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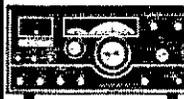
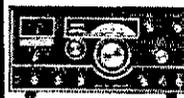
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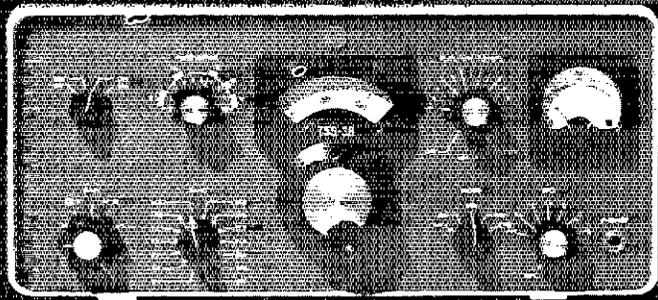
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QST

SEPTEMBER 1971

VOLUME LV NUMBER 9

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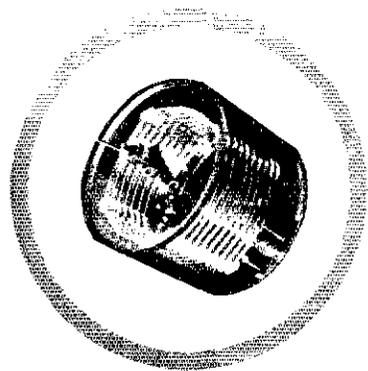
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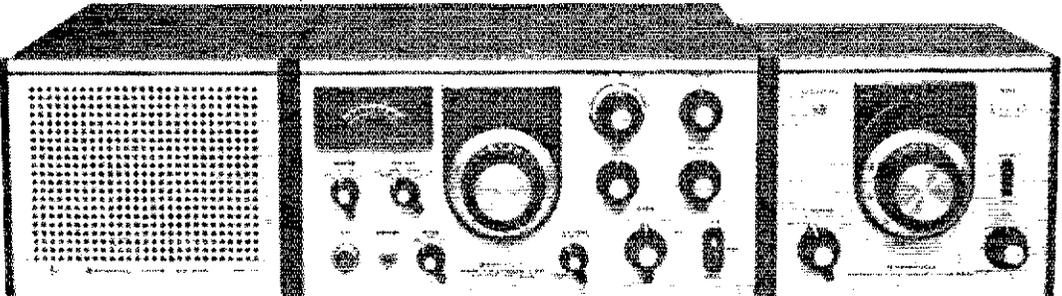


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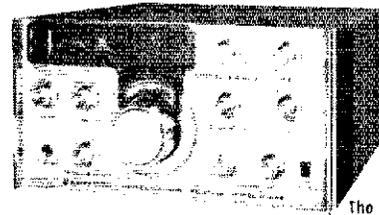
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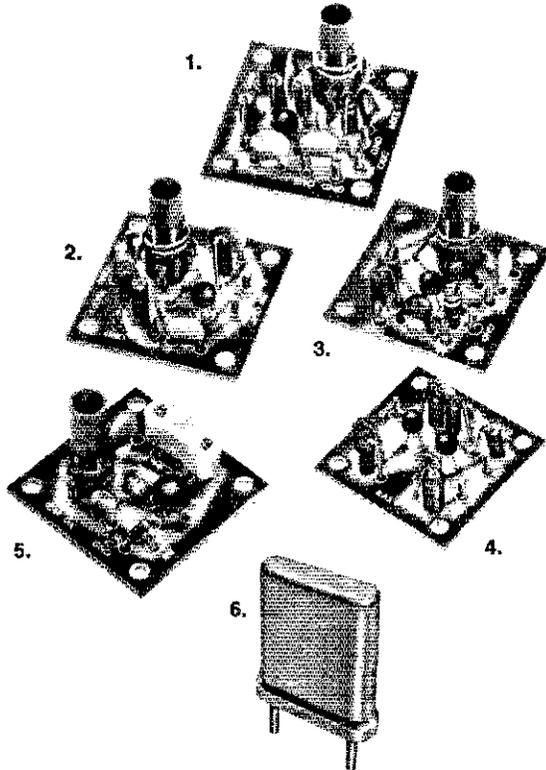
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* Member Executive Committee

"It Seems to Us..."



220 MHz CB?

THE EIA (Electronic Industries Association) has petitioned FCC (RM-1747) to take nearly half the 220 MHz band from amateurs and give it to Citizens Banders.

Why?

Because (according to EIA) there is an "ever-increasing need" for personal two-way radio; CB has outgrown its 27-MHz home; and the portion of 220 remaining would still provide "ample room" for amateurs.

Let's take a closer look.

There has been some discussion that the 220 band is not much used by amateurs, and therefore diversion of part of it would not be injurious to us. Such an expression indicates a less than accurate knowledge of what is going on in vhf ham radio today. Most certainly 220 has been *relatively* lightly used. But the big thing in our vhf communications the past year or so has been the expansion of two-meter repeaters, largely fm. The population on 144 MHz has increased to the point it nearly competes with 20 meters for the most stations-per-channel. Indeed, if you live anywhere near the population centers, you know that finding an unused 2-meter spot for a new repeater is difficult and nigh-impossible.

The next logical step is 220, and indeed the move of repeaters to that band has already commenced. Added to the small but avid population of experimenters already on the band, occupancy is increasing rapidly. It is *not* a correct statement that a diversion of some of the present 5 MHz will work no hardship for the amateur service.

But more important, does the Citizens Radio Service really need more space?

Surely some portion of the present Class D activity, as piously claimed by EIA, is composed of those who abide by the rules and regulations, and in some instances actually perform public service. But anyone who has ever listened to 27 MHz long enough (i.e., has a strong enough stomach) to know what is really going on has a difficult time finding any such activity among the forbidden skip and ragchew communications, use of high power, 100-foot antenna towers, foul language, fictitious calls — and blatant challenges to FCC to catch them! Ask any FCC field engineer what his biggest headache is.

EIA says of its proposed new "Class E" service: "Operating regulations must be simple to understand and easy to administer." There follows a suggested subdivision of the 80 channels into *18 different restrictive categories* that makes amateur incentive licensing subbands look like child's play.

EIA does, however, propose simplification of the application form — with a vengeance. The purchaser could go on the air minutes after buying his equipment. He would fill out a simple form and *self-assign call letters* by the initials of his state plus the last six digits of his Social Security number. Instant license! FCC doesn't even have to answer.

But would there really be a need for additional channels if those who abuse the CB license were properly policed? A government study of CBers themselves, conducted by the Census Bureau under contract with FCC, seems to answer that question. It hasn't been publicized much — certainly not by EIA! — but it provides some most interesting and pertinent information. Three-fourths of the respondents are actively using their Class D licenses, which somewhat puts the lie to the claim that 27 MHz crowding is so bad communication is nearly impossible (the activity figure in ham radio is more like 50%). Further, while all such survey results are subject to individual interpretation, the report seems to say that of the active CB group, 70% find 27 MHz useful and worthwhile despite the problems caused by skip-talkers and hard-core violators. The remaining 30% feel that if the scofflaws were eliminated, the present 23 channels would be quite adequate!

So who is asking for the space? Not the CBers, if this government survey is accurate. That leaves the manufacturers, and their industry association, and the \$ sign. It also helps explain why EIA, in the past largely a supporter of amateur radio, more recently has on occasion become derogatory and critical of amateurs (see page 9, February *QST*.)

There's no question the Citizens Band has been a gold mine for manufacturers.

(Continued on page 23)

League Lines . . .

The ITU Space Conference just concluded at Geneva dealt with allocations as low in frequency as a few Megahertz. Had not the three IARU regions and Hq. been present in strength on behalf of amateur radio, the outcome might have been considerably different than that reported on page 78, this issue. Every member can be proud that ARRL supports and finances the activities, including travel, of IARU Hq.

Speaking of ITU, there are more job openings at exotic overseas areas -- frequency management and monitoring expert, Ceylon; transmission expert, Niger; communications instructor, Iran; switching instructor, Turkey. Contact Mr. Denning at Department of State (202) 632-1046.

The case for leaving amateur regulations precisely as is, rather than (as FCC proposes in Docket 19245) add new restrictive rules on message-handling rights, is beautifully put by W3MR in a filing with the Commission; see "Correspondence" this month for the text. ARRL's comment, to be in the same general vein, is in preparation.

The listing of repeaters issued last month by Hq. is an advance edition, produced ahead of normal schedule to provide summer vacationers with useful information extracted from the first registrations received by ARRL. (Send a business-size s.a.s.e. to Hq. if you'd like a copy.) A later directory will include data being collected by the VHF Repeater Advisory Committee, which was not available at the time the preliminary compilation was made.

Just at press time we received word that the "Goldwater bill" to permit amateur licensing of immigrants has passed the House as well as the Senate, and is on the President's desk with signature expected any time.

Movie producer (Ham's Wide World, This is Ham Radio) Dave Bell, W6BVN, is looking for 16-mm. film covering actual emergency communications activities by amateurs during disasters. The intent is another documentary on our public service performance. If you have (or know of any) such, please contact him at 1011 N. Cole, Hollywood, Calif.

And speaking of film, the 15-minute youth-oriented "This is Ham Radio" is an ideal means of carrying the amateur radio story to youth (anyone under 30, that is!). How's to convince your school audio-visual people, or the local radio club or council, to acquire a permanent copy for \$100? It will be useful for many years.

Although we've not made a precise count, ARRL membership shows a definite uptrend the first half of this year. One likely reason is to beat the dues rise, an action which now appears inevitable at the 1972 Board meeting. Life Membership is growing by leaps and bounds as well.

A new edition of ARRL's Articles of Association and By-Laws, incorporating changes made at the 1971 Board meeting, is now ready for distribution, free to any member. The pamphlet also includes rules of the Communications Department, club affiliations, convention approval procedures, and advisory committee rules. A business-size s.a.s.e. would speed our handling of your request.

Quote-of-the-Month (SCM WAØHLQ) in the Denver "Round Table" -- "Many frustrations will come to you as a member of ARRL, just as with any organization. However, many more rewarding experiences are awaiting the amateur who joins the League, becomes actively involved in League affairs, and works for the advancement of amateur radio through the ARRL, not around it."

An 80 — 10-Meter FET Preselector

BY DOUGLAS A. BLAKESLEE,* W1LKL,
AND AUGUSTUS M. WILSON,** W1NPG

IT IS often necessary to put new life into tired or inexpensive receivers, especially when operation is marginal on the three higher hf bands — 14, 21, and 28 MHz. A preselector of the type described here can pep up the front end of such receivers while at the same time offering additional selectivity on all the hf bands. The latter helps to reduce images and generally improves the reception on some of the low-cost receivers. Often, signals heard on the amateur bands actually originate on quite different frequencies. They appear on ham sections of the dial as a result of image reception or overload of a receiver mixer.

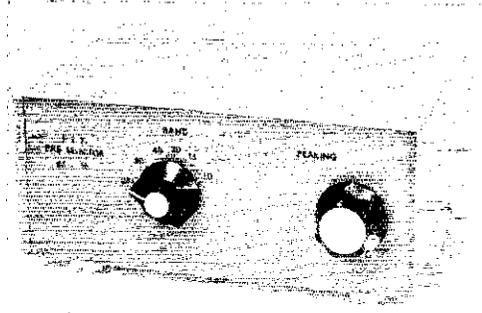
Circuit Details

This preselector is self-contained, except for the power supply, and no modifications are required in the receiver used. The diagram of the unit is shown in Fig. 1. Input and output tuned circuits consist of the preselector tuning capacitor, C1, and high-Q coils wound on small toroid cores. Each coil has a trimmer capacitor for alignment purposes. A secondary winding is added which serves as the input or output 50-ohm link. Band changing is accomplished by S1, a multipole miniature switch. An "off" position is included so that the preselector may be bypassed when it is not required.

Two JFETs are operated in a cascode circuit. The advantage of this arrangement is that the capacitance between input and output is only a fraction of a picofarad — so low that neutralization is not required in the hf range. Current drain is low, so the preselector may be operated from a 9-volt transistor-radio battery if desired, with only a slight loss of gain and dynamic range. Otherwise, a 12-volt miniature power supply, such as the type sold for battery replacement, should be used. If battery operation is contemplated, it would be well to add a power on/off switch; otherwise, current will be drawn all of the time.

* Assistant Technical Editor, *QST*.
** Laboratory Technician, *QST*.

Inside view of the preselector. The circuit board is held off the chassis with 1/4-inch stand-off pillars. The 80- and 40-meter coils are along the rear of the circuit board, with the 20-, 15-, and 10-meter input coils to the right of the switch, while the output coils for the 14- to 28-MHz bands are to the left. Q1 is on the bottom left of the circuit board, with Q2 just above.



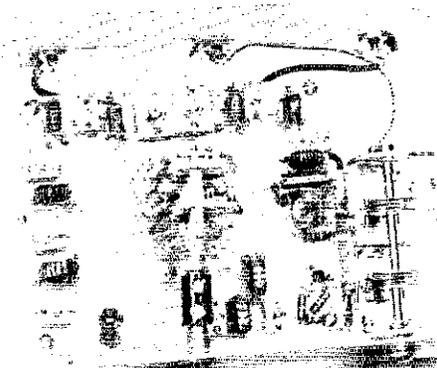
The 80- to 10-meter preselector is constructed in a cabinet made from two U-shaped pieces of sheet aluminum. Press-on feet are used. Panel decals (obtained from H. H. Smith) lend a "finished" appearance to the unit.

The gain for each band has been set at approximately 20 dB by adjustment of the turns ratio on the rf transformers. Although the cascode circuit can provide up to 30 dB of gain, care must be taken so that the preselector does not overload the succeeding stages in the receiver.

Construction

The preselector is built on a 4 x 5-inch etched-circuit board which is housed in a 7 x 5 x 3-inch homemade cabinet. The enclosure is made from two U-shaped pieces of aluminum stock. Any of the popular commercially-made cabinets may be substituted. Also, point-to-point wiring using terminal strips may be employed in place of the etched board. Whatever the assembly technique chosen, good isolation between the input and output tuned circuits is of prime importance. Any stray coupling can cause instability. If trouble develops, a shield between Q1 and Q2 may be of help.

The band switch, S1, is mounted on an aluminum bracket which is, in turn, mounted at the center of the circuit board. The toroid coils are held in place with a drop of epoxy cement. The



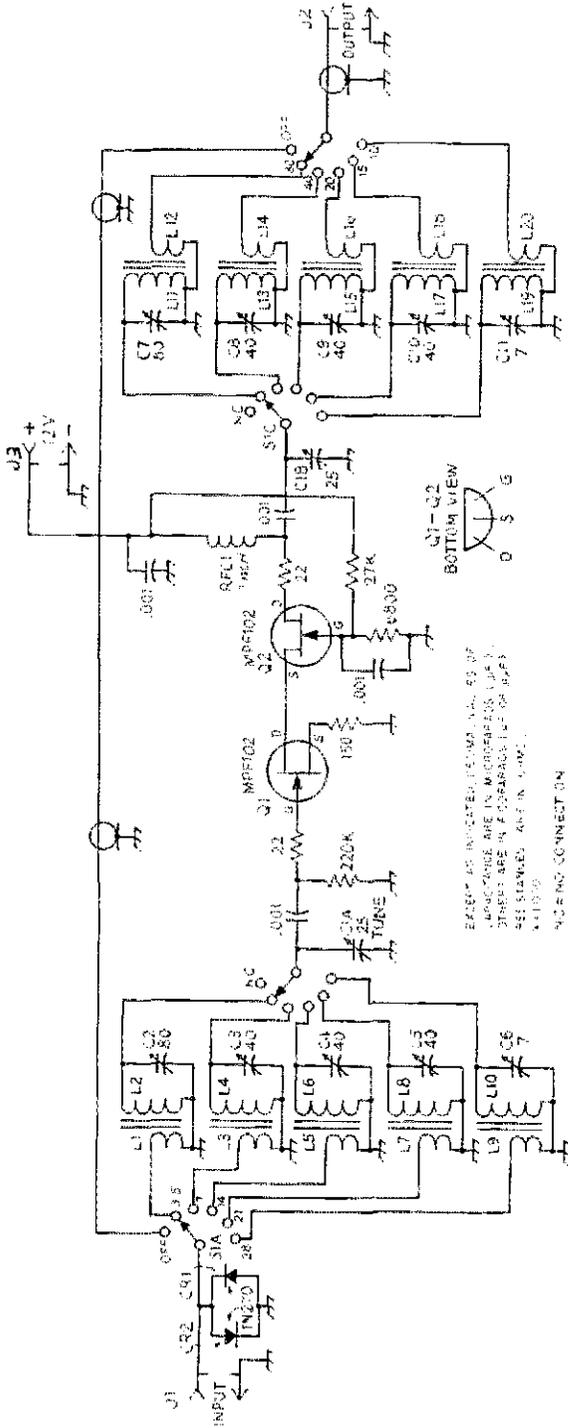


Fig. 1 — Schematic diagram of the selective preselector. Unless otherwise indicated, decimal values of capacitance are in μF ; others are in pF. Resistors are 1/4- or 1/2-watt composition and fixed-value capacitors are disk ceramic. C1 — Split-stator variable, dual section (Hammarlund HF-A-25). C2-C11, incl. — See table. CR1, CR2 — High-speed switching diodes. J1-J3, incl. — Phono jack, panel mount. L1-L20, incl. — See table. Q1, Q2 — HEP 801 or 2N5486. RFC1 — Miniature choke (Miller 70F103A1). S1 — Ceramic miniature rotary switch, 4 pole, 6 position, 2 section (Centralab PA-2011).

COIL TABLE

80	L1, L12 — 5 turns No. 30 enam. over L2, L11, respectively.	L2, L11 — 85 turns No. 30 enam. on Amidon T-50-2 core.	C2, C7 — 7.80-pF compression trimmer, Calcatro A1-247
40	L3, L14 — 3 turns No. 30 enam. over L4, L13, respectively.	L4, L13 — 40 turns No. 30 enam. on Amidon T-50-2 core.	C3, C8 — 4.40-pF compression trimmer, Calcatro A1-246
20	L5, L16 — 2½ turns No. 22 enam. over L6, L15, respectively.	L6, L15 — 20 turns No. 22 enam. on Amidon T-50-2 core.	C4, C9 — 4.40-pF compression trimmer, Calcatro A1-246
15	L7, L18 — 2 turns No. 22 enam. over L8, L17, respectively.	L8, L17 — 13 turns No. 22 enam. on Amidon T-50-6 core.	C5, C10 — 4.40-pF compression trimmer, Calcatro A1-246
10	L9, L20 — 1½ turns No. 22 enam. over L10, L19, respectively.	L10, L19 — 10 turns No. 22 enam. on Amidon T-50-6 core.	C6, C11 — 0.9-7-pF compression trimmer, Calcatro A1-245

Note: Amidon Associates, 12033 Otsego Street, North Hollywood, CA 91607

shield that separates the two sections of C1 must be grounded to the etched board with a short lead. This metal strip provides vital shielding between sections A and B. The PRESELECTOR capacitor is mounted directly to the front panel using hardware supplied with the unit. All of the trimmer capacitors are mounted on the circuit board.

During assembly, whether or not a circuit board is used, a heat sink should always be employed when soldering the transistor leads. If excessive heat reaches the body of the transistor, the device can be ruined.

The input, output, and power jacks are mounted on the rear apron of the chassis. The rf protection diodes, CR1 and CR2, are connected right across J1. Subminiature coax (RG-174A/U) is used to connect the input and output jacks to the circuit board. Sockets for the transistors were included in the original model to facilitate experimentation; they may be omitted if desired.

Alignment

The completed preselector is best adjusted with a signal generator. However, if no test equipment is available, on-the-air signals may be used. The

antenna or generator should be connected to J1 and a short patch cord run from J2 to the receiver. Start with the 10-meter band, and set C1 with the plates fully unmeshed. Then tune in a signal at the uppermost point in the band. Then adjust trimmers C6 and C11 for maximum indication on the receiver S meter. Repeat this procedure for the other bands, setting the appropriate trimmers. The lower-frequency bands will appear to tune more broadly. However, the selectivity provided by the high-Q rf transformers is about the same on each band.

If this preselector is to be used with a transceiver, the unit will have to be switched out of the antenna line when transmitting. Otherwise severe damage will result to the coils and transistors in the unit. If the transceiver has a separate receiving-antenna input, as some do, the preselector can be connected to this jack, and the feeder switched with an external antenna-change-over relay. 

The Post Office Department promises faster mail service with the new Zip codes. Use yours when you write League Headquarters. Use ours, too. It's 06111.

Strays

Remember the "Let's Talk Transistors" series by Robert E. Stoffels, WB9ESH? We've put together a reprint booklet of this 9-part transistor primer and it is available from ARRL for \$1 including postage.

The League Headquarters building is open to visitors Monday through Friday, 8:30 to 4:30 on a "drop-in" basis, and at other times by appointment. The headquarters is on Main Street (Conn. Route 176 and 176-A) about a mile north of the center of town, and about 3 miles west of Conn. 15-U.S. 5, the Wilbur Cross Highway. (For WIAW visiting hours, see the schedule in "Operating News.")

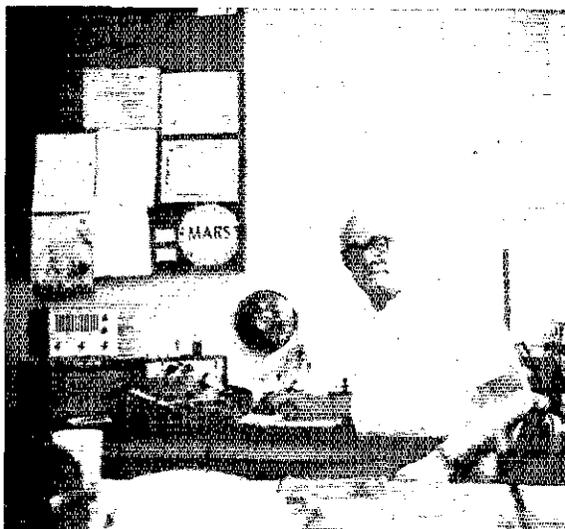
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Sorry, but no reprints of individual QST articles are available, nor are templates available unless specifically mentioned in the article.

Two recent WAS qualifiers. On the right is 64-year-young WN6MKV, about ready for his General Class exam. On the left is WN5BIR, happy to achieve WAS after 7 months hard work, and waiting for an African QSL to qualify for WAC.



A Semiconductor Curve Tracer for the Amateur *Part II***

BY RALPH P. ULRICH,* K7UVK

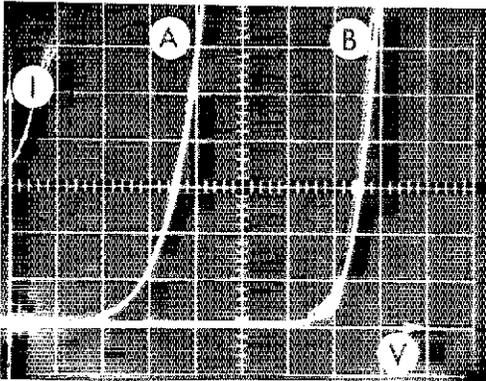


Fig. 1 — Forward characteristics.
Curve A — 1N71A germanium diode.
Curve B — 1N3005 silicon diode.
Vert. 2 mA/div.
Horiz. 0.1 volt/div.

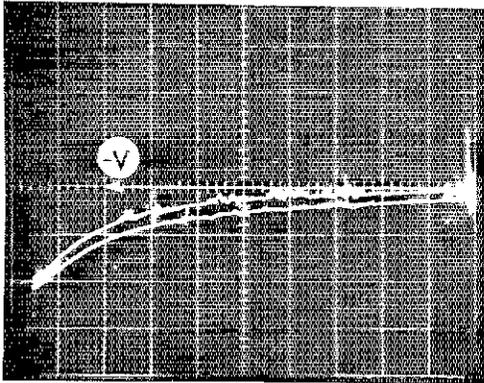
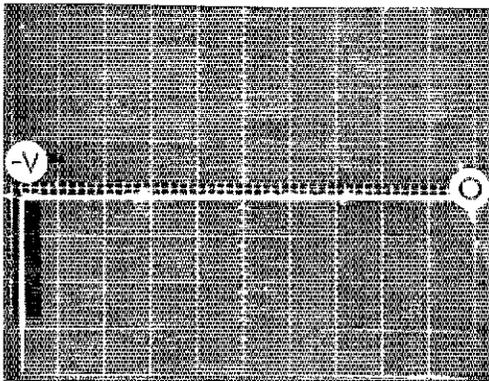


Fig. 2 — Reverse characteristics,
1N71A germanium diode.
Vert. 50 μ A/div.
Horiz. 10 volts/div.



IN LAST month's issue, a curve tracer for determining the I-V curves for semiconductors was discussed. The circuit diagrams and construction details for a curve-tracing attachment to the oscilloscope was presented. In this issue, the use of the curve tracer is discussed showing the I-V curves that can be expected when various types of semiconductors are tested.

Diode Characteristics

The curve tracer displays the current through the device as a function of the applied voltage. Such curves are the I-V curves of the device under test. To display the I-V curves of a diode, only the basic I-V generator is required. Two diodes can be compared for matching by placing them in both DUT positions between the C and E terminals. When a voltage is applied in the forward direction of a diode, little or no current can pass through the diode until the voltage exceeds the built-in voltage or barrier potential³ at which point the current increases exponentially. The barrier potential is between 0.2 and 0.3 volt for germanium diodes, and between 0.6 and 0.8 volt for silicon diodes as shown in Fig. 1.

The general shape of the reverse characteristics of a germanium diode is shown in Fig. 2. Note that the current increases as the voltage is increased. At higher voltages the current increases more rapidly, i.e., the curve is *soft*. On the other hand, reverse leakage currents in silicon devices are typically many times less at comparable voltages below the breakdown voltage. A typical reverse characteristic for silicon diodes is shown in Fig. 3. The leakage current is less than the resolving capability of the tracer until the abrupt voltage breakdown is reached. Junctions exhibiting this abrupt transition are said to have *hard* breakdowns. The reverse leakage of germanium diodes are in the microampere to milliamperere range depending upon junction area and other design parameters. Silicon-diode leakages are in the nanoampere to microampere range.

* 12025 SW Chifford, Beaverton, OR 97005

** Part I of this article appeared in *QST*, August, 1971.

³ This and all other footnotes refer to bibliography at end of article.

Fig. 3 — Reverse characteristics,
1N3005 silicon diode.
Vert. 50 μ A/div.
Horiz. 10 volts/div.

Tunnel diodes are very special semiconductors in which the number of impurities added to each side of the junction is very great. The high impurity level causes a very narrow depletion region to exist. High electric fields are generated when the barrier potential is put across this narrow depletion region. So high is this electric field, in fact, that one might say that the diode is in the voltage breakdown condition with no applied voltage! Reverse current is very high because the tunnel diode is already in the breakdown condition. Under forward bias, a very interesting thing happens: the applied voltage subtracts from the barrier voltage, reducing the internal electric field. The current through the tunnel diode increases with applied forward voltage but at a decreasing rate until a point is reached when the current actually decreases with increasing voltage. This gives the effect of a negative-resistance region. As the applied voltage is increased beyond the negative-resistance region of the curve, the resistance becomes positive, and normal forward characteristics are resumed as shown in Fig. 4.

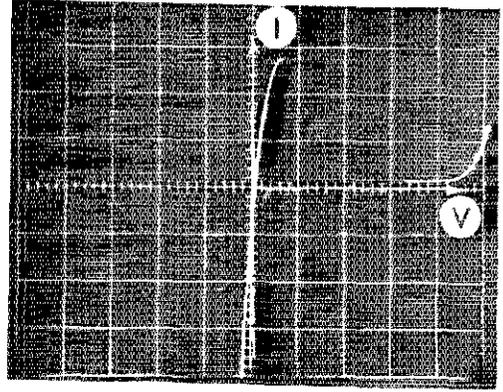


Fig. 4 — Tunnel diode I-V curve, 1N3716.

Note: The negative resistance portion of the curve is missing because of the fast switching through this region.

Vert. 2 mA/div.
Horiz. 0.1 volt/div.

Transistor Characteristics

Bipolar transistors are separated into two types⁴ npn and pnp. The most obvious difference between the two types is the required polarity of the applied bias voltages for normal operation. The npn requires positive voltages on the collector, while the pnp requires negative voltages on the collector.

To generate the characteristic transistor curves which depict how the transistor will act under varying voltages and currents, the collector voltage can be varied, tracing out the collector current for a given base current. Now let us change the base current to a new value and again vary the collector voltage and observe the collector current. The composite of several of these curves is shown in Fig. 5.

A number of properties can be determined from the common-emitter characteristic curves.

1) With base current equal to zero, practically no current flows in the transistor collector circuit and the transistor is said to be at cut-off.

2) Increasing the base current by increments causes increases in the collector current, which within limits are independent of the collector voltage.

3) When base current is increased by an increment, the collector current is increased proportionally. This proportionality is a factor called beta.

4) The current-amplification factor called beta, is defined as follows: beta is the change in collector current divided by the change in base current.

Beta is not necessarily constant, but can be and usually is a function of collector current, while being somewhat dependent upon the collector voltage at the same time. Most transistors exhibit a region of relatively constant beta, although beta does decrease at both high and low collector currents. Fig. 6 graphically illustrates the low

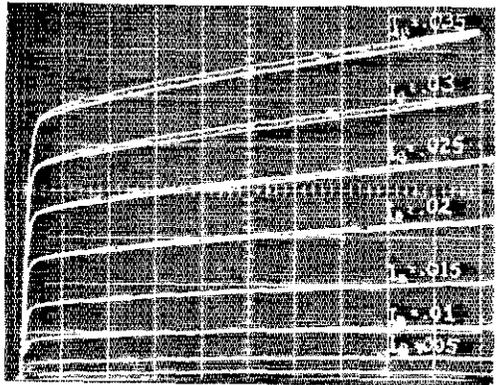


Fig. 5 — 2N3904, npn transistor.

Vert. 2 mA/div.
Horiz. 1 volt/div.
Base .005 mA/step

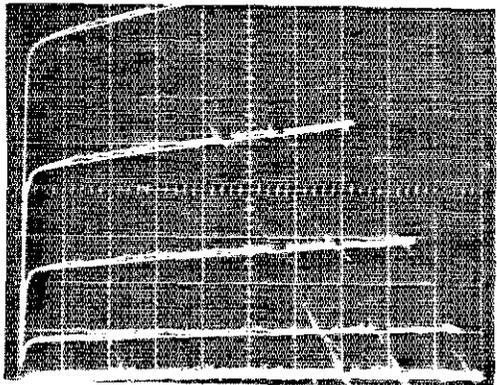


Fig. 6 — 2N3904, npn transistor.

Vert. 0.5 mA/div.
Horiz. 1 volt/div.
Base .005 mA/step

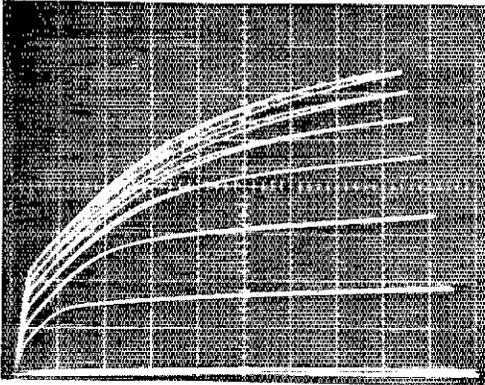


Fig. 7 — 2N3904, npn transistor.
 Vert. 20 mA/div.
 Horiz. 1 volt/div.
 Base 0.1 mA/step

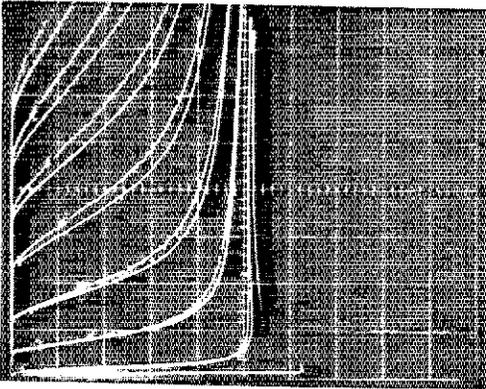


Fig. 8 — 2N3904, npn transistor.
 Vert. 2 mA/div.
 Horiz. 10 volts/div.
 Base .005 mA/step

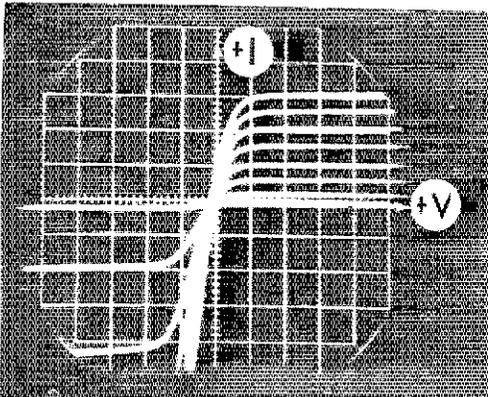


Fig. 9 — 2N2137 pnp germanium transistor.
 Vert. 10 mA/div.
 Horiz. 0.1 volt/div.
 Base 0.5 mA/step
 Forward beta approximately 40.
 Reverse beta approximately 10.

collector current variation. With 5 volts on the collector, and 0.25 mA of collector current, beta is approximately 100. If the collector current is increased to 5 mA for the same collector voltage, the beta will rise to 400.

The beta fall-off at low collector currents is caused by defects near the surface of the base region of the transistor. The effect is usually attributed to surface recombination, which traps a number of electrons injected into the base region by the emitter. In other words it means that fewer of the electrons will diffuse through the base region into the collector region resulting in degradation of beta at low collector currents. As the current through the base is increased, this effect is less pronounced and beta increases.

At high collector currents, beta begins to fall off because of a decrease in effective emitter area and the density of carriers (electrons in the case of npn transistors) crossing the base approaches the impurity density of the collector. Fig. 7 illustrates the effect of high current levels.

Another effect observed in the traces is the fan out of the curves. Note that beta increases with increasing collector voltage. This is caused by the base depletion region widening as the collector-base voltage increases, thus narrowing the effective basewidth. This effect is called basewidth modulation and is manifested by a beta increase with increasing collector voltage.

From the former discussion, it can be seen that each transistor type has a current range in which it is most useful for linear operation. This is one of the design criteria considered in choosing a transistor type for a particular application.

So far, we have not discussed transistor characteristics at high and very low collector voltages. Fig. 8 illustrates a typical behavior near maximum collector voltage. At very low collector currents the device withstands more than 60 volts and then snaps back to approximately 50 volts. This is a consequence of the beta degradation at low currents. If beta had been constant to very low currents, the breakdown would have been about 50 volts. Basewidth modulation (curves slanting upward) is very evident in this photo.

At very low and even inverse bias voltages, there is still some transistor action. Fig. 9 illustrates the behavior of a germanium power transistor for collector voltages between minus 0.5 and plus 0.5 volt. Note that the region to the left of zero voltage is the normal operating region for the pnp device. The area to the right of zero is the reversed- or inverse-bias region. An interesting fact is that the device exhibits transistor action in the inverse region. The forward beta for this device is about 40 at a collector voltage of minus 0.3 volt and a collector current of minus 30 mA. The inverse beta is about 10 at a collector voltage of plus 0.3 volt, and a collector current of 30 mA. Compare this with Fig. 10, which displays the same region for a high-beta (approximately 360) transistor. Though not resolved in this photograph, inverse beta exists and was found to be about 0.6. In general, it can be stated that the higher the forward beta, the lower the inverse beta. Another

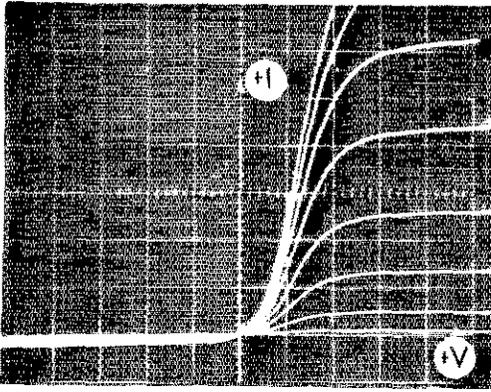


Fig. 10 - 2N3904 npn silicon transistor.
 Vert. 1 mA/div.
 Horiz. 0.1 volt/div.
 Base .005 mA/step
 Forward beta approximately 360.
 Reverse beta approximately 0.6.

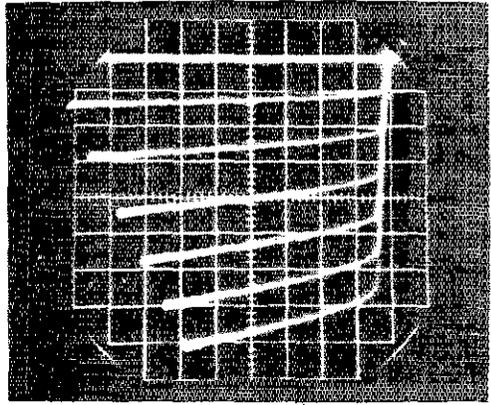


Fig. 13 - 2N2137 pnp germanium transistor at 75 degrees F.
 Vert. 50 mA/div.
 Horiz. 1 volt/div.
 Base 1 mA/step

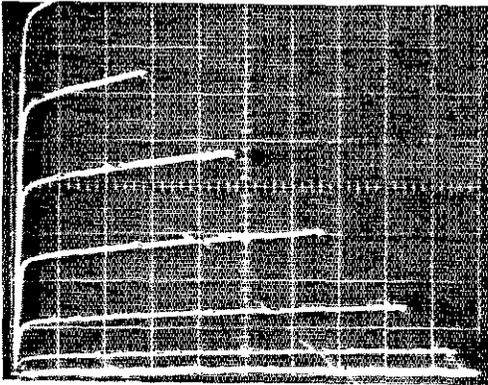


Fig. 11 - 1100-ohm load line for a 2N3904 npn transistor.
 Vert. 1 mA/div.
 Horiz. 1 volt/div.
 Base .005 mA/step

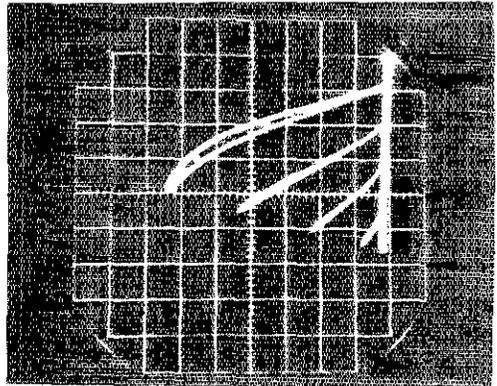


Fig. 14 - 2N2137 pnp germanium transistor at 125 degrees F.
 Vert. 50 mA/div.
 Horiz. 10 volts/div.
 Base 1 mA/step

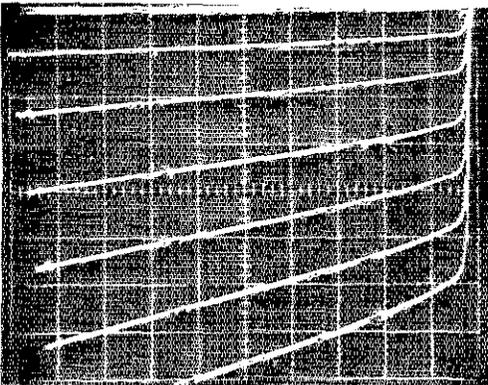


Fig. 12 - 2N3906 pnp transistor.
 Vert. 1 mA/div.
 Horiz. 1 volt/div.
 Base .01 mA/step

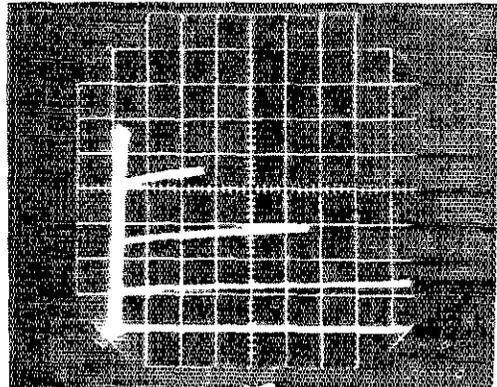


Fig. 15 - 2N3584 npn silicon transistor at 125 degrees F.
 Vert. 50 mA/div.
 Horiz. 20 volts/div.
 Base 0.5 mA/step

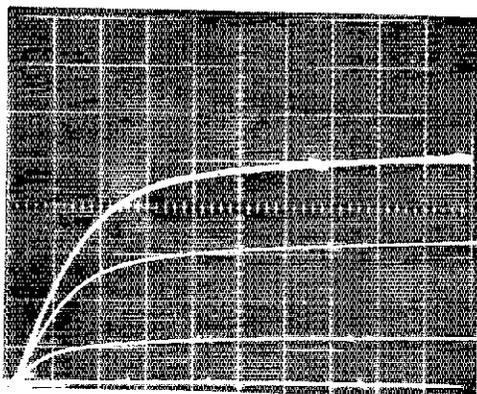


Fig. 16 — n-channel JFET.

Vert. 2 mA/div.
 Horiz. 1 volt/div.
 Gate 1 volt/step

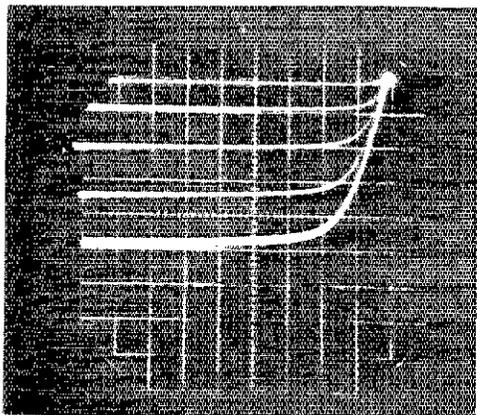


Fig. 17 - p-channel JFET.

Vert. 1 mA/div.
 Horiz. 1 volt/div.
 Gate 0.5 volt/step

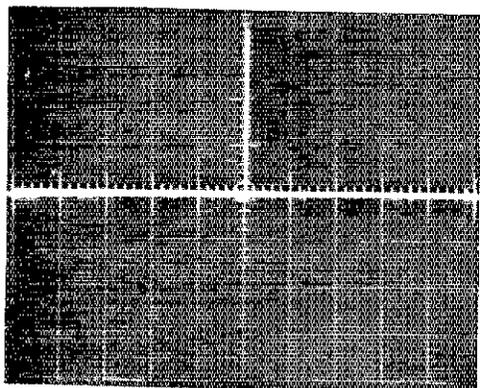


Fig. 18 — 3N58 SCR.

Vert. 50 mA/div.
 Horiz. 10 volts/div.
 Gate .005 mA/step

observation shows that the germanium transistor is more useful at lower voltages than a similar silicon transistor.

As Stoffels so clearly explained in the April, and May, 1970, issues of *QST*,^{5,6} the effect of a resistor in the collector is a predictable load line. The load line of a 1100 ohm collector load is shown in Fig. 11. The maximum collector voltage is set at 10 volts. At a collector current equal to zero, the collector potential is 10 volts, and when the collector current is raised to 8 mA, the collector voltage drops to 1.2 volts. The use of a curve tracer is a very helpful tool in designing circuits to operate at specified bias levels for different load conditions within the useful range of the device.

The curves for pnp transistors are very similar to curves generated for npn transistors; however, the bias requirements are reversed. The collector voltages and currents are negative with respect to the emitter. The curves will be generated with the origin in the upper right hand corner, with voltage going to the left and current going down, as shown in Fig. 12.

Germanium transistors, like germanium diodes, have higher leakage currents, and are more temperature-sensitive than silicon transistors. Figs. 13 and 14 illustrate this temperature dependency of the collector leakage, I_{CBO} , for a germanium device. The temperature difference was caused by the higher power dissipation in the device as a result of higher applied voltages. In Fig. 13, I_{CBO} was 2 mA at 10 volts collector voltage and a case temperature of 75 degrees F. In Fig. 14, the case temperature went up to 125 degrees F. Note that I_{CBO} has increased to 60 mA at 10 volts collector voltage! A silicon transistor operating at the same case temperature (125 degrees F) is shown in Fig. 15. The I_{CBO} in this case was less than 10 μ A. This clearly illustrates one of the several advantages of silicon devices over germanium devices.

Field-Effect Transistors

The characteristic curves for field-effect transistors (FETs) are similar to those of bipolar transistors except that the gate voltage, rather than the base current, is the variable parameter. An n-channel junction FET with a pinch-off voltage of 3 is shown in Fig. 16. Fig. 17 shows the curves for a p-channel junction FET with a pinch-off voltage of 2.

Silicon-Controlled Rectifiers

Silicon-controlled rectifiers (SCRs) are very useful devices for power control. They have three terminals: the anode, the cathode, and the gate. The device acts like an open circuit between the anode and cathode until a triggering current pulse is introduced between the gate and the cathode. The device turns on at some gate-current level, and the impedance becomes very low in its anode-cathode circuit path as long as the anode current flows. This low-impedance state will remain even though the gate current is reduced to zero, it will

(Continued on page 31)

Another Transistor Tester

To Check Surplus Bipolar Transistors

BY R. M. MASON,* W8NN

of the internal battery, for a junction voltage-drop test to determine the type of basic material used in a transistor, for a dc-gain (β) test, and for an $I_{CBO}/I_{EBO}/I_{CEO}$ leakage test.

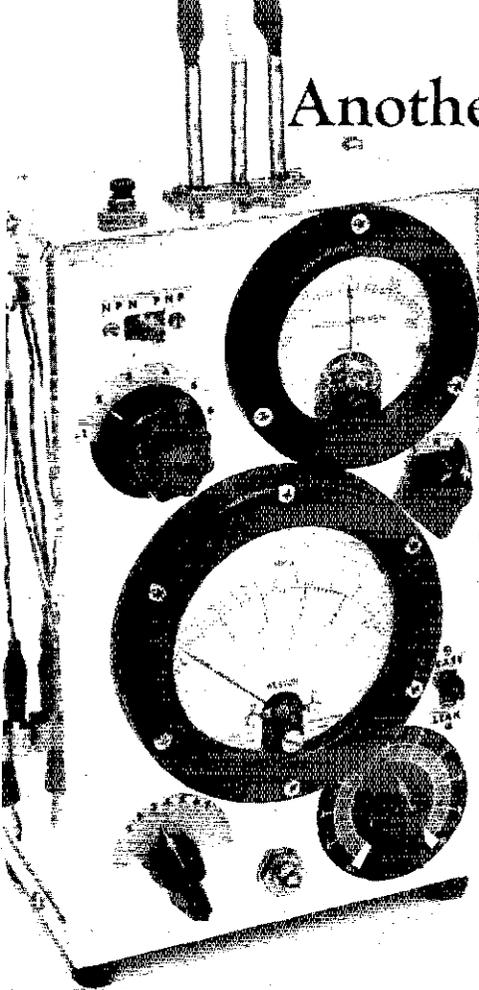
How It Works

The terminal identification test is based on the fact that a bipolar transistor is essentially two diodes connected back to back in an npn device (Fig. 1B) or face to face for pnp (Fig. 1A). In either case, the common lead is called the base terminal. The other two leads are the emitter and collector connections, but the problem remains, which is which?

If an ohmmeter is connected with its negative lead to the base terminal of the device, as shown in Fig. 1A, and its positive lead to either of the other terminals, the indicated resistance will be very low. The same result will be obtained if the polarity of the ohmmeter connections is reversed when checking the device shown in Fig. 1B. Using this method the base terminal, base polarity, and basic substrate material used can be determined. A negative base is characteristic of a pnp transistor, and a positive base indicates an npn. When the low-resistance connection has been found, both terminals should be checked to the base. The terminal with the same polarity as the base is the collector and the remaining terminal is the emitter.

The transistor material can be determined by measuring the voltage drop across the base/collector or base/emitter junction with forward bias applied, see Fig. 1D and 1E. A germanium junction will show about a 0.3-volt drop while a transistor made with silicon material will show approximately a 0.6-volt drop.

With the terminals identified and the terminal polarities known, the experimenter can connect a current source and milliammeter across the collector and emitter; a forward-bias current source, a microammeter and a series-connected variable resistance between the base and emitter; and then proceed to determine the dc current gain, (β_{dc}) of the transistor in a grounded-emitter arrangement (Fig. 5). A ratio of the base-to-collector current can be determined by varying the base current a definite amount and noting the corresponding change in collector current. The resulting ratio will be the beta of the transistor. An example might be: base current change of 20 μ A and collector current change of 0.8 mA (800 μ A) or a beta of 40.



Front view of the transistor tester built by W8NN. The PUSH-TO-TEST switch, S1, is located just to the left of the test clips on the top of the unit, above S2 and S3. S6 is located to the right of the two panel meters, above S5. S4 is positioned at the lower left.

COMPUTER CIRCUIT BOARDS, covered with used but usable transistors, are being offered by many surplus stores. Making use of solid-state devices obtained from such boards isn't always easy, however, as many of the transistors are marked with manufacturer's house numbers, or are not marked at all. The original idea behind this project was to build a compact, self-contained ohmmeter that would have been used to determine the base, emitter and collector leads of bipolar transistors. The design employed low voltages to reduce the chance of damage to the device being tested.

As so often happens during construction, a number of other features were added which resulted in an instrument quite different from the initial concept. Provisions were included for a test

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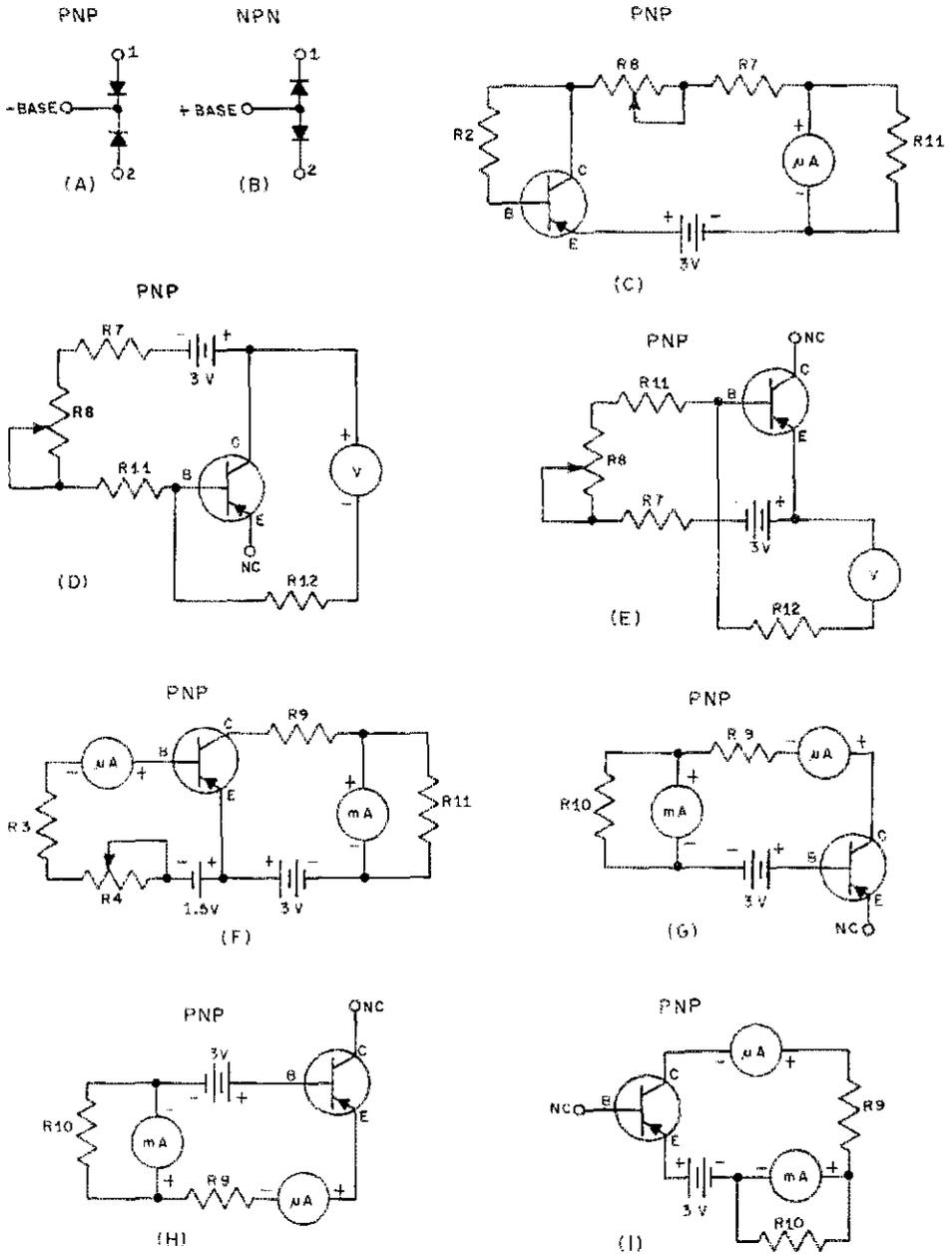


Fig. 1 — Basic circuits used to determine transistor parameters.

Junction leakage can be a problem with older bipolar transistors, especially between the collector and base. If this current becomes excessive, the temperature within the junction will rise and cause higher leakage currents to flow which, in turn, can cause a thermal run-away condition to develop, resulting in the destruction of the transistor. Leakage current is present in germanium transistors at normal room temperature, while silicon types are practically free from leakage under a similar condition. But silicon transistors do develop

measurable leakage at elevated temperatures. Small-signal germanium units should not exceed about $10 \mu\text{A}$ leakage between the collector and base, or the emitter and base. But, power transistors may have leakage approaching 1 mA and still be serviceable. The collector-to-emitter leakage will be even higher. Reverse-bias for the I_{CBO} test, Fig. 1G, and between the emitter and base of the I_{EBO} test, Fig. 1H. Normal polarities are observed between the collector and emitter for the I_{CEO} test, Fig. 1I.

Parts positioning and lead dress are not important in the transistor tester. Extreme care is necessary in wiring the multicontact switches, however, as the chance for error is great.

Construction Details

This tester is built around a multimeter with a 50- μ A basic movement and a current meter with a 100-0-100- μ A range. The multimeter provides the following functions:

- 1) Reads 0 to 5 V dc for checking the 3-V battery and the junction voltage drop.
- 2) Checks ohms $\times 100$ for the terminal location and npn/pnp tests. This range can also be used for external resistance measurements. The meter is shunted to read 0 to 1 mA in this service.
- 3) Reads 0 to 10 mA for the beta and junction-leakage tests.

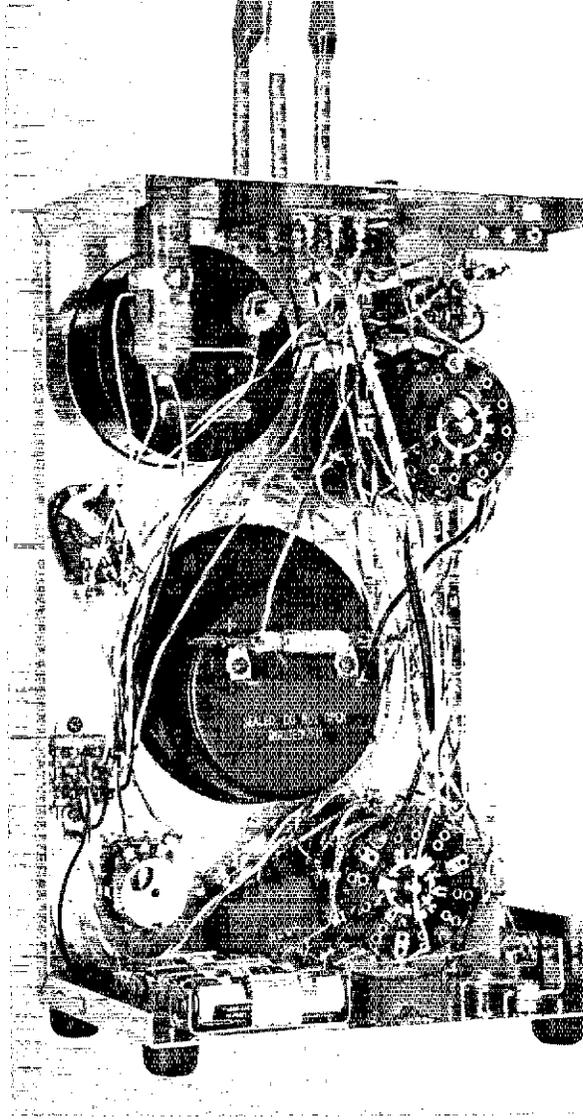
The zero-center microammeter is used to monitor the base current during beta tests, to measure junction leakage current, and to check the two base-biasing battery voltages. A times-5 shunt can be switched in, if needed.

Three insulated miniature test clips, supported by coiled springs, are provided on the cabinet, in addition to a transistor socket with in-line terminals. The test clips and socket terminals are numbered 1, 2, and 3 - from left to right - to correspond with the numbering in Tables I and II. Three extension test leads, held by a clip on the side of the case, are provided for testing of transistors mounted in existing equipment. In-circuit transistor tests should always be made with the equipment power turned off.

The tester is powered by four 1 1/2-volt penlite cells, size AA. Two cells in series furnish voltage to the ohmmeter, leakage-test and beta-test circuits. The other two cells are selected, one at a time, to provide the base-current source. Higher voltages can be introduced at J1 for leakage, beta and, perhaps, Zener-diode breakdown tests, if desired.

Mount the battery holder at the bottom of the case to prevent damage to the other components in event the batteries should leak - a lesson learned from sad experience by this writer. No particular precautions need to be taken during the wiring, except to locate the three 51-ohm isolating resistors close to the test clips and socket terminals. Color coding the wiring, especially to S4, will help in tracing any wiring errors. If you have a VOM with a position that gives a direct connection to the basic movement, then equip your tester with a pair of polarized tip jacks, and save the cost of a 50- μ A meter. Tailor the multimeter range resistors to the internal resistance of your meter, as shown in the Measurements Chapter of *The Radio Amateur's Handbook*.

The zero-center microammeter could be replaced by a 0-100- μ A unit if a reversing switch is employed. Or, use two extra poles on S3 to keep all readings up-scale. A complete test procedure for a transistor or diode is outlined in Appendix A.



Constructing the transistor tester has been a lot of fun and quite educational for this writer. The device has many practical applications around the ham shack.

APPENDIX A

Test Procedure

To test an unknown transistor, proceed as follows:

- 1) Set S3 and S4 to their 1 positions.
- 2) Set S5 to the BASE position.
- 3) Set S6 to the LOW position.
- 4) Set the base-voltage control, R4, to the fully ccw position.
- 5) Move S3 to the 2 position, depress S1 and check the condition of BT1 (3 V).
- 6) Move S3 to the 5 position, depress S2 to the PNP position and check the condition of BT2 (1.5 V).
- 7) Move S3 to the 6 position, depress S2 to the NPN position and check the condition of BT3 (1.5 V).
- 8) Move S3 to the 3 position, move S4 to the 2 position, short test clips 1 and 2, depress S1,

TABLE II

	2	3	4	5	6	7	8	9
1	S2	S4	B	C	E		S4	S3
		6		3	1	I_{CBO}	I_{EBO}	
2.5	PNP	2-				4	3	6
		7		1	3	3	4	
		4		2	3	3	7	
2.6	NPN	1+						5
		5		3	2	7	3	
		6		1	3	2	5	
3.4	NPN	2+						5
		7		3	1	5	2	
		4		3	2	6	2	
3.7	PNP	1-						6
		5		2	3	2	6	
		2		2	1	5	7	
4.6	PNP	3-						6
		3		1	2	7	5	
		2		1	2	6	4	
5.7	NPN	3+						5
		3		2	1	4	6	

resistance reading, then proceed to identify the collector and emitter terminals from columns 5 and 6.

14) Move S3 to the 5 position, leave S4 on the position determined during step 13, depress S1 and determine whether the indicated current is within the range of M1. If the current reading is within the range of the meter, move S5 to the LEAK position, depress S1 and read the I_{CBO} leakage current on the microammeter, M1. If the meter goes off scale, move S6 to the HI position and multiply the reading by five. Always return S5 to the BASE position before making any further tests.

15) Leave S3 at the 5 position, refer to Table II, columns 7 and 8, and move S4 to the indicated

positions to obtain the I_{CBO} and I_{EBO} leakage values. Follow the same testing procedure described in step 14.

16) Move S3 to the position indicated in Table II, column 9. Move S4 to the position indicated in column 3, move R1 to the extreme ccw position, depress S1, and rotate R1 cw until the microammeter current increases a noticeable amount. Note the increase in the collector current shown on the multimeter. Divide the multimeter's current change (in μA) by the microammeter current change (also in μA) to determine the transistor dc gain, which is referred to as its beta. If the microammeter should be driven off scale, S6 can be employed to increase the range by a factor of 5.

17) Some transistors have their cases connected internally to one of their terminals. To determine this condition, set S3 to the 3 position, connect a test lead to the case and to test clip 1, depress S1 and rotate S4 through positions 2 to 7, noting the position that indicates a dead short. If no short is found, shift the test lead to test clip 2, and repeat the process. If a short is found, refer to Table I and determine to which terminal the case is grounded. To test a diode for polarity, junction material, and back-biased leakage, proceed as follows:

- 1) Connect the diode between test clips 1 and 2, set S3 to the 3 position, depress S1, rotate S4 through the 2 and 3 positions, and note the position with the lowest resistance reading. Refer to Table I to determine the diode polarity.
- 2) Leave S4 in the low-resistance position, move S3 to the 4 position, depress S1, and determine the voltage drop; germanium will be about 0.3 V and silicon, 0.6 V.
- 3) Move S4 to the high-resistance position, move S3 to the 5 position, depress S1, and observe the multimeter current. If the current is within the range of the microammeter, move S5 to the LEAK position, depress S1, and read the leakage current. Always return S5 to the BASE position after each test. Q57

"It Seems. . ." (Continued from page 9)

Although there are only about 900,000 station licenses currently outstanding, some 1,800,000 have been issued over the years, and even if each licensee bought only one CB unit at \$150, a lot of money is involved. The assignment of 80 new channels in 2 MHz taken from an amateur band would (the manufacturers hope and expect) provide a new market and more profits. Now, there is nothing wrong with new markets and greater profits *per se*. But there are some more basic questions involving the true public interest:

Would this simply be another instance where manufacturer (and distributor) advertising would pervert the Commission's objectives, as industry advertising and promotion did to the present 27-MHz segment?

If there were proper policing of 11 meters, would there really be a need for additional channels?

Would the granting of additional channels to CBers overcome the problem of skip

talking, high power, illegal antennas, and other violations? Or would it simply assign them another 80 channels on which they could misbehave?

If the FCC cannot now adequately monitor and control the presently-assigned 23 CB channels, would it be able to do any better with 103 channels assigned? Is Congress prepared to appropriate substantial additional funds for such purpose?

If it is found that CB indeed needs more space, is 220 MHz the appropriate spot in the spectrum? Is it better in the long-range utilization of the spectrum in the public interest to take two Megahertz from the amateur service, which has a pretty good record in self-policing and behaving itself, and give those two megs to CB, which has a pretty lousy record of behavior?

These are all questions which have to be asked, and which will have to be answered, before any fair decision can be made. It would be in order for each interested amateur to express his opinion direct to the Commission, referring to RM-1747. Q57

Custom Design and Construction Techniques for Linear Amplifiers

BY MERLE B. PARTEN,* K6DC

TEST RESULTS at 50, 144, and 220 MHz using the new 8877 tube were so gratifying that I decided to try it in a 3.5- to 28-MHz grounded-grid amplifier. Since so many articles about construction have been written in the past, I decided to compile into one text enough data and design variations to allow a home constructor to build an 8877 amplifier without having to bolt-for-bolt copy this design.

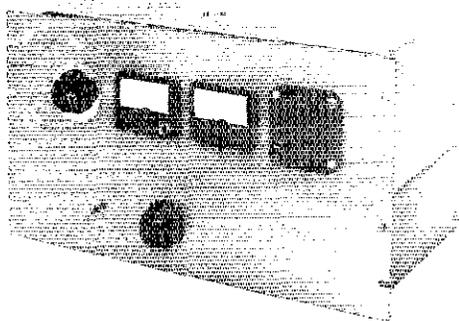
Design Advantages

The 8877 is a big brother to the new 8873 series of ceramic/metal power tubes. It is a zero-biased high- μ triode having an oxide-coated cathode. The plate dissipation is 1500 watts. Heater-to-cathode capacitance is low eliminating the need for filament chokes when operated below 30 MHz. An inexpensive 7-pin socket may be used reducing the overall cost. The grid connection is near the chassis level and permits low-inductance grounding. Average IMD products for the 8877 in linear service run 38 dB below one tone of a two-tone test signal for 3rd order products, and 44.5 dB for 5th order products.

Design Considerations

In building anything, whether it is a new home or an amplifier, there is always something you would like to change after the job is completed. Think the project through before picking up the hammer!

Professional designers are not immune to mistakes. Some manufacturers have chosen a symmetrical knob placement and size pleasing to the eye. The band switch and multimeter-switch may



be located side-by-side, using identical knobs. Even the knowledgeable operator may close the key, look at the meter, reach for the meter switch (he thinks), and grab the band switch instead. (It only happens once per band!) Different knob sizes or placement could prevent a catastrophic error such as this. Don't worry about beauty in a front-panel layout where performance might suffer.

One simple design error can cause several more severe errors to show up as building progresses. A mock-up assembly was made to determine the space required for the coils and capacitors. This rough layout allowed positioning the tube and loading capacitor. A point overlooked was where the loading capacitor shaft terminated on the front panel. It was too close to the left edge. The mistake was solved by using a set of gears from the junk box. An alternate layout would have been to mount the coil and switch assembly on the front shield surface with the switch shaft passing through the front panel. This would eliminate the right angle drive.

Any cost-conscious builder will first review his on-hand supplies. A suitable plate-tuning capacitor, mounted vertically, might free enough space on top of the chassis to mount a plate transformer. The rectifier diodes, capacitors, and bleeder resistors could be located below the chassis, cooled by the airflow from the blower. Suitable power-supply parts may be purchased as replacement items from some amateur equipment manufacturers at a reasonable price.

Convenient location of controls should be a factor in the layout design. A right-handed person

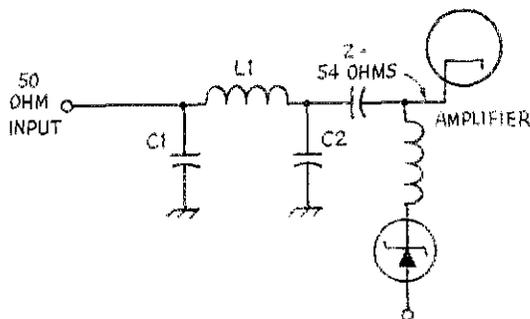


Fig. 1 - Simplified diagram of the input circuit. Component values are given in Table 1.

Fig. 2 — The builder may construct his own socket from a combination of components. This is one area in which the amateur can reduce the overall cost of the project.

usually finds it easy to adjust the loading control with his left hand as he adjusts the plate tuning control with his right hand.

When building uncomplicated equipment such as a linear amplifier, the home constructor has a cost advantage over the manufacturer. Labor and engineering amount to nearly 60 percent of the cost of a commercially-made unit. Think of what that saving would buy in new or surplus parts! A home-built unit may not match one commercially made in appearance, because of differences in shop tools, but it should be as reliable electrically.

A word of caution about buying used vacuum-variable capacitors. When there are no apparent cracks or flaws, a "leaker" or defective unit is hard to detect. If the lead screw moves the bellows too easily, the capacitor *could* be a dud. Have it "high-potted" at the rated voltage, or make sure you have a return guarantee so you can check the unit yourself.

Metal Fabrication

Quality workmanship does not depend entirely on the use of a metal brake and shear. Avoid use of tin snips when cutting materials. Sawing along a line causes less mechanical distortion. If you *must* use the snips, cut outside of the mark on the first slice, then approach the line with several thin slices.

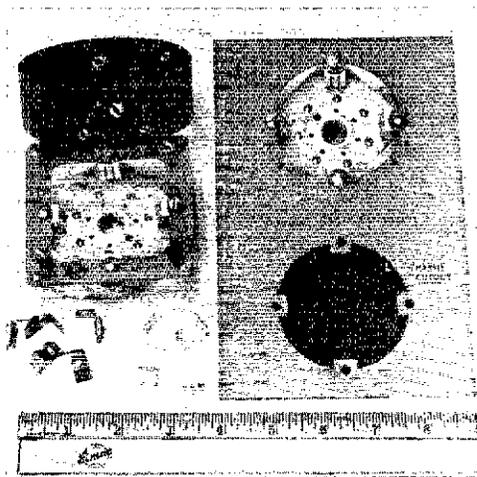
Neat and accurate bending can be accomplished with two pieces of 1 1/2-inch angle iron about two feet long. The material to be bent is clamped between the angle irons, using C-clamps and a vise. Use a piece of flat wood or phenolic as a buffer between the hammer and the material to be bent, to avoid hammer marks. A test bend using a scrap piece of aluminum is sometimes helpful where a critical fit is needed. Use common sense to figure whether the bend will add or subtract metal thickness to marked length.

Tips on Shielding and Isolation

Shielding between input and output circuits of a grounded-grid amplifier reduces the possibility of parasitic oscillations, even when fundamental oscillation is not a problem. Generally, either type of oscillation can be detected by observing the grid and plate meter readings as the plate tuning control is rotated through resonance. If the system is free of parasitic oscillations, maximum grid current and minimum plate current will occur at approximately the same dial setting.

Long plate leads usually encourage the vhf parasitic type of oscillation. In this particular amplifier, however, there was no evidence of this.

Fundamental oscillation in a high- μ triode will not occur unless there is a feedback path



between the input and output circuits. A path could be established, either by a control shaft not properly grounded, or through a wire not sufficiently bypassed. A metal shaft should be grounded where it passes through an open hole. Shaft bushings of the C-clamp variety do an adequate grounding job. If mechanical strength is not a factor, a nonmetallic shaft will do a good job of preventing undesired coupling. When using shaft couplings, replace the slotted screws with Allen screws. Nothing is more frustrating than a slipping shaft. This applies to knobs, too.

Wires passing through shields require the usual decoupling precautions, using ceramic bypass capacitors and perhaps small rf chokes or ferrite beads. This is especially important in treating the point of exit of the high-voltage lead.

If the high-voltage wire is kept in the plate compartment and not passed into the input area of the amplifier chassis, it will require less decoupling and be less prone to feed back. Shielded wire such as RG-8A/U cable, may be used between the plate choke and the exit point.

Regarding TVI and RFI leakage through an opening in a shielding surface, I recall a demonstration by Phil Rand, WIDBM, and Lew McCoy, WHCP, at a radio club in Cleveland, just after WW2. A TV set was placed a few feet from a shielded box containing a 29-MHz transmitter. The top of the box had a four-inch row of 1/4-inch holes. Near the row of holes was a 1/4 x 4-inch slot. One or both openings could be closed with a shield plate. When the 4-inch slot was exposed, the TV set displayed severe interference. With only the row of holes exposed, no TVI was evident.

From this we may conclude that the mating surfaces of an rf enclosure should be free of wrinkles and slots. Securing clean surfaces every 2 inches seems to do the job. Some aluminum material is anodized, making it non-conductive. To avoid slots due to the insulation, check the surface with an ohmmeter. If the surface appears to be nonconductive, it must be cleaned.

TABLE 1

VALUES OF CIRCUIT Q OF 1					
MHz	$C1$ Opt.	pF (USE)	$C2$ Opt.	pF (USE)	$L, \mu H$
3.5	839	(820)	842	(820)	2.36
4.0	734	(750)	737	(750)	2.07
7.0	420	(430)	421	(430)	1.18
14.0	210	(220)	211	(220)	0.59
21.0	140	(150)	140	(150)	0.39
28.0	105	(100)	105	(100)	0.30

Practical capacitor values in parentheses

Air Cooling

The opening in a shield surface where blower air enters the chassis may be a source of rf leakage. In this amplifier, brass-wire screen is mounted in the air stream to minimize this leakage. Tiny globs of solder at several crossover points assure positive connection on the screen. The disadvantage of this method is the eventual collection of dust, restricting air flow. It requires periodic cleaning.

The question so often asked is, "Do I actually need this much air?" Remember, heat is what destroys a tube! If the blower noise is too great, place the fan elsewhere and duct the air to the amplifier. Only a slight hiss will remain as the air passes through the anode cooler.

The Input Circuit

The cathode impedance of an 8877/3CX1500A7 is about 54 ohms. Direct coupling from the exciter to the cathode without the use of a cathode-tuned circuit will work, but performance will be degraded. The reduced-drive requirements and improved distortion products make the small effort of putting a "flywheel" in the input circuit worthwhile.

The input pi-network circuit for each band is set and forgotten. Final adjustment of the slug-tuned coils is made with the amplifier operating and will be discussed later.

Fig. 1 shows the basic input circuit. A computer program for 50 to 54 ohms and a selection of three input circuit Q figures produced the most practical values of capacitance. Q values of 3, 2, and 1 in the computer run indicated that at 3.5 MHz the required network capacitors would be 2500, 1700, and 850 pF, respectively (values rounded out for illustration). A circuit Q of 1 was chosen based on price, physical size, and nearness to stock values. I accurately measured the value of more than 50 5-percent mica capacitors and found that about 90 percent of them were on the low side of the marked value. Keep this in mind when making a selection!

The Q of the input circuit is so low that any of the polyiron or ferrite-core materials are satisfactory. The slugs used in this amplifier were coded red (1-20 MHz).

Miller No. 4400 ceramic forms are one source of 3/8-inch cores. Cambion and Millen are other sources. The Millen No. 69046 is a good choice for 1/2-inch forms.

TABLE 2

LI COIL WINDING DATA					
BAND MHz	NO. TURNS	WIRE SIZE	INDUCTANCE RANGE IN μH	$F^* M$	
3/8-inch Diameter Forms					
3.5	14	24	1.64 - 4.58	5.05	
4.0	14	24	1.64 - 4.58	5.8	
7.0	10	24	0.96 - 2.32	10.1	
14.0	7	16	0.44 - .74	19.5	
21.0	5	16	0.28 - 0.52	29.2	
28.0	4	16	0.17 - 0.34	40	
1/2-inch Diameter Forms					
3.5	15	20	1.975 - 3.67	5.05	
4.0	13	20	1.584 - 3.045	5.8	
7.0	10	16	0.76 - 1.21	10.1	
14.0	6	16	0.43 - 0.736	19.5	
21.0	5	16	0.35 - 0.55	29.2	
28.0	4	16	0.26 - 0.39	40	

Coil winding data is given to allow a choice of either 3/8-inch or 1/2-inch slug-tuned forms. The windings should be close spaced and start at the top of the form.

* A grid dip meter should be used to assure that the inductor resonates at the indicated frequency. The adjustments should be made with capacitors $C1$ and $C2$ out of the circuit.

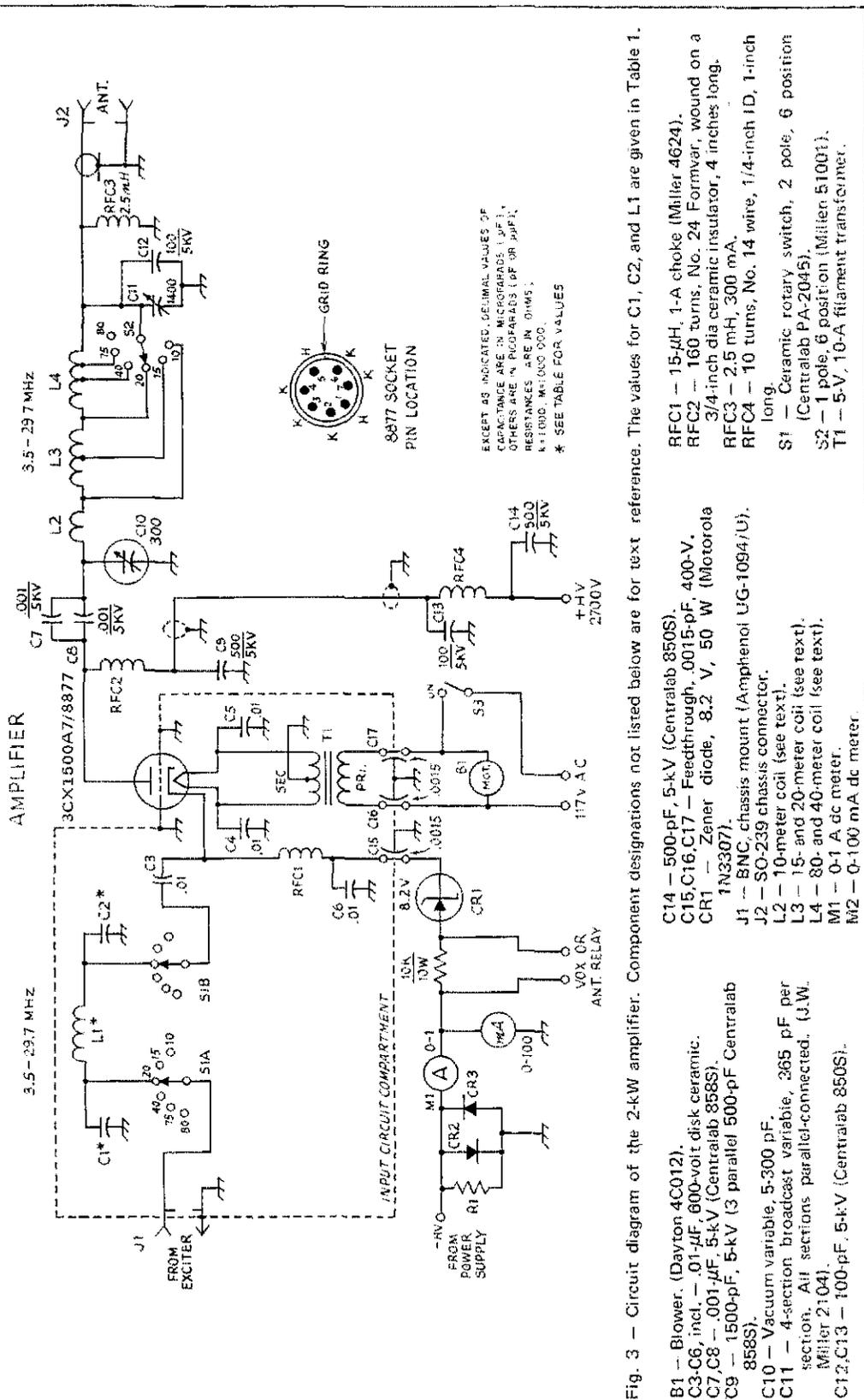
The Socket

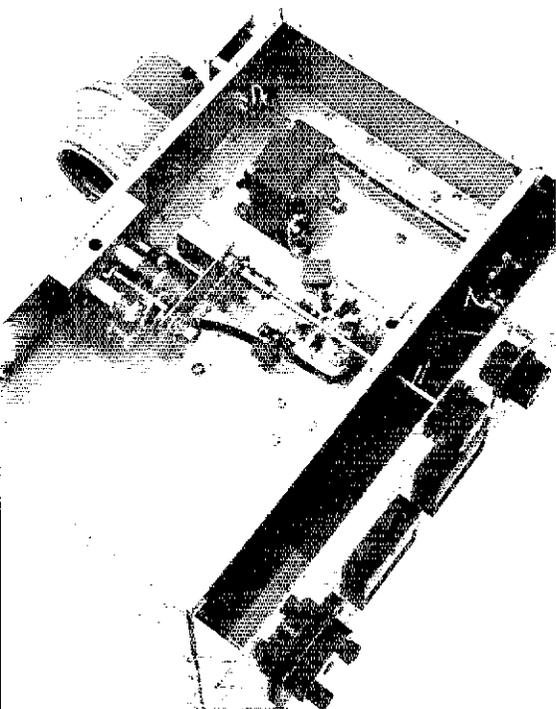
For grounded-grid application, a reasonably priced socket is available from Eimac. The socket is part number SK-2206. If you prefer to build one yourself, a 7-pin septar socket, made by E. F. Johnson (part number 122-247-202) may be used. Fig. 2 shows construction details. Proper standoff spacing is obtained with 3/8-inch metal spacers, plus two metal washers. The finger-stock clips may be ordered from Eimac (part number 149-842).

Output Circuit Considerations

In any amplifier, the plate-to-grid capacitance of the tube adds to the stray capacitance, making it difficult to achieve the desired values of capacitance in a pi-network circuit at 28 MHz. A high value of input capacitance results in a high plate-circuit Q , and high circulating current. The higher Q is an advantage in attenuating harmonics, but the efficiency will be reduced because of high circulating current and heat loss. Since some compromise in circuit Q between 3.5 and 28 MHz is necessary, the best place to "cheat" is at the 10-meter end of the operating range. The 28-MHz coil can be wound with tubing or flat strap which aids in dissipating the heat.

If the 10-meter trade-off is chosen, then consider using an air-spaced capacitor for plate tuning. For contest operating or fast band changing it allows retuning quickly. If a capacitor such as the Johnson 152-1 is used, it will require extra capacitance to be switched in for 3.5 MHz.





The above points are illustrated in Fig. 4. The values given for a Q of 12 are the ones used in the amplifier described. All are for an input resistance of 2000 ohms.

A construction detail sometimes overlooked is the junction marked (A) in Fig. 4. If the amplifier is to operate properly at 28 MHz, the connection between capacitor C2 and the 50-ohm output terminal should be very short. A 5-inch lead, for example, represents quite an inductance. If a long lead is necessary, use RG-8A/U cable from the 50-ohm connector to the junction of L and C2.

Coil and Switch Mock-up

The actual inductance of the plate coil must be close to the design value. This is simple if the author's data and layout are duplicated. A drastic change of layout might be desired, so the following mock-up procedure for the coil and switch assembly will assure optimum operation. Fig. 5 shows the points referenced below.

1) Cut a piece of sheet metal or aluminum slightly larger than the space selected for mounting the coil and switch assembly.

2) Mount the band switch on the sheet in the position it will occupy in the final setup.

3) Measure the distance from the switch arm to the capacitor (C2, if it were mounted) and along the chassis to the tube (if it were mounted). See item M, Fig. 5.

Cut a 3/8-inch-wide copper strap to the length measured. Attach one end to the switch arm and add a jumper to the 80-meter switch position. The free end will be connected to Cx, at (M), later.

4) Measure and cut a strap for the path between the tube position (A) and the 28-MHz coil

The input circuit is mounted on a small bracket to keep the adjustments inside the chassis. S1 and S2 are coupled with a chain drive. A separate shaft arrangement with a knob could have been used for the input circuit eliminating the need for the chain drive.

(D). This path is via the chassis at (A), through the position of C1, then to a point near the connection of the 28-MHz coil, blocking capacitor and rf choke (B) (C) to (K).

Don't let the length of the leads scare you. They actually represent circuit inductance not wound into the coils. Each strap will be about a foot or so long. Now we must find the added amount of inductance needed for each band in the form of a coil.

A pi network is a resonant circuit using a coil and two capacitors in series. For this mock-up, a fixed value of capacitance is used to represent the effective value of capacitors C1 and C2 in Fig. 4. The value changes with each band and can be made with stock values or parallel combinations.

Assuming the use of design values in Fig. 4(A) for a Q of 12, the effective series capacitance of C1 and C2 used for Cx is:

MHz	Cx
3.5	230 pF
4.0	202 pF
7.0	115 pF
14.0	57 pF
21.0	38 pF
28.0	28.7 pF ¹

5) Place the band switch in the 10-meter position. Connect Cx (10-meter value) to the two strap ends (K) and (M). Wind a coil (D) of 1/4-inch copper tubing having 5 to 8 turns about 2 inches in diameter. Space the turns about 1/8 inch apart.

Cone-and-pillar insulators (E) (F) (H) (J) are used to make stable mountings for the coils. Connect the (10) and (20) taps to the proper insulators and install straps (G) between (F) and (H). Securely mount one end of the 10-meter coil to insulator (E). Position the free end as shown for connection to the junction of the blocking capacitor, rf choke and C1 (B) (C). The insulator at (C) represents the height and location of the plate rf choke.

The free end of the lead (B) attached to (C) is then moved from turn to turn until the circuit resonates at 28 MHz. Remove excess turns. This coil stays in the circuit on all bands. Its position affects the inductance of the remaining coils, so mount it securely and connect the lead (B) from (C).

6) The 20-meter coil can be determined next. It is mounted between (E) and (F). Wind the coil in the same direction as the 10-meter coil (D). Normally 1/4- or 3/16-inch copper tubing is used for the 15- and 20-meter coils. This is because of the larger surface and better heat-handling capability.

¹If the plate-tuning capacitor has a high minimum capacitance, use 35 to 40 pF for this band.

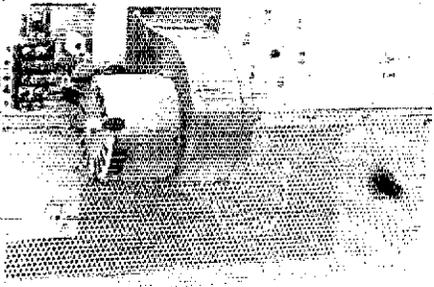


Fig. 6 - Rear view (inverted) of the amplifier. The diodes are mounted on a piece of circuit board,

dummy load. The settings of C1 and C2 were the same as determined earlier.

Control Circuits

There are two choices of methods for controlling standby-transmit conditions. First, the plate voltage may be turned off during standby, in which case no added grid bias is required. The second method allows the plate voltage to be left on at all times, but calls for additional bias during standby. The extra bias is required to cut the tube off completely during this period.

The second method is perhaps more commonly used, and only requires a fixed value of resistance to be placed in series with the biasing Zener diode during standby. Exciter or antenna relay contacts can be used to short out the resistor during transmit periods. This method is preferred when using solid-state rectifiers and high-capacitance filters in a power supply.

For cw operation, an additional resistor may be used to bias the tube close to cutoff, and can be switched out for ssb. A fuse in series with the Zener diode is a feature to be considered. It may save a tube, Zener, or meter from damage if an arc occurs, causing a high current surge. Use a 1-ampere fuse.

A piece of printed-circuit board may be used to mount the meter-protecting diodes. The Zener diode is also mounted on this board. Fig. 6 shows the meter diodes on the left side of the board. Space was allowed to mount a second Zener diode for added bias, switchable from the front panel.

Mechanical Assembly

Wires from the front panel to the rear of the chassis are routed through a duct made of 3/8-inch tubing, threaded at each end to accept nuts. The small blower in the photograph (Fig. 6) provides sufficient air for a 2-kW PEP operation.

To the left of the blower are the six access holes for tuning the input coils. A round disk with matching holes is mounted inside the chassis, held by a center screw. Once the adjustments are made, the disk is rotated enough to cover the holes. Then the screw is tightened to hold the disk in place. Metal buttons will work just as well.

Also shown in the photograph is a method of securely mounting the connector to a plate that is independent of the removable perforated screen. On the upper left is the high-voltage connection.

Metering

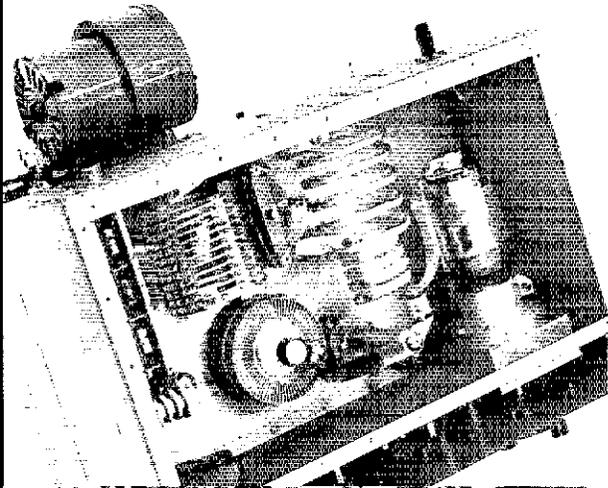
Be sure to protect the meters from damage with a pair of back-to-back diodes. Any of the inexpensive silicon diodes connected in parallel, but with anodes in opposite directions across the meter terminals, will conduct if the voltage exceeds approximately 0.6 volt. An extreme surge may even short one of the diodes. It is therefore advisable to place them where they may be tested or replaced easily. A shorted diode may shunt the meter sufficiently to give a false meter reading, and calibration should be checked if a surge is ever experienced. Only two diodes are needed in this amplifier to protect both meters.

Negative-lead metering is preferred both for safety and simplicity. This method requires all grounds to be removed from the negative points in the high-voltage power supply. The negative points are then connected to a common negative bus which is grounded through a resistor. A separate wire is used to connect the negative bus to the plate meter and back to the tube cathode through the meter and Zener diode, completing the high-voltage path. Since the tube is connected in the grounded-grid configuration, metering for grid current is placed in series with the grid (ground) and cathode. Thus both meter movements are only a few ohms above ground.

The Power Supply

If a power supply is modified for negative-lead metering it is a good idea to use a grounding resistor in the power supply as well as in the amplifier. This limits any voltage difference between the negative bus and the chassis to a very low value. The resistance must be high enough to prevent shunting the meters, but low enough to provide a low voltage difference between -HV and ground. Any value of *wirewound* resistor between 25 and 500 ohms, rated 10 to 25 watts will suffice.

The top view of the amplifier shows the vacuum-variable capacitor mounted to a subpanel. A small blower mounted on the rear of the cabinet provides sufficient air to cool the tube during full-power operation.



With safety of life as a factor, the writer prefers to use parallel resistor combinations.

Final Testing

Laboratory tests at Finnac indicate best performance to be at an anode potential of 2700 to 3000 volts. The efficiency runs between 60 and 65 percent.

Plate impedance figures are based on a 2 kW PEP input using 2700 volts at 740 milliamperes. The grid current for the 8877 runs about 15 percent of the plate current. At full power input, the grid current should be about 110 mA.

When plate voltage is applied, the zero-signal plate current should be about 95 mA. Drive should be applied through a directional coupler. On each band, after fully loading the amplifier to the above conditions, tune the input coil for minimum reflected power. No further adjustment is required and the directional coupler can be removed.

As the plate tuning control is "rocked" through resonance note the action of the grid and plate current. If maximum grid current and minimum plate current occur at approximately the same point, the amplifier is probably stable.

For maximum efficiency from *any* amplifier at *any* power level, it is important to have proper drive and loading. Changing from high to low power (2 kW to 1 kW, for instance) is *not* just a matter of reducing the driving power. Using the 15-percent ratio of grid-to-plate current, the ratio would be 110 to 740 mA for 2 kW input, and 55 to 370 mA for 1 kW input. If the anode voltage of 2700 is maintained, a change from 2 kW to 1 kW will double the plate load impedance. Therefore, the tuning and loading controls *must* be readjusted. Additionally, the drive must be reduced. If the dummy load survives tune-up logging of dial settings, you are finished.

A note of thanks goes to Bob Sutherland, W6UOV, and Ray Rinaudo, W6ZO, for their encouragement in preparing this article and to Bill Orr, W6SAI, for his editorial assistance. QST

EDITOR'S NOTE: A constructional technique used by the author to eliminate rf leakage through large holes in the chassis will be discussed in a subsequent issue of *QST*. It is called a "waveguide-beyond-cutoff" and can be used to duct air from a blower to the amplifier chassis. No screens are required in the air path, yet the chassis remains rf tight.]

Semiconductor Curve Tracer

(Continued from page 18)

switch back to high impedance when the anode-cathode voltage is reduced to zero. Under reverse bias the impedance remains very high. Fig. 18 illustrates the curve for a small SCR.

Conclusion

The curve tracer has been in use for more than a year. It has been extremely useful in characterizing unmarked or coded transistors and diodes obtained from surplus computer boards, and in the retrieval of good devices from the junk box. The author has found it an extremely useful addition to

the shack, especially in determining whether or not a device was still functional in a circuit which failed to work. The curve tracer was used extensively during the design and construction of a 75-meter solid-state ssb transceiver. The author wishes to thank W7ZOI for his encouragement and help in writing this article. QST

Bibliography

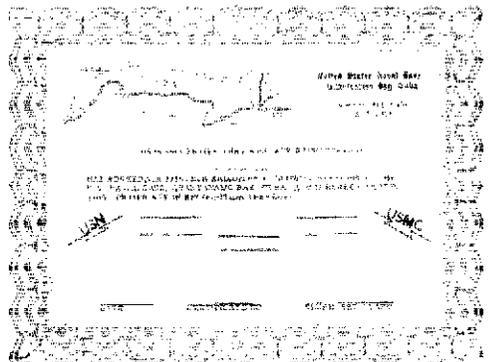
3. Stoffels, "Let's Talk Transistors," Part 3, *QST*, January, 1970.
4. Stoffels, "Let's Talk Transistors," Part 4, *QST*, February, 1970.
5. Stoffels, "Let's Talk Transistors," Part 6, *QST*, April, 1970.
6. Stoffels, "Let's Talk Transistors," Part 7, *QST*, May, 1970.



The Puerto Rico Amateur Radio Society has obtained permission from FCC to operate until December 31, 1971, with the special call KF4SJ in connection with the celebration of the 450th anniversary of the capital city of Puerto Rico, San Juan — the oldest city in the nation. This station will be operated from various historical points on the island.

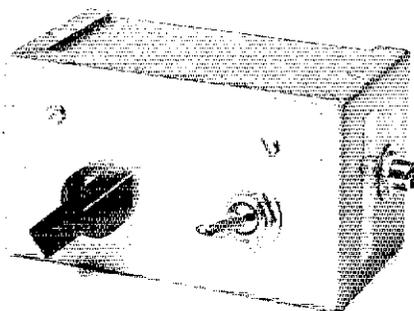
A beautiful commemorative QSL will be sent to all stations worked. The card will include the city's coat of arms in full color and historic information about San Juan. Operation will be on all bands 80 through 6 meters.

Recently W4CFM demonstrated ham radio to the man behind the famous FCC signature Ben F. Waple. We understand that quite a pileup was generated by those hams anxious to get a QSL card bearing an *original* Ben Waple signature!



The Guantanamo Bay Amateur Radio Club is offering a handsome "WAG" (Worked All Gitmo) certificate for working six KG4 stations after January 1, 1971. Application should include calls of the six stations worked, date and time (GMT), and certification by two licensed amateurs that they have verified the original log entries. Apply to WAG Award, c/o KG4EY, FTG Box 551, FPO, NY, NY 09593.

A General Purpose Solid-State Preamplifier



DONALD K. BELCHER,* WA4JVF and ALAN VICTOR,** WA4MGX

OVER THE past few years there have been many articles describing various vhf/uhf amplifiers. There are few types, however, that are good for general-purpose hf amplification. How many amateurs have listened in vain for signals above 20 meters because of a poor receiver front end? How many transceivers have a "dead" sound when the band is out? Here is a preamp which provides usable gain up to 100 MHz. It can improve the noise figure of even a good tube-type receiver and should improve the image rejection of any receiver when used with the narrow-band modification. The noise figure of the unit described here is 2.5 dB at 30 MHz. This is sufficient to provide a 10 dB signal-to-noise-plus-noise ratio with .07 microvolt of signal at the input.

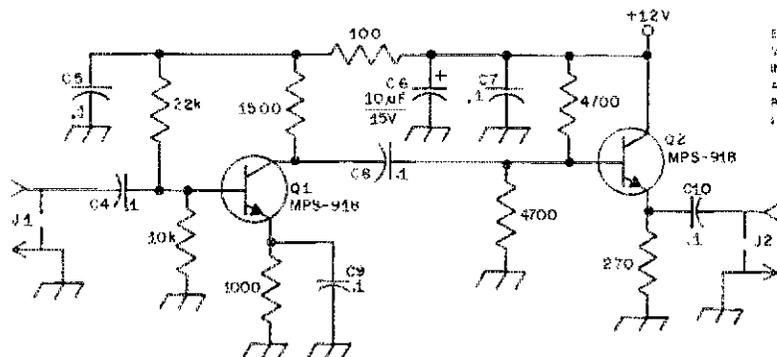
* 754 SE Daytona Dr., Palm Bay, FL 32901.
** 867 Michael St., Miami Beach, FL 33139.

The amplifier consists of a common-emitter stage driving an emitter follower. Generally, emitter followers are not recommended at high frequencies because they tend to be unstable, but in this design there are no tuned elements following the amplifier and hence the amplifier is quite stable.

As with any high-frequency amplifier, good constructional practices should be followed. Short leads, in-line layout, and careful bypassing are all necessary. Since the unit has a gain of more than 40 dB at frequencies below 5 MHz, all of the bypass capacitors shown in Fig. 1 should be used.

If your application calls for wide-band gain, the device shown in Fig. 1 is what you need. But if you intend to use the amplifier as a receiver preamp., the circuit shown in Fig. 2 should be included. It can be mounted in the same box as the preamp.

The amplifier has a gain of 23 dB at 6 meters and a gain of 30 dB at 10 meters. It operates nicely with either a 50-ohm or 75-ohm receiver-input impedance and will serve as an inexpensive receiver accessory. The total cost, excluding the container and connectors, is about \$10.



EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (µF); OTHERS ARE IN PICOFARADS (PF OR pF). RESISTANCES ARE IN OHMS, 1 K=1000, M=1000000.

Fig. 1 — Circuit diagram for the broad-band amplifier. If the amplifier is to be used at 100 Hz, C4, C5, C8, C9, and C10 should be 10 µF in capacitance. C4 should be omitted if the tuned circuit in Fig. 2 is used.

- C4, C5, C7, C8, C10 — 0.1-µF 100-V (Sprague Orange Drop or equiv.).
- C6 — 10-µF 15-V tantalum.
- J1, J2 — Phono jack.
- Q1, Q2 — Silicon npn rf transistor (Motorola MPS-918).

Inside view of the preamp. with the tuned-input circuit shown at the left. The switch is not included in Fig. 1. It is used by the author as an on-off power switch. The prospective builder might consider including a band switch with an "out" position if the amplifier will be used in front of a reasonably good receiver. Under some operating conditions, it might not be desirable to have the preamp. in the line.

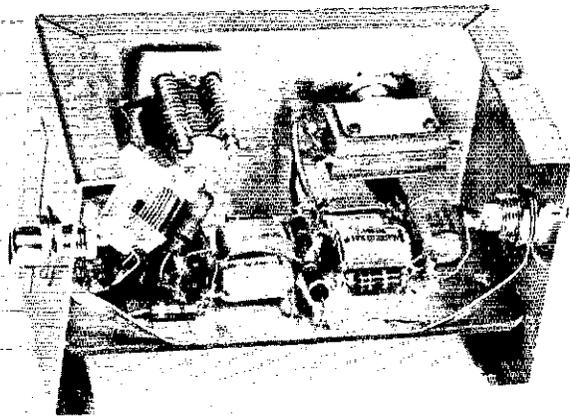


TABLE I

Band	C1	C2	C3	L1
80-40 Meters	47 pF	47 pF	356 pF	4 μ H, 14t
20 Meters	27 pF	27 pF	100 pF	1 μ H, 7t
15-10 Meters	12 pF	12 pF	50 pF	0.75 μ H, 5t
6 Meters	6 pF	6 pF	50 pF	0.38 μ H, 2½t

Coil and capacitor data for the tuned-input circuit shown in Fig. 2. The coil stock is 3/4-inch dia, 32 tpi (B&W 3012).

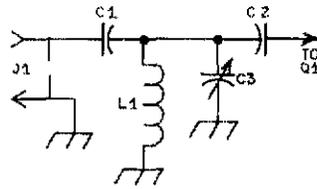


Fig. 2 - Circuit diagram for the tuned circuit. Parts values are listed in Table I.



September 1921

... Our cover now says that *QST* is devoted to the "Wireless Amateur." Thank goodness that "Citizen Wireless" of last month has been changed.

... Atlantic Radio Company's ad shows a 11V204 which looks suspiciously like a P tube.

... Paul Godley writes knowledgeably about regenerative receivers. There is a lot of meat in this one. He is all for the three-circuit tuner but the Editor comments that the ease of tuning the Reinartz tuner more than offsets a small loss in selectivity and sensitivity.

... Traffic Manager Schnell makes a preliminary announcement concerning the forthcoming transatlantic sending tests. Ham activity will surely be a-cookin' for this one. He almost predicts we'll get across. Everyone will be on 200 meters because that's where the British will be listening. Huh! I wonder how many will make that wavelength.

... Irving Vermilya writes entertainingly about ham wireless as a reporter of the day might construe it. Cartoon by 8UX.

... We have some notes on the electrolytic rectifier by Roy Atkinson. He covers the ground pretty well but avoids mentioning the problem of periodically cleaning them. I once had Maxim's 120-cell job. At five minutes per cell, this adds up to ten hours of mess!

... We have a write-up of Ken Hewitt, 2RK, describing his achievements on the air. His ham tickets are at present suspended for violations of the radio laws. I think Ralph Barber, 2ZM, gave him some help.



September 1946

... We are getting our hands and segments thereof as soon as the military releases them. This is great. We are in business and there appears to be no reason why we shouldn't get them all very soon. This is because of fine co-operation between FCC and the military, as well as a lot of hard work on the part of the ARRL.

... A VFO of good stability is described by Don Mix, W1TS. This should free a lot of hams from the restrictions imposed by a crystal.

... A deluxe electronic key with a built-in cw monitor is described by Wilbur R. DeHart, W9DED. This is a very detailed article and should enable the boys to come up with a good one.

... Want a little math? Robert E. Kelley, W1IEB, comes up with a lot of dope on how to match a transmitter to a feed line. He uses a circle diagram and a few simple formulae. Not very tough.

... The ARRL has withdrawn its proposal before FCC to create a D class operator's license for operation above 1215 Mc.

... This year the boys are already revamping, modernizing, modifying, and otherwise monkeying around with surplus equipment. This time it's the BC432, which was quite a box, anyway. George Grammer tells how to make this into a real ham receiver.

... I note with personal interest that Wendell W. King, W3NBV, has an article on crystal control for 144 Mc. I used to know Wendell.

- W1ANA

• *Beginner and Novice*

Low-Cost Hardware

for

2-Meter FM

Reception

BY LEWIS G. McCOY,* WHCP

ONE PHASE of amateur radio that has become extremely popular in the last few years is 2-meter fm (frequency modulation), usually via repeaters. There isn't much doubt that the original impetus to 2-meter fm was started by the availability of 2-way surplus fm gear. However, as more hams become interested in fm, good surplus gear is becoming less easy to find. All one has to do is look at the ads in ham magazines to see that commercially built amateur gear has become the order of the day. Fortunately, the enterprising amateur doesn't have to provide a big outlay of cash for a new transceiver to find out if 2-meter fm has an appeal for him, because most of the new equipment is in the \$250 price class. This article will cover some less expensive methods of giving the mode a try.

* Novice Editor

What is a Repeater?

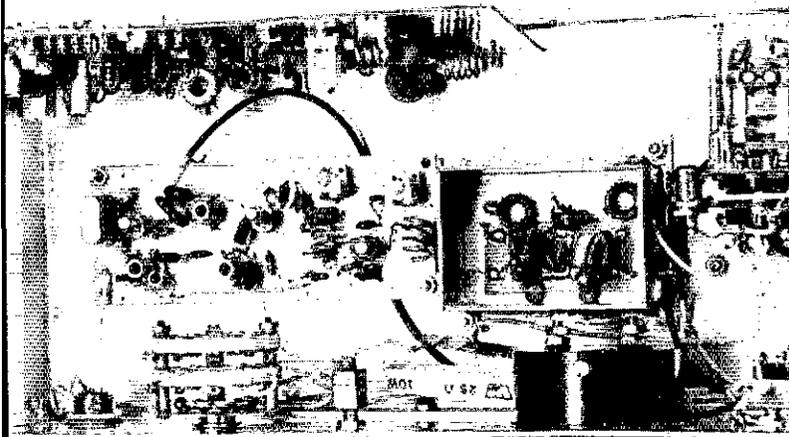
Like any facet of amateur radio, fm has a lingo all its own. You'll hear hams talk about "input" and "output" (and they are not talking about power), capturing a repeater (sounds like a witch hunt), triggering a repeater (it isn't a gun!), and strange number combinations like 34/94.

What is a repeater? Simply, it is a remotely-controlled receiver and transmitter that is usually installed in a superb radio location (as high as possible). The receiver and transmitter are crystal controlled on separate frequencies. An amateur operating a transmitter within the coverage area of a repeater will have his signal reach the repeater receiver and activate a transmit relay. The receiver feeds the incoming signal to the repeater transmitter which retransmits it. Because the repeater normally has the better location, the retransmitted signal has much greater coverage than the amateur would normally have from his mobile or fixed-station location. As to that "input" and "output," hams are referring to the receiver input frequency, 146.34 MHz for example, and the transmitter output frequency, 146.94 MHz. The two frequencies for receive and transmit are separated to avoid transmitter interference to the receiver at the repeater.

The 2-Meter Converter

One of the best ways to familiarize yourself with amateur fm is by listening to hams who are using the mode. Most fm operation takes place between 146 and 147 MHz. Shown in Fig. 1 is the circuit of a crystal-controlled converter that can be used to cover this range when used in conjunction with a tunable i-f receiver. We say "a receiver" because the converter can be used to work into a broadcast set, such as in an automobile, for mobile operation. In this article, it will be shown how to use the converter with either a bc set or a modified 6- to 9-MHz R27/ARC5 surplus command receiver.

While we may be criticized for promoting a method of fm reception called "slope detection," it is a very simple and inexpensive method for listening to the gang on fm. Slope detection takes advantage of the sloping sides of a receiver selectivity curve. If the receiver is tuned slightly to either side of center frequency, on the slope of the



This shows the converter and filter mounted in a homemade cabinet for use in a mobile installation. The unit in the vertical position at the rear of the chassis is the "Pip Squeak" transmitter, described in March, 1971, *QST*. While the layout of the parts isn't critical, and although the broadcast-band filter is used, any installation should be in a shielded enclosure to reduce bc signal pick-up.

QST for

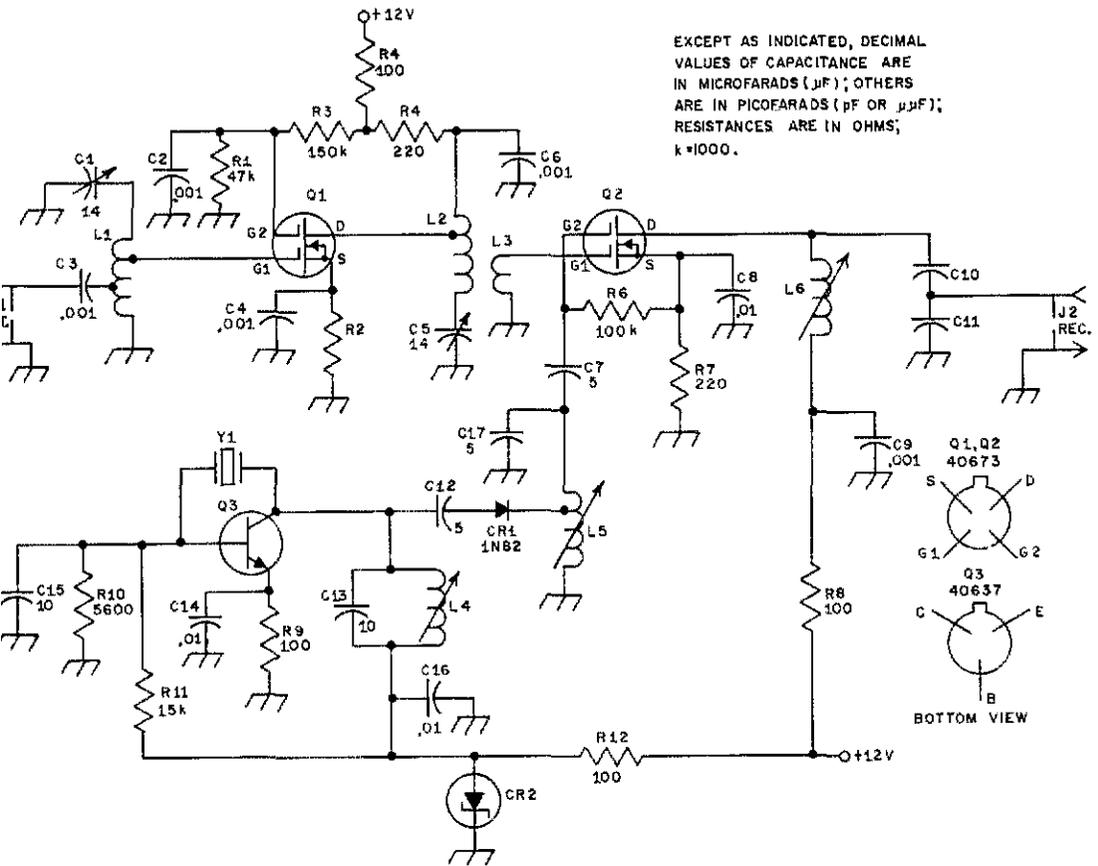


Fig. 1 - Circuit diagram of the 2-meter converter. Circuit designations not listed below are for parts-placement purposes in Fig. 2. Resistances are in ohms, all resistors are 1/2-watt. All decimal-value capacitors are in μF . Others are in pF .

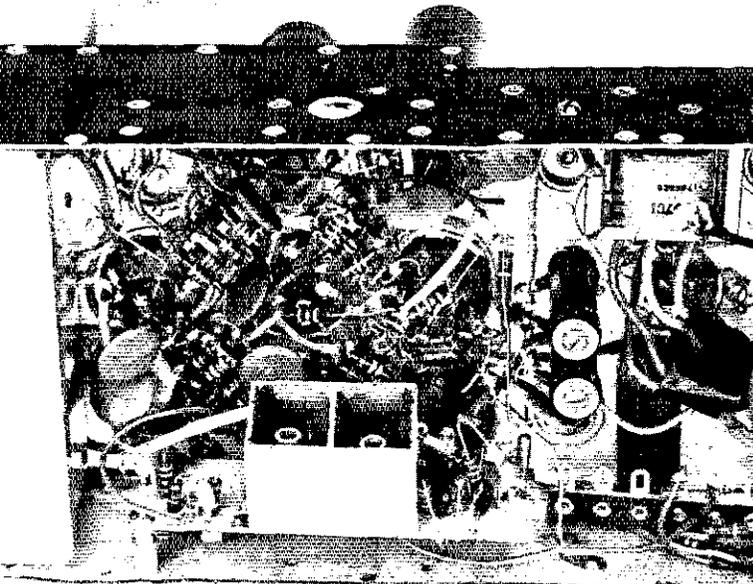
- C1, C5 - 1.7 to 14.1-pF pc-type air variable (Johnson 189-505-5). Compression trimmers or ceramic padders can be substituted.
- C10 - For bc set i-f, 1000 pF., for R27 i-f, 220 pF.
- C11 - For bc set i-f, 180 pF, for R27 i-f, 100 pF.
- CR2 - Zener regulator diode, 9.1 volts, 1 watt (HEP 104 or equiv.).
- L1 - Four turns No. 16, 3/8 inch ID, 5/8 inch long, tapped one turn from each end.
- L2 - Four turns No. 16, 3/8 inch ID, 1/2 inch long, tapped 1 1/2 turns from each end.

- L3 - Two turns of insulated wire, same diameter as L2, mounted between last two turns of L2 at C5 end.
- L4 - Pc-board variable inductor, 1.26 μH nominal (J. W. Miller 46A126CPC, J. W. Miller Co., 19070 Reyes Ave., Compton, CA 90221. Catalog available).
- L5 - Pc-board variable inductor, 0.189 μH , tapped one turn from ground end (J. W. Miller 46A187CPC).
- L6 - Pc-board variable inductor, for bc set i-f, 90 μH (J. W. Miller 46A825CPC), for R27 i-f, 6.3 μH (J. W. Miller 46A566CPC).
- Q1, Q2 - RCA 40673.
- Q3 - RCA 40637.
- Y1 - 48.485 MHz for bc band, 43.333 MHz for R27, overtone crystals (International Crystal Co. GP type).

signal, it is possible to copy the signal. It will sound much like an a-m signal. For good slope-detection audio quality, we don't want a receiver with too selective an i-f system. Ideally, for 5-kHz deviation, the i-f pass band should be at least 8 or 10 kHz wide. Either a bc set or the ARCS type receiver is excellent for slope detection.

To take full advantage of fm, a limiter and discriminator should be used in the receiver. This article also provides the information for installing such a device in the ARCS, if desired.

In the converter, Q1 is the rf amplifier, and Q2 the mixer. The oscillator, Q3, is crystal-controlled, using an overtone crystal in the 45-MHz range, the exact frequency depending on whether a bc set or ARCS receiver is used for the tunable i-f. The tuned circuit L4-C13 is resonant at the crystal frequency, and the signal is then multiplied by means of CR1. L5-C17 is tuned to the third harmonic of the crystal frequency, with the resultant signal being fed to gate 2 of Q2, the mixer. Output from the mixer is passed along to the



This view shows the installation of the limiter/discriminator in the R27. Etched circuit board is used for the unit. To avoid coupling, the circuit of L1 and C1 is shielded from L2. The integrated circuit, U1, is mounted below the etched board.

receiver through circuit L6-C10-C11 which is tuned to the receiver input frequency.

The converter is mounted on an etched circuit board that measures 2 x 5 1/4 inches. A half-scale template for the board, along with the parts placement, is shown at Fig. 2.

Broadcast-Band Filter

If the converter is to be used with a bc set, such as is found in an automobile, it is a good idea to install a band-rejection filter in the line to the antenna. This will help prevent strong bc stations from feeding around or through the converter into the bc set.

Shown at Fig. 5 is a simple filter that will provide adequate filtering to prevent bc interference. The coils in the filters are wound on toroid forms to provide high Q and good skirt selectivity. You will note from the photograph that the filter enclosure is made from etched circuit-board material. It is simple to make a shielded enclosure using this material as it is easy to flow solder along the joints of the side panels. However, any metal enclosure can be used for the filter as long as it provides good shielding.

ARC5/R27 - BC455 Modifications

The 6- to 9-MHz surplus receiver is designated either R27 or BC455, depending on the model you get. These units are still available as surplus.¹ Some conversion is necessary. This information is given in detail in one of the League publications.² Also, a complete circuit is available in a surplus-diagram book.³ The only conversion details that will be discussed in this article are the addition of a limiter and discriminator for fm reception.

Fig. 3 shows the circuit of a limiter and discriminator. Fig. 4 shows the changes necessary in the R27 to install the unit. In the receiver we modified, the BFO was removed in order to provide adequate space below deck to install the limiter/discriminator. You may want to work out some other arrangement, but we wanted the complete receiver in one package.

The detector/BFO, a 12SR7, is changed to an audio amplifier. It follows the discriminator. The

¹ Fair Radio Sales, P.O. Box 1105, Lima, OH 45802.

² *Understanding Amateur Radio*.

³ *Surplus Diagram Handbook*, Cowan Publishing Corp., 14 Vanderverter Ave., Port Washington, NY.

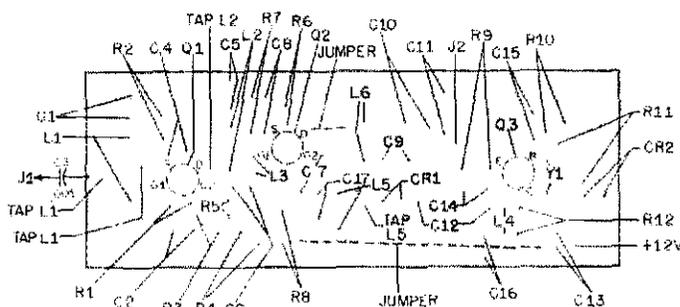


Fig. 2 - Half-scale template of the 2-meter converter.

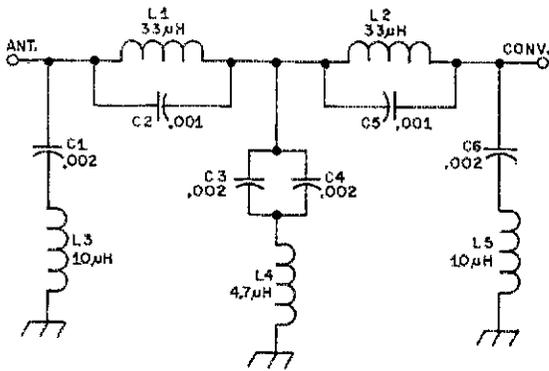


Fig. 5 — Circuit diagram of the broadcast-band rejection filter.

C1, C3, C4, C6 — .002 μ F.

C2, C5 — .001 μ F.

L1, L2 — 33 μ H, 76 turns No. 30 enam. wound on Amidon* T68-2 toroid core.

L3, L5 — 10 μ H, 42 turns No. 30 enam. wound on Amidon T50-2 toroid core.

L4 — 4.7 μ H, 26 turns No. 30 enam. wound on Amidon T50-2 toroid core.

* (Amidon Assoc., 12033 Otsego St., N. Hollywood, CA 91607, catalog available.)

12SR7 is used to drive the 12A6. In the unit shown, the output transformer was changed to one that would drive a speaker with a 3.2-ohm voice coil. Inserting the limiter/discriminator unit in the R27 is quite simple. Remove the lead connected to the diode terminal of the 12SR7, Fig. 4, and connect this lead to CA, the coupling capacitor of the limiter/discriminator. The output coupling capacitor of the unit, CB, should be connected to the top of R1, the volume control, Fig. 4.

Converter Tune-Up

After the converter has been wired, connect an antenna to J1. Using a short length of coax, connect J2 to the receiver antenna input. Depending on the receiver used, bc set or R27, it should be tuned to a frequency of about 146.5 MHz. The receiver setting can be determined by subtracting three times the crystal frequency from 146.500.

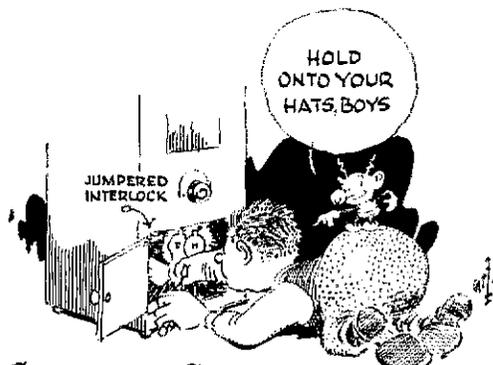
First, check the oscillator circuit with a wave-meter or grid-dip meter to make sure it is working. Turn up the receiver audio gain and then peak C1, C5, L5, and L6 for maximum noise. If you have or can borrow a grid-dip meter, it can serve as a signal source for peaking the various stages. Tune the grid-dip oscillator to 146.5 MHz and you should be able to hear the signal. Position the grid-dip meter somewhere near but not too close to the antenna, and then use the signal for peaking the various stages. You'll find that there is a setting of the slug in L4 (close to the point where the oscillator quits) that provides the most gain. If the bc set has an antenna-input trimmer, adjust this for maximum signal gain also. There is an antenna trimmer on the R27, so it should be adjusted accordingly. In tuning in an fm signal with slope detection, you'll find that the best audio quality will result when

you tune slightly off the center of the signal. It will only take you a few minutes to get the knack of it. In our mobile installation, we set the bc push buttons to the various local repeater frequencies so the repeaters can be tuned in quickly without any knob twiddling. Also, while it isn't the best antenna in the world by a long shot, we pushed down the bc whip to 18 inches, about a quarter wavelength on 146 MHz, and used it for the antenna. Works pretty well too!

Limiter/Discriminator Adjustments

Once the limiter/discriminator is installed in the R27, it is ready for adjustment. The first step is to connect a microammeter (M1) to the discriminator. The meter should be a zero-center type, either a 50-0-50 or 100-0-100 μ A. You can use a conventional meter but it will require reversing the meter polarity as you make the adjustments. Turn on the receiver and adjust the slug in L1 for maximum noise. Then, adjust L2 for zero reading on the meter. You don't need to have the converter connected for these next adjustments, so you can use the output from a VFO or grid-dip meter. Tune the receiver slowly across the test signal and watch the deflection of the meter. As you go past the signal, the meter will deflect first in one direction and then the other. The object of the adjustments is to get the meter to deflect *equally* in each direction as you tune across the signal. If the deflection isn't equal, adjust L1 so that you get equal deflection. Next, check M1 to make sure it is still at zero with *no* signal. If it isn't, you'll have to readjust L2. The trick is to get equal deflection on either side of a signal, and a zero reading without a signal. This means going back and forth between the two coils until the correct adjustment is achieved. Once you have these adjustments made, the receiver is ready for fm reception. (This is one of those cases where it's a "heckuva" lot easier to show a ham how to do it than to write about it!)

After listening, you can make up your mind whether you want to try the fm route or not. A simple fm transmitter, and one that we packaged in the mobile installation, is "The Pip Squeak" that was described in March, 1971, *QST*.



Switch to Safety

Using the Motorola

TU-110 Series Transmitters

on 420 MHz

A-M and CW, as well as FM, with a Popular Surplus Unit

BY DALE P. CLEMENT,* WA1FSZ

SURPLUS FM transmitters such as the Motorola TU-110 are popular for channelized fm communication just below 450 MHz. They are also readily adapted to a-m and cw work at 432 MHz. Extensive use of stable transmitters and high-performance receivers has shown that the 420-MHz band has most of the reliable characteristics that have made 2 meters popular, and operation on the higher band has increased markedly in recent years.

The TU-110 transmitter rf unit has a 12AT7 crystal oscillator, a 6CB6 reactance modulator for fm, a 6CB6 first doubler, 5763 second doubler, 2E26 or 6146 third doubler, a 2C39A tripler-driver, and a 2C39A grounded-grid amplifier. The transmitter is conservatively designed to deliver 10 to 15 watts output. If you build your own power supply, as described here and shown schematically in Fig. 1, as much as 20 watts output is obtainable. With the keying circuit and external modulator arrangements also described, the conversion offers the following features:

- 1) Selection of a-m, fm, or cw operation by the turn of a switch, with no readjustment of the transmitter operating conditions or tuning.
- 2) Send-receive control with one switch. On cw, this is a toggle. On voice there is optional push-to-talk provision.
- 3) Stable chirp-free cw.
- 4) Transmitter frequency spotting without putting a signal on the air.

Power Supply and Modifications

Construction of the power supply is not critical, except that the relay, K1, the function switch, S1, and wiring be able to withstand the high voltage. Two cables are used. One carrying the audio (microphone) and relay-control wires is shielded to prevent hum pickup by the microphone circuit. If your transmitter is one of those having a round pin for terminal 5, and you cannot locate a suitable mating connector, drill out the mounting rivets and replace the connector with a Cinch-Jones P-315-AB. Use a Cinch-Jones S-315-CCT connector

* 19 Conant Drive, Concord, NH 03301.

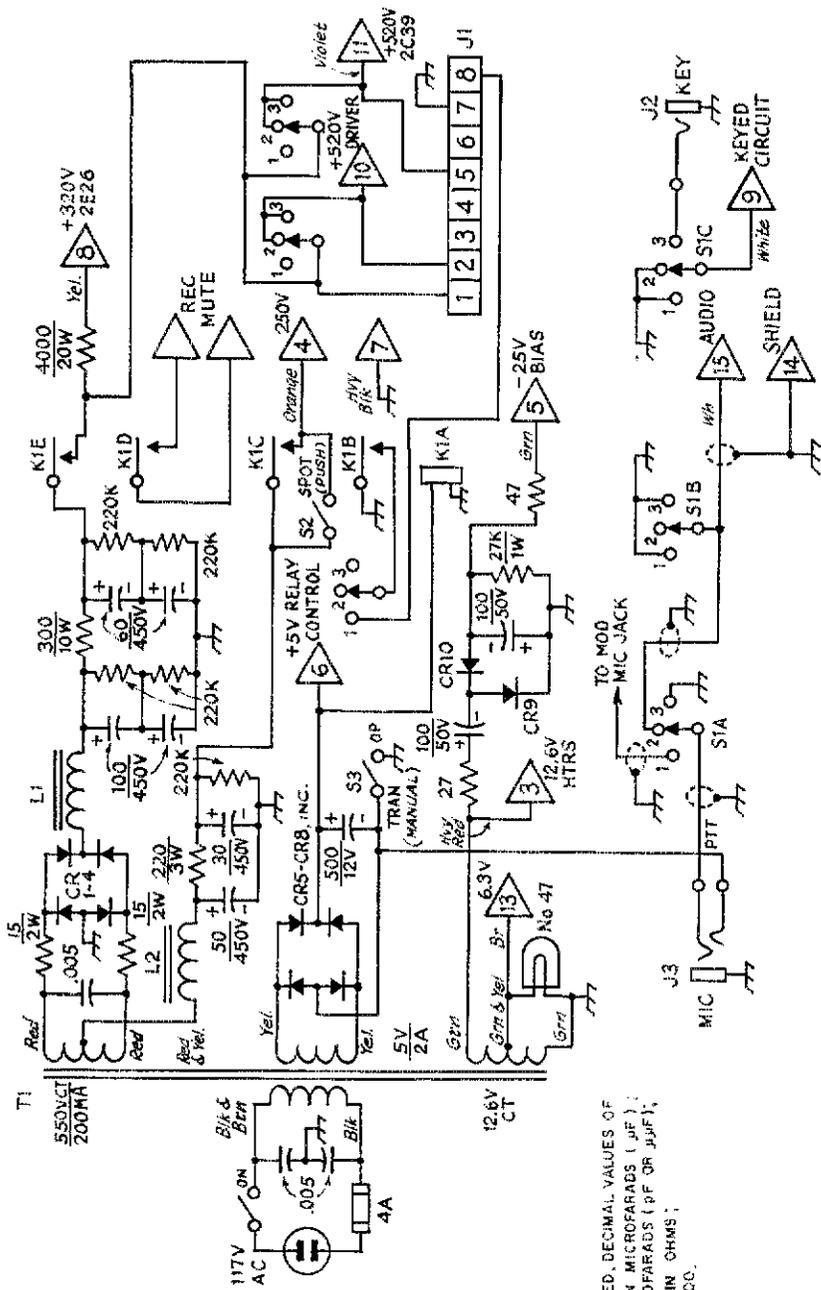
on the power cable. If no a-m capability is desired, the modulator cable can be disconnected from the power unit, and the cw and fm modes will not be affected.

Modifications were made on the transmitter to put the crystal oscillator on frequency and improve its stability, to make provision for cw keying, and to permit high-level modulation. The *FM Schematic Digest*¹ recommends adding 5-pF capacitors across L6 and L7 (the coils between the 5763 and 2E26 stages) in order to reach the lower frequencies in the amateur band. Also recommended is removal of the output filter (Z5) from later-model units that have a 6146 doubler, because the filter will not work at 432 MHz.

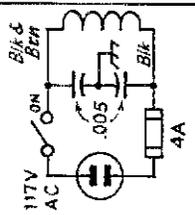
Keying for cw is accomplished easily by lifting the ground end of the 330-ohm cathode resistor (R17) in the 5763 stage, and running it to a keying line, as shown in Fig. 2. The electrolytic-capacitor leads must be disconnected from the 5763 cathode, but solder them together and tape the connection. The oscillator and first-doubler stages are left running during keying, in the interest of stability. Thought was given to keying the final or driver, but dc grounding of the cathodes and the extensive network of grid-circuit resistors make this impractical. With minus 25 volts fixed grid bias, obtained from a diode voltage-doubler powered by the 12.6-volt heater line, the 2C39As conduct heavily only when driven.

Frequency control is by means of an 18-MHz *fundamental* crystal (from JAN Crystals, or Type R-24 from International Crystal Mfg. Co.). Crystals in the 8-MHz range are not usable unless the tuned interstage circuits are modified. It was found that the coil (L2) in series with the crystal made the frequency come out about 100 kHz below 432, when an 18,000-kHz crystal was used, so the coil was shorted out with a piece of tinned wire. (If crystals are ordered for the desired *operating* frequency, giving the transmitter model number, Motorola crystal number and oven information, this short may have to be removed — *Editor*.) Adjusting the slug in L1, accessible through a hole in the bottom plate, allows pulling the oscillator enough to move the operating frequency, about plus or minus 50 kHz at 432 MHz.

¹ Available from S. Wolf, 1100 Tremont Street, Boston, MA 02120, and dealers; price \$6.50. For more information, see January, 1971, *QST*, p. 39.



T1
550VCT
200MA



12.6V
CT

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

Fig. 1 - Schematic diagram and parts information for the power supply for the uhf transmitter. Capacitor values are in microfarads (μF), 1000-volt rating unless otherwise indicated. Polarity markings indicate electrolytic. Numbers in triangles are those on the transmitter power plug, P1, as given on the Motorola diagram. Functions of S1 are 1 - e-m, 2 - fm, 3 - cw.

- CR1-CR4, incl. - 800-PRV, 500-mA rectifier.
- CR5-CR8, incl. - 25-PRV, 2-A rectifier.
- CR9, CR10 - 50-PRV, 1-A rectifier.
- K1 - 4-pole double-throw relay, 5 to 6.3-V dc coil. Contact arms should have 1000-volt rating.
- L1 - 1-H 350-mA choke (Triad C-28X).
- L2 - 3-H 160-mA choke (Triad C-13X).

- J1 - Octal socket, for modulator cable.
- S1 - 6-position 3-position ceramic nonshorting rotary switch (Centralab PA-6019).
- S2 - Push switch.
- T1 - Power transformer, 117 V ac pri; 550 V, ct sec., 200 mA; 5 V, 2A; 12.6 V, ct.
- S3 - Toggle switch.

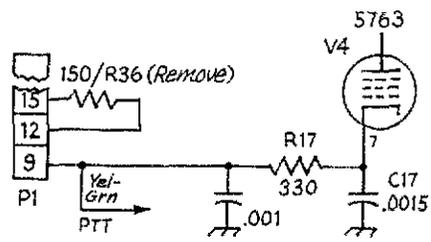


Fig. 2 - Keying modification made on the Motorola fm transmitter. Only the .001- μ f capacitor is added. Others are original Motorola parts. More information in text.

Oscillator stability, especially during cw keying, is improved by regulating the voltages applied to both 12AT7 plates, by means of Zener diodes. The dropping resistor values in the regulator circuits, Fig. 3, were chosen to allow 1.5 to 2.5 mA through the 110-volt Zener diode, and 2 to 3.5 mA through the 150-volt one. It should be emphasized that operating conditions different from those used here may require adjustment of the values of R1A and R8A. If your power supply regulation is not good, you may need higher-wattage Zener diodes than those specified, so that their maximum current ratings will not be exceeded during load changes.

The built-in antenna changeover relay in the transmitter is wired in parallel with the power-supply relay, so that they can be activated simultaneously. The coil is intended for 6.3 volts dc, but it will operate with less, so the 5-volt winding of the power transformer can be used with a full-wave bridge rectifier for relay control. See Fig. 1. Disconnect the heavy green-and-yellow wire from one lug of the antenna relay, leave it free, and ground the lug. Do not disturb the remaining lug, which has a black-and-white wire connected.

The final 2C39 plate voltage is modulated normally, and the driver is modulated about 10 percent, to obtain 100-percent modulation of the output signal from the grounded-grid amplifier. Provision for use of an EICO 730 Modulator is shown in Figs. 1 and 4. The 6500-ohm tap on the modulation transformer (pin 5 on the modulator output socket) is used for the final stage, and the

(Continued on page 45)

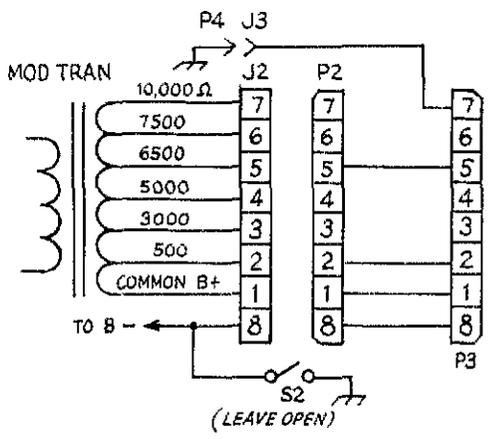


Fig. 4 - Details of cable used for connecting an EICO 730 Modulator to the uhf fm transmitter. Experimentation with different values of transformer impedance can be made easy if more wires are added to the cable between P2 and P3. S2, on the modulator, must be left in the OFF position at all times.

- J2 - Octal socket on EICO Modulator.
- J3 - Lug on modulator grounding wire.
- P2,P3 - Octal plugs on cable.
- P4 - Modulator ground post.

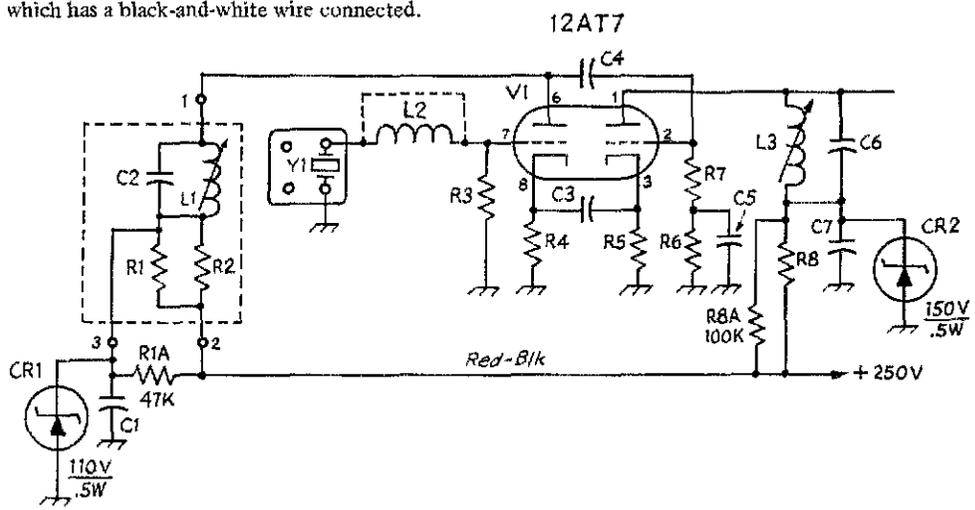


Fig. 3 - Changes made in the oscillator circuit, to regulate the plate voltage on both sections of V1. Parts not described below are the original Motorola components.
CR1 - 110-volt 1/2-watt Zener diode.

- CR2 - 150-volt 1/2-watt Zener diode.
- R1A, R8A - See text; values shown were selected to give desired Zener-diode current.
- Y1 - Fundamental crystal, 18 MHz for 432; see text regarding short across L2.

Low-Loss Passive Bandpass CW Filters

USING LOADING COILS

BY D. C. RIFE,* WA2PGA

THE MANY recent articles on cw filters^{1,2,3,4,5} attest to the fact that some amateurs, like myself, are still using receivers with cw performance that can be greatly improved by the use of a narrow-band audio filter. Most of the LC filters reported require the use of active (powered) components to compensate for loss or adjustment of the impedance that loads a passive filter. A passive low-loss filter can offer the advantages of no power consumption and, because of fewer components, lower cost. One compelling reason for not using passive filters is that they usually require inductance values that are not easily obtained.

This article presents passive cw-filter designs that use only 11- and 44-mH coils, the values that can be obtained by using surplus 44-mH loading coils. The design technique is not new. It is routinely used by filter designers, but amateurs have made little use of the technique.

Design Details

The filter design that follows is a 3-section bandpass filter. A Butterworth (maximally flat) response shape was chosen, but other shapes could also be used. By the way, a constant- k bandpass section with equal terminations has a Butterworth response. See, for example, page 50 in the 1970 or 1971 *Radio Amateur's Handbook*.

With reference to Fig. 1, a 3-section (6-pole) Butterworth filter has the values indicated by the formulas. These design formulas, and others for other filter configurations, can also be derived from tables of normalized low-pass filters. See Geffe,⁶ Hansell,⁷ or Zverev⁸ for details and tables. In Fig. 1, f_1 is the lower-3-dB band-edge frequency and f_2 is the upper.

* 10 Broadmoor Dr., Lincroft, NJ 07738.

¹ Countryman, "Selective Audio Filter for C.W. Reception," *QST*, February, 1964.

² McCoy, "The Selectoroid," *QST*, December, 1966.

³ McCoy, "A Solid-State Selectoroid," *QST*, May, 1970.

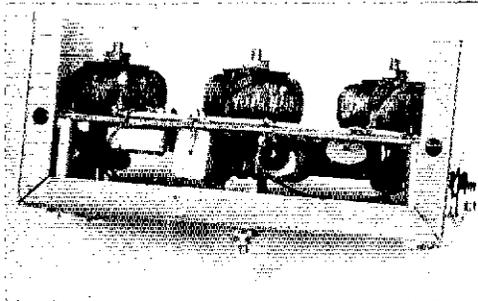
⁴ Anceaux, "A Solid-State Audio Filter," *QST*, December, 1968.

⁵ Hayward, "An RC-Active Audio Filter for C.W.," *QST*, May, 1970.

⁶ Geffe, *Simplified Modern Filter Design*, Rider, New York, 1963.

⁷ Hansell, *Filter Design and Evaluation*, Van Nostrand, New York, 1969.

⁸ Zverev, *Handbook of Filter Synthesis*, Wiley, New York, 1967.



Shown here is a selective audio filter constructed by WA1CQW from the design developed by the author in this article. The filter components are mounted on a piece of perforated phenolic board which is supported by metal standoffs. With information presented in the text, one can develop a similar filter suited to his individual preferences.

Observe that the input and output inductances are equal and proportional to the bandwidth, B . We can turn the relationship around and write

$$(1) B = \frac{\omega_0^2 L_1}{R}$$

Equation (1) tells us that if certain values for L_1 , ω_0 , and termination resistance, R , are desired, then B is determined.

For cw work, f_0 might be 875 Hz. The specified center frequency is, of course, a personal choice. I use 875 Hz. Let us further choose $R = 600$ ohms. Typical values for B , related to L_1 , then are from (1):

L_1 (mH)	$\frac{B}{2\pi}$ (Hz)
11	88
22	176
44	353
88	706

These bandwidths are what would be obtained if lossless coils and capacitors were used. The four inductance values listed can all be obtained from center-tapped 44- and 88-mH coils, without modification of the coils. Other values can, of course, be obtained by modifying coils.⁹ I chose (again personal preference) to use 44 mH for L_1 and a bandwidth, $B/2\pi$, of about 353 Hz. The values of the other components, from the formulas in Fig. 1, are:

$$C_1 = 0.753 \mu\text{F}$$

$$L_2 = 542 \text{ mH}$$

$$C_2 = 0.0611 \mu\text{F}$$

The resulting circuit is shown in Fig. 2. Now we have a problem: Where are we going to get a

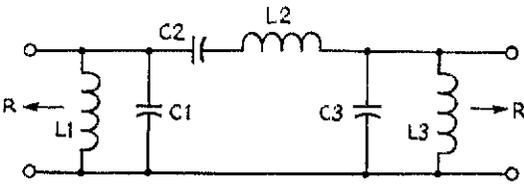
⁹ Wetherhold, "Inductance and Q of Modified Surplus Toroidal Inductors," *QST*, September, 1968.

high- Q , 542-mH coil? Suppose we prefer to use 44 mH for the middle inductor. If two ideal transformers with turns ratio

$$n = \sqrt{\frac{542}{44}} = 3.51$$

are used, the filter can be realized as shown in Fig. 3.

At this point we introduce the three handy circuit identities (Norton's transformation) given in Fig. 4. We will only use identity (a); the others are presented because they are useful in other situations. For example, (c) is useful when an internal-



$$B = 2\pi(f_2 - f_1) \quad \omega_0 = 2\pi\sqrt{f_1 f_2} = 2\pi f_0$$

$$C_1 = C_3 = 1/BR \quad C_2 = B/2\omega_0^2 R$$

$$L_1 = L_3 = \frac{BR}{\omega_0^2} \quad L_2 = 2R/B$$

Fig. 1 - A Butterworth filter.

shunt inductance value is too small, as might occur in a 5-section filter. Notice that in each case the transformer turns ratio, n , is limited by realizability conditions.

Each transformer in Fig. 3 and its pair of capacitors form the type of network shown in Fig. 4a. Carrying out the indicated calculations and circuit substitutions we obtain two more realizations of the same filter, as shown in Fig. 5.

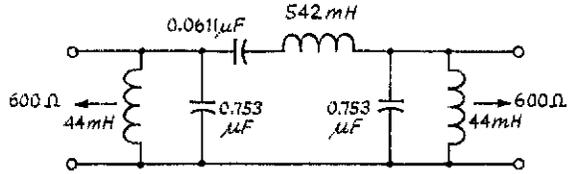


Fig. 2 - First realization of filter.

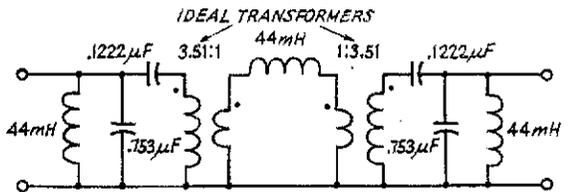


Fig. 3 - Alternative realization of filter.

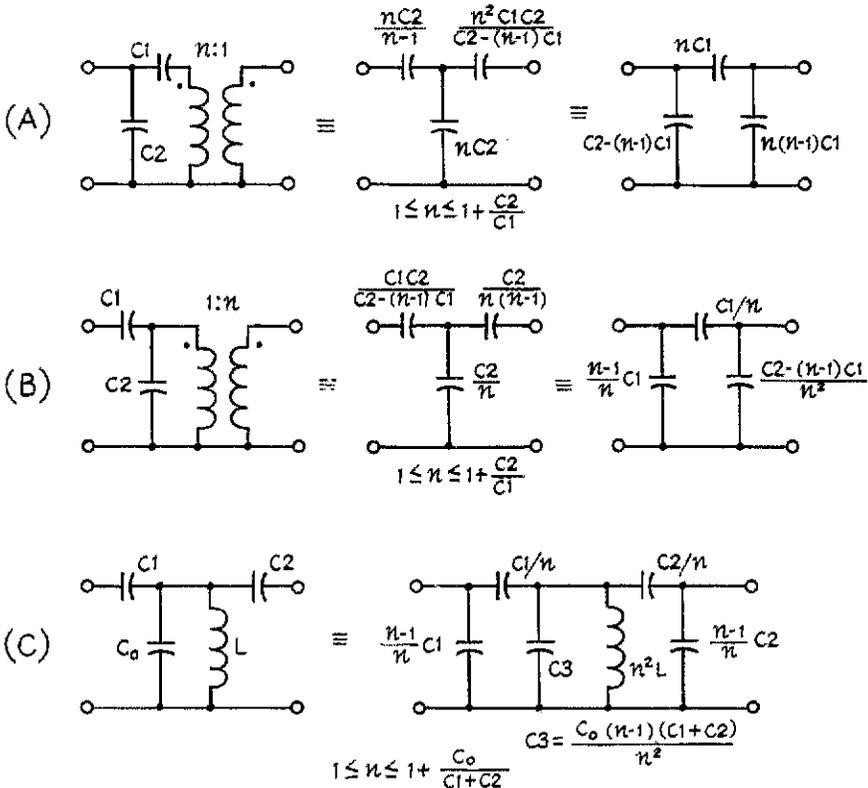


Fig. 4 - Some circuit identities.

(Fortunately, the desired value of n fell within the indicated bounds.) Either of the filter realizations shown in Fig. 5 can be constructed using the desired 44-mH loading coils. The second one, Fig. 5b, however, uses less total capacitance and is slightly lower in cost.

The last step is to approximate the capacitors in the more-or-less-exact design of Fig. 5b, which has neglected the effect of coil losses. To get good results some care should be taken in capacitor approximations. For the present case, look back at Fig. 1. We see that if the input and output terminals are shorted, then the resulting capacitance across the center coil will resonate it at 875 Hz. Also observe that with the center coil opened, the end coils will each be resonated to 875 Hz. For best results these two conditions should be met in the finished design.

Completed Filter

Turning to Fig. 6, I chose capacitance values close to the ones given in Fig. 5b, but adjusted to easily realized values. Observe that the 1- and 0.5- μF capacitors, when in parallel, are just about twice the capacitance needed to resonate the

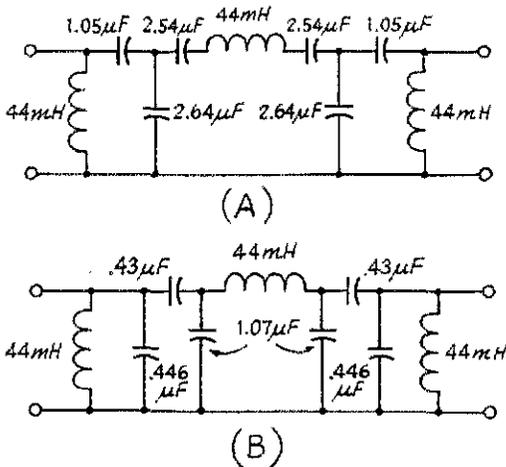


Fig. 5 - Two more realizations of the filter.

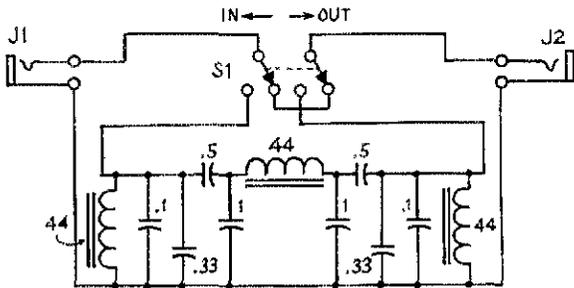
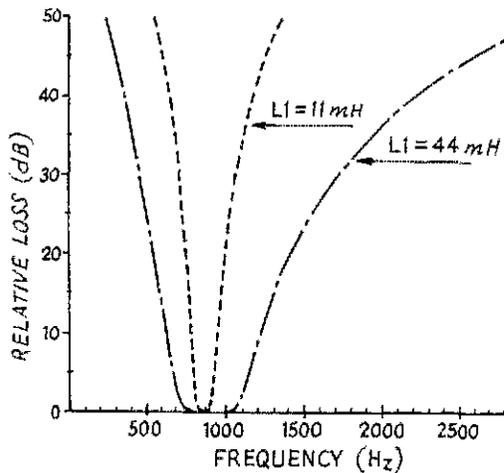


Fig. 6 - Completed design of a practical filter. This circuit is an approximation of the one shown in Fig. 5b. Capacitors are mylar, all values are in microfarads. Inductance values are in millihenrys. See *QST* Ham-Ads for sources of surplus inductors.



COMPONENT VALUES ($F_0 = 875$ Hz)

MEASURED 3dB BW	427	106	Hz
L1, L3	44	11	mH
L2	44	44	mH
C1, C6	0.43	2.80	μF
C2, C5	0.50	0.25	μF
C3, C4	1.0	1.25	μF
INSERTION LOSS AT F_0	1.0	4.2	dB

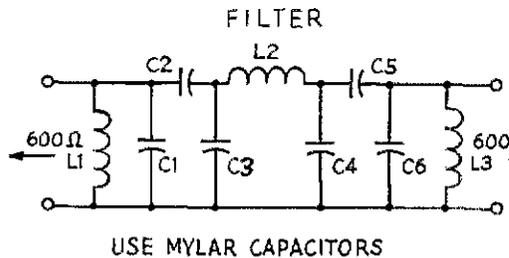


Fig. 7 - Measured relative loss of filters.

center coil to 875 Hz. Similarly, the 0.1 and 0.33 μF values in parallel with the series combination of 1 and 0.5 μF (0.33 μF) almost resonate the end coils to 875 Hz. At present prices the total cost of the filter components shown in Fig. 6, using 100-volt mylar capacitors, is just under \$5. The switch and jacks are extra.

Fig. 7 shows the measured frequency response of the circuit. As can be seen, the computed bandwidth has almost been realized. Notice that the insertion loss of the filter is about 1 dB, which is hardly noticeable. Also shown in Fig. 7 is a similar design carried through with 11-mH end inductors. The insertion loss of the second filter is about 4 dB.

A bandwidth of more than 400 Hz is, of course, far more than the minimum that will pass cw signals, but I have been using the filter with the Ten-Tec PM 3A transceiver with gratifying results. The use of a narrower bandwidth requires a stable receiver with a slow tuning rate.

TU-110 Transmitters on 420 MHz

(Continued from page 41)

A word about use of the filter with various loads: It is important, if the proper frequency response is to be obtained, at least to approximate the specified nominal source and load impedances. A load mismatch of 2 to 1 is not serious.

For those who may want to use the above-described design procedure for other frequencies, the procedure is summarized in the appendix. QST

Appendix

Summary of Design Procedure for Butterworth Filter

Refer to Fig. 7 for component definitions.

Select:

- 1) Center frequency (f_0).
- 2) End inductance (L_1 and L_3).
- 3) Center inductance (L_2).
- 4) Termination resistance (R).

Compute:

$$\omega_0 = 2\pi f_0$$

$$B = \frac{\omega_0^2 L_1}{R} \quad \text{Note: } L_1 = L_3$$

$$C_a = \frac{1}{\omega_0^2 L_1}$$

$$L_o = 2R/B$$

$$C_o = \frac{2}{\omega_0^2 L_o}$$

$$n = \sqrt{\frac{L_o}{L_2}}$$

$$C_1 = C_6 = C_a - (n-1) C_o$$

$$C_2 = C_5 = n C_o$$

$$C_3 = C_4 = n(n-1) C_o$$

Notes: 1) $\frac{1}{2}(C_2 + C_3)$ resonates L_2 to f_0 .

2) $C_1 + \frac{C_2 C_3}{C_2 + C_3}$ resonates L_1 to f_0 .

500-ohm tap (pin 2) for the driver. If you want to try other modulation impedances, adding other wires to the cable between P2 and P3 of the connecting cable (Fig. 4) will make changes a simple matter. Any modulator of at least 25 watts output can be used. If the modulator does not have suitable transformer taps, a resistive divider can be used to adjust the audio level to the driver stage.

The high-impedance microphone used for a-m can be switched to fm service, after removing the 150-ohm resistor (R36) that is connected to pins 12 and 15 of the power connector. This was necessary to supply voltage for a carbon microphone. Check the deviation and signal quality. The audio line to the reactance modulator should be grounded when not using fm, to prevent modulating the carrier with ac or unwanted audio. This is especially important for T-9 cw at 432 MHz.

Tune-Up and Use

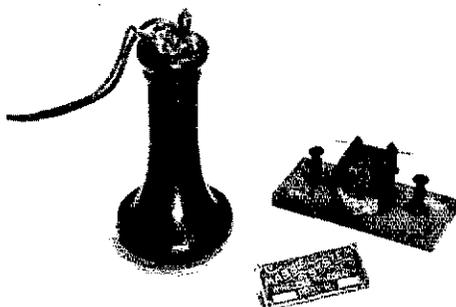
A VTVM or high-impedance VOM is used to indicate developed voltage to ground on each of the meter-socket pins, starting with the oscillator, pin 2, and progressing to the final, pin 6. Pin 1 is used for metering relative output, when adjusting the final tuning and loading controls, with a 50-ohm dummy load connected. Use a long nonmetallic screwdriver for the 2C39 adjustments. Pins 7 and 8 are for reading plate current.

With the equipment modified as described, the XMT-TUNE switch on the transmitter must be left in the XMT position. In the TUNE position the 2C39s will operate from the 320-volt line, and the 4000-ohm resistor in the power supply will blow.

Well, there it is — a simple and inexpensive way to make your debut on 70 centimeters, with a dependable, versatile, and easy-to-operate rig. Good luck on uhf! QST

From the Museum of Amateur Radio

Depicted above are a couple of components of a receiver made in 1904 by Robert F. Gowen, 2XX. The phone is a common variety of 75-ohm telephone receiver, while the detector is of the type used by Massie System of Wireless Telegraphy. It comprises a steel needle lightly resting on a pair of wedge-shaped carbon blocks. This thing is remarkably "microphonic" and does work but not very well on phone, although music is recognizable as music. Not for hi-fi rigs! Gowen used it as a standby for his electrolytics. — *WIANA*





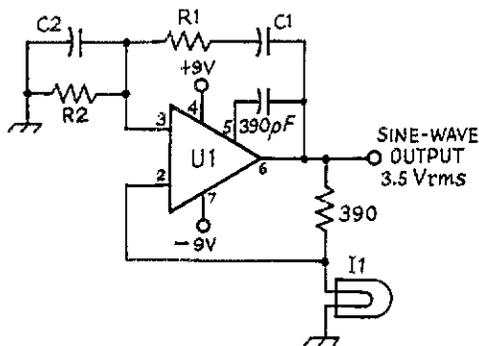
Hints and Kinks

For the Experimenter



A SIMPLE AND INEXPENSIVE AUDIO OSCILLATOR

In looking around for a very simple and inexpensive way of generating an audio signal for testing purposes or general use, I came up with an idea incorporating an integrated circuit that functions as a Wein-bridge audio oscillator. There are only two special components needed, a uA709C linear operational amplifier and a No. 327 pilot lamp. The linear operational amplifier may be purchased from Poly-Paks, P.O. Box 942R, Lynnfield, MA 01940 for \$1.69 each, and the No. 327 pilot lamp is available from wholesale suppliers for 48 cents.



Circuit of a Wein-bridge audio oscillator. Components not listed below are for text reference.
I1 - No. 327 lamp.
U1 - uA709C linear operational amplifier.

In the circuit, if resistors R1 and R2 are equal and capacitors C1 and C2 are equal, then the frequency generated is:

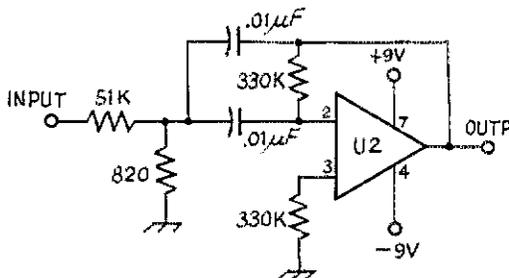
$$f = \frac{1}{2\pi R1C1}$$

where f is in Hertz, $C1$ is in Farads, and $R1$ is in ohms.

Several frequencies may be selected by switching in different values for C1, C2, remembering that C1 and C2 are equal. - Glen Rothwell, W7BL

A SIMPLE AUDIO FILTER

The cw performance of many less-expensive receivers can be improved significantly by the addition of an audio filter. The circuit combines simplicity and some gain. The circuit is a bandpass active filter, using an integrated operational amplifier. It has a center frequency of 1 kHz, a bandwidth of 100 Hz, and a gain of 10. The filter is powered by two 9-volt transistor batteries.



An active filter provides additional selectivity after the receiver audio circuit.
U2 - N5741V operational amplifier.

Headphones with an impedance of 600 ohms or higher can be used on the output of the audio filter. If it is desired to operate with a loudspeaker, an impedance-transformation stage is required along with some additional power gain.

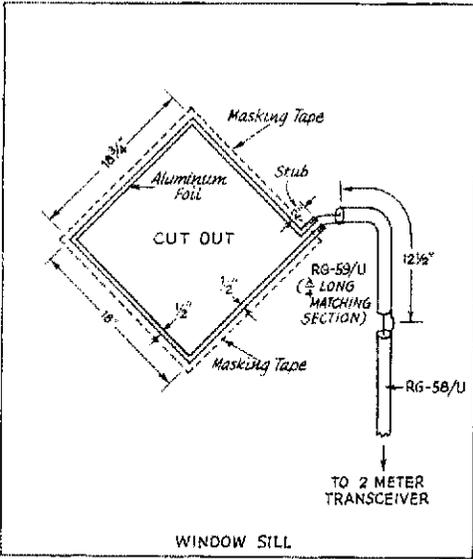
The N5741V operational amplifier is made by Signetics and sells for \$1. It is their short dual-in-line version of the popular 741 operational amplifier. The entire circuit can be built on a 1 x 2-inch circuit board and taped to the batteries. It can then be mounted in a Minibox or tucked into the receiver. A switch to remove power and bypass the filter is required. - Robert R. Knibb, WA3LJO

9-VOLT TRANSISTOR BATTERY CLIPS

Battery clips for the common 9-volt transistor radio battery can be obtained by carefully peeling away the metal case on used 9-volt batteries and saving the battery top containing the male and female connections. Solder a wire to each of the connections and you have a battery clip. - Mike Kaufman, K6VCI

THE QUICKIE QUAD FOR TWO

This is a quad antenna for two-meter operation that can be made out of aluminum foil and taped to the inside of a window. The standard 18-inch-wide roll of aluminum foil will work fine. Referring to the sketch, cut out a piece of foil to the outside dimensions shown. Next cut a piece of cardboard to the same dimensions as the foil. Take some one-inch-wide masking tape and fasten the foil and cardboard sheets to the window oriented as shown in the sketch. Cut the inside foil out with a razor or a knife being careful not to go through the cardboard and scratch the glass. Now complete the job by taping the edge on the inside of the square. Make sure that you leave the 2-inch-long stub free of tape.



Dimensions for the WSAP quad antenna.

Now that the antenna is up, the next step is feeding it. Since the feedpoint impedance of the quad antenna is approximately 100 ohms, some sort of matching will be required if 50-ohm line is to be used. A quarter-wavelength matching section with a characteristic impedance of 71 ohms will be required. A 12 1/2-inch-long piece of RG-59U coaxial cable will work as the quarter-wave transformer since its impedance is close to 71 ohms. The transformer is taped to the window and one end is attached to the antenna input. The braid of the antenna stub and held in place by tape. The center conductor is connected to the other section of the stub and also taped. On the free end of the quarter-wave transformer, attach an 83-1SP plug and UG-176/U adapter. An 83-1J straight adapter is used to connect the transformer to a feedline. All that remains is to connect the feed line to your two-meter station. — *George Goldstone, WSAP*

[EDITOR'S NOTE: The quad antenna with the feed point on the side as shown in the diagram will receive and radiate vertically polarized signals. If horizontal polarization is desired, place the feed point at the bottom of the quad.]

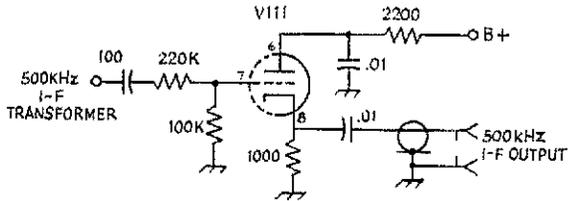
A PRODUCT DETECTOR FOR THE 51J-4

When I used the Collins 51J-4 receiver as a tunable i-f system for 6- and 2-meter reception, it was obvious that a product detector was needed for good ssb reception on either of these bands. Something simple was needed without drilling holes or adding knobs to the front panel.

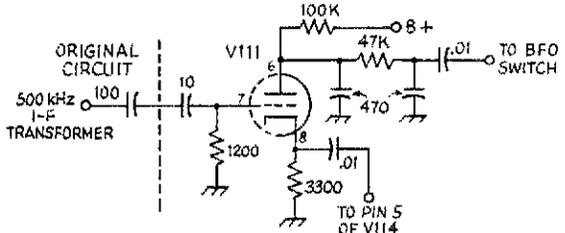
After looking at the circuit diagram, a solution to the problem of product detection was at hand. One half of V111 is an i-f cathode-follower circuit seen in the diagram. It provides the proper impedance transformation so that a panadapter can be used for viewing the signals in the hand-pass of the i-f amplifier. This cathode-follower circuit could be modified and used as a product detector.

The diagram shows the circuit adaptation to change the cathode-follower into a product detector.

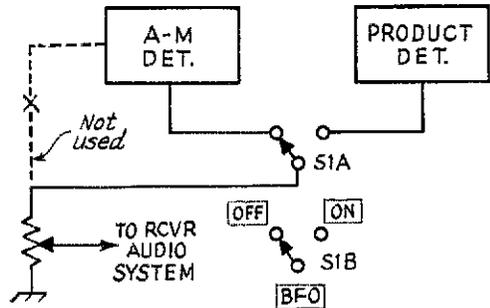
A further inspection revealed that the control for the bfo function was a dpdt switch with one half of it not in use. The unused portion of the switch was used to transfer detector output. With the bfo function switch in the OFF position, the output of the a-m detector is connected to the receiver audio system. Additionally, the bfo is disabled. With the bfo switched on, the output of the product detector is connected to the audio amplifier. Since in this position, the bfo is connected to the product detector, it will act as a carrier oscillator. Insure, when wiring the circuit modifications, that shielded wire is used from the output of each detector and from the audio gain control to the bfo function switch. When receiving cw or ssb, use the PITCH control to obtain the desired audio note or to obtain the proper sideband. — *Ralph Saroyan, W6JPU*



The original cathode follower circuit used for i-f output to a panadapter.



Added product detector.



Block diagram of the modification to the 51J-4 Collins receiver.

Technical Correspondence

RECEPTION OF RADIO-FREQUENCY EMISSIONS FROM JUPITER

Technical Editor, *QST*:

As a lab project for an astronomy course at Middlebury College in Middlebury, Vermont, Lance Collister, WA1JXN, and I built a radio telescope which would allow us to receive the radio emissions coming from Jupiter. Our system was set up to receive at 18 MHz. Although we did not have sufficient time before the end of the semester to make as many observations as we wished, I think we can say that we achieved success. We were indeed able to receive Jupiter with little trouble, once we had the equipment operating properly.

We decided first to build a 4-element cubical quad. We got it up on the roof of the science center at the college, but the day after it was completed, it blew over, sustaining major damage to the spreaders! We figured that the wind load of a quad was simply too much for our mount, and so we quickly redesigned the antenna into a 4-element Yagi. The Yagi performed even better than the quad, although we had only one night's observation from the quad before the catastrophe. Apparently the horizontal polarization of the Yagi made the system much less susceptible to ignition noise. We did not have a chance to try the quad with horizontal polarization.

The system was set up as follows: The antenna was connected to a Drake R4B receiver, which tunes 18 MHz. The output of the receiver (from the audio amp.) was split two ways. One went into the hi-Z input of an audio amp. and thence to a speaker. This allowed control of the listening volume without having to touch the receiver of gain control. Using the hi-Z input of the amp. isolated the amp. effectively. The other output was fed into a bridge rectifier and thence into an RC circuit which established a time constant of about 5 seconds, thus eliminating "spikes" from static crashes, etc. The RC circuit consisted of two pots in parallel across the output of the bridge, with a capacitor in series between the pots. The second pot, in addition to providing a control of the decay time of the RC circuit, also provided a load for the receiver's output. From the RC circuit, the signal was fed into a Hewlett-Packard chart recorder.

Setting up the RC circuit with the proper values for the resistors and capacitor was a cut-and-try job. None of the formulae we tried worked out for some reason.

We recorded some very nice noise storms from Jupiter, as well as consistent lower-level noise coming from the planet at all times. Now that I have learned what Jupiter sounds like, I have identified its static-like noise while working on 14 MHz at night!

The next step in the project, if it is continued, is to make some determinations of the antenna performance in terms of gain, front-to-back, and front-to-side ratios. That, along with measurements of the overall system gain, will permit measurements of the absolute power of the signals reaching earth from Jupiter. After that, perhaps some investigations of the relationship between the positions of Jupiter's 12 moons and the strength of

the emissions would be in order. In summary, I think we have achieved initial success and hope that more work can be done in the future. ¹ — *Millyn D. Moore, WA1JGK, RFD 2, Arlington, VT 05250.*

KEYBOARDS AND KEYBOARD KEYS

Technical Editor, *QST*:

An old cw operator would like to make a few comments on the keyboard keys, and in particular W4UX's Touchcoder II.^{2,3} I have built three of them so far, using W5OGZ's circuit boards, and three different keyboards. I went to lots of trouble with the first one, silver-plating the contacts under the keys. The second one just uses "brass to brass," and the third one uses just iron that is already there on the old typewriter, hitting brass-headed nails. I can detect *absolutely* no failure to make contact at any time with iron as the strikers. In fact the last keyboard was made from an old Remington Electric that has several pieces of iron swiveled to the key with more chance for a high-resistance connection, with absolutely no failure. I think that not enough emphasis was placed on the availability and cheapness of old typewriters as keyboards, rather than looking for hard-to-find switches or something.

I think that it will be apparent to both touch typists and "hunt and peck" artists alike, that something like 1/8- to 1/16-inch in key drop, with probably 1/2-oz pressure to make contact is about right for the keys. My method is to discard everything off the old typewriter except the keys, mount under the levers (right behind the "comb") a piece of plastic about 1/2-inch thick and 1-inch wide or so, so that the parallel key levers will strike the plastic after the key has dropped the 1/8 inch. Then where the key hits, I drill a small hole and push the brass nail down, so that its head acts as a stop for the key. If you want a longer drop, just mount the plastic down a little lower. Most of the old typewriters have an individual setscrew on each key for tension adjustment. Usually the back-space key can be relocated just to the left of the 2 for making a 1 key, as "little L" will not work.

Some of the "Auld Tymers" lament the lack of identity noticeable with a keyboard keyer, but in my case of being a cw operator since 1937, I find the "personal touch" loss gratifying in most cases. I tried to read one commercial operator for years, and never could tell a dot from a dash. If he was still in operation, I would gladly send him a keyer so he could tell me the time of day! Let's hear more good cw on the air. — *Jack E. Cox, WSJPM, Rt. 2, Childress, TX 79201.*

UNMODULATED-CARRIER MYSTERY UNVEILED

Technical Editor, *QST*:

While searching the bands in connection with the ARRL Intruder Watch⁴ some months ago, I reported an S-8 carrier on 14,318 kHz some

¹ Reception of radio signals from outer space by amateurs has been going on for years. Some of the articles which have appeared in *QST* on the subject are listed here. — *Editor.*

1) Goodman, "Radio Astronomy," *QST*, May, 1956.

2) Firor, "A Radio Telescope," *QST*, September, 1957.

3) Bryant, "Touchcoder II," *QST*, July, 1969.

3) Firutl, "One-Letter Memory for Touchcoder II," *QST*, May, 1971.

4) Baldwin, "The ARRL Intruder Watch," *QST*, May, 1969.

mornings and evenings. Having found many 14-MHz carriers in the past which are harmonics of 7-MHz foreign broadcast stations, I looked and found a signal on 7159 kHz which appeared to be related to the 14,318-kHz interference. FCC in San Diego found it to be only S-1, as did FCC in Marietta, Washington. Both indicated that it was from due south, which agreed with my observations.

The weak signals reported by others suggested a local source. Therefore, I divided 14,318 by several integral digits, then multiplied the resulting values by each digit, and determined approximately a hundred fundamental and harmonic frequencies that could be involved. A search disclosed 3579.5 kHz as the fundamental, and 7159, 10738.5, 14318, 17897.5, 21477, 25056.5 and 28636 kHz as the harmonics. All were audible here at the same time, even after the 14-MHz band had gone dead. Then I looked up the TV color-burst frequency, which is 3579.545 kHz (see Technical Correspondence, *QST*, February and April, 1971). Switching off color-TV sets proved this to be the source. Some harmonics may disappear when the color TV is switched to different channels.

Apparently, when looking for the signal source, all were taking bearings on someone else's color TV. The loudest signal here was from my own color set. This could serve to remind others of this possible source of "intruder" interference. — *E. H. Conklin, K6KA, Box 1, La Canada, CA 91011.*

THE MODERN SOLID-STATE OSCILLATOR

Technical Editor, *QST*:

Ask anybody what the latest is in rock-stable VFOs and he will answer "solid state." It's as modern as the day after tomorrow. But is it? Believe it or not, a solid-state oscillator was developed nearly a half century ago. In the early twenties nearly everybody, including the BCL, built his own receiver. Magazines bulging with construction data enjoyed wide circulation. The staff of one leading publication named *Radio News* worked hard developing new circuits. In 1924, they came up with something that amazed even them. It was a solid-state oscillator using a zincite crystal. It was a fussy critter, but it worked.⁵

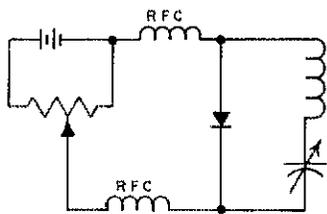


Fig. 1 — Zincite-crystal oscillator circuit of 1924.

Fig. 1 is the circuit. My guess is that negative resistance was the cause of oscillation. But whatever the theory may be, it was a solid-state oscillator. And that almost a half century ago! So — what else is new? — *Edwin F. Ehlinger, W2GS, 1221 Kemble St., Utica, NY 13501.*

⁵ "The Crystodyne Principle," *Radio News* for September, 1924, presents the zincite-crystal circuit, crediting the invention to O. V. Lossev, a Russian inventor. — *Editor.*

TELEPRINTER SELECTOR MAGNETS

Technical Editor, *QST*:

Mr. Schechter's article, "First Steps in RTTY,"⁶ will be very helpful to many beginners in RTTY. However, some clarification of his comments regarding the proper connection of the selector magnets may help to avoid confusion.

First, not all "series"-connected coils are intended for 20-mA operation. Indeed, the most commonly encountered coils are those used by the military and later commercial versions of the Teletype Corp. model 14, 15, and 19 sets. These coils are normally "series" connected, but require 60 mA of current to operate properly.

Two basic selector units are employed in these units: those using pulling type magnets, where the entire motive force for the operation of the armature is supplied by the magnetic field produced by the coils, and those using the holding type magnets, where the armature is presented to the pole pieces by a mechanical action provided by the addition of an "extra" cam surface on the selector cam. This latter method greatly reduces the magnetic force required for proper operation, resulting in lesser amplitude transients which are produced in all of these coils by the collapse of the magnetic field upon interruption of the circuit during normal keying. This is certainly to be desired where a radio circuit is employed, as it will greatly reduce the interference caused by these devices. Unfortunately, the great majority of machines available to the amateur do not use this selector.

In order for one to connect his machine properly, it will be necessary to determine which type selector is being used. Many publications have shown clear photos or line drawings of these units, so simple observation will permit the correct determination. However, many beginners do not have these references at hand, but a simple observation of the machine action at slow speed will easily determine the type. To do this, simply disconnect the ac power cord and any loop supply now connected to the magnets, and rotate the motor fan (or governor housing) by hand in the normal direction of rotation. If the holding type selector mechanism is installed, the armature of the selector will move towards the pole faces six times per revolution of the selector cam. If a pulling type selector mechanism is installed, the armature will not move, and will remain in the SPACE position (armature away from the pole faces).

(Continued on page 52)

FEEDBACK

In "Using the Touchtone Pad," *QST* for June, 1971 ("Hints and Kinks"), Fig. 1 on page 40 should have a ground connection added to the negative terminal of the battery to provide the audio return path.

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In the article, "FM Pip-Squawk, MK-II," *QST* for August, 1971, capacitor C1 of Fig. 1 is listed as a J. W. Miller No. 1640. The correct part number is 1460.

—

In "Putting a Spark Plug on Two Meters," (*QST* for June, 1971, page 20) the value for R115 of Fig. 2 is incorrect. It should be 680k ohms, not 680 ohms.

⁶ Schechter, "First Steps in RTTY," *QST*, June, 1971.



Recent Equipment



To acquaint you with the technical features of current amateur gear.

Drake ML-2 Marker Luxury FM Transceiver

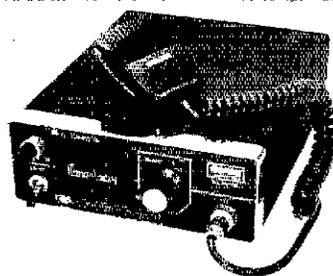
YOU CAN turn most modern solid-state fm transceivers upside down and they all look alike. The top and bottom views of this gear in past "Recent Equipment" columns are very similar. Now take a look at the views of this month's rig — the Drake Marker-Luxury. Notice something unusual — something nestled neatly away in the package? Yes, that's a vacuum tube, a 6360 dual tetrode and it is used as the final amplifier in the transmitter. It's the only tube in this fm transceiver imported by the R. L. Drake Company.

The ML (Marker-Luxury) receiver is a 12-channel, double-conversion superheterodyne, complete with squelch. The audio-output capability is 0.5 watt. The transmitter, also with 12 channels (but not switchable separately from the identical receive channel) is capable of providing a minimum of 10-watts output into a 50-ohm load. You can use the transceiver directly on 13.5 volts (for mobile) or 117 volts ac.

Even though heater drain of the final tube adds to the total power requirement of the ML, the mobileer will appreciate the low-current requirements, especially during long periods of monitoring. The dc drain is only 500 mA in receive and 4 amperes on transmit.

The Receiver Section

There are 16 transistors and 1 integrated circuit in the receiver section. Two n-channel JFETs in a cascode arrangement are used in the rf amplifier. The circuit is shown in Fig. 1. A double-tuned antenna-input circuit precedes the amplifier to provide good front-end selectivity. The use of JFETs helps to reduce cross modulation and overloading. In the mixer, incoming signals are heterodyned with the output from the crystal-controlled local oscillator to provide a first i-f of 10.7 MHz. After some further amplification, signals are converted to the second i-f of 455 kHz (injection furnished by a crystal-controlled second



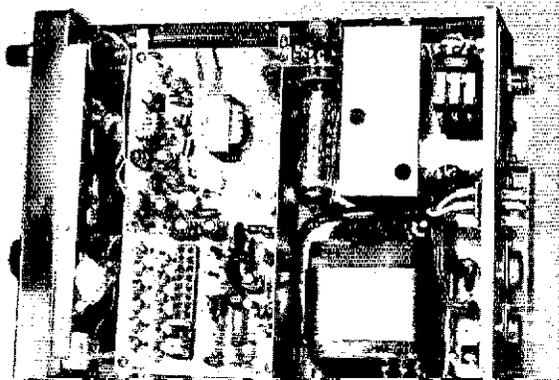
oscillator). I-f amplification is provided by an integrated circuit which also serves as a limiter. Some output from this i-f amplifier is routed to a diode voltage quadrupler (see Fig. 1) which supplies age voltage back to the rf amplifier.

After additional limiting, the signal is detected by a discriminator and is then directed to the squelch and audio-amplifier channels. The squelch circuit operates smoothly, and no thermal drift has been noticed. In fact, the squelch control (which is concentrically-mounted with the af-gain control) was set last winter and hasn't been touched since.

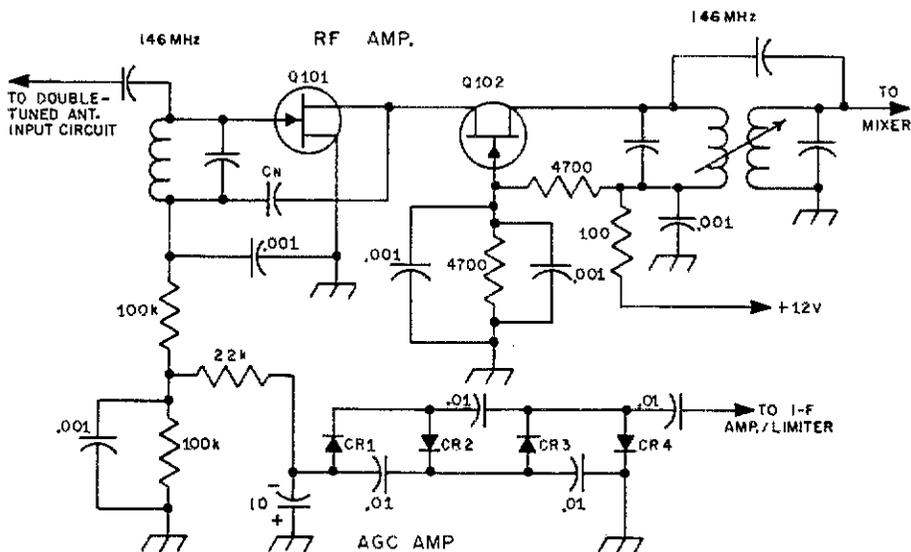
Squelch action is provided by sampling receiver noise at the output of the limiters. The noise is amplified and rectified to produce a dc voltage which then operates a squelch-gate circuit.

Audio output from the receiver terminates at a small panel-mounted speaker. There is also a rear-panel jack for an external speaker. The 1/2-watt of audio and the small speaker give adequate volume even for "window-down" mobile operation. With excessively high ambient noise levels, however, it is sometimes necessary to increase the audio-gain control near to maximum.

The receiver has a combination S- and transmitter-output meter. An S-meter sensitivity control is mounted on the receiver circuit board. The manufacturer rates the sensitivity of the receiver as 0.5 microvolt or less for 20-dB quieting, 1 microvolt or less (30-dB signal-plus-noise to noise ratio) at 10-kHz deviation with 1-kHz modulation.



Looking into the top of the transceiver, Transmitter crystal frequencies are adjusted by the trimmer capacitors on the transmitter board at the bottom left. The final-amplifier tube (the output tank and low-pass filter are in the shielded compartment to its right) and power supply are in the adjacent compartment. Two power-supply transistors can be seen on the chassis back apron.



VALUES OF CAPACITANCE ARE IN MICROFARADS (μF); RESISTANCES ARE IN OHMS; $k=1000$.

Fig. 1 — Rf-amplifier and agc circuit.

The Transmitter

The crystal-controlled transmitter is a straightforward design except for the vacuum tube at the end of the solid-state oscillator-driver chain. The line-up starts with an LC microphone preamplifier/modulator, followed by an oscillator tripler, two doublers, and driver. Output from the driver is LC coupled to the grids of the 6360 dual-tetrode tube which is connected in push-pull. A low-pass filter in the output circuit reduces the harmonic and spurious content of the signal.

The use of a vacuum tube in the rf-power amplifier instead of a transistor eliminates the possibility of the destruction of the transistor if the load becomes highly reactive (when the antenna disconnects or strikes a tree). The old reliable tube can take a lot of this kind of punishment without any danger of "busting a junction!"

Unlike relatively low- Q transistor tank circuits, the 6360 has a high- Q output circuit, and it only takes a slight excursion in frequency for the tank circuit to go out of resonance. No "dipping the final" is necessary once the amplifier has been tuned at the frequency of the fm channels. However, for extended frequency coverage, to MARS for instance, it is necessary to retune the tank circuit. The final-amplifier tank circuit can be adjusted without removing the cabinet. Output tuning is done by adjusting the tank for maximum output as indicated on the relative-output meter.

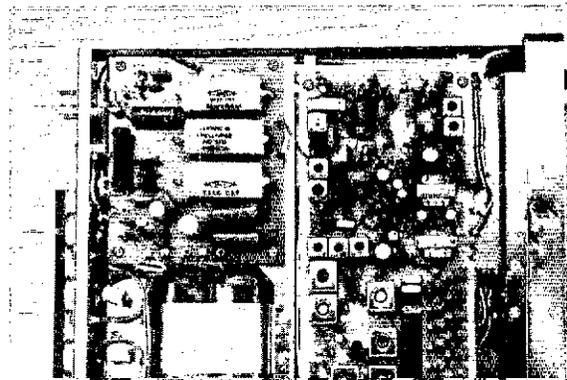
Now the question arises, where do we get plate voltage for the tube? The ML contains a standard dc-to-dc converter which delivers operating voltage

for the 6360 plates and screens. The extremely compact supply (transformer included) is tucked away in the corner of the chassis, adjacent to the rf output and relay circuits (see photographs).

During ac operation, 117 V is applied to taps on the transistor power transformer, and the plate voltage is developed by the same rectifier system used during dc operation. Low voltage for the solid-state circuits is stepped down, rectified, filtered, and regulated in the power-supply circuit. Because of the low oscillation frequency of the transistor supply, there is no acoustical "whine" from the rig, nor does it appear on the signal.

During transmit, the S-meter/relative-output indicator works as an rf voltmeter for tune-up adjustments and aids the operator in keeping an eye on transmitter operation. The antenna is switched by a relay which also transfers the power and control circuits from send to receive...

A 500-ohm dynamic microphone with a push-to-talk switch is supplied with the ML. You can use a carbon microphone with the transceiver if you wish. Connections for the mike are shown on the schematic diagram. Frequency deviation is adjustable to 15-kHz maximum, but is factory-set at 5-kHz.



Bottom view of the Marker-Luxury fm transceiver. The receiver board with the bank of inductors for frequency adjustment is at the right in the photograph. Power supply components are grouped to the left.

Some Final Comments

The ML can be described as a neat little rig. Workmanship is impressive, as is the layout of components and controls. When it comes to zeroing the crystals on frequency, there are two rows of trimmers on the transmitter board for this purpose. It is sometimes necessary to hold your breath when making the adjustments since a small angular movement of the capacitor will pull the crystal several hundred Hz.

Setting the receive crystals on channel is a bit more difficult since inductors with movable slugs must be adjusted (requires a special notched tool). The coils have a heavy coat of wax, so it's necessary to melt the wax with a soldering iron before the slugs can be moved. A test point at the discriminator is provided for using a zero-center microammeter to aid in setting the receiver frequency right on the button.

Speaking of crystals, the ML is supplied with two transmit and two receive crystals: 146.34/146.94 MHz and 146.94/146.94 MHz. You're on your own for extra crystals which must be 1/12 the output frequency for the transmitter and be fundamental mode parallel resonant with 30-pF load capacitance in HC-25/U holders. The receive crystals are overtone in mode, series-resonant, and in the same type HC-25/U holder.

Technical Correspondence

(Continued from page 49)

Once this has been determined, it is now possible to determine how the magnets should actually be wired. Only the holding type selector can successfully be used with 20 mA coil current. Three types of magnets were commonly used, along with two types of cores. The first is the No. 177M coil, which has a solid core and a dc resistance of 105 ohms per coil. These are most commonly found on the pulling type selector assemblies, and are always wired in series for 60-mA operation. The second type sometimes encountered is the No. 197M coil, which has a laminated core and a dc resistance of 115 ohms per coil. Again, as in the first example, these coils are always wired in series for 60-mA operation. The third type is the No. 207M coil, which has a laminated core and a dc resistance of 92 ohms per coil. These are normally used on the holding type of selector, and are normally wired in series for 20-mA operation, and in parallel for 60-mA operation.

It is important to note that the type of core determines the clearance between the armature and the pole faces of the magnets. The solid type of core should have .002- to .007-inch clearance, while the laminated core requires "some," but not more than .004-inch clearance. These figures apply only to the pulling type selector mechanism. The holding type assembly requires a different technique, in that the armature is "crammed" against the magnet faces for proper operation ("minus" clearance). One should refer to the appropriate technical manual for this type of selector before attempting to make adjustments, as it is very unforgiving of small clearance misadjustments. These adjustments can make all the difference

Marker-Luxury 2-Meter FM Transmitter

Height: 2 3/4 inches.

Width: 7 7/8 inches.

Depth: 10 1/4 inches.

Weight: 8 1/4 pounds.

Power Requirements: 13.5 volts dc, receive current 500 mA, transmit current 4 amps; or 117 volts ac, receive power 6 watts, transmit power 50 watts.

Price Class: \$330

Distributor: R. L. Drake Company, 540 Richard St., Miamisburg, OH 45342.

The receive crystal frequency is found by subtracting 10.694 MHz from the receive frequency, then dividing by 3.

Also furnished with the ML package is a mobile mounting bracket, external speaker plug, ac and dc cords, quarter-wave antenna with plug, and a dynamic microphone.

A 7-page instruction manual comes with the set, but contains no circuit theory or troubleshooting information. It does have a schematic diagram, a few specs, and operating instructions. However, most of the component values are shown on the diagram, so one can troubleshoot and find replacement values. — *WICUT*

between solid copy and something that looks like early Mongol dialect. In addition, when oiling a machine, it is important not to allow oil or grease to contaminate the faces of the armature or pole pieces, as this would cause the armature to depart the pole pieces slowly, causing MARKING end bias. I hope this information will be of some help to the beginning RTTY'er. — *W. H. Craig, WB4FPK, Director of Engineering, WGOH Radio, P. O. Box 487, Grayson, KY 41143.*

Stays



Hams from four continents attending the Space Conference (see p. 78) visited HB9AJI (Jack Herbstreit, WØIN, director of C.C.I.R.): VU2GR, W1RU, VU2ZR, OK1WI, ZL2AZ, WØDX, and host HB9AJI. (VE3CJ was behind the camera.)

Results,

37th ARRL

International DX

Competition

REPORTED BY AL NOONE,* WAIKQM/WB6SAZ



ZB2AV ... Ron

THE 1971 ARRL DX test was held the first and third weekends of February and March, 1971. Judging from the many reports received, we had another successful contest. The only disappointment was a decrease in the total number of logs received at Hq, 2646 as compared with 2822 in 1970. This decrease can be attributed directly to a large drop in cw entries, offset somewhat by an increase on phone.

Conditions, while certainly not as good as last year, were by no means bad. The only real loss appears to have been 28 MHz on the second cw weekend.

Activity was certainly there. A rough count at the close of the competition indicated participation from at least 155 different countries. Some of the rarer DX stations available were: OR4, JY1, FB8X, ZB2, HV3, EP2, JDI, MIB, 9G1, KC6, ST2 and many more.

Competition was fierce. It would take much more space than that which is available to adequately give credit to all. However, some of the more outstanding scores were: W1BGD/2 2,395,980 on cw; WA3HGV 3,166,539 on phone; KH6RS (K2SIL, opr.) 4,319,532 on cw and XE1KS 6,140,817 on phone. A score of 1.6 million was necessary to make the TOP TEN!

The new multi-single category appears to have been received well with 225 groups participating. Undoubtedly, this will be retained. In contrast, only 46 groups chose the more difficult multi-multi. It is interesting to note that the ARRL Contest Advisory Committee has been studying the DX Competition and finds the present basic format well received. Any comments from participants concerning the DX Competition rules should go to your nearest CAC member.

Our thanks to HR2GK (WA8VRB, opr.), VP2ES, GDs 3YBH/SATG, DJ6SI/LX, HV3SJ, JDIABX and others who journeyed to rare countries and states for the competition. Your efforts are more than appreciated.

And finally, are you all set for the November Sweepstakes? If not, now's the time to give it some thought. — WAIKQM.

* Asst. Communications Mgr., ARRL.



K6LZQ/VP7 ... Clarence

OR4CR (Bill, ON4QJ, opr.)



Clubs

Fifty ARRL-affiliated clubs, quite an improvement over last years 41, locked horns in combat for the gavel! After the dust had cleared and the shouting stopped, it was the FRANKFORD RADIO CLUB out on top. High scorers for the club were K3HTZ on cw, WA3HGV on phone. Their main competition, the POTOMAC VALLEY RADIO CLUB, put up a strong fight but had to settle for a close second. K1LPL/3 and W3E2T took honors on cw and phone, respectively. Always in there fighting but still having to settle for third was MURPHY'S MARAUDERS. They were led by W1BGD/2 on cw and WB2SQN on phone. Fourth place this year goes back to the NORTHERN CALIFORNIA DX CLUB. A quick glance at their score would seem to indicate they had little difficulty unseating their competition to the South, the SOUTHERN CALIFORNIA DX CLUB,

who took fifth. The only other score over 10 million again was that of the 128 CONTEST CLUB in sixth place. Rounding out the TOP TEN, we have: the RICHARDSON WIRELESS KLUB, GOLDEN TRIANGLE DX CLUB, FLORIDA DX CLUB and CENTRAL MICHIGAN ARC.

	CW	PHONE
Potomac Valley Radio Club	1	Frankford Radio Club
Frankford Radio Club	2	Murphy's Marauders
Murphy's Marauders	3	Potomac Valley Radio Club
Northern California DX Club	4	Northern California DX Club
Southern California DX Club	5	Southern California DX Club
128 Contest Club	6	Golden Triangle DX Club
Florida DX Club	7	Richardson Wireless Klub
Richardson Wireless Klub	8	128 Contest Club
Central Michigan ARC	9	Central Michigan ARC
Golden Triangle DX Club	10	Florida DX Club

AFFILIATED CLUB SCORES

Club	Score	Entries	CW Winner	Phone Winner
Frankford Radio Club(Pa.)	45,378,041	75	K3HTZ	WA3HGV
Potomac Valley Radio Club(Md.)	45,307,631	62	K1LPL/3	W3E2T
Murphy's Marauders(Ct.)	37,908,796	89	W1BGD/2	WB2SQN
Northern California DX Club	27,817,849	62	K6AHV	K6AHV
Southern California DX Club	24,092,324	59	K6LOM	W6RR
128 Contest Club(Mass.)	12,337,422	24	W1BFW	WA11RG
Richardson Wireless Klub(Tex.)	9,584,313	33	WA5JMK	W5EQT
Golden Triangle DX Club(Fla.)	8,740,788	13	K4TIG	W4LBP
Florida DX Club	7,213,742	13	W4HOS	K4SHB
Central Michigan ARC	6,626,314	13	W8BVBY	W8OQL
Order of Boiled Owls(N.Y.)	4,897,748	11	W2GGE	W2CP
Northern California Contest Club	4,746,483	9	K6ERT	WA6BVY
Twin City DX Association(Minn.)	4,066,194	14	W0HP	W0HP
Connecticut Wireless Association	4,006,289	9	K1UDD	W1BIH
Northern Illinois DX Association	3,791,231	18	WA9IVL	W9OHH
South Jersey Radio Association	3,582,127	21	W2FYS	W2BHK
North Carolina DX Association	3,059,094	10	K4CIA	K4ARP
Norwood ARC(Mass.)	2,919,465	11	WA1JKZ	WA1JHO
Overlook Radio Society(N.Y.)	2,828,991	5	.....	W2DXL
Niagara Frontier DX Association(N.Y.)	2,581,308	11	K2KNV	K2INP
Laurentian DX Club(Que.)	2,495,442	7	VF2NV	VF2NV
Ohio Valley AR Association	2,441,082	10	W8JIN	K8AWS
Indian Hills Radio Club(Ohio)	2,319,963	4	W8OXQ	.....
Rockford AR Association(Ill.)	2,123,805	8	.....	W9LVT
Etna Radio Club(Pa.)	2,038,392	4	.....	.....
Utah DX Association	1,753,338	5	.....	K7RAJ
North Alabama DX Club	1,536,243	5	.....	K4MG
Minnesota Wireless Association	1,477,007	13	K0JLL	WA0YAW
Gloucester County ARC(N.J.)	1,241,325	10	W2LBF	W2SDA
Columbus AR Association(Ohio)	1,237,786	11	K8EHU	W8NPF
Four Lakes ARC(Wisc.)	1,105,947	7	W9LNM	W9LNM
Winnipeg DX Club(Man.)	715,371	11	.....	VE4RP
West Park Radiops(Ohio)	686,058	13	WB8FNE	WB8FNE
Delta Amateur Radio Club(Tenn.)	476,391	6	WA4FDR	WA4FDR
ARINC Amateur Radio Club(Md.)	429,702	8	WA3JYV	W3PWO
Lexington High School RC(Mass.)	398,928	4	.....	.....
New Providence ARC(N.J.)	327,132	4	.....	WB2JLW
Warren AR Association(Ohio)	317,700	3	.....	.....
Brightleaf Amateur Radio Club(N.C.)	307,080	4	.....	K4SKI
Hollywood Amateur Radio Club(Fla.)	264,105	6	W4OZF	W4OZF
Virginia Century Club	263,304	3	.....	.....
Steel City Amateur Radio Club(Pa.)	197,478	3	.....	W2KPI
Elk Grove ARC(Ill.)	164,352	3	.....	W9GYN
Springfield Amateur Radio Club(Ohio)	162,756	5	.....	W8VZE
Scarboro Amateur Radio Club(Ont.)	151,959	4	.....	VF3FNM
Johnson County Radio Amateurs Club(Kan.)	56,670	3	.....	.....
Colonie Central H.S. Radio Club(N.Y.)	31,971	6	.....	WB2FGS
Central Illinois Radio Club	22,122	5	.....	WB9APC
Garden State AR Association(N.J.)	9,561	3	K2RXQ	.....
Chicago Radio Traffic Association	6,696	4	W9REC	.....

DX CONTINENTAL CHAMPIONS

CW		Phone	
<i>Single Op.</i>	<i>Multio.</i>	<i>Single Op.</i>	<i>Multio.</i>
G3FXB	YU3EY	LA0AD	HW6KAW
JA1CG	JA3YBF	JH1CJQ	KA2KS-
EL2CB	9E3USA	EL2CB	9E3USA
KH6RS		KH6RS	KH6HCM
HR2GK	VP2ES	XE1KS	KL1AIZ
YV5KL	LU2E	YV5CVE	HC1ARE
		Europe	
		Asia	
		Africa	
		Oceania	
		N. America	
		S. America	

Soapbox

First time in 35 years had a competitive antenna — enjoyed it immensely. — W3ZJ. Happy to hear HV3SJ on 80 — added a new country for lots of the gang. — W3EOP. Sure was a great opportunity to catch new ones. — WA3MSW. European openings were poor and short this year, time to start building those beams for 80/40! — WA9IVL. The DX gang really provided some sharp operating this year. — W9JA. Biggest kick came when I called CQ and 5R8BF answered. — W9HE. Glad to see the rarer stuff out this year. — WA2VYA. Conditions great on 80 meters this year. — K4PUZ. Had a lot of fun in my first single operator effort in this contest. This is by far the top contest of the year. — WA8VBY. Worked 11 new countries. — W8KCY. Conditions were very good in early evening for Pacific and down under stations. — K8ERO. Very pleased with multi/single competition, we enjoyed it here. — K8UDJ. Friendly time-saving advise to DX operators: If you have a big pile-up of W/V/E stations, (1) Identify yourself at least every other QSO; (2) Add call or just letters of station you are answering after you give the number. — K2BK. Lost my antenna to the wind gods. — WA2LQO. Working VS6BL was the biggest thrill in 11 years of ham radio. — WA2IRS. Declining sunspot cycle becoming more obvious, especially on 10 meters. — W0JU. Great contest. Kept my record intact of having participated in all ARRL DX Tests. — W1AJO. The terrific snow static the first 6 hours of the second weekend caused a big disappointment among the W1 gang. — W1BPW. Had 22 five banders on five continents. Ten meters terrible second weekend. — K0DQI/1. Great conditions, see you next year with a KW. — WA7OXQ. Ten is gone, I guess! — K6AHV. Put up a sloper for 40 towards JA with fb results — 123 JAs. — K6OZL. What a thrill to work an EL and a 5W1 on 7 MHz with a 33' TV mast without radials! — K6CLV.

Power line noise limited efforts to a one weekend, low band, multiplier hunt! — WA6DKF. XYL threw a surprise party Friday night of second cw weekend and presented me with 500th QSL to complete 5BDXCC. Didn't mind the interruption at all! — K4CIA. First time I have submitted a score but have been active in cw DX Competition for four years. — WA4EWX. Just as I got set to pounce on PZ1AC, who was S5 and running 300 milliwatts to a transistor, my XYL turned on the electric mixer and wiped him out. Gave him a call anyway, and when the racket stopped found that I had landed him. — W4KFC. Glad I didn't know it was JD1ABX I was calling late in the contest, probably wouldn't have raised him. — W4UQ. Rig problems on 15 meters, no antenna for 80/40, and the non-stop din created by five kids failed to dampen my enthusiasm for this great contest. And from the fierce competition observed during the contest, I would guess others with the same type problems generally did the best they could. — WB4OGW. Was glad to give the boys the Wyoming multiplier this year. — W6JHV/7. First European, contacts from this QTH on 40 meters. — W7AYY. The 5BDXCC activity apparently has increased occupancy on all bands, so all bands were busier, relieving some of the load formerly on 20 meters. — W6AM. Conditions to Europe the March segment were great on 21 MHz. — K6MP. First attempt, very enjoyable, except for high local noise level. — only managed four new countries! — G3DPX/W6. Was very pleased with the quantity of rare DX, especially on 40! — VE3UOT. Dipoles don't dig DX. — VE3CQA. Sure enjoyed the contest, looking forward to the next one. — VE5PM. A marvelous contest, the best in 10 years. We made 5BDXCC in four weekends! Everyone seemed to recognize our new call. — W3AU, ex. W3MSK. The heroes of this contest were out in droves. Not the old standbys you work every contest, but the people who get on for a few hours just to give out a few points. They deserve a special

DIVISION LEADERS

CW		Phone	
<i>Single Op.</i>	<i>Multio.</i>	<i>Single Op.</i>	<i>Multio.</i>
K1LPL/3	W3AU	WA3HGV	W3AU
K9CUY	WA9LGQ	W9ZRZ	W89BPG
W0HP	WA0CPY	W0HP	K0WWW
W5WU/5		K5MDX	K4RTA
W8QXQ	K8UDJ	W8LXU	K8MMM
W1BGD/2	K2AHQ	WB2SQN	W1BGD/2
W0MYW	K0MKD	WA0ETC	WA0WKI
W1BPW	W1MX	K0DQI/1	W1MX
W7RS	VE7ZZ/W7	W7RS	W5QQQ/7
K6AHV	W6GFS	K6AHV	WA6IQM
W4KFC	W4BVV	W9MIJ/4	K4CG
K5QNO/0	WB5AXC	K7RAJ	WA7GWU
K4TIG	W4ZXI	K4SHB	K4HF
K6LOM	W6ANN	W6RR	W6HX
W5RER	W5KFL	K5ZJK	W5RER
VE2NV	VE2ARO	VE7BDJ	VE1DH/1
		Atlantic	
		Central	
		Dakota	
		Delta	
		Great Lakes	
		Hudson	
		Midwest	
		New England	
		Northwestern	
		Pacific	
		Roanoke	
		Rocky Mt.	
		Southeastern	
		Southwestern	
		West Gulf	
		Canadian	

Minimums Band	30	50	80	70	70	Minimums Band	30	50	80	70	70	Minimums Band	30	50	80	70	70	Minimums Band	30	50	80	70	70	
K1AGB	45					W2LXK	59	86				K4CIA	48	55				WB6AR	14	38	81	80		
K1UDR	63	72	91	87		W23WD	57		90	76		K4CL	58	58				W6MCR				52	82	73
K1EVS	50					W2Y7	51	62	72	72		K4H	48					W6NCR				52	82	
K1HVV						W2BDD	60	79	102	92	72	K4JZ	39	65				W6R				57	87	74
K1HX	42	56	81	85		W2DHO	57				K4JZ	39	50				W6RDM	37			57	83	86	
K1NOL	56	81	86	82		W2JAN	52				K4KSD			70			W6RDM/6*	57	67	83	86			
K1TZD	37					W2UWA			108			K4THA	34					W6CTJ	52	85	85	77		
K1LUD	53	56	94	75		W2XKS	43	65	86	70		K4TIG	48	76	90	76		W7H				64	89	
K1VIM	50	71	86	84		K3HTZ	54	75	80	70		K4TVY	32					W7RS				38	86	
K1ZND	57	71	89	89		K3JWV	43	67	70		K4VY			84			W7SU				38	58	92	
K2DQJ	51	68	96	85		K3LPL	60	76	87		W8SV*	75	102	119	110	85	W8RBT				54	81	78	
W1BH	47	57	86	76		K3LPL/3					W8RW	49	61				K8UDJ*				54	71	86	
W1BPW	64	77	97	81		W3AFM			(21)		W4KFC	47	63	93	84		W8BV*				42	74		
W1DAL	38					W3AIB					W4VY	33					W8TB				14	52	79	
W1DIT	40					W3AII	76	103	134	118	72	W4W	56	54			W8TDX						77	
W1EGB	41					W3AKW					W4HHD	30					W8GOU							
W1FFG	40	54				W3BHP	34	62			W4ZLI*	76	102	119	99	84	W8HJ				45	72	71	
W1WNU	47					W3BKN	48	50			W4ALDM	51					W8KIC						90	
W1XK*	67	87	83			W3BID	57				W4ALS/74	45					W8OXQ				55	68	104	
W1PL	49	58	82			W3BY	51		81		W4ANV						W8RDT						84	
W1YS	49					W3CJ	43	61	86	83		W4AP	85					W8SH*				55	68	90
W1XN	35					W3CGR	43	61	86	83		W4BQ	53	55	93	84	51	W8SOY				60	84	91
W1XNR	40	76	83	75		W3CGRS					W4BXR	48	70				W8VBY				74	53	84	
W1XLD	41	68	102	83		W3CJ	51		85	90	W4BXS	41	58				W8VLY						71	
W1XJY*	50	72	78			W3CWC*	52	74	85	96	W4BXS/5	41	58				W8WH						80	
W1XNF*	30					W3CWC	51				W4BXS/5	41	58	104	96	73	W8VLT						93	
K2AHO*	46					W3CNR	44	51			W4BVS	56					W8VHH						82	
K2AHT	36	56				W3CND	41	95			W4BVS	56					W8VJ						85	
K2KNV	41	59	87			W3CNE	41	84			W4BVS	36	63	105	80		W8VJR						56	
K2LWR	78					W3CNY	34				W4BVS	61					W8VJ						85	
W2AB	40	53	80	70		W3CNY	45		106	94	W4BVS	81					W8VY						70	
W2ACM	40	53	80	70		W3CNY	45		106	94	W4BVS	81					W8VY						70	
W2DCL	53	69	86	83		W3CNY	45		106	94	W4BVS	81					W8VY						70	
W2E	37					W3CNY	45		106	94	W4BVS	81					W8VY						70	
W2GGL	53	66	94	76		W3CNY	45		106	94	W4BVS	81					W8VY						70	
W2HL	37					W3CNY	45		106	94	W4BVS	81					W8VY						70	
W2HFG	38					W3CNY	45		106	94	W4BVS	81					W8VY						70	
W2JRV						W3CNY	45		106	94	W4BVS	81					W8VY						70	

salute! - WA3HGV. Stork came through with a 6 pound 9 ounce "QSL" on the last cw weekend. To add insult to injury the attending obstetrician was W3RK! - W3YIK. Lost every antenna in second weekend due to ice and high winds. - W3GM. Returned to the air after 6 years. New call, new location. - W4GXV, ex: W1EJT. Had a lot of fun on this, my first DX contest. - WB9EBO. Many new countries, especially on 75! - K9LIH. Worked 19 new countries with Swan Island being NR, 100! - WA9UEK. I worked 496 JAs! They will all want

QSL cards, sigh! - K7YWZ. Conditions seemed poor but very good activity. Ten meter openings good at times. - K7PXL. Murphy's Law applied 2nd weekend - tower stuck halfway, 10 meter antenna failed, transmitter failed and finally linear blew up! - K6SVL. Didn't hear any DX on 160, even though we have a good antenna. - WB6WIT/6. Did ya ever get tangled in a frantic pile-up on a rare multiplier the second weekend, bang away for 15 minutes to get him, then look at your check-off sheet and discover that you worked

Minimums Band	30	50	80	70	70	Minimums Band	30	50	80	70	70	Minimums Band	30	50	80	70	70	Minimums Band	30	50	80	70	70	
K1CNS	58	40	20	15	10	W3AKW	57	40	26	15	10	W4COH*	75	40	20	15	10	K8UDJ				80	102	70
K1HX						W3AZ	58	83	74	72		W4COH*	75	40	20	15	10	K8UDM*	58			80	123	84
K1VIM	45	54	75	101	79	W3AZ	58	83	74	72		W4COH*	75	40	20	15	10	K8UDN	51					
K1ZND	47	57	89	77		W3AZ	58	83	74	72		W4COH*	75	40	20	15	10	K8UDP*	45			75	111	52
K2DQJ	48	57	88	95		W3AZ	58	83	74	72		W4COH*	75	40	20	15	10	W8VY*				59	82	72
W1BH						W3AZ	58	83	74	72		W4COH*	75	40	20	15	10	W8VY*						84
W1DQ						W3AZ	58	83	74	72		W4COH*	75	40	20	15	10	W8VY*						84
W1HLL						W3AZ	58	83	74	72		W4COH*	75	40	20	15	10	W8VY*						84
W1XK*	39					W3AZ	58	83	74	72		W4COH*	75	40	20	15	10	W8VY*						84
W1QGG						W3AZ	58	83	74	72		W4COH*	75	40	20	15	10	W8VY*						84
W1PVP*						W3AZ	58	83	74	72		W4COH*	75	40	20	15	10	W8VY*						84
W1XNF*						W3AZ	58	83	74	72		W4COH*	75	40	20	15	10	W8VY*						84
W1XNF*						W3AZ	58	83	74	72		W4COH*	75	40	20	15	10	W8VY*						84
W1XNF*						W3AZ	58	83	74	72		W4COH*	75	40	20	15	10	W8VY*						84
W1XNF*						W3AZ	58	83	74	72		W4COH*	75	40	20	15	10	W8VY*						84
W1XNF*						W3AZ	58	83	74	72		W4COH*	75	40	20	15	10	W8VY*						84
W1XNF*						W3AZ	58	83	74	72		W4COH*	75	40	20	15	10	W8VY*						84
W1XNF*						W3AZ	58	83	74	72		W4COH*	75	40	20	15	10	W8VY*						84
W1XNF*						W3AZ	58	83	74	72		W4COH*	75	40	20	15	10	W8VY*						84
W1XNF*						W3AZ	58	83	74	72		W4COH*	75	40	20	15	10	W8VY*						84
W1XNF*						W3AZ	58	83	74	72		W4COH*	75	40	20	15	10	W8VY*						84
W1XNF*						W3AZ	58	83	74	72		W4COH*	75	40	20	15	10	W8VY*						84
W1XNF*						W3AZ	58	83	74	72		W4COH*	75	40	20	15	10	W8VY*						84
W1XNF*						W3AZ	58	83	74	72		W4COH*	75	40	20	15	10	W8VY*						84
W1XNF*						W3AZ	58	83	74	72		W4COH*	75	40	20	15	10	W8VY*						84
W1XNF*						W3AZ	58	83	74	72		W4COH*	75	40	20	15	10	W8VY*						84
W1XNF*						W3AZ	58	83	74	72		W4COH*	75	40	20									

QRP CHAMPS

(150 Watts or Less at All Times)

CW		Phone	
W4CRW	531,102	WAØYAW	367,200
K5ABV	511,038	WB2ZTH	355,200
W1FNW	308,454	WA1ABW	260,142
K2MFY	298,200	WA1KBG	218,700
KØJL	254,340	WA1KZE	205,196
W3QOR	241,344	W4CRW	204,687
WA1ABW	230,748	W5LPO	183,864
W2AZO	204,633	WB9DXW	180,774
W4WHK	172,104	W2FBF	171,912
W9HJ	161,568	W4WRY	153,807

1972 ARRL DX COMPETITION

Phone: Feb. 5-6, Mar. 4-5

CW: Feb. 19-20, Mar. 18-19

of the test was working K2LWR on 80! — HS3AFB. Power outage, family visiting from the US, bands QRN S9 — kids sick, etc. Maybe next year! — HSIADX. Thanks for nice contest. — UK2GAM. Very sorry, but in second period not have time for test. — UR2LO. Very fb contest. — UP2BV. Many thanks and good luck. — UB5TQ. Conditions was very poor. — UB5OE, since 1927. Discipline seemed to improve as the frequency increased, being worst on 80 and best on 10. — K4BZH/VP7. I wouldn't advise eating crisp potato chips with head phones on, the QRM is fierce. — WBØASR/KP4. We all had a great time but just wish conditions had been better for the cw weekends. — G3SIX. My 8th ARRL competition. — OH7NW. In the second period the 28 MHz band was not to work W/VE. — DL1GN.

him last month? - K2BK. I think there should be a separate category for single-band entries. — WB2MQI. First one, really enjoyed it, will put in more time next year. — WB8EUN. HW6KAW was so loud I thought he was in Central America. When I found out it was a new prefix for France I really flipped! — WA8OBG. Another anemic effort, with inadequate equipment, by an inept operator. — W8AJW. I wish I could have spent more time on the air, really enjoyed the limited exposure to the contest. — K1ATL. Murphy plays for keeps — halfway through the contest someone broke in and removed most of the equipment. — WA2BCT/1. Very pleased to work YBØAAN, OR4CR and KC6RS. — W4ZSH. This was my first contest and I thoroughly enjoyed participating in it. — WB4QWM. Raised 7Z3AB on 20 for a multiplier and had ST2SA break in for a double! — K6CQF. Hope the VU2 on 28 MHz turns out to be for real. — W7YTN. The JAs get thicker every year, but where were the Africans? — W5FCX. It is really different and pleasant experience to work the contest on this side of the pile-up, I hope it will be useful when I return home. — YV5AMH/W5. Working conditions fair here, great thrill to work 100 countries on 20 meters. — VE4EU. Contest helped to bring 5BDXCC a bit closer. — VE6AGV. Thanks to W6JHV/7 for Wyoming on 4 bands, I know he made a lot of DX stations happy. Where the heck were the VE8s? — TJ1AW. My first entry in the competition though have been active in it for some time. — VK3IQ. Had peaks of 95 per hour on 7 MHz with only 100 watts to a dipole! — KH6HKM. Propagation poor to US on 80, 10 far better than expected. — ZL1BN. Much fun in spite of local voltage fluctuations giving both transmitter and keyer trouble. My 1st contest from the DX end and certainly not my last. — EP2ER. This competition was very fine chance for 5BWAS, but very difficult to get contacts on lower bands because of having poor antennas for 80/40 meter bands. — JA1NDO. A great thrill to be DX though the openings are not too long to the states. Highlight

Thirty-Seventh ARRL

International DX Competition

W/VE scores are listed by ARRL division and section; DX scores are listed by continent in alphabetical order by country name. Multioperator scores follow single-operator scores within each section or country-grouping.

Awards: The operator of the first-listed single-operator station in each section or country is the winner for that area and receives a certificate award. In a section or country from which at least three valid multioperator entries were received, the top-scoring station in that category receives a certificate award. There will not be separate certificates for multi-single and multi-multi entries. (Awards are scheduled for a September 15th mailing) The top-scoring single-operator DX entrant for each continent each mode, receives an engraved plaque. Affiliated-Club awards are shown elsewhere in this article.

Scores: In the list to follow, read (from left to right): call of entrant, final score, multiplier(total countries per band for W/VE; total states and Canadian call-areas per band for DX), contacts, approximate dc power input (A represents power up to and including 150 watts; B, over 150 and up to and including 500; C, over 500; D, combination of A+B; E, A+C; F, B+C; G, A+B+C), total time of operation (to the nearest hour). Example: WA3HGV 3,166,539-493-2141- C-85 indicates final score of 3,166,539, multiplier 493, contacts 2141, power over 500 watts, operating time 85 hours.

A single operator asterisk following a call denotes an ARRL Hq. staff member, ineligible for an award.

TOP TEN

Single Operator CW			Single Operator Phone				
W/VE		DX	W/VE		DX		
W1BGD/2	2,395,980	KH6RS	4,319,532	WA3HGV	3,166,539	XE1KS	6,140,817
W5RER	2,241,891	YV5KL	3,385,692	K6AHV	2,573,550	KH6RS	4,545,456
W1BPW	2,164,470	KH6IJ	3,334,230	W6RR	2,555,715	KH6IJ	4,143,079
K1NOL	1,946,043	KH6HKM	2,673,216	KØDQI/1	1,877,466	KH6BZF	3,618,680
K1ZND	1,848,396	EL2CB	2,518,845	K6SEN	1,855,854	KP4DLW	3,397,536
K1LPL/3	1,824,876	PJ2PS	2,486,150	WB2SQN	1,846,200	EL2CB	2,872,302
K1DIR	1,819,755	TJ1AW	2,278,404	K1VTM	1,750,980	LAØAD	2,673,290
KØDQI/1	1,713,842	HR2GK	1,712,787	W2SZ	1,742,547	XE1LLS	2,445,744
K1VTM	1,694,744	CP6FG	1,615,464	K5ZJK	1,683,540	YV5CVE	2,290,626
W3GRF	1,623,336	G3FXB	1,609,272	K4SHB	1,650,416	CT1BH	2,252,211

WVE PHONE

ATLANTIC DIVISION

Delaware

WAJHGV 3,166,539-493-214-C-85
WANK 507,174-274 617-C-45
WBNK 406,286-238 569-C-67
WBOFV 340,992-322 512-C-80
WBDPA 732,521-179 433-C-40
WBDPA 123,114-142 289-C-25

Eastern Pennsylvania

K3TGM 670,437-279 801-C
W3DHH 615,741-269 763-C-48
W3GRS 458,238-262 583-C
W3ALB 308,649-199 517-C-45
W3YIK 247,962-187 442-C-30
W3EJA 227,088-166 456-C-36
W3KCS 214,020-174 410-C-40
W3KVV 204,750-150 455-C-29
W3KFO 165,528-152 36-C-51
W3KFT 163,298-168 324-C
W3OIW 144,820-130 372-B-51
K3JH 111,969-117 319-C-13
W3CGS 101,382-122 227-C-71
W3ZJ 91,410-110 277-B-22
W3ANX 89,688-101 296-B-56
W3DWO 86,445-113 255-C-23
W3JXF 71,280-110 216-C-45
W3HA 54,432 84 216-B-24
W3EVA 46,455 95 163-B
W3CAA 37,674 78 163-C-16
W3GHD 16,254 63 86-B
W3GUP 9030 35 86-A 7
W3NNA 7260 44 55-C 5
W3EAN 3102 23 47-A 2
K3ZOL 2736 24 38-B-10
W3IAR 672 14 16-B 3
W3GUD 324 9 12-C 3

Multi-Single

W3NZ (+W3OV) 616,161-259 794-C-56
W3BIP (+W3JYB) 114,972-143 268-C-36

Multi-Multi

W3GM (8 ops.) 3,989,892-466-2854-E-75
K3HTZ (6 ops.) 2,383,128-408-1947-C-96
WA3ATX (5 ops.) 1,980,180-380-1737-C-96
W3MWC (4 ops.) 1,790,106-402-1485-C-90
WA347P (+W3s LRN LR) 1,217,277-337-1137-C-84
W3SS (6 ops.) 892,584-322 924-C-96
W3FHR (+K3KNH) 563,601-257 731-C-36

Marviano-D.C.

W3EZW 834,400-298 935-C-66
W3AXW 567,112-266 713-C-72
W3KMW 496,206-243 682-C-66
W3TAX 408,900-188 725-E-30
W3GRF 333,450-195 870-C-40
W3KDD 234,960-110 712-B-42
W3AGZT 217,792-166 438-C-59
WA3JOS0 169,215-145 389-C-53
W3PWO 111,792-137 322-C-35
WA3JYV 80,343-113 237-A-18
W3JNL 75,936-112 226-C-44
W3HVM 72,306-103 234-C-22
W3CFR 69,642-106 219-C-20
W3AFNM 65,163-107 203-E-35
W3YHR 63,242-103 206-A-50
W3EUF 54,535-105 189-A-22
WA3HWV 42,312 82 172-C-12
W3AWN 19,764 54 122-C-11
W3ML 18,000 66 100-C-9
W3LMZ 12,792 52 82-B-12
WA3OHG 10,143 49 69-A-13
K3TVE 9072 36 54-B-4
W3I-A 6000 40 50-B-30
W3CSZ 5628 28 47-C-5
K2QBW3 3564 27 66-A-6
W3YSH 3480 29 40-E-7
W3QHC 1980 22 30-B-6

Multi-Single

WA3LHG (+W3JNQ) 380,190-230 551-C-85

Multi-Multi

W3AU (7 ops.) 8,689,828-617-4703-C-96

W3ADO (multiop)

701,712-264 886-E-52

Southern New Jersey

WA2IZS 734,580-308 795-C-64
W2BHK 731,952-272 847-C-75
W2EUI 453,987-219 641-B-55
W2EHB 446,199-221 673-B-38
K2OH 373,320-204 610-B-50
W2SDA 355,506-193 614-C-52
W2UCV 270,336-176 512-C-40
W2PAL 196,537-187 351-C-2
W2FYS 191,388-164 389-E-48
W2TGC 190,503-183 347-C-40
W2BZFX 175,200-160 365-C-50
W2TBE 171,912-152 377-A-38
W2OKJ 141,960-130 364-C-30
W2DTP 105,444-116 303-C-48
W2PLD 92,574-111 278-C-35
WA2NPD 44,118 86 171-B-24
W2SDB 43,407 91 159-C-25
W2PFO 42,330 85 166-B-33
W2BNRU 36,990 90 137-B-28
W2BVMD 19,899 67 99-A-20
W2BWKV 19,551 49 135-A-30
W2TFF 16,068 52 103-C-10
K2CPR 10,890 55 66-B
K2ORA 5814 34 57-A 7
W2QWA 3300 22 50-C-10
W2SXF 1440 20 24-A 6
W2ZGPH 108 6 6-B 1

Multi-Single

K2AA2 (2 ops.) 262,143-171- 511-C-36

Western New York

WA2BYJ 828,240-272 1015-C-74
K2INP 426,258-238 597-C-45
W2EWL 286,896-172 556-C-59
W2PDB 68,931-111 207-E-2
W2QIP 59,400-100 198-C-32
WA2EBA 55,800-100 186-B
W2FXA 52,080-124 140-C-10
K2IWR 41,688 72 193-C-50
W2RPP 35,550 79 150-A-20
W2EFR 19,126 75 88-C-14
W2EUI 10,350 50 69-C-20
K2BDG 2883 31 31-C
W2VXA 2550 25 34-A
WA2CDV 1953 21 31-C 8

Multi-Single

WA2QYR2 (6 ops.) 612,513-253 807-C-94

Western Pennsylvania

W3VJ 1,114,992-256-1044-C-77
W3VFO 993,462-313-1058-C-70
WA3JH 165,600-160 345-C-26
W3YX 118,404-132 298-C-49
W3PIX 112,560-112 335-B-29
W3KPL 104,742-138 253-C-32
W3WU 77,814-131 198-C-23
W3SDV 75,600-105 240-A-31
WA3MQJ 56,025 75 249-A-20
W3SMX 37,146 82 151-B-33
WA3CDM 29,376 68 144-C-30
W3KVS 17,940 65 92-E-22
W3ZDW 17,136 68 84-B
W3VYK 5661 37 51-A 9
WA3KMA 75 5 5-A 1

Multi-Single

W3TV (+W3s AOH VW) 1,384,761-329-1403-C-72
K3RZL (+W3GUL) 1,033,746-326-1057 -74
W3GV (5ops.) 130,083-131 321-C-49

CENTRAL DIVISION

Illinois

W4LVT 715,711-271 907-C-68
W3OHH 657,748-284 772-C
K9KDI 428,328-176 661-C-42
W9BAOH 310,575-205 505-B-60
WA9RCH 305,442-213 478-B-60
W9DWO 268,091-189 473-C
K9WTS 256,198-198 432-E-53
W9BZW 216,384-196 386-C-33
W9KDX 123,114-142 289-E-35
K9RJO 122,640-140 292-C-51
W9GYN 120,132-141 284-B-59
K9WFB 112,230-145 235-C-17
W4WYB 108,468-138 262-C-30
WA9SVZ 75,535-115 219-A-30
W9IVB 63,468 82 258-C-38

W9TAG 58,590 93 210-E-36
WA9ZCG 57,834-102 189-C-35
WA9VGV 56,496-107 176-B-28
W9TLU 54,405-117 155-C-34
W9HT 44,955 81 185-C-24
K9MNT 35,556 84 153-B-28
W9IB 34,602 79 146-B-16
WA9NJB 25,050 55 170-C-18
W9JVL 25,180 68 129-C-13
W9MAF 22,833 59 129-B
W9KAW 22,656 64 118-C-14
K9HLM 21,357 63 113-C-21
W9QLM 20,832 62 112-B-30
W9GXH 19,110 65 98-C-15
K9HQH 17,544 68 86-C-29
W9CRN 17,160 65 88-C-17
W9RFRO 16,832 56 99-B-44
W9BFL 12,960 54 80-A-18
W9WAF 12,546 51 82-B-15
WA9SJS 96 18 42 77-A-29
W9AG 9180 45 68-B 8
WA9WMI 9159 47 31-C-12
W9KDR 8418 46 61-A-18
K9UCN 7752 34 76-C 7
WA9PGE 7680 40 64-A-32
K9ORP 7242 34 71-A-12
W9VGV 6804 36 63-A-20
WA9VXG 5280 32 55-A-14
K9BJM 5022 31 54-B-18
W9LVH 2808 26 36-A 5
W9DDL 2772 22 42-C-12
WA4ZRP 2139 23 31-A-12
W9YDR 1980 20 33-B-16
W9KWA 1575 21 25-C-12
W9REC 297 9 11-B 8
W9GXR 192 8 8-A 1

Multi-Single

W9R8W (4 ops.) 292,425-175 557-C
WA9VOL (+W9s DWO VJ) 119,700-133 300-C-35
W9AAJ (+K9VFL) 115,500-125 308-C-36
W9YYG (3 ops.) 64,824 73 296-C-22
W9DY (multiopt.) 15,500 60 75-C-24

Indiana

W9ZRX 1,433,076-389-1278-E-88
K9CUI 762,900-300 849-C-81
WA9RQY 412,104-223 616-B-71
W9CL 219,348-167 438-C-36
K9HDP 201,600-160 420-C-51
K9ODF 188,097-169 371-C-52
W9LOL 184,140-155 396-C
W9RDXW 180,774-166 363-A-35
K9LH 99,960-140 238-G-35
W9IQD 88,008-152 193-C-17
WA9VGY 79,794-143 186-F-30
K9CWD 61,740-105 196-C-25
W9HTO 41,529-109 127-C-18
WA9SMM 40,290 85 158-C-23
W9VDB 22,890 70 109-A-15
W9BDZ 10,672 46 75-A-18
WA9UFO 3540 30 40-B-12
WA9YZD 756 14 18-A 4

Multi-Single

WA9WBL9 (+W9HDR) 37,926 86 147-A-36
W9RPG (+K9LNX) 481,296-271 592-F-74

Wisconsin

W9LWC 569,769-257 719 50
W9LNM 208,680-185 376-E
W9ZBD 109,080-158 420-C-32
W9BC 142,839-177 269-B-50
W9KXK 109,647-131 279-B-50
WA9ZCP 49,980 98 170-G-18
WA9ZWL 34,584 88 131-B-15
W9HJ 28,044 57 164-A-14
WA9VCK 26,928 66 136-B-19
K9DIN 26,520 65 136-B-28
WA9UEK 16,740 62 90-B-48
WA9PUN 13,365 45 99-B-16
W9RXJ 13,104 42 104-C-22
K9JDX 10,878 49 74-B-10
W9QW 6954 38 61-C 4

DAKOTA DIVISION

Minnesota

W9HP 1,105,830-330-117-C

W9PAN 463,686-218 709-C-52
WA6YAW 367,200-204 600-A-72
WABTWW 158,460-139 380-C-20
W9GTY 78,624-126 208-C
WA0HPG 73,188-114 214-B-26
WA0JUC 52,100-100 174-A-19
K0JL 51,543 84 210-A-13
WABPRS 26,448 76 116-C-21
W6SUF 24,192 72 112-C
W9EWN 23,598 69 114-C-50
W9OCY 17,820 55 108-C-19
W6CA 13,338 57 78-C
W6BLEF 12,120 53 80-B-28
K0TFF 10,692 44 81-C-20
W0BE 1386 21 22-C 6

Multi-Single

K9WXX (4 ops.) 884,070-285-1034-C
W9BQX (11 ops.) 151,670-154 285-F-68

North Dakota

W6CAO 26,470 62 145-B-22

South Dakota

WA9OML 28,576 76 126-A-66

Multi-Single

WA9CPX (4 ops.) 665,034-271 818-C-96

DELTA DIVISION

Arkansas

WASSOG 141,240-132 358-B-40

Multi-Single

WSPBZ (+K5BOC) 524,394-234 747-C-64
WA5WMC (+W5WMD) 71,868-106 226-A-61

Louisiana

W5OB 111,375-135 275-C-56
W5KC 63,393-111 187-C-15
W5WG 40,162 86 158-A-65
WA5YCG 36,120 86 140-A-28
K5LVE 6966 43 54-D-0
W5JFB 6663 31 71-A 6
K5RSH 6327 37 57-B-16

Mississippi

K5MDX 1,463,904-368-1326-C-73
W5MUG 101,331-139 243-B-20
W5SUE 36,288 87 148-C-40
WA5HEC 3807 27 47-A-14

Tennessee

W84WT 508,248-234 724-E-60
WA4FRD 324,000-216 500-C-32
K4PUZ 70,380-115 204-C-16
W84COL 10,800 50 72-A
WA4OGG 3534 31 38-B 4
W84PNE 1339 19 27-B 4
W84RAV 75 5 5-A-12
W4GYV 12 2 7-C

Multi-Single

K4RTA (+K4SGL) 957,420-324 985-C-67
K4TTA (3 ops.) 931,224-322 964-C-75
K4SXD (+W84FEC) 701,364-277 844-B-73
WA4JSX (3 ops.) 501,984-249 672-C-70
W4VSV (5 ops.) 66,933-111 201-C-27
W4POP (3 ops.) 126 6 7 1

GREAT LAKES DIVISION

Kentucky

W84GSS 522,240-272 640-F-65
K4TJX 47,284-121 268-A-62
K4FKJ 85,448-108 202-B-12

Michigan

K8IDE 542,385-255 709-C-62
W8RCC 327,056-213 504-C-57
K8PJO 285,570-190 503-F-61
W8ASV 267,282-186 479-F-39
W8ASL 250,446-178 469-C-12
W8ROL 182,028-154 394-C-45
W9JLN 170,661-163 349-B-60
W8BEN 158,550-151 350-E-32
W8RGUF 153,663-131 391-C-18

WBIII 94,116-124- 253-C-55
 WBAROBG 15,930-59- 90-C-10
 W8LS 8775-39 75-C-14
 WA8PWZ 6300-35- 60-A-25
 WA8WMC 4128-32- 43-B-20
 WB8EAL 3552-32- 37-A-3
 WA8OKS 1560-20- 26-B-3
 WKAQF 1512-21- 24-F-15
 W8EGI 12-2- 2-C-1

Multi-Single

KRUDI (4 ops.)
 1,614,540-379-1420-C-96
 W8SH (6 ops.)
 1,102,230-331-1110-C-96
 W88FOF (+W88FFP)
 7242-34- 71-A-18

Multi-Multi

W8NGO (7 ops.)
 1,273,635-341-1245-F-90

Ohio

W8LXU 689,730-277- 830-D-72
 W8OKF 413,721-231- 597-C-64
 W8JXJ 300,564-198- 506-C-36
 W88FNE 219,531-169- 433-C-60
 W8DKT 186,798-163- 382-C-49
 WA8TNI 137,676-149- 308-B-34
 W8NPF 125,156-134- 312-C-46
 W8BDO 115,920-161- 240-B-41
 WARTKM 101,834-118- 288-A-36
 W8MBB 86,184-114- 252-C-27
 K8AWS 81,774-118- 231-F-29
 K8NMG 75,852-129- 196-B-34
 WASPRR 69,006-106- 217-C-50
 W8JAO 67,932-102- 222-C-30
 W8VZF 66,933-111- 201-D-24
 W8SAC 59,940-108- 185-B-29
 W8GMX 55,692-84- 221-B-43
 W8AFW 53,077-83- 314-A-4
 W8EDN 48,024-69- 232-B-46
 K8SUL 43,521-89- 163-A-46
 W8RZG 38,376-82- 156-C-23
 W8BESB 37,410-84- 145-A-37
 K8MMH 33,462-78- 143-B-19
 W8BR4 34,344-72- 159-B-3
 W8TJS 23,732-68- 117-B-46
 W8AMF 23,580-60- 131-16
 W88EG 21,390-62- 115-B-6
 W8YRB 12,348-49- 84-C-15
 W8IRG 12,243-53- 77-B-25
 W8DFL 11,172-49- 76-C-14
 W8YGR 10,944-57- 64-A-01
 W8NCV 8322-38- 73-C-22
 W8MKE 5100-34- 50-C-2
 W8ZCO 4620-35- 44-C-6
 W8KZH 4320-32- 45-F-7
 W8RFVY 4158-33- 42-C-2
 W8JO 2730-26- 35-C-6
 W8RFK 2520-28- 30-A-5
 W88HRU 672-14- 16-B-5
 WA3ML/8 576-12- 16-C-5
 K8PYD 546-13- 14-C-4
 W88GBY 462-11- 14-A-6
 W8FMG 6-1- 2-C-1
 K8EHU 3-1- 1-C-1

Multi-Single

K8MMX (+WA8 FCM LRE)
 2,462,229-363-2261-C-96
 W8BVF (+K8TVO)
 672,792-289- 77B-E-72
 W8VTD (6 ops.)
 292,824-196- 49R-C-41
 KR8CH/H (3 ops.)
 15,222-59- 86-F-32
 W8BIA (+W8ARU)
 630-14- 15-A-14

HUDSON DIVISION

East New York
 W2SZ (+W2OEL, opr.)
 1,742,549-361-1609-C-70
 KA2BAH 626,070-246- 849-B-42
 K2SHL 497,688-233- 712-F-52
 W2AMM 121,656-148- 274-C-20
 WA2AUB 101,080-133- 254-B-43
 W2SHZ 22,878-62- 123-C-5
 W2JXL 9504-48- 66-C-6
 W2FZGS 8100-36- 75-B-12
 W2LOLQ 3960-30- 44-A-8
 WA2TNV 2079-21- 33-B-4
 W2KZN 1104-16- 23-F-8
 WA2GSB 12-2- 2-A-4

Multi-Single

W1BGD/2 (+WA9HHH)
 2,256,318-519-1795-C-95

K2BK (+WB2 BXL ZPW)
 639,831-271- 787-C-84
 K2UQT/2 (4 ops.)
 1,550,607-349-1481-C-96
 WA2DNR (3 ops.)
 21,783-53- 137-E-8
 V Y C A I

Multi-Multi

W2CP 400,062-223- 598-C-42
 W215K 388,113-209- 619-C-63
 WB2ZTH 355,200-700- 592-A-40
 W2LEJ 278,166-179- 518-B-60
 W2IRV 248,508-177- 468-C-40
 W2GHY 141,643-133- 355-B-50
 K2DWD 132,030-135- 326-B-62
 WA2AYP 128,238-134- 319-B-32
 WA2VDA 11,012-78- 218-B-19
 W2YCW 43,500-100- 145-C-12
 W2CKR 42,840-84- 170-A-34
 WB2MQJ 35,328-48- 246-A-6
 W2WMG 21,240-60- 118-C-6
 W2ZPG 8820-49- 60-A-6
 WA2PXB (WB2JFG, opr.)
 8149-29- 95-B-10

WB2KB 7236-36- 67-B-35
 PY2FCX/W2
 5616-36- 52-B-29
 WB2PVC 3611-23- 53-A-10
 WB2MUC 2808-26- 36-A-6
 WB2ZIN 1900-22- 30-A-6

Multi-Single

WA2GRY (+WA2 MOT MS)
 52,239-83- 211-B-24
 WA2DZG (+WA2 EC)
 41,724-76- 183-A-31
 WA2MBF (multitp.)
 6615-35- 63-B-13

North New Jersey

WB2SON 1,846,200-362-1700-C-82
 W2YET 1,283,808-311-1376-C-77
 W2JXJ 1,001,072-296-1130-C-74
 W2MB 815,265-305- 891-C-68
 WA3BAZ/2
 561,330-231- 810-C-73
 W2RAD 369,600-224- 550-C-62
 WA2DZU 301,716-174- 578-B-60
 WB2JLV 300,255-185- 541-F-62
 W2FCR 271,584-184- 492-F-45
 WB2HEO 243,432-168- 483-B-52
 WB2VFT 169,422-151- 374-D-35
 W2FLE 52,793-129- 139-C-6
 W2PFE 51,042-94- 181-B-25
 WA2FRS 33,666-67- 166-A-13
 WB2POG 27,939-67- 139-C-18
 W2CXY 25,920-64- 135-B-6
 W2HLL 15,264-53- 96-C-14
 W2CVW 13,770-54- 83-C-9
 WB2KQC 6993-37- 63-B-9
 W2BBK 3600-30- 40-B-11
 W2SE 2310-22- 35-C-4
 W2LUL 1080-18- 20-A-5
 WA2CAK 1026-18- 19-A-12
 WB2CWO 867-17- 12-A-29
 WB2VHC 429-11- 13-F-6
 K4VUD/2 27-3- 3-A-3

Multi-Single

WA2CFA (8 ops.)
 996,300-324-1025-F-87
 WA2NPP (3 ops.)
 36,573-73- 167-E-21

Multi-Multi

K2USA (7 ops.)
 174,174-143- 406-F-48

MIDWEST DIVISION

Iowa
 WA8ETC 456,840-235- 648-C-70
 WBMYW 406,560-242- 560-C-29
 W8KB 123,120-135- 304-B-29
 WADATY 40,344-82- 164-B-18
 W8YLF/W (W8JG, opr.)
 26,373-59- 149-G-17
 K8IR 10,488-46- 76-C-8
 W8NLF 8184-44- 62-B-16
 W8EGI 8103-37- 73-B-11
 W8JGJ 1197-19- 21-G-1

Multi-Single

WA8QJX (4 ops.)
 17,100-57- 100-B-18
 WA8TIG (2 ops.)
 1914-22- 28-A-3

WA8PKF (2 ops.)
 840-14- 20-B-3
 K8CML 68,376-111- 206-C-24
 W80ARF 30,186-78- 129-A-26
 WA8DQZ 11,600-50- 78-A-32
 K8LHL 8442-42- 67-A-11
 WA8VJE 3444-28- 41-C-10

Missouri

W8LBB 203,913-163- 417-C-54
 K8JFL 168,168-156- 360-C-39
 K8DJB 56,088-114- 164-B-35
 WA8VYR 52,965-107- 165-C-26
 WA8VZC 19,602-66- 100-A-24
 K8ZHD 15,219-57- 89-C-23
 W8CDD 9720-54- 60-F-14
 WA8LMS 3354-26- 43-A-4
 W8QAU 3-1- 1-1

Multi-Multi

WA8WKI (4 ops.)
 167,904-159- 352-A-96

Nebraska

WA8LGR 36,258-217- 558-G-63
 W8KH 185,592-152- 407-C-49
 W8NGJ 46,350-103- 150-B-20
 W8UOV 22,940-60- 133-C-21
 W8WLO 9243-39- 79-C-7
 WA8GHZ 5500-25- 74-B-16

Multi-Single

WA8EEL (+ WA8GZ)
 10,608-39- 92-B-10
 WA8ZPM (+WA8VY)
 4263-29- 49-B-7

NEW ENGLAND DIVISION

Connecticut
 K1VTD 1,750,980-379-1542-F-81
 WA1JLD 1,497,222-343-1328-C-55
 W1OKG 1,219,431-311-1307-C-90
 K1ZND* 1,202,192-331-1212-F-55
 W1BBH 805,464-324- 829-C-60
 W1FEG 782,565-257-1015-C-65
 WA1IOJ/1
 703,500-268- 875-C-35
 K1GUD 578,004-196- 983-C-46
 W1FLM 498,348-218- 768-C-50
 K1ASJ 374,489-181- 691-B-53
 W1DO 373,368-188- 662-C-34
 G5XPM/W1
 372,204-196- 633-B-51
 K1JHX 326,592-216- 504-F-26
 K1DPB 270,720-192- 470-C-36
 W1FTX 249,600-208- 400-C-43
 WA1KQM/*
 230,202-203- 37H-C-48
 W1FBY* 145,656-168- 289-C-6
 WA1JZC/1
 134,518-103- 436-B-38
 W1DIT 88,011-127- 231-C-37
 W1CNU 84,048-103- 272-B-28
 WA1KMR 73,416-133- 184-B-30
 W1QOV 57,165-103- 185-C-12
 WA1MNN 50,244-77- 212-B-50
 K1GTE 48,240-80- 201-B-23
 K1JUD 42,336-96- 147-B-8
 W1DFP 36,850-67- 184-B-20
 W1CPC* 27,342-62- 147-C-6
 WA1KKM 27,264-64- 142-A-28
 W1RN 24,768-64- 129-A-18
 WA1DJG 20,670-51- 130-A-3
 W1FTD 18,894-67- 94-C-11
 WA1JLV 18,250-50- 123-A-6
 K1WMO 16,677-51- 109-B-25
 W4WFL/*
 16,356-58- 94-A-24
 K1TZD 15,000-50- 100-C-10
 W1FXK 8494-42- 69-1
 W1PPN 8364-41- 68-C-9
 W1RW* 7884-36- 73-B-6
 W1FRD 6903-39- 61-F-19
 W1EGM 6432-32- 67-A-11
 WA1ISD 4284-28- 51-E-4
 W8DRE/1*
 3861-33- 39-G-7
 K1YXG 2280-19- 40-A-10
 W1RU* 1170-13- 30-C-2
 W1CPC1*
 1123-15- 25-C-6
 K1QKR (WA1JZC, opr.)
 459-9- 17-B-2
 K1WVX 560-10- 12-F-4
 WA1MAO 144-6- 8-A-2

East Mass.
 WA1JHO 1,414,224-322-1464-1-57
 WA1IRG 1,318,240-352-1253-C-69
 K1CSJ 614,061-243- 843-C-49
 W1UYU 409,714-209- 651-B-59
 WA1JWO 236,040-166- 480-F-16
 WA1KBF 218,700-162- 450-A-50
 WA1KZF 205,196-172- 399-A-65
 WA1LRN 137,808-132- 348-B-55
 W1ESN 130,536-147- 296-F-1
 WA1ION 108,330-157- 230-C-34
 WA1NLX 101,088-104- 324-B-52
 WA1IJD 99,234-149- 222-A-27
 WA1JXZ 84,539-91- 310-D-77
 WA1LXK 73,340-95- 260-A-57
 WA1NII 60,600-101- 200-A-75
 K1SHN 59,325-113- 175-C-12
 WA1MCY 52,437-77- 227-A-33
 WA1INDU 39,150-87- 127-B-10
 WA1KSF 35,112-77- 152-B-26
 WA1IIB 27,156-62- 146-1
 W1HX 16,932-68- 83-B-36
 W1MCO 15,066-54- 93-C-7
 W1KSN 14,151-53- 89-F-12
 WA1NDM 12,798-54- 79-A-10
 W1PLJ 6615-38- 63-B-16
 W1MO 3612-28- 43-C-6
 K1DCB 1865-23- 27-C-5

Multi-Single

W1MX (3 ops.)
 1,070,460-313-1140-C-94
 WA1JUY (4 ops.)
 1,041,600-320-1085-A-95
 WA1HRY/1 (6 ops.)
 418,446-243- 574-B-52
 WA1LXE (5 ops.)
 10,440-58- 60-B-2

Maine

W1MN 170,469-141- 403-C-36
 K1GAX 21,726-71- 102-C-9

New Hampshire

WA1CFT 135,387-147- 307-A-69
 W1BPW 20,592-66- 104-C-8
 W1DXB 14,942-62- 94-A-5
 W1CHA 2584-18- 48-C-2
 K1ATL 300-10- 10-B-4

Rhode Island

1,877,466-383-1634-C-74
 W1RFQ 20,440-60- 150-C-4
 W1AWE 14,352-52- 93-1
 W1FLN 9261-49- 63-C-7

Multi-Single

W1VPY (5 ops.)
 563,409-231- 814-C-72
 W1HGA 17,808-56- 106-B-7

Vermont

W1FBX 329,175-209- 525-C-57
 WA1ABW 260,142-191- 454-A-30
 K1KNQ 156,331-161- 325-C-33
 WA2BCT/1
 55,341-99- 187-F-11
 W1F2D 51,597-91- 189-B-18
 WA1MFB 29,475-75- 131-F-8
 W1HRV 25,326-67- 126-B-12
 W1EOB 9540-53- 60-C-6

Multi-Single

W1YK (5 ops.)
 117,912-136- 289-C-25
 K1EAB (+W1SHM MOK)
 72,417-101- 239-C-42

NORTHWEST RN DIVISION

Idaho
 W1DVB 28,908-66- 146-C-24

Montana
 WA7KST 165,986-149- 372-B-48
 W7EOH 112,440-120- 313-C-40
 K7ABV 55,860-70- 266-F-24

Wyoming
 W7CBB 53,406-86- 207-C-28
 W1BTP 15,561-39- 133-B-19
 W7FIN 5850-25- 78-A-20

Oregon
 W7RS 739,152-232-1062-C-47
 WA7CCR 282,066-106- 892-B-65
 WA7OVB 102,930-47- 365-B-59



If you were active for any length of time in the 1971 DX Test, chances are you QSOed one or more of the operators shown. They are: (l. to r., t. to b.) EL2CB, WA4OVP/8R1, K1VTM, ZS5WN, HR2GK (WA8VRB, opr.) KH6HKM, 6W8DY, YV5CVE, WB6ZHD, W7IR/TG, CT1VX, and PJ2PS.



W7GVX 68,643- 87- 263-B-42
 WA7IHN 41,340- 53- 260-A-49
 W7PIK 11,484- 33- 116-C- 7

Washington

W7BJ 393,680-148- 888-C-59
 W7EXM 124,740-135- 316-C-41
 W7JRU 85,212-108- 263-B-80
 W7YTN 63,054- 62- 339-B-43
 K7IDX 50,115- 65- 257-C-32
 W7QCN 37,422- 81- 154-C-23
 WA7ICB 33,825- 55- 205-E-16
 WA7OBL 23,736- 46- 173-C-21
 K7LW1 6222- 34- 63-B-10
 W7GYF 2700- 25- 36-A- 3
 WB6JAN/7 1775- 17- 25-B- 9

Multi-Single

WSQQQ/7 (4 ops.)
 2,020,518-306-2201-C-96
 VT7ZZ/W7 (2 ops.)
 814,681-181-1501-C-89
 W7VRO (+W7EKM)
 215,016-136- 527-C- 2

Multi-Single

W6IHN (+W6HRS)
 233,173-137- 543-C-40
 W6ZBS (+W6Z11)
 139,776-128- 364-F-60

Multi-Multi

WB6GfJ (4 ops.)
 1,479,924-284-1737-C- 80

ROANOKE DIVISION

North Carolina

WA41-FW 928,896-328- 951-E-75
 K4ARP 557,280-270- 690-C-66
 K4KZZ 517,920-260- 664-C-69
 K4BBK/4 474,375-253- 625-F-37
 K4MPE 255,600-213- 400-C-46
 W4TMR 223,938-174- 443-B-48
 K4SKI 152,064-144- 352-C-34
 W4AIC (WB4IOJ ops.)
 101,220-140- 241-F-26
 WB4EEM 98,640-137- 240-E-18
 K4CCKA 72,102-122 197-C-32
 WB4MWA 69,156-102- 226-B-48
 K4AJR 67,260-118- 190-C-14
 WB4JYB 60,600-100- 202-C-19
 W4QMW 24,840- 73- 115-C-13
 K4HRN 19,992- 68- 98-C-19
 W4VON 9844- 46- 74-C- 8
 WB4RYK 9636- 44- 77-B-23
 K4CIA 9585- 45- 71-C-12
 WA2SSI/4 2574- 26- 33-A- 6

South Carolina

K4II 502,686-261- 642-C- 2
 WB4KRI 64,617-119- 181-E-55
 WB4OGB 2310- 22- 35-A- 7
 K4ZDT 3070- 23- 30-A- 6
 W4ULY 1800- 20- 30-A- 7
 W4WT 1584- 22- 24-B- 8

Virginia

W9MII/4 1,020,627-309-1101-C-79
 W4S5Y 633,600-300- 704-C-64
 K4LKJ 61,882-262- 787-C-62
 W4DM 487,701-243- 699-C-40
 W4W5F 396,036-228- 579-B-37
 W4LZ 389,610-222- 587-C-36
 W4ZSH 362,664-219- 552-C-60
 K4FCL 335,097-197- 567-C-47
 K4ZA 281,190-206- 455-C-45
 K4OD 249,549-193- 431-B-47
 W4CRW 204,687-171- 399-A-54
 W4AYBV 168,147-157- 357-C-43
 K4CPO 148,782-137- 362-C-30
 W4CC 134,640-136- 330-A- 4
 K4ASI 126,096-142- 296-B-52
 W4VAN 96,600- 92- 350-C-31
 W4KOO 84,444-124- 227-B-25
 W4UPJ 78,674-112- 234-C-23
 K4FBL 73,920-110- 224-C-14
 WB4OXD 62,322- 94- 221-A-4L
 W4BVV 49,956- 92- 181-C- 2
 K4ALH/4 49,590- 87- 190-L- 2

W4ZM 42,336- 84- 168-C- 5
 WB4QWM 41,160- 98- 140-B-24
 W4RMS 40,326- 94- 143-1-21
 W4JIV 34,272- 84- 136-C-19
 K4DXO 34,200- 76- 150-B-15
 K4LBJ 22,176- 56- 132-C-12
 W4WBC 17,226- 58- 99-C-12
 W4WTE 2106- 26- 27-C- 5
 W4YHD 1440- 20- 34-C- 2
 K4LDR 1122- 17- 22-A- 4
 K4DSC 324- 9- 12-B- 8

Multi-Multi

K4CG (7 ops.)
 3,370,185-455-2469-C-48

West Virginia

WB8CGC 125,934-139- 302-A-54
 WA8VEA 19,968- 64- 104-B-13
 KBHUH 7020- 36- 65-A-17

Multi-Single

W0MYN (5 ops.)
 1,023,750-273-1250-C-96
 K0WAR/0 (3 ops.)
 3264- 32- 34-B-40

New Mexico

K5LYK 155,832-151- 344-C-45
 WB4JSV/5 54,120-120- 151-G-19
 W5RSZ 24,959- 71- 115-F- 8
 K5IKL 16,470- 45- 122-C-19
 W5QJQ 6732- 33- 68-A- 7

Multi-Multi

WBSAXC (6 ops.)
 12,642- 42- 102-E-31

Utah

K7RAJ 875,529-243-1201-C-67
 V14AH/W7 394,251-143- 919-C-53
 W7HS 26,304-159- 555-C-47
 WA7MGK 241,164-154- 522-C-52
 W7MFU 88,494- 98- 301-C-48

Multi-Multi

WA7GWU (+K7NXH)
 1,160,664-274-1412-C-80

WA7NSS 1520- 19- 27-A-10

K4OV 40,848- 92- 148-C-19
 WB6GH 14,535- 57- 85-B-18
 WB4OPG 3861- 33- 39-A- 6
 KSLZT/4 108- 6- 6-A- 2

West Florida

W4WKO 25,125- 67- 125-B- 4

SOUTHWESTERN DIVISION

Arizona

K7YWZ 936,117-273-1143-C-70
 W7CFJ 405,600-200- 676-C-70
 W7AYY 327,060-158- 690-C-48
 K7PXI 256,542-169- 506-B-48
 WA7KTH 29,580- 68- 145-B-27
 W7FF 15,423- 53- 97-C- 9
 WA7NWL/7 36- 3- 4-B- 2

Los Angeles

W6RR 2,555,715-335-2543-C-86
 K6SFN 1,855,854-309-2002-C-82
 W6DGH 869,250-150-1159-C-66
 K6SVL 730,080-195-1248-G-75
 W6DSQ 449,652-102- 742-C-63
 W6PHJ 446,616-184- 808-C- 8
 W6NJU 350,550-205- 570-C-40
 W6DOX 286,380-172- 555-C-46
 K6SSN 227,040-172- 440-C-56
 K6QPH 195,624-143- 456-C-26
 W6BORS 179,676-138- 334-C-40
 W6AM 163,116-138- 439-C-30
 W6AMG 129,168-138- 312-C-44
 W6APW 125,829-123- 341-C-25
 W6OAU 106,722- 98- 363-C-73
 K6YRA 106,596- 94- 378-C-35
 K6RU 101,736- 72- 471-C-35
 W6GLY 96,360-110- 292-C-33
 W6UQC 83,916-111- 252-C- 6
 K6OC 74,542- 94- 267-C-49
 K6VYD 64,758- 86- 253-C-10
 W6ABA 49,883- 83- 201-C-29
 W6FHA 34,992- 72- 162-F-42
 W6YFR 33,300- 75- 148-C-20
 W6DMPQ 30,264- 52- 194-D-12
 W6BUD 23,436- 62- 126-C-18
 K6NA 19,872- 48- 138-C- 2
 W6JSO 18,618- 58- 107-C-20
 W6JSO 17,136- 51- 112-B-39
 W6JKR 9900- 50- 66-C- 4
 W6ADRR 7209- 27- 89-A-12
 W6HS 6408- 29- 74- 2
 W6RCV 5238- 28- 62-B- 6
 W6GSM 4836- 26- 62-B-12
 W6P5U 4030- 26- 52-A-14
 K6MOT 3813- 31- 41-C-18
 W6EYV 1343- 17- 27-B- 6
 K6KVC 594- 11- 18-A- 4

Multi-Single

W6HX (+W6Bs OLD VFJ)
 1,645,020-260-2109- 70
 WB6WIT/6 (4 ops.)
 1,530,192-284-1796-C-95
 WB6JOD (2 ops.)
 5733- 39- 49-C-10

Orange

WB6UDC 806,058-253-1062-C- 2
 W66FL 526,000-163- 667-C-55
 W6BNSI 192,759-137- 469-C-59
 W6BFCR 168,480-104- 540-C-31
 W6EIF 132,165- 99- 445-C-30
 K6CH 105,930-107- 330-C-20
 W6YMW 69,714-123- 189-C-40
 W6XVM 39,312- 84- 156-B- 6
 WA6FIT 3900- 65- 200-C- 2
 W66OLJ 231- 7- 11-B- 1

San Diego

W6MAR 471,744-192- 819-C-38
 W6LUN 48,777- 71- 229-C-46
 W6CHV 30,129- 83- 121-B-18

Santa Barbara

K6OW 193,050-143- 450-C-46
 W6GFB 27,000- 60- 150-C-17
 VE7BNE/W6 14,157- 39- 123-B- 2
 W6MQF 3105- 13- 45-B- 5

PACIFIC DIVISION

East Bay

K6AHV 2,573,550-350-2451-C-86
 K6QW 463,104-192- 804-C-29
 K6DYQ 448,362-207- 722-C- 8
 W66H 417,786-179- 738-C- 2
 K6HH 249,570-141- 590-C-63
 WB6ADA 43,254- 54- 267-C-15
 K6MHD 41,934- 73- 196-C-40
 W6ROZ 2592- 18- 48-C- 2
 W6LJA 1632- 17- 32-C- 6
 W6RC 192- 8- 8-C- 2

Multi-Single

WA6IQM (+W6MAV)
 1,894,221-321-1967-C-96
 K6AN (+K6AUC)
 1,465,134-281-1738-C-95
 W6DOD (+W6KG)
 1,021,570-255-1354-C-90

Nevada

WA7CWM 111,780-115- 346-C-34
 K7ILB 109,718-119- 311-C-56
 K1AGB/7 80,898- 97- 278-C-23

Sacramento Valley

K6RN 228,360-173- 440-C-34
 W6BIL 8883- 47- 63-D-30
 W6KYA 1890- 18- 35-B- 6

San Francisco

K6TL 7332- 47- 52-C-13
 K6TU 252- 7- 12-A- 5

Multi-Single

W6BIP (+W6BII)
 300,588-148- 677-C-51

San Joaquin Valley

WA6JVN 1,600,170-286-1865-C-65
 W6GRV 13,254- 47- 94-C-11
 W6MMH 4752- 24- 66-B-10

Santa Clara Valley

K4BVD/6 1,509,108-268-1877-C-75
 K6CQE 1,316,868-257-1721-C-61
 W6HVN 1,135,260-255-1484-C-77
 WB6KKB 664,350-206-1075-C- 7
 W6WX 512,820-210- 814-C-57
 WB6RIU 507,900-200- 845-B-65
 W6HON 499,198-197- 846-C-70
 K6ITI 376,992-176- 714-D-50
 WA68VY 358,716-167- 716-C-56
 W6CNA 200,256-112- 596-1-37
 K6PIH 61,470- 90- 228-C-18
 W6HRB 55,488- 68- 273-C-16
 W6CUF 47,040- 70- 224-C- 8
 W6YVK 41,580- 70- 198-B-21
 K6QZ 39,102- 98- 133-B- 6
 W6CLM 38,454- 58- 221-F-35
 WA6DKF 21,384- 66- 108-B-22
 K6UXV 16,836- 46- 122-C-31
 WB6WAV 16,758- 57- 98-C- 8
 W6ISQ 13,200- 55- 80-C- 8
 WB6UOM 7296- 32- 76-C- 5
 W6EJ 3816- 24- 53-C- 7
 WA6LDW 3096- 24- 43-B-11
 W6G8Y 1755- 13- 45-B-14
 WB6AMG 336- 7- 16-A- 2
 W6KJ 312- 8- 13-C- 1

ROCKY MT. DIVISION

Colorado

K0ZTL 85,977-123- 233-A-22
 WA0VPO 31,228- 61- 116-A- 8
 W0BWI 11,826- 54- 73-C-22

SOUTHEASTERN DIVISION

Alabama

K4MG 484,614-247- 654-C-61
 K4BYM 431,649-219- 657-C-63
 K4VKW 349,170-226- 515-C-60
 K4BBF 251,427-209- 401-C-50
 K4DOY 48,360-104- 155-B-38
 K4OVE 9594- 41- 78-B-32
 K4IHO 5550- 37- 50-B-13

East Florida

K4SHB 1,650,416-356-1546-C-78
 W4LBP 1,101,120-310-1184-C-73
 W4ZCB 817,089-287- 949-C-38
 W5HVU/4 795,312-263-1008-C-78
 W4YK 310,440-199- 520-F-27
 W4FWG 273,867-193- 473-C-31
 K4CL 238,650-185- 430-C-50
 K5VPS/4 238,632-163- 488-C-48
 W4HOS 165,561-173- 319-B-45
 K4BNC 130,467-157- 277-A- 8
 W4HKJ 94,050-114- 275-C-18
 K4KO 89,328-138- 217- 33
 W4ASVH 89,271-109- 273-C-34
 W4QZF 67,980-103- 220-C-14
 W4GXV 53,235-105- 169-B-27
 W4GZD 46,740- 95- 164-C-23
 W4BRB 45,924- 89- 172-B-15
 WB4OKY 44,820- 83- 180-B-39
 WA4YPM/4 34,656- 76- 152-C-36
 29,949- 67- 149-C-19
 W0WKU/4 27,966- 79- 118-B-20
 WA4KJV 21,600- 72- 100-A-20
 K4TIG 18,786- 62- 101-B-10
 K4AUA 7371- 39- 63-A-10
 K0FCG/4 7056- 43- 49-C- 7
 W4EEO 5043- 41- 41-A-20
 W4F5G 2079- 21- 33-A- 4
 WB4SUQ 2016- 21- 32-C- 2
 K4WSA 270- 9- 10-B- 6
 WB4NTH 48- 4- 4-A-14

Multi-Single

K4HF (4 ops.)
 2,669,868-419-2124-C-96
 W4FDA (+WB4EYX IAE)
 1,563,720-332-1570-C-96
 WA4CQD (+WB4OPL)
 1,451,340-330-1466-B-9D
 WA4EZA (+K0BCCG)
 99,375-125- 265-G- 2
 WB4TON/4 (11 ops.)
 19,992- 68- 98-A-23

Georgia

K4APL 517,650-238- 725-C-67
 W4WRY 153,807-167- 307-A-40
 W4DQD 127,281-133- 319-C-18
 W4DXI 63,360-110- 192-C-34

WEST GULF DIVISION

North Texas

K5ZJK 1,683,540-398-1410-C-84
 W5EQT 1,041,003-321-1128-C-61
 K5HTM 243,270-170- 477-C-60

80/40 METER DX CONTACT BOX

CW

Call	80	40	Call	80	40	Call	80	40	Call	80	40	Call	80	40
CP6FG	74	113	HB9KC	27	11	KZ5KN	100	125	SM5CMP	5	48	UL7GW	12	12
CT1VX	311	357	HB9QA		3	LA1OA	83	173	SM6CUK	5	29	UP2OO	9	19
CT2BC	64	30	HC1KP	105	153	LASCI		9	SM7EAN		39	UQ2AO	45	
CT3AS	63	33	HL3XAM	55	28	LA6GF		100	SM0BDS		11	UQ2DB	8	8
DL2YE	46	51	HR2CK	368	396	LA0AD	250	24	SP2BMX		6	UR2GT	3	3
DL4OP	32		HS1ADX		10	LU2E*	86	315	SP2DVH		64	UR2LO	20	20
DK1HO	29		HS3AET	3	11	LU6DAZ			SP3BHG	60	60	UT55Y	19	3
DK1KS	13		HS3AFB	7	29	DU6SH/LX	111	8	SP3DOI		71	UW3EH	3	3
DK3BJ*	313		IIASF	33	265	LZ1KEZ*			SP5EOA		75	UY5DV	1	10
DL1GN	18	21	IIBLF		84	OA4DX	136	120	SP5PWK*	73	65	UY5HW	5	5
DL3VI	66		IIBOI*	144	181	OH2BO*			SP5ZA		6	UY5OO	27	27
DL4JS	53	68	IIFGP		115	OH5E	3	1	SP6DMJ		5	UY5RH	27	27
DL7BQ	52	119	IIFOX		30	OH6NH		29	SP8AG		15	UY5TF	16	16
DL7HN	124	168	IUMGN		27	OK1AFN	12	67	SP8MJ		37	UY5ZP	10	40
DL7NS	23	90	IIMQ		53	OK1AOV		9	SP9AGS		2	VK2GW	395	395
DM2BFF*	41	64	IYYCZ		45	OK1DZS		6	SP9AXH		18	VK2RA	3	3
DM2BPF	26	22	JA1BDD		11	OK1JN	8	37	SP9DH		1	VK2VN	28	37
DM2CUI	12	4	JA1CG	2	81	OK1KTL*	130	241	SV0WO		31	VK3AXK	297	297
DM3OGB	2		JA1JGK	58	130	OK1KYS*	76	71	W7IR/TG		51	VK3JQ	51	51
DM3PEL	24	32	JA1NDO	16	42	OK1KZ		10	K1WKK/TL2		10	VK3QI	333	333
DM3RQG	3		JA1SR	1	48	OK1MSP	4	22	TJ1AW	123	367	VK5FM	21	21
DM4RFM	36	42	JA1WYZ		6	OK1TA	24	37	UA1ZL		10	VK5KO	12	32
DM4ROL	11	8	JA3CKR		10	OK2REU	5	29	UA6UX		15	VP2ES*	206	328
DM4YEL	18	32	JA3USA	63	142	OK2BFS	13	10	UA0GF	2	2	K4BZH/VP7	207	223
EA2CR	12		JA3YBF*	42	368	OK2BOL	11	48	UA0JW		70	VU2JN	11	11
EA2DT	57	91	JA4BNT	6	60	OK2HI		62	UA0LH		7	YO2AFB	19	19
EA3KT	23	44	JA7AMK		30	OK2PDM	7		UA0LJ		30	YO2APY	16	16
EL2VXD	23	26	JA7BDW		109	OK2PEQ		65	UA0OI		2	YO2BP	19	19
EL4AL	6	15	JA7BE	4	47	OK2QX	42	203	UA0ZAM	2	37	YO2RA	6	6
EL9I	184	212	JA7GAX	1	62	OK3CGP	11	112	UB5MZ	2	281	YO6ADM	6	48
EL2CB	132	356	JA7GOB		11	OK3FR		282	UB5RS		9	YO6AFB	17	17
F2FO	49	29	JA7HOP	18	38	OK3TCA	1	11	UB5TO		18	YO6KBM	240	240
F5SP	1	8	JA7KXD		25	OK3YL	2	23	UB5TR		9	YO7AGM	14	14
F8TC	25	50	JA9YBA*	6	177	ONBUL		102	UB5VK		37	YO7AWN	47	228
F8TO	183	163	JA0EJN		30	OX3AB	142	103	UB5ZE		22	YO7DL	7	7
F8VI	258	203	JA0EMS	18		OX3DL	112	192	UC2RL		1	YORDD	7	22
F8ZF	258	203	JA0EPZ	21		OX3WQ	94	101	UD6CB		4	YORKAL	9	9
F9LI	7	26	JA0HXH	1		OX4XC	43	53	UD6CN*		17	YU1BCD*	147	395
F0WJ	24		JA0JP		34	OX5BT		6	UK1AAG*		2	YU1DKL	57	57
F8XX	25		JD1ABX	69	81	QZ3FYN*		2	UK1TAA*		6	YU1JRS*	58	279
G2AJB	67		JH1CI	1	80	QZ3PO		6	UK1TAL*		2	YU1JST	23	23
G3DC	138	113	JH1WIX		79	OZ4H		24	UK2BBB*		17	YU2CBM*	23	100
G2QT	78	214	JR1BRV		7	OZ4HW		8	UK2GAM*		19	YU3EY*	301	653
G3RO	289	301	JWSNM		14	OZ5CI		33	UK2GAY*		30	YV5KL	404	766
G3APN	23	44	KA8FY*		85	OZ5DX	237	305	UK2WAF*		2	ZB2AV	219	169
G3FXB	260	338	KG6JAR		49	PA0ALW	29		UK3AAO*	25	89	ZD6H	43	92
G3KMA	77	157	KH6GSE	26	126	PA0FRI		126	UK4AAB*		21	ZE1BE	28	34
G3KSH	11	23	KH6HAM	252	112	PA0GN*	107	110	UK5A2Z*		14	ZL1AFW	4	36
G3SUX*	113	276	KH6HGL		47	PA0LOU	47	135	UK5IAZ*		5	ZL1AMO	24	400
G3VNR*	211	208	KH6HKM	249	499	PA0PHK		47	UK5KAA*		59	ZL1BN	21	92
GDSATG	46	58	KH6J	475	697	PA0TB	47	21	UK5MAF*		49	ZS6FN	89	129
GW3ITZ*	169	109	KH6RS	573	978	PA0VB		10	UK5UAB*		57	5W1AR	60	136
GW3I	301	294	KL7AIZ*	58	57	P12PS	413	576	UK5VAA*		38	7Q7AA	3	13
HA1VE	118		KL7BCH		112	PJ6AA	151	80	UK5WAA*	10	11	9E3USA*	3	31
HA2KME*	2	51	KL7FBI	6	40	PJ9JR	2	3	UK6AAF*		14	9Y4NN	64	72
HA2KMR*	30		KL7GLL		256	PY1BLG		30	UK6DAU		1	9Y4VU	244	226
HA3GO	192		KL7MF		55	SK6AB*	308	532	UK9HAD*		1			
HA5KQD*	215	329	KP4DJ	110	113	SM2EKM		37	UK0CAB*	45	90			
HB9AFG	57	109	WBASR/KP4		136	SM4DHF		89	UK0FAD*		7			
HB9AGH	5		KR6AY*	79	204	SM5BNZ		87	UK0FAH		42			
HB9AON	3		KR8BY		34	SM5CAK	33	7	UK0JAA*		25			
HB9DX	51	52	KR8EA	26	24	SM5CBN	22	22	UK0ZAA*		52			

*Multioperator Station

PHONE

CN8HD	187	67	G3TJW	387		JA3IRO	19	8	KP4DLW	123	331	SM6DKO	25	207
CT1BH	201	215	G5AOF		15	JA3USA	19	36	KR6AY*	22	98	SM8BYZ*	1	1
CT2BC	56	57	G6LK		32	JA3YBF*	11	196	KV4AM	267	268	TG9ND	242	76
DL2YE		6	GW5AQR	47	37	JA4BNT	2	12	KV4GP	259	8	TJ1AZ	24	4
DL4RM		3	GW3NWX	28	41	JA7BSK	7	21	KZ5KN	50	58	UK5IAA*	20	20
DL4SW	9		HA5KQD*	51	139	JA7HYS	7	21	KZ5SRP	366	208	UK5IAZ*	25	25
DL5JF	100	143	HB9QD	140	287	JA7KXD		1	KZ5ZZ	120	76	VP2AAP*	150	110
DL6QH	23	5	HC1ARE*	561	625	JA9YBA*	1	31	LA0AD	289	300	VP9GF	323	233
DL6WD	42	327	HL3XAM		10	3D1ABX		9	OA8V	45	85	XE1KS	595	615
DL6WE	40	432	HS3AFB	12	3	JH1CJQ	9	106	OF2EGL	31	49	XE1LS	299	425
DL8PC	107	56	HW3KAW*	239	529	JH1EIG	30	31	OH2BO*	1	54	XE2I	1	1
DL0JRA*	83	173	II1BBZ*		124	JH1MTR		8	OK1AVU	7		YN1MG	190	295
EA1FD	94	138	II1ELL		11	JH1YDR		48	OK1TA	1	39	YU1SJ	3	3
EA3RF	26	51	II1FLD	92	272	KA2KS*	52	239	OK2ABU	3		YV1TO	84	84
EA8FS	46	57	II1KBT*		107	KA8EY		4	OX3WQ		13	ZD8AB	51	1
EL2CB	190	297	IIMAU*	11	60	KC6WS		43	OZ3PO		3	ZL1AGO	75	405
F2MO	20	13	II1MOL	203	171	KG6AAY	124		OZ5DX	20	18	ZL1BN	11	11
F2SI	46	174	II1WXY		1	KH6BZF	251	398	OZ5GF		7	ZS3CI	2	3
G2QT	47	134	JA1BDD		2	KH6HCM*	504	786	OZ5GJ		7	4M7AV	226	83
G3FAV*	55		JA1CG		5	KH6HGP*		12	PY1CLI		63	6W8DY	39	46
G3IOC*	198	357	JA1DFQ		2	KH6J	132	264	PA0GN*	12	78	9E3USA*	3	3
G3KMA	2	82	JA0CUI/V1	6	102	KH6RS	422	730	SK6AW*	10	36	9G1WW	31	52
G3SFM	38		JA2JW		14	KL7AIZ*	128	469	SM5CAK	1	1	9Q5RD	2	2
G3SIX*	32	167	JA2LNW		3	KP4DJH	11	37	SM5EAC	11		9Y4VU	177	150

WSRR 216,756-162-498-C-36
 K5AAV 173,628-156-371-C-47
 WSKYD 171,360-170-336-C-31
 WSLUJ 123,904-135-306-C-18
 W5FCX 122,301-127-321-C-28
 W5OJZ 113,796-116-327-F-39
 W5LUD 42,018-94-149-C-38
 W5KHP 34,452-87-132-B-19
 W5OGZ 25,704-72-119-A-17
 W5SDH 24,186-58-87-C-8
 W5SAAR 23,856-71-112-A-35
 W5SAOF 14,964-58-86-D-37
 W5NDY 12,654-57-74-C-13
 W5QF 8442-42-67-A-14
 W5VSL 7659-37-69-C-4
 W5PXH 2475-23-33-C-4
 W5RSO 940-15-22-C-6

Manitoba
 VE4FU 527,067-243-723-B-58
 VE4RP 320,436-162-660-C-66
 VE4KE 152,090-134-319-F-57
 VE4MP 83,172-116-239-B-30
 VE4IK 65,427-113-193-B-40
 VE4OX 17,820-54-110-C-19
 VE4DD 16,560-60-92-B-31
 VE4EW 14,700-50-98-B-80
 VE4SD 12,015-45-90-C-18
 VE4SK 7866-38-69-B-20
 VE4XJ 5049-33-51-A-5
 VE4BJ 4674-38-41-B-20

Maryland-D.C.
 K1LPL/3 1,824,876-366-1662-C-75
 W3GRF 1,623,336-344-1573-C-55
 W3EKN 708,102-279-858-C-74
 W3MJP 693,100-239-993-C-62
 W3AXW 581,756-263-742-C-72
 W3EYF 486,918-254-639-E-63
 W3GN 439,461-193-759-C-56
 W3TMZ 430,866-202-711-C-33
 W3PZA 304,479-189-537-C-26
 W3FA 296,820-194-510-C-42
 W3A1HG 244,584-172-474-C-67
 W3CRF 194,304-176-368-C-30
 W3FII 148,800-160-310-A-28
 W3JYV 138,996-132-351-C-59
 W3AFM 126,445-121-353-C-32
 W3A3NJ 108,600-128-275-B-59
 W3HVM 86,394-121-238-C-24
 W3KA 77,070-70-380-C-2
 W3AJENM 74,880-120-208-F-37
 K0QET/3 63,900-100-213-B-47
 W3NL 36,450-75-162-C-26
 W3LPR 26,574-86-103-B-19
 W3YSH 25,174-82-103-C-17
 W3RYV 17,751-61-97-B-21
 W3AWN 14,685-55-89-E-11
 W3EZN 13,050-50-87-A-22
 W3LMZ 13,014-54-81-A-13
 W3XSE 880-40-74-C-5
 W3KMY 7200-40-60-C-4
 K2QBW/3 6864-44-52-A-6

W2EAX 10,788-58-62-C-6
 W2PDB 3348-31-36-C-2
 W2UJ 3264-32-34-A-18

Western Pennsylvania
 W3VT (1,218,990-358-1135-C-76
 W3VEQ 772,470-270-954-C-74
 W3PZC 204,240-148-460-C-60
 W3A3IH 106,860-137-260-C-23
 W3NU 83,190-141-198-C-27
 W3UT 69,948-116-201-B-26
 W3NKO 32,555-85-129-A-28
 W3KYCY 17,400-58-100-A-24
 W3MQJ 17,136-48-119-B-9
 W3VK 8280-46-60-C-12
 W3YX 4740-30-53-C-16
 W3KMA 346-13-14-A-2
 W3QVS 192-8-8-A-2

Multi-Single
 WA5OCG (3 oprs.) 134,670-134-335-B-66
 K5LZA (+WNSAAS) 65,268-98-222-C-50

Multi-Multi
 WA5JMK (6 oprs.) 1,897,200-400-1581-C-80
 W5QBM (3 oprs.) 1,155,735-315-1223-C-90

Saskatchewan
 VE5NW 165,024-144-382-C-40
 VE5RU 46,920-85-184- -

Alberta
 VE6MR (VE6AVR, opr.) 659,520-229-960-G-72
 VE6AP 191,820-139-460-B-50
 VE6AUV 67,017-89-251-A-38
 VE6EO 2438-23-36-B-8

British Columbia
 VE7BDJ 824,760-232-1185-C-65
 VE7BR 46,201-69-203-F-27
 VE7AZG 26,550-59-150-D-34

Multi-Single
 VE6AO (133 oprs.) 402,900-158-853-C-72

Multi-Single
 W3TV (+W3 AOH VWO) 1,664,172-342-1622-C-56
 W3GV (K3VXF+W3AHSR) 13,944-56-83-C-18
 W3EXW/3 (WA3JH+W3N3WP) 3-1-1-A-

Oklahoma
 K5BXG 317,775-223-483-C-60
 W5IWL 109,962-123-298-A-53
 W5ZWO 11,172-49-76-B-17

Wife CW
 WIFE CW

Atlantic Division
 W3XN 833,553-303-917-C-65
 W3NNK 458,838-261-586-L-64
 W3TF 308,385-165-673-C-50
 W3DRD 195,816-164-398-C-41

Central Division
 W3LVT 217,761-253-968-C-64
 W9RFR 709,758-258-917-C-72
 W9IVL 607,671-251-807-C-74
 W9OHH 537,750-250-717-C-4
 K9WTS 350,244-207-564-F-60
 W9WYB 256,113-199-429-C-7
 W9JGV 253,038-181-466-C-47
 K9KDI 199,758-169-394-C-21
 W9HJ 161,568-198-272-A-1
 W9FT 157,200-131-400-C-40
 W9AG 79,758-126-211-C-20
 W9DWO 73,872-108-228-C-4
 W9KDR 69,600-116-200-A-39
 W9VVB 60,000-102-203-C-16
 W9AJSW 42,570-86-165-B-21
 W9YVG 30,240-70-144-C-10
 K9HLLW 25,352-74-116-C-28
 W9MAF 20,358-58-117-B-4
 W9GB 18,960-79-80-C-13
 W9BML/9 16,170-70-77-C-7

South Texas
 W5NMA 1,049,870-327-1070-C-88
 K5ISR 581,196-259-748-C-58
 YV5AMH/W5 218,115-185-393-F-75
 W5LPO 183,864-163-376-A-60
 W5SAE-D 81,699-113-241-F-53
 W5SU 36,000-75-160-C-12
 K5JZY 30,000-100-100-C-35
 W5ASAUZ 22,500-75-100-F-15
 W5QAM 14,337-59-83-B-30
 W5RBB 13,440-56-80-B-8
 W5RO 12,126-43-94-E-39
 K5RVE 5508-36-51-C-8
 W5ELN 3696-28-44-C-20
 W5ZWC 2088-24-29-A-10
 W5LDX 588-14-14-B-32

Delaware
 W3NX 833,553-303-917-C-65
 W3NNK 458,838-261-586-L-64
 W3TF 308,385-165-673-C-50
 W3DRD 195,816-164-398-C-41

Multi-Single
 W3ADO (9 oprs.) 299,130-169-590-F-2
 W3TOS (+W3A3ML) 58,788-92-213-B-43

Indiana
 K9OLL 12,144-46-88-B-36
 K9MNT 9180-45-68-B-10
 W9SBS 8460-47-60-B-19
 K9IEK 7776-48-54-B-23
 W9RKC 4274-32-44-B-23
 W9HPG 1130-20-22-A-7
 W9BDDR 1726-18-28-B-15
 W9WR 855-15-19-B-9
 W9PFB 120-6-7-A-7
 W9GXR 3-1-1-A-1

Multi-Single
 W5RER (4 oprs.) 2,851,425-437-2175-C-96
 W5WLD (+W5AZXO) 307,800-200-513-C-69
 W5WQF (+W5AS UGI YSC) 287,817-197-487-A-70

West Pennsylvania
 K3HTZ 1,580,040-360-1463-C-93
 K3HJ 1,230,273-289-1419-C-65
 W3NZ 739,755-255-967-C-59
 K3WJV 704,790-246-955-C-75
 K3YUA 548,352-224-816-F-63
 W3KT 515,499-241-713-C-4
 W3GRS 449,820-238-630-C-4
 W3ALB 373,752-232-537-C-41
 W3EOL 207,088-176-564-C-40
 W3KFO 282,744-187-504-C-49
 W3OOR 241,344-192-419-A-31
 K3AIG 235,500-157-500-C-39
 W3ZJ 209,760-160-437-B-33
 W3MFW 198,090-186-355-C-22
 W3ARK 171,054-129-442-B-35
 K3TGM 159,588-132-403-C-4
 W3AIZ 151,590-155-526-B-30
 W3EAN 120,818-103-391-F-22
 W3QLW 106,959-101-353-B-13
 WA4NOX 88,212-77-252-B-56
 K3YOV 40,128-88-152-A-55
 W3CGS 40,053-79-169-C-9
 W3CAA 37,125-75-165-C-16
 W3GTO 34,680-85-136-C-20
 W3GHD 31,920-76-140-D-4
 K3FME 24,642-74-113-E-37
 W3HMR 23,985-65-123-C-17
 W3FOP 16,245-57-95-C-14
 W3FVW 12,906-47-76-B-8
 K3RDT 8040-48-60-A-6
 WA3LAR 4059-33-41-C-6
 WA3NNA 1518-27-23-C-2

Southern New Jersey
 WA2IZS 522,792-274-636-C-64
 K2JUL 404,010-201-670-B-40
 W2EVS 378,144-208-606-E-64
 W2FHF 316,602-198-533-B-52
 W2PAU 303,810-205-496-C-48
 W2LU 264,654-169-522-B-44
 W2SDH 243,474-154-537-C-52
 W2DT 221,832-156-474-C-50
 WA2VYA 120,648-132-306-A-67
 WA2NPD 44,772-91-164-F-28
 W2E1W 33,264-72-154-A-44
 K2CPR 7896-47-36-B-8
 WA2EOB 5022-31-54-B-18
 W2HAZ 1368-19-24-A-4
 W2BLV 330-10-11-A-2

Multi-Single
 W9DY (multiop) 51,168-104-164-C-40
 WA9VGG (+WB9CIS) 243-9-9-A-4

CANADIAN DIVISION
Maritime
 VE1ANT 142,551-141-337-B-54
 VE1AJ 64,512-96-224-C-17
 VE1EK 24,136-66-122-A-4
 VE1PL 20,160-64-105-C-15

Multi-Single
 VE1DH/1 (+VF1s ACU ASI) 1,813,320-365-1656-C-93

Quebec
 VE2NV 658,530-271-810-F-60
 VE2AY 549,936-228-804-C-74
 VE2WA 466,504-240-648-C-48
 VE2WY 313,035-205-509-B-53
 VE2HS (VE2BDZ, opr.) 238,878-138-577-C-6
 VE2AH 49,608-78-212-B-26
 VE2DJR 41,607-69-201-B-19

Ontario
 VE3CCO 689,661-267-861-D-60
 VE3EEN 100,224-116-288-C-19
 VE3CLS 71,604-108-223-B-25
 VE3AN 58,760-104-189-C-50
 VE3DHU 48,108-76-211-A-35
 VE3CPC 30,368-73-139-A-12
 VE3BIZ 11,322-51-74-A-19
 VE3SV 3744-32-39-C-12
 VE3CSP (1944-24-27-B-10
 VE3BNV 1683-17-33-A-8

Multi-Single
 W3BIP (+WA3JYB) 763,776-272-936-C-93

Multi-Multi
 W3GM (7 oprs.) 5,151,195-483-3555-C-96
 W3MWC (4 oprs.) 1,776,280-367-1615-C-85
 WA3ATX (+WA3ATV) 1,713,507-359-1591-F-96
 W3FHR (+W3BYX) 411,435-223-615-C-66

Indiana
 K9CIY 739,963-259-957-C-83
 W9IOP 374,189-179-697-C-1
 K9DKW 323,290-190-567-C-54
 K9HPD 175,380-158-370-C-54
 WA9WBE 34,620-79-146-B-24
 W9LWU/9 25,272-78-108-E-15
 WA9OFO 17,670-62-95-B-25
 W9BDGY 27-3-3-B-1

Multi-Single
 WA9LGO (WA9AUM+W9BUV) 145,894-119-410-C-34
 WB9ATL (4 oprs.) 30,720-80-128-C-23

Multi-Multi
 WB9DTK (+WB9FTW) 324-9-12-B-18

Wisconsin
 W9KYZ 608,580-245-828-E-75
 W9LNM 391,380-220-593-C-60
 W9JA 177,147-243-243-A-4
 W9KXK 168,966-149-378-C-51
 W9HCC 104,280-110-316-C-21
 W9PIT 103,356-123-261-D-1
 W9BG 81,918-132-222-F-31
 W9OW 75,096-84-298-C-25

Multi-Single
 K2KNV 908,622-298-1013-C-55
 W2CXM (WA3HRV, opr.) 815,265-297-915-C-80
 K2INP 749,385-273-915-C-71
 WA2BLEX 210,312-184-381-C-40
 W2QIP 193,866-158-409-B-32
 W2BJH 157,500-150-350-C-48
 WA2CDV 101,813-113-301-C-61
 W2FR 90,298-151-200-C-25
 W2RPP 81,270-126-215-A-29
 K2LWR 57,096-78-244-C-50
 W2AB 50,760-94-180-C-13
 W2FUI 50,052-86-194-C-52
 W2VXA 45,984-96-161-A-40
 WA2PCW 33,562-66-119-D-63
 WA2LOI 21,952-64-115-B-27
 W2WPI 15,714-54-97-A-15
 WA2ICU 12,690-47-90-D-11

Western New York
 K2KNV 908,622-298-1013-C-55
 W2CXM (WA3HRV, opr.) 815,265-297-915-C-80
 K2INP 749,385-273-915-C-71
 WA2BLEX 210,312-184-381-C-40
 W2QIP 193,866-158-409-B-32
 W2BJH 157,500-150-350-C-48
 WA2CDV 101,813-113-301-C-61
 W2FR 90,298-151-200-C-25
 W2RPP 81,270-126-215-A-29
 K2LWR 57,096-78-244-C-50
 W2AB 50,760-94-180-C-13
 W2FUI 50,052-86-194-C-52
 W2VXA 45,984-96-161-A-40
 WA2PCW 33,562-66-119-D-63
 WA2LOI 21,952-64-115-B-27
 W2WPI 15,714-54-97-A-15
 WA2ICU 12,690-47-90-D-11

Wisconsin
 W9KYZ 608,580-245-828-E-75
 W9LNM 391,380-220-593-C-60
 W9JA 177,147-243-243-A-4
 W9KXK 168,966-149-378-C-51
 W9HCC 104,280-110-316-C-21
 W9PIT 103,356-123-261-D-1
 W9BG 81,918-132-222-F-31
 W9OW 75,096-84-298-C-25

WB9BJO 33,462-66-169-B-10
 W9Y1FC 14,952-56-89-B-13
 W9TFC 13,530-55-82-B-19
 WB9BPN 4284-34-42-B-20

DAKOTA DIVISION

Minnesota

W0HP 987,768-306-1076-C-1
 K0JL 254,340-180-474-A-47
 K0RA 149,807-157-317-C-15
 W0BCWE 147,420-175-364-B-50
 K0BKX 119,880-180-222-C
 W00KLI 109,728-127-288-C-29
 W00PRS 74,160-120-206-C-34
 W0GUY 68,139-113-201-C
 W00UCU 58,743-107-184-A-29
 W0NR 31,48-84-124-C-27
 W00VFN 25,272-72-117-A-38
 W00CLY 20,703-67-103-C-13
 W00LPG 4089-29-47-B-5
 W00TRF 3915-29-45-B-5
 W00YAW 2700-30-30-A-2
 W00PAN 396-11-12-C-2

Multi-Single

W00BWM (+W00YAW) 180,000-160-375-B-30
 K0BWX (+W75) 175,380-158-370-C-32
 W00BI (+W00BZ) 180,620-129-260-C-20
 W00B0G (3 oprs.) 798-14-19-F-7

South Dakota

W0BOML 363-11-11-C-12
Multi-Single
 W00BCPY (+W00CPX) 192,127-176-364-C-90

DELTA DIVISION

Arkansas

W0SS0G 128,250-135-318-B-38
 W0SDRW 89,460-140-213-C-15

Louisiana

W0WMM/5 1,166,115-289-1345-C-78
 W0OB 173,907-171-339-C-66
 W0KC 89,298-123-242-C-28
 W0SW 25,900-70-124-A-69
 W0PM 11,421-47-81-C-7

Mississippi

W0SRUB 144,261-137-351-C-27
 W0SA 24,564-89-92-C-24
 W0SHCE 21,420-68-105-B-35

Tennessee

K4PUZ 811,035-269-1905-C-64
 K45XD 520,344-216-803-C-57
 K4FW 368,712-216-569-C-64
 W44FDR 147,840-160-308-C-21
 W4EWR 72,770-110-219-B-23
 W44FRX 12,150-54-73-B-9
 W40GG 675-15-15-1
 K4PR 450-10-15-B-3
 W4GYV 330-10-11-C-1

GREAT LAKES DIVISION

Kentucky

K0VDY/4 2100-25-28-A-20

Michigan

W0ROF (W08ZDT, opt.) 999,000-296-1125-C-72
 K0RCT (W08RTU, opt.) 780,498-262-993-C-62
 W08VBV 120,000-300-804-C-80
 W08GUF 178,857-153-390-C-27
 W0KJN 160,425-155-345-B-60
 W0KJC 153,139-167-307-A-63
 W08EUN 145,866-151-322-F-13
 W0DSO 79,002-99-266-B-60
 W0REW 65,484-102-214-E-19
 W0BSCC 50,730-95-178-C-30
 K0BER 34,992-72-162-B-35
 W0BRAAX 25,347-71-119-B-21
 K0BZF 23,790-61-130-C-34
 W0BREAU 18,231-59-103-A-13
 W0RFI 17,010-54-105-B-7
 W0BCAW 14,592-38-128-A-16

K0PTZ 10,764-46-78-C-18
 W08YNU 4968-36-46-B-31
 W08WMC 4050-30-45-B-19
 K0WUI 3075-25-41-B-20
 W08FEM 1596-19-28-C
 K00WG 1275-17-25-B-11
 W08CI 684-12-19-F-3

Multi-Single

K0UDJ (6 oprs.) 1,517,670-365-1386-C-96
 W08SH (5 oprs.) 1,902,696-378-1019-C-96
 W087HO (4 oprs.) 95,445-105-303-C-45

Ohio

W08OXO 1,271,610-355-1194-C-70
 W080YU 1,070,388-318-1233-1-84
 K0EHU 869,484-308-941-C-70
 W08KIC 843,600-296-950-C-70
 W08IN 761,244-316-203-F-70
 W08DB 711,495-291-815-C-55
 W08ROV 410,712-218-628-C-80
 W08FIN 169,623-141-401-C-65
 W08ZCO 118,404-143-276-C-33
 W08AJW 114,648-136-283-A-38
 K08NMG 98,784-147-234-B-31
 W08GOC 89,964-126-238-A
 W08BDO 75,849-131-193-B-41
 W08RTN 70,329-107-219-B-34
 W08RSW 68,854-123-186-C
 W08FI 63,874-109-196-E-52
 W08GMX 52,206-77-226-B-40
 K0YCW 37,340-77-140-B-17
 W08YGR 29,484-91-108-B-12
 W08NPL 27,738-69-134-C-39
 K08WN 27,256-69-108-B-8
 W08MKL 19,776-64-103-C-3
 W08VZF 18,600-62-100-A-16
 W08JNG 18,114-64-96-F-14
 W08MH 17,955-57-105-A-22
 W08GU 16,830-51-110-C-29
 W08DU (W03BG, opt.) 16,740-62-90-C-8
 W08JO 14,553-63-73-C-15
 W08BOR 13,095-45-97-B
 W08KYD 12,285-45-91-A-24
 W08LL 11,520-48-80-C-6
 W08KZ 8979-41-73-F-11
 W08MG 6519-41-53-C-5
 W08MEM 5985-35-57-B-9
 W08SR 5385-35-51-A-24
 W08JAO 4500-30-50-C-7
 W08IC 3906-31-42-B-16
 K08MMH 1296-18-24-B-14
 W08KAJ 768-16-10-B-1
 W08FOS 576-12-10-A-4
 W08HRU 270-9-10-B-2

Multi-Single

W08VF (+K0RTVO) 602,880-256-785-C-86

HUDSON DIVISION

Eastern New York

W1B1DJ2 2,395,980-405-175-C-87
 W2DXL 1,483,614-354-1416-C-86
 W02SIH/2 518,868-213-812-C-50
 K2JHL 498,960-210-792-E-58
 W2ZHO 373,176-219-568-C-48
 W2AZO 204,633-189-429-A-5
 W2ZHAI 107,508-124-289-A-4
 W2AMM 78,105-127-205-C-18
 W2EAH 65,205-105-209-C-14
 K2LKM 15,340-60-85-B-15
 W2IP 1980-22-30-B
 W2KZN 756-14-10-C-6
 W2PFGS 216-8-9-B-1

Multi-Single

K2AHO (+W2ADNY) 853,710-286-495-C-96
 K2BK (4 oprs.) 693,963-249-929-F-94
 N.Y.C.L.
 W2GGF 1,256,000-320-1370-C-74
 W2BKKS 1,137,936-314-1214-C-65
 W2LXK 515,403-243-708-F-60
 W2IRV 451,104-254-592-C-45
 W2YCW 326,151-217-501-C-46
 K2MFF 298,200-168-593-A-50
 W2PCJ 131,418-147-298-C-20

K2DW 81,324-108-251-B-56
 W2AFM 68,840-110-208-C-50
 W2ZHM 68,064-96-237-A-49
 W2CWR 55,032-93-208-B-36
 W2WGA 53,233-113-157-B-50
 W2WMG 52,275-85-205-C-20
 W2JNY 42,600-60-237-C-21
 W2YHK 34,656-76-152-B-17
 W2LUI 33,600-80-104-A-10
 W2CP 14,490-46-105-C
 W2CZZ 8118-41-66-A-7
 W2ZPG 2647-29-31-A
 W02LMI 855-15-19-B-3
 W2ZHO 530-10-11-B-6
 W02MFK 297-9-11-B-2

Multi-Single

W2LQO (3 oprs.) 325,128-184-589-A-55
 W02DZ (+W02TOL) 176,985-171-345-C-29

Northern New Jersey

W2YU 1,033,830-315-1094-C-71
 W2WD 757,800-300-844-C-77
 W2AHD 383,598-213-354-B-42
 W2CVW 265,392-194-456-F
 W2HL 156,006-162-321-C-33
 W02FUS 144,144-156-308-A-32
 W2BFUE 141,246-153-354-B-42
 W2HIG 45,120-94-160-A-28
 W2A2HO 34,194-82-139-A-24
 W2SI 24,138-54-149-C-22
 W2NFP 23,664-68-116-A
 W2EY 16,648-56-111-C
 W2RHK 5400-36-50-B
 K2RAO 5217-37-47-B-3
 W2BL 4200-35-40-D-5
 W2ECL 2625-25-35-A-6
 W2ZCO 855-15-19-A-24
 W2ZLP 144-6-8-A-1
 W2LU 90-5-6-B-4
 W2PCG 48-4-4-A-2

Multi-Single

W2FRZ (3 oprs.) 507,334-189-542-C-45
 K2BPP (2 oprs.) 29,550-50-197-C-13

Multi-Multi

K2USA (4 oprs.) 14,700-50-98-C-36

MIDWEST DIVISION

Iowa

W0MYV 395,712-229-576-C-31
 W0CUC 184,041-169-363-F-41
 K0HR 171,601-167-325-C-39
 W0KB 167,601-161-347-B-38
 W0BSY 161,371-139-363-C-47
 W0DATY 61,560-90-228-C-30
 W0DLW (K0SHDU, opt.) 39,500-88-195-C-22

Multi-Single

K0MKD (+W08VCN) 212,210-178-399-C-96

Kansas

K0BYP 37,701-71-177-F
 W0BPL 25,754-14-107-B-18
 W0BVJ 23,040-64-120-A-17
 K0LHJ 14,904-54-92-B-32
 K0CML 7104-37-64-C-6

Missouri

W08RDJ 294,528-208-472-D
 W0BU 210,870-142-495-B-30
 K0ARS 147,795-167-295-A-30
 W09BZY/0 121,584-136-300-C-48
 K0GPF 12,126-43-94-A-18
 W0DSW 9085-49-55-A-10
 W01YJ 3420-30-36-B-16
 W08MS 2871-29-33-B
 W0ZLU 3-1-1-A-1

Nebraska

W0BLO 175,980-140-419-C-37
 W0BNG 127,374-142-299-C-38
 W0BLR 21,228-61-116-D-17

NEW ENGLAND DIVISION

Connecticut

K1ZND* 1,848,396-363-1698-C-78

K1VTM 1,694,744-349-1628-C9
 W03LD 1,463,616-363-1343-C9
 W1FVY 1,057,056-286-1232-C9
 W1EGE 1,038,270-267-1106-C9
 K10HD 1,023,231-301-1111-C9
 W1HHS 1,015,890-325-1043-C9
 K1JHX 1,010,030-307-1109-C9
 K1F7D (W010J, opt.) 884,736-256-1152-C9
 K1ASJ 647,410-227-954-B4
 W1FLM 551,696-309-855-C9
 W1FVY 458,173-267-572-C9
 W1TS 407,232-224-686-C9
 K1LGD 365,280-160-770-C9
 W1AJO 279,180-180-812-B4
 K1DPB 257,580-162-830-C9
 W1DFT 145,080-155-312-C9
 W1CNU 130,620-140-311-B9
 W1OR 102,225-145-235-C9

66,780-106-210-C9
 W1RN 39,312-91-144-A-1
 K11VS 36,408-74-164-C-1
 W1IMAO 35,109-83-141-A-1
 W1FCM 28,550-70-135-A-1
 W11CNU 21,670-55-133-B3
 W1AKKM 18,144-56-108-A-2
 W1FZJ 17,588-61-96-B-1
 W11PI 15,601-60-87-F-1
 W1NJM 14,196-52-91-C-1
 W1NMMY 13,500-36-125-A-6
 W0DFR/1+ 10,800-45-80-G-1

W1KOMIT* 10,062-45-78-C-1
 K1UWR 864-4-67-C-2
 K1QWR (W117C, opt.) 8336-42-66-B-1
 W1EFL 8208-36-76-A-1
 W4W11/1+ 7740-44-60-B-1

W1RW* 1590-34-45-B-1
 W1FVY* 408-4-19-C-1
 W1FVY* 27-7-3-A-1
 K1GTC 12-3-9-B-1
 W1AB 5-1-1-A-1
 W1AOBL* 3-1-1-B-1

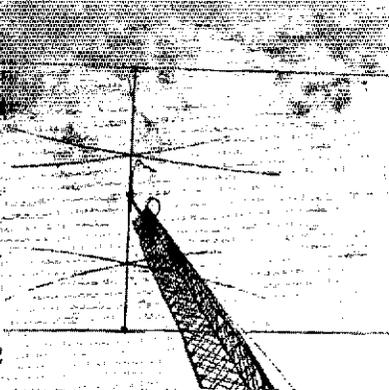
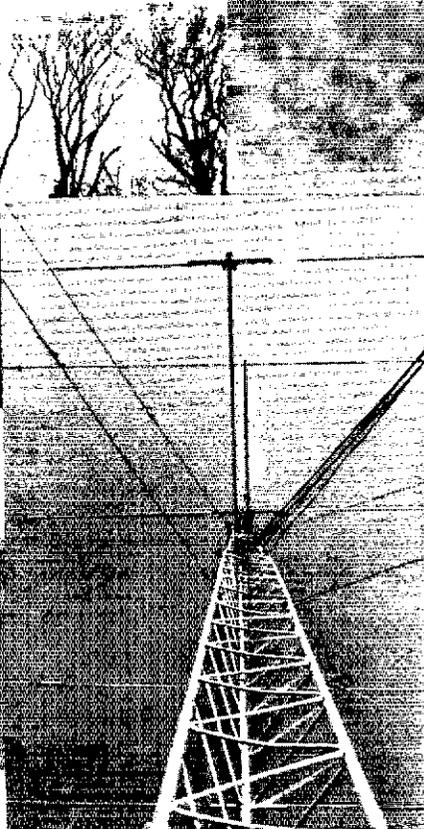
Multi-Multi
 W1NFS (4 oprs.) 260,008-186-466-C-5

Eastern Massachusetts

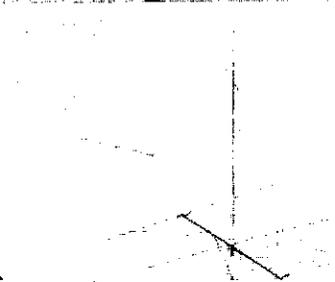
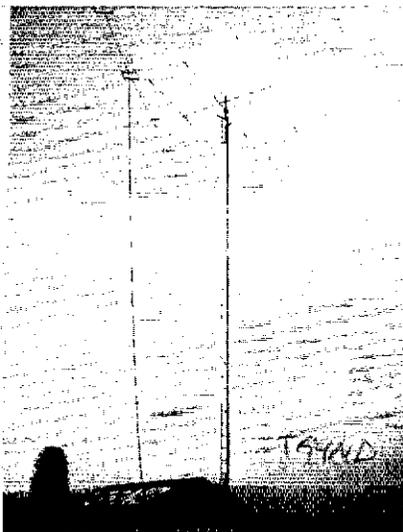
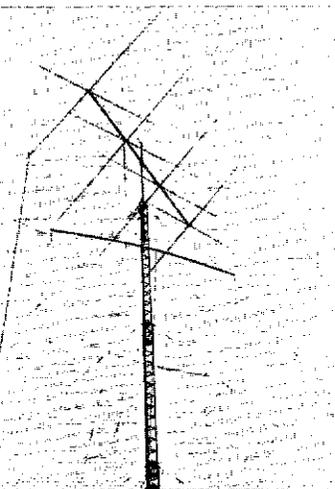
K1NDI 1,946,043-363-1987-C-72
 K1RDI 1,018,755-371-1635-C-98
 W1JRG 1,237,788-314-1320-C-9
 W1PE 1,018,788-292-1163-C-9
 K1HVV 346,764-148-281-C
 W1PNW 308,454-202-509-A-73
 W1KZL 250,900-190-342-B-5
 W1KXK 219,398-163-457-D-04
 W1IKZ 181,828-131-46-D-04
 W1DAL 179,463-165-36-F-03
 W1AION 163,736-183-300-C-3
 W1WAI 129,558-151-286-C-3
 W1ROL 90,243-111-271-C-4
 W1ESN 61,020-114-180-C
 W1ILKU 45,599-97-159-A-3
 W1KSF 45,012-94-162-B-3
 W1MBO 38,776-88-109-C-3
 K1SHN 33,995-89-135-C-1
 W1ILD 14,364-63-76-A-1
 K1AGB 12,420-48-92-F-3
 W1NYA 8804-42-54-B-1
 W1ICTT 8142-37-56-A-1
 W1DPL 1350-16-25-B-6
 W1AMYK 546-13-14-A-1
 W1HIZ 068-8-7-A-1

Multi-Single

W1MX (3 oprs.) 1,384,320-320-1442-C-5
 W1LWY (3 oprs.) 1,067,679-291-1223-C-5
 W1LHQ (+W1HVV) 291,060-154-64-F-3
 W1AX (+W1HVV) 189,120-197-320-C-2



It's always interesting to see what the other guy is using for antennas. The skywires pictured here belong to:(l to r., t to b.) GDs 3YBH/5ATG, K1VTM, HC1WZ, KØDQI/1, PJ6AA, W6MAR, TG9ND, K1LPL/3, JA6LYU and W9ZRX.



New Hampshire

W1RWP 2,164,470-385-1074-C-83
W1CHA 102,440-104-339-C-23
WHOD 67,568-103-220-B-37
WA1SD 39,808-69-144-B-24
W1DXB 27,816-76-122-A-7
W1SWX 147-7-7

Rhode Island

K0DQI/1 1,713,842-377-1518-C-72
W1VVP (WA1CKL, opr.) 332,925-193-575-C-40
W1AWE 29,580-68-145-B-3
W1YNF 16,810-22-35-B-3

Vermont

W1WTF 161,622-123-438-C-40
W1PLG 50,127-93-181-B-55
Western Massachusetts
W1FZD 555,120-240-771-C-54
W1FOB 388,800-243-361-F-25
WA1ABW 230,748-164-469-A-28
W1YK (WA2BCT, opr.) 218,436-167-436-F-26
WA1FBX 108,486-147-246-F-35
W1HRV 1425-19-25-B-4
WA2BCT/1 363-11-11-B

Western Massachusetts

W1FZD 555,120-240-771-C-54
W1FOB 388,800-243-361-F-25
WA1ABW 230,748-164-469-A-28
W1YK (WA2BCT, opr.) 218,436-167-436-F-26
WA1FBX 108,486-147-246-F-35
W1HRV 1425-19-25-B-4
WA2BCT/1 363-11-11-B

NORTHWESTERN DIVISION

Montana

K7ABV 136,022-139-566-C-33
K7TV/7 96,354-101-318-C-51
W71R 3366-17-66-A-6

Oregon

W7RS 473,196-188-839-C-41
WA7CGR 216,639-119-612-B-58
W7MP 27,216-54-168-B-43
W7LT 7440-28-85-R-32
W9AWE/7 3990-11-64-A-14
W7PIC 1386-24-33-C-6

Washington

W7DYQ 247,170-154-535-F-52
W7GYF 27,760-120-216-A-16
WA7JCB 64,860-92-235-F-24
E7GON 63,340-85-248-C-10
W7ON 44,319-79-187-C-26
WA7OBL 42,700-50-386-B-78
W7IU 9108-44-69-A
K7UWT 162-6-9-C-2

Multi-Single

VF7Z7/W7 (VF7AZ/B) 612,836-121-189-C-91
W71AM (WA7JCA/W7FDI) 482,457-219-771-C-87
WA7OXQ (WA7PAM) 6000-20-100-A-40

PACIFIC DIVISION

East Bay

K6AHV 1,310,400-300-1456-C-76
K6HH 315,684-146-111-C-55
W6YUS 259,278-158-547-F-62
K6AN 161,634-158-341-C-35
K6AUC 140,751-117-401-C-35
W6MAY 108,480-113-320-C-21
W6HH 60,088-94-284-C
K6JB 75,609-93-271-C-40
K6PJ 58,716-84-233-B-10
W6IYZ 47,526-89-128-C-19
W6IOM 16,200-50-108-B-10
W6RQZ 14,805-38-141-C
W6PQZ 9324-28-111-B-20
K6SQ 6486-34-83-A
W61JA 6912-32-73-C-7
K6LRN 3402-24-22-A-10
W6BWP 528-8-22-A

Multi-Single

W6KG (W6JDD) 733,057-221-115-11-C-90

Multi-Multi

W6NKG (C opr.) 877,270-234-1385-C-96
Vladimir
WA3WM 31,832-64-178-C-13
K1AGB/7 23,245-31-168-C-18

Sacramento Valley

W6NKR 221,076-164-553-C-61
K6RN 146,556-138-354-C-30
W6HH 25,092-82-102-F-35
W6KYA 6480-30-72-B-10

San Francisco

W6WB 299,679-191-523-C-36
W6MTJ 49,329-81-203-C-19
K610 75-5-5-A-2
W6NGZS 12-2-2-A-1

Multi-Single

W6BIP (WA6DJH) 465,750-207-750-C-81

San Joaquin Valley

K6OZL 483,894-206-783-B
W6K1V 173,316-143-404-C-29
W6CLP 19,404-49-132-B-33
W6MMH 1734-17-34-B-8

Multi-Single

W6iVM/6 (WA61VN) 1,222,194-302-1349-C-94

Santa Clara Valley

K6FRT 705,048-232-1013-C
W6WX 692,076-214-1078-C-65
W6HQH 624,960-224-930-C-75
K6rJZ 421,260-236-955-C
W6HOC 274,659-203-451-C-45
W6CNA 261,960-148-594-F-10
W6OKK 148,916-118-434-G-52
W6NHR8 147,600-123-400-C-30
K6C1V 146,508-116-421-C-62
W6KJ 95,784-104-307-C
W6CLM 90,741-87-349-C-58
W601 84,096-96-292-B-28
W6HCT 79,488-96-176-C-22
W6WAW 77,760-96-276-C-11
W6A10 72,165-85-283-C-38
W6Z0 43,860-85-172-C-17
W6ADK1 36,465-85-143-C-19
W61J 29,412-76-129-C-17
W6GBY 24,544-52-158-B-30
W6BHD 13,800-46-100-C-12
W6ISO 9072-54-56-C-5
K6JQV 7920-32-80-B-12
W6DWO 4698-29-56-B-15
W6BVV 1485-15-33-C-4

Multi-Single

KoFBF (B opr.) 1,864,800-356-1850-C-96
W6C1F (D16RX) 896,400-240-1245-C-90
W6DJY (W6BCLP) 69,525-103-225-F-45

Multi-Multi

W6GFS (4 opr.) 2,169,261-339-2189-C-96

ROANOK DIVISION

North Carolina

K3CIA 522,904-208-846-C-19
W4TRM 329,293-211-539-B-60
W441FW 116,084-124-515-C-22
W40MW 62,916-98-214-C-19
K410 42,108-87-162-A-35
K3BBK/4 30,150-75-134-A-12
W4VON 17,798-67-93-C-16
W4BWA 5088-32-53-B-13
K4HRN 4371-31-47-C

North Carolina

K4H 251,934-199-422-C-34
W441WX 109,275-155-235-C-64
W4BDC/B 4182-34-41-A-7
W44LDM 3999-31-43-A-10
W4B4NR1 2730-26-32-B-10

Virginia

W4KFC 1,523,892-348-1461-C-58
W4KXV 907,200-280-1080-C-57
K4BKQ 610,848-257-808-C-53
W4JLS1/4 534,000-279-638-C-40
W4CRW 531,107-266-619-A-80
W4NH 509,040-210-808-C-38
W4LZ 468,122-219-718-C-48
W4LQ 464,686-286-550-C-54
W4YHD 232,731-169-489-C-24
W4ZY1 195,086-167-386-C-26
K41BL 183,864-166-376-C-24

W4WSF 179,712-156-384-C-11
W4WB7 176,400-150-392-C-32
K4LDR 155,376-156-332-A-48
W4DM 135,192-311-344-C-15
K4JS 125,610-156-265-C-58
W4ZM 119,730-130-407-C-16
K4QD 94,962-133-238-C-24
W4CC 94,392-138-238-A
K4JD 35,014-87-143-B-43
K4PC 30,267-37-171-C-14
W4NM 29,735-65-107-A-15
W7BRX/4 11,799-57-69-A-22
W4KMS 7708-43-52-C-7
K4FHF/4 4050-30-45-F-8
K4JQ 3960-33-40-A-35
K4JD 3384-24-47-B-16
K4FX 2940-20-49-B-6

Multi-Single

K4ZA (W6A01U) 269,610-209-430-C-56

Multi-Multi

W4BVV (10 opr.) 5,393,504-496-3626-1-96
K4CG (6 opr.) 2,058,761-359-1893-C-47

West Virginia

W8BJ 11,178-34-69-B-20
W8BHJ 11,070-45-83-A-18
W8AWLA 5115-31-55-B-9
W8CIV 4828-34-48-C-11
K50YG 1449-21-21-B-3
W8BK 264-5-11-B-3

Rocky Mountain Division

Colorado

K5ORQ/W 685-444-236-976-C-70
K5Z1L 38,808-88-1472-A-19
W5AVPO 25,296-63-136-B-9
W5BCQ/1 1734-17-34-A-6
W50YK 740-6-14-A-5
New Mexico
W4T5V/S 403,650-207-650-F-48
W50JAX 153,166-137-380-C-88
K5MA1 1782-22-27-A-1
W50NO 18-2-3-A-1

Multi-Single

W5AXC (3 opr.) 3,672-22-23-C-12

Utah

W4HS 359,983-179-634-C-63
W7TE 295,596-153-644-C-41
W47MGK 15,900-150-342-C-57
W7RU 52,136-32-246-B-33
Wyoming
W6HVV/7 81,827-173-238-C-26
W4VNS 429-11-13-A-4

Southeastern Division

Alabama

W44SPK 40,716-87-156-A-20
K4MG 19,381-71-111-C-13
W44N1 6042-38-53-A-23

Eastern Florida

K411G 1,274,085-345-1242-C-82
K41L 708,573-251-941-C-82
K411HA 543,154-247-733-22
W44AV 490,779-219-747-C-72
W44HP 394,688-228-872-C-59
K4H (W4JLR, opr.) 380,018-203-624-C-82
W4HOS 294,903-217-457-B-60
W4WTR 172,104-202-284-A
W41L 104,448-136-256-C-40
W4OGT 64,944-88-746-A-17
W44OGW 36,639-89-190-B-37
W4BRB 41,760-87-160-B-15
K4NT 35,600-89-134-C-23
W44SVH 21,200-80-132-C-20
K41A1A 21,808-64-114-A-16
W8WV/4 15,236-52-98-A-18
W4LI 7500-50-50-A-20
W8BAW-4 4224-52-44-A-4
K4WSA 3795-33-55-C

Multi-Single

E5YPS/4 (+K5SN) 406,800-171-793-C-6
K4PY (+W8MKB) 250,380-193-428-C-5
WH4TON/4 (B opr.) 107,124-113-316-C-3

Multi-Multi

W4ZKI (10 opr.) 4,540,212-486-3114-F-9

Western Florida

W4VY 23,463-29-98-B
W4WKO 2754-27-34-A-4
W4DXI 209,868-202-513-C-6
W4BRP 127,680-133-320-C-3
W4WRV 11,055-35-67-B-3
W4ZSU 0950-30-34-A
K51Z1/4 70-5-5-A-4

SOUTHWESTERN DIVISION

Arizona

W7CF 989,430-295-1118-C-6
W7DI 834,170-380-993-C-2
W74YV 339,858-158-717-C-6
W47MMK 1560-20-23-B
W7U1U 1440-20-24-A
W47RWL 588-2-28-A

Los Angeles

K6LGM 1,201,668-354-1414-C-7
W6KR 1,295,040-284-1520-C-8
E65SA 509,978-207-820-C-2
W6DOX 459,270-210-729-C-6
W677D 435,528-184-399-1
W6DCH 351,900-170-690-A-4
W6AM 285,188-172-543-C-3
W6DPH 202,648-156-636-1
W601 161,577-117-463-F-10
W61PH 125,631-81-317-C-7
K6M1 109,599-119-307-C-2
K61OJ 87,138-103-282-A-2
W6RCV 81,368-88-312-C-3
K6RU 62,856-62-291-C-5
W6ISO 60,808-88-231-B-5
W6AMVY 53,352-76-234-A-8
W6NJ 50,888-72-141-C-3
W61P 27,360-60-152-C-2
W6DPO 25,296-62-136-C-1
K61LH 20,130-55-122-C
W6JKR 12,060-60-67-A
W6AZK1 11,739-43-91-B-4
K5MHG/6 9655-41-79-B

W6BID 3952-31-64-C
W66GH 1836-12-51-A

Multi-Single

W61OD (W6KHS/W6E1/B) 16,080-67-80-C-1

Orange

W6MOR 628,191-223-430-F-6
K6H 147,600-133-400-C-3
K6CU 146,588-141-446-C-3
W6B1F 137,564-97-404-C-2
G3DPX/W6 55,776-83-224-B-2
W61O 45,460-81-290-B-7
W61H 45,966-47-426-C-7
K61XA 33,208-72-163-B-8
W6B1A 49,29-51-53-B-8
W6BOLJ 828-12-23-B
W6N61 6-1-2-A

Multi-Multi

W6ANN (3 opr.) 1,998,030-341-1945-C-1

San Diego

W6MAR 1,381,788-293-1474-F-8
K65DR 1,122,714-306-1223-F-7
W6CHV 1,174,474-167-474-B-6

Multi-Single

W61FY (+K6V7A) 1,104,600-280-1315-

Santa Barbara

K6GW 273,045-167-545-F-4
W6CJ 90,638-91-332-C-2
W6MOL 5,994-31-58-B

WEST GULF DIVISION

Northern Texas

WASJMK 1,265,058-442-1233-C-67
 WSELOJ 1,073,829-264-1408-C-66
 WSLIU 683,904-274- 832-C-68
 K5ABV 511,038-267- 638-A-73
 W5FCX 310,866-197- 526-C-49
 W5HD 304,930-165- 414-C-51
 WASVSI 170,640-144- 398-C-40
 WSZSX 156,450-149- 350-C-23
 W5KYD 118,728-136- 294-C-27
 WASRXT 77,568-101- 256-C-49
 WSLUD 71,583-107- 223-C-18
 WSQBMB 37,848- 76- 166-C-21
 W5OG 35,109- 83- 141-C-15
 WASUKT 23,400- 65- 120-F-13
 WBSAOF 21,777- 61- 119-B-26
 WSQI 21,624- 68- 106-A-25

Multi-Single

WBSAAR (+WNSAAS) 17,460- 60- 97-A-23

Multi-Multi

ESRWK (10 ops.) 504,099-337- 709-C-48

Oklahoma

K5BXG 27,600- 80- 115-C-25

Southern Texas

W5RFB 2,241,891-387-1931-E-83
 W5SBR 492,912-252- 652-C-56
 W5GO 351,177-183- 641-C-30
 W5MCO 262,270-140- 461-C-58
 K5TSR 173,847-167- 347-C-33
 W5LJT 101,475-123- 275-C-20
 WA5OKC 70,851-113- 209-A-36
 W5LPO 61,938-111- 186-B-24
 W5HVX 54,648- 99- 184-C-45
 W5RBB 34,056- 88- 129-B-15
 WA5ZWC 46,098- 32- 48-B-10
 W7WAHUS 2142- 21- 34-A-13
 W5BWM 1392- 16- 29-B- 8
 WASAUZ 360- 10-12- B- 2

Multi-Multi

W5KLL (5 ops.) 834,480-285- 976-C-89

CANADIAN DIVISION

Maritime

VO1AW 461,148-166- 926-C-60

FOREIGN

CW SCORES

NORTH AMERICA

Alaska

KL7BC 663,348-149-1484-B-58
 KL7MF 379,764-137- 924-C-22
 KL7GLL 233,359-119- 658-A-45
 WBRBYTKL7 22,632- 41- 184-B-17
 KL7YB 8670- 34- 85-B- 4

Multi-Single

KL7AIZ (K5JSH+K6HVZ) 141,588-114- 514-C-18

Anguilla

Multi-Single

VP2FS (2 ops.) 702,884-182-1284-A-33

Bahama Islands

K4BZHV/VP7 557,928-189- 985-A-37

Canal Zone

KZ5RN 144,204-122- 394-A-11

Costa Rica

K1WKK/712 510,842-163-1046-A-24

Dominican Republic

H13XAM 287,546-133- 723-B-27

Greenland

OX3W 1,219,293-211-2021-B-0

OX3WQ 801,793-171-1565-D-0

OX5BT 50,386- 61- 274-A-19

OX3AB 25,239- 57- 131-B-0

VE1EK 82,917-111- 249-A-0
 VO1CO 72,168- 97- 248-A-70
 VE1AL 79,928- 58- 173-A-37
 VE1AII 46,800- 39- 41-B-10

Quebec

VE7NV 682,344-243- 936-F-65
 VE2AYU 652,830-235- 926-C-81
 VE2RZD 94,488-124- 254-A-0

Multi-Single

VI2ARO (+VI2BC10) 76,860-105- 244-A-15

Ontario

VE3UOI (+VE3AIA, ops.) 176,952-146- 404-F-42

VE1AL3

147,062-139- 353-B-36
 125,766-153- 274-B-46
 85,232-112- 264-A-49
 53,730- 90- 194-C-27
 13,221- 39- 113-B-19
 12,121- 54- 76-B- 8
 10,711- 17- 21-A- 7
 504- 12- 14-A- 2

Multi-Single

VE3JEN (+VE3ABN) 28,755- 71- 135-C-10

Manitoba

VI4MP 121,518-129- 314-F-41
 VE4XJ 62,694-81- 258-B-38
 VF4KT 22,491- 49- 153-F-15
 VE4DD J-1-1-B-1

Multi-Multi

VE4QD (3 ops.) 61,509-101- 203-B-72

Saskatchewan

VE5PM 44,589- 89- 167-C-0
 VE5TT 10,880- 40- 91-A-54
 VF5RA 66-12- 38- 58-B-30

Alberta

VE6EO 21,543- 43- 169-C-24

Multi-Single

VE6MR (+VE6 AGD AVRI) 43,050- 70- 205-C-13

British Columbia

VE7BDJ 476,658-234- 679-C-63
 VE7HO 102,366- 94- 363-B-52
 VE7BZC 1962- 6- 109-B- 7

Guadeloupe Island

FG7XF 79,596- 87- 396-A-0

Guatemala

W7JR/TG 469,920-178- 880-A-13

Honduras

HR2KG (+W5AYR, ops.) 1,712,787-241-2369-B-35

Saba Island

PJ6AA 298,074-151- 658-A-0

Trinidad

9Y4VU 1,170,960-210-1860-B-46
 9Y4NN 157,663-114- 461-D-14

Puerto Rico

KP4DJ 773,126-191-1263-B-0
 WH0ASR; KP4 395,446-149- 885-B-35

Virgin Islands

KV4GP 31,122- 57- 182-B- 8

SOUTH AMERICA

Argentina

LU6DAZ 50,496- 64- 263-B-10

Multi-Single

LU2E (+LU2 IDAY 2DEG 8DO) 2,221,422-227-3267-B-93

Bolivia

CP6LG 1,615,464-216-2493-A-48

Brazil

PY2DRP 606,624-142-1424-B-29
 PY1RG 131,900- 98- 518-A-0
 PY1BLG 091,235- 51- 662-B-29
 PY2ZAI 91,020- 74- 410-B-13

Chile

PY1DLH 46,905- 59- 265-B-10
 PY2IAB 30,624- 58- 176-B-15
 PY10HP 76,676- 52- 171-A- 6
 PY1CKV 85,26- 29- 908-A-0

Ecuador

HC1KP 1,320,600-213-2100-B-62
 HC1WZ 40,887- 77- 177-D-10

Venezuela/Caribbean

P12PS 2,496,150-258-3225-A-32
 P91R (+W3ZKH, ops.) 398,502-131-1047-C-0

Pico

0A4DX 835,674-197-1414-A-32

La Guayana

YV3KL 3,385,692-281-4324-B-77

Fuero

CT2BC 56,264- 76- 238-A-10

Azores

ON4XG 400,636-148- 903-B-38
 ONRUL 7344- 24- 102-A-12

Belgium

LZ7KHN 151,848-111- 456-A-0
 LZ1KPW 116,841-179- 493-A-0
 LZ2J1 61,731- 57- 361-B-0
 LZ1NJ 34,104- 58- 196-B-0
 LZ2GS 11,808- 32- 123-A-0
 LZ1ZQ 19,938- 19- 34-A-0
 LZ7KRZ 252- 7- 12-A-0

Multi-Single

LZ1KEZ 31,464- 57- 184-A-0

ON4XG 400,636-148- 903-B-38
 ONRUL 7344- 24- 102-A-12

Bulgaria

LZ7KHN 151,848-111- 456-A-0
 LZ1KPW 116,841-179- 493-A-0
 LZ2J1 61,731- 57- 361-B-0
 LZ1NJ 34,104- 58- 196-B-0
 LZ2GS 11,808- 32- 123-A-0
 LZ1ZQ 19,938- 19- 34-A-0
 LZ7KRZ 252- 7- 12-A-0

Multi-Single

LZ1KEZ 31,464- 57- 184-A-0

Czechoslovakia

OK2OX 564,438-151-1285-C-58
 OK1TA 210,630-119- 595-A-0
 OK1MAS 110,865- 95- 389-A-0
 OK3CGP 57,354- 79- 242-A-0
 OK1AEN 55,920- 80- 213-A-27
 OK1KZ 54,872- 67- 281-B-29
 OK2BJL 46,104- 68- 226-A-28
 OK2BFS 43,954- 69- 222-B-24
 OK30TF 26,226- 47- 186-A-0
 OK2BFI 24,300- 54- 150-A-17
 OK3ZBU 21,360- 40- 178-A-0
 OK1MMK 18,972- 36- 179-A-0
 OK1MSP 18,159- 47- 129-A-0
 OK1AOV 13,167- 33- 133-A-0
 OK2WDC 12,420- 46- 90-A-0
 OK3TRV 9108- 33- 92-A-0
 OK1ATZ 7098- 26- 91-A-0
 OK3LR 7050- 25- 94-B-0
 OK2BJJ 6336- 24- 88-A-0
 OK3TCA 4554- 23- 66-A-0
 OK2PFI 3425- 17- 65-A- 4
 OK2HI 2976- 16- 62-A-0
 OK1JN 2970- 22- 45-A-10
 OK1FP 2268- 18- 42-A-0
 OK1PZ 1920- 20- 32-A-0
 OK1FON 1800- 20- 30-A- 6
 OK3JGT 1632- 17- 32-A-0
 OK3EQ 1260- 14- 30-A-0
 OK1ALA 1215- 15- 27-A-0
 OK3Y1 900- 12- 25-A-0
 OK1DAV 240- 8- 10-A- 2
 OK3TRP 222- 6- 12-A-0
 OK1UJ 210- 7- 10-A-0
 OK2PDM 126- 6- 7-A- 2
 OK3TBF 56- 3- 4-A-0
 OK1ACV 27- 3- 3-A-0
 OK2BBQ 12- 3- 3-A-0

Finland

OH5SI 168,860- 95- 596-B-12
 OH2IS 131,439- 77- 582-B-0
 OH9PF 47,522- 73- 217-B-0
 OH6VP 47,436- 67- 208-B-0
 OH2LU 16,236- 44- 123-A-0
 OH6NH 16,218- 51- 106-A-0
 OH6RU 15,732- 46- 114-B-0
 OH3YR 14,022- 41- 114-A-0
 OH7NW 9324- 37- 84-A-0
 OH2BCD 6380- 29- 74-B-0
 OH3NR 5841- 33- 59-A-0
 OH7OV 1860- 20- 31-B-0
 OH4RB 1560- 15- 34-B-0
 OH7OO 720- 12- 20-A-0
 OH7SY 264- 8- 11-B-0
 OH8OB 120- 5- 8-A-0

France

OH2AA (OH2s BLC BLJ KA) 4875- 25- 63-B-0

Multi-Multi

OH2RO (4 ops.) 204,850-150-1568-B-0

France

F8VJ 600,936-168-1193-A-49
 F8TC 295,656- 97-1016-A-32
 F8ZE 290,634-131- 71-B-19
 F2PO 178,770-118- 505-A-0
 F0WJ 41,340- 65- 212-A-0
 F8WQ 34,854- 74- 157-A- 6
 F9TD 71,611- 31- 77-B-0
 F6ACV 7038- 34- 69-A-0
 F5SP 6851- 31- 73-A-0
 F8VO 2892- 22- 40-A-0
 F91T 1683- 17- 33-A- 4
 F6ATS 960- 12- 27-B-0

Germany

DK1CU 1,044,270-205-1698-C-0
 DL7HN 906,270-170-1777-C-8
 DL7BO 592,803-161-1041-F-37
 DL7NS 102,250-118- 547-B-0
 DM4YL 189,175-115- 518-B-0
 DL4JS 177,480-102- 580-B-24
 DK1IO 144,990- 90- 537-B-44
 DJ4OP 127,503- 93- 457-B-0
 DL1GN 100,977- 97- 369-A-0
 DK1DB 99,720- 90- 370-B-0
 DJ2YE 92,625- 95- 325-B-0
 DL9YC 79,336- 47- 617-B-0
 DM4RFM 78,498- 89- 298-A-0
 DM2CU 74,880- 64- 390-B-0
 DL3VI 73,968- 92- 268-A-0
 DKSHG 46,986- 41- 382-B-0
 DM3PTI 30,240- 63- 160- 0
 DL1RB 23,028- 38- 202-C-0
 DM2BPF 22,005- 45- 163-A-0
 DI9PO 17,544- 43- 136- 0
 DL21X 13,590- 42- 166-A-0

Germany

DK1CU 1,044,270-205-1698-C-0
 DL7HN 906,270-170-1777-C-8
 DL7BO 592,803-161-1041-F-37
 DL7NS 102,250-118- 547-B-0
 DM4YL 189,175-115- 518-B-0
 DL4JS 177,480-102- 580-B-24
 DK1IO 144,990- 90- 537-B-44
 DJ4OP 127,503- 93- 457-B-0
 DL1GN 100,977- 97- 369-A-0
 DK1DB 99,720- 90- 370-B-0
 DJ2YE 92,625- 95- 325-B-0
 DL9YC 79,336- 47- 617-B-0
 DM4RFM 78,498- 89- 298-A-0
 DM2CU 74,880- 64- 390-B-0
 DL3VI 73,968- 92- 268-A-0
 DKSHG 46,986- 41- 382-B-0
 DM3PTI 30,240- 63- 160- 0
 DL1RB 23,028- 38- 202-C-0
 DM2BPF 22,005- 45- 163-A-0
 DI9PO 17,544- 43- 136- 0
 DL21X 13,590- 42- 166-A-0

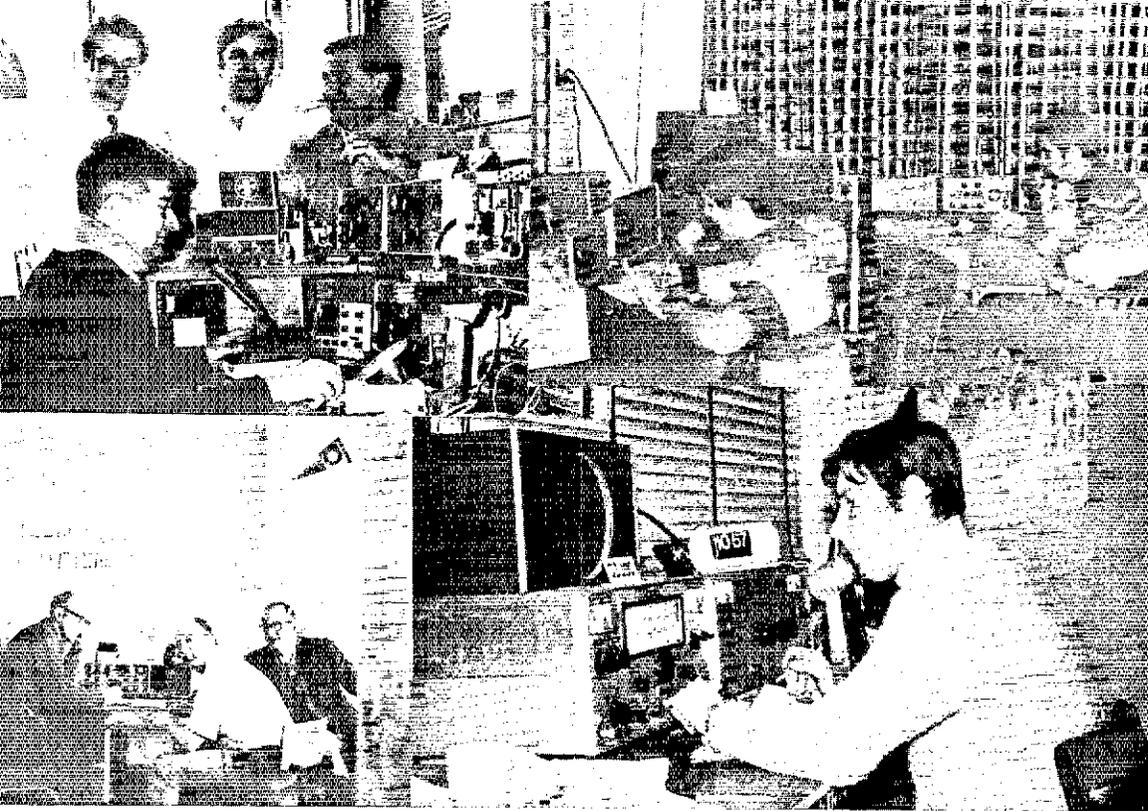
Germany

DK1CU 1,044,270-205-1698-C-0
 DL7HN 906,270-170-1777-C-8
 DL7BO 592,803-161-1041-F-37
 DL7NS 102,250-118- 547-B-0
 DM4YL 189,175-115- 518-B-0
 DL4JS 177,480-102- 580-B-24
 DK1IO 144,990- 90- 537-B-44
 DJ4OP 127,503- 93- 457-B-0
 DL1GN 100,977- 97- 369-A-0
 DK1DB 99,720- 90- 370-B-0
 DJ2YE 92,625- 95- 325-B-0
 DL9YC 79,336- 47- 617-B-0
 DM4RFM 78,498- 89- 298-A-0
 DM2CU 74,880- 64- 390-B-0
 DL3VI 73,968- 92- 268-A-0
 DKSHG 46,986- 41- 382-B-0
 DM3PTI 30,240- 63- 160- 0
 DL1RB 23,028- 38- 202-C-0
 DM2BPF 22,005- 45- 163-A-0
 DI9PO 17,544- 43- 136- 0
 DL21X 13,590- 42- 166-A-0

Germany

DK1CU 1,044,270-205-1698-C-0
 DL7HN 906,270-170-1777-C-8
 DL7BO 592,803-161-1041-F-37
 DL7NS 102,250-118- 547-B-0
 DM4YL 189,175-115- 518-B-0
 DL4JS 177,480-102- 580-B-24
 DK1IO 144,990- 90- 537-B-44
 DJ4OP 127,503- 93- 457-B-0
 DL1GN 100,977- 97- 369-A-0
 DK1DB 99,720- 90- 370-B-0
 DJ2YE 92,625- 95- 325-B-0
 DL9YC 79,336- 47- 617-B-0
 DM4RFM 78,498- 89- 298-A-0
 DM2CU 74,880- 64- 390-B-0
 DL3VI 73,968- 92- 268-A-0
 DKSHG 46,986- 41- 382-B-0
 DM3PTI 30,240- 63- 160- 0
 DL1RB 23,028- 38- 202-C-0
 DM2BPF 22,005-

Greece		Portugal		UKSUAB (3 oprs.)		Water		
SV0WP	416,325-105-1324-C-29	C11VX	1,386,903-211-2191-B-66		16,758-42-135-A	GW3H	529,704-168-1051-A	
SV0WO	274,701-103-889-F				UK5VAA (2 oprs.)		<i>Multi-Single</i>	
					11,560-30-84-B	GW3ITZ (12 oprs.)	632,632-154-1372-A	
							<i>Yugoslavia</i>	
							YU1DKL	65,588-76-288-B
							YU1SF	33,858-57-198-A
								<i>Multi-Single</i>
							YU3EY (5 oprs.)	2,146,221-231-3263-B
							YU1BCD (4 oprs.)	1,482,618-218-2245-B
							YU1JRS (7 oprs.)	851,025-175-1621-B
							YU2CBM (8 oprs.)	178,824-108-551-B
								ASIA
								<i>India</i>
							VU2IN	40,248-52-259-A
								<i>Iran</i>
							FP2FR	1377-17-27-A
								<i>Japan</i>
							JA1CG	618,266-157-314-D
							JA1JKG	413,055-137-1008-D
							JA3USA	412,100-130-1058-C
							JH1CHI	370,599-131-945-A
							JA7BDW	345,978-129-894-B
							JA1RND	308,229-127-809-A
							JA7AMK	315,122-89-566-A
							JH1MTR	147,906-99-498-A
							JA1SR	138,807-97-477-A
							JA4BNT	125,257-89-431-A
							JH1WJ	109,494-79-462-A
							JA7HOP	101,436-79-428-A
							JA7GAX	73,725-75-328-A
							JA7KXD	66,516-69-332-D
							JA7BL	44,160-64-230-B
							JR1BRJ	20,202-37-182-A
							JA1WYZ	13,702-34-135-A
							JA3CKR	11,466-36-161-A
							JA0JN/1	9864-27-111-A
							JA0LZP	5390-22-85-A
							JA1BDD	3330-25-66-A
							JA0LYU	2112-16-44-B
							JA7GOB	1419-11-43-A
							JA0HXH	720-9-27-A
							JA0EMS	441-7-21-A
							JH1RS1	470-6-35-A
							JA0OP	306-3-34-A
							JA0VY	81-3-9-A
								<i>Multi-Single</i>
							JA3YBF (5 oprs.)	1,359,176-212-2766-A
							JA9YBA (multiopt.)	447,990-137-1124-E
							KAREY (3 oprs.)	338,520-130-868-E
								<i>Lebanon</i>
							ODS(X)	12,240-34-122-A
								<i>Ogasawara Island</i>
							ODIARX (JA1KSO, opr.1)	294,580-130-765-A
								<i>Azerbaijan SSR</i>
							UK6DAU	33,232-88-264-A
							UK6CTN	3392-32-77-B
							UK6CB	129-7-11-A
								<i>Armenia SSR</i>
							UG6FA	1664-16-34-A
							UG6JJ	60-4-3-A
								<i>Turkmen SSR</i>
							UHRBO	432-12-32-B
								<i>Uzbek SSR</i>
							UKRAAA	1782-18-31-B
							UKRNBH	1128-12-32-B
								<i>Tadzhik SSR</i>
							UKRAO	13,365-33-405-A
							UKRAB	2052-18-38-B
								<i>Tazakh SSR</i>
							UL7GW	23,000-50-154-B
								<i>Ningbia SSR</i>
							UKRMAA	9744-29-112-B
								<i>European USSR</i>
							UA1ZL	104,058-82-428-A
							UA1AJ	58,220-48-428-A
							UW3EH	47,925-71-225-B
							UA1NR	46,110-58-265-A
							UA1DF	36,265-37-215-A-19
							UA1TA	11,800-40-99-B
							UA3ET	10,788-29-124-A
							UA6UO	8787-29-101-A
							UV3GL	8100-30-90-A
							UV3TI	6049-23-91-A
							UA1RND	5049-33-51-B
							UA3TV	4875-25-65-B
							UA6UO	3978-26-51-B
							UA4OK	3822-26-49-A
							UA3DAK	2820-20-50-B
								<i>Multi-Single</i>
							UK3AAO (4 oprs.)	595,373-153-1329-B
							UK6AAE (3 oprs.)	307,296-99-1033-B
							UK1TAA (4 oprs.)	129,717-87-306-B
							UK1AAG (3 oprs.)	112,860-90-427-B
							UK4WAB (3 oprs.)	43,616-47-310-B
							UK1TAL (3 oprs.)	33,028-46-240-A
							UK4AAB (3 oprs.)	16,560-46-120-B
							UK3XAJ (2 oprs.)	2528-16-53-B
							UK3XAM (2 oprs.)	264-8-11-A
								<i>Kaliningrad</i>
							UA2CK	20,755-35-198-B
								<i>Ukraine</i>
							UBSMZ	237,690-114-657-A
							UY5ZP	97,344-78-430-A
							UB5TR	70,453-77-312-B
							UY5A1	59,760-48-418-A-48
							UY5OU	58,776-62-317-A
							UT5SY	38,070-47-270-A
							UB5ZF	31,654-71-158-A
							UB5TU	29,928-58-172-B
							UB5RS	22,204-54-142-B
							UK51AG	18,392-44-143-B
							UY5TL	16,996-44-128-A
							UY5RH	13,455-39-115-A
							UB5U1	75,33-31-81-B
							UY5YR	6075-27-75-A
							UB5G1	5670-27-70-A
							UB5H1	5007-21-92-A
							UY5DV	4680-15-32-A
							UY5HW	4410-21-28-A
							UK51AP	2980-20-50-A
							UK5UAI	1989-17-33-A
							UY5DJ	1330-10-30-A
							UB5VK	1332-12-77-A
								<i>Multi-Single</i>
							UK5IAZ (3 oprs.)	145,512-86-564-B
							UK5KAA (2 oprs.)	145,200-88-550-B
							UK5MAE (2 oprs.)	46,368-56-276-B
							UK5UAS (3 oprs.)	40,662-54-251-B
							UK5WAA (2 oprs.)	22,195-51-171-B
								<i>Romania</i>
							YO7DL	44,730-35-426-B
							YO2AE	36,900-60-205-A
							YO7AM	29,520-41-240-A
							YO2BV	14,448-28-172-A
							YO6ADM	11,664-27-144-A
							YO9ALY	9198-47-85-A
							YO2BP	5700-25-76-A
							YO9IO	4556-34-67-A
							YO8DD	4324-29-52-C
							YO6AFP	3448-17-48-A
							YO2RA	755-15-19-A
							YO2APY	528-11-16-A
							YO6KRM	306-6-17-B
							YO7AWN	294-7-14-A
								<i>Multi-Single</i>
							YORKAE (YORs AP OK)	4290-26-55-B
								<i>Latvia SSR</i>
							UQ2OC	19,350-43-150-A
							UQ2DB	3000-24-47-A
							UQ2AQ	1890-14-45-A
								<i>Multi-Single</i>
							UK2GAM (UQ2s ON PJ)	365,804-126-1013-B
							UK2GAY (3 oprs.)	308,172-112-920-B
							UK2ZBY (3 oprs.)	22,740-42-138-B
								<i>Finland</i>
							UR2LO	63,919-74-305-B
							UR2FU	8148-28-99-B
							UR2FT	240-8-10-A
								<i>Spain</i>
							EA2DT	329,727-134-839-A
							EA3KT	147,804-115-436-A-50
							EA2LR	4500-30-50-A
								<i>Svalbard</i>
							JWSNM	51,657-67-257-B
								<i>Sweden</i>
							SM4DHF	236,223-117-673-B
							SM7EAN	181,308-116-521-A
							SM5CMP	157,570-95-557-B
							SM2CUE	141,210-90-523-B
							SM21KM	116,721-81-306-B-18
							SM5BNZ	39,056-88-420-A
							SM6CUX	62,640-90-232-A
							SM6BUS	43,758-66-221-A-20
							SM6FO	35,280-33-240-A
							SM5CBN	



There were many excellent multi-op stations active this year. Here are but a few. (l. to r., t. to b.) HV3SJ, WA7GWU, HC1ARE, G3JOC, LU2E, K8MMM, W1MX (center), and KH6HCM.



<i>Asian USSR</i>		VK3AXK 659,718-171-1286-A-50	<i>Bolivia</i>	<i>Finland</i>		
UA0ZI 117,648-76-516-A-6	VK5EM 246,684-122-674-A-21	CP6FG 697,740-145-1604-A-19	OH5SE 406,392-118-1148-B-18			
UA0GF 67,965-69-328-B-6	VK2CW 244,800-64-1275-A-6	CP6EL 593,676-138-1434-C-29	OH3WF 158,742-101-514-B-6			
UA0FL 59,550-50-397-B-7	VK5KO 51,294-83-206-A-10	CP3BY 8904-28-106-B-4	OH2VB 87,363-51-571-B-6			
UA0HW 41,817-53-263-B-6	VK3IQ 19,737-51-129-A-4	<i>Brazil</i>				
UA9QAA 22,032-48-158-B-6	VK2VN 18,308-54-113-A-3	PY1(FL) 868,901-167-1862-B-62	OH3JR 31,668-58-182-B-6			
UA9QI 18,213-39-156-A-6	VK2RA 7500-25-100-A-2	PY3APH 448,074-146-1023-B-18	OH2FS 16,416-38-156-B-6			
UA9VQ 13,158-37-129-A-6	<i>Guam</i>		OH8OW 126-6-7-B			
UK9CAE 9990-30-111-B	KG6IAR 295,953-119-829-B	PY10UF 240,238-113-721-B-23	OH2BFX 276-3-3-B			
UK9CAD 9450-25-176-A-6	KG6ASP 936-12-26-B-2	PY6OA 16,341-68-375-B-6	OH2BHU 3-1-1-A			
UW9PI 7018-29-81-B-6	<i>Hawaii</i>		<i>Multi-Multi</i>			
UA0OI 6183-29-71-A-6	KH6RS (K2SH, opr.) 4,319,532-281-5124-E-65	CF5GO 129,276-76-570-A-19	OH2BO (6 opts.) 1,108,809-169-2190-B-6			
UA0ZAM 3720-20-62-A-6	KH6IJ 3,334,230-265-4194-C-65	CE8AO 103,900-50-689-A-6	<i>France</i>			
UA0LH 3645-15-81-A-6	KH6HKM 2,673,216-252-3536-A-71	<i>Colombia</i>		F2SI 1,768,333-203-2904-A-6		
UW9WB 3480-20-58-A-6	KH6HAM 444,540-186-800-D-24	HK5BWX 15,912-36-144-B-6	F3J 33,480-60-186-A-12	F3LJ 27,720-55-168-A-6		
UV9PR 2193-17-43-A-6	KH6GSE 123,480-120-343-C-8	<i>Ecuador</i>		F6BDJ 27,720-55-168-A-6		
UA9MQ 1937-17-41-A-6	KH6HGL 32,850-50-219-A-9	<i>Multi-Single</i>		F9DW 26,235-5-162-B-6		
UV9VC 1218-14-29-A-6	<i>New Zealand</i>		FR2F 12,236-19-222-B-5	F6APE 14,652-37-133-A-6		
UK9HAC 413-7-20-A-6	ZL1AMO 1,168,356-196-1987-A-50	HCLARE (25 opts.) 5,542,280-274-6740-C-96	E2MO 8760-40-73-A-6			
<i>Multi-Single</i>		ZL1AFW 417,627-147-947-A-42	HCLWZ (+HC1s KH PR) 2,520,375-235-3575-B-90	<i>Multi-Single</i>		
UK0JAA (UA0s JB JO) 213,100-100-726-B	ZL1BN 393,756-157-836-A-30	<i>Guyana</i>		HW6KAW (6 opts.) 3,090,780-723-4679-B-86		
UK0ZAA (UA0s ZZ ZAI ZAM) 182,166-97-626-B	<i>Western Samoa</i>		WA40VP/BR1 1,043,736-157-3216-B-55	<i>Germany</i>		
UK0CAB (3 opts.) 128,821-77-558-B	SWIAR 422,880-160-881-A-45	<i>FOREIGN PHONE SCORES</i>		DL6WD 1,896,174-202-3129-B-65		
UK9HAD (3 opts.) 92,736-69-448-B	<i>NORTH AMERICA</i>		WA2HYX/BR1 422,331-119-1183-A-44	DL6JF 1,472,940-196-2505-B-70		
UK9OAD (3 opts.) 78,195-65-401-B	<i>Alaska</i>		<i>Paraguay</i>		DJ6LV 369,055-165-1756-B-6	
UK9CAN (3 opts.) 59,902-61-328-B	KL7MF 593,325-135-1465-C-25	ZPSTU 157,360-80-656-B-6	<i>Venezuela</i>		DL6OH 790,713-147-1793-B-56	
UK0FAD (3 opts.) 45,264-46-328-A-6	KL7BCH 10,935-27-135-B-2	OA1BU 664,056-138-1604-A-36	DL0AFZ 774,090-141-1830-R-14		DL6FJ 245,916-108-759-B-22	
UK9HAB (2 opts.) 35,050-50-237-B	KL7GLL 2149-13-55-A-7	OABU 182,609-133-459-C-6	DL4JZ 243,865-95-856-B-6		DL3UP 197,496-104-633-B-6	
UK9XAC (3 opts.) 33,440-44-254-A	<i>Multi-Single</i>		DL39L 177,045-55-1073-B-6		DL3ML 87,892-86-341-6	
UK0FAF (3 opts.) 22,712-34-223-A	KL7AIZ (7 opts.) 2,153,619-133-3081-C-73	YVSCVE 2,290,626-251-3042-B-78	DL6WE 55,156-41-432-C-6		D14OP 45,372-38-398-B-6	
<i>Ryukyu Islands</i>		KL7DLO 2,141-43-166-B-5	DL40P 32,832-76-144-A-6		DL48R 19,152-48-133-B-8	
KR8EA 34,800-50-232-C-12	VP2AAP 1,119,195-209-1785-B-28	<i>EUROPE</i>		DL9YU 13,152-32-137-B-6	D12YE 9480-40-79-B-6	
KR8BY 16,380-35-156-B-16	<i>Bahamas</i>		EU03VGO 7128-27-264-B-6		DL1RO 1640-20-82-B-6	
<i>Multi-Single</i>		K6LZQ/VP7 26,250-35-250-A-9	ALAND ISLANDS		DL3VI 1035-15-23-A-6	
KR6AY (+KR6XR) 1,191,003-187-2123-C-6	<i>Bermuda</i>		Austria		OM2BGO 924-21-44-B-6	
<i>Thailand</i>		VP9GE 1,981,578-223-2963-A-6	OE2BGL 1,300,320-172-2520-A-6		DL5LC 913-13-27-F-10	
HS3AFB 75,072-64-391-C-26	VE3BS/VP9 20,050-50-134-A-6	<i>Azores</i>		<i>Multi-Single</i>		
HS1ADX 49,140-60-273-C-19	<i>Canal Zone</i>		CT2BB 197,892-92-717-B-11		DL0RA (5 opts.) 1,302,000-200-2170-C-48	
HS3AET 43,953-49-299-C-6	KZ5RP 1,015,230-215-1574-A-29	CT2BC 87,906-98-299-A-20		DL45W (+DA2PH) 633,780-140-1509-F-56		
<i>AFRICA</i>		KZ5ZZ 1,012,410-210-1607-C-7	ON4XG 65,658-62-353-A-10		<i>Gibraltar</i>	
<i>Ascension Island</i>		KZ5KN 28,764-68-141-A-8	ON4AK 46,332-54-286-B-13		ZB2A 113,740-110-345-A-6	
ZD8H 495,360-160-1032-A-22	<i>Cayman Islands</i>		<i>Czechoslovakia</i>		Guernsey	
<i>Cameroun</i>		ZF1WP 39,432-53-248-B-10	OK2ABU 150,640-80-607-B-18		GC3YIZ 137,547-87-527-A-21	
TJ1AW 2,278,404-228-3331-A-71	<i>Dominican Republic</i>		OK1TA 88,935-77-396-A-6		<i>Hungary</i>	
<i>Canary Islands</i>		HI8SAV 904,626-174-1733-B-34	OK2PAX 19,482-34-191-A-6		<i>Multi-Single</i>	
EAB8K 340,810-115-698-B-6	HI3XAM 222,560-104-714-B-14		OK3KGI 18,450-45-137-A-6		HASKDQ (5 opts.) 833,508-156-1781-B-6	
<i>Ethiopia</i>		<i>Greenland</i>		OK2QR 10,656-37-97-B-4		
<i>Multi-Single</i>		OX3WQ 149,457-77-647-B-6	OK1AVU 9000-40-75-D-19		<i>Ireland</i>	
9E4USA (K3BSY+WBR1AK) 29,988-68-147-A-23	OX3AB 54,990-47-390-B-6		<i>Denmark</i>		I14AL 91,605-93-329-A-6	
<i>Kerguelen Islands</i>		<i>Guatemala</i>		OZ5DF 473,478-146-1081-B-6		E12VDO 2376-18-44-A-9
F88XX 31,680-48-220-A-6	TG9ND 1,584,276-112-2491-B-36		OZ5GX 383,934-122-1049-A-6		<i>Ile of Man</i>	
<i>Liberia</i>		<i>Mexico</i>		OZ8MG 258,726-107-807-A-7		GD3YBH 279,565-113-825-A-26
E12CB 2,518,845-245-3427-C-6	XE1KS 6,140,817-283-7233-C-73		OZ3PO 25,080-44-190-A-17		<i>Italy</i>	
1LSK 481,758-138-1164-B-40	XF1LLS 2,445,744-251-3277-B-6		OZ5CI 7228-22-174-A-6		I1EFD 1,602,016-208-2568-B-85	
<i>Madagascar</i>		XE2I 111,510-90-413-B-18	OZ1TD 2262-22-57-A-6		I1EOL 1,600,090-195-2154-B-55	
SR8AP 22,176-48-154-C-12	<i>Nicaragua</i>		<i>Malta-Single</i>		I1ELL 1,178,775-155-2535-B-6	
<i>Madeira Island</i>		YN1MG 1,159,278-202-1913-B-52	OZ7RD (7 opts.) 381,006-122-1045-A-6		I1EIL 481,440-120-1354-A-50	
CT3AS 192,816-104-309-A-6	<i>Puerto Rico</i>		<i>England</i>		I1EBZ 421,296-131-1072-A-6	
7Q7AA 406,146-127-1066-A-29	KP4DLW 3,397,536-251-4512-C-68	G2QT 772,590-182-1415-A-36		I1WXY 48,195-45-357-B-8		
<i>Malawi</i>		KP4DJI 519,300-150-1154-B-27	G3SEM 707,294-133-1832-B-55		I1LSP 15,594-46-113-A-6	
7Q7AA 406,146-127-1066-A-29	<i>Trinidad</i>		G3YHB 450,180-122-1230-A-50		I1ZNH 9879-37-89-A-12	
<i>Rhodesia</i>		9Y4VU 788,472-188-1399-B-41	G6LK 293,544-108-906-B-35		<i>Multi-Single</i>	
ZE1BL 159,120-80-663-A-26	9Y4NN 735,372-132-1857-B-28		G3KMA 277,032-119-776-A-35		I1MAU (3 opts.) 1,364,250-170-2677-B-52	
<i>South Africa</i>		<i>Virgin Islands</i>		G5AOF 112,852-86-439-A-32		I1KBT (3 opts.) 587,541-151-1297-A-54
Z5SWN 508,380-148-1151-A-6	KV4GP 1,118,880-180-2072-B-61		G3TJW 41,796-30-1161-B-6		I1BH 308,432-56-1241-C-22	
Z5GPN 394,632-168-783-A-18	KV4AM 381,810-130-968-C-15		<i>Denmark</i>		<i>Luxembourg</i>	
Z56KF 15,015-33-152-A-13	<i>SOUTH AMERICA</i>		G3JFY 4350-25-58-A-6		WA4WML/LX 540-9-20-A-6	
Z51ACD 8856-36-82-A-6	<i>Antarctica</i>		<i>Multi-Single</i>		<i>Netherlands</i>	
<i>OCEANIA</i>		KC4USL 136,218-73-622-C-13	G3JOC (4 opts.) 2,778,357-223-4162-B-90		P11HRL 297,360-118-840-B-6	
<i>Australia</i>		<i>Argentina</i>		G3JX (5 opts.) 856,464-176-1588-B-88		PA0GMG 124,047-99-418-A-12
VK3QI 867,867-187-1547-A-62	LU2FAO 356,850-130-915-B-20		G3FVA (11 opts.) 668,861-149-1500-A-90		PA0YN 8352-29-96-B-12	

<i>Multi-Single</i>	SM7AIL 4603-26-59-B	<i>Multi-Single</i>	<i>Senegal</i>
OGN (9 oprs.)	SM7JAF 4095-21-65-B	UK9HAD (2 oprs.)	6W8DY 69,186-89-258-B
538,020-140-1281-A-96	SM6BSM 2268-18-42-B	8550-30-95-B	<i>South Africa</i>
<i>Norway</i>	SM4AWG 1260-14-30-B	<i>Ryukyu Islands</i>	ZS7GP 95,976-86-372-B-22
2,673,290-230-3881-A-81	SM7RS 360-10-12-A	<i>Multi-Single</i>	<i>Southwest Africa</i>
6GF 165,546-102-540-B-10	<i>Multi-Single</i>	KR6AY (+KR6XR)	ZS3CI 496,446-97-1706-A-34
3K 80,028-78-342-A-42	SK6AW (5 oprs.)	656,880-136-1610-B	ZS3KC 348,588-92-1263-B-32
74,380-84-315-A	1,574,832-172-3052-B	<i>Thailand</i>	<i>Tunisia</i>
2PK 69,360-80-289-A-16	SMØBY7 (+SMØOC)	HS3AI B 81,704-68-401-B	JV8AL 113,146-74-510-A-12
4DM 32,088-56-141-B-20	419,206-239-1754-B	<i>AFRICA</i>	<i>OCEANIA</i>
6BN 29,673-63-157-B-12	<i>Switzerland</i>	<i>Ascension Island</i>	<i>Australia</i>
8BN 24,450-50-163-A-5	HB9QD 1,556,103-197-2633-B-76	ZDRAB 401,940-140-957-A-32	VK5MF 135,600-80-565-B-24
8RI 8196-64-121-A	HB9DX 14,175-45-105-B	<i>Cameroon</i>	VK2WD 56,760-43-440-A-11
8DM 5850-30-65-A-6	<i>Wales</i>	TJIAZ 557,856-144-1292-B-80	<i>Guam</i>
2DI 4914-21-78-A-3	GW3NWV 580,492-158-1225-B-35	<i>Canary Islands</i>	KG6AAY (+KIPKO opr)
4VG 1890-21-30-A	<i>Yugoslavia</i>	JANES 765,450-150-1701-B	1,706,776-191-2900-B-51
3HM 432-12-12-A-2	YU1SI 129,789-69-627-B-14	<i>Dem. Rep. of the Congo</i>	KG6ASP 37,224-66-188-C-4
6XI 420-10-14-A	<i>Multi-Single</i>	Q9SIA 817,552-148-1842-B-37	KG6JAR 10,374-78-91-C
<i>Poland</i>	YU1BCD (YU1 PCF QBC)	90SGJ 91,542-73-418-B	<i>Hawaii</i>
630,630-130-1617-B-46	1,270,070-170-2473-C-70	90SRD 44,068-46-320-B-25	KH6RS (K2SIL opr)
34,457-52-245-A	<i>ASIA</i>	<i>Ethiopia</i>	4,545,456-281-5719-C-47
16,434-33-167-A	<i>Japan</i>	<i>Multi-Single</i>	4,143,079-263-5251-C-70
4293-27-56-A	JHUCJO 801,135-171-1564-B-11	9EJUSA 603,296-136-1479-A-20	KH6BZL 3,168,680-260-4651-C-96
1440-16-31-B-12	JAØCWVJ 771,897-157-1616-B	<i>Ghana</i>	<i>Multi-Single</i>
<i>Multi-Single</i>	JH1YDR 732,000-160-1525-B-39	9G1WV 1,549,668-178-2902-A-63	KH6HCN (4 oprs.)
21,620-46-157-A	JA3USA 318,240-115-926-C	<i>Kerguelen Islands</i>	5,047,884-281-5996-C-95
<i>Portugal</i>	JA3FRJ 299,805-115-869-B	FBHXX 84-4-7-A	<i>Indonesia</i>
2,252,211-221-3397-B	JA2JW 226,113-113-607-C	<i>Liberia</i>	YB0AAN 328,125-105-1045-B
<i>Romania</i>	JH1FIG 177,480-95-624-B	L12CB 2,872,302-239-4006-C	<i>New Caledonia</i>
702-13-18-A	JA11FF 164,208-88-622-A	L12CH 1,305,141-157-2771-C-68	FK8AH 17,136-28-204-A
<i>European USSR</i>	JA1CG 138,528-78-592-B	<i>Madagascar</i>	<i>New Zealand</i>
9555-21-160-A	JA7BSK 136,800-80-570-A	5RRAP 10,080-32-105-C-3	ZL1BN 986,460-164-2005-A-37
3933-19-69-B	JH1MTR 109,395-85-429-A-22	<i>Madeira Island</i>	ZL1AGO 378,376-154-819-B
2346-17-46-A	JA4BN1 57,456-63-304-A	CF3AS 48,195-51-315-A	ZL2ACP 227,304-123-616-A
<i>Multi-Single</i>	JA1DHQ 56,242-61-308-A	<i>Malawi</i>	<i>Philippines</i>
351,384-94-1179-B	JA7KXU 34,910-55-242-B-31	7Q7AA 272,943-99-919-A-21	DUIFH 621,828-138-1502-C
<i>Kaliningrad</i>	KAR1Y (WA8WPW, opr.)	<i>Mauritius</i>	<i>Tahiti</i>
<i>Multi-Single</i>	JA7GAX 23,547-47-167-C-13	3BRCV 39,345-61-213-A-8	FO8BY 163,125-87-625-B-20
1,186,965-195-029-B	JA2JAB 13,528-36-116-A	<i>Morocco</i>	<i>Western Carolines</i>
<i>Ukraine</i>	JA4IRJ 11,397-29-131-A-12	CN8HD 727,716-149-1628-B-33	KC6WS 709,020-156-1515-C-32
22,466-47-161-B	JA3YJQ 10,650-25-142-A-12	<i>Mozambique</i>	<i>Western Samoa</i>
11,214-44-95-B	JA4LLD 7,998-51-86-A-11	CR7IK 310,500-100-1035-A-28	3042-13-78-A-4
8820-30-100-B	JA8FDB 7770-30-259-A-15	<i>Check Logs (W/VE CW)</i>	
4503-19-79-A	JA6FIT 7482-29-86-A-14	W2EGI, W2LKH, WA2AUB, K3KMA, W3CTE, W3EGN, W4JUK, W6EYR, W7QK, K8BYH, W8HAN, W8CJNH, WØYQG, VE3ATF, (W/VE PHONE) K1WJB, W2EGI, W2UJ, K3KMA, W3EGN, W4KJL, WB4PQD, WB6TU1, W8BJ, W8FTS, VE2BWW, VE6AAV, (DX CW) DJØTA, DL1HP, DL6WD, DM2BCF, DM2BTO, DM2BUN, DM2CCN, DM2CGH, DM2CHM, DM2DRO, DM2DWN, DM3EGO, DM3LOG, DM3XHF, F2SQ, G3WP, HA5CI, HA5FA, HA5KFN, KZ5CU, LA8XM, LA9OI, L8FBH, LZ1KCO, LZ2KTS, LZ2-N-169, OH1QB, OH3JR, OK2BCJ, OK2BEI, OK2BOV, OK2PDL, OK3EQ, OZ7MJ, OZ8HC, SM5BFJ, SM5UH, SM5UU, SM6PF, SM7QY, SMØIX, SP1CTN, SP1DPA, SP3BES, SP5AHH, SP5IP, SP9CVG, SP9EEE, SP9ZD, UA1CVA, UA3DD, UA3GO, UA3LAV, UA6BV, UA9CAT, UA9IF, UA9IG, UA9MG, UB5NA, UK5WBK, UK9CAM, UK9OAA, UV3CN, UV3DO, UV3HD, UV3JT, UV9DU, UW3FW, UW3HY, UW3UG, UW4NP, UW6CV, UW6CW, UW9PT, UWØBA, YO2AVP, YO8KGA, YO9HO, YV5BPG, YV5CKR, E3JJ, Z56JK, Z56RE, 5H3MB, (DX PHONE) CR6PT, DK2XV, DL7DE, HA5HR, HS1ADX, JA6SBK, WA4UT/KP4, W9PTN/KV4, LA7CL, LA9OI, LU5DDM, LZ2EE, OD5LX, OH7AA, OK1AAA, PY2DB, PY8GS, SM5AQE, SM5BFJ, SM5CBN, SM5GA, SM6AHS, SMØBDS, SP3XR, SP5DZ1, TJ1AW, UA9VX, UA9-13031, UK3SAB, UK5QAU, UV3DN, UW3FW, YS10, YV5BPG, ZE1BL, ZE3JJ, 5H3MB, 7P8AB. QST	
22,466-47-161-B	JH1DXM 5717-23-83-A	<i>Check Logs (W/VE CW)</i>	
11,214-44-95-B	JA1GSK 5016-19-88-A	W2EGI, W2LKH, WA2AUB, K3KMA, W3CTE, W3EGN, W4JUK, W6EYR, W7QK, K8BYH, W8HAN, W8CJNH, WØYQG, VE3ATF, (W/VE PHONE) K1WJB, W2EGI, W2UJ, K3KMA, W3EGN, W4KJL, WB4PQD, WB6TU1, W8BJ, W8FTS, VE2BWW, VE6AAV, (DX CW) DJØTA, DL1HP, DL6WD, DM2BCF, DM2BTO, DM2BUN, DM2CCN, DM2CGH, DM2CHM, DM2DRO, DM2DWN, DM3EGO, DM3LOG, DM3XHF, F2SQ, G3WP, HA5CI, HA5FA, HA5KFN, KZ5CU, LA8XM, LA9OI, L8FBH, LZ1KCO, LZ2KTS, LZ2-N-169, OH1QB, OH3JR, OK2BCJ, OK2BEI, OK2BOV, OK2PDL, OK3EQ, OZ7MJ, OZ8HC, SM5BFJ, SM5UH, SM5UU, SM6PF, SM7QY, SMØIX, SP1CTN, SP1DPA, SP3BES, SP5AHH, SP5IP, SP9CVG, SP9EEE, SP9ZD, UA1CVA, UA3DD, UA3GO, UA3LAV, UA6BV, UA9CAT, UA9IF, UA9IG, UA9MG, UB5NA, UK5WBK, UK9CAM, UK9OAA, UV3CN, UV3DO, UV3HD, UV3JT, UV9DU, UW3FW, UW3HY, UW3UG, UW4NP, UW6CV, UW6CW, UW9PT, UWØBA, YO2AVP, YO8KGA, YO9HO, YV5BPG, YV5CKR, E3JJ, Z56JK, Z56RE, 5H3MB, (DX PHONE) CR6PT, DK2XV, DL7DE, HA5HR, HS1ADX, JA6SBK, WA4UT/KP4, W9PTN/KV4, LA7CL, LA9OI, LU5DDM, LZ2EE, OD5LX, OH7AA, OK1AAA, PY2DB, PY8GS, SM5AQE, SM5BFJ, SM5CBN, SM5GA, SM6AHS, SMØBDS, SP3XR, SP5DZ1, TJ1AW, UA9VX, UA9-13031, UK3SAB, UK5QAU, UV3DN, UW3FW, YS10, YV5BPG, ZE1BL, ZE3JJ, 5H3MB, 7P8AB. QST	
8820-30-100-B	JA3BLN 3476-17-95-B	<i>Check Logs (W/VE CW)</i>	
4503-19-79-A	JA1BDD 3552-26-76-A	W2EGI, W2LKH, WA2AUB, K3KMA, W3CTE, W3EGN, W4JUK, W6EYR, W7QK, K8BYH, W8HAN, W8CJNH, WØYQG, VE3ATF, (W/VE PHONE) K1WJB, W2EGI, W2UJ, K3KMA, W3EGN, W4KJL, WB4PQD, WB6TU1, W8BJ, W8FTS, VE2BWW, VE6AAV, (DX CW) DJØTA, DL1HP, DL6WD, DM2BCF, DM2BTO, DM2BUN, DM2CCN, DM2CGH, DM2CHM, DM2DRO, DM2DWN, DM3EGO, DM3LOG, DM3XHF, F2SQ, G3WP, HA5CI, HA5FA, HA5KFN, KZ5CU, LA8XM, LA9OI, L8FBH, LZ1KCO, LZ2KTS, LZ2-N-169, OH1QB, OH3JR, OK2BCJ, OK2BEI, OK2BOV, OK2PDL, OK3EQ, OZ7MJ, OZ8HC, SM5BFJ, SM5UH, SM5UU, SM6PF, SM7QY, SMØIX, SP1CTN, SP1DPA, SP3BES, SP5AHH, SP5IP, SP9CVG, SP9EEE, SP9ZD, UA1CVA, UA3DD, UA3GO, UA3LAV, UA6BV, UA9CAT, UA9IF, UA9IG, UA9MG, UB5NA, UK5WBK, UK9CAM, UK9OAA, UV3CN, UV3DO, UV3HD, UV3JT, UV9DU, UW3FW, UW3HY, UW3UG, UW4NP, UW6CV, UW6CW, UW9PT, UWØBA, YO2AVP, YO8KGA, YO9HO, YV5BPG, YV5CKR, E3JJ, Z56JK, Z56RE, 5H3MB, (DX PHONE) CR6PT, DK2XV, DL7DE, HA5HR, HS1ADX, JA6SBK, WA4UT/KP4, W9PTN/KV4, LA7CL, LA9OI, LU5DDM, LZ2EE, OD5LX, OH7AA, OK1AAA, PY2DB, PY8GS, SM5AQE, SM5BFJ, SM5CBN, SM5GA, SM6AHS, SMØBDS, SP3XR, SP5DZ1, TJ1AW, UA9VX, UA9-13031, UK3SAB, UK5QAU, UV3DN, UW3FW, YS10, YV5BPG, ZE1BL, ZE3JJ, 5H3MB, 7P8AB. QST	
1680-16-35-A	JAØHXH 2898-71-46-A	<i>Check Logs (W/VE CW)</i>	
<i>Multi-Single</i>	JA3KXR 2580-20-45-A	W2EGI, W2LKH, WA2AUB, K3KMA, W3CTE, W3EGN, W4JUK, W6EYR, W7QK, K8BYH, W8HAN, W8CJNH, WØYQG, VE3ATF, (W/VE PHONE) K1WJB, W2EGI, W2UJ, K3KMA, W3EGN, W4KJL, WB4PQD, WB6TU1, W8BJ, W8FTS, VE2BWW, VE6AAV, (DX CW) DJØTA, DL1HP, DL6WD, DM2BCF, DM2BTO, DM2BUN, DM2CCN, DM2CGH, DM2CHM, DM2DRO, DM2DWN, DM3EGO, DM3LOG, DM3XHF, F2SQ, G3WP, HA5CI, HA5FA, HA5KFN, KZ5CU, LA8XM, LA9OI, L8FBH, LZ1KCO, LZ2KTS, LZ2-N-169, OH1QB, OH3JR, OK2BCJ, OK2BEI, OK2BOV, OK2PDL, OK3EQ, OZ7MJ, OZ8HC, SM5BFJ, SM5UH, SM5UU, SM6PF, SM7QY, SMØIX, SP1CTN, SP1DPA, SP3BES, SP5AHH, SP5IP, SP9CVG, SP9EEE, SP9ZD, UA1CVA, UA3DD, UA3GO, UA3LAV, UA6BV, UA9CAT, UA9IF, UA9IG, UA9MG, UB5NA, UK5WBK, UK9CAM, UK9OAA, UV3CN, UV3DO, UV3HD, UV3JT, UV9DU, UW3FW, UW3HY, UW3UG, UW4NP, UW6CV, UW6CW, UW9PT, UWØBA, YO2AVP, YO8KGA, YO9HO, YV5BPG, YV5CKR, E3JJ, Z56JK, Z56RE, 5H3MB, (DX PHONE) CR6PT, DK2XV, DL7DE, HA5HR, HS1ADX, JA6SBK, WA4UT/KP4, W9PTN/KV4, LA7CL, LA9OI, LU5DDM, LZ2EE, OD5LX, OH7AA, OK1AAA, PY2DB, PY8GS, SM5AQE, SM5BFJ, SM5CBN, SM5GA, SM6AHS, SMØBDS, SP3XR, SP5DZ1, TJ1AW, UA9VX, UA9-13031, UK3SAB, UK5QAU, UV3DN, UW3FW, YS10, YV5BPG, ZE1BL, ZE3JJ, 5H3MB, 7P8AB. QST	
<i>NIAA (3 oprs.)</i>	JA7HYN 1994-14-48-A	<i>Check Logs (W/VE CW)</i>	
279,720-126-759-B	JA6LYU 720-8-30-B-12	W2EGI, W2LKH, WA2AUB, K3KMA, W3CTE, W3EGN, W4JUK, W6EYR, W7QK, K8BYH, W8HAN, W8CJNH, WØYQG, VE3ATF, (W/VE PHONE) K1WJB, W2EGI, W2UJ, K3KMA, W3EGN, W4KJL, WB4PQD, WB6TU1, W8BJ, W8FTS, VE2BWW, VE6AAV, (DX CW) DJØTA, DL1HP, DL6WD, DM2BCF, DM2BTO, DM2BUN, DM2CCN, DM2CGH, DM2CHM, DM2DRO, DM2DWN, DM3EGO, DM3LOG, DM3XHF, F2SQ, G3WP, HA5CI, HA5FA, HA5KFN, KZ5CU, LA8XM, LA9OI, L8FBH, LZ1KCO, LZ2KTS, LZ2-N-169, OH1QB, OH3JR, OK2BCJ, OK2BEI, OK2BOV, OK2PDL, OK3EQ, OZ7MJ, OZ8HC, SM5BFJ, SM5UH, SM5UU, SM6PF, SM7QY, SMØIX, SP1CTN, SP1DPA, SP3BES, SP5AHH, SP5IP, SP9CVG, SP9EEE, SP9ZD, UA1CVA, UA3DD, UA3GO, UA3LAV, UA6BV, UA9CAT, UA9IF, UA9IG, UA9MG, UB5NA, UK5WBK, UK9CAM, UK9OAA, UV3CN, UV3DO, UV3HD, UV3JT, UV9DU, UW3FW, UW3HY, UW3UG, UW4NP, UW6CV, UW6CW, UW9PT, UWØBA, YO2AVP, YO8KGA, YO9HO, YV5BPG, YV5CKR, E3JJ, Z56JK, Z56RE, 5H3MB, (DX PHONE) CR6PT, DK2XV, DL7DE, HA5HR, HS1ADX, JA6SBK, WA4UT/KP4, W9PTN/KV4, LA7CL, LA9OI, LU5DDM, LZ2EE, OD5LX, OH7AA, OK1AAA, PY2DB, PY8GS, SM5AQE, SM5BFJ, SM5CBN, SM5GA, SM6AHS, SMØBDS, SP3XR, SP5DZ1, TJ1AW, UA9VX, UA9-13031, UK3SAB, UK5QAU, UV3DN, UW3FW, YS10, YV5BPG, ZE1BL, ZE3JJ, 5H3MB, 7P8AB. QST	
279,720-126-759-B	JA6KAV 420-7-20-A	<i>Check Logs (W/VE CW)</i>	
<i>SLAZ (3 oprs.)</i>	JA7GQB 414-6-23-A	W2EGI, W2LKH, WA2AUB, K3KMA, W3CTE, W3EGN, W4JUK, W6EYR, W7QK, K8BYH, W8HAN, W8CJNH, WØYQG, VE3ATF, (W/VE PHONE) K1WJB, W2EGI, W2UJ, K3KMA, W3EGN, W4KJL, WB4PQD, WB6TU1, W8BJ, W8FTS, VE2BWW, VE6AAV, (DX CW) DJØTA, DL1HP, DL6WD, DM2BCF, DM2BTO, DM2BUN, DM2CCN, DM2CGH, DM2CHM, DM2DRO, DM2DWN, DM3EGO, DM3LOG, DM3XHF, F2SQ, G3WP, HA5CI, HA5FA, HA5KFN, KZ5CU, LA8XM, LA9OI, L8FBH, LZ1KCO, LZ2KTS, LZ2-N-169, OH1QB, OH3JR, OK2BCJ, OK2BEI, OK2BOV, OK2PDL, OK3EQ, OZ7MJ, OZ8HC, SM5BFJ, SM5UH, SM5UU, SM6PF, SM7QY, SMØIX, SP1CTN, SP1DPA, SP3BES, SP5AHH, SP5IP, SP9CVG, SP9EEE, SP9ZD, UA1CVA, UA3DD, UA3GO, UA3LAV, UA6BV, UA9CAT, UA9IF, UA9IG, UA9MG, UB5NA, UK5WBK, UK9CAM, UK9OAA, UV3CN, UV3DO, UV3HD, UV3JT, UV9DU, UW3FW, UW3HY, UW3UG, UW4NP, UW6CV, UW6CW, UW9PT, UWØBA, YO2AVP, YO8KGA, YO9HO, YV5BPG, YV5CKR, E3JJ, Z56JK, Z56RE, 5H3MB, (DX PHONE) CR6PT, DK2XV, DL7DE, HA5HR, HS1ADX, JA6SBK, WA4UT/KP4, W9PTN/KV4, LA7CL, LA9OI, LU5DDM, LZ2EE, OD5LX, OH7AA, OK1AAA, PY2DB, PY8GS, SM5AQE, SM5BFJ, SM5CBN, SM5GA, SM6AHS, SMØBDS, SP3XR, SP5DZ1, TJ1AW, UA9VX, UA9-13031, UK3SAB, UK5QAU, UV3DN, UW3FW, YS10, YV5BPG, ZE1BL, ZE3JJ, 5H3MB, 7P8AB. QST	
164,619-91-604-B	JA7YKA 294-7-14-A	<i>Check Logs (W/VE CW)</i>	
<i>SLAD (2 oprs.)</i>	JR1SWB 294-7-14-A	W2EGI, W2LKH, WA2AUB, K3KMA, W3CTE, W3EGN, W4JUK, W6EYR, W7QK, K8BYH, W8HAN, W8CJNH, WØYQG, VE3ATF, (W/VE PHONE) K1WJB, W2EGI, W2UJ, K3KMA, W3EGN, W4KJL, WB4PQD, WB6TU1, W8BJ, W8FTS, VE2BWW, VE6AAV, (DX CW) DJØTA, DL1HP, DL6WD, DM2BCF, DM2BTO, DM2BUN, DM2CCN, DM2CGH, DM2CHM, DM2DRO, DM2DWN, DM3EGO, DM3LOG, DM3XHF, F2SQ, G3WP, HA5CI, HA5FA, HA5KFN, KZ5CU, LA8XM, LA9OI, L8FBH, LZ1KCO, LZ2KTS, LZ2-N-169, OH1QB, OH3JR, OK2BCJ, OK2BEI, OK2BOV, OK2PDL, OK3EQ, OZ7MJ, OZ8HC, SM5BFJ, SM5UH, SM5UU, SM6PF, SM7QY, SMØIX, SP1CTN, SP1DPA, SP3BES, SP5AHH, SP5IP, SP9CVG, SP9EEE, SP9ZD, UA1CVA, UA3DD, UA3GO, UA3LAV, UA6BV, UA9CAT, UA9IF, UA9IG, UA9MG, UB5NA, UK5WBK, UK9CAM, UK9OAA, UV3CN, UV3DO, UV3HD, UV3JT, UV9DU, UW3FW, UW3HY, UW3UG, UW4NP, UW6CV, UW6CW, UW9PT, UWØBA, YO2AVP, YO8KGA, YO9HO, YV5BPG, YV5CKR, E3JJ, Z56JK, Z56RE, 5H3MB, (DX PHONE) CR6PT, DK2XV, DL7DE, HA5HR, HS1ADX, JA6SBK, WA4UT/KP4, W9PTN/KV4, LA7CL, LA9OI, LU5DDM, LZ2EE, OD5LX, OH7AA, OK1AAA, PY2DB, PY8GS, SM5AQE, SM5BFJ, SM5CBN, SM5GA, SM6AHS, SMØBDS, SP3XR, SP5DZ1, TJ1AW, UA9VX, UA9-13031, UK3SAB, UK5QAU, UV3DN, UW3FW, YS10, YV5BPG, ZE1BL, ZE3JJ, 5H3MB, 7P8AB. QST	
633-29-219-B	JR1BRJ 165-5-11-A	<i>Check Logs (W/VE CW)</i>	
<i>Belorussia</i>	JR3BUJ 108-4-9-A-1	W2EGI, W2LKH, WA2AUB, K3KMA, W3CTE, W3EGN, W4JUK, W6EYR, W7QK, K8BYH, W8HAN, W8CJNH, WØYQG, VE3ATF, (W/VE PHONE) K1WJB, W2EGI, W2UJ, K3KMA, W3EGN, W4KJL, WB4PQD, WB6TU1, W8BJ, W8FTS, VE2BWW, VE6AAV, (DX CW) DJØTA, DL1HP, DL6WD, DM2BCF, DM2BTO, DM2BUN, DM2CCN, DM2CGH, DM2CHM, DM2DRO, DM2DWN, DM3EGO, DM3LOG, DM3XHF, F2SQ, G3WP, HA5CI, HA5FA, HA5KFN, KZ5CU, LA8XM, LA9OI, L8FBH, LZ1KCO, LZ2KTS, LZ2-N-169, OH1QB, OH3JR, OK2BCJ, OK2BEI, OK2BOV, OK2PDL, OK3EQ, OZ7MJ, OZ8HC, SM5BFJ, SM5UH, SM5UU, SM6PF, SM7QY, SMØIX, SP1CTN, SP1DPA, SP3BES, SP5AHH, SP5IP, SP9CVG, SP9EEE, SP9ZD, UA1CVA, UA3DD, UA3GO, UA3LAV, UA6BV, UA9CAT, UA9IF, UA9IG, UA9MG, UB5NA, UK5WBK, UK9CAM, UK9OAA, UV3CN, UV3DO, UV3HD, UV3JT, UV9DU, UW3FW, UW3HY, UW3UG, UW4NP, UW6CV, UW6CW, UW9PT, UWØBA, YO2AVP, YO8KGA, YO9HO, YV5BPG, YV5CKR, E3JJ, Z56JK, Z56RE, 5H3MB, (DX PHONE) CR6PT, DK2XV, DL7DE, HA5HR, HS1ADX, JA6SBK, WA4UT/KP4, W9PTN/KV4, LA7CL, LA9OI, LU5DDM, LZ2EE, OD5LX, OH7AA, OK1AAA, PY2DB, PY8GS, SM5AQE, SM5BFJ, SM5CBN, SM5GA, SM6AHS, SMØBDS, SP3XR, SP5DZ1, TJ1AW, UA9VX, UA9-13031, UK3SAB, UK5QAU, UV3DN, UW3FW, YS10, YV5BPG, ZE1BL, ZE3JJ, 5H3MB, 7P8AB. QST	
10,500-25-142-A	JAØYAW 50-2-5-A	<i>Check Logs (W/VE CW)</i>	
<i>Lithuania</i>	JA2LNW 9-1-3-A	W2EGI, W2LKH, WA2AUB, K3KMA, W3CTE, W3EGN, W4JUK, W6EYR, W7QK, K8BYH, W8HAN, W8CJNH, WØYQG, VE3ATF, (W/VE PHONE) K1WJB, W2EGI, W2UJ, K3KMA, W3EGN, W4KJL, WB4PQD, WB6TU1, W8BJ, W8FTS, VE2BWW, VE6AAV, (DX CW) DJØTA, DL1HP, DL6WD, DM2BCF, DM2BTO, DM2BUN, DM2CCN, DM2CGH, DM2CHM, DM2DRO, DM2DWN, DM3EGO, DM3LOG, DM3XHF, F2SQ, G3WP, HA5CI, HA5FA, HA5KFN, KZ5CU, LA8XM, LA9OI, L8FBH, LZ1KCO, LZ2KTS, LZ2-N-169, OH1QB, OH3JR, OK2BCJ, OK2BEI, OK2BOV, OK2PDL, OK3EQ, OZ7MJ, OZ8HC, SM5BFJ, SM5UH, SM5UU, SM6PF, SM7QY, SMØIX, SP1CTN, SP1DPA, SP3BES, SP5AHH, SP5IP, SP9CVG, SP9EEE, SP9ZD, UA1CVA, UA3DD, UA3GO, UA3LAV, UA6BV, UA9CAT, UA9IF, UA9IG, UA9MG, UB5NA, UK5WBK, UK9CAM, UK9OAA, UV3CN, UV3DO, UV3HD, UV3JT, UV9DU, UW3FW, UW3HY, UW3UG, UW4NP, UW6CV, UW6CW, UW9PT, UWØBA, YO2AVP, YO8KGA, YO9HO, YV5BPG, YV5CKR, E3JJ, Z56JK, Z56RE, 5H3MB, (DX PHONE) CR6PT, DK2XV, DL7DE, HA5HR, HS1ADX, JA6SBK, WA4UT/KP4, W9PTN/KV4, LA7CL, LA9OI, LU5DDM, LZ2EE, OD5LX, OH7AA, OK1AAA, PY2DB, PY8GS, SM5AQE, SM5BFJ, SM5CBN, SM5GA, SM6AHS, SMØBDS, SP3XR, SP5DZ1, TJ1AW, UA9VX, UA9-13031, UK3SAB, UK5QAU, UV3DN, UW3FW, YS10, YV5BPG, ZE1BL, ZE3JJ, 5H3MB, 7P8AB. QST	
61,568-38-540-B	<i>Multi-Single</i>	<i>Lebanon</i>	
43,362-66-219-B	KA2KS (3 oprs.)	OD5BA 1344-16-28-B	<i>Ogasawara Islands</i>
5100-20-85-A	1,267,200-192-2200-C-88	<i>East Pakistan</i>	JØ1ABX (JA1KSO, opr.)
<i>Multi-Single</i>	1,892,060-170-2140-C-48	<i>Kazakh SSR</i>	68,760-60-271-A-4
2BBH (3 oprs.)	JA3YBF (6 oprs.)	<i>Kirghiz SSR</i>	
701,238-146-1601-B	1,892,060-170-2140-C-48	DL7YR 459-9-17-B	
1R (2 oprs.)	JA9YHA (multiopt.)	<i>Kirghiz SSR</i>	
43,176-56-261-B	310,185-113-974-C	FKMMA 936-17-26-B	
<i>Scotland</i>	<i>Lebanon</i>	<i>Asiatic USSR</i>	
708,822-159-1486-A-61	OD5BA 1344-16-28-B	UAØDG 23,250-31-251-A	
21,552-24-300-A	<i>Ogasawara Islands</i>	UAØW 14,100-32-150-B	
<i>Spain</i>	JØ1ABX (JA1KSO, opr.)		
1,371,428-212-2157-C-65	68,760-60-271-A-4		
570,873-139-1374-B-32	<i>East Pakistan</i>		
112,516-92-380-B	OR4CR (ON4QI, opr.)		
<i>Svalbard</i>	14,472-36-134-C		
6660-3			

AMATEUR RADIO PUBLIC SERVICE
NTS RACES AREC
In the Public Interest, Convenience, Necessity NRX

CONDUCTED BY GEORGE HART,* WINJM

HEALTH AND WELFARE

AT THE RECENT meeting of the Pacific Area Staff of the National Traffic System, reported elsewhere in this column, much discussion was devoted to the subject of origination and handling of "Health and Welfare" traffic during or following a communications emergency. Actually, a "communications" emergency isn't required to generate such traffic. Even if normal communications facilities remain intact, they are often not sufficient to cope with the abnormal situation of millions of anxious friends and relatives seeking information on the welfare of people in the affected area.

Such inquiry (we prefer this term to "health and welfare" because it is more precise) traffic receives the precedence designation Q (formerly P2) and is the third precedence down. Health and welfare traffic coming *out* of the disaster area receives precedence two, termed P for "Priority." Needless to say, the number one precedence is EMERGENCY.

The PAS discussion of the subject of inquiry traffic ran along lines of how to best handle it *after* it had been originated, and admittedly the staff got somewhat off the subject of how to handle it on NTS into the subject in general. Prior to that, however, it was generally agreed that origination of such traffic should be *discouraged*, and that when accepted by any amateur it should be accepted with the definite understanding (inherent in all message handling by amateurs) that it may or may not ever be delivered.

But the crux of the discussion had to do with the best method for handling such traffic by amateur radio. Normally, an individual amateur station originates it at the behest of a worried relative, addressing it to a home address. When (if) it arrives in the disaster area, one of two situations may obtain: first, and most likely, it finds the recipient in good health and in no need of assistance; but if he has been driven from his home by the disaster, injured and hospitalized, or even

*Communications Manager, ARRL.

killed, the average amateur trying to handle the message is going to have the dickens of a time finding him in all the confusion usually associated with disasters.

Welfare agencies, on the other hand, are set up for this purpose, among others. During and following disasters a constant stream of names of people being inquired about goes from Red Cross chapters all over the nation into those chapters in the disaster area, which do their best to set up to investigate the inquiries and report back. An individual message is less likely to get through to its destination in the first place, and if it does, less likely to find a dislocated addressee, than one handled through a welfare agency such as the Red Cross.

Does this suggest that amateurs in a disaster area who receive such messages and cannot deliver them should contact their local Red Cross chapters? It suggests more than that. It suggests that persons wanting to originate inquiry traffic be referred to a welfare agency in the first place, that such traffic be addressed from one welfare agency to another rather than from one individual to another, the names and addresses of inquirer and inquiree, where appropriate, being contained in the text of the message following the format of ARRL NINETEEN. ("Request health and welfare report on"). Many such messages can be handled in a short time using "book" form.

Welfare agencies (mostly the Red Cross, but others also can be involved) in a disaster area are naturally more inclined to handle such inquiries coming from their own people before those coming from some amateur in the area whom they never heard of. Consequently, the PAS feels that inquiry traffic, *when* it is necessary, should go from welfare agency to welfare agency rather than from individual to individual, and should be handled systematically by amateur radio (if normal commercial means are not available) in conjunction with such agencies.

A related topic had to do with automatic cancellation of Q traffic after it had reached a certain age, the rationale being that after a certain



The Pacific Area Staff of the National Traffic System at San Jose, Calif., July 4. Left to right are Gene Dotson, W6IPW, member-at-large; Gordon Wenz, W6BGF, member-at-large and chairman; Don Stansifer, W6LRU, RN6 manager; Bob Howe, K7NHL, TWN manager; Bill Watson, W7BQ, RN7 manager. (Photo by WINJM)

Sharing a pleasant moment at San Jose are Gene Dotson, W6IPW, and John Minke, W6KYA, Sacramento Valley SCM. (WINJM photo.)

time such traffic was not likely to be useful and only cluttered up the nets. But after some discussion on this point, it was decided to leave this up to the originator who, if he wishes, can give such instructions via an HXB ("Cancel message if not delivered within hours of origination") in the preamble.

The above is "traffic talk," but deserves special treatment because of its application to emergency operations. — WINJM.

Traffic Talk

Are phone patches classifiable as "traffic"? Well, yes and no. They certainly are not "written" or "record" traffic, and there is considerable doubt that they can be called "formal" traffic. But as to whether or not they can be called traffic at all, this is debatable — and has been the subject of quite a few debates we have heard, some of them on the heated side. The first thing you have to have is a definition of the word "traffic" from the amateur standpoint. The closest Webster comes to it is: "The information or signals transmitted over a communications system: messages." This is pretty good, for Webster, and if we accept it (we don't have to, you know) we certainly have to accept phone patches as traffic. Yet, the traditional concept has been that of written messages. For many of us, this concept is hard to let go of.

But yes indeed, phone patches are "traffic." They are not written, record or formal traffic, but they do qualify under the general term.

National Traffic System. Your CM had the privilege to attend as a participating observer, on July 2, 3, 4 and 5, a meeting of the Pacific Area Staff of the National Traffic System at San Jose, Calif., concurrent with the Pacific Division Convention of ARRL. The convention and the staff meeting were two quite separate activities, but there is no doubt that the presence of the staff contributed to the convention, and this was the intention. Here are some gleanings from our notes.

Present for most of the meeting were Chairman Gordon Wenz, W6BGF; RN6 Manager Don Stansifer, W6LRU; RN7 Manager Bill Watson, W7BQ; TWN Manager Bob Howe, K7NHL; and Member-at-Large Gene Dotson, W6IPW. PAN Manager John Vaidean, W6BNX, joined the group for a short time on Monday (5th). FCC Director W6VNO and MAL W7DZX were unable to be present.

The first session took place on Friday evening, July 2, before the convention program got under way. Most of the discussion concerned agenda items, each participant being given the opportunity to add items to the tentative agenda to make it definitive. But discussion strayed, as it always does in such gatherings, and got into the following areas: sending too fast on cw nets; putting PSHR data on Form 1; reimbursed travel for an NTS educational program; realignment of RNT bound-



aries; using RTTY in NTS; more incentives for cw operators to take part in NTS; ssb participation in NTS; daytime operation of NTS; education of SCMs about NTS.

The "formal" part of the meeting got under way on Saturday. We put the word in quotes because although the meeting is supposed to be conducted by Roberts Rules of Order, Mr. Roberts's bible took a severe beating during the course of the meeting. *Nevertheless*, compared with most such meetings we have attended, Chairman Wenz did a masterful job of controlling and directing the discussion.

An early order of business was to reelect W6BGF to another term as member-at-large with the understanding that he would continue as chairman. According to the PAS Terms of Reference (TOR), MALs are elected by the staff for two-year terms. Gordon's term had expired, so his reelection merely made his status as chairman "legal."

Other matters discussed and in some cases acted upon are presented as briefly as possible, both for information and comment if desired.

1) SCMs should encourage formation of ssb nets at NTS section level; that is, those sections not now boasting an NTS section ssb net should form one, for best maximum coverage of the section.

2) Chairman W6BGF presented a proposal for a daytime NTS net, following a discussion of the possibility of having one large "delivery" net in an emergency, to short-circuit channels. In essence, the W6BGF plan (called the American Traffic Net) would consist of three ssb nets and one novice net having general check-ins, operating daily on 14 and 21 MHz. The first net would convene at 1700 GMT on a 14-MHz frequency, the second at 2000 GMT on a 21-MHz frequency, the third at 2200 GMT on a 21-MHz Novice frequency and the fourth at 2300 GMT on a 14-MHz frequency. (All times one hour earlier during "daylight saving" time.) The first three sessions will include, along with an NCS, a representative from each area of NTS. The fourth session will include a representative from each of the 12 NTS regions, along with the area representatives who attended the other three sessions. In this way, it is hoped that traffic may more quickly reach its destination region by 2300 GMT or shortly thereafter, in order that it may be

Shot at the Wisconsin Nets Assn. Picnic in July were Sid Pokorny, W9NRP, Wisconsin SCM (I.) and Sherm Carr, W9NGT, Wisconsin SEC. (Shot by K9PKQ.)



BRASS POUNDERS LEAGUE

Winners of BPL Certificates for June Traffic

Call	Orig.	Recd.	Rel.	Del.	Total
W3CUL	321	1097	858	129	2405
W7BA	14	469	425	59	947
K9ZSO		454	—	484	908
K5TFY		427	421	4	852
W0LCX	24	487	900	14	725
K9NSN	24	287	201	67	699
W4VVS	116	278	73	205	671
W3VR	184	209	171	16	580
W6JOU	28	276	220	56	580
W7WRC	512	34	4	24	574
W3EML	28	362	225	—	555
K9ZSO(May)	—	277	—	277	554

BPL for 100 or more originations-plus deliveries

W9JYO	195	KRONA	133	WB4AIW	108
WA6BYZ	150	W8OCU	123	W2OE	106
WA4MKH	146	W7TFL	118	WA4PNY	103
W4QYI	139	W4BDWL	113	WA3AFI	102
W3TN	133	WA7AVI	110	W9BJR	102

BPL Medallions (see July, 1968 QST, p. 99) have been awarded to the following amateurs since last month's listings: WB2LGA, K5MAT, WA5TWC, W4SDEI, WA7EUX, VE3IV.

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.

further dispatched to section level in time for delivery the same day originated. Gordon concedes that there are plenty of question marks in the idea, and some of these received discussion. The PAS then recommended this or a similar daytime setup be instituted as a part of NTS.

3) The PAS encourages more use of RTTY as an option to cw in all NTS cw nets, at any level, and requests NTS net managers and officials to survey possibilities. The signal QRR? could be used with the understood meaning "Are you ready for RTTY transmission?" Thus, two stations from a cw net dispatched to a side frequency to clear traffic could do so by RTTY if they have the capability. RTTY traffic handlers might be solicited via privately-published RTTY bulletins.

4) The staff recommended coordination of vhf repeaters and satellite operation into NTS.

5) A period of time was spent in discussion of origination and handling of messages, including (a) "operator's notes," (b) modification of HXB to include other situations, (c) encouragement of more originations by net members, (d) two points for originations to stimulate traffic and (e) encouragement of more "fair" traffic.

6) Reconstruction of RN7. Because of the size and extent of RN7, PAS recommends that Saskatchewan be transferred to the Tenth Region, Alberta and Montana to the Twelfth Region. Alaska to remain in RN7 but not to be counted in representation percentages.

7) The staff recommended a QST article be published regarding the meaning and use of the Q (P2) precedence designation in originating traffic; also, that origination of such traffic in an emergency be discouraged, but when originated be routed through the Red Cross only, if available.

8) There was discussion about the desirability of a publication, separate from those at present existing, on "How to Get Into NTS."

The PAS was in session, off and on, for four days, starting Friday evening, July 2 and continuing through Monday noon, July 5, at which time one of the members had to leave and the

agenda items had been completed anyway. Estimated total time in session, about ten hours.

Burt Coy, VE3GI, our respected and revered ECN Manager, has become a silent key. Burt has been an NTS stalwart for many years — in fact almost from the start — and we shall miss him.

National Traffic System. EAN moved to 7070 kHz during the month of June, but it was necessary to move back to 80 meters four times. So, effective July 1, EAN was back on 3670. IRN's big rep problem has been RI. However, WLYNE has returned and has recovered much better in July. W7BQ reports traffic build-up at the end of the month saved disaster, with nine nets reporting zero traffic. W7BQ suggests more incentive needed at the local levels to originate traffic, lest we starve. WB8ALU is acting 8RN manager during June and July while W8CHT is on vacation. 9RN manager W9HRY says: "With three unreported sessions and two sessions not held, what can I say that won't burn holes in the paper? Here's hope for the future." TEN Region Net Certificates were issued to K9DDA, WA6TNM, and K9ORK. K7NHL reports great scarcity of traffic on TWN. TWN expects to try sb on second session on 3970/7270 in August.

June Reports

Net	Sessions	Traffic	Rate	Avg. Rep. (%)
EAN	30	1218	40.6	94.4
CAN	30	800	26.6	100.0
PAN	30	1019	34.0	95.5
IRN	60	486	8.1	88.1
2RN	60	416	6.9	99.7
3RN	60	378	6.3	97.2
4RN	51	343	6.7	80.5
RN6	60	825	13.8	100.0
RN7	58	280	4.8	42.0
8RN	54	353	6.6	85.8
9RN	55	402	7.3	90.9
TEN	60	360	6.0	75.8
ECN	57	110	1.9	88.8
TWN	42	162	3.9	42.0
TCC Eastern	124	616		
TCC Central	90	686		
TCC Pacific	134	731		
Sections ²	2028	9545	4.7	
Summary	2725	18,730	PAN	5.4
Record	3242	23,817	1,149	15.9

¹TCC functions, not counted as net sessions.

²Section and local nets reporting (53) — AL: AEND AENT AENB; AR: OZK; CA: NCCN; CO: CN; CT: CN CPN; FL: GN VEN FMFN QFN EFIN TPTN QFIN; GA: GSN GTN; IL: ILN; KS: QKS R5BN KPN; KY: KYN KTN; LA: LTN LA; MD: MDCTN; MA: W9MN; MI: Q9MN; MN: MSN MSPN; NJ: PVTEN NJSN NJN; NY: NYS NL1; NC & SC: CN; OH: OSSB BN; ON: GPN GBN; ON-PQ: Q9N; OK: BN; PA: EPA PTTN; PQ: WQVHF; SC: SCN; TX: TEX TTN; UT: BUN; VA: V5BN VSN; WA: WSN.

Transcontinental Corps. Best June since 1968 traffic-wise, thanks to the Airstream Rally in PAN, reports W3FML for TCC Eastern. Vacations taking their usual toll, W0LCX reports extra schedules were set up on TCC Central to handle the overload from the Airstream Rally traffic from PAN. And W6VNO reports 14 extra skeds to handle traffic from the County Fair at Del Mar. Extra skeds account for the difference in traffic handlings. Following are the June reports.

Area	Functions	% Successful	Traffic	Out-of-Net Traffic
Eastern	124	92.0	1676	616
Central	90	96.6	1392	686
Pacific	134	97.0	1620	731
Summary	349	95.2	4688	2033

The TCC Roster: Eastern Area (W3FML, Dir.) — W1s BJG, E1J NJM QYV UBG, K1SSH, WA1JTM, W2s FR GKZ OC, K2KTK, W42s KCU UWA, W2LZN, W3EML, K3MVO, W4s NLG SOQ UQ, K4s GTS KNP, WB4NNO, W4s PMJ RYP, K8KMO, W48s PIM VYR. Central Area (W0LCX, Dir.) — W4s OGG ZJY, WB4KPE, W5s MI SBM, W9s CXD DND, W49VZM, W6s HI INH LCX ZHN, W16s IAW WEZ, K0AEM. Pacific Area (W6VNO, Dir.) — WSRE, K5MAT, W6s

Public Service Honor Roll June, 1971

This listing is available to amateurs whose public service performance during the month indicated qualifies for 30 or more total points in the nine categories below. A delineation of the points awarded for each function is given in the category key at the end of the Honor Roll listing. Please note maximum points for each category.

Category	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	Totals
Max. Pts.	10	10	12	12	20	20	3	5	5	
K7CTP	10	10	12	12	12	20				76
WA1GCE	10	5	12		12	15		5	5	64
WB9NJR	10	10	12	12	12		3		5	64
WB4KDI	10	10	12	12	12				5	61
WB4LAA	10	10	12	12	12				5	61
W4OGG	10	10	12	12	12				5	61
WB8CYB	10		10	12	12	12			5	61
WA8ETX	10	10	9	12	12		2		5	60
WB4OKT	10	10	12	9	12				5	58
W6LRW	7	10	12	12	12				5	58
WA9VAS		10		12	12	20	3			57
WB2AEH	10	10	12	12	12				5	56
WA2ICU	10	10	12	12	12				5	56
W3EZX	10	9	12	3	12			5	5	56
WA3QGM	10	10	12	6	12				5	55
K3ZNP	10	10	9	12	12		1			54
W7MCW	10	10		12		20				52
VE3ARS	10	5	12	12	12					51
WB4JMH	10	10	12	6	12					50
W6FJT		5		12	12	20		1		50
WA2JIM	6	10	9	12	12					49
W5EDT	10	10	12		12			5		49
W6BCF	10	10	12		12			5		49
W7OCK	10	5	4	12	12		1	5		49
W8IMI	10	10	12		12			5		49
WA8YUB	10	10	12		12			5		49
K6MRI	10	10	12		12			5		49
K7NHL	10	9	12		12			5		48
K6BXF	10	10	4	12	12				5	48
W4NOG		10		12		20			5	47
W6MNY	10	5	12	3	12				5	47
W9HRY	10	8	12		12			5		47
WA8NOQ*	10	10		12	12		1			45
WB2NOM	10	10	12		12					44
WA2VYS	10	10	12		12					44
WB4OMG	10	10	12		12					44
K5ROZ	10	10	12		12					44
W5SBM	10	10	12		12					44
W7PI	10	10		12	12					44
W8BV	10	10	12		12					44
WA9JFC	10	10	12		12					44
WB2UFG	10	2	7	12	12			5		43
W7BQ	10	7	12	3	6			5		43
WB8CWD	10	6	12	3	12			5		43
W9LXC	10	1	12		12		3	5		43

WA3IPU	10	3	12		12					5	42
WA7MAD	10	8	12		12						42
W3MPX	10	10	12		4					5	41
WB8CLF	10	10	9		12						41
VE3ERU	10		12		12					5	39
W1BVR	10	5	12		12						39
W2FR	10		12		12					5	39
W2RUF	10		12		12					5	39
W3LOS	10		12		12					5	39
W3NEM	10		12		12					5	39
W5RBB	10	5	12		12						39
WA5VQE	10		12		12					5	39
WA8VKF			10		12	12				5	39
K0BAD/4	10	2	12		12		3				39
W0HI	10		12		12					5	39
BR1Y/W4	10	8	12		9						39
K3MVO	10	4	12		12						38
WB4EKJ	10	4	12		12						38
W4UQ	10	4	12		12						38
WB8ALU	10	4	12		12						38
W3TN	10		12		12			3			37
WN4PNY	10		12		12			3			37
W6INH	10	3	12		12						37
W3MPX	10	10	12		4						36
W6LYY	10			12	9					5	36
K4UNW	10	1	12		12						35
W6DEF	10	10	12		3						35
W6CAP	10	10	12		3						35
WA0VYV	10	10		3	12						35
VE3DV	10		12		12						34
VE3FXI	10		12		12						34
VE3GFN	10		12		12						34
K1SXF		5		12	12					5	34
WA3IYC	10		12		12						34
K3OIO	10		12		12						34
W3YA	10		12		12						34
K6YBV	10		12		12						34
W7JEY	10		12		12						34
WA0HTN	10		12		12						34
WA1MFB	5	10		12						5	32
W2CU	10	10	12								32
K2KTK	10		12		9						31
W2MTA	10	3	12							5	30
W4ILE	10	8		12							30

*Denotes multioperator station.
 Category Key, (1) Checking into cw nets, 1 point each; (2) Checking into phone/RTTY nets, 1 point each; (3) NCS cw nets, 3 points each; (4) NCS phone/RTTY nets, 3 points each; (5) Performing assigned liaison, 3 points each; (6) Legal phone patches, 1 point each; (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.

RGF EOT IPW MLE MNY VZT VNO, K68 KCB DYX, W468 DFL LFA, W78 FM KZ PLOZX FKB, K0JSP.

Independent Net Reports (June)

Net	Sessions	Traffic	Check-ins
20 Meter Interstate SSB		1814	454
Eastern Area Slow	29	54	206
E'CTTN	27	74	326
7290	44	686	1815
Northeast Traffic	30	261	336
Mike Farad	26	195	325
Clearing House	26	197	435
Hit & Bounce/MW	30	556	278

Public Service Diary

A light plane carrying three persons disappeared June 2 while enroute to Seaside, Oregon. After a four day search produced no results, K7WWR was asked to provide communication for coordinating the efforts of the search parties. With K7WWR as a base station, W7QF operated 80-meter mobile for two days in the field, during which several reported sightings were checked out by airplanes. All were negative. The search continued June 10 and 11 with WA7LUU driving in from Corvallis and then

to the remote locations. June 12 and 13 WA7EES set up portable, once in southwest Washington, and once in northwest Oregon. Operation was secured at 1800 PDT on June 13 with no trace of the missing plane. — K7WWR, SCM WA.

On June 7 a tornado touched down in Livonia, Michigan, with broken windows and downed trees, power and phone lines reported. Hardest hit was St. Mary's Hospital with loss of power and phone. The only outside communication following the storm was K8HFP, a staff member of the hospital, who called W8LN on 2-meter fm with his mobile unit. W8LN requested help through the Great Lakes Repeater, W8IJP, and the W8SDZ repeater. Within minutes W8LN was swamped with assistance. There were four base stations, 15 mobiles, two repeaters, and many hand portable units handling emergency traffic. Doctors were given portable hand units to use within the hospital in place of their public address system, which was knocked out. A total of 20 amateurs participated. — WA8NBD.

While driving on Interstate 59 about 15 miles south of Meridian, Miss., on June 11, K8YUW/5

saw a car pulled off to the shoulder with the hood up, boiling steam, and a little white-haired lady standing by the car waving a handkerchief. Inquiring as to the trouble, she said: "My husband is in the back seat with a heart attack, and I am trying to get him to the hospital; but my car will not run." The man could not speak, had a weak pulse and was shaking severely. At the request of the man's wife, K8YUW/5 decided to take him to the hospital, but being a stranger to the area, directions were needed. K8YUW/5 fired up his mobile rig on 20 meters, and asked the YL System to get the Highway Patrol to meet him at the outskirts of Meridian and escort him to the hospital. KØHPJ on the System put through a long distance call to the Patrol and arranged for the assistance. — *WSNCB SCM MS.*

A fatal automobile accident the week of June 12 on Guam resulted in health and welfare phone patch traffic from Fort Dodge, Iowa. When official channels became clogged, WØBW patched through the next of kin via KG6AJA with an assist from KG6JAB. As a result, a critically injured Navy man was able to get through to relatives in Fort Dodge.

The untimely death of a nurse in Bloomington, Ind., triggered a desperate effort to contact her husband, who was on a missionary research expedition in a remote part of the Gabon Republic in western Africa. On June 18 the Red Cross enlisted the aid of WA9AAV to contact the husband in time to bring him home for the funeral. After 24 hours of scanning the bands for a TR8 to no avail, WA9AAV finally contacted an amateur outside Monrovia, who relayed the message to a missionary broadcast station. A missionary in Libreville heard the broadcast and contacted the police. They put out the message on their local radio "hotline" to a nearby village close to the bereaved missionary who, upon receiving the message, was able to return to Indiana just in time for the funeral. Incidentally, commercial cablegrams, which were also sent, lay around for three days in a post office 50 miles away from their destination. — *K9CUY.*

Prior to NCSing the Indiana Traffic Net (QIN) on June 24, W9QLW heard a "QRRR" on 3656 kHz. Through heavy QRN, he identified WBØCHG, Elma, Iowa, who needed help in notifying civil authorities because of storm damage and evidently no phone outlets. With an assist from WA9ZKX, information was relayed through the Red Cross to the sheriff and the Iowa State Police. — *W9FC, SEC IN.*

On June 28 K1VRT, WØRJN, and WIHNA were in QSO when KG4AN, Guantanamo Bay, Cuba, asked for assistance with phone patches for the *USS Trenton* which had had an explosion in the engine room earlier in the day killing four men and injuring six critically. KG4AN, operated by KG4EY, handled 84 phone patches in six hours to concerned relatives in the states. KG4CS, KG4EW, and KG4AM also assisted with the traffic to K1VRT, WIHNA, WA1NDG, WB4HDS, and WA4VHM. — *KG4EY & KG4CS.*

On June 24, K2IEZ, Communications Officer for the Woodbridge, N.J., e.d., received a report from a mobile unit on 146.82 MHz that an explosion had occurred at a chemical and explosives plant in Sayreville and that a large area of the plant was on fire. The plant radio system was inoperative and all

telephone lines were out of order, AREC units were immediately dispatched to provide communication to the disaster scene inside the plant (WA2VFB), outside in the emergency equipment marshalling area (WA2NAV), to a telephone line via radio to make outside calls (WA2RHL), and from the main gate to the hospital (K2IEZ). Units used the 146.22/146.82 MHz repeater with several other units on standby. Communications rendered consisted of requests for fire equipment, additional ambulances, and requests to and from state and local police. Communication also aided traffic and crowd control. AREC units handled assistance requests to the Salvation Army and to the Red Cross for victims of chlorine gas leaks. All ambulance traffic was dispatched from the scene to the local hospital, and utility companies were contacted. Communications were supplied from 2245 EDT June 24, to 1700 EDT June 25, when the operation was secured. All operations were under the AREC via repeaters by members of the N.J. Emergency Repeater Service of Woodbridge. — *K2IEZ.*

On July 3 a hiker suffered a near fatal fall of about 1000 feet in Mount Baker National Forest, 50 miles northeast of Everett, Washington. WA7GDU and his wife witnessed the fall. A nearby physician administered aid, while WA7GDU hurried the rest of the way down the trail to his car and called "mayday!" on 146.76 fm. His call was first heard by WA7QA who alerted her OM WA7HYD. Although mountainous terrain made communication difficult, K7KSZ and W7IEU were alerted. After several false leads on obtaining removal of the injured party, W7IEU and K7KSZ established contact with K7KXN in Mount Vernon, Skagit County. Unable to copy, WA7GDU moved to a better location, whereupon K7KXN patched in WA7GDU to the Skagit County Sheriff. Arrangements were made to have the Mountain Rescue unit proceed to the scene. A helicopter from Fort Lewis removed the victim to University Hospital in Seattle. — *W7IEU, Asst. EC Snohomish Co., WA.*

During the 6-meter band opening on July 12, WB4HIL/4, operating from a Boy Scout camp near Rockwood, Tennessee, was attempting to contact his father, W4YGI, with the report of an injured fellow scout with a possible broken rib. The parents in nearby Clinton needed to be notified of their hospitalized son. Although the distance to WB4HIL's home was approximately 40 miles, contact could not be made. But the call was heard by WA2PAU in Saratoga Springs, N.Y., who was able to relay through WA4TJW in Knoxville and later K4LTA in Oak Ridge. The injured scout's condition and phone numbers were passed on during 20 minutes of highly tenuous band conditions. — *WA2PAU.*

Only 36 SEC reports were received for the month of May, which is the low for the year and five less than the number of reports received for the same month last year. Total AREC members represented is 12,572, also a low. Sections reporting: AB, AZ, AR, CO, CT, FLA, ENY, EMASS, IN, IA, KS, Los Ang, MAR, MI, MT, NE, NV, NLI, NNJ, NTEX, OH, OK, ON, OR, SDgo, SK, SD, SNJ, UT, VA, WA, WV, WFLA, WMASS, WNY, WPA.

11th RTTY DX "British Columbia Centennial" Sweepstakes

1) The contest commences at 0200 GMT Sat. Oct. 16 and ends at 0200 GMT Mon. Oct. 18, 1971. The total contest period is 48 hours but no more than 36 hours of operation is permitted. Time spent in listening counts as operating time. The 12 hour non-operating period can be taken at any time during the test but times on and off must be summarized on the log and score sheets.

2) The contest will be conducted on the 3.5, 7, 14, 21 and 28 MHz amateur bands.

3) Use the ARRL Country list, except that KL7 KH6 and VO are to be considered as separate countries.

4) The message is to consist of a message number, time in GMT, zone and country.

5) All two-way contacts with stations in one's own zone will receive two points. All two-way contacts with stations outside one's own zone will receive points listed in the Zone Chart (see page 54, Sept. 1969 *QST*). Stations may not be contacted more than once on any one band. Additional contacts may be made with the same station if different band is used for each contact.

6) In honor of the British Columbia Centennial, bonus points of 100 will be added for every VE and VO station contacted. Total bonus exchange points to be multiplied by number of VE7s (B.C.) worked. Bonus points to be added to total score at the end.

7) Entries will be classified as either single or multioperator stations. Individual operators of multi-operated stations can submit their logs singly and compete as single operators, instead of submitting a group log. Logs from multi-operated stations, or Group logs must compete for multi-operated station awards.

8) A multiple of one is given for each country worked including one's own on each band. e.g. If one country is worked on 3 bands, 3 multipliers are given.

9) CARTG log sheets are available for SAE or IRCs. Separate pages will be used for each band. Information contained will be band, exchange numbers, times in GMT, station calls, zones, countries, exchange points and power. Logs must be received not later than December 1, 1971. Send them to: Canadian Amateur Radio Teletype Group, 85 Fifeshire Road, Willowdale, Ontario, Canada.

10) To score, the total exchange points multiplied by number of Countries worked, multiplied by number of continents (maximum 6). Finally "B.C. Centennial" Bonus points added.

Scoring Example

Exchange points 2020, countries 40, continents 5.
Score: $2020 \times 40 \times 5 = 404,000$ pts. Bonus: - 6 VE Contacts = 600 points. 2 VE7s included - $600 \times 2 = 1,200$ pts. TOTAL SCORE = 405,200 points.

Awards

Ten plaques will be sponsored by B.C.A.R.A. members and the *RTTY Journal*. High Score USA - Gold Medallion and Ribbon by *RTTY Journal*. High Canadian Score - Gold Medallion and Ribbon - Canadian Director's Award. "Green RTTYer" High Score (never participated in any



RTTY contest) Plaque - B.C.A.R.A. 10 Meter High Score - Silver Medallion and Ribbon *RTTY Journal*. High Score for low power stations (under 100w input) - plaque by B.C.A.R.A. SWL Printer High Score - Plaque by B.C.A.R.A. High Score for Narrow Shift contacts - Sidney Burnett Memorial Plaque. High Score Multi-Operated Stations - 3 plaques by B.C.A.R.A. and *RTTY Journal*. Certificates for top scores in each USA and Canadian district and in each country.

Strays



R. L. Hawkins, W5FW (I) member of the Chickasaw Indian Tribe and Asst. Director, welcomes W5EYB, W. Gulf Director, to the 1971 Lawton-Fort Sill Oklahoma Hamfest.



The 1971 Space Conference

A New "Amateur Satellite Service" with Additional Operating Privileges

THE WORLD ADMINISTRATIVE Radio Conference for Space Telecommunications (WARC/ST) convened June 7, 1971, in Geneva, Switzerland, to review and make necessary changes in the ITU Radio Regulations as they concern extra-terrestrial radio communication, and radio-astronomy.

For six weeks, more than 700 delegates, staff, and observers wrestled with problems which have arisen in this fast-moving science since the first such conference in 1963. Solutions were usually compromises, because of the diverging views of various countries participating.

The International Amateur Radio Union, through its 83 member-societies, had been planning for this conference some years in advance. At the 1963 meetings, official recognition for amateur space activity was given only to our exclusive worldwide band 144-146 MHz. This apparent limitation was not too restrictive in practice, however, because the U.S. had granted approval for Oscar launches with outputs on 28 MHz in one case, and 430 MHz in another, on a non-interference basis. Nevertheless, IARU sought expanded privileges in the international rules, and through advance work with member-societies was able to inspire official proposals to ITU from Argentina, Australia, Brazil, Canada, Federal Republic of Germany, Netherlands, New Zealand, United Kingdom, and the United States — all for space authorization in various additional amateur bands.

Amateur Representation

A number of amateurs participated in the conference. Delegates or advisers from their respective countries included HZ1HZ, Saudi Arabia; VE3CCJ, Canada; W3KYI, K4BZF, WA4NTA, W4ZC, W5UEW, K0BGD (and a few ex-Ws), United States; OH2WS, OH2AZN, Finland; VU2ZR, India; EI4N, Ireland; JA1NET, Japan; EL2L, Liberia; 5T5AD, Mauritania; PA0WN,

Netherlands; DL3SO, DL1XJ, Germany; G2BVN, G3IWL, United Kingdom; HB9AS, HB9EL, HB9IL, Switzerland; HA5KBF, Hungary; EP2MA, Iran; SM5AHK, Sweden; 6W8DL, Senegal; YU1AF, Yugoslavia; ZL2IQ, New Zealand. The group of observers for IARU, headed by W0DX, consisted of PA0DD, VE3CJ, ZL2AZ, W1RW, W1RU, and (later) K3JTE. Because government people had many responsibilities in fields other than amateur radio, the job of getting favorable conference decisions fell largely to this IARU team.

The conference organization was as customary — various committees to handle credentials, budget, etc., and others (of greater importance to us) on allocations, and on technical matters. The number of proposals to be considered by the conference was much too large to be handled by these major committees in full session, so a number of specialized "working groups" were formed, dividing up the work. Our allocations matters were assigned to Working Group 5C, along with problems of meteorological satellites, earth resources satellites, and standard frequency and time signals.

Amateur radio turned out to be the number one subject for this group's agenda. At the very first meeting there was general agreement (tho not unanimous) that amateurs should be granted space activity authorization for the exclusive hf bands (7.0-7.1, 14.0-14.25, 21.0-21.45, and 28.0-29.7 MHz). But at the very same meeting there was intense opposition to our use of the additional bands which are shared either with other services worldwide, or allocated to different services in the three ITU regions. The extent of this opposition was not known previously, because countries do not normally make "negative" proposals. It also became obvious in the working group discussions that there had been considerable advance liaison between many of the countries in opposition — most of them in Europe and Africa.

A good bit of negotiation to solve knotty problems took place informally, such as in this lobby of the conference building, or the coffee bar in the distance.

Heavy Opposition

With France leading the "enemy" through an extensive presentation pointing up various difficulties (real or imagined) which hams might cause, country after country agreed there were dangers in permitting Oscar satellite use of amateur bands which were primarily assigned to radiolocation — or, in some cases, fixed and mobile communication. Logic seemed unimportant; largely disregarded were the facts that amateur satellites use extremely low power; that radars have special circuitry making them substantially immune to unwanted stray radiation; that any weak amateur satellite signal will hardly interfere with a commercial mobile operation on the ground; that if interference does occur it would last only a few moments and then (because of the orbit involved) not be heard again for 12 or 24 hours; and that in the unlikely event of serious interference to another service, the amateur satellite will be turned off on ground command. Most delegates seemed to have their minds already made up. The result was that after several days of discussion, Working Group 5C reported favorably on amateur satellite use of our exclusive bands, but turned thumbs down on anything else. The only flicker of hope was a casual mention by Switzerland of the possibility of an okay for a small segment of 420 MHz, 435-438.

The IARU crew was disappointed, but by no means downhearted. Matters would have to come up for review in main Committee 5 on allocations, we knew, and so work commenced behind the scenes to line up support for additional amateur privileges. Effort was particularly expended in getting agreement to that small 435-438 MHz segment, and similarly small chunks at 1215-1230, 5650-5670, and 10,350-10,400 MHz, chosen after informal discussions with various delegations as the areas where the least difficulties would likely be caused to current non-amateur operations. A treatise on amateur space activities and plans — with emphasis on shooting down the interference specter and on suitable command, control, and responsibility matters — was prepared by the team and issued as a formal conference document.

Any optimism the IARU team had in the effectiveness of such planning for Committee 5 review was quickly destroyed, however, when that meeting commenced — some three weeks later. Its

During the conference a magnificent exhibition, "Telecom 71," was sponsored by ITU, with both governments and industry having extensive displays. IARU arranged this stand to tell the amateur radio story.



Chairman, who we discovered has a reputation for anti-amateur views, discouraged any discussion and went right to a vote — which he took on the question of amateur satellite operation in the full 420-450 MHz band, rather than the 435-438 segment mentioned in the working group report and which his country (Switzerland) had originally suggested! The result was defeat — 31 to 25. This chairman then quickly went to the higher bands, taking them as a package rather than individually (despite protests of several countries) and got a 46-to-18 vote against us.

This time the IARU crew was downhearted, and it was not much comfort to find a number of delegates privately rather critical of the chairman's summary handling of the amateur situation. It was some slight reassurance, however, that several countries (U.S., New Zealand, U.K., Israel, Italy) served notice of intention to bring the amateur case up before the entire (plenary meeting) conference for review.

The Full Plenary

The IARU team intensified its efforts, knowing the final plenary would be a last chance. Informal contact and discussions were held (or renewed) with a large number of delegates. (As ZL2AZ put it, "It is surprising how hoarse one can get even though he is supposed to be only an observer!") It was felt desirable to have new and official documents for specific conference consideration, so the allocations matters could not be brushed off again. The United Kingdom agreed to sponsor a proposal for 435-438 MHz amateur space use and issued a paper strongly in support of such authorization. In the limited Committee 5 discussions, Italy had indicated the possibility of agreeing to small segments for amateurs in higher





Members of the IARU observer team inspect the display. L. to r., G2BVN, Region I Secretary who made most of the arrangements, W0DX, ZL2AZ, PA0DD, VE3CJ.

bands. IARU liaison with the Italian delegation led to their issuance of a document proposing the earlier-named segments at 1215, 5650, and 10,350 MHz. (Other nations such as Canada, New Zealand, U.S., would likely have issued such proposals if requested, but it was deemed important that the initiative come from the European area, where most of the opposition was centered.)

Our "hearing" in full plenary was fair and adequate — despite the fact it was only 36 hours before the complete decisions of the conference were due to be printed and formally signed by all participating countries! The segment 435-438 MHz was, by an overwhelming vote of 63 to 3, authorized for amateur satellite use. However, the proposals for segments at 1215 and 5650 were rejected by substantial majorities; and that at 10,350, while coming closer, still lost, 36 to 30.

Non-allocations Matters

There were subjects involving amateurs besides frequency allocations, of course. One proposal was to define the "Amateur Satellite Service," in conformity with the conference's apparent desire to identify and define most anything and everything in space. The final version:

Amateur-Satellite Service. A radiocommunication service using space stations on earth satellites for the same purposes as those of the amateur service.

There was also an addition to Article 41, the section of the Radio Regulations treating amateur matters. The purpose of this new material is to ensure alleviation of any harmful interference which might be caused by amateur satellite operation to other services. It reads:

"Space stations in the Amateur Service operating in shared bands shall be fitted with appropriate devices for controlling emissions in the event that harmful interference is reported in accordance with the procedure laid down in Article 15. Administrations authorizing such space stations shall inform the I.F.R.B.¹ and shall insure that sufficient ground command stations are established before launch to guarantee that any harmful interference that might be reported can be terminated by the authorizing Administration."

These were favorable items, but there were numerous difficulties to be avoided as well. Some examples: Argentina had proposed withdrawal of a

¹ International Frequency Registration Board of the ITU.

400-kHz portion of our 6-meter band, 50.55-50.95 MHz, from *any* kind of amateur use, in order to prevent interference to Channel 2 TV. This loss was successfully averted. In an attempt to find space for maritime-satellite operation, Sweden (plus some others) worked hard to switch 432-434.5 MHz from amateurs to that service; fortunately for us, there was never any majority agreement.

Conclusions

So now we have an Amateur Satellite Service, officially recognized by and defined in the international Radio Regulations. We can (officially effective January 1, 1973) employ satellites transmitting in the exclusive worldwide bands:

Frequency (MHz)

7.0 - 7.1	28.0 - 29.7
14.0 - 14.25	144.0 - 146.0
21.0 - 21.45	24.0 - 24.05 GHz

plus shared use of 435-438 MHz. This should serve our needs for some years, perhaps until the time of the next conference — when certainly we shall return seeking additional space privileges. Prior to that time, should amateur development and activity in space make it desirable to use additional bands such as 1215, it is not impossible that, with suitable precautions to avoid interference to other services, special permission could be granted for such a launch.

Perhaps the most important conclusion to be drawn from the results of the conference is — once again — that for success in obtaining desired privileges, amateurs and their associations in all ITU countries must commence work several years in advance, to ensure a favorable attitude on the part of their national administration. Some societies had indeed done this — notably the Radio Society of Great Britain; the official United Kingdom attitude had changed substantially since 1963 from one of foot-dragging to one of enthusiastic and aggressive support. However, many societies had *not* done so — whether through lack of success in efforts to convince administration authorities, or whether through lack of any effort at all. National policy once made in advance of the conference is extremely difficult and often impossible to get changed substantially at the conference itself, so it is not practicable to rely on the IARU team of observers to accomplish such miracles. Again, the job must be done by national societies with their own administrations well in advance of any conference. The world's amateurs will simply have to make an even greater effort next time. *WIRW*

Happenings of the Month



ELECTION NOTICE

To All Full Members of The American Radio Relay League Residing in the Atlantic, Canadian, Dakota, Delta, Great Lakes, Midwest, Pacific and Southeastern Divisions:

An election is about to be held in each of the above-mentioned divisions to choose both a director and a vice-director for the 1972-1973 term. These elections constitute an important part of the machinery of self-government of ARRL. They provide the constitutional opportunity for members to put the direction of their association in the hands of representatives of their own choosing. The election procedures are specified in the By-Laws. A copy of the Articles of Association and By-Laws will be mailed to any member upon request.

Nomination is by petition, which must reach the Headquarters by noon of September 20. Nominating petitions are hereby solicited. Ten or more Full Members of the League residing in any one of the above-named divisions may join in nominating any eligible Full Member residing in that division as a candidate for director therefrom, or as a candidate for vice-director therefrom. No person may simultaneously be a candidate for both offices; if petitions are received naming the same candidate for both offices, his nomination will be deemed for director only and his nomination for vice-director will be void. Inasmuch as all the powers of the director are transferred to the vice-director in the event of the director's resignation or death or inability to perform his duties, it is of as great importance to name a candidate for vice-director as it is for director. The following form for nomination is suggested:

Executive Committee

*The American Radio Relay League
Newington, Conn. 06111*

*We, the undersigned Full Members of the ARRL
residing in the Division, hereby
nominate of
as a candidate for director; and we also nominate
of as a candidate for
vice-director; from this division for the 1972-1973 term.
(Name Call City Zip Date)*

The signers must be Full Members in good standing. The nominee must be the holder of at least a General Class amateur license, or a Canadian Advanced Amateur Certificate, must be at least 21 years of age, and must have been licensed and a Full Member of the League for a continuous term of at least four years at the time of his election. No person is eligible who is commercially engaged in the manufacture, sale or rental of radio apparatus capable of being used in radio communications, is

commercially or governmentally engaged in frequency allocation planning or implementation, or is commercially engaged in the publication of radio literature intended in whole or in part for consumption by radio amateurs.

All such petitions must be filed at the headquarters office of the League in Newington, Conn., by noon EDST of the 20th day of September, 1971. There is no limit to the number of petitions that may be filed on behalf of a given candidate but no member shall append his signature to more than one petition for the office of director and one petition for the office of vice-director. To be valid, a petition must have the signature of at least ten Full Members in good standing; that is to say, ten or more Full Members must join in executing a single document; a candidate is not nominated by one petition bearing six valid signatures and another bearing four. Petitioners are urged to have an ample number of signatures since nominators are occasionally found not to be Full Members in good standing. It is not necessary that a petition name candidates both for director and for vice-director but members are urged to interest themselves equally in the two offices.

League members are classified as Full Members and Associate Members. Only those possessing Full Membership may nominate candidates or stand as candidates; members holding Associate Membership are not eligible to either function.

Voting by ballots mailed to each Full Member will take place between October 8 and November 20, except that if on September 20 only one eligible

OVERSEAS AND ABSENTEE BALLOTS

All ARRL members who are licensed by FCC or DOC but are temporarily resident outside the U.S. or Canada are now eligible for Full Membership. These members overseas who arrange to be listed as Full Members in an appropriate division prior to September 20 will be able to vote this year where elections are being held.

Even within the U.S., Full Members temporarily resident outside the ARRL division they consider home may now notify the Secretary prior to September 20, giving the current QST address and the reason why another division is considered home (e.g., holding an amateur call appropriate to the division). So if your home division is the Atlantic, Canadian, Dakota, Delta, Great Lakes, Midwest, Pacific or Southeastern, but your QST goes elsewhere because of a different residence, please let the Secretary know, as soon as possible but no later than September 20, so you'll receive a ballot for your home division.

candidate has been nominated, he will be declared elected.

Present directors and vice-directors for these divisions are - *Atlantic*: Harry A. McConaghy, W3EPC and Jesse Bieberman, W3KT; *Canadian*: Noel B. Eaton, VE3CJ and A. George Spencer, VE2MS; *Dakota*: Larry J. Shima, W0PAN and Edward C. Gray, WA0CPX; *Delta*: Max Arnold, W4WHN and Franklin Cassen, W4WBK; *Great Lakes*: Alban A. Michel, W8WC and Currin L. Skutt, W8FSZ/K8EPT; *Midwest*: Sumner H. Foster, W0GO and Ralph V. Anderson, K0NL; *Pacific*: J. A. Doc Gmelin, W6ZRI and Hugh Cassidy, WA6AUD; *Southeastern*: H. Dale Strieter, W4DQS and Charles J. Bolvin, K4KQ.

Full Members are urged to take the initiative and to file nominating petitions immediately.

For the Board of Directors:
July 1, 1971

JOHN HUNTOON
Secretary

HEARING ON GOLDWATER BILL

The bill (S-485) introduced by Senator Barry Goldwater, K7UGA, and sponsored by 29 other Senators, to allow future citizens to hold FCC amateur licenses, cleared the Senate on May 25. On June 24, the Subcommittee on Communications and Power of the House Committee on Interstate and Foreign Commerce held a hearing on S-485, HR 7343 HR 8964 and HR 9261 (the latter three identical to S-485 and to S-1466 of the previous Congress). The only witnesses were Chairman Dean Burch of FCC and ARRL General Counsel Robert M. Booth, Jr., W3PS.

During questioning, Chairman Burch stated he regarded this legislation as stop-gap and said FCC

was preparing a legislative proposal which would eliminate citizenship requirements for all but broadcast and common carrier stations and service. There was some inclination by committee members to wait for FCC's bill. However, Counsel Booth urged the immediate adoption of the bills on grounds the text had already been twice enacted by the Senate and once approved by the Subcommittee; further, the other matter was so extensive and sweeping that many objections might arise. The ARRL view prevailed; the Subcommittee has since reported the bills favorably to its parent group.

Counsel Booth's written statement follows:

Mr. Chairman, I appreciate the opportunity to present the views of the American Radio Relay League in support of the proposed amendment to the Communications Act of 1934.

The American Radio Relay League is a nationwide nonprofit organization of licensed amateur radio operators having approximately 90,000 licensed amateurs as voting members. There is no comparable organization or spokesman for Amateur Radio in the United States. The League also is the headquarters organization of the International Amateur Radio Union, the membership of which is composed of the national amateur radio societies of 83 nations, including the USSR. Requests for admission to membership from the national societies of Thailand and Singapore are pending, and an application from the Romanian society is expected momentarily.

The President of the League, Robert W. Denniston, often testifies in hearings on proposed legislation of interest to the amateur radio operators of the United States. Mr. Denniston regrets his inability to be here today. He is in Geneva heading up the International Amateur

The League election process is again underway, with nominations closing September 20 at noon. Where there is more than one candidate for an office, ballots will be sent to all Full Members in that division. Inner and outer envelopes are provided to ensure secrecy of each member's vote, and the envelopes remain sealed until ballot-counting day, usually November 20. Here, in a previous year, W1RU and WA2INB cut open envelopes with a machine, while the clerks in the background "unstuff" them. The outers are segregated before any inner envelopes are opened. After the ballots have been removed, they're carried to an adjacent room for sorting by candidate. Counterclockwise: W2TUK on the telephone; VE3CJ; W7PGY; Treasurer Houghton; CPA John Luft (seated); W1RW (with ballots); W0BUQ. A "Tickometer" is used to count the ballots after sorting.



Here is Esther Forbes, "Mrs. WB6QDC," manning the W6 QSL Bureau booth at the Pacific Division Convention. The picture gives us an excuse to remind you to have stamped self-addressed envelopes at your branch of the QSL Bureau (addresses elsewhere in this issue) and, if your envelopes were sent before July 1, to send some 2¢ stamps along (1¢ for Canadians) to cover the postal increases.



Radio Union's delegation to the World Administrative Radio Conference on Space Communications to support proposals of the United States and other major countries for enlargement of the rights of radio amateurs to engage in space communications. The International Radio Regulations for years have made available to amateur radio most valuable frequency bands on a world wide basis in recognition of the importance of amateur radio to all the nations of the world.

The legislation before you is another step toward fulfilling the purposes and objectives of the Amateur Radio Service as outlined in Section 97.1 of the Rules and Regulations of the Federal Communications Commission:

§97.1 Basis and purpose

The rules and regulations in this part are designed to provide an amateur radio service having a fundamental purpose as expressed in the following principles:

(a) Recognition and enhancement of the value of the amateur service to the public as a voluntary non-commercial communication service, particularly with respect to providing emergency communications.

(b) Continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art.

(c) Encouragement and improvement of the amateur radio service through rules which provide for advancing skills in both the communication and technical phases of the art.

(d) Expansion of the existing reservoir within the amateur radio service of trained operators, technicians, and electronics experts.

(e) Continuation and extension of the amateur's unique ability to enhance international good will.

The International Radio Regulations, a treaty to which the United States is a signatory, provides that amateur radio licenses can be issued only to persons who have demonstrated a knowledge of the technical aspects of radio communications. In addition, amateurs desiring to operate on the high frequency bands which are useful for long distance and world wide communications must demonstrate a knowledge of the Morse Code.

Slightly less than 50 percent of the half million licensed amateur radio operators of the world live outside the United States. This is indeed a vast pool of trained technicians, many extremely well qualified engineers and scientists.

In 1964, Congress enacted an amendment of the Communications Act to permit amateur radio operators licensed by other countries to operate while visiting the United States. It later was recognized that the amendment created a void. An amateur licensed by another country who immigrated to the United States under a permanent visa and who had expressed his intention to become a citizen was unable to engage in amateur radio operations until after he had obtained his

citizenship and then passed the examination of the Federal Communications Commission. When Senator Goldwater learned of this inequity, he introduced S.1466 in the 91st Congress and S.485 in this Congress.

Attention to this anomaly was called to the attention of Senator Goldwater and the League by an engineer-scientist who had immigrated to this country five or six years ago from a Central European country. When he left his native land, he was required to surrender the amateur license he had held for many years. I understand that frequent contacts and discussions via amateur radio played a most important part in his decision to become a United States citizen.

I have been told of a similar case involving a medical doctor from a Central European country who now is practicing medicine in New England and who applied for and successfully passed the amateur examinations of the FCC only a few days after he became a citizen of the United States. He now is one of the best "ambassadors" of this country in his daily contacts with his old country and with other amateurs throughout the world.

These are just two of a number of cases where highly qualified professional men have become citizens of the United States as the direct result of amateur radio.

Almost every member of Congress is aware of the service rendered by the radio amateurs — hams — of the United States in times of emergency and disaster, such as earthquakes, tidal waves, hurricanes, typhoons, tornados, floods, blizzards, ice storms, and fires. But few are aware of the intangibles which will flow from the pending legislation. Amendment of the Communications Act as proposed in the legislation before this Committee most assuredly will serve the national interests of the United States.

Thank you for affording the American Radio Relay League the opportunity to present its views and recommendations.

INQUIRY INTO TVI

FCC earlier this year published a Notice of Inquiry, Docket 19183, to develop data and recommendations as to television receiver improvements and revised fm broadcast assignment

principles which could be used to alleviate various kinds of interference to television reception (See pages 81-82, June *QST*). Originally, deadline for comment was July 1, 1971, but by order June 29, this was extended to October 1.

Pursuant to Minute 35 of the 1971 ARRL Board Meeting, the League has already filed its views on the matter; the text follows:

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D. C. 20554

In the Matter of

Inquiry into performance of television broadcast receivers and location of FM transmitters to alleviate interference to television reception

Docket No. 19183

To: The Commission

Response to Notice of Inquiry

The American Radio Relay League, Incorporated, respectfully submits the following response to the Notice of Inquiry released April 5, 1971 (FCC 71-309, 36 FR 6459, 7029), which seeks "to develop data and recommendations as to television receiver improvements . . . to alleviate various kinds of interference to television reception."

Interference to reception is as old as radio. With the advent of commercial television broadcasting following World War II, interference complaints and problems increased by leaps and bounds. Television interference (TVI) committees were established throughout the United States by amateur radio operators, television servicemen, and broadcast (AM, FM and TV) station engineers in cooperation with the Federal Communications Commission.

Improvements in the design and operation of transmitters in all of the many radio services to eliminate spurious radiation and reduce harmonic radiation to an extremely low level were accomplished in short order. Next was the imposition of radiation limits on receivers and other devices under Part 15 of the Commission's Rules and Regulations. The weakest link always has been and continues to be the design, installation, operation and maintenance of television receivers and accessories.

The television receiver, by the very nature of the characteristics of television signals, is a relatively broadband device and is manufactured and sold under most competitive conditions.

A television receiver, particularly a color receiver, is a most substantial investment. Maintenance is expensive. An outdoor elevated receiving antenna, which is exposed to the elements, is essential in most instances where community antenna television (CATV) service is not available. A most substantial percentage of the population of the United States resides beyond the normal service areas of television stations and must rely on relatively weak signals. As a general rule, susceptibility to interference varies inversely with the strength of the desired signal.

The solution to TVI is most complex. The Commission's records contain extensive reports of the work over the years of many TVI committees on interference from all sources including electrical equipment and not just amateur stations. It has been the observation of the ARRL that at least 90 percent of all TVI complaints result from one or more of the following conditions (which are not necessarily listed in the order of frequency of occurrence):

1. Overloading of the television receiver by signals, often on frequencies far removed from those of the desired signals, so strong that non-linear operation produces spurious signals. This condition has become more severe with the use of transistors in the input circuits of the radio frequency (RF) tuners.
2. Adjacent channel interference resulting from lack of selectivity of the television receiver.¹
3. Improper tuning and adjustment of the television receiver by the user.
4. Improper or lack of maintenance of the television receiver.
5. Poor connections and corroded contacts in the antenna and lead-in which produce intermittent reception and, at times, rectification of strong signals.
6. Broad band, high gain preamplifiers (or signal boosters) used in weak signal areas.
7. Attempts to receive signals far beyond the normal or reasonable service area of a station.

The experience of the TVI committees has been that most of these conditions can be alleviated *provided* the television receiver owner is willing to cooperate. Unfortunately, all too often the receiver owner takes the position that he has paid several hundred dollars — and sometimes even more — for a receiver and outdoor antenna, that neither the receiver nor its installation can possibly be at fault, and that he is entitled to interference free reception irrespective of the distance from the desired stations. All too often the seller of the receiver and the serviceman will "pass the buck" by placing the blame unjustly upon the licensee of a transmitter in any of the many services.

¹ See "Response of RF Tuned Circuits at Frequencies Far From Resonance" by W. K. Roberts (FCC), IEEE Transactions on Broadcast & Television Receivers, Vol. BTR-14, No. 3, October 1948.

H JAMBOREE ON-THE-AIR

W3RXP



Each year, one particular weekend is marked out to show amateur radio to Scouts — called Jamboree on the Air. This year, the dates are October 16/17 for forty-eight hours, starting and ending at midnight by your own local time (a change from earlier affairs which were on GMT). A typical operation last year is shown here at the Shrine of the Most Blessed Sacrament Church, Washington, DC, under the call W3RXP/3.

QST for

Maitland H. Carey, WA4DJF (right), receives a Delta Division Certificate of Appreciation from Harold Starks, W4JVO, president of the Giles County (Tennessee) Amateur Radio Club for assisting in the training of new amateurs. (Photo by Kent Kressenberg, WN4SYU, for the Giles Free Press)



Experience over the last twenty four years leads only to the following conclusions: -

1. The design of television receivers must be improved by (a) redesigning circuits to eliminate the generation of spurious signals under strong signal conditions; (b) incorporating high pass filters in the input circuits;^{2,3} (c) providing highly selective circuits to reduce adjacent channel interference particularly from signals on frequencies immediately below 54 MHz, below 174 MHz, and above 108 MHz;⁴ (d) providing coaxial or shielded circuits between the antenna terminals on the receiver and the input to the RF tuner; (e) providing for use of unbalanced coaxial transmission lines from the antenna to the receiver; and (f) improved shielding generally.⁵

2. The same practices, where applicable, must be applied to booster amplifiers.⁶

3. The receiver owner must be made aware of the fact (a) that his rights to satisfactory reception are not paramount to the rights of others to operate transmitters, and (b) that the degree of protection from interference to which he is entitled is directly related to his distance from the transmitter of the television station. The operating instructions should be revised or a separate pamphlet should be provided setting forth these fundamentals in simple words and illustrations. Those documents should make clear to the receiver purchaser that additional filters and other installation precautions may be required and will be furnished by the dealer at no additional charge for parts and installation.

4. The manufacturers must provide additional training aids and instructional and maintenance materials for servicemen.

More specific recommendations as to specifications and standards are not offered as every manufacturer knows what is required to produce satisfactory receivers.

Arguments have been advanced from time to time to the effect that the Commission has no authority over the design characteristics of receivers. During the hearings on the legislation which, in 1968, became Section 302 of the Communications Act of 1934, as amended, testimony was presented calling attention to the fact that the receiver often is the cause of unsatisfactory reception which, without investiga-

² Some manufacturers already provide for the adding of such filters upon request of the customer. The practice of charging for the filter and for the installation varies between manufacturers.

³ Two or more high pass filters may be required, one for use for the 54-108 MHz band, one for the 174-216 MHz band, and one for the UHF band.

⁴ The present practice of providing guard bands is most wasteful of valuable spectrum space.

⁵ The broadband IF circuits are most susceptible to interference from transmitters operating on frequencies within or close to the pass band. Complete shielding is essential.

⁶ The input circuits of some boosters are tuned only by the elements of the antenna. All are transistorized.

tion, might appear to be caused by unwanted radiation of a transmitter or some other device. If the Commission's authority over the design characteristics of receivers is questioned by any party, a proposal for appropriate legislation should be introduced without delay.

Any improvement of receivers will increase the cost to the consumer. However, if every manufacturer is required to incorporate the same improvements, no one will gain a competitive advantage. Further, if the public interest will be served by incorporating safety and anti-pollution devices in automobiles even though the price to the consumer will be increased from one to two hundred dollars, the public interest also will be served by improving television receivers even though a two or three dollar increase in price may result. From a practical standpoint, the actual cost to the consumer of incorporating the necessary improvements at the time of manufacture will be far less than the present practice of providing fixes in the field.

The American Radio Relay League, as always, is ready, willing and able to join with other interested parties in working together toward a permanent solution to the most serious problem of television interference.

Respectfully submitted,

THE AMERICAN RADIO RELAY
LEAGUE, INCORPORATED

By Robert M. Booth, Jr.

Its General Counsel

July 1, 1971

ADVISORY COMMITTEE NOMINATIONS

One of the many ways in which members help steer the course of the League is through advisory committees in specialized fields. This year, the membership is being expanded to a maximum of eleven in each group, and initial appointments of terms up to three years were authorized by the ARRL Board of Directors. The full rules may be found as an addendum to the Articles of Association and By-Laws, edition of July 1, 1971. (Copy on request to members; a stamped,



At the Medical Amateur Radio Council meeting on June 24 at Atlantic City, Certificates of Merit were given to Jose E. Hauser C., OA4HJ, Peruvian earthquake work; Alan Dorhoffer, K2EEK, helpful interest and support of MARCO; Walter Shriner, MD, W9CBG, furnishing instruments and pharmaceuticals to missionary hospitals; Ted M. Newland, G3TMN, organizing Great Britain/European nets of MARCO; and Felix de Pinies, MD, WB2QMU, developing Spanish-language nets of MARCO. Here WB2QMU receives his certificate from J. Stanley Carp, MD, K1EEG, MARCO prexy. An "Honorary Degree" was conferred on the banquet speaker, The Reverend Daniel Linehan, S.J., W1HWK, director of the Weston (Mass.) Observatory. (Photo by Christine E. Haycock, MD, WB2YBA)

self-addressed envelope of standard business size would be appreciated with the letters "AABL" on it.)

Candidates for committee membership may be nominated at any time by three sponsors, each of whom is a Full Member of ARRL. Each candidate must have been a League member for a minimum of two years; licensed as a Technician or higher for three or more; and currently and consistently active and qualified in the specialty area of the field served by the advisory committee.

This is a call for nominations; convenient forms may be obtained by writing the secretary at ARRL Hq. The President, in consultation with the committee chairman and liaison members, on or about November 1 of each year, will select replacements for members whose terms are expiring, or shall reappoint them for a subsequent term as appropriate. A file of eligible nominees will be maintained for use as a source of replacements.

A member's initial term of office will be either for two or three years as designated by the President, with approximately one-half the initial members having two-year terms and the remainder having three-year terms. Members may be reappointed for no more than two consecutive

two-year terms, but are again eligible for appointment to committee membership after a lapse of one year.

The incumbents are:

V.H.F. Repeater Advisory Committee

- Gilbert J. Kowols, W9BUB, Chairman, 216 Belle Plaine Ave., Park Ridge, IL 60068
- Taylor Shreve, W0CXW, 1230 Valentia St., Denver, CO 80220
- Arthur M. Gentry, W6MEP, 7832 Jellico Avenue, Northridge, CA 91324
- Leon Giannakeff, VE3BUI, 1107-35 Tobermory Road, Downsview, Ontario
- Jon Marcinko, W7FHZ, 26501 18th Pl. So., Kent WA 98031
- George F. Munsch, W5VPQ, 11314 Janet Lee, San Antonio, TX 78230
- Jon J. O'Brien, W6GDO, 6605 Fifth St., Rjo Linda, CA 95673
- George D. Rose, Jr., W4GCE, 105 Middleboro Place, Lynchburg, VA 24502
- Howard L. Lester, W2ODC, 8 Bath St., Alplaus, NY 12008

Contest Advisory Committee

- Leonard Chertok, W3GRF, Chairman, 8301 Temple Hills Road, Washington, D.C. 20031
- Roger Corey, W1AX, 60 Warwick Drive, Westwood, MA 02090
- George W. Hippisley Jr., K2KIR, 112 Kennedy Lane, No. Syracuse, NY 13212
- Ronald R. Sigismonti, W3WJD, 790 Bridge Road, Rahns, PA 19426
- Kenneth Bay, W4UQ, 1925 Parkland Drive, Lynchburg, VA 24503
- Philip J. Goetz, W6DQX, Box 5491, Los Angeles, CA 90055
- Katashi Nose, KH6IJ, 4207 Huanui Street, Honolulu, HI 96816
- Fred Deziel, W0HP, 2417 West 112th Street, Bloomington, MN 55431
- Jack Ravenscroft, VE2NV, 353 Thorncrest Avenue, Montreal, Quebec 780, Canada



The Outstanding Amateur Award of West Virginia for 1971 went to Delf A. Norona, WA8NDY, of Buckhannon. The Award was presented at the ARRL State Convention on July 4 at Jackson's Mill by SCM Don Morris, W8JM (left). At right is Kay Anderson, W8DUV, last year's winner of the award.

TABLE I

CALL	TRUSTEE	EVENT	LICENSE PERIOD
WF7AIR	George E. Martin	MONTANA STATE FAIR Great Falls, Mont.	July 30 - Aug. 8, 1971
WD6WD	R. W. Johnson	SW DIV AMTR CONV Disneyland Hotel	Sept. 1 - 7, 1971
WB9RPT	M. J. Van Den Branden	RADIO EXPO '71 Lake County Fair Grounds, 9 miles west of Waukegan, Ill.	July 9 - 11, 1971
KC0KC	J. S. Scaptason	ANNUAL CONV. MOBILE A R AWARDS CLUB	July 1 - 5, 1971
KQ0NEB	Russel B. Ritzman	NEBRASKA STATE FAIR Lincoln Fair Grounds	Sept. 1 - 8, 1971
KF4SJ	Victor Madera	PUERTO RICO'S 450th ANNIV., San Juan	July 1 - Dec. 31, 1971
WS0ATA	Francis Cahov	25th ANNIV. STRATEGIC AIR COMMAND, Bellevue, Nebr.	June 7 - July 7, 1971
KC2GMF	Dorothy Strauber	GREAT MONMOUTH FAIR Freehold, New Jersey	June 28 - July 4, 1971
W8WVA	Delf Norona	W. VA. STATE RADIO CONV., Weston, W. Va.	June 30 - July 5, 1971
WF7WBC	John S. Harlan	CARAVAN CLUB INTERNATIONAL ANNUAL MEETING, Salem, Ore.	June 21 - July 6, 1971

DX Advisory Committee

- Bob Eshleman, W4QCW, Chairman, 3716 Drake-shire Road, Richmond, VA 23234
- Edward L. Raub Jr., W1RAN, 207 Thames Street, New London, CT 06320
- Ted M. Marks, WA2EQG, 924A Village Drive West, North Brunswick, NJ 08902
- Robert B. Vallio, W6RGG, 18655 Sheffield Road, Castro Valley, CA 94546
- Norman G. Ray, W7LFA, 14005 132nd Avenue NE, Kirkland, WA 98033
- J. G. Baumgardner, W8BF, 20470 Lorain Road, Fairview Park, OH 44126
- Robert E. Baird, W9NN, P.O. Box 498, Plover, WI 54467
- Clyde F. Norton, W0ELA, 14 Westwood Circle, Minnetonka, MN 55343
- Morton Wolfson, VE3ACD, 305 Rosemary Road, Toronto 10, Ontario, Canada

SPECIAL EVENTS CALLSIGNS

Under provisions of Section 97.51 (a)(4) of the amateur rules, FCC will make special call signs available to amateur radio stations located at events of general public interest. Application should be made at least 120 days prior to the desired date of authorization, by letter to the Amateur and Citizens Radio Division, FCC, Washington DC 20554.

A recent news release from FCC lists these recent calls. (See Table I.)

LICENSE SURRENDERED

Russell E. Jantzen, W5VBR/W6TBN, of Riverside, California, received an order from FCC suspending his operator license for the remainder of its term and another asking him to show cause why the station licenses should not be revoked. The orders mentioned alleged transmissions of obscene, profane, or indecent words, language or

meaning; of unidentifiable noises and sound effects; of language derogatory of certain races; and of threats of bodily harm to other persons. The order of suspension also stated that the licensee had misrepresented material facts to, or concealed them from, the Commission, or was lacking in candor in his responses to Official Notices of Violation.

A hearing was requested, and was accordingly scheduled for May 10 in Los Angeles. Prior to the hearing, however, Jantzen turned in his licenses for cancellation. Accordingly, the Safety and Special Radio Services Bureau asked that the hearing be cancelled "with prejudice"; the motion was granted effective June 9. The notation "with prejudice" precludes Jantzen from reopening the matter. He can, at a later date, apply for new licenses, but the FCC, even then, could require him to show cause why it would be in the public interest to issue the licenses, in light of the past record.

QST

Fifty Years of ARRL

A bound 152-page reprint of the gold-edged historical articles which appeared in the 1964 issues of QST is available from the ARRL for two dollars postpaid. Titled *Fifty Years of ARRL*, the book covers the highlights of ARRL and amateur radio history during the fifty years from 1914 to 1964, and will make a companion piece to the classic *200 Meters and Down*, a reprint of which is also available from the ARRL for two dollars.



Correspondence From Members -

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

DOCKET 19245

● [EDITOR'S NOTE: The following are comments submitted to FCC by Robert P. Haviland, W3MR.]

1. The (international) Radio Regulations, in Paragraph 78, define the Amateur Service as "A service of self training, intercommunication and technical investigation carried on by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest.

2. The interpretation of this paragraph varies somewhat from country to country. In this country, the interpretation is based on "a voluntary noncommercial communication service" (Section 97.1), with the added express provision, "an amateur station shall not be used to transmit messages for hire, nor for communication for material compensation . . ." (Section 97.111). Third party traffic is therefore presumed; it is expressly contemplated in numerous agreements established under Paragraph 1562 of the Radio Regulations.

3. The Commission's rules, Section 97.39, prohibit issuance of a station license to a "school, company, corporation, association or other organization, or for its use . . ."

4. The issue raised by the Commission in the instant docket is: does handling of a third-party message originated by a "school, corporation, association or other organization" by a licensed amateur, operating a licensed station, constitute use of the station by that school . . . (etc.)?

5. An analogy may be helpful. Suppose my neighbor has requested that I post a letter for him. On the way to the radio store, by car, I stop and drop the letter into a mail box. Has the neighbor had use of my car? Clearly, he has not. This would still be true if I had made a special trip to the mail box. I have rendered a service to my neighbor, a service which was voluntary and non-commercial and which was completely independent of the use of the car, which was never at the disposal of my neighbor. Only if I grant control of the car and if he actually drives (operates) the car has my neighbor had use of it.

6. Exactly the same considerations apply to a message generated by, say, the Red Cross, and transmitted by an amateur station, via, say, the Intercontinental Net. The originator of the message, in this case the Red Cross, has not had the use of either the amateur station or of the net. Instead, the originator has received a service; inasmuch as this service has been non-profit and voluntary, such service is expressly contemplated by the regulations.

7. The basic error of the Commission in its approach to this issue is attempting to equate "transmit a message originated by" and "to have use of a station." By definition, a station is an assembly of physical equipment, including transmitters, receivers, etc. To have use of a station, it must be possible to operate, i.e., to turn off and on, to adjust frequency, etc. The handling of a

message originated by a third party does not in any conceivable way grant the ability to operate the station to that third party. Thus the contention of paragraph 4 of the instant docket is completely without foundation, and is, therefore, an outright error.

8. Although the allegation is utterly without merit, it does raise the question: should the regulations be changed? To discuss this, attention is again invited to Paragraph 78 of the Radio Regulations, and to Section 97.3(b) of the Commission's Rules. Both contain the phrase ". . . interested in radio technique solely with a personal aim . . ." The nature of the personal aim is not specified. Observation and discussion with amateurs will show that the personal aim varies widely. It includes, among other activities, traffic handling; to some amateurs this is a challenge, recognized as requiring high personal ability; to others, it is a public service, and to still others a factor of training, for example, for emergencies.

9. In Section 97.1 of the Commission's Rules the Basis and Purpose of the Amateur Radio Service are set forth. These explicitly contain just the factors of self skill, training, public service and readiness for emergencies discussed in paragraph 8 of this response. In view of this it does not appear possible to restrict traffic handling without injuring the service itself. Therefore, it appears that a change in regulation would be, at best, unwise.

10. Unfortunately, in skirting around this matter the Commission commits an error of far greater scope than a matter of the amateur service. In paragraph 2 of the instant docket, the Commission lists a group of organizations, implying that these are the "good guys" whose traffic should be allowed, while in paragraph 3 it states that other organizations exist, with the implication that these are the "bad guys" whose communications should *not* be allowed.

11. To term this view "fantastic" would be an understatement. The concept set forth in paragraphs 2 and 3 of instant docket are nothing more than a slightly disguised version of pre-censorship, accomplished by the not-so-subtle means of a list of organizations whose aims are, in the word of the Commission, "meritorious." It hardly seems necessary to point out that any such action is forbidden to the Commission in Section 326 of the Communications Act of 1934.

12. The proposal of the EIA in RM-1687, while well intentioned, is no better. The proposal implies that there are factors which preclude transmitting messages originated by organizations not mentioned, and therefore again implies censorship.

13. A further factor: the Commission rightfully makes no distinction amongst originators in licensing radio stations to, say, the American Telephone and Telegraph Company. Yet, if the direct implications of the instant docket are pursued, one family of messages can be transmitted over AT&T circuits legally, while the same family transmitted over an amateur net would be illegal.

solely because of the originator and irrespective of any other fact. The contradiction is obvious. The full implications are frightening.

14. The above considerations, in summary, are:

The transmission of a message originated by a third party over an amateur station does not in any conceivable way constitute use of that station by the message originator.

Restriction of the right of amateurs to handle third party traffic would constitute an injury to the Amateur Service.

Any attempt to categorize originators of third party traffic into allowable and unallowable groups constitutes censorship, and is expressly forbidden by the Communications Act of 1934.

15. In view of these factors, the only course available to the Commission is to dismiss Docket 19245 and RM-1687, with prejudice. — *Robert P. Haviland, W3MR, King of Prussia, PA*

DEBUGGED

● This is just a note of gratitude for WA2HVA's letter (Tech. Corres., June *QST*) regarding PEP, etc. His explanation of the problem cleared up more "bugs" in my understanding of PEP and linear amps than Mr. Buus will ever know. — *Greg Combs, K4CRB, Hustonville, KY*

RED INK

● I note that there is anxiety over the new postage rates with the spectre of even higher rates to come. I can see no logical reason for the League to run into the red. Therefore, I would be willing, and even suggest, that all members — even those holding life memberships — be taxed accordingly. The ARRL is rare and unique in its status of looking after the rights of hams. In many foreign countries, aside from devious methods at times, it is impossible for even the nationals, let alone a foreigner, to obtain operating privileges. Yours truly is a case in point. In 25 years, the only chance I have had to participate has been on vacations back in the States. Some of the gripers about interference, regulations, etc., do not in fact realize just how fortunate they really are! — *Hugo W. Havet, Jr., K7ZLA, Dhahran, Saudi Arabia*

WRONG FREQUENCY

● A friend of mine at the office came up to me several weeks ago and asked what he could do about a ham who was coming in on his stereo tape deck. He said it didn't bother him at first but after about thirty minutes of this he got pretty mad. I asked him if he knew who the ham was and he gave me the fellow's call letters. I then asked if the ham lived pretty close and had he been notified. My friend said, "I tried to tell him to stop messing up my stereo. I picked up both microphones and called him, but he never did answer." — *Ken Lambert, WA5EOG, Houston, TX*

TWO-TOTER TOTER

● The Two-Toter lass (page 23, July *QST*) is so lovely and you don't even credit her name! One picture is worth the whole book, as the expression goes. If you had a full-size color photo available, I'd send for it regardless of price! — *George Peterman, Silver Spring, MD*

[EDITOR'S NOTE: The young lady is Linda Sturtevant, our *QST* Production Assistant and former cover girl (*QST*, March, 1970).]

LIFE MEMBERSHIP

● Congratulations to the Board of Directors for their fine decision of providing Life Membership privileges to Associate Members as well as Full Members (League Lines, June *QST*). — *Alejandro C. Posada, Los Angeles, CA*

CO-ED HOBBY

● I strongly agree with your editorial in June *QST* encouraging the recruitment of new people into ham radio (*Newcomer Propagation*). I am glad to see that you are recruiting new hams through the Boys Clubs and the Boy Scouts. But why don't we also look for new hams in the Girl Scouts? If we invite more YLs to become hams, we can insure the growth of our hobby.

There is no reason that ham radio has to remain a man's hobby. Women are showing an increasing interest in technology and these women would make good hams. Also, a growing number of YLs on the air would attract more young OMs to be active hams. Young men are most interested in hobbies that are co-ed and that encourage social life. Even the stock car tracks are recognizing this and they are starting to encourage women drivers in their races. We would do well to follow this example. — *Nickolaus Leggett, WB9BVI, Baltimore, MD*

MERCI

● Congratulations are in order once again for the League, Counsel Booth, and associates. As always, the League's comments to the FCC were clear, concise, and made their points very well in the matter of Docket No. 19183.

These comments would serve well, except perhaps for a few technical points, to explain interference conditions to a layman. — *Edward F. Erickson, W2CVW, South Amboy, NJ*

[EDITOR'S NOTE: See "Happenings," this issue, for the text on which W2CVW is commenting.]

GENEVA — 1971

● Just wanted to say how much I enjoyed reading the very informative two-part Geneva — 1971 article in the May and June issues of *QST*.

If it weren't for the ARRL, would we still be operating in the 150-200-meter bands? — *Dave Lambert, WA1JSD, Derry, NH*

TRIVIA—FINAL FINAL

● Well here is another letter to those who think that the "Trivia" should be left out of *QST*; from one who has been writing "Station Activities" since 1941 and hasn't missed a month yet. Even during the war, I sent in small ones.

Remember, *QST* is our newspaper and it contains something for everyone. If you're not interested in a certain subject, you don't have to read it.

Over the years I have had many nice letters and radiograms from hams from all parts of the world who read these reports. One letter I had during the war was from an English ham who was reading my column on board *H.M.S. Rodney* while it was on its way into Boston for major repairs. It was quite a thrill when he came to my house and visited me.

So to you fellows who don't like "Station Activities," just skip over it. — *Frank Baker, W1ALP, Braintree, MA*

[EDITOR'S NOTE: W1ALP is the "dean" of SCMs, having served Eastern Massachusetts since March 11, 1940!]

I.A.R.U. News



INTERNATIONAL AMATEUR RADIO UNION, THE GLOBAL FEDERATION OF NATIONAL NON-COMMERCIAL AMATEUR RADIO SOCIETIES FOR THE PROMOTION AND CO-ORDINATION OF TWO-WAY AMATEUR RADIO COMMUNICATION

TELECOM 71

A very extensive exhibition in the field of telecommunications took place from June 17-27 in Geneva in conjunction with the World Administrative Radio Conference for Space Telecommunications (see page 78). Called Telecom 71, it presented the products and services of exhibitors from many nations.

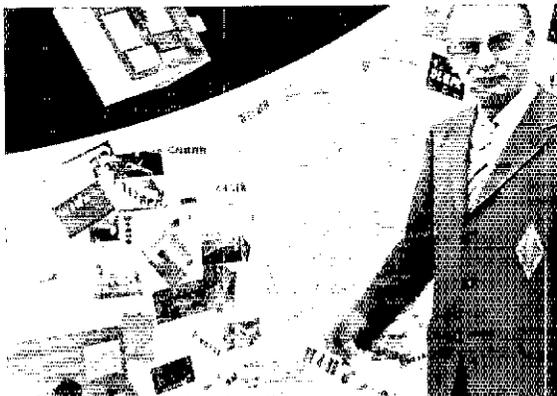
A highlight, for amateurs, was the International Amateur Radio Union exhibit organized by the IARU Region 1 division under the direction of G2BVN, assisted by F8RU and G3OOH. The IARU display with its prominent location near the entrance to the "Palais des Expositions," site of Telecom and the WARC-ST, was seen by virtually all who visited the show. Oscar satellite models, QSLs, amateur publications, and actual "bread-board" Oscar hardware were featured. Thus, an opportunity was provided for IARU representatives to meet with Conference delegates, visiting amateurs, and members of the general public. DL1FI (and XYL) served as hosts at the stand during the many hours IARU personnel were at conference sessions.

DX OPERATING NOTES

Reciprocal Operating

(**Bold face type indicates changes since last list.**)

United States Reciprocal Operating Agreements exist only with: Argentina, Australia, Austria, Barbados, Belgium, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Finland, France*, Germany, Guatemala, Guyana, Honduras, India, Indonesia, Ireland, Israel, Jamaica, Kuwait, Luxembourg, Monaco, Netherlands,* New Zealand, Nicaragua, Norway, Panama, Paraguay, Peru, Portugal, Sierra Leone, Sweden, Switzerland, Trinidad and Tobago, United Kingdom,* Uruguay, and Venezuela. Several other foreign countries grant FCC licensees amateur radio operating privileges on a courtesy basis; write League headquarters for details.



A mainstay of the crew manning the IARU display at Telecom 71 was DL1FI. Here Alfred is shown on-the-job at the amateur booth.



Receiving the first 6Y5 authorization following the U.S./Jamaican agreement of reciprocity is W1DPL (right). Making the presentation is the Hon. Cleave Lewis, Minister of Communications and Works. Observing, from left are Oswald Golson, Parliamentary Secretary to the Minister; Ainsley Gauntlett, Chief Engineer, Postal and Telegraph Department; Victor Panton, Engineer-in-charge, P. & T. Department; and 6Y5LA, president of the *Jamaica Amateur Radio Association*.

The first Russian visitor to ARRL/IARU headquarters in many years was UA3BK. Shown in this photo, Felix (left) receives a complete description of the activities of W1AW from Hq. staffer W1WPR.

QST for

Recently, W4MIA visited the Soviet Union and had the opportunity of meeting RAEM (center), the president of the Radio Sports Federation of the USSR. Interpreter, Mrs. Nadeyeva, is on right.



Canada has reciprocity with: Belgium, Bermuda, France, Germany, India, Israel, Luxembourg, Mexico, Netherlands, Nicaragua, Norway, Peru, Senegal, Sweden, Switzerland, United Kingdom, U.S., Uruguay, and Venezuela.

Third-Party Restrictions

Messages and other communications — and then only if not important enough to justify use of the regular international communications facilities — may be handled by U.S. radio amateurs on behalf of third parties *only* with amateurs in the following countries:** Argentina, Barbados (only U.S. stations/8P) Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Greenland (XP calls only), Haiti, Honduras, Israel, Liberia, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela. Permissible prefixes: CE CM CO CP CX EL HC HH HI HK HP HR LU OA PY TI VE VO W or K/8P XE XP YN YS YV ZP 4X and 4Z. Canadian hams may handle these same type third-party messages with amateurs in Bolivia, Chile, Costa Rica, Dominican Republic, El Salvador, Honduras, Israel, Mexico, Peru, U.S., and Venezuela. Permissible prefixes are: CE CP HI HR K OA TI W XE YS YV and 4Z.

DX Restrictions

U.S. amateur licensees are warned that international communications are limited by the following notifications of foreign countries made to the ITU under the provisions in Article 41 of the Geneva (1959) conference.

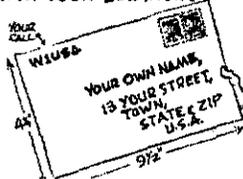
Cambodia and Vietnam forbid radio communications between their amateur stations and such of other countries. U.S. amateurs should not work XU XV or 3W8. Canadian amateurs may not communicate with Cambodia, Vietnam and Jordan. Prefixes to be avoided by Canadians are JY XU XV and 3W8.

QET

* Agreement includes overseas entities.

** By special agreements, third-party traffic is also permissible with Australian amateurs for traffic regarding amateur satellites, and with 4U1TU.

IS YOURS ON FILE WITH YOUR QSL MGR?



A.R.R.L. QSL Bureau

The function of the A.R.R.L. QSL Bureau is to facilitate delivery to amateurs in the United States, its possessions and Canada, of those QSL cards which arrive from amateur stations in other parts of the world. All you have to do is send your QSL manager (see list below) a stamped, self-addressed envelope, about 4 1/4 by 9 1/4 inches in size, with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left-hand corner.

Cards for stations in the United States and Canada should be sent to the proper call area bureau listed below. Recent changes are in bold face.

- W1, K1, WA1, WN1¹ — Hampden County Radio Association, Box 216, Forest Park Station, Springfield, Mass. 01108.
- W2, K2, WA2, WB2, WN2 — North Jersey DX Assn., PO Box 505, Ridgewood, New Jersey 07451.
- W3, K3, WA3, WN3 — Jesse Bieberman, W3KT, RD 1, Box 66, Valley Hill Rd., Malvern, Pennsylvania 19355.
- W4, K4 — H. L. Parrish, K4HXF, RFD 5, Box 804, Hickory, North Carolina 28601.
- WA4, WB4, WN4¹ — J. R. Baker, W4LR, P.O. Box 1989, Melbourne, FL 32901.
- W5, K5, WA5, WB5, WN5 — Kenneth F. Isbell, WSQMJ, 306 Kesterfield Blvd., Enid, Oklahoma 73701.
- W6, K6, WA6, WB6, WN6¹ — No. California DX Club, Box 11, Los Altos, California 94022.
- W7, K7, WA7, WN7 — Willamette Valley DX Club, Inc., PO Box 555, Portland, Oregon 97207.
- W8, K8, WA8, WB8, WN8¹ — Columbus Amateur Radio Assn., Radio Room, 280 E. Broad St., Columbus, Ohio 43215.

- W9, K9, WA9, WB9, WN9 — Northern Illinois DX Assn., Box 519, Elmhurst, Illinois 60126.
- W0¹ — Reggie Hoare, W0OYP, P.O. Box 115, Mitchellville, Iowa 50169.
- WA0¹ — Lloyd Harvey, W0QGI, P.O. Box 7, Arica, Iowa 50024.
- K0, WB0, WN0¹ — Dr. Philip D. Rowley, K0ZFL, Route 1, Box 455, Alamosa, Colorado, 81101.
- KP4 — Alicia Rodriguez, KP4CL, PO Box 1061, San Juan, P.R. 00901.
- KZ5 — Canal Zone Amateur Radio Association Box 407, Balboa, Canal Zone.
- KH6, WH6 — John H. Oka, KH6DQ, PO Box 101, Aiea, Oahu, Hawaii 96701.
- KL7, WL7 — Alaska QSL Bureau, Star Route C, Wasilla, Alaska 99687.
- VE1 — L.J. Fader, VE1FQ, PO Box 663, Halifax, N.S.
- VE2 — John Ravenscroft, VE2NV, 353 Thoncrest Ave., Montreal 780, Quebec.
- VE3 — R.H. Buckley, VE3UW, 20 Almont Road, Downview, Ontario.
- VE4 — D.E. McVittie, VE4OX, 647 Academy Road, Winnipeg 9, Manitoba.
- VE5 — A. Lloyd Jones, VE5II, 2328 Grant Rd., Regina, Saskatchewan.
- VE6 — Karel Teitelaar, VE6AAV, Sub. Po 55, N. Edmonton, Alberta.
- VE7 — H.R. Hough, VE7HR, 1291 Simon Road, Victoria, British Columbia.
- VE8 — George T. Kondo, c/o Ministry of Transport, Norman Wells, N.W.T.
- VO1 — Ernest Ash, VO1AA, PO Box 6, St. John's Newfoundland.
- VO2 — Goose Bay Amateur Radio Club, PO Box 232, Goose Bay, Labrador.
- SWL — Leroy Waite, 39 Hannum St., Ballston Spa, New York 12020.

¹These bureaus prefer 5x8 inch or #50 manila envelopes.

QSL Bureaus for other U.S. Possessions and for other countries appear in the June and December issues of QST.

Note: First class mail in the U.S. is now 8¢ an ounce. QSL Bureau users should send their manager enough two-cent stamps to cover the envelopes on file.

COMING A.R.R.L. CONVENTIONS

- September 4-6 - Southwestern Division, Anaheim, California
 September 25-26 - North Carolina State, Raleigh
 October 9 - Dakota Division, Sioux Falls, South Dakota
 January 22-23 - Southeastern Division, Miami, Florida

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.

NORTH CAROLINA STATE CONVENTION

Raleigh September 25-26

The 1971 North Carolina State Convention is sponsored by the Raleigh Amateur Radio Society and will be held Sunday, September 26, at the Dorton Arena, Raleigh. Pre-convention activities Saturday night, September 25, will include the Carolina Chapter QCWA inaugural meeting (contact Stu Meyer, W2GHK/4, P.O. Box 17316, Raleigh, NC); N. C. DX Association meeting

(contact Bill McDowell, K4CIA, 3709 Huntleigh Drive, Raleigh, NC); and the N. C. Single Sideband Net get-together (contact Charlie Brown, K4VLR, RFD 8, Box 2685, Raleigh, NC). A hospitality suite will be open Saturday night at convention headquarters.

Sunday's activities will include technical presentations, MARS meetings, code and homebrew contests, and an indoor flea market where exhibitors may drive their vehicles directly onto the display floor to show their goodies. A YL-XYL program is planned for Sunday morning, through and including the mid-day meal.

QST Technical Editor Doug DeMaw, W1CER, will conduct a wide-ranging technical session Sunday morning and participate along with Roanoke Division Director Vic Clark, W4KFC, in the ARRL Forum on Sunday afternoon.

Convention headquarters is the Holiday Inn North, Highway U.S. 1 North, Raleigh, N. C. Reservations can be made directly with the Holiday Inn. Convention activities will be conducted at Dorton Arena located on the North Carolina State Fairgrounds on N.C. Highway 54, just west of the city.

Full convention registration and YL-XYL Program registration are \$4 each, which includes a lunch. Afternoon registration is \$2, which does not include the meal. Contact John Fried, W4WWD, 3606 Winton Road, Raleigh, NC 27604, for registrations or further information.



SEPTEMBER

1971

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Florida - The Second Annual Miami Auction-fest, September 18 at Washington Federal, 633 N.E. 167 Street. There will be a \$1 donation and doors will open at 8:30 A.M.

Florida - The Tampa Hamfest, Saturday and Sunday, October 16-17 in the Electrical Building, Tampa Fair Grounds. Fully air-conditioned in-door gala event. Fun for the whole family. Plenty of free parking.

Germany - September 5, Hanau. Contact B.R. Chambers, W4NIC/DA1DU, Sig. Ops. Co. (Hanau), USASTRATCOM-EUR, APO, New York 09165 for details.

Illinois - The Peoria Area ARC 14th annual Hamfest Sunday, September 19, at the Exposition Gardens (same as last year) on the northwest edge of Peoria. Lunch available. Plenty of activities for the entire family beginning with the campsite opening the preceding evening. Free coffee and donuts from 9 to 9:30 A.M. Free swap section, parking, contests, cartoons for the kiddies. Advance registration \$1.50, at the gate \$2. For further details and advance registration write Wendell McWilliams, WN9DZJ, Box 1, Rome, IL 61562.

Kansas - The Annual Wichita Hamfest, Sunday, September 12, at the 4-H Building, Central St. & Tyler Rd. Registration starts at 9:00

A.M. Technical discussions, exhibits, swap table, and more. Good food at nearby restaurants. For additional information write WB0BVC, Mike Downing, 2301 S. Santa Fe, Wichita, KA 67211.

Massachusetts - On October 2, NEDXCC meeting and banquet at the Holiday Inn, Totten Pond Rd., Winter Street exit from Route 128, in Waltham. Registration begins at 1 P.M. At 1:30, there will be a DX contest forum, movies and slides of recent DXpeditions, DX quiz, and talks by prominent DXers. At 7, the banquet features a roast beef dinner, award presentations, and a special guest speaker. Afternoon registration is \$1 and the banquet is \$8.50 per person or \$16 for two if reservations are made prior to September 1. Hotel reservations must be made directly with the Holiday Inn. For afternoon registrations and banquet registrations, send check or money order to Peter K. Butler, WIBPW, 3 Elizabeth Drive, Merrimack, NH 03054.

Nevada - The Sierra Nevada ARS presents the CARC meeting at Reno at the Nugget, Sparks, Nevada on October 1, at 1 P.M. For dinner reservations (\$7) write Frank Cherne, 840 Rhode Island Dr., Reno, NV 89503 before September 25.

New Jersey - The South Jersey RA Gala Hamfest on Sunday, September 12, 11 A.M. to 3 P.M. at Molia Farm, near intersection Routes 30 and 47, Malaga (Rain date September 26). Picnic area, parking facilities, swap shop, and more. Check frequencies 3,930, 50.3, and 145.3 MHz. Advance donation \$2 per family until September 6; at the gate, \$3 per family. Obtain advance tickets from Joe Duffin, W2ORA, 247 Kings Highway, West, Haddonfield, NJ 08033. Checks should be made out to South Jersey Radio Association.

Ohio - Cincy Stag Hamfest, September 26 at Stricker's Grove, Compton Rd., Mt. Healthy, Cincinnati. Lots of food, flea market, model

(Continued on page 108)



How's DX?



CONDUCTED BY ROD NEWKIRK,* W9BRD

Why? (continued)

We can usually depend on the far-flung DX grapevine to hold up its end of a "How's" dialogue. Responding to our July lament on lax QSLing we have qualified assent from W4CCD:

I've often wondered about the effects of callsign confusion on QSL returns. I refer to the multiplicity of phonetics one hears in all portions of the bands — strings of Whisky, Washington, Wonderful, Sugar, Sierra, Saratoga, Slightly-Silly (no kidding), and so on. I doubt if it's possible in this rather individualistic society of ours where anti-establishment ideas seem to be the in-thing that we could ever get everyone to use one set of phonetics and quit trying to be funny. I'll bet this would rev up QSLing if misunderstood calls is really one of the reasons for worsening returns.

Individualistic society? Well, VE1AL feels that humdrum conformity may be a factor inducing declining QSL response. Our ham stations now all look quite alike, all sound much alike through speech and keyer signal processing, and QSL individualism is equally limp. AI stresses this point:

The usual stock QSLs are a drag to look at. My own card is something a little different and draws reasonably high returns. Many QSLs received are so almost exactly identical that any interesting variations are impressive and remembered. If amateurs would put a little thought and effort into designing more desirable cards they might do better on returns. Sure, it costs a little more these days — but so does a good radio station.

From the strictly-DX angle our QSL tradition is under attack by other more insidious influences. G3FKM, DX editor for RSGB's *Radio Communication*, comments on the QSLing "instructions" of one recent DXpeditionary group:

QSLs sent with two IRCs will be answered via bureaux, those with one IRC "will be put aside for later handling — this may be a considerable time." If more than one card is sent per envelope they will be answered at a rate of two IRCs per card (via the bureau) and any left over will be set aside "for future contemplation." Cards submitted with no IRCs will be put aside for "future, future contemplation." Cards ac-

companied by one dollar or more are expedited but only sent airmail if two IRCs are sent as well! Your scribe feels that this savours of extortion. It is quite fair to offer contributors rapid reply but to threaten noncontributors with deliberately delayed cards and to demand one dollar plus postage for an airmail reply is not a very pleasant practice.

We like to put it this way: The financing of amateur radio operations should remain completely dissociated from QSOs and QSLs, including the speed thereof.

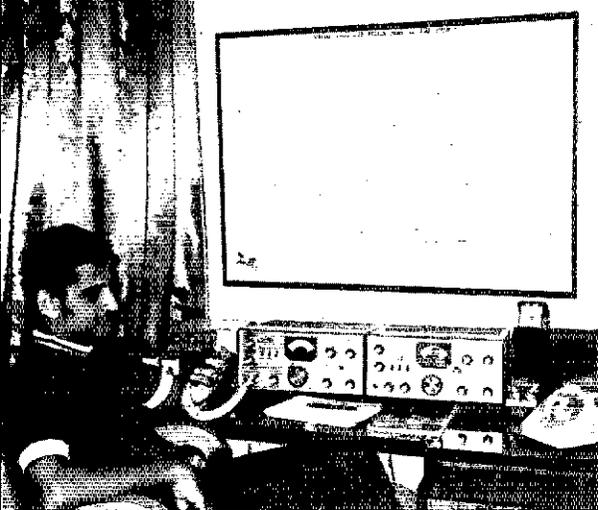
+ + +

10 meters approaches another moment of DX truth. We had qualms about the 1970-'71 season but sunspot numbers plateaued for a while and things turned out pretty well. Ten burst open in early autumn right on schedule and held on well into spring. Any hope for substantial 1971-'72 DX fun on 28 MHz? Sure, but openings promise to be fringier and stingier, especially in our northern latitudes. Transequatorial paths will remain interesting but you may be wondering where all the Europeans have gone. (They'll be in there, all right, but working mostly Africa.) Wrapped up your ten-meter century for ARRL's coveted 5B-DXCC yet? This may be your last decent chance for years and years, OM. Let's scamper through some of the radiotelegraphic goodies grabbed by "How's" cw reporters Ws 1PL 4ZYT 8YGR, Ks 3YVN 5MHG/6, Was 1HA 2HZR 6PZL 7OLT, Wbs 2JYM 4KZG, VE7BAF, 11ER, and G3DME's QUAX gang before the band suddenly folded in April: CE8s AA CF, CN8s CG DW, COs 2BB 2KG 6AH, CP6FG, CRs 3AB 3KD 4AE 4BS 6AI 6AL 6DA 6KB 7AW 7BN 7CN 7EY 7FM 7IZ, CTs 1VX 1WY 2AP 2BC 2BO 3AS, CXs 1AAC 3AAC 3BH 7AP, DF0AFZ, DM3YTF, many DJ-DK-DLs, EAs 2CR 4LH 6BD 8BK 8FH 8FO, ELs 2CB 2CO 8K, EP2BQ, ET2USA, a dozen Frenchmen, FB8XX, FG7TG, FL8s BL HM, FM7WE, RF7Z, two dozen Gs, GB3SX, GCs 2LU 3YLI 3ZIP 5ANX, GD3AIM, GM5AIW, GW3s IEM KSQ ZWU, HAs 2KMR 7KLC, HGs 4YP 5KCH 9KOZ (a 10-meter Hungarian prefix variation), HB9s ACP AJA, HCs 1JU 1KP 2GG, HIs 3XAM 8MQ 8NAB, HP10, HR2GK, HV3SJ, IIs BQI ER FGT, IS1s AEW FIC, three dozen JAs, JD1ABO, JH1s BAY HDB QOJ, JWS 5NM 7UH 8MI, JXs 2HK 8YM, Ks 1WKK/TI2 4BZH/VP7, KA8FY, KC4AAD, KGs 4S 6JAR, KH6s AG COB HCM HHS HKM IJ RS, KL7GLL, KP4s CFB CRT DJI DKX, DRs 6AY 8CF 8EA, KV4s AM CI EN GP, KZ5s CU EE EK, LAs 2PL

* 7862-B West Lawrence Ave., Chicago, IL 60656.

HW6KAW (F6KAW) has an antenna roof-garden imposing enough to serve as your QTH of the Month. These 250-foot-high sticks, including an inverted V for 80, bring the Ivry Radio Club station to the verge of winning ARRL's Five-Band DXCC certification. This snap comes courtesy chief operator F5QE.





FL8HM mans a comfortable DX corner in Djibouti. Hassan will probably do his part to keep 28 MHz alive this season, ten being one of his favorite mike and key hangouts. (Photo via W9FN)

Where:

ASIA - STAR's QSL bureau has many cards, some dating back to 1958, for former HS amateurs who departed Thailand without leaving forwarding addresses. We will be happy to forward them without charge if advised of their former HS calls, periods of operation, current call signs, and current addresses. - *HSIABU*, v.p. *Society of Thai Amateur Radio*, P.O. Box 2008, Bangkok, Thailand. . . . I'm still a few cards behind after returning to W4VFP, but I'll continue to QSL 100 percent. Thanks to the gang for QSLer of the Month mentions. I did "try harder" while in Bangkok! - *ex-HSIADX*. . . . QSLs for JD1ABX Ogawasara operation from March 7th to 24th may go via JH1HWN. - *DXNS*. . . . JE1CJN, 21,291 kHz at 0120 GMT, displays the latest Japan prefix which goes with the JA-JH-JR block. - *LIDXA*.

6GF, LU3EX, LX1s CF JT, MP4s BBA AHM BIH BIO TDK TDO, OAs 3X 4MS 4QN, OD5LX, OK1s AFN FAR, ON5GQ, OXs 3AB 3DL 3MO 3VJ 5AX, OY6FRA, OZ7Z, PA0s LOU WVV, PI1KMA, PJs 2PJ 2PS 2VD 9JR 9JT, PYs IHO 2FCJ 5ASN 5YC 8FI, PZ1s AC AH AV, SL6AL, SMs 4EXO 6TFH 7BUN, SP6OQ, TFs 3YL 5AB, TI0R, TJ1AW, TU2s BW CX, UAs 1ZP 2EC 3IN 4BI 4FV 6CU 0EM 0ZI, UC2s OZ WA WP XB, UF6s DG FA, UH8s BG 8O CJ, UI8s AAR IK NK, UKs 1BDM 2BAF 2BAO 2BBB 2PAD SEAN 5IAZ 6APD 8HAA 0CAE, UL7s FAN GW PAE PX TA WI XI, UO5s AP AW GR, UP2s BAE CG NK OX PD, UQ2DB, UR2s IO TAX, UT5s LC YP YZ, special 10-meter-Russian-prefixed RAs 3QGA 6LAQ 6LOQ 9FCA 9FFI 0LEX, RB5s 1AA LAG UGE, RF6FBG, RIBIAE, RL7JAN, RP2s BBM PCO, VF8BB, VKs 2APK 2DA 2EO 2QL 2VN 2WD 3ALLY 3AZY 5DS 5HD 8HA 9NP, VPs 2AAP 2EE 2MK 7DX 7NY 8LV 8LR 9BK 9GD 9GR 9MR, VQ9s B RK, VRs 2FO 6TC, VS6BC, VU2s IRA REG, W7UXP/KH6, WA7FHD/KH6, XE1AX, XT2AB, XW8BP, YN1YL, YO7VF, YUs 2BHI 3EY, YVs 1TP 5ANT 5KL, ZB2AV, ZC4s CB IC IK, ZDs 3P 5X 8CS 8H, ZEs 1AS 1BA 1BJ 1BL 1BT 1DC 3JO, ZFIAN, ZLs 1AAT/k 1AIZ 1AMO 1BGT 1GX 2CD, ZP0BK, ZSs 2AG 2HI 3AW 3KC 3YK 6J 6OS, 4Us 1TU 4ITU, 4S7EC, 4X4s MN YM, 5N2AAU, 5R8s AB AM AP, 5U7AR, 5WIAR, 5Z4LW, 6Y5AR, 7Q7s AA RM, 7Z3AB, 8PGs AE DQ DV, 8R1J, 9E3USA, 9H1s BA BB BL CB CH CL R, 9J2s JY MC RO TL WR XZ, 9M2ON, 9Q5QR, 9U5AC, 9VIQE, and 9Y4VU. Most of these code cats will be back in the slot this season to see how the ionospheric ball bounces. Next month we'll list some 28-MHz mikers as space allows. Let's not give up on ten without a fight - good luck, good fishin' and fingers crossed!

AFRICA - On returning from England after three months of medical attention I find more than a thousand QSLs waiting for answer. Airmail to the U.S.A. now requires three International Reply Coupons, and too many W/Ks send only one. I can no longer afford the difference in days of rising costs and fixed income, so hereafter QSLs arriving with less than three IRCs must be answered via bureau. - *CT3AS*. . . . Until further notice I will act as QSL manager for ZD8CW. The usual self-addressed stamped envelopes (s.a.s.e.) are requested from W/K applicants, s.a.s.e. plus sufficient IRCs from non-W/Ks, and others will be answered via bureau. - *W2MUM*. . . . QSLs will be sent via bureau for all successful contacts with ZS3CCE, a commemorative station to be active on DX bands in October. - *ZS3s KC XQ*.

EUROPE - Amateurs in the United States and Canada should QSL F0WJ-F0WJ/FC via W5QNY, all others via REF of France. - *K5MAT*. A reminder that all QSLs for Yanks in Germany now go via DARC because the old DL4-DL5 bureau has been dissolved. - *DL4WJ (W4UVV)*. . . . You will find that HB0XTO

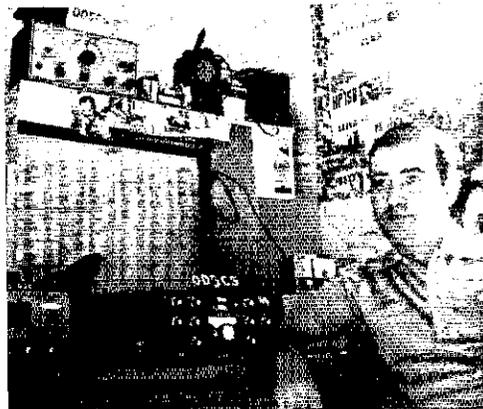


UA6XG's daughter Elena could follow in the pretty footsteps of stewardess UA1JL for all we know. Vic classically represents that fading breed, the builder-DXer, and his current project is a homespun version of the Signal One. (Photo via K2QHT)



9M2PT of Telok Anson, Perak, provides plenty of rare QSOs with this homebuilt 6146 sixty-watter. Peng Tak plans a quad to help battle worsening DX conditions on the higher frequencies. (Photo via W5UNF/6)

OD5CS enjoys heavy W/K/VE attention on several bands. Varooj radiates from Beirut, one of the Middle East's most active DX capitals. (Photo via W3HNK)



(DK3ST) is good for a sure QSL. - DK2PN. . . . QSLs for our intended Sark activity on the 13th-19th of this month (callsign unknown at this writing) may go via RSGB. - K2MH, G3HZL. . . . I have no knowledge of, nor QSL arrangements with, any 3X station. - 11ZSQ. . . . The G8GUU in your May pages is a misprint or pirate because the call has not yet been issued. Also be advised that there is no "G4TO" as specified by a self-styled 8X8. Lastly, G6ZY (also G6ZY/CN) states on his QSL he does not want cards but he does confirm QSOs. - G2MI, RSGB QSL Bureau. . . . I find that German stations QSL very nearly 100 percent. - W9LEX. . . . In helping to confirm some hard-to-get U.S.S.R. areas all I ask is 9-1/2-by-4-inch s.a.s.e. to accommodate those large-style Russian cards. I've just added UC2-land to this offer. W3HNK.

HEREABOUTS - I find it necessary to keep a blacklist of stations that persistently show bad manners and poor operating procedure. A listed station will not be QSO'd except in contests and then without QSL. - 3P6DR. . . . My tour as QSL manager for VP2MO, operator Jim Granger, begins with QSOs of May, 1971. Earlier VP2MO QSOs by a different operator (the call has been reissued) can possibly be confirmed via WA8RWU. - WA3HGV. . . . WA3KKB, designated by an FP8 as his QSL manager, has no such arrangements. - WB4PUD. . . . QSLs arrive here from DX stations but I am not a QSL manager. - WA1MIJ. . . . I find DX stations better about QSLing than locals. If a card is really important to you it's only fair that you defray postage cost. - W3TV. . . . QSL managers for multioperated DX stations usually appreciate your designating the name of the operator QSO'd. This is often of great importance in log checks. - VE4SW. "QSLers of the Month" EP2FB, FM7WW, JDIABO, KC4s USL USN USV, KW6DT, KX6s DC DR, OR4CR/AP, P19CL, ST2SA, T11AW, VK9NP, W4OTY/mm, ZK2AH, ZL4OL, ZM7AG, Z73AB and 8R1J, along with QSL aides Ws 2BBK 2CTN 3HNK, Ks 2BPP 2DDK 3RLY 4ZCP and 9GZK, are roundly applauded in "How's" correspondence from W31ZJ, K6UGS, Was 2NGB 3HGV 4ZZU 7MMK and VE4SW for commendably quick comebacks. Any flashy performers in your mailbox lately for our approbation? . . . *Help!* These italicized colleagues seek hints toward tacking up QSLs from tardies mentioned: W2HL, YB0AAH; W9LEX, C31CE, UA3TU, 9G1GS; K6UGS, CE0AE, HC2NW, JK1ABO, KM6DT, SM7CWF, VP2LC, ZE1CW; WA61VP, PX1MB; WA7MMK, TF2WMB; VE4SW, TV8BT and 6Y5CM. Any 'alp'? . . . W3HNK, Was 2HBZ 21WA 2NGB 61VP and DJ9ZB offer to assist harried DX ops with burdensome QSL chores.

SOUTH AMERICA - We call your attention to the fact that QSLs for QSOs with stations signing special Brazilian prefixes PP PV PW and PX may go via our LABRE bureau. - PY1DF. . . . Hang in there, fellows! CP6FN came through with a QSL thirty-five month after QSO. - W5QPX. . . . Peruvian stations may use their OB prefixes for the rest of this year during state

anniversary festivities. - DXNS. . . . Have you sent your branch ARRL QSL Bureau Manager additional postage for your filed s.a.s.e. to cover the latest U.S.P.S. rates increase? It's still a bargain, you know. . . . QTH suggestions from the mailbag now, mindful that each specification is necessarily neither "official," complete, nor accurate:

BY1AB, 579B Tong Tien Men, Peking 11, P.R.C.
 C21DC, P.O. Box 193, Nauru Island
 DL4WJ, J. Wilson (W4UVV), MISSA-DSE, Worms, APO, New York, NY 09058
 G3XEC, G. Grundy, Thrift Cottage, West Wickham Rd., Balsham, Cambridge, England
 HK5MD, Box 6149, Cali, Colombia
 EX-HS1ADX, Lt. Col. H. Rosenthal, W4VFP, 216 Missionary Ridge, Hampton, VA 23369
 IA5WWW, C. Martinucci, P.O. Box 144, Plombino, Italy
 IH9LAW, I. Lazzara, via Faro S. Leonardo 3, I-91017, Pantelleria (TP), Italy (or to IT9GAJ)
 KF4SJ, P.O. Box 1871, Ponce, Puerto Rico
 KG6JBD, A. Di Bona, Box 87, Cal Lab, FPO, San Francisco, CA 96637 (or to K6PWX)
 KX61Y, APO, San Francisco, CA 96333
 SP0KRT, Box 73, Radzionkow, Poland
 VP1BH, P.O. Box 27, Stann Creek, British Honduras
 VP1ST, P.O. Box 35, Belize, British Honduras
 VP1TB, P.O. Box 212, Belize, British Honduras
 VP2EQ, Post Office, Anguilla, W.I.
 VQ9R, P.O. Box 193, Mahe, Seychelles
 WB4LDK/KB6 (to WB4LDK)
 YB9UA, P.O. Box 171, Djakarta, Indonesia



9G1WW expects to remain available at Terna for another two years or more, preferring phone on 10 through 20 with occasional 40- and 80-meter sorties. Emite's XYL Tara helps fill the log as 9G1YA.



EX-YO2BO, now WB2AQC after an interminable citizenship wait, recently traipsed through the Caribbean with XYL WB2BAV greeting dozens of on-the-air friends along the way. In the first panel Jose, PJ7JC, shows George the dividing line between rare PJ7-land and rarer FS7-land. Next we see

YN7IES, Box 2876, Managua, Nicaragua
 ZP5RL, R. Loewen, Box 166, Asuncion, Paraguay
 (or via RCP)
 3C1s AN EG (via OH2BH)
 3V8AH, L. Johansson, P. O. Box 780, Tunis,
 Tunisia
 5J3CC-HK3CC, Aptdo. Aereo 11414, Bogota 1,
 D.E., Colombia
 5VZYH, P.O. Box 2233, Lome, Togo
 SWIAK, Box 721, Apia, Samoa

608, Menlo Park, CA 94025), Southern California
 DX Club *Bulletin* (K6HH), UBA's *On the Air*
 (ONs 4AH 5VA), VERON's *DXpress* (PA0s FX
 LOU TO VDV WWP) and *West Coast DX Bulletin*
 (WA6AUD). Pitch in and push this DX wagon,
 friend!

+ + +

Who:

ARRL's W1YYM, proprietress of *QST's* popular "Operating Events" section, feeds us results of last year's lively VK-ZL-Oceania DX Contest, doings alternately sponsored by WIA and NZART. Treating phone statistics first, U.S. call area leaders are Ws 1OKG 2FCR 3TLN, K4MG, WAS 5WMK 6EPQ 8QIY, Ws 9ITD 0GNX with VEs ITG 2NV 3EWY and 5TO pacing the provinces. In scoring order it goes WA6EPQ, Ws 0GNX 3TLN, WAS5WMK, K6HPZ, W2FCR, VE3EWY, Ws 6dGH 1OKG, WA8QIY, VEs ITG 7BNE/W6 and K1VTM. Country voice winners include C88AA, CR8IC, CT1LN, DL6TV, DM2AUF, DU1EH, EAs 3RF 6BD 8GK, EP2BQ, F9RM, FK8AH, G3PHO, HA6KNB, HB9AHA, HP1JC, I1AA, JA9AG, KH6GMP, KR6JX, KZ5NW, LA9OI, LU4ECO, LZ1AA, MP4BH, OA8V, OD5BA, OH6RH, OK1AGO, ON5MG, OZ7KB, PA0OI, PJ9JR, PY3APH, PZ1AH, SM3CXS, SP9ABE, UA9BE, UC2WE, UD6BD, UG6JJ, UH8BO, UI8CD, UKs 2BBB 2RAA 5MAF 8HAA, UO5BZ, UW3FD, W3CHH/KG6, XE1LLS, YB1BM, YV4IQ, and ZC4MT. Home front mickmasters by call area are VKs 1GD 2KM 3KM 4LF 5WP 6CT 7GK 8A2 9GN, ZLs 1AKY 2AVY 3US and 4FX. Among the radiotelegraph entries our call areas are topped by Ws 1EVT 2MEL 3NU 4WSF 5OB 6RGG 7IR 9IHN, WA0KDI, VEs ITG and 3EWY; by score size it's Ws 7IR 3NU 6RGG 1EVT, K6QZ, Ws 2MEL 9IHN, K6FKR, Ws 6dGH 6TZD 1PL and VF3EWY. Some code country kingpins are CR7IZ, DL6TV, DM2AUF, F8TC, FR8AH, G5RP, GM3CFS, HP1AC, JA9YBA, KG6JAC, KH6JJ, KZ5NW, LA1OA, LZ2DC, OH2FS, OK2RZ, ON4XG, OZ1W, PA0IR, PY7SR, SM7ANB, SP3DOI, UAs 1DZ 0FR, UC2WG, UD6AM, UF6LA, IIG6JJ, UH8BO, UI8AI, UI8AB, UKs 2PAA 2RAN 5JAA, UL7BG, UO5AP, UQ2GW, VS6AF, YU4EBL and ZS2A. Down Under key clinchers are VKs 2APK 3OP 4VX 5FO 6HD 7GK SHA 9XI, ZLs 1HV 2BCO 3US and 4CA. World-wide short wave listeners made a fine

C31BZ (to G3JJJ)
 C31DC (via G5YC)
 F0FW (to DJ4BU)
 F0WJ (see text)
 F0WN/FC (to ON4JT)
 F0WV/FC (to ON4JT)
 F0ZN (via DJ9ZB)
 F08DE (to F9QV)
 HB0XJV (via DJ9ZB)
 HB0XUD (to ON4QV)
 HB0XUO (to DK4SL)
 IP1MOL (via W2GHK)
 JD1ABO (via JA1BA)
 JY9XL (to FG7XL)
 MP4MBC (to G3XEC)
 OA4XK (via RCP)
 QJ0SUF (to OH2BHU)
 ON6CE (to W3ZA)
 PJ9JR (via WA3IAQ)
 SV0WLL (via SV0WT)
 SZ0FK (to ZL2AAW)
 VK0JM (via WIA)
 VP2MO (see text)
 VP5KG (via DJ9ZB)
 VQ9KL (via 5Z4LW)
 VSSCB (via WA6AHF)
 VU2HLU (via W0PAH)
 YA1OK (via SMSBKG)
 YA1OS (via SMSBKG)
 YB5AAQ (via W5ADZ)
 ZD8CW (via W2MUM)
 ZS3CCE (via SARL)
 3A0FF (to DL4WJ)
 3A0FP (to WA6GDS)
 3B8DK (via VE6AKV)
 3B9DK (via VE6AKV)
 3V8AF (via RFF)
 5R8AB (via G3WRN)
 5W1AT (to KB6CT)

Your benefactors in the QTH department this month are Ws 1BBJ 1CW 1YYM 2BTQ 3JZL 5BZK 5UNF 6GSV 6HUQ 7JAC 9DY 9GFF 9LNO, Ks 2OHT 5MAT, WAS 3GVP 3HGV 4ZZU 6IVP 7MMK 8VRB, Ws 2AQC 2BAV 4PUD 9CJS, VEs 3CUI 4SW, DK2PN, ON8VH, Columbus Amateur Radio Association *CARAScope* (W8ZCQ), *DX News-Sheet* (G. Watts, 62 Bellmore Rd., Norwich, N.72 T., England), Far East Auxiliary Radio League (M) *News* (KA2LL), Florida DX Club *DX Report* (W4FRO), Japan DX Radio Club *Bulletin* (JA3UI), Long Island DX Association *DX Bulletin* (W2GKZ), Newark News Radio Club *Bulletin* (J. Heien, 3822 Marshall Ct., Bellwood, Illinois, 60104), Northern California DX Club *DXer* (Box



VP2s LT and LO, left and right, flanking him in sunny St. Lucia. The third frame shows VP2GAE, WB2AQC, VP2s GW GC and GD admiring skywires on Grenada. Last but hardly least, Eva, WB2BAV, hamchats with John of FG7XT, famed DX specialist on RTTY, SSTV, and ssb.

showing in this affair, turning in nearly a hundred logs. See you next month in the '71 edition! . . . The 1970 SP DX Contest, a cw-only shindig sponsored by PZK of Poland, finds Yank call area champs Ws 1DS 2KHT, WA3LNM, Ws 4KMS 5GR 6JPH 9QWM and ØBMM with VO1AW, VEs 1AE 2IL and 3EDC copping Canada. The score-size ranking goes VO1AW, Ws ØBMM 5GR, WA3LNM, VE2IL, Ws 4KMS 1DS 2KHT, WA3QMJ, VE1AE, W2NCG, VE3EDC, W6JPH and WAØEPG. Highs per country include CR7IZ, DL1QQ, DM4RFM, F2PO, G3ESE, HA8UD, HP1AC, HS5ABD, JASVQ, LA3HM, LZ1AZ, OE3AX, OK1AWQ, OZ4HW, PAØMIR, PY1ADA, PZ1AH, SM5CIK, UAs 3QO 9WS, UB5MZ, UC2LB, UD6AS, UH8BO, UJ8AB, UKs 2FAK 2PAA 6GAB, UL7JG, UO5WU, UQ2PP, VK3AHQ, YO8AGZ and YU1QBM, with the UK7LAZ staff turning in the fattest multiop catch. The next go in this SP series comes off next April. . . . We'll squeeze in a reminder that DXCC members can live it up at the 19th annual W9-DXCC get-together in Chicago on the 18th of this month. Check *quick* with W9GIL for attendance details.

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W h e n :

One of our all-time favorite issues of *QST* is that of a quarter century ago this month — September, 1946. It recounts return of the 20-meter band to amateur radio after too many wartime years of QRT. How eagerly the mag was snapped up and devoured by starved DXers! W1JPE (now W1DX), on hand to chronicle developments in "How's," wrote that "Ten meters was dropped like a hot 61.6 by the DX gang. Things seem nearly back to normal already with that old familiar 14-Mc. edge-crowding, VFO-climbing and QSL-begging. Many of the lads lopped off a lot of stuff the first month back on 20, much of it very savory indeed." . . . Big-gun

countries totals, painfully eked out on shaky 28 MHz in preceding months, averaged only around sixty or seventy and really began to zoom. Some of the period-piece catches reported are ACs 3SS 4YN, EQ4DC, E24s F and X, FA8RA, FM8AD, HH3L, KA1AE, LB3ZA, OQs BR ER JF LL, PKs 1RI 5LK 6TC, VP4TR, VQs 3TOM 4MNS 6MI, YSs 1BU 4JH 4RM 7CX, Ws 2AMH/J9 2OAA/J8 8LZK/NY4, XACP and XAPQ, XU1YO, XZ2GS, YIs 2BA 5AL, YR5C, ZA2A and ZCIAR on cw; CIs MG PL, EPIC, J9s AAG ABE, KA1ABD, OX1AA, ST1EA, SU1KE, VSIs BD BQ, Ws 2JE/J9 3IYC/J2 6OCA/J3 and YR5KW on phone. Among contributors to By's column of 25 years ago we see WIs COI KFV KMY, W2s ATJ LSN, W3BKZ, W4s BPD BRB, W5EWZ, W6s GRL HG ITH KIP LER PBI PBV TI TND, W7EYS, W8s HGW PHZ POQ ROX, W9s DXL NDA STU, Gs 2PL 8KP and VE1EP, several of whose calls still ring loud and clear on old 20. . . . Good friend Jeeves, now retired, was in on the fireworks. W1CJD pictured him strolling back from Radio Row bearing surplus from the wrong war. . . . All in all, quite a *QST*. Outside "How's DX?" beside dated yet interesting tech features, you'll find one of the late W2GVZ's classic yarns ("How to Catchum DXCC"), a needling two-pager by the immortal Sourdough and a rather prophetic editorial. What's your favorite *QST*? From a DX man's standpoint, we find Vol. XXX, No. 9 hard to beat. QST



VK4s YP (left) and NP (third from left) officiated when Brisbane DX Club greeted and feted members of *La Balsa's* crew in January when the raft grounded at near-by Mooloolaba after its epic 8500-mile voyage from Ecuador, a network of Pacific amateurs contributed communications security for the venture.

The World Above 50 Mc.

1215-1300

2300-2450

5300-5370

7300-7370

8400-8470

10500-10570

21000-22000

50000-9

CONDUCTED BY BILL SMITH,* KØCER

Six Meters, Far East Style

THE CONSENSUS of North American 50-MHz DXers is that the 1971 summer *E* season was poor. Openings were frequent in most locations, but intensity and duration were not comparable to recent years. Such has not been true, however, in the Far East.

Ray Clark, KR6RI, reports from the Ryukyu Islands that six meters was wild during June, and until at least the middle of July, when his most recent report was filed. Ray had many June contacts with HL9WI, Korea, and a logbook full of JAs. He also worked DUIZAI in the Philippines. Openings between KR6RI and Japan happened almost every day, and the HL9WI beacon was heard nearly as frequently. Last month we reported that JA1MRS and several other JAs had worked KL7HAM, Shemya, Alaska, May 30th. I don't know whether these contacts have been confirmed, but KR6RI quotes JA1LZK as saying he and ten other JAs worked KL7HAM June 28 around 0250 GMT. The opening lasted one hour, with S9 signals. A June VHF QSO Party log received from KL7HAM at ARRL Headquarters lists five JA contacts June 13.

KR6RI's log for the first half of July gives evidence of exceptional conditions in the Far East. He worked JAs nine of the first ten days of the month. Ray also worked HL9WI several times and VS6AI, Hong Kong. VS6AI was worked by JA1MRS, giving Mic his 14th 6-meter country. HL9WI likewise worked VS6AI, July 10. Ray says the QRM from the Japanese mainland was terrific at this time. The day before, KR6RI was working JAs around 0800 GMT while the JAs were also working KL7HAM! No one has offered a guess as to the mode of propagation, but the Far East is well known as one of the world's muf hotspots.

KR6RI says that several new stations are active, including C21AA in the Republic of Nauru, HM1EA in Korea, KR6RS and KR8HP, as well as many Japanese stations. Statistics show the amateur population of Japan growing at a rate far exceeding that of any other country, indicating

* Send reports and correspondence to Bill Smith, KØCER, ARRL, 225 Main St., Newington, CT 06111.

that the number of JAs may soon surpass the number of W/Ks.

Ray, who signs K5ZMS stateside, expects to return to the U.S. later this year, to reside in Boston. His frequent reports on Far East DX have been interesting, if not just a little frustrating, to those of us not blessed with similar propagation possibilities.

OVS and Operating News

50 MHz may not have been as productive overall as in some past summers, but still there have been three 50-MHz WAS awards issued by ARRL as a result of the 1971 summer DX season, and there are very likely more to come. WA6HXW, W6NIT, and K7ICW have their certificates already, and W6NLO says that he and K6EJO got their 50th states July 12. WA1LCT provided Vermont for W6NLO, and W1YTW gave K6EJO Maine. For the first time since Hawaii and Alaska became states, we are now seeing some of the original 48 rated as "hardest" on 6, at least in the West. But Easterners feel they really have a tough row to hoe, as KH6 and KL7 seem almost impossibly difficult, without F2 DX.

K7ICW received the first 50-MHz WAS award ever endorsed for 2 way ssb. WAS rules don't allow for propagation endorsements (who could *prove* a claim?) but K7ICW's almost certainly is the first WAS of any kind achieved entirely by way of sporadic-E skip. Even his Nevada (Reno, 405 miles) and Arizona (255 miles) were ionospheric propagation. Probably the northern tip of Maine is the only spot in Northeastern USA where such a feat could be possible, and there are few other spots to match K7ICW's in this respect.

Al worked WA1EKN June 27, for his Maine contact, in a 3-minute opening during which no other eastern stations were heard. His 50-MHz WAS is the result of 11 years of plugging, during which K7ICW has become something of a propagation expert. When he says that openings this summer have been about as frequent as in other years, but that intensity and duration have been much less, you can believe him.

If you've found 1971 notably lacking in ionospheric disturbances, reports from ESSA, Boulder, state that "M and X events" for the first six months of 1971 have been only 22 percent of those in the same period of last year.

As reported last month, the season definitely started late. In many years the last half of June is the peak period, but this year, July has been exceptionally productive. The 10th seems to have

European interest in 144-MHz moonbounce is increasing and according to W1RLV, the operator pictured above, Gary, SP5AKG, of Warsaw, Poland, is one of those preparing for moonbounce activity.

QST for



Lionel Edwards, VE7BQH, Vancouver, B.C., has an excellent system working on 144 MHz moon-bounce. Lionel is pictured with his 432 rig (foreground) and 2-meter kW. He uses a 160-element collinear array for his moonbounce work.



been "the day," if one can be singled out. WA6LYC rates it that way for Southern California. He began hearing W1s around 8:30 A.M., and only that area was heard for an hour. Then the whole Northeast, including VE1 - VE4, came through, until about 11 PDT. Only multihop was heard in all this time. The band folded around noon, reopening for single-hop around 8 P.M., for about 3 hours.

WA6JRA liked this one, too, as it brought him Vermont (WA11YK), 47; Maine (W1YTW), 48; and New Hampshire (WA1FSN), 49. He needs only Delaware. K6QEH also snagged W1YTW for No. 49, but missed Delaware. These fellows also noted the lack of single-hop while the 1s were in. This may happen more often than not; otherwise multihop might be very hard to work through stronger single-hop signals.

WA2OAF likes July 11-12, and well he may, for the period provided openings to Washington, Oregon and British Columbia, all distinct rarities in the Northeast in recent years. Ed's Washington list includes W7GRH K7IDX K7BBO W7CWS K7GSE and K7WIA, plus WA7GCS, Oregon, and VE7ANP. This all started at 2154 EST, July 11. At 1658 EST on the 12th, WA2OAF began a run that included W6NLO WA6JRA and W7UBI (Idaho), interspersed with single-hop.

Now, by call area, here is a sampling of who worked whom, and with what, including a notable "first." WA1NNW, Littleton, Mass., has been trying slow-scan TV on 50 MHz for months, but he made his first contact via Es, on July 6. He ran across the SSTV signal of K9HKW, calling CQ. Ed called on ssb and switched to SSTV for a picture QSO of some 20 minutes. If there has been two-way work on 50-MHz SSTV prior to this, it has not come to our attention. On July 10, Ed worked W4EFF on SSTV, thanks to a phone call to the latter station made by WB4QXI.

Equipment at WA1NNW is all home-built, except for the camera. His receiving adaptor was built from June, 1970, QST. The picture transmitting circuitry is from July-August, 1969, CQ, working with an SB-110. K9HKW has the Robot setup.

WA1DFL, Mass., says "nothing doing the first half of June." Later in the month, Steven caught openings to 4s, 5s, 8s, and 9s, and heard Wyoming's W7VDZ June 23. WA1NQV, Mass., observed 16 openings in June, including Puerto Rico and Cuba, plus the areas reported by WA1DFL. K1QDR reports W1ELP noted aurora June 29. He says that W1ELP has worked over 4000 different stations on 50 MHz.

Running but 5 watts output and a 5-element Yagi, WB2EYE worked CO2DC, Havana, June 20. The Cuban station was the only DX signal Bill heard. This past month, I received no reports from 3s or 4s.

Joe, WA5HNK, reports from Texas, "we have had our normal amount of summer skip." While there have been conflicting reports on conditions during the June contest, Joe appears to have done well. On Saturday, June 12, he worked 298 stations in 35 states and Mexico. All U.S. call areas were included. May 31, Joe heard KL7GLL, Sitka, Alaska for about 30 seconds, but the Alaskan

signal was covered by S9 VF7s in the Vancouver area. Pat, WA5LYX, sent his usual detailed report for May, but it didn't arrive in time for publication last month. Pat lists the 18th, 21st, and 29th as the better days. The opening of the 29th was good for two hours of double-hop to 1s and 2s. Pat says this was the best multihop opening he logged since 1965 — and we should mention that Pat probably spends more hours monitoring E propagation than he does eating or sleeping. Early June was not particularly productive in the San Antonio area.

WSKDM, Mississippi, says June 25 was a good E day. Among his many contacts, using 20 watts of am, was one with CO2IF, Havana. From Arkansas, WASPWP sent his first report to this column. Gene reports openings over the July 4th weekend, to New England and VE7.

From California, WA6JRA reported a 27-day repeat, June 25, of the major May 30-31 E event. Sam worked multihop to KP4DHC, Puerto Rico, and the East Coast. Sam and others in the Los Angeles area also worked into the midwest, VE4MA and XE1AAN. WA6JRA noted a weak, brief opening to KL7GLL on June 24. W6DPD says, "lack of skip spoiled the June QSO party." Chuck went on to mention infrequent single-hop openings on a few June days.

WA6HXW reports, "in my opinion this summer season has been the poorest since I've been on the band." Other than the July 4th weekend openings, Harley says conditions have been poor. He did work multihop to the East Coast on the 4th. Having made 50-MHz WAS this summer, Harley says he'll be giving most of his attention to 432, where he'll sport a kW and 104-element Yagi array.

WB9EDP, Illinois, found conditions fairly decent in June. Highlights included contacts with XE1AAN, VE6ZR, VE1ANJ, and WB2RLK/VE1, with the band opening 13 days in June. WAØTRO, Kansas, reports similar success to that at WB9EDP. He says the period of June 24-27 was particularly good.

Bob, operating WB2RLK/VE1 in Nova Scotia, says E was very good in June. On the 23rd he worked 79 stations in 16 states and on the 27th, 122 contacts in 17 states, including K5EFW, New Mexico. QSLs for him should be mailed to Robert W. Billings, WB2RLK/VE1, R.R. 1, Bridgewater, Nova Scotia, Canada.

Vince, K8REG, has been issued the call KV4HG for use during his trips to the Virgin Islands. Between June 28 and July 6 he caught two openings into Florida. WSQDB tells Vince that he intends to operate in the near future from Jamaica.



The U.S. and Jamaica recently signed a reciprocal operating agreement so I'd guess there will be some 6Y5 operation by vacationing Americans.

144 MHz reporting continues to be slow, perhaps because of the apparent lack of good tropo conditions thus far this summer, and the switch of much 2-meter activity to fm. At least the fall tropo season is just around the corner. VE7BQH, pictured elsewhere in this column, updated us on his moonbounce activity. Lionel has his 160-element collinear up and has constructed a selsyn readout mechanism to give proper moon tracking. "No more racing outside and up on the roof every 15 minutes or so, and I figure I've gained 2 dB by proper antenna steering." That is 2 dB a moonbouncer cannot afford to lose! VE7BQH and K6MYC work nearly every time they schedule, and Lionel's results with SM7BAE are nearly as good. Working Sweden from Vancouver regularly on 144 MHz really isn't too bad! Lionel says some new European blood is being drawn into the EME picture. In Germany, DK1KO has heard both VE7BQH and K6MYC, as have several other European stations using modest antennas, with the aid of ground reflection gain. DK1EGA, using an 80-element collinear, has had some success in schedules with VE7BQH. Lionel says Ray, VK3ATN, planned to be ready for renewed schedules in August, with a new amplifier. VE7BQH also has a new amplifier, a 4CX1000A.

WA1FFO, Conn., says tropo conditions have been "fair to average." He is completing a kW amplifier. K5UGM, Dallas, reports early June conditions above average, to Missouri and Kansas. WA6HNK, Texas, is new on the band with a kW, and 15 elements at 95 feet. Joe says he is open for meteor-scatter schedules.

In Canada, VE3DSS, Toronto, reports several evenings of local inversions, but no outstanding DX. VE3EMS has purchased VE3NA's kW for some serious scatter work. VE3ASO has a new stacked 15-element Yagi array, and VE3FKX reached state number 16 by working W8AEC, W. Va., during the June contest.

220 MHz activity around the country is apparently increasing, but the reporting on same isn't. WB6NMT activated a beacon May 10 for 220 E observation. So far, only local reception of the signal has been reported. Louis is busy at several 220 projects including a new array of sixteen 9-element Yagis to replace a wind-damaged 96-element array. That antenna was slated for replacement anyway, the storm just hastened the project. Louis and W7CNK have been trying to determine minimum system requirements for 220 EME success. They concluded that 500 watts at the antenna, antenna gain totaling 42 dB at both ends of the circuit and a 1.5-dB receiving-system

Slow-scan TV on 50 MHz is featured at WA1NNW. The camera is at the far right. Next to the left, above, is a closed-circuit monitor, resting atop the receiving setup. A Dumont 304H scope, under the sign, has a P7 screen, for viewing the received picture. A Heath SB-110-A, to the left of the microphone, is used for transmitting ssb and pictures.

noise figure will yield signals sufficient for contacts under good conditions. From there on, every extra dB adds to the reliability.

This summer WB6NMT had hoped to begin tropo schedules with KH6GRU and KH6NS, but personal problems in Hawaii have prevented those two operators from being active. Louis hopes the schedules might still begin this fall.

Jim, WB8IDD, (ex-WASZVI) is attempting to get a 220 newsletter, similar to the one edited by WA6GYD, off the ground. If you're interested, contact Jim at Box 74, Haslett, Michigan 48840. By the looks of the first edition, Jim is off to a fine start, but he will need support.

432-MHz tropo begins perking this time of year, and there have been several rather good evenings this past summer. W2BLV worked into Ohio, Michigan, and Western Pennsylvania, as well as Virginia and Delaware, June 17. A high-pressure area moving along the Atlantic Coast July 4 touched off excellent tropo from Maine to South Carolina. A receiver problem at W4NUS probably prevented W2BLV from working South Carolina, but George worked north to W1YPW, Maine, and most other states in between.

K4QIF, Virginia, worked W1YPW on July 6th, giving Rusty state number 20 on 432. Signals from throughout New England were quite strong that evening at K4QIF. K5UGM, Dallas, is building an array of four 15-element Yagis and is looking for schedules.

Old friend Al, W0DRI, Topeka, is another to join that elite "worked 20 states on 432" group. Al's number 20th was K0AWU, North Dakota, worked July 6, K0AWU runs 50 watts and a 44-element Tilton Yagi array. Al says midwestern signals were excellent that night, and W9WCD, DeKalb, Illinois, was a steady "40 over 9" in Topeka. For four consecutive years, Al has found good tropo conditions the first ten days of July.

1296 MHz certainly isn't being ignored by the tropo and moonbounce group. The July 4th tropo reported above permitted Al, K2UYH, N.J., to work his 7th state on 1296 in the person of Andy, W1AJR, Rhode Island. Rusty, K4QIF, says he'll soon be on 1296, which should delight the gang up the coast, along that favorable tropo path. K4QIF has 500 watts output and a dish, needing only to complete the feedline hookup. From Oakland, Florida, K4NTD reports a 350-mile contact with W4VHH, S.C., for a nice piece of 1296 tropo DX. K4NTD's signal was the first ever heard on 1296 by W4VHH except for his weak signal source. Not a bad beginning, eh?

W9WCD, fresh from his EME success with W2NFA, hopes to soon schedule G3LTF, and OZ9CR, Denmark, via the moon. OZ9CR is a club group. G3LTF needs no introduction to 1296 EME fans.

On June 18, VE2HW worked K2YCO, Rochester, via tropo over a 260-mile path. VE2HW believes this to be the first Canada to U.S. contact on 1296. VE2HW was running some 60 watts into

an extended 32-element collinear. He is nearing completion of a 600-watt final.

Band Planning, 220 MHz and Up

Improvement of our frequency usage in the 220 and 420-MHz bands is vital, for several reasons. On 220, Channel 13 TV stations and high-band TV receiver-oscillator radiation make trouble for us in the low end of the band, yet this is where much of our weak-signal EME and other DX work is scheduled. Radar is troublesome in the low end of 220 in many areas, too. For these reasons, 222 is a favored part of the band in California and some other areas. Should the rest of us follow suit? WB6NMT suggests that 221.5 to 222.5 be considered "the band" for a-m, ssb, and cw communication, with frequencies lower and higher left to the growing needs of fm and repeaters.

For years, most work in the 420-MHz band has followed an ARRL-backed "gentlemen's agreement," which puts wide-band modes other than ATV between 420 and 432, narrow-band modes between 432 and 436, and amateur television between 436 and 450. This worked well in the 1950s, but it is obsolete now, what with burgeoning ATV interest, country-wide use of frequencies above 440 for fixed-channel fm, with repeaters and repeater-control links, and general lack of interest in wide-band modes originally stated for the bottom 14 MHz.

Many ATV experimenters, apparently unaware of other users of the 420-MHz band, have moved into the region around 432 MHz, raising havoc with weak-signal DX scheduling, traditionally concentrated between 432 and 433 MHz. This has led to considerable strife, but progress is being made in cooling the tensions. As reported last month, W6ORG proposes that 435.0 be made a standard ATV video carrier frequency, with accompanying sound at 439.5. Tom says that this has worked well for the Southern California ATV Club, and the 432-MHz DX fraternity of that area. Though it might be thought that 435 is close to 432, for a wide-band mode like television, Tom assures us that this separation is adequate, and that the ATV on 435 will not be heard, up to at least 433 MHz, because of the low signal-density that far away from the ATV carrier.

Of prime importance to future planning is the outcome of the Space Telecommunications Conference, now in session in Geneva. Anything proposed is only "paper planning, until that party is over — but we should be doing some hard thinking. The time is long-gone when we can think of 420 to 450 MHz as virgin territory. We've got QRM problems there already, and they're going to get worse if we don't get organized in the matter of who uses what modes where — on 220, 420, and even higher bands, too. The world above 220 MHz is filling up — fast! — *W1HDQ*

ARRL Repeater Directory

It's out, and waiting for your addressed business-size envelope, with 8 cents postage affixed, to get it on the way to you. This is a first effort, admittedly incomplete. If your repeater is not in it, and you want it to be in the next edition, send for the convenient registration card, fill it out, and return it to ARRL. We'll try to keep up with new registrations, here in the column, so that you can update your directory until the revision next year. Some too-late registrations are on file already. We'll try to have a tabulation of them in this space next month.

QST

Silent Keys

IT IS with deep regret that we record the passing of these amateurs:

W1CBS, Herbert W. Mason, West Barrington, RI
K1FFK, Wallace R. Newton, Greenfield, MA
W1GIX, Herbert J. Gauthier, Windsor, CT
W1KVG, Thomas D. Spencer, Mirror Lake, NH
WA1OFO, John W. McMahon, Williamstown, MA
K1QVW, Joseph H. Bessette, Randolph, MA
WA2BNF, Joseph A. Stauhs, Belleville, NJ
WB2BXX, John J. Lennen, Rumson, NJ
W2CBT, Fred Cost, South River, NJ
WA2DYJ, Arthur F. Munch, Buffalo, NY
W2IC, Lloyd F. Kinnear, Stanley, NY
WB2MHA, Joseph A. Walsh, Pine Hill, NJ
W2RFX, Wallace R. Coleman, Vestal, NY
W2TRC, Irving Goldberg, Rochester, NY
K2YFM, Edward J. Sheehy, Allendale, NJ
W3CGM, James H. Boyer, Earleville, MD
W3HQP, Homer B. Peacock, Randallstown, MD
K3JCZ, Edwin H. Black, Ebensburg, PA
WA3MRV, George S. Gillespie, Secane, PA
WA3OAG, James C. Harris, Washington, DC
W3OUA, Rudolph J. Platek, Carnegie, PA
W3ZQI, James E. Sherwood, Hillsboro, MD
K4AYR, Lawrence Keeton, Holdaway, FL
WA4BAY, James E. Thain, Jr., Miami Lakes, FL
W4HMG, Bryson L. McGraw, Columbia, SC
W4OQA, Ned C. Cantrell, Memphis, TN
K5IPL, Hawes H. Heard, Arkadelphia, AR
W5K5, Lilburn O. Abshere, Lawton, OK
K6AA, William E. Clyne, Vista, CA
W6ADN, William Freeman, Reedley, CA
W6EBA, Ralph W. Tetzlaff, Redondo Beach, CA
W6EHJ, Orin W. Miller, Sun City, CA
K6EUI, Robert H. Van Norynen, Fullerton, CA
W6JEE, Reuben G. Pirkle, Berkeley, CA
K6MJQ, The Rev. Alex Grech, Los Angeles, CA
K6OQ, H. E. McFarland, San Jose, CA
K6PH, Robert W. Boyter, Foster City, CA
W6TWF, Vincent A. Wirth, Duarte, CA
W6VKD, Verlie E. Haviland, Stockton, CA
W6VUQ, Edward G. Young, So. San Gabriel, CA
WB6ZHS, Dan A. Munday, Rancho Mirage, CA
W7BU, Wayne K. Harris, Astoria, OR
K7CSM, Louis A. Disbrow, Salem, OR
W7FGW, B. J. (Tex) Sparks, Selah, WA
K7GRU, Rial Rolfe, Phoenix, AZ
W7MYL, William E. Fenton, Everett, WA
W7OOY, Jeannine L. Phillips, Bozeman, MT
W7VDD, Charles Howard, Seattle, WA
W8EAF, Herbert E. Siegel, Capac, MI
W8EJY, Walter S. Forcier, Detroit, MI
W8IJT, Howard S. Randall, Wadsworth, OH
W8KK, Nye R. Lanphier, Painesville, OH
K8UBF, Carl K. Greene, Yellow Springs, OH
W8ZL/W4ZL, Harold J. Burhop, Dafer, MI
W9GPT, Wilbur F. Douglas, Eau Claire, WI
W9ONY, Fred H. Zoltn, Milwaukee, WI
W9PHG, Francis E. Greeley, Jr., Westmont, IL
W9PIW, Edward G. Fleisner, Wisconsin Rapids, WI
W9QKK, Maurice E. White, Chicago, IL
W9TOK, Richard S. Acker, Chicago, IL
WØDKJ, Merten M. Hasse, Vermillion, SD
WAØDZA, Ceylton K. Magwire, Hayes Center, NE
WØGLN, James R. Gosset, Overland Park, KS
KØHUO, Horace K. Hudson, St. Louis, MO
WAØIBB, Earle C. Engstrom, Grand Island, NE
WAØNGP, Elbert J. Kuhn, Englewood, CO
WØTX, Harry E. Phillips, Brighton, CO
VE3GI, B. A. Coy, Manotick, ON
VE3IM, Otto E. Rand, St. Catharines, ON
VE4ZR, William R. Russell, Winnipeg, MB
VE7PP, P. W. Pike, Victoria, BC
VE7SL, M. E. Green, West Vancouver, BC
KP4BG, Rafael J. Acosta, Rio Piedras, PR
KP4WD, Luis Garcia de la Torre, Hato Rey, PR
PY2FG, Ernesto Conrad, São Paulo, Brazil, SA



YL news and Views

CONDUCTED BY LOUISE RAMSEY MOREAU,* WB6BBO

The Jackpot Question

THE STATEMENT that we are the proud holder of an amateur radio license has a curious effect on the uninitiated. The reactions range from a "Do-you-know-so-and-so?" (pronounced very distinctly), through Aunt Lizzie's shocked, "With your background and education?" to a rather eager request to tell why the kitchen radio has a loud hum. But, no matter how people react, they almost invariably come up with the same question: "But what do you DO when you're talking on the radio?" And when they ask it, little do they know that they've hit the jack-pot, for that is just the same as opening the flood gates at Hoover Dam.

We usually begin with the little things that never fail to impress — our DX, the contacts halfway around the world that have begun as casual meetings and become warm, lasting friendships. We go on to the thrill of meeting a celebrity, a well-known name that is almost a household word, and see their eyes shine as they ask, "Oh! you mean you really talked with him?"

We describe our nets, those YL clubs of the air, and explain the coverage, some local, and some at vhf frequencies to facilitate any Technician members, while others include several states whose members may never meet except once a year at a convention or hamfest. And then we tell of the ones that extend across a continent with gals dropping in from other countries when conditions permit. We chat easily about YLs we know in Japan, or South Africa, or Australia.

We explain the many times that we have stopped the hobby side of the activity to place ourselves and our skills at the convenience of the public to help maintain that lifeline of every community, communications. And we describe in detail a personal experience with some emergency, and how excited we were when the mail brought the Public Service Award that we display so proudly.

* YL Editor, QST. Please send all news notes to WB6BBO's home address: 1036 East Boston St., Altadena, CA 91001.

What do we do? We meet with gals in Mexico in that person-to-person activity between two countries. We're the ladies in MARS, and in Hurricane Watch, and Intruder Watch, and Weather Nets. We are FCS, and SECs, and SCMs, and ARRL Assistant Directors. We're active in RACES, and we are the gals who have had our own "People-to-People" project in the YLRL Adoptee program for many years. We're taping *Harmonics* and other material for the convenience of the sightless YLs. We have clubs with a world-wide membership list. We are poking into amateur TV, and building our own TV equipment. We've been found tracking communications satellites and dreaming of even more distant operation. We spend hours keeping members of our armed services all over the world in touch with their loved ones at home. The list of the things we do spreads over the full program of amateur radio activity. Name it, and it is a pretty sure bet you'll probably find a YL working in there somewhere.

Usually we don't run down when we are telling people what we do. Rather, we just stop because we suddenly realize we have been holding forth for an embarrassingly long time. Almost always, when we do stop, we are rewarded by, "You know when they had that flood a few years ago some ham called me with a message that my sister was ok. I never did get the name, so I will just thank you."

1971 YLRL Anniversary Party Contest Rules

Cw	Starts:	October 20, 1971	1800 GMT
	Ends:	October 21, 1971	1800 GMT
Phone	Starts:	November 3, 1971	1800 GMT
	Ends:	November 4, 1971	1800 GMT

Eligibility: All licensed women operators throughout the world are invited to participate. YLRL members only are eligible for the cup awards. Non-members will receive certificates. Only YLRL members are eligible for the Corcoran Award. Contacts with OMs do not count. Contacts on nets do not count.

Operation: All bands may be used. Cross band operation is not permitted. Only one contact with each station will be counted in each contest.

Procedure: Call "CQ YL."

Exchange: Station worked, QSO number, RS, or RST, ARRL Section or country. Entries in log



WA0MNL, Rosemary; and WA0ERA, Eldon Lewis; and their family, son-in-law; daughter Linda, WA0MNM; son; daughter-in-law, WB0CZL; and son, WB0CZJ. Resemary is president of the Pikes Peak Radio Amateur Assn.

QST for

JA YLs who attended the JARL Convention. Front row: JA1CFS, JA2BBH, JA2DYL, JA9CHE, JA9GXX. Center row: JA3JZN, JA2KGM, JA0ADL, JA1CLI, JA1DAR, JA7BYL, JA0TW, JA2NFJ, JA9NB. Back row: JA3VMT, JA1EYL, JA1AEQ, JA0EC, JA1YL, JA1CUO, JA4FRV.



should show time, band, date, transmitter, and power. Logs must be signed.

Scoring: A. Phone and cw will be scored as separate contests. B. All YLs located within an ARRL Section score one (1) point for each QSO with another station located within an ARRL Section. Score two (2) points for each contact with a station not located within an ARRL Section (i.e. DX). Definition of DX: all stations not located within an ARRL Section. DX YLs will score two (2) points for each contact with a station located within an ARRL Section. Score one (1) point for each contact with another DX station. (Note: Please know your ARRL Section. A list may be found on page 6 of QST, or send SASE to the YLRL contest chairman for a list.) Multiply number of contact points by total number of different ARRL Sections and/or countries worked. C. Contestants running 150 watts, or less, dc input at all times may multiply the results of (B) by 1.25 (low power multiplier). D. Ssb contestants running 350 watts PEP, or less, at all times may use the low power multiplier (results of (B) by 1.25).

Awards: Highest cw score - Gold Cup (YLRL member only anywhere in the world). Highest phone score - Gold Cup (YLRL member only anywhere in the world). First, second, and third place cw and phone scores (not combined) and highest cw and phone logs in each district and country will receive a certificate.

Corcoran Award: Highest combined cw and phone scores (YLRL members only within an ARRL District).

DX Only: Highest combined cw and phone score from North and Central America including the Greater and Lesser Antilles, will receive a YLAP Hager Plaque for YLRL members only. Highest combined score from any other part of the world will receive a duplicate award.

Logs: Copies of all logs must show claimed score, be signed by the operator, be postmarked not later than November 20, 1971, and be received no later than December 4, 1971, or they will be disqualified. Please check your logs carefully. Be

sure they are complete. No logs returned. Be sure the copy is legible, carbon copies are easily smudged. Remember, this is the busy holiday mail season, and mail may be slow.

Mail copies of logs to: Mae Hipp, K7QGO, 5655 Yukon Drive, Sparks, NV 89431, U.S.A.

Howdy Days Logs

The date for the receipt of the Howdy Days logs was unavailable for the rule listing in August QST. Please note that all logs must be received by October 14, 1971.

For rules, please check QST, August 1971, "YL News and Views."

MINOW NET Officers

The MINOW Net, covering the states of Montana, Idaho, Nevada, Oregon, and Washington, as a YL on-the-air club has elected the following officers for the year 1971-72. President - W7WLX, Ethel Devish, Washington; Vice-president - WA7FRM, June Gantner, Washington; Secretary - WA7BDD, Joan Cahagher, Idaho; Sunshine Chairman - Wilberta Longwell, Oregon.

JLRS Meeting

The Japan Ladies Radio Society, which includes all YLs in Japan, with a membership of over 100, held a meeting in conjunction with the JARL Convention in Tokyo. The agenda included on-the-air activity, and the organization of JLRS. Twenty-one YLs were present.

Officers elected for the years 1971 and 1972 are: President - Fumi Abe, JA1AEQ; Vice-president - Mitsuko Sakamoto, JA1FPB; Secretary - Kuni Kan, JA1YL; Treasurer - Emico Ito, JA1CFS; Awards - Setsuko Mashita, JA7BYL/1; Bulletin Committee - Mitsuko Gomi, JA1CUO; Eiko Watanabe, JA1DAR; Chieko Yamada, JA1EYL.



YLs attending LIMRE Convention in Hermosillo, Mexico: Anna, XE1VU; Esther, WA6UBU; Teresa, XE2LLY; Roxi, K6ELO; Eugenia, XE2EO.



Members of the MINOW Net attending the Annual Picnic in Richfield, Washington. Front row: K7TWQ, K7UBC. Center row: W7IXR, WA7KMC, W7NJS, WA7KHB, K7VSG, W7WLX, KS6DJ/7. Back row: K7MRX, W7FDE, WA7IRD, W7HHH, K7PVG, K7RAM, WA7BDD.

Freedom Foundation Honors to WA3ATQ

Harriet Creighton, WA3ATQ, was honored by the Freedom Foundation, of Valley Forge, Pennsylvania, for her "Operation Free Radiogram" project in which she maintained schedules relaying messages to and from service men stationed at the Guantanamo, Cuba, Naval Base, as well as her communication link between the hospital ship *Hope* delivering messages of doctors and ship personnel.

The 1970 Honor Certificate Award plaque was presented to Harriet at a luncheon sponsored by the Women's Marine Association in her honor and was attended by women Marines from the Delaware Valley area.

WA3ATQ was further honored for her activity by a letter of commendation from the commanding officer of the Marine Corps at Guantanamo Bay.

The letter stated in part: "Your completely unselfish donation of time, skills, and equipment has immeasurably added to the overall efficiency of this organization and is greatly appreciated."

"YL News and Views" adds congratulations to Harriet for her work and for the great honor she received.

Dr. Christine Haycock, WB2YBA

Call her "Doc," "Chris," "Prof.," WB2YBA answers to all of these as well as Colonel, for she has just been promoted to the rank of full Colonel in the Medical Corps of the U.S. Army Reserve.

Chris was the first woman ever permitted to intern at Walter Reed Medical Center, Washington, D.C. She was a Captain in Japan during the Korean War, and has remained in the active reserves since then. She is also Assistant Professor of Surgery at the College of Medicine of New Jersey at Newark, and Director of Emergency Service at the Martland Hospital Unit of the College. As if that weren't enough to keep a gal busy, she is on the staffs of four other hospitals!

Chris is a past President of the New Jersey Women's Medical Association, and was voted "Woman of the Year" by that group in 1970. With an outstanding record in the medical world, WB2YBA is also interested in photography and is a life member of the Photographic Society of America. She is a member of the ARRL, YLRL, NY-YLRL, YLISSB, and is at present Second District Chairman of YLRL. She holds WAC and WAS Awards and was also honored by MARCO for her on-the-air medical assistance.

The OM, Sam Moshowitz, is well known to science fiction readers.

QST



Freedom Foundation Honor Award Certificate presented to WA3ATQ, Harriet Creighton, by LCDR C. E. Aldrich, K2ERF, Asst. to the President of the Freedom Foundation, at a luncheon meeting held in her honor by the Women's Marine Association, Philadelphia, Pa.



Christine Haycock, WB2YBA, receiving her rank of Colonel in the Medical Corps, U.S. Army Reserves.

Operating Events

de 011311

SEPTEMBER

- 1-6 SW Div. Conv. operation of WD6WU, QSL via K6VDP.
2 W6OWP Qualifying Run (W6ZRI, alternate) at 0400 GMT on 3590/7129 kHz, 10-35 wpm. This is 2100 PDST the night of Sept. 1. Copies to ARRL for grading.
4-12 Puget Sound Council of ARCS event, p. 101 Aug.
5-6 Nebraska QSO Party, p. 101 Aug.
11-12 VHI QSO Party, p. 66 Aug.
11-12 WAEDC phone, p. 101 Aug.
11-13 Wash. State QSO Party, p. 101 Aug.
12 FMT, open to all, rules p. 101 Aug.
15 WIAW Qualifying Run, 10-35 wpm, at 0130 GMT on 1,305, 3,52, 7,02, 14,02, 21,02, 28,02, 50,02 and 145,588 MHz. This is 2130 EDST the night of Sept. 14. Underline one minute of top speed copied, state no aids used (typewriters OK), sign and mail to ARRL with your full name, call (if any) and mailing address.

18-19 Scandinavian Activity Contest cw 1500 GMT Sept. 18 to 1800 GMT Sept. 19. Non-Scandinavians try to work as many Scandinavians as possible, repeat QSOs permitted on additional bands. No cross mode permitted. Prefixes to work are: LA, JW, JX, OH, OHP (Aland), OHQ, Market, OX, OY, OZ, SM/SK/SI. All are considered Scandinavia for the contest. Classes include single op., multiop, single transmitter and multi-multi. Clubs stations, even when operated by just 1 amateur, are considered to be in the multioperator class. Multi-multi stations must use a separate series of numbers per band. Exchange RST(T) and number starting with 001. One point per QSO and a maximum of 10 multipliers per band. Final score, number of QSOs (one point per QSO times number of multipliers). Only multiband category. Appropriate awards. Logs must show dates, times in GMT, stations, numbers, bands, notation of new multipliers. Separate logs per mode. Usual statement. Mail logs no later than Oct. 15 to the SRAI Contest Committee, Box 306, ST-00100 Helsinki 10, Finland. (Phone session to be held Sept. 25-26.)

18-20 Pennsylvania QSO Party, 2300 GMT Sept. 18 to 0200 GMT Sept. 20. Pa. stations count 3 points per out-of-state QSO, one point per Pa. QSO, multiplied by the number of ARRL sections and counties worked. Out-of-state stations count 1 point per QSO, multiplied by the number of Pa. counties worked. Same station may be worked on different bands/modes. Logs must show date/time in GMT, QSO number, stations RST(T), county worked (for non-Pa.) or ARRL section (for Pa.) plus band/mode. Activity will be found around 72.5 kHz up from the low end of each cw band and 20 kHz down from the top end of each phone band. Check phone bands on the event GMT hours. Appropriate awards. While multipliers are a separate category, certificates will be awarded to single ops. only. Mailing deadline is Oct. 18. Send logs to the Nittany ARC, Box 60, State College, PA 16801.

20 CWA High-Speed Code Test, sponsored by the CWA, Wireless Assn. Transmission starts at 0115 GMT, instructions at 0130 GMT. First test transmission at 0150 GMT (40 wpm) followed by 45 wpm at 0200, 50 wpm at 0210, 55 wpm at 0220 and 60 wpm at 0230 GMT. (This is Sunday evening local time.) Look for call-up transmissions starting at 0115 GMT on 3525, 3637, 3640, 3653, 3665, 3690, 7025, 7070, 14025 and 14070 kHz. All participants should be sure to copy instructions starting at 0130 GMT.

- 22-24 YL Howdy Days, p. 99 Aug.
25-26 North Dakota QSO Party, p. 101 Aug.
25-26 Scandinavian Activity Contest phone, see Sept. 18-19 listing.
25-26 V/LW Contest, p. 63 Aug.
28 WIAW Morning Qualifying Run, 1300 GMT (this is 9 am EDT Sept. 28). Same frequencies as well as additional details under the Sept. 15 listing.

OCTOBER

2-3 VK/ZL/Oceania DX Contest phone, from 1000 GMT the 2nd to 1000 GMT the 3rd. WVEs count 2 points per QSO per band with each VK/ZL and 1 point for Oceania stations other than VK/ZL. Final score computed from the sum of QSO points multiplied by the number of VK/ZL call areas worked on all bands. Exchange RST(D) plus serial number starting with 001. Logs must show date, time in GMT, calls, bands, serial numbers. Underline each new VK/ZL call area. Use a different log sheet for each band. Summary should show call, name/address, details of gear, and for each band QSO points for THAT band and VK/ZL call areas per band. This permits computation of single and all-band scores. Usual declaration required. Handsome colored pictorial certificates will go to winners in various all-band categories. Logs must be mailed to reach the Wireless Institute of Australia on or before Jan. 30, 1972. Send to the Federal Contest Committee of the WIA, Box N1002, G.P.O., Perth, Western Australia 6001.

2-4 California QSO Party, sponsored by the North Hills RC (K6IS), from 2000 GMT Oct. 2 through 0200 GMT Oct. 4. Use all bands, phone and cw. The same station may be worked only once per band, per mode. Calif. stations send QSO nr., RST(T) and county. Non-California stations substitute ARRL section or DX country for location. Calif. stations may work each other for QSO credit only. Non-Calif. stations may work only stations in Calif. Scoring: Calif. stations multiply QSOs by all ARRL sections and DX countries (remember, do not count Calif. stations!). Others use Calif. counties for their multiplier. Suggested freqs.: 3560 3735 7060 7175 14060 21060 21110 28060, 3880 3980 7280 14280 21280 21380 and 28580. Logs must show dates, times, band/mode, stations, exchanges. Logs become the property of the club and cannot be returned. Suitable awards. Entries must be postmarked no later than Nov. 13. Mail to SCM John Minke, W6KYA, 6230 Rio Bonito Drive, Carmichael, Calif. 95608. Please include a summary sheet. A large case is required for results (not by DX stations). If planning rare county operation, notify W6KYA. Novice activity is encouraged.

2-4 CQ-Western Electric, cw, rules from the Indian Hills ARC, Bell Telephone Labs, Naperville, Ill. 60540.

6 W6OWP Qualifying Run.

9-10 Space Net VHF Contest, to coincide with the anniversary date of Apollo 7, all bands 50 MHz and up, from 8 pm to 8 pm your local time, all modes (except repeaters). Exchange number, report and zip code. The multiplier is based on the number of different zip codes plus 10; 2 points per complete QSO. Indicate power on entry, awards in 3 different power categories. Non-U.S. use post office name in lieu of zip code which will count the same as a zip code in scoring. Multipliers count just once. Logs must be postmarked by Nov. 5 and sent to the Space Net Director, Tony Slapkowski, WB2MTU, Box 909, Sickleville, NJ 08081.

9-10 VK/ZL/Oceania DX Contest cw, see Oct. 2-3 listing.

9-11 CD Party phone, open to all League appointees and officials who are notified separately by bulletin. Check with your SCM, page 6, to see if you can qualify for an appointment.

9-11 CQ-Western Electric phone, see Oct. 2-4 listing.

14 WIAW Qualifying Run.

16-17 Boy Scout Jamboree-on-the-Air, midnight Friday to midnight Sunday, local time

16-17 CQ-Western Electric rtty/vhf, see Oct. 2-4.

16-18 CD (Communications Department) Party, cw.

16-18 Canadian Amateur Radio Teletype Group 11th World-Wide RTTY DX SS. Rules list issue.

20-21 YL Anniversary Party, cw.

NOVEMBER

3-4 YL Anniversary Party, phone.

4 W6OWP Qualifying Run.

12 WIAW Qualifying Run.

12-14 QRP CW Contest.

13 FMT

13-14 SS, phone.

13-20 QRP CW QSO Party

20-21 SS, cw.

DECEMBER

4-5 Telephone Pioneers QSO Party.

8 W6OWP Qualifying Run.

11-12 R.I. QSO Party.

11-12 F.V. Contest, cw.

11-12 160-Meter Contest.

14 WIAW Qualifying Run.

30 WIAW Morning Qualifying Run.

31 Straight-Key Nite.

JANUARY

8-9 VHF SS.

29-30 Simulated Emergency Test.

FEBRUARY

5-6 DX Competition, phone.

19-20 DX Competition, cw.

MARCH

4-5 DX Competition, phone.

18-19 DX Competition, cw.



Operating News

GEORGE HART, WINJM
Communications Manager
ELLEN WHITE, W1YYM
Deputy Communications Mgr.
ROBERT L. WHITE, W1CW; DXCC
GERALD PINARD, *Training Aids*
ALBERT M. NOONE, WA1KQM; *Contests*

The Annual Check Up. Every summer, headquarters takes on the task of conducting a complete check up on the membership of all SCM appointees, who must be ARRL members in good standing to retain their appointments. It is usually a full time job for one person during the greater part of the summer to go through the membership files in search of nearly 5000 appointees, recheck for those not found, send out the standard form letter advising those not in the file that they must keep their membership current in order to hold appointment, and handling and analyzing returns.

Inevitably, in the process, a few appointees who are members get these letters, and naturally most of them get somewhat upset about it, even though the letter clearly admits the possibility that there could have been a mistake made at headquarters. But also, on the plus side, it has been noted that the reminder results in many renewals and not just a few weed-outs of appointees who have been inactive for quite some time. All in all, the process is worthwhile in helping to keep our appointment files current. In any case, it is required that such a check up be conducted annually to make sure that those receiving the benefits of appointment-holding are a part of the organization.

Problems arise when a large number of appointees have recently moved or renewed their membership; occasionally these out-of-file membership stencils are not found even after check and double check because of the bustle of routine Circulation Department procedures or just plain clerical imperfections, and someone gets a letter who really is a member. Nothing to get excited about; the letter doesn't say you are not a member, it only says we cannot find you in the files. If you are indeed a member, just advise us the expiration date on your membership certificate and everything will be taken care of.

The 1971 annual check up has now been completed. A total of 4136 appointments were

checked against the membership file, of which 444 were not found. Some of these (90, to be exact) turned out to be non-appointees in the file by reason of being "complimentary" appointees, or silent keys. Then the remaining 354 were sent letters asking about their status. Those replying negatively or not replying are referred to the SCM — and of course in a few cases replies have resulted in correcting our membership files. Those renewing or joining are simply returned to the appointment file.

SCMs cannot be expected to check the membership of every application for appointment, and it is more efficient for headquarters to do all the checking at once rather than every time a Form 4 appointment card is received from an SCM. Thus, it's an annual summertime job. Eligibility to hold an official appointment is one of the benefits and privileges of membership. While ARRL serves all amateurs in many ways, the administration of operating appointments through the Field Organization is restricted to full members only.

Novice Frequencies. Our thinking Miss. SCM Walker Coffey, WSNCB, opines that it is odd that all suggested Novice congregating frequencies for state and section QSO Parties seem to be 3735, 7175 and 21,110, where indeed any novice participation is encouraged. This may be good in that a lot of activity concentrates in a certain spot, giving crystal-bound novices a better chance to pick up new states for WAS, etc. but had in that those spots are bound to be so QRM-laden as to make adequate QSOs difficult.

Walker feels that a little system in the use of crystals by novices relating to the geography of the activity concerned might be helpful. One method he suggests is that first call area activity be concentrated on frequencies ending in 1, second call area on frequencies ending in 2, etc. right up to 9, and of course 0 for the 0 call area. Thus, a novice looking for a station in the 8th call area, for example, would use a crystal giving him a frequency ending in 8; and of course 8th call area novices looking for contacts with just anyone would use a crystal coming out with a frequency ending in 8. Bright idea? Maybe some crystal-trading is called for. If you are a novice in, say, the fifth call area, you would want to get hold of crystals on 3705, 3715, 3725, 3735 and/or 3745 for your general QSOs, along with others you may



A couple of SCMs man the ARRL exhibit at the San Jose Convention in July. At left is Len Norman, W7PBV, Nevada SCM. At right is Paul Parker, WB6DHH, East Bay SCM. (Photo by W7PBV.)

need to work into other call areas — for example, 3707, 3717, 3727, 3737, and/or 3747 to try to snag some of those rare seventh call area states. Similar on other bands, of course. If the idea of some such system in novice QSOing caught hold, it might help alleviate any QRM situation now existing as a result of overuse of crystal frequencies ending in 5.

Of course the whole thing would have to be voluntary, but once it got started each novice would have a pretty good idea of the best place to call CQ and the best places to call others. A Vermont novice, for example, could probably do pretty well on 3711 (except when he wanted to

work Nevada or Wyoming!), while a New York novice would need to do a little moving around.

Walker concedes that there may be better ideas. Anybody got any?

The Official VHF Station. In July and August *QST* we covered the Official Observer and the Official Bulletin Station. This is the third in our series to promote interest in ARRL SCM appointment.

The OVS appointment started out as OES (Official Experimental Station) and many still prefer this designation, but since only those

(Continued on next page)

WIAW CODE PRACTICE

WIAW transmits code practice according to the following schedule. Approximate frequencies are 1.805 3.52 7.02 14.02 21.02 28.02 50.02 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.

Speeds	Local Times/Days	GMT
10-13-15	7:30 PM EDST dy	2330 dy
	4:30 PM PDST	
5-7 1/2-10	9:30 PM EDST SnTThS	0130 MWFSn
13-20-25	6:30 PM PDST	
5-7 1/2-10	9:00 AM EDST MWF	1300 MWF
13-20-25	6:00 AM PDST	
35-30-25	9:30 PM EDST MWF	0130 TThS
20-15	6:30 PM PDST	
35-30-25	9:00 AM EDST TTh	1300 TTh
20-15	6:00 AM PDST	

The 0130 GMT practice is omitted four times a year on designated nights when Frequency Measuring Tests are sent in this period. To permit improving 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 GMT dates and Aug. *QST* practice text to be sent in the 0130 GMT practice on the following dates.

- Sep. 8: It Seems to Us
- Sep. 14: Correspondence
- Sep. 17: League Lines
- Sep. 27: ARPS

The subject of practice text for the following sessions is *Understanding Amateur Radio* First Edition.

- Oct. 1: Transmitting Accessories, p. 208
- Oct. 4: Universal Transmatch, p. 211

WIAW SPRING-SUMMER SCHEDULE (April 25-October 31)

(Specific frequencies shown below indicate general operating periods)

The ARRL Maxin Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 1 p.m.-1 a.m. EDST, Saturday 7 p.m.-1:00 a.m. EDST and Sunday 3 p.m.-11:00 p.m. EDST. The station address is 225 Main Street, Newington, Conn., about 7 miles south of Hartford. A map showing local street detail will be sent upon request. If you wish to operate, you must have your original operator's license with you. The station will be closed May 31, July 5 and September 6.

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
0000	←			C.W.-OBS ¹			→	
0620-0630 ⁴	←		3,700 ²	14,020	14,020	7,150 ²	14,020	
0630	←		3,700 ²	14,100	14,100	7,150 ²	14,100	
0100	←			Phone-OBS ²			→	
0105-0130 ⁴	←		3,820	50,120	145,000	1,820	21,270	
0130	←		CODE PRACTICE DAILY³ (35-15 wpm TThSat, 5-25 wpm MWFSn)				→	
0230-0300 ⁴	←		3,555	1,805			3,555	
0300	RTTY-OBS ⁵		RTTY-OBS ⁵	←		RTTY-OBS ⁵	→	
0310-0330 ⁴	←		3,625	14,095	7,095	14,095	3,625	
0330	Phone-OBS ²		←		Phone-OBS ²		→	
0335-0400 ⁴	←		7,220	3,820	7,220	3,820	7,220	
0400	CW-OBS ¹		←		C.W.-Obs ¹		→	
0420-0430	←		3,700 ²	7,020	3,945	7,150 ²	3,520	
0430-0500	←		3,700 ²	7,080	3,945	7,150 ²	3,555	
1300	←		CODE PRACTICE³ (5-25 wpm MWF, 35-15 wpm TTh)				→	
1700-1800	←	21,285 ⁶	21,285 ⁶	21,285 ⁶	21,285 ⁶	21,285 ⁶		
1900-2000	←	14,280	7,255	14,280	7,255	14,280		
2100-2100	←	14,100	14,280	14,095	21,285 ⁶	7,080		
2200-2300	←	21,285 ⁶	21,100 ⁶	21,285 ⁶	7,255	14,280		
2300-2330	←			RTTY-OBS ^{5,7}				
2330	←			CODE PRACTICE DAILY³ 10 13 15 w.p.m.				→

¹CW OBS (bulletins, 18 wpm) and the code practice on 1,805, 3.52, 7.02, 14.02, 21.02, 28.02, 50.02, and 145.588 MHz.
²Phone OBS (bulletins) 1.82, 3.82, 7.22, 14.22, 21.27, 28.52, 50.12, and 145.588 MHz.
³RTTY OBS (bulletins) 3,625, 7,095, 14,095, 21,095 and 28,095 MHz.
⁴Starting time approximate. Operating period follows conclusion of bulletin or code practice.
⁵Operation will be on one of the following frequencies: 21.02, 21.08, 21.27, 21.41, 28.02 or 28.52 MHz.
⁶WIAW will listen in the Novice segments for Novices, on the band indicated, transmitting on the frequency shown.
⁷Bulletins sent with 170-Hertz shift, repeated with 850-Hertz shift.
⁸Sent with 170-Hertz shift.
 Maintenance Staff, W1s QIS WPR, WA1NEU. *Times-days in GMT. Operating frequencies are approximate.

operating on vhf and above were eligible, it was changed to OVS some years ago and its scope broadened to include some of the operating aspects of vhf activity. With the advent of renewed interest in fm and repeaters, the vhf and uhf parts of the spectrum are now more operational in nature than experimental.

OVS appointment is open to any amateur licensee who operates on vhf or above (i.e., six meters and below). Yes, novices too. While experimental and public service work are specifically encouraged, duties of the appointment are not limited to these particular types of activity. Just about any type of vhf activity can qualify. The principal requirement is that the appointee set the example of excellence in all fields of vhf endeavor, whether his "bag" be traffic nets, repeater operation, satellite or space experimentation, propagation, contests, emergency preparedness, or what-else-is-there?

Many believe that vhf is the coming thing in amateur radio and that eventually the bulk of amateur radio operation will take place on these and higher bands; in fact, some think this has taken place already. While we doubt this, it does appear that there is a gradual exodus vhf-ward; either that, or the newer licensees are cutting their teeth on vhf bands rather than on the "DC bands," which will have the same end result. Maybe some day the column "The World Above 50 Mc." will be eliminated because this will include most of "the world," and maybe at that time we'll have a new column entitled "The World Below 30 MHz."

Be this as it might (or might not) be, it is very apparent that vhf usage by amateurs is on the increase, and OVS appointments should be also. So how about it, you vhfers? Sign up to be a member of the "elite" among your crowd and do your part toward making vhf operation an honorable and exemplary part of the amateur radio picture. Get an application from headquarters or your SCM (see p. 6). — WINJM.

Five-Band Award Updates. It is now six months since the last listing of new members to these prestigious groups (p. 104, March '71 QST). How have they been going? Well, see for yourself:

SBDXCC: We left off at number 58 in March. Since then, 51 additional plaques have been issued. Here are the recipients, starting with number 59: HP1JC W2YT EA4IL VO1FB W2FR W3NU W7MB VE2NV W2HH W9BZW W3KT W6EJJ W3NZ W4DQS DL7HZ K4BVD/6 K4CIA F9RM K2BKU W7SFA K4IEX W6WX K4DJC K4EZ W4ZXI F3AT W2TP DL7PR W5WZQ W2FXA W8BDO K4JC LX1BW SM5BHW SM3BIZ VE7ZM W5FL WA2IZS K4II W3TV W4SYL YU3EY VO1AW YV5BPG W3AZD OK2RZ 11AA G3KDB KP4CL LA5HE W7SGN.

5BWAS: Continuing with number 33 — W2TP K4LSP VE3ACL W2FXA W4GK WA3GUL K2GPL WA5IIS WA0VKP W4KEB K4ELK K4BVD/6 W6EYY CE0AE W4HHM WA4ZLP W4UF K4IUV K6SSN WA0NYU W6NJU VE3GNM K4HPR W82NRU W6JKR W2HO K7NHV/8 W4OZF W9FVD K1TZZ WA8VRB.

— WIYYM

Hamfest Calendar

(Continued from page 92)

aircraft flying, and contests. \$5 covers everything. Further information from John Bruning, W8DSR, 6307 Fairhurst Ave., Cincinnati, OH 45213.

Ohio — The Findlay Hamfest, Riverside Park, September 12. Swap-shop, flea market, net conferences, manufacturers' display, and MARS. Advance donation \$1; \$1.50 at the park. Tickets and information from Dan Jernigan, K8VXD, Route 2, Findlay, OH 45840.

Ohio — Third Old Time Hamfest, Indian Hills Radio Club, Sunday, October 17 at the Slovenian Social Home, 20713 Recher Ave., Euclid. Swap and shop, dinner, and contests. An old-fashioned hamfest — come for fun and education. For tickets and further information write Gladys Zimmermann, W8ZUK, Public Relations, Indian Hills Radio Club, 1504 Maple Grove Rd., Cleveland, OH 44121.

Pennsylvania — The Uniontown ARC 22nd Annual Gabfest on the club grounds, Old Pittsburgh Rd., September 11. Swap and shop, plenty of refreshments, free coffee. Registration \$2. The club grounds are near the turnoff for the Old Pgh Rd., off Route 51 between Hills shopping center and north of town. Follow signs on Route 51 north of town and on Route 40 West. Write Joseph M. Sofranko, W3UUZ, 438 Braddock Ave., Uniontown, PA 15401, for information.

Tennessee — The Greater Memphis ARC annual Mem-Fest, with an evening dinner on Saturday followed by Sunday gathering at the State Technical Institute, same place as last year. For further details contact Floyd McDaniel, K4NRV.

Washington — The Walla Walla Valley RAC Silver Anniversary All Family Picnic and Hamfest, September 25 and 26 at the Jefferson Park fieldhouse in Walla Walla. Swapshop, contests,

homebrew, and antique radio display. Annual meeting of Northwest Div. ARRL, MINOW, and NW SSB groups. Lunch served at 12:30 will be potluck. Coffee and punch furnished both days. Free registration. Talk-in on 3.960 and 146.76 MHz. For more information write Pat Steward, W7GUC, 1404 Ruth Ave., Walla Walla, WA 99362.

Wisconsin — DXCC certificate holders are invited to attend the W9DXCC Annual Meeting September 18 at the Holiday Inn (Eden's Expressway), Chicago. Registration and program until 5 P.M. Dinner at 6:30. Advance paid registration is \$10 (includes dinner). At door, \$11. W9GIL, Chairman, 910 East Calumet Rd., Milwaukee, WI 53217.

□□□□





DX CENTURY CLUB AWARDS



The DXCC Honor Roll consists of the top ten numerical totals in the DXCC. Position in the Honor Roll is determined by the first number shown. The first number represents the participant's total countries, less any credits given for deleted countries. The second number shown represents the total DXCC credits given including deleted countries. All totals shown represent submissions received through June 30, 1971.

Honor Roll

DL1IN	321/340	WSMMK	320/344	K9LUI	318/328	W8CUT	317/327	DL3BK	314/331
G3FKM	321/341	WSPOA	320/341	ON4DM	318/340	W8KPL	317/337	DL7HU	314/326
G4MJ	321/341	WSQK	320/374	VK4QM	318/344	W8ONA	317/336	G3DO	314/339
GRKS	321/342	W6CUQ	320/348	WJGYE	318/336	W9WYB	317/334	G3FKB	314/335
GW3AHN	321/343	W6FPZ	320/344	WIHF	318/332	YV5AB	317/338	HB9TL	314/333
HB9J	321/348	W6OSU	320/335	W2AYJ	318/340	YV5ANF	317/318	JA2JW	314/328
K4LNM	321/338	W6LN	320/343	W2BMK	318/333	DI2HW	316/336	K2UVU	314/330
VE2NV	321/342	W6TZD	320/343	W2BOM	318/337	DL1KB	316/338	K4ICK	314/329
WIHX	321/344	W6WQW	320/340	W2CR	318/338	G6TA	316/334	VL3CFG	314/331
W2AGW	321/348	W6ZO	320/344	W21XA	318/334	K2OFA	316/335	W2FXN	314/331
W2CTO	321/344	W7AQB	320/335	W2GCK	318/323	K2PXX	316/324	W2GT	314/336
W2DXX	321/330	W7MB	320/347	W2GON	318/322	K2YXY	316/326	W2HOT	314/317
W2FZY	321/337	W7PHO	320/340	W2LV	318/340	K7ADL	316/324	W2YCW	314/319
W2HTI	321/340	W8JIN	320/348	W2MJ	318/333	K8ONY	316/328	W2ZGB	314/332
W2NU1	321/340	W8MPW	320/341	W2NQ	318/325	W1CBZ	316/334	WA2DIG	314/326
W2OKM	321/342	W8UAS	320/344	W2PV	318/323	W1JNV	316/336	WA2ELS	314/321
W2RGV	321/340	W8ZCQ	320/337	W2QHH	318/342	W2DOD	316/337	W3EKR	314/334
W2SSC	321/340	W9DWO	320/336	W2RDD	318/335	W2EXH	316/325	W4MCM	314/328
W4GXB	321/345	W9LNM	320/346	W2SAW	318/338	W2J1	316/338	W4RLS	314/321
W4PLL	321/339	W9AIH	320/338	W2HXD	318/321	W2MS	316/337	W5EGK	314/335
W4VPD	321/341	W9LLA	320/346	W3CGS	318/340	W2PDB	316/330	W5MMD	314/336
W5ABY	321/341	W9MLY	320/339	W3DJZ	318/328	W2CKS	316/320	W5PM	314/331
W5UX	321/339	W9PNO	320/345	W3ELV	318/343	W4IC	316/324	W5WZQ	314/331
W6AM	321/349	W9QGI	320/339	W4MR	318/340	W4IF	316/331	W6ABA	314/321
W6BZE	321/344	W9SYK	320/341	W4NJJ	318/324	W4SSU	316/327	W6KG	314/330
W6CYV	321/342	C13AG	319/346	W5CG	318/330	W4TM	316/341	W6KZS	314/319
W6KZL	321/340	G3HCT	319/333	W5KBU	318/338	W5HE	316/320	W6ZJY	314/321
W6NJU	321/338	I1ZL	319/334	W5UKK	318/335	W5TIZ	316/332	W7ADS	314/336
W6PT	321/341	J1BKB	319/330	W5EFL	318/323	W5OGS	316/335	W7BA	314/327
W7KH	321/347	K6AN	319/343	W6DZ	318/333	W6ANN	316/338	W7QPK	314/322
W8BF	321/345	K6EC	319/336	W6HOC	318/334	W6FL	316/322	W8LY	314/331
W8DAW	321/348	K6LGF	319/334	W6KTF	318/322	W6FRS	316/325	W9AMU	314/333
W8EWS	321/348	K8LSG	319/332	W6RLH	318/327	W6HSQ	316/326	W9JUV	314/336
W8GZ	321/347	K9KYF	319/330	W6UOV	318/335	W6RGG	316/320	W9MOK	314/329
W8JBI	321/343	L4UDMG	319/338	W6WX	318/328	W6SCP	316/334	W9NLY	314/333
W8NGO	321/341	PY2CK	319/345	W6ZM	318/331	W8ARH	316/322	YV5AJP	314/326
W8PHZ	321/339	W1FZ	319/341	W7CMO	318/331	W8CT	316/324	YV5BNW	314/314
W9BG	321/349	WIHZ	319/340	W8DMD	318/343	W8EVZ	316/322	ZL3IS	314/330
W9NDA	321/348	W2BOK	319/339	W8KIA	318/345	W9GIL	316/336	G3AAE	313/336
W9BW	321/345	W2HO	319/338	W8QJR	318/338	W9YTV	316/343	G3J1M	313/328
W9DU	321/340	W2JUV	319/343	W9HUZ	318/341	W9BMO	316/332	JA4RJO	313/317
DL3RK	320/340	W2QM	319/337	W9RCJ	318/333	W9BN	316/325	K2UKQ	313/320
DL6FN	320/338	W2WVG	319/333	W9KF	318/338	W9NVZ	316/331	K9UKN	313/317
DL7AA	320/345	W2WZ	319/345	W9LWG	318/332	DJ2ZG	315/319	P12BKQ	313/317
DL9OH	320/334	W2ZY	319/330	Z1HY	318/345	DL7BA	315/335	SM3BIZ	313/333
HB9MQ	320/341	WA2RAU	319/323	C86BX	317/337	DL7BN	315/333	VE2BV	313/333
K2BZL	320/340	W3GRS	319/334	G2HOZ	317/338	G3HDA	315/330	VE5RU	313/329
K2LWR	320/336	W3LMA	319/344	G5VT	317/340	IT1AI	315/334	W2GLF	313/330
K4TJL	320/331	W3NKM	319/339	I1AMU	317/339	J11DM	315/333	W2HH	313/315
K7GCM	320/331	W3WGH	319/337	K2YLM	317/320	K4JC	315/321	W3FMK	313/318
K8KB	320/334	W4BJ	319/334	K4FA	317/327	K4PDB	315/332	W3MQ	313/321
L1U6DX	320/347	W4BYU	319/340	K4KO	317/340	K6CH	315/337	W4AAU	313/335
OF1ER	320/345	W4ML	319/342	K4WI	317/326	K6EV	315/320	W4ELE	313/333
PA6FX	320/343	W4QCW	319/339	K6DC	317/337	K6NA	315/339	W5GJ	313/323
W1AX	320/346	W5K1W	319/335	K6DJ	317/341	K6VVA	315/327	W6DQ	313/321
W1AZY	320/337	W6HX	319/345	K6YRA	317/321	K9BIM	315/318	W6HYG	313/328
W1BAN	320/336	W6LD	319/341	K9CF	317/329	LUSAO	315/334	W6MGL	313/329
W1BIH	320/347	W6RKP	319/336	K9ZH	317/321	OH2BH	315/320	W6EFPQ	313/321
W1CKA	320/333	W6TA	319/336	KP4RK	317/330	PY2PA	315/319	W7ADS	313/317
W1CLX	320/346	W7AC	319/346	L4FY	317/342	VK3KB	315/341	W8DF	313/312
W1DK	320/340	W7OF	319/339	OH2NB	317/341	W1DGG	315/323	W8KBT	313/329
W1GKK	320/348	W8BI	319/339	ON4NC	317/341	W1NU	315/333	W9FKC	313/337
W1MW	320/340	W8EV	319/340	PY2CO	317/321	W2LAX	315/335	W9BAU	313/324
W2BXA	320/347	W8K1F	319/328	PY2SO	317/321	W2UVE	315/336	YV5BPI	313/318
W2CP	320/329	W8WZ	319/344	W1GL	317/323	W4AVY	315/330	HB9KR	312/329
W2PCJ	320/340	W8YCP	319/333	W2CYS	317/342	W4JDR	315/334	K1YZW	312/314
W2SUC	320/340	W9G1F	319/335	W2ZTV	317/320	W4VMS	315/320	K4AIM	312/329
W2TP	320/332	W9HB	319/337	WA2RLQ	317/321	W5FFW	315/335	K6OW	312/322
W2ZX	320/342	W9HLW	319/328	W3AFM	317/330	W5GO	315/321	K9WTS	312/317
WA2LZS	320/339	W9SFR	319/337	W3MWC	317/334	W5HDS	315/334	OH2QV	312/320
W3GAU	320/346	W9BFB	319/340	W5GR	317/340	W6B5Y	315/334	OK1ADM	312/320
W3KT	320/347	W9CFZ	319/326	W5DLG	317/341	W6FOZ	315/336	W2CKY	312/332
W3LMO	320/336	W9PFI	319/338	W5PWV	317/331	W6VUV	315/324	W2TQC	312/334
W3MP	320/345	4X4DK	319/340	W5QKZ	317/328	W7ENW	315/342	W4BBR	312/331
W3RNQ	320/339	G2BVN	318/339	W6CHV	317/338	W8MB	315/329	W5A1X	312/340
W4ALT	320/346	G131VJ	318/336	W6LZJ	317/325	W9QON	315/319	W5E1J	312/321
W4DOS	320/338	K11XG	318/328	W6GPB	317/341	W9TKD	315/328	W6CAE	312/336
W4LRN	320/335	K1SHN	318/325	W6KUT	317/340	W9GKL	315/332	W6YV	312/335
W4OM	320/345	K2BK	318/335	W6AGLD	317/321	YV5BOA	315/319	W8BRA	312/338
W4OPM	320/338	K2DCA	318/338	W6GOOP	317/325	ZS6LW	315/333	W9BK	312/325
W5AO	320/342	K6RO	318/331	W7IG	317/328	DJ9KK	314/318	YV5AHR	312/318
W5KC	320/346								

(Continued on next page)

Radiotelephone

W2HTI	321/339	W9N7M	319/326	W2OKM	317/336	ON4DH	315/334	YV5BNW	314/314
W6AM	321/347	4X4DK	319/340	W2PV	317/322	PY2PA	315/319	ZPSCF	314/332
W6GVM	321/345	DJ2YT	318/336	W2ZTV	317/320	W5JWM	315/329	DJ7ZG	313/317
W8BF	321/345	DL1IN	318/336	W3NKM	317/336	W5KBU	315/334	C3DO	313/337
W8GZ	321/347	DL6EN	318/333	W3RIS	317/345	W5LZW	315/325	PY4TK	313/333
DL9OH	320/334	G3FKM	318/335	W4NJJ	317/322	W9DWO	315/321	WIMMV	313/332
W1JFG	320/338	C13VJ	318/334	W4OM	317/336	ZS6LW	315/330	W2GVN	313/317
W2BXA	320/345	K1IXG	318/328	W6RKP	317/329	HB9J	314/337	W4EEF	313/333
W2RCV	320/337	K4TJL	318/330	W8QJR	317/337	KP4CL	314/320	W5POA	313/330
W2TP	320/339	K6LGF	318/330	W8AJJ	317/321	W1DGI	314/322	W6KTF	313/317
W2ZX	320/342	K9LUI	318/328	W6GAA	317/323	W2BQM	314/329	W6TA	313/323
W4PDL	320/333	L1U4DMG	318/337	YV5AB	317/338	W2EXH	314/321	W6ZJY	313/320
W8WB	320/338	PA0HBO	318/334	G6FA	316/333	W2GLF	314/330	W7CMO	313/319
G8KS	319/336	W1ONK	318/337	K6YRA	316/320	W2JIT	314/331	W8EVZ	313/318
K8RTW	319/331	WA2ZS	318/328	K9ECE	316/327	W2WVG	314/321	ZL1HY	313/339
K9KYF	319/330	W5CG	318/330	W3DJZ	316/323	W3KT	314/336	HB9LL	312/330
PY2CK	319/345	WASEFL	318/322	W3WGH	316/328	W4ANE	314/332	JAI BK	312/321
TK2P	319/344	W6BAF	318/331	W4SKO	316/332	W6NJU	314/325	K0UKN	312/316
YK5MS	319/341	W6REH	318/323	W6EL	316/321	W6YUW	314/323	PY2PC	312/314
W1BAN	319/334	W6ZM	318/326	W9LNM	316/330	W6WX	314/318	VF3QA	312/331
W2YY	319/324	W8MPW	318/330	YV5ANE	316/317	W7QPK	314/321	VF5RU	312/327
WA2RAU	319/322	W0CM	318/338	G5VT	315/338	W1JN	314/332	W1CLX	312/329
W4QCW	319/335	SZ4ERR	318/343	K2BZI	315/328	W8UAS	314/335	W2PTF	312/331
W7PHO	319/340	11AMU	317/339	K4HFF	315/327	W9RNK	314/335	W6YY	312/335
W8BT	319/339	K2YLM	317/320	K5JEA	315/329	W9WHM	314/334	W9SFR	312/322
W9ILW	319/328	ON4DM	317/339	OE1ME	315/331	W0MLY	314/329	YV5AHR	312/318
W9NDA	319/342					YV5AIP	314/326	YV5BPI	312/317

Radiotelephone listings follow the general-type "New Member" and "Endorsement" listings - June 1-30, 1971

New Members

F8RU	269	UB5RR	150	W9ZRU	110	WA3OSO	107	WA0ZAX	103	HC1WZ	100
KV4AM	229	DJ6NI	144	DJ6VY	109	DJ7FT	106	VE6EO	102	K8TMR	100
JA4OK	222	OZ1AJ	134	DL1YB	109	OK2BDE	106	WA1EXE	102	KH6HF	100
K6OJO	221	W6HX	134	W7AVS	109	YF1AIG	105	WA3NAV	102	KP4DFW	100
W5OU	220	JA4RI	130	ZL1AFW	109	DM2CDL	104	W86KSV	102	UF2DB	100
JA2ACC	219	DM2BDG	124	K9HDP	108	PA0KVN	104	W9VRK	102	VQ3AZY	100
5H3JL	208	UK3DAA	124	UT5HT	108	WB9FJX	104	DM2BNL	101	W1EM	100
ZP5PD	203	F5QF	123	W4GYV	108	DK2NA	103	U1SSP	101	WA1HAA	100
W6HJA	202	K1LJS	116	WA7KSU	108	K4CRY	103	VF4YZ	101	W3LDD	100
WB8FUN	176	W2TMI	111	ZL2ANR	108	KR6AY	103	WB2YKA	101	W4DFU	100
K4ZA	157	HC2RZ	110	K9RJO	107	UW0IX	103	WA9LBO	101	W9GYN	100
LA4LG	154	PY1BV	110	WB2FWW	107	WA5VQH	103	W0LTB	101	WA9UEK	100

F8RU	263	KV4AM	183	OZ1AJ	132	KL7AP	110	EA3FP	102	E6AXP	100
K7YWZ	228	JA4OK	181	K7GFX	127	WA9CTO	108	K8RFG	102	F8NT	100
JA2ACC	214	WA3ATX	152	HGHI	122	W7AVS	107	W8SDV	102	K1DYA/VE2100	100
5H3JL	204	JA6HSM	148	DJ4NT	121	WA2HLH	106	R2P2AV	101	WA2AWJ	100
ZP5PD	200	WB8EUN	145	WB4MKB	119	HPLJI	105	UA3HB	101	W7BRU	100
11MAU	199	DJ6NI	140	LU2DFK	112	WA2SQG	105	WA0ZAX	101	W9ZBD	100

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.

W5NMA	325	W1AA	290	WA3HGV	250	K7NHG	200	WA2EAH	180	WA7CGR	160
VF3AAZ	315	W3BWZ	290	W4BA	250	VE3BXY	200	WA4YVQ	180	W8SQD	160
W1OOS	315	WA3KK	290	W4CRW	250	VF4AE	200	W86MVK	180	CX9BT	140
W3VW	315	W4GTS	290	W6OMR	250	VF5NW	200	WA8VRB	180	F67TD	140
W6HVN	315	W4IO	290	W8SRK	250	WA1JHO	200	WA0WKV	180	K1OME	140
W6OF	315	WA4TSP	290	W9DE	250	W3LB	200	EL2BZ	160	K4TBN	140
W1DEP	310	W0CY	290	W0MAF	250	W3NKK	200	I3ECF	160	VP9GD	140
W4RRB	310	W4FPW	290	DJ5JH	240	W4AST	200	JA3BTR	160	W1AM	140
K4H1A	305	DK2BI	270	DL7DE	240	W4CZS	200	JA3FGJ	160	WA2AUB	140
K4THA	305	K1KNQ	270	K2DNL	240	WB4PI	200	K6RIP	160	W6AKM	140
JA1IBX	300	K4HPR	270	K4CFE	240	W5PCX	200	K6ZMZ	160	W6CMX	140
JA1ZZ	300	K5HYB	270	K0ARS	240	W7NYO	200	K9PZD	160	WB6WQV	140
K4MPE	300	W2FR	270	WA3GTX	240	WA9SVY	200	OZ2X	160	W0NAR	140
W1JMT	300	W3NV	270	W8JJA	240	W0BA	200	OZ5VT	160	GW3TP	120
W2PPG	300	W4IHN	270	WA8TPL	240	DL9FM	180	U44LN	160	K7NHV/8	120
WB2UKP	300	W4UF	270	11AND	220	G2NEI	180	WA2SDH	160	SM5ACO	120
W4OET	300	K2AGZ	260	K9POG	220	F8GR	180	WB2VFT	160	W1RYB	120
WASJH	300	K9CUY	260	PY2BRO	220	K4CDZ	180	W4KA	160	W1ND	120
WASREU	300	W1HGA	260	VF5JH	220	K6AAW	180	W4MGL	160	W3MNE	120
W6BUO	300	W7YQI	260	WA3GNW	220	K7VPT	180	W4PMD	160	W41LE	120
W6MUR	300	W8GMX	260	W4BKP	220	K0BEA	180	W4VJH	160	WA4EWX	120
W8HZ	300	W8EDC	260	W4YUU	220	LA4HL	180	WA4DRU	160	W3JZJ/5	120
K4OCF	290	VF3UR	250	WASLES	220	SMSBFC	180	W5QBM	160	WASQNV	120
K81FF	290	K51IW	250	W6EBO	220	UW3CX	180	W6HRB	160	WAS5UE	120
OZ1LO	290	K0GXR	250	K2QBW	200	W2FWK	180	W61TD	160	W8QVO	120
SM1CXE	290	W3JXH	250	K4RBZ	200	W2NFP	180	W6RXW	160		

(Continued on page 151)

All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

DELAWARE - SCM, John Penrod, K3NYG - SEC/PAM: W3DKX. RM: W3EEB. Amateurs are reminded that station activity forms are available from ARRL and your local club. Please include an SASE to ARRL. All reports are welcomed. WA3HGV/3 won the ARRL DX contest for the U.S.A. on phone. Glad to have a Delawarean win such an event, WA3LTA has moved to Ø-Land. W3EEB is now handling traffic for the tourist, K31LY has been schooling up in Penna. WA3KEF is broadcasting for WDOV. K3FLP and W3ZNF are charter members of the new DEL-MAR-VA FM Repeater Society. K3JXR vacationed in FL/GP-Land. Thanks to all the radio clubs and amateurs who wrote to their local representative about the amateur license plate bills. Traffic: W3EEB 69, W3DKX 25, WA3LTA 7, K3NYG 5, WA3DUM 3.

EASTERN PENNSYLVANIA - SCM, George S. Van Dyke, Jr., W3HK - SEC: W3ICC. RMs: W3EML, W3MPX, K3MVO, WA3AFI, K3PIE, W3QDB. PAM: K3PSO. OO reports were received from K3RDT, K3NSN, K3KEK. OBS reports from WA3AFI, W3CBH, WA3KFT. OVS reports from W3ZRR, W3CL, WA3KFT, K3VAX. RPLs: W3CUL, W3VR, W3EML, K3NSN, WA3AFI. PSHR: WA3OGM, K3MVO, K3JOI, W3MPX. Summer heat is taking its toll on traffic!

Net	Freq.	Operates	QNI	QTC	RM/PAM
PTTN	3610	6:45 P Dy	288	264	WA3AFI
FPA	3610	6:00 P Dy	265	292	W3MPX
EASN	3726	2:30Z Dy	206	54	WA3OGM

W3CUL/W3VR reports all antenna repairs completed. W3EML reports TCC going well, but their try at 40-meters didn't work out so they are back on 80. WA3OGM has some kind of a record, 122 consecutive nights in PTTN. WA3ECC is now on 2. The Little League still holding W3ADE down. Look for W3AXA from XE-Land. Congrats to WA3CTU on receiving his BS from Penn State U. W3BUR might cross paths with W3AXA in XE-Land. Field Day messages were received from WA3DUL/WA3CXM, K3SSC/J. Cumberland Valley ARC and WA3PTV/WN3QHR/WN3PKU. WA3AGD has returned from duty in Asia and is located in Ga. Would like sked to Phila. area cw 80/40/20. Phila. Co. AREC has been operating to handle emergency traffic during the Western Union strike, got some publicity for hams on most of the TV stations news programs. WIP radio also had coverage. New officers for the Mt. Airy VHF ARC are W3CJU, pres.; W3BPP, vice-pres.; W3SAA, corr. secy.; WA3BIV, rec. secy.; K3JAS, treas.; K3JJZ, WA3AXV, W3FOD, dir. Gov. Shapp signed a proclamation declaring the week of Sept. 11 as Radio Amateur week in Pa. Present were K3HNP, W3HK, W3BNS, K3OMK, W3JOH, W3ICC. WA3OGM puts out a nice bulletin for EASN members. Traffic: W3CUL 2405, K3NSN 699, W3VR 580, W3EML 555, K3PIE 372, W3MPX 310, WA3OGM 191, WA3OVZ 184, WA3AFI 142, W3CDB 112, K3JOI 101, WA3ATQ 87, K3MVO 80, WA3PGT 78, W3HK 75, WA3ECC 53, WA3LVC 35, WA3MYC 29, WA3MQP 28, K3BHU 24, W3VA 21, W3ADE 17, W3HKK 17, W3CBH 14, W3AXA 13, W3CL 11, K3KKO 11, K3KTH 7, W3OY 7, WA3CFU 6, W3BUR 3, WA3BQ 2, WA3IAZ 2, WA3IUV 2, W3EU 1, W3GMK 1, W3KEK 1, K3VAX 1.

MARYLAND-DISTRICT OF COLUMBIA - SCM, Karl R. Medrow, W3FA - SEC: W3LOY. RMs: W3EZE, WA3IWI. PAM: W3FCS. Congrats to the June BPL man, W3TN. PSHR credits go to W3EZE and W3TN. MDD held 30 sessions with QNI average of 9 and 130 messages. MDDS in 24 sessions QNI 5,6 handled 46. The phone net MIXTN met 16 times with 13.2 average and 44 messages. W3CDD entertained QCWA with color slides and pictures. W3OKN is using his summer frequencies, W3ECP says his problem is growing old, WA3AJR is EC. Prince George's and Charles Counties, K3RUQ

is portable in the Pocono Highland Camp teaching radio. K3LFD keeps the Sun, liaison circuits alive. W3QU has new Drake gear. WA3MSW has been fighting rig problems. W3JPT has new beams on 6 and 2 and keeps AMSAT skeds. W3EOV got the rig going in his ear. W3BWT has been an ORS since 1923. W3HXY relays the reports of WA3GXN and WA3HIV. WA3LFU, home from school, is making a big impression on MDD. W3FCS is a big phone man with a high traffic count. WA3LWT keeps MDDS hopping while he does the same at work. K3GPN, W3BWT, WA3LVS, WA3KQG, WA3LFU renew as ORSs; K3STU and WA3APQ renew as OOs with W3FCS renewing as OPS. Field Day reports from W3CZ, WA3OER, W3CJT, W3FDU, WA3NAN, W3FZY, K3NCM, WN3OYP. The FANN on 7160 kHz met 10 times with QTC 41, reports WA3LQV. K3BA likes his new call, WA3NSZ, Randallstown, St. High ARC, produced several new novices. K3QDC keeps his hand in. WA3OHI has his new HW-101 on the air, W3LDD after 18 years made DXCC and has QSLs for half the U.S.A. counties. K3GZK spells the regulars on MDD. W3GLM is moving to Wheaton. W3FDU reports his XYL is WN3QYR. W3FZT published a net bulletin with a summary of activity on MDD. WA3NAN reported absolutely no problems this Field Day. Traffic: (June) W3TN 237, W3ECS 106, W3EZE 92, W3OKN 84, WA3LFU 64, K3GZK 52, WA3LWT 46, K3BA 42, WA3MSW 42, WA3HIV 33, W3FZY 32, K3RUQ 31, W3FA 27, W3ECP 17, W3EOV 14, WA3GXN 11, K3LFD 10, W3QU 8, W3BWT 4, W3HIXF 4, K3QDC 4, W3LDD 3. (May) W3CRE 7.

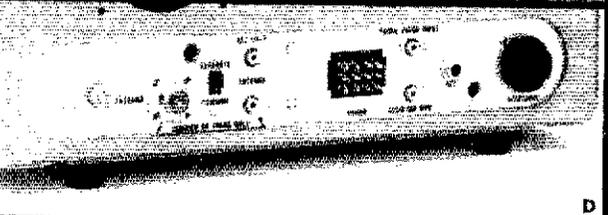
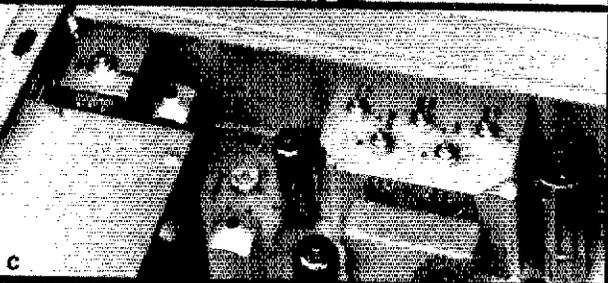
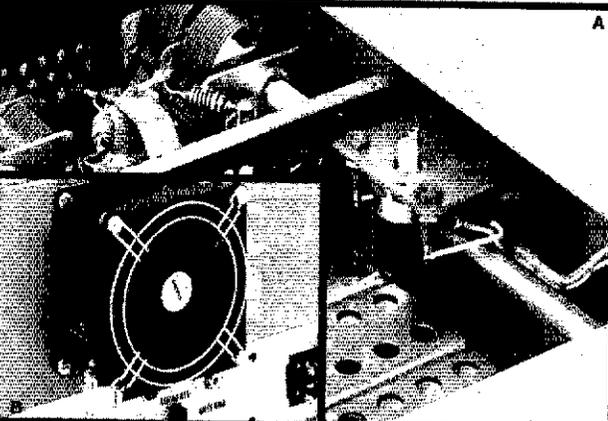
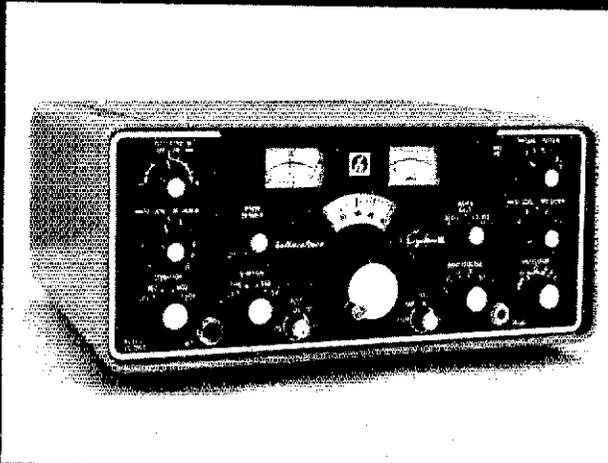
SOUTHERN NEW JERSEY - SCM, Charles E. Travers, W2YPZ - SEC: W2LVW. PAMs: W2BFE, W2VPZ. RM: W2JI.

Net	Freq.	Time(PM)	Sex	QNI	Tjc.	Mgr.
NJN	3695	7	60	868	524	WA2BAN
NPON	3630	6 Su	4	65	12	WB2JJE
MUOVHEN	145.9	8 F	4	12	0	W2Y2P
NJN(May)			62	791	351	WA2BAN

Field Day has come and gone. WB2VEJ continues to lead the pack and is a recent ORS renewal. Check your appointment date and if renewal time has arrived, send your certificate to this office immediately. Our lone YL is still in there pitching with a fine report and also doing some missionary work. Rose Ellen (W2CDZ) spoke on the subject of women in radio communication to her local PTA group. WB2JJE and W2YPZ are still trying to copy teletype. An up and coming young man is WA2KWB. Frank, an engineering student at Rutgers, the state university, and an active member of the South Jersey group, has passed his first class Commercial Radiotelephone test. In spite of his college and work load, Frank has been a great asset to our group, Gloucester Co. ARC, headed by pres. WB2JJE and a loyal staff, enjoyed operation of club station W2MDD/2 in the Field Day exercise in class 5A, reports chm. W2BFE. It is with great pleasure that I announce honors for WB2VEJ and WB2S1X. Both of these gentlemen have responded each month from Jan. to July with impressive activities reports. Runners up are WA2FGS, W2ORS, W2IU and DVRA (K3CFE). Traffic: WB2VEJ 134, W2ZOKK3(P) 27, WA2FGS 25, WA2BLV 17, WB2JJE 17, WA2KWB 13, W2JI 12, WA2KAP 10, W2YPZ 9, WB2SFX 6, W2IU 5.

WESTERN NEW YORK - SCM, Richard M. Pitzense, K2KTK - Asst. SCM: Rudy M. Ehrhardt, W2VP1. SEC: W2RUF. Appointment renewals are K2AYQ as EC and W2RQK as OO/OPS. Not too many messages received from ED groups from our section. How come? WB2QIF will be returning to Buffalo from his Navy stay in Hawaii. NYS handled 262 messages with 754 check-ins for June. K2AYQ's ARRC roster shows 60 active participants in the Glens Falls area. WN2OHO reports problems with the Monticello School administration have been resolved and the club station will hopefully be active by Sept. They have talked the principal into ham radio. Governor Rockefeller proclaimed the week of June 20-26 as Amateur Radio Week for New York State. W2EML has moved to fex. W2RXM has a good maritime signal on 3915 kHz. W2RHL is quite active on 2-meters these days. W2RKL has a new tower and beam. K2HYQ has moved to Hamburg. Sorry to report the passing of W2DRY. W2CZH and W2CZJ are now active on 2-meters from Ithaca. WA2BCK has a new FT-DX560, SB-220, 70 ft. tower and MP-33 beam. W2OE has left for a trip to the British Isles. He made BPL before he went though. Ex-W2CQ is now VP7CQ in the Bahamas. WB2JNW and W2CFP operated ED with

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the Auburn club, K2QLL/2, K2CC/2 was operated by WA2s DHS, F-KW, BCK, MPC, PVM, WB2s HUA, LJO. WN2AOG is a new ham in Lancaster. WA2BQL is brewing a 4-1000A linear. WA2MPC reports FSS activity slackening off during the summer months. The Glens Falls ARRL handled communications for the White Water Derby in North Creek, the Little League Parade in Glens Falls, and the American Henley rowing regatta on Lake George. WB2RPL and WA2PCK are sporting new Drake 2-meter fm rigs. WB2BOJ of Pottersville has a new Swan 270-B. Welcome to WN2AFO of Glens Falls. Congratulations to K2BKU on 5BDXCX number 77. It looks like WNY amassed well over a million points in the July CD Party, a section record? Traffic with the + indicating PSHR. (June) W2OE 329, W2ER* 236, WA2ICU* 222, W2RUF* 93, W2MTA* 79, W2FZK 64, W2MSM 61, WB2VND 36, W2BU 54, WB2IKL 53, W2FEB 37, WA2ITJ 22, K2RKT* 22, W2RQF 22, WA2ELD 17, K2QFV 15, K2BWK 14, K2DNN 12, WA4PDM/2 12, WA2ANE 10, W2EFA 10, W2PVI 8, WA2MPC 8, WA2DHS 7, WB2FPG 2, K2IMI 2, WB2JNW 1. (May) WB2VND 55.

WESTERN PENNSYLVANIA - SCM, Robert E. Gauryla, W3NEM - SEC: W3KEL. PAM: K3ZNP. RMs: W3LOS, W3KUN, WA3JPU. WPA CW Net meets daily 3585 kHz at 7:00 P.M. KSSN meets Mon. through Fri. 3585 kHz at 6:30 P.M. It is with deep regret that we record WA3KLO and W3AGG as Silent Keys. Pennsylvania annual QSO Party is the week end of Sept. 18-19, rules in the Operating Events section, this issue. Radio Amateurs of Erie (RAE) say their monthly hidden transmitter hunts have been successful. They also report that WA3COS is a new Extra Class and that WA3QAT and WN3PVU are new General Class licensees. Presque Isle ARC reports 9 fm repeaters in the Erie area and workable from Erie. These stations include Ohio, WNY, Canada and Erie. The Erie RC recorded its largest FD score ever. Congrats. Also, several clubs, due to insufficient operators, placed only one transmitter on the air for Field Day and the faithful crews that participated had a ball. Another note on F.D. I received the lowest number of FD messages ever. WA3MDY had his rig monkeyed with by Murphy 3 days before F.D. He got it fixed just in time. The Nittany ARC again provided excellent communications via fm repeater for the annual Fremont Parade. Two Rivers ARC supports an emergency radio station located in the McKeesport Hospital. The station has been in existence for quite some time and serves as NCS one night a week on the local net. Uniontown ARC reports WA3KOG is now in New Zealand and that WA3OGO is a new General Class licensee. KSSN traffic report for June: 15 sessions, 57 stations, 27 messages. Traffic: W3NEM 129, K3ZNP 114, WA3JPU 109, W3YA 101, (W2KAT, W3NEM ops), W3KUN 78, W3LOS 62, W3MJ 39, W3ATQ 26, WA3MDY 18, W3UT 14, WA3NAZ 13, W3ZLO 13, W3SN 12, W3IDO 9, K3SIN 7, WA3GBU 6, WA3JH 5, W3LOD 5, K3HKK 1. Total traffic 760.

CENTRAL DIVISION

ILLINOIS - SCM, Edmond A. Metzger, W9PRN - SEC: W9RYU. PAM: WA9CCP and WA9PFI (vhf). Cook County LC: W9HPG.

Net	Freq.	Time(Z)/Days	Tfc.
HN	3940	1400 Su	7
ELN	3690	0030/0300 Dy	197
NCPN	3915	1300/1800 M-S	83
III PON	3915	1430/2245 M-F	568
III PON	145.5	0200 MW-F	14
III PON	50.28	0200 M-F	3

Reports that have been received by your SCM from the various Field Day chairmen indicate a very FB turnout by the many clubs participating. It is with deep regret that I report the deaths of W9VD and K9HCY. This column's sympathy to their families and many friends. The Rockford Amateur Radio Assn. held their annual family picnic on Sat. July 17. The 19th Annual Meeting of the W9DXCC will be held on Sat. Sept. 18, at the Holiday Inn at 111 Skokie in Chicago. Contact W9GL for details. W9HRY reports that the Ninth Region Net had a traffic count of 435 for the month. The Indian Hill Radio Club of Naperville will hold the 12th annual CQ Western Electric contest for all licensed radio operators or retired employees. Contest rules can be obtained from John Cannon, WA9TOR, Indian Hill Bell Laboratories at Naperville. Now is the time to start planning the winter and fall code and theory classes. Write the Communications Dept. of the American Radio Relay League for their informative publications for the conducting of such classes to help swell our ranks of new amateurs. The Chicago FM Club held their "Expo '74" on July 10 and 11. Many an eyeball QSO was held at this superb gathering. New officers of the Radio Amateur Megacycle Society are W9DY, pres.; WA9OWK, vice-pres.; WB9CJS, secy.; WA9KHK, treas. The Jacksonville Area Amateur Radio Club held their annual Hamfest on July 11 with capacity turnout. Don Bredesen of Lombard, who is employed by Global

Research and Supplies, supplied tapes of various Apollo Space Missions at the June meeting of the York Radio Club of Elmhurst. The amateur who bought a mini-beam at Starved Rock from WA9ZXU can contact him for the parts and instructions that were left behind. WB6ALX/8 is now WB9ERV with QTH at Aurora and employed by the FAA at the Chicago Center. New appointments include WA9RTB and WB9ADQ as OOs and W3IZI/9 as ORS. WN9BWC has a new TDX-560. Traffic: (June) WA9WNH 240, WA9ZUE 161, WB9AWY 153, W9HOT 93, W9JXV 69, WB9FHK 61, WA9RTB 40, W9DOQ 38, WA9LDC 36, WA9SEB 31, WA9LHU 29, WB9EDP 19, WA9NZF 17, W9IJM 7, WB9ELP 3, W9PRN 3, W9LEX 2, WA9ZXU 1. (May) W9DOQ 52.

INDIANA - SCM, William C. Johnson, W9BUQ - SEC: W9FC. RMs: W9FC, W9HRY, WA9WMT, WA9ZKA. PAMs: K9CRS, WA9OHX (vhf) W9PMT.

Net	Freq.	Time(Z)/Days	Tfc.	Mgr.
QIN	3656	0000 Dy	205	WA9WMT
ITfN	3910	1330 Dy	426	WA9OHX
		2300 Dy		
		2130 M-Sa		
PON	3910	1245 Su	65	WA9UMH
		1840 S-S		
PON VHF	50.7	0200 Su-Th	101	K9APH
Hoosier VHF			40	W9PMT

WA9WMT QIN net mgr. has resigned because of other commitments. WB9ESD has an HW-22 and is trying to start a Teenage net. The Teenage net on 3740 has folded due to insufficient participation. K9BJJ is the new EC for Washington County. Grant County ARC is now an ARRL affiliate. Field Day was very good this year with good weather and a lot of contacts. W9BUQ was in Cincinnati in June for the OMK Assn. Spring meeting. It was held at the Holiday Inn North. We went out to see the Voice of America Station located there. The IPON VHF group held FD on top of the Indiana National Bank Building (33 stories high) and used a motor generator for their power supply. In case of an emergency any place will do as long as one can get communication. K9KFM blew up his linear. WA9FDQ has a Motorola Motrak. Traffic has been down due to the recent cut-back in servicemen going overseas. OMK Assn. will hold their Fall meeting in Dallas, Tex., more details next time. Indianapolis Radio Club last meeting until fall was July 2. Indianapolis Repeater is on 146.76 rev. and 146.34 transmit. The BPL certificate went to W9JYO. Amateur radio exists because of the service it renders. Traffic: (June) WA9WJA 243, W9HRY 223, W9JYO 207, K9ZKX 131, WA9OHX 118, W9QLW 88, WA9VZM 77, W9BUQ 74, W9FWH 61, W9PMT 57, K9FZK 49, K9CBJ 31, WA9OAD 24, K9YBM 18, W9JMJ 17, W9JLM 17, WA9BHG 16, W9DZC 16, W9RWC 16, K9ILK 14, W9HWR 13, W9LQ 13, W9YYX 13, WA9AXF 12, W9RTH 11, K9VHY 9, K9DIY 8, W9EJ 8, K9KTR 6, K9QVT 4, W9ENU 3, WB9BAP 1. (May) WA9UAM 19, WB9BAP 3.

WISCONSIN SCM, S.M. Pokorny, W9NRP - Asst. SCM: Joseph A. Taylor, W9OMT. SEC: W9NGT. PAMs: WB9CKE, K9FHL, WA9OAY, WA9PKM, WA9QKP. RMs: WB9BJR, K9KSA.

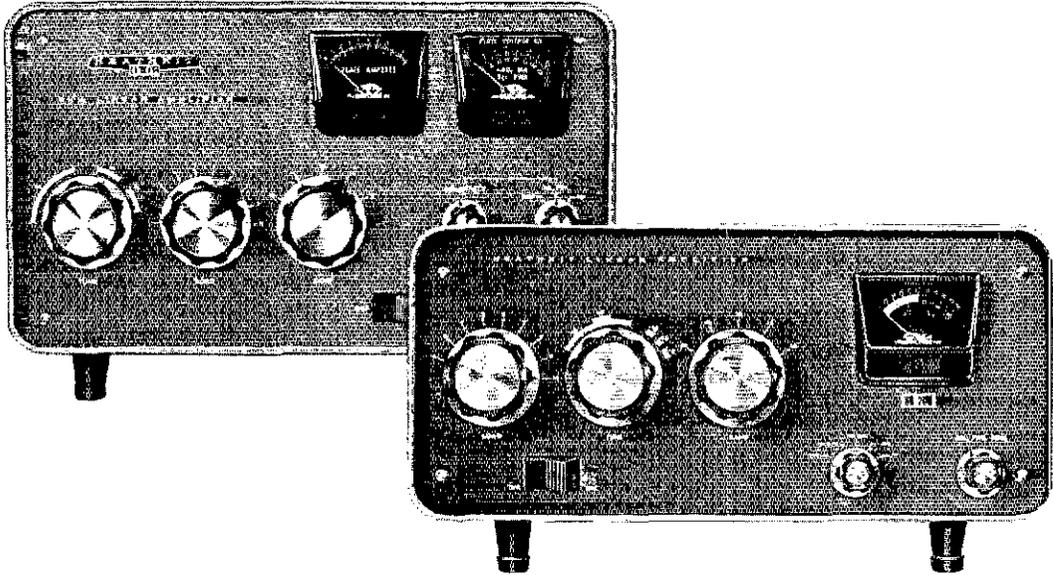
Net	Freq.	Time*/Days	QNI	QTC	Mgr.
WSSN	3662	0030 TTS			K9KSA
WIN	3662	0115 Dy	208	154	WB9BJR
WRN	3620	0130 Su(RTTY)			K9GSC
SW2RN	145.35	0230 Dy	138	4	WA9PKM
SW6RN	50.4	0300 M-S	106	1	WB9CKE
BWN	3985	1245 M-S	439	270	WA9OAY
W-RACES	3993.5	1400 Su	45		ANC-W9NRP
BEN	3985	1800 Dy	698	84	WA9QKP
W-PON	3925	1801 M-F	403	60	W9FMC
WSBN	3985	2300 Dy	1091	91	K9FHL

*All nets one hour earlier during the daylight saving time period. It is with regret that we note W9JJP, W9ONY and WA9UGT as Silent Keys. We all offer our sympathy to their families. Remember Sat., Sept. 18, the YIARC family banquet night. Contact K9PKQ for more information. Your SCM received 14 Field Day messages this year. The following appointments have been cancelled. ECs: K9OSK and K9QKG. ORS: K9DHN and WA9WOC. Sorry boys but no response to my notices. Traffic: WB9BJR 305, K9CPM 281, WA9YSD 143, K9FHL 59, WA9UNN 55, W9RPH 48, W9HHW 32, K9JPS 30, W9RKO 28, WA9OAY 28, W9JSL 19, K9KSA 13, WA9LRW 12, K9LGU 11, W9RTP 7, WA9NBU 4.

DAKOTA DIVISION

MINNESOTA - SCM, John H. Halstead, K0MVF - Asst. SCM: Edna M. Thorson, WA0RRA. SEC: WA0MZW. RMs: WA0IAW, W0AAU, PAMs: WA0HRM, K0BTL, WA0IHQ and WA0QWE are Silent Keys. Charlene was very active in the Hand-Ham System and MSPN. Recently, WA0WEZ and WA0PRS passed their Extra Class exams and W0KRC passed his Advanced Class. W0PPT is back on

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Sturdy, lightweight construction! You build your SB-200 on a heavy-gauge, one-piece aluminum chassis that is partitioned for extra strength and proper isolation of components and circuitry. The extremely clean arrangement allows you to have your SB-200 on the air 15 to 20 hours after you begin assembly. All you need are normal bench tools and a VOM for alignment. Order now!

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the air again after taking time out to marry off his youngest daughter, WA0GGU and partner won first place in the annual canoe race at Gilbert, Minn. This is his second win in as many years. Field reports came in fast and furious to the SCM. W0AAA/9 operating on an island in Lake Superior was stranded for awhile. Seems the launch was late. A call to MSPN got the problem resolved and families notified. W0PAN spent three weeks in the east. Traffic: (June) WA0VAS 671, W0ZHN 210, K0CSE 153, WA0IAW 112, K0ORK 63, WA0YVT 63, WA0RRA 60, K0MVF 50, WB0CAP 46, WA0TFC 46, WB0BRG 45, K0ZRD 43, K0FLT 27, WA0TGT 27, WA0YER 27, WA0HRM 26, K0ZBI 22, WA0VYV 20, WA0SGJ 19, WA0VHX 19, K0ZXE 18, W0PT 16, K0SKO 16, W0UMX 16, WA0EWC 14, WA0JPR 11, WA0YAH 11, WN0CGT 10, WA0VUP 10, W0KNR 9, WA0VYB 9, W0ISJ 8, WA0YGE 7, WA0EPX 6, W0KLG 4, WA0MMV 2, WB0CNB 1, W0PAN 1, WA0PRS 1. (May) K0JTA 7. (Mar.) WA0PRS 22.

NORTH DAKOTA - SCM, Harold L. Sheets, W0DM - SEC; WA0AYL, OBS; WB0ATR, PAM; W0CAQ, RM; WA0RSR, OU; W0BF, WB0ANH/0 is in Minn, WA0RSS/0 is up on the farm in the Bigland area working portable with the DSS rig. Nice signal too into Bismarck where WA0RSR is on the family end. W0GFF keeps a sked with WA0AAD/0 in Minn. at their cottage. W0DM took the HW-101 on a trip to Iowa and worked portable with good results. Despite the rigors of old age he enjoyed his 50th class reunion of the members of his high school class. Weather conditions were quite uncertain for Field Day. Messages were received from the Teddy Roosevelt, Three Rivers, Dakota Feedback and Fox Amateur Radio Clubs. Nice work fellows. WA0IVH was host at his farm on the Goose River to a picnic for the hams of that area. Mobiles W0KTZ and K0IFP have been putting in exceptionally strong signals up into the Grand Forks area. W0ZTL has been experimenting with some antennas. WA0RSR is still battling away on TFN. Through his efforts, N. Dak. was in sixth place in hours of participation. Don't forget the N. Dak. OSO party.

Net	kHz	C/D/T/Days	Sess.	QNT	QTC
Goose River	1990	0900 Su	4	63	2
PON	3996.5	1830 S-Su	11	212	18
		0900 Su			
NDRACES	3996.5	1830 M-F	21	479	26

Traffic: K0UTP 63, W0DM 15, WA0SUF 12, W0CDO 3, WA0JPT 2.

SOUTH DAKOTA - SCM, Ed Gray, WA0CPX - The SDSU group, Canton, Hot Springs, Prairie Dog Amateur Radio Club and Black Hills ARC are clubs that reported Field Day activity to the SCM. W0ZWL/0 with help from the other members of the Black Hills ARC provided communications for the Powder Puff Derby at their required stop at Rapid City. The operation spanned 3 days of portable operation including portable antennas as well as emergency power. The Powder Puff Derby is an airplane race of women pilots across the U.S. which ran from north to south this year. Two-meter repeater activity continues to grow in the state with good activity in Brookings, Sioux Falls and Rapid City. These groups are using standard repeater frequencies of 146.34/146.94.

DELTA DIVISION

ARKANSAS - SCM, Jimmie N. Lowrey, WASVWH - SEC; W5RXU, RM; WASTLS, PAM; W5KJT, W5RXU in Little Rock is the new SEC for Ark. W5PBZ is the new EC in Benton County while W5SFA has volunteered for the job in Washington County. W5SFA also has a new TR-4 for his mobile which should come in handy as EC. W5SK1 has been traveling during the summer and will spend the remainder of it in Denver. W5ZKF has a new 80- and 40-meter antenna system. K5DKT has been working on a compressor which he hopes to have on the air soon. W5SOQ attended the SW Traffic Net convention held in Houston.

Net	Time(Z)/Day	Freq.	Mgr.
OZK	0000 Dy	3790	WASTLS
Razorback	0100 M-S	3995	W5KJT
Hillbilly	2330 Dy	3995	W5ZKE
Post Office	2130 M-F	3925	W5MIO
Ark. Phone	1100 M-S	3937	W5VFW
DX Info	2345 M	3860	W5EFL
CAREN	0100 Th	146.34/94	W5ODF
Club Council	0100 Su	3995	

Repeaters: W5DI-Little Rock 146.34/94; W5YUT-Fort Smith 146.34/94; W5SNO-Fayetteville 52.55/53.3. Traffic: W5ZKE 70, WASTLS 25, W5SOQ 22, K5DKT 3.

LOUISIANA - SCM, J. Allen Swanson, Jr., W5PM - SEC; W5OB, PAM; W5NYY, RM; W5VQE. The summer doldrums are here once again judging by the reports from you fellows! Have a happy holiday. It is with deep regret that I report W5OU as a Silent Key. John was an avid DXer and helped in any amateur cause or

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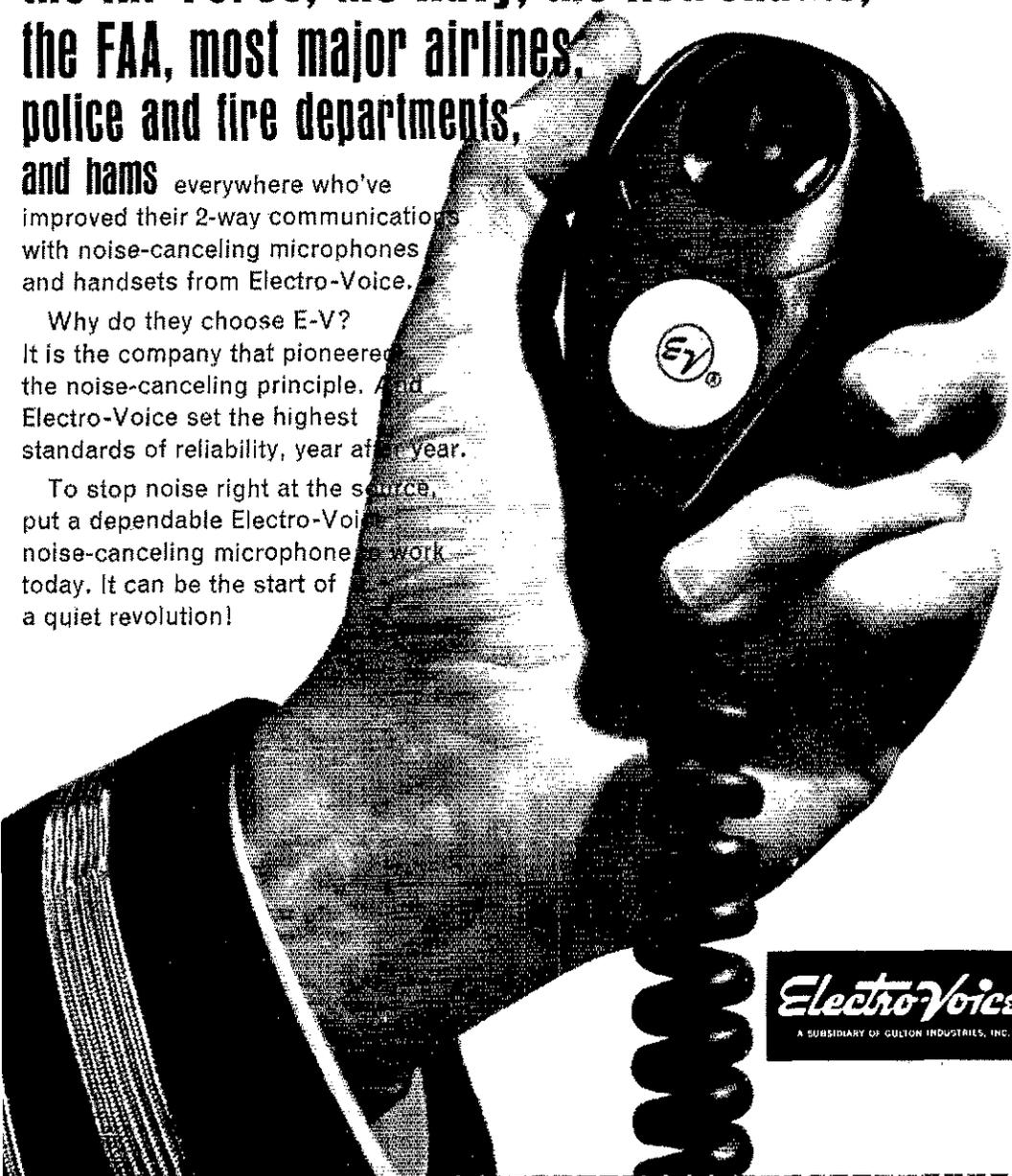
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741 OP-AMP*

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Type	Description	Sale
<input type="checkbox"/> SN7400N	Quad NAND gate	.45
<input type="checkbox"/> SN7401N	Open coll. out	.45
<input type="checkbox"/> SN7402N	Quad NOR gate	.45
<input type="checkbox"/> SN7410N	Triple 3 in. gate	.45
<input type="checkbox"/> SN7420N	Dual 4 in. gate	.45
<input type="checkbox"/> SN7430N	3 input gate	.45
<input type="checkbox"/> SN7440N	Dual 6 in. buffer	.45
<input type="checkbox"/> SN7441N	BCD-Nixie driver	1.95
<input type="checkbox"/> SN7473N	Dual J-K flip flop	.88
<input type="checkbox"/> SN7474N	Dual "D" flip flop	.88
<input type="checkbox"/> SN7475N	Quad latch	1.95
<input type="checkbox"/> SN7476N	Dual J-K flip flop	.88
<input type="checkbox"/> SN7490N	Decade counter	2.25

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800	.12	.12	.28
1000	.15	.16	.39
	.18	.22	.59

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activity, W5OB reports that all hands are getting their equipment ready for the hurricane season. Let's hope we get by-passed this year. WASWB operated portable from the La. Tech. Music Cam and says he got six ham "converts". WA5DXA tells me that both the local NOLA Nets on the air are going great guns. The Jesuit High ARC operated from Madisonville during FD. Incidentally, activity was the highest noted in recent years on F.D. K5LXZ is assisting in EC duties up Rustonway! The newly formed Delta DX Association held their second meeting and showed slides of the operation last year in Albania, the hard-to-get country! WASQVN reports LAB urgently needs some south La. check-ins to handle traffic. WASZZ received his WAS and CP 20-wpm. Traffic: WAS1VJ 58, W5MI 47, WA5QVN 36, WASZZA 31.

MISSISSIPPI - SCM, Walker J. Coffey, W5NCB - SEC, WASJWD. RM: W5SBM, WASTMC. PAMS: W5JHS, WA5KEY, K5MDX. Appointments: WASGOH, WB5DZC, K5TFV as OPS; W5KDM as OVS; W5SDZC, K5TFV as ECs. Endorsements: WA5EIN as ORS; WASGOH, W5KDM, K5IHQ as ECs. We need more check-ins, fellows, on the Novice and CW nets. K5MOJ is the new Net Mgr. on the CCCHN and WASTWI is Net Mgr. for MSBN. W5OEB and WASUYW did a fine job as Net Mgrs, thus past year. WASUYW is the new Director, Army MARS. W5JHS makes a big contribution as Net Mgr. GCSBN, an old pro. W5EDT has been carrying the ball as act. Net Mgr. MTTN. Excellent FD participation by clubs and groups. Congrats to K5MDX as top phone man in the 1971 YL-OM Contest; to W5EDT and W5SBM for making PSHR; to CGCHN for 1441 QNLs and 96 QTCs; to MSBN for 1100 QNLs and 74 QTCs; to MTTN for 190 QNLs and 77 QTCs. W5RUB is a new Intruder Watch volunteer. Need more, fellows. Please help us with this program to protect our bands. Contact me for details. Traffic: W5SBM 275, WASUHH 198, W5LDT 136, W5NCB 66, W5WZ 23, WASYZW 23, W5WB 12, WASTMC 11, WASYJA 11, WA5KYB 7, WA5WQT 4.

TENNESSEE - SCM, O.D. Keaton, WA4GLS - SEC, WB4ANX. PAMS: W4PFP, K4MQI, WA4EWW. RM: WB4DAJ.

Net	Freq.	Time(Z)/Days	Sess	QNT	QTC	Mgr
1SSBN	3980	2330 M-S	22	1588	104	K4MC
ETPN	3980	1040 M-F	22	608	36	WA4EWH
1PON	3980	2330 Su	4	127	5	WB4RH
1N	3635	0000 Dy	23	73	42	WB4DA
MTTMN	28.8	0200 T&F	8	93	0	WA4GL
ETTMN	28.7	0200 W&F				WA4QK
TPN	3980	1145 M-F	30	1217	75	W4PFP

1300 S-Su

Field Day was a success. W4PQ/P4, W4TRC/4, WB4MDA/4 and W4GZK/4 reported their activities. W1PCP's visit with the RAC club of Nashville June 14 was received with great enthusiasm. Remember HAM-FEST '71 at the Technical Institute in Memphis on Oct. 3. Thanks to W4MEA for printing the new TPN roster, and to W4OGG for acting as interim RM. I would like to attend as many club meetings as possible; in order to incorporate this with my other travels I need to know your regular meeting date. Those who want 1972 call letter auto tags must make application for them before Sept. 15, 1971, to Motor Vehicle Division, Dept. of Revenue, Andrew Jackson State Office Bldg., Nashville, 37219. Traffic: W4RUW 115, WA4GLS 49, W4OGG 43, WB4ANX 34, W4SQE 34, WA4ZBC 26, WB4DAJ 19, WA4YEM 18, K4SJV 16, W4PFP 1, W4TYV 11, WB4MYZ 7, WA4CGK 6, WB4MPT 6, WB4LHV 2, W4SGJ 3.

GREAT LAKES DIVISION

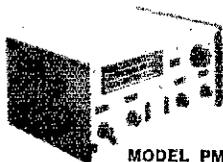
KENTUCKY - SCM, Ted H. Huddle, W4CID - SEC, K4YZI. Appointment: WB4PSJ and WB4PVC as ORSs. Endorsed: W4NB as ORS. BPLs: W4OYI and WA4MKH.

Net	QNT	QTC	Net	QNT	QTC
KRN	386	23	KTN	891	12
MKPN	543	68	FCATN	56	
KYN	221	236	KNTN	164	13

The Mammoth Cave Hamfest was held June 6 with good attendance. Don't forget the Lexington Test in Sept. WA4MEX has a new HW-101 and W4CID has a new SB-102. Field Day activities were held in Lexington, Ashland, Louisville, LaGrange and Henderson. WA4OPS is now a Silent Key. The Owensboro gang is going great guns again. They combined with Henderson and Evansville groups provide communications for the hydroplane regatta then turned around and did the same for the Explorer Scout Canoe Race the following week end. All this after placing second in the nation with their SET score, W4BTA has retired to devote full time to ham radio, WA4RTT's HW-100 has "Black Lang" from sitting near his coal mine. Traffic: WA4MKH 319, WA4VZ 205, W4BAZ 17, W4OYI 159, WB4PSJ 107, K4UNW 107, WB4PVC 103, K4PW 9, WB4KPE 92, K4MAN 63, W4CID 61, WB4EOR 50, W4OXM 4.

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MODEL PM2B. Popular two watt CW transceiver. Operates on 80-40-20 meters. Side-tone. Lantern battery or 12 VDC power source. Size 10 1/2" W x 4 1/2" H x 6 1/2" D. Weight 2 3/4 lbs. Price \$64.95.

MODEL PM3A. Advanced 5 watt CW transceiver. Operates on 40-20 meters. Side-tone. Push pull final. Pt Network. Break-in keying. Size 10 1/2" W x 4 1/2" H x 6 1/2" D. Weight 3 lbs. Price \$79.95.

ANTENNA TUNER

MODEL AC5. Matches 52 ohm output of Power-Mites to open wire on random length antennas. Maximum power 10 watts. Size 4" W x 2" H x 4" D. Weight 1 lb. 4 oz. Price \$8.95.

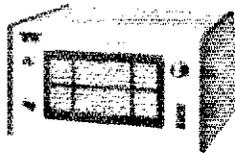
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MODEL S20. Complete audio and speaker system for receivers/transceivers. Plugs into headphone jack. Provides maximum AGC to keep all signals constant level. Front panel headphone jack. Size 8 1/4" W x 4 1/2" H x 6 1/2" D. Weight 3 1/2 lbs. Price \$39.95.

MODEL S30. Similar to S20 but has built in FR4 CW filter; switchable. Size 8 1/4" W x 4 1/2" H x 6 1/2" D. Weight 4 lbs. Price \$49.95.

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AA1. IC audio amplifier. 100 db gain. Drives high impedance head phones. Size 4" W x 1" H x 2" D. Price \$7.95.

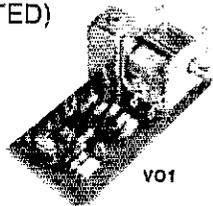
VO1. Oscillator-buffer. 40-80 meters. Drift less than 100 Hz. Output 2 volts R.M.S. Size 4" W x 2" H x 2" D. Price \$7.95.

TX1. Crystal oscillator and power amplifier. 2 watts input. Covers 80-40 meters. Size 4" W x 1" H x 2" D. Price \$7.95.

MR1. Four modules listed above, with instructions for inter-connecting to make a 80-40 meter transceiver. Price \$29.95.

AC1. Convenience kit for MR1. Includes meter, antenna switch, knob and connector. Price \$7.95.

AC2. Keying side-tone monitor. Operates on 6 volts DC. Size 4" W x 1" H x 2" D. Price \$5.95.



VO1

AC6. 20 meter converter/side tone converts PM2 to PM2B. Added to MR1 will provide side tone and 20-meter band. Size 4" W x 2" H x 2" D. Price \$7.95.

AC7. Send-receive switch to convert Power-Mites to automatic semi-break-in. Adjustable hold time. Size 4" W x 2" H x 2" D. Price \$9.95.

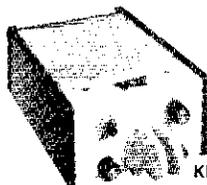
AC9. Electronics for Signalizer. Can be installed in receivers to provide enhanced AGC. Requires 12 VDC. Size 3" W x 1" H x 2" D. Price \$19.90.

AC10. Filters used in FR4. 400 Hz band width with control. Size 4" W x 2" H x 2" D. Price \$12.90.

KR3. Solid state keyer electronics used in Model KR20 and KR5. Operates from 12 volts DC. Size 4" W x 1" H x 2" D. Price \$17.95.

KR4. Squeeze keyer electronics used in squeeze keyer model DR40. Price \$47.95.

KEYERS AND KEYSER PADDLES



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MODEL KR40. Squeeze keyer. Iambic sequence. Full memories. Variable weighting. With dual paddles. Speeds from 6-60 wpm. 115 volt AC operation. Side tone. Size 4 3/4" W x 2 1/2" H x 8" D. Weight 4 lbs. Price \$89.95.

MODEL KR20. Keyer. Self-completing. On/off weighting. With dual paddles. Speed 6-60 wpm. Monitor side tone. 115 V AC operation. Size 4 3/4" W x 2 1/2" H x 8" D. Weight 4 lbs. Price \$59.95.



KR5

MODEL KR5. Keyer. Self-completing. Optimum weighting. Single paddle. Speed 6-60 wpm. Operates from 6 or 12 volts DC. Size 4" W x 2" H x 6" D. Weight 1 lb. 6 oz. Price \$34.95.

MODEL KR1. Paddles as used in KR40 and KR20. Mounted in formed aluminum case. Size 4 1/4" W x 2" H x 6" D. Weight 1 lb. Price \$18.95.

MODEL KR2. Paddle as used in KR5. Mounted in formed aluminum case. Size 4 1/4" W x 2" H x 6" D. Weight 1 1/2 lbs. Price \$12.95.

If you want detailed information on any of these products, just drop us a line. If a TEN-TEC dealer is near you, by all means patronize him. It helps you and Amateur Radio. If, however, you are not in a trading area covered by a dealer, send your order direct and it will be shipped postpaid.



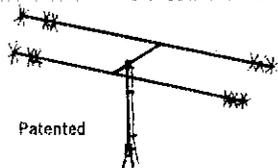
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SWR at Resonance	1.5 to 1.0 max.

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K4TRT 39, WB4FTC 35, WB4AUN 20, WA4MEX 20, WA4AGH
 K4YZU 19, K4AVX 17, W4NBZ 16, WA4FAP 14, W4BTA
 WN4UGU 10, K4YCB 10, WB4EQY 6, WA4ENH 4, WA4MXJ
 Total traffic: 1812. Reports: 27.

MICHIGAN - SCM, Ivory J. Olinghouse, W8ZBT - S
 W8MPD. KMs: W8SPM, W8RTN, W8WVL, K8KMO, W8EL
 PAMs: W81AN, K8MJK, K8PVC, VHF PAMs: W8CVO, K8A

Net	Freq.	Time/Days	QNT	QTC	Sees.	A
QMN	3663	2300 Dy	178	61	30	WAR
WSSB	3935	0000 Dy	755	93	30	K8
BK/MEN	3930	2230 S-F	886	83	26	WAS
UPFN	3920	2230 Dy	440	38	28	K8
GLETN	3932	0130 Dy	879	128	30	K8
PON-ph	3955	1600 Dy	780	350	30	K8
PON-cw	3645	0000 M-F	166	26	25	VF3

Silent Keys: K8VRF, W8ZL, W8MMG, K7WKU, W81-X, our
 for ten years, celebrated fifty years as a ham in June. Congrats
 W8RPI is getting out real good on new inverted V. W8RZM
 building a new portable rig, W8SDKO, W88BYB and W8AAR
 a ball working Michigan Week, Armed Forces Day and the Mich
 QSO Party, K8HFP, K8PWA, W8GHU, W8BDDY and W8WCC
 proud owners of a new Regency, K8PJO, K8GMC and W8BLC
 new Advanced Class, W8BCC is proud of his new Extra C
 W8IAP and W8BDF both have General Class. A needle in the
 stack! The SCM received a long distant phone call from a lad
 Seattle, Wash. the other night with a death message for her fa
 who was visiting a blind Minister in Mich., a ham, call unknown
 all we had to work with was the call K4MT painted on the bar
 Airstream trailer. The Mich. Wolverine Net solved the proble
 forty-five minutes. No emergency too large or too small for h
 Traffic: (June) K8LNL 216, W81XR 165, W8YVR 164, K8
 151, W8ZBT 115, W81YA 92, W8ZDE 77, W8MO 75, W8B
 72, K8DYI 58, W8NOH 53, W8WZV 52, K8MJK 51, W8B
 48, K8ZJU 46, W81Z 38, W8U 36, W8SQC 36, W8BLE
 W8AX/S 27, K8JLD 27, W8BBI 25, W8DCN 22, W8BAK
 W88BYB 20, W81X 18, W8BEN 17, W8BOJ 17, W8S
 W89WYU 14, W8SHZ 11, K8JHA 11, W8VXM 10, W8S
 W8FZL 8, W8OGR 8, K8ALM 7, W8AGO 6, W8SANK 6, K8
 6, W8BFG 6, W8VZ 5, W8WV 5, W8DUJ 3, W8B
 K8FAK 2, W8ONZ 51, (May) W8SHZ 28, K8PJO 22, W8B

OHIO - SCM, Richard A. Egbert, W8ETU - SFC: W8
 RM: W8IML, PAM: K8UBK, VHF PAM: W8ADU.

Net	QNT	QTC	Sees.	Freq.	Time(L)	A
OSSBN	2040	862	60	3972.5	1440/2245	G
BN	543	360	34	1580	0200/2300	V
O6MtrN	410	45	60	50.16	0100	WAS
				50.61	2300	WAS
OSN	104	40	30	3680	2225	WAS
BN RITY	169	56	30	3605	2200	WAS

BPLs were earned by W8DWL, K8ONA, W8QCU and W
 ORS W8QCU advises that Ohio Army MARS handled
 messages during June. IC W8MMH reports the Lima area
 provided communications for the International Inland Boat
 June 12 and 13. OVS W8TYF tells of operating in the VII
 Party from Black Mountain, W. Va. He and WA4QG work
 sections on six, 13 on two and three on 432 MHz. Springfield
 Q-5 states that Ohio is third in amateur population, following
 and N.Y. Columbus ARAs annual Ox Roast takes place on Su
 at Westerville Municipal Park. Details from W81LE. Toled
 hams provided communications for the 51st Annual Milk T
 Race on June 19 and 20. We revert to report that W8WTD.
 and W8KK joined Silent Keys. Northwest Ohio Asst. Lt. W8G
 an article in Ham Shack Gossip, reminds ARLC members th
 function of amateurs in a disaster situation is strictly commu
 nications. He cautions against playing policeman or otherwise
 involved beyond the call of communications duties. Some
 very wise counsel. Don't forget the Greater Cincinnati ARAs
 Stag Hamfest at Stricker's Grove, Sept. 26. Details from W8A
 severe thunderstorm knocked out the power and telephone
 the city of Marysville in June. Alerted by CP and Red Cross,
 Ohio ARLC activated its I-OC and sent a "flying squad"
 affected area. For 24 hours they furnished communications be
 Marysville and Key City Columbus using 2 in and the Centra
 Radio Club's repeater for most traffic. The ARRL Re
 Directory is now available from Hq. for a stamped leg
 envelope. Field Day has come and gone for another year, with
 rules changes over last year. Contact members of the C
 Advisory Committee and express your feelings about the
 W8B1J qualified for an OSN certificate and the followin
 sent certificates for regular participation in BN: W8BALU, W
 W8UCI, W8BDHY, W8BETX, W8GVX, W8HGH, W8JD, K
 W8OJL, K8RXD, W8BULF, Ohio Six Meter Net certificate
 to regulars K8ACD, W88BP and K8JLW. The fall meeting

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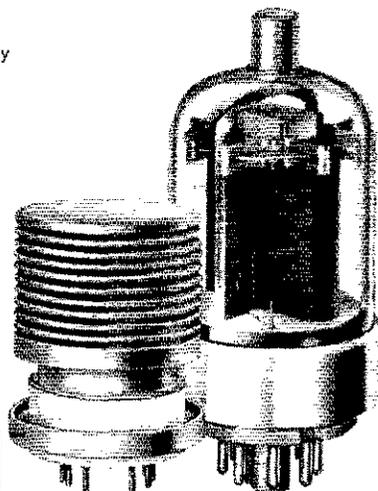
Take power tubes, for example. RCA amateur tube fans expect maximum performance year after year. And they get it. So do our professional customers. As a matter of fact, designers of amateur, commercial and military electronic equipment have rated RCA first in power tube brand preference studies year after year.* So take a tip from the professionals. When

you need power tubes, insist on No. 1—RCA. We have the widest choice. And the best. We suggest you obtain a copy of the 1970 Guide to RCA Industrial Tubes, TPG 200E.

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Ohio Council of Amateur Radio Clubs will be held in Columbus Oct. 2. All Ohio clubs should be represented at OCARC meeting. Contact W8OUU. Welcome to new ARRL affiliates Evendale Al Shaker Heights H.S. ARC and Athens H.S. ARC. Traffic: (Ju) W8CUT 308, W8DWL 292, K8ONA 215, W8OCU 210, W8BGC 302, W8PMJ 158, W8TEL 158, W8LTX 153, W8IMI 151, W8MI 148, W8ZTV 130, K8BPX 129, W8GVX 128, W8QFK 117, W8CWD 114, W8WAK 114, W8RNC 105, W8SLD 104, W8JMD 98, W8YUB 92, W8NOC 84, W8RCLF 69, W8GNL W8QXQ 64, W8JD 48, K8QYR 44, W8WPO 43, W8BEEZ 4, W8GVI 39, W8RAYC 37, W8GRT 37, K8EHE 34, W8LGD W8BAJC 31, W8TYE 29, K8PBF 26, W8LCO 25, W8NAL W8ULF 24, W8ADU 23, W8GRG 23, W8VKF 22, W8UX W8ETU 19, W8VWH 19, W8FRD 18, W8BORQ 18, W8AJZ W8ARV 15, W8BHI 15, W8KXD 14, K8BYR 12, K8DHJ W8MIH 12, W8AJW 11, W8CKM 11, W8BDZ 10, W8LAG W8GEO 6, W8SDA 6, W8MGC 8, W8STX 8, W8MHR 6, K8L 6, W8JEH 5, W8TV 5, W8FSS 3, W8LAM 3, W8RZX W8DBI 2, W8MCR 2, W8AZN 1, W8CQC 1, W8OLU K8RXD 1. (May) K8LFI 13.

HUDSON DIVISION

EASTERN NEW YORK - SCM, Graham G. Berry, K2SJM Asst. SCM/PAM: Kenneth M. Kroth, WB2VJB. SEC: W2URP. R. WA2VYS. VHF PAM: WB2YOU. Nets: FSN 2300Z daily 3.55 NYS 0001Z and 0300Z daily 3.675; NYSPT&N 2300Z daily 3.925; NY County Net 1400Z Sun., 0045Z Tue-Fri, 3.667; NYPT 2145Z daily 3.912. AREC/ARFSC interim report: SAC W2U starts the fall season with county coordinators W2PK Schenectady; WA2FAH, Albany; WA2CRS, Rensselaer; WA2WC Ulster; K2CXC, Rockland and WA2JWL, Westchester. Columbia. Dutchess still lacking, and Orange needs an EC of its own take over from WA2WGS who's handling two counties. Job for the glamour of DX chasing, takes hard work to get going volunteers, anyone? ECK look for announcement next column special net schedule for intercounty cooperation. On the calendar activities list: The Harmonic Hills Swim party at WB2ZE WA1OIP's new home, attended by Dir. W2TUK and Vice-E K2SJO. New meeting spots for Harmonic Hills and for Westchester ARA. Check them for locations/times. Schenectady ARA has traditional Ladies Night June 7 featuring an illustrated talk North Country history. Heard many area clubs and individuals during FD, and received FD messages from some. Attention all club secretaries: Hudson Council Newsletter, edited by WB2WI appears regularly from now on - send her information on repeater freqs., speakers available from your club; classes scheduled also a "Tek Topics" column open to contributions. Individual station reports: WB2IXW earned WAC on June 17; WA2IYF is back on 80-20; WB2OLO now holds WAS and is past mid-point; DXCC: WB2KIF topped to Advanced Class; as of press time WN2NSJ turning in the "N" on a new General ticket. WA2RA back from trip to Orient. WA2VLS to PS Honor Roll in Ju. WA2VYS again active "MM" on Long Island Sound this summer. WA2NSO new General. The Communications Club of New Rochelle set up 2-week amateur radio display in the local library. Other club might try League Hq. glad to cooperate. Traffic: WA2VLS 1; W2URP 48, WB2KDC 45, WA2VYS 45, WB2IXW 43, WB2VJB WB2HIV 24, K2SJM 22, WB2JLR 20, W2ANV 16, WA2WGS WA2EAI 8, WA2HHO 6.

NEW YORK CITY AND LONG ISLAND - SCM, Fred Brunjes, K2DGI - SEC: K2OVN, RM: K2UAT, HF PA WA2UWA, VHF PAM: WB2RQF. The following are major ARRL nets, join one!

Bronx	28.64 MHz	0.35 MHz	146.17 MHz
Brooklyn	28.64 MHz	0.35 MHz	145.26 MHz
Richmond			146.88 fm
New York	29.5 MHz	50.48 MHz	
Queens	29.5 MHz	50.20 MHz	145.62 MHz
Nassau	28.72 MHz		145.32 MHz
Suffolk		53.51 MHz	146.82 fm
Brooklyn		50.46 MHz	146.82 fm
Huntington	28.74 MHz	50.46 MHz	145.59 MHz

Note: Nets usually open 2000 local, Mon. Well, looks like quite a few people are away on vacation these days, judging from amount of activity reports that are or are not coming in! Do know what to send in you say? Here are some samples: W2 reports worked 23 states and Mexico with a Ten-Tec run-in watts. K2AAS reports settled in Las Vegas now at 4617 Rip 1 Winkle Lane and expects to be active during Aug. and thereafter WA2MDX seems busy these days as NCS of ECARS, pres. of school club, trying out the traffic nets, and giving a new FTDX a shakedown test! WA2EUS, WA2SVG and WB2FPE having a g 1296 MHz. Best DX in Philadelphia using varactor tripler

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Spinner (-S)	—	\$.90

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Model TC2: Skirt 2 1/2"; Knob 1 1/2"
Model TC3: Skirt 3"; Knob 2 1/2"

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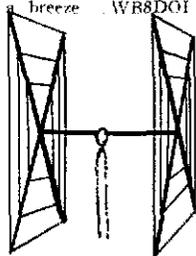
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QUADS Totally satisfied with quad. Worked OK4VJP, SM7DLH, KE1AB, DM4SEE, FL8SR, F6AUM, HK7YR in few hours. Instructions a breeze. WR8DOI

CUBICAL QUAD ANTENNAS

— these two element beams have a full wavelength driven element and a reflector (the gain is equal to that of a three element beam and the directivity appears to us to be exceptional! ALL METAL (except the insulators) — absolutely no bamboo. Complete with boom, aluminum alloy spreaders; sturdy, universal-type beam mount; uses single 52 ohm coaxial feed; no stubs or matching devices needed; full instruction for the simple one-man assembly and installation are included; this is a fool-proof beam that always works with exceptional results. The cubical quad is the antenna used by the DX champs, and it will do a wonderful job for you!



10/15/20 CUBICAL QUAD SPECIFICATIONS

Elements: A full wavelength driven element and reflector for each band.

Frequencies: 14-14.4 Mc.; 21-21.45 Mc., 28-29.7 Mc.

Dimensions: About 16' square

Power Rating: 5 KW.

Operation Mode: All.

SWR: 1.05:1 at resonance.

Boom: 10' x 1 1/4" OD, 18 gauge steel, double plated, gold color.

Beam Mount: Square aluminum alloy plate, with four steel U-bolt assemblies. Will support 100 lbs.; universal polarization.

Radiating elements: Aluminum wire, tempered and plated, .064" diameter.

X Frameworks: Two 12' x 1" OD aluminum 'hi-strength' alloy tubing, with telescoping 3/8" OD tubing and dowel insulator. Plated hose clamps on telescoping sections.

Radiator Terminals: Cinch-Jones two-terminal fittings.

Feedline: (not furnished) Single 52 ohm coaxial cable.

Now check these startling prices — note that they are much lower than even the bamboo-type:

10-15-20 CUBICAL QUAD. \$37.00
 10-15 CUBICAL QUAD. 32.00
 15-20 CUBICAL QUAD. 34.00
 TWENTY METER CUBICAL QUAD 27.00
 FIFTEEN METER CUBICAL QUAD 26.00
 TEN METER CUBICAL QUAD. . . . 25.00
 (all use single coax feedline)

BEAMS "Just a note to let you know that as a Novice, your 3-E1. 15 Beam got me RI Section Winner and New England Division Leader in Novice Round-up. See June QST, p. 57 for picture of ant. (below). Tnx for a fine working piece of gear. 73s, Jay, WA1JFG"

Compare the performance, value, and price of the following beams and you will see that this offer is unprecedented in radio history! Each beam is brand new! full size (36' of tubing for each 20 meter element for instance); absolutely complete including a boom and all hardware; uses a single 52 or 72 ohm coaxial feedline; the SWR is 1:1; easily handles 5 KW; 3/8" and 1" aluminum alloy tubing is employed for maximum strength and low wind loading; all beams are adjustable to any frequency in the band.

2 E1 20. \$21	4 E1 10. \$20
3 E1 20. 27*	7 E1 10. 34*
4 E1 20. 34*	4 E1 6. 20
2 E1 15. 17	8 E1 6. 30*
3 E1 15. 21	12 E1 2. 27*
4 E1 15. 27*	
5 E1 15. 30*	*20-ft. boom

ALL-BAND VERTICALS

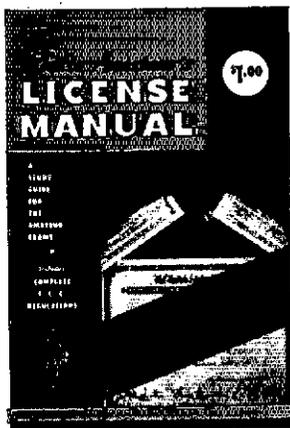
"All band vertical!" asked one skeptic. "Twenty meters is murder these days. Let's see you make a contact on twenty meter phone with low power!" So K4KXR switched to twenty, using a V80 antenna and 35 watts AM. Here is a small portion of the stations he worked: VE3FAZ, TI2FGS, W5KYJ, W1WOZ, W2ODH, WA3DJT, WB2FCB, W2YHH, VE3FOB, WA8CZE, K1SYB, K2RDJ, K1MVV, K8HGY, K3UTL, W8QJC, WA2LVE, YS1MAM, WA8ATS, K2PGS, W2QJP, W4JWJ, K2PSK, WA8CGA, WB2KWY, W2IWJ, VE3KT. Moral: It's the antenna that counts!

FLASH! Switched to 15 c.w. and worked KZ5KKN, KZ5QWN, HC1-LG, PY5ASN, FG7XT, XE2I, KP4-AQL, SM5BGK, G2AOB, YV5CLK, OZ4H, and over a thousand other stations!

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 V80 vertical for 80, 75, 40, 20, 15, 10, 6 meters. . . . \$16.95
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amplifier for transmit and preamp and converter for receive. W2JTP working on 220 MHz conversion of Motorola 80-D to up to 220 to fm. W2BCB is recovering nicely from a stroke and is active again with a Drake TR-4. Needs some help though to get the show organized. Anybody in the Douglaston area that could give him a hand, would be most welcome. WB2LZN and the other NLI trap stations could use some help in routing some of the traps (telephone calls can be expensive if not spread out) particularly on more local basis. So how about checking in once in awhile for a pickups to give them a hand. On that subject, WB2UFG reports good progress in the training program of NLI. So if you ever thought of trying your hand at traffic to see what it is like, check now on NLI and learn the way it should be handled. WN2U reports being active now with a Heath GR-54 and a Viking Challenge (loaded for 75 watts of course) and an inverted "Y" 40- and 15-meters. WB2AOC reports a fine slide show of his travels around the world of visits with amateurs, and is open for invitation to be a program for local clubs! WA2BAV is really working hard DXCC. With a new license and 4 weeks operating, she worked 23 stations and 36 countries. Next month will have a ghost writing report while I'm away. See Nov. QST for mystery guest! Traffic (June) WB2LZN 225, WB2OYV 76, WN2OAY 51, WB2LGA 41, WB2UFG 41, W2bc 17, W2GP 10, K2AAS 7, W2DBQ 7, W2PFB 10, WA2MDX 3. (May) WA2LJS 10.

NORTHERN NEW JERSEY - SCM, Louis J. Amoroso, W2ZJG; SEC: K2KDO. RMs: WA2BAN and WA2TAF. PAMs: K2KDO and WA2TAF.

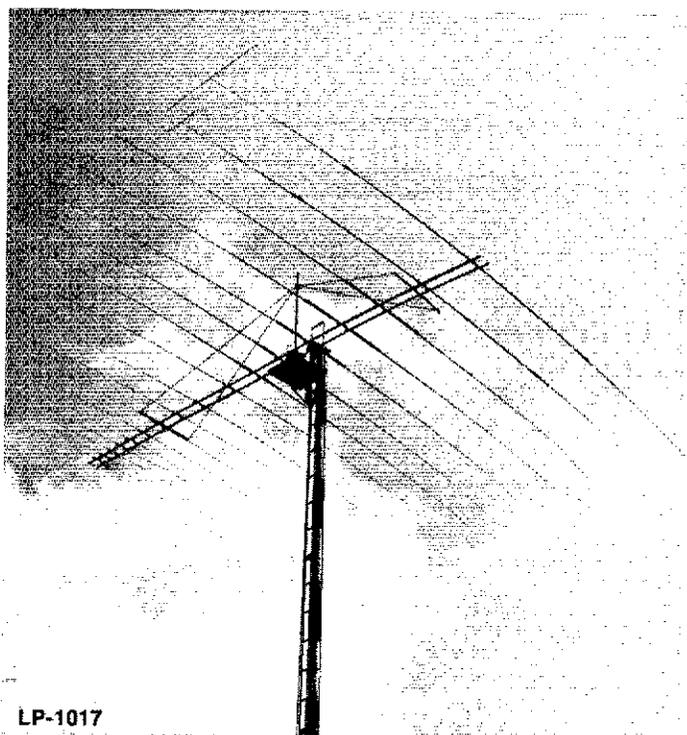
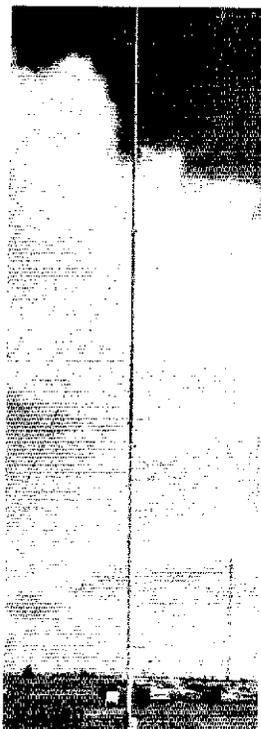
Net	kHz	Time (PM)	Days	Sess.	QNT	T/c	
NJN	3695	7:00	Dy	30	546	221	WA2BZ
NJN	3695	10:00	Dy	30	322	103	WA2BZ
NJNS	3740	8:00	Dy	24	94	33	WA2FV
NJEFTN	3950	6:00	M-S	29	611	159	WA2FV
PVEFTN	145710	7:30	Dy				WA2FV
EUTN	145800	8:30	Dy	23	77	19	WB2L

New appointment: WB2NOM as ORS. New club officers at Kearny ARC are W2IXD, pres.; K2YFF, vice-pres.; WA2JAL, treas.; WB2GYQ, secy. WB2HFO received his Advanced, WN2BJD is a ham in Succasunna. WN2ABV is the harmonic of W2LXD. WA2L is conducting a licensing course at the Bayonne CD Hq. The Garden State ARC operated KC2GMF at the Monmouth Fair. WB2F received his WAS and DXCC. WA2EUX won first place NJ in both the SC and Fla. QSO parties. WA2LNB has a new eleven-element array on 2 meters. K2LTI is on 2 meters with a two- five-element beam. WA2OPY has new Clegg-22, WN2NAB operating on all novice bands. W2CVW added the 100-V to his show. WB2LW looking for more NCS. WA2MCI is out of the service. W2JWU and W2ZTV added speech compressors to their rigs. WA2JIM is the new mgr. for the PVEFTN. We wish to thank WA2JNO for his fine job. W2KIE has a new SB-220. WB2HEO has a new 40-ft. tower with a fifteen-element 2-meter and a six-element 6-meter beam. We regret to note the passing of W2CBT. He was missed by his many friends. W2ZZ has his 2-meter Ringo antenna up 55-ft. We wish to thank the many groups who served Field Day messages. Again this year it proved to be the big one. We man was good to us and conditions were EB. Please advise ARRL Contest Advisory Committee (CAC) how you like the rules. Route your letter via ARRL Hq. Traffic: (June) WB2 362, WB2DDQ 204, WB2VPR 197, K2KDO 163, WA2NLP 100, WB2AEH 110, WB2NOM 94, WB2LTW 85, W2CU 67, K2DDQ 67, WB2CDE 51, WB2JAL 49, WA2JIM 46, WA2JNO 44, WA2FVH 44, W2ZEP 33, K2RXQ 29, K2DEL 24, WA2EUX 24, WB2OHV 24, WA2CAK 17, W2ZZ 16, WA2FUI 15, WB2RKK 12, WA2CCF 12, WB2JAE 9, K2ZFI 9, WA2DNB 6, W2EZW 6, WB2BCS 5, WA2 4, W2CVW 4, K2EOP 4, WB2WNZ 3, W2ABL 1. (May) WN2 18, WB2WNZ 2.

MIDWEST DIVISION

IOWA - SCM, Al Culbert, K0YVU - SFC: K0LVB. Sorry to note the passing of W0VAU and W0EEG, who served the 75-m net ever so faithfully. My apology to WA0VKF who it seems has a SBWAS certificate number 41. Congrats to K0LUIZ on getting Advanced Class and WN0DTD on making General Class. DTD has a new TR-4 to boot. WN0EFG is a new ham at Osage. See the month that the FCC examiners come to Des Moines for those of you who are waiting to upgrade. W0AVW has been traveling Europe. W0JAO, K0GAZ, K0FLX and W0QCB recently attended the Amateur Radio Missionary Service convention at Harrison, Va. The 3900 Club of the Air held a banquet at Sioux City on 19. They also have become an ARRL affiliate. W0BW says DX has been kinda poor, so he is back to handling traffic. Have been hearing that there is starting to be some 2-meter activity around Dodge. Speaking of 2-meters, there is in the works a revision for frequency allocation plan for AREC/RACES for Iowa and K0 reports that the ARRL is working on a revision for the Midwest Division.

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includes us) will be electing a new Director soon, as W0GQ is retiring. I understand that WA0JRP of Thompson has announced his candidacy, anyone else? Nets: IOWA Fone (noon) QNI 146R, QTC 151; IOWA Fone (eve) QNI 1013, QTC 36; ITCN (eve) QNI 1015, QTC 44. Traffic: (June) W0LXC 775, K0DDA 94, K0AZJ 56, WA0AUX 47, K0JGI 43, WA0VZH 43, W0MOQ 31, W0WB 25, W0BAAM 9, K0LKH 6, WA0EFN 2, WA0YJW 2. (May) W0KB 122, WA0YJW 9.

KANSAS - SCM, Robert M. Summers, K0BXT - SEC: K0LPP, PAMS: K0JMF, K0PNU, RMS: K0MRI, WA0TZK, VHF PAMS: WA0CCW, WA0IRO. Many thanks to all of you participating in this year's SET. The effort paid off in a second and third place tie according to K0LPE, WH0CL is operating ssb on 1805 and 1815 nightly at 9 P.M. and would appreciate a few svt reports as well as contacts. WA0NKD has been working on an Auto Patch for the WA0CJO repeater at Salina. W0PB had the misfortune of having a Rocky 2-meter transceiver stolen while attending the Rocky Mountain Conv. He also reports that the Hawatha group is active again providing communications for the Boy Scouts in that area. K0MRI has tabulated the first half of the year for OKS as follows: QNI 2956 and QTC 1247 in 370 sessions. We've got a mighty fine new group, why not join them. Jim also says that this month of June is tops for QNI, however the low for QTC. You can't win 'em all! Jim! Field Day messages were received from K0NL/0, W0GJ/0, W0SOL/0, WA0ZUP/0, K0BT/0, W0DE/0, W0HT/0, W0TWU/0, W0VZC/0 and W0DEP/0. Mobile Monitor Sec. QNI 713 fixes stations, 77 mobiles, 52 QTC and 39 patches or phone calls. Net reports for June are as follows: K5BN - QNI 1040, QTC 101, 27 sessions; KPN - QNI 200, QTC 24 in 17 sessions; HBN - 512 QTC 54 in 22 sessions; OKS - QNI 540, QTC 136 in 60 sessions and KWN - QNI 567, QTC 5 in 30 sessions. Ks Wx man of the month is WA0KDP. Traffic: W0H 216, WA0LBB 187, K0MRI 144, W0H 99, K0BKF 88, K0JMF 83, WA0EFC 57, WA0LLC 48, W0B0BY 39, W0GCI 36, K0EPF 35, WA0TAS 34, W0CJL 19, W0PH 17, W0B0C 13, K0GZP 13, K0GJ 12, W0CL 11, W0B0CL 9, W0B0CZ 9, W0GUR 9, WA0OZP 6, WA0RCZ 6, WA0OWH 4.

MISSOURI - SCM, Robert J. Peavler, W0BV - SEC: W0ENW New appointments: W0AIB as EC for Jackson County, K0SGJ as OBS and OPS. Appointment renewed: K0AEM as RM.

Net

Net	Freq.	Time(Z)	Days	Sec.	QNI	QTC	Mgr.
MtPON	3963	2200	M-S				WA0TAA
MEN	3963	2230	MWT		13	192	6 K0KUE
MOSSB	3963	2300	M-S		26	1116	82 K0RPI
MON	3585	0000	Dy		27	111	95 K0AEM
MON 2	3585	0245	Dy		30	105	52 W0HH
PHD	5045	0030	T		4	99	11WA0KUI

New officers of the MOSSB net elected at the June meeting are: K0RPH, mgr.; K0HNE, assl. mgr.; W0QMF, treas. The Missouri General Assembly passed a bill which would restore call-sets license plates to amateurs; my thanks to the PHD Club, the Jefferson City Club, W0AIB, and to all who helped in getting the bill through. Congratulations to: WA0SHC, who became the father of a girl; to W0B0TT, who passed Advanced Class; and to new Novices W0DEPH, W0JFP, W0EPI, W0NERC, W0N0RI, W0N0RE, W0N0RF, W0N0RG, W0N0RH, W0N0RI, W0N0RX, W0N0RY, W0N0EX and W0N0FAI, who were in the class conducted by PHDARA. Field Day messages were received from K0BIX/0, W0BRN/0, K0BYC/0, W0DE/0, K0LJR/0, K0OYM/0 and W0YOR/0. W0GKS, Professor of Chemistry at Northeast State College, has retired and moved to Ohio. Recently-licensed W0DFF passed Extra Class exam and now has the call W0NN; Rue, who has been away from amateur radio for several years, had plenty of seniority starting with W5EFC in 1935. W0YZS worked Michigan for State No. 9 on 432 MHz. Traffic: K0AEM 219, W0BV 209, WA0HTN 106, W0OUD 55, W04KSL/0 29, W0HJV 16, W0AKU 9, W0GJ 4.

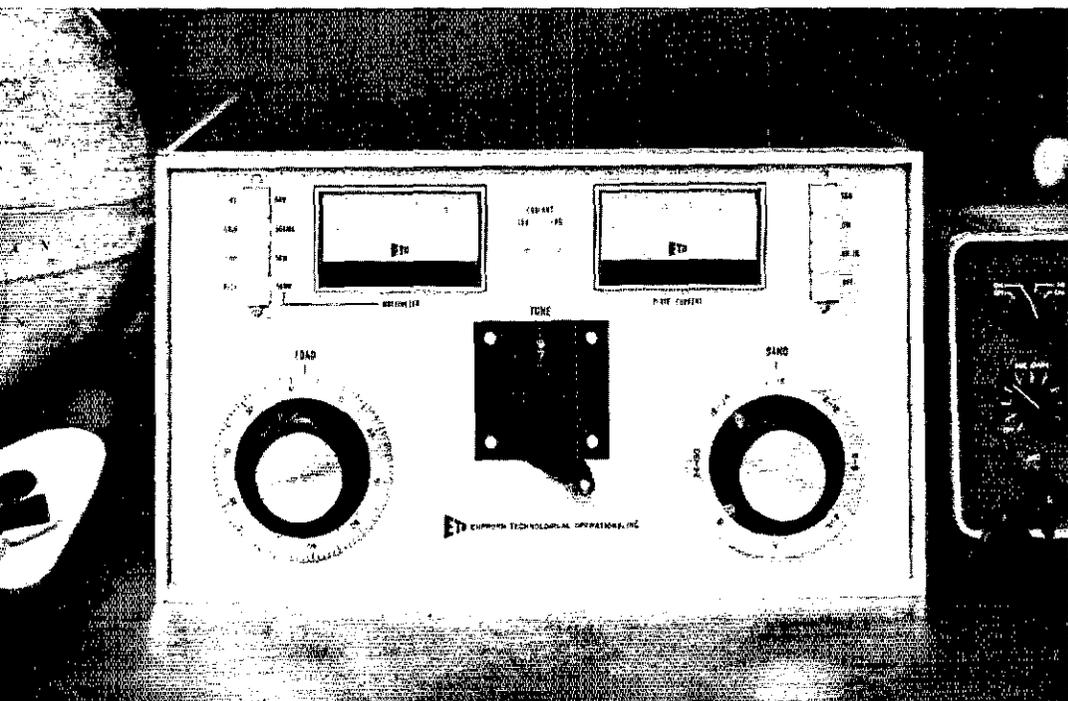
NEBRASKA - SCM, V.A. Cashion, K0OAL - Asst. SCM: Velm Sayer, WA0GHZ. SEC: K0ODF. Renewed appointments: W0DO as EC and W0IQD as ORS.

Net

Net	Freq.	GMT/Days	QNI	QTC	Mgr.
NSN I	3982	0030 Dy	692	27	WA0LO
NEB	3590	0300 Dy	123	26	W0TQ
NMN	3982	1230 Dy	1111	59	WA0JL
WNN	3950	1300 M-S	583	11	W0NI
AREC	3982	1330 Su	159	2	W0IR
CHN	3980	1730 Dy	1050	45	WA0GH
DEN	3980	2000 M-F	134	4	WA0AU
NSN II	3982	2330 Dy	727	28	WA0LO

The decline in QNI/QTC for NSN I and II was because of Net Control stations overlooking passing reports to the PAM, 5 sessions not accounted for. Congrats to new Novices W0N0RH of Chadron W0N0EH and W0N0VC of Sutherland. Box Butte Co. ARE

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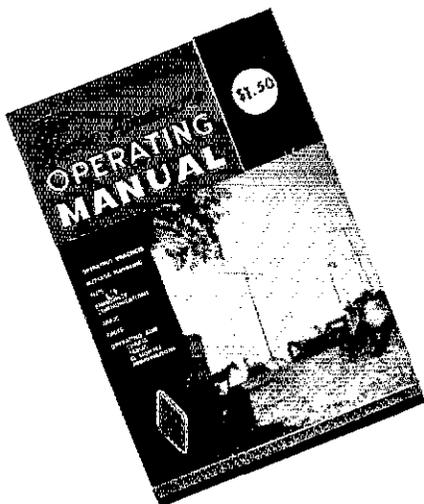
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2-meter net QM 18 and QTC 1. W0EQB lost his antenna during June storm. WA0LRQ will be moving to Nelson sometime in Aug. Hope all had a successful F.D. Don't forget the Nehr. QSO Part Sept. 050000-062300Z. Traffic: (June) W0L0D 323, WA0SCP 9, W0T0D 31, WA0CBI 26, WA0GH7 21, K0JEN 17, W0CAU 16, K0OAL 16, K0ODF 16, W0N1K 11, WA0PIE 10, K0DGW 9, K0HNT 8, WA0QX 8, W0KPA 6, W0RZ 5, W0LJO 5, WA0YG 5, WA0ZCN 5, K0MUF 4, WA0ZCM 4, WA0EL 3, WA0LOY 3, WA0OKC 3, WA0PCC 3, WA0YGI 3, W0AGK 2, K0FRU 2, WA0JUF 2, WA0OQX 2, W0WZR 2, W0YFR 2, W0DJO 1, WA0UJZ 1. (May) WA0CBJ 32, W0HOP 11.

NEW ENGLAND DIVISION

CONNECTICUT — SCM, John J. McNassor, W1GVT — SEC, W1HHR. RM: K1EIR, PAM: K1YGS, VHF PAM: K1SXF.

Net	Freq.	Time/Days	Secs.	QMI	QTC
CN	3640	1845 Dy	60	538	36
		7200			
CPN	3965	1800 M-S	30	348	16
		1000 Su			
VHF 2	145.98	2200 M-S	22	80	1
VHF 6	50.6	2100 M-S	22	146	1

High QMI: CN — W1N1MZ, W1AGH, W1CTI and K1EIR. CPN — K1EIC, W1GVT, W1LJH, W1N1MZ and K1YGS. SEC W1HHR extends thanks to the many ARCC members active on Field Day — their offer of assistance to local CD Communications Units might be appreciated. All clubs are invited to send your Winter Program listing to Director W1QV. K1EIR sent out another fine CN bulletin. Also a well done 1RN bulletin from W1EFW. Tri-City ARC bulletin indicates a very complete club program under way. The Conn. Yankee ARC Novice Class trained nine new Novice members. G3XPM/1 vacationed in Va. W1OBR on long camping vacation. QSLs W1-Land via traffic nets. WA3JSU/1 was summer operator ORP from Switzerland. W1ENG lost all his antennas during a storm. W1H0L is going mobile. W1ACKA is on 14.3 at 2100 GMT as CT2. W1N1MZ moved to Hamden. W1H1SN now in E. Mass section. Congratulations to: W1ZCHO/1 for Advanced Class. W1N1OQ, W1N1OIT, W1N1OYA, W1N1OYB, W1N1OYC, W1N1OYT, W1N1OYE, W1N1OXX, W1N1OXY and W1N1OXXZ all new Novice Class! Thanks for the many Field Day activity reports — hope you enjoyed it. Our Net Mgrs. welcome all newcomers. You can provide an outlet for traffic in your area and at the same time meet some of the finest amateurs on the air — please try it! Traffic: (June) W1EFW 235, W1N1MZ 226, W1JVV 220, W1AGH 108, W1C7R 81, K1SXF 60, W1MFW 58, W1GVT 51, W1AJMO 42, K1YGS 4, W1YYM 31, W1A0FP 23, W1DQJ 21, W1YBH 20, W1MOW 1, W1QV 11, W1ZCHO/1 8, W1AW 3, W1BDI 3. (May) W1H0L 9 (Apr.) W1H0L 137.

EASTERN MASSACHUSETTS — SCM, Frank L. Baker, W1AD — SEC W1A0G received reports from: W1S1JF, EE, HKG, K1NFW, ZUP, CDZ, W1ADXI. K1JH1 is RO and LC for Foxboro. K1TK1 is CD Dir. W1BUX is Deputy Dir. K1QVW, W1HXK a Silent Key. W1A1SI/1-SI have moved to Fla. I wish to acknowledge many Field Day messages. W1DEC has retired and W1A1DED are down in P-town for the summer. W1A0SA K1E1U's wife and he is now RO for Ayer. W1ACZ/W1AZE is on from the Cape. K1YGW went back to Okla. on a trip. W1TQ ex-W1GG in Reno. W1HA is back for a visit. K1DXY/6 sends his love from La Mesa, Cal. W1N1OZ, W1N1OSD, W1A0RZ are YLs. Tri-Meter Crossband Net had 12 sessions. 41 QNTs. W1DAL is ORP with SB-220 and ORP with Ten-Tec PM-3A. W1J1XT is RO for Burlington. K1PNB still is not feeling too well. K1DZG passed the Advanced Class exam. W1BDF is busy on hCARS. W1LS MY NPD, NAN have General. W1KHV will be mobile on 20 on his country trip. K1FKP will be stationed in Calif. K1TVY was mobile in ME on 75. Appointments endorsed: W1MOJ, K1TR1, W1ADM as ECs; W1KZE as ORN/OPS; W1BUE as ORS; W1DLC-DED OPS. K1DJG has SB-220 busy with Sigma Alpha Int'l Amale Radio Fraternity on 15-20. W1MSB reports the Early Eighty Fr Net had 190 QNTs, 30 sessions, 73 traffic. W1MVQ is in hospital. W1A1X-W1CZB at summer place in Mattapoisett, no mini beam for 10-15-20. W1DJC is back to school again. W1ADI says he has been hearing some daytime openings on 6, needs K0CF for S.D. New officers of Quannapowitt RA: K1ZUP, pres.; W1F vice-pres.; W1H0D, secy.; K1NKA, treas.; W1S F.D., F.I. IS W1S HPS, IRG. K1NFW, dir. W1WSN spoke on 2-meter fm a repeater. Massachusetts ARA held a "Ladies Night" meeting. W1WLZ in Fla. training duty. W1ELG is in Vt. on 3990. W1M1Z is many bands. K1TR1 is on 6. W1FMW helping new Novice W1JWQ has DXCC and will be attending W1PR. New officers Framingham RC: W1HGL, pres.; W1N1LG, vice-pres.; W1LLS secy.; W1A1HH, treas.; W1S KAN, LFM. ERI, dir.; W1S MR MGP. W1A1AGQ, act. comm. W1D1MC is working hard for his M.

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(B) **4 POLE:** A four dipole gain array with mounting booms and coax harness 52 ohm feed, 360° or 180° pattern.

AFM-4D	146-148 mhz	\$42.50
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(C) **FM MOBILE:** Fiberglass $\frac{3}{8}$ wave professional mobile antenna for roof or trunk mount. Superior strength, power handling and performance.

AM-147		\$26.95
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(D) **11 ELEMENT YAGIS:** The standard of comparison in VHF communications, now cut for 2 meter FM and vertical polarization.

A147-11	146-148 mhz	\$17.95
A449-11	440-450 mhz	13.95

(D) **POWER PACK:** A 22 element, high performance, vertically polarized FM array, complete with all hardware, mounting boom, harness and 2 antennas.

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(E) **4 ELEMENT YAGI:** A special side mount 4 element FM yagi can be fixed or rotated — good gain and directivity.

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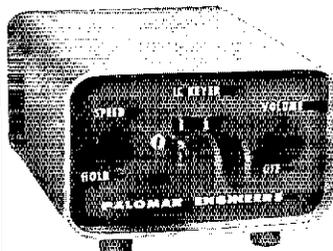
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at N.U. EMN reports for Mar., Apr. and May: 198 QNIs, 41 sessions, 89 traffic, 235 QNIs, 46 sessions, 109 traffic, 248 QNIs, 45 sessions, 124 traffic, WA1JWQ spoke out DX at the Middlesex ARC. Capeway RC met at W1GPL's QTH. K1SNZ new in Norfolk is on the air. W2WIG/1 now in Sharon. WA1NJA is in Navy communications. WINCK having lots of luck working ex-W1s out in Cal., Wash., etc. W1KVO has a new rig. W4ULR up this way on his vacation. EM2MN had 22 sessions, 121 QNIs, 72 traffic. New Eng. Emerg. Phone Net had 4 sessions, 98 QNIs, 1 traffic. WN1OWL is W1OJY's son. K1PPP going on a trip to Alaska. WA1AZR started a new net on 3920 called the 4 P.Mers. New officers of the Chelmsford ARC: WA1GSE, pres.; WA1EMN, vice-pres.; WA1LGY, secy.; W1DQM, treas. K1CIJ is in the Vet. hospital in Bedford. WA1KFJ has dipoles for all bands. WN1OAJ is on cw on several bands. Traffic: (June) W1OJM/1 440, WA1FY 267, W1PLX 176, WA1LFE 77, K1DJG 73, WA1MSR 66, W1MKN 57, W1EMG 47, WN1OMM 35, W1UX 32, W1CZB 22, WA1MSK 21, K1PRB 21, WA1MHJ 16, WA1DJC 14, W1AOG 8, WA1KFJ 4, K1LCQ 2, W1NF 2, K1OKL 1. (May) W1EMG 72, WA1MSB 41, WA1TX 37, W1CZB 6.

MAINE - SCM, Peter F. Sterling, K1TEV - SEC: K1CLF. PAM: WA1CM. RM: W1BJG. WN1NKC has moved to Calif. and hopes to be back soon. WA1FCM and WA1JCN have joined shacks; both are enjoying the summer at a pond in North Livermore. The QUTC and Barnyard Net members had a nice meeting at Concord, N.H. The following officers were elected: W1BHA, mgr. for the BYN; W1SFS, asst. mgr.; W1CTR, chief op. K1GAX now has 299 contacts toward his DXCC. New hams in Maine are WA1OUR, WN1OUV, WA1OVI, WN1OON, WA1OVH, WN1OVF. Congratulations. The 2-meter fm Sanford repeater WA1KGP is in operation and is quite busy. The Waterville repeater is finally in business and is using the call of W1ZKL. WA1KYV is in Germany for the summer and hopes to be able to operate portable from there. K1LPS has moved from N.H. and is now residing in Maine. W1OHG is active on the fm band, I still am looking for news, any tidbits welcomed. Traffic: WA1FCM 149, K1TEV 6.

NEW HAMPSHIRE - SCM, Robert C. Mitchell, W1SWX - RM: WA1GCE. Greetings from Deer Island, New Brunswick our vacation hideaway. Welcome back from Calif. to W1EVN. Hams on the move are W1UBG to Dover and WA1GCE to Hollis. Thanks to the many hams who sent letters that welcomed me back as SCM. New novice stations are welcomed in the New England Novice Net (NENN) Mon., Wed. and Fri. on 3733 kHz at 1830 local time. WA1SZ now is a member of AMSAT and building equipment to use for the upcoming Oscar repeater satellite. WA1GCE reports 160 check-ins in 30 sessions with 175 traffic on V1NHN. Recent visitors to the net were W1JH, K1HK and W0KON/1. Field Day messages were received from W1TA/1 and WA1CFT/1. W1DYE, a research analyst, now is W2VFS operating from atop a 16 story building. W1JY uses an HW-100 mobile in Calif. Sorry I do not have all the traffic reports with me. Traffic: WA1GCE 147, WA1MXT 91, W1EVN 2, W1SWX 1.

RHODE ISLAND - SCM, John L. Johnson, K1AAV - SEC: W1YNE. PAM: W1EXL. VHF PAM: K1TPK. RM: W1BTY. Appointment: W1YNE as ORS. Endorsement: W1TXL as PAM. OPS and ORS. R1SPN report: 30 sessions, 491 QNI and 57 traffic. The Somerset Radio Club and the Providence Radio Club purchased a trophy to be awarded to the club with the highest score in the Field Day activities between the two clubs. Next year the trophy will be on the line again for the highest score on Field Day 1972. Rules will be announced early next year. This is a good way to encourage more participation in the FD activities and it is hoped other clubs will pick up the challenge. Members of the Newport County Radio Club were located on Goat Island for their FD activities. The W1OP Club was located at the Boy Scout Reservation in Cranston and the W1AQ Club was located at the North Central Airport in Lincoln. In all it was a very active FD for Rhode Island Clubs. W1YNE would like any cw operators to contact him who would like to operate with him on the FRN. Traffic: W1TXL 111, W1YNE 23, K1VYC 14, K1CEP 4.

VFRMONT - SCM, E. Reginald Murray, K1MPN -

Net	Freq.	Time(Z)/Days	QNI	QTC	Mgr.
Gr. Mt.	3932	2130 M-S	546	27	W1J17
Vt. Fone	2935	1300 Su	82	4	W1KKM
NHVTN	3685	2300 Dy	160	170	WA1GCE
Carrier	3945	1300 M-S	352	13	WA2FAN
VTPD	3909	2200 Su	54	8	K1HQB
VTSB	3909	130 M-S			WA1HSG

Congrats and welcome to Novices WN1OSH (Jeffersonville) WN1OSY (St. Johnsbury) and Tech. WA1OVV (Enosburg Falls) WA2FAN is the new pres. and Net Mgr. of the Carrier Net. W1JL and K1OGX were re-elected vice-pres-treas. and secy. respectively. VTCD RACES Net (3990.5 at 1400Z) will resume operation Sept

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(Free Standing, 9 Sq. Ft. - 50 MPH)

CDR TR-44 rotor*
100 ft. RG58A/U coax cable
100 ft. control cable

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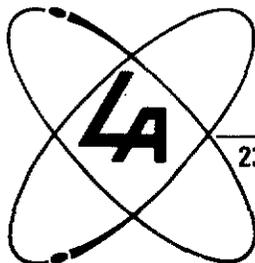
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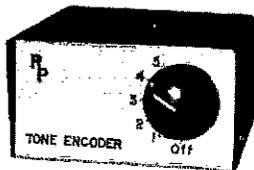
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WESTERN MASSACHUSETTS — SCM, Percy C. Noble, W1BVR — SEC: WA1DNB, CW RM: W1DVV, PAM: WA1MFB. The Summer morning WM Emergency Net continues through the summer with a total QNI of 42 during June. Tri-county 10-meter net held 3 sessions with a total QNI of 24. Total phone traffic, 15. W1KK is the new asst. EC for Hampden County. W1CSF and WA1DNB set up a ham demonstration at the North Eastern Comm. Team jamboree (CB) at Westfield Fair Grounds on June 20. The WM CW Net had 148 QNIs and handled 119 messages. Top five in attendance were W1BVR, W1DVV, WA1LNF, WA1FBE and W1STR (tied for 4th place) and W1KK. W1DVV and W1KK handled NCS of WMN several evenings while on a vacation trip to Va. and Pa. W1STR helped them keep in touch with home base. WA1FBE checked in frequently from his summer QTH in Maine. WA1LNF checked in to many WMN sessions operating cw mobile. WMFN held 13 sessions during June, handling 18 messages with total QNI of 52. Tops in attendance were WA1NTI, WA1MFB, K1SSH with W1PUO, WA1DNB and WA1LNF tied for 4th place. WA1MFB is Mon. night engineer at WPI and HC fm station. WA1LPJ now has a 1KW final. CMARA reports that, because of low attendance, the radio theory class has been called off until fall. The YARC bulletin states that WA1IZS has a new SB-200 and that WA1NLN is also using a linear. Traffic: K1SSH 191, W1BVR 107, W1PUO 90, W1DVV 77, WA1LPJ 61, WA1LNF 43, W1STR 21, WA1FBE 20, WA1MFB 18, WA1ABW 1.

NORTHWESTERN DIVISION

IDAHO — SCM, Donald A. Crisp, W7ZNN — SEC: WA7EWN. The FARM Net meets on 3935 kHz at 0200 GMT each day. The Idaho RACES Net meets on 3991.5 kHz week days at 1415 GMT. The Northwest Slow Speed Net meets each day at 0200 GMT on 3700 kHz. WA7ROT is a new amateur in Orofino. The Lewiston-Clarkston Club set up Field Day stations at Black Fir cabins south of Lewiston. The club had a good turnout for the Field Day activities and a pot luck dinner afterward. The Thatuna Club set up four Field Day stations on top of Moscow Mountain. QSO getting a little dull and repetitious up on the phone band? Dust on the old cw key and fire up on the cw band for a little operating variety. CW can be a lot of fun. Or how about trying RTTY or SSTV for something different? FARM Net report: 30 sessions, 88 check-ins, 32 traffic handled. Traffic: WA7BDD 85, W7ZNN 37, W7IY 13, W7GHT 8, W7HIS 4.

MONTANA — SCM, Harry A. Roylance, W7R7Y — Asst. SCM: Bertha A. Roylance, K7CHA. SEC: W7TYN, PAM: WA7IZR, VHF PAM: WA7IAC, WA7OBH is doing graduate work in Dillon toward a degree in English. The Missoula repeater has been licensed KL7EGU — yes, KL7EGU. Input is 146.40 and output on 147.00. W7LBK spent his vacation in VK-Land. WA7HMI graduated from Northern college in Havre. WA7NWP has his 101 on the air. W7WYG and WA7IZR were elected directors of MTN. K7IQA was appointed an honorary director. The repeater in Helena is ready to go on the air just as soon as a home for it is found. The Capital City Radio Club picnic was held on top of McDonald Pass. Had report of several of the clubs having an FR Field Day. The SCM operated three states on 2 meters on Field Day. Sorry to report the passing of W7BFR. Billings. Traffic: W7FKB 156, WA7IZR 43, WA7OUD 1, WA7OBH 10, K7BMT 8, W7LBK 7.

OREGON — SCM, Dale T. Justice, K7WWR — Section report: WA7GTX reports for the AREC net sessions 29, traffic contacts 47, check-ins 452, maximum number of counties 16. Field Day reports were received from W7RXO/7, W7PXL/7, W7KYC/7, W7KYO/7, W7FO/7, K7CBP/7, K7IWD/7 and many other stations were worked during the week end. W7MLJ has a new transceiver WA7JTN patched 474 parties from S.E. Asia to the mainland during June. W7IJJ is active on 2 fm, and 75 and 40 phons. WA7GFF returned from Korea and now is at Hamilton AFB, Calif. WA7EES has returned from Japan. WA7DAC was in L.A. during the summer. K7WWR operated from San Jose for one week, managing to meet most nets in spite of distance and QRN problems. Traffic (June) W7WBC 574, K7NTS 174, K7OUP 48, WA7MOK 3, W7LT 18, WA7KRH 16, W7MLJ 6, (May) K7NTS 181, WA7K 88, K7OFG 84, K7OUF 70, WA7MOK 42, WA7HES 38, K7WW 18, WA7KRH 14, W7LT 9, W7MLJ 8, (June) K7WWR 22.

WASHINGTON — SCM, Arthur Henning, W7PI — SEC: W7UW, RM: W7GYF, PAMS: W7MCW, W7GVC, VHF PAM: K7LRJ, K7BBO. New appointments: WA7GWL, WA7OCV as ORS, WA7LOV as OPS; W7OCV, K7LFT, K7QIW as OVSS; WA7NWK

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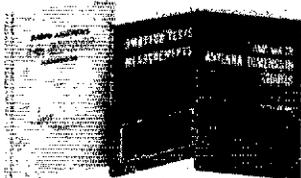
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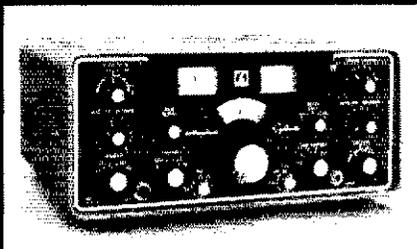
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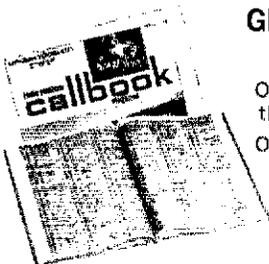


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WSN	3590	0145	292	100	30	W7GY
NSN	3700	0200	283	93	30	WA7HC
NTN	3970	1830	1083	116	30	WA7HK
NWSSB	3948	0230	887	43	50	W7VDB

Lots of activity Field Day week end: 16 clubs reported in with 26 operators including 98 AREC members and 7 non-club groups with 16 operators. WA7LOQ alerted by K7WWR/7 of emergency call from WB0CAP/0 of fire at Field Day site near Hopkins, Minn. called Hopkins Fire Dept. on landline. New boy jr. opr., reported by WA7HCL. New WARTS directors are W7UVI, WA7LRD, WA7HKE, K7CZF, W7JWJ. For experience in cw net and traffic handling check into NSN, 3700 kHz at 0200Z. WA7GWL reports 2-meter traffic activity flourishing in the Bremerton area. New ARAB officers: WA7NUK, pres.; K7RNZ, vice-pres.; K7VVA, secy.; treas. W7SAE, W7FEN and K7YZZ are upholding the Northwest and West Coast on slow-scan TV activity. Western slow-scan TV net skeds are 9 P.M. 3445 kHz and 9:30 P.M. 7220 kHz. Washington State Amateur Radio Week has been proclaimed by Gov. Evans as Sept. 6 through 12. Roeing Bears are sponsoring Wash. State QSO party on fine week end of the week. Puget Sound Council of Radio Clubs will issue certificates for contacts made with Washington stations during the week. W7AVI has WAS confirmed. W7DK will have a ham station at Western Washington State Fair in Puyallup. Walla Walla Hamfest is Sept. 25 and 26. HAMS provided complete communication coverage for the Everett Strawberry Festival Parade and Ebey Slough Boat Race. VHF PAM K7BBO says 50 MHz propagation during June worst seen in many years. K7UMC expects to be on soon with 1296 rig. W7FQE for change of pace puncturing the ozone with a 2-watt rig. Traffic: W7BA 947, W7E 295, WA7HRK 268, WA7AVI 265, W7KZ 126, W7BQ 117, W7GV 91, WA7HCL 91, K7CTP 89, W7MCW 72, WA7OCV 56, W7AX 47, W7FQF 46, W7JEF 39, WA7GWL 26, W7JWJ 23, W7IEU 15, WA7DZL 15, W7APS 14, W7ZHZ 14, W7BUN 13, WA7EDQ 12, WA7CYY 11, WA7LOQ 11, W7AIB 10, W7QCX 4, K7BBO 2, WA7GVB 2.

PACIFIC DIVISION

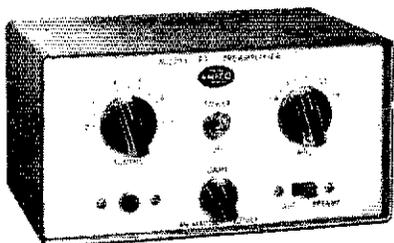
FAST BAY — SCM, Paul J. Parker, WB6DHH — RMs: WA6DI and W6IPW. These two are more than willing to discuss traffic or just plain traffic with anyone. Look them up. Special thanks to W6OT, Oakland Radio Club for putting on the Order of the Wolf. Hong at the San Jose Division. K6LJ received the ARRL Public Service Award for handling emergency traffic during the recent L.A. earthquake. WB6BGO and WA6FDB and XYL really worked for a few days. W6AKB recently returned from vacation in Idaho. W6IPW was recently appointed a member of the Pacific NTS staff. W6TT is hard at work on 5BWAS. All who didn't make San Jose submitted an FR convention. Thanks to all radio clubs who sent messages to the SCM. Sure is easy points and we do like to see you work Field Day. W6OT, VE2AOV/JW6, K6EACG/6, W6CX and others. Traffic: (June) W6IPW 294, WB6VFW 31, K6TX 4. (May) W6IPW 148.

HAWAII — SCM, Lee R. Wical, KH6BZF — Asst. SEC: KH6BZP, RM: KH6AD. PAM: KH6GJN. VHF PAM: KH6GRU. QSL Mgr: KH6DQ. ECs: KH6s GPQ, BAS, GLU and KC6EJ. RACES: N. Coordinator Dick Hamada, Radio Officer.

Net	MHz	Time(Z) Days
Friendly	7.290	2030 M-F
World-Wide Boy Scout	21.360	1800 S
Confusion (Patches)	21.400	0030 All
Pacific Interisland	14.335	0830 M-W-F
Micronesia	14.335	0800 T-Th-S-Su
S.E. Asia	14.320	1200 All
Islander	21.111	0600 M-W-S
PACDXNET	14.265	0600 T&F
Pacific Typhoon*	14.265	

*During typhoon alerts, Congratulations to K2SH/KU6GPC, KH6RS who took the ARRL '71 DX test high score for Oceania both modes. KH6OR recently returned from SW8-Land after business trip. KH6OO is recuperating at home after his hospital bout. KH6HGL is active on 15-meter cw using a 14-AVQ and Heath HW-16. Several hams just completed their freshman year at the U of Hawaii are KH6HFV, KH6HFK and KH6HGL. KH6GQC reports that he's being reassigned to the Seattle area for another naval tour. WH6HMF is a new Novice working out of NAVCOMMSTA Honolulu. Another new Novice in Waimanalo is WH6HM. WA7LFD/KH6HDA has returned from an assignment at HL9KR. recently visited Kauai, more on that next month. (describing my visit to the new WVVH Kauai NBS station). Keep those reports coming. Pau for now. Aloha. Traffic: (June) KH6BZF 2

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 W0DAD/KH6 20, W6HJF 7.

NEVADA - SCM, Leonard M. Norman, W7PBV - SEC: L. Mike Blain, WA7BEU, 560 Cherry St., Boulder City, Nev, 89001. Congratulations to K7ICW for working his 50th state on 6-m ssb. K7ICW's new project is to make WAS on 160-meters. W7E-an MD will be moving to 6-land to further his studies in heli research. WA7DJW and WA7TTO have opened a new business in Boulder City. CARC meeting being hosted by SNARS in Span Oct. 2, contact WA7DUL for details. K7YVN, K7ZAU and son on a research project in Xi-land. Wedding bells for WA7MO. Mobilizing in Nev, remember fm on 34/94, WCARS-7255 a WPSS-3952, around the clock band conditions permitting. K2AAS/7 is looking for Nev. traffic. W7TFV reports good DX the quad. The SAROC Convention Committee report everything A-OK for Jan. 6, 9, 1972, at the Flamingo Hotel Convention Center.

SACRAMENTO VALLEY - SCM, John F. Minke, III, W6KYU. It looks like the 1971 Field Day was a wet one for Sacramento Valley, at least for W6AK and K6IS portable operations. W6KJ drove up to Fimnon Reservoir and set up the tent in the rain. As the sun came out, I dismantled the station and drove home. If you worked K6IS on 20-meter ssb, it was me. W6VUZ is building slow-scan TV monitor, Mike lives in Red Bluff, so if anyone else that area is interested in ATV, contact him. The Nevada Court ARC now has a membership of 28, with the newest member W6NGUV and W6NGUY. The Pacific Division convention was held on the July 4 week end at San Jose; not many amateurs were seen from Sacramento Valley. Those who did not attend missed a good thing. It looks as if there will be no more conventions in the near future, unless some group decides to sponsor one. How about one in Chico, Lake Tahoe, Croville, Grass Valley? I'm still looking for new I can put in this section. I did receive a letter from K9E:CG/4 in commenting on the column, but that was about all except for a few club newsletters and Form 1 cards. Traffic: (June) W6NKR 1, W6LNZ 18, W6KYA 2, W6VUZ 1, (May) W6NKR 22.

SAN FRANCISCO - SCM, Kenneth S. McTaggart, K6SRM. K6TW is a new DU in the section. W6KSS is a new QRS and W6GGR is a new OPN. W6GGR keeps extra busy as secy. for WPSS Net. K6PQI and his XYL, W6UAH, are studying for the General Class tickets. K6ZXS has a new 37-ft. tower up. K6UGS has a 3-kw generator which will be hooked up to take over powering station in the event of commercial power failure. W6BIP reports very rewarding Field Day was held with the SFCC. They used a San Francisco Disaster Corps mobile communications van. While L.A. earthquakes are still fresh in our minds it might be the time to determine what our emergency power would consist of if needed. W6NCMS is now W6BCMS. W6BJOP operated a station at the Novato Western Country Fair in June. W6SLX is a new member QCWA and continues to check in on Calif. Weather Net. W6PZL active in Navy MARS. W6HSD is busy with 4-H projects. W6BK has been inactive because of house-building activities. K6UW active on 20-meters from Rohnert Park. The Valley of the Moon Club enjoyed a picnic and swim at the home of W6HZZ in June. Contact your EC or SEC W6KML. If you are interested in AR activities in the section. Traffic: WA6BYZ 295, W6KVQ 1, W6WLV 164, W6BJOP 136, W6RNL 10, W6BWV 7, W6GGR 1, W6KSS 3, W6PZF 2.

SAN JOAQUIN VALLEY - SCM, Ralph Saroyan, W6JPU. K6VFE has retired from teaching, and has moved to Santa Barbara overlooking the sea, and looks forward to "hammering it up." She is very active in Fresno, teaching code and theory for intending novices, and handled a lot of traffic. WA6JDB is vacationing in L. County. WA6CPP uses WA7PEI when vacationing in W7-Land. W6BVY, K6SNA, W6JUK, W6JPU, W6JRV, WA6CUZ, W6CSE and W6TTP attended the Pacific Division Convention in San Jose, June 3, 4, 1971. W6NJUG is a new Novice. W6ZKH had problems with his cox during a lightning storm. K6KOL is stationed at a weather station near Omaha, Neb. K6RKP has moved to Provo, Utah. W6BXN operated at Hathfield State Park during Field Day. W6 operated near Shaver Lake during Field Day. WA6HAI operated Miramonte during Field Day. W6NKJ has a Swan 250 on 6-meters. K6RGZ is back on 6-meters. K6RPH and W6YFP are on 2-meters. K6OZL is recuperating from a small operation. WN6IXS has DX-60 and HR-108. W6FIR is recuperating and is on 75 watts. Traffic: WA6JDB 29, WA6CPP 1.

SANTA CLARA VALLEY - SCM, Albert F. Gaetano, W6VY - RM: WA6LUA. WA6UC has been handling phone patches to Salvador and Pago Pago for exchange students. Congratulations due to W6GME and W6FMI who went through the cap and got routine at Foothill Jr. College. On June 9 a simulated emergency was conducted at the El Camino hospital and communications was

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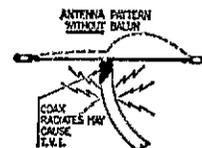
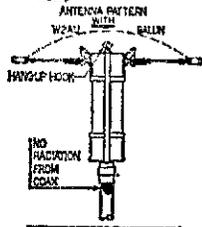
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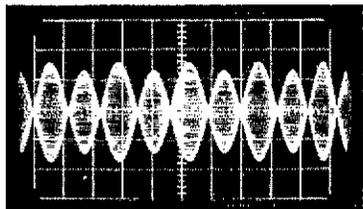


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handled by WA6MLY, WA6BXXH, WB6YZI, WB6DVJ, WB6JPO, WA6ASH and K6IQY. The hospital was very pleased with the following performance. Congratulations gang. Many of the reports coming in to your SCM from Field Day groups have indicated that all had a good time. The first scholarship from the W6HC Harry Engwich Memorial Fund was awarded to WB6QLZ. Contributions to the W6HC Memorial Fund can be sent to Financial Aids Office, San Jose State College, San Jose, Calif. 95113. You fellows on N15 working Mid-West stations don't forget that their noise level is running around 89 and copy is difficult. So be patient with them. Traffic: W6NW 488, W6RSY 409, W6YRV 316, WA61 PA 275, W6HVB 272, W6D1E 124, K6DYX 110, W6VZT 86, WA6NHD 72, W6AUR 41, W6N1G 35, WA6DKF 7.

ROANOKE DIVISION

NORTH CAROLINA - SCM, Calvin M. Dempsey, WA4UQC - WN4PNY got her General, made BPL and 41 points on PSHR all in one month. FB Joyce, WA4KWC got his Advanced. The Cape Fear Radio Club participated in FD with 25 operators. K41GF operated portable FD with 10 operators. The Buncombe County Amateur Radio Society used emergency power on FD with 15 ARCC members and 7 stations. The N.C. DX Association is now an ARRL affiliate, FB to this fine club. The Forsythe Amateur Radio Club had a good FD.

Net	Freq.	Time(Z)/Days	QTC	Mgr.
CN (E+L)	3573	2245 Dy	71	K4LND
		0200		
NC SSB	3938	2330 Dy	9	WB4ADE

Traffic: (June) W4-VN 157, WN4PNY 156, W4WXX 48, WB4OQY 45, W4RWL 38, K4VBG 20, WA4VNV 18, WA4EQC 11, WB4BCG 2, K4MC 2, WA4KWC 1. (May) WN4PNY 60, WB4OZ1/4 32.

SOUTH CAROLINA - SCM, Mrs. Elizabeth Y. Miller, WA4EFP. SEC: WA4ECL. Asst. SEC: W4WQM. PAM: W4JSD. RM: K4LND. New Novices reporting in are WN4UQS of Ballentine and WN4TWE of Chapin. Welcome also to K4FRX (ex-W3YAG) now residing in Columbia. We've again temporarily lost W1OA/4 to his Conn. QTH for the season, WB4OBZ is studying at Notre Dame for the summer. USC ARC now has the call WB4VTK. Among clubs participating in FD were Rock Hill and North Augusta-Bulvedere ARCs, WB4MCI is recuperating at home after serious auto accident. W4WQM is seashore bound after a three-week bout in hospital. All SC and NC hams are invited to participate in CN. Those unfamiliar with cw nets should heed K4LND's tip to check in on the late net until you catch on to the procedures.

Net	Freq.	Time(Z)/Days	Mgr.
SSBN	3915	2300 Dy	W4JST
SLPN	3930	1600 M-S	
		1230/1930 Su	
CN (early)	3573	2245 Dy	K4LND
CN (late)	3573	0200 Dy	W4EFT

SSBN 104, CN(E) 71. Traffic: WB4QNP 70, W1OA/4 64, W4MTK 45, W4NTO 22, WB4RKU 7, WB4OBZ 4.

VIRGINIA - SCM, Robert J. Sagle, K4GR - Asst. SCM: A.E. Martin, Jr., W4THV. SEC: WA4FBG. Asst. SEC: WB4CVY. PAMS: W4OKN, WA4YXK, RMC: WA4EUL. WB4NNO, W4SHL. Field Day readiness reports from Richmond Irregulars, K4JM; Vienna Wireless Society, K4LHB (once local news write-up); Dept. of State, W3DOS. Two Min, K41DR/WB4RDV; Ft. Belvoir, WB4MAB; WA4TFZ, K4GTS/W4YZC. The Potomac Area VHF Society is going strong. My apology for July entry on WC4BBT - SI-VVA was one participant along with Southern Peninsula ARC, Tidewater ARC, UNCTANT Amateurs, Virginia Beach ARC and possibly others. WB4PWP is a new OPS. W4JLJ has 2,337 counties. W4KX is beating back jungle instead of hamming. W4ZM is in the throes of changing QTH to Springfield. New SI-VVA officers: WB4OXD, pres., WB4GTF, comm. mgr., new members WB4PYO, WB4QVG, K4TSL and WB4SQK. WA4HQW has a new solid state message generator operational. I got married on July 7. W4KAO working more hamming suffering. W4DM vacationed, W4LOO portable with Boy Scout camp, WB4KBI camping and mobile. K0PIV/4 finished school, thinking of originating a TTY traffic net, K4GTS (ex-WB4GTS) still active in everything. WB4RNT working a 11-hour 5-day week plus house work plus traffic-handling. W4TI scared us with surgical operation but XYL K4LMB assures us all is FB. W4UQ heading for month in Mich. W4SOO traveling still but traffic count still is impressive.

Net	Freq.	Time(Z)/Days
VSHN	3935	6:00/10:00
VSN	3680	6:30
VN	3680	7:00
VFN	3947	7:30

Traffic: June WB4NNO 353, W4SOO 326, K4KNP 170, W4LUC 166, W41E 93, WB4SIK 92, WB4KSG 69, WB4KIT 64, WB4RNT

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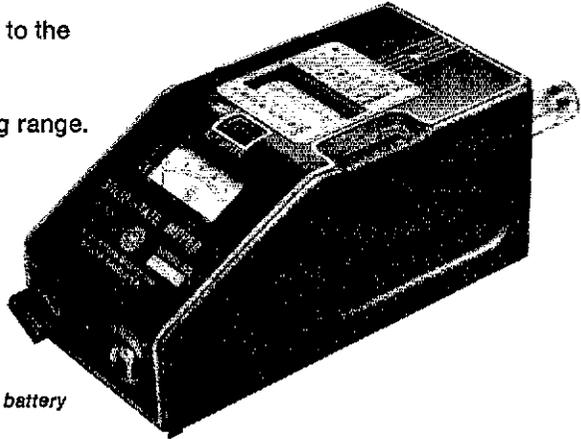
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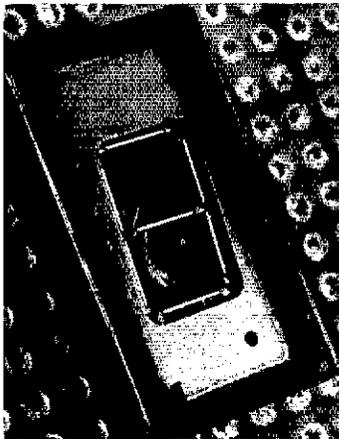
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BRE206	800	2.0	50	—
BRE302	200	3.0	70	400
BRE304	400	3.0	50	600
BRE306	600	3.0	50	700
BRE308	800	3.0	50	800

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64, K4FSS 58, K4GTS 47, K4KA 42, WB4SGV 39, K4GR 3
 K0P1V/4 26, WB4KBJ 22, WB4GMC 19, WA4JFF 19, WA4PBG 1
 WA4N1G 14, W4LQO 13, W4LHV 11, W4DM 8, W4JJEZ 1
 K4JYM 6, W4MK 6, WB4UMJ 4, WA4WQG 3, W4YZC 3, W4KA
 2, WA4HQW 2, WB4RDV 2. (May) WA4EUL 43, WA4PBG 2
 WA4HQW 6. (Apr.) WA4EUL 54.

WEST VIRGINIA - SCM, Donald B. Morris, W8IM - 564
 WANNDY. RM: WB8BBG, PAMS: W8DUW, K8CHW, W8IYI
 Phone Net Mgr.: W8RPOS. CW Net: 3570 at 2300 and Phone Ne
 3995 at 2230. Congratulations to WANNDY on being chosen:
 "Outstanding Amateur of the Year for 1971." Kanawha ARC wa
 the Field Day Trophy and Morgantown Radio Association plac
 second. All awards were presented at the State Conventio
 Jackson's Mill. Major prize winners were, W8PBO, W8IMX, W4AC
 and K8ZNI. WB8CYR was elected as cw net mgr. and W8RPO
 became phone net mgr. during "Mill" meetings. Dates for the 197
 West Virginia State Radio Convention will be July 1 and 2, 197
 Organizational meeting will be held in Charleston in Nov. It is wit
 regret, I report the passing of K8RNE. West Va. CW Net with 5
 stations handled 11 messages and the Phone Net with 367 station
 passed 95 messages. W8KIM, W8VII, W8AVZ and W8RPI B
 active on 29.6 fm. Following stations are active as FC's or asst. EC's
 W8AKR, W8AFC, W8BFCG, W8CWX, W8DUW, W8DUV, K8CFI
 K8BDH, W8PFB, W8FZP, K8QEW, K8BCF, W8RDX, W8ECC
 W8YTP, K8NVE, W8SNDY, W8EQH, W8SGL, W8NYE
 W8QEL, W8TQV, W8DFC, W8BOM, W8JDH, W8IYD, K8BC,
 W8DJI, W8RDDX, W8HRQ, W8LEW, K8HUH, W8SHT
 K8GBN, W8HVB, W8AST, K8MSP, K8TPI, W8TGE, W8BCY
 K8CHW, W8AWCK, W8ARQ, W8ART. Traffic: W8RPOS 9
 W8CYR 41. W8AKQ 40, W8LFW 16, W8AEC 10, W8SND
 10, W8IM 9, W8DUV 4, W8BBM 3, W8KWL 3, W8IYD
 W8OKG 2, W8THX 2, W8ARW 2, W8PFB 1, K8CFT
 W8IHA 1, W8ANK 1, K8SVH 1.

ROCKY MOUNTAIN DIVISION

COLORADO - SCM, Clyde Penney, WA0HLQ - SEC
 WA0QOY. RM: W0LRN, PAMS: W0BAWG, W0CXW, K0IGA
 W0LRW, W0WYX and XYL are enjoying a well earned vacatio
 from their duties as fire-lookouts atop Squaw Mountain this yea
 W0UAT, is now on 160 meters and a regular check-in to the Silve
 State Net. Other newcomers to the Silver State Net includ
 W0DVR, W0BY and W0YCI. In May, 1971, the Eye Emergenc
 Net passed the 5000 mark in eyes furnished since 1967.
 Congratulations! I am most pleased to welcome the Columbine Ne
 as a new section net in Colo. Under the able leadership of W0GD
 net mgr. and W0JFX, asst. net mgr., the Columbine Net perform
 an excellent service, and enhance the traffic handling capabilities
 of the Colo. section. Net traffic for June: Hi-Noon QNI 660, QTC 6
 9 phone patches, time of 286 minutes for 29 sessions, Ey
 Emergency QNI 670, time of 826 minutes, 285 eyes requested, 3
 eyes shipped. Silver State QNI 201, 107 formal, 23 informals, tim
 of 881 minutes for 28 sessions, Colorado Code QNI 92, QTC 4
 time of 444 minutes for 24 sessions. Traffic: (June) K0ZSQ 90
 W0WYX 314, K0JSP 96, WA0ZWA 95, W0LQ 83, W0SIN 70
 W0LRW 42, W0LRN 39, W0BY 17, K0FCR 16, W0BYNP 1
 WA0HLQ 8, W0KPH 8, W0YFD 7, W4MXU/0 6, W0LLA
 W0UAT 3, K0IGA 2. (May) K0ZSQ 554, W0SIN 98, W0YCD 2
 W0KPH 6.

NEW MEXICO - SCM, James R. Prine, W5NUI - TI
 Albuquerque Canavan Radio Club and many other hams in the ar
 provided extensive communication support for the civil offic
 during the civil disturbances the week of June 13. More details
 the SEC report by WSALR. Emergency communications provide
 by mobile W5V11 June 27 permitted the notification of famili
 in the Lubbock and Amarillo, Tex. area of the safety of man
 young campers that had to be evacuated from the Sangre de Cris
 Mountains. Field Day messages have been received from K5Q
 Iov Alamos; W5VBQ, Alamogordo and K5HAY, Clovis. K5SWI h
 completed major antenna overhaul with good results. W5DMG h
 also improved his 75-meter antenna system with addition of a balu
 The 2-meter repeater system yielded dividends in the prom
 dispatch of ambulance and police escort for an injured motorcycl
 July 7, W5MSP discovered the accident some miles north of Cut
 NM and contacted W5PNY, via the Mt. Taylor Repeater W5JD
 who utilized the W5P10 repeater to notify the Los Alamos poli
 department. An ambulance was on the scene 8 minutes late
 K5MAT received the 35 wpm proficiency sticker. Traffic: K5D
 143, W5RI 74, W5P10 33, W5N10 33, W5MYM 18, W5SOB 1
 W5DMG 14, W5JNC 9, W5SDA 6, W5M1Y 3, W5N2T 3.

UTAH - SCM, Carroll E. Super, K7SOT - SEC, W7RWE, R
 W7OCX, W7FM, W7MEL and W7VTJ received Public Serv

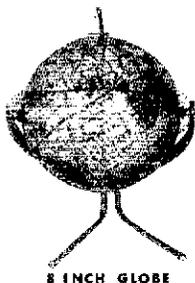
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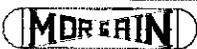
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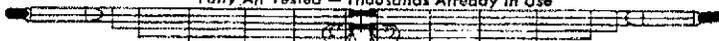
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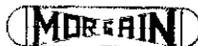


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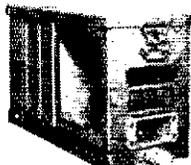
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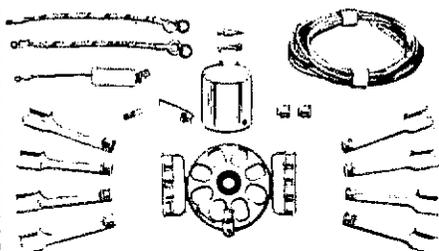
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Awards for their participation in handling traffic during the Southern Calif. earthquake. It is with regret that I report WA7KAM's wife passed away in June. K7ZJS issued 50 amateur cooperative notices in June. W7EM requests that anyone interested in amateur TV please contact him in order to stimulate more activity in this field. W7JZ has been issued the Beehive Net Certificate award. Utah Beehive Net operates daily on 7272 MHz, QNI 670, QTC 68, average time 18.77 minutes. W7OCX, W7WKF and K7SOT attended the Rocky Mountain Division convention in Colorado Springs, Colo. Vacations, fishing, yard work or the combination have taken their toll of station activity during June. Traffic: W7OCX 92, W7EM 87, WA7HCQ 41, K7SOT 18, K7CLO 17, WA7MEL 2.

WYOMING - SCM, Wayne M. Moore, W7CQL - SEC: K7NOX. RM: W7GMT. PAMS: W7TZK, K7SLM. OBSs: K7SLM, K7NOX, W7SDA, WA7FHA. Nets: Pony Express, Sun. at 0800 on 3920; YO daily at 1830 on 3608; Jackalope Mon. through Sat. at 1215 on 7260; Wx Net Mon. through Sat. at 0630 on 3920; PO Net 1900 Mon. through Fri. on 3950. Notice that the YO Net had to go back to 80 meters - 40 wasn't very dependable. WA7TGD and K7TTH have been operating from Shuteley Basin this summer. WA7BDI went to Mich. in July for a Motor Maids (YL motorcyclists) convention - she is a life member of the organization. Is 11-year old Randy Ruth, WN7RUO, the youngest novice in the state? The convention and hamfest are now past for another year and if you didn't attend one or both you surely missed something. Drop me a line for news for this column. Traffic: W7TZK 44, W7SDA 42, WA7BDI 8, K7WRS 8, K7RFL 2.

SOUTHEASTERN DIVISION

ALABAMA - SCM, James A. Brashear, Jr., WB4EKJ - SEC: W4DGH. RM: W4HFU. PAM: W4WLG. WB4OJD reports that he was the only one in the Florence FD group that stayed up and operated all night. The Dothan ARC organized FD for the first time using the call WB4JFW/4 from the Dothan football stadium. The Limestone ARC was heard using the call K4KJD. The Birmingham ARC was rained out and had a hard time just leaving the site because of so much mud. WB4LNC (a teenager), on the way home from the FD site, said he was looking forward to the next one! Congratulations to: WB4EOW on getting his Extra Class ticket. WB4SVH and WB4SVX for replacing the "N" with a "B" in their call. WB4DOY on receiving his DXCC. W4AUP reports his brother finally got a license (WN4TNI) after being exposed to amateur radio for almost half a century. W4DGH says he was happy to see the Ala. section in the top ten in the 1971 SET. A repeater (146.22 in and 146.82 out) will soon be in operation on top of a 33 story bank building in Mobile. WB4LNM is working on a 2-meter solid state walkie-talkie and will be moving to Auburn U. in Sept. K4PRE new QTH is Jasper, Ala. Welcome to K0ELW/4. His QTH is Birmingham and he is waiting on his "4" call. WB4KSL/0 is spending the summer in Ø-Land and participating in MON MON 2 and TEN Appointments: WB4LNC as ORS, WA4DYD, WA4SNU and WA4VEK as EC of their respective counties. Endorsed: WB4DOY as OPS, WA4MTC and W4GET as ECs. Traffic: WB4OKT 193, W4HFU 189, WB4EKJ 137, WB4SVH 93, WB4NLK 88, WB4KDI 75, WB4JMH 73, WB4OJD 72, WA4VEK 68, WN4SON 56, K4OAZ 40, WB4KSL/0 29, WB4SBD 23, WB4ADT 19, W4DGH 5, WB4LNM 5, WB4NLU 5, WB4OVR 3.

EASTERN FLORIDA - SCM, John F. Porter, W4KJG - Asst. SCM: Regis Kramer, W4ILE. SEC: W41YT. Asst. SEC: W4SMK. RMs: K4EHY and W4ILE. PAMS: W4OGX 75 and W4SDR 40. Our traffic is down for the summer months. WB4AIW made RFL WB4LAA, WB4OMG and W4ILE made PSHR for June. New officers: Fort Pierce Radio Club: WB4MUQ, pres.; WN4NOZ, vice-pres. WN4VBI, secy.; WB4LME, treas.; W4NTE, trustee. K4QG is getting married and moving to new QTH in St. Pete. WB4AIW was appointed as new EC for Manatee County. The West Palm Beach ARC had lightning strike their 15-meter novice beam during Field Day. They have also been notified that they placed first in Fla. in the Third Annual West Valley Amateur Radio Club, L.A. Ten Meter Band Opening Contest. They were second overall. During FD WB4TCD (15-years old) held his own with the older men. The 2-meter bug bit W4BRB. On a recent week end DXpedition or Grand Bahama, working under the reciprocal /VP7, he made over 60 contacts up, down and across Fla. on 146.94. He had to work hard for them because of a weak receiver. Henceforth, he swears, he will leave Channel 94 to the 2-meter aficionados. His first contact was W4BUG, Boca Raton. WN4SAC took a hit by lightning also. The victim was his KWM-2. W4OSF was in charge of the Hollywood Club Field Day activities. Says they had a real good turnout. The FD activities of the Platinum Coast ARS made close to 1000 QSO during their outing. WA9ITB was a visitor and helped out on CW. OFN and GN are holding their own with the phone nets. Traffic:

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THE AMERICAN RADIO RELAY LEAGUE, INC., NEWINGTON, CONN. 06111

QS 9-71

(June) WB4AIF 467, W4FPC 280, WA4SCK 254, WB4OMG 179, W4JLE 119, W4FEF 114, W4SDR 100, WB4HJW 97, K4FAC 78, RR1Y/W4 70, WB4PEF 68, WB4IAA 62, W4DVO 54, W4YFX 53, W4IA 42, WB4GHD 41, W4NGR 40, K4JWM 37, WB4HKP 34, W4FJA 28, W4GUU 28, WN4RCQ 24, W4GDK 21, W4LSR 21, WA4HDH 20, WA4OWG 17, K4BLM 15, W4EH 14, W4YJT 14, K4SJH 13, W4BNE 12, WB4TPJ 11, W4DFP 10, WA9ISX/4 9, W4BCZ 7, K4OG 7, W4SMK 7, K4PCG/4 2, W4KGI 2. (May) W4BNE 28, WB4PKP 23, W4BCZ 9. (Apr.) WB4PKP 27.

GEORGIA - SCM, A.J. Garrison, WA4WQU - Asst. SCM; John T. Laney, III, K4BAI, SEC; WA4VWV, RM; K4BAI, Acting RM; WB4SPB, PAM; K4HOI, W4LRR.

Net	Freq.	Time(Z)/Days	QNI	QIC	Mgr.
GSN	3595	2300/0200 Dy	757	230	K4BAI
GRN	3478	0000			WA4VWV
GTN	3718	2200	77	8	WB4SPB
Ga. Cracker	3445	1200 Su	110	9	WA4IQ

Field Day was the word during June. The Atlanta Club had 17 operators and 6 rigs on the air. The Augusta Club had 12 operators and 4 rigs. The Griffin Club was reportedly hit by a heavy thunderstorm on Sat. evening. Good food, fellowship and fun was the order of the week end, regardless of the weather. WB4PEF has a new HW-32 on 20 meters. WB4NTW is really putting out a big signal on 3975 from Savannah with the new 811-A (four of them) linear. New additions to the Atlanta Club are W4LRR and WB4PEE. Let us take this opportunity to encourage all traffic handlers to mail or send by radiogram their station activity report to the SCM between the 1st and 7th of each month. Be sure also to mail your certificate (if you hold an appointment) to the SCM for endorsement. Traffic: W4LEP 122, K4BAI 114, WA4RAV 114, WB4RUA 73, W4AMB 60, WA4WQU 59, W4RNI 42, W4CZN 26, K4NM 25, WB4KVE 8, W4KRE 7, WA4LLI 7, W4FDN 5, W4REI 4.

WESTERN FLORIDA - SCM, Frank M. Butler, Jr., W4RKH - SEC; W4IKB, RM; K4LAN, RITY, W4WEB, PAM; W4NOG, VHF; W4LUE. Field Day reports were received from W4NN/4, WB4VCZ/4, W4RYZ/4 and WB4GTY/4. Other groups reported participating were W4UC/4, WA4ECY and W4JJ/4. Pensacola: WA4IZM renewed as OPS. WB4VJM and WB4VJN are new hams in Cantonment. The FBARA Newsletter is being edited by K4SVX and K4CF8 while K4LAN is away. The 6-meter gang are back on 50.7

MHz, Sun, and Wed. at 7:00 P.M. - WB4JHO NCS. W4UBN is a new station on 6-meter. Fort Walton: New hams include W4OUF, W5ZXO/4 and WB0CYD/4. WB4VIP is the new call for the CD EOC. WA4WCF is active on 2-meter fm. Panama City: K4VFY is new net mgr. of OFN. WB4VBV joined the 2-meter fm gang. W4GGU, WA4IMC, WB4LEL and K4VFY, using call W4JJ/4, reportedly had top FD score in section. Chipley: W4IKB installed a twenty-two-element 2-meter beam, 125-ft. up. He also was appointed OG. Tallahassee: WN4s VDL, VDM and VDN are new hams. WN4VDO, down in Carrabelle, also got his Novice ticket. WB4LOQ's XYL is now WB4VNU! TARC still is looking for a good fm repeater site. Cross City: WB4VBY is now living here, while WB4RNT lives just up (U.S. 19) at Salem. QFN Net Certificates were issued to K4LAN, K4VFY, W4ZWD and K0BAD/4. Traffic: K4VFY 228, WB4FQU 108, BR1Y/W4 70, K0BAD/4 60, WA4IZM 17, W4NOG 17, W4RKH 16, W4FDJ 10.

SOUTHWESTERN DIVISION

ARIZONA - SCM, Gary M. Hamman, W7CAF - SEC; K7GFZ, PAM; W7UXZ, RM; K7NHL. Don't forget the SW Division Convention at Disneyland over Labor Day week end. All Field Day participants seemed to have a great time this year although the extreme fire danger in the forests restricted some areas from use. Band conditions were somewhat unstable but many contacts were made as the following unofficial statistics show.

Station	Transmitters	Operators	Contacts
W7JN/7	4	19	2,350
W7GV/7	5	34	793
W7IO/7	3	18	666
WA7LNW/7	3	3	400
W7APE/7	3	13	350
K7EMM/7	1	1	159

Tucson and Phoenix were visited by Doug Blakeslee from Headquarters and he gave a talk at club meetings in each city. Snowflake and Show Low are represented on 2-meter fm by WA7HIT and K7BDY. WA7NWL is planning to go on a tour of Austria with the East High Symphony Band in 1972. Section Net Certificates for outstanding participation in June were earned by K7EMM, WA7HIT, WA7KOE, K7NTG, W7OUE and K7UOK. PSIR: K7NHL 48, WA7MAD 42. Traffic: K7NHL 192, WA7MAD 125, K7NTG 61, K7EMM 43, W7PG 38, WA7NOA 18, W7CAF 16, K7RLT 12, K7KYW 10, W7OUE 9, WA7LNW 8, WA7MCK 8, WA7IXC 6, W7LLO 5.

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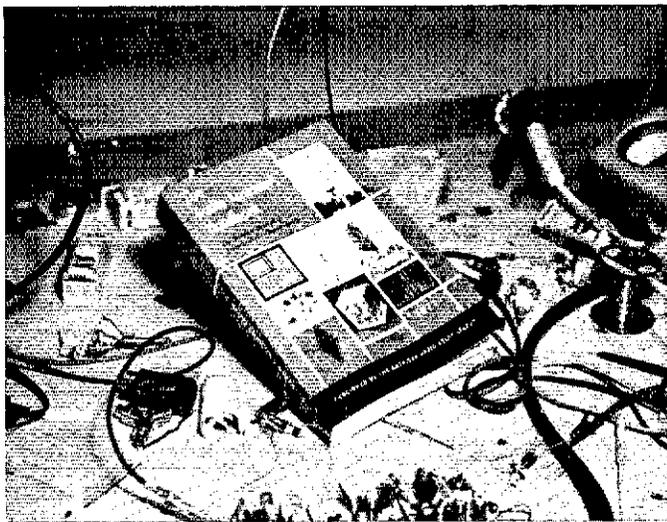
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THE AMERICAN RADIO RELAY LEAGUE, INC., NEWINGTON, CONN. 06111

QS 9-71

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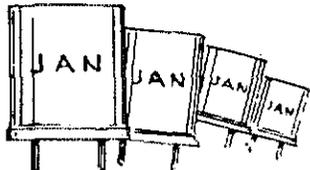
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LOS ANGELES - SCM, Eugene H. Violino, W6INH - WB6ZVC has come up with a beautiful routing guide for SCN. W6QQZ is now printing the Crescenta Valley Club paper. The Southern Counties Club had a nice picnic at San Dimas park on June 13. The Los Angeles TELCO Club received their ARRL affiliation in June. There was a nice turnout for the SCN traffic group the arrangements being taken care of by W6LYY. W6MLZ is visiting the east coast for a while. Public Service awards were received by W6INH, W6QQZ, WB6BBO, W6LYY, WA6AGU and W6LPJ. W6BHC still having trouble with low-band transmitter but still going strong on vhf as OBS. K6VGH is working with Culver City AREC as EC. We've missed W6QAE on SCN of late. WB6GGL now checking into new net IREW on 14.300 kHz 9 P.M. Sat. W66USZ recently married. WB6TXX reports that the AREC has a 220 MHz repeater, WA6ZOC, in the L.A. section which serves as another communications link. When not involved in AREC it is an open-channel 24-hour a day repeater. Receives on 224.220, transmits on 224.820 MHz. OCWA will have their annual fall dinner Oct. 23 at the Long Beach Petroleum Club. W6MST is still waiting for his FT-101 via slow boat. W6PZY is planning to go to Tahiti this fall. K6BV has had a rash of QRN at his QTH and so spends most of his time with the ultra highs, 1296 MHz area. W6AM's open house was a success. The San Gabriel Valley Radio Club will have their auction Oct. 5 and the Monterey Park Club will have one on Oct. 7. We would like to have a liaison between the 2-meter So. Counties Amateur Radio Traffic Net and SCN. Is there anyone who can operate both nets? W6JHT has been elected Director of the Western Public Service System. WB6ZII can be heard almost every night on 2-meters. Congratulations to WB6YIZ for the excellent job of routing earthquake traffic in the affected area. Traffic: (June) W6INH 341, W6LYY 207, WA6QQZ 158, W6QAE 136, W6VVC 110, WB6BBO 71, W6USY 62, W6JHT 46, WA6KZT 43, W6OED 43, K6CL 28, K6EA 26, WB6KKG 16, W6DGH 7, K6ASK 7, W6FD 4, K6CDW 3, W6BHC 1. (May) W6OEO 46, W6QAE 17.

ORANGE - SCM, Jerry L. Verduft, W6MNY - Asst. SCM: Richard W. Birbeck, K6CID. SEC: WB6COR, OBS W6BAM has revised his cw bulletin transmission to M-W-F, 7080 kHz at 2030, and 3580 kHz at 2100 local time. A new OVS is 14-year old W6GHRH. WA6EGN, W6QBD and WB6ZOK have received Section Net Net Certificates for their participation on SCNT. W6MNY received a Public Service Award for handling a large volume of health and welfare traffic during the L.A. earthquake recovery operations. Congrats to W6TMY who has completed his 400th consecutive check-in on the Orange County 75-meter AREC net. W6WJ was presented with a life membership certificate by Anaheim ARA in recognition of his dedicated effort as editor of Squelch. OO W6VOZ is proud of his new Swan four-element tri-hand beam, OVS K6YNB has completed new 500-watt finals for both 220 and 432 MHz and used both in the June VHF Contest on Mt. Potost, Nev. WB6RIV won the June So. Cal. VHF Club 6-meter 1-Hunt. The So. Cal. VHF Club in conjunction with Anaheim HS Electronics Club sponsors an open 220 MHz am repeater with input frequency 221.54 MHz, output 223.54 MHz. The Citrus Belt ARC has donated a year's subscription of QST to the San Bernardino City Library. Section Field Day activity was high with the following clubs/groups reporting via a Field Day message: Fullerton ARC-W6ULL, Riverside County ARA-K6SJA, Citrus Belt ARC-W6JBT, Corona/Norco group-W6DCC, Newport ARS-W6MRO, Orange County ARC-W6ZE. San Bernardino County RACES-W6CV. The ARRL Repeater Directory is now available if you send a legal sized self-addressed envelope with 8-cent stamp to ARRL headquarters. SCN meets at 6:30 P.M. on 3600 kHz daily and badly needs Orange County outlets. PSHR: W6MNY 51, W6QBD 26, WA6TVA 21, WB6ASR 3. Traffic: (June) W6MNY 304, W6QBD 52, WB6AKR 30, WB6ZOK 16, W6WRJ 15, K6GGS 14, WA6TVA 13, WA6LOQ 6, W6GB 4, WA6YWS 4, WB6ZEC 4, W6CPB 3, W6BUC 2, WB6EAU 2. (May) WB6ZEC 2.

SAN DIEGO - SCM, Paul C. Thompson, W6SRS - Asst. SCM: Art Smith, W6INI. As this term of office begins I am looking forward to the continued growth of the ARPC in this section. My thanks to all official stations and league officials for their continuing support. Those stations active are W6BGF, W6EOT, W6VNO, WB6LYG, K6KDE, W6JOU, W6LRU, W6LKF as OBS, WA6COE, WA6TJK as OBS, K6EC, W6SRS as OGS, K6BTO, W6DEY as OVS. Become an active participant in your section activities. Appointments are presently available. Clubs: Area clubs were well represented in the Field Day activities. SOBARS and No. Shore* had programs in July on satellite communications. El Cajon had the annual picnic at Flynn Springs. They also have passed the 100-member mark. San Diego DX met at the home of K6CF. Palomar is installing the new repeater on Mt. Palomar. IVARA meets at Imperial Valley College. Local hams operated K6JCC at the So. Calif. Expo. Station activities: K6BTO and W6DEY have new

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SANTA BARBARA - SCM, Cecil D. Hinson, WA6OKN - SEC: W6JTA, RM: W6UJ, WB6BWZ has returned to ham radio after completing his pilot training, WB6BWZ has recently been appointed OO in the Santa Maria area. W6JTA reports only one snake on Field Day and as a result their score is better than last year. WN6NEB got his General and a new tri-band beam and rotator. W6AB was active during Field Day with 23 members, 4 stations and about 1100 contacts. W6DKQ is nearing completion of his 432 MHz ATV transmitter in addition to recently working 174 countries. The Santa Barbara ARC meets each month at the Santa Barbara Recreation Center. For additional information contact W6JPP (pres.) at 967-1181. The Channel Cities net operates on 145.8 each evening at 1830. WN6ITO is a new Novice in Thousand Oaks. W6TKA hosted a gathering of the 3895 "good guys" net in Santa Barbara. The Ventura Co. ARC meets the 2nd Fri. of each month at 7:30 P.M. at the Oxnard Community Center. WB6LIT from Ojai reports good results by turning his antenna north into the mountains and bounces his 145.8 MHz signal into Santa Barbara for the Channel Cities Net. Traffic: WA6DEI 119.

WEST GULF DIVISION

NORTHERN TEXAS - SCM, L.E. Gene Harrison, W5LR - Asst. SCM: Gene Pool, W5NFQ. PAM: W5BOO. RM: W5QGG. Our reservations came in for Texoma Oct. 29, 30 and 31, hope to see you there. W5UF attended No.Tex.Emg.Net meeting in Breckridge. W5KHE reported to SCM on committee work. Temple ARC new officers are W5VLF, pres.; W5WDW, secy. W5BCSJ is a new Lufkin ham. Irving ARC reports good bank account. Many members on vacation including WA5ULG and W5TTY. Garland ARC reports Murphy's Law held up directory. Richardson ARC reports 25 stations active in DX Contest. FD plans included 2 stations, 4 teams of 2 people sked, 2-hour intervals. Congrats men, DARC mailing QTH Box 173, Zip 75221. W5QMJ QSL Mgr. reports cards arriving at a rate of 1.5K/day. Please send Large Size SASE. KC Club Ft. Worth very active in FD. W5JA, Dallas representative Eye Bank Net, sends thanks to all nets operating on 3970 kHz for discontinuance of phone patches during their sked at 0100Z. W5KXD of Lewisville appointed official VHF station. Al is a longtime Dallas ham and plans experiments on 432 kHz with W2AZL in '72. W5UF suffered a slight stroke on June 10 but is doing OK. Texas cw hfc. net bulletin has many good points on procedure, operating hints, how to "zero" a frequency correctly along with a "kitty" request. WA5VJW/WA5VJX are on vacation. Jim Hix has some very pertinent remarks on forming messages. The ARRL format is somewhat similar to military messages and not real hard to learn but so few people will take the time to keep everything correct. W5EZY So.Tx. RM is to be commended on his work and standards set. Your SCM traveled in excess of 1100 miles this month on League business and found more sincere devoted "hams" than was ever before encountered. W5QGG N.Tx RM returned from TDY in Ind. Please keep up the good work and Form 1 cards coming. Traffic: WBSAOI 172, W5LR 12, WASSMI 9, W5KHE 7, W5QGG 5, WNSEBC 3, W5UF 3.

OKLAHOMA - SCM, Cecil C. Cash, W5PML - Asst. SCM: W.L. Smoky Stover, K5OOV. SEC: W5FESN. RM: W5YRO. PAMs: W5MFX, W5SWHV, K5DLE and W5ZRZ. QSL Bureau: W5QMJ. The VHF Repeater Directory is ready for distribution, send legal size self-address stamped 8-cent envelope to the League for your copy. The Net Directory will probably be out also by the time this goes to press. Listen to your OBS for the announcement. Sorry your SCM didn't get to make the Field Day trip with your SEC but Leonard reports a very fruitful trip to the central and northeast part of the state. I did get several messages from Field Day stations. W5KE visited the National Bureau of Standards laboratories in Boulder, Co., while on a trip with or for the FAA. Congratulations to Extra Class W5CPR. Some vacationers this season include W5JJ to the Rocky Mountain Division ARRL Convention in Colorado Springs, K5CAY also W5QMJ to Calif. W5FWX to Washington and how does this grab you W5FW and wife W5PWN after about thirty years on a second honeymoon to Niagara Falls. Be sure to get an envelope (4 x 6 in) with plenty of postage to your QSL Bureau. You would be surprised how many thousand QSLs are piled up with no envelope or postage or address to mail them to. If you already have an envelope there, get the extra 2 cents postage to him. Sorry no room for net reports please check your net directory for the Okla. nets, frequency and time. Traffic: K5TEY 852, W5ACDG 39, W5FKL 38, K5OCX 22, W5PML 17, W5MFX 16, W5AZM 3, W5JJ 2.

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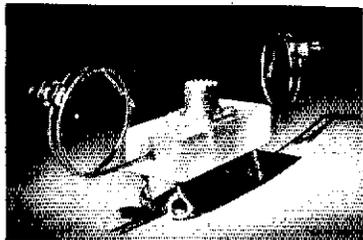
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SOUTHERN TEXAS — SCM, E. Lee Utrey, K5HZR — SEC: K5HXR, PAMs: W5FUA, W5KLV, RM: W5EZY, OO K5SBR is on the job again and advises that WSAC is still being moved with new fm repeater going up atop Kyle Field. QRS W5ABQ reports that HNN (novice net at noon CDT) is now handling a little traffic. OO K5T5R lost his 80-meter antenna in a recent blow. OBS W5LPO reports 230 worked for DXCC. PAM W5KLV advises new STEF officers are W5PCU, NCS; W5DHK, alt. NCS; W5KLV, secy.-treas.; W5KYYX, prog. OBS W5OVH advises new El Paso ARC officers are W5OVH, pres.; W5DIP, vice-pres.; WASLTO, secy.; W5LWP, treas.; K5UYH, trustee. OO WASLES participated in the May FMT. I acknowledge activity reports from WASIQV, W5QO and W5BGL. Congratulations to K5ROZ and W5RBB on PSHR again. Heard on FD W5ES, W5ND, W5KA and W5SC. Welcome to W5BDGE to Southern Tex. EC W5KR reports FD almost washed out and cicadas were heard calling CQ FD.

Net	kHz	Secs.	QNI	QTC
LEX*	3770	62	310	180
TTN*	3961	30	1388	110
7290 Tfc.	7290	44	1815	686

*NTS. Traffic: (June) W5KJN 179, W5EZY 115, W5VW 112, K5ROZ 88, K5HZR 83, W5RBB 70, W5ABO 59, W5ITW 53, K5RVF 29, W5SAUJ 21, W5BGE 20, W5QO 18, W5BHO 11, K5HUA 5, W5AC 4, W5KLV 2, (May) W5MKY 78.

CANADIAN DIVISION

ALBERTA — SCM, Don Sutherland, VE6FK — SEC: VE6XC, PAM: VE6ADS, ECs: VE6SS, VE6AZU, OPS: VE6YL, VE6HN, VE6ASL, ORS: VE6LZ, VE6WG, OO: VE6HM, VE6MJ, VE6TY. The NARC will celebrate its 50th anniversary by sponsoring the 1972 Alberta Hamfest. VE6YL, VE6APF, VE6LZ, VE6SB handled the Calgary end of communications for the Powder Puff Derby. CARA had an interesting dinner meeting in honor of the Old Timers. Although I was only able to spend an hour in attendance, I did enjoy it very much. The stories from the OTs were very interesting. This form of evening could become an annual affair. At the present time CARA has worked hard installing the station VE6NQ/6 at the Calgary Exhibition and Stampede. The opening run seemed pretty successful. VE6ABZ, VE6HN and VE6SB extend their thanks to the many willing helpers. APNS is holding its own although the holiday season has cut down the QNI considerably. Nice to see the recent increase in written message traffic on the net. Sorry to report that VE6AW who was formerly VE6AWS is back in the hospital. Traffic: VE6FK 14, VE6SS 4, VE6VS 2.

ONTARIO — SCM, Holland H. Shepherd, VE3DV — Ont. traffic circles were shocked to hear of the sudden passing of one of its staunchest supporters VE3GI. An amateur since Apr., 1931 Burt was first and foremost a cw traffic man par excellence. Always on the lookout for new traffic men he devoted a good portion of his spare time teaching young people to learn the Morse Code and was always ready to help the new amateur. At the time of his passing (June) he was the mgr. of the Eastern Canada Net and by the time you read this his successor will have been chosen. Your SCM received a letter recently from newly-licensed amateur VF3CUI who was considerate enough to want to give his instructor, VE3DKW, full credit for opening up a marvelous new world for him. To all those amateurs who so unselfishly give of their time and their talents, a great big "thanks" from all of us. Some months ago I mentioned that VE3DSS was appointed an official VHF station. To date, VE3DSS has worked 18 states in 6 call areas with his best DX being 700 miles, all on 2 meters. RAQI has recently put out a fine call book on VE2, courtesy of one of Canada's foremost equipment retailers. All Ont. cw traffic nets are back on 80 after their summer sojourn on 40. Unfortunately EAN was not able to cover the distances consistently on 40 meters and had to revert to 80 meters on July 1. Congratulations to VE3CGJ on his new call and to VE3EXY his sponsor. The Algoma ARC are now getting a work party together to help VE3CGJ get an antenna up and another White Caner is on the air. Traffic: VE3FRU 175, VE3DPO 94, VE3DV 61, VE3BR 53, VE3FKI 52, VE3GFN 45, VE3EHL 23, VE3BPC 20, VE3DU 12, VE3CRW 11, VE3FRG 11, VE3AUI 10.

QUEBEC — SCM, Joe Unsworth, VE2ALE — ORS: VE2UN, VE2DLG, OO: VE2DCW, Gord, ex-SCM pro loafer 3/71, celebrated 50 years as a ham (1st ticket June 1921). On June 18, 1971 VE2HW contacted K2YCO, Rochester, NY 260 miles RST 569 1296 MHz Tropo, a Canadian record. VF2WM says 2-meter signals readable from his QTH to Lac St. Jean. VE2RIF, VE2BOK received Advance Class tickets in June. RAQI elections for Sept. Le nouveau comite de repetitices 2-meter de RAQI est dirige par VE2BUB. La Semaine Provinciale des Radio-amateurs debutera bientot: collaborons-y tous. Le radio Club de Thetford (VE2CTM) a ete fonde en 1927 sous la presidence de Cleophas Adams. Felicitations aux gagnants du

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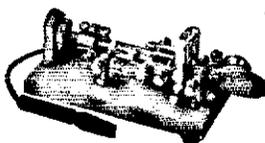
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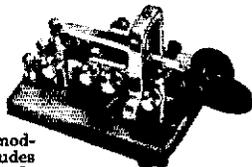
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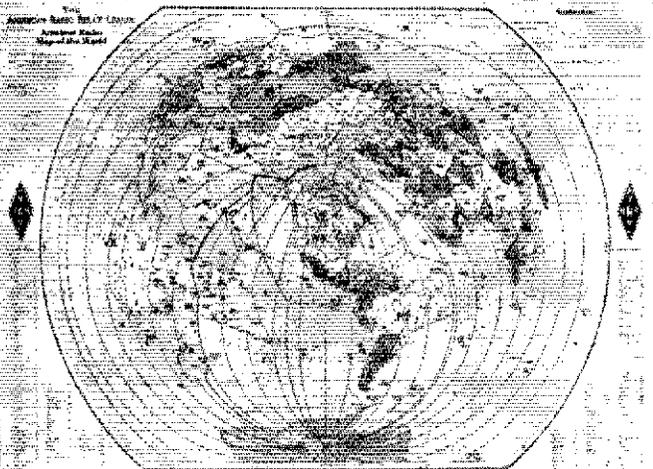
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SASKATCHEWAN - SCM, Barry Ogden, VE5BO - FD for Saskatchewan Homecoming Year '71 has done come and gone with a good time had by all those that were fortunate to be able to take part, good activity from all over the province. VE5AB set a record during his FD operating, he's 80-years young! Competition was very keen to be No. 1 in VE5. (Who ran their portable plant off their car gas tank and had to use gas from their outboard motor to get home?) Please listen for those "weak mobiles" with emergency or important traffic from the northern lake areas during the camping out. Would appreciate any information on homebrew gear for QST publication. Hear rumbles of solid state ssb rigs and other interesting goings-on. CW Nets: SATN 0230Z 3690, RN7 (1) 0230Z 3560, RN7 (2) 0430Z 3560, BCEN 0300Z 3650. SRA (VE5SK) 146.46-146.94. Hope everyone enjoyed the VES 'Fest and is enjoying good health and summer holidays. Traffic: VE5GL, 47.

DX Century Club Awards

(Continued from page 110)

W2CKY	330	W3NV	270	WA9NFL	2
LU9DAH	325	WA5REU	270	WA9SVY	2
DL7HU	320	WB6UJO	270	W0BA	2
W6CHV	320	DK2BI	260	K1OKW	1
WB2HXD	315	K1KNQ	260	K4GHR	1
W4IC	315	VE3QD	260	K7AXF	1
WSNMA	315	W1DO	260	QD5AU	1
I1FLD	310	W1HGA	260	VE5NW	1
K8IKB	310	WA4GUZ	260	W3AXW	1
OK1ADM	310	W9ICF	260	W3NNK	1
PY2CYK	310	W9WYB	260	WA4YVQ	1
PY2PC	310	YV5ANQ	260	WB6MYK	1
VE2NV	310	EA4LH	250	WA0WKV	1
W1OOS	310	VE3UR	250	ZL1UR	1
W3GRS	310	W2GT	250	ZL2ACP	1
W4BRB	310	W2PDB	250	CE6EQ	1
W5HJA	310	WA2VEG	250	DL6KV	1
ZS6BBP	310	W4BA	250	HR1WSG	1
IT1JT	305	WA3IUV	240	I1AND	1
K6EC	305	W4UF	240	I3ECF	1
W3AEV	305	WB4BAP	240	JA1BA	1
FG7XL	300	WB4EEM	240	OZ5VT	1
I1ZV	300	WB9BGS	240	SM5BFC	1
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K4CAH	300	K2KGB	220	WA4DRU	1
PY2ASO	300	K4IEY	220	WA4FZA	1
W3EVW	300	K6OJO	220	W5QBM	1
OA4OS	290	K9CUY	220	W6OMR	1
VK4QM	290	W4BKP	220	W7NYO	1
W1AA	290	W4DQD	220	W8AQF	1
W1JMT	290	W4HDK	220	ZL2AFT	1
WB2UKP	290	W7VRO	220	F5XA	1
WA4TSP	290	I1DAB	200	G2NH	1
WA0OAH	290	K9POG	200	K6BAG	1
I1LCK	280	WA1JHQ	200	K6ZMZ	1
JA1IBX	280	W2GA	200	VE2JH	1
K4BBF	280	W4AST	200	W2EHB	1
VE3AAZ	280	W4CZS	200	WB4IDM	1
WA3IKK	280	WB4GPI	200	WA8VRB	1
W5KTW	280	W6EBO	200	YV1YC	1
W6GRV	280	W7YQI	200	VP9MI	1
W3MP	270	W8JJA	200	W1RYB	1
		W9DE	200		

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(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters, be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters. Ham-ads signed only with a post office box or telephone number without identifying signature cannot be accepted.

(3) The Ham-Ad rate is 50 cents per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy, since Ham-Ads are not carried on our books. No cash or contract discount or agency commission will be allowed.

(5) Closing date for Ham-Ads is the 20th of the second month preceding publication date.

(6) A special rate of 15 cents per word will apply to advertising which, in our judgment, is obviously non-commercial in nature. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 15-cent rate. Address and signature are charged for, except there is no charge for a code which is essential you furnish. An attempt to deal in apparatus in quantity for profit, even if an individual, is commercial and all advertising so classified takes the 50-cent rate. Provisions of paragraphs (1), (2) and (5) apply to all advertising in this column regardless of which rate may apply.

(7) Because error is more easily avoided, it is requested copy, signature and address be printed plainly on one side of paper only. Typewritten copy preferred but handwritten signature must accompany all authorized insertions. No checking copies can be supplied.

(8) No advertiser may use more than 100 words in any one advertisement, nor more than one ad in one issue.

(9) Due to the tightness of production schedules, cancellation of a Ham-Ad already accepted cannot be guaranteed beyond the deadline noted in paragraph (5) above.

Having made no investigation of the advertisers in the classified columns except those obviously commercial in character, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

QCWA Quarter Century Wireless Association is an international non-profit organization founded 1947. Any Amateur Radio Operator licensed 25 or more years is eligible for membership. Members receive a membership call book and quarterly news. Write for information, Q.C.W.A. Inc., Box 394, Mamaroneck, NY 10644.

PROFESSIONAL CW operators, retired or active, commercial, military, gov't, police, etc. invited to join Society of Wireless Pioneers - W7GAQ/6 Box 530, Santa Rosa CA 95402.

FREE sample copy Long Island DX Assn bulletin. Latest DX news. Business size size to K2AFY Box 74 Massapequa LI NY 11762.

DXCC Certificate holders are invited to attend the W9DXCC annual meeting September 18, 1971. Holiday Inn (Eden's Expressway) Chicago, Illinois. Registration and Program until 5:00 P.M. Dinner at 6:30 P.M. Advance paid registration \$10 (includes dinner), at door \$11. W9GIL, Chairman, 910 East Calumet Rd., Milwaukee, WI 53217

FOUNDATION for Amateur Radio Annual Hamfest Sunday, 24 October, 1971, at Gaithersburg, Maryland Fairgrounds.

PEORIA Hamfest - September 19, Peoria, Illinois, same place as last year. For details, see Sept. issue of QST, Hamfest Calendar. Advance registration: \$1.50. Write: Wendell McWilliams, WN9DZ, Box 1, Rome, IL 61562.

NEW Mexico Hamvention 1971 will be presented 17, 18, and 19 Sept., '71, at Sheraton Motor Hotel, Albuquerque, Technical sessions, top speakers, ladies' program, entertainment, and swapfest. Banquet on 18 Sept. For info and registration: New Mexico Hamvention, Inc., Box 14381, Albuquerque, NM 87111

CINCY Stag Hamfest: The 34th Annual Stag Hamfest will be held on September 26, 1971, at Stricker's Grove, Compton Rd., Mt. Healthy, Cincinnati, Ohio. Lots of food, flea market, model aircraft flying, and contests. Identify Mr. Hamfest and win prize. \$5 cost covers everything. For further info, contact John Brunning, W8DSR, 6307 Fairhurst Ave., Cincinnati, OH 45213

AN INVITATION NYC area hams and SWLs are invited to attend NY Radio Club meetings - 2nd Monday of every month, George Washington Hotel, 23rd St. & Lexington Av at 8 PM - New members wanted.

MARN Mosaic Amateur Radio Net an international association of Masonic amateur radio brethren and members of the appendant Orders. It is dedicated to international good will and service to mankind. Write for information, MARN 11049 Avenue E, Chicago, IL 60617

HAM ticket - Amateur radio license course for Novice, General, Advanced, Extra Class. Write for information, Clayton Radio Co. 220 Mira Mar Av. Long Beach CA 90803.

QSL Cards???? Personalized made-to-order!!!! Largest variety Samples 25c, DeLuxe 35c Religious 25c. Rus Sakkers, W8DED, Box 218, Holland, MI 49423

QSLs Second to none. Same day service. Samples 25c. Ray, K7HLR, Box 331, Clearfield, UT 84015

GORGEOUS QSLs, Rainbows, etc. Top quality! Low prices! Also photostamps. Samples 10c. Refundable. Joe Harms, W4BLQ, Box 158, Edgewater, FL 32032

PICTURE QSL cards of your shack, etc. from your photograph. 50c. \$12.50. 1000, \$16.25. Also unusual non-picture designs. Generous sample pack 25c. Half pound of samples 50c. Raum's, 4154 Fifth St. Philadelphia PA 19140.

QSLs, samples 10c. Fred Leyden WINZJ 454 Proctor Av. Revere MA 02151.

CREATIVE QSL cards. Personal attention. Imaginative new designs. Send 25c. Receive catalog, samples and refund coupon. Wilkins Printing Box 787-1, Atascadero CA 93422.

SAMPLES 10c. Harry Sims, 3227 Missouri Ave. St. Louis MO. 63118.

QSLs 3-color glossy 100, \$4.50. Rutgers Var-Typing Service. Free samples, Thomas St. Riegel Ridge, Milford, NJ 08848.

QSLs 300 for \$4.50, samples 10c, W9SKR, George Vesely, Rt. #1, 100 Wilson Rd., Ingleside, Ill. 60041.

RUBBER stamps \$1.50 includes tax and postage. Clint's Radio, W2UD0, 32 Cumberland Ave., Verona, NJ 07044.

QSLs "Brownie" W3CJL, 3111 Lehigh, Allentown PA 18103. Samples 10c. Catalog 25c.

DELUXE QSLs, Petty, W2HAZ, PO Box 5237, Trenton NJ 08638. Samples 10c.

DON'T buy QSL cards until you see my free samples. Fast service, economical prices. Bolles, Little Print Shop, Box 9848, Austin TX 78757.

QSL, SWL, WPE cards. Samples 25c. Log books, file cards, decals. Malgo Press, Box 375 Toledo OH 43601.

QSLs, SWLs, WPE samples 15c. Nicholas & Son Printery, PO Box 11184, Phoenix AZ 85017

FRAME Display, and protect your QSLs with 20 pocket plastic holders. 3 for \$1, 10 for \$3, prepaid and guaranteed. Tepahco Box 198T Galatin TN 37066.

QSLs 100 3 color glossy \$4, 200 \$6; globe, eagle or straight key on front; report form on back; free samples. Rusprint Box 757B Kansas City MO 64316

QSLs - Thin dime brings samples. Alkanprint, Box 3494, Papago Station, Scottsdale, AZ 85257

100 TWO color QSLs. \$3.25. Stamp for samples. Joe Yutz, W3LXY, Pottsville, PA 17901

QSL, SWL cards that are different. Quality card stock samples, 20c. Home Print, 2416 Elmo Ave., Hamilton, OH 45015

Excellent QSLs, reasonable, Samples 15c, W9CL Press, R.R. 1 Box 811, Carmel, IN 46032

ENGRAVED call signs for shack or car. Specify call sign. \$1 to P. Lansing, 744 Mirador Rd., Vestal, NY 13850

REVISED 1971 QSL catalog! 300 cuts, stock and ink samples, ten report forms, plus ten sample QSLs. 25c. Cornelson's Quality QSLs, 321 Warren St., North Babylon LI NY 11704

C. FRITZ, yes, we're still printing better QSLs! Samples 25c. Box 1684 Scottsdale AZ 85252

QSL Print. Samples, 25c. P.O. Box 33, Blaisdell, Melrose, MA 02177

NEW! QSLs professionally designed and printed. Every card original, exclusively for you. Samples 25c (deductible). WIFLX DSL Designs, 20 Britton St., Pittsfield, MA 01201

3-D QSLs - Increased returns assure users' satisfaction. Samples 25c (refundable). 3-D QSL Co., Monson 2, Mass. 01057

WANTED: Collins EWS-1 xmttr. Must be late series and clean. Norman Coutts, VE7ANZ, Beaver Cove, B.C., Canada

CANADIANS: Wanted: Drake, Heath, or similar receivers and/or transmitters. Send particulars. For sale: Minnheam HR-10B Viking Adventure Transmitter. Offers?? VE3EYV, 16 Grandmont, Sault Ste. Marie, Ontario

WANTED - All types of tubes. Top prices paid for Varian and Eimac. Jaro Electronics Corp., 150 Chambers St., New York, NY 10007.

WE BUY all types of tubes for cash, especially Eimac, subject to our test. Maritime International Co., Box 516, Hempstead, NY 11551

CASH paid for your unused tubes and good ham and commercial equipment. Send list to Barry, W2LNI, Barry Electronics, 512 Broadway, NY 10012.

WIRELESS sets, parts, catalogs, bought, traded. Lavery, 118 N. Wycombe, Lansdowne PA 19050.

AMATEUR museum buying old radios, books, magazines, catalogs, parts. Selling QSLs and C.Q.s. Env Rasmussen 164 Lowell, Redwood City CA 94062.

WANTED: An opportunity to quote your ham needs. 32 years a ham gear dealer. Collins, Signal/One, Drake, Galaxy, Tempo, Kenwood, Henry 2-K, and all others. Also \$25,000 inventory used gear. Request list, Chuck, W8UCQ, Electronic Distributors, Inc. 1960 Peck St, Muskegon MI 49441. Tel: 616-726-3198

FINDLAY, Ohio Hamfest will be September 12th at Riverside Park. Net Conferences, Flea market, swap-shop, door prizes, manufacturers' display, etc. Donation \$1 in advance, \$1.50 at park. Tickets and details from Dan Jernigan, K8VXD, Route 2, Findlay, OH 45840

SAROC January 6-9, 1972. Advance registration \$9 per person includes tickets for admission to meetings, Ham Radio Magazine, Swan Electronics, Hy-Gain/Galaxy Electronics and SAROC parties, buffet lunch breakfast. Advance registration with out-night show two drinks \$14.50. Advance registration with Flamingo dinner show \$17.50. Ladies who register receive transportation for shopping tour, luncheon, crazy hat contest program. Frontier Airlines SAROC group flight package planned from Chicago, St. Louis, Omaha, Denver. Send for details. Advance registration to SAROC, Southern Nevada AEC, Inc., Box 73, Boulder City, NV 89005, before 31st December. Accommodations request to Flamingo Hotel, Las Vegas, NV 89114, before 15th December.

RECEIVING & Industrial Tubes, Transistors, all brands - Biggest discounts, Technicians, Hobbyists, Experimenters - Request Free Plant Catalog and save! Zalytron 469 Jencho Turnpike, Mineola, NY 11504

SPIDERS for boomless quads, Helarc welded aluminum, Al's Antennas, 1539 So. Washington St., Kennewick, WSN 99336

WE buy electron tubes, diodes, transistors, integrated circuits, semiconductors and resistors. Astral Electronics, 150 Miller St., Elizabeth NJ 07207, Tel. 212-354-3141

CAPACITORS - brand new 27BFD electrolytics at 50%wvgc. Ten for \$19.50, Mehalley, K4HP, P. O. Box 642, Manetta, VA 30060

TELETYPEWRITER machines, parts, bought-sold, S.A.S.E. Int Typetronics, Box 8873, Ft. Lauderdale FL 33310

WANTED: Teletype machines, parts, Models No. 28, 32, 33, 35, 37. Cash or trade for Drake equipment. Altronics-Howard Co., Box 19, Boston MA 02101. (Tel: day or night 617-742-0048)

1000 PIV @ 2 amp, new epoxy diodes includes disc bypass and bridging resistors, 10 for \$4.50. Diodes only 10 for \$3.50. New 190 MF @ 500 volt Electrolytic caps, \$1.60 ea. Postpaid USA. East Coast Electronics, 123 St. Boniface Rd., Cheektowaga NY 14225

WE'RE still trying to complete our collection of callbooks at 192. Anyone have extra copies of Government Callbooks 1922-1925 and Radio Amateur Callbooks 1928-1954? AERL, 225 Main St., Newington CT 06111

WANTED - For personal collection, The Radio Amateur's License Manual, Edition 12, WICUP, 18 Mohawk Dr., Unionville CT 06085

SAVE on all makes of new and used ham equipment. Write or call Bob Gimmes, 89 Aspen Rd., Swampscott, MA 01907, Tel: 617-598-9700/617-598-2530

VERY interesting Next 6 issues \$1. "The Ham Trader," Sycamore, IL 60178

CLUBS: Send membership list for QST's World QSL Bureau, 3200 Panama Ave., Richmond, CA 94804

TRANSFORMERS rewound, Jess Price, W4CLJ, 507 Raehn, Orlando, FL 32808

DUMMY loads, 1 kw, \$9.95; phone patch, \$8.95. Wired, \$4.00. Ham-Kits, Box 175, Cranford, NJ 07016

PRIVATE collector wants old wireless gear, Buy trade, Dick Sophie, 1945 E. Orangeburg Blvd., Pasadena, CA 91104

HARDBOUND QSL'S 1961-1970, K2GBH 12411

WEST Coast hams buy their gear from Amrad Supply, Inc. Send for flyer, 1025 Harrison St., Oakland CA 94607

LOOKING for skeds with YEs. Interested in astronomy, hovercraft vehicles, astronautics, politics of technology, ecology, computers, railroads, aerostats, electronics, and art. WB9BVI Extra Class Nicholas Leggett, Department of Political Science, Johns Hopkins University, Baltimore MD 21218

GREENE - center insulator, with or without Balun - a tough number to beat - free flyer, Greene Insulator, 3 Pilgrim Dr., Bedford, NH 03102

UPGRADE your license! You need Post-Check. Original, expertly devised, multiple-choice questions covering all areas tested in FCC exams. Same form as the FCC exams. Keen answers, explanations, IBM sheets for self-testing. Over 300 questions and/or diagrams for each class. Each class complete in itself. Basic questions duplicated where they apply. New prices because of new postage rate. General Class \$4.25, Advanced Class \$4.50, Extra Class \$4.75, including first class mailing. Add 50c each copy for air mail. Send check or money order to Post-Check, P.O. Box 3564, Urbana Station, Des Moines, IA 50322

NOVICES: Need help for General Ticket? Complete recorded audio-visual theory instruction. Easy, no electronic background necessary. Write for free information, Amateur License, Box 6018, Norfolk, VA 23508

VHF/UHF frequency meters, VFO or generator 85-1000 Mc, 144-148, 220-225, 400-450, schematic, calibration book, Portable \$108, rack mounting \$88, no calibration book \$68. Nylon climbing belt with lanyard \$20. R3M871J3 Collins receiver \$295, Link, 1000 Monroe Tpk., Monroe, CT

GROUNDING grid filament chokes, 30 amps \$5, Plate chokes 800MA 3-.30MCS, PUSA4-8 William Deane, 8831 Sovereign Rd., San Diego, CA 92123

WANT wireless (early) magazines and equipment for W4AA historical library. Wayne Nelson, Concord, NC 28025

NOVICE crystals: 40-15M \$1.60, 80M \$2.10, Free Flyer: Nat Stonette Electronics, Umatilla, FL 32784

ESTATE sale - Many items: Phone or write WB2OHF for free list. xmitr: 3-1000Z, 2kW linear amp with power supply, HK-10 Marauder, parts for 3-400Z linear including supply, recvr: Hammarlund HQ-101, Lafayette KT-320, SK101, all in perfect working condition with manuals, cables, mic, vibrotone, x-tals, tubes, etc. Phone 608-724-5116 after 5 P.M.

HAVE new sb rig. Selling the following equipment just taken from everyday service: Viking Valiant i/w & Apache TX 1 vixits, line w/6-m gear, Sixer HW 29A, 1/3 GP-11 & RA 20, WB2VND, Box 31, Corbettsville, NY 13749

SALE: SB401 \$275, never used. Collins 76A2 receiver \$125, 40 ft steel tower \$40, Ham-aid rotor \$75, Coley T336 \$100. All in excellent condition. J. Staley, W2CHT, 713 North St. Ext., Batavia, NY 14020

KWM-2/516F-2 very good condition \$700. MP1DC + 351D-2 \$165, Heath HB-20 \$75, Like new Clegg Thor VI w/ps \$150, Eico 720 \$40, NCH-2000 w/new tubes \$325, WB2IEC

SIX meter Virginia kilowatt final, pushpull 4CX1000s; \$495. Send \$2 for photos, W4IOH

SELL: Swan 500CX and 117CX power supply and speaker month old \$500, or will take cheaper transceiver in on trade. Galaxy 300 and 20 console \$165, SR 150, H3 A.C. Factory 40 and mobile mount, real used \$240, Richard Schark, 417 North Ferry, Ottumwa, IA 52501

SELL: Drake-2c, with calibrator, \$180. Drake -2-N-T, with 25 Novice Xtals \$110, Drake - MN-4, with Lientec dummy ant, \$75, \$75. Vibroplex, presentation model \$25, S. Eberle, 191 West First St., Mansfield, OH 44303

SELL: Hammarlund HQ170A. Excellent condx. \$165. Bob Adams, WB2GYJ, 41 Lake Rd., Upper Saddle River, NJ 07458

FINE stainless, other, hardware. Lists-small charge. Stresser, W8LRL, 29716 Brantbank, Southfield, Mich. 48076

PERFECT 4-400A linear, spare tubes \$150, you ship. Eico 232 VTM, wired \$25, Knight gridip \$15, Pennwood digital clock \$9, RVAC vertical \$25, Shure 444T microphone \$20, AH mint. Joe Schwartz, 28 Chestnut Hill Ln., Reisterstown, MD 21136

DRAKE R-4R, extra xtals, excellent condx. \$525 - no trades. E2KNL, Ivan P. Hersh, 35 Pine St., Youkers, NY 10701

SELL Yaesu FT101, new April, mint, complete, \$475. C. K. Morgan, P.O. Box 201, Paradise, CA 95969

SWAN 500C, 117CX supply, excellent, \$435 prepaid. Johnson Invader 200 sbs, 3-m, etc. VFO, fair condition (write first) \$145 prepaid, WB9DWU, 4114 Northcote, East Chicago, IN 46312

HEATHKITS professionally wired, tested. Send for quote. Parrish, 306 W. Amberst, Melbourne, FL 32901

"HOSS Trader Ed Moory" says he will not be undersold on cash deals! Shop around for your best price and then call or write the "Hoss" before you buy! New Equipment: Gonset 2000 watt linear Mark IV, reg. \$525, cash \$389 while they last; Mosley MCQ-10 quad, 10 meters, \$52; Swan SS-16 lattice filter prepaid, \$75; New Rohm 50 ft. foldover tower, prepaid, \$235; New Mosley Classic 93 and Demco Ham-M rotor, \$205; Used Equipment: GR-4, \$40; TD-XB, \$38; Marker Lancer ML-1, \$235; Ham-M, \$79; KV-4 VFO, \$69; NCX-1000, \$759; Ranger II, \$109. Moory Electronics Co., P.O. Box 506, DeWitt, AR 72042, Tel: 501-946-2820

SELL: Hallicrafters HT-32B mint \$235; Collins 75A2 with matching speaker mint \$150; National NC101 with matching speaker, 2-meter converter, excellent \$135; Hallicrafters SR42A like new \$85; Lafayette HA-750 6-meter transceiver new \$75; Johnson Viking 500 good \$225; Heathkit SB610 monitroscope \$60; Hallicrafters HT37, HT41, SX111 mike and speaker \$375; Collins 3281, 7851, 516F2, 312B4, excellent \$600; Ranger I very good \$125, Hewlett-Packard 524A counter good \$140; Mike offer, D. B. Laxson, WB9V, 3808 Gingerbread Road, Alexandria, VA 22301. Phone: 318-443-9843

COLLINS KWS1, 75A4 late models in mint condition. Extra pair 4CX250B, solid state rectifiers, Astatic 10D mike. Matching speaker with phone patch. All interconnecting cables and coax antenna switch. Manuals and original packing boxes. Will deliver within the North East. Tel: \$110. W1AZB, POB 335, Central VT, CT 06332, Tel: 203-564-3838

SWAN monobander, 20M USB, mint w/ac & dc power. Will ship, \$200. G. A. Sobel, K0MBB, 10236 Canter Way, Overland, MO 65114

NC-200, NCX-A, mint condition, \$240, on air now, K4LFV, Breece, 3425 Keene Park Dr., Largo, FL 33540. Will ship collect.

SWAN 500C with 117X ac supply, 14C dc module, V32 VOX \$400, WA9SZZ, 944 Lincoln, Manitowish, WI 54220

SB301 ev and sb filters, perfect condition \$250. Reason for selling, replaced with SB302, Bill, WA0VAV, Miltons, MN 56354

VIDEOTape recorder, Ampex VR-6000, excellent, w/new head, four hour tapes, Hi-Fi, \$650. TS-419 900-2100 MHz generator, \$290. BRD 450A power meter, \$35. GFL 17A3 surveillance receiver set, \$750. R-220 receiver, fair, \$250. \$40B transfer oscillator, \$200. Kay 240B noise meter, \$90. TS-186C frequency meter, 0.1 to 10 GHz, \$50. Miralite 21-inch monitor, \$75. Johnson 6N2, \$45. Gonset GSB-100, \$90. NLS 6513 DVM, \$76. All parts for 4CX1000A linear, two tubes, \$200. Most metalwork done. Large rotary inductor & vacuum variable. K4GVO, 450 Island Beach Blvd., Merritt Island, FL 32952

FOR SALE: Collins 75S-R receiver, Henry 2K, many others. EASE for complete list. Fennessy, 4328 Reece Dr., Pittsburgh, PA 15227. Phone: 884-1277

COLLINS 361-D2 mobile mount and MP-1 dc supply \$160, W2GHS, 47-48 197 St., Flushing, NY 11368

HEATH DX-60B transmitter, HG-10B VFO, 2 Novice crystals \$95, Lafayette 10 meter ground plane \$5, 87 copies Popular Electronics 1963-1971, 28 copies Radio-TV Experimenter 1965-1970, 20 copies Elementary Electronics 1965-1971, 27 copies Electronics Illustrated 1963-1968. Make offer Ed Kalk, WA1JZC, 75 Tumblebrook Ln., West Hartford, CT 06117

FOR SALE: New unpacked Drake R48; also two Central Electronic 100Vs. Call 413-527-4304, or write K1ANX.

ANTENNAS: Dual bands: 80-40 meters, \$35; 40-20 meters, \$29.50, others available. Literature on request. House of Dipoles, Box 8484, Orlando, FL 32806

JUST discovered! 50 year old flame proof key type J-7-A U.S. Government order 141082 dated 1921. Beautiful heavy duty construction in new working condition. For the collector, antique buff, and antique gear museums. An unusual conversation piece, curio, desk weight and gift. A rare find. Limited supply. Order today \$9.95 ppd. Racer Rally Accessories, 79 Washington St., Brooklyn, NY 11201

YOUR call letters on attractive 3-D magnetic sign for your car, 3" x 10 1/2" only \$4. Sanco Associates, Box 5, Westfield, NJ 07090

LAMPKIN 205 deviation meter wanted or other high quality deviation meter for use 2M fm. WA4YFI, Bill Smitherman, R1 2, East Bend, NC 27018

JOHNSON 275 watt matchbox with swr indicator, HQ150 with spkr, B&W 5100 xmitter, Heathkit swr meter. Complete \$200. W3FVW, 9 Diane Dr., Malvern, PA 19355

SELL: Collins 78A3 receiver, \$150, Globe HG-303 xmtwr w/matching V-10 VFO \$40, Contact George Hawrysko, WB2GWW, P.O. Box 568, Jamaica, NY 11424, Phone: AC212-277-4001 bet. 5-9 P.M.

WANTED - HA-14 Kompact linear reasonable. A. E. Wilson, Box 392, East Brewster, MA 02640

HALLICRAFTERS SR-400, PS-500, good condition, new finals, \$560 ppd, Ten Tec PM3A 40, 20 meter QRP, \$45 ppd, Richard Nelson, 181 Oak Ridge, Summit, NJ 07901. Tel: 201-273-2518

DRAKE 2B 5/2BQ, 2AC, excellent condition, \$190, Elco 720, \$70; Elco 722, \$35, both factory wired, 570 East Broadway, Boston, MA 02127, Tel: 268-0229, Paul C. Hunt, K1MJS/1

ARRL experimental dc power supply, Code oscillator, Resistors, capacitors, meters, etc. SW-5m, fm telefunken table radio \$65, Dyna 30 watt mono music amplifier, pre-amp. \$45, B. Devin, 417 W. Park Pl., Okla. City, OK 73103

ENTIRE rig: R4B, T4XB, AC4, MC4, RPC-3 speech compressor, SB-220, All mint, \$1000, Also 70 ft. Rohm +25 tower, Ham-M, 3 ea. quad, Shipping not included, Walter Knodle, c/o 211 Physics Bldg., Urbana, IL 61801, Tel: 217-365-2724

DRAKE 2C, Good condition, manual, original container, \$165, FOB, WA6MWF, P.O. 325, Capitola, CA 95010

HAMMARLUND HX-500 \$225, A fine all mode 100 watt transmitter 10-80 meters, excellent condition at one third original cost, Thomas, W2UK, Juniper Pl., Colts Neck, NJ 07722

FOR SALE: Johnson Viking matchbox, model 250-30 1000 watt; Heath monitor scope, never used, Model SB-610, both for \$180, Excellent condition, J. E. Rightmyer, 601-05 So. 4th, Hamburg, PA 19526

SELL: W1VG's complete 1 kw station, Collins 75S-3B with 2 cw filters, 32S-3 with 616F-2, Henry 2K, Bird Thubline rf wattmeter with carrying case, B&W filter, B&W matchmaster, EV 630 mike, Speedex 501, all connecting cables, instruction books, (315 countries confirmed). Can ship but prefer that equipment be picked up. \$2000, PCB West, Hartford, Will sell complete station only, no deals, L. Morrow, W1WG, 99 Bentwood Rd., West Hartford, CT 06107, 203-521-0416.

FOR SALE: Johnson 6N2 with VFO, \$60; Dumont 241 scope, \$40; Tektronix 514D (needs work) \$35; HP 200SR audio oscillator (rack mount, one year old) \$120, Gus Wilson, c/o ARRL, 225 Main St., Newington, CT 06111

MANUALS - \$6.50 each: R-274/FR, TS-34A/AP, R-390/URR, Hundreds more, S. Consalvo, 4905 Raonre Dr., Washington, DC 20021

HEATH HW-32A 20 meter sbt station. Brand new, used very little, with brand new HP-23A ac crystal and crystal calibrator. Factory aligned, \$135, u ship, WA5VQC, Andy Weis, 13502 Westport Ln., Houston, TX 77024

NCX-500 transceiver w/AC-500, mike, SWR, speaker console. Less than 20 hours. Immaculate. WA2HPP, 84-15 161 Ave., Howard Beach, NY 11414, Tel: 212-855-1278

HEATH SB-301 with am and cw filters, \$260 or best offer. Excellent condition, K4NDX, 3613 Malabar, Montgomery, AL 36106

HEATHKIT: Warrior Kilowatt linear amplifier, HA-10, Excellent condition, \$80 plus shipping. Also: Model 15 TTY, page printer, \$90, Kirkwood High Radio Club, 801 West Essex, Kirkwood, MO 63122

SELL: several new Vibroplex Lightning Bugs \$15, Johnson Speed-X bugs w/crystal finish \$15, Hallcrafters SX-A mixer with built-in 116 & 12v supplies and HA-26 6&2M VFO \$140, Want: SB-110, SB-610, SB-620, Duobander, Jim Toole, 27 Sheldon St., Wilkes Barre, PA 18702

FOR SALE: Marker Luxury 2-mtr fm transceiver \$100 off Drake price. Accessories, Crystals for 34/94. Ship express or bus CD, \$230, No trades, WB5EK

FOR SALE: WRL Duo-bander 80 & 40 meters with AC 384-A 400 w ac power supply just retubed & factory serviced. Contact Jack Barnett, WB2DUJ, Pottersville, NY 12860

WANTED: SB-10 sbt adapter to Heathkit Apache, in working condition. Jeff Katz, 7 Beatrice Ave., Blmfd, CT 06002, WAINMI

COMPLETE 20 meter 3el beam antenna \$12, Kirk gamma match for 20M beam \$10, WA6JWR

HEATH DX-60 B and HG-10 B VFO, fine shape, \$90, Ron Pierce, 1201 W. Mission Rd., #57, Alhambra, CA 91803

FOR SALE: HA-350 with speaker and DX-100 plus extras. Sell separate or together. Please offer. Contact WA2AWJ, 627 Buxton Ave., W. Hempstead, NY 11552, Tel: 516-489-8929

FOR SALE: 6-10-15-meter transmitter - 1 kW NFM-650W am, power supply, transmitter & VFO rack mounted - air cooled - includes D104 mike & stand, spare finals, Dow key relay, & foot switch. Excellent cond. - \$175, HQ 170A receiver w/lock, matching speaker, headphones, and 6-meter var amp. Perfect cond. - \$200, HE45B transceiver with VFO, PPT mike, 12 V and 110 V cables, Includes 6-meter halo. - \$100, Call Mel Spiegel, K3DZC, 215-L18-3522

WANTED: RME DB-20 preselector. Will consider later model. Price and condition in first letter. Also will buy an RME 69 receiver, W5PM, RFD 1, Box 399, Covington, LA 70433

SELL: QSTs January '43 through April '71 and CQs April '59 through March '62. First cashiers' check or money order for \$35 takes all 382 issues FOB my shack, R. H. Morse, W6CRQ, 1066 Kendall Dr., San Gabriel, CA 91775

HEATH DX100 transmitter, on air, \$60, W2HKE, New Jersey, 201-838-8143

HW-16 transceiver for sale. Please contact Richard Solomon, 95b Park Ave., New York, NY 10028

WANTED: Technical Materiel Corporation GPR-92 receiver, also need G5B-1 adapter. Please state condition and lowest price. All replies answered. Jay Spivack, K2EGA/6, 671 Vernon St., Apt. 401, Oakland, CA 94610

BADGES by Adrian, WB8GEW, 3-line engraved badges, any color \$1.25. Special rates to clubs. Fallert's Engraving, 121 N.C.S.T., Hamilton, OH 45013

RCA Model WO-33a(K) oscilloscope with probes and manual \$50; Lafayette Model HA-350 rcvr with speaker, mint, \$50; Heath "Twoer" with mike and manual, mint, \$45; Simpson 260 VOM, with manual and leather carrying case and two sets test leads, excellent condition \$35, M. T. Donnell, Jr., W5HSE, 2805 First St., Brownwood, TX 76801

WANTED: BC453 receiver, mint condition; SW3 plug in coils; Landline telegraph sounders. Write Moose, K6CDA, Ozona, AR 72854

WANTED: Military and commercial telegraph keys for a collection. Any condition. Reasonable. WA4NMQ, 1630 Venus St., Merritt Island, FL 32952

SELL: Homebrew 813 xmtwr, complete 40-10 meters \$80, Ham-M rotator \$70, Call after 4 P.M. 607-967-4797, K2MGR, Kurt Stietz, RD #1, Bainbridge, NY 13735

DRAKE 2C receiver with 2CS speaker for sale. Only slightly used \$165, WB5DCE, 2202 So. 43, Temple, TX 76501

SELL: NCX-500, AC-500, mint condition, \$325, W2GCW, 192-15A 69th Ave., Flushing, NY 11365, Tel: 212-454-2775

CLEGG Zeus xmtwr, \$225, Will consider trade, WA4EVQ, Box 1267, Homestead, FL 33030

HW-16, Heathkit, mint, four months old, factory tuned, plus ten Novice crystals, \$110, Will pay postage, WN2SLG, 56 Van Riper Ave., Clifton, NJ 07011

COMPACT Globe HG-303 transmitter (75W) with crystal, Dow-key relay, manual, cables, filter. Just \$55, Gross (WB2FQE), 31 Eaton Rd., Syosset, NY 11791, (516-931-2766)

SELL: Collins 32S-3 transmitter, extremely good condition, \$350, Ben Lowe, WA5UVM, 14027 Gatehouse Dr., Dallas, TX 75240

HEATH HW-12A, excellent condition, includes mobile bracket and microphone, \$60, Jeff Wagner, WA3HPF, 3302 West Lake Rd., Erie, PA 16505

WANTED: VLF rcvr 10-100 kHz, tuneable transistor phase lock preferred. No WWII junk. WA3LVV, 2203 Foxhall Rd., Washington, DC 20007

DRAKE T-4XB, Drake 2-B and Johnson Viking Thunderbolt for sale. \$600 takes all, individual prices on request. No shipping price. F.O.B. Skaneateles, WA2HOH, Box 11, Skaneateles, NY 13152, Tel: 315-685-5941

QRPP - QRPP - QRPP - Interested in what it's all about? The Milliwatt: National Journal of QRPP has it all - operating news, construction projects, QRPP WAS, DXCC standings, awards. Volume #4 postpaid \$3.40 per year (six issues). Ade Weiss, Editor, Millwatt, Meckling, SD 57044

TTY: Assorted +28 Manuals on hand plus 25 years experience in repair and overhaul of TTY eqpt. Can I help? Bill Gieckel, W2OWH, 14 West Holly Dr., Sayville, NY 11782

HAMMARLUND 110 160-6 rcvr vry gud cond \$115, Knight T-150-A 80-6 am, cw, xmtwr, xtal, and has VFO \$45, Fair cond, 11 Newell Dr., Basking Ridge, NJ 07920

FOR SALE: Vibroplex original, deluxe perfect condition, \$20; SB-101, SB-600, HP-23A, Built by Electronics Tech. & factory aligned, \$384-192-A modification kit installed. Mint condition \$350, Jimmy Powell, 200 Andrews, Cleveland, MS 38732

HAM Bargains: Cleaning house, Sase for list, K3GEO, 4229 Estates Ct., Allison Park, PA 15101

WANTED: Hallcrafters HA-7 crystal calibrator for SX-122 receiver. Also want S-129 or S-219 receiver. Howard Hougland, 639 North Sierra Bonita, Los Angeles, CA 90036

COLLINS 75 S-3A (extra xtals) \$450; 32 S-3 with 516 F-2 \$650; 312 B-4 \$125. Prices firm. Pick up deal only. Phone 609-494-2081 weekends or write K2HY

DRAKE 2-C svr \$180, Knight T-50 xmtr and 111 xtals \$40. Peter Zawistowski, 8 Burbank St., Pittsfield, MA 01201

FOR SALE: Five, like new, Squires-Sanders Model BNSG-1 Spectrum generators. Provides 50 or 100 kHz gips at 1, 10, 100, or 1000 microvolts from 100 kHz to over 50 MHz. Internal Oscillator stability + or - 10 ppm. Makes excellent precision calibrator and signal source. Originally \$600 each. Yours for \$39.95 each. Send for technical data sheet. C. Van Atta, W3FRJ, 1903 Sunset Ave., Wanamassa, NJ 07712. Tel: 201-774-4053

AMPLIFIER parts: 2 4-400As/Johnson sockets, 356 MMF VAC VAR/Groth tube counter, 2100 MMF C2, knobs, HD band switch, 100CFM Rotron fan, input coil forms/switch, 2 200MA 900V, filament chokes TR750, Tribander 440V HD 12VDC mobile supply (designed for TR-3) \$60. WASENP, 218 Karen, Lafayette, LA 70501

COLLINS 75S1, 32S1, 516F2, crystal pack for 32S1, mike. Perfect. Need Green. \$600. Lindsey, W5FR. Phone: 713-488-0517

FOR SALE: 14AVQ vertical 1 yr. old \$20. Brand new 5U1 scope tube \$8. WA05VO, RR2, Box 115B, Lawrence, KS 66044

MUST sell 75A-4, Heath keyer, Shure mike, Nutronics 4BFV vertical with radials, all in excellent condition, \$325 or best offer. Steve Kanne, W5EHW, 2500 Wilshire Blvd., Los Angeles 90067. Phone: 213-277-6620

TELETYPE: SASE for list: AN/URR-13 receiver, 200-400 Mc tuneable \$39, Telecomm, Box 4117, Alexandria, VA 22303

SELL: DX-100B (chirp), SB-10 \$65, HQ-170e mint endng \$200. Will not stop. Mike Bentscher, 312 Brookheld, East Lansing, MI 48823. Tel: 332-0237

SELL: fine used Mosley TA32, \$45, AR22 rotator gratis. No shipping. W2TB, 21-229-3260

SELL: Sony CRF-230 80-10, RFO, sbb, am/fm/LW \$450. Douglas Fraser, 9114 Eton Rd., Silver Spring, MD 20901

WANT: Drake 2-C. W2HBV, 654 Freeman, Orange, NJ 07050

SBE 34, excellent, mobile mount, Hustler antennas, microphone, calibrator, instruction book. \$285, W2MDL. Tel: 212-521-3866

FOR SALE: excellent National NC12000 amplifier for \$449. Delivered within 300 miles of Anderson, Indiana. K9TJZ, Charles Jones, A/C 317 9413

WANTED: Taylor 3108/3107 wind and speed direction indicators. Quote condition and price. O. J. Suptiska, 53 Hayward St., Yonkers, NY 10704

STD. COM SR-C826M with SR-C12/120-1A acps. Like new w/warranty card in original packing. Net less 15%, W2AH, 151 Rock Creek Ln., Scarsdale, NY 10583

FOR SALE: Swan 500 xcvr, 117-CX power supply, EV-719 mike. Mint condition, low time on the sr \$360, D. Usdan, M.D., 12465 Mustone #101, St. Louis, MO 63141

APACHE TX-1 excellent condition \$90. Jim, WA6ONK, 91108. Tel: 213-793-9011

WANTED: National SW-3 receiver. Any model ok, preferred with coils. W3QH, 5899 Barnes Ave., Bethel Park, PA 15102

COLLEGE expenses: SB-101, cw filter, HP-23A, Cuienna, swr bridge, 10-80 meter dipole, microphone, \$400. Make offer on part. WR3YQ, 6 Bernath Dr., Trenton, NJ 08630

COLLINS KWS1 transmitter \$450, 75S1 \$265, 32S1 \$350, R4B \$375, T4XB \$375. AU trades considered, WA4LXN, Foy Coble, 251 Collier Ave., Nashville, TN 37211. Tel: 615-833-2724

MINT Drake TR-4 station with MS-4, AC-4 w/warranty card. Big, swr, matching mike, ham magazine, etc. \$510. WA0YBN, Russell Geoffrey, 3003 N. Tejon, Colorado Springs, CO 80907

SELL: Swan 350, late green dial compact homebrew ac supply, manual A-1 \$255, Johnson phone patch \$15, Hallcrafters SX117, HT44, PS150-120, manuals, immaculate \$400, K9PYY, 5271 North Shoreland, Milwaukee, WI 53217

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SELL: 1939 Sky Buddy mint condition. Make offer. Pick up only. Rodenbach, 5 Orchard Neck Rd., Center Moriches, NY 11934

HW-100 well built, h.b. power supply, HP-13 \$320, Lafayette HA-250 10, 11, 15 & 6 mtr mobile linear, \$45. Realistic DX-150 mint, \$60. HM-10A \$20. Will work out deal for TR-101 or fm set. Prefer local deal. WA1YTF, 45 Fremont, Lowell, MA 01850. 1-617-453-5944

MUST sell: HW100, HP23A, SB600, with manual. All very good condition \$250. 1 pay postage. Lawrence Whited, Rt 1, Box 273, Seale, AL 36875

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WANTED: Yaesu FT-101, W2GL, 61 Chatham St., Chatham, NJ 07928

TRADE or sell: Western Electric 1296mc transmitter with power \$75; 144/432 Vactor tripler \$20; uhf products FET 132 converter \$40; TWT amplifier with power \$35; shielded Revere tape recorder for SSPV \$48; B&K 1076 TV analyst LN 175; Singer-Metrix spectrum analyzer \$150; new Varionics II amplifier PA-50A org. Box \$100; Set of three Stoddart receivers w/accessories cover 1500; thru 1000mc \$300; misc. shack cleanup list SASE. W4AP1, Box 4095, Arlington, VA 22204

WANTED: Prewar equipment by National or Hallcrafters. Name, 12330 Lawyers, Herndon, VA 22070

HAMMARLUND HQ 215 \$250, Heathkit HW12 \$50, Knightkit TR108 w/VFO \$75, RTTY model 15 \$35, model 19 \$50. W8GAL, 3592 Northwood, Saginaw, MI 48603

MOBILE Swan 55B remote switching antenna - 80-10 meters - brand new (lost car) \$89. Hoffman, 115 Highland Ave., Jersey City, NJ 07306

SELL: R4A, MS-4 manual, like new. Original carton. \$285, 13 extra xtals. W6DJZ, 3748 Floresta Way, Los Angeles, CA 90043

COLLINS 32S-1, 75S-1, 30L-1, 516F-2, 312B-4, SM-1. Excellent condition, \$1100. Will ship. Paul Alexander, CMR Box 2779, Robins AFB, GA 31093. Tel: 912-923-5896

DRAKE 2B, 2BQ, 2AC, WWV excellent - \$190, Eico 723 600 watt \$20. Trade or sell new pair 4X150Dts for \$500 or 3-1000Z. Stanley Hojnacki, 2307 Beverly Rd., Cincinnati, NJ 08077

SALE: Best offer takes complete kW sbb station. On air condition. R&W 6100 transmitter & linear with solid state power. NC-300 receiver with CE sideband slicer. Phone K6DUE 213-346-0137

FOR SALE: Collins 75A4 xcvr, 3.1 kc filter and vernier knob. Excellent cond. \$280. Johnson 250-39 TR switch \$20. W. L. Hessler, Jr, W2MYK, 3 Seward Ln., Stony Brook, NY 11790. Tel: 516-751-2617

SELL: perfect NGX200 with mobile supply \$240, or trade for 2M fm transceiver topline. WB4DXA, W. R. Wilis, 5688 Oakhurst Dr., Largo, FL 33542

WANTED: Used AC-3 power supply for Drake TR 3. John Bacon, 921 Beachside Ln., Huron, OH 44839

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FOR SALE: uscilloscope AN/USM-24C \$75. Signal Generator 900 Mc to 2.1 Gc \$40, radar signal generator NG/727A/U model 306A-1 General Precision Decca Systems, Inc. \$25. All good condition. James Kelly, 1890 High St., Atwater, CA 95301

HQ110 receiver, Glnhe Sentit am/cw xmtr, gd endx. WA3EIR, 1020 Ethel Ave., Fairview Village, PA 19409

75S3B serial 55364 with 500 Hz filter, mint, 1 1/2 yr old. Tom Merten, VA 12R NAS, Whidbey Island, Oak Harbor, WA 98277

COLLINS KWS-1, 75A4 (+2935), w/w filter, TA-33 SR, WW II SX-12A, Manuals. Mint cond. \$800 cash. W8SMW/2, 188 Oakwood, West Long Branch, NJ 07764, 222-1097

COLLEGE forces sale: Hallcrafters S-76 \$50; 2 meter transmitter \$60; 2 meter converter \$25; Crusley 52 receiver, \$30. WA8UGT, RR #1, Box 115, Wilmington, OH 45177

DRAKE R4A receiver \$250; NCX 3 and NCXA supply \$200; Swan 140 transceiver \$60; Swan 512 dc supply \$50; BC221 and set \$40. All good condition. Philip Schwebler, W9GCG, 4536 N 50 St., Milwaukee, WI 53218

WANTED: Rohu 45, too 130 feet, Collins 312B-4, Sell: NCL2000 \$375; C.E. 100V updated \$375; Spaulding Tri-X tower 136 feet \$250; Collins 30S-1 like new, spare 4CX1000A \$1.075. Walz, W8LJP, 48116. Phone: 313-227-7338 or 455-3560 (12 '41 8 P.M.)

WANTED: 220 MHz transmitter. Contact Radio Officer, Albany County Office of Civil Defense, City Hall, Albany, NY 12207

AMERICAN Red Cross Emergency R.C. annual N.Y.C. Hamfest and auction Sat. noon, Talks on ATV, fm, and mobile, Guest speakers and manufacturers reps, \$2 registration. Flyer available, WB2QBP, 90-07 Merrick Blvd., Jamaica, NY 11432

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COLLEGE expenses, must sell: HW-100 plus HP-23-A power supply. \$250. Excellent condx, recently aligned at factory, J. Nelson, Box 88, Rexford, KS 67753

NOVICE-Technician! NC-155(80-6) receiver, HT-40(80-6) transmitter, Manual, speaker, extras — \$125 or best offer, Steve Fleetwood, WB4QIK, Norris, TN 37828

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GALAXY GT-550, AC-400 p.s., VOX, manuals, original cartons. \$400 or best offer. Will ship. Siefert, 4295 Waybourn Rd., Columbus, OH 43220, 614-451-3345

HAVE Hallcrafters FPM 200, Excellent condition. Best offer. Call 583-8337 or write: Mrs. H. A. Rensch, 2455 Key Largo Ln., W. Lauderdale, FL 33312

NOVICE receiver, Hallcrafters SX-130, sliderule dial, xtal filter, A-1 Dealers sell for \$149, my price \$119. Free shipping. Fitz, WA3QKD, Box 281, Laceyville, PA 16823

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5BK Delta Tri-bander, proven DX antenna, 2 element, 10-15-20 delta, w/acc 30 lbs. brochure \$43, \$25, Order Island Electronics, 4103 Ave. S, Galveston, TX 77550

DRAKE TR-3, AC-3, & DC-3 package price \$425. K4NUG, P.O. Box 156 Parkton, NC 28371. Tel: 919-858-3519

FOR SALE: Like new Yaesu PTDX 400 10-80 transceiver \$50 P.F.P. 30 hours use and new rotor VFO \$32.50 \$25.35 just back from factory \$110. WB6ZUD, 871-B Park Dr., Mt. View, CA 94040. Telephone: 9693297

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SWAN 500C. 117XC ac supply, 14C dc module, \$435. Will ship. WB4ISR, Bill Kitchin, 1487 Community Way, Louisville, KY 40222

SELL: DX 100 as is with manual \$50. Buyer pick up. Arthur Adams, K6CHP, 1010-W. 21 St., Merced, CA 95340. Ph: 722-9023

NOVICES: HW-16 \$75; DX-60A, HG-10, ant, relay, crystals \$90. Heath sb line, make offer. WB4EKI, 133 Laird Rd., Nashville, TN 37205

HALLICRAFTERS SK-111 receiver. Good condition \$100. Joshua Mermstein, WA2OHP, 29 Maple St., Brooklyn, NY 11225, (212)UL6-7782

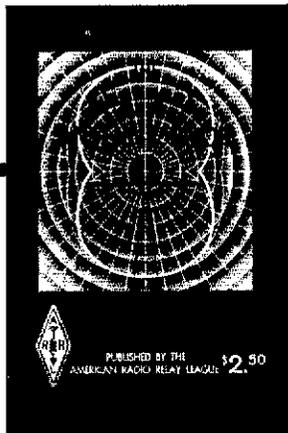
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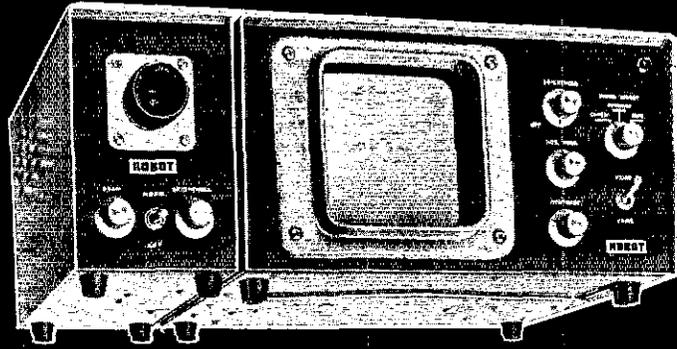
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W6CTH	K4HPR	W9JJL	W3LY	W2LC	
W1JKF	W6ZC	K3SLJ	WAØSMG	K6STI	
W8PEY	WØDO	UW6LC	W1PBT	W1VRN	
W2DD	W4LAS	VE6RM	K4UMD	ZS6NM	
K4RSH	W5TXX	K4TWJ	WA2MID	K1EYN	
SZØCG	YN3RBD	K4PRT	G3ZGO	W9DG	
W7ABW	W8SH	W8SM	WB2LFV	WA9JDM	
W5NOO	KH6BAS	VE3HC	WA0VZF	WB6OM	
W4JOS	ZL1AOY	HK7XI	ZLIDW	W4API	
WA7LQO	KL7FHN	W1VKF	WA7MPI	W8KB	
WA6RNG	W1SIP	EA4DT	WB6SMG	WA3K	
W4UMF	W3LXY	W7SEN	W6Z		
W1VRK	VE3BWA	W3KAU	W9M		
WA7MOV	KL7DRZ	KP4GN	G5Z		
PA0LAM	W4MS	W8YEK	K2		
WB6QWC	FG7XT	KH6DEH	W		



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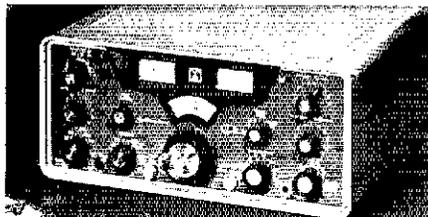
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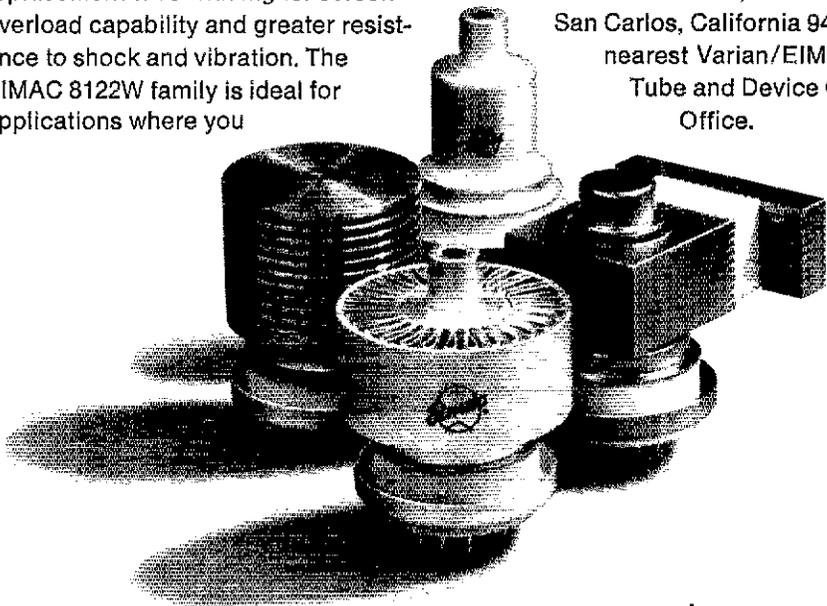
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