/322 W4UWC/325 W5LZ/330 W6CHV/335 W6CUO/327 W9SFR/329 W9AAA/323 XE1AE/332 Y51O/331 YV5AHR/326 YV5BNW/320 YV5BPJ/324	ZL3NS/322	311 DL1IN/336 DL8NU/316 EA4JL/317 EA7ID/332 HB9J/342 HB9TL/337 I2KMG/322 K4HJE/318 K4TJL/330 K5AWR/332 ON4DH/337 OZ3SK/327 PY2CYK/320 PY2PE/323 PY7YS/332 VE3WT/322 WA2EOQ/322 W4PDL/332 W5NMA/334 W5PQA/336 W5SZ/320 W6YMY/327 W7ADS/327 W7QPK/326	W9HB/334 W9HPS/325 W9JF/337 ZL1KG/337

Gentlemen's Agreements

"An informal substitute for an agreement, secured only by the honor of the participants." - Webster's.

The IARU Region I High Frequency Band Plan has been around for a surprisingly long time - 25 years! Within the postwar period of amateur radio (WW-II, that is!), it seems to have been the first formalized approach to the encouragement of specific mode operation in finite areas within a band. That was, *and is*, a big step.

The band plan emphasized "no phone" operation in the cw segments. It suggested that teletype be kept within 20 kHz of 3.6 and 21.1 MHz, within 5 kHz of 7.04 MHz, within 10 kHz of 14.09 MHz and within 50 kHz of 28.1 MHz - all segments shared with cw. The plan also recommended reserving 3500-3510 and 3790-3800 kHz for "DX" work.

In the sixties it was a pretty well followed custom (i.e., a gentlemen's agreement!) for sideband to occupy the high end of 75 with a-m on the low end, a-m from 14.2-14.23 and above 28.7 MHz. Time affords perspective and time proved to be the principal element in the resolution of the a-m vs. ssb furor.

Time, of course, lead to the attrition of old a-m rigs and the widespread availability and popularity of sideband gear.

Most recently the upsurge of gear availability for the "top band" (and resultant occupancy) has raised the question of what is acceptable and appropriate for 160-meter procedure. The "DX Window," 1825-1830 kHz, is recognized by almost all and principally used by European operators. If you're new to the band, you'll find that just about all DX stations working "split" will be listening on 1800-1805, KH6s transmitting up around 1995-2000, DX ssb within 1810-1820 kHz, South American DX stations on the very low end - and the man who knows *all* about 160 is W1BB.

In almost all contests mention is made of frequency segments within which to confine contest operation so as to minimize interference to non-contest operation. Nothing mandatory about their recommendations. Rather, they're an attempt to achieve a number of aims - concentrate activity for the contesters, alleviate QRM from the contesters, and clue in the non-contesters as to what parts of the bands to avoid. Do these recom-

mendations work? Most times. However, the inexperienced do stray into these segments and some contesters stray out when caught up in the heat of battle. The point to remember in all this is that we *are* in the process of evolving to a gentlemen's agreement that is fair to all concerned and one which works because of our own self discipline.

Corollary to the contest segment problem mentioned above is the one of using repeater frequency areas on two meters to amateur contest QSOs. As yet there's nothing illegal about working on the repeater output - but is it particularly ethical? Repeaters are public service machines and this type of operation can do nothing but inhibit their effectiveness. This very problem is under study at this time by the ARRL Contest Advisory Committee as is consideration of prohibition of all channelized fm contest operation on two meters.

There's nothing very mysterious about any of this. Rules evolve from good habits of fair people. With the main FCC emphasis these days on deregulation, we have to exercise personal judgment and realize that governmental deregulation = personal self-regulation.

NEW A-1 OPERATORS

IT9ZWS IT9JOU HA3PG DL3BP W3ABC W6RNL

WIAW OPERATING SCHEDULE

Operating-visiting hours are Monday through Friday 1 P.M. to 1 A.M., Saturday 7 P.M. to 1 A.M. and Sunday 3 P.M. to 11 P.M. (all local Eastern time). The station address is 225 Main St., Newington, CT 06111 (about 7 miles south of Hartford). Maps with local street details and the general contact schedule are available upon request. All frequencies shown are approximate. If you wish to operate, you must have your original operator's license with you. Please note that the station will be closed April 16. *Staff:* Chief Operator/ARRL Asst. Communications Mgr. C. R. Bender, W1WPR; Alan Bloom, WA3JSU; Chris Schenck, WB2SEZ.

Code Practice

Approximate frequencies: 1.805 3.58 7.08 14.08 21.08 28.08 50.08 and 145.588 MHz. For practice purposes the order of words in each line may be reversed during the 5-13 wpm transmissions. Each tape carries checking references. Details on Qualifying Runs appear monthly in *QST* Operating News. The 0230Z practice is omitted four times a year on designated nights when Frequency Measuring Tests are sent in this period.

*Deputy Communications Manager, ARRL

Speeds	EST	UTC
5-7 1/2-10-13-20-25	9 A.M. MWF 9:30 P.M. TThSSu	1400Z MWF 0230Z MWFs
10-13-15	4 P.M. M-F 7:30 P.M. Dy	2100Z M-F 0030Z Dy
35-30-25-20-15	9:30 P.M. MWF 9 A.M. TTh	0230Z TThs 1400Z TTh

To improve your fist by sending in step with WIAW (but not over the air!) and to allow checking the accuracy of your copy on certain tapes, note the UTC dates and *QST* text to be sent in the 0230Z practice from the January issue of *QST*.

3/8 It Seems to Us	3/25 Public Service
3/16 Correspondence	3/29 World Above
3/19 League Lines	3/31 YL News

Bulletins

Columns indicate times in EST-PST-UTC(Z).

Phone Bulletins (1.82 3.99 7.29 14.29 21.39 28.59 50.19 145.588 MHz):

2100 Dy	1800 Dy	0200Z Dy
2330 M-S	2030 M-S	0430Z T-Su

CW Bulletins at 18 wpm (1.805 3.58 7.08 14.08 21.08 28.08 50.08 145.588 MHz):

1630 M-F	1330 M-F	2130Z M-F
2000 Dy	1700 Dy	0100Z Dy

CW Bulletins at 10 wpm (same frequencies as above):

0000 M-S 2100 M-S 0500Z T-Su

RTTY Bulletins at 170-Hz shift are repeated at 850-Hz shift when time permits (3.625 7.095 14.095 21.095 28.095 MHz):

1730 M-F	1430 M-F	2230Z M-F
2300 M-S	2000 M-S	0400Z T-Su

Oscar Bulletins (18 wpm on cw frequencies)

0840 M-F	0540 M-F	1340Z M-F
1400 M-F	1100 M-F	1900Z M-F
1600 Su	1300 Su	2100Z Su

Oscar RTTY:

1700 Su 1400 Su 2200Z Su

In a communications emergency monitor WIAW for special bulletins as follows (times in UTC):

Phone: On the hour.
RTTY: At 15 minutes past the hour.
CW: On the half hour.

WIAW DECEMBER QUALIFYING RUN

Who certified at 40 wpm? WA2DSA W3GN/W3GVR W3KS W3YAF W5KL K6JLW.

Operating Events

MARCH

3: West Coast Qualifying Run, (W6OWP, prime, W6ZRJ, alternate), 10-35 wpm at 0500Z (Universal Coordinated Time, abbreviated UTC; Z used as a designator), on 3590/7090 kHz. This is 2100 PST the night of March 2. Please note that dates are always shown at least 2 months in advance and times are always the same local "clock time," e.g. 9 P.M. local Pacific time. Underline one minute of the highest speed copied, certify copy made without aid and send to ARRL for grading. Please include your full name, call (if any) and complete mailing address. A legal size addressed stamped envelope would be a helpful enclosure to expedite your award.

6-7: DX Competition phone, p. 61 Dec. YL/OM Contest cw, p. 72 Jan.

11: WIAW Qualifying Run, 10-35 wpm at 0230 UTC transmitted simultaneously on 1.805 3.58 7.08 14.08 21.08 28.08 50.08 and 145.588 MHz. This is 2130 EST (9:30 P.M. local Eastern time) the night of March 10. Underline one minute of top speed copied, certify copy made without aid and send to ARRL for grading. Please include your full name, call (if any), complete mailing address and a return stamped and addressed legal size envelope.

13: The Commonwealth Contest, p. 72 Feb.

13-15: Virginia State QSO Party, p. 72 Feb.

14-15: South Dakota QSO Party, p. 73 Jan.

20-21: DX Competition cw, p. 61 Dec.

22: WIAW Morning Qualifying Run, 10-35 wpm at 1400 UTC. This is 9 A.M. EST, same frequencies/details as above.

27-28: BARTG Spring RTTY Contest, Tennessee QSO Party, p. 72 Feb.

APRIL

1: West Coast Qualifying Run (2100 PST the night of March 31!).

3: Six-Meter Contest, sponsored by the Global Research RC, from 0300Z Sat. April 3 to 0700Z Sunday morning. Draw a circle on a map centered on your QTH and earn points for QSOs as follows: Zone 1 are stations within 25 miles of your QTH, zone 2 are stations 25-50 miles away, zone 3 50-75 miles, zone 4 over 75 miles. Zone 1 score 1 point, 2 score 2 points, 3 score 3 points, 4 score 4 points. Any 6-meter contact is valid. Skip stations count if the band is open, but only 1/2 point each no matter where the station is located (this is primarily a ground-wave contest). Logs: Show name, call address, ARRL section (see p. 8) and input power. Mobiles/portables must show actual location. Logging for each station worked should call, zone (or distance in miles from your QTH), time and points scored. Incomplete logs ineligible. Send entries by May 31 to Phil Caruso, K9DTB, Box 271, Lombard, IL 60148. Awards in the following categories: Mobile, portable, high power (100 watts or more), medium power (50-99 watts), low power (50 watts or less).

3-4: "Open" CD Party cw, this issue. SP DX Contest sponsored by the Polish Society the PZK, from Saturday 1500Z till Sunday 2400Z, cw only. W/VEs work as many SP SQ 3Z stations as possible. Repeat contacts on other bands permitted. Send RST and consecutive serial no. starting with 001. Polish stations will use a two-letter group designating their powiat (county). Classifications are multi-multi (club station), single op, multi-

band single op, single band, SWL. Usual log info. Entries must be postmarked no later than May 1. Awards. Send entries to: PZK, SP DX Club, Box 320, 00-950, Warsaw, Poland. 10-11: "Open" CD Party phone, this issue. Novice QSO Party, sponsored by the International Novice Amateur Radio Assoc., from 0000Z April 10 to 0600 April 11. Any class amateur works Novices, exchanging RST and handle. Work a station once only. Novices multiply total QSOs by total prefixes worked (K5ABC and WA5ABC are different prefixes). Non-novices multiply QSOs by number of different Novice prefixes worked. (WN4, WN8, OA3N, OA2N, are different Novice prefixes). The following are considered Novices, with an X indicating a letter assigned in sequence and the dash indicating a numeral: EL-NX, HC-NXX, HI-NXX, KG4NXX, KZ5XXN, LB-XX, OX-NXX, OL-XXX, VU2XXZ, WH6XXX, WL7XXX, WN-XXX, WP4XXX. Please use CQ NP for contest call and use the lower 10 kHz of each Novice band. Logs by May 1 to Andi Anderson, WB5MYV, Route 1, Box 193, Heavener, OK 74937. S.a.s.e. for results. County Hunters SSB Contest, full period UTC. Suggested freqs. are plus/minus 10 kHz of: 3.935 7.240 14.290 21.390 28.580. No credit for contacts on the county hunter net freqs. of 3.943 7.238 or 14.336. Mobiles may be worked once each time they change counties or bands. Mobiles that are worked again from the same county on a different band count for point credit only. Mobiles contacted on a county line count as one contact but two or more mults. Portables that change counties during the contest may be worked for both point and multiplier credit from each new county. Fixed stations may be worked by other fixed stations only once during the contest. Repeat contacts between fixed stations on other bands are not permitted. Fixed stations may be worked by mobile stations each time the mobile station changes counties or bands. Repeat contacts between mobile stations are permitted provided they are on another band and at least one of the mobiles has changed his county. Exchange signal report, county and state (country for DX). Mixed mode contacts are permitted but at least one station must be on ssb. Score 1 point for a contact with a fixed U.S. or Canadian station, 5 points for DX stations, 10 points for a mobile. (KL7/KH6 are considered DX for scoring purposes, maritimes considered fixed.) Multiplier is the total of U.S. counties plus Canadian stations worked (take credit for a county only the first time it is worked). A Canadian station counts each time it is worked. Final score: Total points times total of counties plus VE stations. Log date/time, stations, reports, county, state, band, claimed points (1, 5 or 10). Each new multiplier is to be numbered. Check sheets not required but appreciated on all scores over 100,000. Summary/logs free for a no. 10 s.a.s.e. Awards. Entries must be received by June 1. Send to K9ARS, James Willingham, Route 1, Bevier, MO 3532.

16: WIAW Qualifying Run.

17-18: Florida QSO Party, sponsored by Florida Skip, during the three following periods 1500-2000Z April 17, 0900-0500 and 1400-2400Z April 18. Phone and cw are separate contests. The same station may be worked on additional bands. Florida stations may work each other (for QSO points only). Exchange RS(T) and QTH (county for FL; state, province, country, for others). Non-FL

stations score 2 points per FL portable or mobile, one point for fixed FL contacts. Mult. is no. of different FL counties worked (max. 67). FL stations score 1 point per QSO. Their multiplier is the sum of states (49 max.), provinces (12 max.), and DX (12 max.). Max. multiplier is 73. FL portables/mobiles (on emergency power and running 200 watts or less) multiply total score by 2. Awards. Disqualifications at the discretion of the contest committee for improper reporting (do not combine phone and cw), excessive dupes, errors in mult. lists, illegibility, obvious cheating, etc. Those disqualified will be barred from competing in the contest next year. Show usual summary, log, with name/address in block letters, plus declaration. Include a 13c stamp for results in a future issue of FL Skip. Mailing deadline April 30. Send to Florida Skip Contest Committee, Box 501, Miami Springs, FL 33166.

17-19: Zero District QSO Party, sponsored by the TRA-ARC of Iowa State University at Ames. 2000Z April 17 through 0200Z April 19. Stations outside the zero district will exchange reports with zero stations only. Zeros may work anyone. Be sure to watch for mobiles changing counties. Suggested spots around 3570 7070 14,070 21,070, 28,070 3900 7270 14,300 21,370 28,570. Novices try 3725 7125 21,125. Send RST, QSO no. and section. Zeros also send county. A station may be worked once per band (phone and cw count as separate bands). If a mobile changes counties, he may be worked again. To score: Zeros add sections plus zero counties plus zero sections and multiply total by QSOs. Non zeros use zero counties plus zero sections and multiply total by QSOs. Certificates. To compete: logs, claimed score, and s.a.s.e. (for results) by May 14, to TRA-ARC, WA0TKK B406 Wilson Hall, Ames, Iowa 50013.

18: Two-Meter Contest, by York Radio Club and Global Research, from 0300Z-0700Z, all modes. Score 1 point for each two-way contact. For each mode worked, count a multiplier of 1 per mode (minimum of 5th contacts per mode). Example: A station working a-m, cw, ssb, 5 contacts per mode, would have a multiplier of 3. Logs must show name, call, address, state, input and power. Exchange must include report, call, and state. Send signed log, postmarked no later than three weeks after the contest, to: Phil, K9DTB, c/o Global Research, Box 271, Lombard, IL 60148. Awards. Any questions concerning rules can be answered by K9DTB (312) 279-4658.

24-25: Bermuda Contest, phone, 0000Z April 24 to 0200Z April 25. (cw May 8-9). Operation 80 through 10, no cross band or cross mode permitted. Any number of transmitters and receivers will be allowed. However, all stations participating must be single operator only, operating from their own private residence or property. N.A. and U.K. winners ineligible for a period of two years, regardless of section won. Transmit report plus state, province, UK county or Bermuda parish. Each complete contact counts 3 points. For all stations outside Bermuda, the multiplier will be the total number of different VP9 call signs worked on each band. Awards. All logs must be received by the Contest Committee, Radio Society of Bermuda, Box 275, Hamilton 5, Bermuda. First Annual Triple-Letter QSO Party, sponsored by the University of Mo-Rolla Radio Club, from 1700Z April 24 through 2000Z April 25. Any contact between two amateurs is valid, and any mode or band (excluding cross band and cross mode) may be used. Stations may be worked once per band and once per mode. Object is to contact stations having letter repeated in the suffix of their calls. Exchange consecutive serial no. and report. To score: For each letter repeated in a station's suffix, one point is counted. WB0GQP = 1 point, WA7UMU = 2 points, W0EEE = 3 points. If a 2-letter station is worked (e.g. K2XX), add a point. A triple-letter call (W0EEE) counts as a bonus multiplier. Sum of QSO points from all bands times sum of states, provinces and countries, times sum of triple-letter stations worked = total score. Suggested freqs.: Phone, 3950 7215 14290 21375 28600; cw, 45 kHz up from bottom band edge. Mail logs by May 20 to Ward Silver, WB0GQP, 590 Fieldstone, Ballwin, MO 63011.

November Sweepstakes High Claimed Scores

The following are high-claimed scores received at Hq. as of January 12, 1976, for the 1975 November SS contest. Listings read call sign, score, contacts, multiplier. This listing contains all entries claiming scores of 100,000 points or more. Any entrant who submitted such

a score and whose call sign does not appear on this list should contact Hq. immediately. In case you're planning to scan the cw list for a "Clean Sweep" of all 75 sections, don't bother. VE8 did not exist that weekend! — WA1STN

CW	W6JZU (WB6AIN,opr.)	PHONE	WSRTX (59,578-1093-73)	WA1STN (WA9AUM,opr.)
WA5LES 177,974-1219-73	119,573- 819-73	W7RM (K7VPF,opr.)	K9KGA 139,408-1107-73	120,700- 850-73
KP4EJ 164,688-1188-72	119,422- 841-71	WA9CVS (WB9DJV,opr.)	W5WQF 158,112-1098-72	120,896- 826-73
KAPUZ 164,688-1188-72	119,138- 839-71	W6HX (WB6OLD,opr.)	W4QZT (K7JCA,opr.)	120,416- 848-73
W7RM (K7VPF,opr.)	118,440- 846-70	W5MYA 230,242-1742-75	K7RSC 157,758-1066-74	120,000- 800-72
K5PFL 163,392-1104-74	118,428- 834-71	W6HN (W60AI,opr.)	W8KIC (WA3BG,opr.)	119,466- 821-73
W6RTT 160,728-1096-74	118,406- 811-73	W5BDTX (WB5ZLN,opr.)	K1JHX 156,798-1104-71	119,440- 858-73
K4G5U 160,454-1099-73	117,852- 864-69	W3FAL (WA35ZX,opr.)	K2JOC 155,052-1062-73	119,400- 857-73
W64AEX 160,416-1114-72	117,804- 864-68	W8AEK 227,072-1534-74	W6ADL 154,216-1042-74	118,776- 804-72
W6HJ (WB6OLD,opr.)	117,400- 833-70	W5RRI (W6TAW,opr.)	K6OVJ (WB6VZL,opr.)	118,448- 802-72
W67NIN (W60AI,opr.)	117,180- 837-70	W3LPL (WA2LQZ,opr.)	W6AHL (W6ALV,opr.)	118,400- 858-72
K3EST 160,284-1083-74	116,610- 845-69	W5WMM 192,574-1319-73	W3FAL (WA35ZX,opr.)	118,400- 858-72
K7NHV 155,696-1052-74	116,200- 830-70	W5MTN 191,660-1295-74	W8GON 151,110-1035-75	118,400- 858-72
W6MAR 154,176-1056-73	116,186- 818-71	W6NUT 191,550-1277-75	W6NGG (WB6HJD,opr.)	118,400- 858-72
W3LPL 167,366-1073-71	115,304- 812-71	W6ONV (WA9UC,opr.)	W6ONY 150,238-1094-72	118,400- 858-72
W6NUT 144,952-1004-74	115,200- 803-72	W2WMT (W6TAW,opr.)	W2WUO 149,924-1013-74	118,400- 858-72
W1E 116,176-1029-72	114,356 790-72	W6BVL 207,450-1383-75	W3A2D 149,624-1011-74	118,400- 858-72
W5WMM 147,606-1011-73	114,104- 839-68	W6YBL 205,488-1272-72	K6QUN 149,400- 996-75	118,400- 858-72
W4JUCO 147,312-1023-72	113,840- 806-70	K4TIG (W6TAW,opr.)	K3JGJ 149,040-1035-72	118,400- 858-72
W6GCS 140,424-1021-72	112,980- 807-70	W3LPL (WA2LQZ,opr.)	K9GXR 148,248-1044-71	118,400- 858-72
K6QVJ 140,344-1004-73	112,056- 812-69	W5WMM 192,574-1319-73	W7TML 147,828-1011-74	118,400- 858-72
W2VP (K1ZND,opr.)	111,860- 799-70	W6NUT 191,550-1277-75	W8GFC 146,876-1006-73	118,400- 858-72
W4OZF 146,146-1001-73	111,690- 769-73	W6ONV (WA9UC,opr.)	W8LPM (WA6GNS,opr.)	118,400- 858-72
W1BY 144,814-1017-71	111,430- 790-70	W2WMT (W6TAW,opr.)	K5PFO 146,876-1006-73	118,400- 858-72
W2YD (WA2SRQ,opr.)	110,960- 760-73	W6BVL 207,450-1383-75	W8QSS 145,944-1010-73	118,400- 858-72
W6YBL 140,160- 960-73	110,676- 802-69	W4LZR (WA4FCT,opr.)	W4AMHJ 144,928-1021-71	118,400- 858-72
W6MUR (W6PAA,opr.)	110,610- 790-70	W6QPV (WA2CLO,opr.)	W3IN 144,596- 877-74	118,400- 858-72
WASRTG 138,554- 949-73	110,518- 801-69	W1ZM (WA2CLO,opr.)	K5YVM 144,596- 877-74	118,400- 858-72
W5MYA 137,520- 855-72	110,180- 787-70	W9BWU (WA8RXM,opr.)	K1VTM 144,596- 877-74	118,400- 858-72
W4GAM 134,680- 962-70	109,920- 780-69	W6BVL 207,450-1383-75	W4QNA 143,712- 998-72	118,400- 858-72
W1ZM (WA2LQ,opr.)	107,660- 769-70	W4LZR (WA4FCT,opr.)	W3NYU 143,420-1010-71	118,400- 858-72
W5RTX 131,692- 902-73	107,456- 736-73	W6QPV (WA2CLO,opr.)	W4UZZ 142,828- 963-72	118,400- 858-72
K4BAI 131,572- 889-74	107,456- 736-73	W1ZM (WA2CLO,opr.)	W3YYP (W3UQG,opr.)	118,400- 858-72
W3EIT (K3DAE,opr.)	107,088- 776-69	W9BWU (WA8RXM,opr.)	W6RDF (WB6DVP,opr.)	118,400- 858-72
W5ZSK 131,546- 801-73	106,926- 753-71	W6BVL 207,450-1383-75	W1TABW 139,160- 980-71	118,400- 858-72
K4DBZ 130,782- 921-71	106,500- 750-71	W3GRF (W3BQV,opr.)	W6MIV (WB6QHW,opr.)	118,400- 858-72
K4VX (WB4SQV,opr.)	106,500- 750-71	W6BVL 207,450-1383-75	W3ZSR 138,816- 964-72	118,400- 858-72
W4LZR (WA4FCT,opr.)	106,416- 739-72	W4LZR (WA4FCT,opr.)	K1PKQ7 138,384- 961-72	118,400- 858-72
W3SWF 129,500- 925-70	106,324- 775-69	W6BVL 207,450-1383-75	W9GCP 138,040- 986-70	118,400- 858-72
W6GFC 128,510- 905-71	106,122- 769-69	W4LZR (WA4FCT,opr.)	W3DHM (K3DPQ,opr.)	118,400- 858-72
W5FA (VE7ZZ,opr.)	105,932- 740-71	W6BVL 207,450-1383-75	W3DHF 137,376- 954-72	118,400- 858-72
W3PZ (WB2JVM,opr.)	105,408- 732-72	W6BVL 207,450-1383-75	K1JYN/6 137,376- 954-72	118,400- 858-72
W6RKK 127,800- 900-71	105,364- 732-71	W6BVL 207,450-1383-75	K6CQF (WB6CPE,opr.)	118,400- 858-72
K4TIG (W8FAW,opr.)	104,616- 719-72	W6BVL 207,450-1383-75	W6BPLZ (WB8AY,opr.)	118,400- 858-72
W9BWY 126,720- 880-72	104,244- 714-73	W6BVL 207,450-1383-75	K7LTV 136,880-1005-68	118,400- 858-72
W7DAI 126,648- 866-74	104,190- 750-69	W6BVL 207,450-1383-75	W1FLM/3 135,240- 966-70	118,400- 858-72
K2KR 126,560- 904-70	103,376- 728-71	W6BVL 207,450-1383-75	W2HPF 134,496- 934-72	118,400- 858-72
W6KIC 125,102- 881-71	103,088- 747-69	W6BVL 207,450-1383-75	K5IGW 133,488- 900-74	118,400- 858-72
W4YJU 124,676- 878-71	102,816- 714-72	W6BVL 207,450-1383-75	W3AMH/3 132,900- 900-75	118,400- 858-72
W6ORE 124,392- 876-71	102,528- 712-72	W6BVL 207,450-1383-75	W8LH 132,196- 938-71	118,400- 858-72
W6YDU (WA3BGE,opr.)	102,240- 710-72	W6BVL 207,450-1383-75	W2PRJ 131,790- 955-69	118,400- 858-72
K2AU 123,760- 884-70	102,200- 710-72	W6BVL 207,450-1383-75	W6DQM 131,576- 889-72	118,400- 858-72
W6RKK (WA8RXM,opr.)	101,640- 728-70	W6BVL 207,450-1383-75	W3FFR/1 131,400- 900-75	118,400- 858-72
W7TML 123,200- 880-70	101,608- 728-71	W6BVL 207,450-1383-75	W4DM 130,782- 921-71	118,400- 858-72
W3WJ (W3DQG,opr.)	101,104- 712-71	W6BVL 207,450-1383-75	K4BAI 130,498- 919-71	118,400- 858-72
W1KID 122,640- 840-73	101,104- 712-71	W6BVL 207,450-1383-75	W6YAS 129,500- 875-74	118,400- 858-72
W3WJ (W3DQG,opr.)	100,110- 705-71	W6BVL 207,450-1383-75	W3GRC (WA1RGM,opr.)	118,400- 858-72
W1KID 122,640- 840-73	100,083- 686-73	W6BVL 207,450-1383-75	W6HJ (W60AI,opr.)	118,400- 858-72
W1FME (WA1ABV,opr.)	100,083- 686-73	W6BVL 207,450-1383-75	W6MAY 128,880- 917-72	118,400- 858-72
W6ZR/3 121,968- 847-72	100,083- 686-73	W6BVL 207,450-1383-75	W6POT 128,706- 890-73	118,400- 858-72
K4QNA 121,310- 856-71	100,083- 686-73	W6BVL 207,450-1383-75	W6PKY 128,000- 900-75	118,400- 858-72
W1JYN/6 121,326- 831-72	100,083- 686-73	W6BVL 207,450-1383-75	K5EUF 127,060- 845-74	118,400- 858-72
W69LH 121,248- 842-72	100,083- 686-73	W6BVL 207,450-1383-75	W6ZNP (WB2AEH,opr.)	118,400- 858-72
K6CQJ (WB6CPE,opr.)	100,083- 686-73	W6BVL 207,450-1383-75	W3UTA 124,600- 890-70	118,400- 858-72
K5VIA 120,672- 835-72	100,083- 686-73	W6BVL 207,450-1383-75	W6ZLN 124,242- 889-72	118,400- 858-72
K5TSR 119,720- 820-73	100,083- 686-73	W6BVL 207,450-1383-75		118,400- 858-72

April CD Party - All ARRL Members

Each year, one of the 4 CD (Communications Department) Parties is open to all ARRL members. In this event, the same station may be worked on each of the bands but section multipliers count just once. (Maximum multiplier is 75.) Transmit your "status" plus ARRL section. Non-appointees transmit: Member (MBR), Life Member (LM) or Charter Life Member (CLM) — whichever is applicable; plus ARRL section. Appointees, officials, and advisory committees send usual designation. Score 5 points per QSO. To this figure add your highest ARRL code-proficiency credit; multiply by the total number of sections worked.

Suggested frequencies are: cw, 35 kHz up from the bottom edge of each band; phone, 3870-3900, 7200-7235, 14263-14285, 21340-21360, 28600-28630. Try 10 on the half hour and 15 on the hour from 1500-2100 UTC. Try 160 at 0430 and 0530 UTC and again during the last 5 minutes of the party. Don't forget 6 and 2 and the Novice bands. Report on ARRL CD Party report forms. Send a s.a.s.e. now for your logs. Entries must be received at headquarters by May 10. All participants will receive copies of the CD bulletin containing the results. High-claimed scores (100,000 or more) will appear in July QST.

CW

Starts: 2300 UTC April 3
Ends: 0500 UTC April 5

PHONE

Starts: 2300 UTC April 10
Ends: 0500 UTC April 12

(You may operate any 20 hours out of the 30-hour period. Times out must be 15 minutes or more to count as off-time.)

FM Repeater News

Conducted By Lew McCoy, * W1ICP/WR1ABH

Repeater Councils Take Note

The following material was excerpted from the Upper New York Repeater Council bulletin and these are the suggestions of Mike Brown, WB2JWD, who is the secretary of the council. We found a lot of good ideas expressed, and the information is certainly worth passing on to other groups.

WB2JWD suggests the following policies for the council:

1) Strictly enforce a "nine-month rule." If a repeater is *not* in operation in nine months, reassign the frequency. (This also applies to existing machines which have been abandoned.)

2) Require a license (or application on file) before assigning a repeater pair.

3) Assign no more than one 2-meter pair to any one group at a time. Require at least one year's experience with one machine before expanding to a second machine. (This might also act as an incentive to going to an

alternate band.)

4) Assign each repeater to a range or use classification, based on operators' wishes, area needs, etc. These would be:

a) Wide area. A sort of "clear channel" operation. Only one wide area machine (per "x" population?) to be assigned to any one location.

b) Medium Range. Operation over, say 50 miles, or a given number of counties, or any predefined area larger than a single community. Allocate a limited number of medium-range machines to a region.

c) Local. Operation over a strictly limited area: A single community (no more than one county or city, whichever is larger). Operator must make sure repeater does not extend beyond boundary, and/or accept interference outside the coverage area.

5) Be sure each repeater has taken steps to limit its coverage to the classification assign-

ed. A 100-watt repeater on a 3000-foot hill is *not* local. Assign each repeater to a coverage area when allocating (or perhaps a "non-interference area" is a better term).

6) Require actual on-site tests on a number of frequencies, at least including the requested pair, before allocating any repeater pairs. Guessing is just no longer close enough.

7) Strongly encourage use of 6 meters, 220 MHz and 440 MHz.

8) Put closed and experimental machines on 15-kHz pairs above 147 MHz, if they cannot be moved to another band completely. All closed machines should be "local."

9) Survey every existing machine annually to monitor actual coverage and reassign inactive frequencies (see "nine-month rule").

10) Develop close ties with surrounding councils. Have a liaison person attend their meetings and encourage them to attend ours.

PERTINENT FCC INTERPRETATIONS

The following two letters are interpretations of the rules that will be of interest to repeater owners and operators:

"Dear Mr. --- :

This is in response to your letter dated August 7, 1975.

The provisions of Section 97.108(a) (4) require that an Amateur Repeater station must discontinue operation within three minutes after failure of any control link. *If the control link is entirely functional, there is no requirement that the repeater station interrupt its normal operation at three minute intervals.*

The provisions of Section 97.108 (a) (3) are intended for two purposes. *Prior to the time a repeater station is on the air, the control operator is required to prevent the repeater from causing interference to other stations which might already be operating. During the time that a repeater is actively being used on the air, the control operator is required to monitor the repeater transmissions to detect either technical difficulties with the equipment or user improprieties.*"

"Dear --- :

This is in response to your letter dated September 14, 1975.

Waiver of Section 97.117 of the Commission's Rules to permit the use of a form of telemetry for the purpose of remotely monitoring the status of repeater control circuits or technical parameters is not required. Where the intent of the encoded transmission is not to obscure the meaning but only to facilitate communications, the Commission does not consider the use of such codes to be prohibited.

Accordingly, the use of telemetry in conjunction with your regular amateur activities is permitted under the Rules.

We hope this is responsive to your request. Sincerely yours, John B. Johnston Chief, Amateur and Citizens Div."

REPEATER DIRECTORY REGISTRATION

The deadline for listing your repeater in the new edition of the ARRL Repeater Directory

*VRAC Liaison, ARRL Hq.

is April 1st. If you haven't done so, write us for a registration card and include an s.a.s.e. Also, we have been asked to print the repeater do's and don'ts that appear in our directory in this column — here they are:

Do's

Do keep all transmissions short. Emergencies don't wait for monologues to be finished. If you talk to hear your own voice, what you want is a tape recorder, not an fm rig.

Do think before you transmit. If you can't think of anything worth saying, don't say anything.

Do pause a couple of seconds between exchanges. Someone with a high-priority need for the repeater may want to break in; also, some repeaters are configured so that a brief pause in transmissions is necessary to reset the three-minute timer.

Do identify properly. "W6XYZ mobile" is not enough, even if you're three hundred miles from another call area; "W6XYZ mobile 6" is required. You must give the call of the station with whom you were in contact at the end of the contact.

Do be courteous. A repeater is like a telephone party line, and requires the same kind of cooperation in its use.

Do use simplex whenever possible. Leave the repeaters available for those who need them.

Do use the minimum power necessary to maintain communication. Not only is this an FCC requirement, it's also common courtesy.

Do support your local repeater club, even if it doesn't require all users to be members. Maintaining a good machine is expensive.

Don'ts

Don't break into a contact unless you have something to add. Interrupting is no more polite on the air than it is in person.

Don't forget that amateur radio is allocated frequencies because it is a service, not just a hobby. Don't neglect the public service aspects of vhf/fm communication, such as accident reporting, emergency preparedness, etc.

Don't try to prove what a great operator you are by criticizing the operating techniques of others on the air. Instead, set an example which others will be proud to follow.

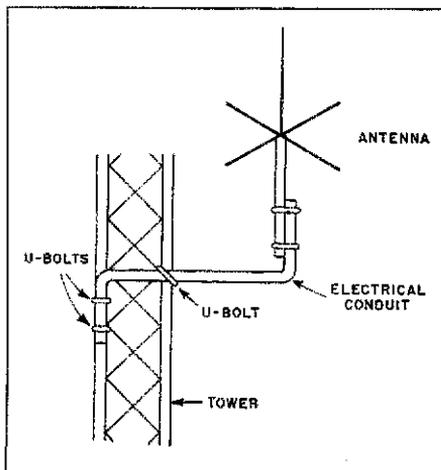
Don't monopolize a repeater. The best repeater users are the ones who do a lot of listening, and little transmitting.

Don't forget that what you say over a repeater can be heard over thousands of square miles by anyone with an inexpensive "public service band" monitor. These people are potential hams; if they like what they hear on the air, they will want to get licenses and join us. Don't leave them with a bad impression of our hobby by making thoughtless or off-color remarks.

AN EASY SIDE-MOUNT FIXTURE FOR ANTENNAS

K9TRG sends along an excellent idea for mounting antennas on the side of a tower. The mount is made from a length of electrical conduit. Use the standard weight — not thin wall — conduit in either steel or aluminum.

All that is required are two right-angle bends; see the sketch. A foot or two should be left below the first bend to allow clamping to the tower leg. The second bend can be located to provide almost any spacing required between the tower leg and the antenna. Have the bends made by an electrician or borrow a bending tool if you want to do it yourself. These tools are shaped to form smooth bends without buckling the unit.





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CANADIAN DIVISION

ALBERTA: SCM, Don Sutherland, VE6FK - Asst. SCM; John Wilkinson, VE6ALR, SEC; VE6XC, EC; VE6AW, VE6VJ, VE6CAS, VE6AU, PAMS; VE6AFO, VE6FM. I regret to report that VE6EB joined the Silent Keys. VE6BL, VE6FV and VE6VC are again on the air after hospitalization. Conditions for APSN are very bad. VE6FS mgr. DRNT finds conditions on HO very variable. The recent blizzard in the Calgary area brought many volunteer repeaters VE6AU, VE6RPT, VE6UHF. The recent mail strike and the following holiday season certainly increased traffic on all nets. The BC slow speed net BC5N is proving very successful. It operates on 3650 kHz at 0330Z. VE6s are welcomed. LN15 is now permanent. VE6FS & VE6FK write ARRL with CC traffic. VE6FS any point in Canada or U.S.A. Traffic: VE6FS 210, VE6FK 204, VE6AMM 96, VE6AAT 57, VE6XC 19, VE6AMU 11, VE6WN 9, VE6AS 7, VE6YW 7, VE6ABU 6, VE6FV 2, VE6CAA 1.

BRITISH COLUMBIA: SCM, H.E. Savage, VE7FB - Last month's report was missed as you didn't write, and report your activities. BCEN's new Net mgr. VE7DFY, was VE7OJ and his years as ORS, SCM, RM in the East, will really be great help to the net here. VE7AQM has finally come (25 yrs cw) on 55B and has a good signal from Hazelton. The BCEN Slow Speed net on 3650 after regular session is open for the new cw types as well as the old timers. By checking in you will likely receive the BCEN News Letter by asking, and that paper will help you in learning how the traffic nets work and how to make out on nets. Christmas season traffic was heavy but finding stations in parts of BC to receive was very poor slow. All of BC is lacking in interest of traffic handling and checking the two active nets. Lets do better for '76. Traffic: (Dec.) VE7ZK 405, VE7CDF 392, VE7HQ 193, VE7DFY 74, (Nov.) VE7ZK 217, VE7CDF 153, VE7DKY 72, VE7DFY 26.

MANITOBA: SCM, Steve Fink, VE4FQ - RM; VE4PG, PAM; VE4JP. The month of Dec. was our most active month for traffic in many years. VE4PG, VE4UL and VE4EA all earned BPL awards and both nets had impressive totals. MTN, 52 sessions, 307 QNI, 402 QTC, 241 sessions, 248 QNI, 175 QTC. The Daytime NTS is in full operation and volunteers are needed for MR representation on DTEN and CAND. Contact me for info. VE4AH is active as W7 while studying in UT. The 1975 totals for MTN (3660 kHz at 6:30 PM local) are: 398 sessions, 1978 QNI, 1197 QTC. If you plan on operating in the U.S. this coming season, write ARRL with CC and request Form 411. Traffic: VE4QG 569, VE4UL 386, VE4EA 322, VE4RO 223, VE4UM 74, VE4XP 33, VE4OW 19, VE4LU 18, VE4JA 16, VE4HR 15, VE4X 13, VE4NM 10, VE4LB 9, VE4MP 8, VE4JP 7, VE4CA 6, VE4CR 6, VE4NN 5, VE4MG 4, VE4TR 3, VE4FK 2.

MARITIME: SCM, Aaron D. Solomon, VE1OC - SEC; VE1ACA. It is with deep regret that I report VE1DU and VE1PZ Silent Keys. Band Condx made Maritime Net and APN difficult. VE3AUM and VO1CC took turns as Net Control of Maritime Net. Proud possessors of IS-520 include VE1ER, VE1AAO and VE1G. VE1AG, VE1MX reports that condx poor during ARR1 160-meter contest. NSRR held annual Christmas party with VE1UV acting as Santa. VE1AIF coordinates weather info from weather net to Halifax C.B.C. morning information program. New executive NBARA VE1WK, pres.; VE1RC, vice-pres.; VE1SY, secy.; VE1ST, treas. Int. Rep. Group VE1OL, pres.; W109, VE1GK, VE1IC, VE1AKT, treas.; VE1HU, Technician; VE1IN, secy.; VE1AKT, treas. I.R.G. reports 3 successful family get togethers during summer and fall. VE1FQ and VE1XJ handed traffic from VE1NE, VO2AW operating portable from Anishst. VE1SH busy attending meetings at Ottawa and New Brunswick. VE1WD and VE1ZJ are active and VE1ZJ has new beam. Congratulations to VE1AAO on making BPL for Dec. VE1RO back on air with 5B-102 and nice signal. BPL: VE1AAO. Traffic: VE1AAO 554, VE1AMR 68, VE1ZH 67, VE1OC 41, VE1XG 39, VE1AMN 24, VE1YO 22, VO1GW 21. (Nov.) VO1GW 9.

ONTARIO: SCM, Holland H. Shepherd, VE3DV - A severe snow storm cut down the attendance of the delegates to the Section and Regional meeting held at the Sheraton Hotel in Scarborough but it did not prevent us from having useful discussion and also to make the presentation of the Asst. SCM appointment to VE3GL or Thornhill. I consider that the revamped ON traffic nets offer the ON amateur not only a high class traffic service but also one of the best foundations for an emergency communication network in time of disaster. You are invited to check in and find out for yourself on any of the ON Section and Local nets. ON Daytime NET (ODN) 3645 kHz 2100Z. Grey-Bruce Net (GBN) 3645 kHz 2330Z. The ON Phone Net (OPN) 3770 kHz 0000Z. Northwest ON Phone Net (NWON) 3750 kHz 0015Z. Champlain Mini Net (CMN) through Repeater VE3STP at 2350Z. Whiteoaks Emergency Net (WEN) Sun. at 1830Z on 3685 kHz. My apologies to VE3EAR, VE3EZU, VE3HUT, VE3NN and VE3VBE for not replying to their AREC registration cards but I will do so before I take off for FL end of Jan. If you like the new form of QST (and I do) why don't you let W1RU know about it. VE3GEA and XYL moving to Calgary in New Year. VE3MH back from Zambia. VE3GFN can take time from traffic nets to make DXCC. Mike is also waiting a real vintage linear made up of a pair of 811As. VE3CV of Peterborough became a Silent Key Dec 16. Our sincere sympathy to his family. VE3ACL pushing for Amateur license plates for ON. ON is only area in North American without the privilege. Congrats to VE3GDL on getting her license and to her OM VE3HRE on passing his Advanced. Traffic: (Dec.) VE3GDL 86, VE3CB 66, VE3GZ 43, VE3GK 47, VE3RG 33, VE3GJ 31, VE3GN 318, VE3DV 208, VE3DPO 186, VE3CDK 144, VE3HJA 144, VE3BZ 129, VE3GT 126, VE3AE 89, VE3DVE 82, VE3ATR 60, VE3CYR 56, VE3EWD 55, VE3GCE 40, VE3HJJ 34, VE3FGV 27, VE3EHL 12, VE3DH 6, VE3GCG 6, VE3CEQ 4. (Nov.) VE3FHQ 16, VE3GCC 4.

SASKATCHEWAN: SCM, P.A. Crosthwaite, VE5RP - The 1976 hamfest will be sponsored by Prince Albert of the Northern Amateur Radio Club. The chmn. VE5RP will be giving us more information concerning the Hamfest, which will be available in you at a later date. Sorry to hear that VE5DE and VE5ED will be taking up residence in Moncton N.B. Good Luck. I would like to thank VE5ET, VE5TT and VE5XC for their fine work in cw net traffic handling. We are always looking for cw operators and if you're interested please get in touch with anyone of the amateurs I have mentioned. Traffic: VE5XC 101, VE5RP 42, VE5BO 40, VE5HP 33, VE5TT 32, VE5IZ 19, VE5YK 13, VE5DN 12, VE5UX 12, VE5LN 6, VE5AQ 3, VE5TR 2.

ATLANTIC DIVISION

DELAWARE: SCM, Roger E. Cole, W3DKX - SEC; K3KAJ. PAM: W3ADUM. RM: W3EBE. PSHR: W3ADUM 49, K3YHR 48, W3JWH 47, K3KAJ 44. Editor W3PCC put out a fabulous 13 page bulletin. The assignment of Billie as Director for the first State AEC, W3YAH had to cut net participation time due to back problems and pneumonia. WN3WY passed his General while on, K3YHR made Extra and daughter-in-law WN3VIT passed her Technician. W3ZBS now active at Lincoln. W3SHB and K3HR celebrated Bicentennial. WAS on Jan. 8th with KL7 contacts. W3ALMY is active at W3AGAY after his Dec. marriage. K3KAJ is house-hunting after his transfer to Kent County. W3GFA and W3LZS are becoming regulars on the DTN. DTN, QNI 136, QTC 61. DEPN, QNI 66, QTC 4. Traffic: W3LE 197, W3WY 26, K3KAJ 109, W3ADUM 52, W3DKX 36, K3YHR 23, W3ADUM 18, W3YAH 10, W3WD 4.

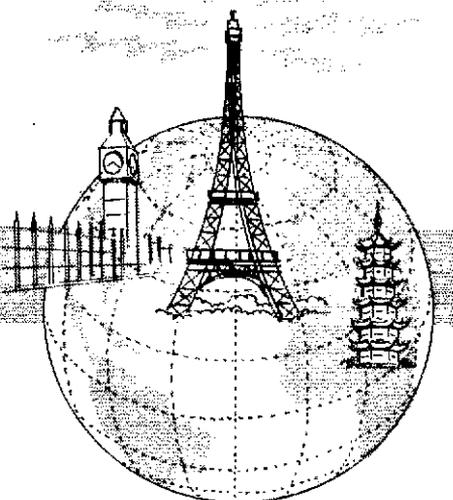
EASTERN PENNSYLVANIA: SCM, George S. Van Dyke, Jr., W3NHK - SEC; W3FBF. PAMS: W3PZO. W3AVJ. RMs: W3EML, K3MVO, W3QGM, W3PHQ, W3WCE, W3WV3. Net reports: EPREPTN, QNI 178, QTC 69; CM6, QNI 13, QTC 0. PSHR: W3PHQ, W3QOZ, K3O10, W3QGM, W3UKZ, W3PZO, W3THT, K3ANA, W3JQL, BPL: W3CUL, K3NSN, W3VR, W3THT, W3ATQ, OO reports from W3HMR, K3NSN, K3O10, K3RDI, W3CUL. OBS reports W3PZO, W3ZHQ, W3A3Z, W3PHQ, K3BHV, W3ADU, W3AL, W3AWR, W3WV3, W3GDA, W3BSV, W3ANDQ, W3JRC, W3JVC, W3BJQ, W3CI. K3NSN now PHD! W3THT grounded his vertical, now he gets out. W3A3Z says its really winter in the Poconos. W3ARCA was outlet for Hospital Christmas traffic in Delaware Valley Area on Christmas day, nice work. They also had a spot as they W3JVE got his big A. W3BUR back from Canary Islands. Murphy working on W3ANDQ. W3JWX fixing RTTY gear for AREC, any gear in any condx is acceptable. W3FBF says gang was ready for SET. W3ZQR says save postage and report every other month! North Penn High School starting now. W3PSP Jan. 26. Contact W3GGS 5 new has resulted from last class. K3GJL got a nice write up in his retirement group paper re Ham Christmas traffic. K3DCB got his Extra WN3VLP just got his big A! K3JUC got the big A too! Lehigh Valley ARC has a few experienced floor and wall washers if you need them. They are also going to start their club paper again in Feb. The novice nets are having problems on 3720 kHz. If you have time check in and give them a helping hand. New Officers: PARA K3GKB, pres.; K4AJN/3, vice-pres.; W3STW, corr. secy.; K3ITH, rec. secy.; W3VEM, treas. Lehigh Valley ARC: W3QET, pres.; K3JUC, vice-pres.; W3HJ, secy.; W3GNN, treas.; W3JWJ, dir. secy.; ECARS, W3JWJ, W3MP, W3JWJ, W3JWJ, K3JEL, secy.-treas.; W3AKTN, dir. Good luck to the new officers in 76! Traffic: (Dec.) W3CUL 3275, K3NSN 1632, W3VR 1480, W3THT 713, W3ATQ 488, W3ARCA 470, W3QOZ 350, W3PZO 192, K3GJL 108, W3EM 142, W3ANR 144, W3RBA 131, K3MVO 111, W3JAB 110, W3JPH 109, W3UKZ 103, W3VRE 88, W3JQY 87, W3QGM 85, K3O10 79, W3VCS 70, W3PHQ 65, W3TPD 51, W3BNR 47, W3ZRE 46, K3BHU 45, W3ID 42, W3AVJ 39, W3JQL 37, W3ADE 35, W3VJE 27, W3AJJ 26, W3BUR 25, W3YMV 20, W3CFV 19, W3CUL 18, W3ANDQ 18, W3LC 15, W3JLWR 12, W3ATV 10, W3ETM 6, W3JWX 6, W3HK 4, K3HXS 4, W3VA 4, W3VDQ 4, W3ZRQ 2, W3BJQ 1, W3BSV 1, W3ACKA 1, W3EJ 1, W3FBF 1, W3GGA 1. (Nov.) K3O10 18, W3BUR 8.

MARYLAND - DISTRICT OF COLUMBIA: SCM, Karl R. Medrow, W3A4A - SEC; W3ZV, MMD 384. PAM: W3LMD. MEPR: 1920 kHz. PAM: W3JOP, MDCIN 3020 kHz. W3FA acting SEC. CW nets at 1900 and 2200 local time daily. Fone nets at 6 PM local daily. MEPR 1300 Sat. and Sun. W3WRN makes BPL for Dec. despite the rig going up in smoke. W3JWJ took off for the holidays. W3ZV reports his 40th birthday at the state after 3 TV news in CA. W3JPI has completed the overhaul of his 20, 15, 10 and 6-meter beams and ready for winter. K3DI likes the AD3 prefix. W3EVO maintains semi-weekly contacts with displaced MD hams in FL. W3LMP returns from a 3 month trip to 6-Land and ooling towers and beams. W3JWJ has 5 skeks between 6 and 8:30 PM daily. W3CDO keeps a regular 20-meter sked with W4PQ. W3UYF sets his sights on the BPL medalion. W3J3Z and W3BZY/3 found no OO discrepancies for the month. W3LDD has the MEPR back on track. W3JOP had the MEPTN primed for the SET. W3BHE used his old Navy Spark key for 5KN. W3JWJ has a 20 meter beam and is looking for a 20 meter to Japan. W3AYKK is making an appearance on the nets regularly as well as 10 meters. W3PRW is busy rag shewing with and without ground wave. K3ORW had Carroll County stirred up for the SET. W3CVC manages lots of cw activity as does W3JMV/3 on the tone nets. W3JHW was busy with Christmas traffic,

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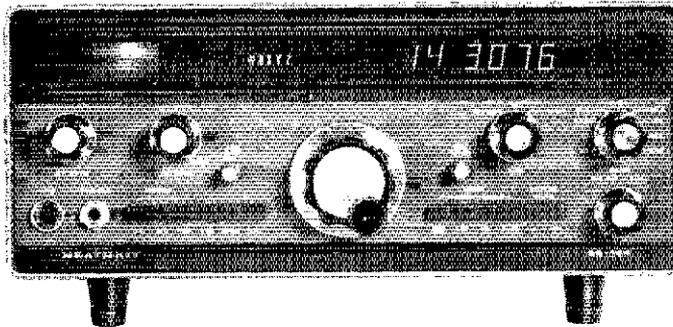


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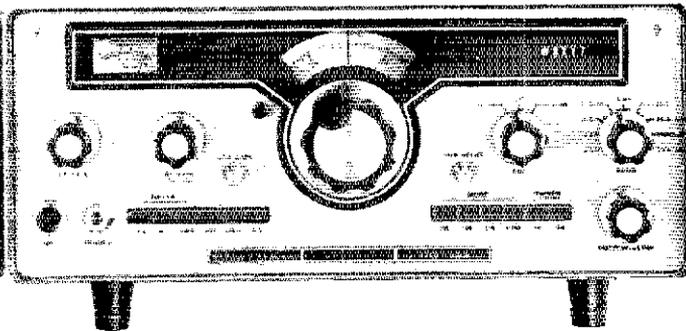
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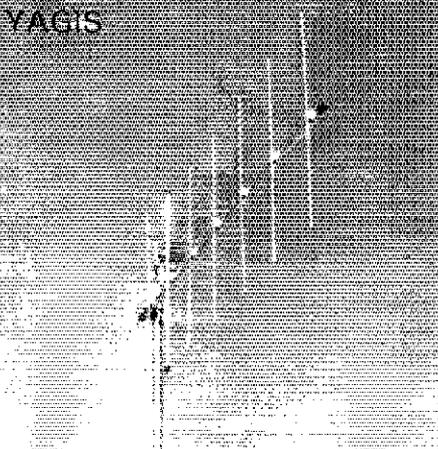
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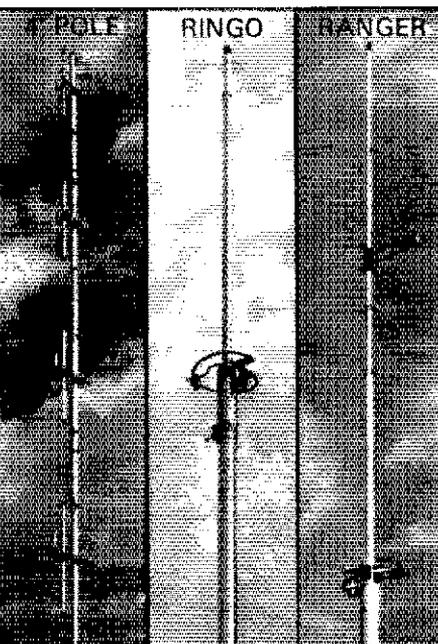
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as was WBZY/3. The K3IQG gang has more tricks up their sleeves for the next semester. WB2JR/3 is a long time no hear, and was named to the "Who's Who Among Students in American Universities and Colleges 1975-1976." Congrats. WA3ZAS replaced the engine in his car planned, along with the grille, hood and a fender unplanned. W3MSN is not enamored with the VHF Sweepstakes exchanges. With the nets: Sessions/Tfc/QNI average. MEPN 21/90/20.3. MDCTN 16/78/13.8. WR/PON 13/72/15.5. Nov. MDD 54/107/5.1. MEPT Toppers WA3ADQ W3EJX W3JGN WA3PRW and other WA3GXN W3LDD MDCTN Top Honor Rollers WA3WRN WA3EOP W3LJD and W3ADQ. MDD's Top Brass WA3WPY K3KAJ and W3FZV for Nov. W3DFW holds the reigns on the WR/PON. Traffic: K3IQG 308. WA3UYF 290. WB2Y/3 248. W3CVE 217. W3FZV 181. W3FA 123. W3MWD 114. WA3JV 110. WA3WRN 105. WA3EOP 94. W3ADQ 77. WA1VMV/3 WA3EOP 59. WA3ZAS 39. K3DJ 20. WA3PRW 16. WA3YKK 15. W3BHE 6. (Nov.) WA3UPH 11.

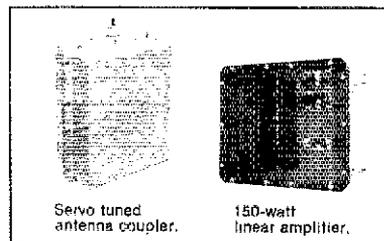
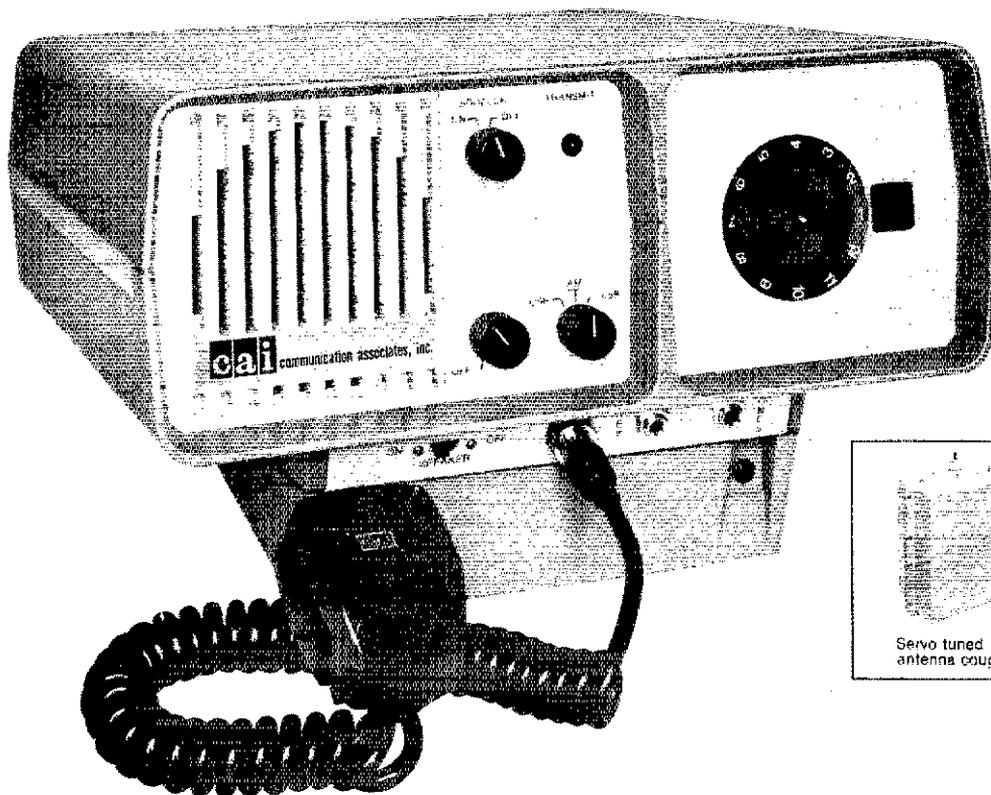
SOUTHERN NEW JERSEY: SCM, Charles E. Travers, W2VPZ. The Christmas season accounted for a tremendous traffic total at several operations at various shopping malls. This is an excellent public service, congrats to the several clubs and their members who made this activity possible. The NJ Slow Net in 35 sessions reports QNI 180, QTC 111 and 82 QSP. NUN (late session) QNI 199, QTC 141, QSP 46. The Early Session reports QNI 395, QTC 298, QSP 239. The NJ Phone in 31 sessions listed 570 check-ins, with 508 traffic. The Sun. sessions (4) saw 78 check-ins, 128 traffic. Check your certificates for endorsement. If you are participating in a regular NTS send your QSL card requesting appointment to your SCM. Be sure your complete name and address appears on your QSL. New officers: W266 Rancocas Valley. WA2NEQ, pres.; WA2QEQ, vice-pres.; WB2JJN, treas.; K2BG, secy. Burlington County. WN2YNT, pres.; W2PKF, vice-pres.; W2GSV, treas.; WB2ZMY, secy. W. Jersey RC. K2SQS, pres.; WB2LBT, vice-pres.; WB2LCC, secy. treas. Gloucester Co. RC. WB2DOR, pres.; K2HPV, vice-pres.; WA2TGS, treas.; W2TDS, WA2FZ, secy. D. Valley. R. W2HLD, pres.; WA2VIA, vice-pres.; K2AAK, treas.; WB2GIZ, secy. Congrats to WA2VKG on passing the General Class exam. Alan Daggett of SJRA deserves double honors — he went all the way to the Advanced exam. Traffic: W2ZQ 505. WB2LCV 465. WA2AML 252. WB2LCC 168. W2KUU 119. K2QIU 78. WB2SFX 16. WA2AZU 13. WB2OSQ 11. K2BG 10. W2JWA4HCS 3. W2IU 1.

WESTERN NEW YORK: SCM, Richard M. Pitzerusa, K2KTK — SEC: WB2EDT. Please note that W2CFP has resigned as your SEC and he has been replaced by WB2EDT. WNY owes Dave Flinn a big thanks for a job well done as SEC for the past several years. WB2EDT comes highly recommended and qualified, formerly being EC for the Monroe Co. area, and still being a member of the ARRL Emergency Communications advisory committee. Let's give Jim all the support that he deserves. Who says that nobody reads Station Activities? I quote from a letter received at K2KTK: "I keep in touch with the WNY section via QST, and like to read about the traffic nets and the C.D. The CD Parties must be great fun...". The letter was signed G3XVY, W2RQF very busy QDing. WA2DRC likes the new QST format. WA2GLA is still working at net time, but hopes he can soon return. WA2JIP "waiting for a new transformer" for his Marauder, tells he can get ORS if he can keep the rig running for 3 consecutive months. WA2DRC gets the understatement of the year award — "Conditions made holiday traffic tough". WA2EAJ says that HXG should be used more now that postal rates are higher. Is it any wonder that the WNY program is so popular? About the time you read this a new SCM should have been elected. Please give him all the support you can. Info received here lately has been mighty sparse. WNY stations caught on a recent two meter aurora were WA2HYK WB2ERK WB2KYQ K2KJR W2SBI and K2KTK. Congratulations to WB2UYK WA2LYK W2FP and W2MTA on BPL for Dec. Traffic: WB2UBW 818. WA2UYK 681. W2FR 545. W2MTA 530. WA2ICB 264. W2RUF 255. WA2HSB 189. K2KQC 130. WB2VND 120. WB2FHS 104. W2DRC 102. K2KTK 58. WB2DIX 56. WA2JIP 43. WA2DRC 39. WA2IPC 38. W2EAF 37. W2RUT 36. W2RQF 31. WA2AIV 24. W2UYE 19. WA2EAJ 6.

WESTERN PENNSYLVANIA: SCM, Donald J. Myslewski, K3CHD — SEC: W3ZUH. Asst. SEC: K3SMB. PAM: K3ZNP. RMS: W2KAT/3 W3NEM W3LQS W3KUN. WPA CW Traffic Net meets every on 3585 kHz at 7:00 PM local time. PA Phone Net meets Mon. thru Fri. on 3960 kHz at 5:30 PM local time. PA Traffic Training Net meets daily on 3610 kHz at 7:00 PM local time. Western PA RACES Net meets every Sun. on 3990 kHz at 9:00 AM local time. Appointment holders note, no need to mail your certificate to me for endorsement; you will be mailed the endorsement sticker automatically if your monthly activity was good in the previous year. W3ZUH received the A1 Operator Award. Contact K3PBY if you are experimenting with coherent CW (QST Sept. 75 p. 26). K3VYY and W3PZC have given novice test to 52 individuals in the Beaver Fall area. Fine work fellows. Radio Assn. of Erie officers for 1976: W3JNG, pres.; WA3TRJ, vice-pres.; WA3KKT, secy.; W3STK, treas. It is with deep regret to note the silent Keys of K3OUQ and K3CB. Congratulations to WA3YFN and WA3YFJ who have dropped the "N" and are now Generals. Also, congrats to WA3YEC moving from Notice to Advance Class. Indiana County ARC officers for 1976: K3JL, pres.; Curt Luckhart, vice-pres.; W3FVU, secy. treas. The Two Rivers ARC need not worry about "brown outs" with the acquisition of three 2kW generators. Contact W3MIF, Frequency Coordinator if you are contemplating a repeater. The ARRL Emergency Plan for WPA was completed by W3ZUH and W3JW. This masterpiece will be appreciated by the Section. Thanks fellows for the fine job. Welcome to a new Novice, WN3AYJ. Remember the Bicentennial WAS award offered by the League. The WPA CW Traffic Net had 31 sessions in Dec., 375 stations checked in and handled 306 messages. RMR credits WA3VM 44. Traffic: WA3VGM 351. W2KAT/3 311. W3NEM 240. K3MIV 122. WA3SZX 89. K3HCT 65. WA3SVE 58. W3KUN 43. WA3JBQ 39. K3CHD 35. W3RUL 34. K3SMB 34. W3HDH 30. W3SN 27. K3AS1 17. W3GJG 15. K3SJN 12. W3ATQ 10. K3J5V 10. W3IDO 9. W3UT 9. K3VQV 4. WA3SSU 3. WA3PMT 2.

CENTRAL DIVISION

ILLINOIS: SCM, Edmond A. Metzger, W9PRN — Asst. SCM: Harry Studer, W9RYU. SEC: W9BAES. RMS: K9ZTV. PAM: WA9KFK. Cook County EC: W9HPG.



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150-watt linear amplifier.

12 reasons why this 150-watt, automatically tuned, solid-state SSB system is the leader in its class:

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5. Amplifier protected against burnout. The separate 150-watt linear amplifier is solid state and completely broad-banded. It enables any 2-18 MHz frequency to be programmed without adjustments or mod-

ifications. Overload circuits protect it against high VSWR loads, excessive heat, and damaged antennas.

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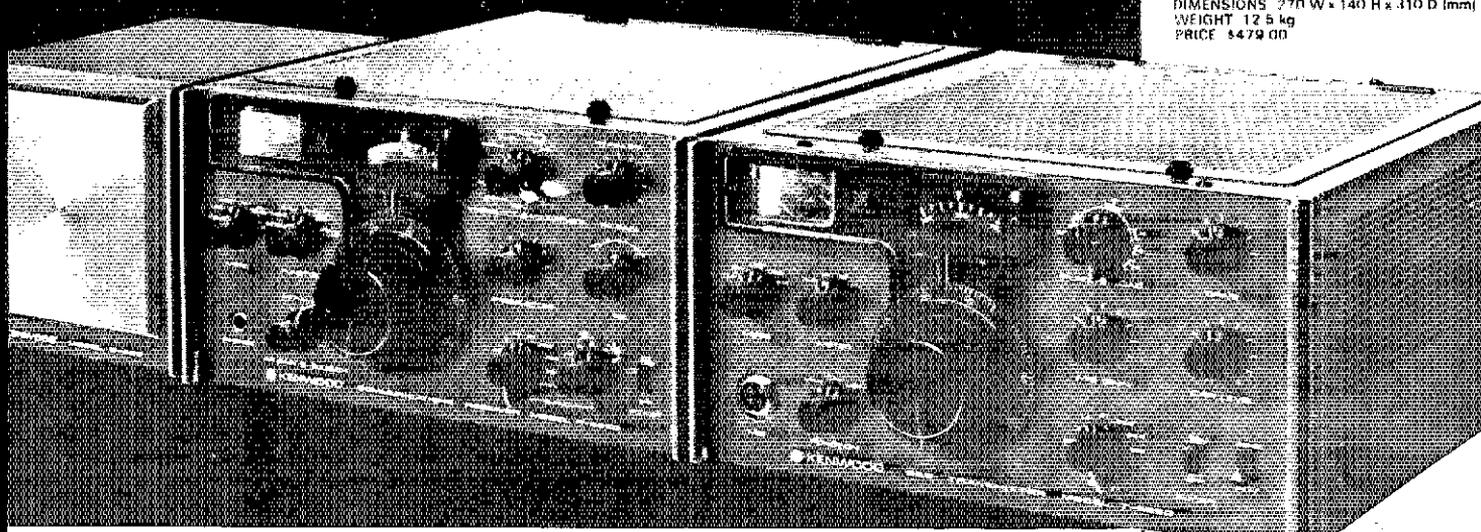
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FREQUENCY RANGE 3.5-29.7 MHz
 MODES USB, LSB, CW, AM
 INPUT POWER: USB, LSB, CW 180 watts on 80 to 15 meters, 140 watts on 10 meters, AM, 80 watts on 80 to 15 meters 60 watts on 10 meters
 ANTENNA IMPEDANCE 50 to 75 ohms, unbalanced
 FREQUENCY STABILITY 100 Hz 15 min after warm-up
 CARRIER SUPPRESSION 40 dB
 UNWANTED SIDEBAND SUPPRESSION 40 dB
 HARMONIC RADIATION -40 dB
 AF RESPONSE 400 to 2,800 Hz (-6 dB)
 KEYING: Blink bias keying
 AUDIO INPUT: 600 ohms or 50 kilo ohms
 TURF AND SEMICONDUCTOR COMPLEMENT: 3 tubes, 1 IC, 4 PFT's, 30 transistors, 38 diodes
 POWER REQUIREMENTS 110-120/220-240 VAC, 50, 60 Hz, 350 watts
 DIMENSIONS 270 W x 140 H x 310 D (mm)
 WEIGHT 12.5 kg
 PRICE \$479.00



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The R-599D is the most complete receiver ever offered. It is entirely solid-state, superbly reliable, compact and features a handsome new look. It covers the full amateur band, 10 through 160 meters, CW, LSB, USB, AM and FM.

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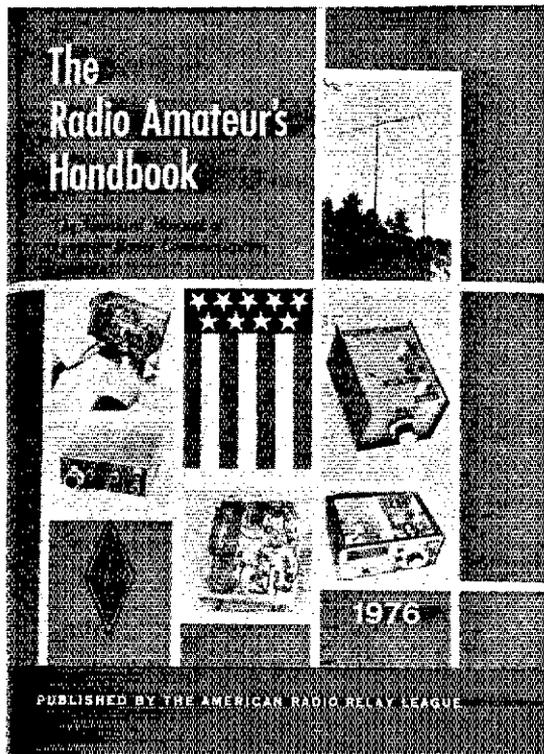
R-599D

FREQUENCY RANGE 1.8-29.7 MHz, 6 meter band - 50.00 to 53.40 MHz, 2 meter band - 144.00 to 147.40 MHz, WWV - 10.00 MHz, CB - 26.80 to 27.40 MHz
 with optional converter
 MODES USB, LSB, CW, AM, FM
 ANTENNA IMPEDANCE 50 to 75 ohms, unbalanced
 FREQUENCY STABILITY 100 Hz per 15 min after warm-up
 SENSITIVITY: USB, LSB, CW 10 µV for 10 dB (S+N), N on 160 to 10 meter band, 1.0 µV for 10 dB (S+N), N on 6 and 2 meter bands, AM 3.0 µV for 10 dB (S+N), N on 160 to 10 meter bands, 6.0 µV for 10 dB (S+N), N on 6 and 2 meter bands, FM 3.0 µV for 20 dB (S+N), N on 10 meter band, 9.0 µV for 20 dB (S+N), N on 6 and 2 meter bands
 SELECTIVITY: USB (LSB) 2.2 kHz (-6 dB), 4.4 kHz (-60 dB), CW 0.5 kHz (-6 dB), 1.5 kHz (-60 dB), AM 5.0 kHz (-6 dB), 12.0 kHz (-60 dB), FM 20.0 kHz (-6 dB), 120.0 kHz (-40 dB), 14.0 kHz (-6 dB), 40.0 kHz (-50 dB)
 with optional FM filter
 IMAGE RATIO 50 dB
 IF REJECTION 50 dB
 AF OUTPUT POWER 1 watt
 AF OUTPUT IMPEDANCE 4 to 16 ohms
 SEMICONDUCTOR COMPLEMENT 2 IC's, 10 PFT's, 34 transistors, 59 diodes
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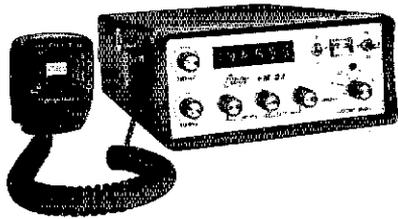
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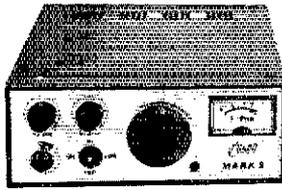
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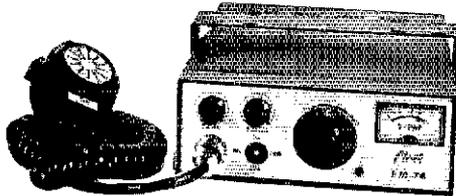


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A new Central Area Net was started Jan. 8th on 7250 KHz at 1 PM and also 2:30 PM 3540 at 14:318 will be used as alternate frequencies. This net will be used to help speed up traffic handling. WB9RBY is now a General Class licensee. The ILN represented 820/0 during Dec. on 9RN. W9ZAV lost his antenna because of high winds. Permission was granted to use the special Bicentennial Call sign for the month of Jan. 1976. That is: W9s are AC9, WA9s are AA9, WN9s are AK9 K9s are AD9, WB9s are AB9 and WR9s are AF9. WB9OVZ, WB9PKC and WN9PFF are the newly elected officers of The Chicago Amateur Radio Club, Inc. The club started their regular code and theory classes in Dec. New appointments this month include WB9PHM as OPS, WA9PVS, OO and K9KHI and WB9NID ORSs. WB9ODF presented a program on Micro-Wave systems, smoke and fire detectors and electronic burglar alarms at the Dec. meeting of the York Radio Club. W9CJW is the new trustee of the Southern Ill. Univ. Amateur Radio Club WA9FGX, WA9VXX and WB9EDZ are the pres. and vice-pres. of the club. WB9ELP is portable 4 in Miami. WN9SDN is a new Novice in the Burbank area. A contest for h-meter enthusiasts will be held by the Society for the Preservation and Encouragement of Six Meters and Global Research. The purpose will be to stimulate h-meter activity. Contact K9EJL for details. The Six Meter Club of Chicago, held their annual Banquet on Dec. 14th. Postage went up an additional three cents in Jan. It is advisable to send three cents for each envelope you have at the QSL bureau. The address is P.O. Box 519, Elmhurst, IL 60126. Plan to attend the Central Division Convention in Milwaukee, WI on July 7 and 10 at the Red Carpet Inn, WB9NOZ, WB9NVN and W9NJP/9 are BPL applicants for the month. Traffic: WB9NOZ 620, WB9NVN 556, W9NKG 419, W9VGV 333, W9NJP/9 311, W9HOT 179, K9ZTV 168, WB9QQJ 150, W9JXV 121, WA9KFK 110, W9KR 95, K9KHI 88, W9LNG 75, W9HPG 73, K9BGL 55, WA9JE 53, WB9BDE 54, WA9AGM 49, W9QYI 38, W9PFI 29, K9PXX 29, W9PQH 17, W9ZAV 9, WA9OBP 2 and K9DDA 1.

INDIANA: SCM, M. P. Hunter, WA9EED - SEC; W9UMH. I trust the holiday season was a prosperous one for you and your families. An interesting article entitled "Once upon a time..." appears in the Dec. issue of the Fort Wayne Ham Splatter (an interesting look at the future of ham radio). Please check your appointment calendar for the month that ends on Dec. 31st every two years. W9QJL reports that the Central Area Staff of NTS has had a successful meeting in Lincoln, NE. This group has the responsibility of advising ARRL on matters concerning traffic handling. WA9QWP reports the Huntington, Co. ARC sponsored their annual kid talk to Santa for three days. W9SIC announces a new 7 meter net at 2330Z each night on the WR9ABN repeater handling traffic, weather, and public service. WB9BPG is the new QSL mgr. for JA9CLV/1. W9EFC reports W9NLO is visiting in IA-Land for 3 months. Lake Co. ARC originated 157 QTC from South Lake in another public display. W9LUG is the new pres. for the Indpls. Radio Club. The Fort Wayne Radio Club gave ham radio a big boost by originating a feature article on the subject in the local papers. Net traffic: ITN 840, QIN 310, IPON 25, Hoos. VHF 4, Traffic: WB9KTR 449, WB9FQI 270, W9QLW 266, WB9OMX 249, W9JCI 211, WB9MAG 194, W9ENU 182, WA9OAD 140, WB9IHR 133, WB9CHK 127, K9TKE 97, WB9MDS 93, W9HUE 64, W9YB 79, K9DCX 68, K9CBY 67, W9IOH 65, W9LTU 64, K9YBM 64, WB9OZW 58, WA9QCF 57, WA9WJA 57, W9E1 51, WA9TJS 48, WA9OKK 42, K9EQI 38, WA9LXP 38, WB9DIX 30, W9JEM 30, W9DZC 26, K9HWQ 20, W9WIM 18, WA9GHI 17, W9WMT 18, K9RPZ 18, K9HMC 17, K9JQY 15, W9RTH 14, WA9BVS 12, W9CMT 10, K9CTJ 10, K9LZN 9, K9KTB 7, K9RGE 7, W9FC 4, WB9RFG 3, W9FWH 3.

WISCONSIN: SCM, Roy A. Pedersen, K9FHI - SEC; K9PKQ, PAMS, WA9YK, K9UTG, RIMS; WB9ICB, W9MFG, K9LGU, K9KSA, Nets: FRMS, Time, QNI, QTC, Mgr.: BWN, 3985, 1245Z M-S, 492, 380, W9AYK; BEN, 3985, 1800Z Dy, 777, 311, WA9LRV; WNN, 3725, 2315Z Dy, 92, 10, WB9ICB; W9BN, 3985, 2330Z Dy, 1139, 229, K9UTG; WIN-E, 3662, 0100Z Dy, 311, 313, W9MFG; WIN-L, 3662, 0400Z Dy, 154, 144, K9LGU; W9SN, 3662, 0030Z MWF, 55, 8, K9KSA; EXPO, 3925, 801Z M-F, 671, 92, WA9NIX, K9GSC, W9DFZ busy helping YARC with projects. WB9EWR building WICER 10-watt final. K9FHI was guest of Tri-Co. ARC banquet. Tri-Co. Swapfest at Whitewater, Mar. 14. W9EN cert. to WB9AMC, WB9NHT. Officers for the W9N, WA9PKM, pres.; K9UTG; secy.; WB9LSS, treas. WNA picnic July 25 at Baraboo. CWRA banquet well attended. BEN cert. to WB9NHI. WB9ICB EC for Waupaca Co. OES to WB9KSK. MARRA banquet at Lodi well attended. I regret to report W9E11 a Silent Key. Neenah-Menasha ARC sponsoring the WI QSC Party May 22-23, nationwide. Contact W9RIT for info. Sorry to hear W9MMP/9 has been in hospital, also WB9MOY back in hospital. New Novice WN9SVL. WN9OCC on with HW16 & HG10 and 40M doubler. W9UCR on 20M with FT101E, 53220 and 204A at 55 feet. Chasing DX for first time in 24 years of hamming. K9ZYS active in WA9 wants to hear from anyone anticipating repeater construction; also passed first class commercial and Amateur Extra. WIN-E cert. to W9KHH. WN9PTY passed General. WB9NME Extra. Traffic: K9CPM 794, W9CND 600, WB9PKX 336, W9PVE 271, W9QVT 210, W9MFG 233, K9FHI 200, K9LGU 133, WB9OZ 131, W9LJU 120, WB9ICB 101, W9MMP/9 69, WB9LKL 66, K9UTG 59, W9IHW 58, W9AYK 51, K9MZC 48, W9NRR 47, WB9HLS 45, K9JPS 39, K9NHT 36, WA9PKM 34, W9UCR 32, K9KSA 24, W9IEM 23, W9SFL 21, WB9PVE 20, WB9JSW 16, W9KHH 16, WB9LW 15, WB9QXD 14, W9RIT 10, W9YFW 9, W9RTP 9, K9KLS 8, K9LYA 5, WB9LSS 4, W9PAK 6, WB9NLS 5, K9ASC 4, WB9PTX 3, K9ANV 2, WB9NKC 2, KH6IAC/0 1.

DAKOTA DIVISION

MINNESOTA: SCM, Frank Leppa, K0ZXE - Attention: All ARRL appointments in this section are in effect until Sept. 1, 1976. No endorsements until then. SEC: WA9UTZ. Dec. traffic reported 3454, up 701 from last month. K0LWF and WA0TFC received the "Outstanding Ham of the Year Award" from the Dakota group. The new pres. of PICONET is WA0ZR, WA0RTD is the new pres. of the Mpls RTTY club. The St. Paul Radio Club is sponsoring the 1976

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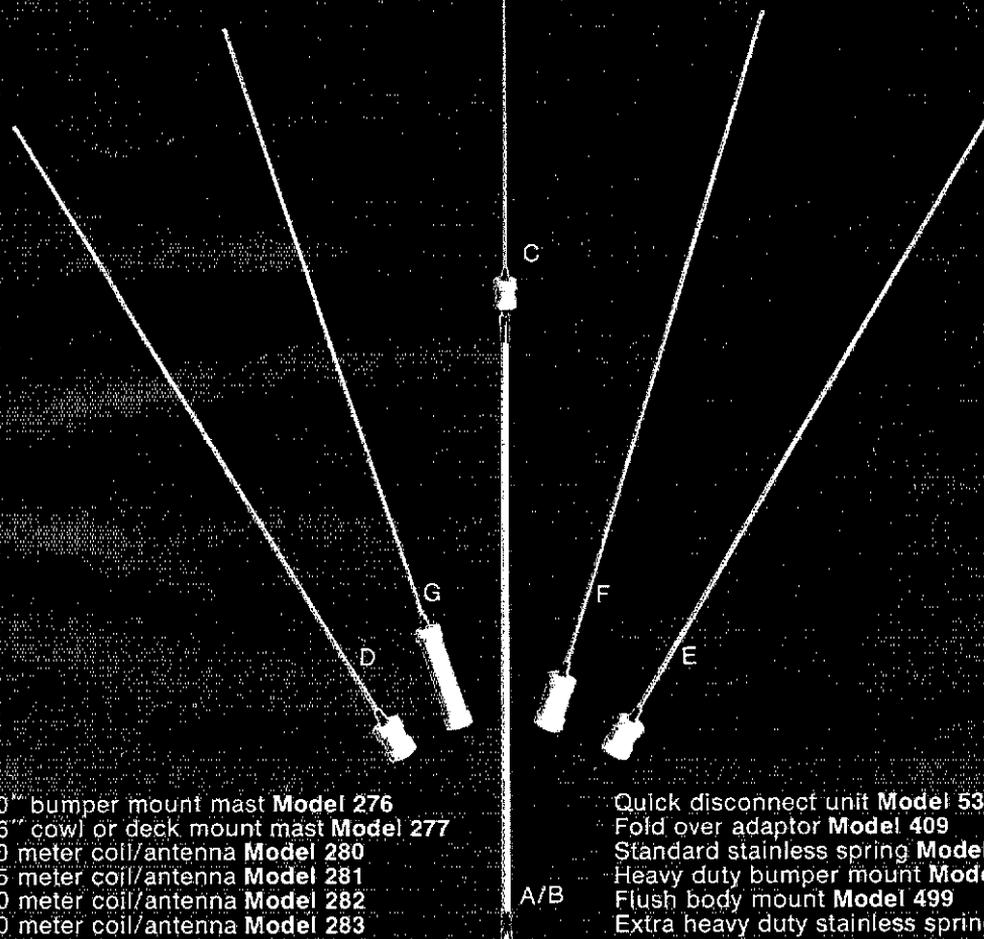
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fiberglass, then baked to make them impervious to weather. Tough ABS end caps and solid brass coil fittings keep performance in, corrosion out.

Whips are 17-7 ph stainless, the finest antenna steel, and are literally indestructible in normal use.

Nominal 52 ohm impedance on all bands. Any coax length will work. Heavy duty, chrome plated mast and whip fittings. 3/8" x 24 base stud fits all standard mounts.



- (A) 60" bumper mount mast Model 276
- (B) 36" cowl or deck mount mast Model 277
- (C) 10 meter coil/antenna Model 280
- (D) 15 meter coil/antenna Model 281
- (E) 20 meter coil/antenna Model 282
- (F) 40 meter coil/antenna Model 283
- (G) 75/80 meter coil/antenna Model 284

- Quick disconnect unit Model 531
- Fold over adaptor Model 409
- Standard stainless spring Model 492
- Heavy duty bumper mount Model 415
- Flush body mount Model 499
- Extra heavy duty stainless spring Model 511

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Hy-Gain Electronics Corporation, 8601 Northeast Highway Six, Lincoln, NE 68505, 402/464-9151; Telex 48-6424
Manufacturers and distributors of more than 300 fine broadcast communications products.

Wilson Electronics Corp.

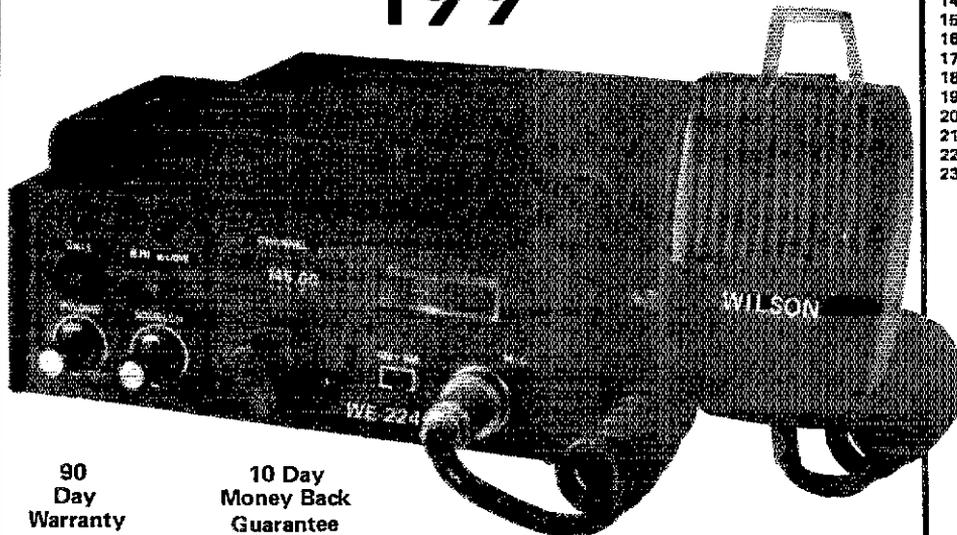
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WILSON "WE-224" MOBILE

SPRING SPECIAL

\$199⁹⁵



90
Day
Warranty

10 Day
Money Back
Guarantee

FEATURES

1. 24 Channel Operation
2. One priority Channel
3. Selectable 1 or 10 Watts Out
4. 10.7 Monolithic Filter Installed
5. 455 KHz Ceramic Filter
6. Numerical Read-out on each Channel
7. Built-in Adjustable "Tone- Burst" Generator
8. Front Panel Tone Encoder Control
9. Accepts Wilson 1402 & 1405SM Xtals
10. Individual Trimmer Capacitors for both TX/RX
11. Mosfet Front End
12. Helical Resonator
13. High VSWR Protection Circuit
14. Reverse Polarity Protection Circuit
15. NBFM - 15 KHz Channel Separation
16. External Speaker Jack
17. Built-in Speaker
18. Dynamic Microphone Included
19. Mobile Mounting Bracket Included
20. Frequency Range 144-148
21. 6 1/2" W x 2 1/2" H x 9 1/4" D
22. Weight: 5 1/2 lbs.
23. Power Requirements:
 - Source: 13.5 VDC ± 10%
 - Receive: .45A
 - Transmit: 2.6A (10W), .7A (1W)

SPECIAL INCLUDES:

- A. WILSON "WE-224"
- B. MOBILE MIKE
- C. MOUNTING BRACKET
- D. 146, 52/52 SIMPLEX
- E. TWO PAIR TX/RX CRYSTALS OF YOUR CHOICE.
(Common Repeater Frequency only)

SPRING Special on Wilson Hand Held 220 and 450

2202 SM

FREQUENCY RANGE 220 - 225 MHz

- 6 Channel Operation
- Individual Trimmers on all TX/RX Crystals
- All Crystals Plug In
- 12 KHz Ceramic Filter
- 10.7 and 455 KC IF
- 3 Microvolt Sensitivity for 20 Db Quieting
- Weight: 1 lb. 14 oz. less Battery
- Battery Indicator
- Size: 8 7/8 x 1 3/4 x 2 7/8
- Switchable 1 & 2.5 Watts Output @ 12 VDC
- Current Drain: RX 14 MA TX 500 MA
- Microswitch Mike Button
- Unbreakable Lexan® Case

USES SAME ACCESSORIES AS 1405

INTRODUCTION SPECIAL

\$239⁹⁵

INCLUDES

1. 2202 SM
2. Flex Antenna
3. 223.50 Simplex Installed



4502 SM

FREQUENCY RANGE 420 - 450 MHz

- 6 Channel Operation
- Individual Trimmers on all TX/RX Crystals
- All Crystals Plug In
- 12 KHz Ceramic Filter
- 10.7 and 455 KC IF
- 3 Microvolt Sensitivity for 20 Db Quieting
- Weight: 1 lb. 14 oz. less Battery
- Battery Indicator
- Size: 8 7/8 x 1 3/4 x 2 7/8
- Switchable 1 & 1.8 Watts Output @ 12 VDC
- Current Drain: RX 14 MA TX 500 MA
- Microswitch Mike Button
- Unbreakable Lexan® Case

USES SAME ACCESSORIES AS 1405

INTRODUCTION SPECIAL

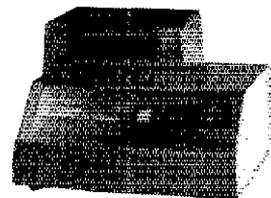
\$269⁹⁵

INCLUDES

1. 4502 SM
2. Flex Antenna
3. 446.00 Simplex Installed

HAND HELD ACCESSORY SPECIALS

DESCRIPTION	SPECIAL PRICE
BC1 - BATTERY CHARGER	\$29.95
BP - NI-CAD BATTERY PACK	10.95
LC1 - 1402 LEATHER CASE	8.50
LC2 - LEATHER CASE FOR 1405, 2202, 4502	8.50
SM2 - SPEAKER MIKE FOR 1402 AND 1405	24.95
TE1 - SUB-AUDIBLE TONE ENCODER INSTALLED	34.95
TTP - TOUCH TONE PAD INSTALLED	44.95
XF1 - 10.7 MONOLITHIC IF XTAL FILTER INST.	8.95
CRYSTALS: TX OR RX (Common Frag. Only)	3.00



BC - 1
BATTERY CHARGER

NOTE:
ACCESSORY SPECIAL
PRICE AVAILABLE
ONLY AT TIME OF
RADIO PURCHASE

Wilson Electronics Corp.

FACTORY DIRECT

SPRING SPECIAL

1402SM
HAND HELD
2.5 WATT
TRANSCEIVER
144-148 MHz

\$164⁹⁵



Optional
Touch-Tone Pad
Shown

FEATURES

1402 SM	1405 SM
<ul style="list-style-type: none"> • 6 Channel Operation • Individual Trimmers on all TX/RX Crystals • All Crystals Plug In. • 12 KHz Ceramic Filter • 10.7 IF and 455 KC IF • .3 Microvolt Sensitivity for 20 dB Quieting • Weight: 1 lb. 14 oz. less Battery • S-Meter/Battery Indicator • Size: 8 7/8 x 1 7/8 x 2 7/8 • 2.5 Watts Minimum Output @ 12 VDC • Current Drain RX 14 MA TX 500 MA • Microswitch Mike Button 	<ul style="list-style-type: none"> • 6 Channel Operation • Individual Trimmers on all TX/RX Crystals • All Crystals Plug In • 12 KHz Ceramic Filter • 10.7 and 455 KC IF • .3 Microvolt Sensitivity for 20 dB Quieting • Weight: 1 lb. 14 oz. less Battery • Battery Indicator • Size: 8 7/8 x 1 3/4 x 2 7/8 • Switchable 1 & 5 Watts Minimum Output @ 12 VDC. • Current Drain: RX 14 MA TX 400 MA (1w) 900 MA (5W) • Microswitch Mike Button • Unbreakable Lexan® Case

1405SM
HAND HELD
5 WATT
TRANSCEIVER
144-148 MHz

\$239⁹⁵



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52/52 Simplex Xtal

Can be Modified
for
MARS or CAP

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Money Back
Guarantee

90
Day
Warranty

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(702) 739-1931

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_____ 1402 SM @ \$164.95. _____ 1405 SM @ \$239.95.

Accessory Special Prices Available Only at Time of Radio Purchase.

_____ BC1 @ \$29.95. _____ BP @ \$10.50. _____ LC1 @ \$8.50. _____ LC2 @ \$8.50.

_____ SM2 @ \$24.95. _____ TE1 @ \$34.95. (SPECIFY FREQUENCY _____)

_____ TTP @ \$44.95. _____ XF1 @ \$8.95. _____ TX or RX XTALS @ \$3.00 ea. _____ INSTALL XTALS @ \$7.50/Radio.

EQUIP TRANSCEIVER AS FOLLOWS: XTALS A. _____ B. _____

C. _____ D. _____ E. _____ F. _____

ENCLOSED IS _____ CHECK MONEY ORDER MC BAC

CARD # _____ EXPIRATION DATE _____

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

SIGNATURE _____

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VALID ONLY MARCH 1-31, 1976

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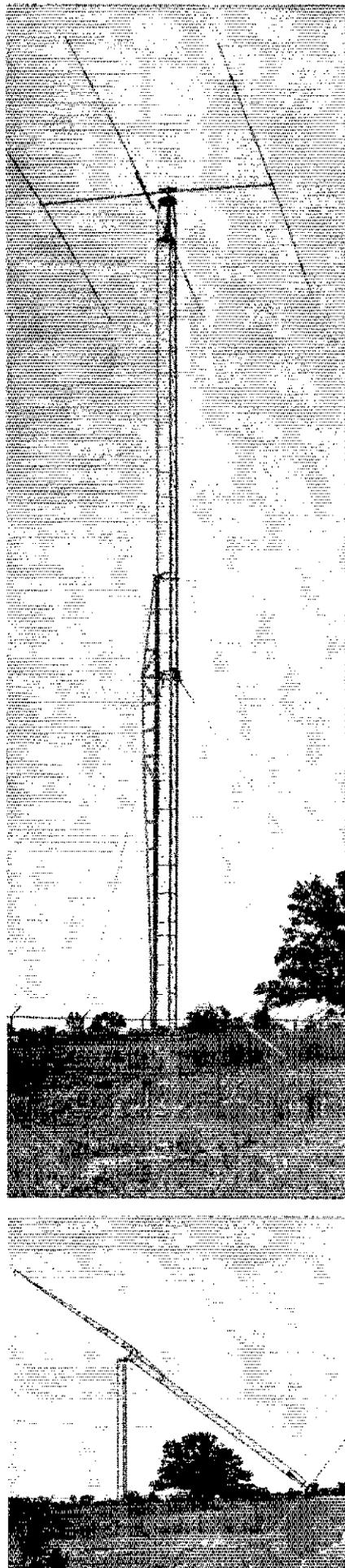
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NOW YOU CAN CHANGE, ADJUST OR JUST PLAIN WORK ON YOUR ANTENNA AND NEVER LEAVE THE GROUND!

Rohn manufactures towers that are designed and engineered to do specific jobs and that is why we have the FOLD-OVER TOWER... designed for the amateur. When you need to "get at" your antenna just turn the handle and there it is. Rohn "fold-over" towers offer unbeatable safety. These towers let you work completely on the ground for antenna and rotator installation and servicing. This eliminates the hazard of climbing the tower and trying to work at heights that could mean serious injury in a fall. So use the tower that reduces the risks of physical danger to an absolute minimum... the Rohn "fold-over"!

Like other Rohn big communication towers, they're hot dip galvanized after fabrication to provide a maintenance free, long lived and attractive installation. Rohn towers are known and used throughout the world... for almost a quarter century... in most every type of operation. You'll be in good company. Why not check with your distributor today?

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ARRL Dakota Division convention this fall, with W0PAN, chmn. The restrictive Maplewood tower ordinance appears to have been defeated by the positive action of area amateurs. (Hooray) K0ZBI is the new PAM for the MSPFN noon session. Our thanks and gratitude go to retiring Noon PAM, K0FL1, for his service for the past several years. Congrats to the upgrading stations: W0QAF Conditional, W0NZZB and W0QNX General, W0QLL Advanced. It's not too early to start the Field Day wheels rolling again. June 26-27 isn't that far away. W0W6Z visited Mpls. while on vacation from Duke. W0ENP moving his huge antenna farm to CA. W0TRY is coming home from Germany and is interested in our VHF activities. W0ZHN and K0UXQ, of Digikay fame, are designing a micro-computer. The MN WX Net is working the Bicentennial WAS with 28 states in their QNI totals. They are also seeking to affiliate with the National Weather Service. W0HGX BPL'g again. Traffic: ASBHOX 842, K0CVD 332, AB0JVT 304, W0QMY 289, W0QVY 207, W0A0G 194, K0CSE 70, K0ZXE 143, W0EKC 120, AB0AG 109, W0NO 76, K0FLT 63, K0RYU 63, W0ATC 61, W0BCT 57, W0LDO 48, W0URW 48, W0LDW 42, W0CPC 38, W0HNS 38, W0DUA 30, W0ZUJ 26, K0GNI 25, W0WYK 24, W0BLO 20, W0AGC 20, W0BNG 19, K0JTW 15, K0ZBI 8, W0GNI 7, W0QCYM 6, W0BJA 3, W0JPR 3, W0OXN 1.

NORTH DAKOTA: SCM, Harold L. Sheets, W0DM — OBS: K0PVG, W0BPS code classes are doing well with several new licenses coming up. K0GGJ spent some time in St. Luke's Fargo, now recuperating at home. W0MND was in the hospital but now home and on the air some. W0FH had bout with the flu. W0GGJ found time to get his Advanced ticket, missed the Extra Class by one point. W0EJ W0HNV K0FRP W0LHB and W0DM keep W0SDQ/0 company on his long mail route on 2m, through the Petersburg, Grafton and Grand Forks repeaters. W0RWL spent the holidays on the farm. K0IOB joined the 2m ranks in Devils Lake. The Fork ARC had a party for the last meeting of the year.

Net - Freq.	CDS/Days	Sess.	QNI	QTC
Manager				
Goose River - 1990900 SII		4	57	20
W0CDO				
YL WX Net - 1996.80730 S-S		31	450	469
W0BRWM				
RACES - 3996.5 1730-1830 S-S		52	641	297
W0ATJ-W0SUF				
Traffic: W0BRWM 766, W0SUF 202, W0CDO 100, W0BDMG 56, K0ATK 47, W0DM 45, W0MXF 21.				

SOUTH DAKOTA: SCM, Ed Gray, W0CPX — SEC: W0ARIG. RM: W0TNN. PAM: W0YAK. The South Dakota Amateur Picnic is scheduled for June 12 and 13, 1976 at Sioux Falls. Please mark this on your calendar and pass the word to your friends. The Mitchell repeater W0ACB has moved to 04/64. The Prairie Dog ARC has elected W0QNL pres.; W0EVQ vice-pres.; K0WU secy./treas. The PDARC is also sponsoring a SD QSO party 1400Z Mar. 14 thru 1400Z Mar. 15. Contact: W0EJ or other PDARC members for more details. Net Reports: Morning WX Net 697 check-ins and 498 WX reports; NJQ Net 957 QNI and 70 QTC; Evening Net 1831 QNI and 48 QTC; SDN CW remains active; SD YL Net 21 and 1 formal. Traffic: W0VRE 525, W0H01 111, W0UEN 109, W0IG 52, W0DVJ 34, W0EVQ 29, W0MZI 23, K0DUR 16, W0DGA 5.

DELTA DIVISION

ARKANSAS: SCM, S.M. Pokorny, W5UAU — SEC: W5RXU, PAM: W5POT, FR: W5MY. Net, kHz, Time/Day, QNI, QTC, Mgr: ARN 3995, 0030/DY, 227, 79, W5UAU; OZK, 3700, 0100/DY, 219, 57, W5MYZ; APN, 3937, 1200/M-S, 864, 65, W5POH; M-Bird, 3925, 2230/M-F, 583, 25, W5ZWZ. Welcome to AR newest hams, W5GQV, W5GQU, W5B QMM, QM, QJQ, QJN, QOS, QPU, 21 people signed up for NWARC novice class. Another novice class planned for this spring; for more info write W5TXA, Fayetteville. The AR DX Assn. recently held its annual banquet at Fort Smith. DXers from as far as IL and Canada attended. Newly elected officers for 1976 are: W5VDH, pres.; K9OTB, vice-pres.; W5YMW, secy./treas. Also wishing info about the ARDXA contact W5VOH. Would like to hear from Club Secretaries. Also dates of all hamlets for 1976. Need Mgr. for ARN and additional NCS for both ARN and M-B. PSHR: W5MYZ 43, W5POH 39, W5UAI 15. Traffic: W5HNN 199, W5BED 72, W5IGF 53, W5MYZ 45, W5UAI 33, W5POH 26, W5GQU 10, W5TXA 10, W5KL 9, W5SHY 6, W5EJ 5.

LOUISIANA: SCM, Robert P. Schmidt, W5GHP — Asst. SCM: John Souvestre, W5NYY. SFC: W5TRI, FR: W5DKI. PAM: W5EJU, VHF: PAM: W5KAX. Regret to report W5GKJ's silencey Jan. 4, 1976. He will be missed. New VHF PAM is W5KAX, who also is pres. of NO VHF Club. Congrats to W5GQJ who made BPL in Dec. Greg is the first Novice in LA to make BPL. New ORS II appointment to W5GQJ, W5NLPQ and W5S0DM. ORS: W5GQJ. New LTN member: W5TQA. LA Tech. Club graduated 3 new Novices, will start new class this month. W5LBY passed General Exam. W5ASD new homebrew tower. W5DVS active in MARS program. New Orleans VHF Club 16/75 repeater now call W5KAKA. LA amateur enjoyed visit by Lou McCoy. W5ICP of ARBIP about 100 amateurs heard Lou speak in Shreveport Jan. 6th and a large group, including W5RLR, our new vice-dir. in New Orleans Jan 7th. W5ANV and W5VQE active on LAN. W5ZZA appointed Asst. Dir. for 1976. A new computer club for amateurs being formed in New Orleans area. If interested contact W5ULB/S.

Net - Freq.	Time/Days	Sess.	QNI	QTC
Manager				
LAN - 3615 kHz	7 & 10 PM DY		376	308
W5SPRI				
1 SN - 3703 kHz	8:30 PM M-F		168	131
K5TIC				
1 TN - 3910	6:45 PM DY		226	59
W5TQA				
LRN - 4587.5	7:00 PM SU		12	4
W5GHP				
Traffic: W5SIQU 502, W5GHP 459, W5ZZA 448, W5TTC 235, W5GQJ 21, W5ANV 91, W5ASD 78, W5SPRI 71, W5EJU 42, W5S0DM 39, W5KQJ 32, W5YN 14, W5IKT 12, W5DVS 4, W5NWO 4.				

MISSISSIPPI: SCM, W. I. Appleby, W5DCY — Please support the MS Slo Net, Mgr. W5MTQ, 3733, W5W 5 PM local. Delta Party winners: W5HUB & K4EOH/S. Regret to report W5SPX's Silent Key. Hattiesburg ARC Novice Class graduated

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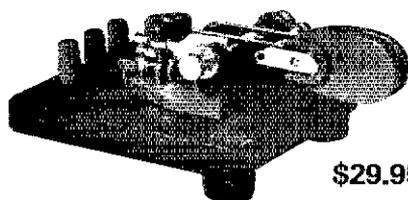
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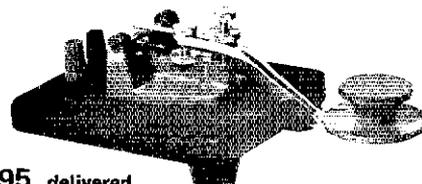


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- Heavy base with non-slip rubber feet
- Paddles reversible for wide or close finger spacing

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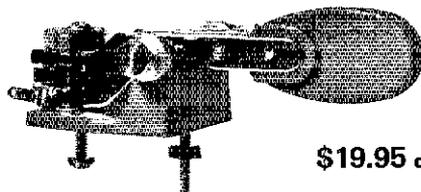


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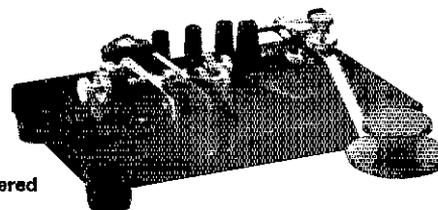
All keys are completely adjustable
All plastic parts Hi-Impact styrene
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- Same as HK-1, but less base for those who wish to incorporate in their own keyer



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- Straight key may be used conventionally or as a switch to trigger a memory

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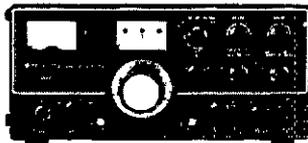
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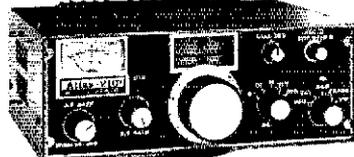
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• Operates all modes: SSB (upper & lower), FM, AM, and CW
 • Completely solid-state circuitry provides stable, long-lasting, trouble-free operation
 • AC and DC capability. Can operate from your car, boat, or as a base station through its built-in power supply
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 • NI-CADS \$30.00
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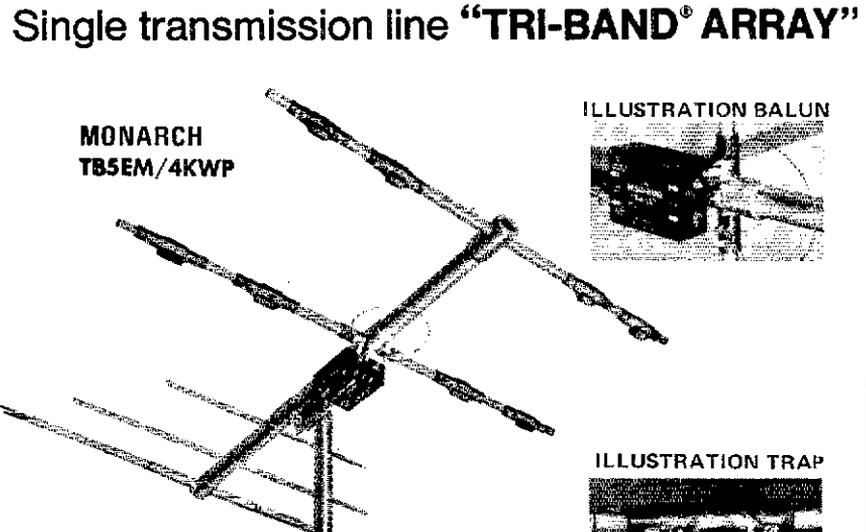


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17 Novices including WN55 QZX RAB QZY RAC RAC QZZ & RAA, Univ. South MS provided class room space and another class now in session. Welcome additional new Ms amateurs WB55 appo gnd get: WN5 QPS QMS QMW QEY QEZ QFA QFB QFD QFR Vicksburg, ARC, has continuing Novice Classes Jackson, Co. ARC has 25 potentials now in class WB50AV & WB5MDR instructing. WNSNJZ nov General and active in STN. WB5FHA MTN Mgr active in CAN. WB5OHN heard on 6 meters. WB5LXX active on DRNS and CAN together with WGDC W5ED WB5BKM WB5IUS. We need more QO applications WB50AV has new rotor & SB&A 4, 1975 Echo officers K5RSI, pres.; K5WCK, vice-pres.; WA5FII treas.; WA5IXC, tech. off.; Mrs. E.H. Hughes, secy WB5KUJ continues FB job as CBS on MTN, MSN and RNS. 1975 Ms Ham Cal License tags available. Call W5EMS on MSBN for data. Heard on MTN W5VEN/5 K3WV/5 W55PLC and W55EDU WB50AV active on Pacific DX net and Maritime Mobile Net. WA5FII our section VHF-UHF Freq. Coord. CAGCN mgr. now WB5LW, WA4ZYT Assn WB5LVA WB5LXX have new SB200, Appointments WB5OVF WA5HMS (VVS); WB5HJE QRS; WB5BKM W5CUIJ W5AEIN W5AGOH QPS; WA5FII QRS QRS QRS QRS; W5L W5NCP W55EM QRS/QRS; W5BW QRS; R5; QRS; W5RUE QO MSBN QN 1168, QTC 107, MSN QN 25, QI 3, MTN QN 170 QTC 116, CCGHN QN 2043, QIC 67. Traffic: (Dec. W5EDY 226, K5OAF 179, W55FHA 156, W5NCZ 70, WB5KUJ 64, WB5DCY 45, W5WZ 45, W5N5B 30 WB5BKM 19, WB5LXX 15, W55HM 18, WNSNJZ 10 WB5EIN 7, W5BW 6, W55FML 4, W55YML 4, W5MTQ 4, W5LL 3, W5BNSC 3. (Nov.) WB5FHA 187, WB5KUJ 73.

TENNESSEE: SCM, C. D. Keaton, WA4GLS — SEC WB4DYJ. PAMS: WB4PRF, K4LSP, RM: WB4DUJ.

Net — Freq.	Time(Z)/Days	Sess.	QNI	QTC
TPN — 3580	1040 M-F		78	3652
WA4EWW				
W4PEP	1145 M-F			
WB4YPO	0000 M-S			
	1400 SSuH			
TCN — 3980	0030M	4	66	
WB4MP				
TY — 3635	0000 Dy	31	175	12
K4YFC				
ETV VHF — 50.4	0000 TThS	12	115	
W4SGI				
ETV VHF — 145.2	0000 WF	7	30	
WB4DZG				
ETM — 28.7	0100 WF	7	85	
WB4NEJ				
MITMN — 28.8	0100 TF	7	53	
W4EAY				
W1VHFH — 146.37200	S	9	161	8
— 146.97	0130 F			
WA4VXV				

WB4KVV has been appointed VHF. WB4FGT has been appointed QRS. If welcome both to these new positions. I am at those who are considering the installation of a repeater to contact Eddie Palmer K4LSP, 4024 Homestead Dr., Kingsport, TN for frequency assignment, this is the only way we can avoid interference at the present time. I want to remind all appointees to mail your station activities to me 60 days prior to the date. Traffic: K4CNY 441 WB4DJJ 93, W4OGS 88, W4RUW 79, K4J5F 77 K4KCK 69, WB4Z5Z 60, WA4UAZ 38, WB4MPJ 29 WB4DDV 27, WA4GLS 25, WA4LJW 25, WB4YCP 24, W5MMD/4 20, WB4GBI 19, WB4PRF 18 WB4WHE 14, W4TYV 12, W4R8K 11, W4RCCQ 10 WB4YCG 10, WB4GZF 7, WB4ANX 6, K4QUM 6 K4MZE 2.

GREAT LAKES DIVISION

KENTUCKY: SCM, Ted Huddle, W4CID — SEC WA4GHQ.

Net	QNI	QTC	Net	QNI	QTC
KRN	381	38	KYN	310	151
MKPN	1208	206	KN	183	44
KIN	1293	306	KNIN	35	1
6DAREC	56	9			

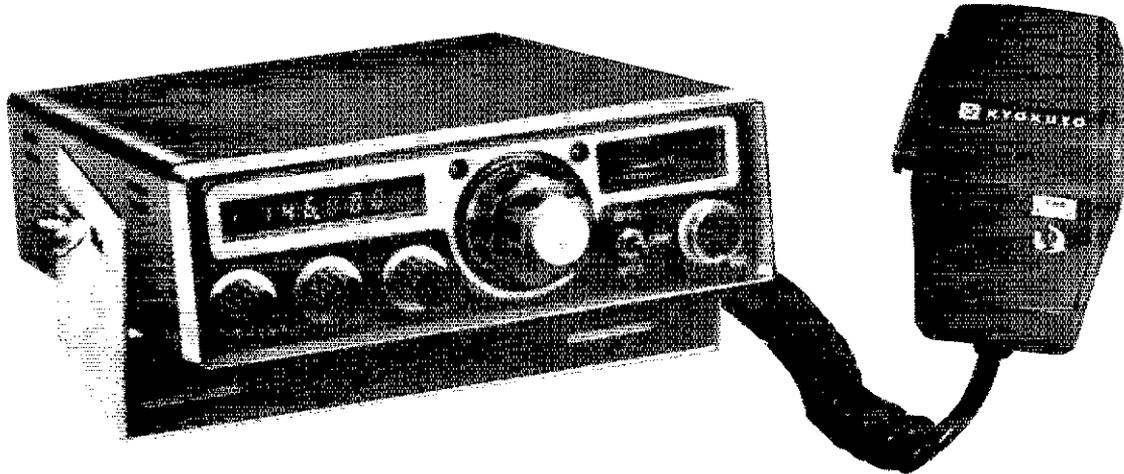
WB4SIJ has a new harmonic and a new 2-meter rig WB4OSS is new pres. of Bluegrass ARC. WNA4MOM now WA4MOM. WB8WHS and K4JBY are new pres and vp of the No. KY ARC. His is club month! The KY County ARC of Paducah provides communications for their Christmas parade. WA4MLF K4LMLF K4LMLF K4LMLF WA4FJY WB4DAD WA4DAU K4LNG WA4JRX and WA4GOZ participated WA4DAD and WB4DAD (YL and QM) are engaged. That should make a good QSL. W4RHZ now operate a radio museum at his home in Covington. W44IG has resigned his position as RM of KNTN. K4151 has resigned as EC of 8th dist. (Jeff. County). Both are men and will be missed. Owensboro ARC will hold "ARRL Nite" Mar. 27. Director Eggert will attend Traffic: WB4ZML 183, WB4QVS 123, WA4GHQ 116 WB4FXQ 115, WB4EOR 96, W4RHZ 81, W4CID 67 WB4RL 67, WB4RJN 51, WB4AZ 49, K4FLM 48 WA4RCD 47, WA4JTE 31, K4TXJ 16, K4HFD 14 W4VWQ 13, WA4AGH 12, K4HOE 12, WB4WB 12 WA4HEH 11, WA4FAF 10, WB4ILF 9, W4CUA 7.

MICHIGAN: SCM, A.L. Baker, W8TZZ —

Net — Freq.	Time/Days	QNI	TFC	Sess
QMN — 3663	2300/0300 Dy	1140	429	9
GLETN — 3932	0130 Dy	396	82	2
MACS — 3953	1600 Dy	1065	366	3
W5BN — 3935	0001 Dy	703	103	3
MMN — 3720	2230 Dy	209	51	3
UPEN — 3922	2230 Dy	684	64	3
M6M — 50.4	0000 MS	228	34	2
BRMEN — 3930	0130 Dy	791	213	3
MIAREC — 3932	2300 S	65	7	

W8CVQ reports SW M12M net QNI 56 in 5 sessions 2M Catfish net had QNI 78 in 4 sessions as reported by WB4WVV. Arrow Repeater has purchased a new Motorola Micor Repeater System for use on 37.9 MHz WB8MKU on the air from new QTH using Johnson's valiant and long wire. WB4WKQ lost his Quad, back on the air with a dipole. 12-year old WNBWHM waited 5 months for license. W8BAIJ is new repeater in South Lyon. K8SWW worked 604 Novices as ZI-LAG. Emission results: Iansc Station ARC, K8BZK, pres. WB5GAG, secy pres.; WB8WML, secy; W8U8U, secy; WB8OBR, act. mgr. Muskegon Area ARC. K8CCJ, pres.; K8ROH, vice-pres.; WB8OBF, secy. WB8IXV, treas.; WB8LBP, act. mgr. Cherryland Area ARC. K8YZV, pres.; WB8WVM, vice-pres.; WB8EYL, secy. WB8VY, treas. New ECs have been appointed to Calhoun and Kent County. WB8FXI will replace WB8TIN as FAST Net Mgr. for the remainder of the schedule. General Class license studies began Feb. 1.

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- **FREQUENCY RANGE:** Receive: 144.00 to 148.995 MHz, 5KHz steps (1000 channels). Transmit: 146.00 to 147.995 MHz, 5KHz steps (400 channels).
- **FULL DIGITAL READOUT:** Six easy to read LED digits provide direct frequency readout assuring accurate and simple selection of operating frequency.
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- **FULLY REGULATED INTEGRAL POWER SUPPLIES:** Operating voltage for all circuits, i.e., 12v, 9v and 5v have independently regulated supplies. 12v regulator effective in keeping engine alternator noises out and protects final transistor from overload.
- **MONITOR LAMPS:** 2 LED'S on front panel indicate (1) incoming signal-channel busy, and (2) un-lock condition of phase locked loop.
- **DUPLEX FREQUENCY OFFSET:** 600KHz plus or minus, 5KHz steps. Plus simplex, any frequency.
- **MODULAR COMMERCIAL GRADE CONSTRUCTION:** 6 unitized modules eliminate stray coupling and facilitate ease of maintenance.
- **ACCESSORY SOCKET:** Fully wired for touch-tone, phone patch, and other accessories.
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- **HIGH/LOW POWER OUTPUT:** 10 watts and 1 watt, switch selected. Low power may be adjusted anywhere between 1 watt and 10 watts.
- **PRIORITY CHANNEL:** Instant selection by front panel switch. Diode matrix may be owner re-programmed to any frequency (146.52 provided).
- **DUAL METER:** Provides "S" reading on receive and power out on transmit.
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Unsurpassed selectivity is yours with the new eight pole i.f. crystal filter, and improved spurious rejection results from the new IC double balanced mixer.

The benefits of ALC now extend to output powers less than full rating with a front panel threshold control. When driving linear that require less than maximum available power from the TRITON, or when propagation conditions permit reliable contacts at reduced power levels, ALC will hold your output to the desired level.

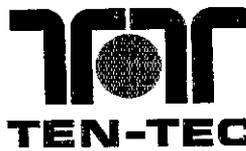
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MCRC. Kent County AREC net now meets Mon. nights on 16/76 at 8 PM local time. Regrettably I report W8SAY, W8NRX and W8AVRH are silent keys. Traffic (Dec.) WB8DKQ 412, K8DYI 278, K8KMQ 260, W8AIT 248, K8LME 184, W8MLO 187, W8WOL 144, W8WEL 133, W8WEL 93, W8GLC 82, W8BRXI 88, W8RTN 84, W8UFS 79, W8NGH 88, W8OW 68, W8TZ 65, W8JAD 64, W8YIQ 60, W8KQU/A 57, W8RNC 56, K8JED 55, W8BJX 54, K8AMU 51, W8IYA 47, W8ATL 47, W8BOB 45, W8WVAI 43, W8IUC 42, W8RNI 40, K8VCA 39, W8BLJS 37, W8WV 34, W8WV 33, W8DC 30, W8U 29, W8POZ 24, K8TAK 24, W8UCQ 23, K8GXV 21, W8BRMH 20, W8RAPN 18, W8ENW 18, W8HKL 18, W8DT 17, W8FEG 16, W8JUP 16, W8RNG 15, W8SOW 14, W8V12 13, W8WVW/B 15, W8LOU 14, W8SDB 14, W8DCN 13, W8TZ 13, W8MTD 13, W8TH 13, W8JME 12, K8JHA 11, K8ZU 11, K8KCI 10, W8BKB 9, W8TTL 9, W8IHX 7, W8WVOM 7, W8CUP 4, W8JAX 4, K8SOW 4, W8WVY 4, W8WVY 3, K8WLE 3. (Nov.) K8KMQ 178, W8ATL 55, K8VOA 33, W8ROB 20, W8WVW 15, W8MTD 14, W8RVC 13, W8BNF 4, W8LUE 4, W8WVOM 1.

OHIO: SCM, Hank Greeb, AC8CT Asst. SCM; William K. Saeffer, AA8MCR, SEC. AA8KPN. RMs: AD8IKD AB8JGW AB8WAK. PAMs: AC8MOK AA8SSJ. My thanks to all who supported me in my reelection. Let's all work together to implement the many ideas which were generated during the election. Net Reports (Dec.)

Net - Freq.	Time/Days	Sess.	QNI	QTC
OS8BN - 3972.5	1530/2100/2345	94	2691	1650
BNR - 3605	2300	33	139	259
06mtrN - 50.160	0200	31	298	110
OSN - 3577	2310	29	168	107
ONN - 3708	2330	9	51	14

AK8TRK and AK8VLR qualified for QNN certification. AK8WJ has worked 40 states in his first month of operation. AB8ELW AB8UIN and AB8VOD are new generals. AD8ONA reports that AC8IBX AB8OZA AB8PSO AB8RPG and AB8SVX helped youngsters at Cleveland's Metropolitan Hospital communicate with Santa Claus via Amateur Radio. Ohio State Univ. Radio Club had a fine effort in the 150 meter contest, with 20% increase in score over last year. AC8PMJ and AC8PIT made BPL. AA8KPN is interested in getting a separate EC for each of Ohio's 88 Counties. Please consider what you can do for emergency preparedness. Traffic: AC8PIT 968, AC8PMJ 724, AB8MZZ 389, AA8HGH 399, AC8PIL 366, AC8ENI 345, AB8KWO 314, AB8MCR 267, AB8OMQ 257, AC8IBX 239, AB8ORR 216, AD8LXA 131, AB8SED 128, AB8MRL 126, AC8QZK 115, AB8KKI 114, AB8LNF 109, AB8HWE 106, AB8JUI 102, AB8JGW 95, AB8TYE 92, AC8JD 91, AB8BYR 87, AC8ALS 83, AB8VW 82, AC8MOK 81, AB8ITX 80, AB8RQJ 74, AB8SSI 69, AK8TRK 64, AB8CJU 57, AU8MLU 55, AB8OV 48, AB8TEM 44, AB8V2 43, AD8LGA 41, AC8LZE 38, AB8MRU 35, AC8CKM 35, AB8VKS 35, AC8DE 33, AC8TH 33, AB8YR 29, AC8GOE 23, AB8AYE 22, AC8DCX 22, AB8QYF 22, AB8GJ 22, AB8VY 21, AC8AL 20, AB8PL 19, AB8GR 17, AB8IGU 17, AA8MHQ 16, AK8VLR 16, AC8OUU 15, AB8HHP 14, AB8UEI 13, AB8VX 13, AC8GXQ 12, AB8REF 11, AC8UQY 11, AC8ARW 10, AB8JSW 10, AB8TSX 10, AB8MGW 9, AB8DQE 8, AB8UIN 8, AB8DW 7, AD8CKY 6, AC8GVX 5, AD8PIT 6, AD8ONA 6, AC8WLG 5, AC8BPL 4, AB8HWS 2.

HUDSON DIVISION

EASTERN NEW YORK: SCM, Gary J. Ferdinand WA2PJL - SEC; W2KGC, Asst. SEC; K2AYG, RMs: WA2FBI WB2IXW, PAM; WB2GEL, Traffic nets: CHN 13925, 11 AM; ESS 13580, 6 PM; NYS 13672, 7 & 10 PM; NYOPR 13913, 5 PM; W2PTG 13925, 6 PM; Albany Area Officers: WB2DXM WA2EAF WA2WJN WB2CQK; directors: WB2PUH WB2CQ W2OQJ. Albany ARA reports passing a resolution against the use of amateur radio in giving radar trap warnings. Westchester club heard W2RP on his favorite topics of propagation and antennas. New Rochelle officers: WA2OJA, W2MOC; directors: W2LPU WB2IXW WA2VEG K2JQB WA2JPR. A ham TV presentation was given by WB2YK WA2ICU and WB2OJA. Schenectady club heard WA2PJL talk on the ARRL Communications Dept. in N.Y. Consrats to: W2NDQI W2ZBS5. W2PTG (advancing) and WA2EAF (advancing) WA2CY were the better (1) 80-meter conditions of late. WB2RUZ was elected manager of the NYSPT&E. K2OJA received a new SB220. Also thanks to Santa was WB2EMU's new four-element 2-meter beam. The first BPL certificate in a year was earned by WB2EMU for home use phone traffic operating. PSHTG WB2EMU WB2RUZ WB2TDX and WA2PLJ. BPL: WB2EMU. Net totals: CHN (QNI 703, QSP 659), NYS (QNI 909, QSP 462), NYSPT&E (QNI 1061, QSP 156). Traffic (Dec.) WB2EMU 537, WA2PJL 345, WB2RUZ 140, WB2TDX 122, W2BWI 112, WB2TGL 99, WB2WZL 93, K2TIG 85, WB2PAU 37, K2OJA 34, K2ZHN 17, W2W55 17, WA2BLU 17, WB2LKM 16, WA2YPO 17, WB2GQJ 11, WA2CJY B. (Nov.) WA2YPO 116.

NEW YORK CITY - LONG ISLAND: SCM, John H. Suttolk, W2GCHY, Asst. SCM/PAM; Art Malatzy, WB2WJF, SEC; K2HTX, RM; WB2LZK. The following are major AREC/RACES nets: Join one.

Bronx	28.64 MHz	50.35 MHz	146.88 fm
Kings	28.64 MHz	50.35 MHz	146.88 fm
Richmond	29.5 MHz	50.35 MHz	146.88 fm
New York	29.5 MHz	50.52 MHz	146.88 fm
Queens	29.5 MHz	50.52 MHz	146.20 fm
Nassau	28.72 MHz		145.68 fm
W. Suffolk	28.73 MHz (Hunt.)		145.59 fm
	28.65 MHz (Smith.)		147.21 fm
	28.610 (Babyton)		146.82 fm

E. Suttolk
Note: Net times between 2000 and 2100 local on mon. Newly elected officers of LIMARC are K2LJO, pres.; WA2APJ, vice-pres.; K2UDT, secy.; WA2JIO, treas.; W2MVS K2CQM W2NXZ WB2BON K2GPF K2PTG and WA2HYS, dir. WA2YE received a new Heath HI-10 keyer from Santa Claus. WB2SHL has his new IRT2C on 31/91. He was also elected to the Radio Club of America and attended their annual awards banquet. W2PF attended the NIC-75 of IEEE in New Orleans where he met many amateur friends. WA2NVJ now home from college. It is with deep regret that we list W2NH as a Silent Key. W2HXT now on the air with a SB220. He also completely changed the operating desk which got SA2YV came from pres. Hoover's campaign hq. in NYC. New officers for the Great South Bay ARC are WA2JZX, pres.; WB2QGH, vice-pres.; WA2PUB, secy.; WB2CHX,

Bil Harrison, W2AVA, SAYS

“Don't scatter your signal!

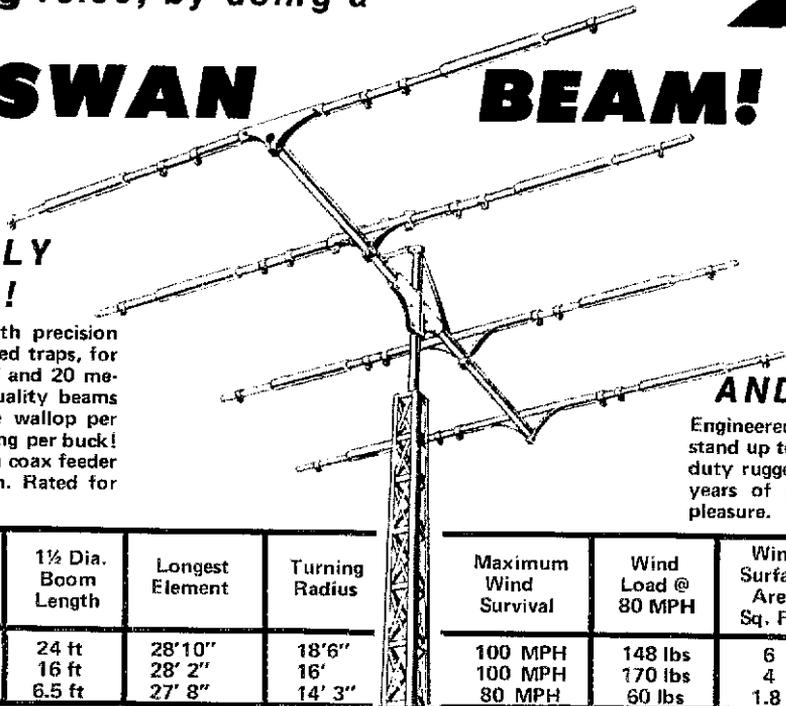
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Model	Working Elements Per Band	1/2 Dia. Boom Length	Longest Element	Turning Radius	Maximum Wind Survival	Wind Load @ 80 MPH	Wind Surface Area Sq. Ft.	Net Weight Lbs	Ham Net Price
TB-4HA	4	24 ft	28'10"	18'6"	100 MPH	148 lbs	6	54	249.95
TB-3HA	3	16 ft	28' 2"	16'	100 MPH	170 lbs	4	44	189.95
TB-2A	2	6.5 ft	27' 8"	14' 3"	80 MPH	60 lbs	1.8	18	129.95

HEAVY DUTY 2-ELEMENT 40-METER BEAM.

Maximum forward gain and front-to-back ratio in the CW or phone portion of the 40-meter band is easily achieved for optimum performance. Large high-Q loading coils are weather-proofed. Rugged design.

MB-40H	2	15.75 ft	30' 4"	17' 6"	100MPH	80 lbs	2.5	40	199.95
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Includes base section, coil, and top section

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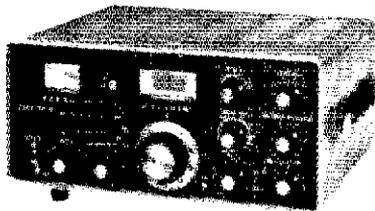
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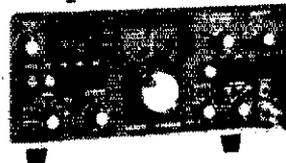
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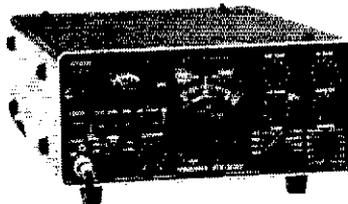
The FT-101E YAESU Transceiver with new RF Speech Processor. Solid state 160 thru 10 meters. **\$749***
*FT-101EE (less processor) \$659.



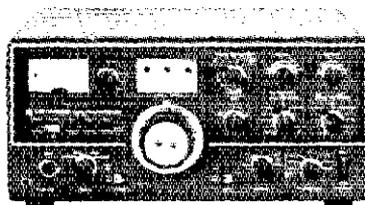
The FT-620B YAESU Transceiver Solid state 6 meters SSB. **\$449.**



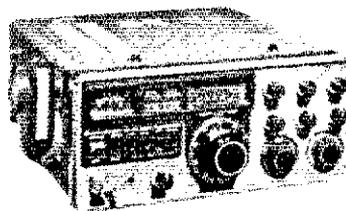
The FT-201 YAESU Transceiver Solid state 80 thru 10 meters. **\$629.**



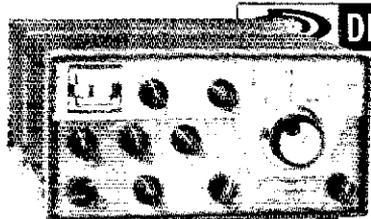
The FT-221 YAESU Transceiver Solid state 2 meters SSB/FM/CW/AM **\$679.**



The TS-520 **KENWOOD** Transceiver. Solid state 80 thru 10 meters. **\$629.**



The TS-700 **KENWOOD** Transceiver. Solid state 2 meters SSB/FM/CW/AM. **\$700.**



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treas.; WB2KAW WB2CHY and WA2SUS, dir. Under APO/FPO happenings, DA1LD now on two meters with a Motorola, only transmit freq. is 145.55 though, he's at Rhein-main, DA2CW, at Waldorf is on cw only with an HW-16, TIA1PK on 80 with a "Europeanized" 55-34 and a long wad. This is supplied by DA1PK, anyone in APO/FPO NY wishing to have info included in this column please send the info to me, or DA1PK Box 5249 APO NY 09157. New officers for Iu-Boro ARC are WA2WAK, pres.; K2YVJ, vice-pres.; WB2TCC, secy.; WB2VZQ, treas. The club also has a RTTY autostart net on 145.620 MHz, also have Fast Scan TV on 449.25 MHz. Welcome to new ops WB2YKG. Tu-Roro will also sponsor a 2M RTTY contest on Mar. 5, for further info, contact the club at 149-14 14 Ave., Whiteshore, NY 11357. K2JFF has received the DLD 400 diploma from Germany for working 400 different DOK's. It is also with deep regret to list W2LNI as a Silent Key, he was the "Barry" of Barry Electronics. Officers for Grumman ARC are K2UAT, pres.; WA2HSQ, vice-pres.; WA2JFA, secy.; WA2FWY, treas.; WA2PKY WB2VEL W2WWD and W2ZVJ, board members. LIMARC now has a 220 MHz machine on 223.22 in and 224.82 out. W2DBQ has sent ARRL his check to cover membership dues for his 4th year (1982). Officers: (Dir.) WB2PYK 470, W2EC 336, WB2SHL 263, W2MLC 245, WB2WRT 243, WB2YKG 218, AA2WKH 183, WB2LZN 178, WA2VPA 171, WA2UJH 74, WB2YVY 71, W2HXT 43, WA2USJ 27, WA2VEI 20, WA2ZGR 18, K2JFE 14, WA2NVI 12, WN2VYL 11, WA2PMW 10, W2TE 10, WA2JZX 9, W2PF 8, WB2HTM 7. (Nov.) WA2ZGK 38.

NORTHERN NEW JERSEY: SCM, William S. Keller, III, WB2RKK

Net - Freq.	Time (PM)/Days	Sess.	QNI	QTC
Managers				
NJN - 3695	7:00 Dy	31	395	239
WB2LCV				
NJN - 3695	10:00 Dy	31	199	46
WB2LCV				
NJPN - 3950	6:00 Dy	31	570	508
WB2VTT				
NJPN - 3950	9:00 AM Su	4	78	99
WB2VTT				
NJSN - 3730	8:15 Dy	35	180	82
WB2RKM				
PVTEN - 145.71	8:00 Dy	31	no report	

WA2OPY
SEC: WB2PBO. PAMs: WA2OPY (VHF) WB2VTT (HF). RM: WA2DSA. GO reports received from WB2CST K2EK WB2IEK WB2TFH WB2ZBI K2JFJ and W2FBL elected officers of the Fairway ARC (WB2RL) are: WB2SVK, pres.-treas.; WN2WXC, vice-pres.; WA2UDS, secy.; WN2VHJ, act. WA2BYX, pres.-treas.; WN2WXC, vice-pres.; WA2TDS, secy.; WN2VHJ, act. mgr. Present activities include Oscar and SSTV operations. The Cranford ARS (AB2CLW) reports successful operations from their biennial exhibit. The Old Barry ARC now holding Novice classes Wed. at 7 PM. Congrats to new Extra Class licensee WA2SLF, Advanced WA2AZU WB2HJW and WB2VTT, and to WN2YQJ, who recently passed General Class exam. NNJ also welcomes new Novice WN2DLZ of Wayne, K2KF now the proud owner of a second-class phone license. WA2ZUO has 150 confirmed and WA2GEZ recently worked his first VRI. WA2GEZ also won the NNJ section award for the Sept. VHF contest. K2FK reports excellent results in the recent FMT. WA2QHN now working QRP with his new HW7. WA2FLH and W2ODV (Bayonne CD Radio Club) have added new RTTY equipment to their stations. WA2QHN now on 2 meters, while W2RZ works 2m. K2GBW has worked 46 countries via Oscar, and has recently been doing much 432 MHz work on Oscar. NNJ welcomes trafficker WA2DIW back from his Dec. Paris trip. A2KOG and the Scotch Plains RACES provided radio communications at the recent Watchung Boy Scout Klondike derby. Speaking of public service, does anyone ever wonder what all those abbreviations above represent? They concern the public service aspect of our hobby, such as the traffic nets and appointments. Most are explained in the "Operating Manual." Better yet, contact your SCM, SEC, or someone you know who is active in the traffic nets or amateur Radio Emergency Corps (ARLCC), become a part of the Amateur Radio Public Service Corps and find out how rewarding it can be! The best of luck to all in the final weekends of the ARRL DX contest. Traffic: (Dec.) WB2VIT 857, WB2RKK 798, WA2DSA 683, K2BHL 363, WA2RMZ 340, WA2PCF 199, WB2RKM 134, WB2LH 02, WB2SLF 90, WB2ZEP 8, W2RZ 48, WA2RZP 46, WA2DIW 42, WB2HSG 42, WB2KNS 36, W2BLM 34, WA2CYU 32, WB2PHU 37, W2WHB 32, WA2CAK 24, WA2CCF 21, WA2SLF 19, K2ZFI 17, WA2SRQ 8, W2KLE 7, WA2ULU 6, WB2QJU 5, WB2TDL 5, W2YD 5, W2ODV 3, WB2UF 4, WB2VCR 2, WA2QHN 3, WA2ZUO 2, WA2QJ 2, WB2RJJ 1, WB2VYF 1, (Nov.) WN2ASD 32, WB2RJJ 3, WB2TDL 3.

MIDWEST DIVISION

IOWA: SCM, Max R. Otto, AC9LFF - WR0AJV Ames 04/64, WR0AGU Iowa City 28/88 and WR0AID Cedar Rapids 40/00 have Auto Patch IA. Hester County plant has a crystal net. If interested contact WB0GGI or WA0DOY, Muscatine Co. really coming to life with Novice classes, 14 ARLC members and even W0BTP active on 20 with his 32V1. W0SVS was on the air in the hospital thanks to W0LFH and K05BD. Due to a stroke and leg amputation, WN0NB is a wheel chair locker at work and the article of WB2ETI, he now is WN0NB. K0AZJ reports the Fall Com Net had a healthy increase. Decorah Solut St. Ansgar Spencer and Walker planning repeaters. New officers of IA City Repeater Assn.: K0RL1, pres.; K05VW, veep.; W0BHOQ, secy.-treas.; W0LFF, member-at-large. WA0PLU lost the use of his rig when XYL became W0QGL, congrats to W0LFF who moved them to VA Hospital with his guitar. IA City ARC officers: W0BHOQ, pres.; K0UJ, veep.; W0LFF, secy.-treas.; WN0PXH, act. mgr. New appointments: K0IR OO and OVS, W0JYF QRS. WN0OKA acting as NCS on Mid Slow Speed Net at times. New officers for 3900 Club are K0RSL, pres.; W0LUN, veep.; W0FZQ, secy.-treas.

Net - Freq.	Time (L)/Days	Sess.	QNI	QTC
Iowa 75 Meter - 39701830	M-5	27	1809	182
WA0VZH				
Iowa 75 Meter - 39702330	M-5	27	1116	78
WA0ACX				
Tall Corn - 3560	0030-0400 Dy	61	412	148
K0AZJ				

Traffic: (Dec.) WA0AUX 463, K0AZJ 166, W0YLS 156, W0BPX 108, W0JYF 59, W0LCX 49, WA0KHF

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146.80	146.20	available repeaters



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DRYCOMM 10-02 M Ampl \$125 35-0 40IN 110 Out 130 470-25 450.MC 120 P-1416 16 Amp Supply 95	HAMMARLUND HQ 110 AVHF Receiver \$189 HQ-110C Receiver 119 HQ-110AC Receiver 149 HQ-145X Receiver 169 HQ-170C Receiver 159 HQ-180 Receiver 379 HQ-215 Receiver 259 SP-600 Receiver 179 HX-50 Transmitter 169	ICOM	REGENCY	REGENCY	
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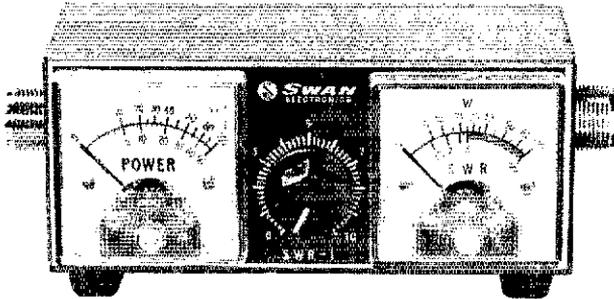
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W1CUH 4, WNIUHN 4, W1QV 3. (Nov.) WA1SWJ 15, WA1JYP 10, WNIUHN 9, WN1VEN 1. (Oct.) WA1RYL 104, WA2CCF/1 16.

EASTERN-MASSACHUSETTS: SCM, Frank Baker, WIALP - SEC WIAOG received reports from WA1RTR WIBAB K1CFW K1COW K1PAD W1EGH. New ECs: WA1IGL WA1IDA K1LEP. WIAOG left for FL. WA1DQW PAM for 2, K1PAD new PAM for 75. WA1KZ1 reports new club in P-town, Rprim ARC, will have new ham. Congrats to WINT on his 84th birthday. WA1WEB son of WITNK. Our sympathy to W1SZB/VE1 on the death of his wife. W1PFG a Silent Key. W7KUA is ex-WGNM. New officers of SEMARA, W1AEC, WA1KA, pres.; WA1SLH, vice-pres.; WA1CRI, treas.; W1VYF, secy; WA1FNM W1EHR. W1ETH has TR22C on 2m fm. South Shore ARC had Christmas party. Hingham ARC reactivated. Whitman ARC has nets on 6 & 10 on Wed. at 2000 & 2100. WA1RL1 has Advanced and endorsed for 8 bands. W1PEX made BPL. W1NF keeps skeed with WA1ZK/MM whose wife lives in Beverly. WA1SPA 2m asst. EC to W1EGH. WNIWGX XYL of WNIITKD. WA1E17, again active on 75. FB. WA1UUK/1 active at Ft. Devens. WA1TEH NCS in EMRI. K1s BIG NOL, WA1WDW on 2m fm. EM2MN had 81 QNIs, 31 Q1C. Thanks to WA1IFE for his work as PAM for 2. The net will be on 01-61 on Fri. K1LCQ as NC. WA1LR, ex-W1PVS has an SB. 102 and looking for a partner. W1JUF has inverted Delta Loop for 75. EMR1PN had 255 QNI, 221 Q1C. EC WA1HON says they have a station in the Police Station. WA1WHR. WA1TWD fixed his HW-17A for 2m fm. W1LAV has an SB200 linear. WA1MKP overhauling his rigs. Endorsements: WA1PDM as OP2, WA1MYK WRS. NENN had 105 QNIs, 33 Q1C. WA1TEH has HW-101 and WNIWV in his sister. WA1PEU joining ARRL's Instructors Corps. Massasoit ARA held their MARA night. HHTN had 163 QNIs, 58 Q1C. WA1MHJ WA1MSK made BPL. WA1MSK issued a "Zero Beat" of the EMRIin, they need some new help. Wat say. W1UX, ingr. of Clearing House Net on 3925 at 1500 GMT Mon. thru Sat. wants to thank all the NCS & members for their fine help during 1975. NEEPND had 75 QNIs, 22 Q1C. W1AYG worked a GM on 160. W1NIS is a Silent Key. WASN had 115 QNIs, 39 Q1C. EMRI had 390 QNIs, 406 Q1C. WA1UGJ now General. Univ. of Lowell Wireless Soc., Auction Mar. 12. Contact WA1PDI for details. Traffic: (Dec.) WA1MS 63, WA1MHJ 51. W1PEX 529. K1PAD 355, W1UX 169, W1EIH 139, W1DMS 108, WA1SXU 75, W1NF 68, W1EMG 65, W1EGH 54, W1DMH 50, WA1DQW 38, WA1MYK 35, WIAOG 20, WA1EYV 18, WA1IFE 18, WA1PAZ 15, W1KBN 14, WA1UUK/1 12, WA1TWD 6, W1BUF 4, WA1PAZ/1 3, WA1FNM 1. (Nov.) WA1MHJ 27, K1JUV 1, WA1TEH 2. (Oct.) WA1MHJ 166. (Sept.) WA1MHJ 152.

MAINE: SCM, Ed Bristol, WA1MUX ~ SEC: WA1FCM. PAM: K1GUP. RM: K1MZB. New EC WA1JCN. Nets: ME Seagull QNI 977, Q1C 160; NE Barnyard QNI 976, Q1C 12. BPL WA1FCM. WA1IOG has rejoining club. K1JIF friends class. K1GUP's music entertains at Bangor St. Hosp. twice monthly. FB Jerry. K1JTW W1AE & W1CBV have escaped to FL for winter. W1ACW will take his chances with the rest of us. K1NMP W1UTQ & XYL and W1RER's XYL all reported on the road to recovery. Portland's "99 Plus Men's Group" should be HAM oriented. W1BHA W1CTR W1EYV W1GCB W1EM W1SFS. K1GJ K1PKX & WA1SDP are all members! W1CTR & XYL made the NE Barnyard Luncheon for '75 in Dec. ME repeaters continue their aid to motorists, et al. First Section on-air meeting FB but too short. Will start from now on 2:00 P.M. local, 3940 kHz. Sun. Discussed AREC 55 & Tech. nets; bulletins; procedures. Traffic: WA1FCM 621, WA1IOG 160, K1MZB 85, WA1JHT 69, WA1MUX 51, WA1UOY 51, K1GUP 29, W1OTQ 16, W1CTR 15, WA1JCN 7, W1GU 3.

NEW HAMPSHIRE: SCM: Robert C. Mitchell, W1SWX. SEC: K1RSC. PAM: K1VSD. RM: WA1GCE. Endorsements: W1GCE WA1FSZ QVSS and K1VSD as PAM. Welcome new hams WA1VVV, WNI1WL and WNI1VX. Your SCM had two enjoyable visits to the Derry and Portsmouth RCs. The GSPN had 338 check-ins, 95 traffic. WA1LNH has been appointed OO. The Port City ARC meets Sun. at 10 AM on 3900. The NHVI Net had 133 check-ins, 74 sessions, 70 traffic. W1BYS is WB4BCP in FL and works the Tampa repeater. WA1JSD and WA1VDG received their General tickets. WA1JSD working lots of DX. WA1CFT WA1JSI WA1PSI and XYLs had an enjoyable New Years' Eve. K1PQV's brother-in-law W1GKK active with 2m meter fm rig. WA1PSI's Robot 300 has been repaired and he is back on slow scan. W1DXB building a new shack in the basement. W1SWX worked JT@OAG on 80 meters for Zone 23. W6MZW/1 working lots of 160 stations. Traffic: (Dec.) K1BCS 290, K1PQV 64, WA1GCE 63, K1LMS 47, WA1PSI 14, W1SWX 7. (Nov.) WA1GCE 44, W1BYS 2.

RHODE ISLAND: SCM, Ron Simonton, K1GMW - A phone net has been started on WR1APV 147.96/36 at 2100 local time Mon. through Fri. Liaison stations to and from the net will also check the repeater at 1830 and 2230 local time daily. K5FPW/1 needs operators to man positions for the Tall Ships activities June 23 through July 1 '76 (this includes Field Day/week end). If you can make a commitment for a shift please contact K5FPW or me. K1LPA plans to operate from PJBCM during the ARRL DX Test he also is looking for people to join a group for air transportation to the Dayton Convention. New England Dir. W1HHR and K1GMW were guests of the NCRG at their Christmas party. WA1SE1 was the host for the Fidelity ARC Christmas party, and the club has a surprise gift for W1GL2 to honor his many years of service to the club. W12XA and W12PA are active on two meter RTTY and are looking for other stations for a possible auto-start net. We still need help with the section cw net see the Jan. column for details. Appointments: W1AM from OO Class IV to OO Class I. W1GO, OBS. Traffic: K1GMW 203.

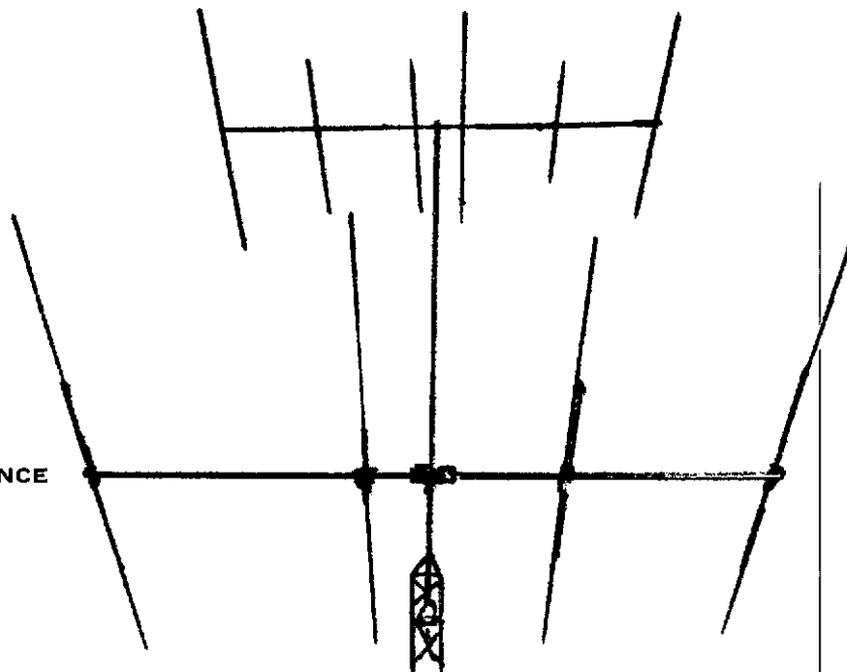
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M240	30	2	73'0"	39'6"	10.0	250	60	63	\$299.00
M520	40	5	36'4"	27'0"	5.0	125	90	96	269.00
M204	26	4	36'4"	22'6"	3.9	100	46	49	139.00
M155	26	5	24'3"	18'0"	3.7	93	41	44	139.00
M154	20	4	24'3"	15'9"	3.0	75	30	32	89.00
M106	31	6	19'0"	16'1"	2.9	73	34	36	99.00
M104	17	4	18'0"	12'9"	2.0	50	20	22	64.95
DB54(20)	40	5	36'4"	27'0"	7.9	198	105	119	299.00
(15)		4	24'3"						
DB43(15)	26	4	24'3"	15'8"	4.3	108	36	38	119.00
(10)		3	18'0"						
DB33(15)	17	3	24'3"	12'2"	3.8	95	31	33	89.00
(10)		3	18'0"						

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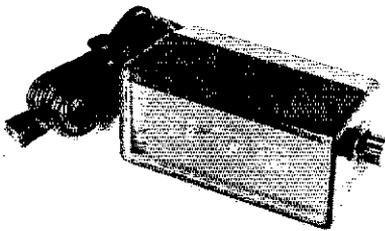
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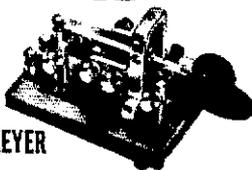
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W1LZ

Thanks to all who have wished me well as a new SCM. Special thanks to W1BRG and W1VSA. We regret to report the loss of K1DBW. BARC has received permission to relocate W1AFL (01-61) to highest point in city of Burlington. W1BRG new CVX WA1GX1 now running 1 kW SSB, CW. VT QSO Party scheduled for May 8-10 by CVARC. Inquiries to WA1YK Traffic: WA1QOP 103, WA3FR/1 5 WILMO 7.

WESTERN MASSACHUSETTS: SCM, Percy C. Noble
W1BVR - SEC: WA1DNB, PAM: WA1MJE, CW RM
W1DVM, Jcd. WA1PAM, WA1PLS. Our sympathy to W1IW in the loss of his wife. WA1MJE appointed Public Relations Asst. by N.E. Div. Dir. W1MHR. New ORS: W1DWA, Hampshire College now WA1WDL. WA1LNF works MIT from Worcester on 450 MHz repeater with 7 watts. WMPN 22 sessions, QNI 304 t/c. 98. No. different stns. 71, controls: WA1RL, K1RQG, WA1R, WA1MJE, W1MN 31 sessions, QNI 194, t/c. 158. No. different stations 20. W1MEN 4 Sun. sessions, QNI 99 (40 from repeaters) t/c. 8, controls: WA1DNB, W1GUP, WA1FKE, W1MAREC Repeater 23 sessions, QNI 230, t/c. 32. No. different stations 27. OO K1RQG sent out 19 discept notices. All notices are hereby reminded that one of the requirements of the membership application is a monthly report to the SCM (address, page QST). CMARA: K1KQS spoke on facsimile. New member WA1OPN, HCRA bulletin is boosting 2-mate CW. MARC: W2NSD/1 speaker of the month. Plans are under way for more code & theory classes. Prov. M1 ARAs speaker of the month was W1LBW. W1MAREC: RA: DVW suggests brushing up on msg form, C signals, phonetic alphabets, etc. DNB urges operational guide lines for emergencies. New bulletin received from Guinebaug Valley RC. Traffic: WA1RL 624 WA1MJE 623, W1Y 636, W1DVM 165, W1BVR 633, W1TM 18, W1DWA 17, W1K 17, WA1LNF 42, WA1OUZ 30, WA1PLS 21, WA1DNB 8, W1DVM 6, W1HNJ 2.

NORTHWESTERN DIVISION

ALASKA: SCM, Roy Davis, KL7CUK - It is with sorrow that we report the death of KL7FCN and his wife Betty. They were killed in a car accident Jan 3rd. Every one will certainly miss them. SEC KL7JDO produced and ran the SET rules and guide lines to all AREC members and others. Hope we have an outstanding exercise. KL7GCH spending the holiday with old AK friends in W4-Land. We have two new ECS KL7EKZ to replace KL7IEG who was transferred to W9-Land and KL7RU for the Juneau area. Welcome aboard, KL7HOV says we have had 5/1 check-ins for 31 sessions of ASN. KL7HND says not going to these cold days at his QTH. The AKN fighting propagation problems. KL7IS and KL7HAQ have good VHF link going direct on 146.94 between Fairbanks and Anchorage. The gang in South East have a good RTTY net going with the CONUS. The longest dog sled race in the world will start Mar. 4 from Anchorage and run to Nome. The race committee has asked the amateurs of AK to supply communications for them. Traffic: KL7JDO 22, KL7CUK 13

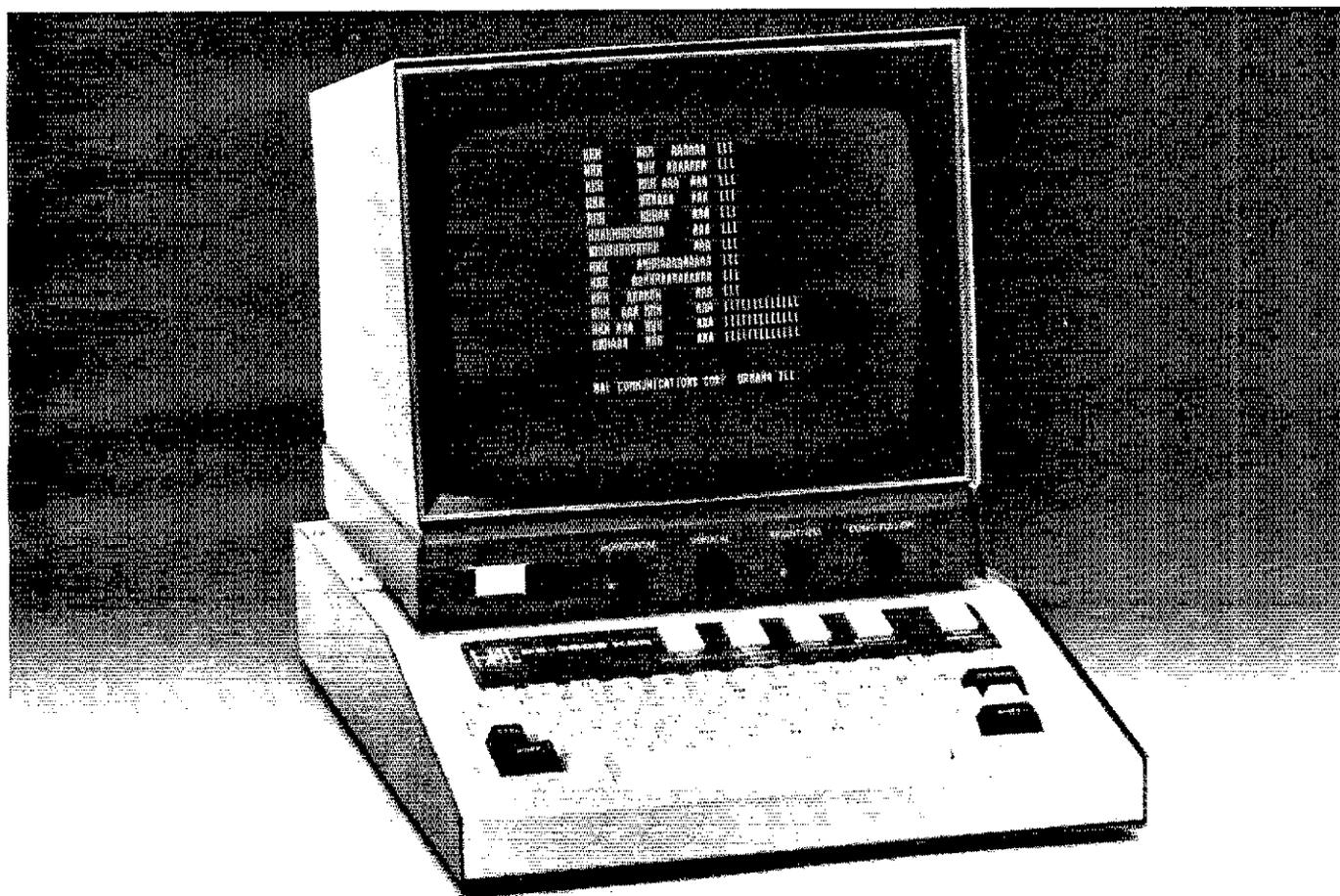
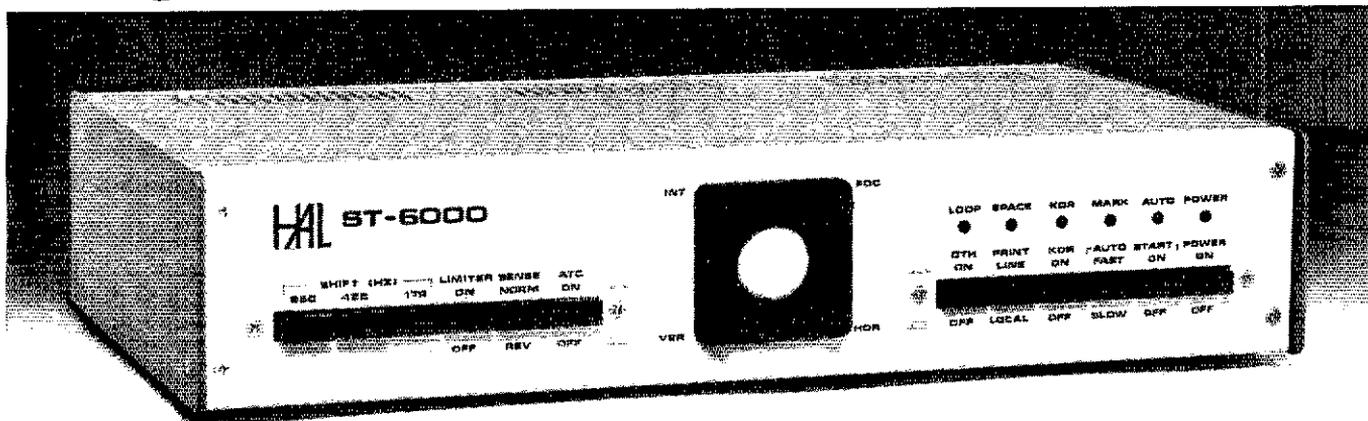
IDAHO: SCM, Dale A. Brock, WA7EWW - SEC W7JMH, PAM: WA7HOS.
Net - Freq. Time/Days Sess. QNI QTC
Manager
FARM - 3.935 0200 Dy 31
W7TWZ
IMN - 3.635 0230 M-F 23 112 9
W7GHT
RACES - 3.99 1415 M-F 23
K7JBC
Id. Silver - 3.93 0115 MWF
W7IY
Pocatello Radio Club reports eleven persons are attending their code and theory class taught by W7UKH and W7CUJ. They also report that Mount Harrison Civil Defense Repeater is in operation. W7IS says he gave many Christmas presents, no DC report. W7FHQ and WA7JFC are active on this winter. Traffic: W7GHT 484, WA9KKR/7 267, WA7CTS 37, W7GBO 33, W7KDB 2.

MONTANA: SCM, Harry A. Roylance, W7RZY. Asst. SCM: Bertha A. K7CHA, SEC WA7IZR, PAM: WA7PZO. New Computer Information Net (CIN) is being set up at 4:00 PM M5 on 3930 kHz by WB7CDM/7 in Missoula. Butt Amateur Radio Clubs new officers for 1976 are K7EJ, pres.; K7TIM, vice-pres.; WN7Y/TQ, treas.; W7ROE, secy. Received some nice pictures of the VHF meeting and will be happy to share them with anyone interested. IMN net had 23 sessions, 94 QTC and 13 QNI. Reason for no news on the MT traffic net is that I never hear from them so cannot pass on any information I do not receive. Sorry to hear of the passing of W7KFR in Darby. Traffic: W7TGU 69, W7NEG 36, WA7KMP 31, K7BMT 8, WA7PZO 2.

OREGON: SCM, Leonard R. Perkins, WA7KIU - SEC: W7HLF, RM: K7OUF, PAM: K7RQZ.
Net - Freq. Time QNI QTC Mgr.
BSN - 3908 0130Z 341 22 WA7MH
OSN - 3585 0245Z 162 132 WA7TX
AREC - 3993 0300Z 148 4 WA7NE
NUCLEAR -
50.250kHz 9:30 am 14 W7FE
NSN - 3702 0300 250 81 WA7OC

You think a DX pileup is rough, how about a traffic net on 80 after sundown? VHF conditions have partially made up for the lack of propagation on HF. Medford to Portland via 16776 on Scott Mt. near Sutherlin on Dec. 18. Rogue Valley RC presented Medford Public Library with a set of ARRL books. K7RQZ in Bend a big help warning travelers of road conditions on both 75 and 2. If you like to listen African broadcasts stations tune to OEN on 3980 at 0200Z. Hard to hear the net but the music is great. Morning RACES net on 3974.5 is about the only net in the Section that can accomplish coverage. WA7MHP is the new E1 for OSU Campus. Sat. morning coffee "Break" in Eugene/Springfield, call K7KVV on 52 for time and place. Impromptu get-together one Sat. evening yielded 70 licenses at Papa's. DE WA7KIU, many thank and best to you and the League. QW7HLF, Dwight, 1875 Orchard Home Drive, Medford, OR 97501. SK DE WA7KIU. Traffic: Dec. W1VSA 446, K7IFG 371, K7IWD 276, W7DAN 159, K7NTS 92

Stay tuned for future programs.



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lishing different tone pairs. You can select AM or hard-limiting FM modes of operation to accommodate different operating conditions. An internal monitor scope (shown on model above) allows fast, accurate tuning. The ST-6000 has an outstandingly high dynamic range of operation. Data I/O can be RS-232C, MIL-188C or current loop.

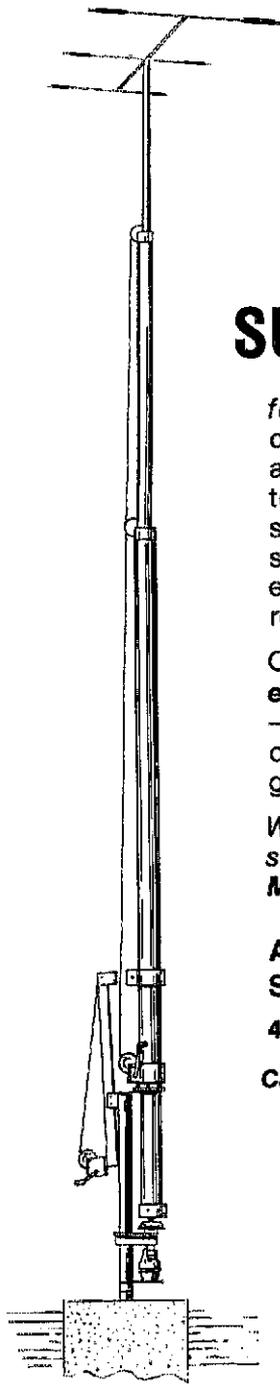
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of codes, including Baudot, ASCII and Morse. The powerful, programmable 8080A microprocessor is included in the circuitry to assure maximum flexibility for your present needs—and for the future. The KSR models offer you full editing capability. The video display is a convenient 16-line format, of 72 characters per line.

These are some of the highlights. The full range of features and specifications for the ST-6000 and the DS series of KSR and RO terminals is covered in comprehensive data sheets available on request. Write for them now—and tune in to the most sophisticated TTY operation you can have today... or in the future.



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W7HLE 79, W7MLM 66, K7OUF 66, WA7IJO 66,
WA7QDC 38, WA7YEU 26, W7LT 19, WA7MHP 17,
WB7AVB 3. (Nov.) K7NTS 182.

WASHINGTON: SCM, Mary E. Lewis, W7QGP -
SEC: W7QGP, Asst. SEC: E. K7VAS, W. WA7FBH
PAM: K7YRQ, RM: K7OZA, VHF PAMS: E. K7LRD
W. K7GWE.

Net - Freq.	Time	QNI	QTC	Sess
WSN - 3690	19:30	245	148	31
W7LG				
NWSSB - 3945	18:30	827	41	31
W7YDR				
NTN - 3970	11:30	1812	143	31
W7PWP				
WARTS - 3970	17:30	1710	164	31
W7QGP				

Plans for NW Div. ARRL convention in Seattle, July 29-31, 1977 are advancing rapidly. Spread the news in your club announcements, on the air contacts and in the meetings. See the date 29, 30 & 31, 1977. See you in Seattle for a tri-decker NW Div. ARRL convention, National QGWA and NW DX Convention. SEE U in "77". Breakfast ARC meetings appear to be replacing evening meetings with VLS & MYLS attendance increasing. A call on a local 2 M repeater will direct you in. Why not try a breakfast meeting this summer? K7OXL busy studying electronics in TX. It's a long way from Forks, WA. WB2YGR now WB7CGA residing in Kirkland. Rules are changing rapidly for the amateurs. Please get yourself a current copy. ARCC members in Skagit City, still on stand-by alert, dikes are still washed out and tides are making repairs difficult for Skagit City. Is WA7M5G. Poor band cond produced fewer activity reports and less news. What is your club planning for Hamfests, picnics or Field Day? W7KLP has upgraded to Advance per a note from a letter by a W6. Cnf. Nets; WSN QNI 296, QTC 140; NWSSB QNI 824, QTC 109; NTN QNI 111, QTC 63; WARTS QNI 2743, QTC 382; (Nov.) NWSSB QNI 832, QTC 58; WSN QNI 334, QTC 99; NTN QNI 1746, QTC 89; WARTS QNI 1823, QTC 82. New officers LCARC WA7QMV, pres.; WA7QWG vice-pres.; WB7AGW, secy-treas. Traffic: (Dec.) W7DZX 433, K7OZA 156, WA7BD2 111, W7APS 55, K7VNI 38, K7KEI 38, W7LG 32, WA7EDQ 28, W7EN 20, W7CAB 19, W7EAB 18, W7EAB 17, W7PWP 16, W7IEU 11, WA7GVB 6, K3MNT/7 5, K7GGD 2. (Nov.) K7CTW 91, WHAD 20, WA7GVB 3.

PACIFIC DIVISION

EAST BAY: SCM, Charles R. Breeding, K6UWR -
Asst. SCM, Ronald Martin, W6ZF, SEC: W6BPK,
Asst. SEC: W6DSI, RMs: K6HW and W6DIL, PAM:
WA6YCE, VHF/PAM: WA6JUD. New appointments
are WA6YCD, OPS and W6TYM, ORS. New officers
for the East Bay Radio Club are W6FAS, pres.,
WA6CRG, vice-pres.; WA6VBV, secy.; W6KTC,
treas. There are two new nets operating in the East
Bay Section. W6JJK is busy on the Bay Area
Regional Traffic Net. (BARTN). BARTS/1 operates
on Fri. and Sat. at 7:30 PM local on 3740 kHz and
BARTN/2 operates on Fri. and Sat. at 8 PM local on
146.52MHz fm. The CW speed is 10 to 15 wpm. For
information contact net mgr. WA6BMV or asst. net
mgr. WA6YCE. This stations made QRP this month.
K6HW and W6TYM. PSIR: WA6YCE and WA6VEF.
Congratulations to all for a very fine job done well. We
note even with a sudden illness that put W6JJK into
the hospital he did a fine job in the traffic department.
We are pleased to report that Ralph is doing well. The
YASME Foundation recently held a Board Meeting
and elected new officers. Those from this Section
elected were: W6RGG, secy-treas; W6KTC, W6DOD,
dir. Traffic: (Dec.) K6HW 679, W6TYM 618, WA6P1,
302, WA6BMV 109, W6JJK 78, WA6VEF 58,
K6PMG 52, W6ZF 2. (Nov.) K6PMG 38.

NEVADA: SCM, John D. Weaver, W7AAF -
WA7WYF transmits Official bulletins Mon. at 6 PM
on 3.9965 and Tue. at 7 PM on 146.94 and 52.525
from Las Vegas. W7ILX in full swing on RTTY with
his new AN/AGC-6. Congrats to WA6NF7 on passing
the first phone. W7IA is SNARS new call sign.
SNARS 146.19/79 machine is on the air in the Reno
area. It is an open machine, carrier entry, and all are
welcome to use it. W7CX is busy on RACES and
SARC. Have been hearing many stations using their
identifying call signs. Please mail me your reports
and news letters by the second of the month so I'll
receive them in time to meet my deadline for this
column. Traffic: W7ILX 310, WA7WYF 8.

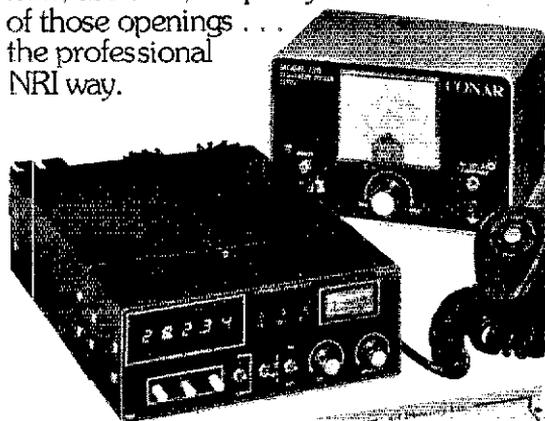
PACIFIC: SCM, Pat Corrigan, KH6GQW - SEC:
KH6GMP, RM: KH6IQU. SP1 was a success due to
fine efforts of SEC, KH6GMP, ECs and others. EARC
has tried reading news on state repeaters on Mon.
W1ZPB/KH6 has 14AVG up now FB. Congrats to
KH6JAQ who got Extra in Nov. John still ramrods the
WPTN and seeks more check-ins. RM KH6IQU is
busier than a cat and needs ew traffic help. Contact
Buzz if you can help. WA4GIF/KH6 has volunteered
as an ARC. Inist Corps members W1ZPB/KH6E was
here over holidays with his Oscar gear and had FB
QSOs. EARC will provide comms for annual bike race
Apr. 18. All interested contact KH6GQW. Although
04/64 repeater was shut down, Kaul hopes to
reactivate the pair from a new site soon. HARC's 76
Hamfest this spring. Here are details next
issue. During Apr. they hope to have Bicentennial
Am. Op. display at Ala Moana. HARC Christmas dinner
was one of the best ever with entertainment courtesy
KH6ARG. New club pres.: KH6ION, HARC,
KH6HML. BIARC Traffic: KH6IQU 654,
W1ZPB/KH6 162, G6JAQ 151, KC6DK 136,
KH6GQW 106, KH6JES 93.

SACRAMENTO VALLEY: SCM, Norman Wilson,
AA6JVD - SEC: W6SMU, 1976 officers for the
Golden Empire ARS of Chico are K6JGD, pres.,
WA6WJZ, vice-pres.; K6HTM, secy.; K6IF, treas. New
officers for the Radio Amateur Mobile Soc. are
WA6ITE, pres.; K6YS, vice-pres.; W6NH1, secy.,
W6RTK, treas.; W6QHP WA6UNL and W6BKZN, dir.
Congratulations to new Novices W6GFX W6N6NV
and W6GETT. W6PBC is developing a 700 MHz scaler
for amateur use. W6BL, recently returned from a
mobile trip to KY with XYL and Swan 260. Welcome
to W6KOP, Redding, a recent refugee from S. CA.
W6N6NV has an HW16 and HG10B on 7 MHz.
Ex-2P4TT is working on his U.S. ticket. Sacramento
AREC meets each Mon. at 2030 local time on their
repeater W6ALN/6, 146.31/91. Traffic: WA6ORW
30, W6DEF 37, W6RSP 6, W6FZY 7.

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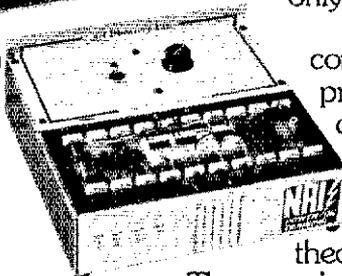
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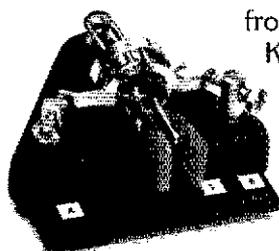
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SAN FRANCISCO: SCM, Rusty Epps, W6QAT - ECs: WB6BWC (SF City), K6MUP (Sonoma), WB6AGR (Mendocino), and WA6ICB (Humboldt). Please contact these ECs for AREC memberships. We still need ECs for Marin and Del Norte Cties, and an SEC for the SF Section. Congrats to WA6AJN on receiving his General. W6NLV (KY), W6KHI (Novice), WA6AJN, new mgr. of W6SG, the MARC club stn. K6TP, new secy. of NCN; and to W6RNL who was honored with membership in the AI-Op Club. WA6HPF busy testing out his new phone patch. W6FCQ was selected as MARC's 1975 Ham of the Year. WB6TJ picked off five new states for WAS during the 55 contest. The WR6s are busy conducting 2m hidden transmitter hunts on the 3rd Fri. of each month - contact WA6LLX for details. W6DOL experimenting with ATV on 450 MHz. AK6MDS and AB6ITN both hope to get WAS by working stns using the bicentennial prefixes. We are saddened by the passing of W6KUF who became a silent key on Dec. 3. Traffic: (Dec.) W6RNL 278, W6PL 228, K6TF 151, W6NL 92, WB6BDL 58, AB6JEO 17, AB6IN 3, W6OAI 3, W6LUPV 2, W6GGR 1. (Nov.) W6BJEC 46, WB6ITN 10, WA6HPF 2.

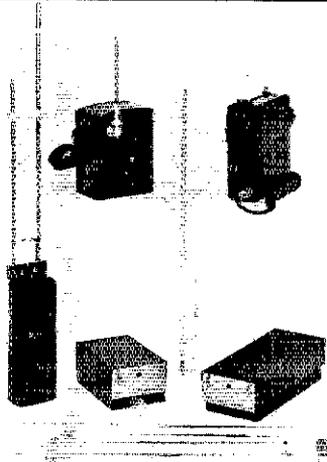
SAN JOAQUIN VALLEY: SCM, Ralph Saroyan, W6JPU - The Fresno Amateur Radio Club will be holding their annual hamfest on May 1-2, 1976. It isn't too early to prepare. The new officers of the Isakerfield Amateur Radio Club are: WA6HNO, pres.; WB6KTW, vice-pres.; WA6UNI, secy.; W6QOQ, treas.; K6ARE, dir. WA6TVC received his Extra Class license. WB6DEO has an FT-DX560 and a homebrew keyer. WA6ABS is on 2 meter fm. WB6JCT has a Temp-1. W6FOZ is mobiling with a Galaxy. W6SQP is working DX on 75 meters. WA6GQI is chasing DX on 20M. W6QKP has a TR22. W6GLIK has an IC230. WA6WLJ is heard bicycle mobile on 2 meters. W6FEF is on ATV. W6SF and K6OZI were active in SS. WA6FVJ (WA6FV) has general license. WA6CPP and W6YKS are on RTTY. K6DRI has a ham on the low bands. WA6CPP has worked 90% of the U.S. counties. The new officers of the Delta Amateur Radio Club are: W6BSSE, pres.; W6BICL, vice-pres.; WA6FVI, treas.; W6BHX, secy. W6HTP and K6YDW are on RTTY. K6BKZ is on 2 meters fm. WA6HNO is the new SEC for SJV. The San Joaquin FM Radio net meets at 1930 PST on 146.28-35 MHz. Traffic: WA6RXI 133, WA6JDB 12, WA6CPP 2.

SANTA CLARA VALLEY: SCM, Jim Maxwell, K6AGW/C6 SEC; WA6RKB, W6RSY, W6YBV, mfg. BPL; W6RFF, PSHR, K6JDR, pres. pouring 120W on 1296, working into Fresno regularly on both cw and ssb. He speculates that a new 1296 distance record may be possible considering the number of relatively high power, well equipped stations coming to the band. W6RSY going wild with 7 ticskeds daily. Welcome to K6TP of the SF section, new NCN secy. New General WB6HRL now in the area. W6RFF, NCN mgr. notes he has been ORS since 1939. Congrats to EC WB6IZF, now back in the saddle as WCARS publicity chmn. The Palo Alto ARS (PAARA) still meets the 2nd Fri. monthly at the Menlo Park Radio Center. K6RST, pres. Their popular bulletin ably handled by WA6NCK. The CCRC Circle says the outstanding Foothill College Electronics museum is open to the public, contains a fascinating display of old radio and ham gear, including a complete spark station. Relected to the Perant Foundation (with a great certificate) are: WA6ROM, W6AX, K6RTU, W6GNB testing a new 2 wave 20M V beam, W6EMR is nearly at the half-century mark in his quest for DXCC. Congrats to WA6TUF, who was on the mainland end of the first K6E to maintain S3TV G50 through Oscar. TUF also working on states with a contract through the satellite. W6RNU is GRV on RTTY, but finds time to be QRL also as OO. Four SOV hams still active on the FCC advisory committee for WARC preparations: W6PUX, W6ISQ, K6LFH and W6SAI. They need your support, and are happy to hear your comments. New officers for CCRC are: W6NJV, pres.; W6JRA, vice-pres.; WA6DJ, secy.; W6YOM, secy. and bulletin editor; WA6NIL, publisher. The CCRC meet the 1st Wed. monthly at QTH of W6QIE. Traffic: W6BSY 993, W6YBV 512, W6RFF 181, W6NWL 119, W6AUC 71, W6E5F 56, W6GNB 31, WA6LUM 18, W6BVE 12, WA6HAD 5, W6RNU 5, W6BIZF 4, W6KZJ 4, W6EMR 3, K6AQ 2, W6MMG 2.

ROANOKE DIVISION

NORTH CAROLINA: SCM, Chuck Brydges, W4WXZ - SEC: W4EFL, PAM: W4QFO, VHF PAM: K4GHR, RMC: K4MC. EC of the month spotlight falls on K4CJZ of Guilford Co. so if you reside in that area get in touch. WB4LDO reports 220 MHz repeater active at WR4AKR atop Mt. Pisgah 222.34 in/94 out. W4LAE has new 2-meter rig Heath 2026 and homebrew 11V converter. K4FTB reports daytime 4RN busy at Christmas and needs NC support on 7240 kHz at 1800 UT and 3935 kHz at 2100 UT. WA9NW/4 new OPS and looking for help on Daytime 4RN so how about you NC daytime ops checking the above mentioned freqs? Attention All Novices. There now is a combined NC/SC Novice Net, Carolinas Novice Net (CNNN) operating on 3718 kHz daily at 5:30 PM and net mgr. W4LUKJ. WA4CBB now Extra Class, congrats! Ex-WA4E7Z now WB4EQB and look for NC stns on hf. New officers for the Mecklenburg ARS are: W4MGG, pres.; WB4IZP, vice-pres.; WA4UPA, secy.; K4MQG, treas. Mecklenburg ARS just completed second Novice Class for '75 with total of 35 new amateurs both sessions, congrats! K4JVH reports on health of W4FLS who suffered severe stroke about year ago and Jeff is bedridden and unable to help. Hopefully the future will enable him to get back out. K4JVH also has several QRP rigs running from a solar battery and has worked call areas 3, 4, 6, 2, VE3 and 0. The Carolinas-Virginia Repeater Assn (CVRA) now boasts of 15 member repeaters with associate membership at 600 so if you are a repeater user support CVRA and send inquiries to W4IZI, Box 3325, Burlington 27215. WB4YJQ ran a demo station at Signal Hill Mall in Statesville. Traffic: (Dec.) K4GCN 373, WA9YDJ/4 354, WB4PZU 322, WB4NKG 306, K4FTB 305, K4MC 255, K4CJZ 241, WA4KSO 201, W4RWL 137, W4WXZ 132, W4OFC/1, K4EZH 97, W4NMS 80, W4FMN 73, WB4KHZ 58, WB4JMG 56, WB4OX 44, WB4OZL 36, K4FBG 36, K4AIH 26, WA4CBB 20, K4FOY 14, K4TTN 7, WB4TOP 3, WA4LWO 2. (Nov.) W4RWL 64, K4FBG 28, K4AIH 5. (Oct.) K4FBG 2.

SOUTH CAROLINA: SCM, R. H. Miller, WA4EJG - SEC: W4ZMW, Chief RM: WB4OBZ. The SC Novice Net completed its final session on Dec 31st, and is henceforth designated as the Carolinas Novice Net.



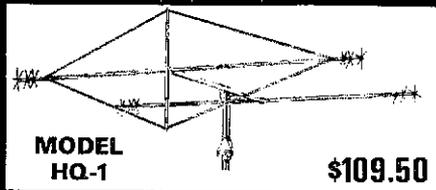
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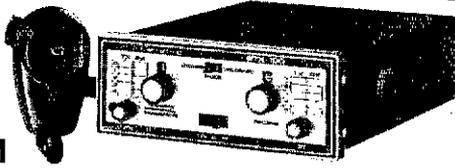
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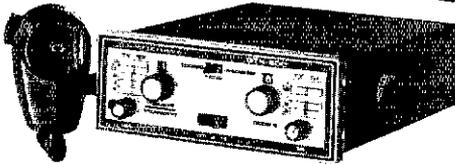


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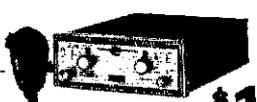
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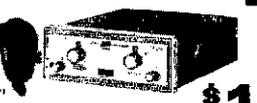
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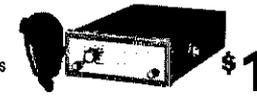
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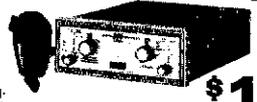
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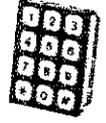


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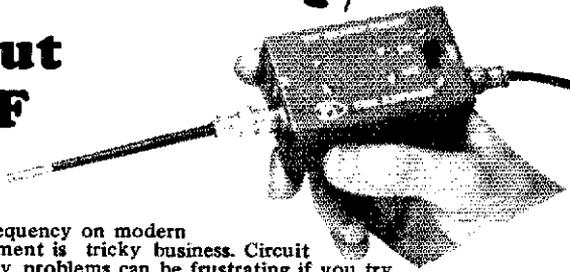
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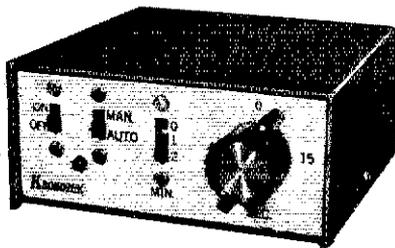
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(CNN), a combined Section Net of the two Carolinas Under an arrangement similar to that of the well known CN, management will remain in SC until a change becomes necessary, whereupon management reverts to NC and continues to alternate between the two Sections. The SC Distribution System is continuing to make steady progress as a grassroots extension of NTS, with PX participation and traffic on the increase. A year-end bulletin just published describes the System and how it works. Beyond a doubt, this is the most efficient method for distributing traffic that has ever been developed in SC.

Check-ins:	CNE	CNL	SCNN	PX
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	348	241		

The above statistics include all traffic nets from which reports have been received. Traffic: WB4OBZ 317, W4NTD 190, WA4ECJ 122, W4ANK 30, W4LUK 18, WA4DAX 16, WA4IVE 14, K4JIM 13, W4LMS 4.

VIRGINIA: SCM, Robert L. Follmar, W4QDY - SEC: WA4YIU. Asst. Sec: WA4FBG, FAM (V5BN), WB4YKM, RMS: K4IAF (VN); WB2VYK/4 (V5N); W4SHJ (4RN). Net freqs.: V5BN 3947 KHz; V5N & VN 3680 KHz; 4RN 2567 KHz. Real good news: received a letter from W4MMP, Marketing Chairman of the Interstate Radio Convention, Inc. announcing that the 1976 ARRL Roanoke Division Convention will be held in the City of Norfolk, VA. Scene of activity will be Norfolk SCOPE and we hope there will be plenty of good accommodations for everyone, exhibitors & visitors alike, hi. The date is the week end of July 31st and Aug. 1st. W4DIN sez theme of Feb. Springfield Annandale ARC will be description of NTS '87 How's & Why's of tie handling, FB1 W4KFC our 1st VeePee operated briefly from XEICE in Mexico City, attended Christmas dinners of VA Amateur RA in Richmond and also the Potomac Valley RC, took part in 10- & 160-meter tests, Busy Man! K4VWK finally received Advanced tickets, W4TZC says his son JW received his General with call WB4DPR, congrats, WA4PBG building a new 5B-104 & his Drake away for major overhaul, WB4DRB active on QRP (2 watts) 80/40 best Dx 1000 miles, County Hunter W4UJJ (404) reports 404 certificate, 4-38 states completed all counties, W4KAU having to try to repair old test gear & get in shape for some activity, SEC WA4YIU says that between work & emergency trip to NE not too much time for radio activity during month, W4TMN says they have moved and settled in their new house NNW of Wmsbg & lots of room for antennas, FB, WB4JRC elected secy. (1976) of the Clean Air Act Radio Assn, WA4UB reports rig down, traffic: (Dec.) WA4EJ 629, WA4KRP 87, K4KNP 434, W4YZC 364, W4UJZ 298, WA4VEN 225, K4MLC 183, W5VZO/4 169, K4IAF 159, K4JM 141, W4SLK 133, WB4FLT 114, WB4KIT 111, K4GR 110, W4QDY 96, WA4JVO 64, W2TPV/4 57, W4ZDN 53, W4SHJ 52, W4QDZ 40, K4FE 38, WA4YIU 39, W4SGG 38, WB2YK 34, W4KFC 32, K4VWK 32, W4DGT 24, WB4FDI 24, WB4YKN 19, K3DSG/4 12, WB4LEK 10, WA4PBG 10, WB4DRB 9, W4MK 7, W4TZC 6, W4LXB 4, WA4UJ 4, WB4AFA 2, W4KA 2, K4GIS 1. (Nov.) K4KDJ 364, WB4YKM 226, K4MLC 144, W4TZC 22, W4LXB 8, W4DM 5.

WEST VIRGINIA: SCM, Kay Anderson, W8DUV - K4ZPR's new Extra Class ticket arrived Christmas Eve, just six weeks after he took test! WB8CJU also made Extra and WB8DQX upgraded to Advanced. Many others in state still waiting to hear. W8FZP is new OPS in Romney and WB8SAW appointed OPS in larger, larger club activity still high with 5 hopefuls studying for Novice test, but school's club station had to give up license (WB8TOX) when trustee left. Why didn't WB8SAW or one of the other students become trustee? FCC says trustee must be 21! Mid-day Net handled 72 messages, 701 check-ins while WV Phone net handled 102 messages, checked in 964 stations. WA4N (cw) with one 150 checked in, handled 82 messages and had 949 ARRL Novice minutes. Just a handful of dedicated operators keep this net active under the direction of RM WB4ZA. Traffic: (Dec.) WB8II 125, WB4ZA 81, WB8DQX 80, WB8JWX 69, WB8QYN 35, WB8CKX 24, WB8FZP 20, KBQEW 18, WB8OS 15, KBZD 14, WB8SC 12, WB8GQX 12, WB8RUZ 10, WB8TEE 10, KB8CF 9, KB8ZM 9, WB8CRW 7, WB8UE 7, WB8SAW 7, WB8CIN 6, W8DUV 6, WB8IE 6, WB8TOC 6, WB8CW 4, KB8XO 4, WB8JH 4, KB8CF 3, WB8IE 3, WB8OSM 3, WB8UJ 3, WB8YTP 3, KB8ZD 3, WB8DF 2, WB8TF 2, WB8GWR 2, WB8KI 2, WB8ND 2, WB8PH 2, WB8PF 2, WB8SCG 2, WB8THZ 2, W8WLC 2. (Nov.) WB8IJW 104.

ROCKY MOUNTAIN DIVISION

COLORADO: SCM, Clyde D. Penney, W8HLQ - SEC: K8FLQ. RM: W8HCK. PAM: K8CNV. WA8YGG. The following correction is to be applied to previously listed data for the Centennial Chapter of the CO 10-15 net. First 500 bar award went to W8INK, 2nd 500 to W8WAG, and 3rd 500 bar award went to WA8YNG. My apologies for the mix-up. Officers for the Mile-Hi DX Assn. are WB8NHG, pres. WB8IWL, vice-pres.; WB8CJ, secy-treas. The ARRL 1976 Convention to be held in Denver, has as the Convention theme, "Tune in the Spirit of '76". Congratulations to WA8YNG who has won the second "Black Jack" award in the 10-15 Net. Officers for the Boulder ARC are WB8CDD, pres.; WB8NEU, vice-pres.; WB8JJK, secy.; WB8FV, treas. CCN is in need of more novice participation, more outgoing traffic, and more outlets in Southeastern and Western parts of CO. Anyone who can help in any of these areas will be most welcome. For Dec.: Hi Noon QNI 1451, QNI 1006, QTC 29, time 1:18 minutes, (Nov.) QNI 1006, QTC 29, informals 196, 29 sessions, 1105 min., SSN QNI 131, QTC 28, 24 sessions, 285 minutes (Nov. QNI 180, QTC 46, 26 sessions, 474 min.), Columbine QNI 1185, W8YWX 1482, K8YFK 753, WB8COT 544, K8ZSQ 209, WB8HCK 299, WA8YNE 186, WB8HB 151, WB8NCH 105, WB8NNI 103, WB8NS 77, K8OTU 63, WB8YGO 57, WB8PVT 48, K8WJZ 48, KBQIX 34, WB8MCL 24, WA8TMA 24, W8SHJ 23, WB8IZO 18, WB8YCL 16, WB8ELD 12, W8PT 12, K8CNV 10, WB8LQ 10, WA8YD 10, WA8YNG 8. (Nov.) WB8MTA 510, K8YFK 472, W8LQ 73, W8W 27. (Oct.) W8LQ 102,

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NEW MEXICO: SCM, Edward Hart, Jr., W5RE — ASST. SCM: Joe T. Knight, W5PDY. SEC: W5ALR. PAMS: W5PNY W5DMG. RMs: W5UJH K5KPS. New Mexico Road Runner Net meets at 1800 Mountain time, 3940 kHz says 983 stations reported with traffic total of 77. Southwest Net (SWN) 2 and NCS meets 1911 Mountain time. Stations in AZ are urged to report into this net until such time as activity in AZ justifies formation of an AZ net. Dec. totals for SWN, stations checked in 208, traffic 236, net was in session 928 minutes and is run at 15 wpm or slower if requested. RM K5KPS awarded W5AS 1X a net certificate and recommended W5AS New OBS. New OBS: W5A7YK Jan. 1, 1976. Traffic: W5DAD 299, K5KPS 234, W5ENI 226, K5MAT 113, W5RE 98, W5A7YK 91, W5DMG 43, W5MSW 22, W5BWB 17, K5ZNN 16, W5Y15, W5SOHI 14, W5QNR 13, W5SMY 8.

UTAH: SCM, Ervin Greene, W7FU — SEC: WA7ZRO. RM: W7OCX. WA7GFY was awarded the BUN Certificate this month. Congrats. W7OCX reports a total of 901 check-ins on BUN for Dec. Nice work from K7HIR, handling a total of 306 msgs for the month. W7OCX and WA7MEL consistently qualify for PSHR, good traffic scores also. Lots of the signals heard on the air using the Bicentennial prefixes, sounds strange on 2 meters. W7H0I reports he is chasing the last of the 50 states for 5BWAS. W7VEO finds a mini data processor has many amateur applications. WA7SYV is far behind. A few PSYers have acquired mini computer terminals and converting to software. W7NFT should have a new 22-82 repeater in the Richfield area by spring. More and more Handi-talkies are showing up on the ski slopes. New question: Is a handi-talkie on a chair lift a mobile or portable? WA7ZDO sent out more than 300 letters and application forms for membership in IREC along with the UVHF Society mailing. Traffic: W7H0I 300, WA7MEL 95, W7OCX 50, W7BE 24, W7DKB 22, W7LTM 9, W7H0I 8, W7EU 5.

WYOMING: SCM, Joe Ernst, W7VB — Propagation very poor during Dec. and Jan. with out-of-state stations doing a lot of calling for the Morning Weather Net and the Evening WY Cowboy Net. W7NXX is heard checking in from ID occasionally. K7ITH vacationing in the southland in Jan. WA7RKC off for San Clemente and Phoenix early Jan. for some golfing. Over the holidays W7HNI broke his arm the code stamper one. W7ZK made W5AS on 75 in early Jan. W7VB, W7L and W7LH were at the W5AR convention. K7KMT W7VB and the Casper Radio Club are inter-connecting the Casper and Boyesen repeaters. K7KSA, while snowmobiling on Powder River Pass, worked the Isoyen, Casper, Rapid City and Lead, SD repeater with very fine results. Officers of the Fremont Radio Club are WA7CQ, pres.; W7ZCJT, vice-pres.; W7AHL, secy-treas. W7VEW scheduled to give a program at the Club on his work with the Oscar Satellites and moonbounce. Traffic: K7VWA 460, W7TZK 323, W7YWW 83.

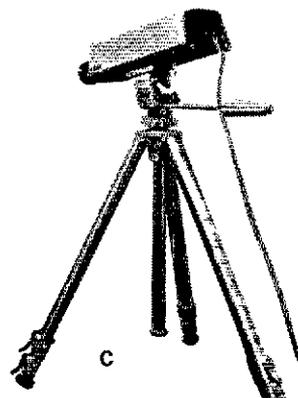
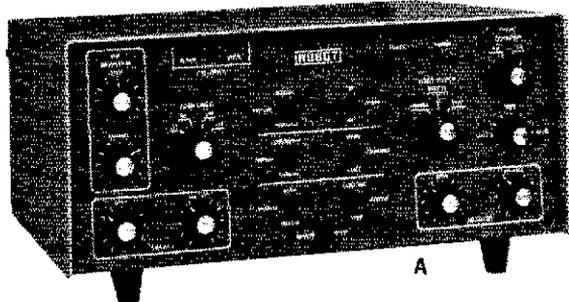
SOUTHEASTERN DIVISION

ALABAMA: SCM, Jim Brashear, WB4EKJ — New officers Limestone ARC, W4MT0, pres.; W4VHO, vice-pres.; W4WLD, secy-treas. Mobile ARE, WB4GG, pres.; WB4JU, vice-pres.; W4MVM, secy.; WB4CY, W4MMD, editor. Mobile ARC to have Hamfest again this year. The Sand Mini Repeater Assn. new repeater in operation. Has autopatch. Freq. of Mt. Cheaha repeater changed to 147.69 F and 147.09 R. W4UAR using ICOM IC30A for 446.00 simplex operation UHF. Enjoyed Christmas dinners at Huntsville, St. Paul and Sand ARC. The Co. CO Dir. holds a Novice license and is a member of the St. Clair ARC. WA4MLK serving as NCS on AENJ, daughter WN4RND NCS on AENJ; their UM, W4RQS, liaison from AEND, B and M to RNS. WN4TMG passed. Advanced. WB4SVH brought new HW-202E, W4RND, editor. Mobile ARC. W4WLD, W4CEO and WN4CEO and WN4CQV now QNI AEND from Mobile. Still need cw operators to QNI/GTC AENB and help with liaison to/from RNS. AL section also needs liaison help to/from the daytime RNS. Don't forget SET reports must be at ARRL by Mar. 15. Appointments: W4VHO to be W4B4XD and W4WLD a QVSS; W4B4XD OBS. K4GUU running phone patches from overseas. K4HJM has new HW-202E. WB4CXD on RTTY with mod. 26 machine; also on 6 & 2 RTTY. Tuscaloosa and Selma ARCs provided communications for "Christmas on the River" pageant and parade in Gadsden. Traffic: W4RND 240, WN4JDH 214, WA4E1U 14, K4AOZ, WN4TMO 44, WB4RCF 38, K4GUU 36, K4LYU 36, WA4ZDW 35, K4HJM 14, WB4CQA 12, K4CUU 11, W4RQS 10, WA4MLK 5, WB4TVY 5, WB4CXD 3, WN4RND 1. (Nov.) WB4SVH 1.

CANAL ZONE: SCM, Roderick J. Ister, KZ5PI — Plans are underway for the CZARA to conduct this year's Annual CZ Hamfest. The Chagrus River ARC is unable to support their Annual Hamfest as a result of a vast reduction of hams in Gamboa. The CZARA is planning their Hamfest to be held on or about Mar. 1 1976. Final plans will be discussed at the Feb. CZARA meeting. New CZARA club officers have been elected for the New Year include KZ5AL, pres.; KZ5SF, vice-pres.; KZ5JL, secy-treas. KZ5EJ is leaving the Canal Zone and all wish Evilyn the best and many thanks for her devoted efforts as the Amateur Radio Coordinator for the CZ. Plans are being finalized for a two meter hidden transmitter on Mar. 31. Future CZ hams have been offering each Sat. morning at the Balboa cafeteria for coffee and short discussions and thus far attendance has been excellent. All are cordially invited and please bring a New Ham.

GEORGIA: SCM, A.H. Stakely, K4WC — SEC: K4H; RMs: K4JUN, RM: K4VHC, congrats to K4VHC who makes PSHR, and to W410 on net certificate for FL Amateur Sideband Net, and to K4LRO who is new OBS. G5BN Dec. report is QNI 1441, GTC 134. Excellent G5N bulletin by K4VHC. Make an effort to drop in on G5N as it is going great. W4LRR talks to W415 on 432.55 between 1900 and 2030. 55B activity at 144.110 includes W4LRR, W4LNG and W4WDH. WB4TVU reports N. GA Contest Club activity includes CD party as club station WB4LDK is new OBS. WA4AEL, new Advanced. W4B7Z still sending QSL notes. New Officers South-eastern DX Club are K4TBN, pres.; W4GKF, vice; K4LRO, act. mgr. Please notify SCM if you wish CD appointment. The roll has been cleaned up and all active appointments renewed. Traffic: K4VHC 300, W4AAY 62, K4WC 21, W4AEL 17, W4HON 16, K4BAI 14, W4J4M 4, W4B7Z 2.

NORTHERN FLORIDA: SCM, Frank M. Butler, Jr., W4RKH —



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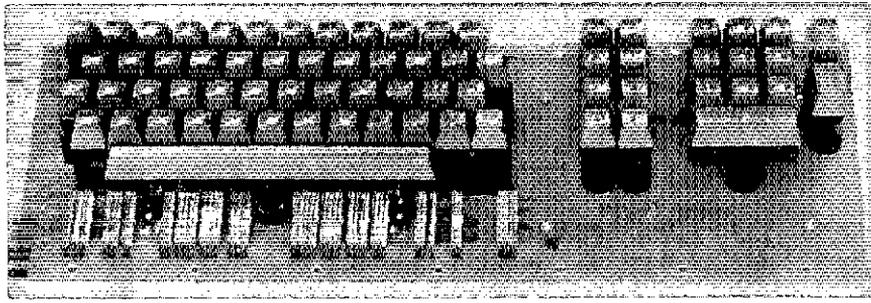
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Section Net Certificates earned by WA4FBI WB4GHU WB4HKP on QFN; and by W4DTV WA4MYF K45RI and WA4VJ on FAS. Net NFPN boomed its rep. rate to QFN over 75%. WNETV works 80-15m from Eglin AFB. WA7QFW/A new WA8FTA. WB4TPR a regular liaison between NFPN and QFN. Radio Emergency Support Team (REST) concept being formalized by SEC WA4WBM and CD RO WA4WNY. K4RZM and K4PMO handled much CD traffic during recent storms. WB5DKP/A new WA4NMH and active on NFPN. WA4KLI upgraded from Tech. to Advanced. WA4BAX elected NM. TPTN; also NCS on D4RN. Good to hear W4GAN. XYL of W4JGD, on nets again. Officers of Gainesville ARS are WA4KA, pres.; WA4YLY, vice-pres.; WA4EJ, secy.; W4RUJ, treas. U of FL station W4DFU has a new quad and larger meeting room. K4GWQ a new HW-2026. Officers of NOFARS are WB4DAD, pres.; K4DDY, vice-pres.; WB4EEK, secy.; W4JL, treas.; WA4ND, act. mgr. NOFARS/RANGE jointly sponsoring class for Novice/Tech., plus a new directory of hams in NE Fla. N. FL DX Assn.'s VP5B operation up to top place in WPX contest. FL Crown ARCC Net moved to 146.52 MHz on Jan. 8. K4EZE now holds Advanced Class ticket. Sorry to report W4MZH a Silent Key. W4LDM's rig is allergic to 'phone operation WB4QKG active as OO. Traffic: (Dec.) WA4FBI 443, WB45KI 358, W4WNY 127, W4LDM 206, WB4XN 198, WB4GHU 188, WB4DT5 176, K4VF 165, WA4A 155, W4DDY 140, WB4TPR 127, W4SDR 124, WA4EYU 48, WB4DAD 43, W4RKH 42, W4DTV 40, WB4VDM 40, WA4FJA 38, WB4TZR 38, WA4WBM 36, WA4RAX 32, WB4ADL 25, WB4NJI 25, WA4MYF 24, K4OER 18, WA4ECY 16, K4RZM 16, K4RNS 15, WB4VMP 15, W4RFTVQ 12, WB4BKD 8, WB4TXM 6, WA4RQK 5, WB4VAP 5, WA4ACR 2. (Nov.) W4LDM 50. (Oct.) K4RZM 171, K4PMO 69.

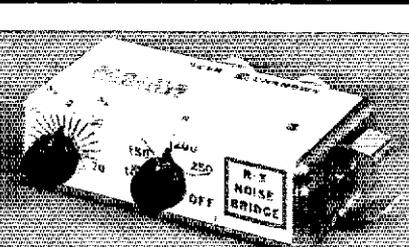
SOUTHERN FLORIDA: SCM, Woodrow Huddleston, K4SCL - SEC: W41YT, ASS: SEC: W45MK, RM: K4EBE. PAMS: WA4NBF WA0GX. New appointment this month: WB4ALH FAS I Net Mgr. OOS reporting: K4DAS K4JPF WA4UVG. W4YW reports he has been hamming 47 years! W4LEP reports Vero Beach ARC has new office and is waiting for license. K4GFH, secy-treas. WA4LW has been waiting 35 days for his ATV repeater license! How long for Tampa Bay Repeater (WB4HAE) WR4 license? K4DAS has new vertical for 20-15-10. WA4UVG received 35 wpm CP sticker. Our special thanks goes to W4DL for his very FB 93m transmissions on 3655 kHz at 8:30 P.M. 12-30-76. Mon. and Fri. Besides getting the latest dope, this is a good source of CW receiving practice. The Christmas rush has come and gone. Our traffic totals are up a little, but not as much as expected. Only 2 HPLs issued for Dec. Perhaps we are not publicizing our free message service as we should. We feel there are lots of stations who handle traffic but not report their activity in the SCM. Come on fellows, lets have your reports so the record can reflect a realistic account of what happened. Traffic: (Dec.) K4SCL 599, K45JH 527, WB4TRI 520, WA45CK 414, K4TH 411, W4DQS 406, W4EH 405, W4WYR 399, WA3NBE 335, W4VDO 325, W4GQ 306, K45NS 301, W4MEE 182, K4GYY 142, K45JA 139, WB4AID 134, W4DZO 86, WA4GYR 80, WR4HJW 62, W4GFC 50, WB4ALH 50, W4LE 48, K4BLM 42, W4IRA 41, W4ACTM 40, W41YT 37, W4GDK 32, W4FLW 24, W4NTE 23, K4CFP 20, W4MML 14, W4ACFQ 12, W4GQ 10, K4RCP 8, K4ATOP 8, W45NK 7, W4DDW 5, W4LK 4, WA4UVG 3. (Nov.) WB4AID 35, W4MML 12, WA4UQ 5, WA4ZLW 3.

WEST INDIES: SCM, David Novoa, KP4BDD - New appointments: KP4GM OO, KP4HG OVS, KP4WL RM. KP4DM gave FEB Christmas party at his new QTH in Aricibo. KP4XG now KP4EJ. KP4GM is also KP4FJL while in Utuado. KP4EGF's repeater is at the Puntita Mt. The Monte Maravilla machine belongs to KP4DL. We welcome the following new hams to the 2-meter band: KP4s EJJ EIO EII EIQ and EIL. KP4UW active on 40 cw QRG. KP4AST working DX thru the satellite strong signal of 75. KP4CO active as Navy MARS Coordinator. KP4DDI experiments on 2-meter DX. KP4GN operates 55V. The annual convention of the Radio Club de Puerto Rico will be on Apr. 23-25, 1976, at the Onrado del Mar Hotel. For info contact KP4AOC. We are working on the AREC organization. If you want to help in an emergency contact me. Traffic: KP4B8E.

SOUTHWESTERN DIVISION
ARIZONA: SCM, Marshall Lincoln, W7DQS - RM: K7NHL. PAMS: WA7KQE W7UQQ. New club officers reported are: Old Pueblo RC: WB7BQN, pres.; WB7WPY/7, vice-pres.; W7V7M, secy-treas.; W7KFF, comproller. Tucson Repeater Assn: W7UHW, pres.; WB7WPY/7, vice-pres.; W7IHM, secy.; K7QMR, pres. Sun City ARC - K7BN, pres.; W7KBE, vice-pres.; W7JLY, treas.; W7JAJ, secy.; W7YR, director. Amateur Radio Council - WA7GEQ, pres.; WA7JCK, vice-pres.; W7HFR, secy.; WA7NIY, treas. The AZ ARC of Phoenix and Scottsdale ARC are combining their efforts to publish a single newsletter to serve both clubs. K7JQF is new ass. EC for Williams area in Coconino County. Propagation conditions have made 75-meter nets very chaotic at times. Members can help greatly by carefully observing net discipline, following the net control stations' instructions exactly, and by not butting in to transmit when someone else, who may be difficult to hear, is already transmitting. Remember the Southwestern Division Convention Apr. 5-11 in Tucson. See you there! Nets: Cactus Net QNI 1148, QTC 426; ATEN QNI 640, QTC 115; SWN QNI 204, QTC 236. A7FN certificates to K7NFK K7NMQ WA7GQ K7GL W7RQ. Traffic: K7NHL 633, K7NIG 206, W7UQQ 51, W7KQE 42, W7DQS 23, W7YKMM 22, WA7EXL 18, K7NMQ 18, W7RQ 9, WA7JCK 6, WA7PLW 5, WA7NHQ 4, WB7BGC 2, K7GLA 2, K7MT 2, WA7VTM 2, W7IX 1.

LOS ANGELES: SCM, Eugene H. Violino, W6INW - Assn: SCM: Kevin A. Berasly WB6QYN. RM: K6JUY. WB6PKA WB6ZVC. EC in charge of AREC WB65PK. Holiday are here and gone. The net ops have had difficulty in maintaining their skeds the last few months due to extreme ski conditions especially on 75 meters. W6MAB finally finished installation of his Log Periodic antenna, 40-ft. boom a real sight to behold. W6DL having troubles with his arm, and has reports in and out of the Vets Hospital, best wishes Ray. K6GYB continue to build a new transmatch, has been scrounging and ordering parts, says not easy to come by. W6MGM had been acting as his resting retreat both low band and hi band, puts in good signal along the coast. WB6PKA is new RM in charge of liaison

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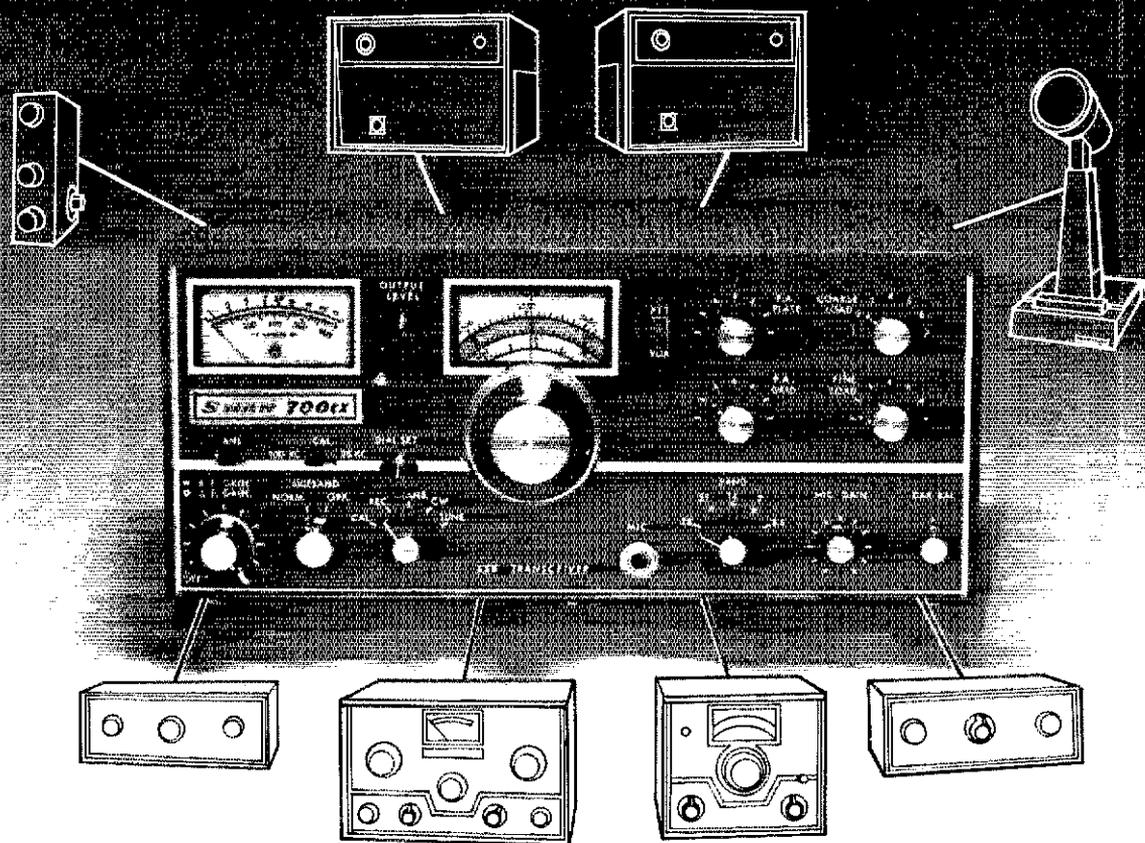
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2N-1185	Transistor 400 MHz	1.00
2N-1186	Transistor 400 MHz	1.00
2N-1187	Transistor 400 MHz	1.00
2N-1188	Transistor 400 MHz	1.00
2N-1189	Transistor 400 MHz	1.00
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between miss n trails net and RN6 contacts. Official Bulletins being sent regularly by WA6FEJ 0330 GMT 7060 kHz so you that want to keep up to date can get code practice at the same time. W6UEO reports a short month due to vacationing but returns in big traffic total. Jim has been one of the 5CN mainstays always there when you need him. It was good to see and eye ball WA6TLV while home from school during the Christmas season, he also is the proud owner of a new memory keyer and Autak QF-1 audio filter. W6DRTS has recently been visiting the medicos, the Telco RC reports Mike Kinsler is now reporting a new call W6WC also details on their recent "White Elephant" fund raising event by W6DNR. TRW RC reports they have two of the best tower raiser experts in their group. They are W6YCZ and W6BRMV. Anyone having tower problems might contact these gentlemen. W6DSSN and K6IAF/5. The Net handled 372 pieces of traffic and reports 228 checks in for month of Dec. He says that they now cover L.A. Orange and parts of San Bernardino Co., and have 200 members on their 50 MHz net. Special congrats to WA6LDT and W6BJK for the fine work done during the Rose parade with the communications. New AEC in the Section are WA6VSK and K6IAF/5. The Southern Counties RTTY group held recent meeting at WA6RAP's house. Yours truly would like reports on my signals on 80 meters have new K.E. trap dipoles up and seems to load good on both 80 and 40 meters any comments will be appreciated. Traffic: W6INH 283, W6BPK/4, W6JHU 303, W6IAF/5 248, W6CEO 171, WA6DN 157, W6QAE 176, WA6TLV 89, W6BTKR 70, W6RFP 47, W6BRO 40, K6LJ 39, W6TCH 39, W6EWO 36, W6USY 20, W6B6AT 17, W6NKE 15, W6YID 8, W6BZKI 4.

ORANGE: 5CM: William L. Weisse, W6CPB - Asst. 5CM: Dick Birbeck, AD6CID. SEC: WA6IVA, RM/PAM: AB6AKR. Desert Rats, through their licensing classes have had at least 32 people who have received their new license or upgraded their license. Can any other club report? W6JRM has a new toy, a Kenwood TS-520. WA6HYV of Riverside is a Silent Key. Our condolences to the family. Recently two teenagers landed in the hospital because they were lowering an antenna which struck the High Voltage line. Don't let this happen to you. Take all safety precautions when working on or near high voltage. W6BUK has problems with W4XB. Had to dust off the spare TR3 in order to keep in contact with his QCWAs pals in A.Z. Riverside Mountain Rescue Unit assisted in removing a 22-year old hiker from Idylwild on Dec. 28. W6GHX WA9IAT/6 W6LKN W6NSN and K6ZCE were the active group in the evacuation. Congrats fellows, W6AJW is visiting Australia and South South Sea Islands. W6JRM has elected new officers for 1978. Please send me name, call, address of the new officers for my records. If you have not heard the next Southwestern Division Convention is Apr. 9-10-11, 1976 at Tucson, AZ. Better get your reservations in soon. Traffic: W6BEIG 913, WA6TVA8, W6CPB 60, W6WRJ 30, K6GGS 28, K6LJA 12, WA6EWS 2, W6GBD 1.

SAN DIEGO: SCM: Arthur R. Smith, W6NI - SEC: W6GBF. CC: 257 County W6Z2. Northern, W6IAC Central, W6BJQ Southern, Imperial County: W6BRMG. Asst. Directors in SW Division invited to participate in League Officials Net each Wed. at 1900 PST on 3907 kHz. Search and rescue operations in Baja Calif. in late Dec. and early Jan. Involved W6GRF, W6JDC and W6DQ. W6AGT, W6BMM, WA6HXE, W6EIQX, W6SRS appointed Disaster Communications chmn of S. D. County Red Cross. New AREC nets: Tue. 1930, 147.6/303 MHz; Wed. 1900, 50.225 MHz (am). We lost a good friend and active supporter of NIS and AREC with the death of WA6DMB, in Dec. Patman had reported WA6RM as a Silent Key. Gene worked for Collins Radio after retiring from Marines. WA6GDC new Tech; welcome aboard, Paul. Upgraded to General, WA6KAU, member San Diego Mountain Rescue Team. Now active on 6 meters. WA6COE WA6PPG WA6PWA. Pancake breakfasts (2nd Sat. each month) at Normal Heights United Meth. Church continue to attract many ears. Try it if you'll like it! WA6HGK has portable 2-meter repeater for emergency use. W6DEY keeping check on 6 meter activity. Traffic: (Dec.) W6GBF 235, W6PZO 68, W6DEY 33, W6TZV 12, W6EFRF 10, W6AFU 9, WA6IK 2. (Nov.) W6PZO 45, W6TZV 8.

SANTA BARBARA: SCM, D. Paul Gannon, WA6DIE - W6SMJ new pres. of Satellite ARC. They are making plans for the 1977 Division Convention in Santa Maria. W6BHW chmn. and friends. W6BHW attended the annual SBARC dinner meeting. Over 50 attended an installation dinner for the Poinsettia ARC where WA6DEI installed new officers. The Poinsettia ARC purchased a 2.5 kW generator for emergency use. SBARC sponsoring code classes in Santa Barbara at Harwood. WA6EJC chmn. of Interference committee. The Satellite ARC classes produced 10 Novices and 1 Tech. Contact W6BHW or W6BGRW for info. on new class. W6BGRW NCS of Santa Maria ARC net Mon. at 1930 on WR6AHZ. W6BHWJW obtained assistance for an injury accident using WR6AHZ. W6BHWJW who called the CHP. W6BVG headed checkpoint comm. for Baja 1000 road race in Nov. Herb also NCS of Section SSB AREC Net 3935 Wed. at 1730. Comms for Camarillo Parade handled nicely by the AREC. Participants WA6S BIV B5Q DEI GZY QFC UEO ARU HCD JKG W6Q WB6CMI RW GAE W6PMM ORU K6GYL. W6BVG assisted W6MBZ with Novice classes in Paso Robles. W6PRP has new Memory Keyer. WA6MBZ completed Accukeyer. WR6AHZ a 100-ft tower. WA6VRN new Yaesu Twins. WA6EJO W6BEGW new TS-920 transceivers. W6BDHW new tower and quad. W6B6JKM new TV typewriter. WA6DEI a new ST-6. W6IHW received special letter from the Navy for W6IHW's participation. WA6WE passed Advanced. WA6CCK visited Germany and Switzerland. RTTY stations needed for TRICAR Bulletin Net on 3605 at 1730 Mon. PSRR: VGC 6, YX 29, MXM 46, 11W 25, DEI 44. WA6WYD handled 119 msgs on MARS RTTY. Traffic: (Dec.) W6BZX 245, WA6DEI 173, W6B6XIM 66, W6B6JKM 9, K6GYL 8, K6QPM 5, W6B6JW 4, W6POU 3. (Nov.) K6QPM 24.

WEST GULF DIVISION

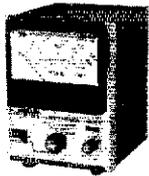
NORTHERN TEXAS: SCM, L. E. Harrison, W5LR - Asst. SCM: Frank E. Swell, W5TJZ. SEC: W5DWL. RM: W5GL. PAM: W5GSSN. Dallas ARC Bulletin publishes nice calendar monthly showing meeting dates Metroplex Clubs. CBS 566 shows handwriting on wall for us "Code-die-hards". SET week end Jan 24/25 history when you read this. Minute 64 Jan '75 ARRL Board meeting applicable to Amateur Service. W5QPK sends another FB report for CO work as does W5TI and others. EC K5CZC now living Big D area. Smith Co. Emergency plan received thanks to W5SMOT & W5ASNG. W5CCE plus 500 plus liaison stations. W5TI reports 269 messages cleared &

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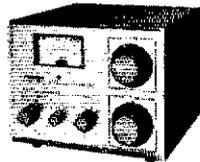
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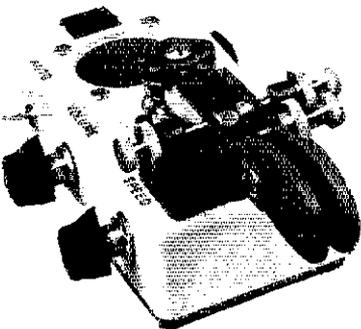
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divided between Eyebank, 1X Net & ARTS (Amateur Radio Telegraph Society). Contrary to WBSIR's on making Extra Class, K5BDC made Advanced also active with RACES, TB, WA8SWM/5 moved to Dallas wants keep up with CW W5QU advised, EC W5NFO Asst. SCM WTK area submitted excellent info relating Minutes 29 May '75 Board Mtg. In joint meeting Dallas-Ft Worth-Tyler QCWA Chapters well attended per W5QGZ's report. W5GQX continues report 49 monthly observations which showed 6 "Hams" holding Extra Class License for T9C discrepancy. (Director, Asst. Dir. & other SCM's take note.) It is indeed wonderful that we can do our own policing within our Midwest Group. It's really wonderful to read some of the cards and letter brother amateurs send back to our OOs. WA5ZZA has forwarded a full report of recent ICC traffic meetings held in various cities of the U.S. To the uninitiated a brief story of traffic U.S.-wise could be depicted as saying US is divided into three areas with northern & southern Divisions operating the same as special committee on operating ability of activities concerned. If you are interested please break in and join 'em. W5PIT wants ORS. Houston QCWA crowd discussing group meeting with Santone & Austin bunch slated for Shulenberg. Kilocycle Club FTW K5AH reports FB Christmas party. Club repeter call W5BDC. Reports AREC list shows W5SHN W54K1T, WA5UOC W5BCB & W5GY. New EC Gregg Co. W5BCKH. Traffic: (Dec.) W5QU 429, W5TI 269, W5BMFQ 164, W5SDXB 55, W5SGII 8, W5LR 8. (Nov.) W5QU 203.

OKLAHOMA: SCM, Leonard Hollar, WA5FSN - PAMS: WBSAZ5, WA5OUV, WA5QPP, RMs: W5RB W5BNKD, W5SLHG has moved from Bartlesville to Midwest City. ALEC reports in Education Dept. is offering 2 hours credit to students obtaining their Novice license. Also have heard of many classes going on all over the state, but no late reports on results. Altus, Broken Arrow, Enid, Oklahoma City and Shawnee are among those that I have heard of. Altus Club in process of forming the amateur section of the Emergency Operating Center thanks to some help from City Council. An active group, doing a fine job of promoting Amateur Radio. K5TEY has moved to a new QTH and is back on the air. We are saddened by the loss of W5CZB, Silent Key as of Jan 3rd. Jerry was the Granddaddy of the OK Storm Warning Net. His yearly reports on traffic and the Holiday Traffic load all of which was well-handled by a line group of operators. Traffic: W5RB 333, W5BNKD 247, W5SELG 145, WA5JGU 119, W5REC 81, W5BNKC 66, K5TEY 62, W5SLG 43, W5BKGK 42, W5BAZ5 40, W5BOYU 38, WA5QGP 38, W5PML 27, W5ASLV 20, W5FKL 18, W5ADC 10, W5JJ 5, W5BNMZ 2.

SOUTHERN TEXAS: SCM, Arthur R. Ross, W5KR - SEC: W5BSCUR, RM: W5UGE, PAM: W5AMN. Oos reporting this month: WA5LTK K5BSZ. OVS reporting this month: AD5LZJ and a late Nov. report from K5LZJ. WSAC at TX A&M has new Heathkit SB-104. OPS WAUX/5 reports "Rio Grande Valley QCWA Chapter chartered in Dec. OVS AD5LZJ has examined applicants for 11 Novices, and a technician, one Conditional EC W5TFW says his club had grand Christmas party, 77 present. OPS W5BMNL reports that he and K5WOB and W5BMZ have helped get nine new Amateurs! RM W5JUG says he has been NCS on Christmas eve and New Year's eve two years in a row! ECORS W5LJJ working much traffic and getting in local QSOs on 2-meter air and will have 8-meter fm soon. EC/OPS/ORS W5FMA back on 2 meters. K5FRK has new CW keyboard and reader. W5QDL is new AREC member. W5NPI has completed new Heath VFO. ORS W5H11, Mgr. for 1EX 55 CW net, reports new record with 226 QNI and QTC 74 for Nov. Still needs operators for NCS and TEX reps. Get with him on 3748 KHz at 8 PM Central time. W5YZ reports big plans by Houston QCWA Chapter for National Convention. EC W5YCK sends nice bulletin The Bark from Big Bend ARC; reports new officers: W5YK, pres.; K51AG, vice-pres.; W5BHQV, secy.; W5BRLR, treas.; W5LW, ed.; W5MHO, instructor. W5HGV recently upgraded to Advanced. The BBARC also helped out with Heart A5ns. Cyclotron; also managed to get 4 new Novices going. Traffic: (Dec.) K5HZR 465, W5UJJ 375, W5KLV 299, WA5EA 293, W5SQDW 278, W5UGE 276, W5TQP 276, W5BDM 176, W5AMN 159, W5BNUM 131, W5SGVO 62, W5TFW 54, W5SLTW 45, W5BSC 34, W5SJR 18, W5CBT 3, W5LU/5 3. (Nov.) W5UJJ 225, W5OOW 110, W5BLLI 95, W5SGVO 5.

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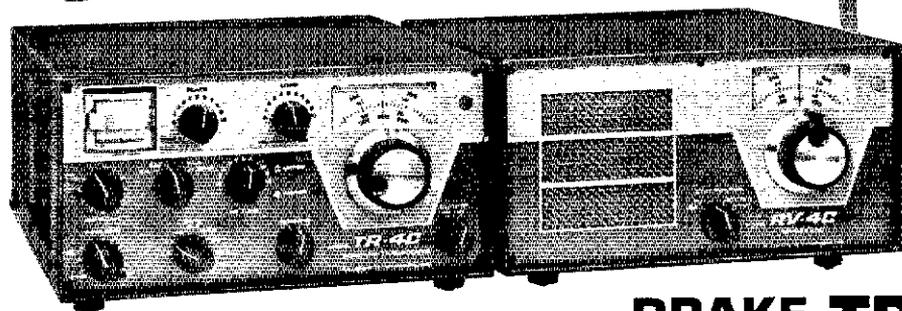
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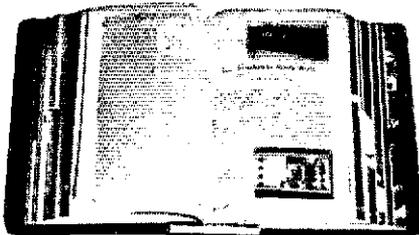


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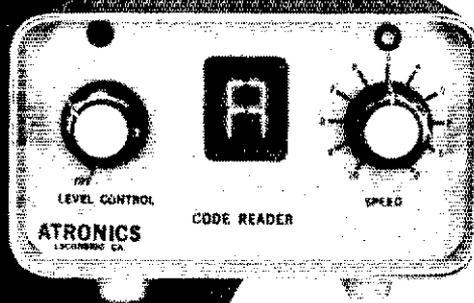


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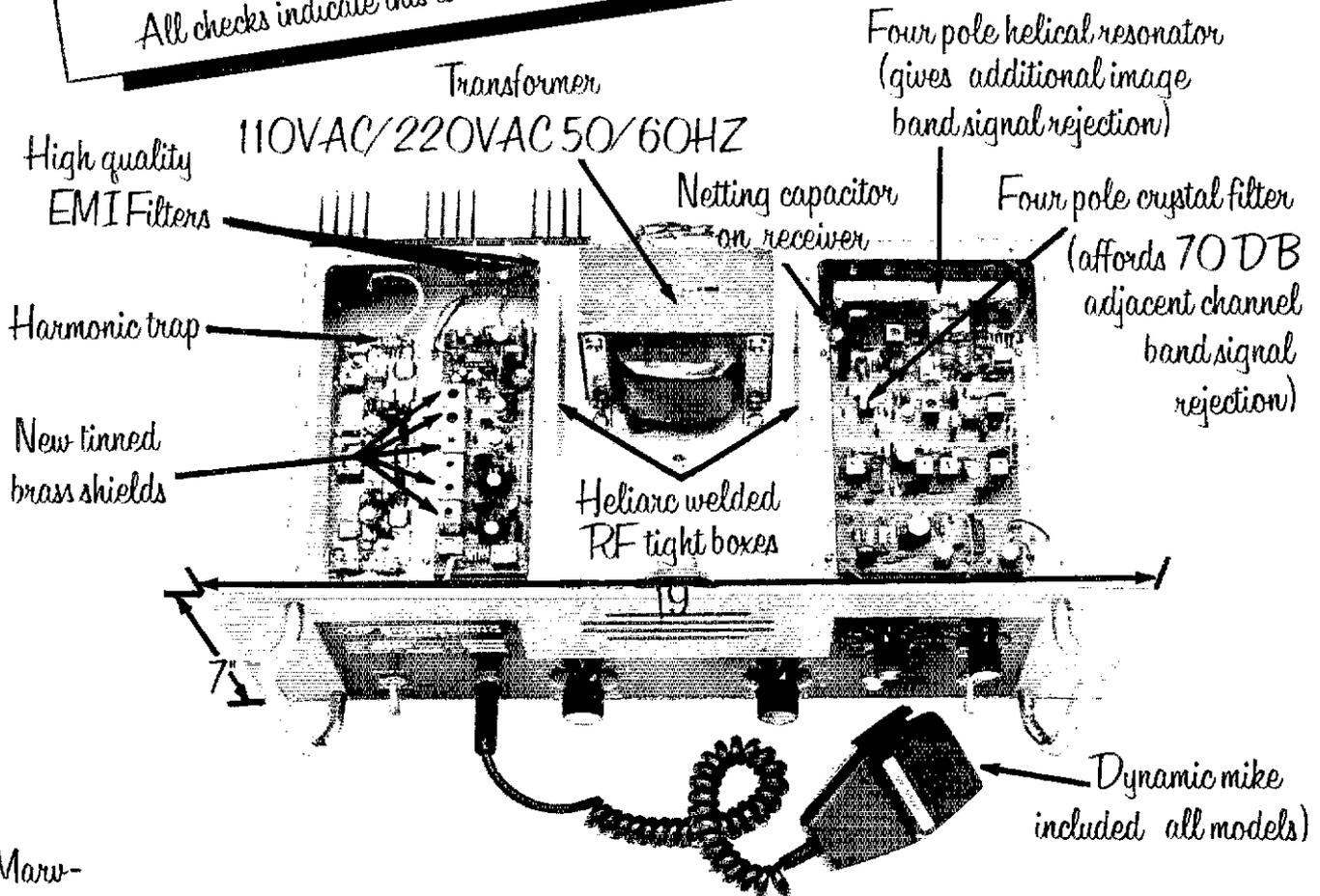
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 FROM: ROBERT BROWN, Chief Engineer

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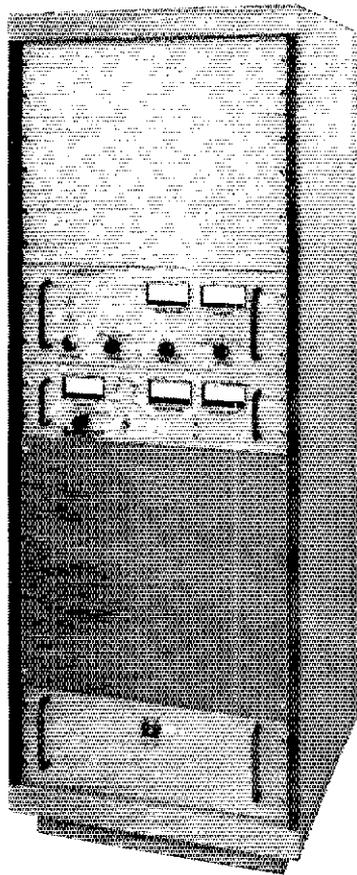
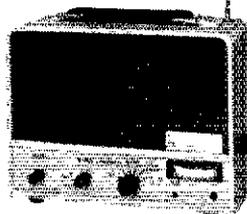
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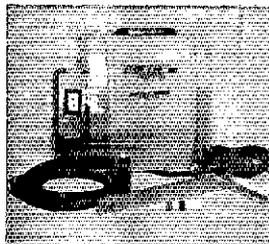
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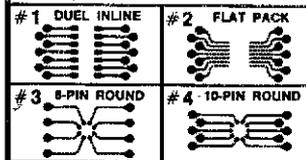
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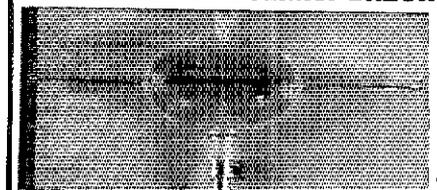
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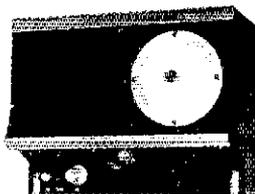
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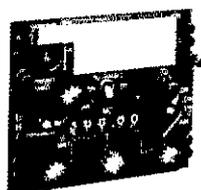
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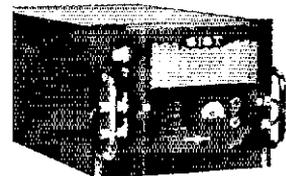
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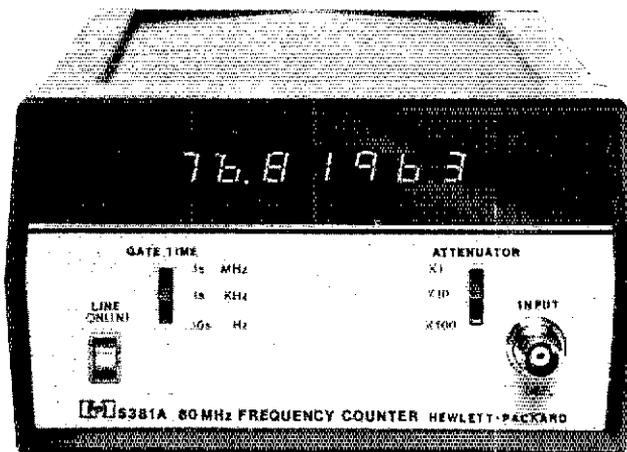
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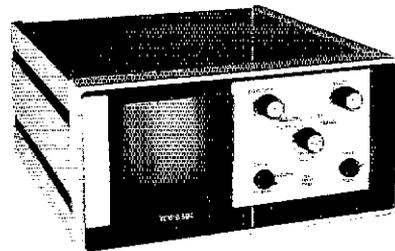
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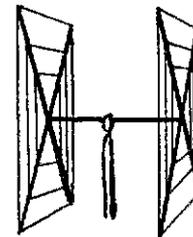
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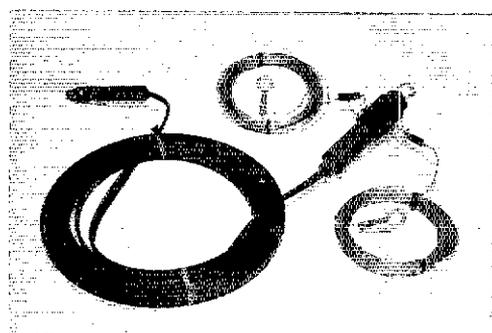
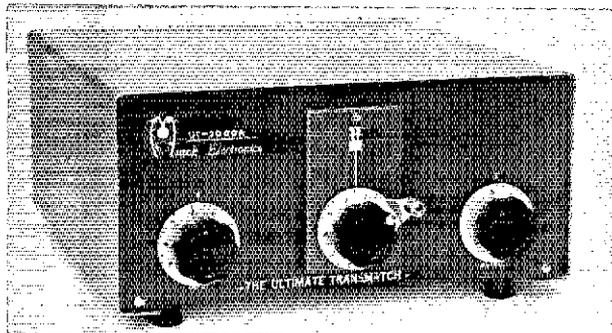
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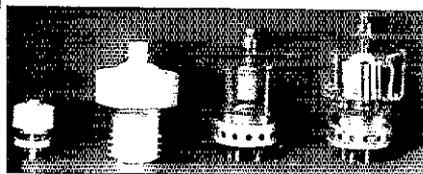
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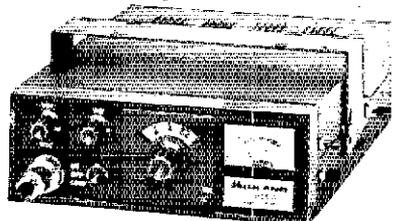


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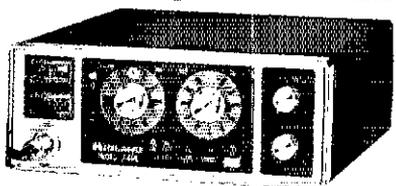
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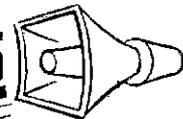
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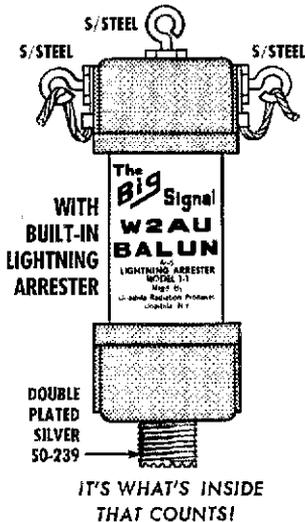
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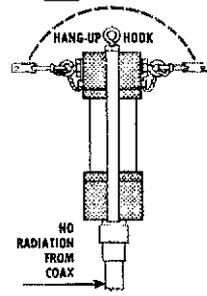
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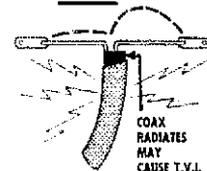
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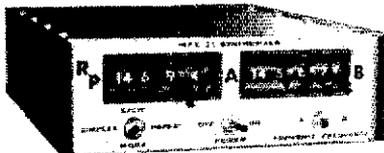


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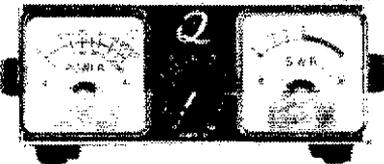
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THE 21st Annual Ham Auction, America's Largest Saturday March 13, 1976, at Lucas County Recreation Center, Toledo, Ohio. Auction, Flea Market, Commercial Displays, Prizes. 8:00 A.M. to 5:00 P.M. \$1.50 Advance, \$2.00 after March 1st. Talk-In 146.52. Send S.A.S.E. Toledo Mobile Radio Association, Box 273, Toledo OH 43696.

ROCHESTER Hamfest 1976 combined with the N.Y. State ARRL Convention is Friday thru Sunday, May 21-23. FCC exams. Flea market Saturday only. Your name added to mailing list or information - write Rochester Hamfest, Box 1388, Rochester NY 14603.

F.M. BASH, Dayton, Ohio, April 23, 1976, on the Friday night of the Dayton Hamvention. This is a social evening for all Hams and their ladies from 9PM till midnight. Free admission, free snacks, C.O.D. bar, live entertainment by TV personality Rob Reider (WVA&GF) and his group. A new larger location at the Dayton Biltmore Towers, (First and Main St. 45402) will accommodate the crowd and afford 3 alternate routes to the Hamvention Center. Make your reservation direct to stay where the action is.

25th Dayton Hamvention at HARA Arena April 23, 24, 25, 1976. Technical forums, exhibits, and huge flea market. Program brochures mailed March 8th to those registered within past three years. For accommodations or advance flyer, write Hamvention, P.O. Box 44, Dayton OH 45401.

LIMARC runs the largest NYC area Flea Market. Sunday May 16, NY Institute Technology, Old Westbury. Talk-in 25/85 - W2KPK.

HAMFEST! Indiana's friendliest and largest Spring hamfest. Wabash County Amateur Radio Club's 8th Annual Hamfest will be held Sunday, May 23, 1976. Rain or Shine, at the 4-H Fairgrounds in Wabash, Indiana. Large flea market (no table or set-up charge), technical forums, bingo for XYL's, free overnight camping with AC hookup, plenty of parking. Lots of good food at reasonable prices. Admission is \$1.50 for advance tickets, \$2.00 at the gate. For more information or advanced tickets, write Bob Mitting, 663 Spring Street, Wabash IN 46992.

MOULTRIE Amateur Radio Klub 15th annual hamfest April 25, Wyman Park, Sullivan, Illinois. Indoor-outdoor market. Advance ticket sales by mail only. \$1.25 or \$1.50 at gate. Write: MARK PO Box 327, Mattoon IL 61938.

TREASURE Coast Bicentennial Hamfest - Sat-Sun March 20-21, 1976. The "Biggest Little Hamfest in America." For info write: K4QM P.O. Box 3088 Vero Beach FL 32960.

KENTUCKY Ham-o-Rama - Sunday May 30 (Memorial Day Weekend) at Boone County Fairgrounds, Burlington, Kentucky, 10 minutes south of Cincinnati, Ohio near I-75. Prizes, forums, XYL program, P.O. Box 31, Fort Mitchell KY 41017.

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NORTHWESTERN Pennsylvania Swapfest. May 1, Crawford County Fairgrounds, Meadville, Free Admission. \$1 to display. Flea market begins at 10: AM. Refreshments. Commercial displays welcome. Indoor if rain. Talk-in 146.04/64 and 146.52 MHz. Details, Crawford Amateur Radio Society, Box 653 Meadville PA 16335.

ROCK RIVER Hamfest — April 25. Amboy, Illinois Lee Co. 4th Center. Jct. 30 & 52 Same place as last year for further details see hamfest calendar \$1.00 advance gate \$2.00, write Carl Karlson W9ECF, Nachusa IL 61057.

W6LS 11th Burbank California Hamfest. Saturday and Sunday, May 15 & 16, Flea Market, Prizes. 2814 Empire Avenue, Burbank CA 91504.

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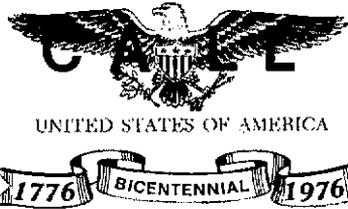
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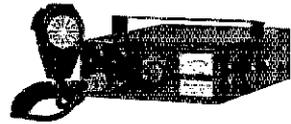
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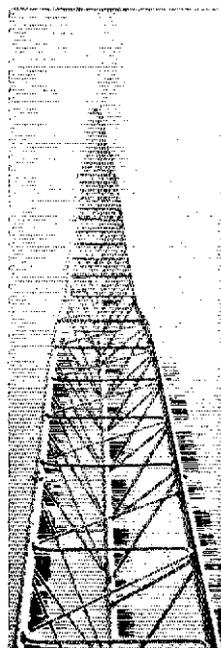
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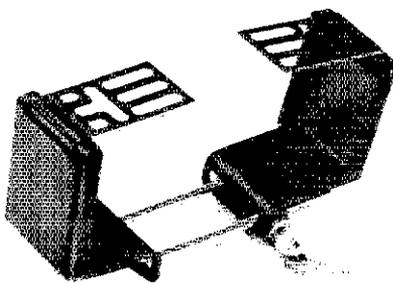
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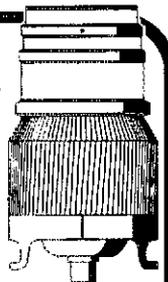
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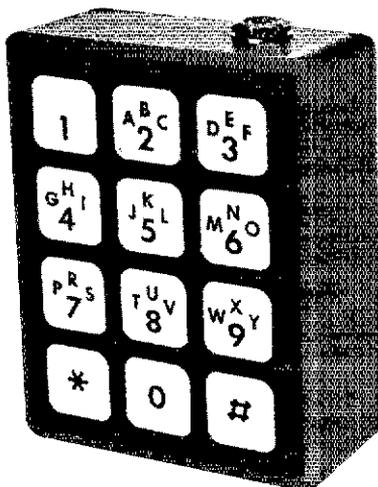
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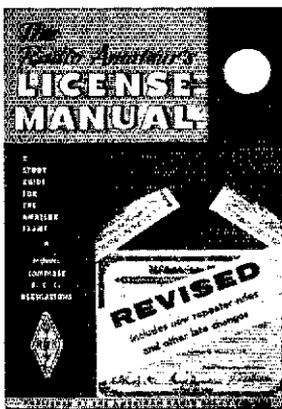
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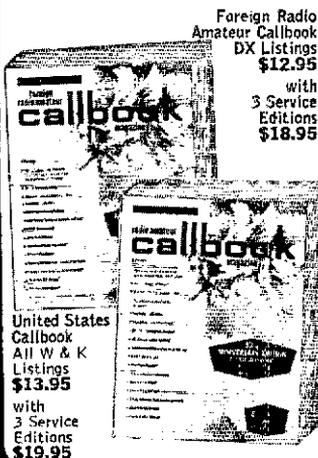
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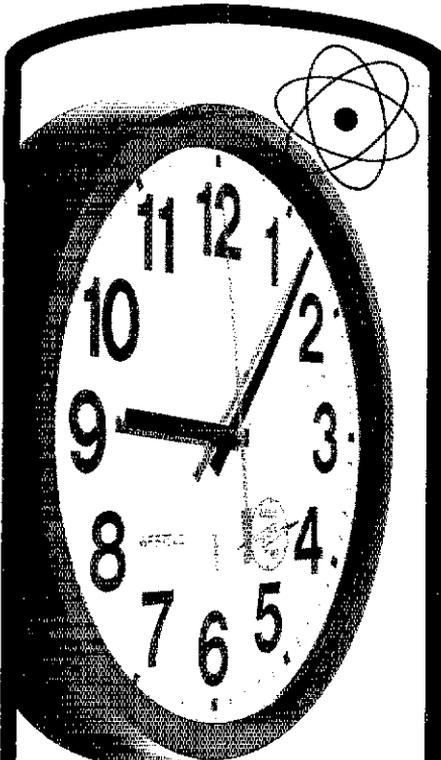
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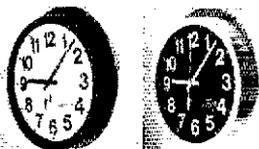
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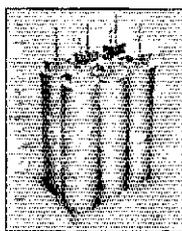
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WANTED: HW-22, FT-101, HP-23, HP-13, SB600, HS-24 mobile speaker, 40 mtr mobile ant. Mail reply only. WB9HPJ, 6649 So. Fairfield, Chicago IL 60629.

WANTED: Collins 75A-4 burner tuning knob. WB0MRX, 925 S. Madison, Junction City KS 66441. COLLINS R-390A wanted. Donald, 6059 Essex, Riverside CA 92504. (714) 687-5910.

MAGAZINES, books and other electronics publications wanted by collector; buy/swap. Donald, 6059 Essex, Riverside CA 92504. (714) 687-5910.

Galaxy V MK2 transceiver speaker console AC 400 P.S. 2x4 Xtal mike \$20. Estate of W. A. Kirk, Contact R. Black, 208 Clark St., Brockport NY 14420.

STATION for Sale: T4X, AC3; \$350; R4, MS4, Xtra Xtals, \$240; together, \$540; SB220, \$325; 1A-36, \$150; 4-EL quad 10-15-20 \$100, on air, will demo. Bob, WA2RJZ (316) 585-9235.

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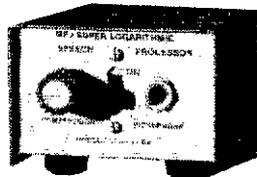
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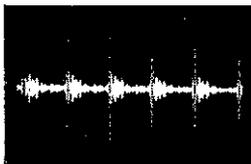


Fig. 1 SSB signal before processing. See the high peaks and the low valleys. Our NCX-3 is putting out only 25 watts average power.

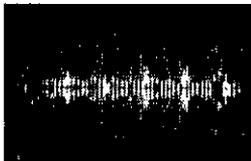


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WANTED — Atlas 210, N.B. mobile mount. Will trade SB104, HP1144 SB-104-1-2, W3GMX. SavaCool. 121 Villar Drive, New Castle, DE 14720. (302) 322-4839.

QST — 1933/1957, 200 copies, many years complete, listing from Wessell, W2AAZ, 5819 Fieldston, Rd., Riverdale NY 10471.

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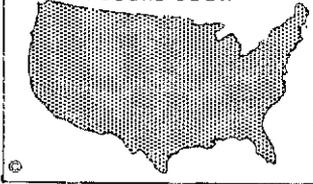
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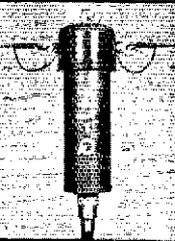
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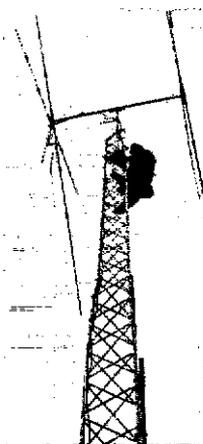
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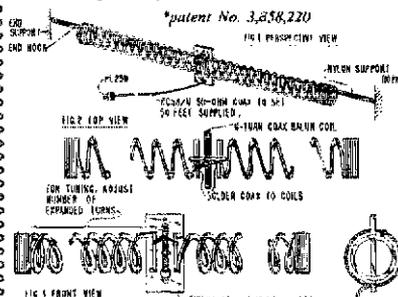
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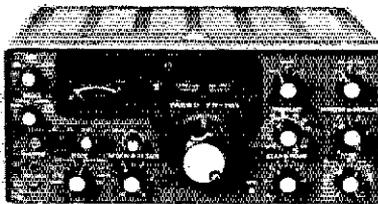
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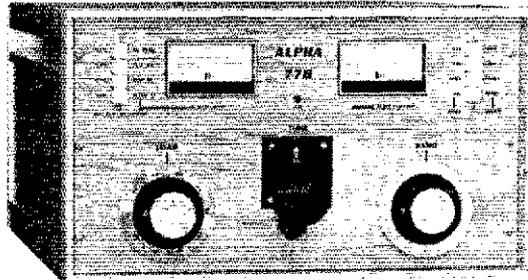
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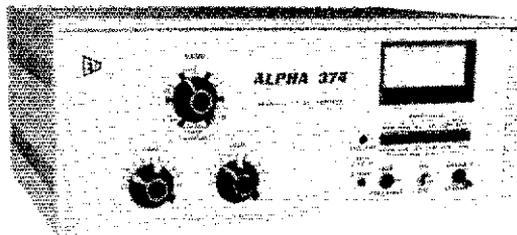
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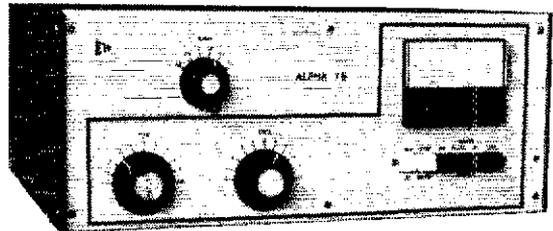
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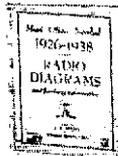
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DRAKE 2-c receiver, 2 CQ speaker, accessories. Heath DX 604, 10B, 6C, relay, cable, new tubes, antenna, \$300 - Scott WN2VNO; (516) 744-1867.

SB104, HP1144, SB604 just factory checked and in excellent condx., with all updates. Need money for summer school. Will sell for \$650, 1 ship. Rand Johnson, WA7RLT, 1929 Dry Slough Rd., Mt. Vernon WA 98273.

EXCELLENT - SB401, crystal pack, \$350 - SX117, realigned by W9YKA, \$180. Both \$500, you ship, WB5HHH, Box 6415, Waco TX 76706.

SBK-101 mint WAC, speaker. For tuition - \$350, pickup only. WB2G QJ1, 64 Lawn Ave., Middletown CT 06457. (203) 346-4775.

NOVICE Gear: Eico 720 transmitter, \$90, National NC-155 receiver, \$100, Hallicrafters HA-5 VFO, \$45, Hy-Gain 1R/AVT/WB 10-80 ant., \$65, or all for \$250. You ship. Jim Johnston, 860 W. Main, Platteville WI 53818.

FOR SALE: Valiant transmitter - \$145; Drake 2NT - \$127, R4 - \$249; Hallicrafters S-20R - \$offer, SX-96 - \$125, SX-101 - \$148; SCM Electra 120 - \$149.50; IBM Selectomatic - \$374; Sanyo Answering Machine - \$129.75; Kodak Retina 35mm - \$72.40; Bushnell 7x35 - \$36. Don Bradley, Box 222, Glen Ridge NJ 07028.

WILL pay cash. Any or all. James B. Lansing speakers. One D130A. One D21b. One N1200. Two 175 DLH assemblies. 100 Mile area NYC K2UJJ, (516) 798-8056 evenings.

RC-17U Connectors (new) plugs, receptacles, elbows \$4. Simpson Voltmeter model 260 \$25. Hickock VTVM model 1600 \$49. HP VTVM model 400 D \$55. HP Audio Oscillator \$10. Thomas W2UK, Juniper Place, Colts Neck NJ 07722.

SELL: Hallicrafters HT-37, \$150. Heathkit HW-22A, AC, DC Power Supplies, \$160. Bruce Prindle WB2RLL, R.D. No. 2, Hamilton NY 13346. (315) 824-1325.

WANTED Collins 305-1 high voltage (transformer and inductor), 1 Shore Box 268 Rt. No. 1, Yackinville NC 27065, (919) 961-6230.

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SELLOUT Hallicrafters HT 44, SX117, Loudenboomer, keyer, 18HT, scope, 5 mtr filter, misc. Send stamped envelope for prices and details. Ira Miller WA7SIT 5630 S. Heather Dr. Tempe AZ 85283.

DAYTIME weather net (3705 kHz, 1500Z) needs members especially amateur meteorologists capable of receiving Canadian and USA Government weather broadcasts at the 200 to 400 kHz band. Copy broadcasts and furnish reports for amateur weather map construction. Write Jim Collier W2QBB 100 Redwood Terrace Williamsville NY 14221.

SELL: TR-4 w/NB, AC-4, GR-54, crystals, key, ham, electronic magazines. SASE. Ross Mosler ex-WN6DEF, 10452 LeConte, LA CA 90024.

RTTY: New ST-5 demodulator with autostart, all usual features, \$140; same with AK-1 tone generator, \$180. Both UPS prepaid 48. Fred Firestone WB9IEE, 806 N. School St., Normal IL 61761.

FOR SALE - too much equipment - Collins KWM2, No. 10119, with 516F-2 - extra clean - \$625. Drake 2C receiver with matching speaker, almost new, \$155. Raytrack autolevel, \$22. Collins F455-FA-31-6550 filter, \$20. Prepaid in 48. Jack Yeoman, WBVHY 3284 Yeoman Rd., Washington C.H., OH 43160.

CLEGG FM27B latest model nearly new, never mobile, used little \$349.50 with s.a.s.e. Morton Jacobs MD, K0EPJ, 6416 Verona Road, Mission Hills KS 66208.

WANTED: Raytheon MV-225 Micro-vernier control knobs with round dial skirt. Sell TVT-11 with P.S., KY8D, cursor, screen read and memory. Partially assembled, no connectors \$225. Mike Bruski, Box 15 TST, APO San Francisco CA 96263.

WANTED: VHF magazines such as VHF Horizons, VHFer, 6-UP, The VHF Amateur, etc. WIGUD, Ron Vanke, 173 Shear St., Wrentham MA 02093. (617) 384-2281.

WANTED: Used Collins gear. Advise price - I'll pay shipping WA9UCE/6, 178 Paseo Robles, Anaheim CA 92807.

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Jobs for Hams

R. f. engineer wanted. Ham/CB background preferred. Ground floor opportunity. Call Gold Line, Mr. Landelius, at (203) 838-6551.

WANTED: Electronic instructor, general, Theory, workshops, Summer science camp. Write Epstein 4 B 440 Westend Ave., New York NY 10024.

HAM Radio and Electronics Counselor for children's summer camp, 19 years or older, general or advanced class license. Experience as a camper or counselor helpful. H.R. Saphir, 62 Howard, Tuckahoe, NY 10707.

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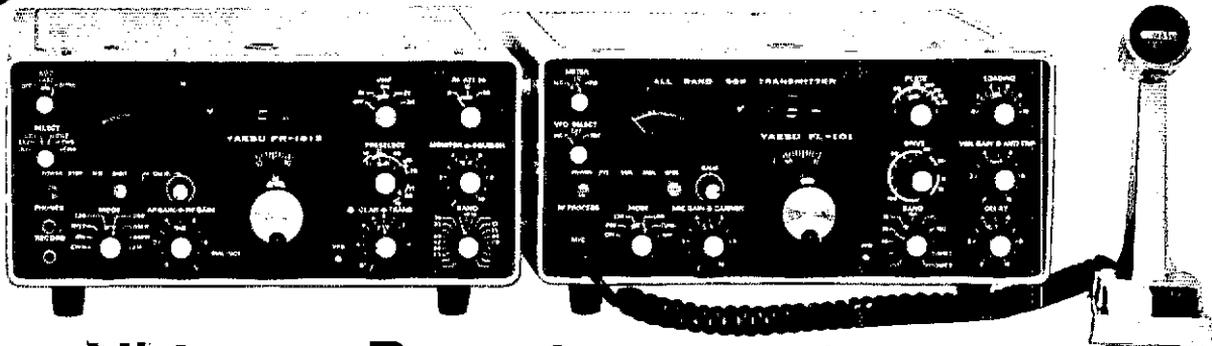
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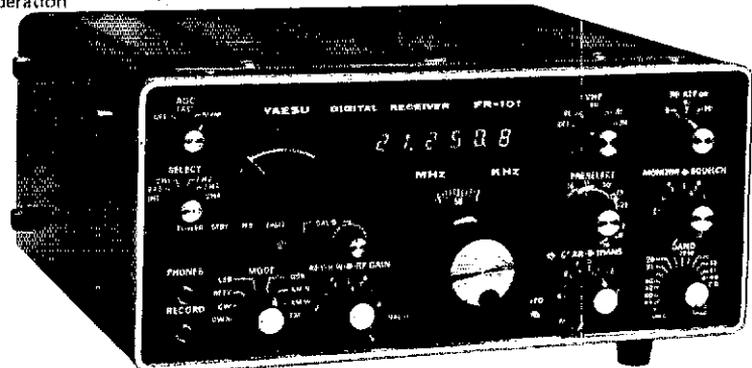
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