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amateur radio

November 1972
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OFFICIAL JOURNAL OF THE ARRL

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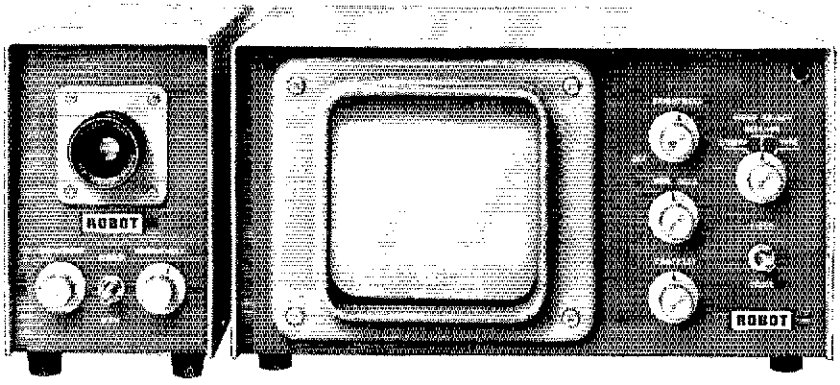

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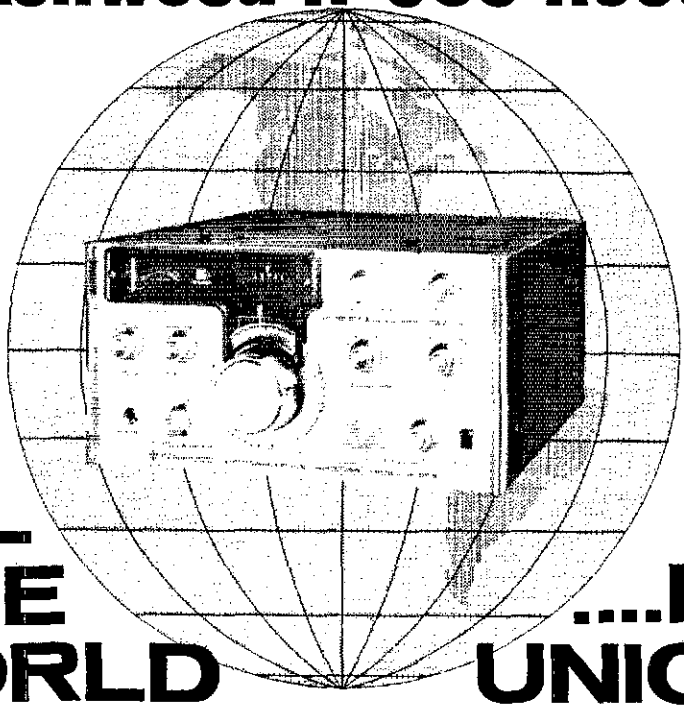

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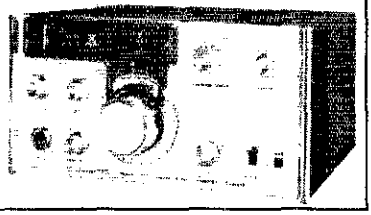

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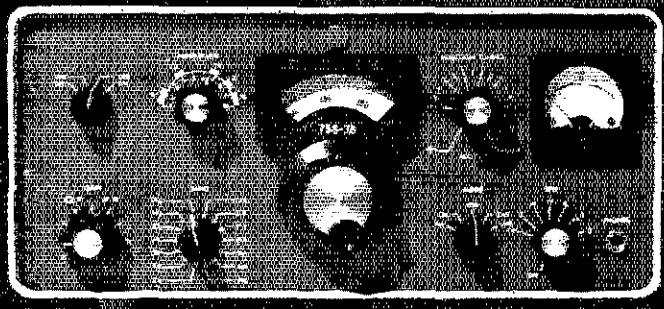

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QST — NOVEMBER 1972

VOLUME LVI NUMBER 11

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OUR COVER Installing the 20 meter beam at the W6VB/6 FD site. Complete FD results start on page 56.

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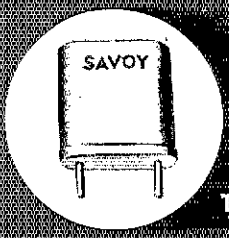

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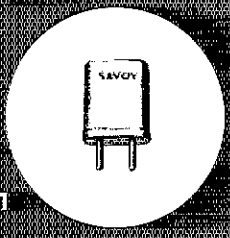

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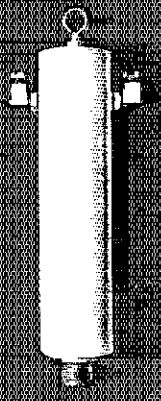

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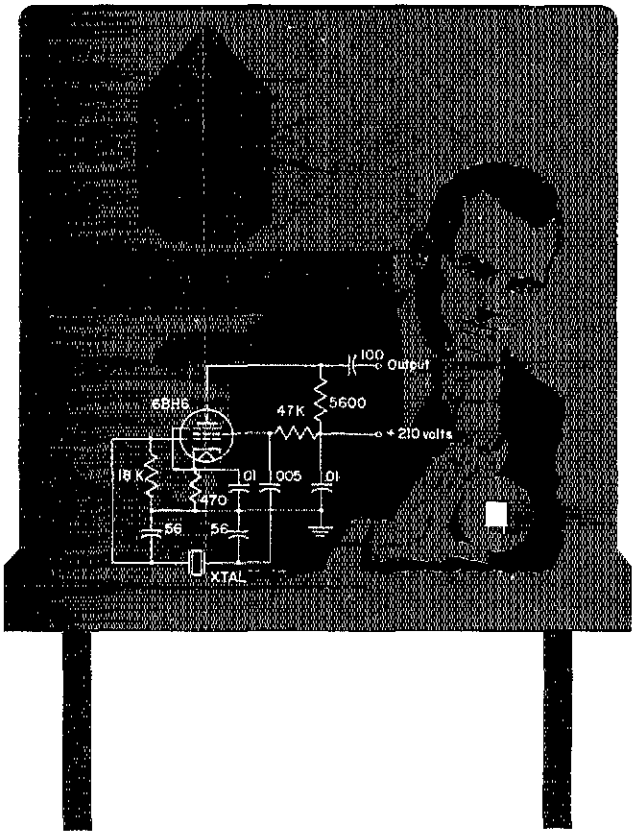

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It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors.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

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

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"It Seems to Us..."

FCC OUTPUT

THE PAST FEW WEEKS have seen public release of the greatest number of FCC actions affecting the amateur radio service of any similar period in our recollection. A mountainous accumulation of petitions for rule-making is being cut back – it's not quite to the molehill stage yet, but it is reaching a defensible level. Kudos to the staff for that.

However, no one expects the wisdom of Solomon, and by no means have all problems been solved. Many points are still basically controversial; were they not, the months and sometimes years of waiting for action would be totally unacceptable.

Of the major actions, the first of course was Docket 18803 – which must not be passed off quickly as "that repeater thing" by those having no interest in fm. It is a complex proceeding loaded with some new policies, procedures and philosophies applying to us all. Last month we rushed the text into print, with a hastily-written introduction containing some first-blush interpretations. Our early input, from members and League officials alike, indicates a broad support of the general principles enunciated in the new rules, and where there is disagreement – even substantial disagreement – it is with specifics.

In this issue are some typical questions and answers, aimed at clearing up additional sticky points. ARRL has already requested a partial stay of application of the new rules, or a clarification of the effective dates, to alleviate the burdens of re-crystalling and site analysis which otherwise may be required of many repeater operators in an unfairly-short time. We understand FCC staff has also given the point some study on its own. If any action results before last-minute deadline for "League Lines," we'll report it there (page 10).

FCC has also issued its decision in the matter of expansion of our voice bands, Docket 19162. With but a short time for evaluation prior to writing this, we've had little member reaction; but we can say for certain there is not much enthusiasm being expressed. Earlier discussions and grapevine reports seem to have prepared us for acceptance of no expansion above 14 MHz, as the Commission has indeed now decreed. But when one gets to specifics, the action rather difficult to understand is the minimal – almost ludicrous – 10 kHz expansion of General/Conditional Class voice privileges in the 75-meter band.

In our view there are two major factors here, each important but unfortunately in direct conflict. One is the desirability of promoting movement up the license-class ladder by intentionally making the General Class portions more crowded and thus less desirable, and consequently providing an incentive to upgrade. The other is the practical fact that 75 is our major field for voice nets handling traffic and preparing for emergencies. It is a keystone in the process of amateur fulfillment of our "basis and purpose" challenge to which the Commission commits us in Section 97.1 of the rules. It is the major argument in the League filing last year, which ended in a plea for 75 additional kHz for General/Conditional phones, as against the 25 kHz which FCC proposed – and the mere 10 which FCC actually adopted.

A careful examination of the Report and Order discloses not one word on this point; there is paragraph after paragraph defending the Commission's pullback from its initial proposals for phone expansion, but none whatsoever on the change of view toward *relative* space available to the various classes of license. We can only conclude that FCC considered the incentive licensing aspects to be more important.

Some amateurs have said that the League's request for more General/Conditional space at 75 was a retreat of our own from the principle of incentive licensing. We disagree. It does indeed show that where the two factors are in conflict, we place the amateur public-service capability above the furnishing of incentives in this portion of the spectrum. But this isn't a new idea – the League's original incentive proposals nearly ten years ago were for reactivation of the Advanced Class license and reinstatement of the "Class A phone bands," starting first with the 20-meter band, and later, 15 and 40. Only after some time – years – for evaluating the effectiveness of

(Continued on page 90)

Flash! Just at deadline, FCC issued a policy statement modifying compliance with the Report and Order, Docket 18803, especially as concerns existing repeaters and remotely controlled transmitters. Here's the text:

Applications filed after October 17, 1972 - All amateur applications filed on or after October 17, 1972, must comply with the new rules adopted in Docket No. 18803.

Existing stations - A station operating as a repeater station, and/or one authorized for remote control, whose license was granted as a result of an application filed prior to October 17, 1972, should comply with the new rules adopted in Docket 18803 to the extent possible after that date, but must fully comply by no later than June 30, 1973. Applications for such stations received prior to October 17, 1972, will only be granted authorization for operation through June 30, 1973. These stations and any other station whose license must be modified to comply with the new rules may file an application for modification for the balance of the original license term without payment of additional filing fees. If a renewal or additional privileges are requested, normal filing fees will be required. Applications for station license modification filed after April 30, 1973, may not be processed in time to permit continuity of operation.

Waivers - The granting of waiver requests except under the most exigent circumstances are not contemplated.

Intra-community - The Report and Order and the rules speak of limiting repeater station coverage to intra-community amateur radiocommunication. In consonance with the rules limiting to two the number of repeater stations operating in tandem, intra-community is considered the maximum area covered by such a network.

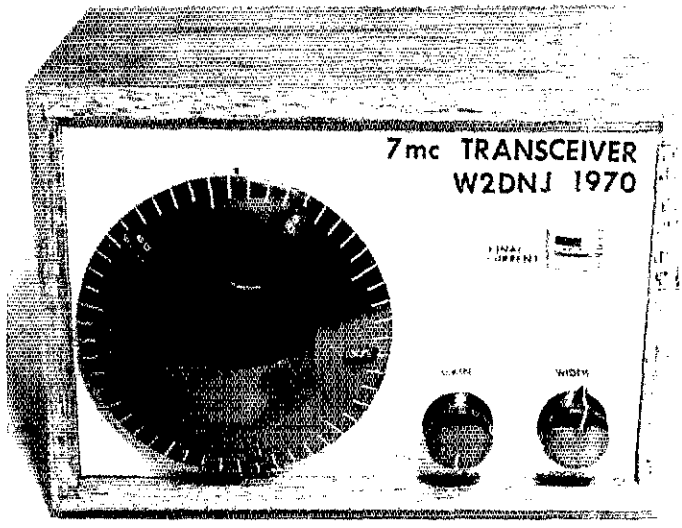
Call signs - Beginning October 17, 1972, a license issued for a repeater station will authorize a call sign having the prefix WR followed by the number of the applicable FCC district. The suffix will be three letters assigned systematically starting with AAA.

Another last-minute item: the Commission has adopted a Report and Order in Docket 19245, the "Eyebank Matter." It presents, for the first time in any official document, definitions of third-party traffic and of emergency communication. It deletes the words, "nor for its use," from Section 97.39 which prohibits the licensing of schools, companies, etc. It contains a strong new section governing third-party traffic, including the prohibition of "Third party traffic involving material compensation, either tangible or intangible, direct or indirect, to a third party, a station licensee, a control operator, or any other person"! And there is another new section prohibiting radiocommunications in connection with any activity which is contrary to Federal, State or local law. These changes become effective December 1. We'll have the text next month.

There is also a Notice of Proposed Rulemaking, concerning possible limited compensation for amateur club station control operators and possible relaxation of the logging requirement for third-party communications. The new Section 97.114 (b), particularly, would appear to prohibit the use of paid people at stations like W1AW. Accordingly, FCC has issued a waiver and requested comment by December 20 on proposed new rules to clarify the situation more permanently. Again, full text in the next issue.

And say, if any of these new rules of the past two months turn you off, write to your director, whose name and address is on page 8.

Some Tips on Successful QRP Operation



BY ROBERT B. STECKER,* W2DNJ

HAM RADIO IS different things to different people. I have been an enthusiast of low power over the years and to me it is much like fly fishing with a delicate rod and light line. Making an unexpected "catch" of a rare one is one of the great thrills of our hobby.

Surprisingly long distances can be covered regularly with a watt or two and a simple antenna. Successful QRP operation, however, requires attention to many details. Here are some items I have found to be very important:

1) An elaborate antenna system isn't necessary, but your antenna should be resonant at your operating frequency. Also, you should use a full-size (half wave) antenna if you can. As someone very wisely said: There is no substitute for a full-size antenna.

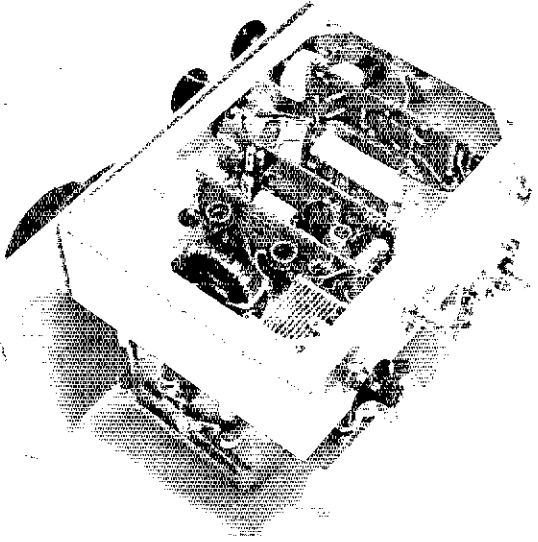
2) It is essential that the antenna be reasonably well matched to the feed line. Matching adjustments are important. My one-watt QRP rig gives away 20 dB to a 100-watt station, therefore I can't afford to lose any efficiency. The antenna is a quarter wavelength above the ground and the feed line runs away perpendicular from the antenna to minimize unbalanced currents. The SWR at 7050 kHz is 1.05 to 1.

3) My experience indicates that a VFO is a necessity for QRP work. You must look for stations; they seldom come looking for you. This means you must be able to operate on the other fellow's frequency. Crystal control is too confining to be effective.

4) Resist the temptation to over miniaturize low-power transistorized circuits. You need the best layout and construction. Squeezing equipment into too small a space can cause instability. In attempting to make circuits small, it is very easy to rationalize the elimination of "unnecessary"

* 400 Hamilton Ave., White Plains, NY 10602.

QRP operating is becoming very popular among amateurs who operate the hf and vhf bands. By present-day standards, low power can mean anything from 100 watts to less than a watt, depending on one's point of view. The operational techniques employed vary with the amount of power developed by the QRP transmitter. No one would question the fact that the lower the power output, the greater the care that must be given to station and antenna details. When running only a watt (or less), the amateur had better not overlook *any of these details or he is likely to spend many lonely hours pounding brass or speaking into his microphone without meaningful results. The fun and pleasure derived from QRP type operating comes from making contacts (and finishing them) successfully. Presented here is a list of items the author considers "essential" for enjoyable operating. While most of these hints fall in the "opinion" category, it is difficult to argue with success. The author has an impressive log! If you have tried QRP and* didn't *like it, perhaps you've overlooked something.*



Bottom view of the QRP transmitter used by the author to make contacts in 18 states over a six month period.

components (like a Zener diode) which stabilize the oscillator supply voltage.

5) Correctly shaped keying is a real asset in QRP work. An S4 or S5 signal that is crisp and clean can cut through QRM when mushy, poorly shaped signals of greater strength are unreadable. Shaping networks are among the "unnecessary" components that are sometimes omitted from low-power equipment to save space!

6) It is important to send at a comfortable speed and to form letters and words well. Remember, when you are using low power, the other fellow may be working hard to pull you through. Make it as easy as you can for him.

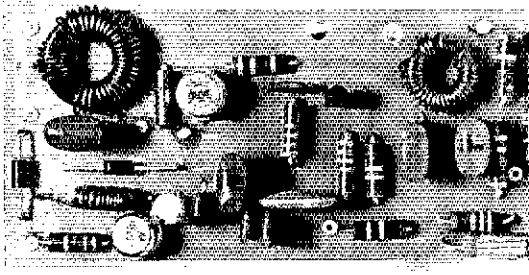
7) Pick your operating frequency carefully. The crowded band conditions of early evening on 40 meters are usually not for me. QRP is better in the early morning when there isn't much competition. Do a lot of listening and almost never call CQ. The best success comes from tuning up and down the band, answering strong signals that are relatively free from QRM.

8) A stable receiver is important. Things like a smooth dial mechanism, free from backlash, low noise, and excellent selectivity are valuable when working QRP. When you succeed in making a contact, you don't want to lose the QSO because of a deficiency in your receiver.

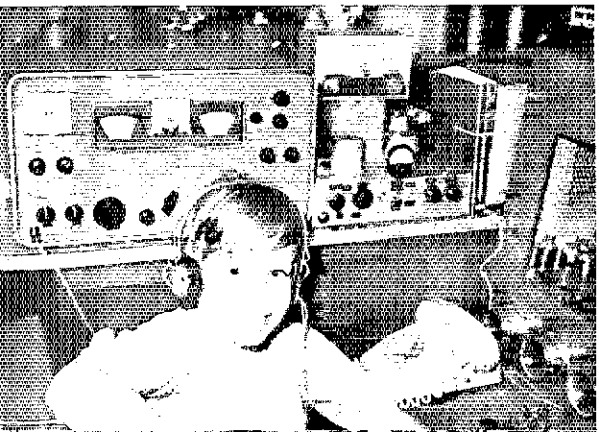
9) I have found batteries a very satisfactory power source for QRP work. My present rig[1] is a fully transistorized transceiver. The receiver section, including the VFO is powered by a single 9-volt transistor radio battery which requires replacement after about three months of regular daily operation. The transmitter section, with an input to the final amplifier of just under one watt, uses two six-volt lantern cells. These have been in service for six months and show no signs of needing replacement.

During one half year of operation my "one watter" has produced contacts in eighteen states ranging up and down the east coast from Florida to New Hampshire and as far west as Kentucky and Wisconsin. Well over half of all signal reports were S7 or better. I have enjoyed QRP operating so much that the old reliable 100-watt rig is on the shelf gathering dust, and from all indications it may stay there a long time. QST

[1] The receiver circuit is similar to the Hayward-Bingham design as shown in *QST* for November, 1968. The transmitter was described in August, 1970, *QST*.



A "clean" layout is one of the necessary measures to assure stability.



Strays

Can Novices work DX? WN4ZXU would certainly say so — at the age of nine, he has already worked "across the pond." Jerryl gets plenty of support from his dad WB4JGZ, who is president of the Forsyth ARC of Winston-Salem, N. C.

QST for

Antenna Traps of Spiral Delay Line

BY WILLIAM J. LATTIN,* W4JRW

MOST "TRAPS" USED in amateur radio multiband antennas are made of lumped inductance and capacitance in parallel. These consist of inductors made of coil stock of No. 12 or No. 14 wire and ceramic capacitors having voltage ratings up to 15,000 volts dc, which are relatively expensive. Vacuum capacitors would be the best, of course, but are also rather expensive.

Another type of trap has a capacitor made of two pieces of aluminum tubing arranged with a small-diameter tube inside a larger tube. Some have polystyrene dielectric, others air dielectric. The ARRL *Handbook* has a very complete description of these types.

Quarter-wave stubs of transmission line can be used for isolating sections of an antenna.[1] Loading coils can be used to modify the harmonic responses of a doublet to the second, third, fifth, seventh, and so on, to obtain a multiband antenna.[2] However, the use of loading coils is quite complicated if more than two bands of frequencies are desired. Traps tuned to the desired resonant frequencies make it much easier to adjust the lengths of the antenna sections, and also to obtain closer spacing between bands than can be obtained with loading coils.

Since quarter-wave sections of transmission line can be used as decoupling stubs for isolation of sections of an antenna, the idea occurred that perhaps quarter-wave sections of spiral delay line (SDL) might be used to make a very simple trap, without lumped capacitance. Spiral delay line is coaxial line with a helical inner conductor.

Construction of SDL Traps

Fig. 1 shows the coil which is the helical inner conductor of the spiral delay line, along with the polystyrene tubing and end pieces for the coil, and the aluminum tube. The completed assembly is shown in the title photograph and Fig. 2.

For a 28.5-MHz trap, a coil of No. 12 magnet wire was wound on a 1/2-inch rod, 37 turns, close wound. The coil was removed from the 1/2-inch rod and it sprang out to about 3/4-inch OD. The coil was 3-1/4 inches long. Enough wire was used to allow end wires straightened out to be 2 inches long on each end of the coil. Two pieces of 3/4-inch OD polystyrene rod cut 1/2-inch thick were drilled in the center to fit over the No. 12 wire ends and one was slipped over each end of the coil. This coil was placed inside a piece of 1-inch OD X 3/4-inch ID polystyrene tube 4-1/4-inches

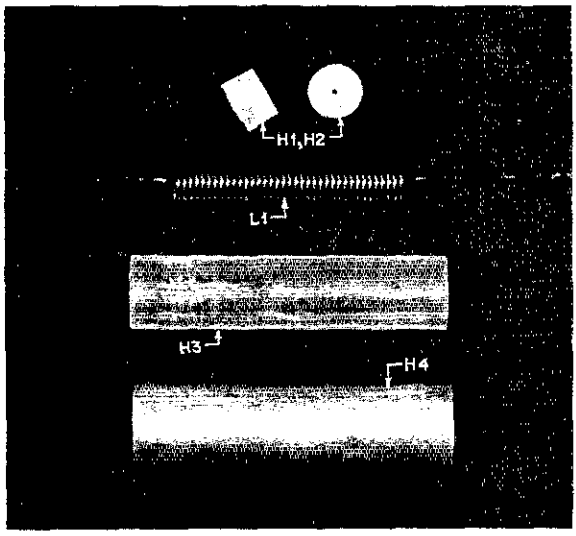


Fig. 1 — The parts used in the make-up of a W4JRW SDL trap.

H1, H2 — End pieces of 1/2-inch length of 3/4-inch OD polystyrene rod with center hole for No. 12 wire.

H3 — 1-inch OD X 3/4-inch ID polystyrene tube, length one inch greater than that of coil turns of L1.

H4 — 1-1/8-inch OD X 1-inch ID aluminum tube, length equal to that of H3.

L1 — Close-wound coil of No. 12 enam. or magnet wire, 3/4-inch OD to fit inside H3. See Fig. 3 and text for turns information.

* 1806 Littlewood Dr., Owensboro, KY 42301.

[1] Lattin, "Multiband Antennas Using Decoupling Stubs," *QST*, December, 1960, p. 23.

[2] Lattin, "Multiband Antennas Using Loading Coils," *QST*, April, 1961, p. 43.

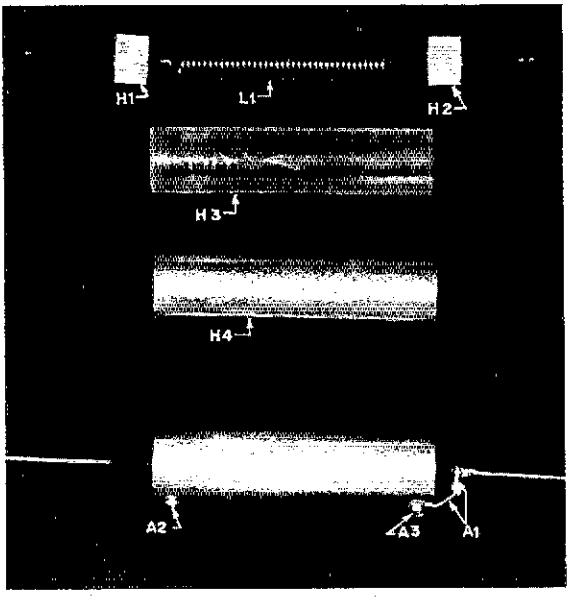


Fig. 2 — Assembly of the SDL traps. See Fig. 1 and text for identification of parts not listed below.
A1 — Solder lug and short length of wire assembled and soldered to short one end of H4 to one end of L1.
A2, A3 — See text. The screw at A2 must not contact the wire of L1.

long, and a piece of 1-1/8-inch OD x 1-inch x 4-1/4-inch long aluminum tube slipped over this. The assembly was held together with No. 6-32 x 5/16-inch screws in holes drilled and tapped just far enough into the polystyrene end pieces to hold the screws in place. The short for this quarter-wave section of spiral delay line was made with a solder lug under one screw with a wire soldered between it and one end of the coil, as shown in the photographs.

The curve in the graph, Fig. 3, shows the number of turns of No. 12 wire required for quarter-wave sections of the above construction. A close-wound coil of No. 12 magnet wire has approximately 12 turns per inch. The length of the assembly for a particular frequency can be determined approximately by dividing the number of turns on the coil by 12 to get the length in inches.

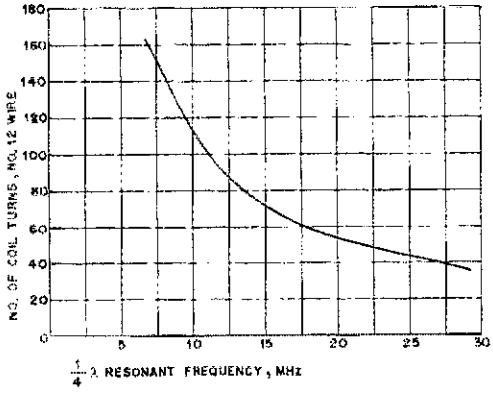


Fig. 3 — Resonant frequency of spiral-delay-line trap versus number of turns in coil.

The traps were adjusted to frequency through the use of a grid-dip meter (checked on a receiver for accuracy of each frequency). The coil can be changed quite easily to the desired frequency by trimming turns if an extra turn or two is put on for this purpose. The coil can also be wound with spacing between turns and compressed or expanded to get the trap exactly on frequency.

After the assembly is completed and tuned to frequency, the coil can be sealed in the polystyrene tube with polystyrene cement or coil dope. An inert gas could be sealed inside quite easily, but there seems to be no particular advantage to this.

Trap Ratings and Performance

The thickness of the polystyrene tube used was 1/8 or 0.125 inch. The average voltage rating for polystyrene is given in various handbooks as 500 volts per mil (.001 inch). This would be 62,500 volts for the thickness of 1/8 inch. The maximum power rating of these traps has not been determined. They have been used with a 2-kW PEP ssb transmitter without any failures from either voltage breakdown or heating. Larger wire, polystyrene tubing, and aluminum tubing can be used, of course, but the curve of Fig. 3 will be different. Formulas for characteristics of spiral delay lines can be found in radio handbooks and text books in which this type of line is described.

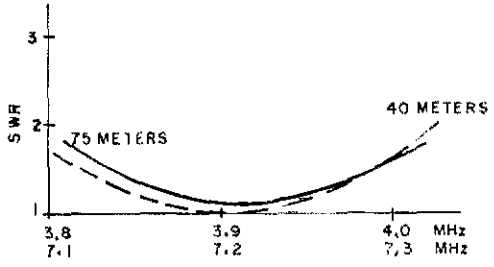
The resonant impedance of the traps was measured and found to be approximately 100,000 ohms. For comparison, a trap made of No. 12 wire and a ceramic capacitor gave about the same resonant impedance. Several lumped-constant 15-meter traps borrowed from triband beams were measured and values from 16,000 to 28,000 ohms were found!

The SDL traps can be used in beam antennas, of course, with suitable mechanical modifications to fit the aluminum tube used in the beam. Spiral delay line can be used for other purposes, such as matching transformers, phasing, and any place where coax line is used but short dimensions are needed. The Zo (characteristic impedance) is a function of wire size, diameter, and spacing of the helical coil, dimensions of the insulator and external aluminum tube. Measurement with an rf bridge indicated a Zo of about 250 ohms for the construction used in these traps.

Figs. 4 and 5 give the dimensions of two doublet antennas experimented with here. The antenna of Fig. 4 has two 7.2-MHz traps and resonates at 3.9 and 7.2 MHz. The antenna of Fig. 5 has eight traps, two each for 10 meters, 15 meters, 20 meters, and 40 meters. Resonances are

(A)

Fig. 4 — At A, dimensions for a 2-band spiral-delay-line antenna, resonant at 3.9 and 7.2 MHz (not drawn to scale). At B, the measured SWR values with this antenna.



(B)

at 3.9, 7.2, 14.3, 21.3, and 28.6 MHz. The flat-top portions were made of No. 12 solid copper wire. The feeder used was RG-8/U. No balun was used in our experiments. It was found that if a trap was not tuned exactly to frequency, it could still be used by changing the wire lengths in the antenna adjacent to the trap to get the desired antenna resonance. An antenna shortened and using traps is sharper in resonance than a full-length doublet. This is generally very well known, but perhaps bears repetition.

SWR curves are also shown in Figs. 4 and 5 for these two antennas. During measurements, the antennas were supported in the center about 30 feet high and were 20 feet high at the ends. Measurements were made at the transmitter with 100 feet of RG-8/U coax between the transmitter and the antenna.

It is advisable to support doublet antennas at the center as well as at the ends, with strain relief at the ends — a simple arrangement of a screw eye, plastic rope, and a sash weight or a brick will do.[3] Since RG-8/U coax is fairly heavy, the center support is helpful to reduce the strain on the antenna. The breaking load of No. 12 copper wire is given in handbooks as 197.5 pounds for soft or annealed wire and 261.6 pounds for medium hard-drawn wire. In a high wind any type of support such as trees, towers, push-up masts, and so on, may move a few inches, putting thousands of pounds of tension on a wire stretched between them. Is there any ham who hasn't broken a wire antenna stretched between two trees when no strain reliefs were used?

One spiral-delay-line trap was tested with a hoist and concrete blocks for weight and didn't break at 200 pounds. As the No. 12 wire used in the antenna was softer than the No. 12 magnet wires in the SDL traps, it appeared that the antenna wire would probably stretch before the wire in the traps. We have had the antenna up for almost two years, supported by three large trees, with strain reliefs at the ends. The antenna was not damaged at all by an 85-mph wind during a storm which bent the top section of our guyed crank-up tower into an inverted U shape with the triband beam hanging down. We did have one ice storm, but it wasn't severe enough to lift the strain-relief weights at the ends of the antenna.

If one desires, he can make the traps stronger by using two screws 180 degrees apart at each end, or even three screws at 120-degree spacing. Also the ends could be made of copper-weld wire soldered to the inner coil. The materials are not difficult to obtain. Most cities now have plastic supply distributors, and also aluminum tubing suppliers. The magnet wire can be obtained at a motor repair shop or from an electrical supply distributor. QST

[3] [EDITOR'S NOTE: To reduce wear and eventual breaking of the plastic-rope halyard, a pulley should also be used; large-diameter types sold in hardware stores as clothesline pulleys are economical and quite satisfactory.]

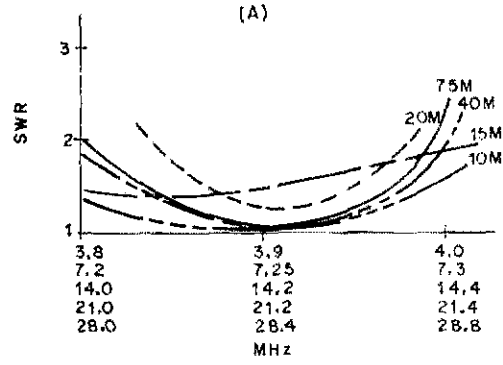
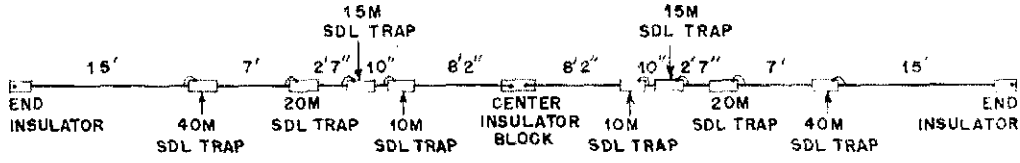
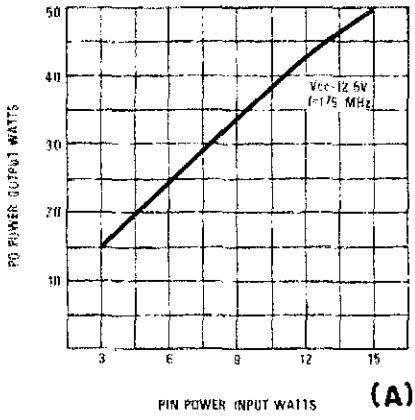


Fig. 5 — At A, the measured SWR values for a 5-band SDL antenna and at B the dimensions for this antenna.

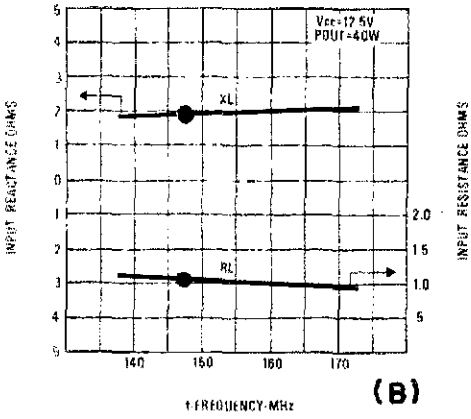


(B)

POWER OUTPUT VERSUS POWER INPUT



INPUT REACTANCE & RESISTANCE VERSUS FREQUENCY



LOAD IMPEDANCE VERSUS FREQUENCY

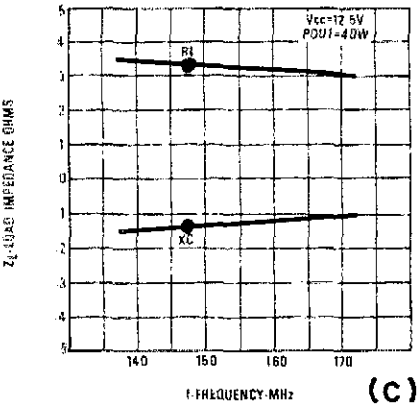


Fig. 14 — (A) Power, (B) input-impedance and (C) output-impedance characteristics of the CTC B40-12.

The best way to demonstrate the fundamentals of solid-state power amplifier design, as discussed in Part I, QST for September 1972, is with a practical example. A single-stage 40-watt 2-meter amplifier is the choice for Part II. This amplifier uses many of the techniques presented in Part I and illustrates some interesting variations.

Fundamentals of Solid-State Power-Amplifier Design

Part II

BY J. H. JOHNSON,* Ex K4WYQ,
AND R. ARTIGO,* W6GFS

THE FIRST STEP in designing an rf power amplifier is a careful analysis of design objectives. These objectives will ultimately define the characteristics of the transistor that is selected. The authors' list of objectives for a 40-watt 2-meter power amplifier is as follows:

1) The amplifier must have a minimum output of 40 watts when driven by 10 watts and operated from a 12.6-volt dc supply.

2) The amplifier must be capable of operating into an open or short circuit without damage to the transistor.

3) The design must be simple to construct and easy to put into operation.

4) All objectives listed above must be met using an economical transistor.

Selecting The Proper Transistor

There are a number of rf power transistors available that can be used. For this design the authors selected a B40-12 manufactured by Communications Transistor Corp. The charts of Fig. 14

* Communications Transistor Corp., 301 Industrial Way, San Carlos, CA 94070.

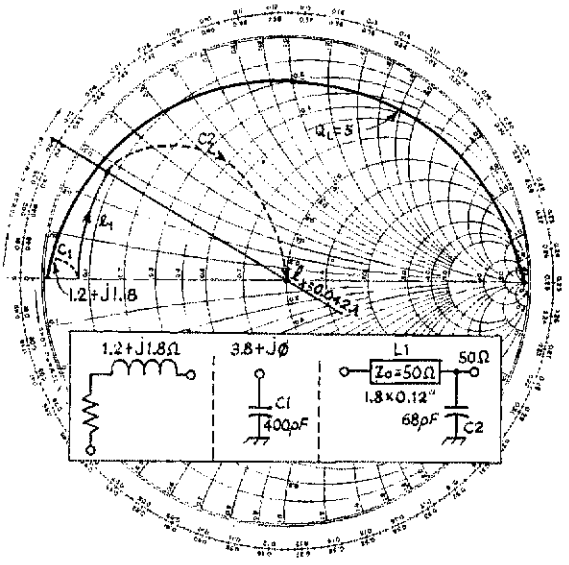


Fig. 15 — Smith-chart design of the input circuit.

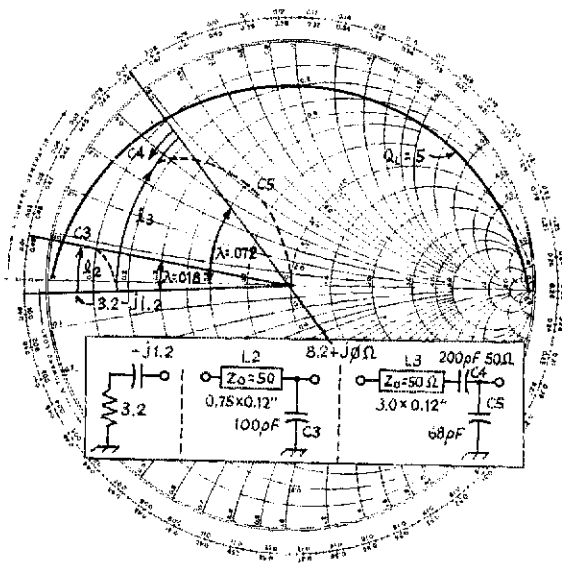


Fig. 16 — Output-circuit design shown on a Smith chart.

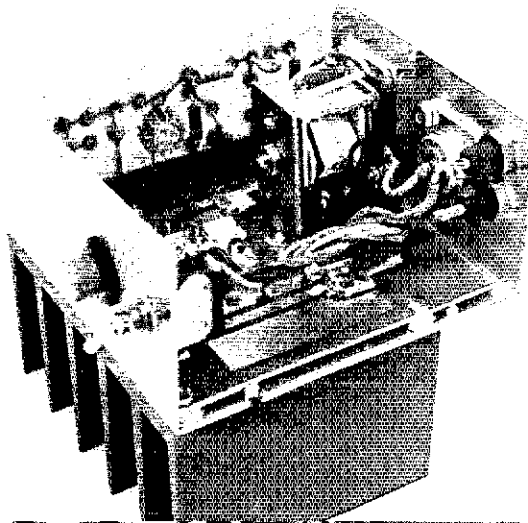
show a number of important characteristics of the B40-12. The transistor has an excellent thermal-resistance rating. Special attention must be given to the thermal resistance of a power amplifier because this specification indicates the limit for power output and determines the size of the heat sink that will be needed.

Other B40-12 parameters of immediate interest are the input and load impedances which will be used as the basis for network design; they are obtained from the impedance curves of Fig. 14. It should be noted that the load impedance specified is for maximum gain. To optimize efficiency, we would have to design for a higher load impedance. From the power-gain-versus-frequency curve, Fig. 19, we see that at 147 MHz the output power will be approximately 45 watts (6.8 dB gain) with 10 watts of drive.

Designing The Amplifier

As outlined in Part I, the first task is to design the input-matching circuits. For a 40-watt-output power level we could employ a circuit similar to the one shown in the manufacturer's data sheet, using five trimmer capacitors. Such a circuit will work well up to approximately 50 watts output. However, as the power output goes up, impedances go down, and circuit components can become very lossy because of high circulation currents. In order to demonstrate techniques required for higher power, the design approach described in Part I will be used. This technique lends itself to high or low power, as well as broadband designs, by using lumped-element and distributed-element low-Q matching networks.

The distributed inductance element takes the form of a microstrip line which can be easily calculated, and the calculated value is dependable. The capacitance value can also be easily calculated; however, it may not be as dependable. The capacitance value is not accurate at high frequencies because of lead inductance. For low-impedance points in the circuit, only quality capacitors with minimum lead inductance can be used, and they should be strip-line compatible. Input and output matching networks for the 40-watt amplifier are designed using a Smith chart. Two charts are required, one impedance chart for series ele-



Bottom view of the amplifier housed in a 4 × 4 × 2-inch cabinet (LMB 143). Layout of components follows Fig. 18. A pilot lamp and metering jacks have been added to this version.

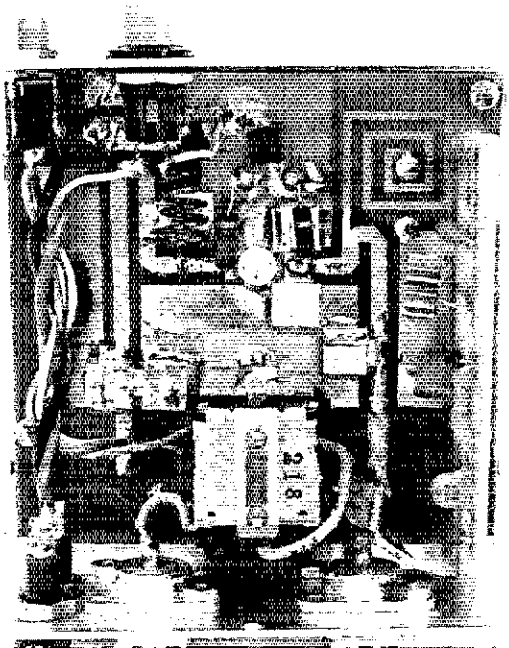
Table I -- Strip-line Width for Glass and Teflon Pc Board

Strip Line Impedance	*Epoxy Glass .060 in. thick*	*Teflon Glass .060 in. thick*	*Teflon Glass .030 in. thick*
10 ohms	1.0	1.337	0.61
15 ohms	0.6	0.850	0.385
20 ohms	0.4	0.609	0.277
25 ohms	0.3	0.466	0.211
30 ohms	0.24	0.371	0.168
40 ohms	0.15	0.253	0.115
50 ohms	0.125	0.172	.078

Table II -- Useful Strip-line Lengths

50 MHz	*Epoxy Glass e=4.8*	*Teflon Glass e=2.55*
λ	108 in.	148 in.
λ/4	27 in.	37 in.
λ/8	13.5 in.	18.5 in.
148 MHz		
λ	37.5 in.	50 in.
λ/4	9.4 in.	12.5 in.
λ/8	4.7 in.	6.25 in.
220 MHz		
λ	24 in.	32.9 in.
λ/4	6 in.	8.2 in.
λ/8	3 in.	4.1 in.
432 MHz		
λ	12.5 in.	16.5 in.
λ/4	3.12 in.	4.12 in.
λ/8	1.56 in.	2.06 in.

Note: e = dielectric constant



The rf-driven antenna-switching relay is constructed on the small pc board which is mounted vertically. The board is submounted using two washers on each mounting screw to assure no downward pressure is applied to the stud of the power transistor. See Part I of this article for complete details about mounting of transistors.

ments and one admittance chart for shunt elements. These charts are available from most college or technical book stores.

Input Circuit

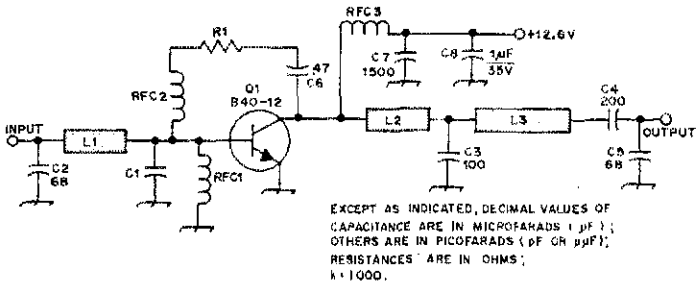
Part I described the importance of selecting the proper circuit Q. For this design example, we will use a Q of 5. Other important considerations are discussed in Part I and should be reviewed to aid in understanding this design.

We start our design by referring to Fig. 15 to obtain the input impedance. The input impedance at 147 MHz is shown as $1.2 + j1.8$ ohms. Since the device impedances are specified in the series form, we can locate this point on the impedance chart directly without additional calculations. We should then rough in a constant-Q line as shown.

Start the input-circuit design by adding a shunt capacitor connected from base to emitter of the transistor to tune out the base-lead inductive reactance of $+j1.8$ ohms. To obtain the value of this capacitor -- and the resultant real value -- it is necessary to use an admittance overlay chart. Dotted lines are drawn on the impedance chart to show the overlay admittance lines used. Then determine whether or not 50 ohms (the input impedance) can be reached in one step by drawing a constant-resistance line from 3.8 ohms to the intersection of $Q = 5$ and a similar line from 50 ohms on the admittance overlay. If the two lines intersect within the area limited by $Q = 5$, the impedance transformation is possible in only one step.

The next step is to determine the length and width of L1, the strip-line inductor for the input circuit. To accomplish this we must first decide on the type and thickness of pc board to be used. Since the most common pc board for rf use is G-10 glass-filled epoxy having a thickness (w) of .062 inch, we will use it. In this design we will use only

Fig. 17 — Diagram of the amplifier. Except as otherwise noted, capacitors are disk ceramic and the resistor is 1/2-watt composition. Components not listed below are marked for circuit-board location purposes.



C1 — 2 Underwood 200-pF mica capacitors connected as shown in Fig. 5 (Underwood Electric, 148 S. 8th Ave, Maywood, IL 60153; order type J101 and specify values desired for C1 through C5).
C2-C5, incl. — Underwood J101 mica.
L1-L3, incl. — See Figs. 15, 16, and 18.
Q1 — CTC power transistor fitted with Thermalloy 6151B heatsink.
RFC1 — Etched on pc board; see Fig. 5.
RFC2 — 0.33-μH molded rf choke (Nytronics SWD0.33).
RFC3 — 6 turns No. 18 enam. wire, 1/4-inch ID, 1 inch long.

strip lines with a characteristic impedance of 50 ohms. From Table I we find that a 50-ohm strip line on glass-epoxy board is approximately 0.125 inch wide. We next refer to Table II for the dimensions of one wavelength corrected for dielectric constant (e) of 4.8. The length of L1 is:

$$37.5 \times 0.042 = 1.58 \text{ inches}$$

The value of all shunt capacitors is rounded off to the nearest standard value available. Lengths of L1 and L2 are not particularly critical.

Output Circuit

From the load-impedance chart in Fig. 14 we see that the optimum load for best power gain is $3.2 - j\,1.2$. From this starting point, the complete output circuit design is given in Fig. 16. All component values were derived using the same procedure as given above for the input circuit. C4 (Fig. 17) is used for dc blocking and is designed into the output network. Notice that the value of C4 is obtained from the impedance chart since it is a series element.

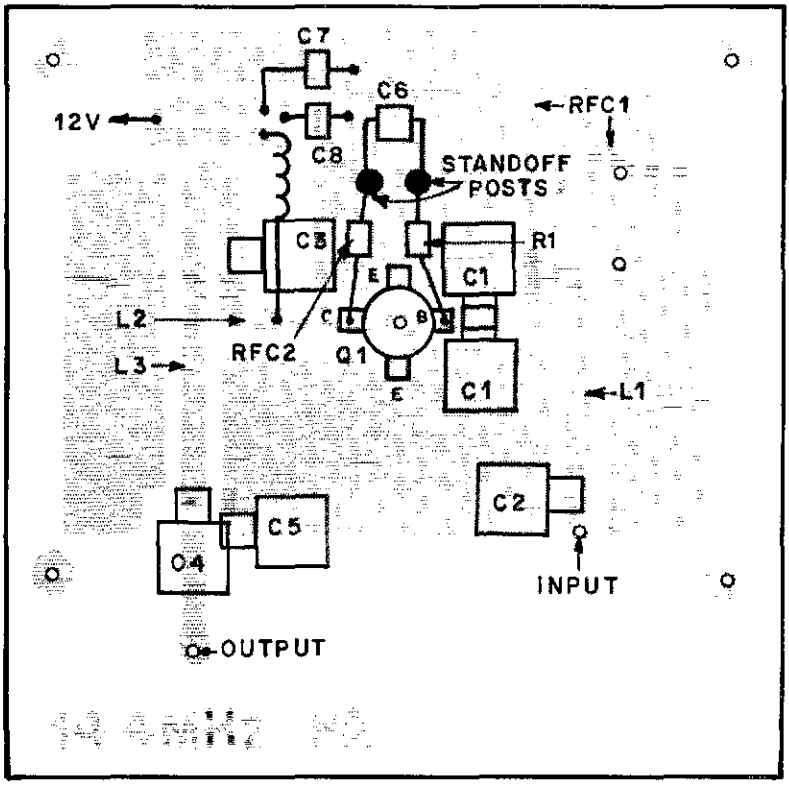


Fig. 18 — Full-scale pc-board foil pattern and parts-layout diagram (top view) for the amplifier. The bottom side of the pc board is a continuous copper plane which has not been etched.

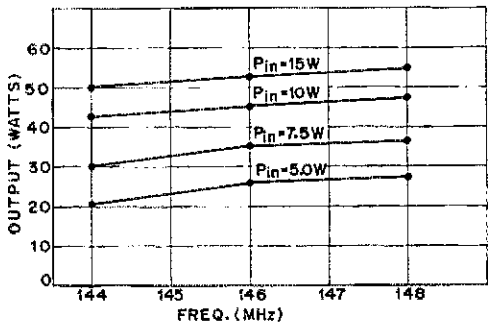


Fig. 19 — Test results of the B40-12 amplifier.

Circuit Layout

Fig. 18 shows the pc-board layout and component placement. Placement of shunt capacitors has been varied to optimize performance. Capacitor C3 is the most sensitive as to position and variation of 1/8 inch either side will change the output power by 10 percent. Special attention should be given to shunt capacitor C1. It consists of two 200-pF capacitors mounted close to the transistor case as shown in Fig. 18. Optimum performance can be achieved only if the recommended shunt capacitors are used. RFC1 is etched on the pc board.

To evaluate the design the amplifier was tested without accessories attached. When power was first applied, the output level was 38 watts with 10 watts of drive. The output power was raised to 45 watts when the proper location for C3 was determined. The amplifier is very stable for drive levels from 0 to 15 watts and supply voltages from 8 to 15. Harmonic attenuation measured:

2nd	-37 dB
3rd	-40 dB
4th	-45 dB

Fig. 19 shows output-power performance of the amplifier for a wide range of drive power.

Final Circuit

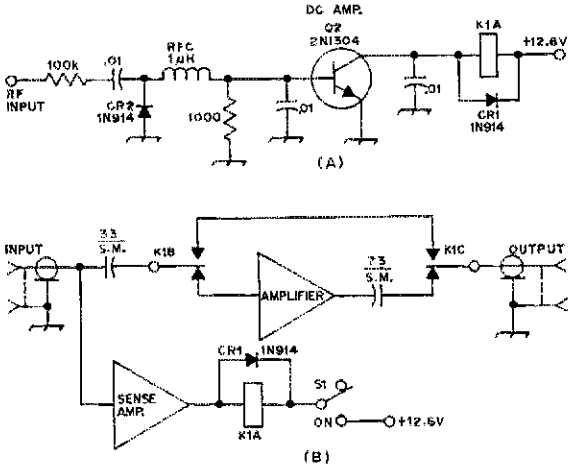
The amplifier must key on automatically when in use. The simple rf-powered relay circuit shown in Fig. 20 is used. This circuit was constructed from junk-box parts and was found to work satisfactorily. Another circuit which was described recently in *QST*[5] will work equally as well. Other features such as an indicator lamp or relative rf output indicator can be used if desired.

When using an open-frame relay for switching the rf amplifier in and out of the circuit, any mismatch introduced by the relay must be eliminated. K1 was modified in a manner similar to that shown in the article by K7QWR (see footnote 5). In addition, two series-connected capacitors were used to tune out reactance introduced by the relay. This is required since the amplifier is fixed tuned and thus has no adjustments to compensate for the relay inductance.

The amplifier was evaluated with a Swan FM-2X and a Standard SR-C826M. Most imported transceivers have VSWR protection circuits which are adjusted to be sensitive to any mismatch to protect the output transistor. Do not attempt to abort or modify a protection circuit.

A number of amplifiers were built using the circuit of Fig. 18, indicating the unit is reproduceable. It is the author's hope that this introduction to microstrip-line power circuit design will stimulate further investigations by amateurs. To encourage work with rf power transistors, the Underwood capacitors, pc boards, transistor, and complete kits, for the 40-watt amplifier are available from Power Kits, P.O. Box 693, Cupertino, CA 95014. The price, $47.50, also includes a heat sink and a predrilled chassis. QST

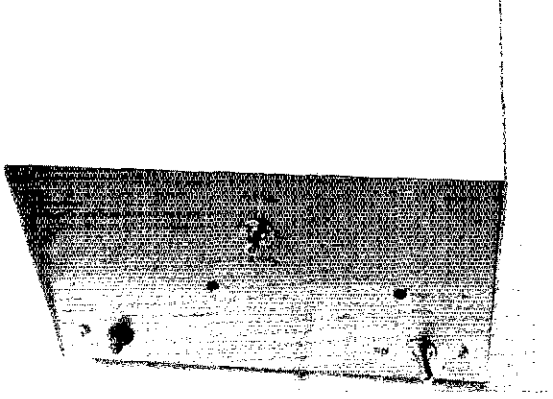
[5]Hejhall, "Some 2-Meter Solid-State rf Power Amplifier Circuits," May, 1972, *QST*.



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

Fig. 20 — Diagram of the rf-powered switching circuit. Resistors are 1/2-watt composition and capacitors are disk ceramic, except where noted otherwise.
CR1, CR2 — High-speed silicon switching diode, 1N914 or equiv.
K1 — 4pdt relay, 10-A contacts, 12-V coil, modified per instructions in *QST* for May 1972, pg. 45.
RFC1 — Miniature rf choke.
S1 — Spst toggle.

The FVGT Box



Employing the Fast VanGeen Transform in an Audio "Spectrum Analyzer"

BY HANK OLSON,* W6GXN, and JOHN VAN GEEN*

IN THE RECEPTION of radioteletype, one of the most important adjustments is the tuning of the receiver to produce the required audio frequencies to drive the demodulator or terminal unit (TU). If, for instance, we are tuning our receiver to print from a transmission utilizing the standard 850-Hz shift, we want the two tones to come out at 2125 and 2975 Hz. Of great value would be an audio Panoramic† analyzer that displayed the audio spectrum coming out of the receiver, say from 100 Hz to 5 kHz. Although Panoramic analyzer or Panadaptor† are the names that most hams use, such devices are actually best called spectrum analyzers.

Spectrum analyzers can be built in a number of ways, but usually they end up deriving their selectivity with one or more sharp band-pass filters of the crystal or mechanical type. There is, however, a more modern technique for spectrum analysis called the fast Fourier transform (FFT) which has become practical with the availability of the digital computer. The FFT technique involves running the signal to be analyzed through an analog-to-digital converter, and then programming a computer to take the Fourier transform of pieces (samples) of the signal. The Fourier transform of a wave form (amplitude vs. time) is, as students of higher mathematics all know, its spectrum (amplitude vs. frequency).

Using the FFT is quite a large order for the average ham because he must either build or buy a computer and considerable peripheral equipment. However, it *is* possible to make a simpler type of transform system that is adequate for RTTY, since *only one tone* is present at a time. The fast VanGeen transform (FVGT)borrows its name from the FFT, but is vastly easier to build and understand.

Consider that we are receiving a series of sinusoidal tones (audio) and wish to display them as a spectrum on a scope. There is no problem with regard to the amplitude, since both the time-varying and the spectrum displays use the Y (vertical) axis for amplitude. If we rectify the audio and apply it to the Y input (with no horizontal deflection or sweep) we will see a vertical line whose height above the base line varies as the signal amplitude. Now all we have to do to get a spectral display is to get the horizontal deflection to vary as the frequency. This will prove to be somewhat involved.

First, let us consider a 1000-Hz signal, as represented in Fig. 1. If we can build a "positive-going zero-crossing detector" that will start a ramp (sawtooth wave) and reset it to zero on the next positive-going zero-crossing of the sine wave, we

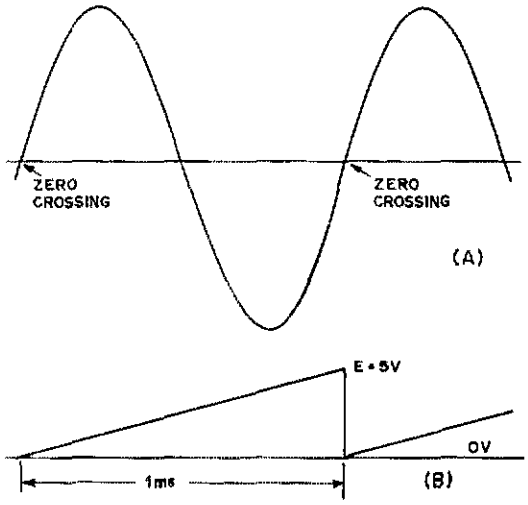


Fig. 1 – The concept of starting a linear ramp voltage at each positive-going zero crossing of the input sine wave is shown here.

* Stanford Research Institute, 333 Ravenswood Ave., Menlo Park, CA 94025.
† Trade marks of The Singer Company, Bridgeport, Conn.

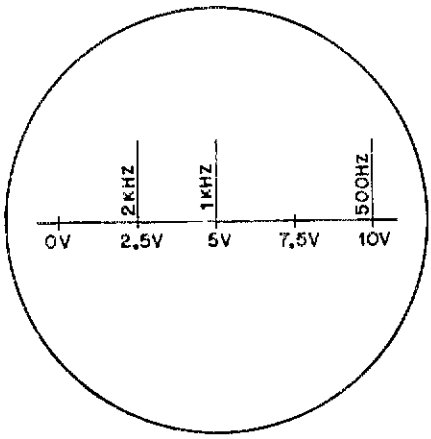


Fig. 2 – This is how an oscilloscope presentation from a fundamental amplitude-versus-frequency converter would appear. The display is assumed to be of other than short persistence, as only one frequency line can be displayed at a given instant.

will have a start. The ramp is to have a *constant* slope, no matter which positive-going zero-crossing triggers it on and off. Therefore, the ultimate voltage (E) to which the ramp rises is proportional to the *period* of the sine wave. If we sample (and hold) this ultimate ramp voltage, we can use this sample as a dc deflection voltage on our scope during the next period of the sine wave. If the ramp slope is (as shown in Fig. 1) 5 volts per millisecond, a 500-Hz signal will give 10 volts, a 1-kHz signal 5 volts, and a 2-kHz signal 2.5 volts. These three equal-amplitude signals would then appear on our scope as shown in Fig. 2. This rather odd "spectrum" is (1) backwards from our usual concept of a spectrum, and (2) nonlinear in terms of frequency.

The "backwards" problem can be handled easily by reversing the horizontal plates of the CR tube, or by inverting the dc horizontal deflection voltage. The nonlinearity occurs simply because $f = 1/T$ (frequency equals the inverse of the period), which is the algebraic expression for an equilateral hyperbola. Such nonlinearity can be removed by using a hyperbolic ramp instead of a linear ramp. The detailed proof of this is not appropriate here, but one can see from the working circuit that it is true.

The hyperbolic ramp is most easily generated by an RC circuit, wherein the R is a thyrite varistor. The thyrite varistor is one of the oldest solid-state devices used in electronics, and is usually used for transient-voltage-suppression purposes.[1] For our use the thyrite varistor functions as a resistor whose current is proportional to the *square* of the voltage across it. Thyrite varistors are made by NL Inds., Inc., formerly the National Lead Co.[2] and are available in a number of stock sizes; the NL67D-5010 is used here.

A block diagram of the FVGT is shown in Fig. 3, and a wave-form sequence in Fig. 4. Note that in these figures it is assumed that negative spikes resulting from differentiation are ignored by the one-shot multivibrators that are triggered by the positive spikes resulting from differentiation. That is, it is the *positive* spike in D that triggers the 5-μsec one-shot, and it is the *positive* spike in G that triggers the 200-μsec one-shot. However, it is the *negative* pulse in H that causes the MOS switch to close momentarily. It is the delay caused by the 5-μsec one-shot that allows the hyperbolic-ramp voltage on C1 to be sampled just before the ramp is ended and reset to zero. This end-of-ramp voltage is stored in C2, and after inversion serves as our dc horizontal deflection voltage. The combination of MOS switch and C2 is often called a sample-and-hold circuit in the electronics literature; that is precisely its funciton here. Also note that it is the 200-μs period of the second one-shot that determines the maximum frequency of the display. This is simply because, for an input frequency higher than 5 kHz, the period is shorter than 200-μsec, and so the ramp never gets started.

Perhaps the most important point to see in the wave-form sequence in Fig. 4 is the fact that the input signal is clipped. The effect of this operation is to make the FVGT circuit able to respond to *only one tone at a time*. That this is true can be easily seen if one supposes that the input is a square wave, which is rich in all odd harmonics. (A 1-kHz square wave contains 1-kHz, 3-kHz, 5-kHz energy, and so on.) The squaring amplifier has no effect on an already-square input, and the horizon-

[1] For this and subsequent references, see the listing at the end of this article.

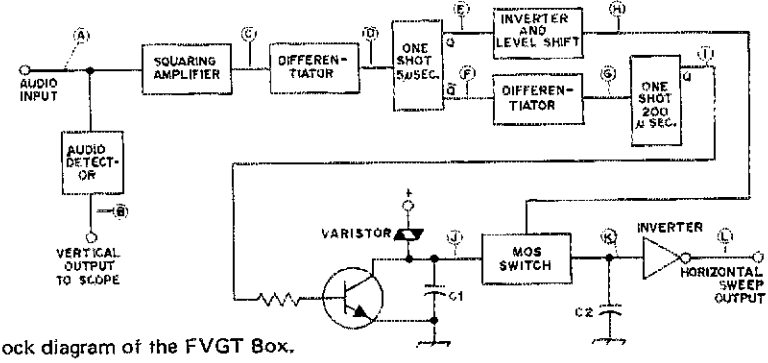
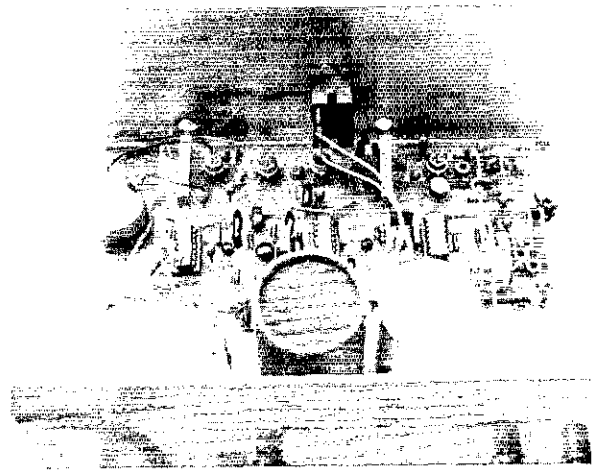


Fig. 3 – Block diagram of the FVGT Box.

This inside view of the FVGT Box shows the circuit board and signal-processing components. The power supply components, located at the rear of the chassis, appear in the foreground in this view.



tal deflection produced is exactly the same as if a sine wave of the same frequency were the input. (The 3rd, 5th, and other odd harmonics of the input square wave do not show up on our display). This limitation of "one frequency at a time" is no serious problem for an RTTY display because that's the way RTTY is transmitted (even four-frequency MUX). A little graphical experimentation or an actual trial of the FVGT circuit on, say, music will show that if one does put in an ensemble of simultaneous frequencies, only the largest single component is displayed. This is particularly obvious when listening to (watching) something like a flute concerto where the flute passages stand out above the ensemble of other instruments.

The Circuit

The complete FVGT circuit except for power supply is shown in Fig. 5. There are a total of eight operational amplifiers used, which may make it seem as if the authors are "buggy" on op amps. The total open-loop gain of all these op amps is really staggering (over 800 dB); however, all the op amps (except the limiter) have negative feedback around them which drastically reduces each stage gain. Four of these op amps are contained in two IC packages (Signetics N5558Vs) which are essentially like the μA741 general-purpose, self-compensated op amps. Two Motorola MC1456CG self-compensated op amps are used where higher impedances are involved. In addition, two LM310H op amps are used; these are internally connected and compensated to be used as noninverting followers. The LM310Hs (U7 and U8) are in locations where extremely high input impedances are required (the input impedance of the LM310H is approximately 10^{10} ohms). The LM310Hs are then really nothing but impedance transformers, having an extremely high input impedance and a low output impedance.

In order to make the vertical (amplitude) deflection on the presentation more useful, the audio is rectified and logarithmically compressed. This makes vertical deflection unidirectional and effectively on a decibel scale. The rectifier (or detector) is of a type that may be new to most hams; it utilizes an op amp (U2A) to eliminate the "offset" caused by a semiconductor diode, i.e., the effect of the diode not beginning to conduct until about 0.6 V is applied across it in the forward direction. The diode-detector system here rectifies with only a few millivolts input. The rectified audio is then applied to the log compressor U3, which is op amp with a germanium alloy-junction transistor in its negative feedback path. Since the output level of the log compressor is rather low and inverted (highest positive output voltage corresponds to lowest positive input voltage and vice versa), we follow it by another op-amp inverter amplifier, U2B. Note that only half-wave detection is used; it could be made full wave if one wanted to use another op amp in a more complex operational-detector circuit.[3] (Reference 3 also dis-

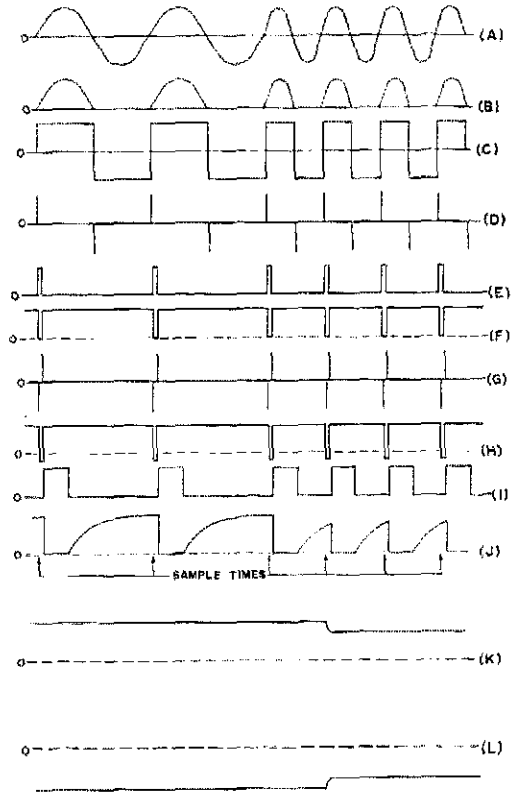


Fig. 4 – Sequence of signal wave forms as they are processed through the FVGT Box.

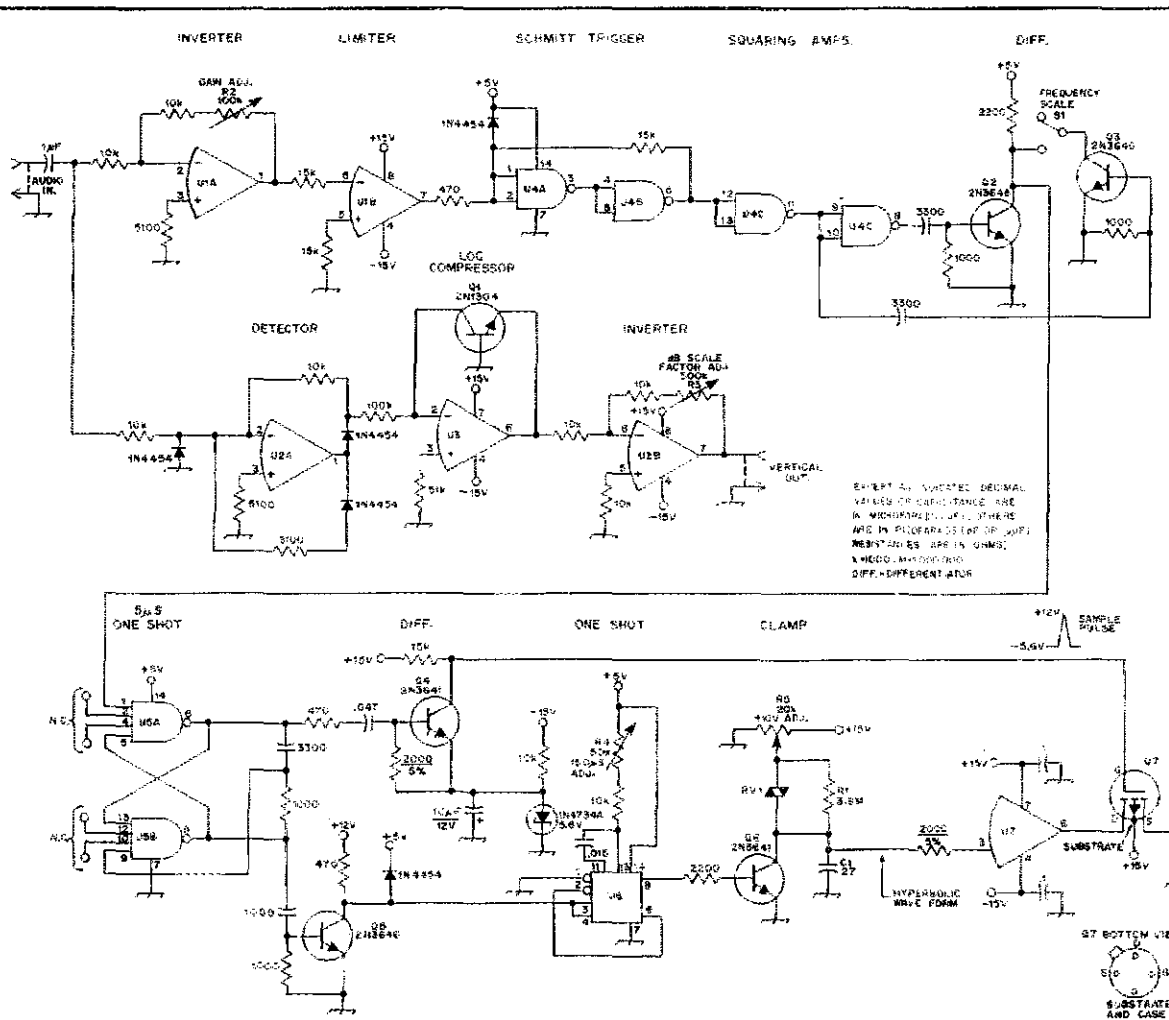


Fig. 5 — Schematic diagram of the FVGT Box. Note: Each op-amp IC is bypassed at the plus and minus 15-V supply terminals with a small tantalum electrolytic capacitor having a value between 1 and 10 microfarads.

C1,C2 — For text reference.

Q1 — Germanium npn transistor.

Q2-Q6, incl. — Silicon npn transistor.

Q7 — P-channel enhancement-mode MOSFET, Intersil IT1701 or equiv. (Intersil, Inc., 10900 N. Tantau, Cupertino, CA 95014).

R1 — For text reference.

R2-R7, incl. — Linear taper.

RV1 — *Thyrite varistor*, 30 V dc, 27 V *ac* (NL Inds. 67D-5010 or equiv.).

U1,U2 — Dual operational amplifier (Signetics N5558V or equiv.).

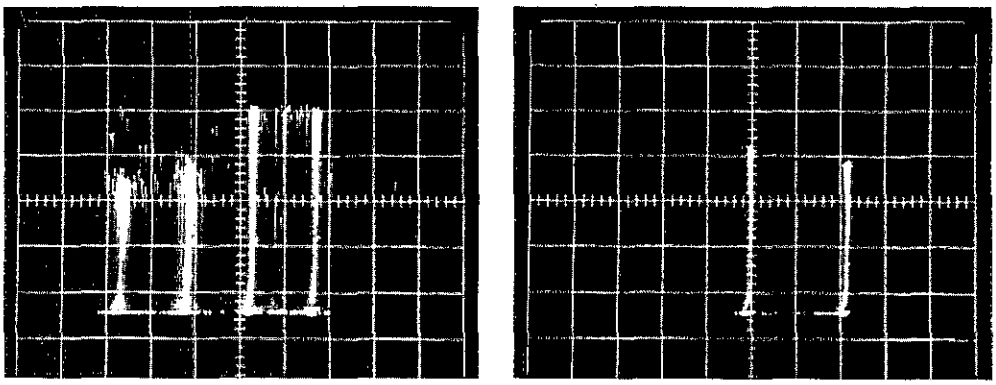
U3,U9 — Operational amplifier (Motorola MC1456CG or equiv.).

U4 — TTL quad 2-input positive NAND gate (*Motorola* MC7400P or *Signetics* N7400A or equiv.).

U5 — TTL dual 4-input positive NAND buffer (TI SN7440N or Signetics N7440A or equiv.).

U6 — TTL retriggerable monostable multivibrator (TI SN74122N or Signetics N74122A or equiv.).

U7,U8 — Operational amplifier (National LM310H or equiv.).

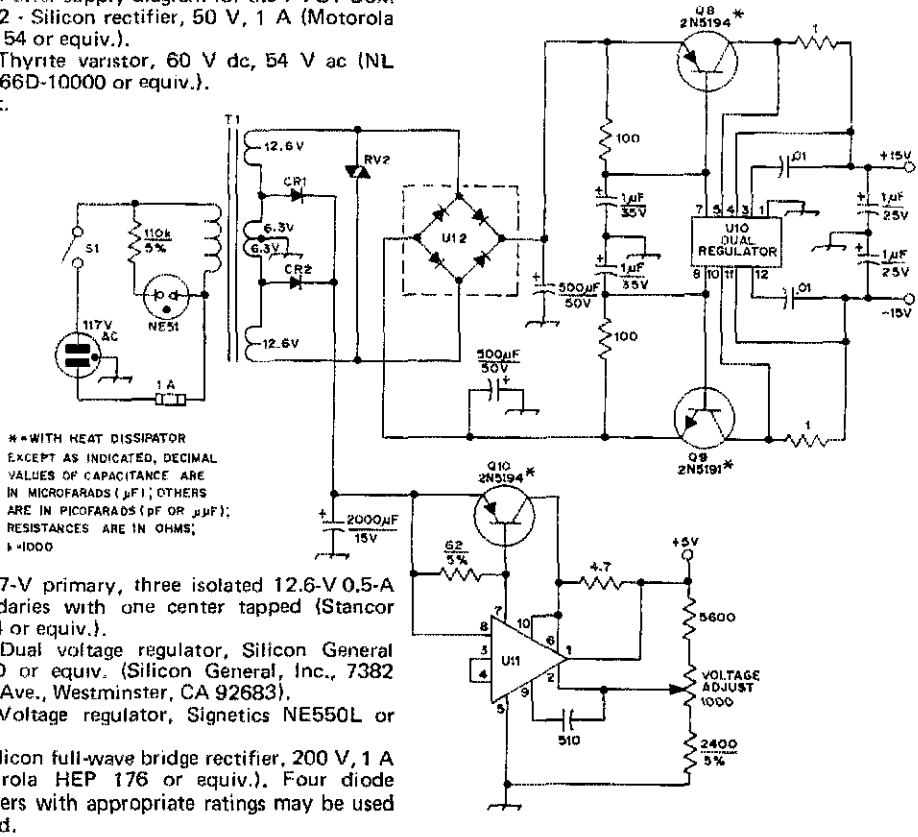


Actual oscilloscope presentations of signals from the FVGT Box. Shown at the left is a 4-frequency multiplexed RTTY signal. Selective fading of the signal components is readily apparent in this photograph. At the right is an amateur RTTY signal.

cusses the log-compressor circuit in a slightly more complicated form.)

The section of the circuit containing the hyperbolic ramp generator and the sample-and-hold circuit is worth some attention; it contains several of the most critical components of the system. The thyrite varistor in parallel with R1, in the collector circuit of Q6, forms the equivalent of a square-law resistor and in charging C1 creates a hyperbolic ramp voltage. This hyperbolic ramp is fed to U7, which has an extremely high input impedance so as not to distort the ramp and extremely low output impedance to drive the next section of the circuit. Q7 is a p-channel, enhancement-mode MOSFET used as a switch in the sample-and-hold part of the circuit. When the gate is not forward biased, the impedance between drain (D) and source (S) is very

Fig. 6 — Power supply diagram for the FVGT Box.
CR1, CR2 - Silicon rectifier, 50 V, 1 A (Motorola HEP 154 or equiv.).
RV2 — Thyrite varistor, 60 V dc, 54 V ac (NL Inds. 66D-10000 or equiv.).
S1 — Spst.



T1 — 117-V primary, three isolated 12.6-V 0.5-A secondaries with one center tapped (Stancor P8364 or equiv.).
U10 — Dual voltage regulator, Silicon General 3501D or equiv. (Silicon General, Inc., 7382 Bolsa Ave., Westminster, CA 92683).
U11 — Voltage regulator, Signetics NE550L or equiv.
U12 — Silicon full-wave bridge rectifier, 200 V, 1 A (Motorola HEP 176 or equiv.). Four diode rectifiers with appropriate ratings may be used instead.

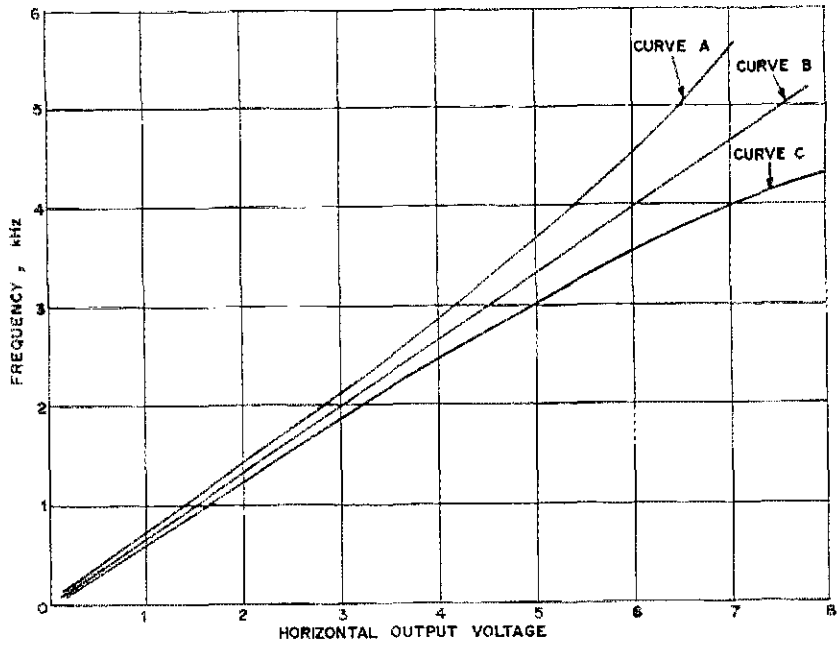


Fig. 7 — These curves show the results of choosing various values of resistance for R1, which is connected in parallel with the thyrite varistor. See text.

high. When the gate is biased forward (negative), the impedance between the drain and source becomes only several hundred ohms, allowing C2 to charge quickly up to the output voltage of U7. Since the output impedance of U7 is only about one ohm, the majority of the resistance involved in charging C2 is the drain-to-source resistance of Q7, about 400 ohms. This makes the charging RC time constant $400 \times 820 \times 10^{-12} = 0.33 \mu s$. This charging time constant must be small because the sample pulse is quite short (5 μs).

On the other hand the discharge time constant must be relatively long compared to the period of the lowest frequency to be displayed. This discharge time constant is composed of the 820-pF capacitor in parallel with the series-connected 2000-ohm resistor and the input impedance of U8 (assuming Q7 is a perfect switch). Since the input impedance of an LM310H is approximately 10^{10} ohms, this would make the discharge time constant approximately $820 \times 10^{-12} \times 10^{10} = 8.2$ seconds. Since it is not planned to display frequencies with periods larger than 1/100 second, this discharge time constant is quite adequate. The voltage which is stored on C2 is available at the output of U8, at a low impedance level suitable for driving the last (inverting) op amp, U9.

In Fig. 5 we find that the 2.5-kHz/5-kHz SCALE switch, S1, is associated with Q2 and Q3. By simply closing this switch, the sequencing is made to happen twice per period of the incoming frequency. In other words, the ramp is started at *each* zero crossing of the input wave form, not just at the positive-going zero crossing.

The Power Supply

In Fig. 6 is shown the regulated power supply which provides plus and minus 15 volts, and +5 volts. ICs are used to simplify the regulation circuitry. U10 is a new type of *dual* regulator IC by Silicon General. U11 is an inexpensive positive regulator by Signetics which provides the +5 V, mostly to operate the TTL logic ICs in the FVGT circuit. Both of these regulator ICs rely upon external power transistors (Q8, Q9, and Q10) to carry the greater part of the current being supplied to the circuit, while the ICs themselves provide only the dc gain and reference voltages. A single Stancor transformer (P8364) provides all the ac voltage necessary; two diodes and a bridge rectifier make up the full-wave rectifiers.

Construction

The two regulators (± 15 volt and 5 volt) are each constructed on separate small etched circuit boards. Perhaps it would have been nicer to have the entire power supply on one board, but these two boards are "standards" in the authors' "bag of tricks" and so were used. Having just the regulator on the board gives one the freedom to use various rectifier-filter systems with it.

The FVGT is built in an LMB W1B cabinet. The main circuit board, which represents all the circuitry but the power supply, is mounted on top of the inside chassis. The two 500-μF capacitors and

(Continued on page 31)

• *Beginner and Novice*

The Mini-Gallon

BY B. H. BRUNEMEIER*, W6FHM/DU1

REGRESSION, PERHAPS – but fun none-the-less! That was the essence of this creation. Six years ago I decided to reach for the ultimate, and toiled through the agonies and ecstacies of a rock-crusher ssb rig, built from the ground up. The completed triumph puts out a crisp, potent ssb signal, and is a delight to operate.

Curiously, the triumph once achieved began to wax a little less euphoric with each passing year. I had achieved the ultimate in sophisticated high-power speech equipment. Why not reach the other way, and strive for the ultimate in simple low-power cw equipment?

The rig described here is the fruit of that regression. I have called it the "anti-dollar" rig, because its construction entailed a total cash outlay of $0.00. Admittedly, my junk box of many years sustains a perpetual parts inventory that would surpass that owned by most hams. However, even if all the components were purchased new, it would come to a very inexpensive 75-watt transmitter.

The Circuit

The object of the game was to achieve a perfectly clean, chirpless cw signal with the fewest parts possible. In east Asia, 20 meters is THE band, and since I rarely operate elsewhere in the spectrum the transmitter was designed as a monobander, with all coils soldered in place permanently. The rig could be modified easily for plug-in or switched coils. In fact, this unit would make an excellent Novice 15-meter transmitter, so information for coils for that band is included.

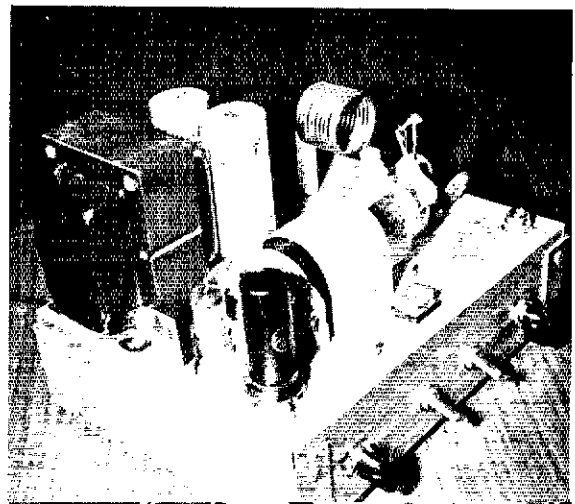
In the VXO circuit, I used a 3.5-MHz crystal for 20-meter operation because I happened to have one, but a 40-meter crystal would work just as well. RFC1 and C5 in series with the crystal to ground "stretch" its fundamental frequency about 1.5 kHz. This is multiplied four times to give a 6 kHz spread on 14 MHz. I found that a random assortment of crystals will exhibit a wide varation in stretching properties. Spreads of anywhere from 1 to 6-kHz may be realized near the crystal frequency with the values of *L* and *C* shown. Increasing the value of RFC1 will increase the range of the stretch. However, I found that if I stretched it further than the values shown, the note began to have a chirp on 14 MHz. The further the crystal is pulled the more unstable becomes its starting oscillation.

The VXO plate circuit is tuned to the second harmonic to drive the 6AG7 doubler grid. The 6AG7 drives the 1625 final to 75-watts dc input with ease. It has drive to spare on 20, so I surmise it would easily go to full power on 15.

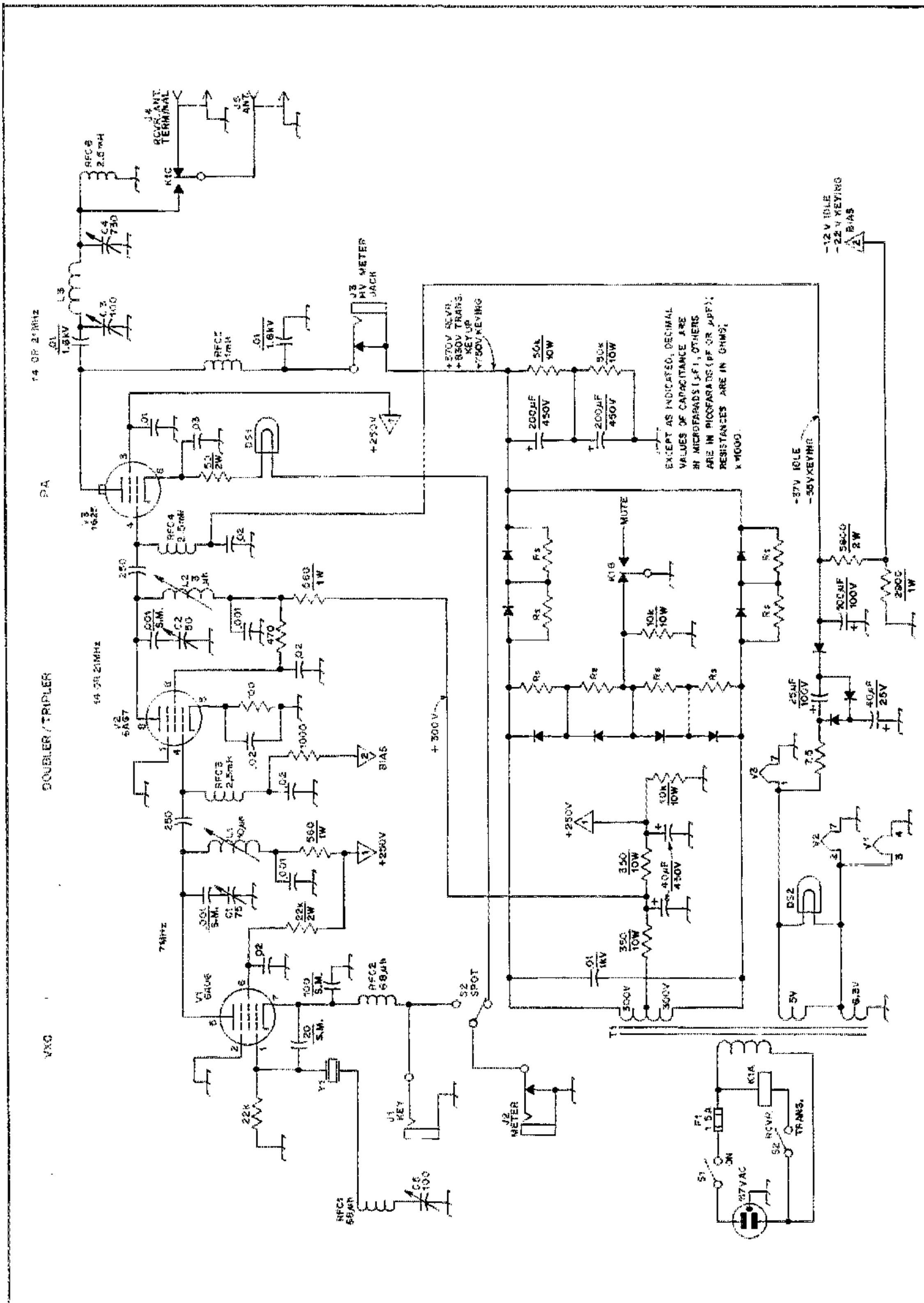
There are no parasitic suppressors in this rig. The two low-level tubes were placed close to the base of the PA tube to keep all rf leads very short. The output tank is far removed from all input circuits, so extreme stability was achieved. A U-shaped aluminum strap, 2-inches wide, is placed over the base of the 1625 tube. These old tetrodes can be unstable without a base shield, so it is wise to use one.

The power supply is also simple. One ordinary receiver-type transformer supplies all power. The high-voltage winding is bridge rectified to supply PA plate voltage. The center tap supplies the low plate and screen voltages. The two heater windings (in series) are enough to adequately heat the 12-volt filament of the 1625.[1] This same voltage is rectified with a voltage tripler to provide the bias voltages. The voltages shown are approximate. Because of the poor regulation with *RC* filters, voltages rise considerably during key-up conditions, and fall when the key is down. However, the time constant of the filter is in each case long enough that the average voltages output hovers around the stated values at average keying speeds. During key-down conditions, grid current flowing to ground through the bias bleeder increases by a

* New Tribes Mission, Box 2570, Manila, Republic of the Philippines



At the left-hand side, just to the right of the crystal is the oscillator tube. Directly in front of V1 is the doubler/tripler tube. The square object in the front top center of the chassis is the jewel covering for DS1, the cathode current lamp for checking amplifier resonance.


VXO
DOUBLER / TRIPLER
PA
EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (μF); OTHERS ARE IN PICOFARADS (pF OR μμF); RESISTANCES ARE IN OHMS; k=1000.

At the upper right-hand corner is the plate tuning capacitor and at the right rear, the plate loading unit. On the far left front is the VXO variable capacitor. The other two variables are plate tuning units for V1 and V2. They are adjusted by means of a screwdriver from the top of the chassis.

Fig. 1 — Circuit diagram of the Mini-Gallon. All bypass capacitors are disk ceramic unless otherwise noted. All resistors are 1/2 watt composition unless otherwise noted. All Rs resistors are 330,000 ohms, 1/2 watt and all Cr diodes are 600 V PRV, 1 A.

C1 — 75-pF variable, any miniature type.
C2 — 50-pF variable, any miniature type.
C3 — 100-pF variable, (Millen 19100 or equiv.).
C4 — 730-pF variable, dual 365-pF per section broadcast TRF type, with stators connected in parallel.
C5 — 100-pF variable, any miniature type
DS1,DS2 — No. 47 dial lamp.
J1 — Open-circuit key jack.
J2,J3 — Closed-circuit key jack.
J4,J5 — Phono jack or coax fitting, type SO-239.
L1 — 9.9- to 15-μH adjustable inductor (J.W. Miller 4506).
L2 — 1.7- to 2.7-μH adjustable inductor (J.W. Miller 4503).
L3 — 20 meters: 10 turns No. 10 enameled, 1-1/2 inch, 1-1/2 inch long. 15 meters: 5 turns No. 10 enameled, 1-1/2 inch dia, 3/4 inch long.
RFC1,RFC2 — 68 μH, powdered iron core (Millen J-300-68 or equiv.).
RFC3,RFC4, RFC 6 — 2.5 mH rf choke.
RFC5 — See text.
S1,S2 — Spdt toggle switch.
S3,S4 — Spst toggle switch.
RY1 — See text.
T1 — 600 V ct at 120 mA, 5 V at 3 A, 6.3 V at 4 A (Hammond*272DX or equiv.).
Y1 — 3.5- or 7.0-MHz as needed.

* Hammond Manufacturing Co., Inc., 1051 Clinton St., Buffalo, NY 14240.

generous percentages all bias actually applied to the tubes.

The control circuits are elementary. A switch opens the PA cathode and shorts out the key to give a "spotting" signal. The SEND/RECEIVE switch permits the operator to control the antenna relay. One pole of this dpdt relay switches the antenna from the receiver antenna jack to the transmitter output. The other pole ungrounds the receiver muting circuit and shorts out the 10,000-ohm resistor in series with the negative lead of the power supply. This resistor prevents a damaging surge of filter charging current when the rig is first turned on. Also, it holds all voltages down to moderate values during receiving periods.

Mechanical Layout

The layout is shown in the photographs. The chassis was built from a single 16-inch aluminum blank from an old bc studio transcription disc. The corners were filled in with 1-inch × 1-inch aluminum angle stock. The completed chassis measures 7-3/4-inches × 10-inches × 2-1/2-inches. It was tailored to fit snugly into a perforated top cover I picked up as surplus. A commercial chassis and cover would work just as well.

The front panel has the only four controls. These are (left to right) VXO tuning, SPOT switch, SEND/RECEIVE switch, and PA plate tuning. The VXO and doubler plate tuning capacitors are internal and are mounted on the chassis. The rear apron of the chassis accomodates the key and cathode-metering jacks, the ac switch and fuse, the coax connectors for antenna and receiver, and the output loading control.

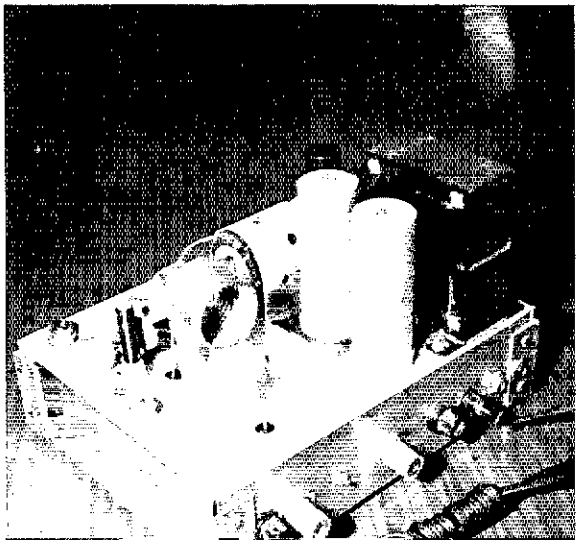
Tuning Procedure

There are only four adjustments to make, so tune-up doesn't take long. If a grid dipper is available, check resonance in the coils first to make sure they are in the "ball-park" region of the desired harmonic. The VXO plate tuning is then

This is the completed transmitter with the cover in place. While television interference is not a problem at this QTH, a cover and bottom plate should be installed for stateside use in areas where TVI could be a problem.

peaked for maximum drive to the grid of the 6AG7. I used an rf VTVM probe on the grid to read the maximum. A neon lamp would do just as well. Next the 6AG7 plate is tuned for maximum output, indicated as maximum plate current in the 1625 tube. Last, the 1625 plate circuit is resonated, and loaded to 100 mA with the loading capacitor. Then the plate tuning of the 6AG7, C2 is adjusted to the point where the plate current of the 1625 just starts to rise. This is the correct setting so as not to overdrive the final amplifier. If it is desired to meter the grid current of the amplifier, a 1625 or 807 requires no more than 3.5 mA.

The rig was so compact that there was no room for a meter, so meter jacks were incorporated for use during initial tune-up. A plate-current lamp is used to check PA resonance during operation. One closed-circuit jack was put in series with the high-voltage lead to read plate current. This was isolated from the chassis by mounting it on a phenolic board. Because of the dangerous voltage on this jack, it is located inside the transmitter.



This view shows the final tank coil and the rear of the transmitter. The homemade rf choke for the final amplifier is visible at the left top of the chassis.

The cathode-current jack is located on the rear chassis apron. The first tuning and loading was done with the top cover (WATCH OUT FOR THAT HIGH VOLTAGE) and the meter plugged into the HV jack. It was found by experiment that 100 mA of plate current in the final was flowing when 130 mA of cathode current was indicated. Once this relationship is established, the HV jack is no longer used. Last tuning should be done with the top cover in place, watching the cathode meter. (Even though the PA coil has one full diameter of free breathing space all around it for high Q, the top cover still detunes it slightly at 14 MHz. Thus, the final tuning should be with the cover on.)

Parts Information

Both the 6AU6 and 6AG7 plate-tuning midget-APC capacitors are in series with dc blocking capacitors. It is recommended that both blocking capacitors be silver micas. This will give the highest possible rf efficiency in the doubler tanks where it is needed most.

RFC3, the PA plate choke, is homemade. (A National R100 was tried, but got very hot after only a few seconds keying!) The form is an unglazed porcelain rod insulator 1-1/2-inches long by 3/8-inch diameter. This is completely covered with a close wrap of No. 30 enameled wire. A 3/4-inch standoff insulator cone isolates the choke from the chassis. Also, polystyrene rod could be used for a form.

T1 is an ordinary receiver-type power transformer, 300-0-300V RMS at 120 mA dc output current. It gets warm, but not excessively so, after an hour of operation. The filament windings are standard for that size transformer, 5.0V and 6.3V.

K1 is a dpdt midget power relay with Bakelite insulation. A ceramic-insulated antenna relay would be good here, but I didn't have one. The Bakelite neither gets warm nor smells at this rf power level, so it must be passable.

DS1, the cathode-current monitor, DS2, the POWER ON pilot, are both No. 47 bulbs, 6-8 V, at .15 A.

Special note: It may be observed that during transmit conditions, with the key up, an idling current of about 15 mA will flow in the 1625 cathode circuit. This *does not* indicate a parasitic! When the key is up for several seconds, the plate voltage rises to 830 volts, and the screen potential

rises to 340 volts. These elevated voltages overcome the fixed bias, and just bring the tube into static conduction. No damage will result, as the plate dissipation is well below the maximum rating of the tube. During average keying speeds, both the plate and screen voltages settle down to the desired values (750 and 250 volts respectively), and the average bias voltage rises to well beyond Class C ratings.

Operation

This little rig is a joy to operate. Perhaps most readers would not care for the monoband or VXO limitations. If not, bandswitching and VFO features could be added to this basic circuit. In this corner of the Pacific, the rig as shown is quite adequate for cw operation. One CQ is enough to keep me in business as long as I care to pound brass. Using a quad 80 feet above ground as a radiator, my usual signal report is a solid S-9 from anywhere in Asia or the Pacific. If the move from maxi-ssb to mini-cw was a step from the sublime to the ridiculous, it was a delightful step backwards. Any joiners? QST

[EDITOR'S NOTE: An 807 has the same characteristics as the 1625 with the exception of tube socket and the heater requirements, 6.3 volts for the 807. An 807 can be substituted by applying the proper heater voltage.]

The FVGT Box

(Continued from page 26)

the power transformer are also mounted on top of this inside chassis. The power supply circuitry, including the two regulator boards, is mounted under the inside chassis.

The only controls accessible on the front panel are the on-off switch and a switch which changes the horizontal scale from 2.5 kHz to 5 kHz. A small neon line-indicator light is also located on the front panel.

The rear apron of the FVGT Box has three coax jacks, for audio input, vertical output, and horizontal output. A fuse holder also protrudes from the rear of the unit; this is the main-line fuse.

Adjustments

Since there are six adjustable pots in the circuit, it might be expected that a certain amount of care is required in setting up the FVGT Box. The setup will require an audio generator, a calibrated-sweep oscilloscope, and a dc voltmeter. (A dc scope can be used instead of the voltmeter.)

Assuming that all preliminary checks are satisfactory (dc supplies all measure the proper voltages, and no smoke exudes from the FVGT Box), connect the audio oscillator to the AUDIO IN jack. One or two volts should be enough for initial measurements. The rectified log-compressed audio should be observed at the VERTICAL OUT jack; the dB scale factor is adjustable by means of R3.

The setting of R2, the gain adjustment, will depend on the normal audio input voltage range used with the FVGT. One author usually runs his setting at a gain of 3 for normal use. This means that the audio voltage seen at pin 1 of U1 is three times that at the audio-input jack.

Next, the 200-μs one-shot, U6, must be set up. Set the period for about 150 μs; this is set by adjusting R4 while observing the wave form at pin 8 of U6 with a scope.

As a first setting, R5 should be adjusted to give +10 volts at its wiper. Also as an initial setting, R7 should be set for minimum gain (minimum resistance).

With an audio input signal of 100 Hz, adjust R6 until the dc voltage at the HOR OUT jack is just slightly on the positive side of zero – about 0.1 V dc.

Now make a plot of frequency versus HOR OUT dc voltage, as shown in Fig. 7. Note that the slope of this plot is adjustable by means of R7, and the "zero intercept" is adjustable by means of R6. The linearity is dependent on the setting of R5, the value of R1, and the characteristics of the thyrite varistor. Of the three curves shown in Fig. 7, curve A is the result of R1 being too large, curve C of R1 being too small, and curve B for the proper value of R1. Unless one gets a thyrite varistor that is radically different from those tried by the authors, R1 should fall very near the 3.9-megohm value specified. QST

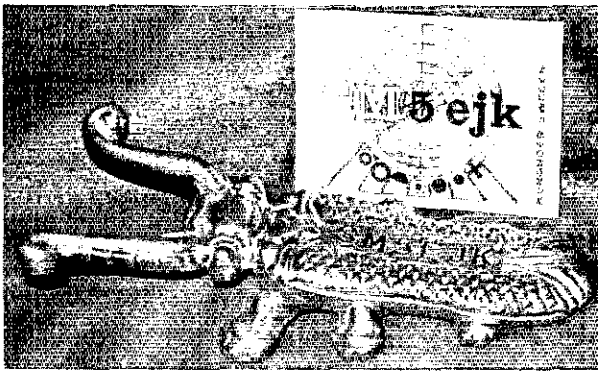
[1] National Lead Industries, "General Characteristics of Varistors", Application Data, Section 9703.

[2] NL Inds., Inc., Electronics Dept., Box 420, Hightstown, NJ 08520.

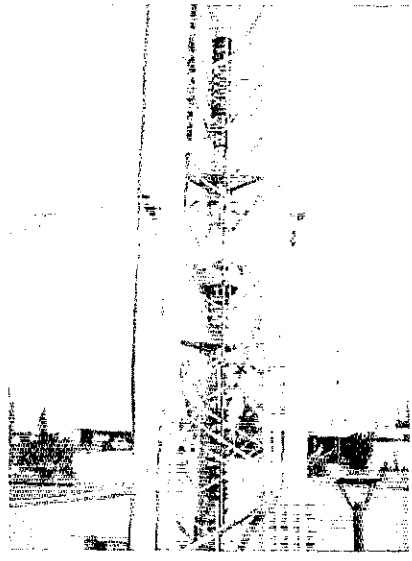
[3] Giles, "Fairchild Semiconductor Linear Integrated Circuits Applications Handbook," 1967, pp. 148-150.

Strays

K2JFJ sends this photo of an unusual QSL! Its a cast-aluminum bootjack finished in gold with the station's call on the back. A more conventional-type QSL is included in the photo to indicate size.



Save the Ham-M



BY A.L. MCINTOSH,* K7AL

I FOUND THAT THE Ham-M was the only commercially available, sturdy rotator that would fit inside the top section of my Tri-Ex telescoping tower. However, the Ham-M was neither designed nor advertised to handle a 10-15-20-meter 4-element *quad with a 36-foot* boom without some assistance. This size of antenna represents quite a heavy wind-load factor and when rotated develops too high a torque for the braking system of the Ham-M.

A rather inexpensive modification can be made to an antenna installation that will compensate and aid the rotator when using a large array. My modification cost me less than $15 and a few hours of time, but has greatly increased the life of the brake system in the Ham-M.

Construction

Basically, what was done at the K7AL location was to use two coil springs as a part of the mast material, above and below the rotator, which act as a massive shock-absorber. Actually the coils are

* 7523 E. Marc Place, Tucson, AZ 85710.

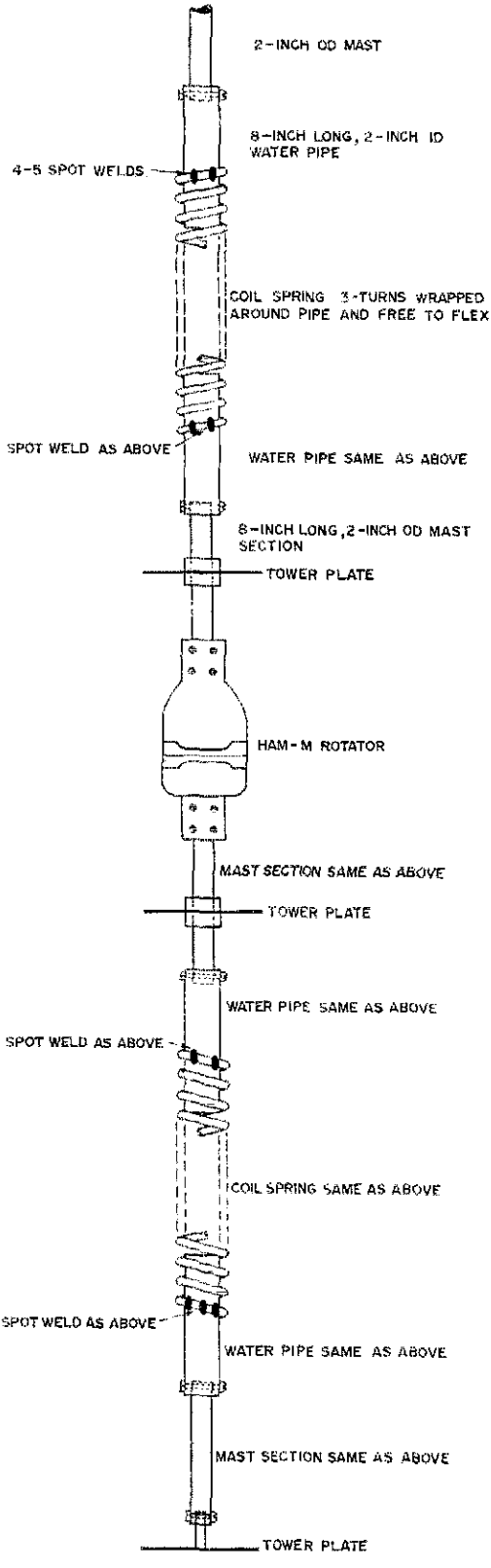


Fig. 1 — The overall arrangement for the rotator system. The automobile springs are wrapped for 3 turns around the 2-inch ID water pipe and spot welded in 4 to 5 places on the end turn, only.

automobile shock absorber overload springs. They cost approximately $5 at an auto parts discount store. The ones that I selected have 13-1/2 turns of 5/16-inch diameter wire, which will force fit over a 2-inch water pipe.

Fig. 1 shows in detail the installation sequence of the parts as I have them installed on my tower. The top 2-inch OD mast is connected to the antenna boom and fitted into an 8-inch length of 2-inch ID pipe, secured by a nut and bolt. The 8-inch pipe, and another just like it, were forced into the ends of the coil spring (below the rotator is another pipe-spring-pipe arrangement), then spot welded at a local welding shop (additional cost, $5.71). *Caution: care must be taken not to ruin the temper of the springs.* Each of these units was then secured over an 18-inch section of 2-inch OD pipe which passes through fixed tower plates used to maintain alignment. The Ham-M mounts between them as shown.

All pipe sections were purchased from a local plumbing supply house for $2. These pipes should be of the ridgeless type (on the inside) so that the 2-inch OD mast can easily slip into them. I then used soft 1/32-inch aluminum as the shim material for the mast section to water pipe, upper and lower Ham-M clamps and the anchored tower plate at the bottom. I recommend using 5/16- or 3/8-inch case-hardened cap screws to bolt all sections of pipe together.

Alignment and Use

In my installation I found that the bottom mast section should be anchored to the tower plate, last, after the boom is aligned with the direction indicator in the Ham-M control box. Prior to final bolting, this lower section was elevated slightly to take the weight of the antenna off the rotator.

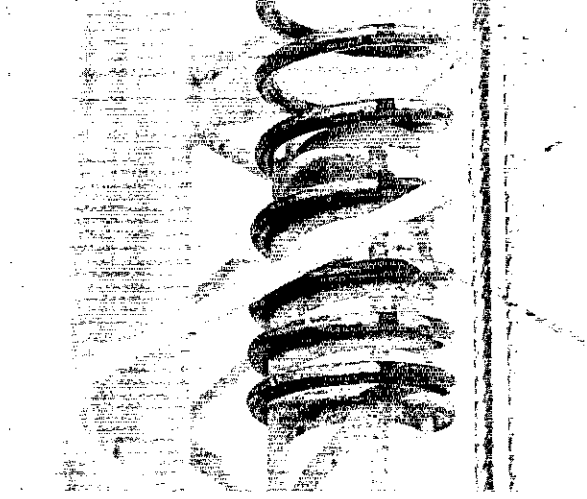


Fig. 2—In this photograph, the spot welds are shown on the end turns of the overload springs. The remaining turns are not welded, but allowed to flex about the pipe.

It may seem strange to see the rotator turn in place of the antenna, initially, a condition which is caused by the torque of the rotator. Then, 2 to 3 seconds later the antenna will start to turn in the desired direction. After the deactivation of the control unit, and the internal brake is applied, the boom continues to turn for a time until the springs can align the antenna in the desired direction. The springs have given good damping action on the antenna and consequently there are no objectionable oscillations. There has been a slight turning of the beam in high winds, up to 15 to 30 degrees, but with this installation the brake has never been broken, which makes the trouble of the installation worthwhile. QST

FEEDBACK

The "Mountaineer" transmitter schematic *caption* given on page 24 of *QST* for August, 1972, has L1 incorrectly labeled. L1 should be L1B and L1B should be L1A.

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The September 1972 *QST* article, "The Pip-Squeak Gets Smaller," page 37, did not list CR1 in the parts list. It is a Motorola MV839 Varicap (72-pF nominal capacitance). Also, RFC3 and RFC 4 should not have ferrit beads over their pigtails. RFC5, which was not listed, should be a 10-μH choke with one bead on its ground-end pigtail.

— • • • —

The formula used in the "Standing-Wave Ratios and Directional Wattmenter Readings" by K1PLP in the Hints and Kinks section of the October *QST*, page 57 is missing the radical signs both in the numerator and denominator. The formula should read as follows:

$$SWR = \frac{1 + \sqrt{\frac{Pr}{Pf}}}{1 - \sqrt{\frac{Pr}{Pf}}}$$

— • • • —

Apparently the enthusiam for facsimile operation (FAX) is running high, judging by the mail received at Headquarters in response to the article by King, "Conversion of Telefax Transceivers to Amateur Service," May 1972 *QST*. There were two errors in Fig. 3 of that article. The filament connections shown for the 12AT7 tube have the numbers interchanged for pins 5 and 9. Just below that in the drawing, the normally open contact of the ACK relay should be shown as a shielded wire running to T of TR36, rather than to a circuit ground.

— • • • —

In a discussion of radiation hazards, the *QST* vhf column of the September issue quoted tentative safety standards set by various agencies. The unit of measurement was given in microvolts per centimeter squared. The term should have been milliwatts, obviously. Thus the expression given on page 89 should have read 0.01 to 10 mW/cm^2. Thanks to Dave Davidson, W1GKM, for pointing out the typographical error, for which the undersigned editor takes the responsibility. —*W1HDQ*

A Morse-Code Time Identifier

An IC CW Clock

BY EDWARD C. PIENKOWSKI,* W8BEB

DURING THE PAST YEAR or so I've had the privilege of using the Columbus, Ohio, 2-meter fm repeater. This repeater has excellent coverage and gives very good service. The only disadvantage was the problem of giving the time of day at the end of each series of transmissions. A couple of close calls when driving at night on the freeway with the car's interior lights on and one's eyes on a watch instead of the highway convinced me that there had to be a better way. Subsequent discussions with the operators of other repeaters have indicated that this is a common problem.

Various mechanical schemes were considered and quickly discarded because of the complexity and the difficulty of construction. There are two ways of entering time on the logging tape and also transmitting the information so that the person using the repeater can verify that the clock is working properly. These are voice and Morse code. Most of the repeaters that originally used a voice announcement to identify the call letters have since converted to cw identifiers. This appeared to cause less disruption of the conversation. On this basis we decided to design a clock that would give time of day, upon request, in Morse code.

Circuit Description

The complete circuit, except for power supply, is given in Fig. 1. Basically, the circuit counts 60 Hz from the power line and registers this count in an integrated-circuit divider chain. Upon request, the hours and minutes, which are stored in binary form, are converted to a serial output, translated into Morse code, and used to turn on and off an integrated-circuit 3000-Hz audio oscillator.

The 60-Hz frequency is very slow moving for IC counters which are designed to run at 10 MHz. This allows the gates to remain in their active region far too long. In this region they act as high-gain amplifiers, rather than gates, and can be expected to oscillate. The 74121 monostable multivibrator, U9, is designed to accept a slow-moving wave form on its Schmidt-trigger input and provide a square-wave output. Since it is not retriggerable it will not accept an input during its pulse time and thus serves to guard against noise during this portion of the input cycle. U2A divides the 60 Hz by two. U1A divides by two again so that the basic timing frequency applied to U23 is 15 Hz. The 30 Hz from pin 12 of U2A is divided by five in U2B and comes out at 6 Hz on pin 11. Division continues through U1B, U3B, and U4, so that one pulse per minute is applied to pin 1 of U26A. The three gates of U26 are used to lock the time in the next five dividers so that it cannot be changed during an output keying cycle.

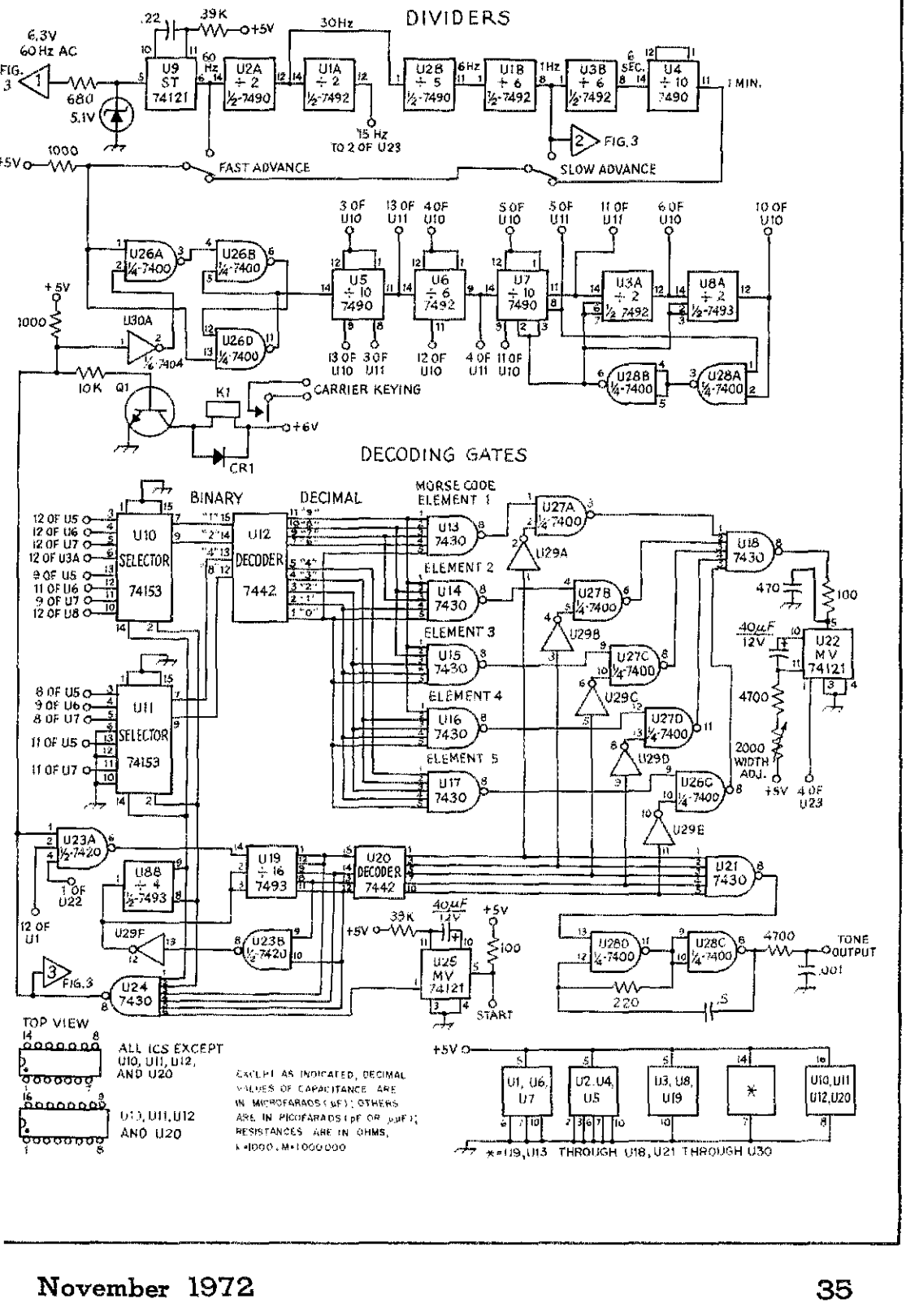
Dividers U5, U6, U7, U3A, and U8A register minute units, minute tens, hour units, and hour tens respectively. Gates U28A and B convert from a fourty-hour to a twenty-four-hour clock. Because of the reset lead into U8A, pins 2 and 3, there will always be a time identification of 0000 sent at midnight.

U10 and U11 are each dual 4-line-to-1-line data selectors/multiplexers. They are used to select the binary number that is to be converted into Morse code. U12 converts that binary number into a decimal number. Gates U13 through U17 are wired to program a Morse-code dash at code-element positions one through five respectively. For example, if pin 3 of U12 is at zero or a low logic level, all other decimal outputs will be high and the number two is to be encoded. A two in Morse code has a dash in element positions 3, 4 and 5; therefore, zeros are sent to U15, U16, and U17. If the number had been an eight instead of a two, then a zero would have been sent to U13, U14, and U15.

The basic clock frequency, 15 Hz, is fed into pin 14 of U19 from U23A. U19 is a binary counter which is used to sequence through gates U13

* 3839 Dempsey Rd., Westerville, OH 43081.

Fig. 1 — Schematic diagram of the cw clock. All ICs are dual-in-line package; pin numbers may not be compatible with other package types. No connections are made to IC pins which are not shown.
CR1 — Any small-signal silicon diode.
K1 — Low-voltage relay (Magnecraft W102MX-1 suitable).
Q1 — See text.
U1, U3, U6 — TTL divide-by-12 counter IC, 7492.
U2, U4, U5, U7 — TTL decade counter IC, 7490.
U8, U19 — TTL 4-bit binary counter IC, 7493.
U9, U22, U25 — TTL monostable multivibrator IC, 74121.
U10, U11 — TTL dual 4-line-to-1-line data selector/multiplexer IC, 74153.
U12, U20 — TTL BCD-to-decimal decoder IC, 7442.
U13-U18, incl., U21, U24 — TTL 8-input positive NAND gate IC, 7430.
U23 — TTL dual 4-input positive NAND gate IC, 7420.
U26, U27, U28 — TTL quad 2-input positive NAND gate IC, 7400.
U29, U30 — TTL hex inverter IC, 7404 (5 sections of U30 unused).


DIVIDERS
6.3V 60 Hz AC
FIG. 3
680
5.1V
.22
39K
+5V
30Hz
60 Hz
U9 ST 74121
U2A ÷ 2 ½-7490
U1A ÷ 2 ½-7492
15 Hz TO 2 OF U23
U2B ÷ 5 ½-7490
6Hz
U1B ÷ 6 ½-7492
1Hz
U3B ÷ 6 ½-7492
6 SEC.
U4 ÷ 10 7490
1 MIN.
FIG. 3
1000
FAST ADVANCE
SLOW ADVANCE
3 OF U10
I3 OF U11
4 OF U10
5 OF U10
5 OF U11
II OF U11
6 OF U10
10 OF U10
U26A ¼-7400
U26B ¼-7400
U26D ¼-7400
U30A ⅙-7404
U5 ÷ 10 7490
U6 ÷ 6 7492
U7 ÷ 10 7490
U3A ÷ 2 ½-7492
U8A ÷ 2 ½-7493
U28B ¼-7400
U28A ¼-7400
10K
Q1
K1
CARRIER KEYING
+6V
CR1
DECODING GATES
BINARY
DECIMAL
MORSE CODE ELEMENT 1
ELEMENT 2
ELEMENT 3
ELEMENT 4
ELEMENT 5
12 OF U5
12 OF U6
12 OF U7
12 OF U3A
9 OF U5
11 OF U6
9 OF U7
12 OF U8
U10 SELECTOR 74153
U12 DECODER 7442
U13 7430
U14 7430
U15 7430
U16 7430
U17 7430
U27A ¼-7400
U29A
U27B ¼-7400
U29B
U27C ¼-7400
U29C
U27D ¼-7400
U29D
U26C ¼-7400
U29E
U18 7430
470
100
40µF 12V
U22 MV 74121
4700
2000 WIDTH ADJ.
4 OF U23
8 OF U5
9 OF U6
8 OF U7
11 OF U5
11 OF U7
U11 SELECTOR 74153
U23A ½-7420
1 OF U22
12 OF U1
U8B ÷ 4 ½-7493
U19 ÷ 16 7493
U20 DECODER 7442
U21 7430
U29F
U23B ½-7420
39K
40µF 12V
+5V
100
U25 MV 74121
START
FIG. 3
U24 7430
U28D ¼-7400
U28C ¼-7400
4700
TONE OUTPUT
.001
220
.5
TOP VIEW
ALL ICS EXCEPT U10, U11, U12, AND U20
U10, U11, U12 AND U20
EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (µF); OTHERS ARE IN PICOFARADS (pF OR µµF); RESISTANCES ARE IN OHMS, K=1000, M=1000000
+5V
U1, U6, U7
U2, U4, U5
U3, U8, U19
*
U10, U11 U12, U20
*=U9, U13 THROUGH U18, U21 THROUGH U30

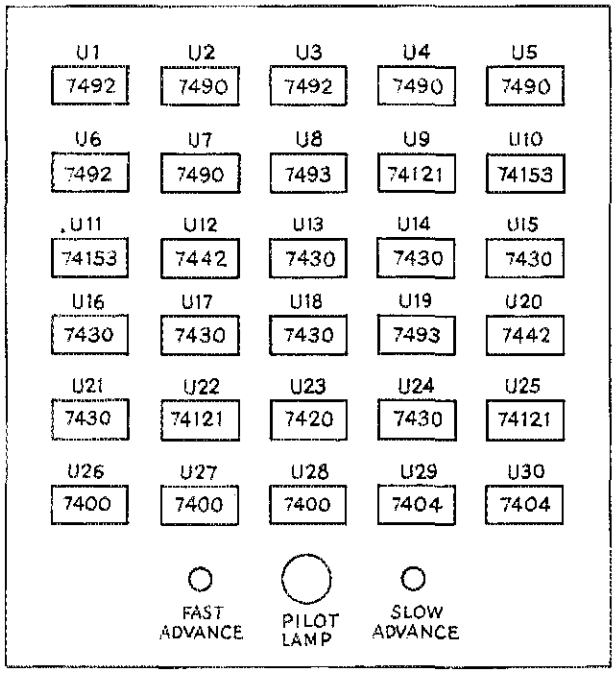


Fig. 2 — Physical layout used by the author for the ICs. See text regarding wiring technique.

through U17, U20, U29, U27, and U26C sequentially enable leads from gates U13 through U17 into gate U18. When U18 detects a dash its output goes from zero to one and starts monostable multivibrator U22. U22 fills in the space between two Morse-code dots, thus making a single dash. It does this by stopping the clock pulses going through gate U23A.

When U19 has counted to twelve it is cleared by U23B and U29F, and counter U8B advances. This causes data selectors U10 and U11 to advance to the next time digit. When U8B has advanced through all four time digits and U19 has reached a count of eleven, all of the inputs to U24 are in the one state. *Its output goes to zero and additional* timing pulses are inhibited at U23A. Through Q1 this also releases the relay and through U30A enables U26 so that the minutes and hours counters can continue to count.

U26B and D are wired as a flip-flop memory, with U26A being used as an inverter. When the time is being sent, the memory is latched so that if a 1-minute pulse arrives from U4 it will not reach U5 immediately. Instead, it is "stored" in U26B and D. When the time message is completed the memory is unlatched, and the time will then be advanced by a pulse from the memory.

The dots and dashes are formed in gate U21. When its output goes to the one state, gates U28B and D are enabled. The first of these gates is held in its active state by the 220-ohm resistor and the audio frequency is controlled by the 0.5-μF capacitor. The output tone is a 3000-Hz square wave fed out through an isolating resistor.

Construction

There are many ways of mounting and interconnecting these integrated circuits. Since I only intended to build one of these units, printed-circuit boards were not used. The method I used has been nicknamed the "dead bug" technique. The ICs are laid on their tops with their pins sticking up in the air and are glued to a brass plate. The plate serves as both ground and a heat sink. The ICs are interconnected with No. 30 solid hookup wire. *Warning!* Don't use heavy-gauge wire. Soldering to these tiny things is difficult enough when a small-diameter wire is used. With anything else it would be impossible to avoid solder bridges and wrong connections. Use a very small, relatively hot soldering iron. I've found that a reasonable amount of heat will not damage integrated circuits.

Connect first the ground leads, next the signal leads, then the +V leads, and finally the 0.1-μF disk capacitors. To minimize the possibility of interference from nearby transmitters, each IC has its own ground lug and its own +V bypass capacitor. Don't just string the +V feed lead from one IC to the next. Instead start with the centermost IC and let your +V feed spread out like a spider web. This will minimize the +V difference between ICs.

I mounted my ICs on the bottom plate of a 7 × 9-inch chassis. The sides of the chassis were used for power supply, rf bypass capacitors, fuse mounting, and other parts. The time-setting switches and pilot lamp were mounted on top of the chassis. This permits mounting everything within the box and only shielded, bypassed, leads enter the box. By completely shielding it this way no trouble was experienced with rf interference.

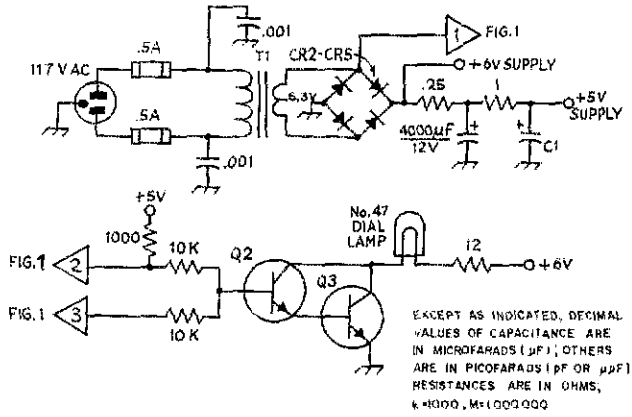


Fig. 3 — Power supply and dial-lamp circuit.
C1 — A 0.1-μF disk ceramic at each IC and several 100-μF capacitors in parallel.
CR2-CR5, inc. — Silicon rectifier, 2.5 A, 50 V.
Q2, Q3 — See text.
T1 — 120-V primary, 6.3-V 1.5-A secondary.

Q1 and the other transistors shown can be anything with a gain of 20 or more and sufficient current-handling capability. Don't eliminate the 12-ohm resistor in series with the number 47 pilot lamp of Fig. 3. This limits the cold inrush current and also lowers the lamp voltage to prolong its life.

Time Setting

One of the more difficult jobs is resetting the clock to the correct time after a power failure. The switches marked FAST ADVANCE and SLOW ADVANCE are normally in a position such that pin 11 of U4 is connected to pin 1 of U26A. When set this way the clock will count normally and the pilot lamp will blink at a one-second rate.

To advance the clock forward in time, operate the FAST ADVANCE switch. The clock will advance one hour for each blink of the pilot lamp. Operating the SLOW ADVANCE switch will advance the clock one minute for each blink of the pilot lamp. Because of contact bounce in the switches, they can be operated or released only when the clock is sending out cw. The procedure then is:

1) Briefly ground the start lead.
2) While the time is being sent, turn on FAST ADVANCE.
3) Count the lamp blinks.
4) When desired count is reached, again briefly ground start lead.
5) Turn off FAST ADVANCE.

If one wishes to set seconds as well as minutes and hours, the clock can be stopped by switching pin 5 of U9 to ground. Opening or grounding leads at other points will not work because contact bounce in the switch will cause incorrect readings.

Operation

Operation is initiated by grounding the START input momentarily, pin 5 of U25. This ground need be present for only a few microseconds to start a message, but may be of longer duration. The presence of a continuous ground at the START input will activate a time message only once, at the initial grounding of the input. It is not feasible to include in this article the control circuits that may be used for initiating a time message, as each repeater will probably have its own individual requirements. QST

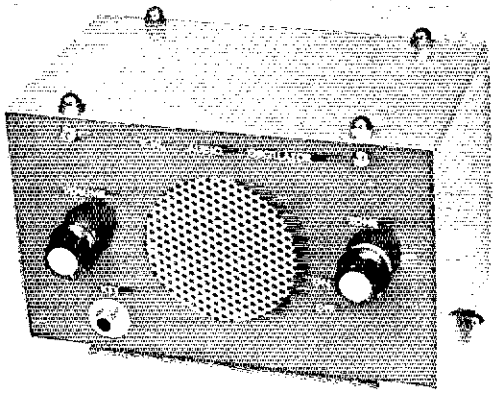
NEW BOOKS

Radio Amateur Operating Handbook, by Marshall Lincoln, W7DQS, published by Editors and Engineers, Division, Howard W. Sams & Co., Inc. Paperback, 8-1/2 × 5-3/8 inches, 160 pages, price $4.95.

Hams whose orientation is solely technical will find nothing of interest in this new book. However, most of us do some operating once in awhile, and it is the new or occasional operator who will find this type of handbook most valuable. The author covers basics such as phonetics and signal reports, as well as the more specialized activities such as traffic handling, contests, and DX in a chatty, informative style. He makes every effort to explain the *reasons* for procedures, as well as to provide examples of proper operating practices.

Several illustrations in each chapter add flavor to the text. The majority of the pictures are of ham stations which were typical of the early 1960s, rather than of current equipment. Vhf operating, other than fm, is not mentioned in any detail.

Included in the book is a twenty-one page appendix of prosigns, abbreviations, and other useful operating data in large, easy-to-read type. Some of the information, such as the list of countries with which third-party traffic is permitted, is bound to change over time, which is a disadvantage for a rather expensive publication. — *K1ZND*



• *Beginner and Novice*

A Code Practice Oscillator for the Beginner

BY WALTER L. WOOTEN,* W1NTH

WHETHER YOU ARE a beginning amateur or have held your license for a time, you probably need a reliable and inexpensive code-practice oscillator to help get the license, or to upgrade. Shown here is a simple oscillator that will serve these purposes well, and with 9 to 18 volts applied, it has sufficient volume to be used for group code classes.

The NE555 IC recently introduced by the Signetics Corporation of Sunnyvale, CA is the heart of this oscillator. The '555 is an 8-pin IC that can be used in several functions where timers or an *RC* oscillator is needed. Inside this 8-pin chip is the equivalent of 23 transistors, 16 resistors, and a diode, which leaves little else required to make the circuit operational. In this version all that is required other than the '555 and a power source are eight additional components, none of which is critical in value. Most of these parts can be found in ham-shack junk boxes or obtained from a transistor radio that no longer works.

*Editorial Assistant, *QST*.

Construction and Advice

The circuit for this oscillator is shown in Fig. 1. When building with ICs there are a few precautions that need to be observed. Like transistors, an IC can be destroyed with excessive amounts of heat. Therefore, care should be exercised when soldering directly to the pins. One lead at a time should be soldered, then *allowed to cool* before proceeding to the next lead. The wrong voltage polarity may quickly damage one or more of the built-in transistors, so care is required when making connections.

The audio pitch is determined by the values of R1, C2 and the setting of R2. The cost of the oscillator may be reduced somewhat by replacing R2 with a fixed value of resistance; R3 could be replaced by a fixed-value resistor. If this is done, the speaker lead must be connected to the junction of C3 and R3.

When power is applied the oscillator runs continuously and the audio output is keyed on and off. This circuit gives a degree of freedom from chirps or whoop-like sounds when rapidly keyed. However, the circuit always draws about 6 mA of current when operated. If used with a small

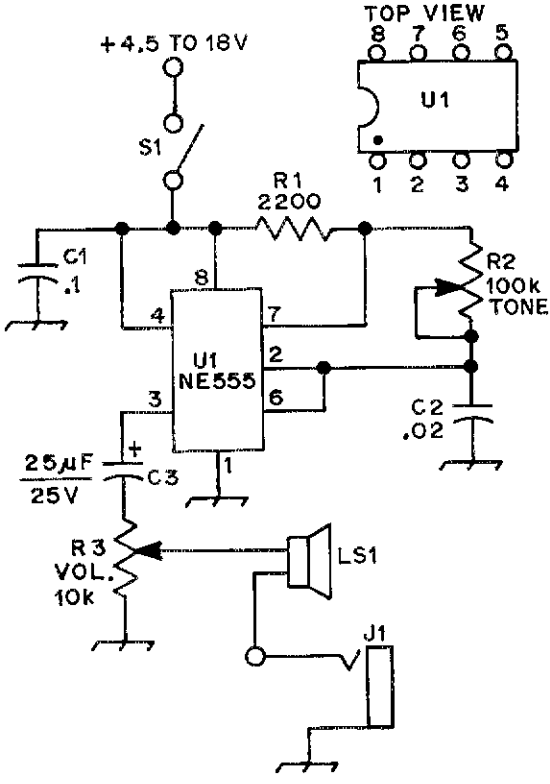


Fig. 1 — The completed audio-oscillator circuit using a Signetics NE555 V-package IC. Component numbers are used for text reference only.

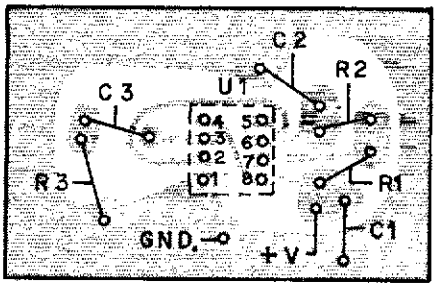


Fig. 2 — Suggested layout for a pc board, if desired (foil side shown). Full scale.

battery, such as those used in transistor portable radios, the battery could quickly be discharged, so a means of disconnecting the power should be used, such as a spst switch, as shown at S1.

A circuit of this type lends itself nicely to the beginners' first try at making a pc (printed circuit) board and a suggested layout for the board is shown in Fig. 2. If facilities are not available for etching a board, point-to-point wiring will work just as well, and perforated board stock is a suitable material to be used. If a builder does not want to solder directly to the IC leads an 8-pin IC socket can be used, making all connections to the socket.

Power Supply and Enclosure

One additional advantage to this IC is that sufficient output can be produced, for use in a quiet room, with as little as 4.5-volts. For greater audio volume, voltages up to a maximum of 18 may be used. The 4.5 volts can be obtained from 3 size D-cells in series. The 18 volts can be obtained from two 9-volt transistor-radio batteries connected in series. Additionally, an external supply could just as easily be used, so binding posts are included on the back of the enclosure for that reason.

The cabinet is homemade and consists of two U-shaped pieces of aluminum. Overall measurements are 3 × 6 × 3 1/4 inches,HWD. The size was dictated more by the available speaker size, plus to provide an area in which to house a battery supply.

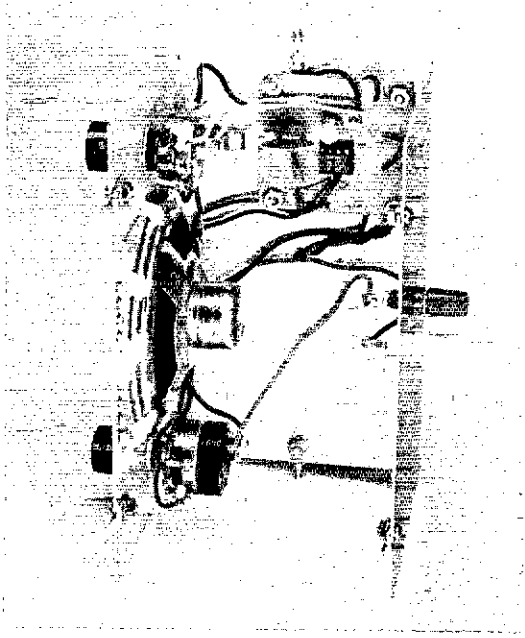
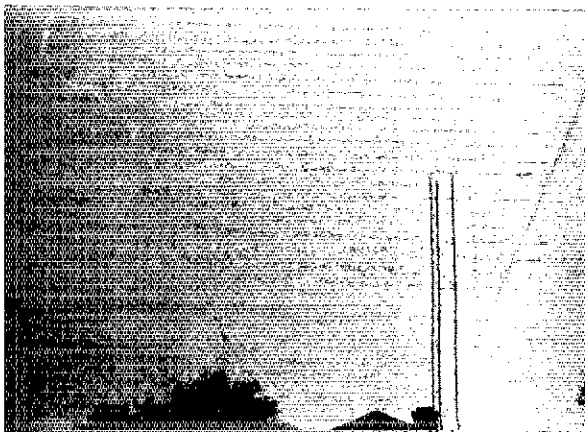


Fig. 3 — The inside view of the oscillator shows how few components are required. The white material around the speaker is caulking compound. (see text). Though no battery supply is shown, there is ample room allowed for one or power may be supplied externally via the binding posts on the back.

The 3-inch speaker used in this design, and the perforated metal shield protecting it, was attached to the front of the enclosure with a bathtub caulking compound like that made by GE, Dow Corning, and others. The method of mounting LS1 is shown in Fig. 3. The speaker and shield are quite secure after an overnight setting of the cement. The compound has a texture like soft rubber when cured.

Decals and spray paint were used to give the unit that "commercial look," Total cost, if everything is purchased new, and with careful buying, can be held to less than $5. QST

Strays



Nope, the lightning didn't take off the top of the tower! WA2SQQ was in the process of putting up his tower when the storm came along. You can bet this photo convinced him to put in a good grounding system on the tower. The picture was taken with Kodak Tri-X ASA-3200.

The Y Match

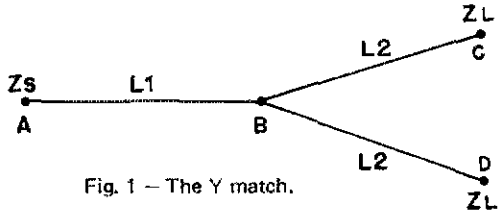


Fig. 1 — The Y match.

BY P. J. FERRELL,* W7PUG

ANTENNAS FOR USE in the hf spectrum consist primarily of wire dipoles and close-spaced parasitically excited end-fire arrays (Yagi, quad, and so on). But as the frequency increases, more elaborate antennas become feasible. These antennas usually require multiple feed points, as opposed to the more common single driven element of the lower frequencies.

Squabbles among hf operators over the relative merits of the Yagi versus the quad will never be settled, but among knowledgeable vhf/uhf men, the subject of broadside versus end-fire arrays is rarely argued. Broadside antennas will almost deliver the theoretical gain for a uniformly illuminated aperture, and they are broadband, too. The one advantage of a Yagi is its simple feed, with a single (albeit cantankerous) driven element to match.

If, however, one takes the trouble to provide a corporate feed system for a multielement broadside array, it will noticeably outperform a Yagi using the same number of elements. The major stumbling block seems to be a scarcity of information on properly feeding and matching a multielement array, and it is to meet this need that the author introduces the Y-match. The basic Y match is shown in Fig. 1. It is constructed of three pieces of transmission line of characteristic impedance ZO connected in parallel at point B. The section from A to B is L1 wavelengths long, and the sections from B to C and from B to D are each L2 wavelengths long. A pair of identical load impedances of ZL ohms (at points C and D) can be matched to a wide range of specified source impedances, ZS at point A. The input power is split equally between the two loads, which are driven in phase. In general, the impedance seen at the junction (point B) is complex, but can become real (resistive) at the end of the "stem" (point A). An interesting feature of the Y match is that the range of real source resistances available at point A occurs in two bounded intervals or regions. The lower region is always below ZO and will be referred to as the "low-range match," and the upper region is always above ZO and will be referred to as the "high-range match" region. For every source resistance in the low range match, RSL, there is a source resistance in the high-range match, RSH, such that:

$$RSL \times RSH = ZO^2.$$

In other words, the two regions can be considered to be related by a quarter-wave line of characteristic impedance ZO. Formulas for calculating the boundaries of the low-range and high-range match regions depend on ZO and the value of the load impedance, RL, and are given in Table I.

The special condition RL = ZO causes both match ranges to collapse to a point with a low-range match value of ZO/2 and a high-range match value of 2ZO. Obviously, such a selection for ZO (or RL) is a very poor choice. The other extreme occurs if RL = ZO/2 or if RL = 2ZO. Then, both match ranges meet at (and contain) the value ZO and there is effectively one continuous range of available RS values from ZO/4 to 4ZO. Perhaps these numerical examples will illustrate:

1. If ZO is 72 ohms, and both RL values are 36 ohms, then:
   a. Low-range match is from 18 to 72 ohms.
   b. High range match is from 72 to 288 ohms.
2. If ZO is 50 ohms, and both RL values are 150 ohms, then:
   a. Low-range match is from 8.33 to 33.33 ohms, and,
   b. High-range match is from 75 to 300 ohms.

If the desired source impedance falls outside both low-range and high-range match regions, then no Y-match solution exists and one must select a different ZO line and try again.

Determining the Line Lengths

Now that the general capabilities of the Y match have been covered, how does one actually calculate the transmission-line lengths L1 and L2, given values for ZO and ZS? Two successive applications of the lossless transmission line equation will give a solution for ZS in terms of ZO, ZL, L1 and L2. Any attempt to invert the equations to give L1 and L2 in terms of ZO, ZL and ZS leads to a veritable algebraic nightmare! One is left with two techniques for an engineering solution to the Y-match problem, i.e., graphical and iterative. It is quite likely that computational complexity is at least in part responsible for general unfamiliarity with this fine matching technique.

* 6021 S. 119th St., Seattle, WA 98178.

Value of the load resistance	Low-Range Match		High-Range Match	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound
$R_L \leq Z_O/2$	$R_L/2$	$2R_L$	Z_O^2/R_L	$2Z_O^2/R_L$
$Z_O/2 < R_L < Z_O$	$R_L/2$	$Z_O^2/2R_L$	$2R_L$	$2Z_O^2/R_L$
$Z_O < R_L < 2Z_O$	$Z_O^2/2R_L$	$R_L/2$	$2Z_O^2/R_L$	$2R_L$
$R_L > 2Z_O$	$Z_O^2/2R_L$	Z_O^2/R_L	$R_L/2$	$2R_L$

Table I — Bounds of available match regions as functions of Z_O and R_L.

The Y-match problem is attacked graphically using a Smith impedance chart. Several steps are required, but the electrical behavior of the Y match is nicely illustrated. The procedure is covered in Figs. 2 and 3. In Fig. 2, $R_L = 3Z_O$. We begin by normalizing all impedances to Z_O and proceed as follows: Draw a circle about the center (1 + j0) which passes through the normalized load impedance (Z_L/Z_O). This R_L circle, identified as A, represents the locus of all normalized impedances available at the end of a line of characteristic impedance Z_O which is terminated in the load impedance Z_L. Two such lines (of length L2) are to be paralleled, thus the value of every point on the R_L circle must be divided by 2 to obtain the impedance behavior for the parallel combination of the lines. Fortunately for us, this new impedance locus is also a circle (of different diameter) centered on the real axis (jX = 0) such that it passes through the points $R_L/2$ and $Z_O^2/2R_L$, also on the real axis. We shall call this the "off-center" circle, shown as circle B. In Fig 2, the off-center circle is constructed to pass through the points 0.167 + j0 and 1.5 + j0. It is this off-center circle which determines the matching range of the Y match.

Any resistive source impedance may be obtained which lies on a circle, centered on the point 1 +j0, which intersects the off-center circle. Two centered circles, C and D each tangent to the off-center circle, define the source impedance range of the Y match. Only those normalized source impedances which lie between the limiting (tangent) circles can be transformed to the off-center circle and thus effect an impedance match. The boundaries of the low-range and high-range match regions are seen to be the real-axis intercepts of these inner and outer tangent circles.

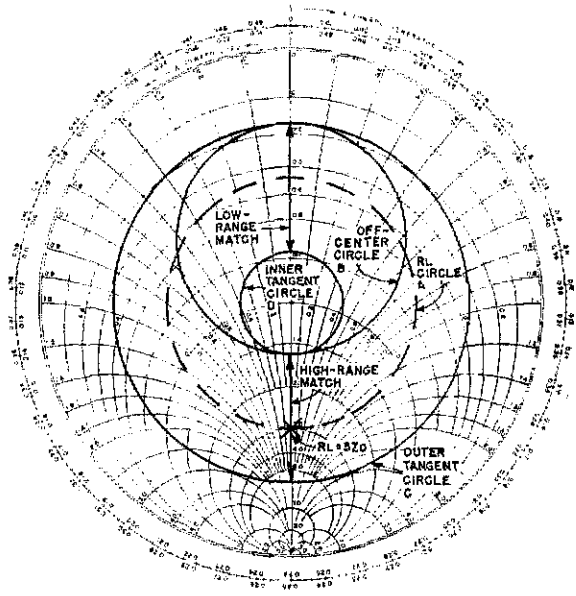


Fig. 2 — The electrical behavior of the Y match is illustrated by these circles drawn on a Smith chart impedance-coordinate system. The two loads, ZL of Fig. 1, are resistive and equal to three times the characteristic impedance of the transmission line for this set of circles. Arrows show two ranges of resistance values available from a Y match; these values may be determined mathematically by data in Table I.

An Example Problem

The following step-by-step example of a graphically solved Y match is illustrated in Fig. 3. Assume a line impedance, Z_O, of 72 ohms, a pair of 50-ohm loads, R_L, and a desired source resistance, R_S, of 144 ohms:

1) Locate the point A (normalized R_L of 50/72 = 0.7 + j0) on the Smith chart.

2) Construct circle I centered at 1 + j0 which passes through the point A. Note that this circle also passes through the point 1.44 + j0 on the other side of the center.

3) Divide both real-axis intercepts of circle I by two to obtain (0.7 + j0)/2 = 0.35 + j0 and (1.44 + j0)/2 = 0.72 + j0. Construct a circle centered on the real axis which passes through these points. This off-center circle II is the normalized impedance locus obtained by varying the length L2, as measured at point B of Fig. 1.

4) Construct circle III centered at 1 + j0 which passes through the normalized source impedance point C, 2 + j0 (144/72 = 2 + j0). This circle is the locus of all normalized impedances which can become 144 ohms, by virtue of changing the length L1.

5) We see that circles II and III intersect at two points, with coordinates of 0.52 + j0.18 and 0.52 − j0.18. The match point B is selected as 0.52 + j0.18, but note that the choice is arbitrary; either intersection could be used.

6) To determine length L1, proceed along circle III clockwise (toward generator) from point B to point C, the desired source impedance. The number of wavelengths traveled is measured on the outer scale as 0.25 −.038 = 0.212 giving L1 = 0.212 wavelength.

7) Return to match point B and double its normalized impedance to obtain 2(0.52 + j0.18) = 1.04 + j0.36 for point D. This new point is on circle I (recall that every point on circle II is half the value of the corresponding point on circle I) and represents the load impedance R_L as seen at the end of a line of length L2.

8) To determine length L2, proceed along circle I counterclockwise (toward load) from point D to point A, the normalized load impedance. The number of wavelengths traveled is again obtained from the outer scale as 0.148; thus L2 = 0.148 wavelength.

This example demonstrates a graphical solution of the stated Y-match problem, but is a somewhat tedious procedure which causes one to wonder if there might not be an easier way to obtain an answer. There is no arguing with the fact, however, that the Smith chart method does provide considerable insight into the electrical behavior of the Y match.

If we are given values for the lengths L1 and L2, the characteristic impedance Z_O and the load impedance Z_L, then solving directly for the source impedance Z_S is a straightforward task (if a trifle

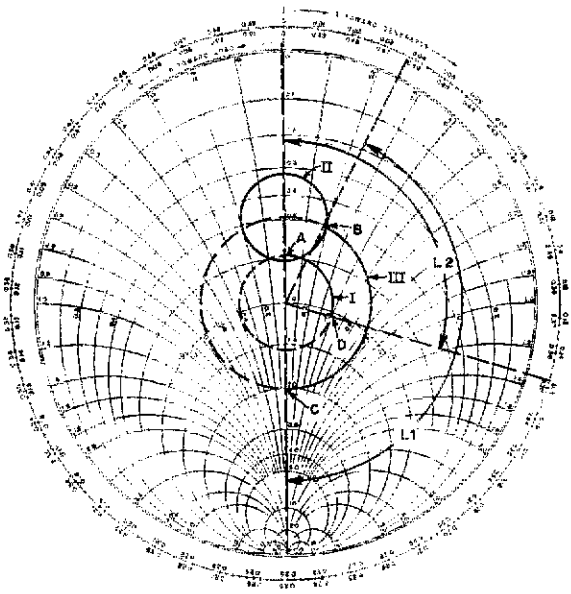


Fig. 3 — Practical example showing use of the Smith chart for solving a Y-match problem. See text.

messy). We run into severe difficulties, however, when we attempt to specify the source impedance ZS and then solve for the line lengths L1 and L2. Upon being thwarted in our attempt at direct solution, we turn to a branch of mathematical sleight-of-hand known as "numerical analysis" and "iterate." Stripped of the high-powered mathematical jargon, iteration is simply taking a guess at values for L1 and L2 followed by another (hoped to be improved) guess, and so on. At each step, we calculate the value of ZS resulting from our guess and see how close we came to our desired value. The trick, of course, is to find some method of making each guess come closer than the previous one did. A purist would argue that such a procedure can never yield the "exact" answer (Zeno's paradox), but practically speaking, it works just fine. The "guess-improvement" method to be chosen will have two properties of immediate concern; i.e., stability and rate-of-convergence. A method is stable if each succeeding guess results in a smaller error than did the last one, and it converges rapidly if the error in each guess is much smaller than the previous guess. It should be clear that iteration may involve a great amount of computation, but fortunately for us, a digital computer excels at just this type of repetitious calculation. A computer program for calculating the dimensions of a Y match, given the necessary parameters, was written in a conversational Fortran IV language for use with the Tymshare, Inc., computer network. This program is presented in the appendix to this article.

It is hoped that sufficient information concerning the Y-match technique has been supplied to allow a painless application to multiple-fed antenna arrays as well as other splitting and matching problems. Many stimulating discussions with many people have directly contributed to this exposition of the Y match. The author especially acknowledges the contributions made by Dr. J. N. Johnson (numerical analysis while you wait) and Paul W. Leonard, W7LMX (the care and feeding of Smith charts), and the experimental corroboration provided by Bill Whitehouse, WA7NUK. As a final observation: to the question "Y match?" always be certain to reply, "Y not!"

Appendix

An iteration program can be a bit tricky, and time-sharing computers allow an interactive approach to be employed. The program calculates L1 and L2 in wavelengths when given Z0, ZL and ZS where the last two quantities may be complex. The guess-improvement method used is known as Newton's method and has the property of extremely rapid convergence if the starting values for L1 and L2 are close to the final answers. Two sets of starting values for L1 and L2 are provided, with the shorter set being tried first. The longer set may be tried upon command in the unlikely event of the failure of the first set. Input parameters to the program are Z0 (line impedance), ZL and ZS. After Z0 and the complex ZL are supplied, the program prints out the boundaries for both low-range and high-range match regions. After receiving the complex ZS, initial starting values for L1 and L2 are supplied and iteration continues until either the difference between the specified ZS and the calcuated value is less than 1/100,000 ohm and processing is complete, or it fails to converge and another set of starting values for L1 and L2 is tried. The resulting answers for L1 and L2 are accurate to about four significant figures, which is more than is required for an engineering answer to the Y match problem.

Computer solutions are restricted to the range of zero to one-half wavelength, but if longer lines are required because of physical constraints, either L1 or L2 or both may be increased by any itegral number of half wavelengths (as long as losses are negligible) without affecting the matching properties, but at the expense of decreased matching bandwidth. If both ZL and ZS are real (resistive), and L1 and L2 are a set of solutions to the stated Y-match problem, the the complementary set of lengths 0.5 – L1 and 0.5 – L2 are also solutions to the same problem. This symmetry enables us to halve the number of different starting values for L1 and L2 and still be certain of obtaining a computer solution. The complementary solution corresponds physically to selection of the "other intersection" of circles II and III in Fig. 3.

A source-language listing of the program is included herein, and the sample problem which was solved graphically in Fig. 3 was also submitted to the program with the resulting printout shown. Only the underlined numbers in the problem were user supplied. Also included is another problem for the design of a 52-ohm 3-dB power splitter made of 95-ohm RG-62/U coax.

```
100 C: Y-MATCH CALCULATION PROGRAM
101 COMPLEX ZB,ZL,ZS,ZT,ZT1,ZT2
102 STRING S(1)
103 REAL L1,L2
104 1 DISPLAY ''
105 ON INTERRUPT GO TO 99
106 ACCEPT 'LINE IMPEDANCE: ',Z0
107 ACCEPT 'COMPLEX LOAD ZL: ',ZL
108 ON INTERRUPT GO TO 1
109 RL=REAL(ZL); XL=IMAG(ZL)
110 IF(XL.EQ.0.) GOTO 6
111 C: IF ZL IS COMPLEX, CALCULATE T FOR REAL IMPEDANCE
112 B=Z0*Z0-RL*RL-XL*XL
113 A=Z0*XL
114 T=(B+SQRT(B*B+4.*A*A))/(2.*A)
115 C: USE T TO EVALUATE ZT AND TAKE REAL PART FOR RL
116 ZT=Z0*(ZL+(0.,1.)*Z0*T)/(Z0+(0.,1.)*ZL*T)
117 RL=REAL(ZT)
118 C: CALCULATE RI (INVERSE OF RL) AND SELECT SMALLEST FOR RN
119 6 RI=Z0*Z0/RL
120 RN=MIN(RL,RI)
121 RA=.5*Z0*Z0/RN; RB=2.*RN
122 C: CALCULATE AND PRINT LOW AND HIGH MATCH BOUNDARIES
123 RP1=.5*RN; RP2=MIN(RA,RB)
124 RS1=MAX(RA,RB); RS2=4.*RA
125 DISPLAY ''
126 DISPLAY 'ATTAINABLE RESISTIVE SOURCE IMPEDANCES ARE:'
127 WRITE(1,102)' LOW',RP1,RP2
128 WRITE(1,102)'HIGH',RS1,RS2
129 102 FORMAT(A4,' RANGE MATCH FROM',F7.2,' TO',F7.2,' OHMS')
130 DISPLAY ''
131 ACCEPT 'DESIRED COMPLEX SOURCE ZS: ',ZS
132 DISPLAY ''
133 IPASS=0; IS=80; II=2
134 5 IS=IS+II
135 IF(MOD(IS,10).EQ.0)GOTO 5
136 IF(IS.GT.60)GOTO 3
137 IX=(1-MOD(IS,2))*(1-MOD(IS/10,2))
138 IF(IX.EQ.IPASS)GOTO 5
139 L1=.05*MOD(IS,10); L2=.05*(IS/10)
140 N=0; ERRTST=1.E8
141 T1=TAN(6.28318*L1)
142 T2=TAN(6.28318*L2)
143 RS=REAL(ZS); XS=IMAG(ZS)
144 C: ITERATION LOOP
145 2 N=N+1
146 ZB=Z(Z0,ZL,T1,T2)
147 C: OBTAIN DELTA T1 AND DELTA T2
148 DT1=SIGN(MAX(.0001,.001*ABS(T1)),T1)
149 DT2=SIGN(MAX(.0001,.001*ABS(T2)),T2)
150 C: CALCULATE APPROXIMATE COMPLEX PARTIAL DERIVATIVES
151 ZT1=(Z(Z0,ZL,T1+DT1,T2)-ZB)/DT1
152 ZT2=(Z(Z0,ZL,T1,T2+DT2)-ZB)/DT2
153 C: OBTAIN FOUR REAL PARTIALS
154 RT1=REAL(ZT1); XT1=IMAG(ZT1)
155 RT2=REAL(ZT2); XT2=IMAG(ZT2)
156 C: CALCULATE THE JACOBIAN DETERMINANT D
157 D=RT1*XT2-RT2*XT1
158 C: IF D GETS TOO SMALL, LEAVE ITERATION LOOP
159 IF(ABS(D).LT.1E-30)GOTO 5
160 C: CALCULATE ERROR (DELTA R AND DELTA X)
161 DR=REAL(ZB)-REAL(ZS)
162 DX=IMAG(ZB)-IMAG(ZS)
163 ERR=DR*DR+DX*DX
164 IF(ERR.GT.ERRTST)GOTO 5
165 C: SUCCESS...IF ERROR IN ZS IS LESS THAN 1E-5 OHMS.
166 IF(ERR.LT.1.E-10)GOTO 4
167 ERRTST=.5*ERR
168 C: CALCULATE NEW APPROXIMATION TO T1 AND T2 AND TRY AGAIN
169 T1=T1-(RT2/D)*DX+(XT2/D)*DR
170 T2=T2-(XT1/D)*DR+(RT1/D)*DX
171 IF(N.GE.10)GOTO 5
172 GOTO 2
173 C: OPPORTUNITY TO TRY THE FINE-GRAIN SEARCH PATTERN
174 3 DISPLAY'THIS MESSAGE APPEARS WHEN NO SOLUTION HAS BEEN'
175 DISPLAY'FOUND. MAKE CERTAIN THAT THE CHOSEN ZS IS WITHIN THE'
176 DISPLAY'MATCHING RANGE... DO YOU WISH TO TRY THE FINER'
177 ACCEPT'SEARCH (TRIPLE THE CPU TIME) ? ',S
178 IF(S.NE.'Y')GOTO 1
179 IS=10; II=1
180 IPASS=1
181 GOTO 5
182 C: PRINT ANSWERS AND RETURN FOR NEW PROBLEM
183 4 WRITE(1,100)N,L1,L2
184 100 FORMAT(I2,' ITERATIONS STARTING WITH L1 = ',F3.2,' AND
 L2 = ',F3.2,' WERE REQUIRED.')
185 L1=ATAN(T1)/6.28318; IF(L1.LT.0.)L1=L1+.5
186 L2=ATAN(T2)/6.28318; IF(L2.LT.0.)L2=L2+.5
187 WRITE(1,101)L1,L2
188 101 FORMAT(' FINAL VALUES ARE:  L1 =',F5.3,' AND  L2 =',
 F5.3,' WAVELENGTH.')
189 GO TO 1
190 99 QUIT
191 END
192 C: FUNCTION SUBROUTINE CALCULATES ZS FOR Y-MATCH
193 COMPLEX FUNCTION Z(Z0,ZL,T1,T2)
194 COMPLEX ZI,ZL
195 C: COMPLEX IMPEDANCE ZI AT JUNCTION OF Y-MATCH
196 ZI=.5*Z0*(ZL+(0.,1.)*Z0*T2)/(Z0+(0.,1.)*ZL*T2)
197 C: RETURNS Z (ZS) FOR Z0, ZL, T1 AND T2 INPUTS
198 Z=Z0*(ZI+(0.,1.)*Z0*T1)/(Z0+(0.,1.)*ZI*T1)
199 RETURN
200 END

PROBLEM 1...

LINE IMPEDANCE: 72
COMPLEX LOAD ZL: 50,0

ATTAINABLE RESISTIVE SOURCE IMPEDANCES ARE:
 LOW RANGE MATCH FROM  25.00 TO  51.84 OHMS
HIGH RANGE MATCH FROM 100.00 TO 207.36 OHMS

DESIRED COMPLEX SOURCE ZS: 144,0
6 ITERATIONS STARTING WITH L1 = .20 AND L2 = .10 WERE REQUIRED.
FINAL VALUES ARE:  L1 = .211 AND  L2 = .149 WAVELENGTH.
PROBLEM 2...

LINE IMPEDANCE: 75
COMPLEX LOAD ZL: 52,0

ATTAINABLE RESISTIVE SOURCE IMPEDANCES ARE:
 LOW RANGE MATCH FROM  26.00 TO  86.78 OHMS
HIGH RANGE MATCH FROM 104.00 TO 347.12 OHMS

DESIRED COMPLEX SOURCE ZS: 52,0
5 ITERATIONS STARTING WITH L1 = .10 AND L2 = .10 WERE REQUIRED.
FINAL VALUES ARE:  L1 = .428 AND  L2 = .176 WAVELENGTH.
```

QST

25 years ago

November 1947

. . . Broadcasting was a threat to amateurs in 1947 as well, but this time TV rather than aural. Manufacturers were turning out lousy (from an interference-rejection standpoint) receivers, and, to be frank, we were just beginning to uncover some tricks and practical methods of harmonic suppression in our transmitters. The editorial sounded a warning that with every reduction technique then known, a 28-Mc. amateur rig could still cause general interference to TV, particularly Channel 2. The League's solution: Eliminate Channel 2 instead of 1 (yes, there was one once); and at numerous FCC hearings on the matter we *almost* sold the idea.

. . . . "Four-Twenty Is Fun!" says the lead article, and VHF Editor W1HDQ describes some simple gear to get down below one meter, "where a half-wave antenna is less than 13 inches long." The receiver is superregen, of course, and inductances are copper tubing lines, with shorting bars for tuning in one case, and a movable vane in another. In a test, the rig covered 7 miles from Martha's Vineyard to the mainland.

. . . Increasing interest in beam antennas is further spurred by an extensive symposium on construction – booms, rotators (one driven by a washing-machine motor) and indicators.

50 Years Ago *this month*

November 1922

. . . The coming conflict between amateurs and broadcasters over wavelength "rights" is foretold in W8ZZ's cartoon cover, showing an upstanding and naturally clean-cut young amateur alongside a (naturally) disreputable older figure representing broadcasting, both standing in judgement before Uncle Sam. The reassuring verdict: "Sonny, my name is on your license the same way it's on his."

. . . The lead story, which *QST* has sought for over a year, describes the "wave antenna," better known by the name of its inventor, H. H. Beverage. Courtesy of RCA, long-wire experiments were made on amateur wavelengths (in those days, much longer than 50 or 100 feet!), and the antenna was recommended for hams with enough space who wanted the directivity it produced – even with number 18 bell wire, it says. There is some interesting discussion of velocity through the wire, measured sometimes as only 88% of the speed of light, so that excessive length and certain critical heights caused the current at the far end of the wire to be 180° out of phase with the input, resulting in all sorts of electron confusion.

. . . Working every call district in one night was such an achievement in 1922 that 1CCZ of Wianno (Cape Cod), Mass., gets a full page writeup on the event and the equipment. Ponder, friends, that today we can have 'em all in a single round table, plus a few dozen overseas countries. — *W1RW*

A Repeater Identifier

BY COLIN ROWE,* VE3AZY

THE BASIC DIGITAL Morse-code generator described by Hall[1] provides the heart of an identifier for fm repeater operation, provided one can reidentify at one-minute intervals. In our application at the VE3RMR uhf repeater and vhf remote base system, we decided not to incorporate the keying or selectable stop options in order to provide additional space on the printed circuit board for recycle and self-completing options that we desired. This note provides a method in which an fm repeater is identified at the beginning of a transmission and every minute thereafter, provided the carrier-operated relay (COR) remains energized.

The circuit shown in Fig. 1 is a one-pulse-per-minute generator needed to provide repetitive identification. With the COR contacts open, transistors Q1 and Q3 are turned on so that both timing capacitors, C1 and C2 are discharged. Upon receiving an incoming signal at the repeater input which closes the COR contacts, both Q1 and Q3 are turned off, thus allowing timing capacitors C1 and C2 to charge. CR3, in series with the COR contacts, provides protection to the circuit of Fig. 1 should the COR lead also be carrying voltage, such as many be present on the push-to-talk line of the repeater. The output across diode CR2 rises, causing a positive spike at the collector of Q4. This pulse clears the control flip-flop (U7 of the original circuit) and enables the Morse identification message to be generated. CR1 and the 22k-ohm resistor allow the capacitor C1 to discharge slowly and to charge quickly when the COR is released and then reenergized. R1 and C2 form a one-minute timing network which fires the unijunction transistor, Q2. The value of R1 will have to be set experimentally because of slight differences in the standoff ratio of the particular unijunction transistor used. In our case, when used with a 68-μF capacitor and a 2N2646 transistor, the value for one-minute time intervals was found to be 459k-ohms (consisting of a 300k-, 120k-, and a 39k-ohm resistor in series. Much higher resistance values will not allow the 2N2646 to fire because of leakage through C2 and the pc board.

The circuit shown in Fig. 2 is used as the self-completing option in order that the repeater

* Apt. 707, 2310 Fox Crescent, Ottawa 14, Ontario, Canada.

[1] Hall, "A Digital Morse-Code Message Generator," *QST*, June, 1970.

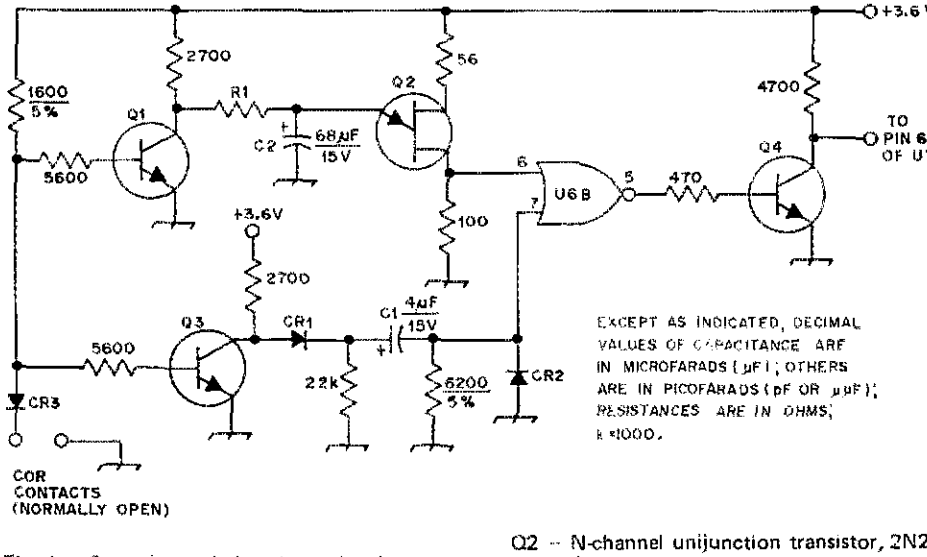
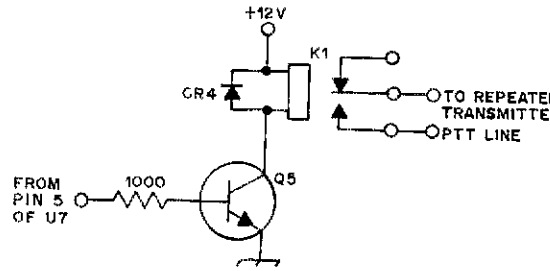


Fig. 1 — One-minute timing circuit for the repeater identifier.
C1, C2 — Electrolytic.
CR1, CR2, CR3,— Silicon diode, 1N914 or equiv.
Q1, Q3, Q4 —16 Silicon npn transistor, 2N3565 or equiv.
Q2 — N-channel unijunction transistor, 2N2646 or equiv.
R1 — See text.
U6 — RTL quad 2-input NOR gate, Motorola MC724P or HEP 570 or equiv. The B section shown here was unused in the original version of the message generator.

Fig. 2 — Self-completion circuit for the repeater identifier.
CR4 — Silicon diode, 1N914 or equiv.
K1 — 12-V dc relay (Potter and Brumfield HP-11D or equiv.).
Q5 — Silicon npn transistor, 2N3565 or equiv.



identify the full call sign, should the COR drop out during an identification. During an identification period, the *Q* terminal of the control flip-flop is high. This voltage is used to operate a relay which has its contacts placed across the repeater transmitter push-to-talk line. In our case, we used a 12-volt dc relay since our higher voltage was 12 volts rather than 6 or 7 as in the Hall code generator. The same values as in his keying relay circuit could be used by those having the lower supply voltages.

The only other addition to our identifier is an audio power-amplifier stage. The output transformer matches the 600-ohm audio line of the repeater.

Operation

Upon closure of the carrier-operated relay, the one-minute timer begins timing and the closure itself resets the control flip-flop. At this point, the identifier message is sent. During this time the relay driver is operated by the control flip-flop, keying the push-to-talk line of the transmitter. As long as the COR remains closed, a pulse is generaged once every minute which causes the call sign to be sent. QST

Strays

ORIGIN OF THE SPECIES?

I recently came across the letter by WB6WGX in the April, 1972 "Correspondence" column, in which he wonders about the origin of the word "Ham." I too, have wondered about that from time to time, and last year did some research on my own. The results were enlightening, and seem to make very good sense. Perhaps this explanation will settle the question once and for all!

The word has its beginnings in the American theatre of the last century. One of the standard, stock characters of Old Time Mellerdrama was the Country Bumpkin, a rude, ignorant clod who was written into the script mainly as comedy relief. His job was to make the people laugh, and while he was on stage he had virtually *carte blanche*. He was the scene-stealing buffoon, and if he stepped in buckets of paint, tripped over his own feet, took pratfalls and made a general fool of himself, so much the better.

To identify himself to the audience, the Country Bumpkin usually made his first appearance gnawing on a hambone. This became almost a tradition, and audiences knew that when the hambone appeared, laughter followed. Gradually, the character itself came to be called "The Hambone," and eventually "Hambone" was used to identify any slapstick comic.

However, an off-shoot definition grew up side-by-side with the actual meaning of the word. The unpopular, egotistical actor who always sought the limelight and who would do anything to steal a scene, even to making a fool of himself, was mockingly dubbed a "Hambone" by his colleagues. The duplicate meanings caused some confusion: when you called someone a "Hambone," were you describing his theatrical specialty or insulting him? The language ironed things out by adapting nicely. "Hambone" retained its original descriptive meaning; the bad actor was known as a "Ham"

And then something interesting happened. The word caught on. According to the Dictionary of American Slang, "ham" enjoyed great popularity toward the end of the 19th century and the beginning of the 20th, and stood for anyone who was totally inept and incompetent in any field. If your dentist pulled the wrong tooth, you called him a "ham dentist." If you painted yourself into a corner your wife laughed and called you a "ham painter." There were ham carpenters, ham mechanics and not surprising, ham telegraph operators.

Then came wireless telegraphy and with it a rapidly burgeoning host of experimenters and tinkerers who were so turned on by this new medium of communication that they spent all their spare time and money fooling around with it. They filled the limited spark-gap spectrum with such squawks, hisses, squeals and other horrendous types of QRM that the poor commercial operators — most of whom were former land telegraphers — had a hard time copying legitimate messages. No wonder then, that these harried professionals called the ignorant experimenters a bunch of "hams."

But soon the word "ham" had run its course and its popularity waned, with the exception of "ham actor" which is still very much alive. By this time however, there were so many radio experimenters, all of whom were called "hams," that the word lost its derogatory meaning. Besides, it was a neat way to differentiate the amateur from the professional. "He's a ham" is a lot easier to say than "He's an amateur radio operator." And, by the 1920s when these "hams" had made most of the advances in the science of radio, the last vestige of insult disappeared. It was no longer a shame to be called a "ham," it was something to be proud of.

With "ham" no longer an insult, telegraphers had to find another word to fill its shoes. And so they reached back and found a term that, like "ham," was an old land telegraphers' word. It's "Lid," and where that came from I haven't the foggiest idea. Maybe somebody out there does. — *Roger Sklar, W9JWJ, Park Forest, IL*

Technical Correspondence

SECONDARY-STANDARD FREQUENCY COMPARISON WITH TV COLOR-BURST FREQUENCY

Technical Editor, *QST*:

Mention has been made of the availabilty of the TV network-generated color-burst frequency, 3579.545 kHz, as a standard of frequency of high accuracy.[1] With the usual decade divider type of system following a crystal oscillator one cannot obtain a zero beat with this frequency.

However, a type 7520/8520 variable-modulo divider available from advertisers in *QST* nicely solves this problem. Two of these units can, by proper interconnection, be used to divide by any whole number from 2 to 255. A 5-MHz source divided by a 7520/8520 programmed for modulo 88 provides an output, the 63rd harmonic of which beats with the color-burst frequency. Actually a modulo 88 works well with 1 MHz or 100 kHz since some higher order harmonic will fall on the desired frequency. Incidentally, there seems to be enough leakage from most color TV receivers to make actual connection to the receiver unnecessary. – *Edward W. Sanders, W2VM, 70 Maxwell Ave., Geneva, NY 14456.*

TELEPHONE INTERFERENCE PROBLEM SOLVED

Technical Editor, *QST*:

On the article by WØMYN in the May, 1972, issue of *QST*,[2] I wish to say that a severe case of telephone interference which I was experiencing was not eliminated by *any* of the methods mentioned. The only thing which cured my problem was burying the cable underground!

I called the telephone company and an official came out to the house, assessed and analyzed the situation. With a special tractor machine, they dug *a pencil-width slit in the lawn, laying the new,* shielded cable at the same time as they went from the house to the pole in front of the house. This cured the problem. – *Ed Bolton, WA3PUN, 4210 Elmerton Ave., Harrisburg, PA 17109.*

MORE ON FINDING DC-MILLIAMMETER INTERNAL RESISTANCE

Technical Editor, *QST*:

I am writing in regard to W8NN's letter on *measuring internal meter resistance.*[3] *Why make* things so complicated?

A very simple and accurate way is to hook a 5000-ohm rheostat in series with the meter and then to a flashlight battery, as shown in Fig. 1. Adjust the rheostat for full-scale deflection, and then measure the resistance of the rheostat. Call this resistance value R1. Then adjust the rheostat for half-scale deflection and again measure the resistance of the rheostat. Call this value R2. Then use some elementary algebra: The resistance of the *meter equals R2 minus twice R1.* – *Jerry Long, WB9DWP, 4801 Orleans Dr., Kokomo, IN 46901.*

NOTES ON THE AUDIO SYNTHESIZER FOR RTTY

Technical Editor, *QST*:

The article, "An Audio Synthesizer,"[4] has given me the ultimate solution to obtaining afsk and should be included in the 1973 *Handbook*. A couple of points, though, may be helpful to others *building this unit.*

The connections to the regulator pass transistor are a little ambiguous. It should be pointed out that the 2N5193 in Fig. 4 is drawn with the "brass disk" side down. Also I advise double checking with a transistor manual as a precaution. If connections are reversed the regulator works until pins 17 and 18 are jumpered. When the jumper is added the 5-volt bus drops to 2.1 volts.

Second! If you happen to get a crystal a little on the inactive side, indicated by slow starting or *no start when pin 5 is grounded, adjust the* capacitive feedback voltage divider, C3 and C4. In my case I added 5.6 pF in parallel with C4, and the start time is now in microseconds.

Keep up the good work with *QST*, and the '72 *Handbook* is great! – *Bill McFadden, VE3DIL/WI, 755 Washington St., Annisquam, MA 01930.*

REFLECTIONS ON "REFLECTED POWER"

Technical Editor, *QST*:

I have just obtained a copy of the 1972 ARRL *Handbook*, *which appears to be an excellent* publication. There is, however, one thing that irks

[1] Huntley, "TV Color-Burst Signal for Primary Frequency Reference," Technical Correspondence, *QST*, February, 1971. See also Dorschug, "More on Color-Television Subcarrier Frequency," Technical Correspondence, *QST*, April, 1971, and Huntley, "5-MHz Oscillator Phase Locked to TV Color-Burst Signal," Technical Correspondence, *QST*, August, 1971.

[2] Bercovi, "How to Handle Telephone Interference," *QST*, May, 1972.

[3] Mason, "Finding the Internal Resistance of a DC Milliammeter," Technical Correspondence, *QST*, June, 1972.

[4] Drake, "An Audio Synthesizer — A Device to Generate RTTY Tones with Crystal-Controlled Accuracy," *QST*, April, 1972.

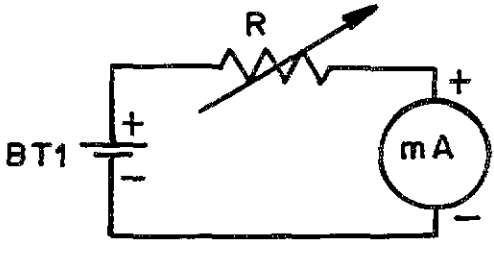


Fig. 1 – WB9DWP's circuit for determining the internal resistance of a dc milliammeter. The value of R should be great enough to avoid damage to the meter from the voltage supplied by BT1.

me. I hurriedly thumbed through several sections to check, and I find it is consistent with its inconsistencies. That is the use of the term,"reflected power." *QST* and other magazines have recently carried articles on this subject, all pointing in the right direction, but either there is too much resistance to change, or the writers are just enough unsure of their position to say it as it really is. Let's face up to it and admit to all the world that there is no such thing as reflected power, although both current and voltage may be reflected.

Rf is alternating current, and as such it follows all the basic laws of ac, even as the lowly 60 hertz in the supply lines does. The text books all tell us that in an ac circuit, power is the product of voltage and current that are exactly in phase with each other. If voltage and current should differ in phase by 90 degrees, the power in the circuit is zero. If the phase angle is other than 0 or 90 degrees, the circuit is carrying a combination of power, represented by those portions of voltage and current which are in phase, and extra voltage and current which are out of phase by 90 degrees and therefore wattless or powerless.

A radio transmission line follows all the rules of ac, regardless of frequency. Thus, a so-called flat line, exhibiting no standing wave, is carrying power because the current and voltage are in phase. An unterminated line can carry no power, for there is no load. The ordinary rf transmission line, tied to a load like an antenna and a power source like a transmitter, can only exhibit effects determined according to the rules of ac. If we assume a mismatch of impedances at the antenna or elsewhere along the line, there will be standing waves of current and voltage between the point of mismatch and the power source. This simply means that two voltage and two current vectors are present. The voltage and current vectors of one set are in phase with each other, and in a second set are 90 degrees out of phase with each other. The first set represents all the *power* flowing in the circuit, but since the others are 90 degrees apart, they cannot in any way represent power, either *forward* or *backward.* Ordinary meters can measure the total voltage or current, but these readings represent only the algebraic, or vector sums of the in-phase and out-of-phase components.

One might ask, "If we are not supplying power to an open-ended transmission line, why do the tubes in the amplifier heat up, or why does the plate current increase?" To force current through a circuit, we must overcome the effects of resistance. Remember, an open-circuited transmission line has both inductance and capacitance, so it is a completed ac circuit with no load at the far end. It also has series resistance, and it has dielectric material between the plates of its capacitance — it has built-in losses. Also the tubes in the transmitter have built-in losses, such as plate resistance. If the open-ended line is connected to the rf generator so that a current will flow, all the I^2R losses in the circuit must be supplied by the generator. This is truly power and it will produce heat. If a current flows, heat is produced and heat represents power, in this case all being lost or wasted.

Of course, these losses are also present when the regular load is attached to the transmission line. Then, if the unmatched line is carrying load current plus useless out-of-phase current, extra heating, representing losses, follows. We want to reduce losses, so we strive to reduce our SWR. This is all we gain, unless the transmitter has too small a matching range.

Why doesn't ARRL, in all their publications, begin to tell it like it really is? *There is no such thing as backward or reflected power!* All reference to such should be excluded from all articles in *QST* and the *Handbook*, conversation, and so on. Perhaps, then, even others, including manufacturers would also get straight, and once and for all the mystery of SWR would be solved. — *G. T. DeLaMatyr, W5GO, 170 W. Caldwood Dr., Beaumont, TX 77707.*

"EASY" AMPLIFIER DESIGN

Technical Editor, *QST:*

Being an electronics engineer and graduate of MIT, I eagerly read your Part I, "Fundamentals of Solid-State Power-Amplifier Design," pages 29-36, in the September issue of *QST*. This article states that it is supposed to convince the reader that solid-state amplifier design is easy! Well any article requiring twenty-two references and a footnote to a, '57 issue of QST (which I have long since heaved) for Part I, is the first clue that this subject is far from "easy!"

My first surprise in reading this article was the statement on page 30 that a transistor will be less rugged at lower frequencies than at 30 MHz — it may be too fragile to be useful. Just the opposite! This statement requires some kind of explanation! Although warned that I was expected to find and study three references on the use of the Smith chart, I was not exactly prepared for what came next; the most cursory explanation I have ever seen! Curves, impedance values, origins, all a mystery! At least one might expect a mechanical explanation of these particular examples! There is no mention of what the "length of L1 = 0.082 λ" is for. The spirals on the printed board look like lumped impedances, not line elements! Also the box on Chart 12C for C1 seems to be missing brackets, and where the numbers come from I can't imagine! Quite a bit of space is spent on generalities, but when it comes to specifics like these, the writer runs out of steam I think. Perhaps future parts of this series will go into these details.

If these matching problems are so easy, how come all the transceivers currently on the market for the hf bands (not 2-meter fm) have tuning and load controls still? Usually articles in *QST* are pretty readable, and this is one main reason I keep up my subscription. The technical societies just don't meet this need, and many engineers I have known and read about have mentioned this problem. Keep up the good work. — *Orville E. Bean, W1MXX, 15 Timber Lane, Wayland, MA 011778.*

Strays

I would like to get in touch with . . .

. . . anyone in the Baltimore-Washington area interested in setting up a station for receiving Apollo 17 transmissions. David Macker, 6 Stanley Drive, Baltimore, MD 21228.

. . . anyone interested in an environmental net on 40-meters. WN9FKX.

. . . hams who are graduates of Virginia Polytechnic Institute. WA4HHP.

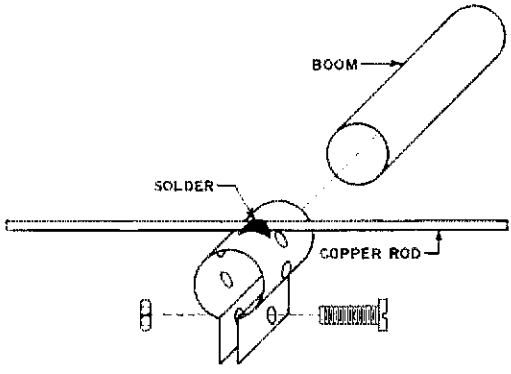
. . . James J. Lumby, ex-WA5DPC, WB4UJK.

. . . electronic representatives interested in a 20-meter net. W5REZ.

Hints and Kinks For the Experimenter

A UHF BOOM-TO-ELEMENT CLAMP

While building an experimental Yagi for 432 MHz I had need of a way to mount the elements to the boom without drilling holes in the latter, so that I could adjust the elements for proper performance. The best way that I could accomplish this was to make the elements of 1/8-inch copper rod and solder them to perforated steel tape of the kind stocked by many hardware and electrical supply stores.

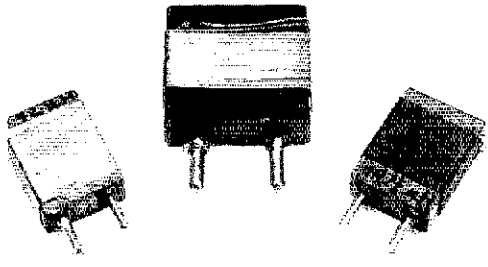


To make the bracket, I cut a 4-inch piece of the tape and bend it around the boom, using a pair of pliers to get a tight fit. The perforated tape is actually a tin alloy and bends easily. It will take solder very well. The bracket was soldered to each clamp using a 50-watt soldering iron.

After optimum spacing is found a more permanent connection may be desired. All that is necessary is to drill the boom at this final setting and place a nut-and-bolt combination through a pair of the holes in the tape, which will prevent movement. – *Steve DiBartolomeo, WN6HOC*

LOW-COST PLUG-IN COIL FORMS

Components for use in amateur construction projects are becoming very difficult to obtain. Few parts dealers are interested in stocking small items for the single-lot purchaser. It is therefore a necessity that the radio enthusiast exercise his imagination as was the practice in the early days of amateur radio, when radio parts were scarce and expensive. In a recent search for suitable low-cost plug-in coil forms for a wavemeter, the writer stumbled upon a long-overlooked technique – modification of an existing radio part for use in a different application.



Many of yesteryear's builders used the bases of defunct radio tubes as coil forms, throwing away the glass envelopes and innards. That method is still a good one if you are fortunate enough to have a supply of the older tubes with phenolic or Bakelite bases. Since this writer long ago cast his old tubes to the winds of antiquity (somewhat wistfully) another source of coil forms became necessary. A look through the junk department of the workshop turned up what should have long ago been the "obvious" . . . old crystal holders with two-pin bases!

Two experimental inductors were wound on FT-243 crystal holders. Another was assembled while using one of the larger surplus holders. Both types are shown in the photograph. The metal front plates were removed and discarded. Similarly, the metal plates and quartz from the inside of the holders were cast aside. A new side plate was made from phenolic sheeting (stiff cardboard, Formica, or other insulating materials are also suitable) and later glued in place on the empty holder. Holes were drilled in the sides of the holders to allow the coil wires to be routed inside them, then down through the base pins where they were soldered in place. The illustration shows how this is done.

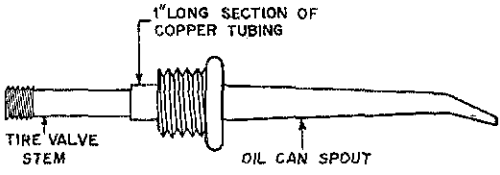
The inductors were checked on a Boonton 160-A Q meter. One FT-243 plug-in coil was wound full of No. 30 enameled wire. The unloaded Q was 100. The inductance was 42 μH. A similar inductor was wound using No. 26 enameled wire. It exhibited a Q of 105, and had an inductance of 14.4 μH. Not bad at all, and the fact that the winding is rectangular rather than circular has no significance! A circular coil from a well-known manufacturer's grid-dip meter (for the same inductance range) was compared to the homemade coil. The unloaded Q readings were nearly identical.

Those wishing to have longer coils can simply glue two crystal holders together, end to end, with epoxy cement. Or, if more than two terminals are needed, cement two holders together, back to back, and use a double crystal socket for the jack. If greater amounts of inductance are needed for low-frequency use, glue a slice of powdered-iron or ferrite material in the holder where the crystal once was. A piece of material cut from a flat hc-band ferrite antenna bar works very well for increasing the inductance of a coil. – *W1CER*

CERAMIC TUBE CLEANER

I had a problem in trying to keep the lint and dust out of the cooling fins on the plates of the 8122 final amplifier tubes in my linear. They are the ceramic types like the 4CX250 family.

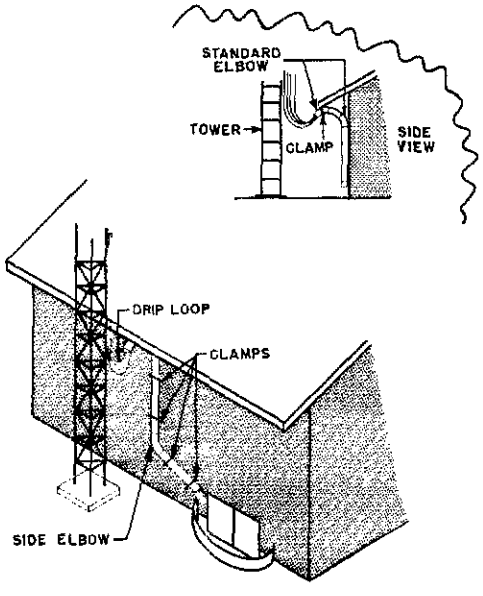
My solution was to solder an automotive inner-tube valve stem to the 4-inch spout of an oil can, using a 1-inch section of copper tubing as a coupler between the two. The end of the spout has an opening of about 1/16 inch and when this arrangement is connected to a tire pump, and an "armstrong" energy source applied, I have a variable-velocity air jet that is cheap and easy to build, which does the job very well. – *Ben Fidler, W7PZ*



DOWNSPOUTS HOUSE FEED LINES

After installing my new antennas and the many feed lines that I had coming into my house, I found they were quite an eyesore. My solution was to use rectangular downspouting with the necessary elbows and clamps to match the existing downspouts on my house and place it as shown in the drawing.

I kept the horizontal portion of the downspout low behind the bushes and shrubs to create as natural an appearance as possible. This arrangement works very well and should appeal to *most* wives.



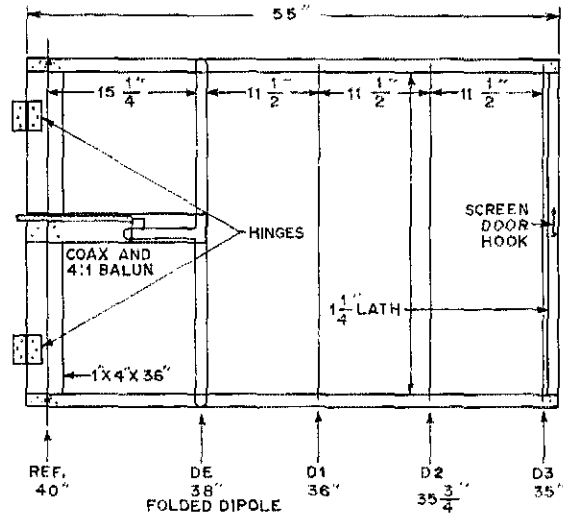
I found that flexible cables and rotator wires will thread through easily, but the solid aluminum-jacketed type is too stiff to bend around the curves inside the downspout. This type cable is placed alongside and bent to shape as inconspiciously as possible, and is then painted to match. With cables coming in from the outside, a drip loop should be provided so that water does not enter the shack during rain storms. – *George J. Poland, W8FWF*

2-METER GARDEN-GATE BEAM ANTENNA

In these times when many amateurs are moving to apartment type complexes, antennas, even in the vhf range, can present real problems. Many types of antennas are unsuitable because of their size and eye appeal to non-ham neighbors and landlords. One solution available to the 2-meter operator, living in an apartment having a balcony, *might be my Garden-Gate Beam.*

The antenna is constructed of light wood-lath material, 1 × 4-inch boards, two hinges, and No. 12 copper wire. The cost of this array is quite low. After construction of the gate, the wood should be sprayed with a clear varnish to seal it against moisture. The gate can then be mounted on the door frame to the balcony and a screen-door type hook and eye added to secure it to the wall when not in use. This will allow full use of the balcony for other purposes.

Matching the antenna for a minimum feed-line SWR is done by sliding a 4:1 balun along a quarter-wave matching stub and pruning of the driven element while monitoring a vhf SWR indicator or wattmeter. Spacing of the elements may be in any of many possible combinations; the ones used here are shown in the drawing. – *Jim McDonald, W4FBO/ϕ*

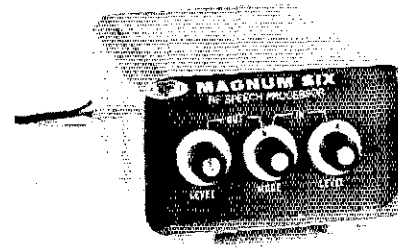


The Garden-Gate Antenna was mounted on a frame 40 X 55 inches, made of 1 X 4-inch lath wood material. The element spacing in wavelengths was 0.2 between REFL and DE, 0.15 between DE and D1, 0.15 between D1 and D2, and D2 to D3.

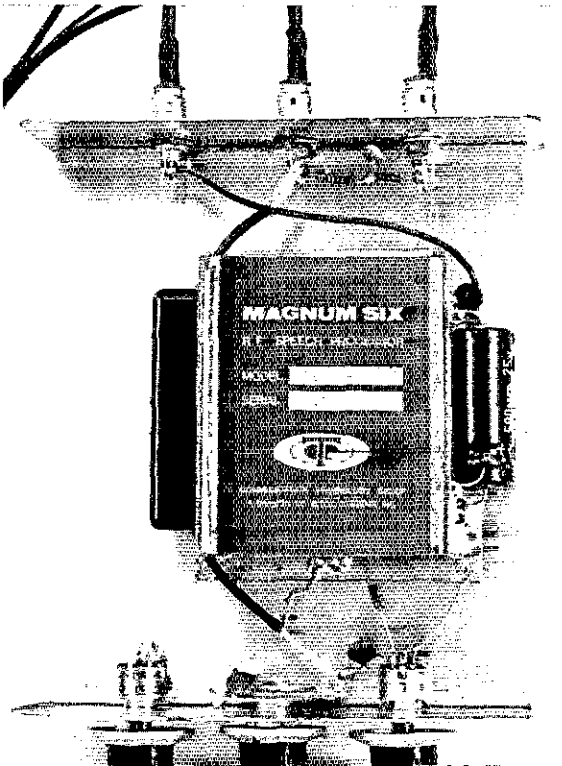
Recent Equipment

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

The Bitcil Systems Magnum Six RF Processor



BITCIL SYSTEMS, INC., has developed a line of rf processors which are compatible with most of the currently available commercially manufactured transmitters. The unit, called a Magnum Six, is basically an rf amplifier and clipper followed by another amplifier. The control functions are designed to allow the unit to be switched into or out of the circuit without interfering with normal transmitter operation. The major difference between versions of the Magnum Six is the filter frequency. Additionally, the method of installing the processor cables varies with the type of transmitter used. All of their models are similar in construction and operation. The differences between units are the frequency at which amplification (and clipping) is accomplished, and the method for interconnecting the transceiver and the Magnum Six. The unit tested in the ARRL lab is designed for use with the Collins 32S-3 transmitter/exciter. However, the same model may be used with the KWM-2 transceiver by replacing the patch cables with an appropriate set designed to accommodate the "M-2."



Inside view of the rf processor. The entire circuit is built on circuit-board material, then soldered together in the form of a box.

RF Processing

Processing is a term which has become popular on the hf bands. The advantages of rf processing, as compared to audio clipping or compression, have been reviewed previously.[1]

Clipping of the rf envelope is a technique which has been used for several years by many enterprising amateurs. Probably the most striking reason for nearly all processors having been home built until now is because each transmitter design requires a different band-pass filter frequency as well as a unique method of tapping into the circuit. Each processor had to be custom designed to operate with a specific transmitter model.

The distinct advantage of rf clipping when comparing it with audio clipping or compression is that no additional harmonic distortion is introduced into the output signal of the transmitter. Harmonics generated by clipping are essentially eliminated by the transmitter filtering system, since they are far removed from the filter frequency.

Circuit Details

The rf signal generated in the 32S-3 Collins transmitter at 455 kHz is interrupted before reaching the filtering system and is connected to the input of the Magnum Six via the cables supplied with the processor. The double-sideband signal is amplified by Q101 I and is then applied to the Magnum Six filter, which, in this case, is identical to the transmitter (Collins type) mechan-

[1] Squires and Clegg, "Speech Clipping for Single Sideband," *QST* July, 1964.

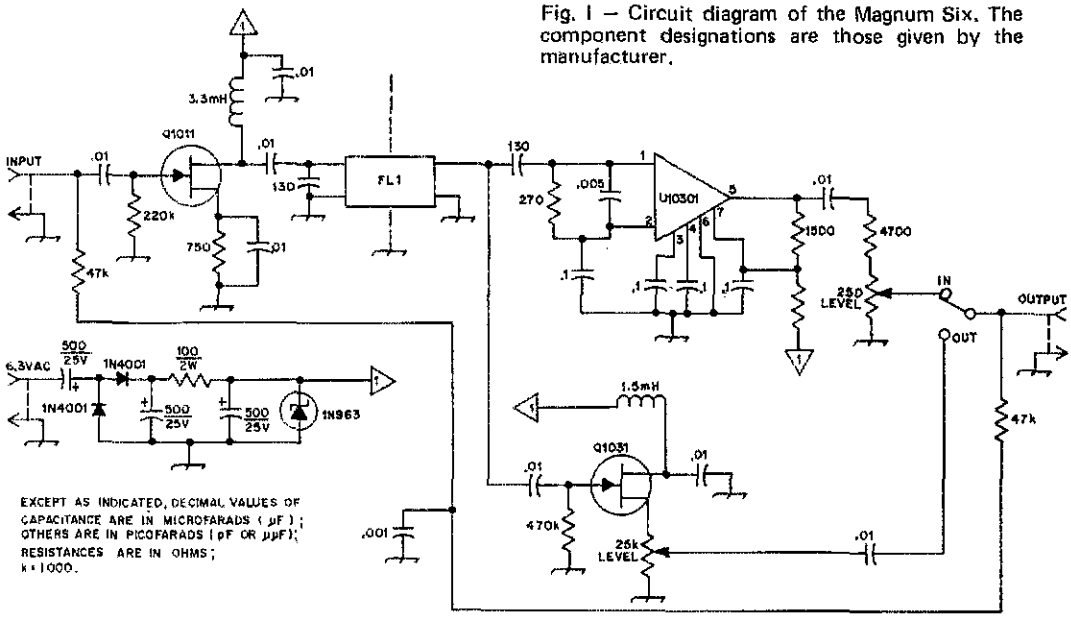


Fig. 1 — Circuit diagram of the Magnum Six. The component designations are those given by the manufacturer.

ical filter. The resultant single-sideband signal is applied to an IC operational amplifier (Fig. 1). The op amp clips the signal peaks, forming symmetrical square waves. The clipped signal is amplified and routed back to the transmitter band-pass filter. This filter removes the harmonics (and consequently the distortion) effectively.

Installation and Operation

Two models of the Magnum Six were tested. One version, designed to be connected to a Heath *SB-401, required a time period of one hour to* install. Some minor modifications of Heath's circuit are necessary. The Magnum Six can be incorporated into a 32S-3 (or KWM-2) in just a few minutes, however, since the interconnecting cables include a tube-socket adapter which plugs into an i-f tube socket and contains the appropriate connections. The original transmitter tube (V3 in the 32S-3) is plugged into the top of the adapter.

Operation

Installation of the Magnum Six is easy; learning to operate it (correctly!), however, is a bit more of a challenge. The instruction manual gives complete details on how to make the necessary adjustments to assure a clean signal. The unit may be set up without the aid of an oscilloscope. The manufacturer recommends that one be handy for confirming the various control settings. We certainly second that recommendation! The unexperienced operator should plan on spending an hour or so getting familiar with the operation of the Magnum Six and its affects to the station transmitter before placing it in full on-the-air operation.

The basic concept of rf processing assures a clean fully clipped signal provided the station transmitting equipment is adjusted correctly. Misadjustment can cause many evil things to happen, not the least of which is generation of a very broad signal. Another consideration of importance is the increased service required of station equipment when full clipping is used. The 6-dB increase in average power represents a substantial increase in power supply demands and plate dissipation for both the exciter and the final amplifier (if one is used).

Several tests were conducted with distant stations in order to determine the effectiveness of the clipping system. It is interesting to note that the difference in sound between the Magnum Six "in" and "out" is about what might be expected when a one-kilowatt amplifier is switched into the line after a 150-watt exciter. There are no signs of audio distortion. Local stations report that the bandwidth of the signal does not seem to increase.

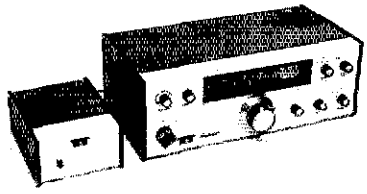
Initial lab tests with the Magnum Six exhibited instability. The problem was traced to a faulty capacitor. No additional problems were encountered.

There is a certain satisfaction that goes along with having a clean-looking "Christmas tree" pattern display on the Monitorscope while speaking into the microphone. That feeling is gone when operating with the Magnum Six in the line. But the interesting comments from other amateurs, and the apparent increased effectiveness of the transmitted signal, makes this one drawback quite worthwhile. — *W1FBY*

The Magnum Six RF Processor

Dimensions (HWD) and Weight:
3-1/2× 5-1/2 × 8 inches, 1-1/2 pounds.
Price Class: $130.
Manufacturer: Communication Technology Group, 31218 Pacific Highway South, Federal Way, WA 98002.

The Ten-Tec Argonaut 505



TO ANYONE WHO started in ham radio with gear occupying most of a basement or attic, a complete station in less than a quarter cubic foot of space and weighing 6 pounds seems almost beyond belief. The Argonaut Model 505 is such a station – and no toy. It has respectable ssb and cw performance, transmitting and receiving, on bands from 80 through 10 meters, yet it is compact and light enough for back-pack portable work. It is an ideal low-current mobile setup, yet it can be useful and a lot of fun at home.

Miniature components, subassembly construction, and innovative circuit tricks combine to give the Argonaut wide appeal. Almost everyone who uses it soon has inspirations about what he could do with this attractive little box. Even the undersigned, with little interest in hf gear as such, can see many uses for the 505. Obviously it would be a fine starting point for coverage of higher bands with transverter accessories. The hf operator, even though he may be kilowatt-minded, sees the Argonaut as a compact exciter for a five-band class AB1 linear amplifier, combined with a good receiver – in the smallest space yet required for these station components.

Subassemblies

Ten-Tec circuit-board units, which we understand can be purchased separately, are listed below in numerical order, which is not related to the routing of the signal through the equipment.

90177 – Permeability-tuned oscillator.
90184 – I-f system.
90186 – Audio power amplifier.
90191 – Ssb generator.
90192 – Control board.
90193 – SWR bridge.
90194 – Receiving and transmitting mixers.
90195 – Rf power amplifier.

Not all these units will be described in detail, and their functions are shown only in a general way in the block diagram, Fig. 1. The tunable oscillator and its multiplier unit, provide injection for both transmitting and receiving mixers. The balance of the receiver portion includes the i-f amplifier, product detector and audio preamplifier, and the final audio amplifier.

A control assembly has antenna switching (with a small reed relay), a variable off-set voltage for the PTO, and provision for cw keying and the generation of voltage for the S-meter. The send-receive switching is complete, including antenna changeover, whenever the rig is keyed. Thus complete break-in is provided; certainly a plus for the cw man and a great aid in QRP work. An audible sidetone is also generated.

The ssb generator uses a crystal oscillator, whose frequency is varied by the proper amount for cw, lsb or usb operation, so that the transmitted signal will be on the frequency of the received signal, unless it is purposely offset by the front-panel control. The sideband rejection and receiver selectivity are supplied by a crystal-lattice filter built into this unit. Using the front-panel control (marked SBN and SBR for normal and reverse) results in lower sideband for 80 and 40,

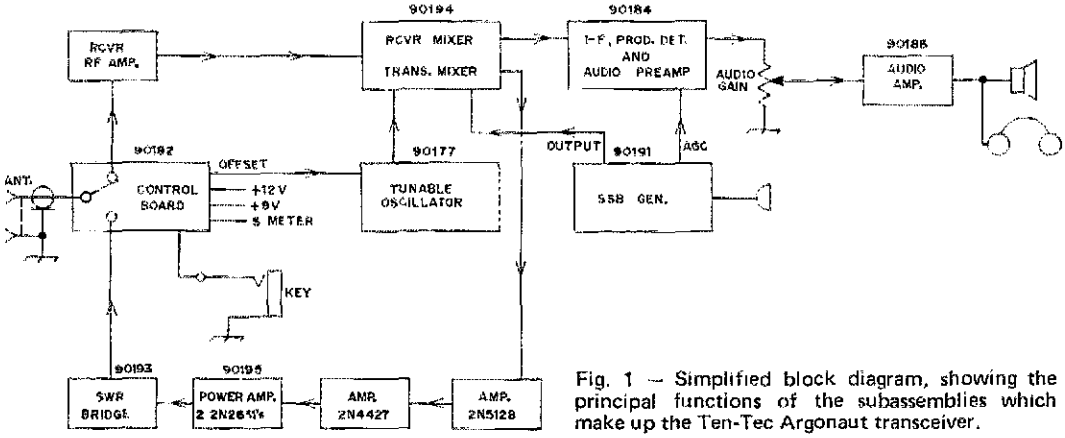
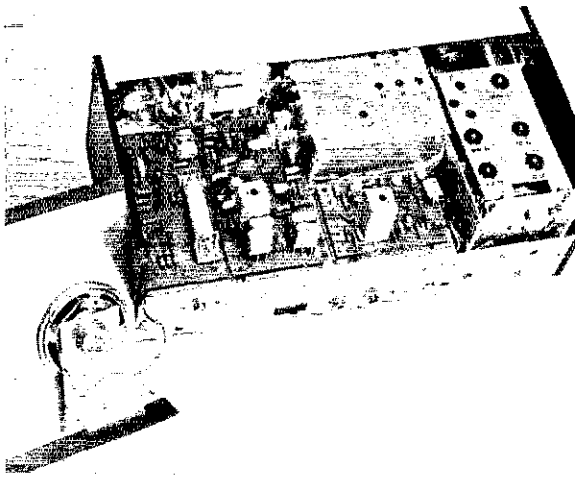


Fig. 1 – Simplified block diagram, showing the principal functions of the subassemblies which make up the Ten-Tec Argonaut transceiver.



Interior of the Ten-Tec Argonaut, as seen with the top cover removed. The small speaker, attached to the top cover, is at the lower left. The three removable circuit-board assemblies, left to right, are the control board, the ssb generator, and the transmitting and receiving mixers. The main tuning system is the PTO, which is inside the shielded compartment, upper center. Other transmitter and receiver circuits, peaked with a single panel control, are in the assembly at the right side.

and upper sideband for 10, 15, and 20, in the SBN position, and the opposite sideband in the SBR position. For cw, the displacement of the transmitting and receiving frequencies is approximately 700 Hz, unless some other separation is put in by way of the offset switch.

Tuning System

The PTO is the heart of the tuning system, for both transmitting and receiving functions. Unlike some devices that serve these ends, the Ten-Tec tuner is quite simple, mechanically and electrically. Usually such an oscillator tunes the same frequency range for all bands, so four positions of the bandswitch are needed to cover the full 10-meter band on most transceivers. In the Argonaut the tuning range of the oscillator, Q2 in Fig. 2, is changed slightly from band to band by switching different values of inductance in series with (L1, 3, 5, 7, 9) and in parallel with (L2, 4, 6, 8, 10) the main tuning coil, L11. Our simplified circuit shows only a single set of coils, in the interest of clarity. L11 remains in the circuit at all times. The switched-in coils set the tuning range and low-end frequency for each band.

Transistor Q1 is made to operate as a Varicap diode, whose effective capacitance across the tuned circuit is varied by means of the variable off-set voltage (reverse bias) from the control board.

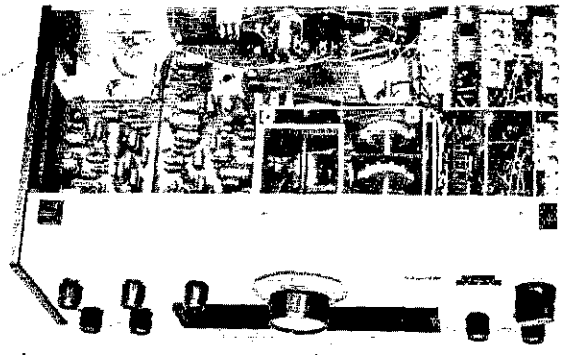
Oscillator output-frequency range for each band is indicated in the second column of Table I. Energy is taken off through an emitter-follower, Q3. A two-section switch (S3A and S3B, not shown in Fig. 2) feeds the follower output to either the output terminal of the board (14-MHz range), or to the multiplier stage, Q4, on all other ranges. The frequencies and orders of multiplication involved are shown in Table I. S2A and S2B, upper right in Fig. 2, select the required value of padder capacitance to make Q4 double on the 3.5- and 21-MHz ranges, or triple on the 7- and 28-MHz ranges. The stage is not used on 14 MHz. Overall, this is a simple solution to the problem of tuning four narrow bands and one wide one (28 MHz) with one band-switch position for each.

TABLE I

Band	*Osc. Range*	*Injection Range*	*Multiply by*
3.5 – 4	6.25 – 6.5	12.5 – 13	2
7 – 7.5	5.333 – 5.5	16 – 16.5	3
14 – 14.5	5.0 – 5.5	5.0 – 5.5	–
21 – 21.5	6 – 6.25	12 – 12.5	2
28 – 30	6.333 – 7	19 – 21	3

Mixers and Amplifiers

Mixing, to convert received signals and the PTO output to the desired frequencies is done in the Ten-Tec 90194 assembly. The receiver mixer is a gate-protected MOSFET, type 40823. The transmitting mixer is a differential-amplifier integrated circuit, CA3053, operating as a balanced mixer. The receiving-mixer output is always 9 MHz. The balanced transmitting mixer is tuned to the various bands by switching the proper value of padder capacitance across its output coil. The latter method also tunes the receiver rf-amplifier input and output circuits and the coupling circuits of the two low-level transmitter amplifier stages. Variable



Underside of the Argonaut transceiver, showing the PTO assembly, inside a heavy shield at the center. The audio power amplifier is at the left edge. Next is the i-f board. The SWR bridge assembly is in back of the PTO. Padder capacitors at the right align the rf circuits.

coils and fixed padders are switched in the final-amplifier output circuit. The switches for these purposes, omitted from our circuits for clarity, are identified as S4A and B for the receiver circuits; S4F for the balanced mixer; S4E and D for the low-level amplifiers; and S4G and H for the final amplifier. All are operated by the band-change knob.

Performance

In recent years there has been too much readiness to write off anything less than several hundred watts as being useless for amateur communication. To do this is to disregard the meaning of the decibel. If you put what you have into the antenna efficiently, any amount of power, however small, will get you some contacts. With some knowledge of how and when to call, and what band to use under what circumstances, two watts of rf power can do alright.

You're not likely to win a DX contest, or even a Sweepstakes, but you will learn how to operate very effectively. You'll save plenty on the light bill, and probably get back on speaking terms with your neighbors, after a while, using something like the Argonaut.

Many factors go into making a pleasant experience out of using any ham gear. Operating convenience is one, and the Argonaut has this. A clean cw signal, and a convenient method of monitoring one's own sending helps — and the Argonaut provides these. Tuning is smooth, even on the 10-meter band, where the kHz move by pretty rapidly (100 per dial rotation). On lower bands the tuning rate is about 25 kHz per dial rotation.

The same VFO controls both the transmitter and receiver and stability is adequate whether the mode is cw or ssb. Receiver sensitivity is far more

(Continued on page 88)

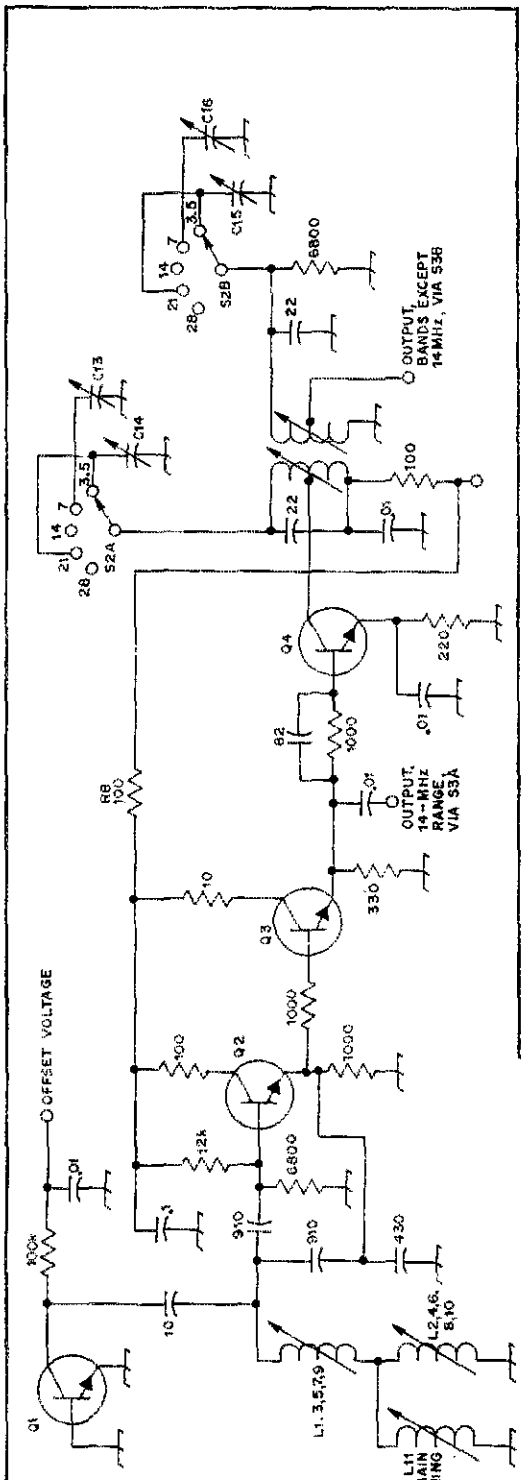


Fig. 2 — Basic circuit of the PTO used in the Argonaut transceiver. Switching used in the oscillator and output circuits is eliminated, for clarity. Coils indicated by the numbers L1 through L10 are switched in series and in parallel with the main tuning inductor, L11, which is tuned by means of the vernier dial. Padder capacitors C13 through C16, switched by S2A and S2B, upper right, enable the oscillator-multiplier system to produce the injection frequencies shown in Table I.

CONTEST DISQUALIFICATION CRITERIA

A New Look at an Old Problem

Discrepancies in contest logs are very common. Nearly all logs have a few of them, made through errors of both omission and commission. A rule of thumb to differentiate between honest discrepancy and deliberate falsification has been difficult to establish and for many years has been a subject of controversy.

For some months a subcommittee of the ARRL Contest Advisory Committee, chairmanned by W1BGD, has been hard at work on this problem and has now developed additional disqualification criteria to apply to all ARRL contests. These criteria have been further studied by the entire CAC and certain of them have been recommended and approved, effective immediately (with the November 1972 *SS*). Here are the details:

1) If the claimed score of a participant is reduced by 2 percent or more, the log may be disqualified. Score reduction does not include correction of arithmetic errors.

2) Score reductions may be made for taking credit for unconfirmed QSOs and/or multipliers, duplicate contacts, banned countries, and/or other scoring discrepancies.

3) If a participant is disqualified, he will be barred from submitting an entry in the next annual running of that specific contest, (e.g., disqualification from the 1972 phone SS prohibits submission of an entry for the 1973 phone SS, but 1973 cw SS participation is okay).

4) The calls of all disqualified participants will be listed in the *QST* report of the contest.

5) Any participant on the borderline of disqualification but not actually disqualified may receive a warning letter from the Communications Manager.

6) For each duplicate contact that is removed from the log by Hq., a penalty of 3 additional contacts will be exacted. The penalty will not, however, be considered as part of the 2% disqualification criteria.

7) These disqualification criteria will be applied to all ARRL contests.

CAC membership: W3GRF Chairman, W1BGD, W2EIF, W4UQ, K5TSR, W6DQX, WA9UCE, WØHP, VE2NV, KH6IJ, W4KFC Board Liaison, W1YL Headquarters Staff Liaison. QST

LATE OSCAR NOTES

Ponder for a moment, the thought of grasping your handi-talkie or 2-meter mobile microphone, and talking to a ham in Alaska or Florida or France! A dream? Yes. Impossible – no. In fact, this is but one of the fantastic new operating frontiers made possible by the Oscar 6 communications satellite. No matter what your interests, repeaters, DX, contests, etc., you'll find new and different activities for you when using amateur radio's new communications facility. To check on the background of this activity, see the bibliography appearing on page 61 of October *QST*.

Want to join the Satellite Communicator's Club? All you have to do is send Amsat, PO Box 27, Washington, DC 20044, news of your first contact using Oscar 6. Include the time, date and call of the station worked, plus an s.a.s.e. You'll receive a handsome certificate attesting to your space communications skill.

Repeaters. Your repeater can be "linked" with the Oscar 6 repeater provided several requirements can be met. First, the repeater trustee must apply to FCC, Amateur and Citizens Division, Washington, DC 20554, requesting "Special Temporary Authority" to participate in the Oscar communications experiment. Amsat encourages repeater groups to take part in this endeavor, but has established several standards which must be complied with. 1. The frequency designated for this type of work is 145.885 MHz. 2. A controlled carrier form of amplitude modulation with an approximate 10 dB of carrier suppression is to be used (i.e. grid modulation or ssb with sufficient carrier inserted). 3. Less than 200 watts of effective radiated power (erp) must be employed by the repeater station on the Oscar uplink frequency. Thus, a two meter repeater could receive your mobile signal on the usual input frequency, then repeat you on 145.885 MHz to Oscar. The corresponding Oscar downlink frequency, 29.435 MHz is received at your repeater and then repeated on your usual repeater output frequency. The *result: possible international communication* from your handi-talkie.

Telemetry. Oscar transmits 24 channels of telemetry to indicate the status and welfare of the various systems on board. The data is transmitted as a series of three digit Morse code numerals. For info telling you how to observe Oscar's internal functioning through telemetry, send an inquiry with s.a.s.e. to Amsat. Telemetry is carried on the 29.45 MHz beacon.

Educational note. NASA has equipped three of its Spacemobiles – traveling lecture and demonstration units – for providing real-time demonstrations of amateur satellite communication. These spacemobiles will be visiting many schools and educational institutions during the expected one-year lifetime of Oscar 6. To investigate scheduling a visit to your area, have your school write: Spacemobile/Oscar, NASA Headquarters, Code FE, Washington, DC. The NASA personnel manning these special units will need the volunteer help of licensed radio amateurs. Why not also offer your help when the units are in your area. – *WA 2INB*

SATELLITES AND THE SS

Added November SS excitement is anticipated with the availability of the Oscar 6 communications satellite (early October launch expected). Participants are encouraged to note satellite QSOs in their log and make mention of the total satellite *contacts on the SS summary sheet.* A special listing will be made of those achieving Oscar QSOs during the SS.

Results, 1972 Field Day

WB6QHL/6

REPORTED BY RICK NISWANDER,* WA1PID/WA8VRB

HURRICANE AGNES ENTERED the June 24-25 Field Day this year. Some considered her air-mobile but others felt that, judging from the large amount of rain that poured out of the sky, Agnes had a permanent connection to ground. Agnes, however, did not send in a FD summary, being last seen thrashing her way out over the North Atlantic, so her final score cannot be published here. Nevertheless we have received word from many participants concerning the scope of her effort.

Numerous FD groups gave up or curtailed their Field Day efforts to come to the aid of those that were inundated by Agnes QRM. "We started our [FD] with the usual 50 or so members on hand but soon found ourselves in the midst of the real thing. Our club's assistance was needed at nearby flood ravaged disaster areas. About 35 members departed in small groups headed for Pottstown and Wilkes-Barre, Pa. to assist local CD and government agencies. Some stayed as long as a week." – W3AI/3, RF Hill ARC. "Agnes did siphon off several of our operators and, from time to time, we were asked for additional help for short periods." – W3VD/3, Rock Creek ARA & APL ARC. "We are not turning in an official FD report as practically all of our group were working on a real disaster in nearby Cattaragus County. We logged over 700 contacts in a 72 hour period, many of these of emergency nature." – WA2UWK/2, Chautauqua County Amateur FM Assoc. Some groups found their normal FD site extremely wet and quickly decided to choose an alternate location rather than operate /mm.

Because of Agnes and her associated side effects, thought was given prior to the contest to canceling Field Day. After discussion with individuals in the affected areas it was decided to continue as planned. Bulletins were sent via W1AW concerning the status of the emergency, asking, among other things, that all emergency traffic and nets be given full leeway. All in all, FD participants handled the situation reasonably well and avoided the FCC-declared emergency frequencies centering on 3815 and 7215 kHz. Kudos to those who aided Agnes communications, forsaking FD for the "real thing."

*Communications Assistant, ARRL.

Facts and Figures

Looking to Field Day itself we note that entries were down again this year to 1007, possibly as a result of that stormy association. Class 2A took honors as the most popular with 204 entries, and 3A dropped to second spot with 184. But 3A did

1973 Field Day June 23-24

CLUB AGGREGATE MOBILE SCORES

Radio Amateurs Mobile Society(CA)	1875
Mobile ARC of South Bend(IN)	722

snatch a little of the glory – they had more participants (2723 to 2252) and more QSOs (146,227 to 143,659) than 2A. The only other categories to break 100 entries were 1A and 1B, with 170 and 107 entries, respectively.

Piling transmitter on transmitter, the Englewood ARA, W2RJ/2, entered the highest category seen in any FD, 22 (that's right, twenty-two!). They needed rigs on 160 meters thru 1296 MHz., on both modes, to accomplish that task. At 100 points per transmitter for emergency power, that's lots of points. Even that was not enough to fend off those gremlins from hereabouts, Murphy's Marauders, W1ARR/1, who ran a paltry 12 transmitters and snagged the highest QSO and point totals in FD.

The men from Madison, the Badger ARA, W9YT/9, topped 2A with 2934 QSOs. The flowchart and other analysis of their record-breaking QSO total proved interesting and informative. California sported the top group in 1A, K6YNB/6, manned by K6SVL, KØGJD, and K6YNB. The threesome ran up a record-breaking QSO total for 1A. Their phonetics, K6 Yellow Nasty Bananas, got a few chuckles. Not quite as good as W2 Fuzzy Wuzzy, who gave your scribe a laughing fit on Sunday when he came back to a CQ.

Because of errors, FD message credit was not given to 49% of those who asked for it. Most were committed in determining the check. *Everything* in the body of the message counts towards the check. This includes words, numbers, commas, semicolons, etc. Credit was also not given if the proper information was not included in the message. Read rule 10-3 on page 79 of May 1972 *QST* again fellows and gals.

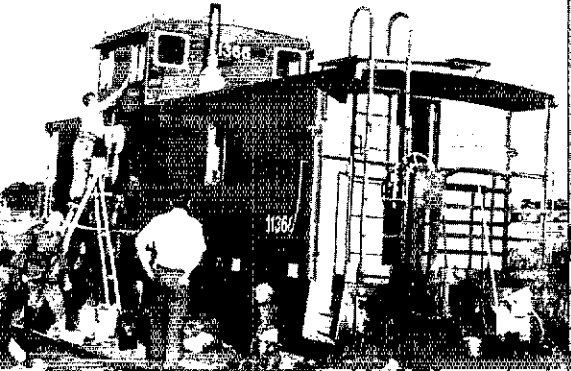
Based on experience this year, do you have any comments or suggestions concerning FD rules? Send them to your nearest representative of the Contest Advisory Committee (W1BGD, W2EIF, W3GRF chairman, W4UQ, K5TSR, W6DQX, WA9UCE, WØHP, KH6IJ and VE2NV).

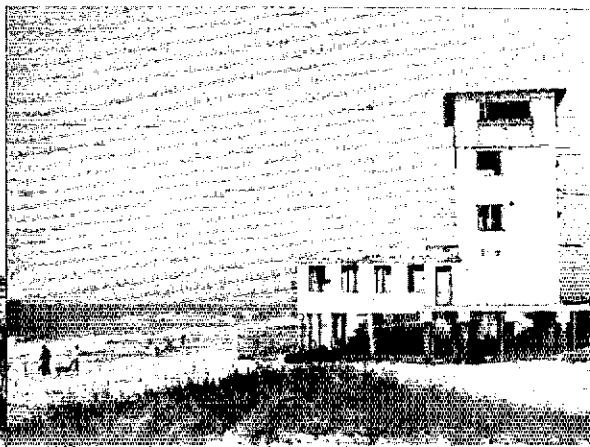
Class-A Call-Area Leaders

(Calls in bold-face represent over-all class leaders)

1A	4A	7A
W1BFF/1	W1NHK/1	K2AA/2
K2UCF/2	W2SE/2	W4HAW/4
W3CZ/3	WA3JZR/3	W5SP/5
W4EFQ/4	W4SKH/4	**W6HE/6**
W5YL/5	W5KA/5	W9YH/9
K6YNB/6	WA6LXN/6	KØJLV/Ø
WB6IGB/7	**W7YE/7**	
W8UM/8	K8BYI/8	8A
W9FB/9	WA9UHY/9	W1KK/1
KØKYK/Ø	KØOKI/Ø	W2MMD/2
VE4EA/4	VO1AT/1	K4BFT/4
		W5SC/5
2A	5A	WA6BGS/6
WA1HRC/1	W1TYM/1	**W9SW/9**
W2FXA/2	W2LT/2	
W3FPP/3	**K3SSC/3**	9A
W4GGU/4	W4POX/4	**VB1AA/1**
K5RWK/5	. . . .	
K6AA/6	K6DKX/6	
W7LR/7	W7AIA/7	
W8COE/8	W8ACW/8	10A
W9YT/9	K9BPL/9	**W2GSA/2**
WØIW/Ø	WØNJ/Ø	K3ERM/3
VE1FO/1	VE3JJ/3	W7NCW/7
3A	6A	12A
W1TX/1	W1EKT/1	**W1ARR/1**
K2BK/2	W2ZZ/2	W7DK/7
W3ONP/3	W3VD/3	
W4TRC/4	W4RL/4	
K5RLW/5	. . . .	15A
W6ZE/6	W6VB/6	**VE3NAR/3**
W7IO/7	K7LED/7	
W4FU/8	**W8TO/8**	
W9FK/9	W9UVI/9	22A
WØIE/Ø	WØCJK/Ø	**W2RJ/2**
VE7EZ/7	VB1NT/1	

Here are two of the more unusual QTHs used by 1972 FD participants. On the left is an honest-to-goodness caboose used by WØMQ/Ø (1A). FD helps clubs prepare their members for emergencies. I suppose you could say this club trains on trains. Hope the FD chairman wasn't railroaded into his job. Right, the ops at WA4TLI/4 (4A) seem to have picked a nice spot for FD, right on the Atlantic Ocean. Between sunburns and dips in the surf the gang managed to nab 635 QSOs. Those who got sleepy at 3 am could take a flying leap . . . into the water, to perk themselves up.





Perched a mere 220 feet above the campus of Indiana University the gang at W9IU/9 garnered 2090 QSOs in 2A. That's K9IQB running coax to the antennas.

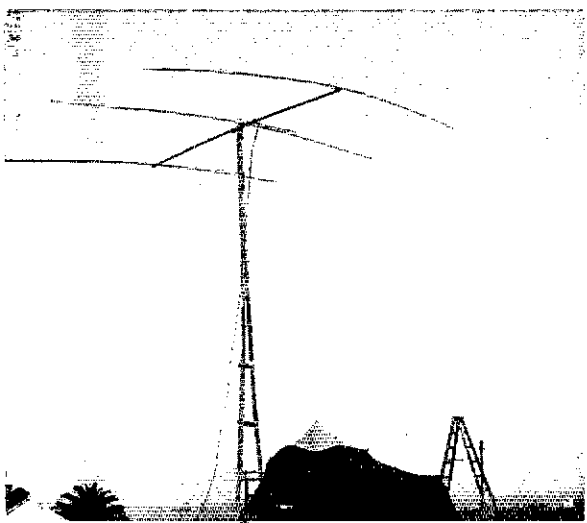
We shed a giant tear for those of you who did not do quite as well, for one reason or another, as those previously mentioned. You hopefully learned something from your experiences this year. In 1973 resolve to fight your way to the FD site through bugs, brambles, rain, rivers, and clinging vines; towing generators, hamburgers (don't forget the chili sauce), receivers, antennas, coax, et al and beat somebody next year. Murphy may be somewhere else in '73.

While on the subject of Murphy, it seems that this year most groups were afflicted by excess moisture from above. Turning to our pocket pamphlet of pfabulous personal puns written by V.Y. Senny Tree, an absolute wizard at philosophical phraseology, we read, "Murphy rains supreme or when it reigns it pours."

Don't forget your galoshes.

Soapbox

Spent part of the time handling flood traffic, part of the time avoiding nets also handling flood traffic, and all of the time wondering why everything was working. – (Radio Assoc. of WNY, W2PE/2) One generator threw a rod after the first hour. Same generator that packed it in last year. – (London ARC, VE3LON/3) We hit air time with a homebrew 4 ele yagi that had never before drawn blood, a pair of 80 meter vee beams that refused to load and a call sign that confused even our ops. (Regina ARA, VA5WCC/VE5) Wow! What a Field Day. I think they get better as time goes on. – (W6ANB/6) It snowed on FD. – (VE8YE) One of VE7ADE's cows tripped over the line from the generator, yanked the connector loose and shorted it out. Luckily no damage to either the generator or the cow. – (Richmond ARC, VE7ARM/7) Had a generator that quit after about 20 hours of operation. Most of the operators quit after about 16 hours. – (Rotten Radio, W4MRF/4) The weather was a lot hotter than the bands. The official tempetature reached 105 degrees Sunday. – (Richardson Wireless Klub, K5RWK/5) Our electricity cost us 55.3 cents per KWH. – (Yellow Thunder ARC, WB9FDZ/9) We think there should be 100 bonus points for surviving Field Day without rest room facilities. – (Cache ARC, WA7TXP/7) Knowing that the fellows in PA weren't just practicing dampened our spirit more than the heavy rain. – (Shenango Valley AR Field Day Group-Warren ARA, W8GFG/3) A Murphy year, 1) highly reliable generator that NEVER breaks down even through 10 Field Days. . . .did, 2) secret weapon super high gain antenna was taken down when a bulldozer caught the feedline and took it away, 3) photos of the FD site didn't come out, and 4) W1YNE got his car stuck in four feet of mud at 3 in the morning. Took an hour to get him out, forcing shutdown of the stations. – (The Providence RA, W1OP/1) Even with our luck Murphy still struck. – (GE Evendale ARS, K8LUC/8) Communicators via the written word we are not. Transcribing logs would be easier if our educators had taught our operators how to write. – (Middlesex ARS, W1EDH/1) We've never spent so much time doing so much and accomplishing so little. – (WA2DFI/2) Our site is about 50 yards from the ocean, which helped. Worked a W6 running one watt with a 57 signal. His antenna was a 4-el quad on the beach. – (Hickam AFB MARS Group, KH6FAH/KH6) Didn't know we would have to run the generators at constant load and later found out that it was the 130 volts that burned out the pilot lights. – (Hat Ham Club, VE6ASW/6) After arranging with a local radio club to borrow a generator for Field Day, it turned up missing 5 days before I was to pick it up. Unable to reach Ed, WØGYH, by phone or radio, I had to sweat it out until he showed up, tired but reliable. Along with a transceiver, vertical antennas, a table, assorted cables and other paraphernalia too numerous to mention, he'd had the foresight to "toss" his 3kw power plant into his wagon before driving 950 miles to join me at 8500 feet in the hills west of Denver for the best FD ever. – (WAØTSW/Ø)



The 20 meter position at K6AA/6 (2A). Founded in 1926 the United Radio Amateur Club claims honors as the oldest in Southern California. FD provided the first opportunity to use the new club call.

Scores

Class A stations are clubs and groups in the field with more than 2 operators. Scores are tabulated according to the number of transmitters operated simultaneously at each station. The figures and letters following each call indicate the number of valid contacts, the highest dc input power used, the number of participants at each station and the final score. The "power classification" used in computing the score is indicated by the letter A, B, C and D after the number of QSOs shown. A indicates power up to and including 10 watts (multiplier of 3); B indicates power over 10, up to and including 200 watts (multiplier of 2); C indicates power over 200 (multiplier of 1). An asterisk following the station callsign indicates set-up operations did not begin until 1800 GMT on Saturday.

1A - Battery

W3AA/3	Beacon Radio Amateurs	337-	A-	6-	1111
W3TQM/9*	non-club group	185-	A-	5-	705
WB8EDZ/8*	The RC of Explorer Post 285	160-	A-	10-	580
WB8BZK/8*	Hypifreq. & D.I. ARC	116-	A-	4-	448
K4SE/4*	Greenville ARC	88-	A-	4-	414
W3NNL/3	Schuylkill River Rats	44-	A-	2-	297

1A

K6YNB/6*	Alexander, DesLoge & Overbeck	1749-	B-	3-	3648
W5YL/5*	Thibodaux ARC	1613-	B-	20-	3376
WB6IGB/7	Them White Mountain Boys & Sue	1603-	B-	3-	3356
W4EFQ/4*	Rutherford County AR Soc.	1375-	B-	15-	2950
W8UM/8*	UMARC: FAW-YVR	1393-	B-	3-	2936
KG4FO/KG4*	Guantanamo Bay Fleet Operators	1360-	B-	3-	2870
W9EB/9*	Independent Contest Operators	1313-	B-	8-	2776
W8OK/8*	MVARCS	1283-	B-	10-	2716
W8EDU/8*	Case ARC	1159-	B-	9-	2518
W1BFF/1	non-club group	1162-	B-	-	2474
WA9PMO/9	Thursday Night Trashin Group	1171-	B-	3-	2442
W3CZ/3	ITT/EPL ARC	1131-	B-	7-	2412
K4CG/4*	Coast Guard ARC	1154-	B-	4-	2408
KZ5AA/KZ5*	USARSO MARS Station	1104-	B-	4-	2308
K4SXD/4*	non-club group	1013-	B-	4-	2176
KH6RS/KH6	Maui ARC	967-	B-	11-	2134
K4JM/4	Central Va. Contest Club	884-	B-	8-	1918
KZ5KZ/KZ5	Canal Zone ARA	880-	B-	15-	1910
W8RTR/8*	Canton ARC	846-	B-	22-	1892
WA6IAE/6	ABK,BSU,DIL,ZNY,IAF	895-	B-	5-	1890
W6VZT/6*	Four H Minus One Club	843-	B-	4-	1886
KØKYK/Ø*	Tri-State ARC	850-	B-	17-	1850
WA3JBW/3*	Brandywine ARC	798-	B-	5-	1846
KØBIX/Ø*	Warrensburg ARC	787-	B-	18-	1774
WAØETC/Ø*	Iowa DX Assoc.	775-	B-	6-	1750
W3MK/3	Maverick ARC of Delaware	794-	B-	14-	1738
K2UCF/2*	non-club group	811-	B-	3-	1727
KH6FAH/KH6	Hickam AFB MARS Group	761-	B-	6-	1722
W9EJ/9	Society of Radio Operators	801-	B-	33-	1702
W1QI/1*	Candlewood ARA	748-	B-	18-	1696
KØTPF/Ø*	non-club group	797-	B-	10-	1694
W1DC/1	1200 RC	723-	B-	6-	1646
WA7ECT/7*	Angel's Engineers	746-	B-	4-	1642
W8UMD/8	Treaty City ARA	745-	B-	6-	1640
WAØYKN/Ø	Armstrong ARC	730-	B-	6-	1610
K3OBF/3	Martys Marauders	716-	B-	6-	1582
WØFLN/Ø*	St. Louis Univ. ARC	711-	B-	14-	1572
W2YT/2	non-club group	730-	B-	3-	1560
WØDEP/Ø*	non-club group	695-	B-	6-	1540
WA2RAZ/2	Nerdskies Inc.	688-	B-	6-	1526
W6VPZ/6*	Northrop RC	683-	B-	15-	1516
W1TM/1	Windsor Mt. Wet Feet	653-	B-	7-	1506
WA1BZS/1	Wallingford Civil Defense	677-	B-	3-	1504
W6KWO/6*	Marina ARC	700-	B-	9-	1500
WB5BAM/5*	807-West Texas Axis	673-	B-	3-	1496
WB6OEX/6*	non-club group	691-	B-	3-	1482
W8TFZ/8*	Aviation RC	689-	B-	15-	1478
WA2BPO/2	AIL ARC	665-	B-	8-	1430
K4KE/4	non-club group	686-	B-	7-	1422
KØDIA/Ø	U of M Radio-TV	618-	B-	5-	1386
W9JJ/9*	Point Radio Amateurs Ltd.	592-	B-	14-	1384
W4LX/4*	Ft. Myers ARC,Inc.	639-	B-	3-	1378
WB8BAI/8	non-club group	601-	B-	4-	1352
W5HTK/5*	Enid ARC	589-	B-	25-	1328
W3GJB/3*	non-club group	611-	B-	3-	1322
W2LY/2	Haddon TWP. RC	609-	B-	9-	1318
K3QBD/3*	First State ARC	576-	B-	30-	1302
WAØRXR/Ø*	Goldfield RC	569-	B-	6-	1288
WA5GNM/5	Central Louisiana ARC	543-	B-	15-	1286
W8NP/8*	non-club group	560-	B-	13-	1270
K4TBN/4*	Peach State Contest Ops. Soc.	579-	B-	8-	1258
VE4EA/4*	Winnipeg Field Day Assoc.	553-	B-	3-	1256
W5AC/5	Memorial Student Center Radio Comm.	553-	B-	10-	1256
K8RMN/8	Tricounty Radiotelegraphy Soc.	549-	B-	9-	1248
W4AY/4	RA Transmitting Soc.	546-	B-	16-	1242
WBØBBN/Ø*	Monsanto ARA	538-	B-	7-	1226
W8EQ/8*	Lima Area ARC	505-	B-	15-	1210
WA9YRN/9	U of Wis-Oshkosh ARC	1044-	C-	10-	1194
W6NWG/6	Palomar RC	484-	B-	10-	1168
K6LDA/6	Crescent Bay Emerg. AR Net	504-	B-	9-	1158
W8SRK/8*	non-club group	521-	B-	3-	1142
VE1AAQ/1*	Anna Valley ARC	495-	B-	9-	1140
W9LJ/9*	Lake County ARC	481-	B-	10-	1112
WA6AXA/6*	Murphy's Law-yers	480-	B-	3-	1110
WA6MIW/6*	The Happy Three	454-	B-	3-	1108
WA9AUC/9	non-club group	475-	B-	3-	1100
W2PGS/2	Oswego County ARA	498-	B-	12-	1096
VE6NQ/6*	Calgary ARA	485-	B-	7-	1070
K4TP/4	Gastonia Gas Lighters	434-	B-	5-	1068
KØNL/Ø	Hiawatha ARC	454-	B-	15-	1063
WBØDLL/Ø	non-club group	479-	B-	6-	1058
W4JIO/4*	Woodbridge Wireless Soc.	425-	B-	12-	1050
W7EO/7	Butte ARC	897-	C-	15-	1047
KØSOQ/Ø*	Hastings ARC	420-	B-	12-	1040
WØUL/Ø*	Fort Dodge ARC	442-	B-	9-	1034
W7ROU/7*	Molalla Union HS ARC	427-	B-	4-	1004
WBØHAE/Ø*	Southwest Minn. ARA and Explorer Post 160	851-	C-	11-	1001
K4BEZ/4*	Humboldt ARC	838-	C-	18-	988
VE4KE/4*	non-club group	486-	B-	6-	972
VE6RCL/6*	Cold Lake RAC	386-	B-	7-	972
VE7ARM/7*	Richmond ARC	408-	B-	4-	966
W9UJM/9*	Nutty Net	391-	B-	10-	932
K5KIR/5	Northeast Miss. ARA	385-	B-	10-	920
VE1JV/1*	Pictou County ARC	375-	B-	10-	900
VE2AQV/W6	non-club group	348-	B-	4-	896
W3OK/3*	Delaware Lehigh ARC	388-	B-	-	876
WA3MVR/3*	non-club group	360-	B-	3-	870
WA9UMN/9	Univ. of Illinois	380-	B-	7-	860
W4TOC/4*	Warrenton RC	377-	B-	8-	854
WAØIDK/Ø	non-club group	377-	B-	3-	854
WA8JXE/8*	Yellow River DX Club	376-	B-	5-	852
WØMQ/Ø	Northliners RC	350-	B-	16-	850
WA3IUY/3	Baltimore Polytech. Inst. Alumni RC	374-	B-	5-	848
W8DYY/8*	Mound RC	349-	B-	11-	848
WA4WFO/4*	non-club group	371-	B-	3-	842
K8KRG/8	Northern Ohio AR Soc.	351-	B-	21-	802
VE3UOW/3*	Univ. of Waterloo ARC	390-	B-	5-	780
WØLAC/Ø	Blackhawk ARC	314-	B-	8-	778
W3FQR/3	Dit Happy Dash Hounds C & P Telephone Co.	384-	B-	6-	768
WØLSD/Ø	Glenwood Amateur Soc.	326-	B-	5-	752
WØMT/Ø	Tin Cup Hams	301-	B-	3-	752
K3HOU/3	Bowie ARC	298-	B-	10-	746
WAØRAX/Ø	Albert Lea ARC	323-	B-	5-	746
WA2NPQ/2	State U of NY of Buffalo ARS	296-	B-	5-	742
WA7BTZ/7*	CB Stompers	291-	B-	4-	732
VE4BB/4*	Winnipeg ARC	572-	C-	18-	722
WBØCQP/Ø*	Duluth Cathedral ARC	271-	B-	8-	692
VE4DF/4	Flin Flon ARC	270-	B-	3-	690
WB8EAS/8	Shaker Hgts. HS ARC	285-	B-	4-	670
W6LIE/6*	Kern County RC,Inc.	257-	B-	20-	664
KH6WO/KH6*	Honolulu ARC	530-	C-	10-	630
W9OFR/9	Joliet AR Soc.	515-	C-	7-	615
KØJOQ/Ø*	Crete ARC	451-	C-	7-	601
K8LMF/8	Apricot-Mess-Net	179-	B-	6-	598
VE4DD/4*	Pinawa Amateurs	409-	C-	7-	559
WAØRBG/Ø*	Grand Island AR Soc.	395-	C-	14-	545
W7GUF/7*	Rogue Valley ARC	215-	B-	3-	530
WØAJA/Ø*	Coon Valley AR	215-	B-	9-	530
WN9IWN/9*	Summer Ski Patrol	185-	B-	4-	520
VE1GM/1*	non-club group	175-	B-	4-	500
VE3IS/3	BBC London (Boathouse Barfly Consortium)	150-	B-	3-	500
WN8LKN/8*	Motor City RC Novice Group	133-	B-	6-	466
WA8WCU/8	Licking County AREC	178-	B-	3-	456
WA7FKF/7*	Union Pacific Handlers	350-	C-	6-	450
WA8MBX/8*	Hillsdale ARC	174-	B-	5-	448
WA8WNJ/8*	non-club group	224-	B-	3-	448
WØKUY/Ø	non-club group	147-	B-	6-	444
KØAJW/Ø*	Minot AKA,Inc.	167-	B-	10-	434
W9OG/9	Tri State AR Soc.	165-	B-	-	430
WN1PHJ/1	Glastonbury RC	66-	B-	6-	332
WØVVB/8*	non-club group	115-	B-	6-	330
WN4ZFO/4	Kentuckiana RC (Novice)	76-	B-	11-	302
WN3QGF/3	Bowie ARC Novices	75-	B-	10-	300
WA9ISU/9	Palestine ARC	100-	B-	3-	300
WB9HTL/9*	Cathedral HS ARC	300-	C-	4-	300
VE7ES/7*	Totem ARC	72-	B-	6-	294
WN5ESQ/5	Alexandria Day School ARC	96-	B-	4-	292
WA3NSZ/3*	Randallstown HS ARC	45-	B-	10-	290
KØWAR/Ø	Lamar ARC	217-	C-	12-	267
WA8ZNC/8*	Eastern Ohio Contesters	108-	B-	6-	266

W0CBL/0*	Northeast Mo. ARC	105-	B-	S-	265
WN4TMD/4	Forsyth ARC/Novices	57-	B-	6-	264
WN7TYZ/7*	Sehome High ARC	27-	B-10-		254
WN4YIX/4	*Cocoa Radio Bugs*	96-	B-	3-	246
WA3RGN/3	Abington ARC	46-	B-	3-	242
WB6OYN/6	The 6OY Club	64-	B-	S-	228
WN0DPR/0	Wichita ARC Novice Group	61-	B-12-		222
WN9JIC/9*	WVRA Novices	28-	B-	-	206
W9BXR/9*	Montgomery County AREC	50-	B-	6-	200
WN0GUU/0	Cedar Valley ARC	21-	B-	4-	192
WN0HDI/0*	Three Rivers ARC	21-	B-	2-	192
W8TFZ/8*	Aviation RC VHF Group	35-	B-	7-	170
WN9IVR/9*	Newkuk's Novices	29-	B-	3-	158
WA3NYY/3	Explorer Post 6	114-	C-	S-	114

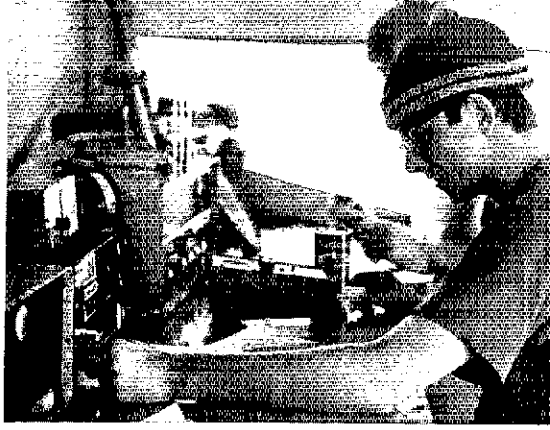
2A - Battery

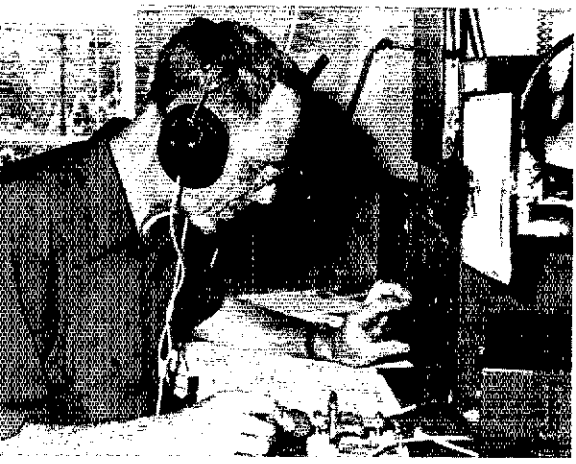
W3TV/3	Friendly Amateur Radio Transmitters Society	269-	A-	3-	807

2A

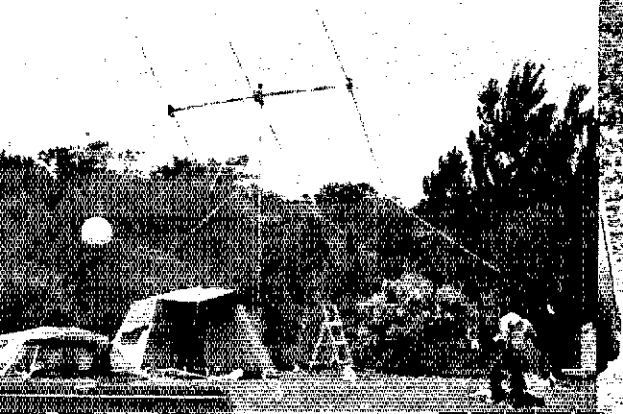
W9YT/9*	Badger AR Soc.	2934-	B-	7-	6168
W4GGU/4	Panama City Contest Group	2216-	B-	4-	4682
K8RWK/8	Richardson Wireless Klub	2194-	B-25-		4638
K9IU/9	Indiana Univ. ARC	2090-	B-	6-	4430
W0IW/0*	Arapahoe RC,Inc.	1924-	B-35-		4148
W2FXA/2*	Buffalo Area DX Club	1849-	B-	9-	4003
W5SBX/5	non-club group	1896-	B-	9-	3992
K6AA/6*	United RAC	1815-	B-20-		3880
W8COE/8	Kanawha RC	1714-	B-25-		3678
W0AA/0*	Minnesota Wireless Assoc.	1597-	B-11-		3444
W9YB/9*	Purdue Univ. ARC	1500-	B-14-		3305
K9BGL/9	Belleville AR Foundation	1514-	B-	4-	3278
W7LR/7	Hellgate RC	1479-	B-10-		3208
K7MNZ/7	Aberdeen ARC	1438-	B-	8-	3176
W8QBC/8*	Oak Park ARC	1486-	B-	8-	3172
W5LXI/5	Lafayette ARC	1360-	B-20-		3020
WA4ZCX/4*	RAC of Knoxville	1400-	B-	9-	3000
WA1HRC/1	WELI ARC	1368-	B-	9-	2936
W4KNW/4*	Independent Group	1333-	B-	5-	2916
WA2WLN/2	The Electric Bananas	1318-	B-	7-	2886
W0ERH/0*	Johnson County RAC	1283-	B-15-		2866
WB6ATW/6*	Southern Cal. Amateur Network	1326-	B-15-		2852
K4KDJ/4*	Va. Tech. ARA	1316-	B-	8-	2832
W9KM/9*	Kokomo Firebird RC	1265-	B-13-		2780
VE1FU/1	Halifax ARC	1232-	B-15-		2764
W0JUU/0*	No. Iowa ARC	1217-	B-18-		2684
K5TYP/5	Keesler ARC	1236-	B-20-		2672
WA2LQZ/2	non-club group	1171-	B-	3-	2592
WA9UVE/9*	The Glen Gates Gang	1161-	B-17-		2572
W0MXW/0*	Rochester ARC	1134-	B-35-		2548
W8LT/8*	Ohio State Univ. ARC,Inc.	1134-	B-18-		2518
WB4IIT/4	non-club group	1139-	B-	3-	2478
W9PIT/9	Neenah-Menasha ARC	1127-	B-10-		2454
WA9LGQ/9*	Indianapolis Red Cross ARC	1102-	B-18-		2454
W2NTN/2	Acme Whammy RC	1121-	B-	7-	2442
WB0BMY/0*	Radio Free Dubuque	1096-	B-	6-	2442
WA0YTU/0*	Pikes Peak RAA	1063-	B-16-		2426
W9UDU/9*	Racine Megacycle Club	1087-	B-20-		2424
W2LZ/2*	Walton RA	1057-	B-10-		2364
VE5FN/5*	Till's Terrorists	1038-	B-15-		2326
K0DDA/0*	Cedar Valley ARC	1012-	B-25-		2324
VE7NA/7	Nanaimo ARA	1011-	B-12-		2322
K7SKW/7	Mt. Baker ARC	969-	B-20-		2238
WA1GBA/1	*non-club group*	989-	B-	4-	2178
W0EK/0*	Explorer Post 11	1011-	B-	8-	2172
W3FPP/3*	non-club group	930-	B-	7-	2160
WA5CKF/5	Irving ARC	976-	B-11-		2152
WB4TON/4*	Hollywood ARC	947-	B-16-		2144
K0OKZ/0	Iowa Independent AR FD Club	946-	B-10-		2142
W8CUL/8	Northern West Va. FD Assoc.	944-	B-	9-	2138
W5FC/5	Dallas ARC	1813-	C-15-		2113
WA5KAK/5*	Friendly Amateur Radio Transmitting Society	887-	B-	6-	2074
WA5KAS/5*	Trans-Texas Joint Effort	909-	B-	4-	2068
W4NLX/4	Indian River ARC,Inc.	891-	B-20-		2032
W5ABD/5*	Westside ARC	887-	B-12-		2024
W0EIT/0	Albert Lea Spiderweb ARA	875-	B-14-		2000
VE5AA/5*	Saskatoon ARC	846-	B-15-		1992
W4AVW/4	Forsyth ARC	838-	B-20-		1976
W3ALD/3	Lake Shore ARA	854-	B-	6-	1958
WA4ECY/4	NCTC ARC	836-	B-10-		1922
WA2PNU/2	Larkfield ARC	831-	B-35-		1912
VE3KAM/3*	Ottawa Valley Mobile RC	805-	B-16-		1910
VF4MB/4	South Western Manitoba ARC	787-	B-15-		1874
W8CQK/8	Battelle-Columbus RC	783-	B-12-		1866
W0EBE/0	Southwest Mo. ARC	805-	B-14-		1860
W2OE-Q/2	Rome RC,Inc.	760-	B-18-		1820
W8MRM/8*	Motor City RC	757-	B-10-		1819
VE3LON/3	London ARC	777-	B-20-		1804
WB8JBM/8	North Ridgeville HS RC & Elyria and Columbia HSRC	775-	B-10-		1800
W6OS/6	Fairmon Electric AR Team	798-	B-	8-	1796
WB4GHZ/4	non-club group	769-	B-	9-	1788
K4RY/4*	Auburn Univ. ARC	740-	B-	4-	1780
K4KJQ/4	Blue Grass ARC	763-	B-14-		1776
VF2ARC/2	Montreal ARC	785-	B-10-		1770
W8DC/8*	Grand Rapids ARA	700-	B-30-		1750
VA5WCC/VE5	Regina ARA	745-	B-20-		1740
K4GFG/4	*Motorola ARC*	864-	*B-11-*		1728
VE3AEA/3	Peterboro ARC	736-	B-	7-	1722
W1MHL/1	non-club group	758-	B-	-	1716
W6LUC/6	Santa Barbara ARC	754-	B-	8-	1708
W0SOE/0	Wichita ARC,Inc.	722-	B-40-		1694
W6DM/6	Mike and Key RAC	681-	B-	7-	1662
W4ABK/4	Kentuckiana RC	685-	B-26-		1620
WA9TXE/9*	So. Milwaukee ARC	680-	B-28-		1610
W3SL/3	Delaware ARC	802-	B-13-		1604
W0NE/0*	Winona ARC	650-	B-	7-	1600
K8UIT/8*	Ford AR League-The Tin Lizzy Club	626-	B-22-		1552
W4NVU/4*	Dade RC,Inc.	648-	B-10-		1551
W2JUG/2	West Jersey Radio Amateurs	623-	B-	7-	1546
W3FT/3	Baltimore ARC	614-	B-20-		1528
W1AQ/1*	Associated Radio Amateurs of So. N.E.	638-	B-15-		1526
W6PIY/6*	West Valley ARA	1326-	C-13-		1526
W9NUW/9*	Wisconsin Valley RA	637-	B-15-		1524
WB5BBJ/5*	Wichita AR Soc.	660-	B-	-	1510
WB4VJO/4*	New River Comm. College ARC	604-	C-11-		1508
K7UGT/7	Sierra Nevada AR Soc.	626-	B-30-		1502
WB2SEQ/2	Amer. Red Cross Emerg. RC	624-	B-15-		1448
W4VHH/4	North Augusta-Belvedere RC	589-	B-10-		1428
WA4YRK/4	Dave, Bob & Mike's Camp-out	614-	B-	3-	1428
W3PSH/3*	Keystone ARC	613-	B-	6-	1426
W0AZR/0*	Austin Area ARC	587-	B-10-		1424
WB4MZT/4*	South Eastern Va. Wireless Association	607-	B-11-		1414
W5ES/5	El Paso ARC,Inc.	582-	B-25-		1414
WA3SYT/3	Mason-Dixon Pirate RS	536-	B-	9-	1412
VE7ARV/7	Vancouver ARC	552-	B-14-		1404
WA2DJS/2	Wayne ARC	548-	B-10-		1396
VE1WN/1	Greenwood ARC	565-	B-13-		1395
W6VLD/6*	McDonnell Douglas Astronautics RC	588-	B-15-		1376
K0BLT/0	Saunder County AR Soc.	563-	B-	8-	1376
WA6IVP/6	Weesun ARC	585-	B-13-		1370
WB0GTV/0	Benton Co. ARC	532-	B-11-		1364
WB0HQG/0	3m ARC	556-	B-12-		1362
W1FDH/1	Middlesex AR Soc.	555-	B-15-		1360
W2ZV/2	Brookhaven Nat Lab ARC	551-	B-13-		1352
K4JVA/4	South Miami RC,Inc.	520-	B-13-		1340
WA5BUG/5	Great Plains Amateur Club	1089-	C-11-		1339
VF3SB/3	Southern Group of Champlain Regional Repeater Assoc.	487-	B-13-		1324
K7PBU/7	non-club group	552-	B-	4-	1304
K4HYB/4	Charles E. Newton Jr. ARC	521-	B-10-		1292
WB9BPW/9	Explorer Post 6 ARC	517-	B-	9-	1284
VE1AA/1*	Queens County Amateurs	508-	B-10-		1266
VE3UI/3	Renfrew County ARC	502-	B-	7-	1254
WB8CSQ/8	Cascades AR Soc.	496-	B-	7-	1242
W0RR/0	Heart of America RC	485-	B-11-		1220
K4HY/4*	Owensboro ARC	597-	B-15-		1194
W3JTZ/2	Chaminade HS ARC	470-	B-	7-	1190
K6QHQ/6*	South Bay AR Soc.	495-	B-13-		1190
W5QGG/5*	*Midland ARC*	466-	B-	7-	*1182*
VE2CRS/2*	Club Radio-Saguenay	455-	B-20-		1160
WB4VCZ/4	Choctawhatchee AR Soc.	450-	B-10-		1150
W0LYC/0*	Dodge City Centennial Gang	450-	B-	3-	1150
WB6OUS/6	Calvary Baptist ARC	445-	B-	7-	1140
W0NL/0*	Mid-Mo ARC	410-	B-18-		1120
W2BMW/2*	*TV-Boro ARC,Inc.*	459-	B-15-		1118
WB4QNX/4	IBM ARC of Boca Raton	459-	B-15-		1118
W2LCA/2	North Country RC	406-	B-	7-	1112
VE6NH/KL7*	Moose Horn ARC	445-	B-11-		1090
WB6HIU/6*	non-club group	437-	B-	3-	1074
W9AML/9	Central Illinois RC	867-	C-12-		1067
W2RP/2*	Westchester ARA	428-	B-	9-	1056
W0VZG/0*	Pilot Knob ARC	388-	B-	8-	1026
VE3ND/3	York North ARC	471-	B-10-		942
W7VNJ/7	Casper ARC	345-	B-11-		940
W2CVT/2	Poughkeepsie ARC	366-	B-	5-	932
W8YDK/8*	Milford ARC	338-	B-13-		926
WA5UMK/5	Ozone ARC	332-	B-12-		914
VE7UI/7*	North&West Vancouver ARC	657-	C-10-		912
W0NH/0	Missouri Valley ARC	331-	B-10-		912
KH6UL/KH6*	Military RC	656-	C-	6-	856
VE6AIK/6	Alberta's Wireless Wonders	318-	B-	6-	836
W4UWZ/7*	Tatuna ARC	288-	B-	9-	826
WB2YPO/2*	The Navesink Emerg. Net	308-	B-	4-	816
W4OQG/4	Mid-South VHF Assoc.	308-	B-	4-	816
WA0HOU/0*	Blue River ARC	283-	B-14-		816
VE3KAR/3*	Kingston ARC	282-	B-10-		814
K7YFJ/7	Boy Scout Explorer Post 308	303-	B-	6-	811
W9CJS/9	non-club group	304-	B-	4-	808
WA7ICP/5	non-club group	800-	C-	3-	800
K6NCG/6	T.I.N.S.C.A.R.C.	295-	B-	3-	790
K8NAW/8*	USNR Grand Rapids, Mich.	266-	B-	5-	782
W2YKQ/2*	Lake Success RC	239-	B-10-		778
VE7ALD/7	non-club group	237-	B-	3-	774
W3DOS/3	Dept. of State ARC	262-	B-20-		774
K4GG/4*	Manatee ARC	255-	B-	7-	760
WB2ENJ/2*	Eastern New Jersey	279-	B-	3-	758
K9YCJ/9*	Gibson ARC	228-	B-	5-	756
W8PIF/8	Marinette & Menominee ARC	225-	B-12-		700

Digging for the weak ones are (right) WB6FXB at W6CX/6 (7A), the Mt. Diablo ARC. True to their name the W6CX/6 FD site was on Mt. Diablo. Below, well known contester W3IN strains for another QSO on 40 cw from W3VD/3 (6A). With an op such as that it is no wonder they had 682 QSOs on 40 cw.





Right, TARC prexy WB4MXX takes a turn at the mike during FD at W4NV/4 (5A). Below Right, WA1s IEB and MHJ try to make some sense out of the 40 meter ssb pile-up they have generated at K1JMR/1 (3A) while Dick Elliot (no call) looks on. Below, what a sight to see in the small snakelike streets of Boston! WB6CEP and WB6BIG, ops at WB6CEP/1, installed this 3 element beauty on the campus of the Greek Theological College in Boston and nabbed 409 QSOs in 1B.

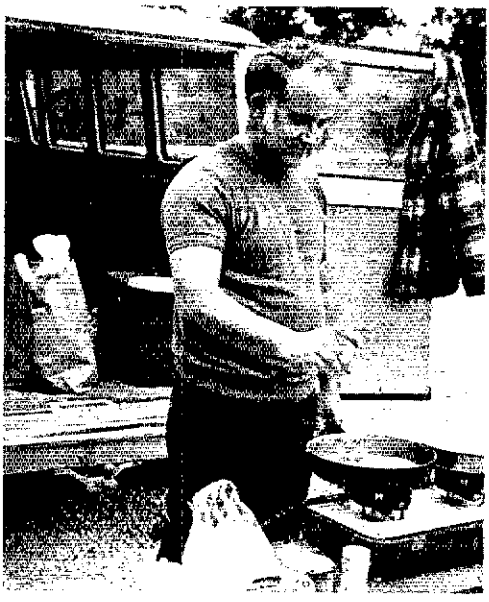


VE6ASW/6*	Hat H.. n Club	216-	B- 3-	682
W8ZPF/8	Amate..r Radio & Electronics Club	240-	B- 8-	680
VE8FD/8*	non-club group	213-	B- 5-	676
W1PSY/1*	non-club group	210-	B- 3-	670
W8QLY/8	Mahoning Valley ARA	228-	B-12-	656
WA3KIJ/3	non-club group	450-	C- 7-	650
W2RHM/2*	Black River Valley ARC	161-	B-15-	622
WB9GLI/9*	Fremd ARC	185-	B-15-	620
WØDK/Ø	Boulder ARC	349-	C- 8-	599
W8IEU/8*	Desc ARC	192-	B- 5-	584
WA8ZGE/2	Euclid Senior HS RC	164-	B- 6-	578
K5HXN/5	Amateur Radio Campers	185-	B- 5-	570
W5SRW/5*	Mesilla Valley RC	184-	B- 3-	568
K1OXV/1	Dennis Yarmouth Reg. HS ARC	317-	C- 4-	567
WA1NXU/1	Swamp Yankee's	152-	B- 8-	564
WA7FOD/7	Emerald AR Soc.	291-	C- 6-	541
W6TO/6*	Fresno ARC	339-	C-18-	539
WB5ABR/5*	Scott County ARC	166-	B- 3-	532
W3PNL/3	The Mavericks	155-	B- 3-	510
K9QDE/9*	Kokomo ARC	125-	B-10-	500
W8EIR/8	Thunder Bay ARC	149-	B- 8-	498
K7HPO/7*	Group from KLVX-TV	112-	B- 3-	474
WAØDOY/Ø	SPARK	234-	B-15-	468
WA2PUX/2	Kinabtzky's Kilowatts	99-	B- 3-	448
WA2FDJ/2	Ogdensburg ARC	121-	B-16-	442
WA5IPE/5*	Wheat Straw ARC	83-	B- 6-	421
W1OFK/1	*non-club group*	66-	B- 4-	382
K1DIN/1*	Needham HS ARC	180-	C- 6-	380
K5VHH/5	Hill Country Scout Ranch	88-	B- 3-	376
WB8FNC/8*	John Marshall ARC	88-	B- 6-	376
W9UZE/9*	DeWitt County ARC	51-	B-10-	352
WB2PXW/2	non-club group	74-	B- 3-	348
W7RGL/7	AR Comm. Service	73-	B- 3-	346
WB2WGP/2*	Mid-County Net ARC	69-	B- 9-	338
WN4UNV/4*	Hollywood ARC/Novice	45-	B- 8-	290
W5DSC/5*	Victoria ARC	281-	C-12-	281
WB5DRY/5	West Memphis Boy Scout ARC	46-	B- 5-	242

3A

W1TX/1 (+WN3SNO)*	Conn. Wireless Assoc.	2898-	B-22-	6196
VE7EZ/7	Victoria Shortwave Club	2885-	B-30-	6120
W4FU/8	Ohio Valley ARA	2530-	B-15-	5360
W4TRC/4*	Kingsport ARC-Bays Mt. RC	2081-	B-42-	4562
W4DW/4 (+WN4WII)	Raleigh AR Soc.	2036-	B-19-	4422
K5RLW/5 (+WN5GJD)	Texas DX Soc.	2016-	B-10-	4382
W9FK/9 (+WN9JIA)	West Allis RAC,Inc.	1928-	B-22-	4206
W5LL/5*	Tombigbee ARC	1888-	B-20-	4176
W9FU/9	Indianapolis DX Assoc.	1869-	B-10-	4088
K4FU/4	Louisville's Active Radio Operators	1828-	B- 8-	3956
W9LM/9 (+WN9ETL)	Northwest ARC	1740-	B-33-	3880
K1JMR/1 (+WN1OLV)	Norwood ARC	1669-	B-24-	3688
K4WAB/4 (+WN4RXR)	Cape Fear AR Soc.	1656-	B-17-	3662
W9AA/9*	Hamfesters RC	1585-	B-15-	3520
W4IZ/4*	North Florida AR Soc.	1558-	B-25-	3466
W6ZE/6	Orange County ARC	1553-	B-24-	3456
W9EI/9	Churubusco Turtles	1523-	B-10-	3446
K9EAM/9 (+WN9JLM)	Green Bay Mike & Key Club	1518-	B-15-	3336
K2BK/2*	Overlook Mtn. ARC	1444-	B-18-	3288
W9DY/9 (+WN9IAA)	RA Megacycle Soc.	1436-	B-16-	3272
W9CQO/9 (+WN9JCN)	Ozaukee RC	1423-	B-25-	3246
W9IO/9 (+WN9INU)	McHenry Co. ARC	1366-	B-20-	3137
K6AEH/6 (+WN6LSG)	Palisades ARC of Culver City	1408-	B-47-	3116
W5KC/5*	Baton Rouge ARC	1351-	B-28-	3102
K1JNQ/1 (+WN1OWI)	Sharon ARA	1317-	B-12-	3034
W4UC/4 (+WNØDLV)	Five Flags ARC	1301-	B-25-	2977
W4BFB/4	Mecklenburg County AR Soc.	1287-	B-16-	2974
W8VVL/8	Queen City Emerg. Net	1266-	B-25-	2932
W8CXS/8 (+WN8JTN)	Hills AR Soc.	1278-	B-15-	2906
W4CVY/4	Columbus ARC,Inc.	1267-	B-15-	2884
W6KA/6 (+WN6LSA)*	Pasadena RC	1239-	B-20-	2878
K6FB/6	Hewlett-Packard ARC	1207-	B-12-	2814
W2LQ/2 (+WN2SMS)	Holmdel ARC	1210-	B-29-	2770
W4MRF/4 (+WN4WSN)	'Rotten Radio' ARC	1168-	B-16-	2736
*WA2ICU/2**	Radio Amateurs of Greater Syracuse	1156-	B- 7-	2712
W5BW/5 (+WN5DCY)	Mississippi Coast ARA	1173-	B-28-	2696
W8VM/8*	West Park Radiops	1166-	B-20-	2682
KP4USN/KP4	Sabana Seca ARC	1160-	B-10-	2670
WB8MNX/8 (+WN8LEM)*	Steelworkers ARA	1155-	B-12-	2660
W7IO/7 (+WN7QLH)	*Arizona ARC*	1162-	*B-30-*	2629
W9QOG/9	Lakeview ARA	1135-	B- 8-	2620
W1HEB/1*	Middlesex ARC	1066-	B-20-	2532
W3ONP/3	Chesapeake ARC	1077-	B-15-	2504
K1RP/1*	Hamden ARA	1069-	B-30-	2488
W9IKN/9 (+WN9GWL)*	Elgin AR Soc.	1084-	B-12-	2468
WØIE/Ø	Western Electric ARC	1080-	B-20-	2460
W9UM/9	Hoosier Lakes RC	1045-	B-22-	2440
W8GFG/3 (+WN3SZX)	SVARFDG-WARA,P.2	1032-	B-10-	2414
K7NWS/7 (+WN7TOT)	BEARS	999-	B-29-	2348
K5FIQ/5 (+WN5GWH)*	Kirkland AFB ARC	968-	B-10-	2286
WA3EWJ/3*	Montgomery ARC	990-	B-15-	2280
W6OTX/6 (+WN6DQU)	Palo Alto ARA	927-	B-10-	2264
W5LOW/5	Okla. Central VHF ARC	956-	B-35-	2262
WØDJ/Ø	PHDARA,Inc.	890-	B-45-	2180
K2IQ/2	Utica ARC	930-	B-18-	2160
KØHMN/Ø (+WNØHUX)	North Kansas City AR Soc.	893-	B-13-	2136
W7NBR/7	Spokane Radio Amateurs	891-	B-18-	2132
VE3PRC/3*	Peel ARC	887-	B-25-	2124
W3ZH/8	ARINC ARC	911-	B- 8-	2122
K5QHD/5	Garland ARC	868-	B-11-	2086
WB9GVN/6 (+WN6RPS)	Travis AFB ARC	868-	B-10-	2086
WB4NTB/4 (+WN4YMS)	Murray State Univ. ARC	859-	B-15-	2068
WA4TFZ/4	The Albemarle ARC	852-	B-12-	2054
K3MTK/3	Suburban ARC	850-	B-28-	2050
WA3QDT/3 (+WN3SLX)	Presque Isle ARC	849-	B-20-	2048
W5PDO/5 (+WN5FDM)*	The Los Alamos ARC	874-	B-20-	2048
W6AB/6*	Satellite ARC	872-	B- 8-	2044
W1OF/1 (+WN1ODJ)	The Providence RA	835-	B-18-	2020
W5TSV/5	Pampa ARC	835-	B-12-	2020
WA3GYE/3	Whitehall ARC	832-	B- 8-	2014
WØKQU/Ø (+WNØDWU)	Central Kansas ARC	828-	B-17-	2006
K7AYF/7*	Shy-Wy RC	800-	B- 6-	2005
K6CLZ/6	Aerojet RAC	813-	B-15-	1976
WAØWOA/Ø	non-club group	838-	B-10-	1976
K4MI/4	Brightleaf ARC	778-	B-10-	1956
WØIS/Ø	Quad City Amateur Soc.	793-	B-10-	1941
W7VSS/7*	Eagle Rock RC	760-	B-10-	1920
VE2CVR/2	Club De La Vallee Du Richelieu	773-	B-10-	1901
W6NI/6 (+WN6KGW)	East Whittier RC	774-	B-15-	1898
K3TGM/3	Wm. Penn RC	782-	B- 6-	1864
W9HPG/9*	Chicago Radio Traffic Assoc.	723-	B-10-	1846
W8DF/8 (+WN8JZN)	Southern Mich. AR Soc.	747-	B-50-	1844
W3KWH/3*	Steel City ARC	724-	B-10-	1748
W9IGW/9	Bloomington ARC	662-	B-20-	1724
W7SAA/7*	Salem ARC	684-	B-12-	1718
WB4RNC/4*	Brandon AR Soc.	675-	B-12-	1700
W9MJL/9	Vermilion County ARA	674-	B-30-	1698
WA1IIK/1	non-club group	697-	B-10-	1694
W4EHW/4 (+WN4TYR)	Dade County ARPSC	670-	B-11-	1690
W3CSL/3*	Monessen ARC	653-	B-	1656
W8VY/8 (+WN8MJI)*	Kalamazoo ARC	645-	B-15-	1640
W6HS/6 (+WN6CJQ)*	Crescenta Valley RC	614-	B-12-	1628
K8DAC/8 (+WN8KNG)	Saginaw Valley ARA	650-	B-13-	1600
WAØQHL/Ø	Three Rivers	621-	B-10-	1592
K9UQN/9 (+WN9IUR)	Motorola ARC	632-	B-10-	1564
W2PE/2 (+WN2DRL)	RAWNY	599-	B-25-	1548
W4BS/4 (+WN4TJH)	Delta ARC	599-	C-25-	1548
W4KCQ/4 (+WN4YOX)	Tuscaloosa ARC	569-	B-20-	1538
W1EW/1*	Merrimack Valley ARC	1174-	C-11-	1524
W2JJ/2 (+WN2SXO)	Massapequa ARC	612-	B-14-	1524
K5VOZ/5*	Lawton Fort Sill ARC	609-	B-14-	1518
WA3RCA/3 (+WN3SEP)	Post 681-Penn ARC	601-	B-15-	1507
WA1MKT/1*	Luting ARC	576-	B- 8-	1502
W9YCR/9	Quad-City ARC	570-	B-	1495
WB5FIL/5	Explorer Post 296 ARC	586-	B-15-	1462
WAØCGV/Ø (+WNØEZV)	McDonnell Douglas ARC	577-	B-15-	1454

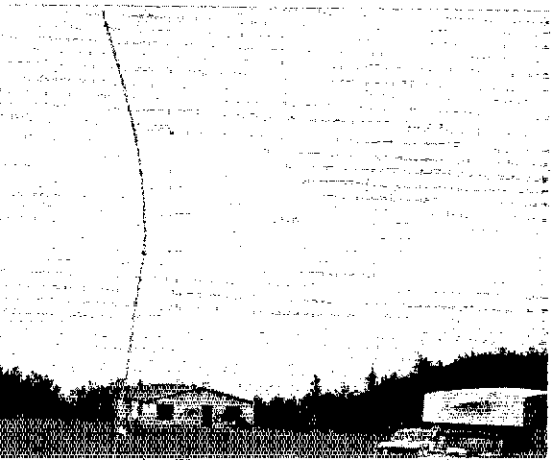
The Lighter Side of Field Day

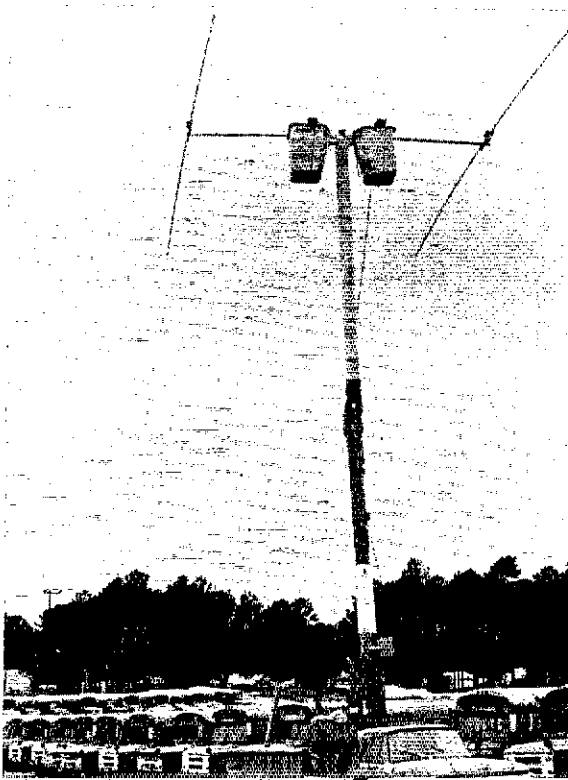


Above: Always wondered why FD chow didn't taste quite the same as Mom's. Here WA8QET, chief chef at W8CQK/8 (2A), prepares the morning eggs with a dash of his own special seasoning. Right: Keeping ops on the job has always been a problem during Field Day. K9BPL/9 (5A) has come up with an obvious solution. Notice that it is attached to his left foot. Hope it doesn't affect his sending.

Right: Putting up the 40 meter beam at W4DW/4 (3A) was easy with a little help from their friends.

Believe it or not, this pole started out as a 60 feet high vertical at K7LED/7 (6A). The gang couldn't get the vertical vertical so they used 30 feet of it as a 75 meter dipole support. The bend got worse as the contest progressed but the antenna did stay up.





K1MTJ/1 (+WN1QHU)					
	Portland Amateur Wireless Assoc.	551-	B-12-	1452
VE3SOO/3*	The Algoma ARC	570-	B-	1440
WB4ABT/4 (+WN4WSO)*				
	Southern Peninsula AR Klub	1058-	C-37-	1408
W6VIO/6*	I.P.I. RC	553-	B- 4-	1406
K9EEI/9	Allison ARC	551-	B-20-	1402
W9LUO/9*	Fond du Lac ARC	542-	B- 6-	1384
K1NQG/1 (+WN1NSM)				
	Fidelity ARC	535-	B-18-	1370
W8RUC/5	Springhill ARC	523-	B- 8-	1346
W1KWX/1	Valley ARC	496-	B-20-	1342
WØZWY/Ø (+WNØHAT)				
	Sioux Falls ARC	976-	C-17-	1326
VE2CAR/2	Chateauguay RC	484-	B- 9-	1318
K2BDX/2	Kearny ARC	509-	B-11-	1318
K9GXU/9 (+WN9IGE)				
	St. Clair ARC	482-	B-13-	1314
W9WWI/9 (+WN9GLG)*				
	Clark County ARC,Inc.	450-	B- 9-	1305
K2BR/2*	Southern Counties ARA	475-	B-25-	1300
W1SYE/1 (+WN1POH)				
	Newport County ARC	469-	B-22-	1288
K8ZAS/8	Delta County AR Soc.	457-	B-11-	1264
WA6CFM/6	Explorer Post 201	627-	B-12-	1254
WB6QHL/6*	"Worldradio" Staff ARC	475-	B- 4-	1250
WAØNOA/Ø	Independence ARC	448-	B-15-	1246
WA9PBZ/9	Pike HS ARC	445-	B- 6-	1240
WA6UOW/6 (+WN6RPU)				
	Explorer Posts 2902&2955	433-	B-18-	1216
WA3JVG/3*	non-club group	457-	B- 4-	1214
VE3SWA/3	South Waterloo ARC	434-	B-23-	1168
WA8ICQ/8 (+WN8MPD)				
	Wayne AR Tech. Soc.	377-	B- 7-	1154
WB2RLO/2 (+WN2GWC)				
	Fair Lawn ARC	393-	B-21-	1136
W4OLB/4 (+WN4UWM)				
	Smoky Mtn. ARC	359-	B- 8-	1118
W8LXE/8 (+WN8MUS)				
	Detroit Metropolitan RC	359-	B- 6-	1118
K8TH/8 (+WN8KKF)*				
	Henry Co. ARC	380-	B-15-	1110
W7GV/7	Old Pueblo RC	377-	B-30-	1104
VE7IP/7*	East Kootenay ARC	401-	B-12-	1102
W7YN/7*	Nevada ARA	375-	B- 7-	1100
WB4PLD/4	FT FD Group	384-	B-11-	1068
W8AX/8*	Thumb ARC	383-	B-13-	1066
K2LSA/2 (+WN2GFF)				
	State Line RC	377-	B-13-	1054
WA9DKP/9	Huntington Co. AR Soc.	349-	B-10-	1048
VE3BSQ/3	Quinte ARC	638-	C- 8-	1038
DJ1US/W1*	Kearsarge ARC	337-	B- 6-	1024
W8CON/8 (+WN8JPC)				
	Mich-A-Con ARC	331-	B-11-	1012
K9DDM/9 (+WN9JBS)				
	Clinton County VHF ARC	306-	B-19-	1012
W8PBO/8 (+WN8KLB)*				
	Canse Creuse ARC	355-	B- 5-	1010
W5BGJ/5*	non-club group	351-	B- 6-	1002
WA7LAZ/7	Hualapai ARC	323-	B-10-	996
WBØHSJ/Ø (+WNØGKZ)				
	St. Charles ARC	323-	B- 8-	996
WA9UCE/9 (+WN9KLN)				
	Libertyville & Mundelein AR Soc.	642-	C-12-	992
VA1LC/1	Loyalist City ARC	591-	C-15-	991
WA3MRV/3	Mobile Sixers RC	337-	B- 7-	974
WØDCW/Ø	Suburban RC	332-	B-20-	974
W3SGJ/3 (+WN3SKL)				
	Beaver Valley ARA	328-	B- 7-	956
W6AK/6 (+WN6RTA)				
	Sacramento ARC	476-	B-14-	952
WØDF/Ø*	Tri State RC	301-	B-22-	952
WA7TXP/7*	Cache ARC	275-	B- 7-	950
K4CO/4	Northern Kentucky ARC	314-	B-15-	928
W2VA/2 (+WN2FIU)				
	Wantagh ARC	263-	B-25-	926
WA3IBA/3	HDL RC	312-	B- 9-	924
K5WPH/5*	Sun City ARC	286-	B-16-	922
K9RHH/9	Meno FLS RAC	285-	B-15-	920
W4TIM/4 (+WN4WMK)*				
	Polk Co. Civil Defense Amateur Comm. Soc.	269-	B- 6-	888
W5CUU/5	Meridian ARC	284-	B-12-	868
W7EK/7 (+WN7PXC)				
	Cascade RC	234-	B- 5-	868
WØMG/Ø (+WNØFEW)*				
	Northeast Iowa RAA	269-	B-11-	838
VE3AWI/3*	Bluewater RC	242-	B-12-	834
WA3RBU/3	Chestnut Ridge ARC	256-	B- 8-	812
W8OG/8	Springfield ARC	256-	B-12-	812
WB5CTH/5 (+WN5GMY)*				
	Colorado County ARC	203-	B- 4-	806
WA6AEG/6*	Mtn. View HS RC	243-	B- 7-	786
W8BLV/8 (+WN8LVN)				
	Dial ARC	242-	B-15-	784
K5JOA/5*	Miami ARC	204-	B- 8-	708
K7RQZ/7 (+WN7TGM)*				
	Central Oregon Radio Amateurs	194-	B- 5-	688
WØZRT/Ø	Bismarck Area RC	327-	C-10-	677
W5KEG/5 (+WN5GAX)				
	Camden ARC	145-	B- 3-	640
W2CWW/2*	Staten Island ARA	163-	B- 7-	626
W6UCS/6*	Monterey Bay RC	273-	C- 4-	623
W1MY/1	Northern Ct. ARC	128-	B- 7-	556
W9KHG/9*	Markham Civil Defense	206-	C-	556
W7JTR/7	Panaramaland ARC	178-	C- 7-	528
WA3OER/3	The British Thermal Unit	76-	B- 9-	452
WA9ZHQ/9	Valley VHF Club	68-	B- 9-	436

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W7YE/7 (+WN7PSQ)				
	Arizona Mtn. Moguls	2790-	B- 20-	6030
WA6LXN/6 (+WN6QMO)*				
	West ValleyARC	2363-	B-18-	5226
W6IFZ/6*	Richmond ARC	2148-	B-12-	4746
W5KA/5 (+WN5EYL)*				
	Austin ARC	1820-	B-20-	4140
W4SKU/4*	Oak Ridge Radio Operators Club	1813-	B-23-	4026
K6TV/6 (+WN6LSN)*				
	Foothills AR Soc.	1734-	B-17-	3918
W2SE/2 (+WN2APO)				
	New Providence ARC	1700-	B-38-	3850
VO1AT/1*	ARC of Newfoundland	1571-	B- 8-	3642
K5UBL/5*	Cleveland ARC	1558-	B- 6-	3616
VE3MRC/3*	VE3 Metro ARC	1537-	B-13-	3574
K5SLD/5	Arlington RC	1522-	B-50-	3494
W2SEX/2 (+WN2BAK)				
	ARA of Tonawanda	1516-	B-30-	3482
W5TI/5 (+WN5FLQ)				
	Fort Worth Kilocycle Club	1498-	B-80-	3456
KP4ID/KP4 (+WP4DLX)				
	RC de Puerto Rico	1513-	B-	3426
WA3JZR/3	IBM ARA & COMSAT ARC	1398-	B-20-	3296
K8BYU/8*	South Eastern Mich. ARA	1354-	B-10-	3108
WB8KLF/8 (+WN8LOO)*				
	Livonia ARC	1291-	B-16-	3032
K4EG/4 (+WN4ZIN)				
	Alamance ARC	1177-	B-15-	2854
WA2LQO/2	Grumman ARC	1180-	B-25-	2810
W1NHK/1 (+WN1OYB)				
	Ct. Yankee ARC	1155-	B-15-	2760
W6PW/6	San Francisco RC	1134-	B-12-	2668
K4KJD/4 (+WN4VHO)				
	Limestone ARC	1084-	B-16-	2618
WA9UHY/9	Wabash Co. ARC	1076-	B- 6-	2552
K1MUJ/1 (+WN1QJQ)				
	Eastern Conn. ARA	1046-	B-21-	2542
W5DX/5 (+WN5GFU)				
	Texas Southmost ARC	1016-	B-16-	2537
WA6SFM/6 (+WN6POV)*				
	Bellflower ARA	970-	B- 5-	2522
W4BFM/4 (+WN4VHK)				
	Decatur ARC	963-	B-35-	2426
WA6TST/6	Barstow ARC	963-	B-10-	2376
W8ID/8*	Seneca RC	912-	B-14-	2274
W9INX/9	The Allen County AR Tech. Soc.,Inc.	871-	B-10-	2192
W4YAU/4	Bristol ARC	826-	B-16-	2102
W6IAE/6	Westinghouse ARC	818-	B- 9-	2086
W4NYK/4	Blueridge Radio Soc.	813-	B-10-	2076
WA2DNR/2 (+WN2RYB)				
	Colonie Central HS RC	810-	B-13-	2070
K6SIR/6	Ramona RC	783-	B- 9-	2016
W9CCU/9 (+WN9HTI)				
	Wheaton Community Radio Amateurs	779-	B-10-	1958
WA1NPO/1*	Whitman ARC	706-	B-20-	1922
WB6PCO/6	Fremont ARC	741-	B-11-	1882
K2YNT/2 (+WN2HQK)				
	Metuchen YMCA RC	690-	B-23-	1830
W6ZB/6*	San Leandro ARC	708-	B-16-	1816
W5DPA/5 (+WN5FWP)				
	Houston ARC	691-	B-15-	1782
W4NN/4 (+WN3SSR)*				
	Eglin AR Soc.	612-	B- 8-	1724
WA4TLI/4	Onslow ARC	635-	B- 5-	1720
W6PMK/6 (+WN6PWT)				
	North Peninsula Elec. Club	776-	B-15-	1702
W6SF/6	Stockton ARC	617-	B- 7-	1684
K8RAY/8	Farmington ARC	592-	B-15-	1634
W9SA/9	North Shore ARC	610-	B-20-	1620
K4MR/4 (+WN4ZGE)				
	Ole Virginia Radio Hams	567-	B-14-	1589
W6TJ/6 (+WN6NLC)				
	Riverside County ARA	578-	B-15-	1556
W3PGA/3	Acro ARC	577-	B- 8-	1554
WA6TOW/6	Coastside ARC	546-	B-12-	1542
W1HH/1 (+WN1OMT)				
	Chelmsford ARA	556-	B-15-	1517
WB9AEO/9	Volk Field ARA	528-	B- 4-	1506
K2AVP/2	Westchester CD	551-	B- 8-	1502
W6MMM/6*	The Terrible Thirteen, Southern Branch	535-	B- 6-	1470
W3CWC/3	Antietam RA	1061-	C-19-	1466
WA7APE/7 (+WN7QNA)*				
	Scottsdale ARC	521-	B- 8-	1442

W2BX/2 (+WN2QEN)					
	Cumberland RC	494-	B-12-	1438	
K2MFF/2 (+WN2AYE)					
	Newark College of Engineering ARC	503-	B-15-	1406	
WA3BAR/3	Ephrata HS ARC	471-	B-10-	1392	
K5WSP/5*	White Sands ARC	460-	B- 4-	1370	
VE2CWR/3	Westminster ARC	459-	B-18-	1368	
W2DMM/2*	QRP Chapter 1 NYC	456-	B-12-	1362	
WA1CFT/1 (+WN1ODG)					
	80 Thru 2 Contest Group	422-	B- 9-	1344	
K4YCB/4	Mountain ARC	420-	B- 8-	1340	
W5SWS/5*	Chetimachi ARC	419-	B- 8-	1335	
W2FWG/2*	T.A.R.C.O.M.	461-	B-12-	1322	
KØOKI/Ø	*Kansas City ARC*	404-	B-20-	1313	
W7DKC/7 (+WN7PSR)*					
	Santiam RC	385-	B-10-	1270	
W6MUF/6*	non-club group	848-	C- 6-	1248	
W7VE/7	ARA of Bremerton	411-	B-15-	1222	
W6OT/6*	Oakland RC	406-	B-18-	1212	
W6QF/6 (+WN6GLZ)*					
	San Gabriel Valley RC	359-	B-14-	1168	
VE1PEI/1	AR League of Prince Edward Island	682-	C-12-	1132	
WB2JSJ/2 (+WN2BXO)*					
	Radio Soc. of Greater Brooklyn	307-	B-12-	1114	
WBØCDC/Ø (+WNØHHT)*					
	NSWA & North Star Hibanders	331-	B-13-	1112	
W3YMW/3 (+WN3SYF)					
	Mountain ARC	281-	B- 9-	1062	
WA5ZAA/5*	OCARE	305-	B-17-	1060	
VE3HB/3*	Oakville ARC	285-	B-10-	1020	
W1BCG/1 (+WN1OFL)*					
	Shoreline ARC	279-	B- 7-	1008	
WA8JBG/8 (+WN8LLT)					
	Clinton Co. ARA	256-	B-10-	962	
W1MV/1	Massasoit ARA,Inc.	243-	B-15-	936	
K9TSS/9	Onalaska Area ARC	244-	B- 7-	888	
K3HWL/3	Crawford AR Soc.	160-	B-12-	770	
K9VHF/9*	Hamilton-Southeastern HSARC	112-	B- 4-	724	
WØMOP/Ø (+WNØEZB)*					
	Longmont ARC,Inc.	266-	C- 8-	716	
W3ECO/3	Amateur Club of Del. Co.	156-	B- 9-	712	
VO1DL/1	Humber AR Soc.	128-	B-12-	711	
WA8FSE/8 (+WN8NBK)*					
	Opequon Radio Soc. of WVa.	329-	B- 8-	708	
W4CO/4	Charlotte ARC	235-	B- 8-	520	

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K3SSC/3	Delmont ARC	2773-	B-25-	6151	
W3AI/3 (+WN3RID)					
	RF Hill ARC	2078-	B-50-	4706	
K6DKX/6 (+WN6MNI)					
	San Carlos CD ARC	1631-	B-14-	3862	
W2LT/2 (+WN2DRY)					
	Bergen ARA & Ridgewood ARC,Inc.	1611-	B-20-	3722	
W6MRO/6	Newport AR Soc.	1519-	B-16-	3638	
K2AE/2 (+WN2AXV)					
	Schenectady ARA	1479-	B-23-	3538	
VE3JJ/3	West Side RC	1352-	B-22-	3304	
WØNJ/Ø*	Story County ARC	1347-	B-30-	3244	
K3BKG/3	Southern Chester Co. ARC	1324-	B-16-	3198	
K9BPL/9*	Motorola Engineers	1339-	B-13-	3178	
W8ACW/8	Genesee County RC	1246-	B-20-	3042	
VE3KCD/3	Kitchener Waterloo ARC	1057-	B-10-	2614	
W4POX/4	Portsmouth RC	1004-	B-11-	2558	
W9JXN/9*	Valley Amateur Repeater Assoc.	1015-	B-10-	2530	
WA6GFY/6	LERA ARC	957-	B-11-	2464	
W8QQQ/8 (+WN8UID)					
	Shiawassee Co. ARA	905-	B-17-	2310	
W9HHX/9	Milwaukee School of Engineering ARC	872-	B-12-	2244	
W7AIA/7 (+WN7SBV)*					
	Clark County ARC	843-	B-16-	2236	
KØLIR/Ø	St. Louis ARC	811-	B-27-	2172	
WB9FDZ/9 (+WN9IXR)*					
	Yellow Thunder ARC	794-	B-30-	2143	
K8LUC/8	G.E. Evendale AR Soc.	796-	B-16-	2142	
W6JBT/6*	Citrus Belt ARC	712-	B-10-	1989	
W2ZQ/2 (+WN2BIX)*					
	Delaware Valley RA	719-	B-12-	1988	
W8OX/8 (+WN8MDG)					
	Hazel Park ARC	740-	B-30-	1980	
VE3AI/3*	Lakehead ARC	695-	B-11-	1940	
W9DUK/9*	Delaware ARA	649-	B-15-	1848	
W7HNZ/7 (+WN7PQU)					
	Spokane Dial Twisters	647-	B-19-	1844	
K6BJ/6	Santa Clara Co. ARC	623-	B-	1746	
W6VMV/6*	Memorex AR Group	623-	B-11-	1746	
K9RGM/9 (+WN9HVJ)					
	Dingaling Net Group	611-	B-11-	1722	
WA8GZE/8	CD-AREC RC	539-	B-17-	1628	
W1TYM/1 (+WN1QLM)					
	Malden ARA	502-	B-12-	1554	
W7VPA/7	Richland APC,Inc.	994-	C-20-	1544	
W2ZE/2 (+WN2FUB)					
	East Brunswick ARC	442-	B-20-	1434	
K7AUO/7	Tektronix Emp. RAC	466-	B- 8-	1432	
W4HFH/4 (+WN4RVB)					
	Alexandria RC	432-	B-19-	1414	
K6GIP/6 (+WN6GJQ)					
	Monterey Park ARC	421-	B-17-	1392	
W4EJZ/4 (+WN4WOU)*					
	Covington RC	349-	B-13-	1298	
W6CO/6 (+WN6SEN)*					
	Silverado AR Soc.	302-	B-17-	1154	
W4IE/4 (+WN4YVA)					
	Sarasota ARA	268-	B-20-	1086	
K8ALB/8	Critical Bias RC	233-	B-11-	1066	
*W6SG/6 (+WN6RKS)**					
	Marin ARC	473-	C-25-	1023	
W7UMX/7*	Whidbey Island ARC	454-	C-14-	1004	
W9OMO/9 (+WN9JMQ)					
	Mancorad Club	239-	B- 9-	978	
W4NV/4	Tidewater ARC	415-	C-11-	915	
WA9LIV/9*	Waukegan VHF Soc. & ARC	269-	C-21-	769	
WA6BAI/6	Tulare County ARC	112-	C-12-	662	

6A

W8TO/8 (+WN8MDM)*					
	Columbus ARA	3200-	B-46-	7100	
W3VD/3 (+WN3RCI)					
	Rock Creek ARA & APL ARC	2930-	B-48-	6560	
W6VB/6	TRW ARC	2623-	B-29-	5946	
W2ZZ/2 (+WN2DWB)*					
	Bergenfield AR Klub	2337-	B-19-	5374	
WA3PJQ/3 (+WN3SXK)					
	Maryland Mobileers RC	2309-	B-38-	5318	
W3SK/3*	Penn Wireless Assoc.	2233-	B-50-	5121	
W3GXF/3	Etna RC	2191-	B-16-	4982	
W4RL/4	Sterling Park ARC	2095-	B-11-	4855	
K6QEZ/6	Ampex Employees ARC	2041-	B-18-	4782	
W4CUF/4 (+WN4ZAG)					
	Birmingham ARC	2010-	B-46-	4720	
K6SYU/6	Anaheim ARA	1823-	B-45-	4351	
K7LED/7 (+WN7TJT)*					
	Mike & Key RC	1480-	B-40-	3660	
W1EKT/1	Quannapowitt RA	1269-	B-34-	3238	
W4IYU/4	Middle Tenn. AR Soc.	1169-	B-17-	2988	
K4HTA/4 (+WN4UPO)					
	Vienna Wireless Soc.	1098-	B-25-	2891	
K1KBO/1	ASA School ARC	1002-	B-15-	2704	
WB4ZPI/4 (+WN4ZOI)					
	Wiregrass ARC	753-	B-11-	2156	
W4MOE/4 (+WN4RPQ)*					
	Buncombe County ARC	704-	B-11-	2108	
VB1NT/1	Nfld. Tel ARC	694-	B- 8-	2038	
W9UVI/9*	Peoria Area ARC	1274-	C-12-	1924	
W6TOI/6*	Downey ARC	639-	B-17-	1878	
K6CPT/6*	L.A. County Disaster Communications Service	584-	B-17-	1818	
K4SAN/4	Cary Area Hams	493-	B-12-	1591	
W9DUP/9 (+WN9GSS)					
	Dupage ARC,Inc.	906-	C-30-	1556	
W6RO/6 (+WN6NUZ)					
	Assoc. Radio Amateurs of Long Beach & Douglas Aircraft RC of Long Beach	843-	C-29-	1443	
WØCJK/Ø (+WNØEWA)*					
	Empire RC	368-	B-13-	1386	
W6MLK/6*	Hi-Frequency Amateur Mobile Soc.	376-	B-20-	1352	
W8VPV/8 (+WN8MED)					
	Cuyahoga Falls RC	494-	C-28-	1094	
K2VSU/2 (+WN2FUH)					
	Mount Vernon HS RC	193-	B- 8-	386	

7A

W6HE/6 (+WN6SAE)					
	Conejo Valley ARC	3673-	B-23-	8177	
K2AA/2 (+WN2AMJ)					
	South Jersey RA	2791-	B-35-	6332	
W4HAW/4 (+WN4TIO)					
	West Palm Beach ARC	2553-	B-27-	5866	
W9YH/9 (+WN9IZE)					
	Twin City ARC	1968-	B-30-	4686	
W6CX/6 (+WN6KEX)*					
	Mt. Diablo ARC	1621-	B-25-	4012	
W2OYH/2	Morris RC	1349-	B-25-	3448	
K6HAI/6	North Shores ARC	1285-	B-27-	3375	
W9MQB/9	Tri County ARC	1144-	B-15-	3038	
W5SP/5	Key City ARC	916-	B-20-	2582	
W6LKF/6	Estero Bay RC & Paso Robles RC	723-	B-21-	2256	
KØJLV/Ø (+WNØGTG)					
	Faribo Area RC	549-	B-17-	1848	
K6IS/6*	North Hills RC	1065-	C-20-	1765	
W6BXN/6	Turlock ARC	765-	C-18-	1515	

8A

W9SW/9 (+WN9GFC)*					
	Chicago Suburban RA	3188-	B-85-	7226	

K4BFT/4	Huntsville ARC	2199-	B-33-	5348	W7NCW/7 (+WN7RCC)				
W5SC/5 (+WN5FJF)						Lower Columbia ARA	1040-	B-22-	3130
	San Antonio RC	1918-	B-57-	4738	K3FRM/3	Frederick ARC	699-	B-13-	1398
W2MMD/2 (+WN2AXJ)									
	Gloucester County ARC	1084-	B-21-	3068		12A			
WA6BGS/6 (+WN6SCA)									
	ARC of El Cajon	677-	B-64-	2259	W1ARR/1 (+WN1PKS)				
W6SD/6 (+WN6OIX)*						Murphy's Marauders	4142-	B-30-	9684
	San Fernando Valley RC	775-	C-28-	1675	W7DK/7 (+WN6QZE)				
W1KK/1	Hampden County RA	731-	C-17-	1581		Radio Club of Tacoma	2918-	B-40-	7136
WA9WXK/9	Westview Ham Club	358-	B-20-	1566					
						15A			
	9A								
					VE3NAR/3	Nortown ARC	2442-	B-57-	6434
VB1AA/1	The Soc. of Newfoundland				VE3WE/3	Scarborough ARC	1988-	B-45-	5526
	Radio Amateurs,Inc.	783-	B-16-	2521					
						22A			
	10A								
					W2RJ/2 (+WN2TWW)*				
W2GSA/2	Garden State ARA	1525-	B-20-	4150		Englewood ARA	3557-	B-52-	9424

CLASS B

Grouped in this listing are the scores of portable stations manned by one or two operators. Where two persons participated, the call of the other operator (if known) is shown following that of the amateur whose call was used. Figures following the calls indicate number of contacts, power, and final score. An asterisk following the station callsign indicates set-up operations did not begin until 1800 GMT on Saturday.

Class-B Call-Area Leaders

(Bold Face=Over-all class leaders)

1B	2B
K1CSJ/1	. . . .
WB2UIH/2	WA2DFI/2
WA3RAP/3	. . . .
WB4MRI/4	. . . .
K5YHX/5	WB5AJS/5
W6ANB/6	OH2BMD/W6
W7WTQ/7	K3VXE/7
W8NTQ/8	WA8TFO/8
W9LVH/9	**WA9AOT/9**
W0QWS/0	W0GKK/0
VE5XJ/5	. . . .

1B - Battery

WA2ERZ/2 + WB2VPR	199-A-	697
WA6EUZ/6* + WB6OVV	161-A-	583
W8NDG/8	142-A-	576
WA3LSX/3* + W2ZCZ	147-A-	541
W6WD/6* + W6UIL	138-A-	514
WA5WYO/5 + WA5GWH	120-A-	510
WA8REN/8* + WA8RQU	135-A-	505
WA1LIP/1*	115-A-	490
K6ZJY/7	116-A-	448
K1LPU/3* + W3GRM	100-A-	400
W6KHS/VE7*	147-B-	394
K8EEG/9*	61-A-	283
W7DRA/7*	55-A-	265
W4WSF/4*	48-A-	244
WA3RSG/3*	42-A-	226
K6FV/6	41-A-	223
WA0ZPT/0*	32-A-	196
W6MSB/6*	25-A-	175
W2GP/2*	19-A-	157
VE2AKI/2* + VE2AYL	15-A-	145
WA9YAO/9* + WA9UDW	17-B-	134
WA8VVN/8 + WA8YTH	16-B-	132
WA8HDM/7	8-A-	124
WB2DLA/2*	4-A-	112

1B

WB4MRI/4	1832-B-	3764
W9LVH/9 + WA9AUM	1493-B-	3086
WB2UIH/2	1100-B-	2300
KG4EX/KG4* + KG4FB	1035-B-	2220
W6ANB/6* + WB6IBL	950-B-	2050
W2DW/2* + W2AB	880-B-	1910
K5YHX/5* + WA5JVO	895-B-	1890
WA3RAP/3 + K3JZU	794-B-	1738
W5YO/5 + WB5EWN	747-B-	1694
K1CSJ/1 + W1FSJ	744-B-	1588
W0QWS/0* + WB0AEW	700-B-	1550
W1FCC/1 (2 oprs.)	669-B-	1438
WA2ASM/8 + W2OPI	567-B-	1234
WA5YPB/5* + WB5AHX	539-B-	1228
WA2KZV/1* + WA1MYA	469-B-	1088
VE5KJ/5 + VE5XH	490-B-	980
K6PJL/6 + WA6EGZ	381-B-	977
WB6CEP/1 + WB6BIG	409-B-	918
VE2BDM/2* + VE2APF	376-B-	902
WA0TSW/0 + W0GYH	401-B-	902
WA0JUK/0* + K0ZXE	365-B-	880
W9NYS/9 + WA9ZPC	350-B-	850
WB2TOC/2 + WA2DUQ	371-B-	842
WB2HLM/2*	359-B-	818
W6FZV/6* (2 oprs.)	340-B-	780
WB9CNP/9 (2 oprs.)	329-B-	758
K1EUM/1 + WN1NOB	258-B-	716
K2EVW/2*	258-B-	716
K0KLH/0 + WA0OOU	279-B-	708
WB4RCK/4*	271-B-	692
W6ACP/6 + W6MVV	293-B-	686
W8NTQ/8* + W8KMF	280-B-	660
K6QY/6 + K6QX	266-B-	652
W7WTQ/7*	249-B-	598
WA5DYK/5* + WA5JLE	286-B-	572
K8RDJ/8 + K8SAK	232-B-	564
WA3MJZ/3	281-B-	562
WB6LRV/6*	225-B-	550
WA1MSK/1* + WA1NEL	219-B-	548
W7DAU/7*	273-B-	546
K3TVT/3 + K3ZMA	217-B-	534
WB4DJO/4	353-C-	503
WB8GSY/8* + WN8MMW	200-B-	500
W0YHF/0 + WA0GMX	222-B-	494
WB6OFA/VE3*	193-B-	486
WB2EZG/2*	176-B-	452
WA0UNB/0	146-B-	442
WA7NWP/7*	136-B-	422
K8NGO/8*	160-B-	420
WA1KBZ/1*	149-B-	398
WA0UNA/0* + WB0EHC	116-B-	382
W7JJV/7*	110-B-	370
W9IBF/9 (2 oprs.)	134-B-	368
VE7PM/7 + VE7ALN	101-B-	352
WB4UIB/4	121-B-	342
WN4SIW/4	120-B-	340
WB2DTH/2 + WB2HTH	161-B-	322
W1SW/1* (WA1NKE, opr.)	150-B-	300
K7EFF/7* + WA7DFP	99-B-	298
WA0YSK/0*	97-B-	294
WB9BPB/9*	58-B-	266
WB8IND/8 + WA8KOQ	158-C-	258
VE6AO/6* (2 oprs.)	72-B-	244
W3GN/8	122-B-	244
WN1PLD/1*	46-B-	242
W2PXL/2*	70-B-	240
WA5YMA/5* + W5TIH	66-B-	232
W0GU/0 + WN0GOE	54-B-	208
WB5HID/5* + WN5CDA	53-B-	206
WA1GMT/1* + WA1GOO	43-B-	186
W7DQS/7*	40-B-	180
WB4NLO/4*	38-B-	176
WN7RBQ/7* + WN7TLV	23-C-	173
WN0FIQ/0	6-B-	162
WN0GYR/0	45-B-	140
K4NLH/7*	64-B-	128
W2FSL/2* + WN2ANY	8-B-	116
KH6GMP/KH6	19-B-	88
WN9EGN/9 + WN9FOT	35-B-	70
K5LZT/9	13-B-	26

2B

WA9AOT/9* + WB9AXO	693-B-	1686
WB5AJS/5 + WB5CEE	695-B-	1590
WA2DFI/2 + WB2ISS	602-B-	1404
OH2BMD/W6* + WA6HDH	403-B-	1006
WA8TFO/8* + WA8UEG	384-B-	968
K3VXE/7 + WA7PFB	348-B-	946
K8GIV/8 + K8BOI	357-B-	914
WA5MMD/5* + WA5FRN	264-B-	778
W0GKK/0* + WN0GTJ	159-B-	518
WA2CLC/2* + WN2CMB	94-B-	388
WB5EHD/5* + WB5FJB	46-B-	292

Class-C Call-Area Leaders

(Bold Face=Over-all class leaders)

1C	
	W6QHP/6
WA2EUI/1	WA7LMO/7
WA2MRZ/2	. . . .
. . . .	K9KQR/9
W6EIF/4	WA0ATY/0
. . .	VE3IR/3

Class C

WA2MRZ/2* (4 oprs.)	202-B-	404
W6QHP/6	179-B-	358
K6HJJ/6	166-B-	332
K3ZMJ/6*	156-B-	312
K9KQR/9 (2 oprs.)	148-B-	296
WB9IUJ/9*	141-B-	282
WA9BVL/9*	130-B-	260
VE3IR/3	122-B-	244
WB6IAW/6	112-B-	244
WB6KZN/6	102-B-	204
W6QYS/6	88-B-	176
W6HYK/6	84-B-	168
WA6HGH/6	53-B-	106
W6ESZ/6	50-B-	100
WA7LMO/7*	50-B-	100
W6TEE/6	42-B-	84
WB6HOJ/6	42-B-	84
WB6LAM/6	42-B-	84
K9SFQ/9* + WB9HQV	39-B-	78
WB6MLB/7* (2 oprs.)	25-A-	75
WA0ATY/0*	37-B-	74
WA9CHY/9*	30-B-	60
K3MNT/2	23-B-	46
WA9TNH/9* + WA9DTW	21-B-	42
W6LLP/6	20-B-	40
WA6SBY/6	17-B-	34
WB6PHQ/6	17-B-	34
WA9ZOF/9	16-B-	32
WA2FUI/1	12-B-	24
W7HLF/7	9-B-	18
WA6DKZ/6	8-B-	16
K9UIM/9	5-C-	5

Class-D Call-Area Leaders

(Bold Face=Over-all class leaders)

1D	WA0TAQ	3D
	VE5YE	
WA1OUH/1		W2FTG
WB2DZO		WA3NHW
WA3ERJ	2D	W8GIO/8
WB4SIO		
WB5BHN	W1NRG	
WA6BYE	WA2EGP	
WA7JBE	WB4UOC/4	4D
WA8BBB/8	**W8TZZ**	
WA9SVZ	W9FBZ	WB8JEJ

Class D

WA6BYE (2 oprs.)	723-B-	1446
WB6FZU/6* (2 oprs.)	599-B-	1198
WB6HDI*	540-B-	1080
WA8BBB/8 (3 oprs.)	501-B-	1002
WA0TAQ + WA0MWW	451-B-	902
WA7JBE	375-B-	750

WB4SIQ	741-C-	741
WA3ERJ (2 oprs.)	361-B-	722
WB4QWM*	329-B-	658
WB8GMX* (2 oprs.)	310-B-	620
WA6DPQ	618-C-	618
WA1OUH/1 (2 oprs.)	292-B-	584
WA9SVZ*	275-B-	550
W8BAA* (14 oprs.)	269-B-	538
K9HVW/4	253-B-	506
WA4KYR*	250-B-	500
W6LUL	242-B-	484
WØNOZ* (3 oprs.)	237-B-	474
WA7LQV*	230-B-	460
WB2DZO* (2 oprs.)	217-B-	434
WA2JEQ	216-B-	432
WB5RHN	196-B-	392
WB8EEZ	194-B-	388
W9LHG/Ø	194-B-	388
WB6KBI	186-B-	372
WB2LVW/4	172-B-	344
WA1USF	170-B-	340
W8CF*	164-B-	328
WB9BJO*	268-C-	268
WN7POQ (2 oprs.)	127-B-	254
WB6BXP	121-B-	242
WØMXO	109-B-	218
WA8ZAV	109-B-	218
K3NAF*	106-B-	212
WA3RML*	102-B-	204
WN7PVV/6*	100-B-	200
WA4DWN*	92-B-	184
K7UWT + WA7IBD	85-B-	170
W2UGB	156-C-	156
WB8KXV	70-B-	140
WAØHIK	69-B-	138
W3JEH*	64-B-	128
WBØDGA*	63-B-	126
WA2CAK*	62-B-	124
WA3MLI	56-B-	112
W8KPK	55-B-	110
WA1NKZ	52-B-	104
WA6DBX	50-B-	100
WA6HOM	80-C-	80
WB2UFN*	38-B-	76
W1FFR*	36-B-	72
WB5CRX	67-C-	67
WB2BSV*	32-B-	64
WA7KWY/7	64-C-	64
W2CKQ	26-B-	52
WA2GKX/4*	25-B-	50
WB4RUA*	50-C-	50
WN9FKX*	24-B-	48
K4HEJ*	23-B-	46
WN9FNY*	20-B-	40
W2JFY	19-B-	38
WN7TUS*	15-B-	30
WA6HAD*	12-B-	24
WA4YNE	10-B-	20
W1WEF*	8-B-	16
K7GGD*	8-C-	8
VE8YE	4-B-	8
W7HLF	3-B-	6

2D

W8TZZ + WB8FBG	431-B-	862
W9FBZ (3 oprs.)	401-B-	802
WB4UOC/4 (5 oprs.)	448-C-	448
W1NRG* (10 oprs.)	221-B-	442
W4DUG (24 oprs.)	198-B-	396
WA2EGP (3 oprs.)	41-B-	82
WN2FNK* (3 oprs.)	29-B-	58

3D

W2FPG* (3 oprs.)	794-B-	1588
W8GIO/8* (5 oprs.)	777-B-	1554
WA3NHW (4 oprs.)	406-B-	812
WB8FXO/8 (3 oprs.)	371-B-	742

4D

WB8JEJ (4 oprs.)	690-B-	1380

Class-E Call-Area Leaders

(Bold Face=Over-all class leaders)

1E	
W1GFH	W7HLF
WB2TEN	WA9ZCP
K3CUW/3	
K4GTS	5E
W6YRA	**WB2NUW**

1E - Battery

W1GFH*	50-A-	150
WB2TEN*	50-A-	150
WB2CMO*	26-A-	78

4E

K3CUW/3 (6 oprs.)	778-B-	1556
W3ZSR	650-B-	1300
WA9ZCP (4 oprs.)	473-B-	946
W6YRA (2 oprs.)	447-B-	894
K4GTS* + W4YZC	111-B-	222
W7HLF	16-B-	32

5E

WB2NUW (15 oprs.)	628-B-	1256

Check Logs

VE3BA, VE3HM, K4FBG, K9DTB/9, WØHKT/4, W6IRJ, W6IZJ, W8EX. QST

3rd ARRL 160-Meter Contest

TOP BAND TEST DECEMBER 8-10

Rules

1) This contest will start at 2200 GMT Friday, December 8 and end at 1600 GMT Sunday, December 10 1972. This is a 42-hour period with no limitation on operating time. Cw only.

2) The contest is open to all amateurs. A QSO with an amateur in an ARRL section (see page 6, *QST*) is worth 2 points. QSOs with amateurs not in an ARRL section are worth 5 points. DX to DX QSOs will not count.

3) Multipliers are the 74 ARRL sections, VE8 and each foreign country worked.

4) The exchange will be the report, plus ARRL section for those in an ARRL section. Those participants outside of an ARRL section will send a report and the name of their country.

5) Competition is within the section and non-W/VE country for certificate awards. Division high scorers will have their section award endorsed with an appropriate seal. Multioperator work is permitted with scores to be shown after single-operator listings (no certificates).

6) To report, use one of the special ARRL summary sheets and an alphabetical list of stations worked (Operating Aid 6), or equivalent. Effectively, your "dupe" sheet and complete special summary constitute your entry. *A copy of your log is not required*, unless specifically later requested by ARRL Hq. Illegible entries and entries without the special summary (or complete information contained thereon) and an Op. Aid 6 will be classified as invalid.

7) Disqualification: In addition to the usual grounds for disqualification (operating contrary to your governing regulations, non-observance of contest rules, etc.), any entry which incurs a 5% reduction of score through the checking process (elimination of duplicate and incomplete contacts and correction of claimed multipliers) will be subject to disqualification review by the ARRL Award Committee.

8) Entries become the property of ARRL, none can be returned. Awards Committee decisions are final. Send an addressed stamped †10 envelope for appropriate entry forms. All entries must be received at ARRL Hq. no later than Jan. 10, 1973 to be eligible. Mail entries, photos, soapbox, ideas for contest improvement, etc. to ARRL, 225 Main Street, Newington, Connecticut 06111.

COMING ARRL CONVENTIONS

January 20-21 – Southeastern Division, Miami, Florida.

March 23-24 – Great Lakes Division, Muskegon, Michigan.

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.

Agnes Has a Field Day

Visits by tropical storms, some of them full-fledged hurricanes, are not exactly rare in the northeast. In 1954 three of them roared up the Atlantic Coast and took swipes at the Middle Atlantic and New England states. The very next year three more of them visited the area, the second one (named Diane) causing unprecedented flooding. Nothing really serious since then, so when Agnes came to visit our annual Field Day she caught many of us a little off guard. This is the factual story of amateur radio's response to the call for emergency communications, executed in traditional fashion, with traditionally excellent results.

By the Amateur Radio Public Service Fraternity*

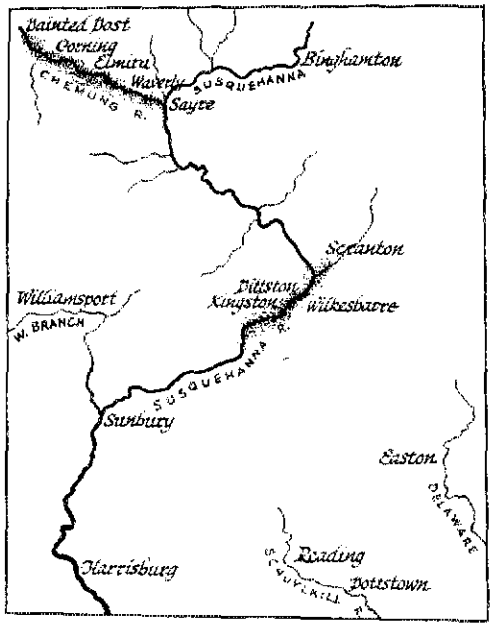
TROPICAL STORMS, in the western and northern hemispheres at least, are spawned in the South Atlantic as low pressure areas, gather force and move northward. When wind velocities reach a certain level, they are given names, and at a nominal higher level they are termed full-fledged hurricanes. They drift along, usually slowly, in accordance with the nudges of pressure areas around them and the earth's rotation – usually northward, then eastward. The tendency is, once they hit land, to move more swiftly, dump billions of gallons of water and disperse as rain squalls.

But all this is very general, and tropical storms, especially after they develop into hurricanes, are as unpredictable as the proverbial female of the species after whom they are named. Their initial northward direction can predominate, keeping them far at sea. They can move almost due east, through the Caribbean and into the Gulf of Mexico, thence making landfall in Mexico, Texas or other gulf states as far east as Western Florida; or, occasionally, they will reverse direction and march across the Florida peninsula back into the Atlantic. One such storm we recall went up Florida's Atlantic coast about halfway, made a complete clockwise circle, then roared across the Florida peninsula into the Gulf. But usually, if they choose the Atlantic side of the peninsula, they move up the Atlantic coast as far as the Maritime provinces of Canada before they disperse – or strike inland, as Agnes appears to have done, to dump billions of gallons of accumulated water on the Middle Atlantic and/or New England states and/or Ontario and Quebec.

Landfall usually "tames" a tropical storm or a hurricane, insofar as wind damage is concerned. But the counter-clockwise whirling vortex of clouds about the storm's center sucks moisture-laden warm air into the upper atmosphere, where it is dispersed and condensed as it contacts the colder air aloft. Fine rain falls, driven into needle sharpness by wind, but the cloud cover continues to form, becomes thicker, more widespread until, at a certain point, it strikes colder air masses and boom! – down comes the rain in torrents.

This point seems to have been reached, as far as Agnes was concerned, in the New York and Pennsylvania area concentrating in the "lower tier" of New York State, precipitating flooding of every little stream and brooklet in that area, which then, rushing into larger streams in turn brought them above flood level and finally, swelling the main artery (in this case the Susquehanna) so greatly

*Compiled by George Hart, WINJM, ARRL Communications Manager, and William C. Mann, WA1FCM, Public Service Assistant.



This map shows the configuration of the Susquehanna and other affected areas, and indicates the areas of heaviest flooding.

At the Erwin Valley School in Corning, WB2EDT (left, standing) discusses strategy and tactics with W2DIQ, right, while WN2EIA, WA2SSU and WB2QAU (backs to camera), all down from Rochester, man the operating position.

that even it caused damage. The main damage was done, however, in the tributaries, whose beds are smaller, not designed to contain the torrents caused by Agnes's downpour. The rushing waters invaded populated areas, floating or tearing houses off their foundations, wrecking bridges, tearing out utility poles and inundating underground and on-ground electrical and telephone facilities so that not only were homes and other buildings destroyed, but left without power, communication, pure water for drinking, food, clothing, shelter. Floods of this nature are not just high, wet water that soaks everything. They are screaming torrents in which every bit of collected debris, from a small twig to a complete building, becomes a missile projected at velocities up to 70 mph, carrying everything away in an orgy of fury and destruction that is impossible to imagine for those who have not witnessed or experienced it.

New York

The Chemung is a quiet, peaceful little river which originates south and west of the Finger Lakes area of New York State and flows generally eastward through Painted Post, Corning, Horseheads, Elmira and Waverly before it joins the Susquehanna at Sayre, Pa. The Susquehanna itself, not normally a large river at that point, originates at Canadarago Lake southeast of Utica and flows generally southward and westward from that point. Both of these rivers have dozens of tributaries, each of which contributed its share of the raging, debris-laden torrents that caused so much damage and loss of life as the river plunged on to its eventual destination in Chesapeake Bay. Even further downstream, in Harrisburg and below, where the river bed widens, there were serious problems, as we shall see.

The hardest hit areas in New York State involved the southwest portion of the state known as the Southern Tier. Reports received reflect activity within disaster areas from Elmira to Salamanca. For several days after the initial flooding on June 22, some communities were totally isolated and virtually the entire area was without power or telephone service.

Elmira was the largest city to be subjected to Agnes. First hints of possible danger came on June 20, when Chemung County EC, K2DNN, was alerted by the c.d. director and reports of flooding in western counties were received on 75-meters. At 1230Z June 22, K2HNM was asked to establish a net alert, warning that high water was expected. That evening K2DNN received a request for communications from St. Joseph's Hospital in Elmira. The AREC net was activated on 6 meters and shifts set up for the night. WA2TCZ was assigned to the hospital, K2MZA and K2PQZ set up a station in City Hall, WA2LUC was dispatched to the c.d. office and WA2STG operated mobile with the City Engineer. As the night progressed, WB2DHR, WA2HFL, K2PIT and WB2NTI lent their assistance.

At 0935Z on June 23, WB2DHR reported water coming over the dike. Equipment was moved to higher floors. K2HNM was sent to Arnot Ogden Hospital and set up on 6 and 2. W2PVG and W2SHE alerted other hams in the area via 6-meters. By 1400 all telephone service and electric power had been lost. W2SHE and WA2HFL delivered a 2-meter FM rig to K2DNN and the hospital was back on the air. W2INY replaced K2DNN who collapsed with exhaustion after 60 hours of operation.

W2PVG was appointed NCS of the 6-meter network. Installations were made in evacuation centers, radio and TV stations, the Naval Reserve Center and buildings at Elmira College. W2RTW and W2QBJ acted as liaison to Air Force MARS and were instrumental in obtaining and guiding helicopters in rescue operations. A portable 2-meter repeater set-up near Beaver Valley linked hospitals in Elmira, Corning and Montour Falls.

Relief operators arrived from Rochester, Syracuse, Binghamton and other areas, W2PVG and XYL provided food and sleeping accomodations. His QTH also used as a collection and distribution center for rigs and equipment. W2PVG, later aided by K2DNN, operated 2, 6, 40, and 75 meters, handling health and welfare traffic. WA2HBS, backed up by WA2GQC, processed over 5,000 health and welfare inquiries with the aid of official computer read-outs on evacuees.

Later, NCS of the 2-and 6-meter nets were moved to St. Joseph's Hospital, under the call K2DNN, where it remained active while other installations were gradually phased out, with the return of telephone service. K2HNM and K2DNN remained at the two hospitals as back-up in case the telephones failed. When the electricity failed in the Arnot Ogden Hospital area, WB2LZD/mobile handled traffic while WB2YGG set up his 2-meter fm rig in the hospital.

W2EUQ (right) discusses with W2UTH (back to camera) and EC WB2EDT (partially hidden) the destruction of a section of Gang Mills, in New York's "lower tier" area near Corning and Painted Post. (WN2LRB Photo.)

On June 25, a call was sent to state c.d. headquarters for anti-venom serum desperately needed at area hospitals. A number of snakes had gotten loose from a flooded snake farm and moved into residential areas. At least one snake bite had been recorded. W2GIT was leaving Albany for Elmira, so he picked up the serum at the State Health Department and personally delivered it to the State Police in Horseheads.

WA2JEQ supplies an account of activity in Horseheads, a small community just north of Elmira, and at a somewhat higher elevation. Horseheads was represented on two nets: Chemung-Steuben Co. Emergency net on 3950 and a local health and welfare net on 3965. The latter net was complemented with a computer list of persons evacuated from Elmira and Corning. WA2QLG was instrumental in compiling the list. WA2EWR spent long hours as NCS of the 3950 net. Outsiders who traveled to the area to help were W2CHV, who set up in the Corning Hospital, and WA2IYB who coordinated the amateurs in Corning with the police and c.d.

On June 26, a portable station, WA2PKE, was arranged in downtown Corning in a recently flooded building. Despite 2-4 inch mud deposits, WA2PKE established contact with WIQT, an am broadcast station which was the only means of reaching the entire area, via K2PIT link. On June 27, WA2JEQ replaced K2PIT as relay station. In 10 hours of operating WA2JEQ handled an estimated 200 messages.

For the first few days of the flood, WA2PKE and WA2JEQ went to the various evacuation centers which had no telephones. Contact was on 75 meters. When WA2PKE returned to Buffalo, WA2QLG replaced him. Activity continued until June 29 at which time most of the power was back on in Corning.

Involvement by Rochester amateurs commenced about 1900Z on June 21 when c.d. Communications and Warning Officer K2ZAA called RO WA2TDF, who in turn alerted EC WB2EDT. The RO and EC notified a corps of volunteers via 2-meter repeater. By 2100Z, 75- and 2-meter stations were operational at Monroe Co. c.d. Contact was established with WB2OFO in Hornell and other hams in the affected areas; relief traffic was handled.

As flooding continued, it was decided to send a contingent of amateurs along with the Rochester Amateur Radio Associations' communication truck, K2JD, to Hornell. Amateurs included WA2EKR, K2LDU, W2MPM, WA2OOI, WB2SSO, and WB2EDT. By 0730Z (June 22) most traffic had been cleared and the group headed back to Rochester thankful that the worst of the flood was over.

Not so! Word was soon received that the river near Olean would soon crest well above flood stage. K2LDU, accompanied by WA2OOI, WB2BGJ, WA2NFK, W2KZD and WA2UIG, headed for the Olean-Portville area and established a most effective communications network utilizing VHF and HF links. Relays were used through Buffalo repeater, WA2ATV, Rochester hams WA2ABQ, K2KVP and others in Wayland.

Meanwhile, other volunteers were appearing. WB2HSU and WA2BED set out for Hornell, but found their way blocked. They convinced an army reserve group that they could be helpful, and hitched a ride on the army's high-water vehicles. For about 98 hours, they provided about the only communications link with Wellsville. WA2HSU returned to Rochester for a few hours sleep, then off to assist in Corning.

MARS services also provided vital assistance. WB2LIN offered the services of Navy-Marine Corps, which resulted in equipment flown in from Groton, CT, to the Naval Training Center in Horseheads. Navy MARS also supplied relief operators, including K2IMO and several Binghamton members. RTTY communications were established between Rochester and the Southern Tier and untold hundreds of messages were handled.

Rains continued into the night of June 23. Many communities were caught off guard as they were hit much harder than expected. Hospitals were among the most hard-pressed for communications. WB2EDT cites handling of hospital communications as being one of the amateurs' most effective and long-lasting efforts in the emergency. An incident will illustrate. K2OIU and W2DFS set up at Schuyler hospital in Montour Falls despite the initial skepticism of the doctor in charge, and rendered valuable assistance. At least one life was credited directly to the amateur communications provided. A patient transferred to Schuyler Hospital from a flooded hospital needed a rare drug to survive. K2OIU and K2RTQ passed the request to WB2OIL operating K2JD at c.d. headquarters in Rochester. He turned the request over to K2ZAA who with the assistance of K2PSA located a source

in New Jersey. It went by State Police from source to Newark airport, by commerical air line to Rochester, by CAP to Chemung County airport and by sheriff patrol car to the hospital.

Members of the Amateur Radio Association of the Tonawandas supplied relief for K2OIU and W2DFS. ARATS station W2SEX was set up and continued liaison with K2RTQ at Beaver Falls Elementary School. W2SEX operated from 0800Z June 26 until 0600Z June 27, at which time WB2QIN and WA2ELD took over. Traffic passed concerned information about people evacuated to and from Schuyler Hospital, dispatching blood, (with help of WA2VVF), securing medicine for an epileptic child, and shipments of fresh water.

K2RUM, who had been instrumental in operations in Olean earlier, and WA2VVF went to a hilltop location above Corning and began 2-meter fm operations with mobiles in Corning. This information was relayed to the outside via 3815 kHz. Emergency power was supplied by a 5 kw generator supplied by WB2UXY.

WA2EDT reports that by the evening of June 24, it was apparent that communication needed in the flood areas exceeded anything that had been imagined. After several requests from emergency operators and a few hasty conferences, it was agreed to ask FCC for permission to move the net administered by K2JD to the extra class portion of 75-meters and the 40-meter net to the advanced portion of the band. EC WA2EDT received word back from FCC at 0435Z June 25, declaring a communications emergency to exist and reserving 3815 kHz and 7215 kHz plus or minus 5 kHz exclusively for that purpose.

More Rochester hams were on the move. This time K2LOL and WA2IZX headed to Painted Post. Again, vhf and hf links were established. Since the Corning area was in need of service by its AM broadcast station which is not licensed for night operation, station officials originated a request to FCC to maintain full-time operations. Messages were handled by K2LOL, WA2IZX and K2JD. FCC also authorized operation of the McKean Co. Pa ARC repeater, W3VV/3, (programmed identification could not be changed) in Corning. WA2EDT comments: "We don't know how the FCC could have been more prompt, responsive or cooperative."

Special note is given to WA2CUZ who set up the Red Cross station in Rochester and worked there until called home to attend a sick husband and child. She continued to operate from home, handling a large amount of vital traffic.

Operations continued! On July 1, K2LZG and WB2OIL headed to Elmira College to augment activities by W2QYT. While putting up an antenna on a campus building, a telephone crew asked the boys if they would mind stringing some telephone wires, which they did. Since W2QYT had activity under control, it was on to Beaver Valley Elementary School for K2LZG and WB2OIL.

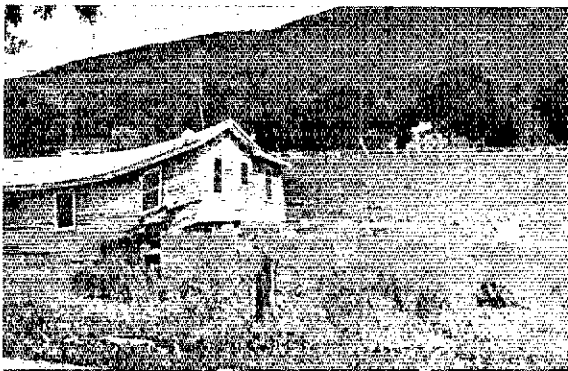
At the school, W2WS was NCS of a 75-meter net (3951) and WA2VVF was NCS on 2 meters. The school was being used as an evacuation center and communications were needed to Schuyler, the nearest hospital. WA2ELD was positioned at the hospital but 2-meter communication with the school was geographically impossible. K2OAR acted as relay between WA2VVR and WA2ELD. K2UOQ was the Radio Officer at B.V.E.S. To complete the communications "circle", WB2PMI and W2CHV represented Corning Hospital and WA2EWR and WB2TQF were situated in Elmira-Horseheads. WA2ELD is an excellent example of the fortitude of the volunteers. He manned the Schuyler post daily beginning June 27 and continuing through July 6, often "putting in" more than 16 hours a day.

Amateurs in many other outlying areas journeyed to disaster areas to assist. Among thse were: W2AMY, W2BSI, Cortland; W2FPP, WA2YQQ, Liverpool; WA2ELA, Dewitt; K2KTK, K2KIR, Syracuse; and W2GIT, WB2DZM, KZ5DA, Albany.

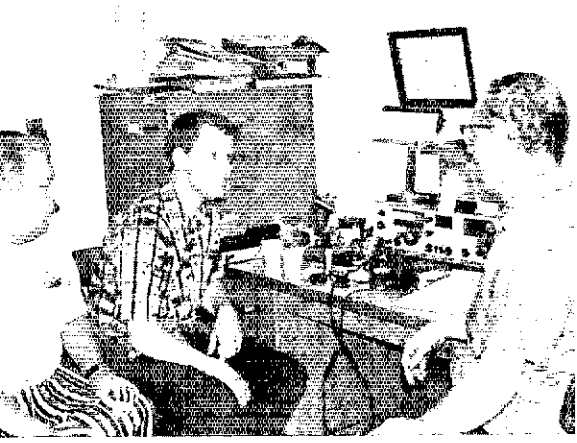
Olean, Portville and Salamanca can also be considered in the disaster area. Activity in this area is reported by EC W2OKS, a newspaper clipping sent in by W2PNW and a Northern Chautaugua ARC bulletin. W2OKS activated the Western New York Tri-County AREC Net on 3970 kHz at 1730Z on June 22. The net ran continuously until 0359Z June 26. During the first day of net operation, W2OKS sent his communications van to Olean under the direction of WA2ETM. Assisting were: WB2HEJ, W2UGT, WB2MYO, WA2AWX and WB2HJV. Most work was via 2-meter repeaters and 75. For several hours, the van was the only communication link with Olean. When the van left to assist operators at Northern Chautauqua ARC, W2SB, Olean communications was taken over by K2RUM situated in a school evacuation center in Olean. He was assisted by WB2VSA and several others. Operation was secured about 1600Z July 25, after handling over 250 priority and 1000 H & W messages.

Jamestown RO, K2TXB, traveled rather extensively through the Portville-Salamanca-Great Valley-Olean area, often providing radio contact with outlying areas "single-handledly". Other hams participating include W2s UCV GBK and DRZ.

Activity outside the disaster areas was plentiful and reports numerous. However, to conserve space



You can't even see the Tioga River (a small tributary of the Chemung) in this photo, but at the height of the flood it floated this house off its foundation. (WN2LRB Photo)



Three very busy hams during Agnes were WA2THS, left, K2YAH and K2LZG, all of Rochester, shown here in earnest conference at Schuyler Hospital in Montour Falls, N.Y.

we can only briefly sketch such activity. Here are some further New York reports.

A near-disaster occurred in Auburn. Deep concern was aroused by loss of several smaller dams along Owasco Lake. If the main dam gave way, the middle of town would be inundated. Alerts were organized on 2-meter fm, 75 and 80 and continued until June 25.

Activity in the Albany area centered around the RACES net on 3993.5 kHz with W2OZR-1 Albany EOC as NCS and the 3951 kHz nets. W2ZPO, in charge of c.d. communications and Assistant Director of Communications for State Police, coordinated operations with state c.d. headquarters. The two nets worked "in parallel" and handled only priority traffic for 24 hours a day from June 23 to June 27. WB2VJB tied-in the 3951 kHz net to c.d. via 2-meter fm.

The Albany ARA and Schenectady ARA Field Day Committees held on-the-air conferences to determine whether or not the clubs should participate in FD activity. It was decided to go ahead and set up, thus assembling crews and checking out gear in case they were needed.

On the morning of June 24, a message was taped and sent into all known "autoprint" RTTY nets concerning the disaster communications and indicating frequencies where emergency communications were taking place. Many responses were received across the country from hams who promised to "spread the word".

W2GTI and W2ODC began scheduling operators for the two headquarters nets. Many of the FD ops returned to their homes to handle traffic. New York State cw net began extra sessions, with K2UYK frequent NCS. NYS manager W2MTA, at the edge of the disaster area, had to ask that H&W traffic be held since he had 500 on the hook then!

Clubs in the area had previously arranged for TV coverage of their FD activities. However, when TV reporters arrived they found work and organization directed towards an actual emergency and not just emergency preparedness. W2ODC describes the result: "Albany and Schenectady Field Day sites were descended upon by hordes of people all wanting to know about relatives in the disaster area. The 'H&W' problem was explained to them, inquiries taken for later handling . . ."

The Schenectady Museum station, WB2CRZ, and many other area amateurs handled countless health and welfare traffic, according to newspaper articles sent in to ARRL.

The North Chautauqua ARC of the Dunkirk-Fredonia, NY, area helped represent the "west". Operations began June 22. Members passed an estimated 1000 messages and were in contact with about 100 local residents. Priority messages to c.d. and other pertinent medical and evacuation information was handled.

Another newspaper article portrays ENY SCM, K2SJN, as an effective liaison between amateur radio operations and Red Cross in New Rochelle, and in New York and New Jersey in general. He advised officials of conditions in disaster areas as described on the air.

We received a several page copy of the log used by W2MTA during the emergency period. It probably is similar in length to those of the scores of other amateurs connected with Agnes.

Pennsylvania

The main problems in Pennsylvania occurred in the Wilkes-Barre area. Some of our detailed reports come from amateurs or amateur groups from outside the area who went in to assist. The only thing to do is run through them to ferret out the facts.

K3WIU tells us that the North Pocono Amateur Radio Club set up a station at the Wilkes-Barre School Administrative Building, which was being used as a sort of command center. This station operated from 4 p.m. June 24 to 11 a.m. June 27, a total of 67 continuous hours, after which other groups took over. Many emergency and priority messages were handled to and from agencies having representatives in the building – such as civil defense, Medical Command, Red Cross, state police, the military and the Civil Air Patrol. A similar station was set up at WSCR in Scranton and became the "anchor" station for a Flood Emergency Information Network. This station, also manned by North Pocono Amateur Radio Club members, operated continuously from 4 p.m. June 24 until 9 a.m. June 25, after which the work was carried on by other amateurs at their home stations. The Scranton station handled much traffic from the Wilkes-Barre station, since most telephones and power were still available in Scranton – altho the group was prepared to continue operating by generator if power failed. Nine club members were involved. On Sunday, June 25, K3TNL and WA3ATQ went into the Wilkes-Barre evacuation centers and collected 79 messages from flood victims and spent the night and the next day clearing these messages to their destinations.

A newspaper clipping sent in by WA3OBI indicates that the Warminster Amateur Radio Club

in Southeastern Pa. cancelled its Field Day and sent operators into the Wilkes-Barre area to assist, along with gear collected from various manufactures and a ten-kilowatt generator supplied by the Naval Air Station at Willow Grove. They set up at Dallas High School, an evacuation and communications center for Luzerne County, as a complete, self-contained, very versatile station – with their own power, food and equipment operable on all amateur bands, both hf and vhf. Many outgoing health and welfare messages were handled through amateur networks, some organized for the purpose, but very shortly even this type of traffic had to be abandoned in order to handle real emergency-precedence stuff, such as that concerned with vaccines, blood, doctors, food and water and police protection. The dispatch mentions that a continuous stream of ham operators came to the area from southeastern Pa., from New England and from as far south as Maryland and Virginia, enabling the operation to continue from the crippled and devastated Wilkes-Barre area until well into July. Unfortunately, the newspaper dispatch mentioned no call letters so the amateur identity of those involved will have to await further research.

The Penn Wireless Assn. of southeastern Pa. set up a station at Freeland, 20 miles south of Wilkes-Barre, and kept it supplied with both operators and equipment to maintain operation from June 24. Three contingents were sent up, the first one to get the station set up and operating, the others to keep it going. Right after FD, WA3KVN loaded a car with gear and, along with K3JQH, K3UZM and WA3NAF, headed north to Freeland. The second group went up Monday evening (W3UAX, WA3IWX and K3HNP) and the third Tuesday morning (K3ZFD, WA3OUQ and WA3NUF). Many others volunteered, but only those properly trained who had something really exceptional to offer were sent. Some of them went into Wilkes-Barre to coordinate with amateur groups there under c.d., while K3VZM and WA3NAF visited the city itself to accept outgoing H & W traffic. Meanwhile K3WKG was accepting as much inquiry traffic as he could. Outgoing traffic was handled by K3HNP and K3WKG through regular NTS nets. The total operation was meritorious, but not 100% smooth according to the PWA bulletin the above is extracted from.

At the conclusion of Field Day, PennARC Amateur Radio Club member WA3QQG heard an appeal over EastCARS for 20 amateur operators with equipment to provide relief for amateur operators in Wilkes-Barre who had been on the job for several days without sleep. Mobilization proceeded apace and by Monday morning (June 26) a group of 8 operators was on its way. In Wilkes-Barre, they set up operations at Wyoming Valley Mall, from which point they assisted WA3JZB (C. D. RACES Net Control) in dispatching amateur operators to points in the area where they were needed, mostly to major evacuation centers. During Monday and Tuesday 29 operators were logged into and out of the mall, and many hundreds of messages were handled by the RACES six-meter net in the complete absence of city telephone service. Heaviest traffic was between WA3JZB in center city to and from essential services such as police, evacuation centers, Red Cross, ambulance services and the military, ranging from death messages to requests for thousands of blankets or two tons of food. "Health and Welfare" traffic was not allowed at this time. On Monday a 75-meter link was established with a group at the airport in Avoca, and on Tuesday a 40-meter link was set up at WA3JZB.

Operation was maintained on a 24-hour basis until Friday, June 30, when military communications took over and the remaining PENNARC boys were sent home. And when we say "boys," we mean just that; PENNARC is affiliated with Explorer Post 681, Boy Scouts of America.

ARRL PR Consultant Don Waters visited Wilkes-Barre and his dispatch, widely copied by area papers adds a few more details. WA3JZB at the command center was only 18 years old, and most of the other operators there were also teen-agers doing a job which would give credit to mature adults: WA3FOF, WA3KKB, WA3JWP, WA3JWT and WA3JVS. At Red Cross disaster headquarters in the GAR High School 19-year-old WA3LVL was in charge and assisted by WA3NVJ, WA3NVD, WA3JZK and WN3POF. WA3NYA manned the station at Wyoming Valley Hospital. W3DGX and K3SLG came down from Pine Grove, and K3CTS and others from the Phila. area.

WA3KIJ and WA3CEX from down Bucks County way journeyed to the Scranton-Wilkes-Barre airport on Monday and set up some equipment which was for a time the only communication out of that area.

K3ZAC reports he went up to Dallas High School on June 30 and did some relieving there until July 2, after having put in some time operating from his own area.

In Wilkes-Barre, WA3JZB supervises the operation while WA3FOF (left) and WA3KKB do the operating from uncovered rigs (to keep them cool).

A very concise report from Lackawanna County EC W3VAP states that his AREC was activated on June 22 and stood by after notifying Red Cross and civil defense that they were ready. On June 23 a six-meter station was set up in the county court house for c.d. communication, working into a network of 13 stations, two of them mobile, with WA3FCP liaisoning to the Eastern Pa. Emergency Phone Traffic Net on 3917 kHz. A more permanent station was erected at the court house that day, operating on both 6 and 75 meters, and also one at c.d. headquarters in Clarks Summit, both stations remaining active around the clock. K3CSG, the Abington ARC station, was used at c.d. headquarters. A number of mobile stations provided vital communications links in the early stages. Many area stations who had not been active came forward to help the "regulars" and both the Abington and North Pocono radio clubs gave up Field Day to lend a hand.

The Lackawanna AREC Net remained active on six meters until June 20, handling emergency and priority traffic, as well as "health and welfare." About 1200 messages were handled by 34 participating stations.

Damage was not quite so extensive elsewhere in Pennsylvania, although several other areas have submitted reports of emergency operation, some of them quite noteworthy. A report by WA3LNH, for example, details some of the activity of the "Packrats" (Mt. Airy VHF Club) in Montgomery County, Southeastern Pa., where the Schuylkill (School-kill) River, a tributary of the Delaware, along with Mother Delaware herself, were acting up. Early Saturday afternoon (24th) local officials requested assistance, and by 1600 EDT six amateurs were involved with operation of the Montgomery County C.D. station at Eagleville. WA3LNH provided net control operation of the six-meter fm equipment. K3ZSG set up two-meter fm operation. WA3NGK took six-meter gear into the Norristown disaster area and operated from C.D. headquarters. Later, W3HKZ established another site at Norristown State Hospital, a third station was set up at Bridgeport and a fourth at the West Norristown Township Building, later removed to the Conshohocken Police Station. W3EAG was operated from Eagleville with five remote sites under RACES, in contact with W3QV/3 in Pottstown, handling traffic for Norristown and the Greater Philadelphia area. W3ZAC handled 75 meters from Eagleville, mostly with Wilkes-Barre.

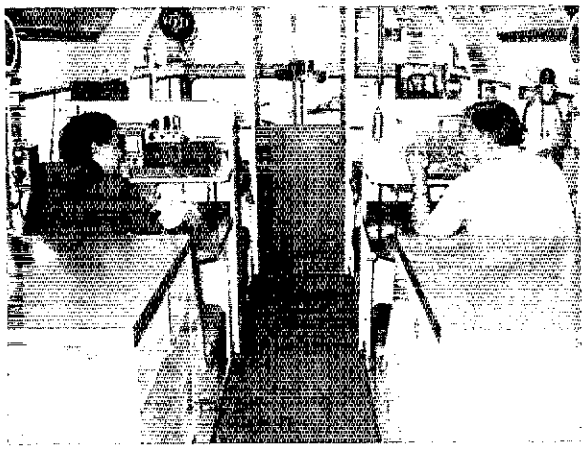
Late Saturday evening K3BPP and WA3NFV arrived to provide support at Eagleville, and just before midnight a delegation from Quakertown arrived. W3CJU was involved on Sunday, along with others, and WA3MIX provided yeoman duty in Norristown during the height of the storm. The Philadelphia Repeater Group (WA3KUR) on six-meter fm was invaluable.

Another report on the Southeastern Pa. situation relates that on June 23 the Montgomery County C.D. communications Officer, W3EAG, issued a call for emergency communications to be set up at Bridgeport. W3HKZ responded and set up a mobile at the headquarters, and WA3KUR repeater on 50 and 450 MHz was activated. Initial communications were with Montgomery County Police and Fire communications in Eagleville. W3SAO was running the operation for Red Cross.

WA3MIX set up a base station at c.d. headquarters in Norristown and spend many hours operating during the next few following days. WA3s FRD AAD and OWG set up another base in Norristown, and mobiles in Bridgeport were relieved when a base station was set up by K3DOX, K3CPG and W3NTD. Bridgeport was also supported by K3ADH and WA3SLM. K3YWH and W3HGZ set up a base at the Borough Hall in Conshohocken.

W3HKZ also set up a base station at Norristown State Hospital for communications between the Army and its helicopters, the county sheriff's office and c.d. headquarters. Most communications were on the Philadelphia six-meter repeater, which operated on stand-by power for 50 hours.

The Philmont Mobile Radio Club sent its communications bus, a converted school bus which they call "The Yellow Peril", to Pottstown at the behest of W3QQH when requested by RO W3EAG, cancelling their Field Day plans. Using the facilities in the bus, communications were set up on two meters between Borough Hall and the bus, on six meters through the WA3KUR repeater to c.d. headquarters at Eagleville on 75-meter ssb to the E. Pa. Emergency Net, and on ten meter a.m. to mobiles in the area and also through K3UWO to the Philadelphia area. All equipment on the bus, plus its own air conditioner, was powered by the built-in 5-kw generator. The club call W3QV/3 was used for about 45 hours, handling considerable emergency traffic, some for the local gas and electric utilities. All equipment and facilities operated perfectly, a good commentary on the club's preparedness, and the group of 18 operators was fed by French Chef W3YHV, using supplies intended originally for Field Day.



Inside the "Yellow Peril," a converted school bus fitted out for communications by the Philmont Mobile Radio Club of southeastern Pa., W3QV/3.

In charge at the Red Cross amateur station in Wilkes-Barre was WA3LVL (center, seated). Others shown are WA3NVJ (background) and WN3POF (right).

Other clubs participating were the Warminster ARC, the American Electronics Labs Radio Club and the Delmont Radio Club.

In Reading, operation was also extensive, according to an article by W3UQC in the *RRC Bulletin*., also resulting from conditions along the Schuylkill River. As early as Thursday, June 22, amateurs were active on six-meter fm from the C.D. Control Center in the county courthouse, including many volunteer mobiles. As telephone lines became overloaded, a 2-meter a-m link was established with the c.d. control center and with Reading City Hall, spark-plugged by W3WJC. Early Friday morning several rescue operations were conducted with amateurs supplying the bulk of communications.

On Saturday Reading amateurs answered a call from WA3CIZ at Eastern Area C.D. Headquarters in Hamburg, who needed operators to handle emergency and priority traffic on 75-meter ssb, and in the afternoon WA3AXS drove to Hazleton where he was instrumental in setting up a 6-meter a-m link with Wilkes-Barre. The following two days found additional Reading amateurs performing services to Eastern Area C.D. headquarters at Hamburg. About 30 different amateur operators were involved.

Northampton County (on the Delaware) RACES was activated and in operation from June 22 to 24, according to RO K3QDV. Participation included ten amateurs who manned the Palmer Township EOC. The initial alert was given at 2030 on June 21 over local 2-meter repeater W3OK, which proved invaluable for local communication. Following the alert, WA3OEH at the Northampton County EOC was activated. A 2-meter a-m RACES frequency was also activated for contact with municipalities within the county. A station was set up on the W3OK repeater frequency (10/70) and a 75-meter link maintained to Eastern Area headquarters. Evacuations took place in Freemansburg, West Easton and Raubsville.

Back to the Susquehanna, newspaper clippings indicate some good work done in the Tunkhannock area by K3HTO and WA3FCU, but concise details are lacking.

On Thursday, June 22, W3ZRQ alerted the Eastern Pennsylvania Emergency Phone and Traffic Net. By mid-day, contact had been established with state c.d. headquarters in Harrisburg and numerous other beleagured locations along the Susquehanna. However, the local area was also having its problems, as W3VA had to move operations from his home to higher ground, where he continued operating, and W3ZRQ went on generator power when the commercial juice failed. The Tamaqua Area Sideband ARA maintained emergency status for 15 hours, at which time W3ZRQ terminated the operation and he and K3NYX went up to Wilkes-Barre to help out as relief operators. "All TASBAR plans for Field Day," says W3ZRQ, "went down the Schuylkill River."

K3VAX reports from Lancaster County, Pa., that the RACES Net was first activated at 0855 EDT on June 22 and wasn't secured until 1755 EDT June 26, after 70 hours of operation. Both a-m and fm were used, with 75-meter links to the state RACES net. Communications were furnished for the Civil Air Patrol, the Naval Reserve, an evacuation center in Marietta, local fire departments and various individuals in dire straits. The RACES group was able to scotch a rumor that a dam at Shamokin had broken, thus preventing much unnecessary evacuation and shutting down of a primary pumping station. The report lists 24 amateurs participating.

W3CUL says she missed most of the flood activity, but OM Al, W3VR, was in there and says we can be proud of our RACES and c.d. boys. He and W3IVS, who came out of semi-activity like "an old fire hoss," handled some traffic for WCAU. Speaking of WCAU, W3PN reports he received two calls from VE2XF offering to help after hearing announcement regarding the need for radio communication direct from WCAU-TV, Channel 10. Not bad DX for that frequency.

W3UA, one of the founding fathers of Penna. RACES, reports that of the five major power plants along the lower Susquehanna, only one was in operation, and that one only partially. Either the turbines (some hydro, some thermal) were out of operation because of flood trash clogging the inlets, or they were inundated. No wonder there was such a power shortage!

Western Penna. also received some damage, principally from the flooding Allegheny River, which rises in the same general area as the Chemung, and the Monongahela, which joins the Allegheny to form the Ohio at Pittsburgh's Golden Triangle. SEC W3KPJ reports activation of emergency facilities in the area starting on June 22, with communications being performed by an estimated 500 operators in the western part of the

This is an amateur radio story, but other services were also involved. In Norristown, Pa., Sam Ely, Montgomery Co. C.D. Director (third from left) presents certificates of appreciation to W3EAG (left), RACES radio officer, and representatives of c.d. communications, CB operators, Norristown State Hospital, and the Fire Chiefs Mutual Aid Assn.

state, both AREC and RACES. Many of these were in the Western RACES area net under NCS W3AEN at Indiana. Hank mentions excellent organizational efforts by ECs in Erie County (WA3HSE and W3ZLD), Greene County (WA3NAZ), McKean County (W3OCR), Elk Co. (W3VMX), Cameron Co. (W3KUN), Mercer Co. (WA3ODQ and K3VQV), along with AREC and RACES members too numerous to mention. W3KPJ received a nice letter of congratulations and thanks from the Erie County C.D. Director.

A detailed report from Greene County EC WA3NAZ tells of monitoring the Eastern and Central Pennsylvania C.D. Nets and the Eastern Pa. Emergency Net, then reporting to the Western AREA CD Net frequency, where he found W3LPP from Butler County waiting. Later, Western Penna. Area C.D. Radio Officer W3AEN broke in and officially activated the Western Area C.D. Net. WA3NAZ alerted his county RACES group but put all operation on the area net frequency. WA3NAZ then spent much of the night at Port Marion monitoring the water level on the Monongahela, rejoining the net shortly after daybreak. As the situation grew worse, other stations were called to the net frequency of 3990.5 kHz, with the help of local broadcast stations. Information on water levels was collected from the various locks and dams along the river and transmitted to W3AEN, which transmitted the information by teletype to all local centers affected. WA3NYH later assisted at the operation of WA3NAZ, who went several nights with little or no sleep. Some traffic was handled for the Red Cross. The river watch continued until the morning of June 26.

Sixteen members of the Venango County (Oil City) AREC spent 145 hours during the emergency monitoring net frequencies and handling emergency and "health and welfare" messages in the Western Area C.D. Net, under Radio Officer W3LOD. Water levels of the Allegheny and Monongahela Rivers constituted most of the group's "business."

In the Erie area, the Radio Association of Erie was involved in emergency operation starting Wednesday evening, June 21, when County EC WA3HSR, along with W3KPM and W3ZLO, decided to activate the Emergency Operating Center (EOC) for the Western Pa. CD Net. A local 2-meter fm net was established, and ECARS and MARS nets were monitored as Agnes's threat moved westward. By Saturday it was evident that a real communications emergency was in progress, and local hams monitored and discussed ways and means of being of assistance. WA3HDK's two meter transmitter broke down, so a cross-band system was set up, transmitting on six and listening on two. Medical and other supplies communications were handled for the Red Cross. For example, at one point the Wilkes-Barre Red Cross asked for a certain type of drug. WA3HSR relayed the info over two-meter fm, W3ZLO put it on 75 meters and WA3HDK plugged it into MARS. Within a few minutes, a supply was found at Walter Reed Hospital in Washington and was flown to Wilkes-Barre. The gang continued to assist through Monday (June 26), which dawned sunny but with emergency communications still needed in many parts of the state. WA3HSR estimates that well over 100 emergency and priority messages were handled by the local gang, along with an untold number of "health and welfare" messages.

EC/RO K3SMB reports from Allegheny County (Pittsburgh area) that while emergency conditions did not exist in his area as they did in Central and Eastern Pa., nine of his group were on the job checking conditions along the Monongahela and Allegheny Rivers, seven of them mobile, and about fifty messages were handled for Red Cross, civil defense and individuals.

Activities Elsewhere

Amateurs in the Greater Baltimore-Washington area participated in supportive communications for relief operations for flood victims. Most operation centered in Howard Co. providing communications between relief centers and stricken areas. Hams aided in the distribution of food, water, clothing, etc. and supplied communications for various officials and two aircraft surveying the area. Since many areas were without telephone service, repeaters such as WA3DZD were used for local coverage. Another key repeater was WA3KWG sponsored by Green Mtn. Repeater Association. Mobile and portable stations using WA3KWG assisted Red Cross and c.d. officials.

The Maryland Emergency Phone Net was activated at about 1300Z on June 22, by K3UAF/4. Many others assumed NCS during the continuous operation of the net until June 26.

Virginia operation is well outlined in a detailed report by SEC WA4PBG. Rising creeks in Augusta Co. showed the first indications of impending danger. Dams were soon threatened. EC WB4KIT

alerted his AREC members and a water watch was implemented, keeping local authorities informed. Continued onsweep of waters brought other ECs and AREC groups on the air. WB4HNJ's emergency net opened and maintained liaison to Virginia Sideband Net. WB4RZW and his AREC group soon joined the emergency scene, adding Covington to the watch.

Manassas was a Virginia city subjected to a siege of high water, losing telephone service and road access. A communication link was established between Fairfax and Manassas. W4PAY, Northern VA RC station located at the Red Cross Chapter House and K4CG, Coast Guard ARC station, held the Fairfax end; W4DIW and WB4RDV represented Manassas. Red Cross traffic was handled until June 24, when telephone service was restored.

Reports of possible high cresting of the Potomac River precluded the chance of relief from Agnes. A communications alert was called into effect requiring communications between the Disaster Chairman in Fairfax and WB4YUU at the evacuation center being established near Falls Church. Northern Virginia FM Association made their 2-meter fm repeater near Tyson's Corner, available and 8 members volunteered their mobile services. Contact was maintained with Red Cross in Fairfax, Arlington and Alexandria. Because of unusual tide conditions when the Potomac crested, the emergency never reached devastating proportions.

The Virginia Sideband Net operated some 34 hours in emergency session. Several emergency nets fed information into VSBN. Motorists as well as c.d. and police were kept abreast of road conditions and other flood data. WA4PXX was NCS for prolonged periods, greatly assisting in getting highway information into police systems.

In addition to previously mentioned amateurs, SEC WA4PBG adds kudos to W4HE and the Alexandria AREC and RACES group for their outstanding help; also to W4THV who organized supportive communications to the c.d./EOC in Richmond.

Another report of Virginia activity comes from EC W4GCE, relating Lynchburg area operations. The local emergency 2-meter fm system was activated. Mobiles returning home from work reported on road conditions and this information was relayed to a local broadcast station to be used as advisory broadcasts. Mobiles were dispatched to areas known to be without telephone service. Portable stations were arranged at sheriff and rescue offices. Mobiles reported over 50 stranded persons to authorities.

K2AAB reported the need for medical assistance for a woman who had been in the water for 3 to 4 hours. He also requested medicine for a diabetic person whose medicine had been displaced by the flood. K3SMQ/4 obtained medical information from the victim's home and relayed to K4PQD, who got the prescription filled through help from c.d. and sent it to K2AAB. Total time was 1½ hours.

Since high water rendered the river guage telemetry system inoperative, amateurs were dispatched to various locations along the river to advise the weather bureau of water levels. This information permitted the weather bureau to determine the severity of the impending flood on the James River headed for Richmond. Operations continued until about 0200 June 22.

In Ohio, the Jefferson and Harrison County AREC were on duty for 22 hours starting June 24. A 2-meter fm station at "Flood Control Shelter" in Empire used the repeater to relay information to the Jefferson Co. Red Cross. Two 75-meter "prowl" cars maintained direct contact to the Red Cross Headquarters. The state EOC was manned by several amateurs on a standby basis. Red Cross in the Columbus area received a number of health and welfare requests from local residents concerning residents in disaster areas. Approximately 40 of these inquiries were sent via ham radio and numerous replies received.

K8ONA supplied a detailed account of the operations of the Apricot Net. They were active in handling health and welfare messages from residents in northern Ohio. Liaison was maintained with Ohio Single Side Band Traffic Net and Buckeye Net. K8ONA received a letter from the Executive Office of the President praising the amateurs' role in providing communications in emergencies and acknowledging the need for a "standing pool of skilled people dedicated to responding to the country's needs when required. . ."

Miscellaneous reports are also acknowledged from Escambia County (Fla.) RACES, from Bergen (N.J.) RACES and from the Rhode Island SEC, W1YNE, detailing alerting operations in their areas.

Epilogue

And that about does it, insofar as reports received are concerned. Of course there are many items in connection with the emergency not reported, many amateurs who participated who did not report and consequently are not included in the above. These will come in later and will be included in "Public Service Diary" supplements as required.

Writing up an emergency operation such as that caused by Agnes involves many hours of labor on the part of those assigned the task – reviewing reports, trying to correlate them, trying to get supplementary information to make them complete, weeding out material not related to amateur radio, assessing importance and value, selecting illustrative material. The result is not always entirely satisfactory, does not always give a 100% true picture, because the writeup is necessarily based on the reports received; when a report received is complete, detailed and concisely written, the resulting writeup is apt to reflect this. ARRL has no trained reporters that can be sent into the field to provide material for *QST* articles. Our reporters are *you*, and writeups have to be based on what you send us.

The assessment of amateur performance in the Agnes emergency is the usual one. Without it, many additional lives (probably hundreds) would

(Continued on page 90)

THE Federal Communications Commission has released its Report and Order in Docket 19162, adding 25 kHz to the 75-meter phone band and 50 kHz to 40 phone. Twenty is completely unchanged; 15 gets only a slight internal shuffling.

The phone band changes adopted here are much less sweeping than those offered either in FCC's Notice of Proposed Rulemaking or in ARRL's response. For comparison, see the Notice beginning on page 82, *QST* for April, 1971 and the ARRL comments beginning on page 78 of *QST* for August 1971. Determination of the official ARRL reaction to this Report and Order will be made by the directors of the League, taking into consideration the comments they receive from the members; their names and addresses appear on page 8 of this and every issue of *QST*.

Phone Band Expansion

Novice privileges changed, too

Novice changes are more striking: for the first time since the license was created in 1951, beginners will be authorized to use variable frequency oscillators instead of crystal control. The 80-meter subband will stay at 3700-3750 kHz, 40 will be moved down to read 7100-7150 kHz, 15 shrinks to 21,100-21,200 kHz, 145-147 MHz disappears from the Novice charts, and a new DX segment is granted from 28.1 to 28.2 MHz, (of course, A-1 only). The Order, released on October 2, becomes effective November 22, 1972. The text follows:

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D. C. 20554

In the Matter of

Amendment of Part 97 of the Commission's Rules to provide for expansion of the telephony segments of the high frequency amateur bands.

Docket No. 19162 RM-1306, RM-1349, RM-1477, RM-1479, RM-1544, RM-1550, RM-1593, RM-1603, RM-1614, RM-1616, RM-1644, RM-1665, RM-1695, RM-1723, RM-1729 Also RM-1748, RM-1873, RM-1880

REPORT AND ORDER

Adopted: Sept.27, 1972; Released: Oct. 2, 1972

By the Commission: Commissioner Johnson concurring in the result.

1. The Commission adopted a Notice of Proposed Rule Making in the above entitled matter on February 24, 1971, which was published in the Federal Register on March 6, 1971, (36 FR 4511). Interested persons were invited to file comments on or before June 1, 1971, and reply comments on or before June 18, 1971, respectively. The Notice proposed to expand the General-Conditional Class sub-band operator privileges in four amateur radio high frequency bands, to provide additional Amateur Extra and Advanced Class sub-bands in those high frequency bands where they do not exist, and to make other adjustments to the allocations of high frequency bands to facilitate the accomplishment of these proposals and additionally to expand the telephony sub-allocations in the five amateur radio high frequency bands from 3.5 to 29.7 MHz.

2. Formal comments were received from persons and amateur radio organizations within the United States and foreign countries. Many comments simply urge the adoption, or the rejection, of the proposals. Others endorse certain proposals and request that others not be adopted. Many propose alternate frequency band allocation plans. Since the comments received were so numerous, it is not practicable to discuss each herein. However, every comment filed has been given careful consideration.

3. Reactions to the proposals expressed in the comments, were highly mixed. Some, identifying themselves as telegraphy enthusiasts, opposed the proposal, usually citing the resulting reduction in the effective use of the telegraphy bands as the reason. Others, identifying themselves as telephony enthusiasts, supported the proposal, usually giving the crowded telephony bands as the reason. Proponents of both sides of the issue agreed that telephony expansion would be at the expense of telegraphy operation, with the telegraphers arguing that their preferred mode of radiocommunication would be impaired and the telephony advocates arguing that telegraphy is outmoded and unnecessary.

4. All of the HF bands from 3 - 30 MHz have predictable propagation characteristics depending on the period of the sunspot cycle, season, time of day, and the order of the frequency band itself. At times, some bands are primarily useful for short-distance radiocommunications, even though under those circumstances signals cross national boundaries. At other times, even the two main lower frequency amateur bands (3.5, 7.0 MHz) become international in character through long distance ionospheric propagation of signals. During the low period of the sunspot cycle, congestion in the lower frequency bands becomes more critical as the maximum usable frequency (MUF) decreases. Bands above 14 MHz, are generally considered international in nature by reason of long distance propagation of signals in these bands for a large percentage of the time.

5. A considerable number of comments were received from organizations located in other countries, and a delegation from one country paid an official visit to the Commission to discuss the ramifications of the Notice. The comments and information of other countries are worthwhile, and provide an added insight to what is normally considered a domestic matter. It is recognized that there are no formal internationally agreed sub-allocation plans which reserve certain portions of any of these bands for one type of emission or the other. There are, however, "gentlemen's agreements" among amateurs in various parts of the World (Region I in particular) which have worked out well in practice in maintaining order and providing efficient utilization of the various amateur bands. Only a few countries, having large numbers of amateurs, provide sub-allocations in

domestic regulations. The International Radio Regulations, to which the United States is a signatory administration, provides only band allocations to the Amateur Radio Service for the three Regions. In reaching a judgment on a matter with implications which could result in a lessening of international goodwill among amateurs, as well as a reduction of efficiency of utilization of the spectrum, we would be doing amateurs generally a disservice were we to disregard physical phenomena. Certainly we would be short-sighted if we totally disregarded opinions such as that of the International Amateur Radio Union, Region I Division, which pointed out,

> "The downward shift to 14,150 kHz will cause severe interference to operation in Region 1. With the high power and large number of US stations it will not be possible for foreign stations to operate above 14,150 kHz when propagation conditions enable USA stations to be heard. The consequent move downward in frequency by Region I Telephony stations will undoubtedly cause breaches of the voluntary IARU Region I band plans which have been in satisfactory operation for a number of years."

A similar opinion was expressed by the Radio Society of Great Britain and others.

6. Therefore, we conclude that a significant expansion of the telephony segments within the high frequency amateur bands would be at the expense of the telegraphy segments. Furthermore, we are of the opinion that the traditional amateur telegraphy radiocommunication mode must not be compromised. The rationale for this conclusion is well summarized in a quotation from a letter to the Chairman of the Commission from the Director of the Office of Telecommunications Policy:

> "While the use of CW radio telegraph communications has been replaced in most radiocommunications services with more sophisticated techniques over the years, this is not considered sufficient reason to justify the curtailment of such operations among U.S. amateurs. Knowledgeable communicators agree that when other types of high frequency radiocommunications fail CW transmissions are likely to get through. Thus, even though other techniques might be relied on first, it still would be wise to retain a pool of U.S. citizens skilled in CW operations as a resource in reserve. Amateur operators, with their past superb record of serving the public interest when needed, are considered the best means for preserving this skill"

7. We find that amateurs have been resourceful in effectively operating in the overcrowded high frequency bands. The vast majority have adopted spectrum conservation receiving and transmitting techniques. The nearly universal incorporation of suppressed or reduced carrier types of SSB emission, and other frequency conserving capabilities, such as highly selective receivers and directional antennas, has permitted more operators to conduct reliable radiocommunication over greater distances. Nevertheless, the question of how the existing high frequency amateur bands can accomodate even a relatively modest increase in the number of stations is now clearly in view. As evidenced by the petitions and comments, even the present number of amateurs authorized for telephony emissions on the high frequency bands at times far exceeds the capacity of the allocated A3 and F3 emission segments. We see no technological developments on the horizon to enable more simultaneous

Highlights of PHONE FREQUENCY & NOVICE Proposals

License Classes	*Present Subbands*	*Proposed by FCC Feb. 71*	*Proposed by ARRL Jun '71*	*Adopted as of Nov. 22, 1972*
Extra	3800-3825	3750-3775	3775-3800	3775-3800
Advanced & Extra	3825-3900	3775-3875	3800-3825	3800-3890
Conditional, General & up	3900-4000	3875-4000	3825-4000	3890-4000
Novice (A-1 only)	3700-3750	3700-3750	3700-3750	3700-3750
Extra	-----	7150-7175	7150-7175	-----
Advanced & Extra	7200-7250	7175-7225	7175-7225	7150-7225[1]
Conditional, General & up	7250-7300	7225-7300	7225-7300	7225-7300[1]
Novice (A-1 only)	7150-7200	7100-7150	7100-7150	7100-7150[1]
Extra	-----	14,150-14,175	14,175-14,200	-----
Advanced & Extra	14,200-14,275	14,175-14,250	14,200-14,275	14,200-14,275
Conditional, General & up	14,275-14,350	14,250-14,350	14,275-14,350	14,275-14,350
Extra	21,250-21,275	21,200-21,225	21,200-21,225	21,250-21,270
Advanced & Extra	21,275-21,350	21,225-21,325	21,200-21,225	21,250-21,270
Conditional, General & up	21,350-21,450	21,325-21,450	21,325-21,450	21,350-21,450
Novice (A-1 only)	21,100-21,250	21,100-21,200	21,100-21,200	21,100-21,200
Extra	-----	28,350-28,375	-----	-----
Advanced & Extra	-----	28,375-28,500	-----	-----
Conditional, General & up	28,500-29,700	28,500-29,700	28,500-29,700	28,500-29,700
Novice (A-1 only)	-----	28,150-28,250	-----	28,100-28,200

[1] When operating from points outside ITU Region 2 (roughly, the Western Hemisphere extended to include Hawaii) licensees of Conditional Class and higher may operate phone 7075-7100 kHz; Novice licensees may operate cw 7050-7075 kHz.

NOTE: The Novice band at 145-147 MHz has been deleted effective November 22, 1972. The telegraphy and RTTY frequencies in the hf bands are not being changed, despite an earlier FCC proposal to reduce the Extra Class cw subbands to 10 kHz each, 3.5 through 21 MHz.

telephony amateur radiocommunication within the present sub-allocations, although this is in itself a challenge to amateurs. Any proposed amendments to Article 5 (spectrum allocation) of the International Radio Regulations to allocate additional portions of the high frequency spectrum to the Amateur Radio Service, are at best some years in the future and only speculative. The only practical solution appears to be one of limiting access to the more crowded bands only to higher class licensees. Until such time as this becomes necessary, amateurs are encouraged to utilize other emissions and frequency bands during times of severe overcrowding of the telephony segments. Furthermore, we strongly urge that the VHF and UHF bands be utilized for all local radiocommunication; that the minimum power rules be strictly observed to minimize interference; that full carrier double sideband emission not be used in the lower four HF bands except in an emergency; and that all amateurs exercise good judgement and restraint when selecting a frequency and emission for their operation.

8. Accordingly, we conclude that the high frequency spectrum available to the Amateur Radio Service does not allow treatment which would significantly alleviate the problem of overcrowding in telephony radiocommunication through expansion of sub-band allocations. We are of the opinion that a small increase for telephony operation in the 3.5 and 7.0 MHz bands can be accomodated without causing a serious deterioration in telegraphy operation. We believe any telephony expansion of the 14.0 MHz band would result in a serious degradation to non-voice radiocommunication, and no expansion is adopted. Numerous comments from amateurs outside the United States express opposition to any telephony expansion by the United States, particularly in the 14.0 MHz band. Should U.S. licensees be permitted to operate in the unofficial, but widely observed, non-US telephony sub-band between 14.1 and 14.2 MHz, they predict a movement by non-US telephony stations into the 14.0 to 14.1 MHz segment, causing a deterioration in telegraphy radiocommunication and a general breakdown in inter-Region cooperation. This must not take place. We also find the 21.0 and 28.0 MHz frequency bands not to be sufficiently crowded to warrant an expansion of the telephony segments.

9. Comments from Canadian amateurs express concern for the resulting impact of expansion of the telephony segments available to US amateurs below 3.8 MHz. In addition to the 3.8 to 4.0 MHz telephony sub-band authorized for both US and Canadian amateurs, they are also permitted 3725 to 3800 kHz. This concern is expressed in the comments from the Director of the Canadian Division of the American Radio Relay League. Although we do not agree entirely with the implied necessity for Canadian amateurs to operate in different sub-bands, their comments are taken into account.

> "Canadian amateur operators have always made extensive use of the 3.5 MHz band. The size of the country and the low density of population have precluded the use of other frequencies, such as 144 MHz, since they did not provide adequate coverage. It is perhaps the most widely used amateur band in Canada for internal communication, in spite of the fact that 25 kHz, (3725 - 3750 kHz) are shared with American Novice operators. While Canadian voice operation could and undoubtedly would be moved to some lower portion of the band such as 3650 - 3700 kHz, in order to avoid Novice interference, there would be less space available for other modes as a result . . "

10. The Notice proposed 3750 to 3775 kHz for Amateur Extra Class and 3775 to 3875 kHz for Amateur Extra and Advanced Classes, an expansion of 50 kHz for telephony privileges. The American Radio Relay League, and others, recommend an expansion of only 25 kHz, limited to Amateur Extra Class operators only. This would authorize some 12 thousand higher class licensees to operate within the 3775 - 3800 kHz sub-band. In recognition of the Canadian operators' comments, we are of the opinion that the American Radio Relay League recommendation is a workable compromise, and we are therefore adopting it.

11. We conclude that the 7.0 MHz telephony sub-band can be expanded as proposed to the extent of permitting A3 operation between 7150 and 7200 kHz. While the comments heavily favor the adoption of this proposal, objections were also made, although to a lesser extent, by Canadian amateurs, because telephony operation is authorized in Canada by the Department of Communication for the same segment. Since the expanded telephony segment of 7150 to 7200 kHz has been heavily utilized for Novice Class A1 operation, and since only a limited number of higher class licensees will be permitted to operate within the new telephony segment, the expansion is acceptable. As a result of this action, the Novice band is relocated to 7100 to 7150 kHz.

12. The proposal to provide a telephony sub-band below 7100 kHz for contacts with stations in Regions 1 and 3, is not being adopted. Numerous comments pointed out that the proposal, if adopted, would make inter-regional radiocommunication with foreign stations occupying these frequencies more difficult since Region 2 stations would overload the segment. The proposal to permit telephony operation between 7075 and 7100 kHz for American stations located outside of Region 2 is adopted, however.

13. In the interest of encouraging beginning amateur operators to gain experience in telegraphy radiocommunications, a new Novice privilege segment is adopted for 28,100 to 28,200 MHz. Observations indicate that the segments 21,200 to 21,250 MHz and 145-147 MHz are lightly occupied for Novice operation and are therefore deleted. In light of these changes, and because of the relocation of the Novice 7.0 MHz sub-band, the requirement that the transmitter be crystal controlled is removed. We are of the opinion that the technical state of the art for calibrated variable frequency generating devices in the Amateur Service permits this change and re-crystalling of the many thousands of Novice Class transmitters is unwarranted. Additionally, this will enhance the operating effectiveness of Novice operation through reduction of interference and increased operating flexibility. Since the distinctive "N" designator in a Novice Class call sign prefix is easily recognized in the Service, Novice operators are cautioned to observe strictly the authorized frequency sub-allocations for Novice Class licensees. While amending paragraph 97.7(d), we revise the wording for the 75 watt power limitation to generalize its application to other amplifying devices in addition to vacuum tubes.

14. As pointed out by a number of respondents, the 28 MHz frequency band does not offer itself to providing meaningful exclusive operating

segments for upgrading incentives since the frequency availability problem is not of comparable magnitude as that encountered on the other high frequency bands. For this reason, the proposed establishment of exclusive operating frequency privileges for Amateur Extra Class and Advanced Class licensees is not adopted. With thousands of amateur radio operators upgrading to Amateur Extra Class and tens-of-thousands upgrading to Advanced Class, while the number of General and Conditional Class licensees is decreasing, adjustments to the sub-band allocations must be made in order to retain the incentive principle. Additional adjustments will be made periodically in the future as the upgrading movement continues. Allocations follow a pattern of apportionment of the telephony segments into three sub-bands in the case of 3.5 MHz and 21.0 MHz; one restricted to Amateur Extra exclusively; one restricted to Amateur Extra and Advanced; and one available to General/Conditional and Extra/Advanced. These sub-band apportionments are determined by considering the number of individual licensees in each group having privileges to each sub-band weighted in favor of the higher classes. Proposed telephony sub-bands restricted to the Amateur Extra Class in the 7.0 MHz and 14.0 MHz bands are not adopted because the application of the apportionment pattern to these smaller telephony segments would result in Amateur Extra Class sub-bands so small as to be practically useless.

15. Comments received in response to the proposed reduction in the Amateur Extra-restricted telegraphy sub-band were almost entirely opposed. Reasons cited included observations to the effect that the proposed 10 kHz sub-band was too small to be meaningful, and that the restricted telegraph sub-band was their primary incentive for upgrading. We find these comments persuasive and in agreement with our own observations. The proposal is not adopted herein, and the sub-band remains at 25 kHz.

16. We find the attached amendments to the rules are necessary and desirable and in the public interest. Authority for adoption of these amendments is contained in Sections 4(i) and 303 of the Communications Act of 1934 as amended.

17. Accordingly, IT IS ORDERED, that effective November 22, 1972, Part 97 of the Commission's Rules is AMENDED as set forth in the attached Appendix.

18. IT IS FURTHER ORDERED, that in addition to the fifteen petitions set forth in the heading to the proceeding, the pending petition of Mr. Frederick J. Hagen, filed February 1, 1971, RM-1748; and the pending petition of Mr. George W. Flyer, filed November 1, 1971, RM-1873; and the pending petition of Mr. William G. Welsh, filed November 8, 1971, RM-1880, have been fully considered and, to the extent that they are at variance with the rule changes adopted, they are DENIED.

19. IT IS FURTHER ORDERED, that this proceeding IS TERMINATED.

FEDERAL COMMUNICATIONS COMMISSION
Ben F. Waple
Secretary

APPENDIX

Part 97 of the Commission's Rules is amended as follows:

1. Section 97.7(a) and table, subparagraphs (d)(1) and (d)(2) are revised to read as follows:

97.7 *Privileges of operator license.*

(a) *Amateur Extra Class and Advanced Class.* All authorized amateur privileges including exclusive frequency operating authority in accordance with the following table:

FREQUENCIES	Class of license authorized
3500-3525 kHz 3775-3800 kHz 7000-7025 kHz 14000-14025 kHz 21000-21025 kHz 21250-21270 kHz	Amateur Extra Only
3800-3890 kHz 7150-7225 kHz 14200-14275 kHz 21270-21350 kHz 50-50.1 MHz	Amateur Extra and Advanced

(d) *Novice Class.* Those amateur privileges designated and limited as follows:

(1) The power input to the transmitter final amplifying stage supplying radio frequency energy to the antenna shall not exceed 75 watts, exclusive of power for heating the cathode of a vacuum tube(s).

(2) Radio telegraphy is authorized in the frequency bands 3700-3750 kHz, 7100-7150 kHz (7050-7075 kHz when the terrestrial location of the station is not within Region 2), 21,100-21,200 kHz, and 28,100-28,200 kHz, using only type A-1 emission.

2. In Section 97.61, the table in paragraph (a) is amended and (b)(10) is added to read as follows:

97.61 *Authorized frequencies and emissions*

(a) * * *

Frequency Band	*Emissions*	*Limitations (see para(b))*
kHz		
1800-2000	A1,A3	1,2
3500-4000	A1	
3500-3775	F1	
3775-3890	A5,F5	
3775-4000	A3,F3	4
7000-7300	A1	3,4
7000-7150	F1	3,4
7075-7100	A3,F3	10
7150-7225	A5,F5	3,4
7150-7300	A3,F3	3,4
14000-14350	A1	
14000-14200	F1	
14200-14275	A5,F5	
14200-14350	A3,F3	
MHz		
21.000-21.450	A1	
21.000-21.250	F1	
21.250-21.350	A5,F5	
21.250-21.450	A3,F3	
28.000-29.700	A1	
28.000-28.500	F1	
28.500-29.700	A3,F3,A5,F5	

(b) * * *

(10) The use of A3 and F3 in this band is limited to amateur radio stations located outside of Region 2. DST

ARRL QSL Bureau

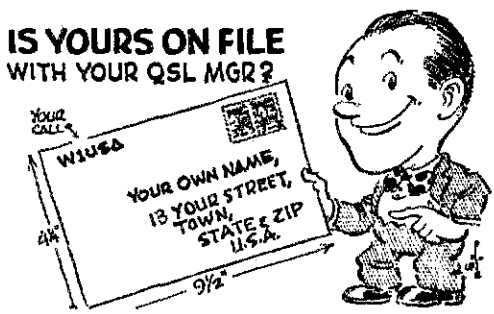
The function of the ARRL QSL Bureau is to facilitate delivery to amateurs in the United States, its possessions and Canada, of those QSL cards which arrive from amateur stations in other parts of the world. All you have to do is send your QSL manager (see list below) a stamped, self-addressed envelope, about 5 by 8 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,WN1 — Hampden County Radio Association, Box 216, Forest Park Station, Springfield, MA 01108.
W2,K2,WA2,WB2,WN2[1] — North Jersey DX Assn. P.O. Box 505, Ridgewood, NJ 07451.
W3,K3,WA3,WN3 — Jesse Bieberman, W3KT, RD 1, Box 66, Valley Hill Rd., Malvern, PA 19355.
W4,K4 — North Alabama DX Club, P.O. Box 2035, Huntsville, AL 35804.
WA4,WB4,WN4 — J. R. Baker, W4LR, P.O. Box 1989, Melbourne, FL 32901.
W5,K5,WA5,WB5,WN5[1] — Kenneth F. Isbell, W5QMJ, 306 Easterfield Blvd., Enid, OK 73701.
W6,K6,WA6,WB6,WN6 — No. California DX Club, Box 11, Los Altos, CA 94022.
W7,K7,WA7,WN7 — Willamette Valley DX Club, Inc., P.O. Box 555, Portland, OR 97207.
W8,K8,WA8,WB8,WN8 — Columbus Amateur Radio Assn., Radio Room, 280 E. Broad St., Columbus, OH 43215.
W9,K9,WA9,WB9,WN9 — Northern Illinois DX Assn., Box 519, Elmhurst, IL 60126.
W0 — Reggie Hoare, W0OYP, P.O. Box 115, Mitchellville, IA 50169.
K0,WA0,WB0,WN0 — Dr. Phillip D. Rowley, K0ZFL, Route 1, Box 455, Alamosa, CO 81101.
KP4,WP4[1] — Alicia Rodriguez, KP4CL, P.O. Box 1061, San Juan, PR 00902.
KZ5 — Lee DuPre, KZ5OD, Box 407, Balboa, CZ. Box 407, Balboa, CZ.
KH6,WH6[1] — John H. Oka, KH6DQ, P.O. Box 101, Aiea, Oahu, HI 96701.
KL7,WL7 — Alaska QSL Bureau, Star Route Box 65, Wasilla, AK 99687.
VE1 — L. J. Fader, VE1FQ, P.O. Box 663, Halifax, NS.
VE2 — A. G. Daemen, VE2IJ, 2960 Douglas Avenue, Montreal 301, PQ.
VE3 — R. H. Buckley, VE3UW, 20 Almont Road, Downview, ON.
VE4 — D. E. McVittie, VE4OX, 647 Academy Road, Winnipeg R3N 0E8, MB.
VE5 — A. Lloyd Jones, VE5JI, 2328 Grant Road, Regina, SK. S4S 5E5.
VE6 — D. C. Davidson, VE6TK, 1108 Trafford Dr. NW, Calgary 47, AB.
VE7 — H. R. Hough, VE7HR, 1291 McKenzie Rd., Victoria, BC.
VE8 — Yellowknife Centennial Radio Club, P.O. Box 1944, Yellowknife, NWT, Canada.
VO1 — Ernest Ash, VO1AA, P.O. Box 6, St. John's, NF.
VO2[1] — Goose Bay Amateur Radio Club, P.O. Box 232, Goose Bay, LB.
SWL — Leroy Waite, 39 Hannum St., Ballston Spa, NY 12020.

[1]These bureaus prefer 4 1/4 by 9 1/2 inch or No. 10 business *envelopes.*

QSL Bureaus for other U.S. Possessions and for other countries appear in the "IARU NEWS" section of the June and December issues of *QST*.



Silent Keys

IT IS with deep regret that we record the passing of these amateurs:

W1ANP, Milton Thurlow, Gorham, NH
WA1BDJ Dr. Chester A. Weed, West Hartford, CT
W1DOF, Thomas E. Tranfaglia, Revera, MA
W1ESO, Charles E. Lane, Milford, CT
W1HJB, Alphonse Tomaszewski, Providence, RI
W1KCT, Wendell C. Phillips, Dedham, MA
K1TCC, Thomas P. Browne, Waltham, MA
W2KED, Frederick W. Roden, East Greenbush, NY
K2MFP, Lowell A. Christman, Sr., Rensselaer, NY
W2NI, Harold M. Keyser, Scotia, NY
W2NR, Clarence O. Aber, Snyder, NY
WA2NVT, David J. Stewart, Keeseville, NY
WA2QLG, Frederick N. Purdue, Jr., Horseheads, NY
K2RZZ, Fred J. Gommo, Jackson Heights, NY
K3BY/Ex-W3MLJ, Thomas K. Chatham, Silver Spring, MD
W3CPL, Leland S. Vandervort, Scranton, PA
W3EBM/W8DW, Roger F. Quail, Springfield, PA
W3IA, Thornley M. Coin, Philadelphia, PA
WA3LMU, Rev. Robert E. Arthurs, Elfwood City, PA
W3TJI, Howard L. Smith, Falls Creek, PA
W3WSW, Frederick L. Will, New Kensington, PA
W4AAW, William L. Hamilton, Nashville, TN
W4DQO, Paul Brake, Miami, FL
W4EIW, Herbert W. Clark, Greensboro, NC
Ex-K4IWL, S. Meredith "Whitey" Myers, Alexandria, VA
W4JNJ, Milton C. Zunes, Norfolk, VA
Ex-W4LHD, Edwin M. Stevenson, Memphis, TN
WA4NZS, Alfred K. Porter, Jr., Reidsville, NC
W4OP, Harold E. Wilcox, Falls Church, VA
K4VMU, Katie G. Hamby, Selma, AL
K5CRK, Sam F. Work, Pine Bluff, AR
W5DC, Cecil E. Bland, Shreveport, LA
WB5FZE/XW8DO, Capt. Benjamin F. Coleman, Mesilla Pk., NM
W5HPL, C. E. Gregory, Ft. Smith AR
W5IA, Percy G. Root, Jackson, MS
Ex-W5IN, Burton E. Andrus, New Orleans, LA
W5JE, Arthur S. Mattes, Port Arthur, TX
WA5MUR, Sexten W. Hedlund, Ardmore, OK
WA5PBV, Frank S. Mitchell, Houston, TX
W5PHR, Harold J. Hepp, Bartlesville, OK
WA5TIK, Otto D. Huggins, Whitsett, TX
W5WYU, Donald B. Ginbey, Snyder, TX
W6CID, Elmer A. Piercy, Victorville, CA
Ex-W6CKC John R. "Kacy" Ward, Berkeley, CA
WA6HXT, Everett W. Hosking, Long Beach, CA
W6KMJ, Daniel Peterson, Garden Grove, CA
W6OHV, Thomas E. Reid, Long Beach, CA
WA6PLA, Alan J. Wolf, Lafayette, CA
K6UGE, Wellington Crommie, Jr., Los Angeles CA
W6WTP, Charles W. Cissel, Yuba City, CA
W7BA, Loyd A. Peek, Seattle, WA
W7HHQ, Leslie L. Sprogis, Newberg, OR
W7RK, Edwin W. McGinnis, Pasco, WA
W8ALM, Elwood C. Baker, Hamilton, OH
W8BPZ, Jabea Shawhan, Waynesville, OH
W8IUA, Roger E. Richard, Dearborn, MI
K8WQL, William O. Parson, Akron, OH
Ex-9AOF, Earl Ross Bell, Louisville, KY
W9DKO Lynford E. Reynolds, Jacksonville, IL
W9QMB, Merritt L. Fiske, Beloit, WI
K0DXI, Nathan B. Belgrade, Junction City, KS
W0EFC, Floyd E. "Schultz" Norwine, Jr., Ladue, MO
W0FYC, George J. Trostle, Sibley, IA
W0GSJ, Cecil A. Wilmot, Litchfield, MN
W0LFO, Dr. Charles F. Reichelderfer, Staples, MN
WA0MXK, Robert Elsea, Wheat Ridge, CO
W0PXE, Wallace E. "Barney" St.Vrain, Kirkwood, MO
VE2APC, Emile Carrier, Cte L'Islet, PQ
VE3FCO, Gerald J. O'Connor, Toronto, ON
VE3XJ, Gordon E. Pipe, Don Mills, ON
VE7CC, J. R. Clarke, Courtenay, BC
VE7HD, Dr. Morton E. Hall, Vancouver, BC
KH6FHD, T. Dudley Musson, Honolulu, HI
HC2JK, Enrique Chacon Decker, Guayaquil, Ecuador

AMATEUR RADIO PUBLIC SERVICE

NTS RACES AREC

In the Public Interest, Convenience, Necessity

CONDUCTED BY GEORGE HART,* W1NJM

A NEW EMERGENCY ADVISORY COMMITTEE?

MINUTE 60 OF THE ARRL Board Meeting in July directed the ARRL Planning Committee to study the feasibility of establishing an ARRL Advisory Committee to function in the area of emergency communications activities, hopefully to have a recommendation in time for the annual Board Meeting in January. The PC has already been at work on this study, in coordination with the communications manager as directed.

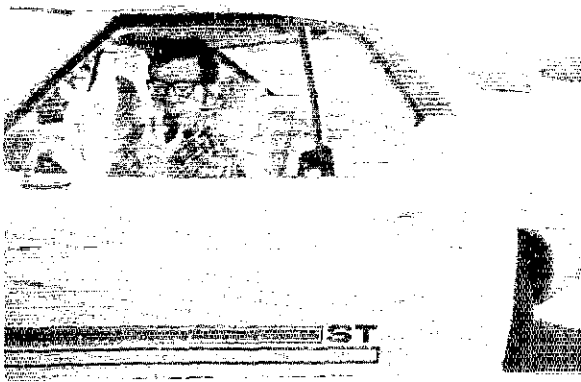
You can help by letting us have your comments. Is such a committee needed? Is it desirable? Would you be interested in serving on it? How do you size up our present effectiveness with respect to carrying out the amateur's so-important emergency communications function? Many think it is none too good, and most can see room for improvement. Such being the case, why should we leave *this* stone unturned to open up a new avenue of ideas and membership input toward improving emergency communications capability through amateur radio?

Such a committee, once established – presumably as a result of a future Planning Committee recommendation and Board action – would function in two equally important areas. (Remember that its function would be *advisory*.) The first is the policy area, in which it would recommend emergency communications policies to the ARRL Board of Directors through the liaison director. The other is the administrative area, in which it would work with the communications manager in shaping procedures for implementation of the Board's policies in terms that will reflect the maximum public service by amateurs along emergency communication lines. It would be concerned with AREC, with RACES, with the so-called "independent" facilities, with special government-agency facilities, with newer federal government entities getting into the amateur radio picture, with any and all groups and organizations having a stake in or an effect on this crucial phase of amateur radio.

Who would staff this new Advisory Committee? Nominations would come from the membership as provided under the Rules and Regulations Concerning Advisory Committees. There are so many good prospects available that the biggest problem would seem to be to select those most outstanding while at the same time providing a good geographical cross-section. Many from among our SECs and ECs could do a terrific job as committee members. Others who are no longer active as appointees but whose past history clearly indicates a lot of ability might come out of "retirement" for the purpose. How to staff an Emergency Communications Advisory Committee? No problem!

Whether an ECAC would produce the needed ideas and impetus is subject to speculation, but we sure need *something*. Perhaps this is the answer or, in any event, *an* answer. The Planning Committee will study the matter in light of your comments and recommendations, and make its report to the Board, hopefully in January. The PC member doing the leg work on this matter is Director Vic Clark, W4KFC. *Let him have your comments as soon as possible* (see address, p. 8)! Send a copy to headquarters too, eh? – *W1NJM*.

*Communications Manager, ARRL.



Last spring, K6LVJ was Coordinator of Communications for the Wheel Chair Olympic Games in Palo Alto, CA. Lately, he has been organizing hidden transmitter hunts. Gee, the "Q" seems to be missing from the car door.

The lineup above portrays four amateurs caught in the act of being NTS officials. Left to right, W1BJG, Eastern Area Staff Member-at-Large; W2FR, 2RN Manager; W4UQ, Chairman EAS and MAL; and VE3ERU, ECN Manager.

Oklahoma Repeater Contest

Use of repeaters is barred from most contests, and to some amateurs this doesn't seem right, particularly since establishment and operation of repeaters have been encouraged and have been so effective in recent emergencies. So the gang at Mid-Oklahoma Repeator, Inc., last July decided to run a mobile contest *requiring* the use of a repeater – their own, on 34/94 – a contest designed to promote activity and training in repeater use and render a public service at the same time. A large order, you say? Read on . . . . .

The scoring is based on various public services, most of them minor, and depends pretty much on being at the right place at the right time, but also on how many miles are racked up looking for incidents or situations to report, from 100 points for reporting a vehicle accident with an injury to five points for smelling gas where it shouldn't be. Five points per mile are also awarded, making it worthwhile for mobiles to stay on the move. Points are subtracted for operating and signal discrepancies. The winner, of course, is the mobile with the greatest number of points at the end of the prescribed contest period.

We get the impression that all the incidents and situations are actually reported to the cognizant local authorities – accidents, malfunctioning signal lights, wires down, fires, debris on thoroughfare, burglar alarms in operation, loose animals (both alive and dead), marker signs down, missing or vandalized, etc. – but groups who might copy this idea would do well to check with them in advance to avoid the possibility of being a nuisance rather than an asset. The Oklahoma group selected a Sunday for this activity, since this is the time when there are a maximum of incidents and situations to report and a minimum of maintenance available to rectify or prevent them.

So who said you can't use repeaters in a contest? Try Mid-Oklahoma's scheme, or some modification of it, among your local group, without official coordination at first, to see if it will take hold. If it does, you can make some good "points" with your local officials toward recognition of the value of amateur radio at the same time you get more involvement of local amateurs.

How to "Send" a Message

At first glance, you would think this ought to be in "Traffic Talk," but the sending of messages is basic to amateur radio public service, and many amateurs have a tendency to think of "traffic" as something that is handled by cw. Today, more of it is probably being handled by voice, and voice operators have an unfortunate tendency to try to emulate broadcast announcers rather than communicators. In sending traffic, they tend to "read" it instead of "sending" it.

Anyone who has taken a basic elocution course knows that in reading aloud or speaking you strive for emphasis and correct pronunciation. You get as much as you can of the old personality into the effort. In day-to-day voice operation, the basic rules of elocution also apply. But in the process of transmitting a record message, some of them go out the window. The object here is not to entertain, amuse, inform or impress the recipient, but to enable him accurately to transcribe a piece of writing which you wish to "send" to him.

So you don't "read" it. Reading implies conveying the meaning, and you are aiming at a lot more than this; in fact, the meaning is really unimportant. It also implies emphasizing certain syllables, consequently de-emphasizing others. It requires that you change your tone of voice, raising it and letting it fall as appropriate to the text. This sounds good and helps convey the meaning, but it can be a great deterrent to writing it down.

Nope, you don't read a formal, record message, you "send" it one word or group at a time, in an

even monotone, pronouncing every syllable, emphasizing every word or group, spelling if necessarily (but only if necessary), spacing your "sending" to writing speed (writing it as you send it is a good way to acquire this skill), forgetting everything but the single task at hand – seeing that the receiving operator gets it written down exactly as it appears before you. He doesn't have to understand it; all he has to do is get it written down accurately – that's AC-curately in speech, AC-CUR-ATE-LY by "voice sending." – *WINJM.*

Traffic Talk

Recently we found ourselves on the receiving end of a bawling out from K8ONA (not the first time) for not devoting more emphasis to *local* traffic nets. Eunice's Apricot Net operates on six meters, ties in with NTS and originates a *lot* of traffic. So do many of the other local nets; and some of them serve very capably in the delivery function as well.

So here's a plug for local nets. They are very important to the basic scheme of traffic handling, especially along emergency communications considerations – for the local level is where most emergencies occur. Even when an emergency is widespread in extent, the local aspect is present and just as important as broader scale aspects. The uhf bands are ideal for this purpose; 75 has many drawbacks. Ten meters ought also to be good for the next few years, but occasional "skip" openings can be a drawback. We would say that six and two are the best bets for local nets – nets covering a municipal area or a county, or even several counties – or, in the east, in some cases the smaller states and sections. For example, Rhode Island is readily coverable on six meters, and with the aid of repeaters so are Connecticut, Eastern and Western Mass., Delaware, NYC-LI, ENY, Northern & Southern N.J., and some of the sections in California. Why not? Why not establish repeaters specifically for traffic nets, thus relieving some of the congestion on 75 and including technician or even novice licensees? If a repeater is used, stations close by can hit its input with very little power, while even stations up to 50 miles out can hit it with a beam antenna, receiving its output on the same beam. Conceivably, and conservatively to boot, a "local area" over a hundred miles in diameter can be covered on two meters. Why aren't more of us doing it? How about more local nets on vhf? How about arranging for the loan of a local repeater for nightly emergency and traffic drills, if you can't put up your own? Worth looking into, gang.

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for Aug. Traffic

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W3CUL	229	1492	1329	136	3186
KØONK	107	597	577	8	1289
KØZSQ	–	534	–	534	1068
K3NSN	308	215	417	106	1046
W3VR	131	291	284	21	697
WAØVAS	115	279	50	229	673
WA4IJH	34	292	234	25	585
K5TEY	3	284	284	–	571
WB6BBO	42	238	208	28	516
WØLCX	3	284	242	3	502
KØZSQ(July)	–	465	–	465	930
W2OE(July)	67	290	224	6	587

More-Than-One Operator Station

WB4HIS	1	536	536	–	1073
WR4USA	582	10		–	562

BPL for 100 or more originations-plus-deliveries

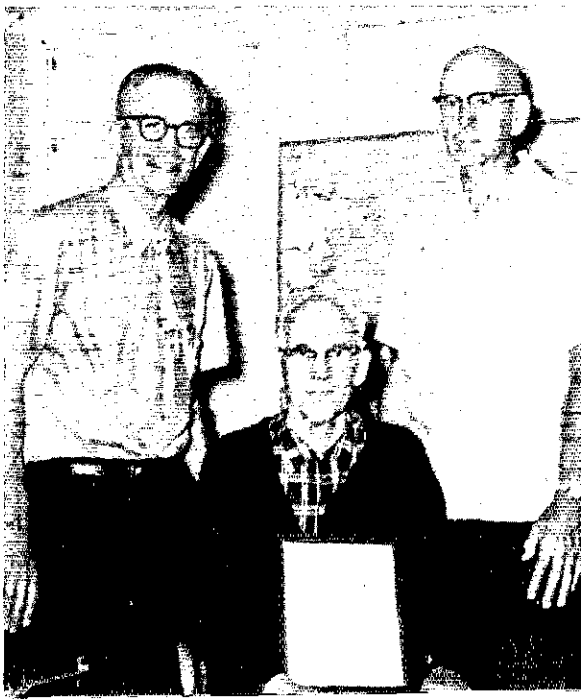
KØYFK	201	W5KLV	124	WB2LZN	105
W8QCU	168	K8NQW	121	WN8IFU	104
WA2CLC/1	139	K1BCS	118	WAØAUX	102
WA8WPO	137	WN8IIF	111	W8IBX	101
KP4WT	137	WB2NOM	109	WA6BYZ(June)	116
WA2NLP	133	WBØAXW	108	WA6BYZ(July)	104
WN3RCI	130	WN1POJ	106	KØYFK(July)	102
		W5TI	106		

More-Than-One Operator Station

K9IU 295

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.

National Traffic System. Solar flares helped set a new record on an EAN session: 0 traffic cleared, with two NCSs (simultaneously). W6BNX reports that traffic has been slow on PAN. Rough band conditions have kept the rate low. Members of 1RN enjoyed a delightful clambake at the home of W1QYY with members of East Mass. Net. 1RN is still running smoothly with good support from members. Solar flares nearly wiped out a couple of 2RN sessions. W2FR sez band conditions improved



W7APS (seated) is presented with an Outstanding Service Award for 20 years of service on RN7. Retiring RN7 manager, W7BQ (left) presented the award in company with new manager, W7KZ.

The Mississippi Sideband Net Picnic, Aug. 20, at *Enid Lake, MS, was the scene of this administrative* session between MS SCM, W5NCB, on the left and SEC, WA5FII. (WA5JWD Photo)

once East Coast NTS activity had finished. Sabotage? W7KZ submits his first RN7 report and finds the almost total lack of participation from VE7 land a most surprising and unaccountable situation. Word from *9RN's W9HRY* is that conditions have not been bad, but representation has. Every time one section gets back on the ball, another falls apart. New TEN certificates were earned by VE4PG, KØBIX and WAØQEX.

June Reports

Net	*Sessions*	*Traffic*	*Rate*	*Avg.*	*%Rep.*
EAN	31	1501	1.181	48.4	96.8
CAN	31	872	.817	28.1	98.4
PAN	31	866	.755	27.3	98.0
1RN	62	485	.363	7.8	90.6
2RN	62	562	.733	9.1	95.5
3RN	62	426	.461	6.9	97.2
4RN	58	378	.317	6.5	85.4
RN5	62	537	.318	8.7	90.3
RN6	62	560	.410	9.0	100.0
RN7	62	197	.224	3.2	56.4
8RN	58	497	.431	8.6	77.4
9RN	58	377	.345	6.5	80.7
TEN	62	514	.449	8.3	79.6
TWN	42	192	.195	4.6	41.3
TCC Eastern	124[1]	595			
TCC Central	93[1]	496			
TCC Pacific	124[1]	661			
Sections[2]	2302	9049	—	3.9	
Summary	*3045*	*18765*	*EAN*	*6.2*	
Record	*3146*	*31117*	*1.440*	*16.4*	

[1]TCC functions not counted as net sessions.

[2]Section and local nets reporting (65): AENB, AEND, AENO (AL); NCN (CA); CCN (CO); BEN, CN, CPN, No. CT ARFC, Nutmeg VHF (CT); DEPN, DTN (DE); FAST, FMTN, FPTN, GN, QFN, QFTN, VEN (FL); GSN (GA); ILN (IL); OKS (KS); KTN, KNTN (KY); LAN (LA); SGN (ME); MDCTN (MD-DC); WMN (MA); QMN (MI); MJN, MSPN, PAW (MN); MON, MSN, WEN (MO); NJEPTN, NJSN (NJ); NM Roadrunner (NM); NLI, NYS (NY); BNR, OSSBN (OH); EPA, PTTN, WPA (PA); TN, TNN (TN); TTN (TX); BUN (UT); VSBN (VA); NSN, PSEN, WSN (WA); WVPN (WV); BEN, BWN, SW2RN, WIN, WSBN (WI); APSN (AB); MTN (MB); GBN, OPN, OQN (ON); WQV/UHF (PQ).

Several members of the Virginia Sideband Net and the Virginia CW Net and a guest are pictured at the Roanoke Hamfest. Left to right, WB4PCK, WA4FGC (PAM), WB4KBJ, W4OKN, K4GR (SCM), W4LQO, W4KFC (Roanoke Division Dir.), W2TUK (ARRL Pres.), and WA4JJF. (Photo by WB4FDT)

Transcontinental Corps.

Area	*Functions*	*% Successful*	*Traffic*	*Out-of-Net Traffic*
Eastern	124	93.0	1630	595
Central	93	93.5	1020	496
Pacific	124	92.7	*1331*	*661*
Summary	*341*	*93.0*	*3981*	*1752*

The TCC roster (Aug.): *Eastern Area* (W3EML, Dir.) – *W1s* BJG EJI NJM QYY YNE, *W2s* FR GKZ, K2KTK, *WA2s* ICU LWA, WB2RKK, W3EML, K3MVO, *W4s* SQQ UQ, *K4s* KNP VDL, WB4OMG, *W8s* IBX PMJ RYP VDA/4, K8KMQ, WA8PIM. Central Area (WØLCX, Dir.) – W4OGG, WA4WWT, *WB4s* KPE YCV, *W5s* MI QU SBM, K6KCB/5, *W9s* CXY DND HI INH LCX ZHN, *KØs* AEM DDA, *WAØs* IAW MLE. Pacific Area (K5MAT, Dir.) – W5RE, K5MAT, *W6s* BGF EOT IPW MLF VNQ VZT, WA6DEI, WB6VKV, *W7s* BQ EKB EM GHT KZ PI, WØLQ, *KØs* JSP OTH, WBØAXW.

Independent Net Reports (August)

Net	*Sessions*	*Traffic*	*Check-ins*
Early Eighty Free	30	239	169
20 Meter ISSB	23	1673	459
20 Meter North American Tfc	27	244	512
Clearing House	27	165	320
International Mission RA	50	580	*1827*
7290 Traffic	46	803	1842
75 Meter ISSB	31	191	1000
All Service	4	*10*	*31*
Mike Farad	26	115	195
Hit & Bounce / MW	31	763	317
Ohio Valley Teenage	31	75	163

Public Service Diary

On Apr. 13, word was received that the son of an officer stationed at Guantanamo Bay, Cuba, had *been seriously injured in an accident in San* Francisco, CA, and was not expected to live. The officer was on leave in Puerto Rico. At 1800, KG4CS established contact with KP4USN, at Sabana Seca. For almost four hours, contact was maintained while KP4USN *contacted* naval activities in San Juan hotels and restaurants and commercial airlines by which the officer was expected to leave the following morning. K1VRT, WA4CGY and WA4ECY helped keep the 20-meter frequency clear. K1VRT assisted in phone-patching to the officer's sister in California. At 2140, the *officer was finally located and contacted* KP4USN who phone-patched him to KG4CS who informed him of the accident. Further contact was required to make arrangements for the officer's wife who

was with him, to travel to Kingston, while he was able to depart direct for San Francisco. KG4CS contacted 6Y5EM and K3WEU/6Y5 on 80 meters and had 6Y5EM contact the American Embassy who made arrangements to meet the officer's wife and assist her in connecting with a flight to Guantanamo. As a result of the assistance by amateurs, the officer was able to arrive at San Francisco prior to his son's death. – (KG4CS)

– . . . –

Scores of man hours of operating were spent between May 10 and 15 in connection with a missing aircraft with two passengers aboard in the Owensboro, KY, area. Each search aircraft had a ham with 2-meter gear aboard; other amateurs were with ground teams. Unfortunately, the plane was not found. Approximately 23 amateurs participated. – (W4OYI)

– . . . –

While mobile in Mission, KS on June 23, KØAYO witnessed an accident. He was in a 20-meter QSO with WB2SJQ and WØSJE and WB2SJQ relayed information to WØSJE in Lee's Summit, MO, who notified authorities. Police were on the scene within three minutes. – (KØAYO)

– . . . –

At about 2030 EDT on July 4, an automobile accident occurred across the street from WB8JEL's house in Cleveland Heights, OH, injuring a teen-age girl. WB8JEL took a portable 6-meter transceiver to the scene and notified the girl's parents via K8ONA on 6 meters. As a result, the parents were able to arrive at the hospital before their daughter's ambulance. – (WB8JEL)

– . . . –

Because of illness in the family, it became necessary to have W4BVU/mobile in Alaska notified to call home as soon as possible. A telephone call to Mt. McKinley National Park proved unsuccessful in locating him. WA4PBG contacted the Alaskan/Pacific Net, but found that W4BVU had not been heard from lately. On July 27, WA4PBG originated a message to net manager KL7EKB, asking him to locate W4BVU. Within 24 hours, KL7HAC had located him and advised him to call home. – (WA4PBG, SEC VA)

– . . . –

On Aug. 2, two climbers were killed by falling ice while attempting to negotiate a mountain in the Wood River Range near the Alberta-BC border. VE6CS and other climbers happened on the scene at about 1500 MST. After assisting in moving the bodies to a lower elevation, VE6CS continued back to camp, arriving at 1920. He called on the Alberta AREC net frequency and reached VE6ALQ in Calgary who phoned the Royal Canadian Mounted Police. A helicopter arrived at the mountain two hours later and the bodies were evacuated. – (VE6CS)

– . . . –

The Boeing Employees Amateur Radio Society was alerted to a missing canoeist at Camp Brown (60 mi. NE of Seattle, WA), on Aug. 2. At 0700 PDT the following day, WA7JBM established communications with WA7HKD and maintained until 0030, Aug. 4. The body was located at 1430, resulting in considerable traffic, mostly phone-patches to the Seattle area. – (W7RJW, EC King Co.)

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Public Service Honor Roll August 1972

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. Those making fewer than 45 points are listed with point totals only.

Category	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	
Max. Pts.	*10*	*10*	*12*	*12*	*12*	*20*	*3*		*5*	*Totals*
W3FCS		9	12	12	9	20			5	67
WB5DEK	10	10	12	12	12	6			5	67
WA3QOZ	10	10	12	12	12	5			5	66
WB4SVH	10	10	12	12	12	2			5	63
WA8UPU	10	10	12	12	12	1			5	62
KØBAD/4	10	10	12	12	12	1			5	62
WA2CXY	10	10	12	12	12				5	61
WA3GSM	10	10	12	12	12				5	61
WB8BMV	10	10	12	12	12				5	61
WA8CTX	10	10	12	12	12				5	61
KØBIX	10	10	12	12	12				5	61
WB2NOM	10	10	12	12	12		3			59
WB2NRK	10	10	12	12	12	3				59
WB4WHK	10	10	12	12	12	3				59
WØIRW	10	10	9	12	12				5	58
WAØVAS		10		12	12	20	3			57
K1OXD	10	10	12	12	12					56
WB2AEH	10	10	12	12	12					56
WA2EUO	10	10	12	12	12					56
WB2OYV	10	10	12	12	12					56
WB2RKK	10	10	12	12	12					56
W3EZT	10	7	12	6	12	4			5	56
WA3OGM	10	10	12	12	12					56
K7OUF	10	10	12	12	12					56
WB8KVU	10	10	12	12	12					56
WB9AHJ	10	10	12	12	12					56
WB4PNG	10	10	12	6	12				5	55
WB8EEZ	10	10	3	12	12	3			5	55
W5SBM	10	6	12	9	12				5	54
WBØCNM	10	10	12	9	12	1				54
K3KAJ	10	10	9	12	12					53
WB4SQA	10	10	9	12	12					53
WA2UOO/2	10	10	12	3	12				5	52
W7OCX	10	10	3	12	12				5	52
WB4RUA	10	10	12	6	12	1				51
WA7JQS		10		12	12	12			5	51
WB6MXM	8	10		12	12	8				50
WB2UFG	10	10	12		12				5	49
WB4NCH	10	10		12	12				5	49
W4ZJY	10	10	12		12				5	49
KØMRI	10	10	12		12				5	49
WAØVYR		10		12	12	15				49
W2TPV/Ø	10	7	12		12	1			5	47
WA3PIG	10	10	12	3	12					47
WBØBIY	10	10	12		12	2				46
WA2ICU	10	10	12		12	1				45
K8NQW		10		12	12	3	3		5	45

WB2FEX . . 44	WA3MQP . . 40	VE4LA . . 35
WA3DUM . 44	WB8KKI . . 40	W1CE . . . 34
K3OIO . . 44	K1EIR . . . 39	K1SXF . . . 34
K3ZNP . . 44	W1UBG . . 39	W2CU . . . 34
WB4VZQ . . 44	W2FR . . . 39	WA2BLD . . 34
W5ABQ . . 44	W2RUF . . 39	K2EIK . . 34
K5ROZ . . 44	W3LOS . . 39	K3BR . . . 34
W6AUC . . 44	W3NEM . . 39	W3YA . . . 34
WA6DEI . . 44	K4UNW . . 39	K4BNP . . 34
W7BQ . . . 44	W7GHT . . 39	K8MAT . . 34
W7PI . . . 44	WB8CWD . . 39	W6YBV . . 34
W8GLC . . 44	WA8VKF . . 39	W7EBK . . 34
WA8NOQ* . 44	KØAEM . . 39	W7WAH/5 . 34
WB9BAP . . 44	WØHI . . . 39	W9QLW . . 34
WØBV . . . 44	VE3DPO . . 39	VE3AIA . . 34
WAØMLE . . 44	VE3EWD . . 39	VE3AWE . . 34
VE3DV . . 44	VE3GFN . . 39	WA2AYC . . 33
VE3GBR . . 44	WB4SKJ . . 38	WB2CFT . . 32
VE3SB . . . 44	W6DEE . . 38	W3QU . . . 32
WA6TVA . . 43	VE3EQZ . . 38	WB8AYC . . 32
W9HRY . . 43	VE3EXI . . 38	WB8CSH . . 32
WB4IMH . . 42	K8MLO . . 37	VE3BPC . . 32
WB6IQT . . 42	WB2IKL/2 . . 35	W4UQ . . . 31
WA3QQR . . 41	WB4THU . . 35	WA2CCF . . 30
WB4EKJ . . 41	WB8HUP . . 35	W2MTA . . 30
W1YNE . . 40	W8IMJ . . . 35	WN8III . . 30
	WAØSIG . . 35	

*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.

While traveling on I-95 near Jacksonville, FL, on Aug. 10, W1BYS came upon a two-car accident. He called into the Jacksonville repeater and reported directly to police via autopatch by WB4JDA. Police sent assistance immediately. – (W1BYS/K1TXC)

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Beginning at 2145 CDT Aug. 16, members of the Ak-Sar-Ben RC provided communications for Omaha, NE, residents who had lost telephone service because of a construction accident. Mobile units were positioned in 10 locations and placed white flags on their antennas to show residents where they could make emergency calls. – (WØFQB, WØMW)

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Beginning on Aug. 17, several amateurs provided communication services between two rescue teams searching for a lost hiker near Edward, CO. The search continued until Aug. 21 when the hiker was found. During that time, a 2½-year-old girl became lost in the same area and communications were expanded to cover the extended search. Twenty-five amateurs participated. – (WAØHLQ, SCM CO)

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After torrential rains in Northern IL on Aug. 25, four amateurs in Plainfield, IL, aided c.d. during the swelling of the DuPage River. Activities, mostly by 2-meter fm, included relaying water levels, routing traffic around flooded roads, evacuation of two homes and operation of the c.d. command post station. Operations were secured at 1700 CDT Aug. 27. Amateurs participating were WA9s NYO OXY WQA and UOT. – (WA9OXY)

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At 1645Z on Sep. 1, XE2BY checked into WCARS in search of medical advice for an injured worker on her ranch, 160 miles SE of Ensenada, Baja California, Mexico. WA6ARQ was contacted and a LaJolla doctor was reached via phone-patch. It was determined that the victim should be moved to a hospital in Ensenada. Weather information for the flight was relayed from the weather service in San Diego. – (WA6ARQ)

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Flash floods inundated the north end of Las Cruces, NM, on Sept. 1. At 2000 MDT, the c.d. director called RACES Asst. Dir. W5LQH, who contacted W5UHI to start organizing the necessary communications and alerting members of the Mesilla Valley RC. A net was started which included W5ICV and W5OPN at the evacuation center at NM State Univ., W5NQC at the c.d. office, W5VQK and W5UHI at Red Cross Headquarters and K5YRY and W5HDR at the flood scene with W9ICW/5 and W5OLF filling in with relaying of messages. Action ended at 0200 MDT on Sept. 2, with club members returning home to get a little rest before their scheduled communications setup for a motorcycle race later that day.

During the races, another flash flood occurred at Hillsboro, NM. Part of the crew was dispatched to the disaster scene and activated a net utilizing WA5KUI's repeater. K5HDR, W5LUI and K5DIT fed messages back to K5ICV and W5OPN at Red Cross Headquarters in Las Cruces. W5VQK, WA5MIY and W5MYN provided a 75-meter link to RACES and c.d. headquarters in Las Cruces, Truth or Consequences and Hatch. Several hundred messages were handled, both health and welfare and assistance traffic. The net was disbanded at 1500 MDT Sept. 4, when telephone service was restored after 48 continuous hours of operation.

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Thirty-four SEC monthly reports were filed for Aug. That's only 46% of the number of reports we *should* be receiving. C'mon you 54%! Aug. reports represent 12,331 AREC members, nearly the same as last year's 12,291 members. Sections reporting: Alta, Colo, Conn, Del, EFla, ENY, EMass, Ind, Iowa, Kans, Mar, Mich, Miss, Mont, Nebr, Nev, NC, NNJ, Ohio, Okla, Org, SV, SDgo, Sask, SDak, Tenn, Utah, Va, Wash, WVa, WFla, WNY, WPa, Wisc. QST

TEN-TEC MODEL 505 TRANSCEIVER

(continued from page 45)

TEN-TEC MODEL 505 TRANSCEIVER

Dimensions (HWD) and Weight: 4-1/2 x 13 x 7-1/2 inches, 6 pounds.
Power Requirements: 12 Vdc, 1 A, regulation 10 percent or better. Ac supply available.
Transmitter Power Output: 2 watts, except 1.8 watts on 28 MHz.
Receiver Sensitivity: Less than 0.5 μV for 10-dB signal-plus-noise-to-noise ratio.
Price Class: $290. Ac Power Supply: $25.
Manufacturer: Ten-Tec, Inc., Sevierville, TN 37862.

than you'll ever need, in conjunction with a transmitter output of two watts. In fact, it's probably good enough for any service, regardless of transmitter power.

If you can be on the air during hours when QRM is not severe, or if you like to take a small portable to remote or high locations, far from the crowds, you're likely to find this little package mighty pleasant company. Even with limited operating time available, mostly during busy weekend hours, the undersigned has had a number of nice contacts on 80, 15 and 10-meters, using an end-fed wire some 60 feet long.

Members of the Headquarters Staff who specialize in hf operation have had good results with the Argonaut on all the bands, with both cw and ssb. All experienced that special glow or satisfaction and initial surprise, when stations came back to them. Even those who should know better, including the writer, learned over again that kilowatt rigs are not everything. QRP *is* an interesting and challenging game, and the Argonaut makes it easy to play. All the operator needs is patience and the know-how that will come, in time. – *W1HDQ*

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.

The New Amateur Rules . . .

. . . Some Questions and Answers

A Report and Order in Docket 18803 was adopted by the Federal Communications Commission late in August, but was of such size that release of the complete text was not accomplished until September 8th. Nevertheless, special efforts were successful in getting the material into October *QST*. There was no time, however, for more than a most cursory explanation, coupled with some off-the-cuff interpretations by Hq. (most of which, thankfully, appear to have been accurate). The scope of the changes is such that nearly every amateur is affected in one way or another, and as a result we have been showered with questions. Here are a few typical of those being asked, plus answers which we have prepared after informal discussions with Commission staff; this does not suggest official endorsement of our answers, of course.

Q. I want to check out the rig of a friend who has passed the Novice exam but hasn't yet received his ticket. Can I operate with my call portable at his location?

A. Yes (and this is a change from our surmise in the October article). Since the location is not under license, you may use the rig with your call in portable status. In other words, FCC has reverted part way – but not all the way – to its "which call to sign" views of years ago.

Q. I spend summers with a ham buddy, and want to get in some operating with my own call, of course with portable designation. Under the new rules, am I obliged to use his?

A. Yes. The location is licensed, and the equipment there is covered by that license; the rules provide that his call be used. Your alternative is to apply for a second license for the location, if you want to sign other than his call, as for example seeking personal contest or award credits.

Q. I must sign his call even if I bring my hand-held 2-meter fm unit?

A. In such a case you're mobile, and sign your own call.

Q. How can we possibly shift our out-of-band repeater frequency and get new crystals for all our crew by October 17?

A. That *is* a problem, which seems generally recognized. At the time of writing this (early October) ARRL is in process of requesting a partial stay of effective date to prevent hardship on existing repeater operators. Hopefully, by the time you read this some such relief will have been granted, and information bulletined by W1AW and others. (And check "League Lines" this issue, since it will be written several days later than this discussion.)

Q. I have a local repeater under an individual call, not a club/trustee and all that. Do I have to shut down October 17 if I don't have a new repeater license by then?

A. No. But you'll have to meet the power and frequency requirements (unless the effective date is postponed).

Q. Do the new rules relieve us of having to log unfruitful CQs?

A. Yes, and unfruitful calls. The log must show the commencement and ending of time the station was in operation, however. And we must add the admonition that most amateurs keep a detailed log as a matter of pride, required by regulations or not.

Q. Is it really true that when mobile I don't need to keep a log?

A. Not quite that simple. What is eliminated is the need to show call signs of individual stations contacted. You *do* need to show dates and times of commencing and ending mobile activity. And of course basic one-time entries in the log should show power, type of emission, frequency band segment, and physical location ("local" will do if within 100 miles of home base).

Q. Is it true that repeaters do not need to log call signs of user hams, but do need to keep notes on every phone patch?

A. Yes. You'll have to figure out how to accomplish this one.

Q. Some guys on distant mountains delight in keying up our repeater fairly often, taking it out of the "intra-community" class. In such cases is our control operator obliged to shut it down?

A. No. There is no *prohibition* of "DX" input, and such occasional instances are no regulatory problem. The basic purpose of the repeater, however, should not be to provide such "service."

Q. With our machine on a mountain-top, to meet the monitoring requirements of both transmit and receive *we'd have to install a second monitor receiver on the mountain with a transmitting link to the control point. Isn't that unreasonable?*

A. We guess the answer here is just to provide compliance in a common-sense manner. The principal aim is to take reasonable precautions that (1) the repeater output doesn't clobber a simplex operation already in progress, or (2) that some ham on the input frequency isn't repeated without his knowledge or intention.

Q. We don't have enough people for continuous control monitoring around the clock. Doesn't that seriously hamper our present ability to provide (emergency) service at all times?

A. ARRL is currently evaluating the desirability of petitioning for relief. For the present, at least, you'll have to choose a balance between the emergency "all-hours" capability of the repeater, and the man-hours available for monitoring control. In its report and order the Commission

requests thought be given and suggestions made for some kind of automatic control. E.g., a system might be set up so that a late-night signal appearing on the input frequency would trigger an alarm at the bedside of an assigned control operator, who could then turn on and monitor the repeater as he chose. Other ideas?

Q. Can "any person" operating my station contact any casual station in a non-third party country?

A. Nope. Anyone other than the control operator is a "third party" and may not communicate with an amateur in a country with which the U.S. does not have a traffic agreement. See "IARU News" or the *License Manual* for country listings.

Q. I see a loophole on the power restriction for repeaters. Why can't we operate our machine as a "remote base" with 50 "control points" (our members), and thus run a full repeater on any frequency we choose?

A. Nice try, but you can't because FCC will raise an eyebrow at and require justification for anything more than one or two control points for such a remotely-controlled primary station.

Q. The new rules say I can let another ham use my station and call if I "designate" him as the control operator. Does this have to be in writing, or is verbal authority enough?

A. Verbal is good enough. His signature would be in the log, of course. QST

It Seems To Us

(continued from page 9)

the program, was 75 to be considered for restriction! And while we're clarifying, there was nothing in the ARRL proposals recommending special privileges for Extra Class or any restrictions on cw segments. It may be Monday morning quarterbacking, but the League's original idea still looks good to us.

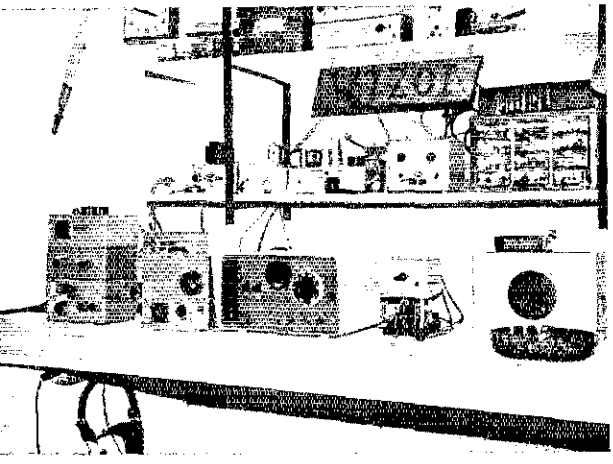
Putting down our brickbat for the moment, we might add that the language of these recent formal actions by the Commission seems more open and direct, and therefore meaningful, with less triteness and "boiler plate" in the reports than in some earlier instances. It is not always convincing, but somehow it conveys a feeling of more direct and personal interest; on balance, that *should* be good. Time will tell.

Agnes

(continued from page 77)

have been lost and much additional agony would have been suffered by those affected. Individual heroes were scarce or nonexistent; teamwork was the key. The best teamwork, of course, came from groups already prepared, but many amateurs previously experienced in emergency work were able to be of material assistance, and some newcomers to this phase of hamming who were at the right place at the right time were also of value. The Agnes Emergency will go down as another star in the amateurs' ledger of public service performed – another *bright* star in a public service record that has become a legend, a tradition, a heritage.

Strays



Not all amateur stations use store-bought equipment! Shown here is the homemade solid-state station of Wes Hayward, W7ZOI, with which WAC has been garnered on both 7 and 14 MHz. The transmitters are of the QRP variety, and the antennas used are a dipole and vertical ground-plane. DXCC is not far away according to W7ZOI and WAC will be realized on 15 meters once Africa is added to the list. At the left of the photo (top to bottom) is a 40-W, 20-meter PA (2N3950), 45-W, 40-meter PA (2N5006), multiband Transmatch, and low-pass filter. At the center is a band-switched solid-state exciter with MOSFET VFO (2.5 watts output) which employss a semi-break-in system for cw. The equipment at the right is a cw-only multiband receiver with MOSFET front end. Three crystal filters are used in the i-f-two four-pole and one 10-pole filter to provide a bandwidth of 350 Hz. A homemade keyer is visible at the far right. The shelf contains homemade power supplies for the gear. It all goes to prove some of the boys still build their own equipment, and that 2 kW PEP is not needed to work DX. – *W1CER.*

Happenings of the Month

LEAGUE ELECTION RESULTS . . .

In current elections for director and vice director of eight ARRL divisions, three directors and four vice directors were the only nominees for their respective offices and thus there is no membership balloting.

In the Hudson Division, scene of some hotly-contested elections in times past, Director **Stan Zak, K2SJO,** and Vice Director **George Diehl, W2IHA,** were returned for second terms as the lone nominees. Also winning second stanzas are the Rocky Mountain director, **Charles M. Cotterell, WØSIN** and vice director, **Allen C. Auten, WØECN.** **Roy L. Albright, W5EYB,** West Gulf director since 1969, and **Jack D. Gant, W5GM,** who was appointed to the vacant post of vice director in May, both were the sole candidates.

The Northwestern Division, has a new vice director, **Dale T. Justice, K7WWR/WA7KTV,** of Hillsboro, Oregon. Dale is 30 years old and works as an electronic technician for the Rodgers Organ Company. He's been an assistant director of the Division since 1967, and has been serving simultaneously as SCM of the Oregon section. First licensed in 1961, he holds ARRL appointment as as official relay station and as an official phone station, as well as being a member of the Amateur Radio Emergency Corps.

. . . AND MEMBER BALLOTING

Balloting is necessary in the other contests. The Central Division will choose between incumbent Philip E. Haller, W9HPG, and challenger William O. Reichert, WA9HHH, for the director slot: and between Edmond A. Metzger, W9PRN, now in office, and Kenneth A. Ebneter, K9GSC, for vice director. New England Director Robert York Chapman, W1QV, is opposed by Daniel A. MacDonald, W1PEX; Roger Corey, W1AX, the current vice director, declined a nomination for director. In the vice director contest, the candidates are Leslie S. Radnay, W1PL, and John C. Sullivan, W1HHR. A three-cornered race for director looms in the Northwestern Division with incumbent Robert B. Thurston, W7PGY, facing Harry W. Lewis, W7JWJ, and William R. Watson, W7BQ. Back East, by somewhat South, incumbent Victor C. Clark, W4KFC, and James Harrison, WB4TBX, are candidates for director while Vice Director Phil Wicker, W4ACY, and James Bulebush, WB4KKT, are on the other side of the ballot. In the remaining contest, Southwestern Director John R. Griggs, W6KW, and former Director Ray E. Meyers, W6MLZ, again battle it out. The vice director candidates are incumbent Arnold Dahlman, W6UEI, and Gary A. Stilwell, W6NJU; a third nominee, Col. Fred J. Elser, W6FB/W7OX, withdrew his name.

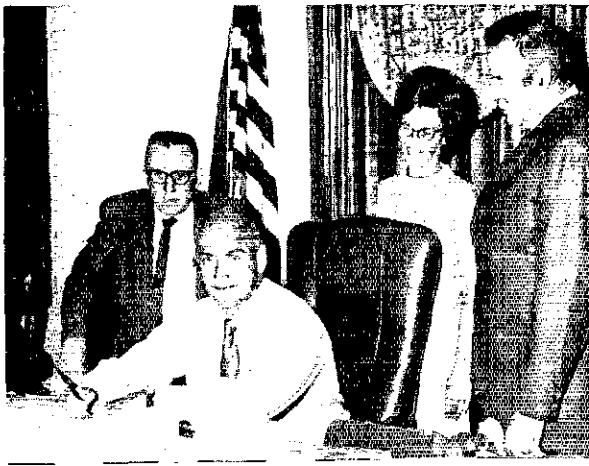
Important: Ballots were mailed the week of October 9 and to be valid must reach headquarters before noon, EST, on November 20. Any Full Member of these divisions who has not received his ballot by November 1 should immediately get in touch with League headquarters.

FLOYD E. NORWINE, WØEFC

We regret to report the death, on July 23, of Floyd E. "Schultz" Norwine, WØEFC, director from the Midwest Division from 1936 to 1946. Schultz was a long-time guiding light of the Order of Brass Pounders Chapter No. 1, of St. Louis, Missouri, a member of the A-1 Operator Club and a 35 wpm cw operator. Much of his time was given to emergency preparedness, traffic handling, and helping newcomers.

CANADIAN LICENSE FIGURES

Amateur licenses in force in Canada as of March 31 totaled 12,607, an increase of 3.7% over a year earlier. The Regional Office at Edmonton, Alberta, has been closed and its work has been divided between Vancouver and Winnipeg, while parts of Ontario formerly handled from Winnipeg are now



The first Amateur Radio Week each year seems to be that of Nevada. Here, nailing down the week of January 1-7, 1973, which not accidentally is SAROC convention week, are Governor Mike O'Callahan, SCM Len Norman, W7PBV (left); Nevada Amateur Radio Club President Faye Lyle, K7YVN and George Lyle, K7ZAU, an NARC director.

ARRL Director elections: ballots received at hq. are immediately sorted by divisions and then stored unopened in a locked cabinet (left photo) until ballot-counting day (usually November 20). After the outer envelopes have been removed to insure the voters' privacy, the inner envelopes are opened. Ballots are piled up by the tellers, a separate pile for each candidate (center photo). Then, under the watchful eye of a Certified Public Accountant, they are actually counted by a Tickometer (right photo), a paper-counting machine so sensitive and accurate it's used in banks to count dollar bills.

administered by Toronto. The Regional breakdown follows:

REGION	*1968*	*1969*	*1970*	*1971*	*1972*
Pacific	1768	1777	1728	1778	1886
Western	1166	1108	1096	1117	2221
Central	1255	1163	1177	1171	
Ontario	4634	4523	4388	4493	4778
Quebec	2233	2157	2138	2193	2220
Atlantic	1446	1333	1379	1403	1499
TOTAL	12502	12061	11906	12155	12607

WAIVER OF FEES DENIED

The Federal Communications Commission has denied the petition of the Chicago Area Radio Club Council, Inc., RM-1980, which requested that license application fees be waived in cases of financial hardship. The Commission said in its press release:

" . . . The fees are quite modest when compared to the fee for other radio services and the cost of radio equipment, especially since a license term is five years long. . . . The amateur group has not adequately shown the alleged financial hardships."

EXTRA CLASS: 1-YEAR WAIT, CODE CREDIT

The Federal Communications Commission has issued a Report and Order in Docket 19163, making minor changes in qualifications for Extra Class. Under rules effective October 27, 1972, an applicant for the top license will need to have been licensed for only one year as a Conditional or higher, as against two years now. Amateurs who held the old Extra First licenses back in the twenties and thirties, who have been continuously licensed since then and now hold the Advanced Class, will be able to get credit for the 20 wpm code test. (The League request for full examination credit to these amateurs was denied on grounds that the present Extra represents a higher level of achievement, even allowing for changes in the state of the art.) The Commission is also going to allow credit for First Class Radiotelegraph licenses and those commercial licenses bearing an aeronautical radiotelegraph endorsement.

At the same time, the FCC turned down a number of proposals for "grandfathering." The text of the Report and Order, containing the FCC arguments for and against the various aspects of this matter, appear below, followed by the new rules themselves.

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the matter of

Amendment of Part 97 of the Commission's Rules regarding licensing and operation requirements for the attainment of the Amateur Extra Class license

DOCKET NO. 19163, RM-1590, RM-1591, RM-1646, RM-1658, RM-1787, RM-1881, RM-1843

REPORT AND ORDER

Adopted: September 7, 1971
Released: September 13, 1972

1. On February 26, 1971, the Commission released a Notice of Proposed Rule Making in the above entitled matter. The notice was duly pub-

lished in the Federal Register on March 3, 1971 (36 FR 4069) and all comments submitted in response thereto have been considered.

2. The rule changes proposed in the notice are two-fold and were suggested by the American Radio Relay League in petitions RM-1590 and RM-1591; and Mr. William K. Smith in petition RM-1646. First, we proposed amendment of Section 97.9(a) of the Commission's Rule to reduce to one year the waiting period required of holders of amateur licenses, other than Novice and Technician, before they may upgrade to Extra Class. Secondly, we proposed amendment to Section 97.25 to provide credit toward the Morse Code element of the Extra Class license examination for former holders of the Extra First Class license who have continuously held its successor licenses and who currently hold the Advanced Class amateur license.

3. Almost all of the comments received supported the proposals with most replies placing particular emphasis on the code examination credit provision. In this regard, comments generally agreed that the Morse Code requirement presents the greatest difficulty to elderly applicants and that consideration is warranted in the case of former Extra First Class licensees who were required to pass a 20 word per minute (wpm) Morse Code examination.

4. Opposition to the proposals was voiced in several comments which argued that reduction of the waiting period would increase the number of inexperienced Extra Class licensees and that allowing code credit to former Extra First Class licensees would be inconsistant with the code speed prerequisite required for license renewal. The Commission appreciates the concern expressed over the possible number of inexperienced Extra Class licensees that could result from lowering the waiting period. However, the Commission is of the opinion that the length of this period alone is not always an accurate measure of an operator's experience and ability. In fact, it has been shown that improvement of one's operating ability and amateur technique is dependent more on regularity of operation than length of licensing time. As to the objection regarding the code requirement for license renewal, the question is not considered germane to the fundamental consideration: Is it necessary that former holders of the Extra First Class license who have remained active and who once passed a 20 wpm code examination, be required to repeat the same examination a second time? The Commission considers mandatory repetition of the code examination unfair to those Extra First Class licensees who have remained continuously licensed and the proposal was designed to eliminate this inequity. In addition, satisfying the code requirement for renewal is each licensee's personal responsibility, and the Commission is not in a position to conclude that licensees seeking code credit are so doing because they cannot satisfy the code renewal requirement under normal, everyday operating conditions. 5. A number of comments received suggested alternative and counter-proposals which are listed as follows:

a. Provide full credit for the written element of the Extra First Class examination to former Extra First Class licensees who have remained continuously licensed.

b. Issue the Extra Class license to persons 50 years old or older who were licensed over 25 years ago and who qualify for, or hold, the General or Advance Class license.

c. Issue the Extra Class license to persons 65 years old or older who were licensed over 40 years ago and who qualify for, or hold, the General or Advanced license.

d. Issue the Extra Class license to persons who have held an amateur General or Advanced Class license continuously for 40 years or more.

e. Provide cumulative code credit toward passage of examination elements, i.e., if an applicant passes element 1(C) and not 4(B), upon re-examination the applicant would be required to pass only element 4(B) and receive credit for previous passage of 1(C).

f. Eliminate the provisions which counts operation under a foreign license toward satisfying the waiting period requirement for the Extra Class.

g. Provide code credit toward the Extra Class license for licensed holders of the Commercial First, Second, and Third Class Radiotelegraph licenses.

h. Provide code credit toward the Extra Class license for persons who held a commercial license of the First or Second Class, in lieu of the Amateur Extra First Class for the same period, between 1923 and 1933, and who obtained the Class A license in 1933 and have continuously held the same and its successor, the Advanced Class, to the present date. In addition to the comments listed, several proposals submitted by formal petitions since the inception of this proceeding set forth the following related suggestions:

(i) Issue the Extra Class license to persons who held an amateur license prior to December, 1941, and who qualify for, or hold, a General or Advanced Class license (RM-1658).

(ii) Issue the Extra Class license to persons who held an amateur license prior to January, 1940, and who qualify for, or hold, a General or Advanced Class license (RM-1787).

(iii) Issue the Extra Class license to persons who held an amateur license 50 years or more ago and who presently hold the General or Advanced Class license (RM-1811).

(iv) Issue the Extra Class license to persons who have held the General or Advanced Class license for a period of 25 years or more (RM-1843).

6. The proposal to provide full written examination credit to former Extra First Class licensees who have remained continuously licensed, is a reiteration of one of the original proposals filed. In reply to the Commission's position that a comparison of the present Extra Class and old Extra First Class examinations showed that the level of difficulty was much less for the latter, the American Radio Relay League replied that due to the absence of training aids and instructional material during the 1923-1933 years, the level of difficulty could be considered comparable to the present Extra Class examination. In addition, the League argued that without exception, holders of the former Extra First Class license have continued to progress in technical knowledge and proficiency throughout the intervening years. The Commission does not deny the claims regarding progress made by licensees of such long standing. However, the Commission still contends that the present Extra Class license is inddicative of attainment of a level of achievement distinctly above that of any previously available license. The current availability of study aids is considered to be immaterial since the scope of present examination material is much more broad that that covered 40 years ago. In addition, if the licensees in question have con-

The Staten Island Amateur Radio Association celebrates 50 years of affiliation with ARRL. ARRL Hudson Division Director Stan Zak, K2SJO, presents a plaque, hand-drawn in ancient script by W2JZX, in recognition of the club's milestone. Left to right: W2ACZ; first president George Gropp; W2CF; K2SJO; W2DMW, present prexy; and W2SGI.

tinued to progress in technical knowledge and proficiency as stated by the ARRL, former Extra First Class licensees should have no difficulty passing the written portion of the Extra Class examination. Accordingly, the Commission maintains that no credit should be provided for the written element of the Extra Class examination and the proposal is denied.

7. Those suggestions which request amendment of the Commission's Rules to issue the Extra Class license to holders of the General or Advance Class license on the basis of length of license tenure and/or licensee's age, including those reflected in petitions RM-1658, RM-1787, RM-1811, and RM1843, are also denied. As the highest grade amateur license, the Extra Class signifies that its holder has clearly demonstrated his technical qualifications based on both minimum licensing time and passage of a rigorous examination. Although the Commission realizes that length of licensed operation can be a valuable asset toward establishing one's eligibility for the Extra Class license, this in itself is not considered sufficient basis for determining the amateur's total qualifications. In addition, to allow attainment of the Extra Class license on the basis of age or term of license tenure alone, would, we believe, discourage amateurs from studying toward license achievement in keeping with the Commission's incentive licensing program.

8. The proposal regarding cumulative credit is also denied. The suggested provision of code credit to an applicant who passes the code element but not the written element of an examination, would present problems in the administration of such a procedure that would make it impracticable. To initiate such a procedure would place an extra burden on the Commission's field offices inasmuch as additional records would have to be maintained in all offices and searched to determine an applicant's past performance. Further, supervision of the code element is of such short duration that, time wise, it is to the examiner and examinees' advantage alike to repeat this segment forthright. The proposal to discount operating time accumulated under a foreign license toward satisfying the waiting period for the Extra Class is also denied. Acceptance of foreign amateur operating experience is in keeping with recognition extended to alien amateurs under existing reciprocal operation provisions and to deny accreditation of such operating experience would be totally unwarranted.

9. Finally, certain aspects of the proposals regarding code credit extension to include holders of valid commercial radiotelegraph operator licenses applying for the Extra Class license appear to merit further consideration. Section 97.25(b) of the Commission's Rules heretofore provided that an applicant for any class of amateur operator license, except the Extra Class, will be given credit for the telegraph code element if within five years prior to the receipt of his application he held a commercial radio telegraph operator license or permit issued by the Commission. However, since persons qualifying for the First Class commercial telegraph operator licenses or those persons holding any commercial radiotelegraph operator license containing an aeronautical radiotelegraph endorsement are required to pass a Commission supervised code examination equal to or higher in speed that that required of Amateur Extra Class licensees, it is considered appropriate to amend the rules to provide code credit to holders of a valid First Class commercial radiotelegraph operator license that also contains an aeronautical raditelegraph endorsement. The proposal to provide code credit to holders of the Commercial First and Second Class licenses, in lieu of the Amateur Extra First Class for the same period, between 1923 and 1933, is denied due to the unavailability of licensing records for the licenses in question.

10. In view of the foregoing, the Commission finds that the amendments to Part 97, Amateur Radio Service, as set forth in the attached Appendix are in the public interest, convenience and necessity. The authority for such amendments is contained in Section 4(i) and 303 of the Communications Act, as amended.

11. Accordingly, IT IS ORDERED, that effective October 27, 1972, Part 97 of the Commission's Rules IS AMENDED as set forth in the attached Appendix.

12. IT IS FURTHER ORDERED, that, in addition to the three petitions set forth in the heading to this proceeding, the pending petitions of Mr. John E. Cunningham (RM-1843) filed August 9, 1971, Dr. Harold E. Stricker (RM-1811) filed June 10, 1971, Mr. Ernest L. Bracy (RM-1787) filed January 11, 1971, and Mr. Paul Williams (RM-1658) filed July 27, 1970, have been fully considered and to the extent that they are at variance with the rule changes adopted herein, they ARE DENIED.

13. IT IS FURTHER ORDERED, that this proceeding IS TERMINATED.

FEDERAL COMMUNICATIONS COMMISSION

Ben F. Waple
Secretary

APPENDIX

Part 97 of the Commission's Rules is amended as follows:

1. Section 97.9(a) is amended to read as follows:

97.9 Eligibility for new operator license.

(a). *Amateur extra class.* Any citizen or national of the United States who either (1) any time prior to receipt of his application by the Commission has held for at least one year an amateur operator license of other than the Novice or Technician Class, issued by an agency of the United States Government, or submits proof that he held for a period of one year an amateur operator license at least equivalent to a General Class license issued by a foreign government, or (2) submits evidence of having held a valid amateur radio station or operator license issued by any agency of the U. S. Government during or prior to April 1917.

2. In Section 97.25, paragraph (b) is amended, paragraph (d) is redesignated as paragraph (e), and a new paragraph (d) is added to read as follows:

97.25 Examination credit.

(b) An applicant for an amateur operator license will be given credit for either telegraph code element 1(A) or 1(B) if within five years prior to the receipt of his application by the Commission he held a commercial radiotelegraph operator license or permit issued by the Federal Communications Commission. An applicant for an Amateur Extra Class license will be given credit for the telegraph code element 1(C) if he holds a valid First Class commercial radiotelegraph operator license or permit issued by the Federal Communications Commission or holds any commercial radiotelegraph operator license or permit issued by the Federal Communications Commission containing an aircraft radiotelegraph endorsement.

(d) An applicant for the Amateur Extra Class operator license will be given credit for examination element 1(C) if he so requests and submits evidence of having held the Amateur Extra First Class license, having continuously held its successor license. An applicant should present his proof in advance of the desired examination time to the Chief, Amateur and Citizens Division, Washington, D. C. 20554 and receive a letter of certification for presentation to the field office where the examination will be taken. No code credit will be given without the letter of certification.

On September 19, FCC dismissed the following requests, all for some form of "grandfathering," on the grounds that ". . . An advancement in rank based upon arbitrary standards of longevity have been considered by the Commission and rejected in Docket 19163": RM-1346, Werner F. Esseluhn and Leroy G. Flamm; RM-1952, W. H. Gibby; RM-1959, K. A. Fichthorn; and RM-2015, George A. Bonadio.

EXECUTIVE COMMITTEE MINUTES

Minutes of
EXECUTIVE COMMITTEE MEETING
No. 342 September 30, 1972

Pursuant to due notice, the Executive Committee of The American Radio Relay League, Inc., met at the Hotel Radisson South, Minneapolis, Minn., at 9:30 A.M. September 30, 1972. Present: President Harry J. Dannals, W2TUK, in the Chair; First Vice President Charles G. Compton, WØBUO; Directors Victor C. Clark, W4KFC, Noel B. Eaton, VE3CJ, John R. Griggs, W6KW, and Robert B. Thurston, W7PGY; and General Manager John Huntoon, W1RW. Also present were General Counsel Robert M. Booth, Jr., W3PS, Directors Roy L. Albright, W5EYB, Ralph V. Anderson, KØNL, Charles M. Cotterell, WØSIN, Phillip E. Haller, W9HPG, and Larry J. Shima, WØPAN; and Vice Director Edmond A. Metzger, W9PRN.

On motion of Mr. Eaton, unanimously VOTED that the American Radio Relay League expresses a deep sense of loss at the sudden and tragic passing of W. J. L. Dalmijn, PAØDD, who contributed so much over so many years to the progress of organized amateur radio, particularly through service to the Region 1 Division of the International Amateur Radio Union, most recently as its chairman; and extends deepest sympathy to the bereaved family, to the national society VERON, and to the Region.

On motion of Mr. Clark, affiliation was unanimously GRANTED to the following societies:

Amateur Radio Club of Ft. Belvoir, Alexandria, Va.; Bristol Central High School Amateur Radio Club, Bristol, Conn.; Calhoun County Radio Assn., Weaver, Ala.; Central Arkansas Radio Emergency Net, Little Rock, Ark.; Delta DX Association, Metairie, La.; Eastridge High School Amateur Radio Club, Rochester, N.Y.; Glendale High School Amateur Radio Club, Springfield, Mo.; Indianapolis Red Cross Amateur Radio Club, Indianapolis, Ind.; Jessamine Amateur Wireless Society (JAWS), Nicholasville, Ky.; Macon County Amateur Radio Club, Macon, Mo.; Mason-Dixon Pirate Radio Society, Wilmington, Del.; National Capitol DX Association, Clinton, Md.; The New Orleans VHF Club, Inc., Metairie, La.; Thomas Jefferson High School Amateur Radio Club, Denver, Colo.;

On motion of Mr. Griggs, unanimously VOTED to grant approval for the holding of a New England Division Convention at Hyannis, Mass., on September 29-30, 1973; and a West Gulf Division Convention at Euless, Texas, tentatively April 14-15, 1973.

On motion of Mr. Thurston, Life Membership was unanimously GRANTED the following applicants:

Craig R. Allen, K6OH; Richard H. Allen, W8CAH; William O. Anderson, W6UQG; Robert S. Aslesen, WAØMKF; John W. Aukerman, W8JMD; Allen C. Auten, WØECN; Michael A. Baker, K8WVZ/Ø; Richard E. Baker, VE3GHI; Larry K. Behle, KØVIV; James P. Brown, Jr., WB4QWM; Roger D. Brown, WA7LJL; Wayne G. Brown, W2TPV; Lewis W. Bruce, W7JMS; Phares W. Calliham, W4ZIO; David F. Carberry, WA1IKN; James G. Card, K3VJH; Lloyd T. Carlson, W7QON; Thomas F. Carten, WA1DJC; Anthony C. Casciato, K4DSZ; William F. Casteen, K6OB; Edward J. Comeau, W1JWA; Peter Craw, G3CCX; Victor L. Crawford, W1TYQ/HZ3TYQ; Roland J. Crull, VE4RS; James L. Decker, WA3NKW; Steve de Wet, ZS6AKA; George A. Diehl, W2IHA; Charles Dorian, W3JPT; Carl A. Eliason, WAØONP; R. David Flesh, W6IBF; George C. Ford, Jr., K2QIJ/WB2KYO; Albert K. Francisco, K7NHV; William L. Gabbert, W5TVH; William A. Galloway, WA3MZD; Morgan W. Godwin, W4WFL/1; Robert F. Gonsett, WA6QQQ; Gurdon W. Gordon, Jr., W1DYM; Paul D. Graveline, K1YUB; Edward C. Gray, WAØCPX; Gerald L. Hale, KØPIV/4; James P. Hamilton, W8BZY; Kenneth A. Hensey, WA9ARE; Floyd Himmel, WAØRKU; John P. Huber, K3BON; John L. Ilgen,

"Toward a National Plan for Two-Meter FM Channels" an article published in May *QST* was picked as best of the issue by ARRL directors. Jack Mason, W5NSQ, the author (center) here receives the Cover Plaque Award from West Gulf Director Roy L. Albright, W5EYB. Mrs. Mason (Marylin, W5NTA) looks on.

K3VOR; Martin H. Irons, W4RCM; Harold E. Johnson, W4ZCB; Herbert R. Johnston, W4QDI; Arieh M. Karger, 4X4JH; Philip L. Kellen, K6TWE; Norman A. Kelsey, W2DNA; Donald R. Klos, W6OOH; Kenneth E. Koestler, KL7BZO; Charles A. Krog, WA7UBJ; G. B. Lewis, WA7OVP; Marshall Lincoln, W7DQS; George C. Loetz, WA7JCB; Albert L. Long, WA5UVD; Jimmie N. Lowrey, WA5VWH; Jesse A. Marino, Jr., WA3LJM; William M. McCraw, WB4LTI; Gregg D. Miller, KØLVB; Frank Mitchell, Jr., K4KA; David Morgan, W6NZD; William W. Muessig, WA4FWM; Mark A. Murray, WA2ZFX; Daniel G. Olasin, WA2AQB; William H. Parker, VE5CU; Burt H. Patkau, VE3CIO; Ralph L. Peterson, WB9CHU; Nicholas J. Peteti, WB4UKO; Roy H. Propst, K4JFZ; John Pudans, WAØAWA; James C. Robertson, WA1MES; Edward C. Schaefer, K4SS; Ralph E. Schutte; James A. Seaton, W4KQL; Harold D. Seielstad, WA6ZHA; Allan C. Shepler, K3WKJ; Richard J. Sherman, K6EIH; James V. Sheward, Jr., K8ZCG; Robert M. Shyavitz, K1VOQ; Frederick J. Smith, WB4KCL; Ralph W. Smith, WB8EPK; Robert C. Sommer, W4CRW; A. John Spraggs, VE7ADE; David Sumner, K1ZND; Gerald A. Tankskanen, K7KOY; Thomas H. Tenney, W8OJM; Lloyd J. Teran, W1YJI; Gaylord L. Timblin, W8JQU/CT2BJ; Reginald W. Toumi, W6ONV; Jack Vassallo, WN8EON; Alan E. H. Venning, VE7LL; William J. Vette, K6TXR; Paul S. Vydareny, WB2VUK; Charles F. Weaver, W4ZKQ; Charles J. Whittaker, K1HNO; Charles K. Wiggins, WB4WTA; Don L. Wightman, K6QGV; Ronald C. Williams, W9JVF; Peter W. Zwanka, Jr., K2HWI.

The Committee next proceeded to examine nominations in the director elections, with careful attention to the application of the eligibility rules concerning membership and freedom from commercial radio connections. The Committee made findings and ordered actions as detailed below, all by unanimous action.

CENTRAL DIVISION

For Director:

Philip E. Haller, W9HPG, and William O. Reichert, WA9HHH, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

For Vice Director:

Kenneth A. Ebneter, K9GSC, and Edmond A. Metzger, W9PRN, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

HUDSON DIVISION

For Director:

Stan Zak, K2SJO, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-Laws, to be duly reelected as Director from the Hudson Division for the 1973-1974 term without membership balloting.

For Vice Director:

George A. Diehl, W2IHA, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-Laws, to be duly reelected as Vice Director from the Hudson Division for the 1973-1974 term without membership balloting.

NEW ENGLAND DIVISION

For Director:

Roger E. Corey, W1AX, was found lawfully nominated, but the Committee was in receipt of a letter from Mr. Corey withdrawing his name as a candidate. Robert York Chapman, W1QV, and Daniel A. MacDonald, W1PEX, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

For Vice Director:

Leslie S. Radnay, W1PL, and John C. Sullivan, W1HHR, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

NORTHWESTERN DIVISION

For Director:

Harry W. Lewis, W7JWJ, Robert B. Thurston, W7PGY, and William R. Watson, W7RQ, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

For Vice Director:

Dale T. Justice, K7WWR/WA7KTV, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-Laws, to be duly elected as Vice Director from the Northwestern Division for the 1973-1974 term without membership balloting.

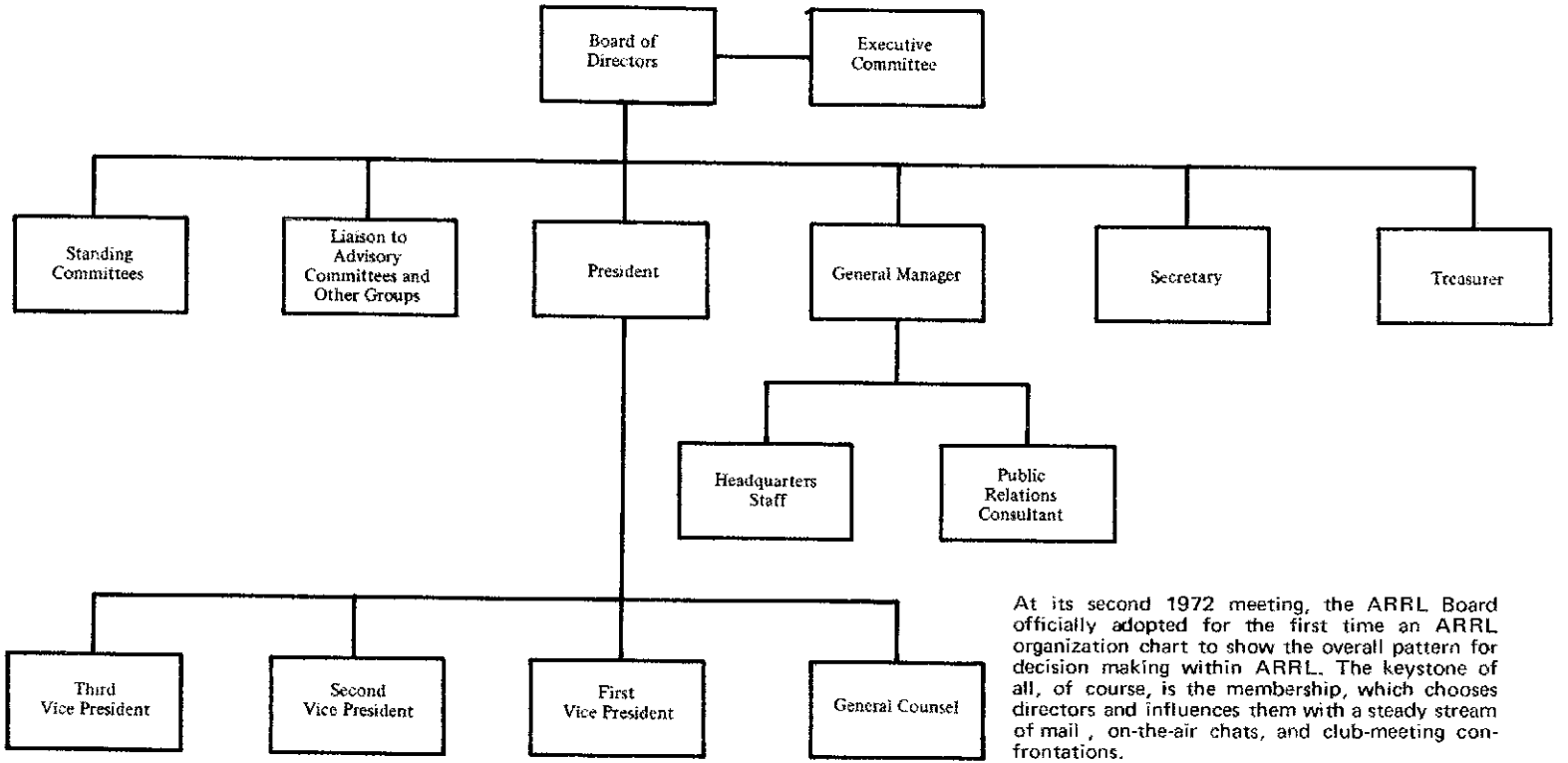
ROANOKE DIVISION

For Director:

Victor C. Clark, W4KFC, and James W. Harrison, Jr., WB4TBX, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

For Vice Director:

James L. Bulebush, WB4KKT, and L. Phil Wicker, W4ACY, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.



At its second 1972 meeting, the ARRL Board officially adopted for the first time an ARRL organization chart to show the overall pattern for decision making within ARRL. The keystone of all, of course, is the membership, which chooses directors and influences them with a steady stream of mail , on-the-air chats, and club-meeting confrontations.

Amateur Radio Week in Minnesota was observed October 1-7. While Governor Wendell Anderson signed the proclamation, these amateurs observed (left to right): WAØVAS, Minnesota SCM; Dakota Director WØPAN; ARRL 1st Vice President WØBUO; WAØEBZ, Public Relations Officer and WAØOOS president, 3M Radio Club.

ROCKY MOUNTAIN DIVISION

For Director:

Charles M. Cotterell, WØSIN, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-Laws, to be duly reelected as Director from the Rocky Mountain Division for the 1973-1974 term without membership balloting.

For Vice Director:

Allen C. Auten, WØECN, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-Laws, to be duly reelected as Vice Director from the Rocky Mountain Division for the 1973-1974 term without membership balloting.

SOUTHWESTERN DIVISION

For Director:

John R. Griggs, W6KW, and Ray E. Meyers, W6MLZ, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

For Vice Director:

Fred J. Elser, W6FB/W7OX, was found lawfully nominated, but the Committee was in receipt of a letter from Mr. Elser, withdrawing his name as a candidate. Arnold Dahlman, W6UEI, and Gary A. Stilwell, W6NJU, were found lawfully nominated and eligible and their names ordered listed on ballots to be sent to Full Members of the Division.

WEST GULF DIVISION

For Director:

Roy L. Albright, W5EYB, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-Laws, to be duly reelected as Director from the West Gulf Division for the 1973-1974 term without membership balloting.

For Vice Director:

Jack D. Gant, W5GM, was found lawfully nominated and eligible. Being the only eligible nominee, he was thereupon declared, pursuant to the By-Laws, to be duly reelected as Vice Director from the West Gulf Division for the 1973-1974 term without membership balloting.

On motion of Mr. Griggs, unanimously VOTED that Messrs. Noel B. Eaton, David H. Houghton and Stan Zak, with F. E. Handy and Edward P. Tilton as alternates, are appointed a Committee of Tellers to count the ballots in the current elections.

The Committee was in recess from 10:00 A.M. to 10:07 A.M.

On motion of Mr. Eaton, unanimously VOTED to follow the same procedures as last year as concerns submission of director annual reports; i.e., that the 60-day lead time be waived for the 1973 annual meeting, and that reports be submitted to the Secretary by January 1, 1973; and that the officers make brief summary presentations at the 1973 annual meeting, with comprehensive reports to follow in April as customary.

The Committee then proceeded to an extensive examination of several recent FCC actions.

As concerns Docket 18803, the Report and Order dealing primarily with regulations for repeaters, on motion of Mr. Griggs, after discussion, unanimously VOTED that in view of the imminence of the apparent October 17 effective date, and the likelihood that news of the action will not reach all amateurs in adequate time, the General Counsel is requested to file a request for a partial stay of the order so that the effective dates may be clarified.

The Committee was in recess for luncheon from 11:55 A.M. to 1:05 P.M.

The Committee next heard a report from the General Counsel on FCC action in Docket 19162, relating to voice band expansion, news of which was released less than 24 hours earlier. After discussion, in view of the fact that only an initial and brief public notice had been issued, and that the extensive text of the Report and Order would not be available for study for some days, it was agreed not to take Committee action at this point.

The Committee examined but took no action as concerns FCC action in Docket 19163, relating primarily to procedures for obtaining the Extra Class license.

The Committee examined the FCC proposal in Docket 19555, in implementation of the National Environmental Policy Act, as to possible adverse effect on amateurs in the construction of necessary towers and antennas; it was noted that ARRL's request for extension of time had already been granted; and on motion of Mr. Clark, unanimously VOTED that General Counsel file comment of the League as appropriate to protect amateur interests.

(During the course of its meeting the Committee discussed, without formal action, election campaigns by mail, the 220-MHz amateur band situation, the "Recent Equipment" column in *QST* and preparation of the amateur position at an eventual frequency allocations conference.)

There being no further business, the Committee adjourned, at 5:00 P.M.

Respectfully submitted,
JOHN HUNTOON, W1RW
Secretary

IARU 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

NEW REGULATIONS AFFECT NON-CITIZENS WISHING TO OPERATE IN U.S.

Recent changes in the United States Amateur Regulations (FCC Part 97) announced in October *QST* have altered the application procedures for permanent resident aliens and have liberalized the conditions under which an amateur station may be operated by other than the licensee.

A new Subpart H in the Commission's Rules describes the special provisions which apply to permanent resident aliens seeking an FCC license. The application for license is made on FCC Forms 610 and 610-C. Both forms must be filled out. They may be obtained from any of the Commission's field offices or from *ARRL* headquarters. Except for the additional Form 610-C, applicants holding permanent resident visas follow the same procedures as U. S. citizens; see Sections 97.11, 97.29, and 97.41 of the Commission's Rules. The new Subpart H appeared in full beginning on page 97 of October *QST*.

The licensee of a U.S. amateur station may now permit any person to operate his station, provided that a properly licensed control operator is present and continuously monitors the communication to ensure compliance with the rules. (Section 97.79(d), FCC Rules). An amateur visiting the U.S. may operate under these provisions without obtaining an individual FCC authorization. However, he may not operate his own station or use his own call sign, and he may not operate except in the presence of an operator licensed to operate in the U.S. See pages 100 and 108, October *QST*.

Note that there have been no changes in the restrictions placed upon the handling of messages on behalf of third parties.

PARA ANNIVERSARIES

In November, the *Philippine Amateur Radio Association* will celebrate three notable anniversaries: the 40th of their organization, the 25th of their joining the IARU, and the 50th of the first amateur radio club in their country (Amateur Radio Club of the Philippines). The ARCP, a forerunner of the present *PARA*, is believed to have been one of the first amateur radio clubs established in that part of the world.

The IARU congratulates all amateurs in the Philippines on the attainment of these milestones, and wishes the *PARA* continued success in representing amateur radio in its country.

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.

* Agreement includes overseas entities.

(Continued on page 107)

The annual SEANet (Southeast Asia Net) Convention, sponsored by the *Radio Amateur Society of Thailand* will be held in Bangkok on November 10-12. Much of the planning for the convention was performed by those pictured here: Mayuree, XYL of HS1WR; John, VE7IR/HS1AFW; *RAST* President Kam, HS1WR; and *RAST* Vice President Pete, W8JNM/HS1AFI.

Correspondence From Members-

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

NRL 50TH ANNIVERSARY

● In 1973 the Naval Research Laboratory will celebrate its 50th Anniversary. In the early days of the Laboratory Dr. A. Hoyt Taylor, ex-9YN, Leo C. Young, W3WV, and L.A. Gebhard, ex-8AG, and others operated the station NKF at the Laboratory and worked various amateurs throughout the States. This was their way of doing the early studies of propagation and developing the theories for the behavior of the ionosphere.

As a part of the celebration of the 50th Anniversary, and to commemorate the part amateurs played in its early history, we would like to contact as many of the early amateurs who worked the Laboratory station, NKF, as possible. Would anyone who worked NKF in the early days please drop me a line.

Many of the old hams might like to know that Leo Young, W3WV, is still active on 40 meters cw daily. L. A. Gebhard, ex-8AG, is still at the Laboratory regularly and is writing the history of the Laboratory. I am just a young squirt of 32 years at the Laboratory.

You may also be interested to know that Arthur Godfrey, K4L1B, was in one of the first Radio Material School classes which were held at the Laboratory when he was a radio man in the Coast Guard. — *H.O. Lorenzen, W3BLC, Superintendent, Space Systems Division, Naval Research Laboratory, Washington, DC 20390*

AUDIRE EST DIVINUM

● After reading the September *QST* quote from *RTTY News* regarding listening, it came to my mind that I was a little bit ahead of you. In an attempt to propagate this idea further, my QSL cards are inscribed with the Latin phrase *vocare est humanum — audire est divinum*, which translates to To Call Is Human, To Listen Is Divine. — *Dave Plis, WA1OUH, Hartford, CT*

HAMS AHOY

● I would like to ask the general ham fraternity for advice regarding a project I am heading up. I am president of a non-profit ecology organization and will be sailing around the world (hopefully by next year) and naturally will be carrying gear for all bands from 2-meter fm through 80 cw/ssb. I would appreciate hearing from other hams who can give me advice on antenna designs for a sailboat. One of the main purposes of this project is to establish a world-wide 15 or 20 meter ssb pollution-reporting net and I wish to hear from other ecologically-minded hams who wish to participate. We are also seeking donations (tax-deductible) of equipment and funds for the project. I would be glad to send them info on our somewhat ambitious project. I would particularly like to hear from hams at oceanographic institutions or the like who could use some of our output data in their work. We are not requiring payment for any of the scientific output of the project and would be glad to help other institutions if we are able. Last, but not least, we are seeking a marine biologist/ham who would be able to serve out a committment of 2-4 years aboard a sailing vessel around the world and become heavily involved in ecological work involving the oceans. Some diving, sailing, or cinematography experience would also be helpful. Any leads on sailing craft possibly available for donation would be greatly appreciated. — *Tom McKeever, W1WJR, President, Seabourne Ecology Associates, Inc., Norwell MA 02061*

HIDDEN MESSAGE?

● I wonder if there is a hidden message in the fact that I never heard WD4USA, but worked WR4USA??? — *Richard W. Randall, K6ARE, Livermore, CA*

SHEDDING LIGHT

● I was very happy to see the article "How to Exchange QSL Cards With DX Stations," in the July *QST*. Ever since I got my first DX contact, I was at a loss as to finding out how to get cards to those hams far, far away. It shed some light on the mystic processes of DX QSLing that many Novices want to know. Maybe you can write some more on this subject, eh? — *Chris Long, WN2GTO/I, Bangor, ME*

[EDITOR'S NOTE: Yes — a piece on QSL Bureau operation is coming up shortly.]

IT STILL HERTZ

● Really enjoyed "7031 kHz" by WØGHX, in September *QST*. I laughed so much it still hertz! — *Eric A. Landau, WA2KER, Long Beach, NY*

● Yup, it has happened again (in "7031 kHz" by Ray Larson, WØGHX, in September *QST*). The controversy over hertz remains heated, partly because so many people think the term is synonymous with cycle. It isn't. Hertz is the international unit for cycles per second. I suspect some silly sycophant will soon discover the earth's seasonal cycle and succumb to the "events per unit time" rationale to invent the "kilocopernicus" to specify some event that occurs 1000 times per year (meal time, maybe?).

But I share the revulsion of WØGHX. I, too, couldn't stomach Hertz at first, and I bellyache even yet at having to use kHz instead of kc/s. Furthermore, I think it is downright indecent to bring forth "Siemens" to replace good ole friendly, backward, "mho." — *William R. Phillips, W4JMB, Fairfax, VA*

● Let's put an end to this Hertz vs cps controversy.

Why not use Charles Proteus Steinmetz for such international honor? If "Steinmetzes" is too cumbersome a term, just use his initials. — *Herbert Heller, W3OFI, Pittsburgh, PA*

UP A POLE

● I must contest the downgrading of CB radio by your magazine. The item in question is a photograph on page 35, lower left, of August *QST*. The antenna could be a CBer's, but don't leave it at that.

For instance:

1. How long are the ground radials for the low band business radio antennas? Roughly 7 to 9 feet in length.

2. How long are the 10 meter ham band antennas? Somewhere around 8 to 9 feet in length.

3. Many multi-band radios used in rescue, i.e., CAP CD, and others, are of this length too.

Its about time you pick on some of your own kind. We have seen very typical hams, especially around Scituate. Even some of the actions of hams on the air leave something to be desired. Why doesn't someone clean up the ham bands before they pass judgement on someone else?

Incidentally, why hasn't the power company's area representative seen this? He could be held responsible for this going undetected. — *James F. Dillon, KMA-9869, Scituate, MA*

[EDITOR'S NOTE: We didn't say this was a CB antenna but if the shoe fits . . . .]

MULTIPLICATION BOX

● ". . . Lucky enough to have fertile junk boxes . . ."— August *QST*, page 11. So *that's* how it's done.

My *Webster's New World Dictionary, 2nd College Edition*, says: "fertile, adj. 1. producing abundantly; rich in resources or invention; fruitful, prolific; 2. causing or helping fertility. 3. able to produce young, seeds, fruit, pollen, spores, etc. 4. capable of development into a new individual; fertilized."

But *my* resistors and capacitors don't reproduce. Please advise. What have I missed in 33 years of ham radio?. — *Mike Fern, WA6OWJ, Los Angeles, CA*

HAM VS CB

● What I don't understand about this whole CB mess is why the CBers want 220 MHz when they have uhf frequencies that are not being used. Class D is not the only class in the Citizens Radio Service. Class B is at 465 MHz. Why don't the CBers use this frequency which is already assigned to their service, instead of trying to steal amateur frequencies? — *Neil Berman, WB2PCM, Brooklyn, NY*

● I would like to make the following suggestion concerning the proposed Class E Citizens Radio Service and the Amateur Radio Service, by which I feel both could benefit. I suggest that we arrange a swap — 25 channels worth of bandwidth in our 220-MHz band to be devoted to Class E citizens band and the 11-meter citizens band to be returned to amateur use. Since skip propagation seems to be absent at 220 MHz, the 25 channels should be sufficient for legal CB operation, and the absence of skip would greatly reduce the amount of pseudo-amateur activity. We amateurs would gain valuable hf spectrum space at the cost of only a small portion of the 220-MHz band. The EIA should be happy with such an arrangement because they could then market 220-MHz CB boxes at $500 each, which is their main goal in suggesting 220 MHz CB. — *Raymond W. Simpson, WA2-PYX/3, Media PA*

HONORING MARCONI

● In this day of space satellite communications across the oceans, how many of us still remember when the first message was sent from our shores across the Atlantic. It happened almost 70 years ago when Marconi himself sent a Morse code message from President Theodore Roosevelt to King Edward VII of England from a 30-kW spark transmitter on 1800 meters, built on a sandy bluff overlooking the ocean from South Wellfleet on Cape Cod. This message was intended for relay to England by Marconi's station at Glace Bay, Nova Scotia, which was 500 miles closer to his station at Poldhu, in Cornwall, England. To Marconi's surprise the President's message was copied directly by Poldhu from Wellfleet without relay and became the first transatlantic message sent from the United States.

His success proved to a doubting world what we take for granted today, that radio signals could follow the curvature of the earth over a 3,000 mile path. Thus began the development of international radio communication and our own illustrious hobby of amateur radio.

A group of radio amateurs has decided to commemorate the 70th anniversary of this first transatlantic radio message from the U.S. by operating a special station from the original site at South Wellfleet on Cape Cod from January 13 through 18, 1973. Permission to use the site has already been obtained from the National Park Service, and a special event call, WM1CC (William Marconi One Cape Cod), has been requested from the FCC. At least three stations are proposed to operate in cw and ssb on the bands from 10 to 80 meters.

Operators, equipment, antennas, and travel trailers towed to the site are still needed. Assistance will also be needed in writing QSLs and feeding the operators. The present schedule calls for setting up antennas on the weekend of January 6-7. The trailers will be towed to the site on Friday, January 12, and prepared for operation beginning 1300 GMT on Saturday, January 13, and running to 0300 GMT on Friday, January 19, precisely 70 years after the completion of the first message.

This is the first time that an activity like this has taken place at the Marconi site. We hope to make many thousands of contacts the world over to honor Marconi's achievement, and to QSL each and every one with a very special card. Marconi considered himself one of us. B. Frank Borsody, K4EC/W2AYN, writing in *QST* March 1972, page 89, quotes Marconi as saying in 1933, "Well, I have always considered myself an amateur." He probably was the first one too, so let's remember him this next January! — *William F. Santelmann, Jr., W1HWM, Lexington, MA*

JUST HIS DISH

● I recommend K2RIW for an award for his article, "A Twelve-Foot Stressed Parabolic Dish," on page 16 of August *QST*. There's a wealth of technical and practical info presented in an understanding manner.

Though I'm not building a dish as yet, I found the article most illuminating and easily understood. —*Ed Fairbanks, W6AIN, Menlo Park, CA*

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

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How:

These pages round out a fascinating quarter century of *QST* mailbag snooping on the part of your conductor. How delightful to be steeped so long in never-ending expressions of DXhilarating OHS. That's Old Ham Spirit, as you must know, *and the hf DX crowd radiates it brightly with pen*, pencil and mill as well as with mike, key and kilowatt. Forty-over – keep it comin'!

Among so many striking changes in our world of DX over the past 25 years, that which impresses us most is a switch in basic DXing ethics and philosphy. On-the-air competition for rare catches prior to the '50s generally was deemed a personal sort of thing, station versus station. When you uncovered a ZK2 you kept it to yourself, at least *until the QSL came through*. Nowadays we line up the club and shout about him from the rooftops.

DX-oriented ham clubs came into their own around the same time and their well circulated publications began showing up. This trend was made to order for DX editors who once had to use their own receivers to scrape up enough gossip to fill a page or two. DX for the masses had arrived. Supplanting the loner-vs.-loner game we saw evolve a kind of communal DX pursuit, group against group, clique versus clique.

Many more hams now are working much more DX but the modern collective DX approach isn't *all peaches and cream. What about the rash of* "QSOs" too dependent on third-station meddling? And we hear that the current pack-hunting fever actually pushes a few overzealous do-gooders to the point of jeopardizing their ham careers by helpfully working new ones for off-the-air buddies. That sounds real crazy, letting somebody else have the fun of working "your" DX, but inflated countries totals are resultant compensation.

Granted, its impossible to visualize DX club *meetings where members would sit around keeping* secrets from each other. Yet our new DX group spirit obviously should avoid worse secrets of its own, such as unethical or illegal tactics that invalidate DX achievements to be certified as one-station (DXCC) or one-operator (DX Test) accomplishments. The organizations of amateur radio, formal or informal and large or small as they may be, are where hamdom's essential ideals and *standards must be upheld, not chipped away.*

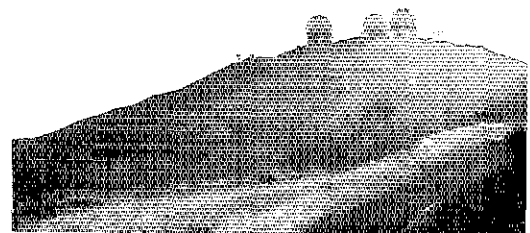
No reason we can't all share more and more DX sport in years to come, all right. Let's just take care that we won't ultimately be enjoying it less and less.

† † †

Where:

NORTH AMERICA – "QSLers of the Month" nominated in mail from Ws 1SWX 6BL 7YF 9LI, Ks 2QHT 3QAP 6PSE, WA7RKA, WBs 2PJN 4IUX 4SXX 4VKW 4WHE 5AHX, WNs 2AMU and 6OSS for praiseworthy QSL promtitude are A35FX, C29ED, CN8CF, CR3KD, DK3EQ, DL2CO/HC8, ET3USD, F6BCP, FB8XX, FM7AJ, FR7AI, GC2LU, GM3AWW, HM4GF, Is IAOH 5FOS, KGs 4CS 6JBD, KJ6CW, KL7HGA, KP4USN, KX6EB, LA4ZL, LU9FAN, OH6NH, PQØMI, SV1GA, TG9DX, VE3s GMA GSO, VKs 7SM 8ZZ, VP2LAW, W9IGW/CEØ WH6HPQ, XE2VB, XV5AC, YI8s BL DS, YN4JAB, YU4VMD, YV3NQ, ZF1WE, ZL2AFZ, ZP5KK, 3D2EK, 8P6BU, 9Q5s DX *and LE, together with* QSL aides Ws 3HNK 6NJU, K3RLY, WA4UOE, WB3UKP, F2MO, ZLs 2AFZ, and 4NH. Any laudables in your recent receipts? . . . Halp! Parenthesized brethren require assistance in running down late-late pasteboards indicated: (W1JUB) FA8CR, TY1ABE, XT2AB, YK2CN, YM4AA from 'way back; (WB4SXX) FM7AJ; (WA7RFA) OA4CBZ, VR6TC, YN4JCC, ZD8FM, ZE1CU; (WB4SXX) 3A2CN, 3D6AW; (WB4VKW) CR7EY, EA8FE, GI3LSM, PZ1AH, ZD8BR, ZE2JH, 8P6BU, 9H1BM; and (WB5AHX) VR6TC. Any 'alp? . . . We offer to serve as QSL managers for *needful ops at the DX end.* (WA7SLC, WB4VKW) . . . Having received no logs since August '71 I must discontinue as VP2MA's QSL manager. I can still confirm his earlier contacts. (VE3BWY) . . . *photo-personalized* QSLs *are* bound to boost one's returns. (W5QPX) . . . Cards lately received marked "second request" indicate strayed QSL mail. I have complete logs and plenty of cards for my K4BZH/VP7

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



HL9WU's hangout at Mangil San looks like something from science fiction. Ron, who signs WA9QVT when back home in Wisconsin, says this QTH of the Month is a superb radio location.

Andros island activity. QSLs have already gone out in answer to all received but further inquiry is invited. (K4BZH) . . . I'll gladly check my logs and respond to those still requiring confirmation of KL7FOW/KL7 QSOs.(K2YE). . . . HRØ may join the KS4 prefix for Swan Island with Honduras and Uncle Sam jointly issuing tickets. (NCDXC) . . . The way 160-meter guys don't QSL, how does one make WAS on that band? (W9LI)

EUROPE — About that HB9XJG deal with WA4WME and GM4AVR, apparently those HB9X-HBØX visitor callsigns are not renewable and are rapidly reissued. We found this to be the case after operating HBØXFY three years ago. (DL4ER-WA9HYS). . . Eighty- and 40-meter contacts with HV3SJ on September 29th-30th may be confirmable through W2IWC. (WWDXC). . . We will QSL direct or via bureaus for all October DXpeditionary QSOs with HBØs AIC and NL. (HB9s AIC NL) . . . Is that Moscow bureau really a big bottomless pit? (W6JNH) . . . Maybe Box 88 is just a chute to an incinerator. (WB4IUX) . . . If my overdue Russians ever come through I'll have nine new ssb countries. (K8PYD). . . Special QSLs will be sent to all stations who worked DA1TCA, special station at Berlin's Templehof Central Airport during an open house September 16th-17th (DAs 1QX 2QW)

ASIA — Our authorities permit Indian radio amateurs optional use of the prefix VU25 until next year, marking the Republic of India's 25th anniversary of independence. VU25FBZ would be QSLd to VU2FBZ. (VU2SC, ARSI) . . . The QSL tender for KA6AY, formerly KR6AY, is QRL with marriage. KA6AY will clear his own backlog on returning homenext month. (WCDXB) . . . I'm QSLing for 4Z4IZ starting with QSOs of December, 1971. Also be advised that I can still issue TA2EM cards from old logs on hand. (W7TE) . . . W5KKZ tells me that the present 9K2CA has no connection with the previous holder of that call for whom I managed QSLs. (K9CSM) . . . Cards sent to my *Callbook* QTH seldom reach me due to a peculiar local mail set-up. Please use the address (in the list to follow). (KA2NA) . . . For my Thailand QSLs I request Stateside stations supply large self-addressed stamped envelopes, others s.a.e. plus appropriate International Reply Coupons, all via W6NYG. (HS4AHV)

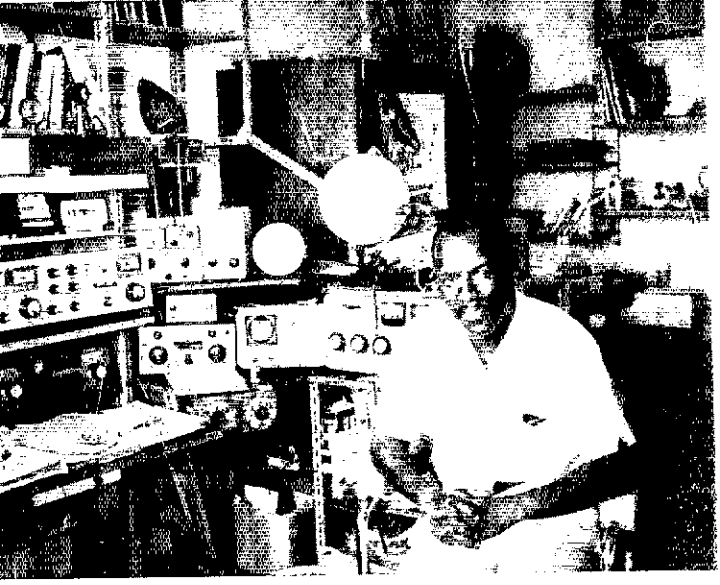
AFRICA — As a Swaziland listener to the ham bands (at age 16 I must wait two exasperating years for a ham ticket here) I often receive QSLs for 3D6s along with answers to my reception reports. Haven't been able to locate any 3D6AW, though. (K. Muller, P.O. Box 283, Mbabne . . . VE2DLQ affirms that VE2JH now handles XT2AF QSLing. (W1JUB) . . . 5Z4MO says his QSL manager, G3YWP, is getting married. This may cause delayed QSL returns. (KØALL) . . . K5QFH/VQ9, expecting his own VQ 9 suffix, sends me Chagos logs every few weeks. I manage Jack's QSLs as of August 13, 1973, and will make turning around time as short as possible. (K4CEF)

OCEANIA — When QSLing to such club stations as KX6s BU and DB it is wise to show clearly on your card the name of the operator you worked. Each op often is responsible for his own share of confirmations. (DXNS). . . Contrary to other advices I do my own QSLing. The only QSL route to C21TL and C29ED is K. Matchett, Box 32, Nauru, Central Pacific. (C21TL) . . . Sea mail delays are severe here since the bottom fell out of the copra market. QSL only via K3RLY. (VR1AA) . . . Due to frequent moves all cards sent to KM6DY may not have caught up with me. Please reapply to my home address (WB4WRN)

SOUTH AMERICA — I'm closing down HC1RF and request that further QSL correspondence be held off until I'm satisfactorily settled in my next location. (WB8LUS) . . . Some PYs switched briefly to Brazil's PW prefix in early September. (DXNS) . . . Now for our who's-where collection but remember that each suggested postal path is necessarily neither accurate, complete nor "official," Like so . . .

A51PN, Pradhan, Post Office, Thimpu, Bhutan
Cs 21TL 29ED (see text)
CE3AOF/CEØ, E. Sjolund, Hotel Hanga Rua, Isla de Pascua, Chile
CP1JV, P.O. Box 2111, La Paz, Bolivia
CR6OM, Box 49, Nova Lisboa, Angola
DA1MU, Box 1485, APO, New York, NY 09132
DA2QW, W. Moore, PSC 533, APO, New York, NY 09611
DLØLJ, Box 211, 4132 Kamp-Linford, W. Germany
EL2NY, Box 98, Monrovia, Liberia
FØWV/FC (to ON4TJ via UBA)
FC2CH, R. Collin, Porto Vecchio, Corsica, France
FP8DH, Box 459 or 189, St. Pierre (or via VE6AYU)
HB9AUY, Rheingoldstrasse 5, 8212 Neuhausen/SH, Switzerland
HBØs AIC NL (to HB9s AIC NL)
HK4CRB, P.O. Box 52378, Medellin, Colombia
HK6JF, P.O. 189, Pereira, Colombia
HP1XTW, P.O. Box 129, Balboa, C.Z.
HR1RS, c/o U.S. Embassy, APO, New York, NY 09887
HS1AHE, D. Dorel, JUSMAG, P.O. Box 149, APO, San Francisco, CA 96346
ID9PFR, P.O. Box 181, I-30100, Venezia, Italy
JY5HC, P.O. Box 2353, Amman, Jordan
JY6s FC HA (via DJ9ZB)
KA2NA, J. Owens, Box 6, Microwave,NAF Atsugi FPO, Seattle, WA 98767
KX6BB, R. Beatty, P.O. Box 1434, APO, San Francisco, CA 96555
KX6JS, P.O. Box 723, FPO, San Francisco, CA 96555
LZ1WL, Box 21, Yambol, Bulgaria
OD5FU, c/o U.S. Embassy, Beirut, Lebanon
SV1FT, P.O. Box 15, Chania, Crete, Greece.
SVØWA/p, MARS Director, APO, New York, NY 09223
TI2KH, Box 10073, San Jose, Costa Rica
TI2OR, Box 1440, San Jose, Costa Rica
VK2BCV/VK9, Golden Gate QSL Bureau, 71 Surrey St., San Francisco, CA 94131
VP2GI, P.O. Box 421, St. Georges, Grenada, W.I.
VP2VAP, Box 200 Roadtown, Tortola, W.I.
VQ9NLB, N. Brierley, P.O. Box 234, Mahe, Seychelles
VR1AD, N. Dunn P&T, Betio, Tarawa, Gilberts
VS6FJ, J. Forsyth, So. China Adventist College, Clearwater, Bay Rd., Kowloon, Hong Kong
WA1QOX/VE8-WBØICS/VE8 (via WA1PEL)
WB4LDK/KB6, B. Zater, Box F82, APO, San Francisco CA 96401
XW8EV, M. Miller, U.S. Embassy, APO, San
XW8EV, M. Miller, U.S.Embassy, APO San Francisco CA 96352 (or to K3NAS)
YBØZZ, Box 2761, Djarkarta, Indonesia
YV5CET, Box 16251, Caracas; Venezuela
YV5DRN, P.O. Box 3636, Caracas, Venezuela
ZD8s AW RW (to G8BXU)
ZK2s AK BD, Radio Station, Niue Island
5N2ESH, E. Sherlock (G3BQH), CFAO, P.O. Box 3034, Electro Hall, Lagos, Nigeria
5R8CO, Box 4246, Tananarive, Malagasy
7Q7NB, Box 5595, Limbe, Malawi
9M2CW, 10 Jalan Leong Kim Sing, Kampar Garden, Ipoch, Malaysia
9M6AW, A. Weatherley (G3EAX), P.O. Box 257, Laubuan Sabah, East Malaysia

A35GC (via ZL2BGU)
CP6FG (to CP1FG)
DA1TCA (via DA2QW)
DJ2JB/9N1 (via DJ9KR)
DKØDE (via DK6KY)
DM8SOP (via DM3YFA)
EI9ONE (via IRST)
EIØDMF (via EI2I)
ET3USF (to K3ZNJ)
FHØDL (via 11PQ)
FL8HM (via K4SKI)
FOØES (to K6KRZ)
FPØVX (to VE3WX)
FPØAJ (toK8DAJ)
FPØWE (to W3LWE)
FS7DX (to W3LWE)
FYØKP (via DJ5AY)
GI5AZF (via WA3HGV)
GW5BAP (to W2NZH)
HBØALX (to HB9ALX)
HBØXKW (to WB8AKW)
HBØXLG (to VE6AGV)



FM7WW sports a sumptuous installation at La Francois. Visiting Fred's diggings at right, from the left, are K2KGB, FM7AA and FM7WN. *(Photo via LIDXA)*

HBØXMS (to DA1AU)
HC1RF (see text)
HS4AHV (via W6NYG)
IICGK/ID9 (to IICGK)
IG9JT (to IT9JT)
IH9JT (to IT9JT)
IH9MCP (to I8MCP)
IH9PLT (to IT9PLT)
JD1ADG (via JA2GXQ)
JT1ADG (via JA2GXQ)
JT1KOK (via OK1KZD)
JY9TZH (to K9TZH)
JY9VU (via HB9AMO)
K4BZH/VP7 (see text)
K5QFH/VQ9 (via K4CEF)
KM6DY (to WB4WRN)
KX6AA (via KX6DC)
KX6MD (to K6CKB)
MP4TEE (via G3LQP)
OHØAL (to OH2AL)
PA9RN (to I1BUP)
TJ1BB (via WB2WQU)
TJ1BF (via K1ZES)
VK9GO (via VK2ATZ)
VP2EW (to K5JZN)
VP2GBI (via VE3BMV)
VP2GBL (via W4YHB)
VP2MA (see text)
VP2SAU (via W3SF)
VP2VAV (via K4CDZ)
VP2VBD (to K7BBD)
VP8ME (via WA5FWC)
VS9MZ (via G3UKW)
VU2FBZ (via K6TWT)
VU2SKV (see text)
W4GIW/VP7 (to K4CDZ)
W3ABC/HC1 (to W3ABC)
ex-XZ2AD (to WA6SNC)
ZB2MED (to ZB2CC)
ZC4DS (via G3LQP)
ZD8BR (to W6EJT)
ZF1WF (via K4CDZ)
3AØEJ (via DK1KH)
3AØEV (to F6ADW)
3B9CK (via JAØCUV)
3X1P (SMØKV via SSA)
4M7AV (to YV7AV)
4NØDX (to YU1SJ)
4Z4DZ (via W7TE)
5H3MT (via DC1HN)
5Z4MO (via G3YWP)
8R1N (via VE6AYU)
ex-9G1ED (to 5N2ESH)
9Y4TM (via VE3CBG)

Great QTH-sleuthing by reporting Ws 1JUB 1SWX 3OCW 4GIW 6AM 6GSV 6ORZ 7YF, Ks 1BCG 2QHT 2YFE 6PSE 6ZIF 8PYD WA1PTZ, WBs 2PNJ 4SXX 5AHX WNs 2AMU 6OSS ØGTJ, Columbus Amateur Radio Association *CARAscope* (W8ZCQ), *DX News-Sheet* (G.Watts, 62 Bellmore Rd., Norwich N.72T, England),Far East Auxiliary Radio League (M) *News* (KA2LL), Florida DX Reports (K4KQ), International Short-wave League *Monitor* (E. Chilvers, 1 Grove Rd., Lydney, Glos., GL15 5JE, England), Japan DX Radio Club *Bulletin* (JA3GZN), Long Island DX Association *DX Bulletin* (K2KGB), Newark News Radio Club *Bulletin* (M. Witkowski, Route 5, Box 167, Stevens Point, WI 54481), Nigeria Amateur Radio Society *News* (5N2ABG), North Texas DX Association *Bulletin* (W5SZ), Northern California DX Club *DXer* (Box 608, Menlo Park, CA 94025), Southern California DX Club *Bulletin* (W6EJI), VERON's *DXpress* (PAØs INA TO), West Coast *DX Bulletin* (WA6AUD) and Western Washington DX Club *Totem Tabloid* (W7YBS). Your turn?

† † †

Whence:

ASIA — Our Far East DX Association was formed for the purpose of promoting DX activity in the Tokyo area and to help foster good relations between KAs and the JA gang. Our club station KA2DX is active on 80 through 10 meters. We are allowed a kW on 10, 15 and 20; 100 watts on 40; and 500 watts on 3537 kHz. FEDXZ officers are KA2s AS pres., DDv.p., BL secy. and RG treas. JH2FMT does an outstanding job as public relations liaison. (WA5IIS) . . . YA1S AB AH ED GNT GVM KY LM NDF OS RA and WC plus many XYLs turned out for a summer meeting of Camel Drivers Radio Club in Kabul. (YA1AB) . . . Former TA1HY now serves in the Turkish navy. (W5QPX) . . . Caught XV5AC on 15 cw while home for lunch, a good time for us modest-power DXers to sneak in goodies. (W9LNQ) . . . Hi from beautiful smogless Thailand. Remind Statesiders that QSOs about politics and third-party traffic would endanger hamming privileges here. (HS4AHV-W6NYG) . . . I'm a Burma old-timer licensed in 1928. Thanks to the Goldwater Bill I am able to enter hamdom again in this free and democratic land. (WA6SNC, ex-XZ2AD) . . . EP2BQ, captured this summer on cw and ssb, gave me my last needed continent on 160 meters. (W1HGT) . . . Oriental addenda courtesy literature of clubs and groups: VE7IR intends to operate as XU1IR on subsequent Phnom Penh stops . . . . UA3BJ and UW3DI enjoyed a Kuril Island August caper as 4JØs BJ and DI, mostly 20 sideband. . . . MP4TBE makes the scene around 14,250 kHz at 0200 GMT. Tom expects a two-year Trucial tour. . . . International DX Association, according to K3RLY, plans a Spratly splurge for early December. . . . VU2FBZ, a 25-year Andamans resident, expects to remain in the islands after retirement. Fred likes 14,022-kHz cw with a homebrew sender and venerable BC-312 inhaler.

AFRICA — From Swaziland I've been following 75-meter DX nets with interest. European QRM and questionable QSO validity are problems noted. I've heard hams in 44 countries around 3800 kHz, 111 countries on 7 MHz, and about 60 on ten meters. Surprised WN8IOT with a 15-meter report and he replied with one of the quickest QSLs on record. Mail is weird here; received my January, February and March *QST* on the same day. Neighbor 3D6AJ will be more active soon on

EA8BK enjoys cw sport with FL-FR equipment and a TH3 rotary. Julian often paces the Canaries gang in ARRL DX Tests.

delivery of a new beam and spare linear components. (K. Muller) . . List-type DX nets are miserable lash-ups, especially one African thing on 21 MHz. (W5QPX) . . . For choice DX I can recommend the Afrikaner Net on 21,358 kHz daily at 1800 GMT. W2PPG is often net. (K2YFE) . . . EL2CB completed my 15-meter WAC. (WNØGTJ) . . . K5QFH/VQ9 will radiate from Chagos till January and promises high activity. (K4CEF) . . . Nigeria joined in suffering from August's intense solar storm but the bands recovered rapidly. We welcome G3BQH back to this country as 5N2ESH, a call he previously held. Eric will be well heard with S-line, beam and vertical. 5N2ABH, however, departs Nigeria (5N2ABG,NARS) . . . More Africanisms via the world-wide DX press: Antarctican ZS1ANT is back at it on 20 cw . . . TU2DO still threatens TL8 activity on appropriate weekends. . . . .Kenya DX talent may lead a 3B9 sortie to Aldabra, Juan de Nova and Rodriquez isles late next month . . . .FL8HM will try DX life in Jordan, Kuwait and other near-by regions this autumn . . . .G4BFZ may accompany a British scientific group to the Chagos next month with KWM-2s in tow.

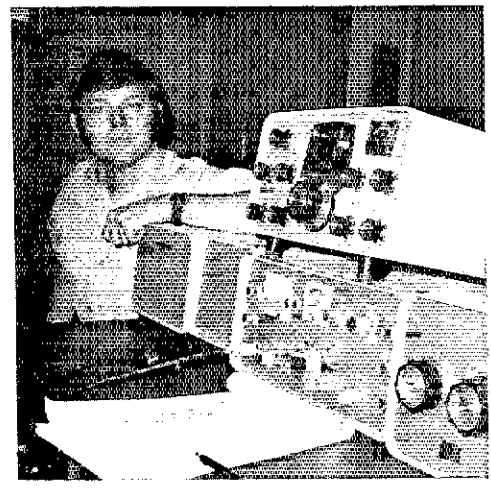
OCEANIA – DX is fine in Hawaii where I use a six-element beam on 15 and dipole on 40. After making General I'll have a 20-meter rhombic and 20-through-160 vertical to go with an FTdx570. Meanwhile the WN gang can find me most weekends on 21,110-21,135 kHz. (WH6HHP) . . . ZL3JC desperately needs Delaware, New Hampshire and Vermont for his WAS-Novice. Bryce has yet to even hear WNs in those states. For prefix collectors he can also sign ZM3JC. Fifteen's his band. (W6ORZ) . . . We're finally getting settled in Texas as W5SZV and WA7SFA/5. Quite a change in hamming from our years on Yap! (ex-KC6s WS YL). . . My parents YBØs ABB and ABD, are on from Djakarta regularly, 14,227 kHz at 1230 GMT. (WA5MUM). . . A new inverted-V immediately rewarded me with 3D2EK. Retired VK3BZ looks for 15-meter Novices almost daily. (WN6OSS). . . ZK1MA, 14,060-kHz cw at 0700 GMT, had little trouble getting through from Manihiki during August's solar sinking spell. (W7YF) . . . Been hitting DX as KX6BU over the past few months. (WA1PTZ) . . . No evident need for a linear final at 9M6AS whose FT-101 creates big enough pile-ups with a TH3 beam. Allan expects to remain in Sarawak at least through 1972 and hopes for further DXcursions across the Brunei border where he is licensed as VS5AP. The biggest DX problem at 9M6AS is dodging QRM from Japan. (5N2ABG, NARS) . . . Pacific tidbits via club periodicals: VK3JW, encouraged by VK9JW Mellish success, ponders another big DX go in '73. . . . ZK2s AK and BD share a 14-MHz 50-watter but anticipate additional multiband equipment shortly. . . . ZL2LH intends to operate from each of New Zealand's 112 counties this fall. Watch plus and minus 14,267 kHz. . . VKØRC, 14,208 kHz around 0930 GMT, goes silent next month. . . . VK9GO of Bougainville has an FT-101, TH3 and other radiators on 80 through 10 meters for your 5BDXCC pleasure.

EUROPE – KH6RS and WA1LKX ran one-two for the USA in our 1971 OZ-CCA Contest. VO1AW, VEs 1AE 3CQ and 2IL were Canadian highs in that order. Single-op country kingpins include CT1LN, DJ7HZ, DM3PEL, EA5BS, F6AWG, G3NSY, GW3SYL, HA1SB, HP1AC, JA1MIN, LA1OA, LZ2XB, PY2FCJ, SM5BNX, SP6DMJ, UAs 3DAK, 9QAA, UB5MZ, UC2AAB, UD6CN, UH8CS, UI8BL, UKs 2BBB 2FAP 2GAA UQ2QDm YO8FZ, and YU1FE. (OZ2NU, EDR) . . . SP5PWK of Warsaw is the headquarters station of Poland's largest ham club, 200 members strong. Its gear, mostly homespun, is operated regularly by about half the membership. (W5QPX) . . . F6BTQ is a blind operator who really enjoys his DX. (WB9ETQ) . . . C31s EF and FA worked each other in April on 75 ssb, possibly the first Andorra-Andorra QSO. (G3KFE via W4WFL) . . . Very strange conditions July 5th produced an evening 28,550-kHz roundtable with Gs 2YX 3YHW 3YHX and myself. They rolled throughfor almost two hours. Statesiders should watch for GB3SX beacon signals particularly when short skip is active toward the north-east. (W3OEI) . . . The ten-meter beacon line-up includes DLØIGI, 28,195 kHz; 3B8MS, 28,200; JA1HGY, 28,200; GB3SX, 28,185; ZC4CY, 28,180; and VE3RMR, 28,175 kHz, all either operational or readying. VP9BA is another leaving the drawingboard stage. W7RM is said to be calculating 28-MHz moonbounce possibilities; would you believe 45 elements rotatable and tiltable? New subscribers to our 10-meter journal include W3OEI, Ks 4IIF 6UZB 7RDH, WAs 3ECN 9QJW and VE3QB. (G3DME, QUAX) . . . Most-wanted countries in order of demand, according to our most recent global poll, are Clipperton, Bouvet, South Sandwich, Iraq, Spartly, Tibet, Iraqi Neutral Zone, China, Burma, Kamaran, Guinea, Sikkim, Fanning, South Yemen, Palmyra, Geyser Bank, Bhutan, Malpelo, Willis, Heard, Juan Fernandez, St. Peter & Paul, Blenheim Reef, and Manihiki. Vietnam's status is in doubt because the vote was taken just prior to XV5AX'S onset. (DXNS) . . . My because the vote was taken just prior to XV5AC's onset. (DXNS) . . . My summer European jaunt as C31EF worked out well. Next, I hope to join forces with U.K. or other European DXpeditionary enthusiast to perhaps include Monaco. Interested parties may reach me via ARRL or the home address. (W4WFL/1) . . . Unusual rag-chew with arctic outpost UPOL-19, a 45-minute chat to help him calibrate his gear. (WB5AHX) . . . FCC-Anchorage sent me a violation notice for working UPOL-21 on 20 cw.

They thought it was a nonamateur station! (W4YOK) . . . Lots of fun with a five-watt PM-3 on 7 and 14 MHz. DX is so good I haven't bothered to go QRO with my homebrew 30-watt linear. (GW5BAP) . . . UA1GZ/m has been very active from Vostok base, Antarctica, on the low edge of 20 cw around 0700 GMT. (W7YE) . . . Our 1971 TOPS 80-meter radiotelegraph contest was won by HBØXHW (DJ6SI) with 397 contacts. Other high scorers in order: OMØCIR, OH1LX, OK1ALW, HA5JI, SP2PAH, OK3KII, DL7NJ and HA8UC. W1SWX also participated. This year's test is set for the 9th-10th of next month. (G3IRM) . . . Some may wonder what happened to the old DL4RM bunch. Military transfers, USAF nonsupport, marriages (DL8RH and I, for example) and QTH changes helped break up the party. I'll be returning to Illinois next May after six years in Europe. (DL4ER-WA9HYS) . . . Our September DA1TCA special helped commemorate the 25th U.S. air Force anniversary (DAs 1QX 2QW) . . . Fs 3MF 5IJ, HB9AMZ and IT9RAN are to be applauded for DX work in our Novice bands. WN6OSS) . . . A few comments noted in the DX fourth estate: Check with Bulgaria's Central Radio Club, P.O. Box 830, Sofia for data on DX diploma earned by confirming QSOs with ten LZ1s and ten LZ2s since 1964. . . . UA1KAE/1, 21,047 kHz at 0800 GMT or so, hails from the frozen continent's Molodezhnaya base. . . . SVØs WH and WTT had Rhodes in mind for this month or last . . . UKØKAA and UA3IN/UAØ ably represent Wrangel isle on 20 cw around 0700-0800 GMT.

SOUTH AMERICA — I have 36 states on 7-MHz ssb but find it hard to get through all the W/K power up there. Usually around 0500-0700 GMT I must break in with cw, then shift to voice. I use a 500-CX, SB-220, ACA-1, SB-610, HM-102 with quad, vertical and dipoles on 10 through 80 meters. U.S. Novices are fun to work from here. So far I've QSOd WNs in 38 states. (ZP5TT) . . . During a period of semiblackout conditions this summer the only readable 40-meter station was OA4AGR. On 80 at the same time LU2ACZ and a few PYs stood out. (K2HYM) . . . LU9FAN, a regular in the 15-meter Novice subband, is interested in aquariums. (WN6OSS) . . . HC1MM and I were married at Quito in July. Among the wedding party were HC1s FB GE JJ FP RP and WL. After leaving Ecuador Maria and I stopped in HKØ-land. She'll be HC1MM/W8 when we take up residence Stateside. (WB8ABN) . . . Most enjoyable visit with PJ3AH and family on beautiful Aruba this summer. (W1JWA) . . . HC2NW, WA3FUM and I operated 10 through 80 as HD8IG in mid-July, (W3ABC) . . . HC1FG and W9UM have been running skeds for 45 years, more than 4500 QSOs including one 18-hour gabfest. (WCKXB). . . K5QHS reportedly investigates South Sandwich DXeditionary possibilities. (NTDXA) . . . PY1DVG scored 1340 QSOs with 62 countries on six bands from Trindade isle in August as PYØDVG. (LIDXA) . . . No non-YV DXpeditioners to Aves island for the present but an "official" 1973 activation is supposed to be in the works. (DXNS). . . other club notes from the south: Brazilians ØMI and ØWH still aim toward Rocas this season and perhaps a St. Peter & Paul encore. . . . LU1ZA surprises from South Orkneys around 7015 kHz in the wee hours. . . OA4OS takes an occasional turn as Pandora's Box Net control on 14,277 kHz at 0400. . . . SM2AGD plans more hamming from Easter isle when not busy tracking satellites.

NORTH AMERICA — WA1QOX/VE8 and WBØICS/VE8 are with a 25-man party assigned to the USCG loran station at Cape Christian, Baffin Island, 400 Miles inside the arctic circle. Ham radio is their contact with home and they are often to be found near 14,348 kHz around 2130 GMT. (WA1PEL). . . VP7CQ, formerly W2CQ, tells me there are plenty of Bahamas stations active but most of them keep busy working each other. (W1PL). . . . 6D4IX (XE1IX) accompanied the official government commemorative party that recently changed the name of old Socorro island officially to Benito Juarez Island. (XE3EB) . . . KL7s EAN EJM EKN EKO EOU FLO GLG HHV and VE6NH/KL7, members of Kenai peninsula's Moosehorn Amateur Radio Club, now offer an All-Alaska Counties Award. S.a.s.e. inquiries to my address are welcome. (KL7EJM) . . . WB2QCJ/mm gets out well from a Coast Guard alert ship some 200 miles off the New Jersey coast. (WN6OSS). . . After much research and observation I have arrived at what I call the First Law of Pile-up Pursuit: Regardless of the number of times a DX station is called, he will always be worked on one's *last* call. (K4THA) . . . After ten months of DXing I confirmed country No.100 out of 130 worked. Twenty cw is a good place to clean up on Europeans. (WB5AHX) . . . Entertained four 17-year-old prospective hams with a three-continent three-way, YV5BPG and VK2ADE on 20. Four continents were represented by a hundred visitors to Rhombic Farms one recent guest day. G3KPO curator of the RSGB museum, was on hand. My mobile kW nears the in-motion 200-country mark, mostly on 20 cw. (W6AM). . . Regarding your August intro, it's surprising how many Novices hunger for Canadian QSOs. My little ten-watter and dipole easily create WN pile-ups on 40. (VE3CUI). . . Still need six more QSLs for my K4BZH/VP7 DXCC. (K4BZH) The majority of big-gun U.S. country-climbers display an amazing lack of concern and understanding toward chaps at the DX end. (W5QPX). . . My first General QSO was first Mexico XE2VB. (WB4WHE) . . . GM6MS, LU2JV and TI2KH were recent cw-to-ssb contacts on 15 but my cross-mode DX career is ending. Just passed my General. (WN2AMU). . . Lost my rare Wyoming status by moving to Spokane from Casper. No more flattering pile-ups. (WA7RFA) . . . Trying six watts and a long-wire after a layoff. Six weeks of QRP fun have already produced 42 countries. (W1JUB). . . Forty cw is filling up with Europeans and other DX again. All set for a fine low-band DX winter if new XYL WN4YNC permits! (WB4SXX). . . Finally back



OY9LV is chief source of contemporary Faeroes DX pleasure with this Torshavn layout. Next year Ole expects to try his long-haul luck from Greenland. *(Photo via W3HNK)*

on DX bands under my own call after years of globetrotting. (K2YFE). . . Considerable line QRN at my new QTH but the local power company is cooperating. (WN9BYO). . . I was recently elected secretary of VERONA. This will keep me busy but I will be on the air renewing acquaintances with the many friends I made while signing PAØWGS and EL9B. (PJ2ELB) . . . According to the magazines the Boy Scouts, now renamed the Scouts, are emphasizing such communications fundamentals as flag signaling and the Morse code. Will their DX suffer? (K3CUI) . . . Four days as FPØsAA and ZZ got us two thousand QSOs on dipoles and Galaxy gear. We also signed VE1 VEØ and VO1 calls while mobile. (WAs ØKXJ 2FBI). . . K4OCE has been awarded QRPP DXCC No.1 after submitting proof of QSOs with 100 countries while running less than five watts input. S.a.s.e. inquiries concerning our low-power DX program and *Milliwatt* publication are welcomed at 213 Forest St., Vermillion, South Dakota, 57069. (K8EEG/Ø). . . Ws 1IIM 1SCS 4IQW 4YKH 8LUI 9ABA, VE3s BS CJ, VP9BX and others who have signed ZF1 calls meet periodically as the Cayman Turtle Net. Instigator VE3CJ prevailed upon resident ZF1WE to serve as NCS for the opening July session. (Caymanian Weekly. . . DX conditions in Seattle are much different than Virginia and old WB4GAH. My first month with 150 watts and a vertical turned up 40 countries. (W7YF). . . Moved up from Tech to General with an SB-100 and triband beam. DXing is a ball, even on 10. (WBØAAM). . . WN5GRX, my year-younger uncle, worked his first DX within hours of firing up on 15. (WB5CKR). . . Central Americans and Southeast Asians are hard to find on 20 cw these days. (WBØCAP). . . HP1XW should now be signing KZ5AE. (K2HYM) . . . Applied for DXCC this summer with 136/125 worked/confirmed, not a bad returns ratio. (WA2CWX). . . It's 103/80 here so far, all barefoot General stuff. (WB5FIU). . . If all goes well I'll join the 300-club this year. (K8PYD). . . Finally gave in to a linear after reaching 195 with my SB-401 and vertical in General subbands. (W5CNU). . . Frauds who work DX for QRT buddies fool less people than they think (W3HNK) . . . DX threat here for a shut-in. I'm nearing DXCC after 21 years on the air. W5MQE contributed a linear to tide me over the sunspot shortage. (W5TFZ). . . Found I had worked about half the Novice DX listed in April "How's". (ex-WN2MBP). . . North-South DX paths were predominant on 160 this summer. Caught PY1DVG and VP8KF among others. (W1HGT). . . Mainly RTTY here but I find 14-MHz cw DX a pleasant diversion. The score is about 75/63 for a casual low-dipole approach. (W9ZTK). . . Friend YS1JEC, whom I schedule each Sunday on 14,280 kHz, visited my Florida QTH in June. WB4TED . . . With such good conditions on the lower bands who cares about decreasing sunspot numbers? DXing is a joy since I got my Extra and can frolic with the DX goodies in those 25-kHz subbands. (WA2APG) . . . W2NSD is mentioned in connection with Bajo Nuevo potentialities this month. Veron . . . VE1AL is interested in receiving reports of his transmissions on 14,202 kHz at 2025-2045 GMT during the July 10th solar eclipse. (DXNS). . . North Capitol DX Club is a fresh group in the Md.-D.C. bailiwick with sixteen charter members rarin' to complete. (WCDXB) . . . W6RW's card from EI9J clinches a 160-meter WAC, quite a stunt from Sixland. 5BDXCC No. 179 for W6DQX is our club's ninth, and WB6UDC will soon make it ten. K6SDR, operating K6HRS, managed 1440 QSOs in the All-Asia brawl. (SCDXC) . . . K5AAD and WA5ZNY gathered six kiloQSOs signing FM7AD, FM7AD/FS7 and VP2VAU this summer. Aves isle eluded them, at least temporarily. (NTDXA) . . . VP5RF who works lots of cw on the low edges is amenable to 5BDXCC aspirants. Our brass is working out measures to spice up membership activity. One move will be inauguration of a Mr. Average DXer Award. The club's confirmed-countries standing is led by K4KQ, W4s DJ DQD CKB IC EEO, K4YYL, W4s BRB DRK HOS, K4SHB and W4IKL, all with more than 300 in that order. (FDXC). . . They're beginning to market full-sized 40-meter rotaries almost like 20-meter models. Enough of those things might disturb the normal weather flow! (CARA) . . . Looks like April 7th-8th at the Fresno Hilton for next year's gala California International DX Convention. (NCDXC) QST

IARU News

(Continued from page 99)

United Kingdom*, Uruguay, and Venezuela. Several other foreign countries grant FCC licensees amateur radio operating privileges on a courtesy basis; write *ARRL* headquarters for details.

Canada has reciprocity with: Belgium, Brazil, Dominica, Dominican Republic, Ecuador, France, Germany, Israel, Luxembourg, Mexico, Netherlands, Nicaragua, Norway, Peru, Portugal, Panama, Senegal, Sweden, Switzerland, U.S., Uruguay, Venezuela, and Commonwealth countries.

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), Guyana, Haiti, Honduras, Israel, Liberia, Mexico, Nicaragua, Panama, Paraguay, Peru, Trinidad & Tobago, 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 4Z 8R and 9Y4. 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 4X and 4Z.

**By special agreements, third-party traffic is also permissible with Australian amateurs for traffic regarding amateur satellites, with 4U1ITU, and with personnel of Project Hope in Jamaica.

DX Restrictions

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.

The Director General of the Posts and Telegraphs Department of Vietnam has notified the ITU that there is no objection to communications between amateur stations in other countries and XV5AC. However, communication with other amateur stations in Vietnam (XV or 3W8) is forbidden. Canadian amateurs may not communicate with Cyprus, Gabon, Iraq, Pakistan, Turkey, Khmer Republic, Vietnam, Libya, and Yemen. Prefixes to be avoided by Canadians are AP TA TR8 XU XV YI ZC4 3W8 4W 5A. QST

YL news and views

CONDUCTED BY LOUISE RAMSEY MOREAU,* WB6BBO

The YL Story — North America

NORTH AMERICA is a continent of contrasts for it extends from the palm trees of the tropics to the cold of the Arctic Circle. It is also the opening chapter of the YL story in amateur radio, for YL participation began in the United States when the Gernsback *Blue Book* listed the names of two women operators in 1910. Sixty years ago, when government licensing went into effect, 13 women were operating in this country, and their numbers have steadily increased to the present total of 10,812, in the 49 states located on this continent. The greatest number of gals are found in the 6th Call Area, followed by W4, W5, WØ, W2/W8 tie with 1,052 in each area, W7, W9, W2, W3, and finally Alaska's 84 YLs licensed with KL7 calls.

Other W or K women under the United States licensing procedures include 17 with Puerto Rico's KP4 prefix; 13, KZ5 in the Canal Zone; KV4BX, KV4DD, KV4FS, of the Virgin Islands; and KG4FD is the YL in Guantanamo Bay in Cuba.

Almost fifty years ago, the first woman operator in Canada was licensed, and became radio's third DX YL. Were Miss Cross still operating her 3QT, issued in 1924, she would be one of the 400 YLs, located in all the Canadian Districts, who are listed in the *Canadian YL Directory*, published by CLARA. But to earn the CLARA certificate for YL contacts in VE-land, it is necessary to find VE8HHH, the only licensed YL in that district.

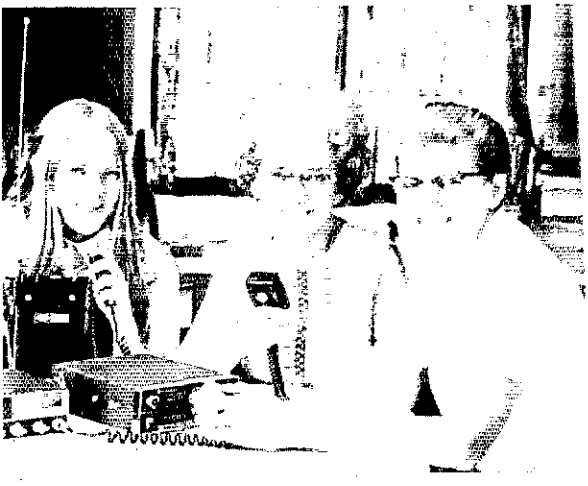
It would be difficult for the *Call Book*, to put "(YL)" after a lady's name in listing of Mexican amateur calls, as they did when X2AZ was issued in 1934, for there are 54 YLs with XE calls, located in the Central and Northern Districts of that country.

Farther south, Nicaragua has issued calls to 35 YLs; 30 women are licensed in the Dominican Republic; and there are 23 in Costa Rica. For those who are hunting YLs operating in Guatemala, or Honduras, there are 17 gals who could give a TG contact, and 20 with HR as their prefix. El Salvador lists 14, and the Republic of Panama 13. Cuba, who in 1927, was the third country in North America to grant amateur radio privileges to YLs now is represented by eleven women on the air. Barbados has 8P6BB, BP, and CP; San Andres and Providencia Islands are represented by HKØBHN; the Bahamas with VP7FA, and Ruthe Ferguson, W1SCS, is the first and only YL operating from the Cayman Island.

If there were a certificate for working all the countries in North America, it could not be offered for contacts with YLs only, because there are no women operators with FG7, FM7, FP8, PJ6, PJ5, TI9, VP9, amateur radio calls. But, under the reciprocal licensing agreement, they could find WA1GUR/6Y in Jamaica, and HK4AUG/HR in Honduras.

None of these totals can be completely accurate because they are affected by not only the language barrier, but by the misinterpretation of given

* YL Editor, *QST*. Please send all news notes to WB6BBO's home address: 1036 East Boston St., Altadena, CA 91001.



Three generations of YLs provided the only two-way communication between town and the Chimney Rock Scout camp in the Wyoming Rockies. Left to right: WA7SUL, Patti, WA7SQJ, Wilma, WA7SQH, Donna. The OM, WA7JYO, provided maintenance.

Maria, HC1MM/W8, wife of WB8ABN, will soon be checking into different YL nets. She has also operated from San Andres Island as HC1MM/HKØ. *(WB8ABN photo)*

names that could be either OM or YL and thus create errors. Also there are different regulations in some countries whereby a wife and husband may, and indeed do, operate using the same call. Thus there are errors of omission that cannot be corrected easily.

The story of the YL operators in North America, as in all continents, must remain incomplete, for the numbers are constantly increasing as more women receive licenses. "YL News and Views" will welcome information or corrections, and omissions in the interests of accurately maintaining the YL story.

YLRL Election Results

The following women have been elected to head the activities of the YLRL for the coming year: President, WA4BVD, Carrie Lynch; Vice-President, WA8EBS, Eila Russell; Secretary, WA6JSY, Myrtle Cunningham; Rec. Treas., W6YKU, Jacie van de Kamp; Dis. Treas., K6HHD, Janice O'Brien.

District Chairmen are: 1st District, WA1KMP, Margaret Doucette; 2nd District, WA2VYT, Dorcas Sparr; 3rd District, WA3NGV, Edna Sutton; 4th District, WB4NTW, Nancy Hickman; 5th District, WA5KRI, Deanna Mercurio; 6th District, W6NLM, Beulah Barrick; 7th District, WA7IRD, Wilberta Longwell; 8th District, WA8VXE, Rosemary Davidson; 10th District, WAØRYZ, Linda Erb; KL7 District, KL7FQQ, Rose Rybachek; KH6 District, KH6TI, Ardelle Johnson;VE District, VE5YY, Martha Pancratz.

Committees are: Publicity, W8DUV, Kay Anderson; Advertising, WØHEM,, Elaine High;Librarian, WA6BNS, Meta Brazell; *Harmonics* Editor, K7QGO, Mae Hipp; Tape Topics Librarians, K7NZO, Raj Caughers (west) and WA8IJW, Dot Baumgardner (east).

Certificate Custodians are: WAS–YL, W3RXJ, Irene Akers; DX–YL, WØJUV, Emma Berg; YLCC, W1ZEN, Onie Woodward; YLRL Continuous Membership, W2OWL, Ruth Siegelman.

Membership Chairmen are: Western, W7NJS, Beth Taylor; Eastern, K4RNS, Marge Campbell; International, WA2WHE, Gretna Longware.

1973 MINOW Net Officers

The MINOW Net, an on the air club of women in Montana, Idaho, Nevada, Oregon, and Washington, held their annual meeting at Tacoma, Washington, and the following officers were elected for the year 1972–73: President, WA7FRM, June Coulter; Vice-President, K7NK , La Verne Hood; Sec.-Treas., K7VSG, Vickie Raymond.

Membership in the net lists residence in one of the five states as the main requirement. All YLs are welcome to participate, regardless of their location, each Tuesday at 1600 GMT on 7135 kHz, and Fridays at 1600 GMT on 3913.

Fifty years in amateur radio with the same call. W3CDQ, Liz Zandonini was licensed in 1922, and is celebrating her 50th year as a ham.

K7UXN, Betty Kugeman, newly-elected president of the YLISSB system.

YLRL Adoptee Program Increasing

The YLRL Adoptee activity of "adopting" women amateur radio operators now includes some 75 women with a list of prefixes that reads like the *Call Book* magazine. The adoptee program is a plan by which YLRL members, and YL clubs that are affiliated with the organization, "adopt" a licensed YL amateur radio operator in a DX country. The adoption is the act of paying the gal's dues in this country in order to bypass the tangle of red tape that is involved in foreign exchange. Thanks to this plan YLRL's world wide membership includes women from Angola, West Germany, France, Guadeloupe, England, Scotland, Switzerland, Ecuador, Colombia, Panama, Thailand, Italy, Japan, Jordan, American Samoa, Norway, Lebanon, Finland, Czechoslovakia, Denmark, Belgium, Brazil, Netherlands, Sweden, Iceland, Guatemala, Costa Rica, USSR, Australia, India, Mexico, Rhodesia, New Zealand, South Africa, Ghana, and the Republic of Zaire.

Add the DX women who are members but not adoptees, and the DX YL membership in YLRL is now a total of 183 and growing.

ZL4GR, Myrtle Earland, New Zealand's first YL.

New Zealand's First YL, ZL4GR

February 6, 1930 was the day that ZL4GR (then ZL3AG) "joined em" because, she writes, "My boyfriend was more interested in radio than in me." It worked.

The requirements in the early thirties were that a newly licensed operator spend the first twelve months operating 80 meter cw. After that, permission was given for phone on 80, and cw on 40, and 20 meters. Additional tests were required for 20 meter phone operation. Those rigid requirements of 40 years ago became habit, and Myrt is still a cw operator on 20, and uses voice on 40, and 80, with some operation on 10 meters when the band is open.

Originally licensed as ZL3AG, Myrt received her present call in 1939 when she and the OM moved to the second district. She is a member of NZART, YRL, OTC, and has been very busy as a speaker at eighty different women's clubs telling about amateur radio.

Myrt enjoys DX, both phone and cw brand, and is always on the lookout for any new ones that she hears. She is active in the South Island Net, a National Net, and the North Island Net that meets the third Monday of each month and includes the 40-some YLs in New Zealand.

When not on the air, ZL4GR is usually with her second hobby, her garden.

How to Find YLs

There has been considerable correspondence addressed to "YL News and Views" for lists of YL operators in various countries. Also requests for times and frequencies that these women are on the air. All licensed amateur radio operators are listed regularly in the *Call Book* magazine. There is no existing schedule of frequencies and times of availability of operators. As with all of us who passed the tests and are now on the air, YLs are where you find them.

Strays

W6FB adds one more YL to the gals who were the first to receive their licenses in 1913. He advises that the call 6SM was issued to Hazel Smith, in Fullerton California. QST

Band Plan for 220 MHz

In *QST* for June 1972, proposed plans for 220 MHz and 420 MHz were given. While the 420-MHz plan will fit the new regulations covering repeaters, the 220-MHz plan does not. For obvious reasons, it is important the amateur fraternity come up with a workable plan for this band as soon as possible.

The Northeast Repeater Association, generally reflecting views of repeater operators from Maine to North Carolina, is considering a plan which which will be acted upon at their meeting in October. The NERA president, W1PRI, informs us he has been in contact with the California Amateur Radio Council and generally, they concur with the proposed plan. We think it at least a good starting point.

So please look over the *proposed* plan and see how it would fit in *your* area. Any suggestions, ideas, or conflicts should be noted and sent to Hq. We will coordinate with the ARRL VHF Advisory Committee, looking toward a finalized version for an ARRL 220 MHz band plan. – *W1ICP*

The Plan

The NERA proposes that 220 MHz fm repeaters employ a 1.60 MHz input/output spacing with input low and output high, with channel spacing of 40 kHz in the 220 MHz band. When the demand for channels dictates, these channels will be split to 20 kHz in the 220 MHz band. Development of 220 MHz repeaters should begin with the 223.38/224.98 MHz pair, and proceed down the band. Full-duplex repeaters should begin with the 22.34/223.94 MHz pair and grow up the band. Calling channels at 223.50 MHz are suggested.

Repeater Input/Output Spacing

We observe that the least spacing which should be considered is 1 MHz, which is approxiamtely the same percentage as the 600 kHz two meter standard. A wider spacing makes repeater design easier. 1.5 MHz spacing is the optimum spacing but is not consistent with the 40 MHz channel allocations. 1.6 MHz spacing is recommended as a compromise, being an integral multiple of the channel spacing, and providing nearly as many channels as the optimum spacing. This choice leads to some 10 dB less transmitter-receiver isolation being required than at two meters, an asset to system design. Additionally, the 1.6 MHz spacing will be easy to relate to, by thinking of the standard 600 kHz spacing on two meters and just adding 1 MHz to it, when trying to remember what the standard pairs are.

Channel Spacing

As previously adopted, 40 kHz channels are recommended under the new plan. Wide-band deviation can be utilized, the channels repeat every MHz, and 40 kHz channels can be "split" to 20 kHz channels (with narrow–band deviation) to double the number of available channels in the future.

National FM Simplex Calling Channel

There is demand, particularly from areas with little or no 220 MHz activity at present, for a "National FM Calling Channel" analagous to 52.525 and 146.94. We therefore propose that 223.50 be established as such a national calling frequency (simplex only).

AFSK RTTY FM Channels

There is also demand for a national repeater channel pair. 223.10/224.70 is proposed for this use, and should be easy to remember as 146.70 is quite popular in many areas for this use.

Point-to-Point and Control Links

Much of the use of the 220 MHz band up to now has been for remote control links. Since such applications are not required to be within the segements allocated for repeater use, we urge that the segment from 220.30 to 220.00 be used as much as possible for these purposes, with growth starting at 220.30 and proceeding up the band.

Input Low or High

We suggest that all repeaters in the 220 MHz band operate with inputs low and outputs high. With high outputs in the 220 MHz band there is less possibility for TVI to channel 13, and there is less chance of causing QRM to the DX chasers in the 220 and 222 MHz segments.

Present Users

In our planning for the inevitable growth of 220 MHz fm repeater operation, we must also consider other users of the band. We acknowledge that the majority of present users of the band are not on fm, and do not plan to change their mode of operation. While we anticipate that the use of fm will expand tremendously in the next few years, there is also a nationwide growth of a-m, cw, ssb and related operation. Operation is at or just above 222.0 MHz on the west coast, and near 220.0 in other areas of the country. There is growing interest on the east coast in moving the DX work to the 222.0 segment to escape QRM from TV local oscillators. Hence, we propose that the repeater channels between 222.02 and 222.30 and their associated output channels not be used by repeater operators, and that this segment from 222.0 to 222.3 be maintained exclusively for the narrow-band modes. This will generate a loss of only 8 repeater pairs, leaving a total of 27 pairs for use. At a later date, if "split" channel operation becomes necessary, 53 pairs will be available. The channels between 223.42 and 223.90 may be used for simplex, control or point-to-point links, and 223.50 is recommended as a simplex calling channel. QST

The World Above 50 Mc.

CONDUCTED BY BILL SMITH,* KØCER

W6FZJ Wide-Band Low-Noise Preamplifier

MANY TRANSISTORS, bipolar and FET, work fairly well at 432 MHz, but for noise figures under 2.5 dB the choice narrows to the bipolars. This amplifier by Joe Reisert, W6FZJ, uses a moderately priced bipolar, though more costly devices may be substituted if the ultimate in low noise figure is desired.

The amplifier is different from most published designs, in that its transistor current-source biasing eliminates most of the problems normally encountered with biasing and emitter bypassing. Its built-in protective diode, CR1, does not affect reception significantly, and it affords a good safety margin to rf burnout. Its low-Q input and output circuits virtually eliminate pruning for optimum performance. Construction is compact, and no expensive components are needed, other than the transistor.

Low-Noise Amplifier Requirements

A low-noise amplifier must have low input losses, a low-noise amplifying device, and sufficient gain to mask the noise of following stages. The system noise factor can be calculated from the formula: where NF_T is the overall noise factor, NF_1 is the preamplifier noise factor, NF_2 is the noise factor of the converter and subsequent stages, and G_1 is the gain of the preamp. All items are *numerical.* The final result can be converted to dB for comparison with most published noise figures. The dB table in the *Handbook* is sufficiently accurate for this purpose.

Practical examples will show that if a really low-noise system is the objective the preamplifier must have fairly high gain (greater than 10 dB) and the following stages must already have fairly low noise figures (less than 5 to 6 dB). Otherwise two expensive rf stages may be needed for optimum weak-signal reception. Especially if the stage following the preamplifier is a diode mixer, the noise figure of the i-f system is very important, as it is part of NF_2 in the above formula.

About Selectivity

A low-Q input circuit can cause problems when the receiver is used in the presence of high-level vhf and uhf signals on frequencies other than the amateur band in question. The preamplifier works well without additional selectivity ahead of it otherwise, but in some situations a high-Q input filter may be needed to prevent cross modulation.

The input circuit of the preamplifier itself is a poor place for selectivity. Impedances involved and space available are not conducive to low loss. A better method is to use an external device, such as a silver-plated coaxial or strip-line filter of large physical dimensions. If more selectivity is needed it can be added between the preamplifier and the receiver, where the penalty in the form of higher system noise figure is much less than in the input circuit.

The input impedance of a low-noise transistor exhibits a high SWR to the input line. This may distort the response of a multiple-pole filter such as the interdigital type, and cause relatively high insertion loss. The tunable coaxial or strip-line filter is ideal, since it can be tuned on the stage, to maintain low loss and still give the desired selectivity. A drawing of a suitable filter, with less than 0.25 dB loss and less than 15-MHz bandwidth, is available from W6FZJ on request, accompanied by a stamped self-addressed envelope.

Construction and Use

The preamplifier can be built in any small metal box, such as the Pomona Electronics No. 2417 cast-aluminum unit used by W6FZJ. Leads to the protective diode, CR1, and the emitter of Q1, should be as short as possible. Circuit board stock for the main plate and shielding makes for easy construction. A suggested layout is suggested by shielding lines in Fig. 1. Rf connectors should be a good uhf type, such as the SMA, available in the inexpensive JCM series by E.F. Johnson. BNC connectors are not recommended. [Check wiring carefully, and apply voltage through a low-range milliammeter. The current drain should be 3.5 mA plus or minus 1 mA. Voltage across the 620-ohm resistor should be 1.5 to 2 volts. No adjustment should be needed for good results, but if a good noise generator is available the turn spacing of L1 and L2 can be adjusted for best noise figure. Connect a filter, if needed, with a short cable and tune only the filter for lowest noise figure.]

Several uhf transistors have been used. The best for the money has been the Nippon 2N5652, which yields gain greater than 12 dB and noise figure under 2 dB. It sells for $11.00. The 2N5651 ($16.00) gives 1.5 dB, and the 2N5650 ($25.00) comes close to 1 dB. The 300-ohm resistor on the right side can be removed, and the 18-ohm one shorted out, if the line loss between preamp and converter is more than 2 dB, as in a system with an antenna-mounted preamplifier.

This is a wide-band amplifier. Though optimized for 432, its noise figure is only 0.25 dB

* Send reports and correspondence to Bill Smith, KØCER, ARRL, 225 Main St., Newington, CT 06111.

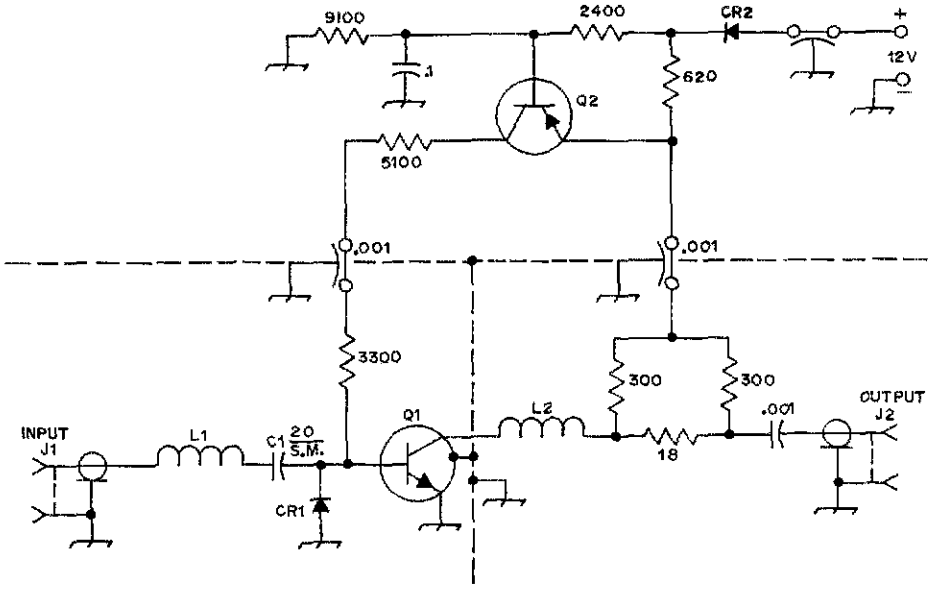


Fig. 1 — Circuit diagram of the W6FZJ 432-MHz preamplifier. Mechanical arrangement is suggested by the shielding, indicated by broken lines. Q1 should be suspended in a hole in the partition, with the collector on the L2 side of the shield.
C1 — 20-pF silver-mica.
CR1 — Hot carrier diode (Hewlett-Packard 5082-2811). Do not use point-contact or germanium diode.
CR2 — 1N914.
J1, J2 — Good uhf receptacle, SMA type preferred.
L1 — 2 turns made from lead to C1, 0.1 inch diam. Adj. for min. NF.
L2 — 5 turns No. 24 enam. 0.1 inch diam. Adj. for max. gain.
Q1 — 2N5652, 5651 or 5650, in order of descending noise figure and increasing price.
Q2 — High-beta greater than 50 at 0.1 mA PNP (2N2907).

higher at 144 MHz. Thus a single preamp can very well be used for 144, 220 and 432 MHz, with close to optimum results. Values for L1, L2 and C1 can be modified to achieve top performance on the band of greatest interest to the builder. In this respect, the W6FZJ preamp is similar to one described by K4PKV and WA4JVE, for 144 MHz, in *QST* for April, 1971. – *W6FZJ, with KØCER and W1HDQ*

OVS and Operating News

50 MHz DXers are finding that there is still DX life left in Cycle 20. On Sept. 13 K5ZMS worked 5s on backscatter from South America. WA5HNK caught his first South American DX the 14th – two hours of LUs, beginning at 1800 GMT, which is the time for *F2* DX. WA5HNK also worked LU7MBH and LU8AHW on the 20th, during the evening *TE* hours.

From San Jose, Costa Rica, TI2MQ reports the band open daily in September, except during cloudy or rainy weather. He was working LU7MBH, Mendoza, Argentina, at 1900 on the 14th, when he heard a CQ in the background, from WB5AEH. Signing quickly with the LU, TI9MQ turned his beam around and worked WB5AEH, with S8 signals. W8UUD was worked at 1915, with weaker signals, but 100-percent communication. TI2MQ has 200 watts PEP input, ssb, and a 3-element Yagi, above his triband beam for the hf bands.

K5ZMS worked TG9KJ, Guatemala, at 2335 GMT Sept. 15, and heard LU8AHW 40 minutes later. TG9KJ was heard in Wisconsin by WA9HUX.

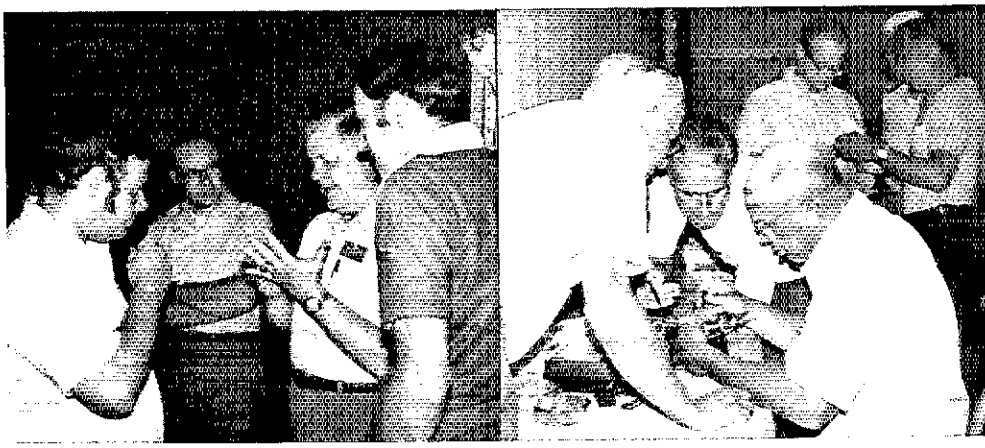
The KH6EQI beacon, reactivated Aug. 10 by Bert Ingalls, KH6GRU, is getting into some surprising places. Transmissions are made on 50.104 MHz as follows: 0100 to 0230 and 1800 to 2300 toward the US Mainland; 2300 to 0100 toward South America; 0230 to 0400 to the western Pacific; 0400 to 0630 to the southwest; and 0630 to 1800 to the south. All times GMT. Please send reception reports to KH6GRU, with a copy to the writer.

KH6EQI worked C21AA, Nauru Island, at 0930 GMT Aug. 27 and again on Sept. 3. Nauru, one of the world's smallest independent countries, is just south of the equator, west of the Gilbert Islands, and 1300 miles northeast of Australia. The beacon was heard Sept. 3 by HL9WI, Korea, and in Japan. KS6DH, American Samoa, was worked by KH6EQI Sept. 5. This was the first 6-meter contact for KS6DH, but he worked C21AA soon after, and KH6EQI again the next day. He runs 10 watts and a 4-element beam.

KH6GRU says that 6-meter newcomer KH6HMD worked C21AA and FO8DR, Tahiti, Sept. 4. KX6HK, Kwajalein, found the band open in several directions around 0930 GMT, Sept. 12. Bill worked HL9WI, and heard JAs and the beacons of ZK1AA and KH6EQI. See later report from KA6RS.

WA6HXM reports that WB6KAP, near San Francisco, is hearing ZK1AA nearly every evening,

The Central States VHF Society held their annual conference August 18-20 in Overland Park, Kansas with 108 amateurs attending. Photos from left, top row: Retiring ARRL VHF Editor Ed Tilton, W1HDQ, was awarded the Society's 1972 John T. Chambers, W6NLZ, Memorial Award. The presentation was by 1971 recipient Mel Wilson, W2BOC, left. Ted Mathewson, W4FJ, was recognized for his six years of leadership in the success of the Society. Second row: Tommy Thomas, W2UK, added his wry humor to the banquet, quipping about his work as KH6UK with W6NLZ in establishing the still-standing tropo DX records on 144 and 220 MHz. WA5HNK, left, and K5WVX, center, found an audience for their tape recording on the first 50 MHz moonbounce contact. Third row: In the foreground, W8KPY, left, and WØOHU, right, cornered ARRL President Harry Dannals, W2TUK, for the latest on the League's vhf program. K8DEO, seated right, found interest in his pet project, 432 converters. New officers elected by the CSVHFS are WØLER, President; WØMJS, Vice-President, W4FJ, Secretary (for the fourth consecutive year), and KØCER, Treasurer. The 1973 Conference is scheduled for August in Minneapolis.



having worked ZK1AA and FO8DR the first time Aug. 20, as reported last month. They were worked again around 0500 GMT Aug. 30. For more on beacons, from WB6KAP, see October *QST*, pages 115 and 117.

K5ZMS reports that word from Japanese friends indicates that the Japan-Australia TE season began in late August, similar to 1970, and another good DX season is well underway – some four years after the "guestimated" peak of Cycle 20!

KA6RS, Okinawa, brings us up to date with information back to May 15. Joe worked HL9WI, DU1JS, and DU1EJ frequently, and heard JAs (no longer workable legally by KAs on Okinawa). VS6DA was worked for the second time in two years. This relates to May through August. On Sept. 8, KA6RS worked KG6RA, Saipan, for country No. 9 on 6. The night of Sept. 12 was one of the wildest in Far East 6-meter experience. KA6RS and HL9WI kept their regular 20-meter sked around 0800 GMT. At 0845 WA6OYU/KG6, Guam, was worked for country No. 10 on 6. This developed into a 3-way with KG6RA, who could hear Guam weakly on scatter. The Guam and Saipan stations broke off at 0937, to work JAs. Meanwhile, KX6HK was hearing the ZK1AA beacon, and both were hearing JAs. A contact between HL9WI and KX6HK at 1000 may have been the first on 50 MHz between Kwajalein and Korea. At 1200 GMT, KA6RS started hearing the VK8VF beacon on 52.195 MHz, but no other VKs.

DX of another kind has again been worked on 50 MHz K5WVX and WB6NMT exchanged reports via the moon September 5, with cw signals rising a few dB over the noise. The contact required about 20 minutes to complete. That makes the 50-MHz EME record 1480 miles. Gary, K6QEH, has plans for extending it. He is working on a 32-element collinear array, with a wire screen reflector, and has hopes of working VK3ATN.

Sporadic *E* held up well into September, after an exceptional summer that found many WAS certificates issued by ARRL. WA1DFL, Mass., says August '72 had more multihop than any previous August he can recall, including an August 29 opening to 8P6EN in the deep Caribbean. W1HDQ, Conn., concurs, citing the fine opening to W4-5 that enlivened the closing hours of the September VHF party as a real Es rarity.. WA2SVD says six was open to most of the U.S. August 1. W3GOA, Philadelphia, worked several Caribbean stations this past summer, and a Central American not previously reported this year, TI2NA, Costa Rica, on August 13. W3GOA has 52 awards won on 50 MHz alone. In the September column mention was made that WA5TDZ had received cards for alleged contacts on six. The station active in New Mexico was W5TDZ/5 operated by W5TDZ and K5EFW. QSLs for the June contest contacts should be mailed to W5TDZ, 8504 Northridge Drive, NE, Albuquerque, NM 87111.

WA5IYX, San Antonio, filed another of his highly-detailed reports. Pat says August '72 was the best *E* August since 1967 in terms of time open, multihop and *E* peaking to 107 MHz. Pat logged 29 states during 33 openings in 15 days. Pat also noted the *F*2 muf at 42 MHz to South American at 1900 GMT, August 24 – "very odd to be hitting this high this early in the season without even the help of a magnetic storm." On August 29, Pat heard *F*2 Spanish at 47 MHz around 1855 GMT, the highest frequency since April 24. Pat says, "Cycle 20 *semper fidelis*." Leathernecks take notice. September 9 Pat saw the *F*2 MUF to South America pass 50 MHz at 1843 GMT and stay there until 1925. He heard unidentified carriers and some W5 backscatter from the southeast. Six meters bears watching! WA5QCP, El Paso, observed six multihop openings in August and reports apparent high *E* muf August 2, 10 and 20 when stations in the 350 to 500 mile range were worked. WA6JRA, near Los Angeles, reports several *E* openings in August including multihop on the 11th, 16th (to Puerto Rico), 17th and 21st. Sam heard FO8DR August 24 and ZK1AA, August 29, via *F*-layer. W6YKS found W1s workable on August 1 at Stockton, and noted several other strong openings late summer.

K7PXI, Phoenix sent a summary of his summer activity. In August Carl observed *E* on 19 days, including 7 days of multihop. On the 16th he worked into Puerto Rico. K7ICW, Las Vegas, reports ten days of August *E*, six of which produced multihop. K7BBO, Tacoma, says there were August openings to the East Coast on *E*. Dave reports W7GRH, Auburn, Washington is getting EME returns with three 6-element Yagis and that WA7KYZ is working on a stacked rhombic array with moonbounce in mind. K7GSE, Seattle, says "real good year for *E*."

VE1ASJ reports excellent success this summer working 8P6EN, XE1PY and W1HOY/KP4, plus several openings to W6. The last West Coast opening was August 12 at 2030 GMT.

144 MHz DX took several forms in August and September. K1MTJ in Maine reached 26 states, adding Indiana on aurora August 5 and Wisconsin seven days later on Perseid meteors. W1FZA, N.H., has 22 worked, thanks to August 22 tropo, when he contacted two stations in Maryland, K4JQU, N.C., and W9HLY in Indiana. He runs a kilowatt and 80-element collinear, for those needing New Hampshire. WA2QQR, Staten Island, heard 9s the evening of August 15 via tropo, but none of the closer 3s and 8s. WA2BLE, N.J., worked the August tropo from Montreal to Virginia. W4WDH, Georgia, says August 27 tropo was workable from North Carolina to Ohio to Oklahoma. John heard WAØCHK, Mo., also. K4JO, N.C., worked from New England to Missouri on the August 4 aurora. K4MSG, on North Carolina's Outer Banks is tearing up the coast with his 17 watts and 8-element Yagi. He wants cw operators to look for him above 145 MHz. Hurricane Dawn spawned an opening September 8 to Connecticut, New York and New Jersey.

W5WAX, Oklahoma, says the August Perseids was "very poor" this year, but tropo on the September contest weedend was exceptional. Sam worked 18 sections in 17 states, excellent from Oklahoma. Some of his better DX, worked September 10, included K2TXB, N.Y., and K4PCL/4, Va. WA7BBM, Tucson, is making Arizona workable on 2 meters. John had meteor contacts with W6PO, K5BXG, K7BBO and KØMQS in late July and early August. John has a kilowatt and eight 5-element Yagis at 40 feet. K7BBO says his contact with John was made on ssb during a 1-minute burst August 13.

WA8LLY, Michigan, had much the same success as many did on the early August aurora, and the Perseids shower several days later. But the shower highlight was a 700-mile tropo contact August 13 with WØEOZ, N.D. Steve now has worked 24 states as a result of the shower and tropo. August 24, 28 and 30 allowed tropo contacts into Iowa and Missouri. K8HWW,

Michigan, worked WB4HEL/4, Tenn., September 10, for state number 30. Clem says tropo conditions were excellent to Oklahoma and Arkansas.

WA9QZE, near Chicago, has reached 28 states, taking advantage of August aurora, meteors and tropo. Maryland, worked August 15 on tropo, and Maine and Rhode Island worked during the Perseids were Al's latest additions before returning to college. W9IDJ, Wisconsin, climed to 26 states via August meteors and the September contest tropo. Highlights the evening of September 10 were contacts with Virginia, Arkansas and Mississippi, the latter two being difficult catches in recent years. K9KQR, also near Chicago, worked eight states during the aurora, New England to Colorado to Arkansas, but went scoreless during the Perseids.

WØRLI, Minneapolis, upped his total to 35 September 10, by exchanging tropo signals with Arkansas and Mississippi. Hank says the band was also open for five hours to Virginia. WAØCHK, Mo., sent a copy of his log covering July 22 to September 4. Yup, you impressed me, John! Toss in a few VKs and your 2-meter log would look like 20 meters. While on the subject of VKs, John may have that in mind also. Eight 15-element Yagis will be pointed toward the moon soon. John's total is now 40 worked.

WN6PZW visited Denmark this past summer where he was licensed as OZ2TY. Tim says 2 meter fm is very popular there and listed seven active repeaters on 145 MHz, mostly running 20 to 30 watts.

220 MHz reporting fell off this month, but K9AQP/1, Mass., found WA8PKB's Ohio tropo signal August 8 for state number 13. W1EOJ has moved from Mass. to New Hampshire where he promises 220 and 432 activity. K6YNB, Fullerton, assisted WA6DZC and WB6RAL with 500 and 1000 watt amplifiers respectively, saying that adds contact September 12 with W4VHH, S.C. W4FJ, Va., reached 22 states Mich., used the September contest tropo to good advantage. Clem had 16 contacts which brought his states total to 8 worked. He says conditions were excellent from Chicago to Boston, but there was not enough activity. K8HWW runs 200 watts and a single 29-element Yagi.

432 MHz states worked totals continue to climb. K1JIX, Mass., worked K8UQA, Cleveland, August 21 for state number 15. W2OMS, N.J., stands at 16 states, but is putting most of his effort on 1296. More on that later. W4AWS, Florida, had a 380-mile contact September 12 with W4VHH, S.C., W4FJ, Va., reached 22 states August 21 working W1YTW, Maine. The September 10 tropo enabled W5WAX, Oklahoma to work WAØCHK, Mo., and W9AAG, Illinois. WA6EXV, Ridgecrest, is approaching moonbounce capability, while continuing tropo schedules with W6FZJ and beginning new ones with K6AEP. W6FZJ's moonbounce collinear is making itself heard over their difficult mountainous tropo path. K8DEO, Ohio, added Maine's W1YTW August 22 to his growing list of states worked. W8FWF added a new state, New York, to his list of eight worked from Michigan. K8UQA, Ohio, stands at 17 worked thanks to August 21 and September 10 tropo openings. K8BBN, now living in Michigan, is looking for states on 432 and will do some building for 220 this winter. WØLER, Minneapolis, found September 10 tropo conditions excellent, logging state 15 in the form of W5RCI, Mississippi. John also worked Ohio, Illinois, Missouri and Kansas, but bemoans no activity from Arkansas or Tennessee which would have been easy pickin'.

1215 and Up is the place to be, especially if you live in the northeast. K9AQP/1, Mass., runs 15 watts output to a 40-inch dish 56 feet high, but is reworking a 7-foot dish and a pair of 2C39s for more power. Bob had several summer contacts with WA2LTM, N.J. and on August 29 worked W1YTW, Maine, for state number six on 1296. W1YTW has been active on 1296 since August 24, with a varactor tripler and 32-element collinear. Bob worked W1YTW again on August 30, followed by W1AJR, R.I. Bob says one problem on 1296 is getting the dish antennas properly aimed. Also in Massachusetts, K1JIX has reached 6 states worked on 2300 MHz (!) completing a contact with K2GRI. John runs a K2GRI-developed 10-watt 2C39 rig. K2GRI's 2300 signals are consistently 12 to 15 dB above the noise over a 130-mile path that crosses 3000-foot elevations in Vermont. K2GRI runs 30 watts output to a 4-foot dish. K2JNG, N.J., has 8 states on 1296, the latest being K4QIF, Va. Walt has regular 2304 contacts with WA2LTM over a 45-mile path, and says WA2VTR is due on 2304 any day. W2OMS, N.J., now has 8 states on 1296 and a best DX of 537 miles; W8YIO in Michigan, August 22. W2OMS runs a pair of 7211s producing 100 watts, and an array of four 13-element Yagis. Vic says the reported 15-dB tropo signal difference between 432 and 1296 is of less significance than the lack of activity. "I'm convinced that with increased 1296 activity, states worked could approach those now reported on 432," says W2OMS.

K2JNG, Union City, N.J., reports working W1AJR, Midletown, R.I., on 2304 MHz, Sept. 6. This is a distance of some 150 miles. The same night, Walt worked K1SFF/3, Ottsville, Pa., 70 miles in the other direction. Signals from W1AJR started weak, but improved to S9 as the night wore on. Eventually they went over to a-m phone, with good results. On the 19th, K2JNG worked WA2VTR, Spring Valley, N.Y., for his fourth state on 2300 MHz. Monday, Wednesday and Friday are the 2304-MHz nights for these fellows. QST

Strays

QST Congratulates . . .

The Right Reverend Edward M. Turner, KV4BQ, who was consecrated Episcopal Bishop of the Diocese of the Virgin Islands.

The University of Oklahoma Amateur Radio Club, W5TC, for winning a First Place award at the graduate level in an "open house" engineering exhibition, with a display of SSTV equipment.

Flash — Oscar 6 was successfully launched at 1719 GMT on October 15. Orbital info is carried on W1AW bulletins; see schedule elsewhere in this issue. Initial observations indicate excessive power being used by a number of ground stations causing temporary repeater failure. Amsat requests all users to employ no more than 100 watts effective radiated power.

Operating Events ..... de W1YL

NOVEMBER

1-2 *YL/AP phone*, p. 98 Sept.

2 *W6OWP Qualifying Run* (W6ZRJ, alternate) 10-35 wpm at 0500 GMT on 3590/7129 kHz, 10-35 wpm. This is 2100 PST the night of November 1. Underline correct minute of highest speed copied, certify copy made without aid and send to ARRL for grading.

4-5 *RSGB 7 MHz Contest phone*, p. 107 Sept. *Maine and Illinois QSO Parties*, p. 125 October. *WAE (Worked All El Paso) Contest*, 2200Z Nov. 4 to 2200Z Nov. 5, ten meters only, sponsored by the El Paso ARC. The event is run to advertise El Paso and their WAE certificate (obtained by working any 15 El Paso stations). El Paso stations compete against each other for multipliers representing states worked. Send your entries to the El Paso ARC, 1501 Golden Hill Terrace, El Paso, TX 79902.

6-12 *QRP_p QSO Party*, p. 125 October.

10 *W1AW Qualifying Run 10-35 wpm at 0230 GMT on 1,805 3,580 7,080 14,080 21,080 28,080 50,080 and 145,588 MHz. This is 2130 EST the night of Nov. 9. 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 complete mailing address.*

10-11 *Trillium Contest*, p. 127 October.

11 *Frequency Measuring Test*, p. 125 October.

11-12 *SS phone*, full info. p. 87 Oct. *Space Net VHF Contest*, p. 125 Oct. *Austrian 160-Meter-Only Contest*, from 1800Z Nov. 11 through 0400Z Nov. 12. OE segments: 1823-1838, 1854-1873, 1879-1900 MHz. Call CQ OE. Exchange RST and number beginning with 001. The exchange must be repeated by both QSO partners. One point per QSO. Every Austrian prefix counts as a factor of 2 points, every other prefix one factor point. Final score equals QSO points times factor points. You can only work three stations in the same country in succession, after which 5 other QSOs must take place before you may work the same country again. (For example, work three OE stations followed by five miscellaneous stations before working OE again.) Usual info, plus a description of the station and a contest declaration must be sent to the OVSV before Dec. 15. Send to: Ing. Gustav Benesch, OE7GB, Wolkensteingasse 4, A-6020, Innsbruck, Austria. Appropriate awards.

18-19 *SS cw*, full info. p. 87 October.

25-26 *CQ WW DX Contest, cw.*

26 *Twentieth annual 10-Meter Ground Wave Contest* sponsored by the Breeze Shooters, Inc. All modes are permissible. Exchange points are determined by a distance basis with separate awards for leaders in four circular zones centered on the Point in Pittsburgh. Mobiles also compete for separate awards. Logs must be postmarked by Dec. 4 for judging Dec. 9. Request logs and rules from Herbert Heller, W3OFI, checker, 2873 Beachwood Blvd., Pittsburgh, PA 15217. All entrants receive a free registration at the 1973 Breeze Shooter's Hamfest.

DECEMBER

2-4 *Lone Star QSO Party*, sponsored by the Austin ARC, starts 2000 GMT Dec. 2, ends 0200Z Dec. 4. Exchange QSO no., RS(T) and county (for Texas), others use state/province/country. QSOs count one point, with the following exceptions: (a) a contact with a novice counts two points, and (b) a novice-novice contact counts three points. Texans multiply QSO points by the sum of states, Texas counties, VE provinces and DX countries worked. Others use Texas counties for the multiplier. The same station may be worked on each band/mode for points. Note that Texas-Texas QSOs are permitted. Frequencies: phone 3900 7265 14275 21350 28600, cw 3560 7060 14060 21060 28600 (yes, 28600). Check 160 on the hour from 0400Z. Texans are asked to be QRV on 15 on the hour and 10 on the half hour during the day. Novices in the bottom 20 kHz of the subband. Vhf 50110 50400 52525 144100 145350 146940, 220, 432. A minimum of 15 QSOs for any award (except DX countries). Those stations competing for the 160 and vhf awards may compete in other categories as well; separate summaries for the special competitions, please. Mobiles/portables changing counties can be worked again for QSO points as well as multipliers. No repeater contacts. Remember cw on vhf. The decisions of the awards committee are final. Send an s.a.s.e. for log forms. Logs (and dupe sheets for Texan entries over 200 QSOs) with a scoring summary and the usual statement must be postmarked by Jan. 15, 1973. Send to: Tom Morrison, WA5GBU/5, Box 13442, Austin, TX 78711. *Telephone Pioneer QSO Party*, sponsored by the Stanley S. Holmes Chapter No. 55, starts at 1900 GMT Dec. 2 and ends at 0500 GMT Dec. 4, all bands. Same station may be worked on more than one band, except one mode per band. Call CQ Telephone Pioneers or CQ TP. Suggested frequencies within 10 kHz of: phone, 3965 7275 14295 21365 28675 50100-50250 and 144275-145500. Try RTTY, Cw, 3565 7065 14065 21065. Score 1 point for signal reports exchanged with a Pioneer in any chapter, 1 point for exchanging reports with each different chapter. Exchange signal report, QSO no., chapter name and no. (ITPA chapter name only). Send log extract with all info., postmarked no later than Jan. 5, 1973 to: Frank J. Wojcik, W2SNJ, Stanley S. Holmes Chapter No. 55, Telephone Pioneers of America, 100 Central Avenue, Kearny, NJ 07032. *Indiana QSO Party*, sponsored by WA9s MXG BWY, from 1800 to 2200 GMT Dec. 2 and 0100-0500 and 1900-2200 GMT Dec. 3, open to all. The same station may be worked on different bands/modes. Exchange QSO no., RS(T) and state, province or country (Indiana stations use their county). Indiana stations may work each other. Suggested freqs.: cw, 3575 7075 14075 21075 28075; phone, 3905 7275 21375 28575 50400. Score 1 point for each contact and multiply by the number of states, provinces, countries (for Ind.). Out-of-state stations use the number of different counties for the multiplier. Appropriate certificates. Try ssb on the even GMT hours. Mailing deadline Dec. 31. Send your log to the contest chairman, T. J. Thamann WA9MXG and M. J. Wetzel WA9BWY, 5139 S. Dearborn St., Indianapolis, Ind. 46227. For results, please include an s.a.s.e.

6 *W6OWP Qualifying Run.*

9-10 *160-Meter Contest*, full info. this issue. *Spanish Contest cw*, sponsored by the Union de Radioaficionados Espanoles, runs from 2000 GMT Sat. to 2000 GMT Sun. Non-EA stations try to work as many EA stations on as many bands as possible in all EA districts, 80-10 meters. Send a 6-digit serial number, representing RST plus QSO number, starting with 001. Two points per EA QSO, repeat QSOs with EAs on different bands permitted. Total points times the sum of EA districts on each band represents final score. Full log info. should be sent to the URE, along with the call of the station, the operator and full mailing address. Usual contest declaration necessary. Reports must be sent within one month following the end of the contest to URE International CW Contest, Box 220, Madrid, Spain. *Delaware QSO Party*, sponsored by the Delaware ARC (W3SL) from 2300 GMT Dec. 9 to 2300 GMT Dec. 10. There are no power restrictions and the contest is open to all amateurs. Stations may be worked on more than one band, but no credit for contacts with the same station using two modes on the same band. Exchange QSO number, report and county (for Del.) or state, province or country for others. Freqs.: cw, 3560 7060 14060 21060 28060; phone, 3975 7275 14325 21425 28650; vhf, 50 50.4 and 144 MHz. Novice spots, 3710 and 7170. Del. stations score 1 point per QSO and multiply by the number of states, VE provinces and countries. Outside stations score 5 points per Del. QSO and multiply by the number of Delaware counties (a total of 3, New Castle, Kent and Sussex). Appropriate awards. In addition a W-DEL certificate will be sent to any station working all 3 Del. counties. Party logs showing required date will be accepted in lieu of QSLs. Mailing deadline Jan. 1. Send entries to Chas. J. McGonigal WA3AVD, 18 Harvard Rd., Wilmington, Del. 19808. (Apply to this address for the W-DEL certificate. No fee, but s.a.s.e. required.)

12 *W1AW Qualifying Run.*

28 *W1AW Morning Qualifying Run.*

31 *Straight-Key Night.*

JANUARY

6-7 *VHF SS, Friendly Firebird QSO Party.*

13-14 *CD Party, cw, YU DX Contest, cw.*

16-18 *OOTC QSO Party, cw.*

20-21 *CD Party, phone, Arkansas QSO Party.*

23-25 *OOTC QSO Party, phone.*

27-28 *Simulated Emergency Test.*

Feb. 3-4, DX Competition, phone.
Feb. 3-11, Novice Roundup.
Feb. 11, Frequency Measuring Test.
Feb. 17-18, DX Competition, cw.
Feb. 24-25, YL/OM Contest, phone.

Operating News

GEORGE HART, W1NJM
Communications Manager
ELLEN WHITE, W1YL
Deputy Communications Mgr.
ROBERT L. WHITE, W1CW; *DXCC*
GERALD PINARD, *Training Aids*

1 Tappa Key. Back in the old college days, *1 Tappa Key* was a common spoof on Greek-letter honorary fraternities, so many of which exist in so many different fields of study, mostly at college level. A recent letter asks us if there are any amateur radio honorary Greek-letter fraternities in existence in colleges or universities throughout the country. The only one we could think of was 1 Tappa Key. Anyone know of others – legitimate ones?

If not, the possibility of establishing something of the sort for college students who have achieved amateur radio status comes up. In fact, it comes up anyway. Many (most?) colleges have amateur radio clubs of one kind or another, why not establish a national honorary society of college-student licensed amateurs, one that will be recognized by the college, included in its programs, its members pictured in the yearbook, its meetings addressed by faculty members and visited by alumni, and its organization nationally sponsored?

A count of our affiliated club active file in 1971 showed that we then had 72 active affiliated college or university radio clubs, and traditionally some of our oldest clubs are college-originated (e.g., M.I.T. Radio Society). How about forming them into a national society of Eta Alpha Mu (HAM in Greek)? Who wants to be Alpha chapter and get the wheels rolling? It will mean a lot of work for someone – headquarters can't do it all. Whatsa, you college kids?

SCM Functions Study. Pursuant to Minute 64 of the July '72 ARRL Board of Directors meeting, the Planning Committee is undertaking a study to determine the advisability and feasibility of expanding SCM functions outside the present scope of on-the-air and CD-related activities. Some SCMs have expressed a desire to perform such additional functions not now authorized (not as SCMs, anyway); in fact, a few have already done so, and some have been doing so for quite a few years, to a greater or lesser extent. SCMs are being canvassed regarding their views on the subject, but SCMs are elected by you members, so you should have something to say about it too. If you have comments, send them in to headquarters, where they will be correlated and relayed to the committee– or send them direct to the director doing the leg work for the committee: Vic Clark, W4KFC, Roanoke Division (see address, p. 8).

Getting an OO Report. The reactions of amateurs on receipt of a discrepancy report from an Official Observer are numerous and varied, running the full gamut from grateful embarrassment to outraged indignation. We have several hundred Official Observers (wish we had more), many of them super-active and extremely dedicated. Most amateurs who are at all active over a period of years sooner or later receive an OO card for some discrepancy in operating or in signal quality. Usually, the reaction, if any, is on the "thank you" side, sometimes with a "but" added, such as "thank you, but I checked my signal out and it seems okay," or "thank you, but you must be mistaken because my log shows I wasn't where you said I was at that time." Once in a while, the poor

Doing Your Own Thing

One of the great things about ham radio is that there are so many ways it can be enjoyed, – building, puttering, rag-chewing, traffic handling, DXing, contesting on cw, phone, RTTY, or ATV. One can be stimulated by experimentation or just relax and exchange ideas and small talk with other hams. Yes, amateur radio is a great pastime, a hobby for all ages, for both men and women. You are lucky to have a hobby so diversified and it would be hard to come up with another one that has something for everybody.

But do we ever really reach our "goal"? Experience has shown that there are always some new goals ahead, no matter how far or how fast we travel. In the very near future amateurs will consistently see each other while they communicate, and this will undoubtedly be another great step forward in amateur radio. But standards are constantly changing and there will be something else in the distance to work for. The "ultimate" will never arrive. Always, there will be that new, far goal to work toward.

So keep in step with a changing world. Enjoy your concept of ham radio, do your own thing, but keep an ear and eye open for the new ideas, concepts, techniques, and don't "fall by the wayside" of incomplete knowledge. Take advantage of each advancement, be conversant at least with everything new, and enjoy the most diversified and progressive hobby of them all – Amateur Radio. (Adapted from *RTTY NEWS*, bulletin of the Canadian Amateur Radioteletype Group, VE3RTT.)

W1AW FALL-WINTER SCHEDULE
(Oct. 29, 1972-April 29, 1973)

The Maxim Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 1 P.M.–1 A.M. EST, Saturday 7 P.M.–1:00 A.M. EST and Sunday 3 P.M.–11:00 P.M. EST. 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 on Nov. 23, Dec. 25, 1972; Jan. 1, Feb. 19, Apr. 20, 1973. Please note that all times-days are in GMT. Specific operating frequencies are approximate and indicate general operating periods.

GMT	*Sunday*	*Monday*	*Tuesday*	*Wednesday*	*Thursday*	*Friday*	*Saturday*
0000	.....	.....	.....	.....	RTTY Bulletin[8]	.....	.....
0030	← CODE PRACTICE DAILY[1] 10-13-15 wpm →						
0100	.....	← CW BULLETIN[1] →					
0120-0200[4]	.....	.....	3.7 Novice[6]	14.080	7.080	7.15 Novice[6]	3.580
0200	.....	← PHONE BULLETIN[2] →					
0205-0230[4]	.....	.....	3.990	50.120	145.588	1.820	21.390
0230	← CODE PRACTICE DAILY[1] (35-15 wpm TThSat, 5-25 wpm MWFSu) →						
0330-0400[4]	.....	.....	3.580	.....	1.805	.....	3.580
0400	RTTY Bulletin[3]	.....	← RTTY BULLETIN[3] →				
0430	Phone Bulletin[2]	.....	← PHONE BULLETIN[2] →				
0435-0500[4]	.....	.....	7.230	3.990	7.290	3.990	7.290
0500	CW Bulletin[1]	.....	← CW BULLETIN[1] →				
0520-0600[4]	.....	.....	3.7 Novice[6]	7.080	3.990	7.15 Novice[6]	3.580
1400	← CODE PRACTICE[1] (5-25 wpm MWF, 35-15 TTh) →						.....
1800-1900	.....	21/28 CW[7]	21/28 SSB[8]	21/28 CW[7]	21/28 SSB[8]	21/28 CW[7]	.....
1900-2000	.....	14.290	14.080	14.290	14.080	14.290	.....
2000-2100	.....	7.080	7.290	14.095 RTTY	7.290	7.080	.....
2100-2130	.....	21/28 SSB[8]	21/28 CW[7]	21/28 SSB[8]	21/28 CW[7]	21/28 SSB[8]	.....
2130	.....	.....	CW Bulletin[1]	.....	CW Bulletin[1]	.....	.....
2200-2230	.....	7.150 Novice	21.125 Novice[4]	7.150 Novice	21.125 Novice[4]	7.150 Novice	.....
2230	.....	.....	RTTY Bulletin[3]	.....	RTTY Bulletin[3]	.....	.....
2300	.....	CPN[6]	7.095 RTTY[4]	3.625 RTTY	14.095 RTTY[4]	CPN[6]	.....
2345	.....	.....	CN[6]	.....	CN[6]	.....	.....

[1] CW Bulletins (18 wpm) and code practice on 1.805, 3.580, 7.080, 14.080, 21.080, 28.080, 50.080 and 145.588 MHz.
[2] Phone Bulletins on 1.82, 3.990, 7.290, 14.290, 21.390, 28.590, 50.190 and 145.588 MHz.
[3] RTTY Bulletins sent at 850-Hertz shift, repeated with 170-Hertz shift; frequencies 3.625 7.095 14.095 21.095 and 28.095 MHz.
[4] Starting time approximate. Operating period follows conclusion of bulletin or code practice.
[5] W1AW will tune the indicated bands for novice calls, returning the call on the frequency on which called.
[6] Participation in section traffic nets.
[7] Operation will be on one of the following frequencies: 21.02, 21.08, 28.02, 28.08 MHz.
[8] Operation will be on one of the following frequencies: 21.270, 21.390, 28.590 MHz.
Maintenance Staff: W1s, QIS, WPR.

W1AW CODE PRACTICE

W1AW transmits code practice according to the following schedule. Approximate frequencies are 1.805 3.58 7.08 14.08 21.08 28.08 50.08 and 145.588 MHz. For practice purposes the order of words in each line may be reversed during the 5-13 wpm transmissions. Each tape carries checking references.

Speeds	*Local Times/Days*	*GMT*
10-13-15	7:30 PM EST dy 4:30 PM PST	0030 dy
5-7½-10-13-20-25	9:30 PM EST SnTThS 6:30 PM PST	0230 MWFSn
5-7½-10-13-20-25	9:00 AM EST MWF 6:00 AM PST	1400 MWF
35-30-25-20-15	9:30 PM EST MWF 6:30 PM PST	0230 TThS
35-30-25-20-15	9:00 AM EST TTh 6:00 AM PST	1400 TTh

The 0230 GMT practice is omitted four times a year on designated nights when Frequency Measuring Tests are sent in this period. To improve your fist by sending in step with W1AW (but not over the air!), and to allow checking the accuracy of your copy on certain tapes, note the GMT dates and *QST* practice text (from the issue 2 months previous) to be sent in the 0130 GMT practice on the following dates.

Nov. 8:	It Seems to Us
Nov. 14:	Correspondence
Nov. 20:	League Lines
Nov. 30:	ARPS
Dec. 4:	World Above
Dec. 8:	YL News

well-intentioned OO gets blasted, and occasionally a hassle results. Even more rarely, but let's face it, sometimes the OO is wrong.

If you get an OO notice for whatever, from whomever, no reply is necessary — although of course a "thank you" note is always appreciated, and would seem only courteous. Many recipients of such notices feel they are being accused of something, and some assume that the notice constitutes a notice of an official record against them. Not so. The notice is intended to be friendly and advisory *only*, similar to another motorist telling you one of your tail-lights is out — to keep you out of trouble with FCC and to achieve, with your cooperation, the highest standards for the amateur service. It is not "self-policing" in the literal sense. It is a cooperative effort spearheaded by official SCM appointees who have volunteered to spend time and (in some cases) use of sometimes-sophisticated equipment toward this cause.

So if you receive an OO notice, keep your cool, OM. It's not a notice from FCC (which *is* serious),

DX CENTURY CLUB AWARDS

Radiotelephone listings follow the general-type "New Member" and "Endorsement" listings – *AUGUST 1-31, 1972*

New Members

W8WOJ	266	W3IZJ/9	120	WA3LLK	106	ZF1WF	103	HG5EA	101	W1YCO	100
DJ4LK	253	JA1DKS	119	JA7JW	105	ZL1BII	103	K3BEQ	101	W3JNW	100
JA2TY	213	DL9PO	115	LA9JM	105	DK2XV	102	OK1AIR	101	WA3BRW	100
K9UIY	165	F9ON	111	K5AMH	104	DK4YE	102	WA1NCK	101	WA3KOZ	100
JA1NVB	148	WA2RAZ	110	VE3DOR	104	JA1QER	102	WA2NDP	101	WA5TUR	100
HA4KYH	136	VE4SW	109	SM7AIL	103	KH6GJY	102	WA2SSV	101	WB5AHLX	100
W9YIE	133	WA5EEM	109	VE7AMD	103	WB9AAQ	102	W4HNK	101	W6JSO	100
W8PBO	128	DK3QE	106	WAØOVU	103	HA3GJ	101	YU3DKS	101	WØNG	100
JR1OUU	125	K6TL	106					G3AHB	100	WAØZRT	100
K6CQF	262	W1RL	130	W1CT	123	YJ8BL	110	W4WOY	104	DK1FB	100
W8WOJ	235	ZS7P	128	W5RI	118	7Q7WW	110	DK3ZC	103	WA2A1Q	100
EA8FG	202	EA6BM	126	W7QO	116	IT9SPI	106	G3WQA	103	W4HNK	100
JA2TY	181	DK1RS	124	PY1BQK	115	DL7BX	105	ZF1WF	102	WB4QVK	100
DL6QW	172	MP4MBB	124	DK4FE	113	WA6QZF	105	ZS6BLK	102	WB4QWM	100
JA1NVB	139									WB9AAQ	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.

W4EX	350	OZ6MI	305	DL6OW	270	W8LBM	240	VE1AL	200	WAØTLT	160
DL1HH	330	PY1HQ	305	I7WL	270	W8PCS	240	W2RHK	200	DL7PW	140
F3YR	330	W1OHA	305	ON5ZO	270	DJ9NW	220	W4GIW	200	JA2AHR	140
G6ZO	325	W2PPG	305	SM6CVX	270	K4EXI	220	WA8TBQ	200	K3NEZ	140
JA6AD	325	WB2UKP	305	W1DS	270	K4HMX	220	DJ6BN	180	K8HBN	140
KH6JJ	325	W5KGJ	305	W2GHK/4	270	K9LIH	220	K9JDV	180	WA1NRV	140
W8BVF	320	WA5QYR	305	W7VRO	270	PY5UG	220	W2AQT	180	W2CKR	140
K6CQF	315	W9IVG	305	W9GXH	270	WB2BNJ	220	W2ELW	180	WA2JRD	140
SM5RK	315	WAØKDI	305	CR6CA	260	W3AIZ	220	W2PEV	180	WB4NDX	140
SMØKV	315	DL3OH	300	F2NB	260	W3TVB	220	W3WI	180	WB4OGW	140
VE3WT	315	K4CEB	300	JA3AAW	260	W3YX	220	W6AYQ	180	WA9WVW	140
W1FTX	315	VE3DBT	300	JA8MS	260	W4SD	220	W6RFF	180	WB9EAO	140
W3PVZ	315	G6RC	290	KP4BJM	260	W6HPG	220	WA9FWY	180	WØHBH	140
HZPB	310	K5KBH	290	WB9FJX	260	W9LI	220	DK5QK	160	K7CXZ	120
JA1ZZ	310	OE1UZ	290	K2AHQ	250	DJ8JY	200	JA8KB	160	K8QWG	120
K5QHS	310	OE2EGL	290	W2AH	250	EA9AQ	200	K1LBB	160	KØLHE	120
LA1KJ	310	OZ3PO	290	W3BRB	250	JA1LN	200	SM7ABL	160	MP4TDM	120
WØGNX	310	OZ5DX	290	W5QBM	250	JA2AN	200	W1CYB	160	W1RML	120
5Z4KL	310	VE3AGC	290	WA5DRU	250	K2MFY	200	W4SNR	160	W2AFM	120
DJ1CG	305	WA8EIX	290	W6MI	250	K2UFM	200	W4VE	160	WA5NOM	120
HRB	305	W9KB	290	WB6WHM	250	K3BHQ	200	WB4QFH	160	WB5BIR	120
I3PRK	305	ZS6IW	290	WA9VGY	250	OZ1AJ	200	W6AKM	160	WB5DLX	120
K4CFB	305	F8CW	280	WA2EAH	240	PY1MCZ	200	WB6VGF	160	G3DPX/W6	120
K4YFQ	305	W2ICO	280	W6YUS	240	SM7CXH	200	W7JUO	160	W6KYA	120
K6HN	305	W9KQD	280					WA9TVM	160	W9OGY	120
W4EX	345	6W8DY	300	WB2HZG	270	W4SD	220	W2PEV	180	W1TIV	140
F2MO	320	CR6DU	290	W9IVG	270	W6HPG	220	W3YX	180	WA2JRD	140
SM5RK	315	DJ1CG	290	W8YEK	270	W8LBM	220	WA3ATX	180	WB4NDX	140
VE3WT	315	WA2HSU	290	WB9BGS	270	W9KB	220	WA5WQF	180	W5HCJ	140
KH6OR	310	W4EAL	290	W2VBJ	260	WB9FJX	220	W6EHA	180	W8MBB	140
W8ZOK	310	W7QK	290	W3HNK	260	I3ZOF	200	W7FSE	180	WB9DVV	140
HRB	305	WAØKDI	290	W5KGJ	260	K4TSJ	200	WA9FWY	180	YV4AFG	140
I3PRK	305	ZL3QN	290	5Z4KL	260	LA8RL	200	HR1RF	160	HK5DE	120
K5QHS	305	W3NV	280	DL3OH	250	OZ1AJ	200	K3CBW	160	JA1LN	120
WB2VAE	305	W4CYC	280	K4YFQ	250	PY1MO	200	K8THT	160	K3KHL	120
WA5QYR	305	WB6UJO	280	W3MDJ	250	W4GIW	200	VE1OC	160	K8TMK	120
W6GRV	305	ZL1AH	280	WA5DRU	250	W7MBX	200	VE5PB	160	KØIUC	120
W8VHY	305	CT1MW	270	W7VRO	250	W9DRL	200	W1CYB	160	MP4TDM	120
JA6AD	300	HUW	270	VE3AGC	240	DL2VS	180	WA2DVO	160	VE3EHG	120
PAØSNG	300	K1QMV	270	WB6WHM	240	HCRW	180	WA5SMM	160	W4GKF	120
WB2UKP	300	OE3SAA	270	DJ9NW	220	I2LG	180	DL7PW	140	WA4ZXO	120
W4BRE	300	W2GHK/4	270	K4HMX	220	W1OHA	180	SM7ABL	140	W5QHF	120
YV4QG	300									WB6UNS	120

it's not a condemnation, not an accusation, not a warning. It's just advisory. It can happen to anyone, has happened to most (yes, even to W1AW). At best, drop the OO a "thank you" card, and skip the "buts." You owe him no explanation and he asks for none. At worst, ignore the notice (and hope the next one won't come from FCC). Above all, don't make an ass of yourself by writing the OO a nasty letter telling him how stupid you think he is and recounting to him all your superior qualifications and experience that make you infallible.

Yes, the Official Observer is doing a good job for us amateurs – for *you*. We need more of him – more qualified amateurs with experience, courtesy, sound judgment and dedication to the amateur service's traditional reputation as a largely-self-regulating body of communicators requiring a minimum of FCC supervision in monitoring and enforcement. If you're interested, ask your SCM, or us, about qualifications.

Absentee Voting. In case anybody has wondered, absentee ballots can be arranged so that U.S. or VE amateurs overseas with APO addresses can vote in their home sections if they wish. Normally, an APO-NY addressee would receive a ballot for an SCM election in the NYC-LI section, about which he usually couldn't care less; and an APO-SF addressee would, of course, receive a San Francisco section ballot.

However, advance notice is required. If there is an election coming up in your home section and you are a full ARRL member and want to vote, notify us in advance so we can make sure you receive a ballot. – *WINJM.*

SEPTEMBER 10 FMT RESULTS

The September 10 ARRL Frequency Measuring Test brought in a total of 137 entries representing 1416 individual measurements. Entries received after the announced date of September 21 are not listed (that's the day W1AW started carrying the results of the test). The umpire measured frequencies for the early run at 3531.194 and 7052.486. Due to QRM, there was no measurement on 20. The late run checked out at 3528.183 7041.206 and 14105.235 MHz. Interested in an appointment as ARRL Official Observer? If so, check with your SCM (see page 6). Plan now to participate in the November 11 FMT, full rules on page 125 of October *QST*.

HONOR ROLL

This top listing is the standing of the frequency measuring leaders. In consideration of the minimum possible error due to doppler and other unavoidable factors, we accredit as of equal merit all those reports computing 4/10ths parts per million (or higher) accuracy. A participant must submit a minimum of 2 measurements to qualify for this listing.

W1BGW W1PIJ K1VHO W2EHA WA2KSB W2YYW W3BFF W3GEX W3PT W4AQD/2 K4RE W4NTO WA4YVQ W5QLO WB6AAL W6BEW W6BXR W6CBX WB6IQM K6KA W6RQ WA6SPJ W6TDZ K7JNK W7QPK/ø W8QZT W8MDI. W9BCY W9MNY K9WGN WØIQW KØVQM VE5DP Ireland.

In the following tabulation, error percentage can be determined by moving the parts-per-million decimal point (the figure shown in parentheses) 4 places to the left. Class I OOs must demonstrate an average accuracy of better than 71.4 parts per million. Class II OOs must show at least 357.2 ppm.

(.5) WA6RZJ, (.6) KØTOV, (.7) K6MZN KØBRS WAØEFN, (.8) K6HV, (.9) W6NBS, (1.2) WØKJY/ø, (1.3) W5TFW W6CBF K6DM W7AXT, (1.5) WØMDL, (1.6) WAØJYK, (1.7) K9WMP KØRPH, (1.8) W6FB, (2.1) W5IJW, (2.3) WØWHE, (2.5) W8DPW, (2.6) W9REC, (3.0) WA5RIO, (3.1) W9KO, (3.3) WA2MID, (3.4) W5CQS, (3.8) W6CDF WA1IUR, (3.9) W9HPG, (4.7) WØLUH, (5.1) W9MKL, (5.3) K9BGL KØTTV, (5.9) W1DDO VE6MJ, (6.1) W2AET W2SAS, (6.4) WB9FHL, (7.0) WA4NWM WA6NGO, (7.1) W4QN, (8.9) WB6BWZ/4, (9.3) K6EC, (9.6) W7FIS, (11.2) KØSGJ, (13.2) WAØDYZ, (14.3) K3PZU WB8AYC, (14.4) W5FMO, (15.6) K6ASK, (16.0) W4YOK, (16.5) K9DQU, (17.0) K2HBA/4 K6CL, (17.7) W3ADE, (18.9) W3FA, (19.0) W3FYK, (19.3) WA5LES, (22.6) K3STU, (24.6) WB6UAX, (25.8) WA2CCF, (29.8) VE3FVW, (30.9) WA6ZKI, (32.9) W2JDC, (34.7) KØRJS, (38.9) K9UQN, (39.2) K9GEL, (39.9) W3IN, (45.7) WB6ITM, (45.9) WA2LLF, (46.5) WA2PJL, (49.5) W2BHJ W9KFI, (51.3) K6GG, (52.8) W9UC, (67.8) WA7HGB, (79.7) W8HR, (87.9) WØLQK, (92.5) WØPHY, (95.4) W1DGL, (104.6) W7RVA, (114.5) W6WRJ VE3GEQ, (132.9) VE2ALE, (134.5) WA3RMS, (142.1) WB6IQM, (210.6) Mallozzi, (242.1) W5QNY, (278.0) K7MTZ, (579.7) WA1FBE, (1391.9) K9HQC, (2128.4) W8OMY, (2651.6) W5YX, (35,449.4) K9TPC.

IN A COMMUNICATIONS EMERGENCY, MONITOR W1AW FOR SPECIAL BULLETINS AS FOLLOWS:

Phone: On the hour GMT
RTTY: at 15 minutes past the hour GMT
CW: on the half hour GMT

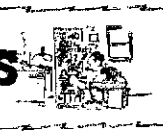
RULES FOR LIFE MEMBERSHIP

1. A paid-up Life Membership in the League shall be available to any Full or Associate Member, other than a Family Member, upon payment of a fee twenty times the annual dues rate, and upon approval of the application by the League's Executive Committee.
2. The Life Membership fee for U.S. applicants is currently $150, for Canadian applicants $170, and for other applicants $180, all in U.S. funds.
3. An applicant may choose an alternative time-payment plan of eight quarterly installments ($18.75 for U.S. applicants, $21.25 for Canadians, and $22.50 for others), to be completed within a two-year span. In such instance, he will be provided an interim two-year Full Membership certificate. Upon completion of the payments, Life Membership will be granted.
4. Life Memberships are non-transferable, and dues payments are non-refundable. In the event an applicant is unable to complete payments on the installment plan within the two-year span, he will be given a term of membership, at the annual dues rate, commensurate with payments received.
5. Other licensed amateurs in the same family, and at the same address, of a Life Member may retain or obtain Family Membership upon payment of the annual dues of $2, but without receipt of *QST*. The dues of the Family Member may be prepaid for any number of years in advance, but there is no special rate.
6. Life Membership is also available to blind amateurs upon payment of a fee of $40, without the receipt of *QST*.

ARE YOU LICENSED?

- When joining the League or renewing your membership, it is important that you show whether you have an amateur operator license. Please state your call and/or the class of operator license held, that we may verify your classification.

Station Activities



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, Roger E. Cole, W3DKX – SEC: WA3DUM. RM: W3EEB. PAM: WA3GSM. Delaware Nets: DTN – Mon.-Fri. 3905 kHz 2230Z. DEPN – Sat. 3905 kHz 2200Z. Del. 2-Meter Net – Mon. 145.26 MHz (A.M.) 2330Z. A 1959 Del. Emergency Net Roster lists W3GTZ, W3FEG, W3FJF and W3HGA still active on Del. nets. The DELMARVA Hamfest with a fair crowd despite threatening weather, saw the Mason-Dixon Pirate Radio Club win the VHF Trophy and the Brandywine ARC edge out the Maverick ARC for the John Thompson Memorial Field Day Trophy by one contact. WA3FYS, WA3SDU and W3PCZ are among the newcomers to 2-meter fm. WA3IID with a new linear and WA3GQY with a new antenna system are putting strong signals into the Del. nets. WA3GAY at the U. of Del. is resuming activity. DTN reports QNI 174, QTC 66/65 with 36 different stations. DEPN shows QNI 48, traffic 4/4 with 23 different stations. PSHR: WA3GSM 61, K3KAJ 53, WA3DUM 44. Traffic: WA3GSM 123, K3KAJ 66, W3DKX 42, WA3DUM 40, WA3IID 37, W3EEB 18, W3GTZ 2.

EASTERN PENNSYLVANIA – SCM, George S. Van Dyke, Jr., W3HK – SEC: W3FBF. RMs: W3EML, K3BR, K3MVO, WA3AFI, K3PIE, W3CDB. PAMs: K3BHU, WA3PLP. OBS reports received from WA3AFI, WA3LWR, WA3QOZ, WA3EEC. OVS reports from W3ZRR, W3CL, WA3MCK, WA3EEC. OO reports from K3RDT, WA3EEC. BPLs: W3CUL, W3VR, K3NSN. PSHR: K3BR, WA3OGM, K3OIO, WA3QOZ. Less pressure this month, no emergencies!

Net	*kHz*	*Operates*	*QNI*	*QTC*	*RM/PAM*
EPA	3610	7:30 P Dy	304	262	K3BR
PTTN	3610	6:30 P Dy	144	70	WA3AFI
EEPN	3733	6:15 A MF	169	239	WA3QOZ
EPAEPTN	3917	6:00 P Dy	402	97	WA3PLP
PFN	3960	5:30 P MF	583	510	K3BHU

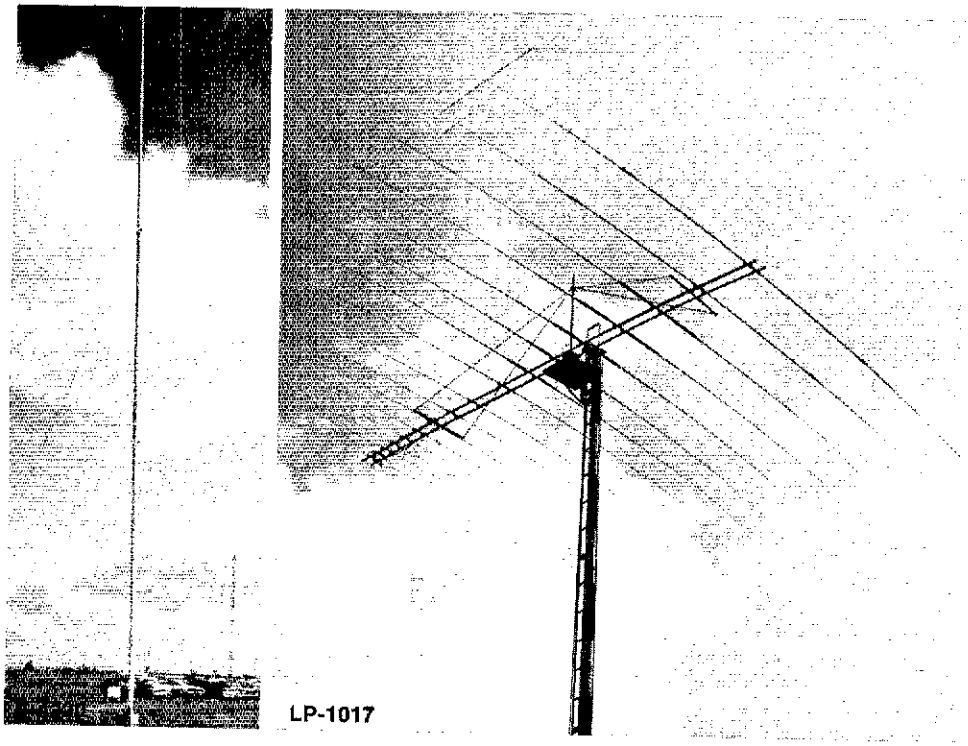
HK1AMW returned to S.A. after visit to Phila. at K3NSN's QTH. W3VR shifted from glue to scotch tape for his reports. WA3OGM says hamfests are the places to meet the guys you work. WA3ATQ mobiling in Canada. W3BNR keeping busy on RACES. W3BUR says 2-meter fm really picking up in Quakertown area. W3AXA made it to ARRL Hq. WA3EEC now in graduate school. WA3IYC now in U. of P. will hear him from W3ABT. W3LC still busy rebuilding. W3EU says if you ever need spare parts, better start looking early and long. Agnes put W3GMK out of business for a while. W3ID reports Montgomery Co. AREC were active during the floods. W3FBF back from New England, expect to hear more from the SEC this season. W3LXC received his old call back after 20 years of inactivity, now handling traffic. W3ZMN using Bethlehem 2-meter fm repeater for propagation broadcasts regularly. K3HXS and K3KNL had WB9BJC and WA8KYF as visitors. WA3PLP says the flood traffic gave the traffic men a real taste of it and now they are clammering for more! I note from reading several club papers that training classes for new hams are becoming more prevelant, that's good. Hope all the antenna repairs are done again. Traffic: W3CUL 3186, K3NSN 1046, W3VR 697, W3EML 456, WA3QOZ 426, WA3OGM 386, K3BR 132, WA3MQP 119, K3OIO 94, WA3ATQ 70, WA3CFU/3 43, WA3AFI 37, W3NNL 26, K3MNT 20, WA3CKA 18, W3BNR 15, WA3QLG 13, W3ADE 11, W3BUR 11, W3HK 11, W3LCX 10, W3AXA 9, WA3EEC 9, WA3IYC 8, WA3RJC 8, K3TNL 7, WA3LWR 5, W3LC 4, WA3MCK 4, K3MVO 4, WA3BJQ 2, W3EU 1, W3GMK 1, W3ID 1, W3KEK 1.

MARYLAND - DISTRICT OF COLUMBIA – SCM, Karl R. Medrow, W3FA – RM/MDD: W3EZT. PAM/MDCTN: W3FCS. PAM/MEPN: W3LDD. WN3RCI has learned the trick and made BPL for Aug. His goal is 12 straight months. WA3PJG kept things alive for the summer, but he must get with it this school year. Club news has W4ZM, W3BWZ, W4YZC and W3ZNH leading PVRC to new glories. The Nat. Capitol DX Assn. has W3ZNH, WA3KSQ, W3BWZ and W3DBT as top management. Watch 'em go! WA3QDH reports the High Point HS of Beltsville WA3DJQ is going great with WA3s QDH, QPM and QGA as chief ops, and they are getting those new Novices trained properly. The New Carrollton ARA and the Greenbelt ARA are now the Prince George's Wireless Assn., K3CEZ. W3LDD reports MEPN had 366 check-ins in 22 sessions a QTC of 40 and 48 informals. W3ADQ is the topper for Aug. W3FCS says MDCTN met 18 times with 69 messages and a QNI average of 15.2. W3EZT reports WA3GSM and K3KAJ of Del. are handling the MDD hot spots. This net met 62 times with QTC of 243 and QNI average of 8.0. W3QU has conducted 3 new Novice exams this month – a real help. K3HPG has solved the restricted antenna problem – a downspout. Works good on 3 92 MHz. K3HNY interested in antique autos. Convertees to 2-meter fm mobile are W3GRM and W3ECP. WA3MJF successfully passed Extra Class. W3ABC glad to be out from under the pile-ups in HC1 and HD8. W3TN says no comment to the summer. WA3RDU is busy with an external VFO and chuckling over his NCS job mobile from deep in Va. W3ZSR has everything tuned up to peak for the coming season. W3ZNW looks forward to EST and renewed activity. WA3IYS is editor of his school paper, and plans to edit and publish a section bulletin. W3EOV takes side trips to the midwest. WA3GXN and WA3IIV live in luxury in their fancy Airstreams, also K3GZK. WA3MSW ready for new adventures. WA3EHK has summer chores accomplished. W3GN was W8HR this summer. K3STU renews as OO. K3STU, W3NGJ and K3GKU entertained the Knights of Columbus Council with an hour program on ham radio. WA3JSZ is settled in new QTH. K3LFD looking for AREC applicants. Renew if you have lapsed. See your EC. Traffic: (Aug.) WN3RCI 293, WA3PJG 188, W3TN 85, W3FA 81, W3QU 81, WA3AFO 65, WA3LFU 57, W3FCS 31, WA3MSW 20, W3ECP 18, W3GRM 17, WA3IIV 16, WA3EHK 12, W3EOV 11, WA3MJF 10, WA3RDU 8, W3ZSR 6. (July) K3GZK 20, WA3RDU 5.

SOUTHERN NEW JERSEY – SCM, Charles E. Travers, W2YPZ – SEC: W2LVW. RM: W2JI. PAMs: WB2FJE, W2YPZ. WA2KWB is now at the Fort Hancock Flying School. Among the certificate renewals are W2ZI who is going strong on voice and cw; WA2FGS and W2CDZ. K2ARY reports transmitting eight bulletins during July and Aug. on 146.88 MHz, Sun., Tue. and Thur. W2FBF reports no poor operating practices during July. W2ORS is again back at school. Too much cannot be said in appreciation of the splendid and consistent work done by WB2VEJ. Another wonderful hamfest sponsored by the SJRA has become history. A well organized program speaks for itself in the great turnout. Congratulations are in order to all who did such a wonderful job. Many "eyeballs" were exchanged and refreshments were delicious. Activities should be well established as this goes to press with increased activity on the part of all hams in providing traffic and net activities. Let us try even more to increase the traffic picture. Originate as much traffic as possible and keep things moving along. Traffic: WB2VEJ 168, W2ZQ 56, WA2CZI 28, W2KGM 8, W2YPZ 3, W2JI 7, W2ZI 7, W2IU 6, WA2KIP 4, W2ORS 4.

WESTERN NEW YORK – SCM, Richard M. Pitzeruse, K2KTK – Asst. SCM: Rudy M. Ehrhardt, W2PVI. SEC: W2CFP. The list of section nets appears in the Apr. station activities column. We have a new procedure for all traffic handlers to follow in reporting traffic. Please mail ALL traffic reports to the Asst. SCM, W2PVI, even traffic reports which originated on the air in message form. Rudy has graciously offered to do the tabulating of these reports for me; with the work load as SCM being what it is, I have graciously accepted his offer. NYS reports handling 318 messages in Aug. with 699 sessions. The NYS softball team, trounced the NJN team 19 to 15 at the NYS picnic, returning the W2FR trophy to NYS. The hospitality of W2MTA and family again being fantastic at that picnic. WA2CDV is active on all bands with a long wire. Old man Murphy took WA2OMN off the air for 5 hot Aug. days. It appears that most clubs are geared up again. Do you support your local club or are you one of the guys who just complains about the clique running it? W2RUT is anxious to put up a new antenna but is having trouble finding the necessary parts. W2RUF reports a new NYSCN

hy-gain Commercial duty HF antenna systems don't compromise HF efficiency



LP-1017

New from Hy-Gain...replacements for the old, inefficient whip and tuner combinations. Now get maximum performance from two new high efficiency antenna systems that operate *without* tuners or other external matching devices. Specifically designed for commercial duty HF communications circuits. Connect your transmitter, receiver or transceiver...and communicate with nearly 90% efficiency.

Check Hy-Gain features...and low *prices.*

Model V-4220 Vertical Omnidirectional
4 through 30 MHz (or 2 through 30 MHz)

- Tunes any frequency 4 through 30 MHz (or 2 through 30 MHz)
- No tuner required—50 ohm input
- VSWR 1.5 to 1 maximum
- True ¼ wave monopole radiation patterns at all frequencies
- Available in fixed station and shipboard models
- Installs with 2 men in a matter of hours

Model LP-1017 Log Periodic 6.2/30 MHz

- Only 36' x 40', 500 lbs.
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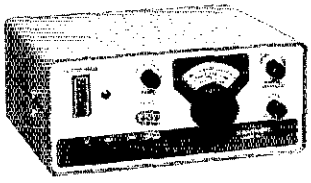

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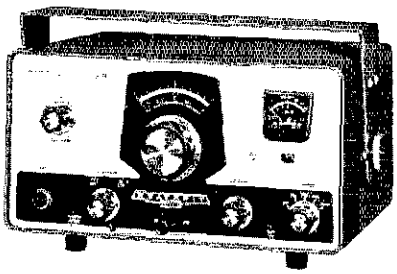

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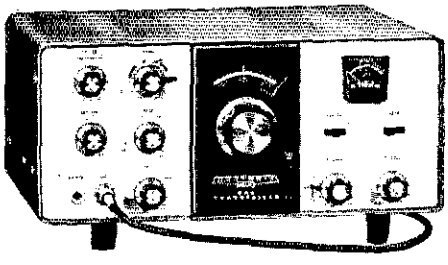

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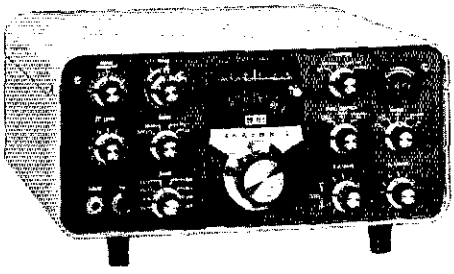

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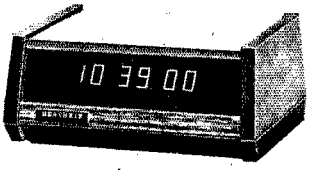

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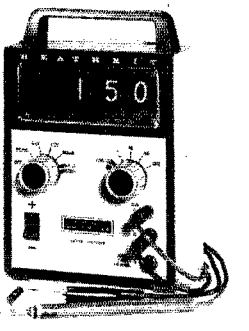

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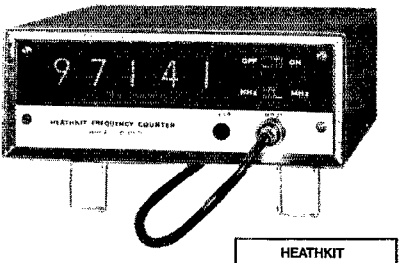

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training session is available to learn NTS procedures. It meets Mon. at 7:45 P.M. local time on 3677 kHz. Congratulations to the Radio Amateurs of Western New York (RAWNY) for having been a League affiliate since 1922. K2VCZ got a car load of ham goodies for $3.00 at the NYSPTEN picnic. K2HOH received the top prize. WB2KAO does an excellent NCS job on NYSPTEN with his braille typewriter. WA2EYF is the new EC for Erie County and is looking for AREC members. W2SD, an antenna pioneer, has a potent signal with his new TR-4. K2SRY, as of 9 years ago, just returned from the Orient and now is W2GLH. WB2EDT organized an ARRL Flood Disaster Review meeting in Rochester. A similar meeting was held in Syracuse on the same day. ARRL's W1NJM attended both meetings. WB2LVW returned to Elmira after 4 years as portable 4. WA2ANE received a surprise QSL from a KG4 worked ten years ago. The Limestone Radio Society provided 2-meter fm communications for the Canastota to Dewitt canoe races. Participating were W2ACM, W2AMY, W2LBO, W2RC and W2SBI. No Aug. BPLs but W2OE gets one for July. Traffic with the * indicating PSHR: (Aug.) WA2ICU* 279, W2FR* 245, WA2ELD* 184, W2RUF* 172, W2MTA* 90, W2MSM 81, WB2NRK* 80, KF2NYS 76, W2OE 73, W2RQE 68, WA2LQP 65, W2FZK 63, W2EAF 59, W2HYM 48, W2RUT 45, WA2AYC* 42, WB2EEX* 41, WA2AOG 40, K2KTK* 36, WA2PUU 32, WN2ADW 30, WB2VND 17, K2DNN 11, K2OFV 9, K2IMI 9, WA2ANE 9, WA2PUX 7, W2PVI 5, WN2SMQ 3, W2CFP 2, WA2OMN 2. (July) W2OE 587, WB2NRK 147, WB2EEX 48, WA2OJC 1.

WESTERN PENNSYLVANIA – SCM, Robert E. Gawryla, W3NEM – SEC: W3KPJ. PAM: K3ZNP. RMs: W3LOS, W3KUN, WA3IPU. WPA CW Net meets daily on 3585 kHz at 7:00 P.M. KSSN meets Mon. through Fri. at 6:30 P.M. on 3585 kHz. The WPA CW traffic net gang held their annual family picnic and yearly meeting at Cook Forest Park with 22 members and their families attending. WA3LJW is back on the air after an absence of a year and a half with a new Drake TR-4 and a 40-10-meter vertical. The Foothills ARC has started a Novice Net Fri. at 7:00 P.M. local time on 7184 MHz with WN3SSU as primary NCS. The following new Novices in the Greensburg area are having a little contest among themselves to see who gets WAS first. They are WN3s RVD, RVN, SPG and SSU. WN3SZX is a new Novice in the Sharon area and has been pushing some traffic. WN3TMG is a new Novice in the Indiana area. The following amateurs have upgraded their licenses: K3OFN and K3PLX to Extra Class, WN3SMD and WN3SLZ to Advanced Class and WN3SMG to General Class. The Pennsylvania State Univ. ARC K3CR, is sponsoring Penn State Amateur Radio Week the last week in Oct. to commemorate 60 years of amateur radio at the University. Check your license. Don't let it expire. Upgrade while you renew. PSHR for Aug.: K3ZNP 44, WA3QQR 41, W3LOS 39, W3NEM 39, WYA 34. WPA traffic net had 31 sessions, 327 stations QNI and handled 163 messages during Aug. Traffic: W3YA 159, W3NEM 110, WA3QQR 88, W3LOS 86, W3KUN 80, K3ZNP 78, WA3IYA 30, W3MJ 26, K3HCT 23, W3SAY 19, WA3LDA 17, W3ATQ 14, W3SN 9, WA3MDY 8, WA3EJO 7, K3VQV 5, W3IDO 4, WN3SZX 4, K3SJN 2, WA3PMI 1.

CENTRAL DIVISION

ILLINOIS – SCM, Edmond A. Metzger, W9PRN – SEC: W9RYU. PAMs: WA9UCP and WA9PDI (vhf). RM: WA9ZUE. Cook Co. EC: W9HPG.

Net	*Freq.*	*GMT/Days*	*Tfc.*
IEN	3940	1400 Su	
ILN	3690	0300/2330 Dy	131
NCPN	3915	1300/1800 M-S	149
Ill PON	3915	2245 M-F	821
Ill PON	3915	1430	
Ill PON	145.5	0200 MWF	15
Ill PON	50.28	0200 M	0

RM WA9ZUE returning from vacation reports the July traffic for the ILN was 118. WB9CCQ's station was recently struck by lightning but damage was light. WA9UKL won a TR-22 at Turkey Run Hamfest. The Annual Hamtesters picnic broke all attendance records and the weather cooperated. The Springfield, Ill. amateurs are installing a two meter repeater station. W9EX and K9IKR helped to summon ambulances, etc., by way of repeater WA9GCK when he witnessed two overturned cars on the Toll Road interchange near Chicago. WA9NRI, K9VGN, W9PYG, K9YST, WB9DJI, W9OKE, WA9JXT and WA9RIJ are the new officers of the York Radio Club. W9DDX spoke at their latest club meeting. Now is the time for clubs in the Ill. section to plan and promote amateur radio with code and theory classes and to be sure that publicity via the news media is used to exploit them. W9LVT won

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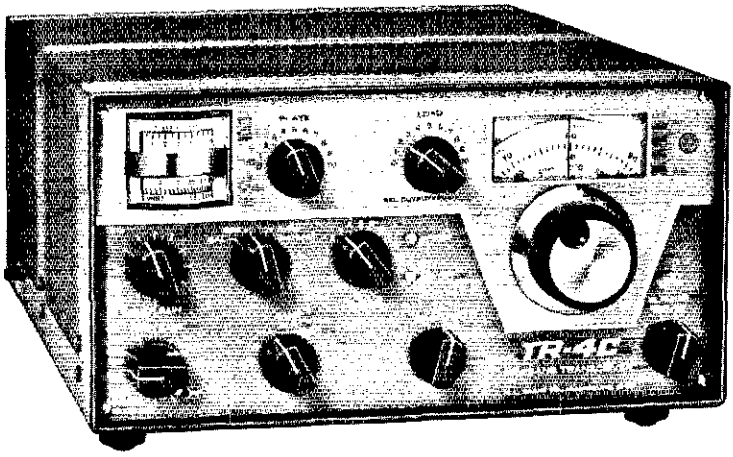

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2300C AC supply 90
Mark II Lin./sup. 450

TRIO
JR-310 Receiver $119

VARITRONICS
FDFM-25 Xcvr $ 99
IC-2F 2m Xcvr 189
PA-50A 2m Amp. 75

NEW EQUIPMENT SPECIALS & CLOSEOUTS

	reg.	NOW
BTI		
2000 Wattmeter	$ 49	$ 39
CLEGG		
22'er FM series 25	$384	$284
Thor AC Supply/Modulator	139	70
Thor DC Supply/Modulator	159	80
EICO		
751 AC Supply Kit	$ 79	$ 49
751 AC Supply Wired	109	79
752 DC Supply Kit	79	49
752 DC Supply Wired	109	69
GALAXY		
FM-210 2m FM 12v	$229	$179
PA-210 2m FM Amplifier	149	49
AC-210 AC supply/booster	49	39
G-35A DC Supply	99	69
GT-550 80-10m Transceiver	550	395
GAVIN		
Maverick II 2m Filter	$ 34	$ 17
GONSET		
902A DC Supply	$ 79	$ 49
HALLICRAFTERS		
SX-146 Receiver	$295	$195
HY-GAIN		
203BA 3 el. 20m Beam (shipped in error to a customer)	$139	$ 89
HB2S2 stacked 2m halos	26	12
SJ2S2 2 el., 2m J-pole	33	17
SD-150B 159-174Mc J-pole	125	49
JOHNSON		
6N2 Converter(26-30Mc I.F.)S	89	$ 59
LINEAR SYSTEMS (ADCOM)	reg.	NOW
350-6 6v DC Supply	$125	$ 25
12-150 12-110v 150w inverter	60	29
RAYTRACK	reg.	NOW
DX-2000L 80-10m Linear	$699	$599

	reg.	NOW
REGENCY		
DR-200 HI/LOW Rec. 110v	$200	$139
DRS-1A Spkr. for above	16	9
MR-33D 30-50McMonitoradio	84	59
TMH-1 single freq.(150-175Mc)	115	49
PR-35BR (30-50Mc) 110v tunable	39	29
SQUIRES SANDERS	reg.	NOW
SS-1S Noise Silencer Strip	$100	9
SWAN	reg.	NOW
TV-2 2m Transverter	$295	$199
410C VFO for 500C	120	99
22B Adaptor	32	25
500CX Xcvr. w/SS-1S filter installed	549	499
TECRAFT	reg.	NOW
TR-20 6m AM xmtr.	$ 65	$ 39
Model 90 6m Conv.(14-18Mc)	54	39
VARITRONICS	reg.	NOW
FDFM-2 and BP-1	$262	$159*
FM-20M Mobile Amp.	150	59*
FM-20BM Base Amp./supply	235	89*
PA-50A 2m FM Amp. 12v	129	99*
FDFM-2S (mod. for MARS)	310	189*

* with 90-day A E S warranty

	reg.	NOW
WATERS		
346 Nueverter, 6+2 Conv.	$175	$ 99
354 Electronic vernier tuning for KWM-2	24	17
355 Electronic vernier tuning for KWM-2 with Waters Q-Mult./notch filter installed	22	9
369 Reflectometer	120	69
SBE	reg.	NOW
SB2-VOX Acessory Unit	$ 38	$ 23
SB2-MIC Mike (dynamic)	16	12

REGENCY HR-212 2m FM Transceiver. 12vdc, 12 channels. Approx. 20 watts output. Unique mode switch allows paired or independent selection of 12 transmit and 12 receive channels (144 possible combinations). With crystals for 146.94 MHz, mic. and mobile mtg bracket..... $259.00

OTHER REGENCY 2m FM PRODUCTS

HR-2A 6 channels. Approximately 15 watts out. 12vdc	$229.00
HR-2MS 4ch xmit, 8ch Rec. w/scanner feature. 12vdc	319.00
HR-2S same as above, but for 117vac	349.00
AR-2 50 watt, 12vdc, Mobile Amplifier	119.00
P-107 13.6vdc 3 amp. regulated supply	39.95
Receive crystals for HR-2A, MS, S, HR-212	4.95
Transmit crystals for HR-2A, MS, S, HR-212	6.50
MA-10 12vdc cord with cigarette lighter plug	2.95

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• Performance
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TR-22 Portable 2m FM Transceiver	199.95
AA-22 Rec/Xmtr Amplifier - 12vdc	149.95
MMK-22 Mobile Mount	9.95
Extra crystals for ML-2F ..... each	5.00
Extra crystals for TR-22 ..... each	7.50
DRS-1 Digitally Synthesized Receiver	2195.00
2C Receiver	255.00
2AC Calibrator for 2C	18.75
2CS Speaker for 2C	22.00
2CQ Speaker/Q-multiplier for 2C	39.95
2NB Noise Blanker for 2C	26.95
R-4B Receiver	475.00
MS-4 Speaker for TR-4/6, R-4B	22.00
TR-4 Transceiver 80-10 Meters	599.95
34PNB Noise Blanker (plug-in)	100.00
RV-4 Remote VFO for TR-4	110.00
FF-1 Crystal Control adaptor	46.95
TR-6 Transceiver - with noise blanker	650.00
RV-6 Remote VFO for TR-6	110.00
AM Plug-in Filter for TR-6	35.00
CW Plug-in Filter for TR-6	35.00
LSB Plug-in Filter for TR-6	35.00
AC-4 AC supply for TR-4/6, T-4XB	99.95
DC-4 12vdc Supply for TR-4/6	125.00
MMK-3 Mobile Mounting kit for TR-4/6	6.95
MC-4 Mobile Console for TR-3/4/6	69.00
2NT CW Transmitter	175.00
T-4XB SSB Transmitter	495.00
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MN-4 Antenna Match Network	99.00
MN-2000 Antenna Match Network	195.00
W-4 RF Wattmeter (2-30 Mc)	61.95
WV-4 RF Wattmeter (20-200 Mc)	73.50
C-4 Station Control Console	305.00
TC-6 6m Transmitting Converter	278.00
TC-2 2m Transmitting Converter	378.00
SC-2 Receiving Converter for 2m	86.00
SC-6 Receiving Converter for 6m	71.00
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TV-1000LP Low-Pass Filter	18.75
LN-4 Line Filter 120v 5 amp	8.00
729SRD Microphone with plug	19.95
SPR-4 Programable Receiver	499.95
5NB Noise Blanker	65.00
DC-PC DC Power Cord	5.00
TA-4 Transceive Adaptor	18.00
SCC-4 Crystal Calibrator	20.00
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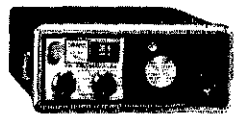
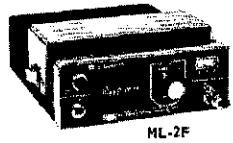
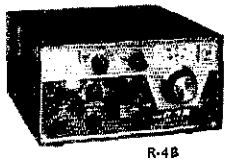
CRYSTAL KITS FOR SPR-4	
Aeronautical Overseas – 7 crystals	32.00
Amateur Bands – 6 crystals	27.00
Citizens Band – one crystal	5.00
Marine Bands – 11 crystals	49.00
MARS – 5 crystals	22.00
Teletype Commercial – 4 crystals	18.00
Time & Freq. Std., WWV – 5 crystals	22.00
Tropical Broadcast – 3 crystals	13.50



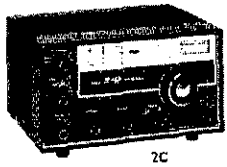
TR-22



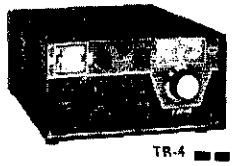
ML-2F



R-4B



2C



TR-4

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2NT Transmitter	$10 Bonus	TR-4 Transceiver	$50 Bonus
2C Receiver	$20 Bonus	L-4B Linear	$80 Bonus
SPR-4 Receiver	$40 Bonus	ML-2 2m FM Xcvr	$30 Bonus
R-4B Receiver	$40 Bonus	TR-22 2m FM Xcvr	$10 Bonus
T-4XB Transmitter	$40 Bonus		

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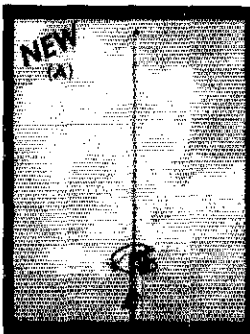
the CQ phone contest for 9-Land. WN9HPV now is WB9HPV. WN9KOS also was tired of his N and is WB9KOS. The repeater at the Egyptian Radio Club station suffered fire damage. W9FHW, K9CRX and W9JAN were elected officers of the Tri-Towa Radio Amateurs Club for the new season. Send get well cards to W9LLX. The Sangamon Valley Radio Club (Springfield) members monitored the radio station at the Chapter House to the Ill. State Fair Grounds for emergency standby. Traffic: W9NXG 298, WA9VGW 270, WA9ZUE 156, WA9OBR 131, W9TAL 124, W9AES 64, W9LNQ 49, WA9LDC 48, WA9RTB 43, W9JXV 39, WB9FHI 21, W9KRR 19, W9PRN 16, W9KR 15, WB9HEG 11, WA9LHU 7, WB9LLP 6.

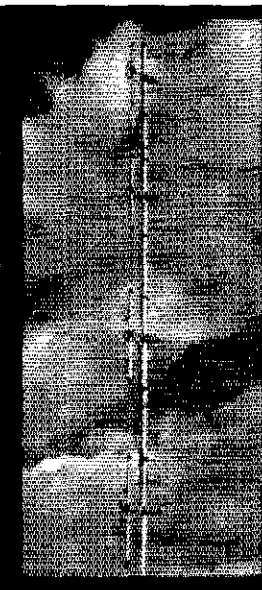
INDIANA – SCM, William C. Johnson, W9BUQ – SEC: W9FC. RMs: WB9ANT, WB9EAY, W9FC. W9HRY. PAMs: K9KTB, (vhf) W9HWR, W9PMT.

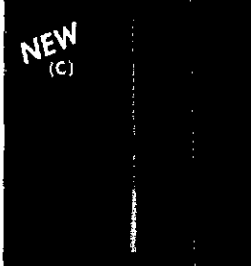
Net	*Freq.*	*Time(Z)/Days*	*Tfc.*	*Mgr.*
IIfcN	3910	1330-2300 Dy 2130 M-S	553	K9KTB
QIN	3656	0000-0300 Dy	210	WB9ANT
IPON	3810	1245-2130 Su 2000 S	26	WB9AHJ
IPONVHF	50.7	0100 M-Th	7	WA9ULH
IPONCW	3740	0000 Dy	41	WB9AHJ
Hoosier VHF			21	W9PMT
IPON VHF	50.2	0200 Dy	25	W9MHZ

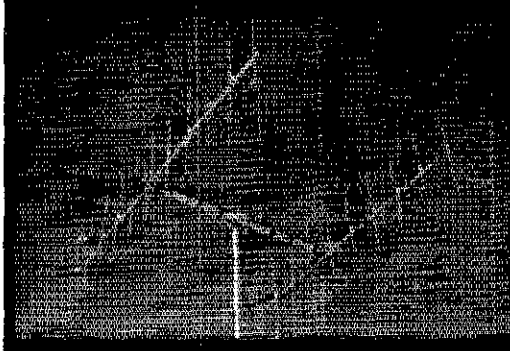
With deep regret I report the passing of W9PC. WA8FKQ/9 has moved to Fort Wayne. WA9OHX has resigned as PAM Ind. Tfc. Net. K9KTB has accepted as PAM Ind. Tfc. Net. WA9PQM was married Aug. 5. WN4VZC/9 passed his General, will have a 9 call as soon as he gets his new license. WA9KWH is trustee for the Jay County Amateur Radio Society, W9SNO. WA9MXG, WA9BWY will sponsor the Annual Ind. QSO party Sat. Dec. 2, 1972. W9BUQ will be EC for the following counties bordering Marion County; Boone, Hamilton, Hendrick, Morgan and Marion. We need an EC for Shelby Co. Let's get the AREC active in the central part of Ind. W9DZC is EC Hancock Co., K9QJT EC Johnson Co. Navy MARS had their picnic at Northeast park Aug. 20. K9IU, Ind. Univ. ARC has been very active. W9PSB is home from hospital. A bulletin was received from WB8IDD about 220 activity in Mich. and northern Ind. QIN Honor Roll: W9EI, WB9GVT, WA9EED, WB9ANT. BPL: K9IU. Amateur radio exists because of the service it renders. K9FOV monitors 29.6 fm and can operate on 146.94-52.525. Traffic: (Aug.) K9IU 401, K9FZX 257, WB9GVT 257, WA9OHX 226, WA9WNH 105, K9CBY 91, WB9AHJ 83, W9BUQ 71, W9HRY 66, WA9EED 63, W9QLW 54, W9JRQ 53, K9KTB 37, W9EL 36, W9KWB 32, WB9BAP 26, K9RWO 24, W9FWH 21, W9PMT 20, WN9VZC/9 20, WB9FOT 18, W9DZC 16, K9YBM 16, W9UEM 14, WA9WJA 13, K9JQY 12, WA9AXF 11, K9EFY 11, K9RPZ 10, WA9TJS 10, K9DIY 8, K9ILK 8, W9RTH 8, W9HWR 7, W9PNP 5, WA9BVL 4, WA9OAD 3, W9BDP 1. (July) WA9TJS 30, WA9BVL 26, K9BQN 16.

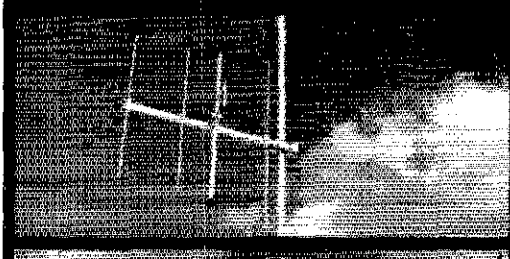
WISCONSIN – SCM, Joseph A. Taylor, W9OMT – SEC: W9NGT. PAMs: K9FHI, WA9OAY, WA9OKP, WA9PKM. RMs: W9UCR, K9KSA. Net statistics: WS8N QNI 891, OTC 212; WIN Early QNI 206, QTC 99; WIN Late QNI 154, QTC 74; BEN QNI 599, QTC 164; BWN QNI 384, QTC 250; SW2RN QNI 151, OTC 3; WI-PON QNI 498/17, QTC 127; Wis RACES QNI 41; Wis QCWA QNI 53. As of Oct. 1, the early session of WIN begins at 7 P.M. local time. W9CTJ has been working with the Milwaukee area amateurs to get regular Milwaukee outlets to QNI the WIN, let him know if you can help. W9UCR has a fine presentation on the NTS, if your club would like a program for one of its meetings drop W9UCR a line. Your SCM and SEC will also be glad to give a program at one of your meetings. Mr. Ray Waldman newly appointed meteorologist in charge of National WX service in Milwaukee was the guest at the Sept. meeting of the WNA. He congratulated the hams for their participation in the past and requested more participation from northern area amateurs, QNI the BWN if you can help. WB9GUG now at the UW Eau Claire. We are in need of a couple OBS to QNI the phone nets, if you qualify and would like to try this appointment, let me know. We are always interested in obtaining more ORS, OPS and OVS appointees. W9UCR reports we still need several stations to act as liaison between the cw and phone nets. Give the other mode a try, you'll be a big help in moving traffic within the section. W9QYH has a new roter and reports excellent results from his portable location at Spectacle Lake. Traffic: W9ZGQ 315, WA9ZAZ 217, W9CXY 156, W9DND 134, W9ESJ 121, W9UCR 120, WB9GGL 114, K9FHI 113, W9MFG 80, WA9SUU 71, WB9GUG 44, K9LGU 38, WB9ABF 31, W9IHW 31, W9KRO 25, WB9HLM 23, WA9OAY 22, K9KSA 21, W9DXV 20, W9NRP 14, K9UTQ 8, WA9MCC 2.

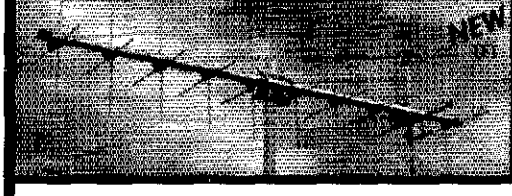












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(B) 4 POLE: A four dipole gain array with mounting booms and coax harness 52 ohm feed, 360° or 180° pattern.

AFM-4D	1000 watts	146-148	MHz	**$42.50**
AFM-24D	1000 watts	220-225	MHz	**40.50**
AFM-44D	1000 watts	435-450	MHz	**38.50**

(C) FM MOBILE: Fiberglass ⅝ wave professional mobile antenna for roof or trunk mount. Superior strength, power handling and performance.

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(D) POWER PACK: A 22 element, high performance, vertically polarized FM array, complete with all hardware, mounting boom, harness and 2 antennas.

A147-22 1000 watts 146-148 MHz **$49.50**

(E) 4 ELEMENT YAGI: A special side mount 4 element FM yagi can be fixed or rotated—good gain and directivity.

A144-4 1000 watts 146-148 MHz **$ 9.95**

(F) FM TWIST: A Cush Craft exclusive — it's two antennas in one. Horizontal elements cut at 144.5 MHz, vertical elements cut at 147 MHz, two feed lines.

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DAKOTA DIVISION

MINNESOTA – SCM, Casper H. Schroeder, WAØVAS – SEC: KØLAV. RMs: WØZHN, WAØYAH. PAMs: KØFLT, WAØIHRM. The SCM was on the sick list for about a week, feeling quite a bit better now. The Hamfest at St. Cloud was a big success, many prizes were given *and a good time was had by all. I also attended the* RTTY Club meeting held at the Attersgate Church on Aug. 14. The AREC Net was discussed in detail. Traffic: WAØVAS 673, WBØCNM 307, WAØYVT 172, WAØVYB 153, KØZRD 153, WØBUC 108, WAØIAW 97, KØGNI 78, WAØTEC 77, WBØDZA 71, WBØDSJ 68, WAØNLT 57, WAØVUP 55, KØPIZ 49, WBØDVP 48, WBØAYE 42, WØWFA 42, WAØYAH 38, WAØFPL 32, KØFLT 30, WAØHRM 23, WAØURW 22, KØICG 20, KØZXE 20, WØOBB 17, WAØYGF 17, WBØAYN 15, WAØJPR 9, KØSXQ 6, KØZBI 6, WAØKOU 4, WØUMX 4, KØVPM 3, WNØGKH 2, KØLWK 2, WØPAN 2.

NORTH DAKOTA – SCM, Harold L. Sheets, WØDM – SEC: WAØAYL. OBS: KØPVG. OO: WØBF. RM: WAØMLE. KØPYZ held a corn feed down on the farm which was attended by 37 hams plus 34 others. FB! Now that the International Chess games have caught on WAØSUF and WBØCUV are locked in the contest of the season over the air. Father Leo, Lisbon, is on with the call WØJCO. WBØIHA is a new call at the Minot AFB. WAØWLP reports working the Winnipeg repeater station as well as Grand Forks. WØDM starts radio classes at Valley Jr. High the last of the month along with a couple of private ones. The ND CW Net was activated Sept. 18. They meet on 3748 kHz at 2150 CDST Mon., Wed., Fri. WAØMLE will again be assisted by WAØELO. In July WAØELO had 27 QNI while WAØMLE had 20. WAØSUF doing well on the nets, wants to thank all who helped him during the summer months.

Net	*kHz*	*CDST/Days*	*Sess.*	*QNI*	*QTC*	*Mgr.*
Goose River	1990	0900 Su	4	49		WØCDO
PON	3996.5	0900 Su 1830 S-S	11	197	12	WAØSJB
RACES	3996.5	1830 M-F	22	459	58	WBØATJ

Traffic: WAØELO 126, WAØMLE 111, WAØSUF 84, WBØFDT 16, WØDM 14, WAØJPT 5, WØMXF 3, WBØCCA 1.

SOUTH DAKOTA – SCM, Ed Gray, WAØCPX – *The Sioux Falls Amateur Radio Club will be having a club auction the evening* of Oct. 30 at 7:30 P.M. at their regular meeting place. Any South Dak. amateur who would like their traffic counts listed in this section must report them to WAØCPX for that month. Also any South Dak. amateur interested in an OPS, ORS, OBS, OO, etc., appointment should make application to *WAØCPX. KØLXD,* KØCXK, KØOOU and KØUDZ were active during the Rapid City flood disaster. If anyone who actively participated during the flood disaster has not seen their call in QST please write WAØCPX with the details of your operation so you may be properly recognized. Net reports: Morning Net – QNI 481, formals 60; NJO – 499, 10 formals; Early Evening – 434 QNI, 15 formal; Late Evening – 869 QNI, 30 formal; SDN CW – QNI 57, formals 47. Traffic: WØHOJ 74, WAØUEN 72, WAØZXV 9, WØOFP 4.

DELTA DIVISION

ARKANSAS – SCM, Jimmie N. Lowrey, WA5VWH – SEC: WB5CEL. PAM: WB5FDP. RM: WA5TLS. WB5FDP is the new PAM for Ark. and net mgr. for the Ark. Razorback SSB Net. There is a new Novice in Texarkana who is the XYL of WA5UDF – WN5HSR. Anyone planning to install a new repeater in Ark. should contact the Ark. Repeater Coordination Assn. (ARCA) to insure that the new repeater does not interfere with others in the area. Also this group has adopted a plan to standardize the 450 MHz control frequencies in the area.

Net	*GMT/Day*	*Freq.*	*Mgr.*
OZK	0000 Dy	3790	WA5TLS
Ark Phone	1100 M-S	3937	W5VFW
Ark Teenage	2000 SS	3975	WB5DWH
Ark P.O.	2130 M-F	3925	W5OEO
Ozark	2230 M-S	3995	WA5ZKE
Razorback	*2330 Dy*	3995	*WB5FDP*
DX Info	2345 M	3995	WA5YMW
CAREN	0100 F	146.34/94	W5RXU

Repeaters: WA5SNO Fayetteville, 52.550/53.020, 146.16/76; WA5YUT Fort Smith, 146.34/94; WB5FKF Forrest City, 146.16/76; *W5DI Little Rock, 146.34/94; W5RHL* Jonesboro 146.34/94. Traffic: K6KCB/5 195, WA5EVW 40, WB5FDP 34, W5EIJ 16.

LOUISIANA – SCM, John R. Rivoire, K5AGI – Asst. SCM: *Louis Muhleisen, Jr.,* WB5AEH. SEC: WA5OLU. The first K5AGI/SCM ARRL La. Section Award was received by W5HNW

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and WA5EVU for the Central La. ARC (CLARC) at the Alexandria Hamfest. On hand for the occasion were our own Vice-Dir. W4WBK, SEC WA5OLU and asst. SCM WB5AEH. Congrats to Hamfest chmn. WA5EVU and the gang in Alexandria for a terrific hamfest. K5DPG, WB5CIH, W5DHE and WN5HGS won prizes at the hamfest. ARCSWL is sponsoring an auction with all proceeds going to the Boy's Village Christmas Fund. At the Aug. meeting of the BRARC members voted an honorary club membership to the SCM. Special thanks to the officers and membership of BRARC. LARC is assisting in the collection of Betty Crocker coupons to obtain a kidney machine. Give them a hand by mailing coupons to W5EXI. WA5FDD is the new editor of the OARC newspaper "ORM." Recent club visits were to the CLARC, JARC, OARC, BRARC and GNOARC. W5UA, ex-W5HHA meets two Navy MARS nets – Midcars Net and 7290 traffic nets daily. Congrats to WN5FRQ for his big step to Advanced Class. WA5YGJ is attending La. Tech in Ruston and WB5COR is in Monroe at NLU. Congrats to recently wed WA5MMD. His best man was WA5IIW. The No. 1 station in the nation by acclamation W5HIT says "thanks" for all the kind thoughts during his illness. WA5SXU has a new Regency on 2-meter fm. WA5ZNV is off Air Force MARS while visiting in Tex. WB5CNM is trying out a new homebrew quad. LAN CW Net meets daily on 3615 kHz at 6:30 P.M. and 10:00 P.M. Please check in occasionally. Traffic: WA5VQE 93, W5GHP 62, WA5WBZ 61, WA5QVN 11, W5EA 6, WB5FRQ 4.

MISSISSIPPI – SCM, Walker J. Coffey, W5NCB – Asst. SCM: Gene McGahey, WA5JWD. SEC: WA5FII. PAMs: W5JHS, WA5KEY, K5MDX. RMs: WA5YZW, WB5DEK. Congratulations to WB5CPF now General and XYL of WB5AHL. WB5DDG has his General. Appointments: WA5FII as ORS and WA5DPO as EC vhf fm repeater activities. WAØGVO/5 has his 4-1000 going. MSBN picnic at Enid was a swell affair, thanks to K5SSZ. WA5JWD and others. WB5BKM and K5IKB sound good on their FR4s. W5RUB is QSY to Fla. for a year on a scholarship for his Masters. He is the only holder of both 5BWAS and 5BDXCC in section. W5TAD shooting for top score again on FMT, also knee deep in microwaves. 1972 Novice Roundup winner in the Delta Div. was our own WN (now WB) 5DCY. My sincere thanks for every station activity report. Need a Novice Net crystal? Let W5NCB know, please.

Net	*Freq.*	*Time(Z)/Days*	*QNI*	*QTC*	*Mgr.*
MTN	3665	0045 Dy	179	109	WA5YZW
MNN	3733	2400 MWF	–	–	WB5DEK
GCSBN	3925	0030 Dy	–	–	W5JHS
CGCHN	3935	*0100 Dy*	*1542*	*80*	*WA5ZOP*
MSPON	3970	0045 MS	300	68	WAØGVO/5
MSBN	3987.5	0015 Dy	1169	114	WA5UIH

Traffic: W5SBM 281, W5EDT 105, WA5YZW 95, W5WZ 72, W5NCB 69, K5YTA 27, W5AMZ 24, WB5DEK 24, WAØGVO/5 22, WB5EJB 8, K8YDW/5 8, W5BW 5, WB5AHY 4, WB5BUE 4, WA5NWZ 4.

TENNESSEE – SCM, O.D. Keaton, WA4GLS – SEC: WB4ANX. PAMs: W4PFP, K4MQI, WA4EWW, WA4NEC. RM: W4ZJY.

Net	*Freq.*	*Time(Z)/Days*	*Sess.*	*QNI*	*QTC*	*Mgr.*
TPN	3980	1245 M-F 1400 SSu&Hol	31	1511	69	W4PFP
TSSBN	3980	0030 T-Su	26	1157	56	K4MQI
ETPN	3980	1140 M-F	21	458	38	WA4EWW
TPON	3980	0030 M	5	144	10	WB4BHZ
ETVHFN	145.2	0000 W&F	8	22	0	WB4DZG
KVHFN	50.7	0100 T	4	19	0	WB4MPJ
MTTMN	28.8	0200 T&F	9	62	0	W4PSN
TN	3635	0100 Dy	29	262	180	W4ZJY
TNN	3720	0000 Dy	31	163	64	WB4USG

The Cedars of Lebanon Hamfest was a success, W4VJW was the winner of the first prize. Thanks for a very fine job to Novice Net Mgr. WB4USG who has had to resign because of school – he is being replaced by the very capable WB4VZQ. W4ZJY has been appointed OBS. CW Net Honor Roll: WB4USG, WB4VZQ, WB4UUH, K4CNY and WB4NIR. May I remind everyone to get your reports in early. Films of some of the space flights are available for club use, anyone interested in showing one at your club meeting contact me. Traffic: W4ZJY 140, K4CNY 123, WB4USG 118, WB4YCV 108, WB4VZQ 48, WB4NIR 44, WB4ANX 27, W4WBK 27, WA4GLS 17, WN4YDY 13, WB4MPJ 11, W4CYL 10, WA4CGK 6, K4SJV 3, W4SGI 2, WB4TPS 2, WB4WHE 2.

GREAT LAKES DIVISION

KENTUCKY – SCM, Ted H. Huddle, W4CID – Appointments: K4TXJ as OPS and WA4AGH as OO. Endorsements: W4BAZ as


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GREAT!!
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ORS and OBS; W4CSN and K4LOL as ECs; W4NBZ, W4OXM and K4UMN as OPSs.

Net	QNI	QTC	Net	QNI	QTC
KRN	496	27	KYN	246	261
MKPN	460	44	KNTN	245	128
KTN	1122	127	KPON	94	13

Applications for call letter license plates are coming in at a good rate. Looks like there will be a good number of them around in '73. Attendance at the Louisville Hamfest this year ran ahead of that for three previous years. Roses to all those who worked so hard. WN4WCM and WN4YAF are awaiting their General tickets. These *two will make good additions to W4BAZ's KYN CW Net. FCATN is* picking up under the leadership of W4OTP. WA4ENH has a new tribander. WA4JQS and WN4WCM have new 2-meter rigs. Section Net Certificates from KNTN have been issued to WN4s YAF, YQS, ZEP, ZMG and ZMK. Keep up the good work fellas. Traffic: WA4WWT 250, WA4JQS 232, W4BAZ 179, K4UNW 138, WN4WCM 135, W4OYI 85, W4CID 70, K4MAN 66, K4TXJ 64, WB4EOR 42, W4OXM 42, WA4VZZ 41, WB4AUN 40, WN4YAF 24, WA4ENH 23, WA4GHQ 21, W4CDA 19, WB4NHO 16, WB4PVC 16, WA4MXD 12, WA4AVV 11, WA4FAF 11, WB4DQM 7, WB4REN 5, WA4AGH 4, K4HOE 4, K4LOL 3, WB4GCV 1.

MICHIGAN – SCM, Ivory J. Olinghouse, W8ZBT – Asst. SCM: B. Peter Treml, W8KBZ. SEC: W8MPD. RMs: W8JYA, W8WVL, W8RTN, K8KMQ, W8GLC. PAMs: K8PVC, WA8KHB, WB8HQS, *K8AEM*, WA8WVV.

Net	Freq.	Time/Days	QNI	QTC	Scss.	Mgr.
QMN	3663	2300 Dy	589	313	61	W8JYA
WSSB	3935	0000 Dy	621	105	31	K8PVC
BR/MEN	3930	2300 S-F	651	119	27	WA8KHB
UPEN	3920	2230 Dy	541	48	33	WB8HQS
GLETN	3932	0230 Dy	791	126	31	WB8AXI
PON	3955	1600 Dy	736	375	31	K8LNE
PON/CW	3648	2400 M-S	*141*	*28*	27	VE3DPO
MI.6M	50.7	0000 M-S	217	16	25	WA8VXE

SW MI. 6-meter weather net in 6 sessions had 48 QNI and 0 QTC, K8ZWR, mgr. W8CVQ reports the SW Mi. 2-meter net had 54 QNI, 2 QTC in 4 sessions. I regret to report W8CQB, K8VYG and K8DUH as Silent Keys. DARA has a well organized emergency set up for the Detroit area on 2-meter fm. WB8CCK is getting a new ham shack. WB8IGU and WB8LOA are new Generals in Lansing. WA8LAY is using the wide band double bazooka on 80 and 40 and says it works much better than the trapped dipole. The design is from the ARRL Handbook. K8BGZ organized and led the CMARC communication network for the Oldsmobile anniversary parade in Lansing. CMARC successfully set up a communication net work for two water ski tournaments on two week ends, special credit goes to K8ILF and WA8QCW. PO Net Amateur of the Month is WA8ENW and the Special Award goes to WA8OGR. Not much news with so many hams on vacation and no club meetings in the summer months and so few bulletins. Traffic: (Aug.) WA8WZF 488, W8IBX 269, *WA8PIM 215, K8LNE 200, W8GLC 192, K8DYI 121, WA8ENW* 103, WB8IMI 95, W8NDI 85, W8MO 67, W8ZBT 66, K8PVC 65, W8TZZ 53, W8JYA 47, WB8HQS 44, WB8HPZ 41, K8JED 36, WB8DJS 34, WB8BYB 33, WA8KHB 30, WB8EBG 28, WB8DTJ 26, WB8BJJ 25, W8NJM 23, WA8NXK 21, WA8VXE 20, WB8EFU 19, WA8OJI 17, W8VIZ 17, W8VXM 17, WB8DKO 16, WA8FXR 16, W8UCN 14, K8WRJ 14, W8IUC 13, WB8BJP 12, WA8WVV 12, WA8MDK 11, WA8ZDE 11, WB8EZ 8, K8HGA 8, K8JHA 8, W8QBE 8, K8TIY 8, WB8GWK 6, W8FX 4, W8HKL 4, K8WLE 4, WA8CUP 3, K8ACO 2, WB8HVO 2, K8QOJ 1. (July) WB8BPY 57, W8NJM 30, K8TIY 11.

OHIO SCM, William E. Clausen, W8IMI – Asst. SCM: Kenneth L. Simpson, WA8ETX. SEC: W8OUU. RM: WA8WAK. PAM: K8UBK. VHF PAM: WA8ADU.

Net	QNI	QTC	Scss.	Freq.	Time(Z)	Mgr.
OSSBN	2076	948	83	3972.5	1530/2100/2345	K8UBK
BN	638	390	62	3577	0000/0300	WA8WAK
O6MtrN	780	73	62	50.64	0100	WA8ADU
				50.16	0200	
OSN	230	79	31	3577	2328	WA8WAK
BN RTTY	72	24	20	3605	2300	W8SZU

BPLs for Aug. went to K8NQW, W8QCU and WA8WPQ. New appointees are K8ONA, OVS; W8VYU, OPS; WB8HUP, OBS. Thanks for an FB job go to K8DHJ, who recently retired from his long-time position as EC of Stark and Carroll Co. QSL mgr. W8CFG and the Columbus ARA appreciate the service provided by eighth area hams in handling bureau radiograms. W8WEG reports the Lima Area ARC set up W8EO/8 at the Allen Co. fair. New officers of the Steubenville area ARC are K8LQM, pres.; W8UYF, secy.; K8APH, treas. EC K8PBE reports 6 members of the Van Wert ARC provided communications for officials of the annual Field Science Day.

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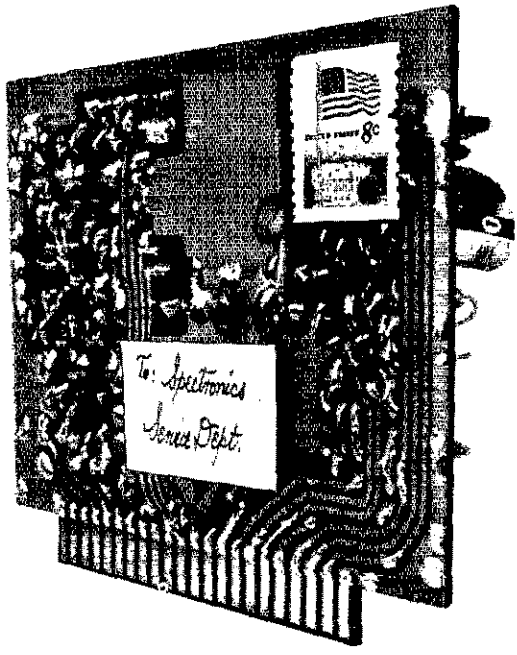

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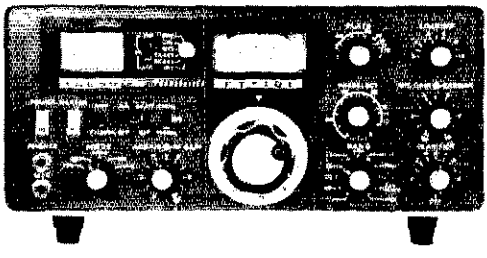
But with the FT-101, you can expect everything but trouble. Like a built-in VOX, 25 KHz and 100 KHz calibrators, the WWV 10 MHz band,



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Central Ohio AREC served the Red Cross during evacuation of the area surrounding a derailed tank car in Columbus. Congratulations to W8KC on his 50th year in ham radio. WB8JEL demonstrated ham radio at the hobby fair sponsored by the Cleveland Hgts. - University Hgts. Public Library. W8GOE says Ohio needs a statewide ham publication. Southwest Ohio AREC, with assists from CD and the Midwest Amateur RTTY Assn., operated a public relations booth at the Hamilton Co. Carthage Fair under the call K8YOJ – special QSL via WA8STX. WB8IBZ is the new chief op. of Columbus ARA's W8TO. The Lancaster and Fairfield Co. ARC reports the passing of former pres. WA8EVL. New officers of Massillon ARC are W8VYU, pres.; K8LBZ, vice-pres.; W8YHU, secy.-treas. The Westpark Radiops Log and the Toledo area's Hamshack Gossip won national awards from the Amateur Radio News Service. Dayton ARA's RF Carrier reports the club is planning 220 MHz fm projects including a repeater. New officers of the Dayton ARA are W8IPT, pres.; WA8ZUQ, vice-pres.; WB8GQH, secy.; WA8RNX, treas.; W8DPW and WA8UUX, dir. W8KKF is NCS for the football score reporting net again this year. WA8COA's Cincinnati Ham Call reports the .07/.67 repeater of the OH-KY-IN VHF ARS is now operating. WA8HWL has returned as editor of the Buckeye Belles newsletter. W8UQI and K8CKJ are teaching Greater Cincinnati ARA's advanced class course and W8ELE and WN8LPM are teaching Columbus ARA's novice course. Ham Shack Gossip reports the Critical Bias RC raised the antenna of its K8ALB repeater to the 600-ft. level and the club provided communications for the Mills Trophy Race. It is now time to start preparing for the SET in late Jan. Traffic: W8PMJ 430, WA8MCR 309, K8NQW 291, W8QCU 247, WA8YLW 192, WA8WPO 189, WA8HGH 173, WB8AYC 159, WB8KKJ 150, WA8WAK 146, WA2ASM/8 138, W8IMI 131, W8MOK 131, WB8MKZ 118, W8CUT 116, WB8KVU 115, W8VIT 108, WB8JEL 104, K8DHD 86, WA8ETX 84, W8VND 73, WA8UPI 68, K8MLO 67, WB8EEZ 63, W8JD 59, W8SUS 53, WB8FXD 52, WA8VWH 50, W8CHT 49, WA8ETW 46, W8QZK 46, WA8ADU 38, WB8CSH 38, W8DDG 38, WB8JGW 35, WB8CWD 34, WA8NOQ 32, W8WEG 30, WA8DWL 28, WB8GGR 25, WB8BHL 24, WA8VKF 23, W3FAB/8 21, W8OE 21, WA8SSI 21, WA8FCQ 20, WB8FNC 20, WA8SED 19, WA8YJB 19, W8LAG 18, W8NAL 17, W8GRT 16, WA8MIH 16, WA8MHO 15, WA8YXB 15, K8ZYX 15, WB8FCT 14, WA8KPN 14, K8BYR 13, WA8STX 12, W8GVX 11, W8LZE 11, WB8FAI 10, WA8HQO 10, K8PBJ 10, WA8BCX 9, WB8CLF 9, K8JDI 7, W8OUU 6, W8GOE 5, WA8BUW 4, W8DH 4, WA8LAM 4, K8CKY 3, WB8HHN 3, W8EQ 2, W8JBP 1.

HUDSON DIVISION

EASTERN NEW YORK – SCM, Graham G. Berry, K2SJN – Asst. SCM/PAM: Kenneth Kroth, WB2VJB. SEC: W2URP, RMs: WA2VYS, WA2FBI. VHF PAM: WA2YQU. Nets: NYS daily at 0001Z and 0300Z on 3.675 MHz; ESS (10 wpm) daily on 3.590 MHz at 2300Z; NYRTTY daily on 3.613 MHz at 2330Z; NYSPT&EN daily 2200Z on 3.925 MHz. On the club circuit: Summer hiatus as always means shortage of items. Schenectady ARA held annual summer picnic and fleamarket. Other picnics by New York State Net and New York State Phone. Traffic and Emergency Net in Aug. Albany Club saddened by loss of W2FEN, Silent Key during summer. Individual station activities: WB2MNE handled cw theory test assignment for Camp Woodcliff students. Thanks, Mike. WA2FBI reports 2100 contacts from FP0ZZ expedition and first US-licensee operation from VE0. WB2FCE back at school but active from W2ZXK. WN2EOO chasing awards. EC WA2WGS to Europe during Aug. WB2VVS back to Holy Cross for senior year, will be missed on 5 nets. New calls in Harmonic Hills RI. from their last classes include WN2IAA, WA2UKP and WA2FUV, with seven more to come. Deep apologies for "goof" in last month's column. The helping hand to your SCM in running Elmira Emergency Traffic net during flood period was, of course, WA1OFP/WB2ZEC, not as reported. Sorry Phil. Appointments note: OO applicants for top class appointment please include certified FMT scores per "Operating Amateur Station" a "must" for appointment. See last month's column to be sure your ORS applications go to the right RM. And remember renewal date for ALL ENY appointments is Jan. 1. Congrats to WN2POD for placing in top ten in Novice Roundup and division leader. All club secretaries: Once more – please put SCM on your mailing list for meeting information, class skeds etc. Badly needed month after month for column inclusion! Thanks. Traffic: (Aug.) WA2VYT 125, WB2VVS 124, WA2FBI 64, W2GPH 43, WB2AEQ 20, WB2VJB 19, WA2WGS 15, WB2LXC 14, K2SJN 10, W2URP 10, WA2EAH 4, WB2KLY 3, WN2EEO 2, WB2NLU 2. (July) WA2FBI 47.

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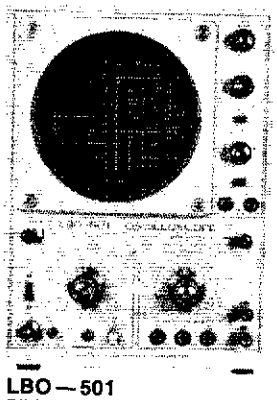

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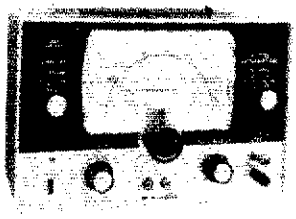

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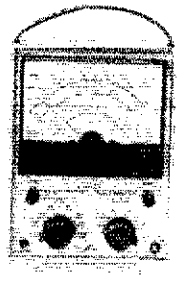

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Brunjes, K2DGI SEC: K2HTX. RM: WB2LZN. HF PAM: WA2UWA. VHF PAM: WB2RQF. The following are major AREC Nets; Join in!

Bronx	28.64 MHz	50.35 MHz	146.17 MHz
Brooklyn	28.64 MHz	50.35 MHz	146.26 MHz
Richmond			146.88 fm
New York	29.50 MHz	50.48 MHz	
Queens	29.50 MHz	50.20 MHz	145.62 MHz
Nassau	28.72 MHz		146.10 MHz
Suffolk	28.73 MHz	50.46 MHz	145.59 MHz
			147.21 fm

Note: Nets usually open 2000 local, Mon. Hope you all enjoyed yourselves at the Convention. It appeared to have really outdone itself this time, with something for everyone. If you didn't get there, you really missed the boat! Well, he did it again! K2RIW has won another Cover Plaque Award for Aug. I have to admit, it's a heck of a way to panel the shack! Congratulations! WB2UZU is off to Baltimore, Md. and a stay at Johns Hopkins for a career in medicine, (always was some kind of an operator). In the happenings department: WB2FKF is proudly sporting an Advanced Class license; WB2FJX has hit the 200 mark for DXCC; and the famous W2RID has been elected to the Electronic Hall of Fame for his efforts over 50 years, in advancing the Electronic Industry through his publications and developments. Congratulations! A speedy recovery goes out to WA2MDX recovering from a recent operation. The NLI picnic proved to be a successful venture this year, with a fairly large size crowd on hand to partake of the festivities. WA2PLI, the official photographer, reports pictures should soon be gracing the pages of QST. It appears the Spasky - Fisher influence has reached NLI, according to reports from WB2LZN. WB2WFJ really "got away from it all" with a camping trip to Fundy National Park in VE-Land. The mountain top expedition was "dampened" by a tropical storm sent up by that fellow Murphy. WA2HMM is really "way out" with new equipment working around 1.227 GHz. He's running a GHz kilowatt (1-watt for you dc fellows)! The Electchester Amateur Radio Society is publishing a fine club bulletin these days! Keep up the good work. Don't forget the new FCC regulations published in the Oct. issue of QST. They are important and should be read by all. Traffic: (Aug.) WB2LZN 427, W2EC 148, WB2OYV 144, WB2WFJ 112, WA2PLI 68, WA2HMM 20, WA2MDX 12, WA2LJS 10, W2PF 8, K2JFE 4, WB2FJX 2. (July) WB2UFG 102, WB2WFJ 81, WB2CUN 5.

NORTHERN NEW JERSEY – SCM, Louis J. Amoroso, W2ZZ – SEC: K2KDQ. RMs: WA2UOO and WA2BAN. PAMs: K2KDQ and WA2TAF.

Net	*kHz*	*Time(PM)/Days*	*Sess.*	*QNI*	*Tfc.*	*Mgr.*
NJN	3695	7:00 Dy	31	482	233	WA2UOO
NJN	3695	10:00 Dy	31	248	100	WA2UOO
NJSN	3740	8:00 Su	4	10	2	WA2FVH
NJEPTN	3950	6:00 Dy	31	494	179	WA2TAF
PVTEN	148710	7:30 Dy				K2KDQ

Club officers for the New Providence ARC are: W2PDG, pres.; W2CGX, vice-pres.; WB2JLW, secy.; WB2GEA, treas.; W2GMI, act. WA2DMF, WA2FVH, WA2UOO, WA2SRQ and WB2YKL all attended the NYS Picnic. NJN lost a very close softball game. I am still receiving request for information concerning code classes. If your club or group is planning to help the newcomer, please forward details to your SCM. WA2TAF had to resign as mgr. of the NJEPTN and we say a very big thank you for a great job. WA2FVH is the new mgr. We wish him luck and ask all to help him out. W2YT is on 2-meter fm with the GE Progress line. WN2IRF is a new ham in Fairlawn and WN2KDY is new in West Orange. WN2KDY reports he is using the HW-16. WB2MOL passed the Extra and W2ABE passed the Extra, Telegraph 2nd and Telephone 1st. WA2CCF reports a good turnout for the NJ QSO party. He expects to have this year's results mailed within a few days after the closing date. WA2SRQ going QRO with the SB-200. WA2FVH joined the W2GTF group. WB2KXK now on 6 meters with the Swan 250-C. WB2KLD has a new 4CX250B amp on 144 MHz. We have openings for most of the appointments. If you are interested, please drop us a line and we will forward the necessary forms. Our SEC is also looking for more ECs. This is your space gang. Let's hear from more of you. Don't forget the SS contest. Hope we have a QSO with you this year. Traffic: WB2RKK 335, WB2NOM 309, WA2NLP 181, WB2DDC 160, WB2AEH 138, WA2RYD 112, WA2EUO 111, WA2SRQ 91 WA2UOO/2 72, W2ZEP 62, W2CU 53, WB2CFT 52, WB2IKL/2 52 WB2CST 51, W2ODV 39, WA8PEJ/2 39, WB2YPQ 31, WB2AKL 23, W2CVW 20, WA2FVH 20, WB2KNS 19, WA2CCF 18, W2WO 18, W2ZZ 18, WA2CAK 13, W2QNL 10, WB2COV 9, WA2FUI 7 WA2QJU 6, K2MFF 5, K2ZFI 2.

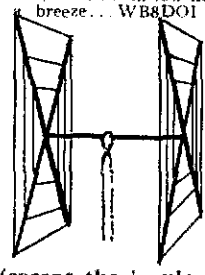
WHICH ANTENNA WINS THE CONTEST ?

In open competition against thousands of commercial and home-brew antennas, WA1JFG won the New England championship with a Gotham beam, by a margin of 5,982 points! WB2JAM won the sectional award for the Sweepstake contest in 1969 and 1970 with a Gotham 4-element 15-meter beam! Hundreds of unsolicited testimonials from grateful hams are our proof that Gotham antennas give you the best design, and the best materials. Forget our low prices — rely on the results op open, competitive contest. Ask yourself: Why do Gotham antennas win?

In QST since '53 without missing an issue!

QUADS

Totally satisfied with quad. Worked DK4VJP, SM7DLH, XE1AB, DM4SEE, FL8SR, F6AUM, HK7VB in few hours. Instructions a breeze... WB8DOI



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 foolproof 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′ × 1¼″ 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′ × 1″ OD aluminum 'hi-strength' alloy tubing, with telescoping ⅞″ 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.

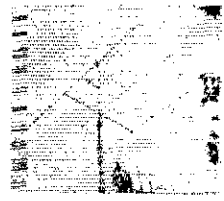
Now check these startling prices — note that they are much lower than even the bamboo-type:

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-El. 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). Thx 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; ⅞″ 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 El 20	$21	4 El 10	$20
3 El 20	27*	7 El 10	34*
4 El 20	34*	4 El 6	20
2 El 15	17	8 El 6	30*
3 El 15	21	12 El 2	27*
4 El 15	27*	*20-ft. boom	
5 El 15	30*		

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, WB2-FCB, W2YHH, VE3FOB, WA8CZE, K1SYB, K2RDJ, K1MVV, K8HGY, K3UTL, W8QJC, WA2LVE, YS1-MAM, WA8ATS, K2PGS, W2QJP, W4JWJ, K2PSK, WA8CGA, WB2-KWY, W2IWJ, VE3KT. Moral: It's the antenna that counts!

***FLASH!* Switched to 15 c.w. and worked KZ5IKN, KZ5OWN, HC1-LC, PY5ASN,FG7XT, XE2I, KP4-AQL, SM5BGK, G2AOB, YV5CLK, OZ4H, and over a thousand other stations!**

V40 vertical for 40, 20, 15, 10, 6 meters $14.95

V80 vertical for 80, 75, 40, 20, 15, 10, 6 meters $16.95

V160 vertical for 160, 80, 75, 40, 20, 15, 10, 6 meters . . . $18.95

How to order: Send money order only (bank, store, or United States) in full. We ship immediately by REA Express, charges collect. DEALERS WRITE!

GOTHAM, 1805 Purdy Ave, Miami Beach, Fla. 33139

MIDWEST DIVISION

IOWA – SCM, Al Culbert, KØYVU – SEC: KØLVB. WØBGK has jumped the fence to Extra Class and has a new 2 letter call, WØNY. WNØFNA reports that the Mid Central Net is active Mon. through Fri. on 3742 kHz at 6:00 P.M. local and welcomes ONIs. Those of you who did not make the 75-meter picnic at Marshalltown on Aug. 20 missed a real fine affair, and an opportunity to meet KØNL our Division Director. By the way, the Sat. evening before is getting bigger and better each year. W8PVB from Mich. attended and won a prize, but that was balanced by your SCM who attended the Mich. *ARRL Convention at the Soo and walked away with a prize too.* WAØEFN echoes the facts of so many, you can't vacation and keep up station activities too. Iowa Phone (noon), QNI 1470, QTC 109; Iowa Phone (eve.), QNI 1003, QTC 26; Iowa Phone (eve.), QNI 982, QTC 32, July: TLCN, QNI 149, QTC 74. Traffic: WØLCX 502, KØDDA 151, WAØAUX 142, KØAZJ 70, WAØZVF 48, WAØVZH 27, WAØYJW 25, WAØTAQ 16, WØMOQ 11, KØYVU 11, WØBW 8, WNØFNA 7, WBØAVW 4, KØCNM 4, WAØAJW 2.

KANSAS – SCM, Robert M. Summers, KØBXF – SEC: WØBGX. RM: KØMRI. PAMs: KØJMF, WBØBCL. VHF PAM: WAØTRO. OKS – Kans. CW Net QNI 404, QTC 125, KØMRI says that this should be the lowest for the year. KSBN – QNI 751, QTC 69 in 27 sessions and the KPN – QNI 227, QTC 12 in 16 sessions, with WØNXJ, KØGII and KØJMF keeping the original phone net in operation Sun. *0800, Mon., Wed. and Fri. 0645 central time. On the other hand the* Mid-States Mobile Monitor Service has had a total QNI of 2031 fixed stations and 163 mobiles for Aug., handling 10 phone patches, 10 calls and QTC 93. A real fine job by the gang handling Service Control. A special thanks to WAØUXI for reporting for WBØBCL, while Al is in Calif. Congratulations are also in order, the household of WA2HSP/Ø has a new harmonic. WAØTKJ having a ball in all the most recent contests handled 23 patches this month. WØPB reports the 2-meter RTTY auto start circuit with WAØEKR/VSJ is now working very reliably. Words of wisdom from KØGZP: "Ice on an antenna increases the resonant freq." KWN had a QNI of 548 and *QTC of 213 for the month in 31 sessions. I know that all who have* been active in AREC joins me in congratulating KØLPE for an FB job as SEC. He resigned Aug. 15 because of ill health. Hope all will give WØBGX the same kind of support. WBØBIY is the new trustee of WAØVWN – Lawrence FM Assn. Traffic: WØHH 256, KØMRI 111, WØINH 96, KØJMF 62, WØBGX 57, WAØLLC 50, WØCHJ 47, KØBXF 46, WØMA 35, WBØBIY 32, WØPB 30, WØZHO 29, WA2HSP/Ø 25, WØRBO 21, WBØCZR 20, WAØUXI 15, KØGII 14, WBØBCL 12, WAØOWH 12, WØGCJ 10, WAØSEV 10, KØLPE 9, KØDVN 8, WAØWJX 8, WAØTXJ 2, WNØGOL 1.

MISSOURI – SCM, Robert J. Peavler, WØBV – SEC: WØENW. New appointment: WBØCXN as ORS. Appointments renewed: KØONK as RM, PAM, ORS. With deep regret I report WAØIZG as a Silent Key. Price was recently honored by the American Osteopathic Association. Net reports:

Net	Freq.	Time(Z)/Days	Sess.	QNI	QTC	Mgr.
HBN	7280	1705 M-F	22	376	36	WAØUPA
MoPON(July)	3963	2200 M-S	26	794	44	WAØTAA
MoPON(Aug.)	3963	2200 M-S	27	695	57	WAØTAA
MoSSB	3963	2300 M-S	27	992	80	KØHNE
MON	3585	0000 Dy	27	117	103	KØAEM
MON2	3585	0245 Dy	27	102	49	KØAEM
MSN	3703	1500 Su	4	14	14	KØBIX
WEN	7280	0030 T	4	10	0	KØBIX
PHD	50.45	0030 T	4	62	9	WAØKUH

These nets will meet one hour later GMT with the shift to Standard time. MNN resumed operation on Sept. 1, 1 P.M. local time on 7040 kHz. The PHD Club is sponsoring a new Novice net on Wed. at 7 P.M. local time on 7160 kHz, with first held Sept. 6. WB8LHO has moved to Warrensburg from Ohio. Congratulations to: WNØCJB, *WNØEDD, WNØFIX and WNØFOJ, who passed General Class exam;* to new Novice WNØIBR; and to WNØDYV, who made highest score nationwide in the Novice Roundup. Special recognition is due KØPCK, who took NCS on MoSSB net for 10 sessions out of 27. Traffic: (Aug.) KØONK 1289, KØAEM 223, KØBIX 111, WØBV 111, WØOUD 48, WØGBJ 33, WAØTAA 21, WAØWOC 16, KØPCK 14, WNØFKY 9, WAØKUH 9, WNØFND 5. (July) WAØTAA 20.

NEBRASKA – SCM, V.A. Cashon, KØOAL – Asst. SCM: Velma Sayer, WAØGHZ. SEC: KØODF. New appointment: WBØCLP as EC. Endorsements: WØYFR as EC; KØIINT and WØYFR as OBSs; WØINR, KØYRL and WAØHWR as ORSs; WAØRFT, WØINR and WAØPSN as OPSs. Aug. net reports:

Net	Freq.	GMT/Days	QNI	QTC	Mgr.
NSN I	3982	0030 Dy	918	19	WAØLOY
NEB	3590	0215 Dy	216	24	WØTQD

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The 9 MHz IF crystal lattice filter provides optimum SSB selectivity and an optional two position audio CW filter inserts a 300 Hz filter, centered around 800 Hz, into the system. Selectable skirt attenuation prevents loss of the signal when the filter is first applied, or permits monitoring of the sidebands without swamping the station being worked.

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The crystal calibrator has a distinctive pulsed signal, and with a simultaneous signal attenuation of 25 dB in the calibrate mode, is foolproof and easy to use.

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Receiver, Model 315	**$229.00**
CW Filter, Model 235	**14.95**

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NMN	3982	1230 Dy	1289	30	WAØJUF
WNN	3950	1300 M-S	479	36	WØNIK
AREC	3982	1330 Su	181	1	WØIRZ
CHN	3980	1730 Dy	1139	12	WAØGHZ
DEN	3980	2030 M-F	126	0	WAØAUX
NSN II	3982	2330 Dy	1066	9	WAØLOY
NEB(July)	3590	0215 Dy	78	14	WØTQD
DEN(July)	3980	2030 M-F	11	0	WAØAUX

Speedy recovery wishes to WØEXP, WØMHB and KØKIE. KTØNEB kept plenty busy at State Fair. Congrats to WBØGWT on General and WAØYIJ on Advanced license. WNØCEZ racked up a nice score during the 1972 Novice Roundup. WBØGAK is operating a Swan 500C and WØAMY has an Argonaut 5-watt ssb rig. WØYMU of Omaha now retired and active from new QTH in Shawnee, Colo. WØLRK busy building 12V power supply for his Regency 2-meter rig. Box Butte County 2-meter AREC net QNI 17 and QTC 2. So *that we will know whom to call on in the event of an emergency* condition please complete an AREC application form. Contact your EC or KØODF, KØOAL. We may need you. Remember the Rapid City flood! Traffic: (Aug.) WAØSCP 114, WØLOD 85, WAØQEX 47, WAØCBJ 30, WØHOP 28, WAØPCC 14, WØSGA 14, WØTQD 13, *WØMW 12, KØODF 8, KØDGW 7, WØLJO 7, WAØYGZ 7, WØFQB* 6, WØLWS 6, WØDMY 5, WØNIK 5, WAØDXY 4, KØJFN 4, WAØJIH 4, WAØJUF 4, WØVUX 4, WBØGAK 3, WØGEQ 3, KØOAL 3, WAØYGI 3, WØDJO 2, WBØEQX 2, KØHNT 2, WØHTA 2, WØWKP 2, WAØLOY 1. WAØMDZ 1. (July) WØTQD 7, KØHNT 4, WØVYX 3. (June) WAØIBL 30.

NEW ENGLAND DIVISION

CONNECTICUT – SCM, John McNassor, W1GVT – SEC: W1HHR, RM: K1EIR. PAM K1YGS. VHF PAM: K1SXF.

Net	*Freq.*	*Time/Days*	*Sess.*	*QNI*	*QTC*
CN	3640	1900 Dy 2200	62	396	262
CPN	3965	1800 M-S 1000 Su	51	647	167
VHF 2	145.90	2200 M-S	23	101	19
VHF 6	*50.6*	*2100 M-S*	*23*	*131*	*10*

High QNI: CN – W1BYW, WA1GFH, WA1NLD, W1CTI, WA1FCM and W1KV. CPN – W1BFY, WA1NLD, W1NQO, WA1OPB and K1SXF. SEC W1HHR would like your EC report – please send. Bristol AREC Bulletin de W1DGL indicates a very active group. WA1OPB invites AREC members to join Section Training Net. Details on CPN. Dir. W1QV Division Letter extends thanks for opinions on previous poll and includes current happenings. Some CN members enjoyed 1RN Clambake. Murphy's Marauders held farewell party for G3XPM who is returning to England – best of luck Rich. Tri-City ARC News includes a Quiz. Danbury CARA Bulletin lists winter activities. Southington ARA Bulletin de W1EFW starts new season. Hope you noticed comments by W1RW in Sept. issue Popul r Science on page 6. W1SBK holding CW classes at Manchester Town Hall. Congratulations to: WA1NFM for Advanced Class; WA1IGG General Class; WN1QYE, WN1QYD and WN1QXA Novice Class; and to WA1NLD for High QNI on CN and CPN! Repeater activity is a great force to create public awareness of amateur capability, please observe ALL Rules and Regulations. *Don't hesitate to point out infractions – if unintentional, your help* will be appreciated. FCC restrictive action will surely follow IF it is required. Traffic: W1EFW 265, W1BFY 228, WA1FCM 179, WA1NLD 130, W1MPW 68, W1CTI 65, K1SXF 50, WA1GGN 47, W1GVT 41, K1YGS 36, W1KV 32, WA1OPG 29, W1AW 28, WA1PHF 22, WA1NBS 20, WA1OPB 10, WA1MTZ 9, WA1NYU 9, W1QV 8, W1RML 8, W1DGL/1 5, W1CUH 3, K1EPW 3, W1BDI 2.

EASTERN MASSACHUSETTS – SCM, Frank L. Baker, W1ALP – SEC W1AOG received reports from ECs: WA1DXI, W1BAB, *K1ZUP, K1DZG, W1ALT, WA1QEK, K1NFW.* WA1GZO in Green Mt. Net. W1HWC, W1KCT, K1TCC are Silent Keys. WA1QQQ new ham in Quincy. W1EAA on 75 in Eastham. W1NT back on air at new QTH. New YLs WA1s QXI, QXL. W1GM moving to Crystal Beach, Fla. W1HY moving to Rumney, NH. W1NCK now is K6WX. Ty RC met at *W1IIB's QTH. WN1s QNV, QNW* on cw. *W1DOM* has NCX-200. W1MEU is still at home but gets on 6. W1FJN moving to W. Pa. W1VN now in Stoneham. K4GXW in Fla., is ex-W1RSP. W1UQ is ex-W1QHC. K1HSD is on 20. WA1LXE gone to College in NY. WA1MYK new EC for Sharon. WA1LAK going to Carleton College in Northfield, Minn. WA1PIK passed General and Advanced and has an HW-101. K1GYE now in Beverly. K1WVW's beam stuck. WN1QQV says he is on the USS Compass Island and will be marine mobile in the No. Atlantic. WA1MSK is new RM for EMN and we want to thank W1QYY for an FB job. Endorsements: W1LE as EC W1CE as ORS; W1PEX, WA1FNM, WA1MWN as OPSs; WA1MWN

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as OVS. An mew net on 6 meters Sun. at 8:30 P.M. WA1OML put up 2-meter beam for WA1GXN and an 80-meter dipole for himself. W1QYY had a clambake at his QTH for EMN1RN gang. WA1MYK has three-element Swan tribander. WA1QEJ in EM2MN and PO Net, on 6. WA1MYK on air during trip across Canada and USA. New officers of Chelmsford ARA: WN1QAA, pres.; WA1OMU, vice-pres.; WA1EMN, treas.; WN1QAB, secy. K1YXO, WA1JZP moving to Maine. K1TIH lost his tower in tornado in Chelmsford. WA1LGY retiring as secy. WN1Q2D is W1BIO's son-in-law. WA1QVJ on many bands. W1MD had the following visitors: OA4CDM, OA4AHJ, XE3LK, HC2OK. W1CE made PSHR. WA1MWN active on 2 fm with 826 and trio TR-2200. WA1DFL says DX good this month on 6 meters. W6JCR is ex-W1GPN and is on 15 cw. WA1ITZ was the first contact for him. W1LUG is running for the House of Representatives. Norwood ARC holds classes for new hams. Officers of Mass. Chapter of NAHC: K1YBS, pres.; WA1DUZ, vice-pres.; W1DKD, secy.-treas.; W1DOM, awards custodian; W1DFR, WA1DFL, WA1EZA, trustees. Capeway RC met at K1HGT's QTH. K1BUR is back in NH. Whitman ARC officers: WA1HIH, pres.; K1YBS, vice-pres.; K1UMP, treas.; K1HTN, secy. Rooster Net held get together at WA1QEJ's. K1MON, WA1KPS, WA1GEP, K1MUC have been working on the Waltham Repeater gear. Somerville and Middlesex ARC again starting up, also Quannapowitt RA. WA1MSK has an HW-101.

Net	*Freq.*	*Time/Days*	*QNI*	*QTC*	*Mgr.*
EMN	3660	1900/2200 Dy	364	206	WA1MSK
EN2NB	145.8	2000 Dy	135	83	WA1OWQ
NEEPN	*3945*	*0830 Su*	78	7	*K1EPL*
6MCBN(Jul.)	50.85	1930 M-F	5		K1OKE
6MCBN(Aug.)	50.85	1930 M-F	61		K1OKE

Traffic: (Aug.) W1OJM/1 289, WA1MSK 214, W1PEX 182, W1CE 150, WA1OWQ 115, W1EMG 48, WA1OML 43, K1PRB 30, WA1NRT 23, WA1MYK 22, WA1QEJ 21, WA1IFE 18, WA1DJC 16, WA1OZI 9, W1PJ 6, WA1MWN 5, WA1PDM 4, WA1FNM 1. (July) W1OJM 258, W1EMG 36, W1UX 34, WA1MYK 12, WA1AKR 8, K1UAF 6, W1CZB 2, W1PL 2. (June) WA1AKR 7.

MAINE – SCM, Peter E. Sterling, K1TEV – SEC: K1CLF. PAM: WA1PEN. RM: W1BJG. K1MTS reports working two new states, Wisc. and Ind. on 2-meter aurora for a grand total of 26 states on 2 meters. K1RQE and K1GAX are tied on confirmations for DXCC. K1JKT is back on the air with a new TR-4 and working new countries. W1NV, ex-W1LHA operates on 2-meter fm, and is quite active. K4CYC has been vacationing in South Harpswell. W1AE's rig is back to normal. K4RO/1 and W1MPP, the century kids are very busy visiting and having visitors during their summer vacation in Waterford. It is with deep regret that we announce the passing of W1ZAG, Auburn. New hams in Maine are WA1QPX, WA1QPW, WN1QYB, WN1QVO. Congratulations, fellows. WA1QHU is an ORS/OO appointee. W1UIR moved to Arrowsic, and hopes to be active soon. The Northeast Area Barnyard Net reports 27 sessions, 694 check-ins, 4 traffic for Aug. 3R1KYC visited K1RQE; W2DXL visited K1GAX and K1RQE. W1AYI and W1AUX vacationed at East Orleans, Maine. W1CTR and XYL toured New York state and had an FB trip. W1EM took a cruise from Boston to Nova Scotia. Traffic: (Aug.) W1BJG 133, WA2QNT/1 75, WA1QHU 39, K1TEV 12. (July) WA1PEN 13.

NEW HAMPSHIRE – SCM, Robert C. Mitchell, W1SWX. SEC: K1RSC. RM: W1UBG. PAM: Open for volunteer. Welcome to new hams WN1QQL, WA1QQR, WN1QVI, WA1QWV, WN1QVX and WN1QYG. Welcome back to K1PQV as ORS and W1DXB as OO. K1BCS is looking for old amateur auto plates. K1PQV parted with the ARC-5 and BC342 and now has a Ranger 2/HQ-150 combo. W1UBG received C21TL QSL for number 100 and DXCC. WA1JSD is overhauling the rotator and antennas before snow flies. WA1PTF and XYL have moved to Fla. W7TML/1 is completing his antenna farm before contest season with most arrays at the 125-foot level. W1UBG's NHVT Net shows 139 check-ins and 84 traffic. Happy Thanksgiving to all. Traffic: K1BCS 343, WA2CLC/1 163, W1UBG 93, K1PQV 9, WA2CMB/1 6, W1SWX 5, W1BYS 4, W1DXB 2.

RHODE ISLAND – SCM, John E. Johnson, K1AAV – SEC: W1YNE. PAM: W1TXL. RM: W1YKQ. RISPN reports 31 sessions, 328 QNI, 41 traffic. The Newport County Radio Club held a successful beach party in Middletown under the direction of vice-pres. W1AWG and W1JFF and W1WLG. W1AM is planning a second series of invited speakers to the club for this year. The club has two new Novices WN1POH who is recording secy. and WN1QOT whose dad is WA1OSL and older brother WA1BLC. The club still issues a certificate to anyone who works five members, so try 6 and 20 meters for contacts. The Providence Radio Assn., W1OP, was very active in the R.I. QSO Party, was operated by WA1LAD, WN1ODJ and WN1PJC. WN1QOG received his Novice ticket

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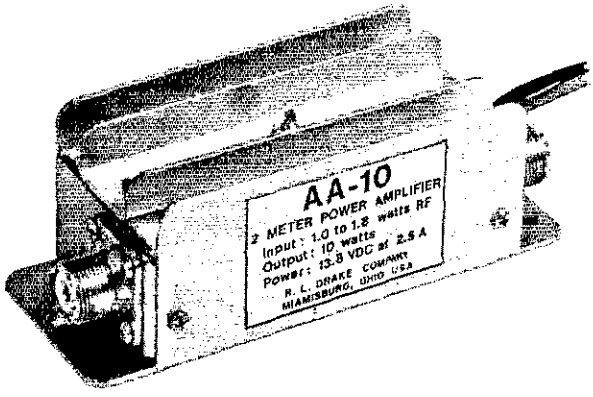

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RF Input Power: 1 Watt nominal, 1.8 Watt maximum

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8 Semi-conductors.

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13.8 Volts DC at 1.5 Amperes.

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through W1OP's Novice classes. W1OP also was the N.E. Division leader in multiop category for ARRL 160 Contest. Thanks go to operators K1HZN and K1NTS for a good job. WN1POJ has a record traffic count for this month and is very active on several nets such as the Eastern Novice Net and several more. Traffic: (Aug.) WN1POJ 153, W1YNE 114. (July) WN1POJ 57.

VERMONT — SCM, James H. Viele, W1BRG —

Net	Freq.	Time(Z)/Day	QNI	QTC	Mgr.
VTPO	3909	2100 Su	89	16	K1BQB
Carrier	3932	1300 M-S			
VTSB	3909	2200 M-S 1130 Su	458	83	W1ZCJ
NHVT	3685	2300 Dy	139	84	W1UGB

Welcome new amateurs WN1QXX, WN1QYF and WA1QXY. W1LMO is back on the air after many years and operating mostly on 20 meters. W1ZCJ is the new manager of the VTSB Net. W1PTB is assistant net manager. Glad to report W1GFD is all mended from broken hip and back home again. WA1QOP is our new RM. Traffic: K1BQB 104, K1OXD 90, WA1QOP 62.

WESTERN MASSACHUSETTS — SCM, Percy C. Noble, W1BVR — SEC: WA1DNB. CW RM: W1DVW. VHF/UHF PAM: W1KZS. WA1DNB reports WMEN held 3 sessions with QNI of 27. W1DVW reports WMN held 31 sessions with a QNI of 134 and traffic 79. Top 5 in attendance were W1BVR, W1TM, WA1LNF, W1STR, W1KK. W1DVW is again on the road to recovery after a 3 week session in the hospital. W1KZS says that the 2-meter fm repeater AREC net is still in operation Sun. at 2:00 P.M. through Mt. Greylock Repeater K1FFK. WA1LNF now has a teletype machine. WA1FBE is back in Amherst after summering in Maine as WA1PNK. As you probably know, our 75-meter West. Mass. Phone Net has folded. We are now considering trying again — possibly 4:30, 5:30 or even 6:30 P.M. By the time you read this, such a net may be in operation (listen at the above times between 3920 and 3940). If we have no 75-meter PAM by that time, applications for the post are desired. OO WA1LPR is still letting the guys with poor signals know all about it! CMARA reports K1RNG has a new 2-meter TR-2200. HCRA reports WA1GVV, pres.; K1HYL, vice-pres.; WA1PLS, secy.; W1HUB, treas. The printer is WA1GOK and bulletin editor and publisher WA1MUH. Over 20 club members were active on FD. HCRA congratulates the new pres. of the Valley ARC WA1LGU. NOBARC reports very fine Hamfest and Flea Market was held in Williamstown with a total ham registration of 132. Technical talks were given by WA2FQL and K2CBA. New club members: WB2DHA, WB2DNE, WB2JKN, W1LLN, K2TMB, W2PFX, W2URP — raising the membership to 88. Traffic: W1BVR 92, WA1LNF 69, W1TM 43, W1KK 40, W1STR 20, W1DVW 15, WA1LPJ 6, W1KZS 1.

NORTHWESTERN DIVISION

IDAHO — SCM, Donald A. Crisp, W7ZNN — SEC: WA7EWV. The FARM Net meets at 0200 GMT each night on 3935 kHz. The Idaho RACES net meets week days at 1515 GMT on 3990.5 kHz and Mon. (local date) at 0130 GMT on 3990.5 kHz. SCM, W7ZNN attended the N.W. Division League Officials meeting at Seattle. Interested in participating in a joint Idaho-Montana CW net? If so contact Al Francisco, K7NHV, P.O. Box 4412, Pocatello, Idaho 83201 and pass along your druthers on the net meeting time, frequency, etc. The two section net encompassing a large area should provide plenty of action. FARM Net reports 26 sessions, 787 QNI, 56 visitor QNI, 75 traffic handled. Traffic: W7GHT 213, WA7BDD 32, W7ZNN 22.

MONTANA — SCM, Harry A. Roylance, W7RZY — Asst. SCM: Bertha A. Roylance, K7CHA. SEC: W7TYN. PAM: WA7IZR. I wish to thank you for your confidence by letting me have the opportunity and pleasure to serve you as SCM for two more years. Mont. PON held 25 sessions, 238 check-ins and 8 pieces of traffic. WA7KZF the Butte repeater is being improved and doing an FB job. The SCM traveled to the Directors meeting in Seattle and also attended the Tacoma Hamfair. Met a lot of new hams and also saw friends from past conventions. Worked a lot of 2-meter repeaters on the trip and some 6 meters. The majority of the repeaters are using tone access. A real good picnic was held at W7OTJ's ranch. The new EC for Missoula is K7IMZ. Billings is in the final stages of getting their repeater up in the Red Lodge area. K7RRS is running for the seventh district chairman in YLRL. Our best wishes Joyce. WA7FBN has purchased a mobile home and has all the comforts of home, rig wise anyway. Mont. Traffic net check-ins for Aug. was 861, 44 pieces of traffic and 23 sessions. Traffic: WA7JQS 172, W7LBK 34, WA7IZR 8, WA7OBH 8.

OREGON — SCM, Dale T. Justice, K7WWR — SEC: W7HLF.

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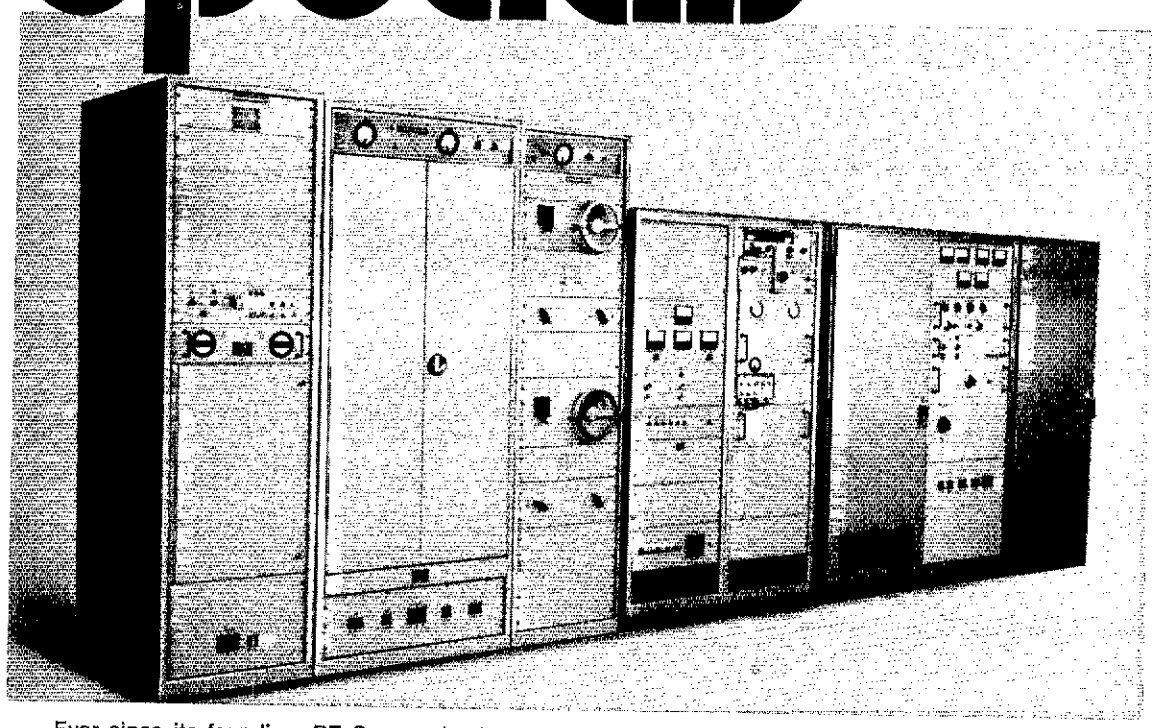

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RM: K7GGQ. PAM: K7RQZ. New appointment: WA7OYC as EC for Lake County. WA7KIU reports for the OSN for Aug. sessions 27, check-ins 70, traffic 38. Several events during the month included the OEN picnic at Lebanon on the 13th, 86 hams present and the EARS picnic at Springfield, 47 hams present. EARS(Springfield) is now meeting on the second and fourth Wed. of each month. W7HLF was in Lakeview to recruit an EC. SCM and SEC traveled to Seattle for the annual Director meeting, and the Tacoma Hamfair. WA7DIW is now on 6 meters. W3AOW now living in Bend. WA7GTX reports for the AREC net for July session 28, check-ins 300, contacts 52, maximum number of counties 11. RVARC(Medford), is trying its hand at classes for license again this fall. W7IIJ is moving to Westport, Ore. Traffic: K7OUF 131, WA7IFS 69, WA7MOK 16, W7IWN 13, W7LT 11, K7WWR 9, W7MLJ 5.

WASHINGTON – SCM, Arthur Henning, W7PI – SEC: W7UWT. RM: W7GYF. PAMs: W7GVC, W7MCW. VHF PAMs: K7BBO, K7LRD. New appointments: W7EBU as EC for Lewis County, K7IEY as OPS, WA7GWL as ORS, W7YGU as OBS.

Net	*Freq.*	*Time(Z)*	*QNI*	*QTC*	*Sess.*	*Mgr.*
WSN	3590	0245	320	113	31	W7GYF
NSN	3700	0300	337	117	31	WA7OCV
NWSSB	3945	0230	999	55	31	K7KPC
AREC	3930	Su 1000	44	3	4	W7UWT
NTN	3970	1930	985	82	31	K7VAS

W7BA, our outstanding amateur and dedicated traffic man became a Silent Key Aug. 17. Besides numerous public service awards Loyd achieved 249 consecutive monthly BPL awards. He will be greatly missed by all of us. W7APS received Outstanding Service Award for 20 years service on RN7 from W7BQ and W7KZ, RN7 mgrs. New pres. of Mt. Baker Club is WA7BZO. WA7LMO is attending Univ. of Wash. XYL of WA7AZO made dramatic entrance into ham radio – she picked up Carl's coax with the lawnmower – time out for repairs and to restore domestic tranquility, hi! School is curtailing WA7LQQ activities – no more staying up all night. K7GCD worked his first VK and busy harvesting onions. WA7AVI made 2 way SSTV contact with New York on 10 meters. Bellingham Novice WN7TYZ is originating a lot of traffic on NSN. WA7MEO needs two more for DXCC. K7GSE needs Delaware and Hawaii for WAS on 50 MHz. WA7ELI is active in VHF AREC nets. K7VNI, EC for Whatcom County is starting an AREC VHF net weekly on 146.76 MHz. W7QCV is active in Navy MARS. On a 1 minute burst, K7BBO during Aug. Perseids worked Ariz. as new state on 2 meters ssb. Traffic: (Aug.) W7PI 354, W7KZ 191, W7JWJ 168, WA7DZL 122, WA7OCV 96, K7VAS 69, W7BUN 57, W7BQ 55, W7APS 44, K7OXL 43, W7AXT 34, K7OZA 24, W7IEU 17, W7ZHZ 15, WN7TYZ 12, WA7EDQ 8, WA7LMO 6, W7AIB 4, K7BBO 3, WA7LQV 3, K7VNI 3, WA7LQQ 2, W7QCV 2. (July) W7QCV 7.

PACIFIC DIVISION

EAST BAY – *SCM, Paul J. Parker, WB6DHH* – *All amateurs* should be aware of the new repeater rules effective Oct. 17, 1972. Check Oct. QST. Congrats to WB6NDR who just received Advanced Class license. New Novices in the section are WN6s SER, SET, SEE, SEG, RYG and RYS. Try to work these new hams and give them a hand. WN6MXT and WN6MZQ *passed Advanced Class exam.* WN6MXT to be /6 in Nevada City until Sept. '73. QSL John Thornton % John Woolman School, Rt. 1, Box J26, Nevada City, CA 95959. Traffic: (Aug.) W6IPW 175, WB6VEW 13. (July) WA6IYB 7.

HAWAII – *SCM, Lee R. Wical, KH6BZF* – *SEC: KH6BZF. RM:* KH6AD. PAM: KH6GJN. VHF PAM: KH6GRU. SRC: KH6FOX. QSL Mgr.: KH6DQ. ECs: KH6s GPQ, BAS, HHG and BZF.

Net	*MHz*	*Time(GMT)/Days*
WCARS	7.255	All
Confusion (patches)	21.400	0030 All
Friendly	7.290	2030 M-F
Pacific Interisland/ Micronesia	14.305	0800 All
Pandoras Box	14.277	0430 All
S.E. Asia	14.320	1230 All
Intercontinental	14.313	Needed All

KH6GFG's XYL presented Gary with a new harmonic. KH6AFG *and company back from a visit to JA-Land. W6HX and XYL were in* town for some surf and sand. KH6GHZ, ex-TA3MP and XYL recently vacationed through the Pacific Northwest and Idaho. KH6HJF is on SSTV. K7WFV reports he's stationed at Clark AB; K2MVS is stationed in HL9-Land. KH6s RS, HCM, BZF and IJ were big winners in CQ's fall classic. W6KUL and co. were in town as was K4II. KH6BWT recently dropped into Henry Radio L.A. for visit

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☐ 741C	Frequency compensator 709 (A)	.41
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☐ SN7416	.48
☐ SN7417	.48
☐ SN7420	.21
☐ SN7421	.21
☐ SN7426	.32
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and equipment haul. KX6s RA and NC are involved in scouting. W6MHA keeps the Confusion Net going on and off the air. A Confusion Net bulletin comes from Al monthly to keep all informed. KH6HLN bought a Heathkit station and should be on soon. Radio Shack has opened stores in Kaneohe's Windward Shopping and Pearl Ridge Shopping Centers. WA3AAJ is enjoying DX in Hawaii. K5CIT/KH6 worked many new ones. K7WQW/KH6 visited the Wash. D.C. area. KG6JAR came through recently on his way to and from CONUS. Joe's a new OBS. KH6GQW and XYL vacationed at the Kuilima Resort. KH6HGP/W7WOX reports DXpedition plans unfolding soon. KH6GMP was home for a month on leave from Tripler Army Hospital. KH6BVS's new tower is up. Last month's "Honolulu Advertiser" had a nice feature article on KH6BWO and his book "My First 85 Years".

NEVADA – SCM, Leonard M. Norman, W7PBV – WA7BEU and W7PRM have been vacationing with their trailers in northern Nev. WA7ECT, K7OHX and K7ZQV active in CW net. W7ILX reports activity in AZ and CA PON. W7BIF candidate for Nev. Assembly. K7ZOK has received his QCWA membership; certificate for his second WAS on 6 meters but is still looking for his 25-year membership pin from ARRL. W7GUA has a new Swan linear. W7CV has a new transmitter site on the golf course. K7YVN received a commendation from Governor Mike O'Callahan for being the first YL pres. of a ham club in Nev. K7UGE 2-meter fm repeater has been moved from Red Mountain to the Charleston Mtns, west of Las Vegas. SAROC convention committee working hard for FB convention at the Flamingo Hotel Convention Center Jan. 4-7, 1973. Contact your SCM for an application for an ARRL appointment. Governor Mike O'Callahan has proclaimed Nevada Amateur Radio Week Jan. 1 through 7, 1973 to coincide with SAROC. Traffic: W7ILX 43.

SACRAMENTO VALLEY – SCM, John F. Minke, III, W6KYA – Now that winter is on the way, how about checking your antenna installations? It is a good chance that we will have a wet winter and it will be no fun working on your antennas in the rain, or snow, depending where you live in the section. Anyone with a 4WD vehicle, with or without a mobile rig, wishing to get on the list to keep informed about activities involving ham radio and 4WD, contact W6TEF. The Northern Calif. Net, (NCN), still looking for check-ins from our section. The net meets daily at 1900 and 2030, local time, on 3630 kHz. The second session is a slow speed net. The northern part of the section attracts many who have retired from the daily rat race. Those include W6BLC in Crescent City, and W6FEX in Smith River, who entertains many visiting hams, especially when the salmon are running! Traffic: K6YZU 7.

SAN FRANCISCO – SCM, Thomas A. Gallagher, W6NUT – Best wishes for a full recovery to W6WLV whose health required his resignation as SCM. This section consists of S.F., Marin, Sonoma, Mendocino and Humboldt counties. S.F. Radio Club meets on 3rd Fri. of the month at 8 P.M. at the S.F. Youth Guidance Center. Contact W6URA for details. Contesters may contact W6NUT re No. Cal. Contest Club. The Humboldt ARC meets 1st Tue. of month and reports its annual picnic was a success. Marin ARC, W6SG, transmits Official Bulletins on the Sun. morning Red Cross Net. I would like to hear from all the clubs in this section. WB6ZOM received FB newspaper publicity for his S. Dak. flood traffic work. WA6BYZ racked up a string of BPLs. K6UGS made DXCC with 180 watts. K6PQI completed all Calif. counties and on 6 worked all N.J. counties. W6RQ and the 133 member Tel. Co. Club Novice classes produced WN6RUT, a YL, and WN6RSA. W6GGR is building solid state 2-meter fm gear. W6RNL has a new linear and vertical. K6HZ is after 5BWAS and 10X on 28 MHz ssb. WB6LRQ is active in Navy VHF MARS. W6BIP/VE8 was active in July CW CD party while WA6DJI/6 kept the key hot at BIP's home QTH. Let's have some activity from this rare section in ARRL Sweepstakes! Traffic: (Aug.) W6BWV 16, W6RNL 14. (July) WA6BYZ 177, W6BWV 11. (June) WA6BYZ 216, W6WLV 62.

SAN JOAQUIN VALLEY – SCM, Ralph Saroyan, W6JPU – New officers of the Tulare County ARC are WB6SPM, pres.; WA6ZRZ, vice-pres.; WB6CHL, secy. W6ARE is trustee for repeater station WB6OPG. WB6TTP is editor of the GRID LEAK, TARC bulletin. W6KOC has moved back to Fresno and is on 75 ssb. WB6VFU attended the Hamfest in Reno on Aug. 5, 1972. WA6ONZ is on 2-meter fm. W6UBK is active in Navy MARS. K6OER, after a lengthy illness, is back on the air. WB6OWI is on 2-meter fm. W6QFR ran into some final amplifier problems. WA6BUH assisted in the Kerman Festival. K6QPE assisted in the Mexican Road Races. WB6RGU is on 2-meter fm. WA6SBM is using an 829-B final on 2 meters. W6GRV is experimenting with speech processers. W6PSQ is chasing DX. W6YKS is on 10 meters. W6SF has worked 37 states on 6 meters. W6YKS has 45 states on 6 meters. W6NWO is on 6 meters.

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WA6EXV was heard by K5UGM on 432 MHz. WA6EXV demonstrated two 30 MHz low noise preamps to the San Bernardino Microwave Society. WA6CPP has worked all counties in Nev. and Ariz. on ssb. W6JDB is active in NCN and they are looking for more members. Traffic: WA6JDB 5, WA6CPP 2.

SANTA CLARA VALLEY – SCM, James A. Hauser, WA6LEA – SEC: WA6RXB. RM: W6BVB. W6BVB reports that NCN had 486 check-ins with 262 pieces of traffic handled in July. W6YBV was active with traffic as was W6NW. W6KZJ was busy on the NTS nets. W6DEF kept occupied with traffic and the 2-meter CD nets. W6AUC was very active on the 75-meter nets. PSHR: W6YBV, W6DEF, W6AUC. W6RFF is heard on both 80 and 10. WA6DKF reports low activity because of business, however was more active in Oct. WA6HAD was active on the traffic nets; W6OII is heard on 75 and reports activity in the July CD Party. W6MMG reports that WN6DFM is now WA6DFM with an Advanced Class license on his first try. Nice going. Traffic: (Aug.) W6BVB 162, W6YBV 145, W6NW 111, W6KZJ 80, W6DEF 65, W6AUC 60, W6OII 19, W6RFF 11, WA6DKF 6, WA6HAD 2. (July) W6OII 5.

ROANOKE DIVISION

NORTH CAROLINA – SCM, Chuck Brydges, W4WXZ – SEC: W4EVN. PAM: WB4JMG. RMs: WB4ETF, WB4VBM. The annual Labor Day week end Shelby Hamfest was again a "biggie" with 1400 ticket buyers and another 200 just searching the flea market. WB4QQY had a busy month with 25 phone patch assists to U.S. Navy MM/Reg 1. New call in Franklin is K4UB and "Uncle Bill" is ex-81Q *with a 1915 callbook listing to prove it. He was* dealed out a large amount of incentive from K4RJ who does some very uhf SWLing when not moonbouncing. K4MSG, new OVS, is catching *openings on vhf from Avon. K4JO also is busy on vhf from* Pfafftown. New mgr. for the JFK Net is K4VBG; secy. is WB4QQM and new dir. are WB4NRZ and W4AMY. The Raleigh ARS news *featured WB4VBM our new RM for early net activities. RM for late* net activities is an old hand, WB4ETF. Congrats to both for spark plugging our cw gang. After a 32-year "break" K4UC is back at mike and key – once a ham, always a ham. Congrats to the Charlotte ARC, W4CQ, now an ARRL affiliate. WA4FFW, Alamance Co. EC, reports nice listing of AREC members and upgraded Novices. His group also assisted the local Red Cross with health and welfare traffic. The Cape Fear ARS, Fayetteville, continues with numerous activities after a fine FD. Fayetteville newspaper ran a story on King Hussein, JY1. Traffic: (Aug.) W4EVN 168, W4WXZ 30, K4MC 27, W4OFO 22, K4VBG 17, W4ACY 15, WB4QQY 12, WB4CES 11, WB4BGL 9, K4EZH 9, WB4JMG 7, WA4VNV 6, WB4HGS 4, WA4KWC 4, W4TYE 2. (July) WB4TNC 32, W4TYE 3.

SOUTH CAROLINA – SCM, James H. Abercrombie, Jr., K4BMS – Two meter activity on up swing with Greer RC having a new repeater in operation. Greenville's Blue Ridge Club making application for repeater on Ceaser's Head Mountain. Bishopville and Florence also have plans for a repeater. As this appears in print, the Rock Hill repeater should become active. Congratulations to WA4LDM for 5BDXCC and was first station in the section to make 5BWAS. WB4UQS, new Ballentine works mostly cw - which also happens to be his handle. WB4UAJ has returned to Vanderbilt U. *after summer vacation at home in Fort Lawn. WB4IKU has moved* back to Greenville from Orlando, Fla. WB4TNS and WB4KNB are studying for their Extra. Congratulations to WB4DRO, WB4TNN *and WB4TNS for upgrading to Advanced Class. WN4ZQH has passed* his General and is now working for his Advanced Class. WB4PBE has made DXCC and can be found chasing those rare ones on 15 and 20. *K4RF, a transplanted Yankee, is frequently heard chasing those DX* stations using his quad down on the coast.

VIRGINIA – SCM, Robert J. Slagle, K4GR – Asst. SCM: A.E. Martin, Jr., W4THV. SEC: WA4PBG. Asst. SECs: WA4JJF, WB4CVY. RMs: WB4NNO, KØPIV/4, W4SHJ. PAM: WA4FGC. Regret to announce resignation of WA4EUL, RM of VN since 1965. *Congratulations to McLean Amateur Radio Assn. and Northern* Virginia FM Assn. on affiliation with ARRL. Eastern Shore ARC has picked up a cartoonist for their paper. VSBN had 10,334 QNI *and 2975 QTC for year Aug. '71 through July '72. WB4RDV* repairing antennas. Welcome back to WA4EPH. WB4PNY back on after parts shortage. W4SQQ now in Bealeton, Va. W4HIR visited by *K4VDL. WN4URW passed General. W4THV getting up TA-33.* WB4YAH back from European sojurn. W4YZC cutting back on work due to work. WB4DRB back from his 4X-DXpedition. *W5VZU/4 back strong after four years inactivity. Dead month for* W4DM. W4NQA has new tower. W4UQ back from vacation. K4JM

enjoying new 15-year-old 75-A4. WN4YKM newly on in Charlottesville. OOs K2HBA/4 and W4HU had relatively quiet month. We'll keep our fingers crossed that it is a trend. WN4UPO doing good DX on 15. K4PQL reports hearing me playing in yard with TR-22! Director, W4KFC grooming antennae for winter. W4JUJ has 2648 counties to WA4WQG's 3035. K4GM grounded antennae for vacation. Hurricane DAWN made us nervous, but no threat.

VSMN	3947 kHz	0715/1630	M-F
VSBN	3935 kHz	1800/2200	Dy
VSN	3680 kHz	1830	Dy
VFN	3680 kHz	1900	Dy
VPN	3947 kHz	1930	Dy
VRN	3625 kHz	2000	Dy
VPQN	3905 kHz	2215	T

Traffic: (Aug.) W4YZC 266, K4KNP 214, W8VDA/4 186, W4UQ 155, WB4SGV 129, K4KA 106, W4HIR 104, WA4FGC 79, WA4JJF 53, WA2BEX/4 47, WB4KIT 44, WB4JMD 39, W5VZU/4 28, K4GR 26, WB4RZW 25, WA4UNS 21, W4KFC 20, WB4PCK 19, WB4DRB 14, WB4FDT 13, WB4PNY 13, K4GTS 11, K4PQL 10, W4THV 9, K4VIG 9, WB4KBJ 8, WA4WQG 8, K4JM 6, W4FQV 5, W4NQA 4, K2HBA/4 2. (July) WB4SGV 90, K4KA 58, WB4PCK 17, WB4RDV 14, WA4UNS 7, K4GM 3.

WEST VIRGINIA – SCM, Donald B. Morris, W8JM – SEC: WA8NDY. RM: WB8BBG. PAMs: W8DUW, W8IYD, K8CHW. Mountain State Emergency Net on Sun. 3927 kHz at 1430Z gives good coverage of Randolph, Tucker, Lewis and Barbour Counties. WB8IJW active from WVU. W8HZA attended QCWA dinner in Washington and received 50-year pin. W8JPL active from Buckhannon on 2-meter fm, mobile and fixed. WN8III and WN8IFU made BPL and WN8III's picture appeared in QST for Outstanding work in Novice Roundup, leading the Roanoke Division. WB8BMV attending Fairmont State College, made PSHR along with WN8III. WN8LAI has been inactive. West Va. CW Net with 76 stations, checking in, handled 35 messages and the Phone Net with 227 stations passed 104 messages. W8DUW, WA8FLF and WA8PFB served on the nominating committee for 1973 State Radio Council officers. Morgantown area amateurs plan a repeater station and W8CUL is active as the WVU Club station. W8DUV builds DX contacts on the YL ISSB Net on 14 MHz. Congratulations to K4LMB for her Roanoke Division Service Award. The Roanoke Division plans Convention in '73 in Northern Va. Traffic: WN8III 228, WN8IFU 146, WA8NDY 62, WB8IJW 51, WB8BMV 50, W8JWX 26, W8AEC 19, WA8WCK 16, WA8POS 8, WA8OKG 7, WA8YCD 7, WB8CYB 6, WB8DXF 5, W8JM 5, WB8EHG 2, W8GWR 2, W8KWL 2, WA8WCH 2, WB8AKR 1, WB8BBG 1, WB8BMW 1, WA8LFW 1, W8QEC 1, K8ZDY 1.

ROCKY MOUNTAIN DIVISION

COLORADO – SCM, Clyde Penney, WAØHLQ – SEC: WAØQOY. RM: WØLRN. PAMs: KØCNV, WØLRW, WAØWYP. WBØAXW represents CTN on TWN/1 and TWN/2. WAØNFO serves as NCS Tue. on CCN, and occasionally on Colo. Emergency Phone Net. Ex-W4MXU/Ø now has his new call WØONK. WBØBSS is acting net mgr. for CTN and Hi-Noon Net during the absence of the regular net mgr. KØOTH has been assigned net responsibility as Station 1 on TCC on Thur. evenings. Official thanks and appreciation was given *on-the-air by WBØCNY of Keystone, S.D., to the Columbine Net in* general, and members KØCNV, K7SLM and WBØCCB specifically, for help given during the Rapid City, S.D. flood. Net traffic: Columbine QNI 831, QTC 52, informals 110, 26 sessions. CTN QNI 281, QTC 44, informals 71, 620 minutes. Hi-Noon QNI 1031, QTC 27, informals 117, 869 minutes. Colo. Emerg. Phone Net QNI 153, QTC 9, 4 sessions. CCN QNI 271, QTC 134, 31 sessions. SSN QNI 189, QTC 134, informals 18, 31 sessions, 699 minutes. Traffic: (Aug.) KØZSQ 1068, WØWYX 402, KØYFK 402, WBØAXW 217, WØLQ 185, WØLRN 123, W2TPV/Ø 121, WØIW 101, WØLRW 60, WBØHCK 38, WØNZL 36, WAØSIG 36, WAØNFO 29, WAØZPP 23, KØTIV 22, WAØTMA 21, WØSIN 15, KØCNV 12, WØONK 12, WØBY 7, WAØYIH 7, WAØHLQ 1. (July) KØZSQ 930, KØYFK 204, WØLRN 110, WBØBSS 35, WAØWYP 20.

NEW MEXICO – SCM, James R. Prine, W5NUI – The repeater in Los Alamos has been shifted to 28/88 on a trial basis to alleviate the 34/94 interference with WA5JDZ on Mt. Taylor. A number of stations participated in the flood relief activity in Las Cruces and Hillsboro but no formal report has been received. The morning and evening section net now is on 3940 kHz which should provide better service and perhaps more off hours monitoring. Traffic: K5MAT 154, W5MYM 48, W5PDY 25, WA5OHI 21, W5PNY 21, W5DAD 20, W5BWV 9, WA5MIY 2.

UTAH – SCM, Carroll F. Soper, K7SOT – SEC: W7WKF. RM: W7OCX. The month of Aug. has taken its toll of amateur activities

and news in the Utah section. With most of the vacations over for the year it is anticipated that activities will increase as the months pass. *The Beehive Utah Net meets daily on 7272 MHz at 12:30* MST. Traffic: (Aug.) W7EM 117, W7OCX 44, WA7HCQ 22, WA7MEL 9, K7CLO 6, W7GPN 2. (July) W7EM 192.

WYOMING – SCM, Wayne M. Moore, W7CQL – SEC: K7NQX. W7SDA went down in Aug. on his vacation and passed his General Class exam – congrats Chet. At the hamfest W7HNI volunteered to accumulate data on the Wyoming hams, hamfests, etc. He will act as our historian so, if you have any information on past hamfests, etc., please send it to Gaddis. He hopes to have a lot of it worked up *including some pictures for next year's hamfest.* K7CSW is back on the air after an absence of several years. W7WFV, who has been operating out of Casper for some time, is in the Cheyenne VA hospital having some broken bones mended after a serious accident. W7VB now has his 2-meter repeater working nicely from on top of *Boysen peak. Traffic: K7NQX 256, W7TZK 101, K7VWA 57,* WA7NHP 7, K7JED 4, W7SDA 3, W7ILL 2, K7TWK 2.

SOUTHEASTERN DIVISION

ALABAMA – SCM, James A. Brashear, Jr., *WB4EKJ* – *WN4RIT* is now serving as custodian of the W4/K4 QSL Bureau. K4IKR is a member of the DXCC Honor Roll and didn't he do an outstanding job as MC at the North Ala. Hamfest? W4SVM (hamfest pres.) and the entire committee put on a good "fest." A big thanks to the QRM Club members who helped with registration and numerous other tasks. Another big thanks to Mr. and Mrs. WB4SXG and son, WB4SJL for providing free coffee and doughnuts at the hamfest. We were fortunate in having our Dir. W4DOS and W4DQD attend the hamfest, also glad to have our neighbors from the Delta Div. (W4WHN and W4WBK) visit with us. Mr. Skipper Lepich, Red Cross Dir. of Emergency Services recently gave an interesting talk to the Birmingham ARC on activities of the American Red Cross and amateur radio during emergencies. K4JK reports illness in his family delayed his vacation in July but is all set to try again – in a new Caprice. WB4SVH, NM of AEND will now be more active on NTS. He also reports the Tuscaloosa ARC is again planning a booth at the West Ala. Fair this year. WB4WUS, NM of AENO reports several projects in process. The Explorer Post 21 ARC reports 4 members recently received FCC licenses and extend congratulations to WN4BCZ, WN4BHP, WN4BHQ and General Class WB4ZKA. WB4TCH reports the club is growing. Endorsed WB4KSL, WB4NLK and WB4SVX as ORSs. Traffic: WB4SVH 136, WB4EKJ 107, *K4AOZ 65, WB4JMH 63, WB4ADT 63, WB4THU 12,* WB4WUS 6, WN4ZQF 6, K4BSK 2, K4HJM 2.

EASTERN FLORIDA – SCM, Regis K. Kramer, W4ILE – SEC: W4IYT. Asst. SEC: W4SMK. RM: WB4OMG. PAMs: W4OGX 75, W4SDR 40. Following are meeting times of Florida cw and ssb traffic nets effective time change Oct. 29.

Net	*Fqcy*	*GMT*	*EST*	*Net*	*Fqcy*	*GMT*	*EST*
GATOR	7115	1330	8:30 A	FPTN	3940	1200	7:00 A
QFN E	3651	0000	7:00 P	FMTN	7254	1700	Noon
QFN L	3651	0300	10:00 P	TPTN	3940	2200	5:00 P
QFTN	3715	0200	9:00 P	FAST	3940	2300	6:00 P

Visitors to Fla. are welcome to join us and keep in contact with the folks back home. New station appointments: WB4WIQ as OPS, WB4WHK as ORS. Renewals: WA4OHO, W4DQS as ORSs; *WA4WZZ and WB4HML as ECs. WB4HIS made his 2nd BPL by* RTTY relays to W3CUL. WB4QFH has his 160 DXCC endorsement. WA4OHO back at Ga. Tech, W4AQL. W4OZF representing the Hollywood ARC is doing some excellent work at WR4USA. W4OZF also has applied for his 500 bar 10-10 award. W4LDM is a strong believer of Switch to Safety. Whee left on vacation and disconnected his antenna. On return he found his antenna disintegrated – rig and house AOK. K4SCL is sending in FB report each month which is being published in QFN Bulletin. K4SCL is mgr. of the FAST Net. WB4CBP ran 153 patches for the 22 men down at KC4USN during Aug. WB4SMA is off to MIT. WB4SQA is now mgr. of TPTN. OO reports received from K4SC, K4NE and W4FRL. Orlando hams starting 2-meter DX net. WB4PNG has the RTTY bug. WA2AFL/4 worked long and hard this summer to *acquire the "bread" for his FTDX-560. W4IZ did a shopping center* exhibit sending taffic from Normandy Mall area. WA3FRV now signing WB4BBH on traffic nets from Miami. WB4OMG is looking forward to a TCC sked offered him by W3EML. K4JWM sold his Drake Line and hints a YL is about to become an XYL. We should soon know about *Florida's Restructuring. Whatever the outcome,* let us all rededicate ourselves in making the Fla. section or sections the BEST EVER. Traffic: (Aug.) WB4HIS 1073, WA4IJH 585, WR4USA 562, K4SCL 363, WB4OMG 173, WB4WHK 145, WA4SCK 142, W4IYT 139, WB4PNG 134, W4SDR 129, WB8ZY/4 127, WB4WYX 103, WB4SQA 93, W4NGR 91, W4DQS 86, *W4ILE* 71, WB4FLW 67, WB4AIK 62, W4IAD 62, K4BLM 59, WB4HJW

57, K4FAC 56, WA4FJA 53, W4VLK 48, WA4BGW 45, W4BM 41, KØECG/4 40, W4IA 40, K4QG 40, WA4HDH 38, K4QG 34, WB4HKP 33, W4VME 29, WB4OAA 28, W4WIQ 28, W4LSR 25, WA4ESS 22, W4GUJ 22, WB4AID 21, K4NE 18, W4DVO 17, W4NTE 16, WB4PTH 16, WB4SMA 16, W4SMK 15, WN4AWH 14, K4LEC 14, W4OGX 14, WA4OHO 14, WB4SKJ 14, W4TJM 13, WB4FJY 12, W4KGJ 12, W4DFP 11, K4EBE 11, WB4NJI 11, K4EZE 10, W4UWP 10, WB4UOC 9, WB4BBH 6, W4LK 6, WA4VZF 6, K4SJH 5, W4YOX 5, W4YPX 5, WB4QFH 3, WA2AFL/4 2, WA5BRJ/4 2, W4FWZ 2, W4UMI 2, WN4VYU 1. (July) W4YPX 13, WB4JJQ 6, W4KGJ 6, WA4PDM 6.

GEORGIA – SCM, A.J. Garrison, WA4WQU – Asst. SCM: John T. Laney, III, K4BAI. SEC: WA4VWV. RMs: K4BAI, WB4SPB.

Net	Freq.	Time(Z)/Days	QNI	QTC	Mgr.
GSN	3595	0300/1150/0000 Dy	707	220	K4BAI
GTN	3718	2300 Dy	–	–	WB4SPB
Ga. SSB	3975	0100 Dy	771	45	WB4DMO

The Atlanta Radio Club new officers for 1972/73 are WA4VWV, pres.; W4BTW, vice-pres.; WN4RSM, secy.; W4GKF, treas.; WA4VHA, act. mgr.; WB4JXO, editor. The Albany Repeater Society plans to have a 2-meter repeater operational in approximately two months. For further information on the plans of the Society and the progress of the repeater, contact John G. Crosby, 1303 Second Ave., Albany, Ga. 31705. K4OSL has moved to a new location near Savannah, Ga. He is planning a seven acre antenna farm. WB4PFE plans to be active again in GSN as soon as he completes his USAF technical school and gets a permanent assignment. W4JM reports he has a new SB-220 on the air. Traffic: WB4RUA 256, K4BAI 97, W4EEP 77, W4DDY 48, WB4UIH 47, W4CZN 45, WA4WQU 41, WA4RAV 40, W4AMB 39, W4PIM 25, W4RNL 22, W4JM 10, WB4SQJ 5, W4FDN 3.

WEST INDIES – SCM, Pedro J. Piza, Jr., KP4AST – SEC: KP4CB. The Radio Club de P.R. held their meeting in Arecibo where they were informed of their repeater's project. KP4CQB received WAZ and WAS certificates. KP4DEX installed a new four-element triband beam. KP4BJM has a four-element Quad and he is waiting for a 50-ft. tower. KP4DXZ has WAZ. KP4VC has moved to new QTH and has a 100-ft. tower with triband beam. KP4BOL is on the air from Utuado. KP4AWM is on 2 meters. Traffic: KP4WT 243.

WESTERN FLORIDA – SCM, Frank M. Butler, Jr., W4RKH – SEC: W4IKB. RM: K4LAN. RTTY: W4WEB. PAM: WA4IZM. VHF: WB4KGW.

Net	kHz	Time(Z)/Days	Sess.
WFPN	3957	2300 Dy	31
QFN	3651	0000/0300 Dy	62

Pensacola: KØBAD/4 was RN5 representative to CAN Staff meeting in St. Louis in Oct. WB2LVW/4 is returning to New York after graduating from UWF. WB4WOB had WB4LNM from Birmingham as a visitor. WA4IZM is working on big and little Motorola FM sets – an HT-220 and a ¾-KW base station. Gulf Breeze: W4AKJ QNIs the Gator Net from his yacht! Milton: WB4IYV appointed to the U.S. Naval Academy keeps skeds with WB4JRP from W3ADO at 1915 GMT on 14,215 kHz. WN4AZB is a new Novice. Fort Walton: New hams in the area include WN4ASI, WB4NLV, WB4VYQ and WB5GCC. The PARC meeting room now sports wall-to-wall carpeting. WB4SFU passed his General Class exam. Defuniak Springs: WN4AZX looking for contacts on 3724 kHz. Panama City: WA4YWK is stationed at Tyndall AFB. Bonifay: WB4PJT was appointed EC for Holmes County, Tallahassee: The .34/.76 repeater is on the air; reports indicate good coverage. W4MNW is active on 2 meters. Another new ham is WN4BAX. Traffic: (Aug.) KØBAD/4 197, WA4IZM 51, W4RKH 27, WB4NHH 19, WN4ZQC 13, WB9AIU/4 6, W4IKB 5, WB4DVM 2. (July) WA4IZM 52.

SOUTHWESTERN DIVISION

ARIZONA – SCM, Gary M. Hamman, W7CAF – PAM: W7UXZ. RM: K7NHL. Officers were elected by the Sun City-Youngtown ARC as follows: W7IWL, pres.; WA7GHW, vice-pres.; WA7SLV, secy.; WA7OOK, treas.; W7HYT, dir. Amateur radio clubs interested in having any amateur attend their meetings are listed below along with the times, days, and locations of their meetings. Arizona ARC, 2000, 1st Thur. 1510 E. Flower, Phx.; Arizona Repeater, 1930, 4th Tue., 4702 N. 24th St., Phx.; Hualapai ARC, 1930, 3rd Tue., DPS Hq. Bldg., Kingman; Maricopa C.D., 1930, 4th Thur., 2035 N. 52nd St., Phx.; Old Pueblo ARC, 1930, 2nd Wed., Randolph Park Clubhouse, Tuc.; Phoenix VHF, 2000, 1st & 3rd Wed., 1510 E. Flower, Phx.; Scottsdale ARC, 1930, 3rd Mon., 7111 E. Camelback, Scottsdale; Sun City-Youngtown ARC, 1930, 3rd Tue., 1st Fed., Svgs., S.C. The annual Winter Hamfest is planned for Feb. 4 at Squaw Peak Park in Phoenix. K7GLA mobile reported an accident near Wickenburg involving an overturned trailer. W2HG has moved from New York to Phoenix. Section Net Certificates were earned by WA7HIT, WA7IXC, WA7JCK, K7RLT, WA7KQE, WA7TQC

Traffic: K7NHL 155, K7NTG 122, W7PG 40, K7RLT 27, WA7GAE 18, W7CAF 15, WA7TQC 15, K7EMM 9, WA7JCK 9, WA7LXC 6, WA7KQE 5, W7LLO 3.

LOS ANGELES – SCM, Eugene H. Violino, W6INH – SEC: WA6QZY. K6BAZ is the proud owner of a new 54-ft. tower and planning to use four-element beam with all band verticle on top. The Southern Calif. VHF Club CD Net is run Mon. at 8 P.M. by WA6BFH, visitors are welcomed to check in. The following members received 50 MHz WAS: WA6JRA, WB6WAX, WB6IMV and WA6OLE. WB6MWT using FAX on six meters. WB6MKA now has Advanced Class license. Anyone experiencing QRM from reciprocal stations with /W6 please advise the FCC or myself. There has been considerable QRM and illegal operation by some of these fellows and its working hardships on the serious hams of the area. For those of you who want code practice – The Monterey Park Amateur Club has on-the-air skeds five nights a week Mon. through Fri. at 8 P.M. on 145.35 MHz. For further information contact WB6GAP. The Pasadena City College is offering amateur radio operating class Sep. 11 through Dec. 4 at the Pasadena High School – 7 to 9:30 P.M. Mon. and Wed. Room 207G. The SCN Mission Trail Net liaison traffic net catching on well, we need more liaison stations to fill empty spots. WA6RCE is the proud owner of a new FT-101 and has been active in the traffic dept. W6OAW, W6WBS and WA6BZX all vacationing in the Utah area. W6CL still very active in the OOTC group. W6FQ handling the Sun. morning QCWA net on 3917 at 9 A.M., would like all QCWA members to check in if possible. W6MAB has new Mini-Mast tower, planning to put it up soon. W6HS reports that VR6TC not active lately as he is convalescing in New Zealand after a leg injury. The Crescenta Valley had a recent T-Hunt. WA6NRB is heading the rebuilding of the Ramona Club repeater after fire damage. WA6MOD has new Yeasu Linear and making lots of phone patches from the Pacific area. AREC group is working with the Red Cross in relation to local fires and have established good liaison. WB6QZY, K6AEH, WB6TXX and WA6JXG working on repeater plan similar to the Tex. plan. They held meeting with local repeater representatives and Dir. W6KW, SCM W6INH. This meeting was sponsored by the Edgewood Amateur Radio Society. Associated Radio Amateurs of Long Beach had their annual Auction which was a goodie. WB6WDS and K6AWO appointed Field Day mgr. for TRW Club. The PARC offered an HT-200 Handi-Talki as the door prize at their Sept. meeting. The Antelope Valley Amateur Radio Club, Inc. reports they had an SSTV demonstration at their Sept. meeting. They are also considering code and theory classes for this fall. W6ABA now has Extra Class ticket. W6GAQ/6 still active on SOWP and SCN. K6ASK working on plans for SCON repeater. This net planning a special award for participation. One hundred hams visited the W6AM Rhombic Farm recently, WB6KXC again active after vacation plans going 2-meter with WA6JDC. Last minute news is that the So. Calif. group voted to follow the modified Tex. plan for 2-meter repeaters. Traffic: WB6BBQ 516, W6LYY 163, W6INH 152, WB6KGK 49, W6QAE 31, WA6ZKI 28, W6USY 20, W6IVC 11, K6CL 10, K6ASK 6, WB6YIZ 5.

ORANGE – SCM, William L. Weise, W6CPB – Asst. SCM: Richard W. Birbeck, K6CID. SEC: WA6TVA. PAM: K6YCI. RMs: WB6AKR, W6BNX. W6CPB and W6MNY, asst. SCM and former SCM visited Citrus Belt RC Aug. 4. W6MNY thanked the members for their excellent AREC support during his term of office. Some 50 members of NARS, Orange RC, Fullerton RC and Anaheim RC met at the ARAA club meeting on Aug. 25 to hear S.W. Div. Director W6KW talk on recent ARRL Board meeting. WB6JOT has added a Henry 2K to his shack. W6FB attended the Sierra Hamfest at Reno Aug. 5. He also has procured a new Swan – his 5th. Desert Rats Radio Club resumed meeting Sept. 20. WB6QNU is recovering nicely from Field Day accident. WB6ASR completed 80-10 final using pair 4-400s. Says it works great. Welcome to new hams WN6STQ and WN6STU. WN6STQ joined AREC, he is a Lt. in Sheriff's Posse at Independence. WA6YWS and WN6STU are testing a QRP cw rig in mountains for possible use in rescue work. Gave snatching is the GAME. W6DTR and 14 members of the Fullerton RC invaded the Anaheim RC meeting in July to claim their gavel. The Anaheim RC retaliated by sending 10 members to the Fullerton RC Aug. 15 to snatch their gavel. To the surprise of W6DTR pres. Fullerton RC, WA6TVA pres. NARS and 9 members also appeared to snatch the Fullerton Club gavel. Much interest has been generated to visiting between the clubs. PSHR: WB6JOT 42, WA6TVA 42 Traffic: WA6YWS 74, WB6JOT 67, WB6ZOK/6 18, WA6TVA 17 W6QBD 13, W6WRJ 11, K6GGS 10, WB6QNU 4.

SAN DIEGO – SCM, Paul C. Thompson, W6SRS – Asst. SCM Art Smith, W6INI. SEC: W6TAI. A year-end membership drive is underway to enlist the aid of more amateurs in the San Diego section AREC prior to the Jan. SET. A general meeting will be held in Jan. for all AREC members to distribute information about th

SET and an old fashion get-together. Visitors at the QTH of W6MAR were W7CFJ and F6KAW. WB6ODR has been elected as the general chmn. for the 1974 S/W Division Convention in San Diego. Hope you plan to attend the 1972 convention in Santa Maria Oct. 21 & 22, 1972. Clubs held auctions this month. PRC now has their license for the repeater. SDFM has changed to COR with input on 04 & output on 64. W6KJR visited K6EC before leaving for Scotland. K6BTO has fifty-two-elements on 1296. El Cajon Club *will sponsor the Fall Home Show Display. W6CN now is W7YM in* Wash. PRC picnic held at Live Oak Park. The San Diego Council RFI Committee indicates that they are having good response with *RFI problems. All problems received by the San Diego FCC are* immediately referred to this committee. Remember that the last Sun. of the month is Emergency Power and Portable Sun. Try to participate in this event. It is a lot of fun and good practice in emergency procedures. PSHR: W6BGF 43, WB6VKV 34. Traffic: W6BGF 254, WB6HMY 145, W6VNQ 128, WA6AMK 62, WB6VKV 60, W6DEY 26, W6TAI 6, WB6CFT 5, W6MAR 1.

SANTA BARBARA – SCM, D. Paul Gagnon, WA6DEI – SEC: *W6JTA. PAM: K6EVQ. RM: W6UI. Many thanks to SW Division* Convention chmn. K6YHK and staff for a great job. WB6WWY now has emergency power in use when checking into the AREC nets. *WB6DBD has donated a station to the SBar Red Cross for use as an* ARCC for the AREC and an SBARC club station. WB6WKC is back at the EC reins after being with Amigos in Central America this summer. He signed *YN9KMA, TG8RJ and /HR5. W6IDU sends OBs* from Newbury Park. K6TIB, WB6DXY, K6EVQ and WB6MXM are all Net Controls on Mission Trail Net. WN6TDA and WN6SSN are newly licensed in Camarillo. W6KZO has an ST-6 converter and AK-1 keyer completed for his RTTY station in Atascadero. WA6OKN has recently returned from a trip to Europe. New OVS K6YLQ advises repeater WA6SIN is now on 430 MHz. ORS WA6MBZ is going to school in Ariz. WB6WKC and WB6WRH worked the VHF QSO party with a Comcraft from 14495-ft. Mt. Whitney. W6OAL, WB6LLT, WB6IMM and K6LBV and others were on the VHF party from Mt. Pinas. They operated all bands from 6 meters through visible light range. K6CFJ vacationed at his brother's XE2 QTH. W6IDU has an ST-5 converter on RTTY, WA6DNU is on 430 MHz and is active on MARS. W6MQF received the Ten Ten award and now has new cw filter for FT-101. WB6BWZ is modifying a Viking II for RTTY. Contestor K6QPH has moved to Ventura. PSHR: WB6MXM 50, WA6DEI 44. Traffic: (Aug.) WA6DEI 175, WA6MBZ 160, W6JTA 135, WB6MXM 95, WA6PEF 10, WA6WYD 6, *W6MOF 2. (July) WB6MXM 81.*

WEST GULF DIVISION

NORTHERN TEXAS – SCM, L.E. Harrison, W5LR – Asst. SCM: Frank A. Sewell, W5IZU. Asst. SEC: WA5KHE. PAM: W5BOO. RM: W5QGZ. Thanks to all of you for voting in our first SCM's election since 1966. This further demonstrates our democratic process and the more people nominated the better the election. Most amateurs never heard of an SCM election. TTN reports 31 sessions, QTC 217, 1438 check-ins. DARC FD score 2013. W5TOO offered ARRL display space in his store, thanks Ed. Thanks also to W5JAX for his comments on League bulletin policy. WB2FZU/5, pres. CARC Lubbock also expressed his ideas for betterment of ham radio. WA5EIY received his 1st tone. WN5GPJ has new HW-101. WB2FZU/5 moving back east. SCM attended Arlington ARC Aug. 18, read OBS No. 383. Considerable comment. Their 450 kHz repeater okay. OO W5KYD rebuilding. Tex. cw active *on 3770 kHz. Check up on your ON signals.* W5JJ, W5HXL and W5WSW writes nice newsletter from Oak City. Kilocycle ARC says estate of W5HUU has gear for sale; WB5FLQ passed his General; WA5UOC and XYL spent 5 days with WB5GON and his XYL. CRW Dallas seven council members and 6 visitors attended last meeting. W5VR of Panhandle ARC reported as Net Mgr. WN5FOY getting Drake T4XB to add to R4B. W5QGZ reports activity at DARC/NoTexas repeater group work during Shriner six hour parade. Participating were WA5LMG, WA5FVD, WB5GBR, WA5RAL, W5SWY, K5SXO, W5IN, W5QGZ, K5ABV, K5SXE, WA5BNW, W5VKM and W5IH. No.EastTex Emergency Net 3970 kHz meets each Sun., 0800, K5DOM, mgr., 47 check-ins and 1 hour 18 minutes operating time for July. Your SCM attended Levelland Swapfest, Sun., Aug. 13. WA5VBM new OPS in South Tex. section. WN5FID passed his General. WA5VJB and others interested in UHF work. FB men keep after 'em. It has been a real pleasure to work with all of you for the past four years. Remember whoever your new SCM may be, be sure and given him the best support possible. Don't forget the upcoming Directors election. Traffic: (Aug.) W5TI 212, WB5EEE 140, W5GY 42, W5SHN 35, W5LR 18, K5UOR 17, W5IZU 8, WN5FOY 1, W5NFO 1, W5VR 1. (July) W5TI 144, WB5EEE 107, W5SHN 59, WA5RUF 27, W5IAR 22, W5IZU 6.

OKLAHOMA – SCM, Cecil C. Cash, W5PML – Asst. SCM: Joseph M. Schlosser, WA5IMO. SEC: WA5FSN. RM: W5RB. PAMs:

W5MFX, WA5WHV, K5DLE and WA5ZRU. Summer is gone. With daylight saving time gone nets are getting back to normal, conditions much better. The Texhoma Hamarama just over when you read this so hope I got to see you there. WB5DGT is happy to report contact with WB2BDA on 15 meters. Stuart is only 11 years old. W5SUG reports good contacts with both Tulsa and Pittsburg, Kan. on 34-94 fm. W5KE returned from Minn. vacation. K5WPP working with Novice class, thanks Fred. WA5WRC is on the late shift. WB5FIK is quite active on 75 but is rebuilding his 20- and 15-meter antennas. Congrats to W5MFX and WA5BPS on appointment as OBS for 2 meters on the repeaters. W5AAH and XYL of Tulsa retiring in Eureka Springs, Ark. The art of homebrewing is not gone completely, W5LYY recently displayed a piece of handi-work at the Tulsa ARC. K5LAD finally got his beam replaced. Congrats to new Technicians WB5BHD and WB5HPQ, XYL of WB5DUC, also new Novice WN5HOO. Traffic: K5TEY 571, W5RB 53, WA5ZOO 26, W5MFX 21, W5FKL 18, W5PML 18, W5SUG 16, K5OCX 11, WB5AZS 9, WA5FSN 9, WB5CWX 8, K5OTM 8, WA5OUV 5.

SOUTHERN TEXAS – SCM, E. Lee Ulrey, K5HZR – SEC: K5HXR. PAM: W5KLV. RM: W5ABQ. Congratulations to new ORSs WB5DQE, K5ROZ and OPS WA5VBM. Renewed appointment for WB5BWV as ORS and K5HGB as OO. OPS/OVS W5ZDU became a Silent Key. ORS WB5BWV upgraded to Advanced. EC W5ICL reports another successful test held with Red Cross. Received OO reports from WA5LES and W5RIY. W5ABQ, K5ROZ and W7WAH/5 are on PSHR. EC WA5MUM reports new antenna installed at Red Cross in Austin. OO WA5MIN has acquired a new rig. OPS WA5VBM says Lufkin has new vhf repeater with 15 operators. Received OVS report from WA5QCP. WB4AIW/5 came back to this section in Sept.

Net	*kHz*	*Sess.*	*QNI*	*QTC*
TEX*	3770	62	386	212
TTN*	3961	31	1643	134
7290 Tfc	7290	46	1911	824

*NTS. Traffic: W5KLV 245, WB4AIW/5 160, W5ABQ 129, WA5VBM 120, WA5YXS 111, WB5CUR 108, WA5FJN 96, K5ROZ 75, WB5BWV 63, W5VW 45, W7WAH/5 42, K5EFH 33, W5HWY 30, W5TFW 26, WA5TJI 24, W5BHO 22, WA5JFZ 11, WB5BGV 9, WB5DQE 8, K5RVF 7, K5HUA 5, W5AFZ 4, WA5CBT 4, WA5MUM 4.

CANADIAN DIVISION

ALBERTA – SCM, Don Sutherland, VE6FK – SEC: VE6XC. Congratulations to the following on their appointment to OPS: VE6AXH, VE6IS, VE6VS and EC VE6WJ. The story for Aug. is poor conditions on the nets, solar storms and summer QRN made operations very difficult. Consequently traffic totals and QNI are down on the APSN. Once again VE7-Land seemed to be the favorite vacation area for VE6s. VHT PAM, VE6AMC is sporting a new tower and HF beam. This was a great help when he and EC VE6FM spearheaded cooperation in Calgary with the fine PR work done by VE3KCD during the Kitchener-Waterloo Fair. Ex-VE6TM had to make another rush trip to Calgary because of the sudden passing of his mother. VE6WL is closing in on his DXCC. Conditions are rapidly improving on 75 – winter can't be too far away. VE6XC – better shake the bug that has been bothering you. Traffic: VE6FK 16, VE6AGU 1.

BRITISH COLUMBIA – SCM, H.E. Savage, VE7FB – The British Columbia Amateur Radio Exhibition booth at the P.N.E. was manned by the Burnaby ARC – very fine show. VE7MF entered the Salmon Derby; he hooked a seagull, no fish. VE7AZG our newest appointee as OBS and OO. Now that school has started amateur radio activity should increase. We are pleased the high check-in the 3755 kHz net remained during the summer. Sorry to report the lack of interest in the art of c.w. – 3650 kHz CW net reported it's lowest in years.

MANITOBA – SCM, Steve Fink, VE4FQ – With regret we record the passing of VE4RB, for many years active on MEPN and always on the bands to lend a helping hand. Summer cottage portables this year included VE4s JK, OL, HR and OP. VE4EA has new antennas up for 80 and 20 for another traffic season, and VE4FQ has a new SB-100. We welcome DOC man VE6RY to Winnipeg. VE4EW now operating as A2CEW. VE4UM is back in operation for another season with some new ops in the crowd. VE4CR reports very low MEPN activity in Aug., so once again your nets, MTN (now back on winter schedule) and MEPN, solicit your support. Don't forget to support your local club at the same time! MTN: 14 sessions, 28 QNI, 16 QTC. MEPN: 31 sesstons, 504 QNI, 10 QTC. Traffic: VE4RO 22, VE4PG 9, VE4LN 8, VE4HR 7, VE4EA 6, VE4NE 5, VE4CR 2, VE4DP 2, VE4RV 2, VE4RB 1.

MARITIME – SCM, W.D. Jones, VE1AMR – RMs: VE1RO, VO1CA. PAMs: VO1FX, VE1YO. The new NSARA executives

include VE1GC, *pres.*; VE1AAC, *1st vice-pres.*; VE1ALB, *2nd vice-pres.*; VE1AKO, secy.-treas. Communications were provided for the Annual Rentorth Regatta by VE1EE and VE1AJL. Congratulations to VE1AJL on a fine effort in the phone portion of The Bermuda Contest 1st in VE and 3rd overall. The MAARC boys, led by VE1WU helped supply communications for The Moncton Air Show. Congratulations to VE1AAB on earning her Atlantic Provinces Award. Congratulations to VE1AKB on the new *Advanced ticket. APN reports QNI 39, QTC 31 in 2s sessions.* Traffic: VE1RO 37, VE1AMR 35, VE1ARB 33.

ONTARIO – SCM, Holland H. Shepherd, VE3DV – Asst. SCM and SEC: Ed Doyle, VE3EWD. RMs: VE3DPO and VE3GFN. PAMs: VE3EWD and VE3GOG. Ont. Science Centre ARC, Don Mills, *expects 10,000 visitors at the 1972 Ham and His World*, Oct. 18 through 22. The show should be open from 1000 to 1800 hours and this year will include for the first time a Message Handling booth. All Canadian traffic net members were urged to be active on those dates to assist in moving the heavy traffic expected. VE3GFN, *Mgr. OQN acted as chief advisor to the Centre on all traffic matters.* VE3CO, Asst. Dir. (Ont.) of Canadian Division, recently visited Ottawa to discuss amateur radio with CNIB officials. VE3GFN Mgr. OQN, made another trip to Ottawa in Aug. to see SCM and Ottawa trafficmen VE3CRX, VE3FXI, VE3ARS and VE3GJG. Nets *are moving, or have already moved, back to 80 meters for the long* fall and winter months. I invite all Ont. amateurs, but particularly those newly licensed, to listen in on the OBN or OQN daily and learn something about this interesting facet of our hobby. Ont. Trilliums off to a good start for 1972/73 with a newsy Aug. bulletin under editor VE3CLT. CLARA certificate now available for working 12 YLs in six call areas. VE3FYW of The Soo is attending Carleton Univ. this fall where he will be able to use the station VE3OCU and their fine equipment. A very special thanks to *VE3FOJ for his work with the beginner's class of the Algoma ARC.* VE3STP, Champlain Regional Repeater group held their annual corn roast during Aug. Your SCM while vacationing in Northern NY kept in touch with the 'gang in Ottawa via repeater VE2CRA using a four-element yagi. Traffic: (Aug.) VE3FXI 105, VE3GFN 86, VE3FQZ 81, VE3DV 74, VE3AWE 51, VE3DPO 34, VE3ATR 29, WA8FIX/VE3 27, VE3ASZ 27, VE3BPC 27, VE3GBR 24, VE3GJG 24, VE3FRG 22, VE3DU 21, VE3EHL 17, VE3EWD 15, *VE3GT 10, VE3EHF 5. (July)* VE3EHF 44, *VE3EWD 41, VE3GT* 20, VE3ASZ 18, VE3DOC 11, VE3FXI 8, VE3AWE 3. (June) VE3AWE 27.

QUEBEC – SCM, Joe Unsworth, VE2ALE – Regret to report VE2BYS as a Silent Key on Aug. 31. Sincere sympathy to Frank's *family and his brother VE2GK. A great day was had by all attending* Ethel's Pub (3,787 MHz PL. Net) picnic at the Long Sault park Aug. 26, (VE3s MARC and VE2RM members). VE2GK and VE2ALE celebrated their birthdays on the same day. The Point Claire Fairview Amateur exposition off to a good start and *interested people signed up for code and theory class this fall by the* Westminister (VE2CWR) club. Former VO1DX now is VE2QV. W91FW/VE2 is in Montreal area with 420 MHz FV, along with *W2GJR/VE2* and VE2AFM. New calls now heard on VHF are VE2s DHF, DEM, ALA, DFH, BKA, AYA, BQI, BAQ, BNX. VE2CJ will be retiring to VE3-Land and VE2FN now is VE6. VE2BRP now living in VE7-Land. I am not in agreement with reduced code requirement as mentioned by RAQI in recent letter received, or any *of the suggested modifications mentioned.* VE2AVP *has made up* printed circuit boards to feed oscilloscope to copy SSTV and VE2BHH is following same. VE2BU selling some of his equipment prior to possibly moving to VE3-Land next spring. VE2AKM assists daily out of town mobilers on the VHF frequencies during summer vacations and VE2BVD/W1 North Hero, Vt. will be leaving for VE1-Land shortly. PSHR: VE2APT 30. Traffic: (Aug.) VE2DR 91, VE2EC 76, VE2DLG 29, VE2OJ 29, VE2ALE 7. (July) VE2APT 20.

SASKATCHEWAN – SCM, William H. Parker, VE5CU – The *following is an up-to-date list of the Saskatchewan ARRL* appointments. Please feel free to contact these men any time you want information or help. VE5BO EC Northern Sask. VE5CU acting SCM and SEC; VE5DN PAM; VE5DP OO; VE5GL RM, ORS and acting SATN mgr.; VE5HP OBS; VE5HQ OBS, OO; VE5JI QSL mgr.; VE5KF EC Regina; VE5OJ ORS; VE5QS ORS; VE5SC ORS; VE5US OVS, OPS; VE5IL EC Moose Jaw; VE5RJ EC Saskatoon. Special thanks to VE5SC who steps down as SATN Mgr. VE5GL reports working VE5s AU, IL, HD, XD, Aug. 28 through the 2-meter Regina repeater from Saskatoon. SATN net in action daily 0130Z on 3690. Check into the AREC net 3780 Sun. 1530Z. RTTY will be in full swing this fall if you need any help get in touch with VE5LG. Looks like the Hamfest '73 will be in Saskatoon. *SARC are working on plans for a real good get together.* Drop me a line to let me know what the latest news in your district is, or send messages via radio. Traffic: VE5GL 32, VE5BO 11, VE5RE 6, VE5HE 5, VE5CU 4, VE5IM 2, VE5LC 2, VE5PD 2.

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QS-11-72

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AN INVITATION NYC area hams and SWLs are invited to attend NY Radio Club meetings — 2nd Monday of every month, Williams Club, 24 E. 39th St., near Madison Ave., at 8 PM — New members wanted. Interesting programs.

ROCHESTER NY is the place to go for the largest Hamfest, VHF meet and flea market in the northeast, May 12th. Write WNY Hamfest, Box 1388, Rochester NY 14603

SAROC Eighth National Convention, January 4 through 7, 1973. SAROC accommodations request to Flamingo Hotel, Las Vegas, Nevada. $15 plus tax, per night, single or double occupancy. Advance Registration $10 per person. Ladies program Saturday. Seminars, meetings, exhibits, Friday and Saturday. SAROC-Swan Social hour, Friday. SAROC-Hy-Gain/Galaxy Cocktail Party, Leo W9CFQ at the Organ, Saturday. SAROC Buffet Hunt Breakfast with Champagne, Sunday. Advance registration, Sergio Franchi, Flamingo Midnight Show, two drinks, $17. Advance registration, Sergio Franchi, Flamingo dinner show, no drinks, $21. SAROC Jet Roundtrip Vacation Package from many cities. Advance registration to Saroc, Box 73, Boulder City NV 89005

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INFORMATION wanted on Telrex beams — 5 el. 15 m. and 6 el. 10 m., both on 36 foot boom, probably about 20 years old. Has boom-to-element hairpin stubs on every element. Need to know element lengths. John Kaufmann, WA1CQW 487 Commonwealth Ave., Boston MA 02215

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WANTED by private collector wireless and wire telephone and telegraph sets, gear books, magazines, etc., pre 1930. Will Nangle, 761 N. 29th St., Milwaukee WI 53208.

HW32, HP23 power supply, XTAL CAL, mike, excellent condition-$110. Bill Patrie, 7 Chevy Dr., Centereach NY 11720.

4 Cetron 872B's guaranteed brand new-$10 each pp. WB8SY, 1012 S. Pine St., San Gabriel CA 91776.

HEATH HW-32, AC supply, XTAL calib., mint-$105. K1JTK, 14 Stevens St., Danbury CT 06810 (203) 743-3727.

MUST sell. Drake 2C recvr.-$190. Heathkit DX60B xmtr.-$45. Dean Tatakis, 70 Mitchell Ave., Poughkeepsie NY 12603.

SWAN 350, DC PS 400-12,-$300. Heath HX20-$95. Onan 350W gas gen-$75. Misc. KW parts. S. Kuhl, W6JKJ, 1149 Heatherstone, Sunnyvale CA 94087. Phone (408) 736-8358.

SO you want to go 40 meters mobile, plus. HW22A, HP23, HP13, mike, speaker, hustler antenna, all for $250. In excellent condition, R.S. Caverhill, W1AUW, P.O. Box 742, Brunswick, ME 04011.

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KEYER: HD-10, mint-$30. Gwin, 1611 Laurel Apt. 918, Knoxville TN 37916. (615) 637-0367.

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WANTED: SX-88/GPR-90-91-92. J. Callan, 65 Beechcroft St., Brighton MA 02135.

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FOR SALE: Hallicrafters SX-122-$150 and S-120-$30, receivers. Both in excellent condition. Bob DiPietro, 44 Evergreen Way, Belmont MA 02178. (617) 489-0381.

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NATIONAL N.C. 300 complete with xtal calibrator, matching speaker, 2M and 6M converters in matching cabinet. Mint condition. No modifications. $125. You pay shipping. Want Johnson navigator and 1KW matchbox. Shirley Arrighi, 7311 Seven Oaks Ave., Baton Rouge LA 70806.

FOR SALE: Swan 500C with 117XC power supply, whisperfan on finals, low pass, Shure 444 mike, digital clock, SWR bridge, straight key, cables, manual, all excellent condition-$350. WB2PNF, 1593 Union Ave., Union NJ 07083.

HR-108 with crystal calibrator, $80. HS-24-$6, IG-102-$40, IM-18-$25. Two solid-state 2-channel CB walkie-talkies-$60. All excellent condition. K2SWDN, 2000 W. Arkansas Lane No. 80, Arlington TX 76013.

SELL Xfmers 3600-0-3600 at 1 Amp-$25. 1.7 Amp-$40, with dual 110/220 pri and FOB. Paul Bittner, 814 4th St. S., Virginia MN 55792.

COLLINS 75A-4 receiver (No. 1120), speaker, instruction book; mint condition-$350. W3UWN deceased. Telephone (215) MI6-1726.

MOM says no beam! If you have a good linear for sale, please write. WB4IUX, 130 Mountain View Lane, Clemson SC 29631.

SWAN 500CX, 117XC with manuals and cartons. Two months old, excellent condition, $500. You ship. Dave Parker, Box 4893, 319 Amms Grand Forks AFB, ND 58201.

FOR SALE: New SB-102 with power supply and SB-610. Sell as set only. Certified check only. Best offer. WB4ACQ, Ron, 415 Parkview Ave., Lexington KY 40505.

DRAKE R4, Drake T4X with MS-4 speaker cabinet and AC-4 power supply. Sell as a complete unit only-$450. Mint condition. Also Heath SB220 linear. New condition-$325. Preceding equipment in daily operation at W7MFU, 3105 So. 4300 West, RFD 1, Ogden UT 84401.

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FOR SALE: Complete radio station with Collins 75S1 receiver, 32S1 transmitter and 30L-1 amplifier and lots of ancillary equipment. Write for details. Herb, W4HJE, 380 SE 15th Ave., Pompano Beach FL 33060.

WANTED: QST for March and November, 1921. W1ZD, P.O. Box 186, Southbridge MA 01550.

SELL DX-40 and Johnson VFO Model 122-$60. K1KQC, 109 Meadowwood Dr., Holden MA 01520.

FOR SALE: Swan 350 with xtal calib., AC and DC supplies. Good condition. Best offer. You ship. WA1EUF, 78 Delaware Ave., Manchester NH 03104.

WANTED: 1M, 220MHz, Gonset IV communicator, and Collins 312B-5, with manuals. W7NHQ, Lowell Maw, 1553 Swan St., Ogden UT 84401.

WANTED: Collins 516F-2 AC supply, will pay shipping, ship ups. Tom Webb, WA9AFM/VE8 ITT/ASI (Cambridge Bay), P.O. Box 6200, Winnipeg, Manitoba R3C 3A4 Canada.

HEATHKIT SB-500 two meter transverter used ten hours (mint)-$160. HO-13 Ham-Scan 455khz IF-$40. John, WA2PBN. (201) 583-3751.

HAMMARLUND HQ-170-AC-VHF excellent condition-$210. Heathkit SB-110A and power supply-$320. Joseph Looney, 6 Gary Circle, Westboro MA 01581.

OR SALE: Douglas-Randall scrubber-inoperative-for $35. Vibroplex super deluxe presentation with case, new June, 1972 for only $40. TR-44 rotor for only $40. All mint, postpaid. Paul Klume, Box 28, Cedar Lake MI 48812.

SIDESWIPER key wanted (not "bug"). Bunnell preferred. John Bunting, P.O. Box 542, Alpena MI 49707.

GALAXY V MKIII, Vox, Cal, AC supply, spkr. console-$325. WAØTYU, 1414 28th Ave., Greeley CO 80631.

SSB transmitter. Hallicrafters HT30 USB, LSB, AM, CW, VFO, xtal, 40 watts, with manual-$65. You pay shipping. John Edell, W2ZPG, 262 Hempstead Ave., Rockville Centre NY 11570.

IMMACULATE KWM 2 with PM 2 PS. Will swap for mini moog, EML 100 etc. Synthesizer. Will ship. K5HGY, Macon Sumerlin, P.O. Box 5473, Abilene TX 79605.

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TH6DX and balun-$100. Tristao CL-40 feet crankup including guys-$140. WB6MNL, 5555 Coral Reef Ave., La Jolla CA 92037.

KENWOOD pair-T-599, R-599, 6 and 2 meter converters. School forces sale. Few hours operation, excellent condition-$675. You pay shipping. James McCalmont, 5931 N.E. 13th, Portland OR 97211.

CONTACT us for new or reconditioned Collins, Kenwood, Temp-One, Drake, Galaxy, Hy-Gain, Mosley, Henry linear, towers, antennas, rotators, other equipment. We try to meet any deal and to give you the best service, best price, best terms, top trade-in. Write for price lists. Try us. Henry Radio, Butler MO 64730.

COLLINS KWM-2, 30L-1. New, best offer. Frank White, W8OY, 19601 N. Park Blvd., Shaker Hts. OH 44122. (216) 942-8300.

SELL SP600-JX-26 rack mount. Best offer. Prefer pick up. Barnes, 7909 Winnsboro Dr., Oxon Hill MD 20022.

QST May, 1950 thru Dec. 1971. CQ 1951 thru 1969. Good condition. Make offer. Reagin Warren, W4RVH, 3125 Loma Lane, Charlotte NC 28205.

QST's wanted. Jan. thru Dec. 1915, Jan. thru Sept. 1916, Sept., Nov., Dec. 1921. Will pay any reasonable price. Joe Mullan, W3RLR, 217 Northway, Baltimore MD 21218.

FOR SALE: Complete amateur station. Heath Dx-60, HR-10 with calibrator, HG-10 VFO, xtal. mike, key, coax sy., grid dipper, power meter, "Q" meter (unassembled), S.W.R. meter. All equipment professionally wired and used less than 25 hours. First check for $200 takes all! FOB Salem NH. Paul S. Mayo, 54 North Policy St., Salem, N.H. 03079.

FOR SALE: Drake 2B-2BQ speaker. Good condition-$170. WSRTX, 509 E. Rome, Gonzales, LA 70737.

WANTED: Collins mechanical filter F4558-08 800 CPS. Charles Hardman, WØIYR, 2005 Starlight, Salina KS 67401.

WANTED: Scott radio, 30 tube philharmonic or 23 tube high fidelity models, 1930's. Also ant., r.f., and osc. coils for Hammarlund SP-200 or any pre 1940 chassis for parts. J.G. Halser, 2438 S. Howell Ave., Milwaukee WI 53207.

FOR SALE: Telrex 4 clement wide spaced 20 meter monobander-$250. Irving Glassman, M.D., K1SEO, 186 Sherman Ave., New Haven CT 06511.

TELETYPE 19-$140. Electrocom FSC250 freq. shift converter with electrocom TK 100 tone keyer-$250. Panoramic panadaptor PR1-$80. Teletype TT63A/FGC terminal unit-$50. John Ferrara. 146 William St., West Haven CT 06516.

SELL immaculate new Swan outfit, custom 600 revr., with SS16B filter also amplifier. 600 xmitter, speaker patch console, and remote general coverage revr VFO. Cost $1400, will discount, or take a transceiver in on trade. Also have nice Hunter Bandit 20000A linear-$275. Roytrack 2000 linear new finals-$425. Richard Schark, 417 No. Ferry, Ottumwa IA 52501. (515) 682-5741.

CANADIANS Free surplus parts catalog ETCO Box 741 Montreal

DRAKE R-4B, T4XB, AC-4, and MS-4 with patch cords and manuals. Like new in original cartons, $800 firm. Cashiers check or money order. You pay shipping or pick up. Robert Thomas, 954 Sacramente, Orange CA 92667.

HAMMARLUND HQ 105TR, speaker working, no operating license, receiver working. Price only $80. Call (312) 684-2734. Mahanbir Dhillon, 5700 S. Maryland Ave., Chicago IL 60637.

WANTED: Straight keys and bugs for collection. Give make, model, condition, price. John Elwood, W7GAQ/6, Box 1243, Lancaster CA 93534.

NOVICE rig for sale. Drake 2NT transmitter, Hallicrafters SX101 receiver, $185 for both. WA2RNH, 17 Farner Ave., Selden NY 11784.

SWAN 240/remote VFO-$150. James Barrow, WA5CJC, 130 E. Virginia, Beaumont TX 77705.

HAMMARLUND HQ-170 with speaker-$200. Hammarlund *HX-50-$200, both manuals. WA8MXH, 1175 Cabot Circle, Flint* MI 48504.

VIBROPLEX-KEYER, key, new, standard model-$20. Mario A. Petrone, 434 So. Euclid St. (3E), Oak Park IL 60302.

L4B linear, carton, manual, spotless. Planning move-$500. Pick up. For perfect linear, no need looking further. W2NXS, Box 4006, Jersey City NJ 07304.

HW-100, HP-23A/W speaker-$220, or separately. Currently in use, good condition. WA5RWT, Morrow, Box 7151ACC, Abilene TX 79601.

WANT: SB-610, Signal/One filters. Sell — full-sized 40mtr yagi-$135; SX-140-$45; new 572-B tube-$12; Johnson T-R-$19; Dow relay-$12; Kojo CW filter-$10; quad boom-$6; KW coax matcher - $45. K1VTM (203) 224-4581.

COLLINS 75S-3B Mint 515. Will ship, certified or cashiers check. F.R. Stokes, WB2JAK, 14 N. Victoria Ave., Ventnor NJ 08406. (609) 822-1484.

NCX-500 w/NCXA AC/speaker console-$290 or best offer by January or trade mint Argonaut, WB9BUJ, 734 Main, Glen Ellyn IL 60137.

FOR SALE: Collins KWM-2 (No. 37652)-$1195. 312B-5 Station Control (has auxiliary VFO, same as KWM-2 to provide separte transmit and receiver frequencies when used with KWM-2)-(No. 30040)-$495. 516F-2 Power Supply (No. 60643)-$125. *SMS-3 Collins mike with push-button option-$50. All items purchased* together as new and actually used about 50 hours. And have Collins Amateur Verification Certificate No. 035115 and No. 035117 dated 11-2-71. Jack Holt, K1VFQ, RD2, Woodbury CT 06798. Tel (203) 263-2717.

6 and 2 meter transmitter, 6 and 2 meter antennas, 6 meter converter and rotator for sale. Call Larry Malakoff, Ronkonkoma NY (516) 595-6310 day and (516) 588-1420 night.

DRAKE R4A, T4X, MS4, AC4. Excellent condition. Very little used, asking $500. Will deliver 200 miles or so. Write W. Pilon 2 Hemans Ct., Worcester MA 01605

DRAKE 2NT Xmtr. Mint condition. 3 xtals, manual, origiarl shipping container-$110. FOB WA6MWP, P.O. 325, Capitola CA 95010.

SACRIFICE Collins R-390-A rec. Mint condition-$550. You pay freight. Rus Keisling, K2FJY, 6 V neyard Ave., Clinton MA 01510.

SELL: Johnson Viking and S.B. adapter, manuals, together-$150. Hammarlund 170A, good-$95. Speaker-$10. Schueler, WR4MYX, (305) 261-1467.

WANTED: 1948-1946 CQ issues. Have extra *CQ, QST, etc.* For sale or trade, W0LV, 1447 Chicago Ave., Minneapolis MN 55417.

TEN-TEC PM2B 80/40/20-$49. WN2QMD, 3 Morry Rd., Red Hook NY 12571.

SELL: Touchcoder, typewriter keyboard sends perfect code-$125 firm. W8PJH, Stuber, Amherst OH 44001.

JOHNSON Adventurer transmitter for sale. Excellent condition-$25. K1JPR, 22 Darbrook Rd., Westport CT 06880.

HW-16 t[illegible]ceiver, m[illegible]-$85, HD-10 keyer, mint-$35. W5GR, 3316 Ed[illegible]ng, Ama[illegible] TX 79106.

NEW Mu[illegible]h transma[illegible]T-2000. Never used-$100. Will mail *A.E. Wilson, Sr., Box 2, East Brewster MA 02634. 896-3549.*

SIGNAL/ONE factory fresh, cw filter-$1650. Drake R-4 with MS-1-$225. W6FW. Phone day (213) 922-1763, eve (213) 862-3645.

HALLICRAFTER SX-146 receiver. Excellent condition, never used. Features preselector control, A.N.L., A.G.C. and kc-2.1 filter. Kc-.5 and kc-5 filters may be added. Covers 80 through 10-$175. John McCann 108-23 86 St., Ozone Park NY 11417. *Phone* (212) 845-7917.

CALIF. HAMS: New Henry 3K-A linear ampl. 1 yr. Full factory warranty-$900. Phone (408) 287-3384. W6HRB.

COLLINS 204H-1 linear. Autotune 2-30. 2.5 KW peak, average. Like new-$1500. H.G. Husbands, 6626 Talmadge, Dallas TX 75230.

WANTED: Carrying case Collins CC-2 for KWM-2 and power supply. Frank McKegney, WA4QCR, 2145 Northeast 2nd Dr., Boca Raton FL 33432.

WANTED: Heath SB-301 in new condition. Pick up local area only. W6YZW, 228 No. Glenroy, Los Angeles CA 90049.

VALIANT $100 No shipping. HR10B with Calibrator-$60. RME 10-20 converter-$23. You ship. W6NVA, 15426 Patronella Ave., Gardena CA 90249.

JOHNSON KW matchbox. Like new. Includes dir. coupler and swr. meter-$119.50. W6KY, 474 So. Arroyo Blvd., Pasadena CA 91105.

COLLINS KWM2, excellent condition-$575 or best offer. Deliver personally in Fla. or Ga. or ship original carton. Joe Bennett, W4OLU, 2801 14th St., Palmetto FL 33561, (813) 722-6308.

WANTED: Swan 140 or two meter FM transceiver. Trade you Swan 120. Also sell Lafayette HA410 ten meter AM transceiver, *best offer. Stephens, Box 802, APO New York 09218.*

EV-674 mike w/switch, stand, as new-$35. Hallicrafters R-50 speaker-$10. Kojo SSB filter in cabinet-$12. BN-86 Balun $10, all prepaid. Bob Ensminger, 11388 Campus, Loma Linda CA 92354.

WANTED: Collins gear, prefer SSB equipment. Trade: artisan organ SS electronics, two manual, full pedals, speakers. W2GTD, (518) 370-0773, 1729 Lenox, Schenectady NY 12308.

WANTED: For HRO 60, AC (15M) and AD (6M) coils with dial scales. Slect-O-Ject and NBFM adaptor. State price and condition. W3BPZ, 1039 N. 21st St., Allentown PA 18104, (215) 437-1608.

SELL: Bendix 2M mobile gear 34-94, 94 direct with spare mike, final-$65. Heath RF signal gen.-$15. Heath signal tracer-$10. You pay postage. Dave Daniel, WA0SVO, RR2, Box 115B, Lawrence KS 66044.

HAMMARLUND HQ180/C, perfect condition-$250. Free with above spectrum analyzer described in CQ, October 1961. Also HW22A, HP-13A and PTT mike, mint condition-$125. Will crate. You pay shipping. K7WJC, Louis Straiberg, 7234 E. Papago Dr., Scottsdale AZ 85257. Phone (602) 947-2568.

COLLINS KWM-2/2A, instruction manuals, new edition-$5, plus $1. parcel-post, $1.50 air-mail, U.S. 48. Other current models manuals same price. Ham Radio Center, Inc., 8342 Olive, St. Louis MO 63132.

SIGNAL/ONE/Alpha 77/ Tektronics: CX7 factory modified to CX7A-$1395. CX7A used less than 3 months-$1750. New $2395. "77" new-$1795. Used demonstrator-$1595. Tektronic portable scope 323, new-$600. Payne Radio, Box 525, Springfield, Tenn. 37172. Days (615) 384-5573, nites (615) 384-5643.

"HOSS Trader Ed Moore" 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 Drake TR4 transceivers, limited supply, $495: New Regency HR-212 two meter FM transceiver, 20 watts, amateur net $259: Demonstrator L4-B, $619. New Rohn 50 ft. foldover tower, prepaid, $239: New Mosley CL-33 and demo Ham-M rotor, $215. Used equipment: TR-4w/34NB, $499: R4-B, $359: T4-XB, $379: Ham-M, $85: 2-B, $169: SB-33, $165: GT-550, $329: HT-37, $169: Write for used list: Moory Electronics Co., P.O. Box 506, DeWitt AR 72042. Tel: (501) 946-2820.

SELL: HW-101, AC supply, microphone, speaker, CW filter, HAL 39 keyer with paddles, and 14AVQ antenna-$350. Michael Nowak, 709 W. Green St., Hensenville IL 60106. Phone (312) 766-0817.

COLLINS 62S1 converter with 5 extra final tubes. Mint condition. Will ship-$625. Davis, 3025 No. Valleyview, Orange CA 92665. (714) 637-3506.

ANTIQUE tubes, UX200, UX201A, etc. List, SASE. Sell/trade WA4NED, Box 468, Gainesville GA 30501.

FOR SALE: HW-16 with many extras-$80. WN4TNU, James McClellan, Rt. 1, Box 1477, Avon Park FL 33825.

SELL: Collins 32S-1 and 516F-2 power supply. Mint condition-$395 plus shipping. Bob Ruffer, 4013 Cleveland Place *Metairie LA 70003. Phone (504) 887-2987.*

ANTIQUE radio parts from Kilbourne & Clark, Seattle. Also some old broadcast and shortwave sets. Dime for list. Bill Baker W7IYY, Troutsdale OR 97060.

SWAN 350, vox, xtal [illegible]ib.-$275. SW-12 dc supply for above-$60. Heath HP-13 [illegible] supply-$40. Collins 75-A2, 2.1 kh mech. filter and prod. det.-$175. All equipment in excellent A-cond. W.P. Maund, 7202 Roos, Houston TX 77036.

LAMPKIN 105B, excellent-$100. Lafayette 120W 2M mobil amplifier—$75. Galaxy SB-175 w/pwr 80-10-$50. Hendi 0-120W VHF/UHF wattmeter-$50. Knight 0-16 vdc 17.5 adjustable metered power supply-$25. Swap VHF/UHF Gea List SASE. W4API, Box 4095, Arlington VA 22204.

CLEANOUT! Hickok 677 5-inch wide-band oscilloscope wit H.V. probe, variable R.F. line-tap, etc., fine condition, best offe over $50. Hallamore high capacity carrier monitor, unused, bes offer. Filament tester-$5. Michael Benioff, WA3BZX, 285 Livingston St., Allentown PA 18104.

HEATHKITS professionally wired, tested. Send for quot Parrish, 306 W. Amherst, Melbourne FL 32901.

FOR SALE: Central Electronics 200V-$300. Central Electronic MM-2 multiphase R.F. analyzer, receiver RCA R320/SCR8 54 kc to 32 Mc. $125. Mint condition. Lafayette HE-74 VFO-$3 Heathkit Marauder HX-10-$125. Ballantine AC voltmeter 1M to 1 KV-$30. Elsin AC voltmeter .01 to 1000V-$30. New boxes, PRC 36 Handi-talkie on 50.6 mgc. Quantity three-$5 each. George H. Rancourt, K1ANX, 78 Williston Ave Easthampton MA 01027. xFO

HEATH SB-400 transmitter for sale. Heterodyne crystal Excellent-$220. Bob Farmer, 11011½ Ratone, Manhattan K 66502. (913) 537-2831.

SWAN 500 CX, VX2, 117XC-$429 plus shipping. Lou William W9GSB, 367 High Rd., Cary IL 60013. Tel. (312) 639-7686.

WANTED: Six 325 mf, 400 volt electrolytics; 2 - 572 -B tub W9KMF, *138 Highview, Rhinelander WI 54501*

TRANSFORMERS rewound. Jess Price, W4CLJ, 507 Raehn, Orlando FL 32806

CRYSTALS airmailed: November QST "Novice Super Special", five or more (band mix OK), all frequencies, active-accurate FT-243's, 40M-15M-$.99 each, 80M-$1.69. Less than five, 40M-15M-$1.50, 80M-$1.75. Postage: Airmail $.15/crystal, 1st. cl.-$.10. General Purpose: (32pf) Ft.-243 .01%, 3500 to 8600 kilocycles-$1.90 each plus postage, (minimum five same or mixed frequencies-$1.75), (nets, ten same frequency-$1.45). .005% add $.50/crystal. Free info-order sheet. "Crystals since 1933". Box Woods, WØLPS, C-W Crystals, Marshfield MO 65706.

HAMMARLUND HQ-170 revr-$140. Eico 720 xmtr-$40. Both in excellent condition. M. Winslet, VE6ATW/W1, 142 N. Compo Rd., Westport CT 06880. (203) 227-9078.

FOR SALE or trade Atwater Kent bread board about 1924. Looks very good. Jim Hammond, WB4EPE, 1201 W. 46th St., Richmond VA 23225.

LINEAR amplifier. Final pair 4-1000A. Power supply 0-5000V at 1200 mils. Solid-state rectifiers. Four meters. Not home brew, customed manufactured, remote control. Cabinet 48H 27W 17D on rollers. 220V Virgil Belford, WØEZG, 2411 McKinley, Great Bend KS 67530.

HALLICRAFTERS SR-150, AC/speaker, 80-10, 150W, S.S.B./C.W., vox, offset. Few hours use. Absolute mint condition-$295. Ranger, good shape-$60. Other items, ask for list. WB6MNS, 440 No. Mentor Ave., (No. 11), Pasadena CA 91106.

COLLINS 390-A receiver with Eldico SBA-1 adapter-$575. Clegg 50-54MHZ AM/CW transmitter, Crystiplexer exciter/250W amplifier-$95. Thomas, W2UK, Juniper Pl., Colts Neck NJ 07722.

VARIABLE cond. Cardwell 9000V split stater 150 mmfd per/sec. 6 in. x 8 in. x 10 ins.-$9, B&W 9000V 110mmfd per/sec. diff. type 6 in. x 8 in. x 9 in.-$9. EIMAC 4-1000A socket SK-500 built-in by-pass condensers-$10. K2EGI, 5 Stratford Pl., N. Babylon NY 11703.

QST sell: July 1924 thru Dec. 1937; June 1942 thru April 1943; Dec. 1944 thru June 1951 less Feb. 1945; Oct. 1947 thru Sept. 1950 less Dec. 1949; July 1922; Aug., Sept., Nov. 1923; May 1927; April 1939; Sept. and Dec. 1952; March 1953. Indexes 1924 thru 1932. Make offer. W2PQA, John Long, 138 Dogwood Dr., Oakland NJ 07436.

WANTED: HW-16. Fine condition. Will pay $80 plus postage. Pete Schoenberger, 143 Gray St., Amherst MA 01002.

WANT 30L1, 30S1, 2K or BTI. Reasonable. WAØRAM, Packwood IA 52580.

JOHNSON Viking Adventurer transmitter - $25. W7JKG, 103 E. Bartlett, Selah WA 98942.

WANTED: SBA-300-4, 2 meter receiving converter. WA3FUV, Don Weyel, Commeaut Lake PA 16316.

POLYCOM 62B AC-DC cords. Needs alignment-$125. Rotunno, WA2CKM, 1816 Parkview, Bronx NY 10461.

COLLINS 32S1, 516F-2; 75S1 with 500 cycle filter and extra stage I/F. Top condition. Pick up-$550. Frank Stolpen, 2060 E. 19 St., Brooklyn NY 11229. 998-2743.

JOHNSON matchbox KW w/coupler, new-$125. KW matchbox w/out coupler-$85. Small matchbox w/coupler-$60. All plus shipping. WA6XTR, 714-795-2144 or Box 241, Calimesa CA 92399.

TMC station, GPK90 and MSR-4 SSB adapt.-$400 or $250 each. SBE2 xciter-$400. PAL 350B linear-$500. All gear-$1000 cash and carry. W2ZUP, (914) 354-0411.

FOR SALE: Factory aligned SB-102, HP-32A, and GH-12A mobile microphone. First certified check or money order for $350. Prefer pickup. Dave Norden, W1GDM, Choate School, Wallingford CT 06492.

NATIONAL NCL2000 linear. Good condition-$350. SB200-$190, Swan cygnet 260-$295. Urr/388-$325. Clegg Thor V1 complete-$120. Swan 400 w/117C 406 VFO 300. Wanted 8122 tubes 2M VFO Drake 2B. List available. John Kakstys, 18 Hillcrest Ter., Linden NJ 07036.

COLLINS 75A-4 and KWS-1, clean, both for $550. B&W 5100 B with SSB generator, B&W 515B-$160. National NC-98-$50. All gear operating and on the air. K5JEF, P.O. Box 7001, Longview TX 75601. Tel. (214) 758-1659.

FOR SALE: Henry 2K-3 linear, positively mint. Motorola 2 meter FM 15 watt 2 channel "Business Dispatcher". QST, 1961-1970-Cq-1961, 1970-73-1960-1970. Send for list. A. Martinka, 457 W. 150th St., Harvey Il 60426.

HEATH SB-102, P.S., spkr., HDP-21A mic and 400hz filter. Like new condition-$450. HM-102 swr/watt meter-$25. HS-24 mobile spkr-$5. Gh-12A mobile mic-$5. HN-31 KW dummy load-$8. HyGain 12AVG-$20. W.H. Wiley, 278 Monroe Dr. No. 28, Mt. View CA 94040.

COLLINS. Wanted, complete station. KWM-2A or 75S with 32S-3 plus 30S-1, 312B-4-312B-3. Will pay top price if serial numbers reflect 1970, 1971 or 1972 vintage. John Bess, W2YIX, 155 W. Bayberry Rd., Islip NY 11751.

SIGNAL One CX7A-$1495, CX7-$1395. Alpha 70 vapor cooled-$1295. Hygain 400 rotators- $100. HA-1 keyers-$50. 7MH3 kirk-$225. Collins 75S3B-$450, 32S3 with new 516F-2-$600, 302C-2 wattmeter-$75, Waters 374 or 334A dummy wattmeters-$80. Ham-m-$75. Waters Codax keyers-$25. Kenwood R-599, S-599 and T-599-$485. SBE 34-$200. Johnson KW matchbox with SWR bridge$100. Drake 2C and 2CQ-$200. Galaxy R530 with speaker-$550. NCL 2000 with new tubes and new set of spares$385. Standard C-146 walkie talkie-$210. Varitronics HT-2-$175. No trades. Douglas Electronics, 1118 S. Staples, Corpus Christi TX 78404.

DX Awards log. 150 page book lists contacts for over 100 major worldwide awards. Individual logs for each award for record of contacts and confirmation. Required over two years to prepare. $3.95 ($4.95 foreign). McMahon Co., 443C Orange Grove Circle, Pasadena CA 91105.

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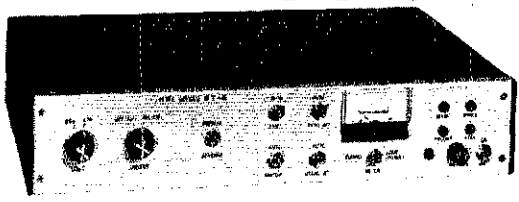

TOP QUALITY RTTY...WITH THE HAL MAINLINE ST-6 TU. Only 7 HAL circuit boards (drilled G10 glass) for all features, plug-in IC sockets, and custom Thordarson transformer for both supplies, 115/230 V, 50-60 Hz. Kit without cabinet, only $135.00; screened, punched cabinet with pre-drilled connector rails, $35.00; boards and complete manual, $19.50; wired and tested units, only $280.00 (with AK-1, $320.00).*

TOP QUALITY...WITH THE HAL 1550 ELECTRONIC KEYER. Designed for easy operation; perfectly timed CW with optional automatic ID for sending call letters, great for DX and RTTY; TTL circuitry, transistor switching for grid block, cathode keying. Handsome rugged crackle cabinet with brushed aluminum panel. With ID, only $90.00; without ID, $65.00.*

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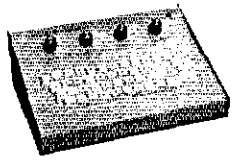
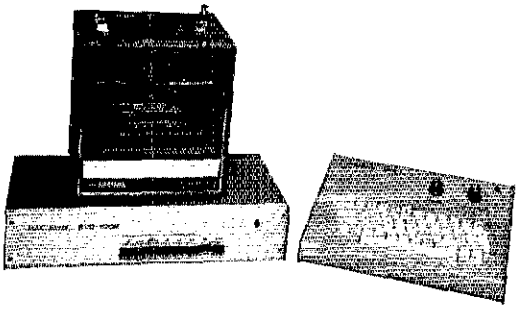


TOP QUALITY... WITH THE HAL MKB-1 MORSE KEYBOARD. As easy as typing a letter—you get automatic CW with variable speed and weight, internal audio oscillator with volume and tone controls, internal speaker, and audio output jack. Smooth operation; completely solid-state, TTL circuitry using G10 glass boards, regulated power supplies, and high voltage transistor switch. Optional automatic ID available. Assembled MKB-1, $275.00; in kit form, $175.00. *



NEW FROM HAL—TOP QUALITY RVD-1002 RTTY VIDEO DISPLAY UNIT. Revolutionary approach to amateur RTTY . . . provides visual display of received RTTY signal from any TU, at four speeds (60, 66, 75, and 100 WPM), using a TV receiver modified for video monitoring. Panasonic solid-state TV receiver/monitor, or monitor only, available. Complete, $525.00; Panasonic TV receiver/monitor, $160.00; monitor only, $140.00.*

TOP QUALITY...WITH THE HAL RKB-1 TTY KEYBOARD. Gives you typewriter-easy operation with automatic letter/number shift at four speeds (60, 66, 75, and 100 WPM). Use with RVD-1002 video display system, or insert in loop of any teleprinter, for fast and easy RTTY. Completely solid state, TTL circuitry using G10 glass boards, regulated power supplies, and transistor loop switch. Optional automatic ID available. RKB-1 assembled, only $275.00.*

HAL provides a complete line of components, semi-conductors, and IC's to fill practically any construction need. Send 24¢ to cover postage for catalog with info and photos on all HAL products available.

*Above prices do not include shipping costs. Please add 75¢ on parts orders, $2.00 on larger kits. Shipping via UPS whenever possible; therefore, street address required.

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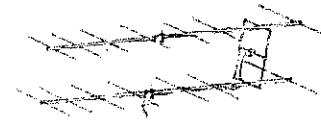

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5/8 wave, for far greater gain over 1/4 wave whip! 56" overall. VSR 1.5:1 or better over full 144-148 MHz range. Waterproof, shock resistant plastic encased base coils. 100 Watt rating. Stainless steel springs and whips, nickle over copper coated for higher conductivity, less heat loss of RF. Complete antenna unscrews for car wash, or stowing.

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Shunt fed. Fittings chrome plated brass. Solderless coax connectors.	Teflon insulated, aluminum plated steel mount. Only 1-3/16" high!
SNAP - IN.	SNAP-IN.
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NO HOLE.	NO HOLE
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Only 6-1/4" long. Rugged, for roughest handling! Bendable, completely insulated, cannot be shorted out.

HM-4. With 5/16-32 base to fit Johnson and Motorola. $5.95

HM-5. *With PL-259 base.* $5.95

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Use these high performance beams, to concentrate your talk-power and squirt it for long haul! Covers full 144-148 MHz without retuning, with VSWR less than 1.5:1. Rugged construction, rated to 100 MPH winds. 2KW PEP. 50 Ohm for coax feed.

HM-172	HM-173
4/4 element stacked Yagi. 4'x4'x4'. 5.8 lbs. $29.95	8/8 element stacked Yagi. 8'6" long x 3.4" x 3'10" 9 lbs. $39.95

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Use HM-185 vertical mounting kit with either beam. $7.45.

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Rugged construction, for long life. Have stainless steel radials, to withstand heaviest ice loading. VSWR less than 1.5:1. Rated 100 Watts. Inlcude mounting clamp for up to 1-1/4" OD masts.

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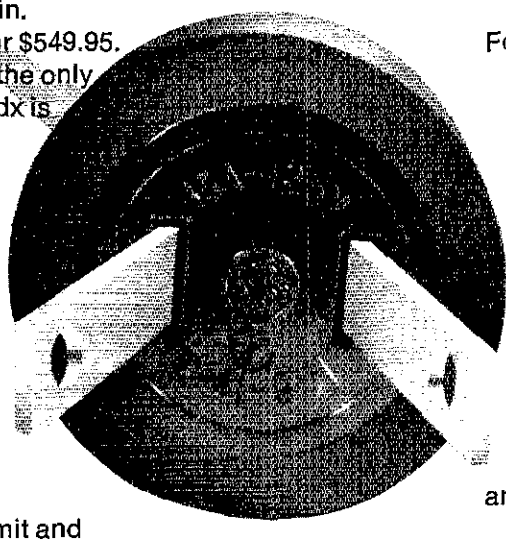

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