QST

July 1969
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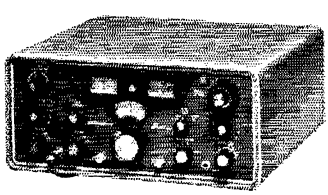
That's right—*simultaneous dual receive!* Unlike any other transceiver/VFO combination, the SR-400 Cyclone and HA-20 VFO lets you "Double-Team" the competition in any DX contest. You can "Band-Scan" for a second contact while you are working another. You can set VFO's on two separate DX stations, receive both simultaneously, and be instantly ready to "Tail-End" on either station. And of course, Hallicrafters' winning performance features don't stop here. Get in front of this rig and you'll know. Hallicrafters has built another "great one" in the fine tradition of the HT-32 and HT-37.



PS: Want simultaneous dual receive with 2 KW on SSB? Put an SR-2000 in your shack.

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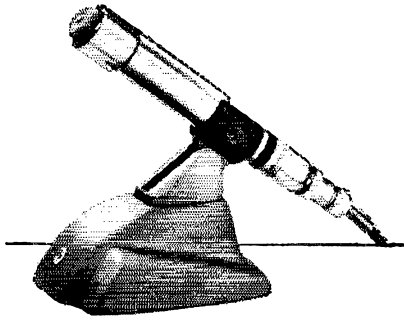
When QRM Gets Tough Choose The Only Microphone With Backbone!



ELECTRO-VOICE
MODEL 676
DYNAMIC CARDIOID

The backbone of the Electro-Voice Model 676 is no mere decoration. It's visible proof of the most exciting idea in directional microphones—Continuously Variable-D (CV-D)™.

Here's how it works. We attach a very special tapered tube to the back of the microphone element. This tube automatically varies in effective length with frequency. It's a long tube for lows—a short tube for highs. All this with no moving parts! The tube is always optimum length to most effectively cancel sound arriving from the back of the microphone, regardless of frequency.

This ingenious solution* is years ahead of the common fixed-path design found in most cardioid microphones. It means you pick up less noise and room reverberation, ensuring a crisp signal and optimum vox performance. It also is less sensitive to wind and shock—ideal for field days! There is almost no "proximity effect"... no boosted bass when you must operate extra close.

Long life and peak-free response are guaranteed by the exclusive E-V Acoustalloy® diaphragm. And the 676 has unusually high output for a microphone so small. Of course you get both 150-ohm and Hi-Z outputs, plus high efficiency dust, pop, and magnetic filters—indeed, all of the hallmarks of Electro-Voice design that have made E-V a leader for years.

But that's not all. The 676 has an exclusive bass control switch built in. Choose flat response (from 40 to 15,000 cps) or tilt off bass 5 or 10 db at 100 cps to eliminate power-robbing lows that reduce efficiency and lower intelligibility. You'll be amazed at the reports of improved audio you'll get when you switch to the E-V676.

Visit your E-V distributor to see this remarkable new microphone today. And when difficult QRM must be faced squarely, stand up and fight back with the microphone with a backbone (and CV-D)—the new Electro-Voice Model 676 dynamic cardioid!

Model 676 Satin Chrome or TV grey, $53.40 net; in Gold, $56.70 net. Shown on Model 420 Desk Stand, $12.60 net. Model 674 identical except stud-mounted with On-Off switch, $56.70 net.

ELECTRO-VOICE, INC.
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*Pat. No. 3,115,207

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Slide a PM-2 Power Supply on the back of your KWM-2 and put them into a CC-2 Carrying Case. Slip the 30L-1 Linear Amplifier into another CC-2 and you're DXpedited. Plug in the antenna, microphone, and three patch cords and you are on the air—anywhere—with a Collins quality kilowatt system.

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Second-class postage paid at Hartford, Conn. and at additional mailing offices.

INDEXED BY Applied Science and Technology Index. Library of Congress Catalog Card No.: 21-9421

OUR COVER

An ordinary method of base-loading a mobile whip antenna? Hardly! This is one of the plug-in coils at the base of W3NFT's five-band perimeter-type mobile antenna. Details on page 26.

QST

JULY 1969

VOLUME LIII NUMBER 7

PUBLISHED MONTHLY, AS ITS OFFICIAL JOURNAL, BY THE AMERICAN RADIO RELAY LEAGUE INC., NEWINGTON, CONN., U. S. A. OFFICIAL ORGAN OF THE INTERNATIONAL AMATEUR RADIO UNION

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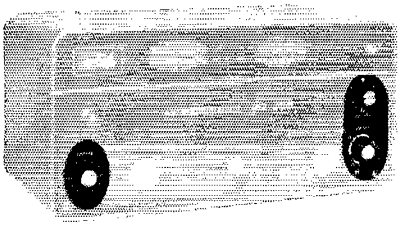
SPEC-I-FI-'CA-TION

. . . A DETAILED, PRECISE PRESENTATION OF FACT –

SEN-SI-'TIV-I-TY



BRAND NEW MODEL HQ200

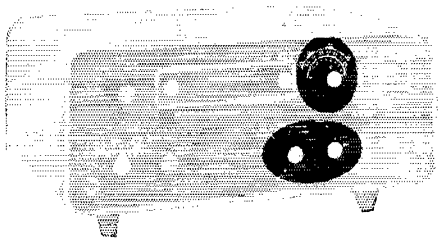
The correct matching of the antenna to the tube input impedance is of great importance in securing an optimum signal to noise ratio. A reactive antenna will usually produce a detuning effect on the input R.F. circuit. A good way of overcoming this problem is to tune the circuit with a panel mounted antenna trimmer or with a variable capacitor ganged with the VFO tuning capacitor. (A Hammarlund Feature for Years!)

SE-LEC-'TIV-I-TY

MODEL HQ-180A

Maximum pre-mixer selectivity is a valuable aid in reducing spurious responses and such selectivity is most easily achieved with an R.F. stage. (See *all* Hammarlund receivers for this - -)

The ability of a receiver to separate stations on closely adjacent frequencies is a measurement of its selectivity. To compare receivers, look at their selectivity curves. The curves show the *nose figure*, which represents the bandwidth in KHz over which the signal will suffer little loss of strength; the other figure, the bandwidth over which a powerful signal is still audible, is termed the *skirt* performance. The ratio of the two is the *shape* factor of the receiver. The ideal would be a shape factor of one—but this is presently impractical. The inclusion of step selectivity by use of a mechanical or crystal filter or by changing LC circuit parameters can provide shape factors close to the ideal. (Check the front panel of any Hammarlund receiver!)



MODEL HQ-215

▼

At Hammarlund, we believe in specifics—every one of our products meets published specifications—not just our engineering samples. Some of our receivers are still in daily use after thirty years and numerous owners! We'd like to tell you more about our radios—General Coverage—Ham Band—Commercial. Drop us a line at our sales office—20 Bridge Ave., Red Bank, New Jersey 07701—or see your favorite Hammarlund dealer.

Established 1910

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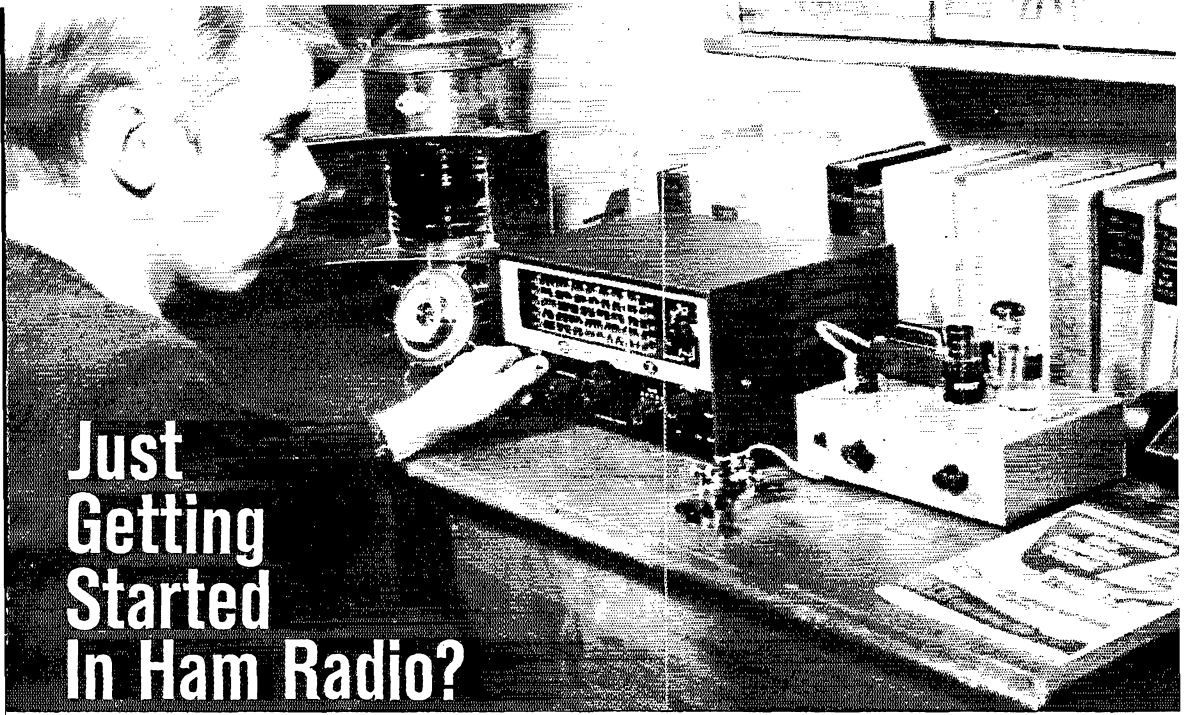
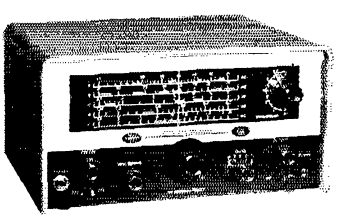


Just Getting Started In Ham Radio?

If your interest in ham radio has only recently developed you already know by now that there are hundreds of brands of equipment from which to choose, some costly . . . some not too costly. For years, Ameco equipment has appealed to the beginner because of its modest cost, yet with engineering and manufacturing quality you would expect to find in really expensive gear. Read about our All-Wave Receiver and Novice Transmitter below, then write for our new Ameco catalog to get complete specifications on these and other moderately priced items.

Model R-5A Allwave Receiver



An exceptionally fine receiver for the short wave listener and beginning amateur operator. Fully transistorized-solid state. Covers .54 Mc through 54.0 Mc in five continuous bands. Includes standard broadcast band, all foreign broadcast bands, all amateur bands from 160 through 6 meters, all 27 Mc CB channels, all 2 way radio frequencies from 30 to 50 Mc including many police and fire departments. Controls include Beat Frequency Oscillator, Noise Limiter, Bandspread. Provisions for external "Q" multiplier. Compare with tube-type units costing as much!

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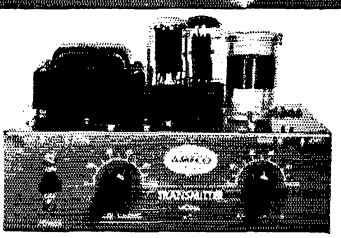

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Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports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

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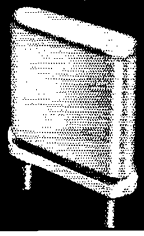

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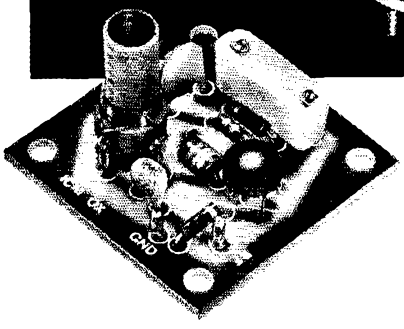

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MXX-1 Transistor RF Mixer **$3.50**
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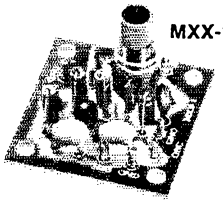
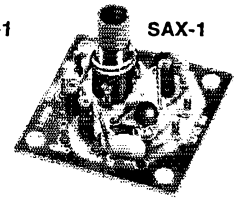
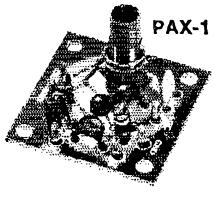
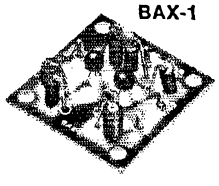

MXX-1


SAX-1


PAX-1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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.

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

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* Member Executive Committee

"It Seems to Us..."

F.M. — SOMETHING OLD, SOMETHING NEW

DURING the past decade, interest in f.m. has been spiraling. Hams by the droves are getting on channelized f.m., mobiles are in wide use, and v.h.f. repeaters are popping up on many a mountain top.

To the early radio amateur, f.m. was an annoying — and unwanted — thing that happened whenever he tried to amplitude modulate his transmitter. Then, Major Edwin Armstrong developed a practical communications system using frequency modulation, and many hams pioneered the use of the new mode. However, f.m. never gained the widespread use among amateurs enjoyed by a.m. and, later, sideband.

The greatest accelerant to the current f.m. movement has been the easy availability of inexpensive equipment. With commercial mobile services forced to reduce channel width to make room for more users, thousands of f.m. transmitters and receivers have become available at moderate cost to hams. This f.m. fervor, incidentally, is not limited to the U.S. It has caught on in Canada, among others; Japan has a growing group of enthusiasts; and, during the League's recent Board of Director's meeting, we received a long-distance telephone call from a couple of Australians wishing to confer on f.m. and repeaters!

Added stimulus for the mobiling f.m.er has been provided by the repeater. It allows consistent coverage of 50 miles or more, even between mobile units, and with a convenience and reliability not known before in amateur communication. Work done with netting together two or more repeaters, geographically spaced, indicates that they may some day provide channels for some of our long-haul amateur communications.

Additionally, f.m. has appeal for the traffic handler and local club net participants. Many clubs find it a successful mode for keeping members in touch with each other. The value of channelized f.m. in traffic was well demonstrated to us last year at the World Scout Jamboree in Idaho. Hundreds of messages were originated from the Jamboree site over a two-meter f.m. channel and picked up by other amateurs for introduction into the h.f. nets.

Like f.m. itself, the repeater idea is not exactly a modern invention; manned repeaters played an important role in the development of interest in the old 5-meter band in the early 1930s, for example. But f.m. and repeaters in the 1960s offer a classic illustration of "the power of an idea whose time has come." All the favoring factors have jelled into what amounts to a revolution in amateur radio communications.

As always happens when a concept catches fire in this way, there has been a dearth of information on "how to do it." Over the years, the outstanding technical articles in *QST* relating to new ideas have come, largely, from the early experts in those fields who have been willing — even eager — to pass along what they have learned, to help newcomers. Apparently most f.m. and repeater enthusiasts have been too busy solving their gear problems to make time to put their ideas into form for *QST* to disseminate to the masses who are becoming their followers. We've had lots of solemn promises to prepare articles, but until recently practically no fulfillment. We finally have some fine material in the works, and all indications point to more to come.

An Advisory Committee on VHF Repeaters, composed of experienced f.m. and repeater men in the U.S. and Canada (see March, 1969, *QST*, page 62), should provide closer liaison between f.m. enthusiasts and ARRL management in both technical and regulatory areas. At its May meeting, the ARRL Board of Directors ordered that a special section of *QST*'s v.h.f. department, "The World Above 50 Mc.," be set aside for f.m. and repeater news. Bill Smith, K4AYO, who conducts this department, will do his part if you, the f.m. enthusiast, will do yours by supplying input. And, a special handbook on the subject will shortly be in the works.

The channels of communication between the League and the f.m. fraternity are fully open. Let's *use* 'em! QST

League Lines . . .

Reciprocal operating arrangements are no help to immigrant amateurs who come to the U.S. intending to become citizens -- they have to wait five years for citizenship to take the amateur exam. Senator Goldwater's bills (S-J.Res.27 and a companion measure S-1466) would remedy the situation by authorizing immediate exam eligibility for such persons. A letter to your Congressman, and particularly one to Chairman Warren G. Magnuson of the Senate Commerce Committee where the bills now rest, in support of the proposals could be of major help in getting some action. More info on page 74.

Club publicity . . . many newspapers are always on the lookout for news of local club activities, and amateur radio is a prime candidate. Regular publicity coverage helps build the club, strengthen attendance, attract new members. Headquarters can help; a revised club publicity handbook is now available. If yours is lost, strayed or misplaced, write for a new copy.

A petition to FCC by Citizens Radio groups to take some of the amateur 10-meter band for CB was strongly opposed by ARRL; the Commission has now denied the request, as reported in "Haps" this month, page 75.

Hq. has the Board-assigned job of preparing an introductory book(let) on amateur radio for the age 12-16 group. To do the best possible job we're looking for input ideas from readers, especially those with youth-training experience -- high-school teachers, Scoutmasters, etc. What should the publication contain, what age reading level should be involved, how deep into theory and technique should the text go . . . and so on. We'd appreciate your advices.

Courtesy of the Library of Congress, each district office of the FCC now has a copy of the General Class amateur license examination in Braille. And by the way, Hq. has several pages of info for the blind free of charge (but the usual self-addressed envelope would help!)

Who says c.w. has fallen into disfavor, even among practitioners of such exotic modes as FM repeaters? "FM Magazine" recently editorialized in favor of a petition to FCC deleting code requirements for the amateur exam, but opposition from readers was so great the idea has been shelved. Even the Apollo astronauts are equipped for c.w. communications if and when every other means fails.

Speaking of space, an active amateur satellite may be in orbit within the next few months. Keep posted on Oscar-Amsat doings (page 58 this issue, for example) and be ready when it occurs.

Back in April, we mentioned club sponsorship of Explorer Posts -- and even convinced ourselves! The Hq. gang are sponsors of Post 73, BSA, with Jerry Hall, K1PLP, our technical expert on RTTY and propagation, as post advisor. A dozen youngsters are embryo hams. By the way, info on the Jamboree station KF7BSA appears on page 48 of this issue.

Quote-of-the-month from "S9," which along with "CQ" is one of the Cowan family of radio publications: "It's time the ARRL moved into the second half of the century and takes a lesson from the CB'er."

Touchcoder II

An Integrated-Circuit Code "Typewriter"

Ingenuity has had free play in the design of this keyboard code generator. The outcome is a simple circuit that can be readily duplicated using standard components — and at relatively low cost. The novel approach to generation of code characters is worth studying even if you aren't (or think you aren't) in the market for a code machine.

BY J. A. BRYANT,* W4UX, ex-W4DGC

THE thought that there must be an easier way to send Morse or Continental code than with a hand key seems to have been around almost as long as the code itself. Apparently there were attempts at the problem even before this century, and as early as 1910 a company marketed an all-mechanical code sending machine that used a typewriter-like keyboard, had a 72 character memory and, of all things, was powered by a spring-wound mechanism.[1] It seems the memory was necessary in order for the operator to store enough text to have time to keep the device wound and operating. Later, others constructed all-relay code typers, but because of complexity, size and possibly other factors their use did not become widespread. Of course, the perforated tape methods have been around a long time and in successful commercial use, but the complexity and expense of the perforator, read head, tape, etc. and the inherent delay between perforation of the tape and actual transmission, have prevented extensive use in the amateur bands.

Something more suited to our use was required, and the advent of solid-state devices seems to have paved the way. Several articles now have been published on practical keyers using various methods of generating code from a typewriter-like keyboard.[2,3,4] Other experimenters have constructed code typers not yet published.[5] At least one manufacturer is now advertising a code typer, the Alphacoder.[6] There has been an article on a solid-state keyboard keyer for RTTY[7] and Horowitz has shown how to modify his code typer for RTTY.[8] Perhaps the paragon of code typers is the "Penultimate Automatic Keyer," [9] which can store entire paragraphs and transmit them on demand. Unfortunately for the average amateur, it is a bit expensive as it requires an electronic computer costing from $10,000 to $20,000.

A fair estimate of the number of code typers now in use on the amateur bands would probably range from 20 to 30, many of which were constructed from the article by Horowitz, W2QYW.[10] For those not yet acquainted with the operation of the basic code typer, an explanation is in order. A special electronic keyer is connected to a keyboard, similar to that of a typewriter, in such a way that striking a key causes the corresponding character to be generated in code with provisions made at the output for keying a radiotelegraph transmitter. Thus, code can be sent in much the same way as typing on a typewriter.

Touchcoder I

About two years ago the writer became much impressed with the code typers used by W8RMH (now W8CV) and W3UCU in their QSOs with him. Their keyers had been constructed from the Horowitz article in *QST*. The article was ob-

* 1542 Linden Avenue, Owensboro, Kentucky 42301.

[1] Habig, "A Telegraph Key With a Memory," *QST*, July, 1963.

[2] Johnson, "Codamite," *QST*, May, 1961.

[3] Granberg, "A Push Button Keyer," *CQ*, September, 1964.

[4] Horowitz, "Perfect Code at Your Fingertips," *QST*, August, 1965.

[5] W6GIH, WØCQB, W9WJB, W1GO, WØEPV and others.

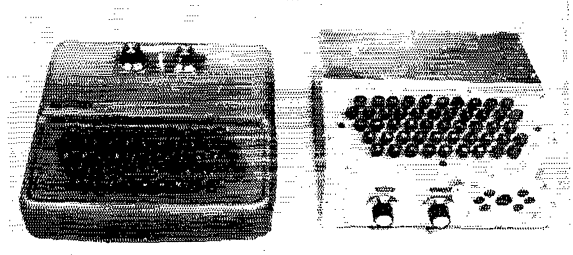
[6] Autovolt, Inc., 68 Richmond Rd., Belmont, Mass. 02178.

[7] Krupp, "Attache Case RTTY," *QST*, February, 1968.

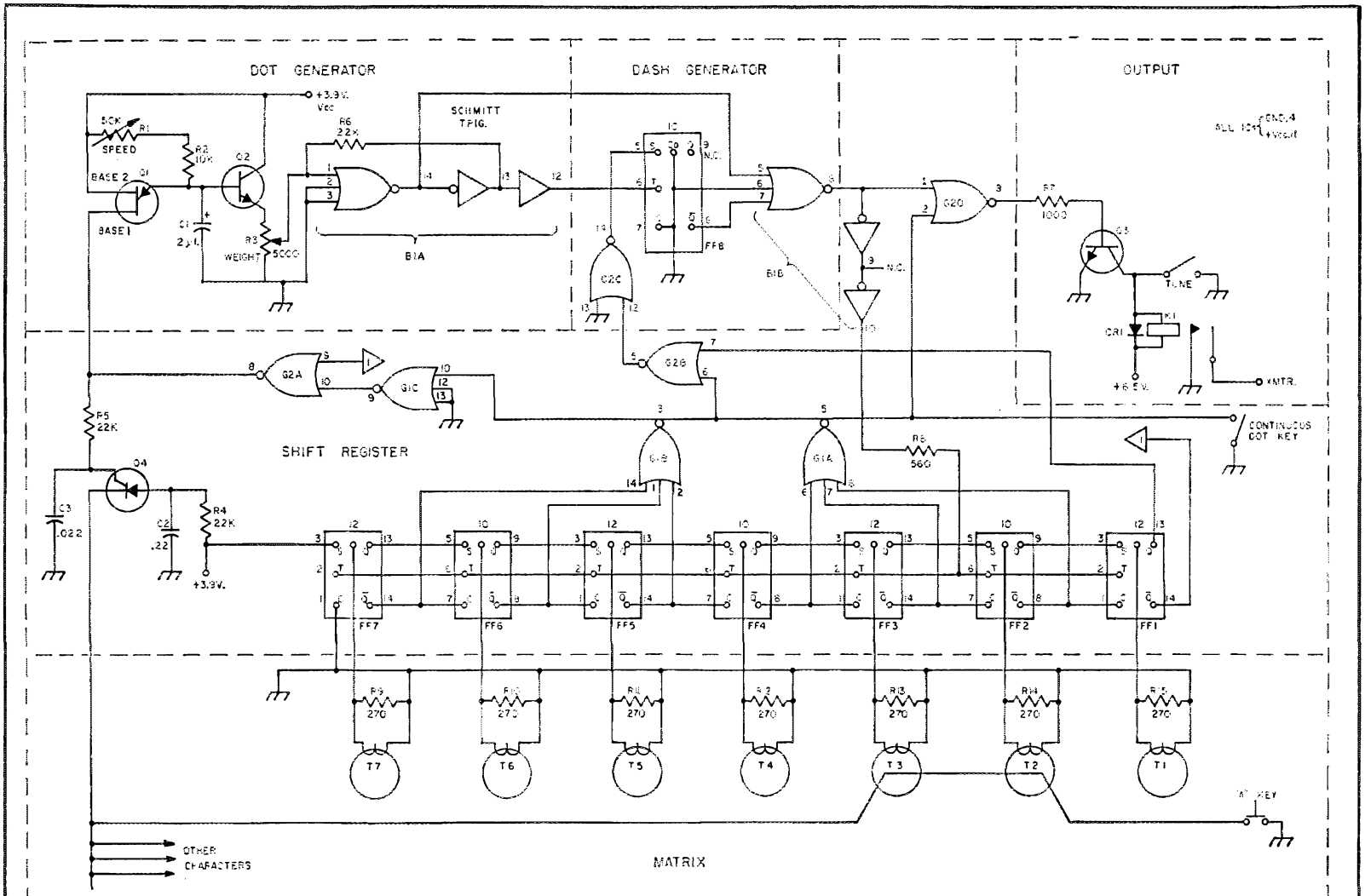
[8] Horowitz, "Perfect Teletype at Your Fingertips," *QST*, October, 1968.

[9] Stark, Gordon and Manfredonia, "The Penultimate Automatic Keyer," *Electronics World*, June, 1967.

[10] Horowitz, "Perfect Code at Your Fingertips," op. cit.



Two models of Touchcoders, illustrating different mechanical assembly. Touchcoder II, at the left, is the one described in this article. It is contained in a surplus IBM punch-card keyboard case, to which a new keyboard has been fitted.


DOT GENERATOR
DASH GENERATOR
OUTPUT
SCHMITT TRIG.
SPEED
WEIGHT
BASE 2
BASE 1
B1A
B1B
FF8
N.C.
TONE
CR1
K1
+6.5 V.
XMTR.
SHIFT REGISTER
CONTINUOUS DOT KEY
+3.9V.
FF7
FF6
FF5
FF4
FF3
FF2
FF1
T7
T6
T5
T4
T3
T2
T1
OTHER CHARACTERS
MATRIX

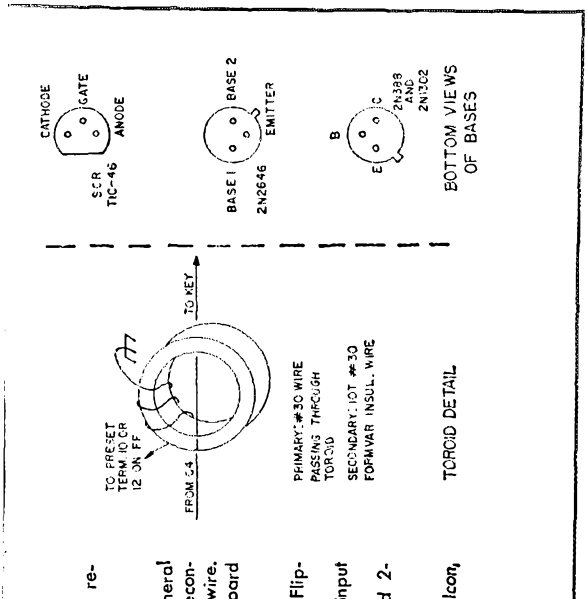


Fig. 1—Logic diagram of the keyer section. Terminal numbers for the integrated circuits also are shown. Fixed resistors, not listed below, are ¼- or ½-watt.

C_1—2-μf., 6-volt electrolytic or tantalum (Sprague TE1081 or equivalent).
C_2—0.22-μf., 10-volt ceramic (Sprague Hypercon HY325).
C_3—0.022 μf., 25-volt ceramic (Sprague Hypercon HY525).
CR_1—Silicon diode, not critical.
K_1—Reed relay, 200-ohm coil, 6 volts (Magnecraft W102-MX-2 or W103-MX-1).
Q_1—2N2646 unijunction transistor.
Q_2—2N388 or other with beta above 50.
Q_3—2N1302 or equivalent.
Q_4—TIC46, Texas Instruments.
R_1—50,000-ohm control, reverse audio taper.
R_2—5000-ohm control, linear taper.
T_1-T_7, inc.—Cores are No. CF 102-06 Indiana General ferrite toroids (Newark Electronics Corp.). Secondary: 10 turns No. 30 Formvar insulated wire. Primaries: No. 30 wires attached to keyboard keys and passed through proper cores.
Integrated Circuits:
FF_1-FF_5, inc.—4 Type MC790P Motorola Dual JK Flip-Flops.
G_1 (A, B, C)—1 Type MC792P Motorola Triple 3-input Gate.
G_2 (A, B, C, D)—1 Type MC724P Motorola Quad 2-input Gate.
B_1 (A, B)—1 Type MC788P Motorola Dual Buffer.
Sockets for ICs—7 required, Type 51-16001 Alcon, available from Newark Electronics Corp.

tained and studied carefully, but as the writer was experimenting with integrated circuits it presented a challenge to make a code typer using them instead of discrete components. Such a keyer was built, using somewhat different logic and replacing the magnetic memory core shift register with one made of integrated circuit flip-flops in a different scheme.[11] That keyer, Touchcoder I, has been in almost daily use at the writer's station since October, 1967.

Touchcoder II

Although Touchcoder I eliminated the need for the memory-core shift register, which is difficult to obtain, and reduced the number of diodes in the matrix from well over 200 to about 125, it was thought that if the matrix diodes could be eliminated entirely the cost and ease of construction would be improved. This article describes Touchcoder II, which was constructed with that thought in mind, eliminating the diodes by use of a matrix utilizing ferrite toroidal-core transformers. The cost of duplicating the keyer should not exceed about $50.00, excluding case and keyboard, even if all parts are purchased new from normal sources.

The Integrated Circuits

The integrated circuits used in the keyer are of the RTL (Resistor Transistor Logic) family and probably the least expensive available. All are the 14-pin dual in-line plastic package type. Only three types are used, NOR gates, buffers and JK flip-flops. For detailed descriptions of the operation of these devices the reader is referred to previous articles[12] regarding digital logic as space does not permit inclusion here.

Circuit Description

The complete code typer consists of a dot generator, dash generator, shift register, toroid matrix, keyboard, output circuit and power supply.

The Dot Generator

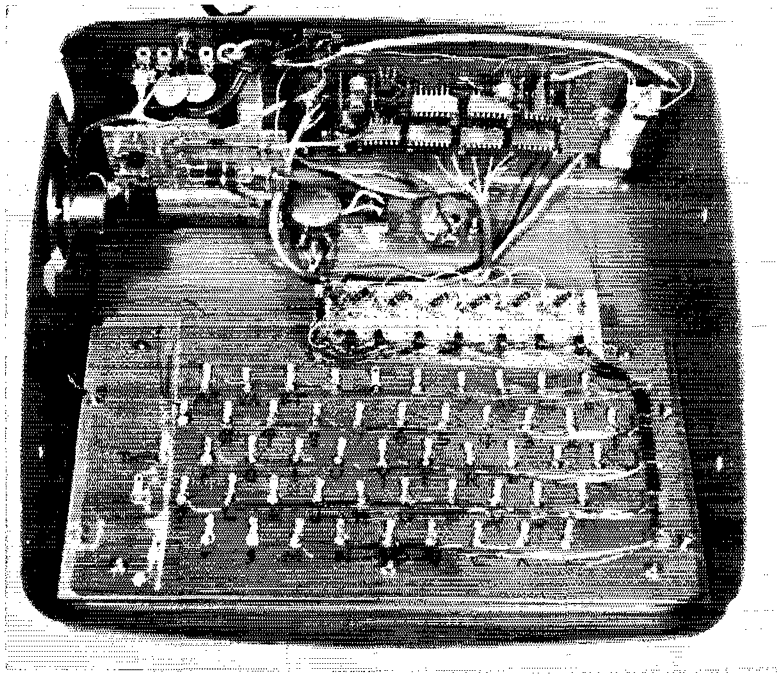
The dot unit length is the common denominator of the whole process of transmitting intelligence by radio-telegraph code. A dot is one unit long, a dash is three units, the space between dots or dashes is one unit, the space between characters is three units and the space between words is seven units. The rate of free-running dots per second multiplied by 2.4 equals code speed in words per minute; e.g., 10 dots per second equals 24 w.p.m.[13]

The dot generator was designed to generate square-wave pulses, dots, with provision for

[11] Replacement of a magnetic core shift register has been described by Weiderhold, W5OGZ. See "Integrated Circuits in the Keyboard Code Machine," *QST*, March, 1969.—*Editor.*

[12] Principles and nomenclature are discussed in two articles in July 1968 *QST*: Pos, "Digital Logic Devices," and Staples, "Integrated-Circuit Frequency Dividers."—*Editor.*

[13] ARRL, *The Radio Amateur's Handbook*, code transmission chapter.



Inside view of Touch-coder II, showing the bottom side of the keyboard in the foreground. The upright punched board at the top left is the power supply. The printed-circuit board at its right contains the components shown in Fig. 1, with the four dual flip-flops in the lower row. The reed relay is at the right-hand end of the board.

adjustment of the space between them (weight control). Having control of weight is desirable as not all transmitters maintain a constant weight from input to output. The dots are used to form dashes by alternately filling in the space between dots, resulting in dashes the proper three units long, spaced by one unit. It will be seen that the dot generator is "keyed," that is, it is inactive except when characters are being generated. The advantage in this is instant response to the striking of a key.

The dot generator consists of a unijunction transistor relaxation oscillator, Q_1 (Fig. 1), with an emitter follower, Q_2, to reduce loading, a control gate, G_{2A}, and a Schmitt trigger made using B_{1A} by applying positive feedback from the output of the inverter section via R_6. There are two outputs of the dot generator, both taken from the Schmitt trigger: (1) from the NOR gate output, positive-going on the leading edges of the dots, and (2) from the amplifier section, negative-going on the leading edges.

In the idle state, C_1 is charged via R_1–R_2 to nearly V_{cc} (+3.9 volts). At this time the emitter of Q_1 does not conduct as its Base 1 has a "high" applied from G_{2A}. Q_2, the emitter follower, is conducting as a result of the positive voltage applied to its base from the charged C_1. The conduction of Q_2 causes a positive voltage to appear at the arm of R_3, the weight control, and this is applied to the input of the Schmitt trigger. As this level is above the trigger point of the Schmitt, the latter's outputs are "low" at the output of the NOR gate section and high at the output of the amplifier section.

When a key is pressed, the output of G_{2A} changes from high to low by an action yet to be described. With a low at Base 1 of Q_1, the emitter fires, discharging C_1 quickly through the low resistance path of G_{2A} to ground. Q_2 reduces conduction, lowering the voltage applied to the Schmitt below its trigger point, causing it to change state. The NOR gate output of the Schmitt, now high, drives the output of B_{1B} NOR gate low, which in turn drives the output of G_{2D} high, turning on relay driver Q_3, energizing K_1 and starting the dot at the output.

As soon as C_1 has discharged, which is almost instantaneously, it begins recharging relatively slowly through R_1-R_2 at an exponential rate. As the voltage on C_1 increases, Q_2 begins increasing conduction, raising the level applied to the Schmitt trigger from the arm of R_3 and eventually reaching the trigger point, causing the Schmitt to snap back to its original state and release K_1, ending the dot. C_1 continues charging until its level reaches the peak-point voltage of the UJT, Q_1, at which time the emitter fires again and the cycle repeats. Proper adjustment of the weight pot, R_3, will cause the space between dots to be equal to the dot length.

The Dash Generator

The dash generator consists of FF_8, G_{2C} and the NOR gate section of B_{1B}. When no dashes are called for, the output of G_{2C} is high, resulting in the S and C inputs of FF_8 being high and low respectively, the condition for triggers to make Q high, $\overline{Q}$ low. The low from $\overline{Q}$ applied to input pin 7 of B_{1B} has no effect, allowing normal dot flow-through to K_1.

When dashes are called for the output of G_{2C} goes low, enabling FF_8 to toggle on the leading

edges of the dots applied to its T input from the output of the Schmitt. The first dot toggles $\overline{Q}$ high and K_1 energizes as with a dot. The end of the first dot removes the high from input 5 of B_{1B} but leaves a high on input 7 from $\overline{Q}$ as FF_8 holds steady. K_1 remains energized even though the first dot ended. The start of the second dot toggles $\overline{Q}$ back low, but now input 5 of B_{1B} is again high from the dot generator and K_1 remains energized. At the end of the second dot, inputs 5 and 7 of B_{1B} are both low and K_1 releases, ending the dash. At the beginning of the third dot FF_8 again toggles and the process repeats, starting the second dash after one unit space.

The Shift Register

The shift register and control circuit consist of flip-flops FF_1 through FF_7, G_{1A}, G_{1B}, G_{1C}, G_{2B}, G_{2D} and B_{1B}. Triggering is from the output of B_{1B} which is the generated dots and dashes, negative-going on the trailing edges. The register is wired to shift from left to right as shown on the diagram; therefore, anything set into the register via its preset (C_{1D}) inputs from the toroid matrix will be shifted to the right one stage at a time at the end of each generated dot or dash.

In the clear state all Qs are high and all $\overline{Q}$s are low. The Qs of FF_2 through FF_7 are connected to inputs of G_{1A}-G_{1B} whose outputs are in parallel, making G_{1A}-G_{1B} into a 6-input NOR gate. As all $\overline{Q}$s are now low, G_{1A}-G_{1B} output is high which, applied to G_{1C} wired as an inverter makes its output low and is applied to one input of G_{2A}. The other input of G_{2A} is from $\overline{Q}$ of FF_1, also low, resulting in the output of G_{2A} being high and preventing the dot generator from operating.

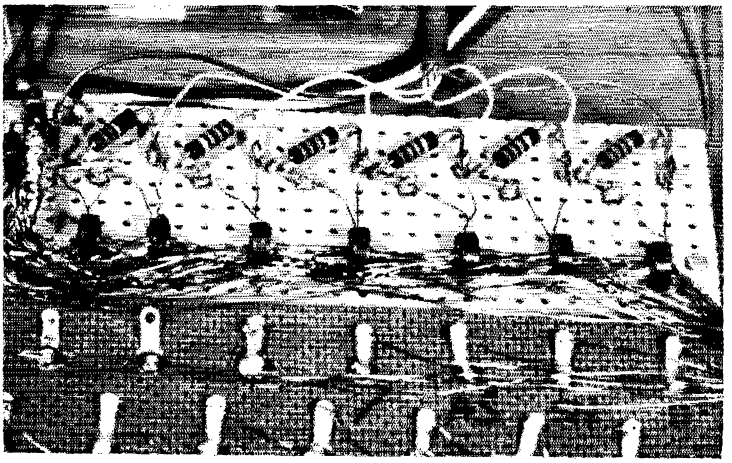
It can be seen that if the $\overline{Q}$ of any flip-flop in the register is changed from low to high the output of G_{2A} will go low and enable the dot generator. The result of all this is that when any stage or stages are set (loaded) by the toroid matrix through the preset inputs the dot generator will be enabled and will run until all high $\overline{Q}$s have been shifted out of the register.

The Toroid Matrix

The purpose of the matrix is to isolate the key-switches of the keyboard from each other and allow each to set the appropriate stage or combination of stages in the register necessary to generate the character assigned. The use of diodes is one popular way of doing this, but requires a large number of them — about 125 if used with the particular shift register in this keyer and as many as over 200 with some other schemes.

In Touchcoder II the use of diodes has been eliminated by using seven ferrite toroidal-core transformers, one for each stage in the register, with the secondary winding of each connected to the preset input of its associated flip-flop. The primaries of these transformers are merely wires passing through the hole in the toroid. There is a separate wire for each of the keys used on the keyboard, and each passes through the toroids necessary to set the stages for the character of the associated key. The resistors bridging the secondaries provide loading to prevent false triggering. Incidentally, these cores are *not* the same as "memory cores," which are capable of retaining magnetism, but are the type used for radio-frequency applications.

With the keyer at rest, C_2 has charged to V_{cc} through R_4. The gate of Q_4, a silicon controlled rectifier, has a high applied from G_{2A} through R_5, enabling the SCR to conduct when a key is pressed. The wires comprising the primaries of the transformers are all connected to the cathode of the SCR at one end and to the key switches of the keyboard at the other. The other sides of the key switches are connected to ground. When a key switch is closed, C_2 quickly discharges to ground via Q_4 and the wire associated with the key. The discharge results in a relatively-high current pulse through the wire, producing a pulse in the secondary winding of each toroid it passes through and setting the associated flip-



Close-up of the board on which the toroid transformers and their loading resistors are mounted. Wires from the code keys are threaded through the appropriate cores as described in the text and Table I.

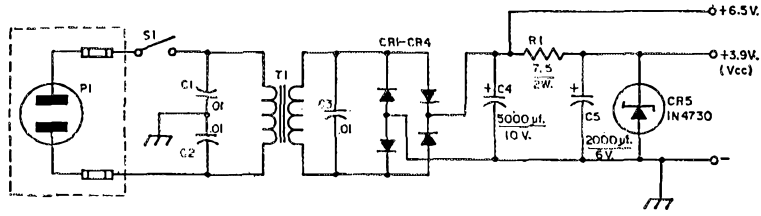


Fig. 2—Touchcoder II power supply. All capacitances are in microfarads (µf.).

C_1, C_2, C_3—Disk ceramic.
C_4—5000-µf., 10 volts (Sprague 39D508G010HP4).
C_5—2000-µf., 6 volts (Sprague 39D208G006GJ4).
CR_1-CR_4, inc.—Silicon, 1 amp. 50 p.r.v. (1N4001 or equivalent).
CR_5—Zener, 3.9 volts, 1 watt (1N4730 or equivalent).
P_1—Fused a.c. plug, ½ amp.
R_1—Two 15-ohm 1-watt resistors in parallel.
S_1—S.p.s.t. toggle.
T_1—6.3 volts, 0.6 amp. (Thordarson 21F21 or equivalent).

flops (making their $\overline{Q}$s go high). The setting of any stage causes the output of G_{2A} to go low and remain low until the register is again clear, therefore the gate of Q_4 becomes low also. When C_2 has discharged, the current through Q_4 is below its maintaining level and with the low on its gate it cuts off, allowing C_2 to recharge through R_4. Q_4 will not be able to conduct again until the register is cleared and G_{2A} goes high. This locks out the keyboard and prevents any effect from key closure during character generation. C_3 filters small spikes from reaching the gate of Q_4.

The Output Circuit

The output circuit consists of relay K_1 and its driver, Q_3. The relay is a reed type, which is capable of very fast operation with negligible bounce. It has a 200-ohm coil and operates from the 6.5-volt unregulated output of the power supply. CR_1 protects Q_3 by shunting the high-voltage spike developed by the collapse of the relay-winding field.

Those who prefer transistor to relay keying can use the alternative output circuit shown in Fig. 4. From recent tests on the air it appears that the transistor gives somewhat better keying than the relay. The Fairchild 2N4888 is specified as that is what the writer is using, but probably almost any other high-voltage p-n-p transistor would work as well.

The Power Supply

The power supply used with this keyer, Fig. 2, is both simple and inexpensive. It provides the 6.5 volts for the relay and 3.9 volts for the rest of the circuit. Although the nominal voltage recommended for the ICs is 3.6, the writer prefers the slightly higher 3.9, which is still within the manufacturer's ratings. Total current drawn by the ICs is around 200 milliamperes. The power supply should not be operated without a load on the 3.9-volt output as the dissipation rating of the Zener diode could be exceeded.

Character Generation

There are several ways in which a shift register and associated logic can be arranged to generate characters. The particular scheme used in this keyer was suggested to the writer by Jim Ricks, W9TO, and seems to be one of the best from a simplicity and component-count standpoint.

The rules for generating characters are:

1) Setting any stage (making $\overline{Q}$ high) will result in the generation of dots, the number depending on the stage set.
2) If FF_1 *and* any other stage or stages are set, a dash will result.
3) When FF_1 *only* is set, a dot will be generated, but will be inhibited from keying the output relay. This gives automatic spacing between letters.

From the earlier explanation of shift register operation, it was seen that each trigger applied to the shift register shifts the state of each stage down the line—from FF_7 toward FF_1, left to right in the diagram. For the purpose of the explanations to follow, remember we are considering a stage as "clear" when its $\overline{Q}$ output is low and as "set" when its $\overline{Q}$ is high; the complete register is "clear" when all $\overline{Q}$'s are low and "set" when the $\overline{Q}$ of one or more stages is high.

The Character Generation Chart, Table I, shows which toroids to pass the wire through for each keyboard character. A couple of examples should suffice to show the operation of the complete keyer.

Making the letter S: Striking the S key on the keyboard discharges C_2 through Q_4 via a wire passing through T_4 and the closed S key switch to ground. A pulse is developed in the secondary of T_4, setting FF_4. G_{2A} output goes low, locking out the keyboard and turning on the dot generator. At the start of the first dot K_1 is energized and B_{1B} output goes high. At the end of the dot K_1 is de-energized and B_{1B} output goes low, triggering the shift register and resulting in FF_4 clearing and FF_3 setting. At the beginning of the second dot K_1 again energizes and B_{1B} goes high; the end of the dot de-energizes K_1 and B_{1B} goes low, again triggering the register and causing FF_3 to clear and FF_2 to set. The third dot starts and stops, resulting in K_1 operating as before and FF_2 clearing and FF_1 setting. The S is now complete, but the shift register is not yet

Table I

Character Generation Chart

Character	T_7	T_6	T_5	T_4	T_3	T_2	T_1
A					×	×	
B			×				×
C			×		×		×
D				×			×
E						×	
F			×		×		
G				×		×	×
H			×				
I					×		
J			×	×	×	×	
K				×	×		×
L			×			×	
M					×	×	×
N					×		×
O				×	×	×	×
P			×		×	×	
Q			×	×		×	×
R				×		×	
S				×			
T						×	×
U				×	×		
V			×	×			
W				×	×	×	
X			×	×			×
Y				×	×	×	
Z			×			×	×
1		×	×	×	×	×	
2		×	×	×	×		
3		×	×	×			
4		×	×				
5		×					
6		×					×
7		×				×	×
8		×			×	×	×
9		×		×	×	×	×
Ø		×	×	×	×	×	×
Period	×	×		×		×	
Comma	×	×	×			×	×
Quote (")	×		×			×	
?	×			×	×		
$\overline{\text{AR}}$		×		×		×	
/		×		×			×
$\overline{\text{VA}}$	×	×		×			
$\overline{\text{BT}}$		×	×				×

× indicates the toroids the key-switch wires pass through for each character on the keyboard.

clear. The fourth dot is generated, but K_1 is inhibited from operation as G_{1A}-G_{1B} output is now high since no stage FF_2 through FF_7 is set, resulting in a high applied to one input of G_{2D} and preventing its output from going high to turn Q_3 on. This "silent" fourth dot, with its unit space before and after, provides the three-unit space between letters. At the end of the fourth dot the output of B_{1B} goes low, triggering FF_1 clear. With all stages in the register again clear, the output of G_{2A} goes high, stopping the dot generator and applying a high to the gate of Q_4, which reenables the keyboard for the next character. Note that if the key-switch had been held closed, Q_4 would again allow C_2 to discharge and another letter S would be generated.

Making the letter C: (Refer to Keyer Waveform Chart, Fig. 3) Striking the C key discharges C_2 through a wire passing through T_1, T_3 and T_5, setting FF_1, FF_3 and FF_5. As FF_1 and other stages are set, a dash will be generated; this results from G_{2A}'s low starting the dot generator, and G_{2B}, with a low on both inputs, driving G_{2C} output low, enabling FF_8 to convert two dots and the space between into a dash. At the end of the dash the shift register is triggered, resulting in FF_2 and FF_4 being set. As FF_1 is now clear, the output of G_{2C} is again high and FF_8 is no longer enabled to make a dash, so a dot is passed through. At the end of the dot, the register is again triggered, resulting in FF_1 and FF_3 set, which calls for a dash again, and it is passed through. At the end of the dash, the register is triggered, resulting in only FF_2 set, which calls for a dot, and it is passed through. The end of the dot completes the letter C, but its end resulted in FF_1 being set, causing the "silent" dot to be generated, providing proper space before the next letter.

Construction

The diagram of the keyer as shown is complete except for the wiring of the voltage supply to the IC packages. In each case, the positive side of the 3.9-volt supply is connected to pin 11 and the negative side (ground) to pin 4.

Construction of the keyer is not especially difficult using point-to-point wiring, but is easier if a printed circuit board is used. Kenneth Wadlow, W4GX,[14] plans to make some printed circuit boards for this keyer and, if so, they should be available from him. The use of sockets for the ICs is highly recommended, as there is little pleasure in trying to unsolder fourteen pins simultaneously when an IC is suspected of being defective. The most economical sockets the writer has found are those listed in the Newark Electronics Corporation industrial catalog as the "Alcon" brand for 40 cents each.

It is recommended that the specified parts be used. The writer has no information regarding substitution of surplus ICs or cores and it is doubtful that such substitution would greatly affect the cost of the complete keyer.

The ICs are a little hardier than they are usually given credit for being and will take a fair amount of punishment without damage; however, they can be ruined quickly by application of a stiff source of voltage to an output that is in the low state. Application of V_{CC} to inputs results in no damage and is quite normal in certain cases as, for instance, where a permanent high input is desired such as at the S input of FF_7 in the diagram.

[14] 1566 Old Hickory Road, Memphis, Tenn. 38116

Table II

Level Chart
Levels to be Expected at Designated Points when Keyer is in Idle Condition.

Component	*Terminal*	*Level*
FF_1 through FF_8	Q	high
	$\overline{Q}$	low
	S	high
	C	low
FF_1 through FF_7	T	low
FF_8	T	high
G_{1A}, G_{1B}, G_{2A}, G_{2C}, B_{1B} NOR	Output	high
Q_1 emitter, Q_4 anode & cathode		above 3.5 V.
G_{1C}, G_{2B}, G_{2D}, B_{1A} NOR	Output	low
R_3	Arm	0.8–1.1 V.
V_{CC}		3.9 V.

"High" indicates greater than 1 volt.
"Low" indicates less than 0.3 volt.

Before winding the ten turns of No. 30 wire on the toroidal cores it is best to coat the cores with varnish or some kind of dope, as it was noticed that the bare cores seemed to have an abrasive effect on the insulating coating of the wire and resulted in electrical contact between the winding and uncoated core. The direction of winding turns on the secondaries and direction of the primary wire passing through the cores should be observed for proper initial polarity to the preset terminals. In passing the wires through the cores to the keyboard, it is not necessary to space them out from the cores they do not pass through — they can lie right against the outside edge and have no effect. As can be seen in the photograph, the cores are lined up axially, spaced about $\frac{5}{8}$ inch apart, on a separate board attached to the keyboard. They are fastened by a dot of glue under each.

The UJT relaxation oscillator is working at a rather low supply voltage for such a device and there is the possibility that certain 2N2646's picked at random may not operate properly. If this should happen, try another 2N2646. The writer has used this dot generator in a fair number of regular keyers and has had little trouble finding satisfactory ones. Also, if the 2N388 emitter follower, Q_2, has low beta, the action of the UJT will be impaired due to loading.

The keyboard should have from 45 to 50 keys, depending on how many special characters are desired. Fairly good contacts are essential as poor ones can result in occasional incorrect characters. Commercial key switches investigated by the writer cost between $1.20 and $3.25 each, making a keyboard using them rather expensive. Some constructors have used standard push buttons and have been rather disappointed with the result, while others have used old typewriters by installing switch contacts actuated by the keys. The keyboard used by the writer is one built by William J. Hawkins.[15] It consists of a metal panel to which flat springs are attached on the underside, with the ends bent up through holes to the top side and regular typewriter keycaps attached with epoxy glue. Under the metal panel is spaced a fiberboard panel with contacts matching the key springs above. When a key is pressed the flat spring touches the matching contact below.

Choice of a case for the keyer is up to the builder's ingenuity. One of the writer's is in one made of sheet aluminum and the other is housed in the shell of an old IBM cardpunch keyboard.

The relay used is one of the reed type and its contacts are designed for moderate voltage and fairly low current. It is excellent when used with modern transmitters using grid-block keying. It is important, however, that no capacitor be used directly across the transmitter keying leads as it may cause sticking of the contacts. If that should occur, they usually can be broken loose by tapping the body of the relay with a pencil. If some capacitance is necessary, a resistor should be placed in series with it. One more precaution is that the reed switch contact terminals should not be bent or distorted as that can affect its performance.

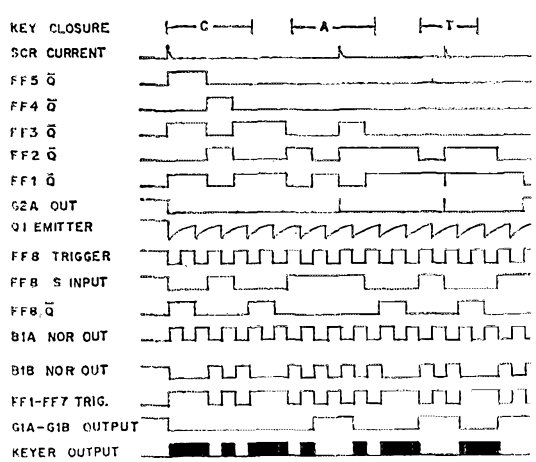


Fig. 3—Waveform chart for the word "cat."

Troubleshooting

Upon completion of construction, check wiring against the diagram. Set the speed control near top speed (minimum resistance) and the weight control near center. Apply power, and while holding a key down, vary the weight control slowly both ways; the control has a wide range and the keyer will not operate over it all. A range should be found where the keyer will operate and be adjustable to proper weight.

If trouble is encountered, the Level Chart, Table II, should help in tracking it down. An ordi-

[15] 27 Fifth Street, Carnegie, Pa. 15106. $26.00 ea. ppd.

nary 20,000-ohms-per-volt v.o.m. is sufficient for measuring almost any steady-state voltage in the keyer. Without a high-performance oscilloscope, it is difficult to see the output of the matrix toroidal transformers as it is a single cycle distorted sine wave of a frequency about 125 kHz. and with a peak amplitude of about 3 volts, depending on how many cores the particular primary wire exciting it passes through.

R.f. troubles, sometimes the curse of ICs, show up only when keying the transmitter with the final on, of course, and cause very erratic operation. Shielding of the keying lead, additional bypassing of the power leads and getting rid of floating r.f. in the shack may help. The portion of the circuit most susceptible to r.f. seems to be the Schmitt trigger, and in particular the lead to it from the weight-pot arm. In extreme cases it may be necessary to run the lead in shielded wire and even install a 1000-ohm ½- or ¼-watt resistor in series with it right at the input to B_{1A}. Bypassing that lead is not effective as it prevents proper operation of the Schmitt. With short leads between the weight pot and B_{1A}, shielding should not be necessary. The toroids and the leads from them to the flip-flops do not seem to be particularly sensitive to r.f.

One unexpected trouble that showed up in the writer's unit was caused by keying a relatively high level of 250 volts. The cure was found to be adding a 470-ohm resistor in series right at the relay contact terminal. Keying voltages somewhat less had no bad effects.

One trick particularly helpful in tracing trouble is to slow the keyer down to a bare crawl by paralleling C_1 with 50 to 100 μf. This gives ample time to check the action of various parts of the circuit, even with a voltmeter. Almost any d.c.-coupled scope is suitable for observing the waveforms almost anywhere in the keyer except at the presets or the current waveform of the primary wires.

A monitor of some kind is very helpful when testing the keyer as it is difficult to tell what is coming out by listening to relay clatter; it can fool you.

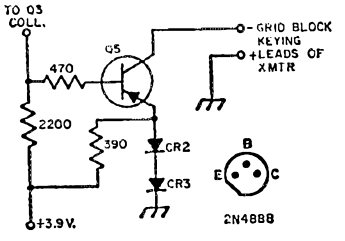
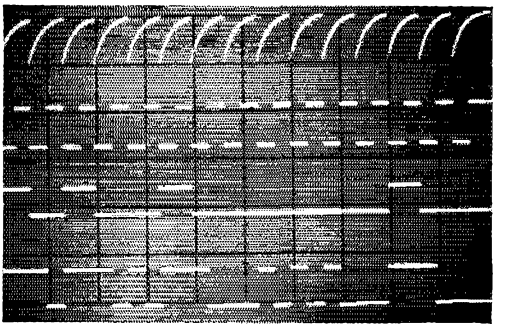
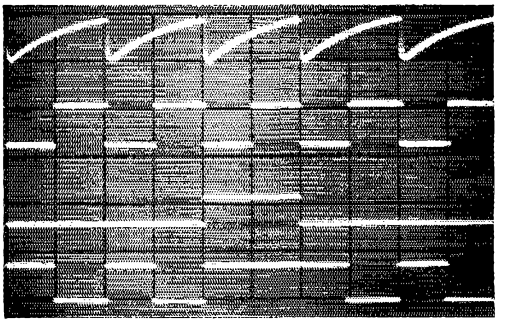


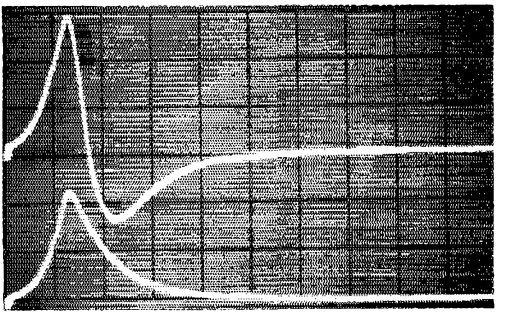
Fig. 4—Transistor keying, alternative to relay shown in Fig. 1. Resistors are ½ watt.
CR_2, CR_3—Silicon, ratings not critical.
Q_5—P-n-p, 150-volt (BV_{CEO}) rating (Fairchild 2N4888 or 105-volt 2N398).



Waveforms recorded on a four-trace oscilloscope. Top row: Waveform at emitter of Q_1. Second row: Output of Schmitt trigger, pin 12 of B_1A. Third row: Waveform at $\overline{Q}$ output (pin 8) of FF_8. Bottom row: Output of G_{2D} (drive for Q_3), "QST" at slow speed.



Similar to slow-speed waveform display, but sending letter "F" at 240 words per minute.



Waveform at secondary of T_2 (top) and across a 5-ohm resistor in series with the primary wire exciting T_2. Vertical scale 0.5 volt per cm.; horizontal scale 2 μsec. per cm.

Operation

It is a rather strange feeling when first using a code typewriter to find that the correct code characters come out with the mere touch of a key. If the user is fairly good at touch typing, it doesn't take long to be sending very respectable code; however, the "hunt-and-peck" artist may have a little more trouble. While the text books on touch typing recommend a steady rhythm in striking the keys, this simply won't do on a code typer. As the code characters are of various lengths, such as the very short one for the letter

"e" and the very long one for the digit "0," the operator must listen to the code coming out and adjust the rhythm accordingly, hastening to the next character following the short ones and pausing for the longer ones to clear. As the keyboard is locked out during character transmission, the operator can be holding the next key down while awaiting completion of the previous one. As mentioned before, holding a key down will result in the character repeating, which is an aid in sending double letters such as "ff," "oo," etc., although holding for "ee" becomes rather tricky at high speed.

In regard to high speed, this keyer and the previous model constructed by the writer have been tested at approximately 150 w.p.m. (60+ dots per second) by holding various keys and observing the output on an oscilloscope. Of course, it is necessary to change the speed limiting resistor, R_2, to obtain this speed. With the value shown in the diagram, top speed is around 60 w.p.m., but can be increased by decreasing the value of R_2, although it should not be reduced to a value too low for proper operation of the dot generator.

No "memory" is provided in this keyer although one capable of storing several characters could have a beneficial effect in smoothing out the flow of code by reducing the timing requirements placed on the operator. The development of a simple and inexpensive memory bank would be an interesting project.

The writer would like to express his appreciation to Jim Ricks, W9TO, for the scheme used in the shift register character generator and for the ideas gleaned from correspondence and on-the-air discussions with him and WØEPV, W6GIH, W4GX, W3UCU, W8CV, WØCQB and others, and to George Clark for the photographic work.

QST

A Coaxial-Line Matcher for V.h.f. Use

BY ROBERT D. SHRINER,* WAØUZO

GETTING maximum power into the antenna, and maximum received signal from it is an objective of all radio amateurs. This becomes harder as we go higher in frequency, and many of us have encountered this problem recently in connection with v.h.f. repeaters, which often have high antennas and long feedlines. Theoretical values for line loss can be obtained from tables supplied by makers of coaxial lines, but these figures assume new line, terminated in its characteristic impedance. The usual amateur installation is less than perfect on both counts.

Let us review an actual case. A repeater system on 146.94 MHz. indicated 22 watts going into the line at the transmitter end, but only 5.5 watts when measured between the line and the antenna itself. There was a reflected-power reading of 18 percent at the antenna end, so the true loss was even worse than the indicated 16.5 watts. In any event, at least 70 percent of our transmitter power was going into heating up the coax. Worse yet, this same loss was applied to received signals, resulting in a very severe reduction in repeater effectiveness.

The matching device described here was then inserted at the antenna, and adjusted for zero reflected power. The forward power then read 10 watts; still not good for a 75-foot run of line, but a 3-db. improvement over what was obtained without the matcher. A similar improvement was effected in received-signal strength with the matcher in the line.

*PO Box 969, Pueblo, Colorado 81002.

To check the true performance of your transmission line, measure the power going into it when it is terminated in a perfectly-matched load. Something like the Heath Cantenna is good enough, up to at least 150 Mc. Then measure the power between the line and the load. The difference is your line loss. It can be as little as 1 db. per 100 feet with really good coax, and good RG-8/U should be only 2.5 db. A small mismatch will not raise this significantly — but the trouble is that the mismatch is usually much worse than you think, if you measure the s.w.r. at the *transmitter* end of the line.

So do not be surprised at losses of 50 percent or more in v.h.f. feedlines. If you have excessive loss *due to mismatch*, this matching device will eliminate such loss. The remaining loss will be that inherent in the line itself — which is bad enough!

The dimensions given in Fig. 1 are for use in 2-meter work, and are not particularly critical. The dimensions and capacitor values can be scaled down for use on 220 or 432 MHz. The small variable capacitors are suitable for power levels up to 100 watts or so. For reasonable safety factor with high power use a wider plate spacing, particularly with amplitude-modulated service.

To adjust the matcher, connect it between the line and the antenna, or an electrical half-wavelength away from the antenna. Start with all capacitors at minimum setting, and adjust each one for lowest reflected-power reading in a bridge connected between the matcher and the main run of line. Some capacitors will have little or

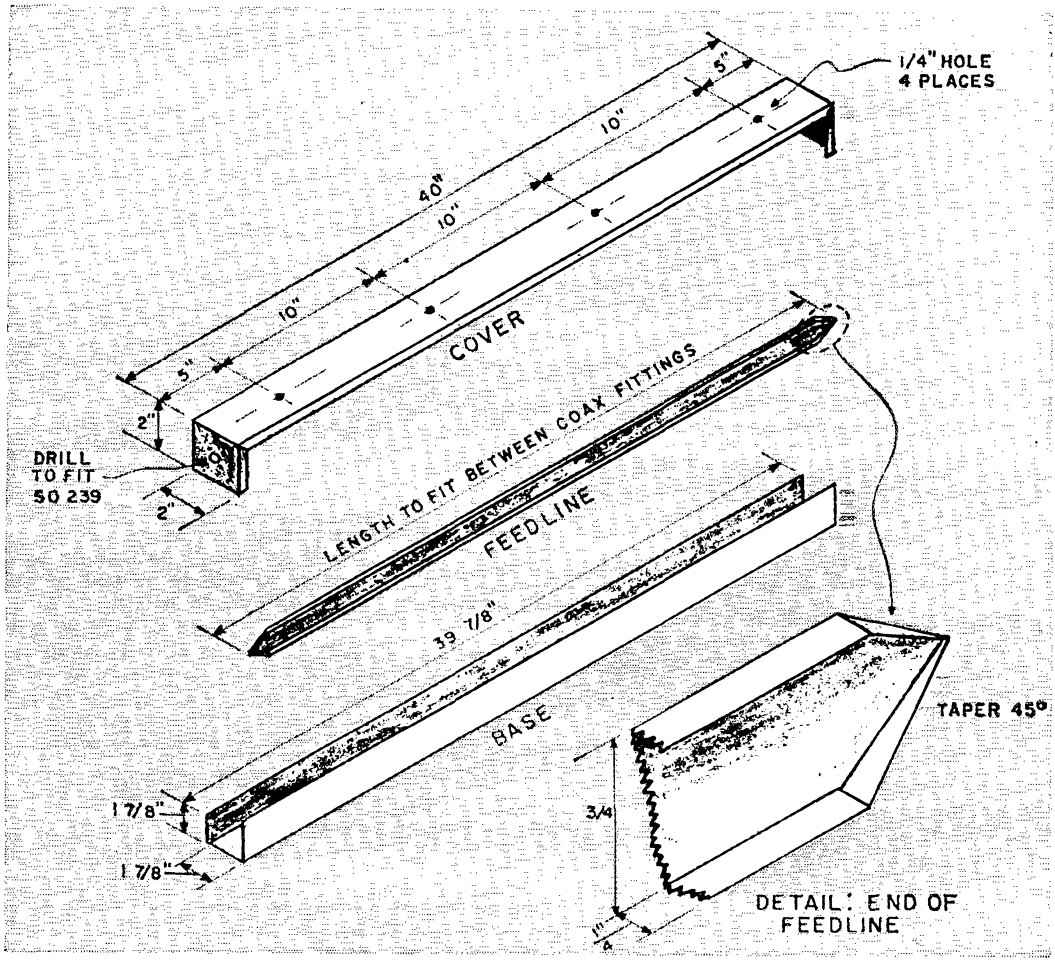


Fig. 1—Details of the coaxial-line matcher by WAØUZO.

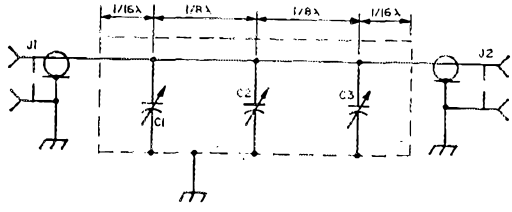


Fig. 2—Schematic diagram of the matcher.
C_1-C_3, inc.—2.7-20 pf. variable capacitors (E.F. Johnson 160-110).
J_1-J_2—SO-239 connector.

no effect. Return any showing no change to minimum setting, before adjusting the next.

The matcher case should be soldered together at all overlapping surfaces, and the capacitor shafts' mounting hardware and adjacent surfaces of the matcher coated with liquid rubber or other water-proofing cement.

In nearly all installations where the matcher has been tried there has been a marked improvement in results, both transmitting and receiving. In no case, has its insertion resulted in a loss.

A similar matcher, designed for mounting in a rectangular box, was described by W3GKP, in *QST* for September, 1968. QST

80- And 40-Meter Listening With A Transistor BC Set

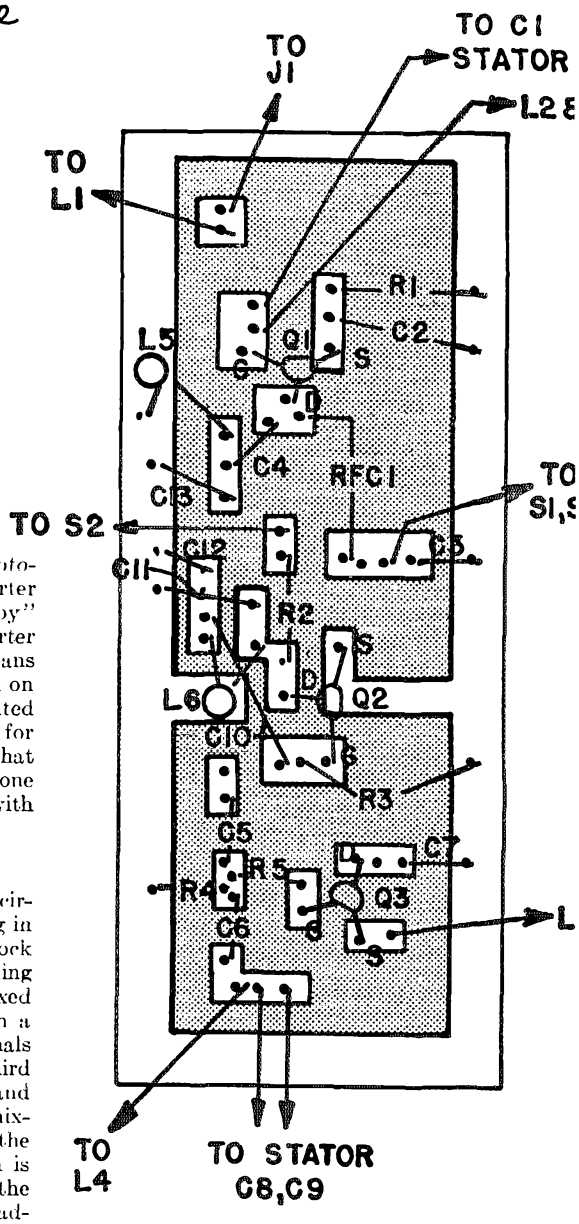
BY LEWIS G. McCOY,* W1ICP

THE 80/40-meter receiver shown in the photographs and in Fig. 1 consists of converter that tunes 80 and 40 meters and a "cheapy" transistor broadcast-band receiver. The converter is inductively coupled to the BC set which means that no modifications of any kind are needed on the BC set. It should be immediately pointed out that this little receiver is not designed for communications but rather as a simple unit that will permit the builder to tune in c.w. and phone signals and thereby familiarize himself with copying code and amateur techniques.

Converter Details

Before actually discussing the converter circuit, let's see how a converter works to bring in ham signals on a broadcast set. Fig. 1 is a block diagram of a converter showing a signal coming into the mixer at 3700 kHz. This signal is mixed in the mixer stage along with a signal from a tunable oscillator at 4700 kHz. These two signals "beat" against each other producing a third signal at 1000 kHz. Actually, both the sum and difference frequencies are produced by the mixing action, the one at 1000 kHz., which is the difference, and another at 8400 kHz., which is the sum. However, we are only interested in the one at 1000 kHz. This signal is fed into the broadcast set which is tuned to 1000 kHz. and then amplified in the normal manner.

As we tune the oscillator through its range, the different frequencies throughout the bands



Template for printed circuit board, showing component placement. Arrows indicate connections to switches and variable capacitors mounted on plate.

* Novice Editor

Cheap transistor radios are easy to get. Here is a simple converter using transistors that converts one of these radios into a poor man's 80- and 40-meter receiver.

are converted to 1000 kHz. and amplified. A little figuring will show that if our oscillator covers 4500 to 6300 kHz. we can convert signals for 80 and 40 meters to 1000 kHz. to be fed to the BC set.

Referring to Fig. 2, Q_1 is an FET mixer, the input circuit consisting of L_1L_2 and C_1. C_1 is a modified variable capacitor with a maximum capacitance of approximately 160 pf., adequate

to cover 3.5- to 7.5 MHz. with the inductance of L_2. Q_2 is the oscillator. C_8 and C_9 are the bandset and bandspread capacitors, also modified units.

Output from the mixer is fed to L_5 and C_{13}. L_5 is a vari-loopstick which is a slug-tuned coil and along with C_{13} can be resonated at 1000 kHz. When L_5 is mounted anywhere within a few inches of the loopstick antenna in the broadcast receiver, sufficient coupling is obtained for short-wave signals to be heard.

Also included with the converter is a beat-frequency oscillator which provides a b.f.o. for copying c.w. and s.s.b. signals. Q_3 is the b.f.o. and C_{11}, C_{12} and L_6 consist of the b.f.o. tuned circuit, resonant at 455 kHz.

Construction Information

The entire converter and b.f.o. assembly is mounted on a printed-circuit board. The three variable capacitors, the antenna terminal, and S_1 and S_2 are mounted on a piece of aluminum which is mounted on standoffs above the printed circuit board. The entire assembly is then installed, along with the b.c. set in a plastic card file box, as shown in one of the photographs.

On the opposite page is a template of the printed-circuit board, exact size as used in the unit shown, and in red is a drawing showing the mounting points for the various components.

As the three variable capacitors come from the radio store they have too much capacitance for our purposes. However, it is an easy matter to modify them. Open the rotor of one of the units wide open. Take a pair of long-nose pliers and carefully bend the rear rotor plate back and forth with the pliers until it breaks loose and then remove it. Do this with each succeeding plate until there are six rotor plates left on two of the capacitors. On the third capacitor, remove all but two rotor plates. This capacitor will be C_9, the bandspread capacitor.

In wiring the circuit board, use one of the pencil-type irons as the bigger irons are too difficult to use for this type of work. Also, when soldering the leads of the transistors, use a heat sink on the lead being soldered so too much heat doesn't ruin the transistor.

As to making the printed-circuit board, you'll find many kits listed in distributors' catalogs and any of these are suitable for the job.

As can be seen from one of the photos, a small bracket is made up to fit inside the card-file box. The bracket is made just loose enough so the broadcast set can be slid in or out with the back of the set facing the inside of the box. When the converter assembly is slid inside the box, along with the BC set, the vari-loopstick coil, L_5, will be parallel to the BC set loopstick as mentioned previously, we found that the two coils didn't need to be too close together to get adequate coupling, they can be several inches apart. The b.f.o. coil also doesn't need to be real close in order to get enough b.f.o. pickup.

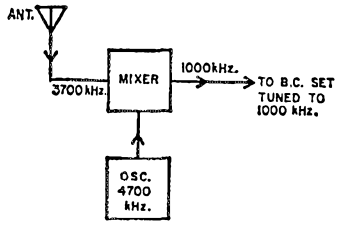
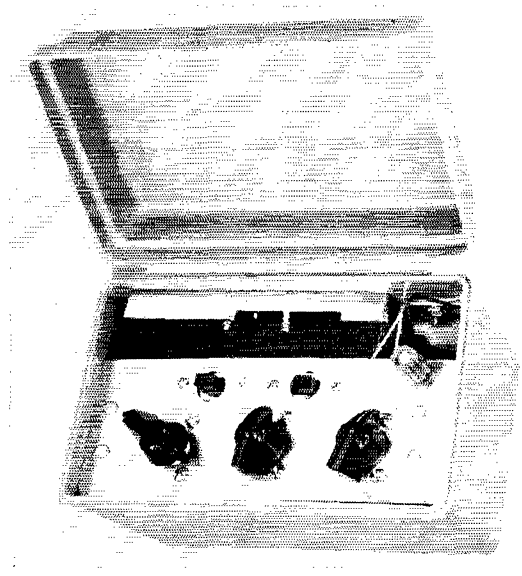


Fig. 1—Block diagram showing mixing process.



Here is the card file box with the receiver and converter mounted inside. The front of the receiver faces the outside of the box so that the receiver back is against the converter assembly.

Tune-up and Adjustment

Once the unit is wired, put an antenna on J_1, a wire about 30 feet long should be adequate. Turn on the converter and BC set, and then tune C_8 to near minimum capacitance. Tune the BC set to anywhere near 1000 kHz. where there isn't a BC station coming in. Next tune C_1 near minimum capacitance for a peak in the background noise, and then tune C_9 through its range and you should hear short-wave signals and they should be in the vicinity of the 40-meter band. It may take a couple of settings of C_8 to find the band but the setting for 40 meters will be near the minimum capacitance setting of C_8. It will be easiest finding the phone band, which runs 7200 to 7300 kHz. Also, you may find a phone station that signs CHU. This is the Canadian time-signal station and they send "beeps" every second and then identify at 10 seconds before each minute both in English and French. This station is at 7335 kHz., just above the high end of the 40-meter band. Once you locate the 40-meter band you can make a mark on the panel for the setting of C_8.

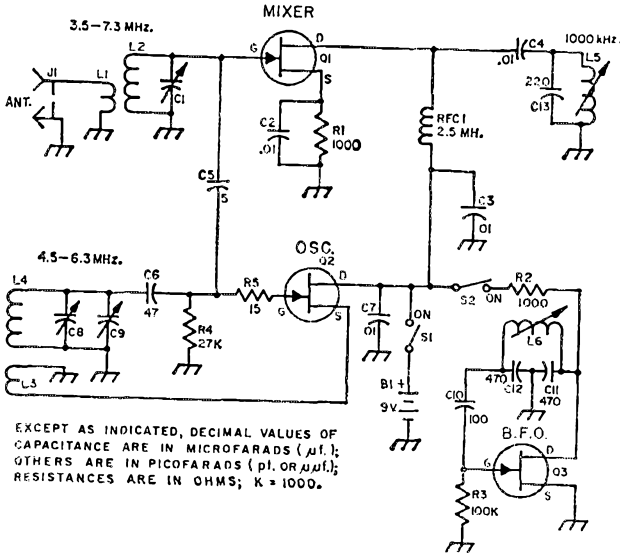


Fig. 2—Circuit diagram of converter and b.f.o. All resistances are in ohms, all resistors are ½ watt. Component designations not listed below are for placement information.

B_1—9-volt transistor battery.
C_1, C_8, C_9—Modified single-gang midget t.r.f. type variables, 365 pf. before modification (Lafayette Radio 32H1103).
C_2, C_3, C_4, C_7—0.01-μf. disk ceramic.
C_5, C_6, C_{10}, C_{11}, C_{12}, C_{13}—Silver mica.
J_1—Phono jack or terminal.
L_1—8 turns No. 24 enamel close-wound over L_2.
L_2—36-inch length of No. 24 enamel, close-wound on Amidon* T-69-2 toroid core, 44 turns total.
L_3—12 turns of No. 24 enamel wound over L_4 to occupy entire circumference of the core; observe polarity.
L_4—Same as L_2.
L_5—Loopstick (Lafayette Radio 32H4106).
L_6—66–114 μh., slug tuned (Miller 4511 or Lafayette, 34H3770).
Q_1, Q_2, Q_3—HEP 802, MPF102 (Motorola).
RFC_1—2.5-mh. r.f. choke.
S_1, S_2—Single-pole, single-throw slide switch.
* Amidon Associates, 12033 Otsego St., North Hollywood, Calif. 91607

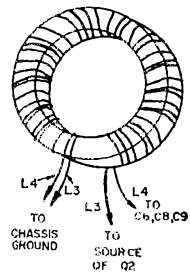
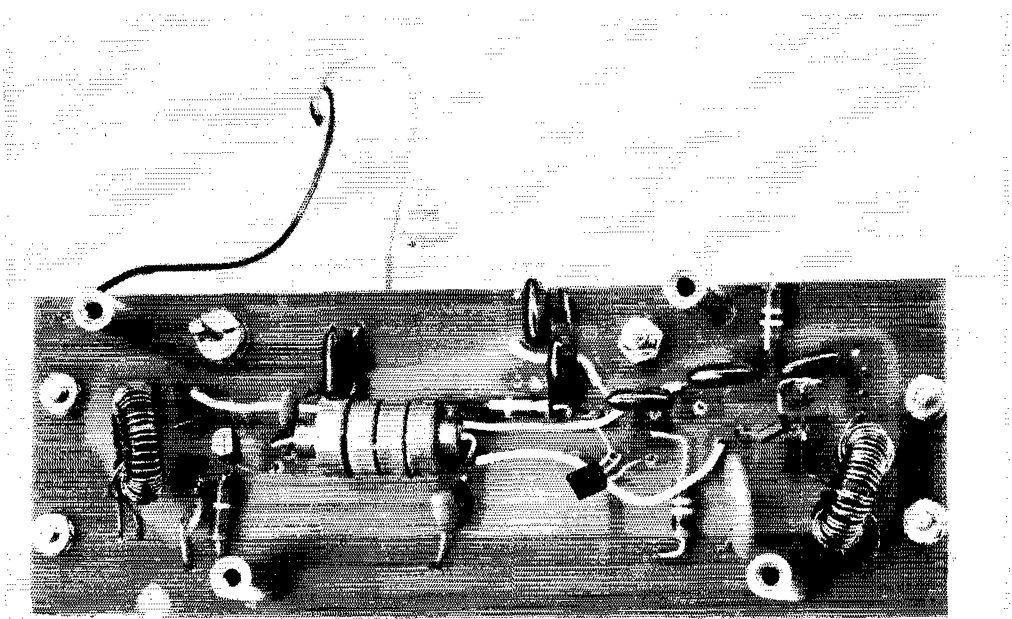
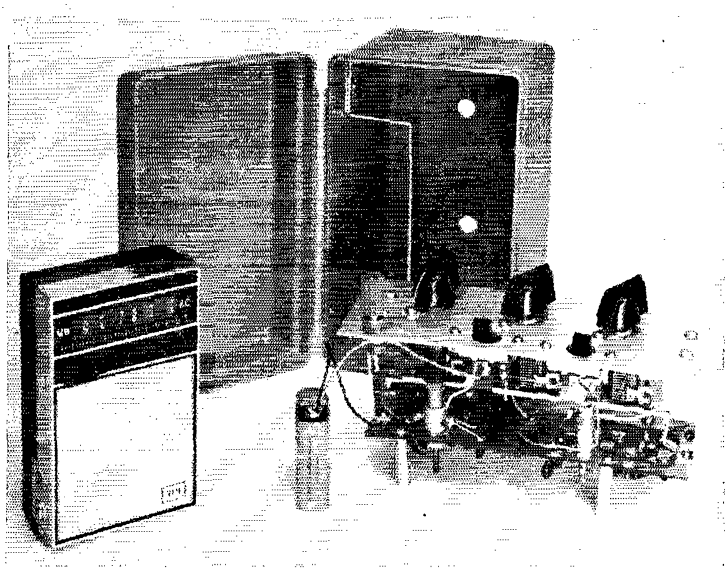


Fig. 3—Method of winding the toroids.



This view shows the parts arrangements on the components side of the printed circuit board. As mentioned in the text, be sure to use a pencil-type soldering iron when mounting the components on the board.



Note the bracket in the card file box that holds the receiver securely. The size of the bracket will depend on the size of the receiver you purchase.

Now set C_8 near maximum capacitance, repeak C_1 for noise and use the same techniques for locating the 80-meter band. The phone portion of 80 runs from 3800 to 4000 kc. If you are doing this during daylight hours you may not hear any activity on 80 meters so set up 80 after dark, when the band is open.

If for some reason, you don't hear any signals on these initials tests on either band, it could be that the "tickler" coil of the oscillator, L_3, is connected backwards. This means that you should remove the ground connection on L_3 and connect it to the drain of Q_2 and ground the lead that was previously on the drain connection.

After you have tuned a signal in on either band, and with the BC set tuned to 1000 kHz., adjust the slug in L_5 for maximum signal strength (by loudness) and leave it there. To adjust the b.f.o. coil, tune in a signal and then adjust the slug in the b.f.o. coil to the point where you hear a beat note on the signal and then leave the slug set at that point. In order to copy c.w. signals you'll have to turn on the b.f.o. switch.

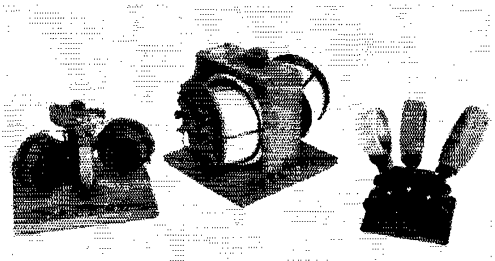
As we mentioned earlier, the combination of the converter and BC set won't make a good communications receiver but it is an economical method of making a receiver that will tune in both phone and c.w. signals for getting familiar with ham signals and learning the code.

QST

From the Museum of Amateur Radio

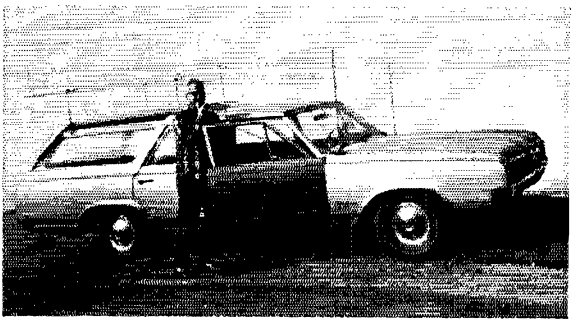
Evolution of the DeForest Honeycomb coil mount.

Here, from left to right, are the three major steps in developing the well-known Honeycomb-coil mount. Robert F. Gowen, formerly Chief Engineer of the DeForest Company conceived the idea of three coils on hinged supports and came up with the crude result shown on the left. It worked sufficiently well to justify pursuing the idea. Next came the advanced model shown in the center. The coils are wrapped with cloth tape. All three coils in both models are tapped. Presumably, Gowan was not satisfied with the switch arrangement and wisely went to plug-in coils of low-loss construction. The final result is the well-known arrangement that most old timers are familiar with. —W1ANA



The Alpha Special

An All-band Perimeter-type Horizontal Antenna for Mobile Operation



The Alpha Special mobile antenna in use on 40 meters. The author has experienced great success with this system.

BY ALLAN W. PORSCH,* W3NFT

"I can't visualize a 3λ/4 15-meter horizontal." "A full λ/4 on 20 meters? What's it like?" These are some of the comments I get over the air with the Alpha Special mobile antenna. Here's your chance to convince your XYL (or YL) that all mobile antennas don't have to be unattractive or objectionable, and at the same time you'll be happy with this perimeter-type, high-performance mobile antenna.

Objectives

Having the desire to improve on the vertical loaded whip, and inspired by the Connecticut Longhorn,[1] I set forth a number of design objectives for this antenna.

1) It had to be easy to garage; this eliminated any take-down or fold-over features.

2) There could be absolutely no front visual obstructions, to eliminate any potential safety hazard to driving. This automatically limited the forward mast section to the cowl.

3) The design should eliminate or drastically reduce losses from an r.f.-consuming loading coil, in order to get the maximum amount of radiating surface.

4) The roof-top area of my station wagon had to be completely free of any obstructions, to enable mounting of two large canvas-covered luggage racks.

5) The system should have some aesthetic appeal for the XYL, and have minimum wind resistance.

After a number of sketches and some preliminary mechanical layouts were made, I finally hit on the idea of a "perimeter" arrangement which met all the five objectives originally set forth. The photos show what finally evolved, and Fig. 1 gives the electrical drawing. The total length of the antenna is about 28 feet.

* R.D. 2, Sylvan Heights, Emporium, Pa. 15834.

[1] Pfeiffer, "The Connecticut Longhorn," *QST*, August, 1967.

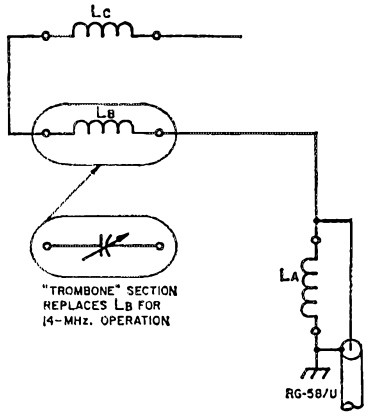


Fig. 1—Electrical diagram of the Alpha Special mobile antenna.

System Arrangement

The Alpha system is resonated at an odd number of electrical quarter-wavelengths by three loading coils placed at different points in the system. The coils are changed or left open, as appropriate for the band in use. For 20-meter operation, L_B is replaced with an adjustable "trombone" section which electrically looks like a variable capacitor. The tip of the antenna is adjustable in length for fine-tuning to exact resonance. Table I shows the coil arrangements I use for each of the five bands covered by the antenna, and Table II shows the coil design data.

L_A aids in getting better than a 1.1:1 s.w.r., providing for easy loading and good efficiency of all transceivers. For 40, 15, and 10 meters, L_B is a "shorting" bar consisting of a small length of aluminum strap or wire. For 75, 40, and 15 meters, L_C is a small coil. For 20 meters, L_C is a

TABLE I

Band Coil Placement Chart

Band	L_A	L_B	L_C	*Tip Length (Approx.)*
10	L_1	Short	Open	———
15	L_1	Short	L_5	13 inches
20	L_1	Trombone	Short	16 inches
40	L_2	Short	L_6	27 inches (7250 kHz.)
75	L_3	L_4	L_6	28 inches (3950 kHz.)

TABLE II

Coil Design Chart

Coil	*Inductance μh.*	*Turns*	*Turns Per Inch*	*Dia., Inches*	*A.W.G. Wire Size*	*Coil Stock*
L_1	0.079	2¼	4	¾	16	B&W Miniductor 3009 or equiv.
L_2	0.14	3½	4	¾	16	B&W Miniductor 3009 or equiv.
L_3	0.35	5	8	¾	18	B&W Miniductor 3010 or equiv.
L_4	21.0	28	10	2	16	Illumitronic Air-Dux 1610 or equiv.
L_5	2.9	9	10	1½	18	Air-Dux 1210 or equiv.
L_6	12.0	15¼	8	2½	14	Air-Dux 2008 or equiv.

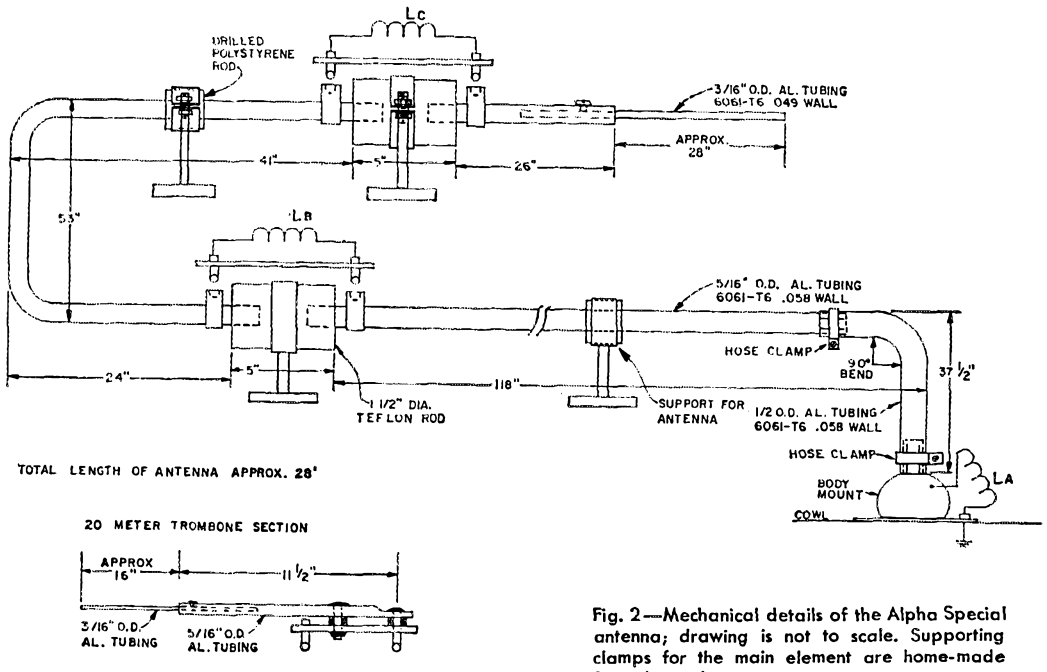


Fig. 2—Mechanical details of the Alpha Special antenna; drawing is not to scale. Supporting clamps for the main element are home-made from sheet aluminum.

Overall view of the antenna system. The four support rods are insulated from the elements. The large Teflon insulator to the rear, on the passenger side, is location L_B. On the opposite side is L_C.

short, and for 10 meters is left open. The system, without L_C, resonates at about 28.825 MHz.

For 75 meters, I use the regular 40-meter coil for L_C and use a small coil at L_B. If a short were used at L_B, a large coil would be required at L_C, although this would give better efficiency.

What's the bandwidth like? Within the arbitrary limits of 2:1 for the s.w.r., the following was measured.

Band	*Frequency Range, kHz.*
75	15
40	50
20	220
15	210
10	650

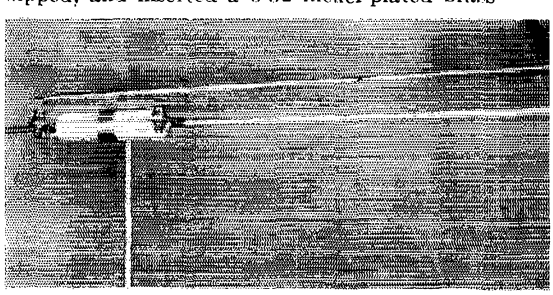
Construction

Fig. 2 gives the mechanical layout of the antenna. This layout should be taken only as a guide, as each installation will be somewhat customized for the particular body configurations. My installation was made on a 1965 Oldsmobile Vistacruiser station wagon. The long upper deck of this model has no gutter, and seemingly presented a serious mounting problem for anchoring the antenna. The final solution was to permanently mount (and paint to match) three eye hooks, just below the vista windows. On these hooks I welded an L-shaped bracket for fastening the antenna support rods. The fourth support, between the vertical mast and L_B, is fastened to the gutter with a gutter hook. It bears very little load and is used to eliminate sagging of the long element run. The same is true of the support between L_B and L_C. All supports are insulated from the antenna. The horizontal elements and insulators were made as small as practical to minimize wind resistance.

The 1½-inch aluminum mast pipe is the principal support. Both ends are slit, and stainless steel hose clamps are used for clamping. The lower portion fits over the stud on the body mount. Aluminum tubing $\frac{5}{16}$ inch in diameter forms the main element of the antenna. An aluminum shim made from thin cookware material was wrapped around the $\frac{5}{16}$-inch tubing to mate properly into the horizontal part of the vertical mast pipe.

Adjustable $\frac{3}{16}$-inch tubing makes a snug fit into the $\frac{5}{16}$-inch main element for the antenna tip and for the 20-meter trombone section. Near the ends of the $\frac{5}{16}$-inch tubing, I drilled and tapped a hole for a No. 8-32 screw, for positive locking after the adjustment was completed. The adjustable elements should be made long enough to reach about half way into the $\frac{5}{16}$-inch tubing.

The supports for the insulators and elements are $\frac{3}{8}$-inch diameter aluminum rods, threaded at each end. For the two supports mounted at L_B and L_C a ¾-inch wide, 0.050-inch thick aluminum U-shaped clamp was constructed to hold the 1½-inch dia. Teflon rod. These Teflon rods have a $\frac{5}{16}$-inch hole drilled at each end about 1 inch deep. This provides a snug fit for the tubing. Near each end of the Teflon insulator, I drilled, tapped, and inserted a 6-32 nickel-plated brass



The 20-meter "trombone" section installed at location L_B, as seen looking across the rear of the vehicle. Jumbo banana plugs and jacks securely hold the trombone or coils in place.

screw to secure the tubing. Off each end of the insulators are home-made aluminum clamps (four in all), around the $\frac{5}{16}$-inch tubing. A jumbo jack is fitted into each one. These hold coils L_B and L_C. The remaining two supports are insulated with drilled polystyrene rod, slipped between the main element and the support clamp. The rod is 1 inch by ¾ inch-dia., with a $\frac{5}{16}$-inch dia. hole drilled in its center to accept the antenna element.

All aluminum joints and connections were liberally coated with Penetrox A, an excellent anti-oxidizing compound, to prevent "freezing" and to obtain low resistance contacts.[2]

The loading coils used at L_B and L_C are mounted on $7\frac{1}{2} \times 5\frac{5}{8} \times \frac{1}{4}$-inch polystyrene sheet material. The jumbo type banana plugs securely hold the coils in place under all driving conditions. The matching coils used at L_A were made plug-in by using the small banana hardware.

[2] Penetrox A is made by the Burndy Corp., and is available through the General Electric Supply Company.

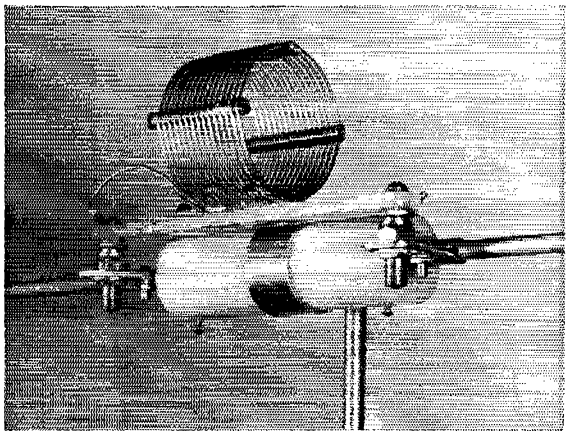
Of particular note is the 20-meter trombone in Fig. 2. The rear banana plug is used for support only, and is isolated from the active element by spacers. When the trombone is installed, the adjustable tip extends to the rear of the vehicle.

Adjustment

To resonate the system for each band and adjust for minimum s.w.r., I found a grid dip meter for the "coarse" adjustment and a v.s.w.r. meter for the "fine" adjustment indispensable. As a suggestion, start with slightly higher value inductances than in Table II, as it is easier to remove than to add turns. Disconnect the coaxial feed line. Select the band to be tuned by inserting the appropriate coils at the three plug-in positions, and place the adjustable tip at the center of its range.

Using the grid dipper loosely coupled to L_A, adjust L_B or L_C to resonate the antenna at the low-frequency end of the band, shorting or removing no more than one turn at a time. This provides the coarse adjustment. For the fine adjustment, connect the transmission line to the antenna, and through an s.w.r. bridge to the transceiver. "Fire up" the rig. Normally, only a few watts of output power will be needed, depending on the bridge sensitivity.

Tune the rig at various points in the band until resonance is indicated by minimum s.w.r. reading. At this point, it may be necessary to trim L_B or L_C some more to obtain resonance in the desired frequency range. Next, remove no more than a quarter-turn at a time from L_A until the lowest s.w.r. reading is obtained. Once this is found, tune the transceiver to the center of the band, or to your favorite operating frequency, and slide the adjustable tip to fine-tune to exact resonance as indicated on the s.w.r. meter. The same procedure is followed for each band except



The 40-meter coil inserted at location L_C. All coils are mounted on polystyrene or Plexiglas material. The support insulator is constructed from 1½-inch dia. Teflon rod.

Shunt feed point, L_A. The matching coil shown is for 40 meters. RG-58/U coax, with a PL-259 plug and reducer, is connected to the body mount underneath the cowl.

10 meters, which, in my case, needed no further adjustments. L_A for 10 through 20 meters remains unchanged and provides a good match.

Operation

The Alpha accepts the "soup" from my Heath HW-100, a medium-power low-priced transceiver. For operating convenience, I have installed a Quemont s.w.r. bridge at the transceiver's output.[3] I can now continuously monitor my s.w.r., which tells me if the system is resonant and functioning properly. I would heartily recommend this feature.

I have not made any exacting evaluations of directional properties but have not noticed any significant differences. DXing? I am amazed at the "reaching" power on the 15- and 20-meter bands. I have had foreign stations (DL, OZ, HC, etc.) answer my CQs and tell me that I have one of the most outstanding mobile signals on the band. These are my two favorite bands, with 40 meters running a close third.

In passing, I wish to thank my XYL for her patience while I was on this project. She is my loyal copilot and log keeper while mobiling. Her only complaint is that the transceiver is between us. As she once said with a bit of nostalgia in her voice, "It's not like the olden days!" Happy mobiling. QST

[3] Quemont Electronics, San Jose, Calif. This is a Monimatch-type bridge which simultaneously reads relative output and s.w.r.

An Improved 5894 Amplifier for 432 MHz.

Modernized Version of a Popular U.H.F. Amplifier Design

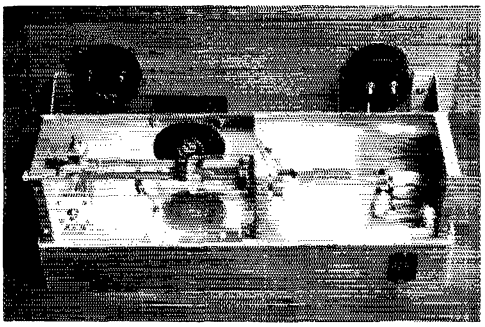
BY CARMEN F. MORETTI, W2AIH*

VARACTOR multipliers are getting more attention from 420-MHz. enthusiasts every day. At one time their high price kept varactors from being widely used, but if one reads the surplus ads these days he can find these little gems at very reasonable prices. With a varactor diode, a few feet of copper wire, and miscellaneous small variable capacitors you can develop a few watts on 432 MHz. very easily, using an existing 220- or 144-MHz. transmitter as a driver. The varactor multiplier delivers surprising efficiency, and it requires no power supply of its own. The problems and expense come mainly when you try to put a medium- or high-power signal on 432 MHz.

A varactor doubler similar to that described in The *Radio Amateur's V.H.F. Manual* delivers about 6 watts on 432 when driven by a 6360 stage on 216 MHz. Varactor triplers will do almost equally well. Up to 12 to 15 watts on 432 is possible with currently available varactors, if a larger driver stage is used. It is not the writer's intention to dwell on varactor multipliers, or to describe in fine detail the 100-watt amplifier shown in the photographs. Rather, it is to call attention to an improved method of transferring power from the varactor multiplier to the grid circuit of a push-pull amplifier.

The amplifier itself is not unlike several designs that ran in the *ARRL Handbooks* of the 1950's. It is the interstage coupling method that makes the difference. As anyone knows who built 9903 or 5894 amplifiers for 432 in the early years of crystal-controlled transmission on that band, coupling efficiency between the driver and amplifier was almost always poor. With some care in adjustment, the arrangement shown here performs this task quite effectively.

*1619 Boulevard, Peekskill, New York 10566.

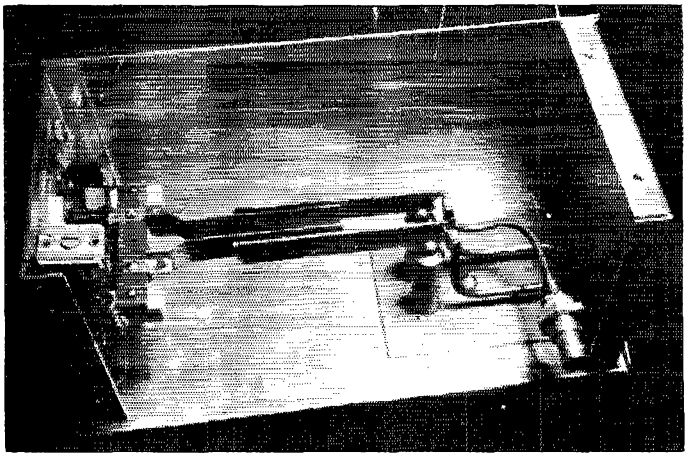


Rear view of the W2AIH 432-MHz. amplifier, with shield covers removed.

Amplifier Tank Circuit Details

In the days of the 50-watt power limit on 432 the 5894 tube was almost universally used. Though the 4CX250-series tubes are now popular for medium- and high-power stages, the 5894 still has merit for input power up to 100 watts or so. With the input circuit described, such a stage can be driven nicely with a varactor multiplier. It is possible that the same idea would work well with the external-anode tubes, and most amateur designs for push-pull amplifiers using these have not been notably efficient as to power transfer from the driver.

The amplifier grid circuit, L_3, is a half-wave line, with high impedance at both ends and low



Close-up view of the 432-MHz. amplifier grid compartment.

impedance at its electrical center. The grid chokes, RFC_1 and RFC_2, are connected at the latter point. Because of the capacitive loading by the input capacitance of the tube, the electrical center of the line comes approximately at the grid terminals of the 5894 socket. Drive is coupled capacitively to L_3 through the combination of the line L_2 and the coaxial balun, L_1. This improvement over inductive coupling methods formerly used is the principal difference between this amplifier and its predecessors.

The plate circuit, L_4, is also a half-wave line, tuned at the open end by the split-stator capacitor, C_1. High-voltage feed through RFC_3 and RFC_4 is at the electrical center of L_4. The closed end of the series-tuned coupling loop, L_5, is near this point. The 5894 screen is series-tuned to ground by C_2.

Construction

The amplifier chassis is aluminum, 3 by 4 by 17 inches. The shield enclosure is 3¾ inches wide and 4 inches high. A bracket for the tube socket is mounted on the chassis so that the plate compartment is 9 inches long and the grid compartment 6 inches. The 3-inch cooling fan is mounted in the center of the front shield plate, 6 inches from the end of the chassis. Air blows against the tube envelope and out through holes in the top cover.

Though the fused glass top of the 5894 envelope is quite strong, care should be used to avoid appreciable mechanical strain on the plate pins. Whatever mechanical arrangement is made for fastening the line to the plate pins should be adjusted carefully, so that tight contact is provided without twisting action. The method used here is shown in Fig. 2. Brass tabs soldered to the outer ends make contact with the stators of C_2.

It is important that the rotor of C_2 not only be insulated from ground, but also *isolated* from it, so that capacitance to ground is at a minimum, and whatever there is be as near balanced to ground as possible. Capacitors in which major metal parts of the frame or mounting brackets are electrically connected or mechanically close to the rotor should be avoided on this account. The capacitor used here was mounted on a Teflon block, ½ inch thick.

The antenna coupling loop, L_5, and its series capacitor, C_3, may be seen at the left side of the interior photograph. Its brass mounting bracket is fastened to the end of the compartment in such a manner as to position the loop properly with respect to the plate line, and line the shaft of C_3 up with its mounting hole in the top cover.

The small compression trimmer visible in both interior pictures is C_2, connected from screen to ground. This is adjusted for best amplifier stability, its purpose being to effectively ground the 5894 screen for r.f. voltage.

The grid side of the amplifier is seen in the second photograph. The coax used for the balun, L_1, is RG-141/U, semi-rigid, and self-supporting. The coaxial input fitting in the right foreground is suspended on the end of the balun. It becomes grounded when the rear shield plate is put in place. The use of semi-rigid coax is recommended, but the ordinary variety can be used if the former

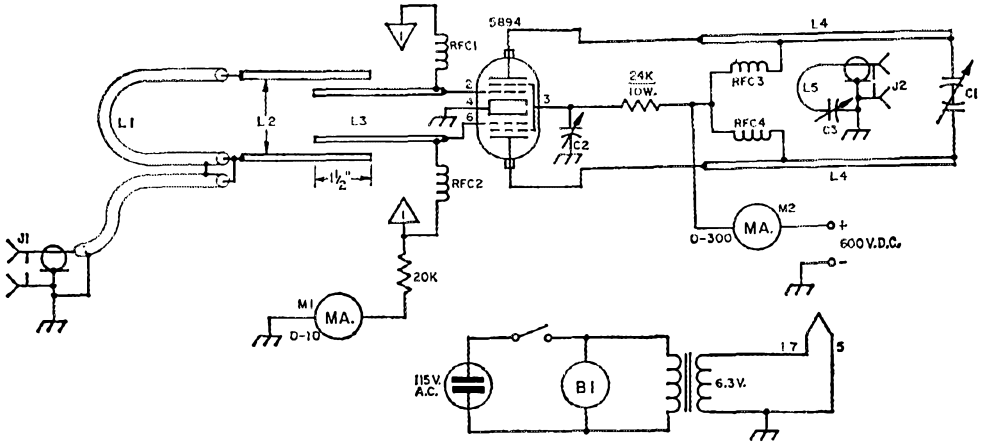


Fig. 1—Circuit diagram and parts information for the 5894 432-MHz. amplifier.

B_1—Motor blower, 3-inch fan (Rotron 2A2).

C_1—10-pf.-per-section split-stator variable, double-spaced (Cardwell PL-6028, Bud LC-1664). Do not ground rotor.

C_2—3-30-pf. compression trimmer.

C_3—5-pf. miniature trimmer (Johnson 160-102).

J_1, J_2—BNC fitting, UG-625/U.

L_1—Coaxial balun, RG-141/U. Loop portion 7¾ inches long.

L_2—Sheet brass strips ½ by 3 inches, spaced ¾ inch.

L_3—Sheet brass strips ½ by 2⅞ inches, spaced ½ inch, except where fanned out to solder to socket terminals.

L_4—Sheet brass strips ½ by 4¼ inches, spaced ¾ inch.

L_5—U-shaped loop, No. 16, 1½ by ⅝ inches.

RFC_1–RFC_4—8 turns No. 20 insulated wire, wound on high-value 1-watt resistor. Grid chokes are at socket terminals, plate chokes approx. 2 inches from plate end of L_4.

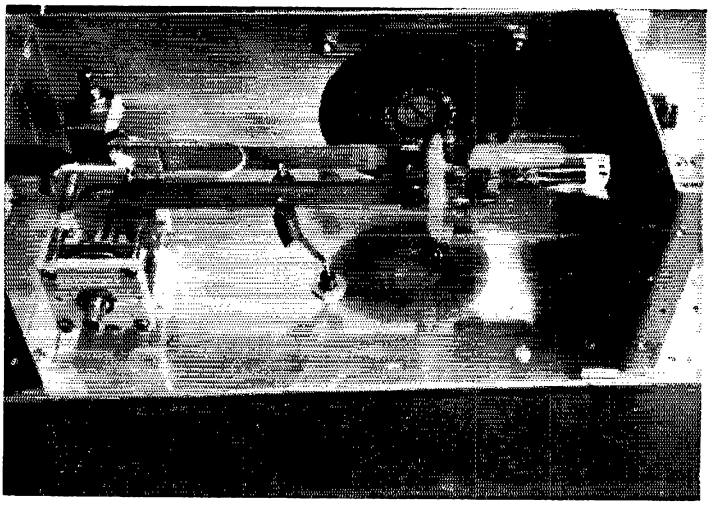


Plate section of the 432-MHz. amplifier.

is not obtainable. The U-shaped section of the balun had to be bent as seen in the photograph, to fit into the grid compartment. Its position is not particularly critical.

An assembly comprising the input lines, the balun and their supports was made on a 2×3-inch aluminum plate. If the mounting hole in the chassis is elongated, the position of this assembly can be adjusted with respect to L_3, for maximum energy transfer. This was not done here, as no trouble was encountered in getting good efficiency with the spacing set as indicated under Fig. 1 — with L_2 and L_3 overlapping 1½ inches. The supports are ceramic insulators 1½ inches high, with brass hardware at the top. The brass strips, L_2, are soldered to the brass screws in the standoffs.

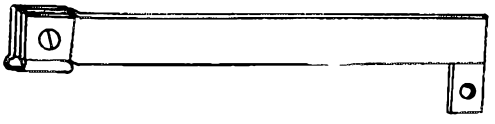


Fig. 2—Plate-line detail.

Adjustment and Use

With a given physical length, width and thickness, as given under Fig. 1, the resonant frequency of L_3 is determined by the spacing between the two brass strips, and by their spacing from L_2. Thus, if all dimensions are approximately correct, optimum energy transfer can be obtained by minor adjustment of these two factors. With drive applied through J_1, and no plate or screen voltage on the amplifier, these spacings can be adjusted for maximum grid current in meter M_1.

Next the screen series capacitor, C_2, should be adjusted so that no change in grid current occurs as C_1 is tuned through resonance. There may be a slight rise at resonance, but there should be no downward dip.

Now power can be applied to the plates and screen, through the meter, M_2. It is best to start with less than maximum voltage, for initial adjustments. With a 50-ohm load connected to J_2, adjust C_1, the position of L_5, and the setting of C_3 for maximum power output. For optimum efficiency, the r.f. chokes through which the plate voltage is fed to the line should be connected as close as possible to the point of minimum r.f. voltage. This point changes with operating frequency, but if the adjustment is made near the middle of the usual operating frequency range the setting will be close enough. The point is found by touching a pencil lead along the line, looking for the point of minimum change in output. Do this with the lowest value of plate voltage that will permit the amplifier to operate properly, and be careful that the pencil is properly insulated, and held in such a manner that you cannot come in contact with the high voltage. If the point of lowest r.f. voltage is found to be at other than that where the r.f. chokes are connected, resolder them to the new spot, and check again.

With 600 volts on the plates, the combined plate and screen current should be no more than about 200 ma. Grid current should be 4 to 5 ma., or more. Output is about 50 watts.

With all shielding in place, a final check for neutralization should be made. With power on, remove the drive for a brief period. Output and grid current should drop to zero. Reset C_2 if oscillation occurs. Make this test only briefly, as the dissipation will be excessive when drive is removed.

In its final form, this amplifier is mounted on a rack panel, on which grid and plate meters are permanently mounted. The chassis is supported two inches back of the panel on aluminum brackets, to make room for the cooling fan and the meters. A dial cord arrangement is used to permit central mounting of the knob for tuning C_1. QST

An Inexpensive

Precise Crystal Oven

Temperature Control to a Small Fraction of a Degree

BY E. E. PEARSON,* W3QY

IRVIN Hoff's article in November *QST*[1] served as the trigger for this piece on a crystal oven. I have been playing around with receivers for WWVB and WWVL and have found that my Valpey 100-kHz. crystal was in need of some temperature stabilization. The oven to be described is similar to several which I have built during the past fifteen years for use in the Engineering Test Lab of Leeds & Northrup Co.

The original objectives for such units were (a) as close control as possible; (b) temperature uniformity in the "work space"; (c) snap-action contacts; (d) minimum control-point drift; (e) reliability; (f) ease of construction and cheapness. Practically all of these characteristics were realized by using two cylindrical vessels, one within the other, with a distributed heater winding on the outer element.

The "vessels" turned out to be ordinary tin and aluminum cans, the outer one being an enameled type originally containing peanut brittle and the inner one a frozen orange juice can. For a heating element I used glass-covered duplex thermocouple lead wire (which has a kind of flat configuration) tightly wound on the outer can, the ends being secured to tie-point connectors. The winding is bifilar to minimize inductive effects when a.c. power is applied. The temperature detector was a mercury thermoregulator (a contact-making thermometer) placed in a suitable bracket on the inside of the outer can. Thermal insulation was provided between the inner and outer cans and outside the latter. That was it!

One such unit in which I placed a brass block and a reference junction, plus oil, produced a temperature stability better than ±0.01 degree C. These devices have given performance up to 15 years or more without any failure or maintenance.

In spite of the use of kitchen items these ovens observe several rather essential thermodynamic principles. The distributed heater provides a high degree of uniformity in heating. The intimate association of the thermoregulator bulb with the inner wall of the can provides excellent thermal coupling and fast response. The inherent sensitivity of the mercury thermoregulator is far greater than that of any conventional bimetallic device and the on and off action is sharply defined. Insulation between the outer and inner cans causes a lag in heat flow which filters out any cycling effect. The inner can has no ultimate alternative other than to assume approximately the basic temperature of the inner wall of the outer can. Anything put into the inner unit gets its heat through the air between it and the walls, to add even more lag. (Although the high degree of uniformity finally attained in the work space is not particularly critical with a crystal, it is of paramount importance in the testing of standard cells, where temperature difference between the legs should be an absolute minimum.)

Fig. 1 shows the general layout. The insulation between the cans was made by carving out blocks of styrofoam to fit the requirements. Circular pieces of ½-inch celotex provide insula-

Really high-accuracy marker frequencies can be obtained from a 100-kHz. crystal oscillator only when the crystal temperature is controlled within close limits.

* 448 W. Clapier St., Philadelphia, Penna. 19144.

[1] Hoff, "The Mainline FS-1 Frequency Standard", *QST*, November, 1968.

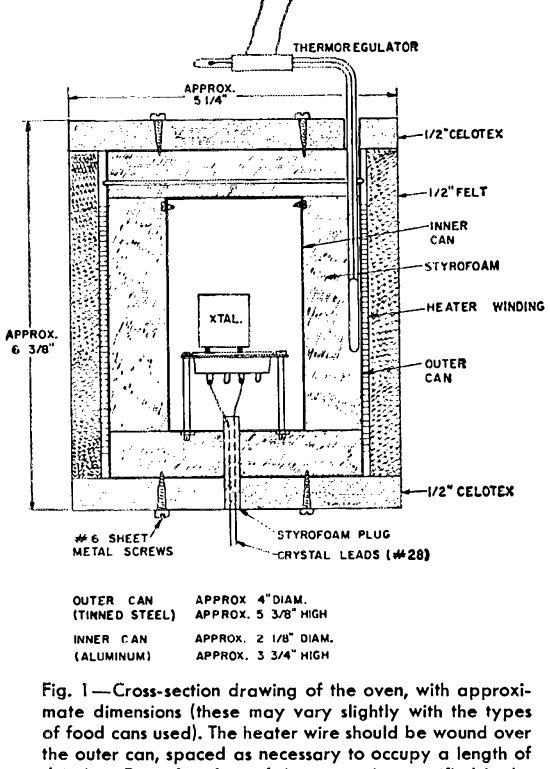


Fig. 1—Cross-section drawing of the oven, with approximate dimensions (these may vary slightly with the types of food cans used). The heater wire should be wound over the outer can, spaced as necessary to occupy a length of 4 inches. Forty-five feet of the type wire specified in the text will be needed. The total resistance is approximately 40 ohms.

tion at the top and bottom of the outer can. A piece of ½-inch thick felt was wrapped and taped around the winding area.[2] The mounting device for the thermoregulator is shown in Fig. 2B.

Leads are brought from the crystal socket through a small plug of styrofoam. The wires should be quite small so as to minimize any thermal transfer from the outer environment to the socket pins, and they should be held at a fixed spacing as they go through the plug in order to maintain the capacitance between them relatively constant.

The relay-control circuit is shown in Fig. 2A. It can be readily understood that the current-carrying capacity of the mercury column is extremely small. The circuit was developed years ago by a colleague at the company and it utilizes a Sigma relay of the a.c. variety having a very high resistance coil. The series and parallel resistors constitute a kind of arc-suppression network. Alternate relay schemes can be used; for example Fig. 4 shows an arrangement using a triode and a d.c. relay of 5000 to 10000 ohms. Solid state relays are probably available — possibly an SCR type (but beware of radio interference!). The important thing is to apply the very minimum of power to the mercury-column contacts.

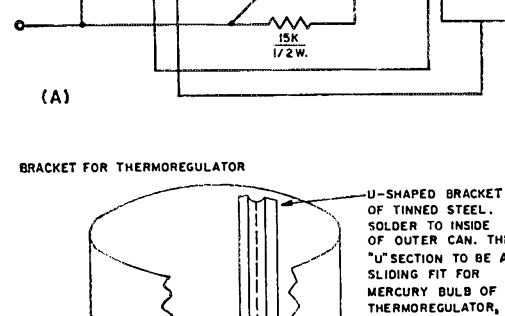
The thermoregulator, shown in Fig. 5, is made by Philadelphia Thermometer Co., 4401 N. 6th St., Phila. Pa. The particular one used on this oven had a control setting of 35 deg. C. or 95 deg. F. The devices can be ordered to any temperature desired. The cost is about $10.

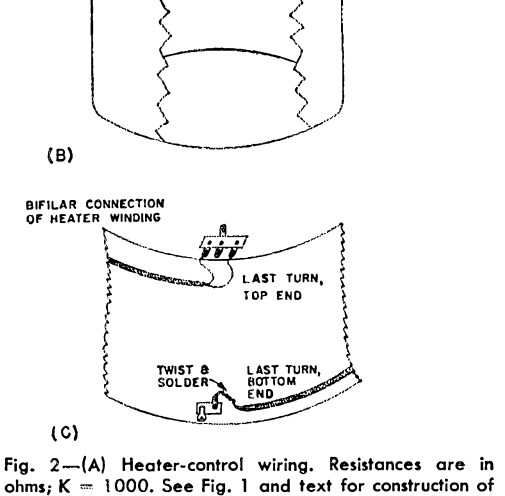
The heating element was never a problem to me since I merely had to "charge out" the wire. It is No. 24 Iron-Constantan TC wire with glass-braid wrap. The L & N designation for the wire is No. 24–50.4.[3] Such wire is probably available from instrument companies other than L & N.

(Continued on page 41)

[2] Felt of this thickness may be hard to find, but a wrapping of ordinary felt cloth obtainable at any dry-goods store can be used instead. It takes about 10 layers to build up to a half inch.

[3] Obtainable from any Leeds & Northrup field office. If none is listed in your Yellow Pages, write Leeds & Northrup, Sumneytown Pike, North Wales, Penna. 19454 for nearest address. The price in small quantities should not be more than ten cents per foot.





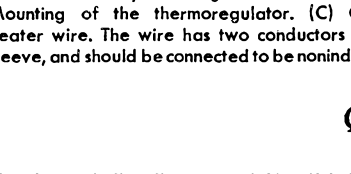


Fig. 2—(A) Heater-control wiring. Resistances are in ohms; K = 1000. See Fig. 1 and text for construction of heater. The relay is a Sigma 41FZ-10000-ACS/SIL. (B) Mounting of the thermoregulator. (C) Connections to heater wire. The wire has two conductors in a fiberglass sleeve, and should be connected to be noninductive as shown.

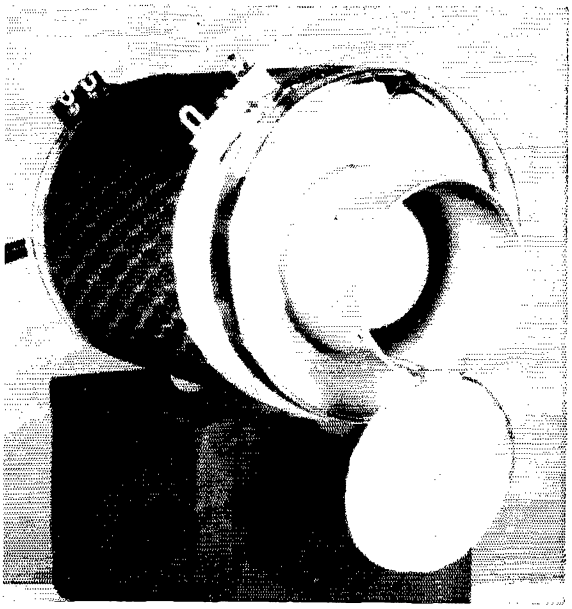


Fig. 3—View of the oven with the top end removed and inner can pulled part-way out. The end of the crystal holder is visible in the can.

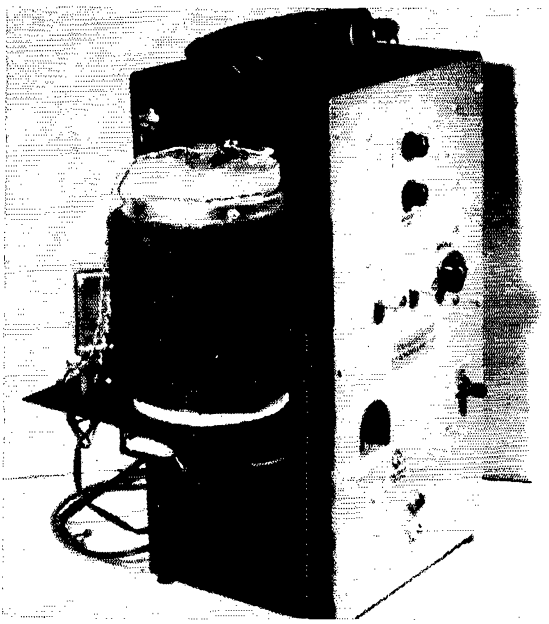


Fig. 6—The oven mounted on the side of W3QY's frequency standard. The shelf supporting the oven also holds the control relay specified in Fig. 2.

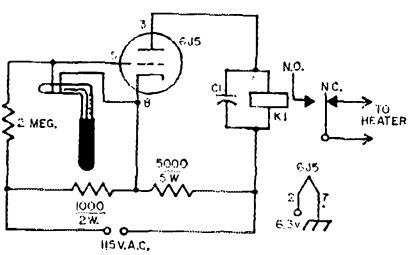


Fig. 4—An alternate relay circuit using a triode tube to control the relay. Keeping the thermoregulator current as low as possible is a primary objective. The coil reistance of K_1 should be of the order of 10,000 ohms. The value of C_1 can be found by trial; it should have sufficient capacitance to eliminate relay chatter, but otherwise is not critical.

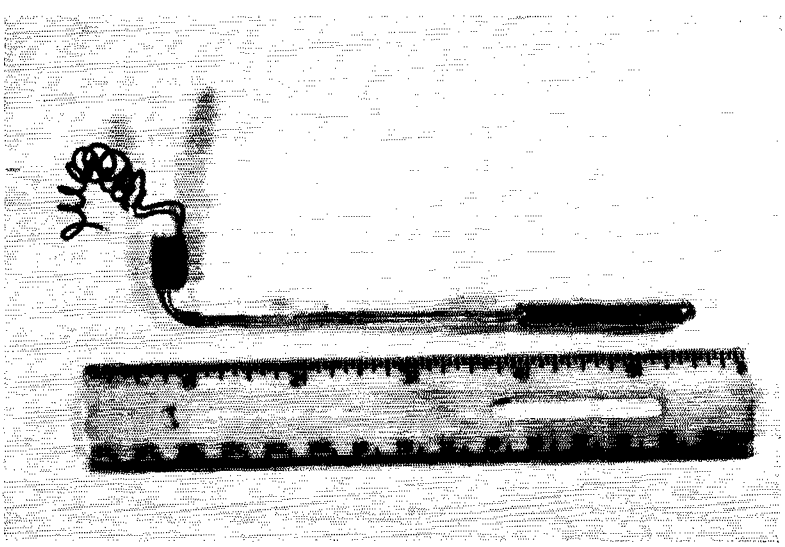


Fig. 5—The thermoregulator, with scale to indicate dimensions.

The Ductopatch

BY NELSON D. LARGE,* W4FQV

THE Ductopatch is a simple phone patch whose cost, whether measured in time, effort or money, is quite low. Construction of the unit is so simple that even the least capable of builders shouldn't be under any strain. And to top it all off, the Ductopatch is inductively coupled to the telephone; there is nothing to be attached to the phone lines.[1]

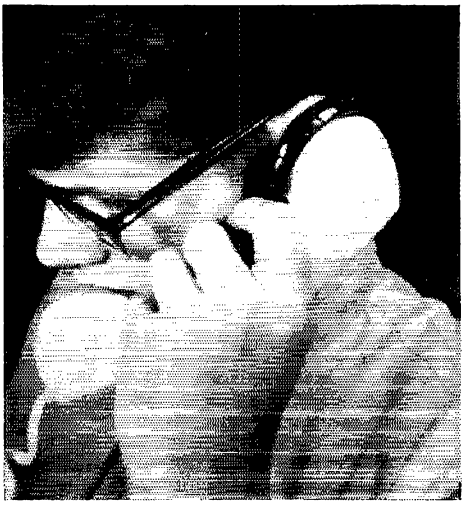
Circuit Description

The basic circuit of the Ductopatch is shown in Fig. 1. L_1 is a coil of wire that has been positioned around the earpiece of a telephone handset, HS_1. When S_{1A} is in the receive position, L_1 inductively couples the audio output of the receiver to the earpiece; however, when S_{1A} is in the transmit position, L_1 inductively couples the audio output of the earpiece to the primary of a step-up transformer, T_1. The secondary of T_1 feeds the audio signal to the microphone input of the transmitter, and S_{1B} provides a spare set of contacts for p.t.t. purposes.

In order to use the basic Ductopatch circuit it is necessary to remove the microphone from the transmitter and plug in the patch. This inconvenience can be eliminated by employing the slightly more complicated circuit of Fig. 2. The use in this arrangement of a four-pole, double-throw, telephone-type switch, S_2, makes it possible to include a microphone jack, J_1, and an appropriate plug to mate with the microphone receptacle on the transmitter. When S_2 is in the receive or the transmit position, the circuit of Fig. 2 functions the same as the basic Ductopatch circuit (the center poles of S_{2A} and S_{2B} move to the contacts on the left while the center poles of S_{2C} and S_{2D} remain as shown). However, in the off position of the switch (the center poles of S_{2C} and S_{2D} move to the contacts on the right while the center poles of S_{2A} and S_{2B} remain as shown), the station functions as though the phone patch weren't present: the transmitter's p.t.t. circuit is controlled by the switch on the microphone, the microphone is connected directly to the transmitter, and the output of the telephone earpiece is not coupled to the receiver speaker.

*4625 Selwood Road, Richmond, Virginia 23234.

[1] At the present time, the Bell System has no technical requirements for indirectly connected phone patches. However, effective January 1, 1970, such devices must meet technical requirements that parallel those listed in Appendix C of the FCC's "Memorandum Opinion and Order" released December 26, 1968. See March 1969 *QST*, page 65.



The coil around the earpiece of the telephone handset provides inductive pickup for the simple phone patch described below.

Because of the limited number of switch contacts in the two circuits just described, it is necessary to operate the receiver speaker when using the phone patch. However, if a four-pole, three-position switch, S_3, is used as shown in Fig. 3, it is possible for the whole phone-patch operation to be carried on in relative quiet. S_{2B} and S_{3C} disconnect the output of the receiver from the loudspeaker and feed the audio directly to the pickup loop, L_1, when the Ductopatch is switched to receive. The rest of this circuit performs basically the same as the arrangement shown in Fig. 2.

Construction

The transformer and switch can be located in the equipment with which the patch is to be used or they can be installed in a small case, Minibox or other enclosure. If none of the small intercom transformers listed in the parts lists is available, an automobile ignition coil may be used instead. However, if this substitution is made, it may be necessary to move the patch around until a position is found where hum pickup is minimized.

S_1 and S_3 are easy to connect, but telephone-type switch S_2 lends itself well to the pitfalls of incorrect wiring because of the structure of the switch and its operation. If S_2 is used, confusion can be avoided by carefully examining the action of the switch and by numbering the contacts on the schematic and the switch.

L_1 is made by winding 40 to 50 turns of No. 14 enameled wire into a compact loop having an inner diameter of about 2½ inches. As shown in the title photo, the loop is protected and held

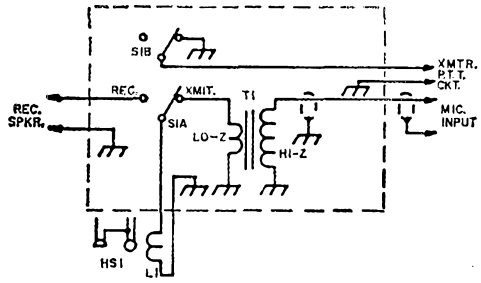


Fig. 1—Basic circuit of the Ductopatch.
HS_1—Telephone handset used for phone patching.
L_1—See text.
S_1—D.p.d.t. switch, any type.
T_1—Intercom transformer, 3.2-ohm primary to approximately 50,000-ohm secondary (Merit A-2923 used; Stancor A-4744, Knight 54 C 1492, Thordarson 20A04, 20A12 and 20A15 suitable). See text.

together by a wrapping of plastic electrical tape.

To avoid hum pickup, shielded cable should be used for the microphone lead. Two-conductor line cord makes for neat connections between the patch and the loop, speaker, and transmitter p.t.t. circuit.

Operation

To use the Ductopatch it is only necessary to make the various connections shown in the schematics and install the pickup loop. To accomplish the latter, slide L_1 over the telephone receiver, varying the loop's position until the point of maximum audio transfer is found. The best coupling point for the Western Electric receiver was found to be close to the rim of the earpiece, while in some Stromberg-Carlson instruments the best signal transfer occurred when the loop was over the receiver, but well toward the handle.

The gain available through this inductively-coupled patch is more than adequate; it is easily controlled by the transmitter or transceiver microphone gain control. However, the operator of a Ductopatch may find that he must reduce his own telephone voice level or hold the telephone slightly away from his mouth so that the signal going to the microphone input of the transmitter is the same level regardless of whether the audio is being generated in the telephone mouthpiece or the telephone receiver.

The Ductopatch has been tried on various transmitters, receivers and transceivers, and it has worked well with all of them. However, if voice-operated control is used, it is necessary to manipulate the patch's function switch in the usual way for push-to-talk operation. Even so, this handy induction-type patch should satisfy the telephone requirements of many amateur stations.

Acknowledgement

My thanks go to John Haun, WA4RRM, who designed the Ductopatch and gave permission to publish the details of same. QST

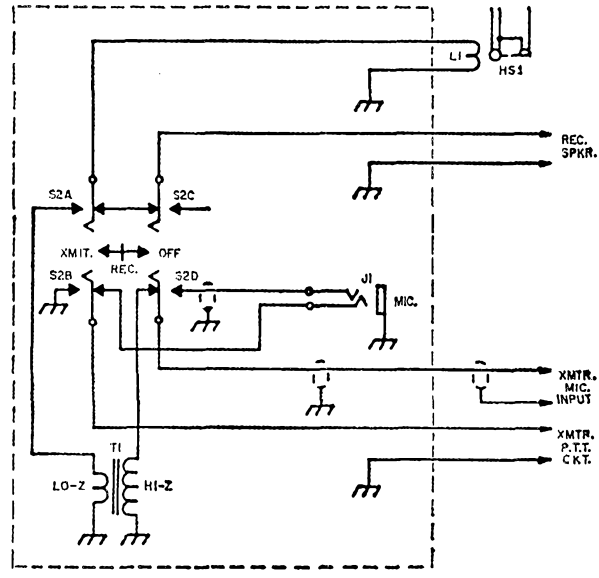


Fig. 2—Ductopatch circuit using a telephone-type switch. Components listed below are in addition to those shown in Fig. 1.
J_1—Microphone jack to mate with existing microphone plug.
S_2—Telephone type, 4 pole, double throw, 3 position.

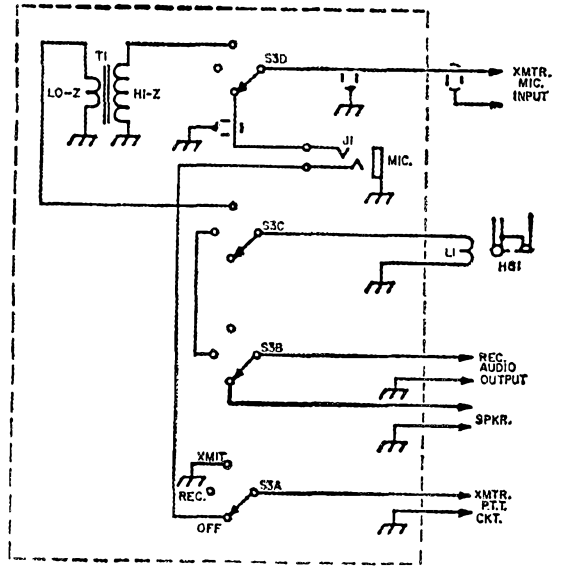


Fig. 3—Preferred Ductopatch circuit for maximum operating convenience. S_3 is a 4-pole, 3 position, lever (Mallory 6243) or rotary (Mallory 3243J) switch. Other components are listed in Figs. 1 and 2.

Regulated Dual Power Supply

Operational Amplifiers for Tight Voltage Control

BY JOHN K. GOTWALS,* W3TNO/9

RECENT drastic price reductions have brought the price of integrated-circuit operational amplifiers[1] ("op-amps") to a point where the radio amateur fraternity will want to consider their use in new circuit designs. As an example, the Motorola MC1439G now sells for $3.60 in unit quantities. A few months ago it cost $11.25! This is one of the better op-amps on the market (Motorola advertises it as "the best IC op-amp yet . . .") with a typical gain of 100,000. The Fairchild μA741C, at $10.51, has some advantages over the MC1439G, but in this writer's opinion not $6.41 worth. The LM201 manufactured by National Semiconductor also is in the same class, performance wise, but like the μA741C, sells for more than $10. Perhaps by the time this article is published, competitive pressures will have lowered the prices of the μA741C and LM201. The experimenter should investigate all three devices in any case.

It turns out that circuits using op-amps are simpler if two power supplies are used, with symmetrical positive and negative d.c. voltages. Likewise, even for discrete transistor circuits, biasing is simpler and drift problems are reduced by using bipolar voltages.[2]

It is the purpose of this article to show how a high-performance power supply can be built simply and cheaply. In fact the total semiconductor cost is under $15 for a plus and minus 15-volt 100-ma. power supply with voltage regulation of 0.05%, ripple less than 2 millivolts, and temperature coefficient of 0.01%/deg. C.

General Theory of Regulated Power Supplies

The block diagram of a typical transistor regulated power supply is shown in Fig. 1. Resistive divider R_2R_3 serves as an output-voltage sampler; i.e., it supplies the error detector with a voltage proportional to the output voltage.

* 419 W. Stadium Ave., W. Lafayette, Ind. 47906

[1] "An operational amplifier is basically a very-high-gain direct-coupled amplifier which uses feedback for control of response characteristics. This circuit can be used to synthesize a broad variety of intricate transfer functions and thus can be adapted for use in many widely diverse applications." Quoted from *RCA Integrated Circuit Fundamentals*, Technical Series IC-40. — *Editor.*

[2] Ashe, "The Secrets of Long-Tail Biasing in Transistor Circuits," *Ham Radio*, April 1968.

Likewise, R_1 and CR furnish the error detector a fixed "reference" voltage. The error detector compares the two voltages, amplifies their difference, and supplies the series regulator transistor with base current. The magnitude of the base current will be such as to *reduce* the difference between the sample and reference voltages. This is an example of negative feedback.

If we assume that the error detector has an infinite input impedance, the following relationship between V_0 and V_1 must hold:

$$(1) \qquad V_1 = \left(\frac{R_3}{R_2 + R_3}\right) V_0$$

But because of the large gain of the error amplifier, the voltage difference between V_1 and V_R will be small. Consequently equation (1) can be rewritten as:

$$(2) \qquad V_0 = \left(\frac{R_2 + R_3}{R_3}\right) V_R$$

Equation (2) shows that by varying the values of R_2 and R_3 we can adjust the output voltage V_0 of the power supply between the reference voltage V_R as a lower limit and the value of the unregulated input voltage as an upper limit.

Another item in Fig. 1 that should be discussed is the current sampler. This is needed only if one desires his power supply to be short-circuit proof. In general, fuses will not act quickly enough to save the series transistor in case of a short circuit on the output.

The current sampler monitors the current drawn from the power supply. If the current exceeds a preset value, the base current supplied to the series transistor will be cut back until the overload is removed. This feature is very simple to add to most power supplies and is well worth

A low-cost "op-amp" simplifies regulated power supply construction and improves performance as compared with discrete-component circuits. The power supply described includes overcurrent protection as well as output-voltage regulation.

the slight extra cost. However, with this type of protection the full unregulated input voltage will be across the series transistor for the duration of the short. Thus the series transistor must have an adequate rating.

In ending this discussion of general properties of regulated power supplies, I would like to point out that the output voltage cannot be any more stable than the reference voltage. If there is ripple and noise superimposed on V_R, this same ripple and noise will appear on the output. However, even if V_R is stable, drift may be introduced by the input stage of the error detector. There are at least two approaches to stable power supplies. One is to have the drift introduced by V_R be exactly cancelled by the drift introduced by the error detector. (For $4.50 an RA1 reference amplifier can be purchased; for details on its application see the 7th edition of the *GE Transistor Manual.*) Another is to use a stable Zener and a stable error detector. This is the approach I have used.

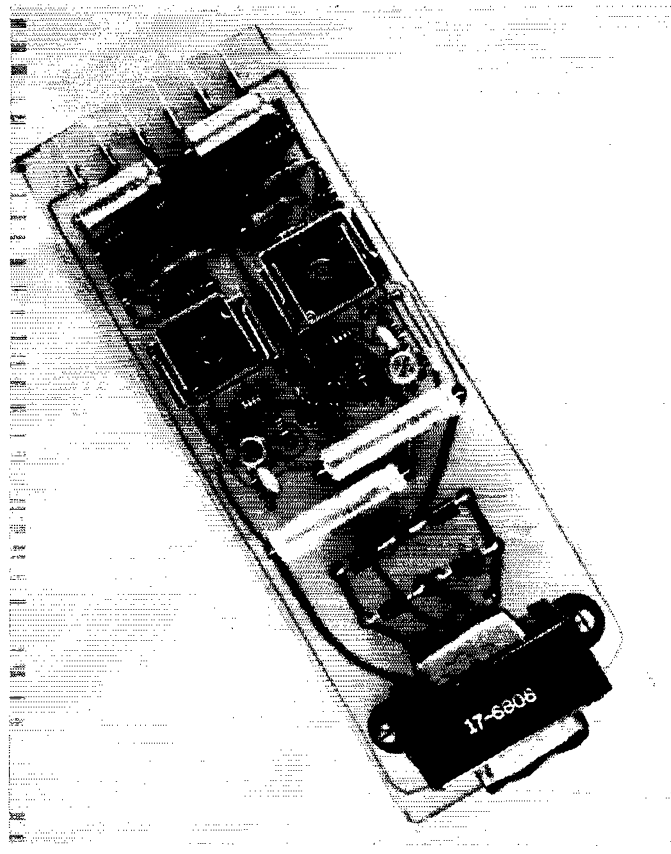
Fig. 2 is the diagram of a high-performance bipolar power supply. We shall discuss only the positive voltage regulator, as the design and operation of the negative supply are identical.

Reference Voltage

The reference-voltage section of the power supply consists CR_5, CR_6, and resistors R_1 and R_4. It has been found that an inexpensive Fairchild 2N3638 p-n-p transistor makes an excellent 6.7-volt temperature-compensated Zener.[3] In my case I bought five 2N3638 transistors and selected the two with the lowest temperature coefficients to use in the power supply. The other three can be used as normal transistors or as Zeners for some other project. As explained by Todd[3], the temperature coefficient is determined by the amount of Zener current. My tests showed this current to be in the range of 2–4 ma. for the lowest temperature coefficient.

Another approach is to substitute a commercial Zener such as a 1N821 for the 2N3638. If a low t.c. is not important no selection or measurement is necessary.

[3] Todd, "Stable, Low-Cost Reference Power Supplies," *Electronics World*, December 1967.



The author's power supply is neatly arranged on an etched circuit board. As the layout is not critical, other types of construction can be used.

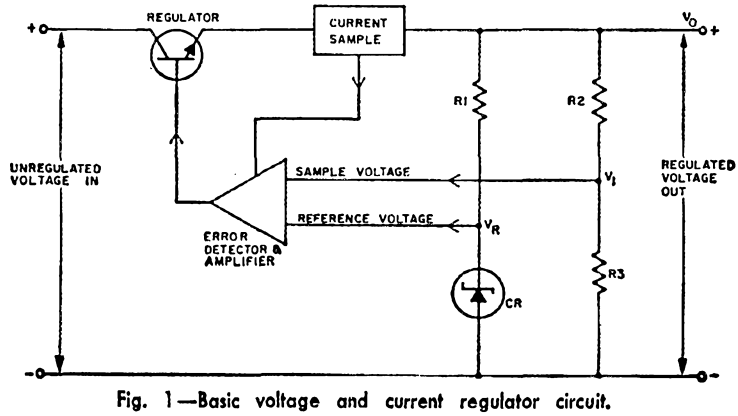


Fig. 1—Basic voltage and current regulator circuit.

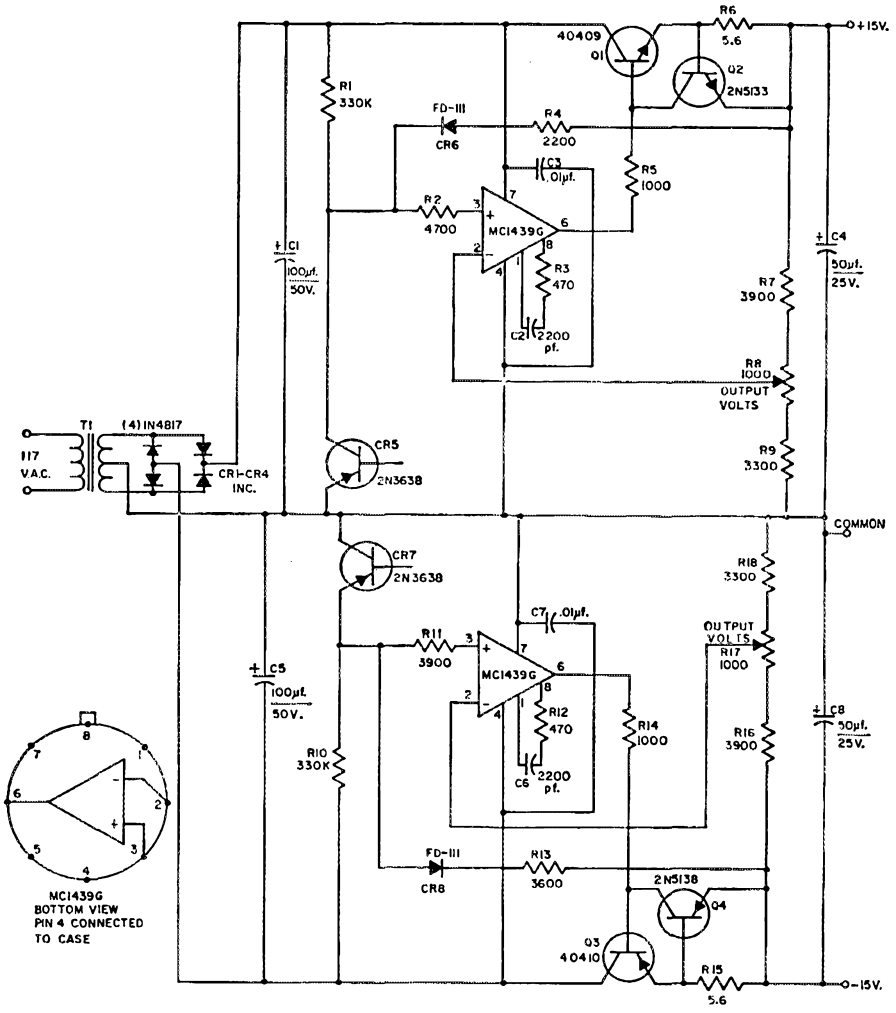


Fig. 2—Circuit diagram of the dual (bipolar) output regulated power supply, with short-circuit protection. (If no part of the circuit is grounded internally, the outputs may be used in series to obtain doubled output voltage.)

C_1, C_4, C_5 C_8—Electrolytic.
C_2, C_3, C_6, C_7—Ceramic.
CR_1-CR_4, inc.—Silicon, 100 p.r.v., 1.5 amp.
CR_5 CR_7—Zener; see text.
CR_6, CR_8—Silicon, 75 v. p.r.v.
MC1439G—Operational amplifier, Motorola.
Q_1, Q_3—Silicon, complementary n-p-n., p-n-p.; $V_{CER\ (SUS)}$, 90 volts; I_C, 700 ma.; h_{FE}, 50 min. at I_C = 150 ma.
Q_2, Q_4—Silicon, complementary n-p-n, p-n-p; V_{CEO}, 18 volts; I_C, 20 ma.; h_{FE} 50 min. at I_C = ma.
R_1-R_8, inc.; R_{10}-R_{15}, inc.—Composition, 10%, ½ or ¼ watt.
R_7, R_9, R_{16}, R_{18}—Wire-wound, any low wattage rating.
R_8, R_{17}—Wire-wound control.
T_1—40 volts center-tapped, 100 ma.

In Fig. 2, R_4 determines the Zener current. R_1 and CR_6 ensure starting of the regulator under any conditions. R_4 and CR_6 could be removed and R_1 used to supply the Zener current. However, this was not done because by using the relatively stable output voltage as a source of current for the Zener, line-voltage fluctuations have almost no effect on the reference voltage.

Error Detector

The error detector and amplifier section of the power supply is the MC1439G op-amp. Power to run it is supplied at pins 7 and 4. C_3 is used to ensure power-supply decoupling of the op-amp. The manufacturer's data sheet specifies the values of the frequency-compensating network C_2R_3. The output of the amplifier is taken from pin 6.

The op-amp amplifies the difference between the voltages applied to its two input terminals. Thus a positive-going voltage at the inverting input (denoted by −) produces a negative-going output. Likewise a positive-going voltage at the noninverting input (denoted by +) produces a positive-going output. Thus this op-amp is nothing but an amplifier with a dif-

ferential input and a single-ended output. Because of its differential characteristics, the MC1439G has such desirable features as low drift and a high power-supply rejection factor. This latter feature means that ripple and voltage changes between pins 7 and 4 have little effect on the output. Op-amps work best when both their inputs see approximately the same resistance, and since the dynamic impedance between the collector of the 2N3638 and the common lead is very low, R_2 was inserted as an approximate match for the resistance in the other input circuit.

Current Limiting

R_6, R_5 and Q_2 give the power supply short-circuit protection. Note that R_6 is in series with the output. In normal operation, Q_2 is not conducting. However, when the output current increases to a point where the emitter-to-base voltage of the 2N5133 is 0.6 volt, it will start conducting. Since the 2N5133 has high current gain, additional current from the op-amp will bypass the base of Q_1 and pass through Q_2. Thus if the load tries to draw more current from the power supply, Q_2 and Q_1 will act as a current regulator and prevent more than 150 ma. or so from being drawn from the supply.

Adapting The Supply To Other Voltages Or Currents

As mentioned earlier, the output voltage can be any value between the Zener voltage and the unregulated input voltage. Just use equation (2) to determine the values of R_7, R_8 and R_9. The maximum voltage limit between pins 7 and 4 is 36 volts in the case of the MC1439G.

To reduce ripple, improve regulation, or increase the output current rating, the following changes could be made.

1) Increase the value of C_1. With C_1 only 100 μf. the ripple across C_1 is 5 volts at a 100 ma. load. For a 1-amp. supply I would suggest 1000 μf. for C_1.

2) Replace the 40409 series transistor with two transistors connected in the Darlington configuration.

Construction

As shown in the photograph, I built the bipolar power supply on a 3 × 8½-inch circuit board. All resistors can be ¼ watt or larger. However, since resistors R_7, R_8, R_9 and R_{16}, R_{17}, R_{18} determine the output voltages, they should be wire-wound types for stability. The Bourns E-Z Trim potentiometers are fine if you want to mount the pot on the board as I did. Sprague's 3-watt Blue Jacket line of miniaturized wire-wound power resistors are small, have low temperature coefficients, and can be used for R_7, R_9, R_{16}, and R_{18}. None of the transistor types are critical, so long as voltage and current ratings are not exceeded. However, the two current-limiting transistors should be silicon types.

Performance

Because of the high gain of the op-amp, the power-supply regulation is quite good. When the output current is varied from zero to 100 ma. the output voltage drops 7 mv. Isolation from the line is also very good. If the current load is 50 ma. and the line voltage is varied from 90 to 130 volts, the change in output voltage is less than 1 mv. Long-term drift of the output voltage is as low as 1 mv. per day.

Acknowledgements

I wish to thank J. B. Ross for providing the picture of the finished power supply, and R. A. Dunham for help in making the printed circuit board. Discussions with R. S. Davey were vital to the successful design of the power supply. QST

An Inexpensive Precise Crystal Oven

(*Continued from page* 35)

As it worked out, the heater had a resistance of about 40 ohms. At 120 volts input this would amount to a load of 360 watts! Actually, it was found that with 12 volts a.c. applied, the control temperature of 95 deg. F. was reached (at an ambient of 74 deg.) with no trouble. A 12-volt transformer (or two 6-volt ones) is usually available around the shack.

Fig. 3 illustrates the winding of the heater and the tie-point connectors. The latter are soldered to the outer can in the positions shown. The inner can is partially removed from the styrofoam insulation and the end of the crystal holder is visible within it. An aluminum cover having two tabs for mounting is also visible.

The completed assembly was mounted outboard on the W3QY frequency standard, Fig. 5. Originally, the leads from the crystal were run into the cabinet and were plugged into the crystal socket, but were too long to let the calibrating capacitor function properly. Ultimately, the 6AQ5 oscillator tube and other associated elements were mounted underneath the oven. The original circuit was abandoned and the circuit presented in Skeen's article[4] was adopted. A 50-pf. variable was mounted on a bracket on the front of the oven bracket. Adjustment using this capacitor was too coarse, so it was shunted by a two-plate midget having perhaps 5 pf. maximum capacitance. None of these components are visible in the photo.

A test run was made to determine the performance of the control system. Temperature of the crystal case was measured by a thermocouple taped to the top surface. At a room temperature of 75 deg. F. it took 3 hours for the temperature of the crystal to stabilize, with 120 volts applied to the heater transformer primary. Once stability was attained the variation in temperature was of the order of ± 0.05 deg. F. The control cycle was 70 seconds on and 40 seconds off. QST

[4] Skeen, "Low-Cost Precision Frequency Measurement", *QST*, January, 1965.

Interference Prevention for V.H.F. Repeaters

Transmitter Cut-off Circuit for Off-Frequency and Over-Deviation Input Signals

BY GILBERT J. KOWOLS,* W9BUB

Two common causes of unsatisfactory quality of voice transmissions through a v.h.f. f.m. repeater are excessive deviation and off-frequency transmission. The simple device to be described will cut off a repeater receiver if signals having either of these undesired characteristics are fed into it.

We can think of this device as a "window." Any signal outside the window no longer activates the receiver. The transmitter carrier frequency should be at the center of this window, as seen in Fig. 1. As modulation is applied the carrier deviates around the center frequency in a symmetrical manner. If the deviation is too wide, distortion results. If the center frequency is not in the center of the window, the signal is also distorted. Both effects are familiar to operators of f.m. repeaters, and the CFAR repeater, on the air continuously since January, 1955, in Chicago, one of the busiest metropolitan areas served by an f.m. repeater, was plagued by them frequently until this window device was installed.

The CFAR repeater turns on whenever a signal is of sufficient strength to cause quieting of its receiver, so there was a need for some way of turning off the receiver whenever it picked up a signal that was more than 3 kHz. off the intended center frequency, or was deviating more than 15 kHz. A simple solution to this problem is shown schematically in Fig. 2. Its operation is based on the fact that the discriminator current in an f.m. receiver is zero when a signal is centered in the receiver passband, but rises if the signal is mistuned. All that is needed, then, is a d.c. amplifier to raise the discriminator current to a level that will operate a relay to cut off the repeater receiver.

Observations at the repeater site showed that, in the Motorola Sensicon receiver, nearly all interference came from signals that produced 10 microamperes or more of discriminator current, so the circuit was set up to respond to this value of current. With no signal, there is no discriminator current. There is still no current when a signal centered in the passband is received. When the signal is modulated, the output of the discriminator is audio, around a zero level, if the signal is on frequency. The filter, R_1C_1, removes audio above 15 Hz. from the cut-off circuit, without affecting the operation of the receiver and the system.

When an off-frequency signal is received that is within the receiver passband, current is produced in the discriminator in proportion to the amount that the signal is off-frequency. If the current is positive it turns on the first transistor, Q_1. This turns on Q_4, whose emitter current then actuates the normally-closed relay, K_1. These contacts are in series with the repeater transmitter control. When they open, the energizing signal for the transmitter is removed, and after the *ON* delay built into the transmitter is passed, the system will drop. If the transmitter was not energized to start with, the open contacts will prevent it from starting up. Thus the system prevents an off-frequency signal from starting the repeater, or will cut it off if an off-frequency signal takes over the receiver.

If the signal is off-frequency in the other direction, the discriminator current is negative, and transistor Q_2 will be turned on. This turns on Q_4 as before, and operates the relay to shut down the system. The selection of the three resistors, R_3, R_4 and R_5, will balance the gain so that a given distance off frequency in either direction will produce the same discriminator current. The value of R_1 and the setting of R_2 serve to control the drive signal to the circuit, and thus set the current level which will energize the relay, while the gain of the circuit remains constant.

It must be realized that R_1 and C_1 do not make a perfect audio filter. Some audio leaks through, and the sum of off-frequency current and the attenuated audio causes unsymmetrical

* ARRL Advisory Committee on V.H.F. Repeaters, and Trustee of the CFAR Repeater. 216 Belle Plaine Ave., Park Ridge, Illinois, 60068. Information originally in *Mike Sky*, published by Society Radio Operators, Vol. 28, No. 5.

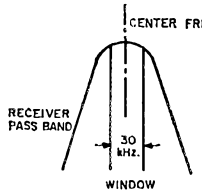


Fig. 1—The "window" concept. The selectivity curve of the receiver slopes, becoming wider for strong signals. The device described effectively establishes a window, 15 kHz. either side of the center frequency. Any signal deviating more than 15 kHz., or more than 3 kHz. off the center frequency, is rejected.

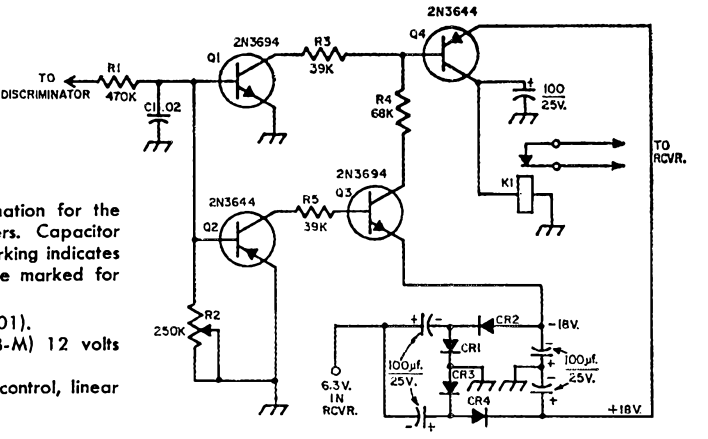


Fig. 2—Circuit diagram and parts information for the 30-kHz. window for v.h.f. f.m. repeaters. Capacitor values are in microfarads (µf.). Polarity marking indicates electrolytic. Parts not described below are marked for identification in text.

CR_1-CR_4—1-amp. rectifier (Motorola 1N4001).

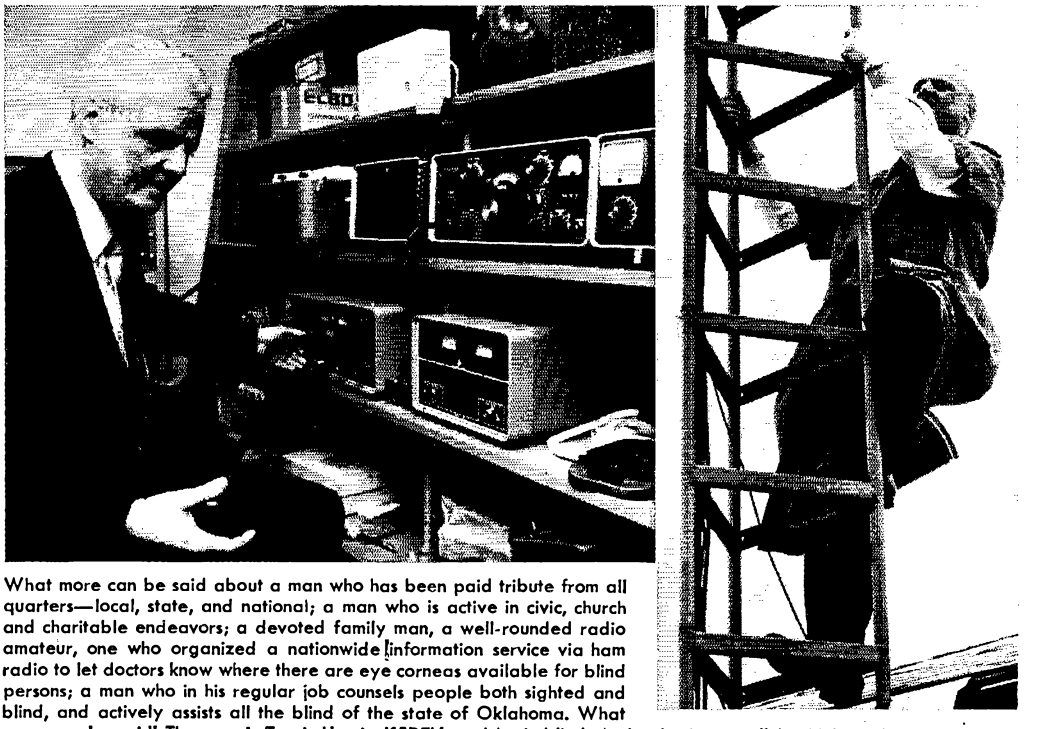
K_1—Miniature reed relay (Dunco MRR-1B-M) 12 volts d.c., 576 ohms.

R_2—250,000-ohm miniature trimmer-type control, linear taper (Mallory MTC-4).

drive to the circuit, and actuates the relay. The final factor to add in is that modulation in excess of normal (in this case 15-kHz. deviation) causes the discriminator to become overloaded, and its output "kicks." This kick is added to the above factors, and further encourages operation of the relay, to prevent over-deviation of the repeater transmitter.

The operation of the transistor circuitry is very fast, and the relay is a miniature reed type, with an operating time of milliseconds, so circuit response is almost instantaneous. At the most, less than a second of offending signal will be heard through the repeater. The unit was built on a circuit board, 3½ by 4½ inches, for attachment to a Motorola Sensicon-A Receiver. QST

Strays



What more can be said about a man who has been paid tribute from all quarters—local, state, and national; a man who is active in civic, church and charitable endeavors; a devoted family man, a well-rounded radio amateur, one who organized a nationwide information service via ham radio to let doctors know where there are eye corneas available for blind persons; a man who in his regular job counsels people both sighted and blind, and actively assists all the blind of the state of Oklahoma. What more can be said! The man is Travis Harris, K5DZV, and he is blind. An inspiration to all, he thinks nothing of working in his shack or on the antenna atop his tower. Hats off to this fine citizen and radio amateur.

Technical Correspondence

LINEAR AMPLIFIER FROM SURPLUS PARTS

Technical Editor, *QST*:

I thought maybe you would be interested in knowing the results of at least one person who reads your articles — "A Low-Cost 700-Watt Linear Amplifier" in February 1966 *QST*, and "Use Surplus and Save," October 1967 *QST*. I didn't follow the diagram exactly, but made a few changes. A cooling fan, antenna relay, commercially-built cabinet and a voltmeter were added. Figs. 1 and 2 show the results.

I didn't do as well as your "under $100," price-wise, but I'm satisfied. The total cost was less than $105. After spending $68 of that for the cabinet, tubes and panel meters, you can imagine the use I made of my junk box and a local surplus store. The plate power supply is separate and contains a three-dollar surplus transformer, 6 silicon rectifiers (37½¢ each including transient voltage capacitors and equalizing resistors — advertised in *QST*), and

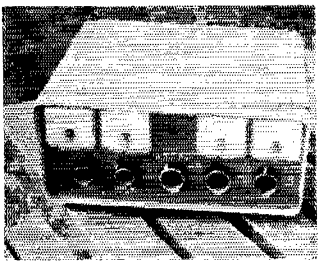


Fig. 1—External view of the 700-watt linear amplifier as constructed by WA3GYH. The power supply is contained on a separate chassis.

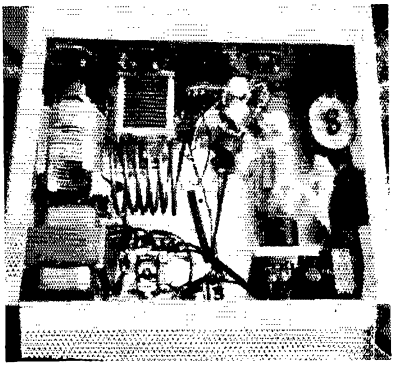


Fig. 2—The inside of WA3GYH's linear amplifier. The p.a. is a pair of 572B tubes in a grounded-grid arrangement. For horizontal mounting of the tubes, filament pins 1 and 4 should be positioned in a vertical plane.

8 pairs of 125-μf. 350-volt filter capacitors (also from a *QST* ad at 50¢ each).

The prices of some of the other items, all surplus, were: fan, $4.95; filament transformer, 50¢; antenna relay, 75¢; and band switch, 25¢. My high-voltage capacitors were removed from old TV sets; filament and plate chokes were home-made. Most everything else is from the good old junk box.

Thanks for the help. — *Marvin Johnson, WA3GYH, 6301 Carson Ave., Oxon Hill, Md. 20021.*

CORROSION IN AMATEUR EQUIPMENT

Technical Editor, *QST*:

For a number of years I have been an active ham, learning, reading, displaying much incentive. I find that there is a prominent lack of material on the subject of corrosion. As a matter of fact, with the exception of a paragraph or two within an article about antennas or other apparatus, it seems that corrosion is not mentioned at all.

I realize that a lot of hams have environment-controlled and dehumidified shacks; most of us, though, lack this luxury and as a result must suffer under the burden of decomposing equipment. This is not to say that our stations suffer crass rust; I am a chemist and not an electrical engineer, as your readers appear to be, so I can view this problem as it should be viewed.

I feel that corrosion may be the biggest problem that most hams will face in this age of store-bought equipment. I suspect that problems stemming from oxidation of equipment are also the most difficult to trace down. A difficulty that clears up intermittently or in response to "banging" the equipment should stem from a corroded connection. Wires that don't "take" solder well are usually coated with some kind of oxide. I think we are going to have more problems with corrosion as transistorized (i.e., low voltage) equipment becomes popular. Corrosion does not only mean oxidation, it applies to all forms of deterioration. Smog-bound parts of the country are likely to suffer from a number of active chemicals in the air.

I don't think there is an effective method of preventing corrosion. The solution to the problem is to expect the corrosion and include a program of oxide removal as part of regular maintenance. An annual polishing of relay contacts and headphone plugs should eliminate a lot of mysterious static and signal loss. How about letting us know how this is properly done? How do you clean the insides of tube sockets? Jiggling the tube works, but what is the super-good mil.-spec. way? I hope someone will provide some answers and guidelines to aid us "appliance ops." A short article or two on cleaning up rigs should be well received. — *Cory Hamasaki, KH6FHN, 2014 Round Top Terr., Honolulu, Hi. 96822.*

25 KHZ. FROM THE TINY FREQUENCY STANDARD

Technical Editor, *QST*:

I am writing with reference to the article, "A Tiny Frequency Standard With Big Ideas," by Pattison, in March 1969 *QST*. Refer to Fig. 2 of that article. The arrow labeled "25 kHz." will not provide 25 kHz. in the schematic shown. The three HEP 583 IC's, starting with the "25-kHz." IC and the next two ending with the IC at output C is a 5-times divider and divides the output B (50 kHz.) by 5, producing 10 kHz. *Any* output in this chain (5-times divider) is 10 kHz.

To obtain a 25-kHz. signal, it is necessary to ground terminals 1 and 3 of the 25-kHz. output HEP 583. This produces a 2-times divider which gives the desired 25-kHz. output. This can be done without endangering any of the HEP 583 units in the 5-times divider chain.

The selector switch, S_1, can be modified (or changed) to automatically ground terminals 1 and 3 of the 25-kHz. HEP 583 when in the 25-kHz. position. I built one of these units and found the above to be true. — *Edwin L. Clark, W2NA, Box 181, Waretown, N. J. 08758.*

TOUCH-CONTROLLED BREAK-IN FOR C.W.

Technical Editor, *QST:*

Though he may not have realized it, W7BZ's electronic paddle in April 1969 *QST* (Gimmicks and Gadgets) has offered a very simple solution to the problem of instantaneous break-in on c.w. Until now, there have been two main ways to have instantaneous break-in with the receiver on the same antenna — an r.f. actuated t.r. switch, or a key-actuated relay. A good t.r. switch is, at best, a generator of harmonics on the feed line, and a noisy cross-modulator ahead of the receiver front end. A key-actuated relay cannot faithfully follow keying, and usually generates wide-band clicks on make if not on break. While a straight key can be built which functions as a properly sequenced t.r. switch, a ham who wants to use a bug or electronic keyer often has no recourse but to flip a toggle switch whenever he wants to transmit.

Experiments in my shack with photoelectric relays, capacity-operated relays, and microswitches have yielded only bulky, inconvenient affairs. But the principle of W7BZ's solid-state paddle can be utilized to design a simple, foolproof method of closing the antenna relay and disabling the receiver before the signal gets out of the oscillator. The trick is that the finger touches the key a time long enough before the key contacts close to give the t.r. relay a chance to close.

A simple modification to your bug or paddle is all that is necessary. Coat each side of the paddle with a thin conducting material (aluminum or copper foil, some types of paints, etc.) and connect a wire from this material to the base of the input transistor in the d.c. amplifier string. See Fig. 3. Depending on the construction of your table and chair, you may not need a ground plate. The amplifier should be shielded against r.f., and good insulation should be used on the ultrahigh-impedance input wire. If you tend to let go of the key while a signal is still going out (while a dash is completing itself), a capacitor across the coil of K_1 will effect a delay in the opening time, without affecting the closing time. — *John A. Foster, WB4BFB/3, Swarthmore College, Swarthmore, Pa. 19081.*

ANTENNA DIMENSIONS IN METRIC UNITS

Technical Editor, *QST:*

It seems silly to measure antenna elements and tuned feedlines in *feet* when we talk only in *meters* for wavelengths. Since we start with frequency, it is so simple to figure wavelength in metric units by dividing 300,000 by kHz. or 300 by MHz. Want to be really precise? Then use 299,776, or 299.776. But the answers come out directly, easily measured off with a tape which is already in the same language. Also, it is thereupon much easier to apply the 95% or applicable velocity factor for a real wire antenna, and, again, to measure.

Metric steel roll-up tapes are easy to buy these days. I have a combination tape, three meters by millimeters on one edge, inches and feet by sixteenths on the other, from Edmund Scientific Co.[1] These are available for about the same low price as feet and inches only. Pure metric tapes are also available.

As a kicker, know ye, know ye, all electrical units are already in metric units (amperes, volts, ohms, farads, henries). What can anyone say to this common-sense thesis, therefore? — *Temple Nieter, W9YLD, 707 Sheridan Rd., Evanston, Ill. 60202.* QST

[1] Edmund Scientific Co., 100 Edscorp Bldg., Barrington, N. J. 08007. The 1969 Edmund catalog lists only a 2-meter (6½-foot) tape of this type. — EDITOR.

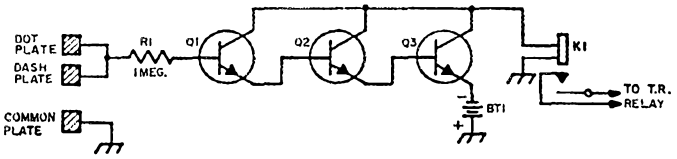


Fig. 3—Schematic diagram for obtaining touch-controlled c.w. break-in. See text for details of the three plates.

BT_1—9- to 27-volt battery, depending on relay used. See original QST article.

K_1—Miniature normally-open s.p.s.t. reed relay, 10-ma. coil (Kidde Doranic 24MM-2C, James Electronics RC-6603, or equiv.).

Q_1—Q_3 incl.—2N697 or similar silicon n-p-n transistor.

R_1—1-megohm, ½-watt composition.

Strays

Trinity Evangelical Lutheran Church, Bogota, N. J. is well represented by hams — W2AHO, The Reverend Walter C. Martin, is its pastor, Douglas W. Campbell, W2JDC, is its president, and the congregation includes W2MQI and WN2IPU!

During the annual OOTC QSO Party, Soupy, W5NW, worked all three Mumford brothers — Bill, Royal, and Hal; W2CU, W3CU, and W6CU! Shortly afterwards, in succession, he worked VK5GN, George, VK3GN, George, and W6AV, George!

Hints and Kinks For the Experimenter

A.C. CALIBRATION OF VTVMs

IT's easy to obtain adequate d.c. calibration of a v.t.v.m. because you can depend on the voltage of a brand new flashlight cell. However, a.c. calibration is a different matter, since a known a.c. voltage is hard to come by. The line voltage, which is usually recommended, isn't satisfactory because it may be anywhere from 110 volts to more than 120.

A simple solution is to connect a silicon diode in series with a low-leakage filter capacitor (be sure to tie the positive side of the electrolytic to the rectifier cathode) and put the combination across the a.c. line. Using the d.c. calibrated v.t.v.m., measure the voltage across the capacitor. Divide this d.c. voltage by 1.41 and you will find the line voltage to a high degree of accuracy. For example, if the capacitor charges to 162 volts, the line voltage is 162/1.41 or almost exactly 115 volts. — *Wilson Doty, WA4DID*

DESOLDERING AIDS

A VERY effective and inexpensive solder-sucker can be fabricated by inserting a two-inch length of Teflon spaghetti into a small ear syringe. The tubing must fit tightly in order for the device to work properly. Solder that sticks inside the tubing may be removed very easily by running a small gauge wire through the tubing. — *Charles E. Wallace, W1IIB*

—•••—

When unsoldering components from printed-circuit boards, hold the end of a piece of small diameter, untinned braid (from coaxial cable) to the connection to sop the solder. Where large amounts of solder are involved, drag an inch or two of braid through the melted solder. Then snip off the braid containing the solder and continue. Prior to sopping, dip the braid in soldering flux to insure that the solder will adhere to it. After all the solder is removed, clean the board with a good flux remover. — *Stanley G. Blair*

ANTENNA RELAY BOX

ANTENNA relays aren't included in many transmitters and linear amplifiers, and they aren't needed if separate antennas are used for receiving and transmitting. However, if a single antenna is to be shared by transmitting equipment that lacks a relay and by a receiver, some sort of antenna switching device must be provided. A suitable unit — in this instance a relay box — is shown in Figs. 1 and 2.

The relay used is a plug-in type. An octal socket for the relay is bolted to rubber grommets that are inserted in holes in the top side of a 2¾ × 2⅛ × 1⅝-inch Minibox (Bud CU-2100A).

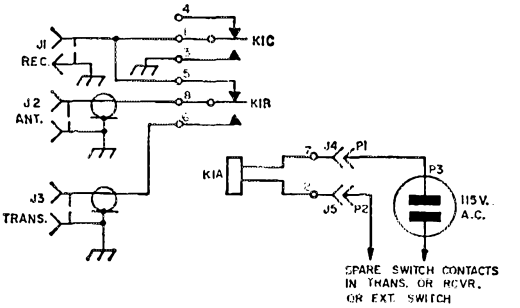


Fig. 1—Schematic diagram of the relay box.

J_1—Phono jack.
J_2, J_3—SO-239 chassis fittings.
J_4, J_5—Insulated binding posts.
K_1—D.p.d.t. 115-volt a.c. relay with 5-ampere contacts (Advance GHP/2C/115VAC).
P_1, P_2—Insulated banana plugs.
P_3—Male a.c. connector.

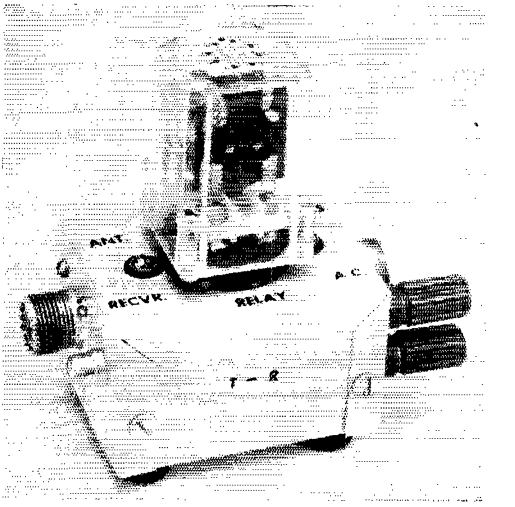


Fig. 2—W1NPG's relay box.

This method of mounting helps to muffle the sound generated when the relay contacts close. SO-239 fittings for antenna and transmitter connections are mounted on sides of the box as are binding posts for the a.c. connection and a phono jack for the receiver lead. All wiring is done with lengths of shield braid. Rubber feet on the base plate prevent the unit from scratching the surface on which the unit is placed.

The relay box is controlled by completing the 115-volt line to K_{1A}. A set of spare switch contacts in the transmitter or receiver can be used for this purpose, or an extra switch can be employed. — *W1NPG*

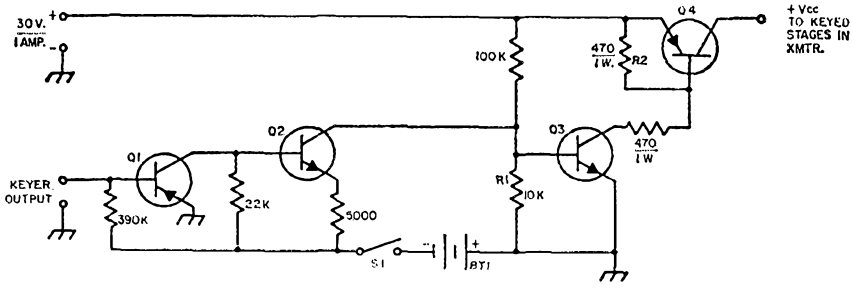


Fig. 3—Schematic of the high-current switch. Resistances are in ohms; K = 1000; resistors are ½-watt composition unless noted otherwise.

BT_1—9-volt transistor battery.
Q_1—RCA SK3004 or equivalent.
Q_2—RCA SK3020 or equivalent.
Q_3—RCA SK3024 or equivalent.
Q_4—RCA SK3009 or equivalent.
S_1—S.p.s.t. toggle.

HIGH-CURRENT SWITCH FOR A SOLID-STATE KEYER

EVER since I began experimenting with solid-state transmitters, a nasty problem has been haunting me: without using a relay, how could I key my rig with an electronic keyer that uses solid-state switching in its output?

My transmitter, which uses negative ground, draws about 1 ampere at 30 volts, and all of the stages, with the exception of the v.f.o. and source follower, are keyed simultaneously. However, my keyer uses a 2N398B output switch that requires for proper operation a negative voltage of low current. In order for the rig and keyer to be compatible, I developed the circuit shown in Fig. 3.

When the key is closed, Q_1 and Q_2 are cut off because they aren't forward biased. The voltage developed across R_1, as the result of the resistor being part of a voltage divider across the 30-volt supply, biases Q_3 into conduction. Q_3's collector current flows through R_2, turning on Q_4, which in turn keys the rig. When the key is opened, Q_1 conducts, biasing Q_2 into conduction. Q_2's collector current flows through R_1 in the opposite direction of the way the divider current flows, and it is greater than the divider current. As a result, the polarity of the voltage drop across R_1 is reversed. This cuts off Q_3 and Q_4, turning off the transmitter.

The negative nine volts for the 2N398B in the keyer, as well as for Q_1 and Q_2, is supplied by a transistor radio battery, and the total current drain is only about 4 ma. The transistors were chosen because they were available locally; many others will work as well at less cost. The SK3009 was mounted with its mica washer directly on the transmitter chassis, and the remainder of the circuit was built on a piece of perforated board about two inches square. — *Richard R. Lucas, W3WSQ*

A-2515 HINT

THE Allied A-2515 receiver reviewed in February *QST* is an excellent unit. However, the one received here had a number of strong spurious signals in the 0.9- to 15.5-MHz. range, with one or more such signals present in the 3.5-, 7- and 14-MHz. amateur bands. By examining a list of the spurious frequencies it was determined that the signals were harmonics of the 455-kHz. b.f.o. The output waveform of the oscillator was examined and found to be sinusoidal, indicating that the harmonics were probably the result of the detector being overdriven.

A simple cure was effected by reducing the output amplitude of the b.f.o. A 9000-ohm resistor was added in series with the b.f.o.'s 2200-ohm collector resistor, R_{219}, and the 9-volt regulated supply. This reduced the b.f.o. collector voltage from 8 to 5 volts, thus lowering the r.f. output of the stage. Now my receiver has no spurious outputs, and the b.f.o. works just as well in its intended function as it did before. — *Sampson P. Holland, Jr., W3RDA*

NOTES ON THE MARCH *QST* FREQUENCY STANDARD

RECENTLY I built a duplicate of the frequency standard described in March *QST* by W7EFV.[1] The performance of the little device was outstanding, except for one serious drawback: because heavy capacitive loading of the crystal oscillator occurred when switch S_1 was turned to the 100-kHz. position, the frequency of the oscillator shifted from what it was when S_1 was in the 50-, 10- and 5-kHz. positions. At 28 MHz. the error was about 4 kHz.

Should one zero beat the standard against WWV as suggested in the text, a significant error in frequency measurements could result, and the user might inadvertently operate outside of an amateur band. To overcome the problem I inserted a 6.8-pf. capacitor between point A on the HEP 580 and point A on S_{1B}.[2] This minor change completely eliminated the frequency shift. — *G. R. Pearce, G3AYL/4*

[1] Pattison, "A Tiny Frequency Standard With Big Ideas," *QST*, March, 1969.

[2] In a letter recently received at Headquarters, W7EFV recommends a similar change.

Ham Radio at The Jamboree

BY PERRY [illegible], WIUED

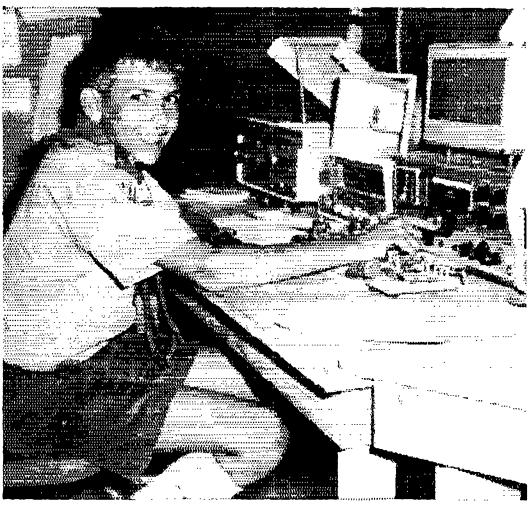
Novices: Look for K2BFW/7, hq. station of the Boys Life Radio Club (operating from the BL tent at the Jambo) in the 80, 40 and 15 meter Novice bands.

AMATEUR radio and shortwave listening will be prominently featured at the National Jamboree of the Boy Scouts of America July 16 through July 22, 1969. The site is Farragut State Park, Idaho (home of K7GS in 1965 and K7WSJ in 1967) and the call this year is KF7BSA. Probable hours of operation, beginning about July 14, are 1600 to 0500 Greenwich Mean Time, mostly with Scouts at the keys and mikes, up to three rigs at a time.

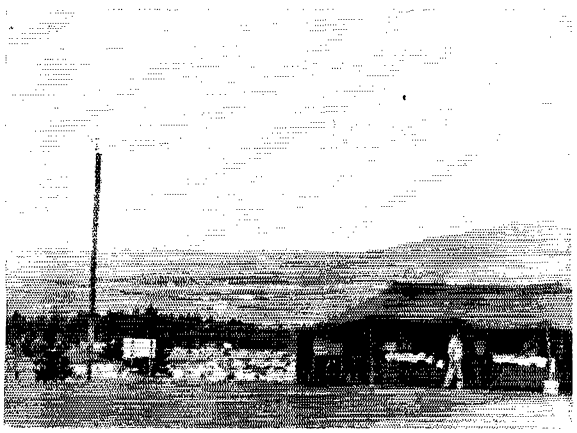
KF7BSA QSO Freqs.		*Traffic Freqs.†*	
C.w.	*Phone*	*C.w.*	*Phone*
3590 kHz.	3940 kHz.	3590 kHz.	3970 kHz.
7050	7240	7040	7280
14080	14290	14040	14280
21140	21360		
28190	28990		

†*Important:* No messages will be handled by KF7BSA; instead, amateurs in eastern Washington and the "Panhandle" of Idaho have volunteered to act as a message center for the Jamboree, relaying into the park through v.h.f. f.m. repeater station W7AAG. Use NTS, ISSBN, [illegible]CARS — or call CQ BSA on the traffic frequencies listed above to get the attention of the Spokane area hams. Messages going to Scouts and leaders at the Jamboree must include subcamp name and troop number in the address. Special full-color QSLs will be sent through bureaus. Yours can be sent to ARRL, Newington, Ct. 06111 — please, use GMT only. QST

*Jamboree operator, c/o ARRL Hq.



At the 1967 World Jamboree, Scout Gary Giles of Ottawa takes a listen.



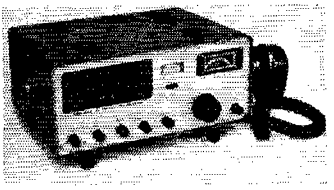
The 1969 BSA Jamboree is being held at the site of the 1967 World Jamboree—Farragut Park, Idaho. The QTH for KF7BSA, therefore, will look much like this photo of K7WSJ two years ago.

David Lee Thompson, an s.w.l. from Brampton, Ontario, reads a message into the two-meter f.m. rig for relay through W7AAG, the repeater on Mt. Spokane.

Recent Equipment

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

The HW-17A 2-Meter Transceiver



A well-known transceiver introduced in the early 1950's is often credited with having "made" the 2-meter band. If this is true, the HW-17A could breathe new life into the a.m. activity picture on 2 meters. The HW-17A transmitter is capable of up to 15 watts output, enough for respectable home-station performance, and several decibels above the average 2-meter mobile or portable rig.

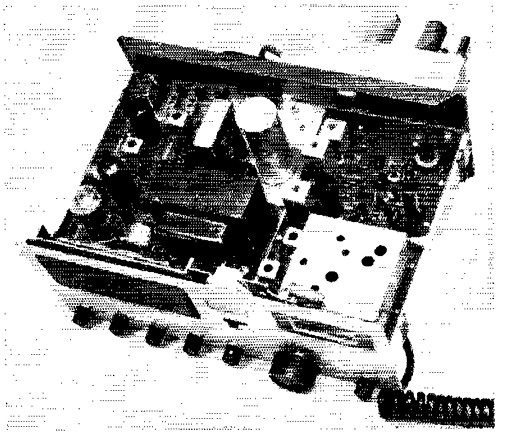
Basic Design

Receiver: The "front end" of the HW-17A receiver is a preassembled tuner, with junction FETs (Q_1, Q_2, in Fig. 1) in the r.f. and mixer stages. The oscillator, Q_3, tunes a 5-MHz. range, 24.695 MHz. below the signal frequency. (This puts the image frequency range between 93.27 and 98.27 MHz. If you have local f.m. stations therein you'll hear them!) The tuner output, at 24.695 MHz., is fed to a second mixer, Q_4, which has crystal-controlled injection from Q_5 on 26.695 MHz. Two i.f. amplifier stages, Q_6 and Q_7, build up the 2-MHz. output of the second mixer, and are followed by diode detector and noise limiter stages, and an audio amplifier, Q_8. All these, and the squelch amplifier, Q_9, and the squelch gate, Q_{10}, are on the receiver etched-circuit board.

Transmitter: A second circuit board carries most of the transmitter. Its design will be familiar to vacuum-tube oriented v.h.f. enthusiasts. The pentode portion of a 7059, V_{1A}, is a crystal-controlled oscillator-multiplier. Normally 8-MHz. crystals are used, with the plate circuit tripling to 24 MHz. The writer found that 6- or 12-MHz. fundamental crystals also work reasonably well, though the possibility of using them is not mentioned in the HW-17 Manual. The oscillator converts to a v.f.o. amplifier or multiplier, when an external v.f.o. is used. Provision is made for powering the Heath HG-10 v.f.o. from the HW-17 power supply, and other types of v.f.o. should be usable. Several have been used successfully by the writer. Sockets for four crystals are included. A front-panel switch selects the desired crystal or external v.f.o.

The triode of the 7059, V_{1B}, triples to 72 MHz., driving a 12GN7 doubler, V_2, to 144 MHz. The final amplifier, V_3, is an 8156 Compactron, capable of up to 15 watts output. Variable capacitors of the oscillator, tripler and doubler circuits are gang-tuned from the front panel, making for quick retuning after frequency changes.

The transmitter r.f. circuits and the first two stages of speech amplification, Q_{11} and Q_{12}, are mounted on the transmitter circuit board. The rest of the audio system is common to both transmitter and receiver, and is mainly on the rear wall of the cabinet. The audio driver, Q_{13}, and push-pull output transistors, Q_{14} and Q_{15}, will be found here.



Interior of the Heath HW-17A 2-meter transceiver. Most of the circuitry is on two etched-circuit boards, the transmitter r.f. section at the left and the receiver at the right. The enclosed portion just back of the tuning dial is a preassembled tuner for the receiver r.f., mixer and oscillator.

Power Supply and Control Circuits

The a.c. supply, for 120 or 240 volts, is built into the transceiver. It delivers a.c. heater voltage to the tubes, low-voltage d.c. for the transistor stages, and 320 volts d.c., under load, to the transmitter. Its solid-state design and use of transistors for the receiver and audio system result in economy in overall current drain. A separate 12-volt supply for mobile use is available for the HW-17A. Also a solid-state device, it is very light and compact, and is controlled entirely by the on-off circuits of the transceiver.

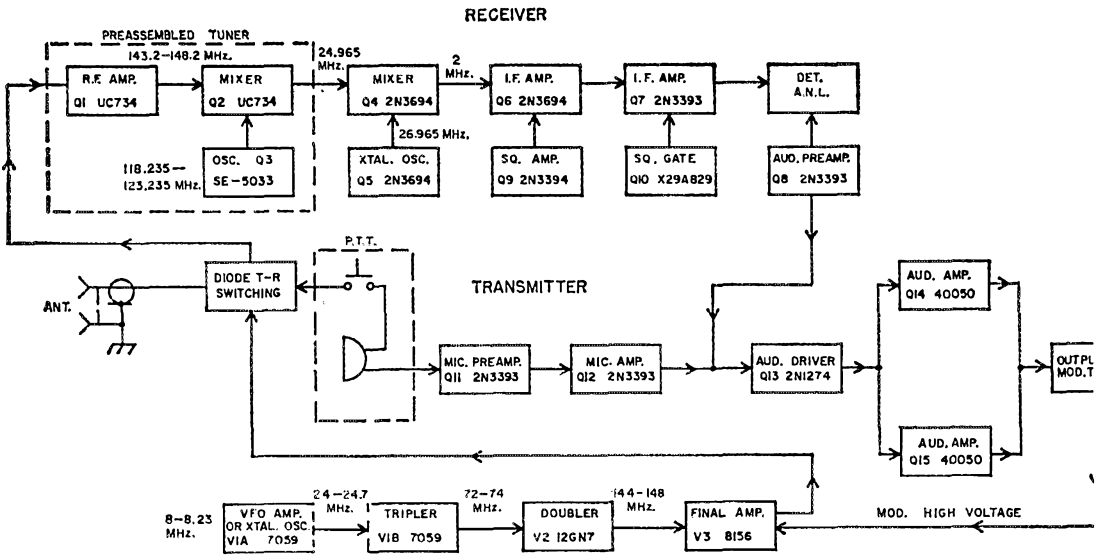


Fig. 1 —Block diagram of the Heath HW-17A 2-meter a.m. transceiver. Stages in the upper two rows are on the receiver circuit board. Those in the two lower rows are on the transmitter circuit board. Items at the right are mainly on the rear wall of the transceiver.

Most users will want to mount this supply somewhere other than in the passenger compartment, as the 2500-cycle oscillator that generates the primary voltage makes a whistle that is audible nearby. Cabling and plugs for remote mounting are supplied.

Transceiver power output when using the mobile supply varies somewhat with battery voltage. A fully-charged battery, with the engine not running, gave 10 watts transmitter output. With the engine going the output rose to 13 watts. Drain at 12 volts is about 7 amperes, a level of overall efficiency much better than was obtained with older 2-meter transceivers for mobile service.

Economy of operation is heightened by intelligent use of the function switch. Its first position, labelled "battery saver" runs the receiver and audio directly from the car battery, with the transmitter heaters and power supply off. The drain is only about 100 ma., so you could leave this on almost indefinitely without hurting the car battery. A second position lights the tube heaters and starts the power supply. The third is a "spot" position, of which more later.

Once the tubes are lighted, control is entirely by the button on the push-to-talk microphone. Push-to-talk is fine, but it would be very helpful to have panel switch control as well. Another novel feature is that the microphone is permanently wired into the circuit. It tends to get in the way during the checkout phases of the project. It also takes a beating when the unit is carried about.

Solid-State Switching

There are no relays or mechanical r.f. switches in the HW-17A. Antenna changeover and other send-receive functions are handled electronically with circuits controlled by the d.p.d.t. switch on the microphone. On RECEIVE (microphone switch up) the audio circuit is completed through the output transformer secondary to the speaker and phone jack to ground, on one side of the switch. The other contacts on this side ground the base of the microphone preamplifier stage, Q_{11}, rendering it inoperative. Pushing the button connects the hot side of the microphone to the amplifier base. The other half of the switch actuates a diode system that closes the transmitter tube cathode circuits. The cathode current then turns on a diode switch that blocks the r.f. from the coaxial line to the tuner input. The circuit from the transmitter output coupling to the antenna line is also closed electronically.

This is a neat, quiet operation, but it is not accomplished without a price: there is a considerable "suck-out" effect from the transmitter circuits in the RECEIVE position. Receiver sensitivity measurement shows 0.3 microvolt (30 percent modulated, 400 cycles) for 10-db. signal-plus-noise-to-noise ratio, average, across the band, but where the transmitter suck-out is at its worst, as much as 0.5 microvolt may be required. (Putting an FET preamplifier in the antenna line made a very marked improvement, with 0.15 microvolt giving the same signal margin over noise. The preamplifier in the receiver line is not the answer, however, as this would still have the suck-out problem.)

Mechanical Features

The low profile of the HW-17A lends itself well to mobile installation. There is no cabinet in the usual sense. Back and front panels go on during the assembly procedure, giving the assembly a rectangular form that is useful in the

adjustment phase of the project. All circuits are then accessible, and the rig is mechanically stable bottom side up, or standing on either end. Identical U-shaped top and bottom plates go on when the job is done.

The sides of the main chassis have press-in plastic inserts. These take large thumbscrews which are used only when they are to engage the gimbal bracket supplied for under-dash mounting. Taking the rig out of the car entails merely loosening these screws and detaching the power plug and antenna connector. Rubber feet combine the functions of mounting screws for the base plate and tilting the transceiver upward a few degrees, when it is used at home.

Tuning of the receiver is by means of a friction-drive dial that works smoothly, and has adequate knob size and tuning rate for mobile operation.

Assembly and Adjustment

Because the transmitter and receiver are mainly circuit-board work, and the mechanical assembly is straightforward, putting the HW-17A together is not a long or difficult business. Probably 15 to 20 hours should suffice for the experienced kit builder. Getting the rig to work properly may be the more time-consuming part of the project.

The preassembled tuner, for example, is supposed to be prealigned. Ours wasn't. We had a sensitivity around 200 microvolts after following through on the instruction-book tuneup procedure, and assumed that this was the result of some wiring or adjustment error. It wasn't. The front-end circuits were far out of whack: once they were peaked properly, the receiver began to "come alive."

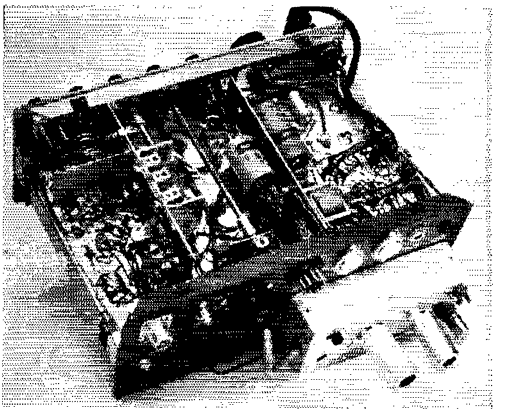
This is easy for an old hand at receiver work, with the necessary test equipment to do the job and evaluate the results, but it would be pretty baffling to the neophyte. A signal generator that can be set to the two intermediate frequencies (24.695 and 2 MHz.) as well as to various points in the 2-meter band is a great alignment aid, but the job could be done without it if you have some 2-meter signals to work with — *and* the necessary receiver know-how.

Transmitter adjustment is straightforward, and should give the knowledgeable v.h.f. man no problems, especially if he follows his own basic instincts and doesn't rely too heavily on the beginner-type instructions given in the HW-17 manual.

Design Changes

Field experience with the predecessor HW-17 turned up several trouble spots in the kit when it was placed on the market some months ago. The major design changes will be outlined briefly here, but any owner of the HW-17 who asks for it will receive a modification kit containing parts and instructions for bringing his unit up to date. The HW-17A version, now being supplied, incorporates these changes.

"Low audio," a common complaint with the transmitters, is cured by two changes. First,



Bottom view of the HW-17A, with receiver circuits at the right and transmitter at the left. The outboard unit on the rear wall is an f.m. adaptor for the transmitter, an extra-cost accessory that plugs into the v.f.o. socket.

the circuit in the plate of V_{1B} was tuned to 48 instead of 72 Mc. in early models, resulting in low grid drive and poor modulation capability in the final stage. A replacement for the plate coil, L_9, takes care of this. If your L_9 has 7½ turns, closewound, it is the old type. The new has 4½ turns, in about same space. You can check on this stage by measuring the voltage developed at the center-tap of the amplifier grid coil, L_{11}. Some 35 to 50 volts should be developed by the drive. If it is less, you need this change. Grid current, measured with a milliammeter connected from the low side of the grid resistor, R_{301}, to ground (test point C on the schematic diagram) should be at least 1.5 ma. There is much less with the wrong L_9.

Several audio circuit changes are included in the recommended modifications. Their contributions are minor, so they will not be detailed here. One transmitter change is a "must" for good modulation, however: remove the 0.22-μf. mylar capacitor that may be across the screen dropping resistor of the final stage (C_{124}, connected across R_{111}). This makes the biggest improvement of all recommended changes. The screen bypass, C_{123}, connected to Pin 7 of V_3, can be changed from 0.005 to 0.001.

Best operation of the modulator transistors is obtained if the bias control, R_{246}, is set so that the resting current of the transistors is about 80 ma., measured between the center-tap of T_6 (red lead) and ground.

When the spot switch is wired as shown in the manual (closing *both* cathode circuits of V_1 to turn on the crystal oscillator and tripler in the RECEIVE position) the level of the spotting signal is far too high. Especially after the tripler modification already described is made, the spot signal blocks the receiver for several hundred kilocycles of tuning range. The cure is to lift the cathode resistor of V_{1B}, (R_{107}, 470 ohms) from the spot switch and run it over to the low side of 150-ohm R_{111}. This can be done with a short lead on the top of the receiver circuit

board. The spot level then is equivalent to about a 1-microvolt signal.

The usual instruction-book practice of telling what to do, but not why, can get you into troubles that you'd never encounter, if you knew the "why." Example: our HW-17 had a strong birdie at about 145.3 — a bad place to have a birdie, surely. The book says nothing about this, but it turned out to be a beat between the 9th harmonic of one oscillator and the 2nd of another. It's easy to tune out. You twist the core slug in the crystal oscillator plate coil, L_7, to minimize its harmonic output. Listen to the birdie and to a test signal alternately while doing this, and a setting will be found where the birdie disappears and the reception is unaffected.

The receiver has a weakness common to most relatively-simple transistor receivers: the a.g.c. action does not have adequate dynamic range. The most obvious result here is that the typical mobile flutter becomes a major annoyance. If you set the audio level high enough to hear weak signals, strong ones rattle the windows. Mobile signals, being mostly weak and variable, pop in and out of audibility with the gain at any setting that is suitable for strong peaks.

Several receiver changes, now in the HW-17A and included in the modification kit for early versions, help to level off the audio peaks and valleys, but the problem of too-low audio on signals below about 2 microvolts remains. In addition, the noise limiter is not effective on most types of noise, and seems mainly to knock the receiver audio level down. This has the practical effect of making it possible to hear only the stronger signals when working mobile. When the audio is turned up enough for hearing signals of average strength over the usual noise of a car in motion, there is a strong tendency to audio howling. This appears to be a microphonic effect in the receiver tuning capacitor, a problem often encountered in v.h.f. receivers.

Frequency Modulation

The manufacturer has brought out an external f.m. adapter, and it is shown with the unit in the photographs. This has worked nicely for the writer, both direct with other f.m. stations and through the local repeater. Only the traditionally easy part of getting on f.m. is accomplished in this way, however. The receiver problem stops most would-be f.m.-ers, and the HW-17A provides no easy answer to this part of the job.

The receiver bandwidth is not too bad for slope-detecting f.m. signals, but the end result is usable only with strong locals. Slope detection does not approach the performance of the designed-for-f.m. receivers now widely in use in fixed-frequency communication above 146 MHz. It should be possible to build an external f.m. adapter for receiving, with probably an additional 2-MHz. i.f. stage, and the usual f.m. detector circuitry. There are integrated circuits available for this, so it shouldn't be too difficult a job, and it should go a long way toward solving the a.g.c. and noise-limiting problems discussed earlier. — *W1HDQ.*

Late Report. Just before press time another HW-17A modification was made available. This 4-step operation, parts and instructions for which will be provided by the manufacturer, is designed to reduce the suck-out effect of the transmitter on the receiver sensitivity. With care in adjustment, as much as 6 db. improvement in receiver threshold sensitivity can be obtained. This costs a little in transmitter output, but it is a good trade, for the HW-17A receiver performance is marginal, at best. Transmitter output dropped to 10 watts in our model, when the circuits were adjusted for optimum weak-signal reception. A signal input of 0.25 microvolt, or less, now gives a 10-db. signal-plus-noise-to-noise ratio, across the band. QST

Heath HW-17A 2-Meter Transceiver

Height: 6½ inches, including mounting feet.
Width: 11⅛ inches.
Depth: 8½ inches.
Weight: 13 pounds.
Power Requirements: 115 volts a.c., 100 watts, with built-in supply. 12 to 15 volts d.c., 10-amp. max., with matching HWA-17-1 mobile supply.
Price Class: $130 with built-in supply. Mobile Supply $25.
Manufacturer: Heath Company, Benton Harbor, Michigan 49022.

Strays

Feedback

In the ICKEY keyer, page 28 of November 1968 *QST*, a 6.2-volt Zener diode should be used for CR_8 rather than 5.6 volts as shown in Fig. 1. The author, W1WCG, reports that this change will correct the situation in case your regulated 3.6-volt output is too high.

Years ago, W9AST, W9GUX and Andy Kovach were inseparable buddies. Subsequently, W9AST passed away. Later, Andy purchased the ham gear from the widow. Recently, W9GUX gave Andy's youngest son the Novice exam. His new call, WN9AST! The first QSO . . . with W9GUX, just as it was many years ago between W9AST and W9GUX.

1969 ARRL International DX Competition — High Claimed Scores

FOLLOWING are high *claimed* scores of entries received by May 20. Read (left to right): total score, multiplier, contacts. Final results will appear in (or near) October *QST*: please don't ask for DXCC credit based on log confirmations until the adjusted scores make the scene! — *W1ARR*

W/VE — C.W.

Single Operator

W1BPW....1,676,664-348-1608
W1AX.....1,574,649-360-1458
K1DIR....1,571,427-333-1573
W4KFC....1,531,959-350-1461
W3GRF....1,279,152-329-1296
K1ZND/8..1,267,576-332-1274
K1KTH....1,246,050-325-1278
W3WJD....1,237,584-354-1166
W3NU.....1,222,385-365-1125
WB2CKS...1,221,350-325-1261
W4LCP....1,212,534-318-1271
K4GSU/3..1,200,620-347-1156
W8DZ.....1,199,184-344-1162
W2DXL....1,194,230-307-1306
W2GGE....1,161,731-323-1205
W9EWC....1,101,198-314-1169
W9LKJ....1,095,150-298-1225
W2PCJ....1,058,832-304-1179
W6RR.....1,057,439-269-1311
W5WZQ....1,057,265-336-1053
W7IR.....1,056,210-323-1091
W3MFW....1,051,155-329-1065
K2KNV....1,046,892-308-1133
K4THA....1,027,140-318-1079
W5JAW....1,011,412-298-1132
W8UM (WB2FIT, opr.)
1,005,774-311-1078
W3WPG....1,003,068-298-1122
W3DQG....929,655-283-1095
K6NA.....927,000-259-1163
W1BIH....921,888-288-1068
WA1FHU....888,174-266-1113
W3MWC....869,458-302- 963
K4II.....860,559-301- 953
W3GN.....821,712-272-1007
W2WD.....805,563-309- 869
K3HTZ....801,864-296- 905
W1WAI....763,689-277- 921
W5GO.....757,635-265- 953
W5IOU....751,800-280- 895
K2DJD....729,549-276- 881
W5WMU....722,439-243- 991
K1UHY....722,016-276- 873
W4HM.....718,680-265- 904
WA1IRG/1..714,714-286- 833
WA1DJG....693,600-255- 912
W2BQF....680,525-275- 837
W3BOQ/8...663,708-284- 779
W7D1.....663,245-261- 849
K6EIV....652,470-239- 910
WA4EMS...649,728-256- 850
W9OAW....645,316-266- 812
WA2OJD....637,320-235- 904
W8QXQ....635,715-277- 765
K8EHU....631,296-274- 768
VE2YU....618,966-251- 822
WA0SDC....607,059-285- 710
VE2NV....603,648-256- 786
W8DB.....598,128-272- 733
W3NX.....594,156-268- 739
K9CUY....580,644-254- 764
W5FL.....577,170-265- 726
W2HO.....559,251-231- 807
W6TZD....547,548-206- 886
W8JIN....526,536-284- 618
W2LXK....526,394-337- 522
W4DM.....522,576-228- 764
W5EU.....511,756-196- 875
W6ISQ....506,664-227- 744
K2DCA....505,620-265- 636
W8ROF....503,424-228- 736
W9RER....503,250-250- 671

Multiop. tor

W3MSK....5,491,712-512-3626
W4BVV....4,033,329-490-3356
W3GM.....3,956,256-456-2892
W3TV.....2,889,212-418-2304
W4ZXI....2,785,056-402-2310
K4BVD/6..1,889,280-328-1920
K4CG.....1,732,926-338-1709
W6ANN....1,595,751-331-1607
W8SEA....1,583,205-299-1765
W6WX.....1,531,989-289-1767
W9YT.....1,477,014-322-1529
W6ITY....1,473,771-299-1643
WØAIH....1,376,760-308-1490
W6NJU....1,265,445-305-1383
K6UYC....1,256,856-285-1470
WA8LYF...1,220,604-308-1321
K3JYZ....1,213,134-302-1339
K6AN.....1,134,188-298-1270
W1YK.....1,038,588-284-1219
K2MME....972,048-308-1052
W3NZ.....869,316-262-1106
W9EXE....789,804-284- 927
W6GFS....729,756-233-1044
W3MVB....729,108-258- 942
K3JH.....725,196-271- 892
WA6UFW...717,255-231-1035
W2CXM....643,210-262- 819
K5YPS....595,200-248- 800
WA2IZS....521,850-245- 710

W/VE — PHONE

Single Operator

W6RR.....1,976,156-364-1816
W4BVV....1,751,718-362-1613
K6AHV....1,271,700-314-1340
W3MVB (K1ANV, opr.)
1,242,243-331-1251
W8SH (K1ZND, opr.)
1,230,460-340-1207
W1AX.....1,205,820-348-1155
W9ZRX....1,138,686-346-1097
W5KTR....1,133,560-340-1112
K1THQ....1,082,952-312-1157
W2DXL....1,040,712-309-1130
W6NJU (K9ZMS, opr.)
1,036,308-292-1183
W8YBU....1,013,760-320-1056
W1OKG....996,816-304-1093
WA3GJU....977,097-319-1021
WA1HHN....946,608-296-1066
WØHP.....918,671-313- 989
W3MWC....916,839-297-1029
W3TLN....884,070-285-1034
K7ADD/3...877,251-309- 955
W6QJW....866,700-270-1070
W4SYL....865,536-322- 896
W5IOU....857,565-295- 969
W5OGS....821,712-304- 901
W4NMA....817,731-279- 977
W4ZCY....814,796-284- 957
K9CUY....802,112-302- 886
K8HZU....794,802-278- 953
K1JHX....773,430-254-1015
W3BQN....767,496-283- 904
K2DJD....741,972-292- 847
W3NU.....738,396-318- 776
W9EWC....730,048-272- 895
W1BIH....729,008-283- 861
W2JSX....710,424-286- 828
WB2YQH...708,936-271- 872
WB6UDC...698,112-256- 909
K8DOC....664,008-292- 758
W9QQN....662,204-284- 777
W3BWZ....657,804-287- 764
K4EZ.....646,098-257- 838
W2MB.....639,978-263- 810
WA3KEG...626,400-288- 725
W6DGH....625,986-249- 838
W4NBV....606,040-278- 727
WA1DJG....600,590-290- 791
W8LXU....588,861-273- 719
WA2CMV...578,952-264- 731
VE3WQ....578,340-255- 756
WA9JDT...563,904-264- 712
K4II.....557,109-259- 717
VE2NV....551,286-249- 738
WB2UZU...542,340-276- 655
WA2BYJ....534,706-217- 806
W8TWA....521,676-258- 674
W3WPG....510,447-223- 763
K5BOC....506,160-240- 703
W2SUC....505,008-252- 668
W3NZ.....501,966-237- 706

Multioperator

W3MSK....7,023,736-569-4152
W3GM.....3,634,260-476-2545
W3WJD....3,295,170-470-2336
W6ISA....1,932,255-351-1835
K4BVD/6...1,801,980-355-1692
VE3FHO....1,580,302-367-1436
K6UYC....1,577,829-349-1507
K4CG.....1,574,640-360-1458
W9LKJ....1,426,680-360-1321
WA8LYF...1,275,120-330-1288
K6AN.....962,631-303-1059
W8NGO....915,474-307- 994
WA2FQG/2..904,257-321- 939
WA6UFW...821,340-270-1014
W5AC.....782,040-280- 931
W5WMU....776,628-282- 918
W3AES....726,600-280- 865
K7RAJ....720,900-267- 900
W4ODR....712,332-282- 842
WA2IZS....712,272-283- 836
K9IPPJ....700,944-272- 859
W3GN.....692,208-276- 836
W6UUI....683,802-243- 938
W9BZW....652,743-273- 797
WB2UDQ...648,324-276- 783
W6KG.....573,306-214- 893
VE1AHK....552,486-242- 761

DX — C.W.

Single Operator

ZD8Z.....4,200,408-257-5704
XE0GEN...3,452,627-275-4185
KH6GPQ...3,225,960-261-4120
PJ2VD....2,703,393-249-3619
HP1XHG...2,553,999-259-3287
HK3BAE...2,405,187-229-3501
K4PHY/YV5
1,660,422-237-2336
DJ4ZR....1,638,960-205-2664
G2RO.....1,585,440-216-2452
GC3IEW...1,578,060-220-2391
HB9UB....1,573,110-210-2511
KL7IR....1,566,840-220-2374
LAØAD....1,511,520-201-2495
XE2AAG...1,476,279-219-2250
OZ1LO....1,410,417-201-2339
JA1AEA...1,357,224-194-2350
5H3KJ....1,347,264-192-2456
G3FXB....1,306,032-208-2093
PAØLOU...1,153,600-200-1963
9J2MX....1,020,624-176-1933
DL6WD....1,016,532-187-1838
DL4QQ....1,004,700-175-1868
ZL1IL.....914,220-180-1693
EI9J......875,610-194-1528
XE0GJR....869,652-196-1479
HA5E......811,903-163-1663
ON4XG.....809,550-175-1542
YV4OY.....807,024-184-1462
EL2Y......764,610-165-1547
YV1OB.....758,716-196-1298
G3TXF.....716,552-172-1392
9Y4KK.....699,180-172-1355
SVØWP.....670,336-148-1606
CR6EI.....638,509-173-1210
DK1CU.....623,448-168-1237
OA4DX.....607,984-158-1283
F8VJ......597,198-177-1125
PJ8AA.....573,363-171-3353
OH8RC.....552,981-143-1289
G3KMA.....517,362-163-1058
VP7NA.....501,960-178- 940

Multioperator

SK6AB.....2,228,343-221-3569
LZ1KPG....1,162,230-190-2039
ET3USA....1,105,146-179-2058
UAØKFG....1,100,280-173-2129
YU1BCD....1,100,010-185-2146
HA5KDG....910,080-180-1688
GW3ITZ....659,149-167-1330

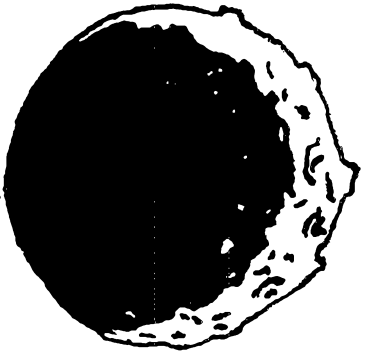
DX — PHONE

Single Operator

KV4FZ.....5,927,589-303-6521
HC1TH.....4,677,981-263-5931
ZD8Z......4,116,735-245-5820
XE1WS.....3,754,976-271-4619
KH6GPQ....3,587,034-253-4726
HI8XRM....2,732,975-245-3722
KH6BZF....2,431,395-213-3805
HK3WO....2,418,000-250-3224
XE1LLS....2,336,605-235-3292
KZ5NF....2,056,560-205-3344
FG7XL....2,035,870-163-4166
HBAF.....1,778,319-197-3009
YN1GLB....1,742,760-206-2820
7P8AR.....1,690,854-187-3014
ZSCDW....1,674,768-184-3034
HP1JC....1,619,352-252-2142
SR1G.....1,586,741-229-2340
LU8DKA...1,523,040-160-3173
JA1AEA...1,487,808-192-2595
CR6GA....1,475,508-164-2999
HFLD.....1,473,155-185-2656
WA3HXR/YV5
1,460,825-215-2265
DL4QQ....1,449,726-183-2641
CT1BH....1,439,819-189-2557
LAØAD....1,382,832-194-2395
KA2RM....1,300,266-198-2189
PJ7JC....1,264,368-212-1988
G3IAR....1,262,608-184-2296
OZ1LO....1,249,305-185-2251
CP1HW....1,236,396-156-2597
SM5EAC...1,169,049-179-2177
G2QT.....1,157,263-193-1997
CT2AT....1,142,854-194-2018
GW3NWV...1,122,407-167-2241
5H3KJ....1,081,920-160-2349
CR6GM....1,023,630-149-2290
EL2BD.....995,788-173-1919
DL4AP.....976,440-158-2060
YV7AV.....967,356-156-2067
YV5CGT/YV3
964,956-194-1658
OA6BU.....914,550-182-1675
HMOL.....898,392-164-1826
KX6PJ.....896,952-152-1967
YU1BCD....838,584-152-2011

(Continued on page 108)

To the Moon and Back -- On 2300 MHz.!



AMATEUR radio signals have been sent to the moon and back on 2.3 GHz., the echoes having been received at a terrestrial distance of 750 miles from the point of origin. Transmission was from W3GKP, Spencerville, Maryland, near Washington, D. C., and reception was by W4HHK, Collierville, near Memphis, Tennessee. So far as is known, this feat represents the first amateur e.m.e. work this high in frequency, and is the greatest distance over which amateur signals have been sent on this band.

Tests were started in November, 1968, after an equipment-building period of over one year. Both transmitting and receiving gear is highly stable, and adaptable to such narrow-band modes as c.w., f.s.k. and s.s.b. Tests were begun before the participants had any firm ideas as to which modes would be most effective. After some experiments with A0, f.s.k. and c.w. (at normal speeds) it became obvious that very slow-speed c.w., using an integration period of a few seconds, and copying on a chart recorder, would be necessary for intelligible information with the existing equipment.

Recent tests have been run at a speed of 1 dot = 3 seconds, or about ⅓ word per minute. The receiver is operated with the crystal filter at or near maximum selectivity, tuning is optimized by combined aural-visual technique, and ultimate readout from the strip chart. One of the better samples is shown in Fig. 1.

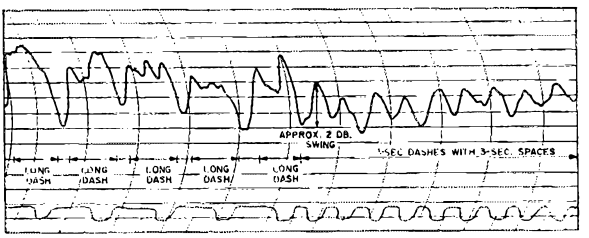


Fig. 1—Reproduction of one of the better chart recordings made by W4HHK of the 2304-MHz. signal of W3GKP, received via the lunar route. Reading from right to left, we see one minute of dots and one minute of dashes, all showing, in varying degrees above the receiver noise threshold. Maximum signal level, some 3 to 4 db. above noise, was achieved by using high selectivity, very slow sending rate, and visual readout. The signal transmitted by W3GKP is shown in the lighter trace across the bottom.

As of early May, more than 50 tests have been run, with W4HHK receiving something on about 10 different occasions. A few "landmarks" are summarized below. For the early tests the antenna hour-angle at W3GKP was fixed, giving just a few minutes of test time. W4HHK was not informed of the signal mode or type of keying, if any.

Dec. 1: W3GKP sending A0, and manually "nodding" his antenna in elevation. W4HHK reported reception of a sound like that of a radar sweeping through the frequency.

January 28, 1969: W3GKP sending Continental code by f.s.k., narrow shift. W4HHK reported reception too weak to identify. When the tape was studied, the signal was tentatively identified, mainly by the spaces.

March 1: W3GKP sending 10-w.p.m. c.w. W4HHK reported a signal too fast and too weak for copy.

March 29: Using the chart recorder for readout, and with no advance information about the transmitted signal, W4HHK correctly identified the transmission as 3 seconds on, 3 seconds off, 10 per minute. The chart shows signals quite definitely for about 4 minutes, plus traces for 2 to 3 more minutes.

April 21: W4HHK identified correctly, and in order, one minute of slow dots, as before; one minute of slow dashes (9 seconds on, 3 seconds off, 5 per minute); one minute of "fast keying" too fast and weak for copy (actually about 10 w.p.m.); followed by a return to slow keying (actually another run of 3-second dots).

April 24: W3GKP sending his call in slow code (3-second dots). W4HHK read out 3 of the 4 letters and one numeral 3 correctly, plus the one missing letter in questionable detail, at a time later proved to be correct.

April 25–26: W3GKP sending slow dots intermixed with his call, and moving the feed horn in increments to track the moon, W4HHK read out 8 letters and numerals correctly, with 5 others questionably. Dots were recorded fairly well, but served mainly to confuse the receiving operator.

A section of the April 21 recording is repro-

duced herewith. This may not look like too much to the casual reader, but surely it must be recorded as a significant amateur radio milestone — along with another visual record, reproduced in March, 1953, *QST*. The latter was a memento of the first successful amateur transmission to the moon and back — the achievement of W4AO and this same W3GKP, still at it, after some 20 years of e.m.e. experimentation! Did someone say that hams of this day do nothing but ragchew endlessly on the air?

The transmitting frequency is 2304.0 MHz. With allowance for Doppler shift, the received signal has been found usually within 1 kHz. of the expected spot on the dial. The W3GKP transmitter has a klystron in the final stage, running 250 ma. at 4000 volts, delivering some 275 watts output. Actually, the setup is a quadruple-conversion transceiver, with the h.f. end being a Collins 32S-1–75S-2, converting to 17 and then 137 MHz. Injections are derived from a single crystal on 20.061 MHz. In transmitting, a varactor mixer is used to go from 137 to 2304 MHz., and the output is amplified in a 416B, to drive the VA-802B klystron in the final.

W4HHK's receiving lineup is best explained with the aid of the block diagram, Fig. 2. Parts of this system were described by Paul at the 1968 ARRL National Convention in San Antonio, and at the Central States V.H.F. Conference in Ozark Lake, Mo. Except for the h.f. portions, both stations are mainly home-built, and the products of endless patient experimentation.

The antennas are parabolic reflectors obtained through MARS surplus channels, adapted to the purpose by much hard labor and careful planning. The 18-foot dish installation at W4HHK was pictured on pages 26 and 31, of August, 1967, *QST*, when it was being used for monitoring solar

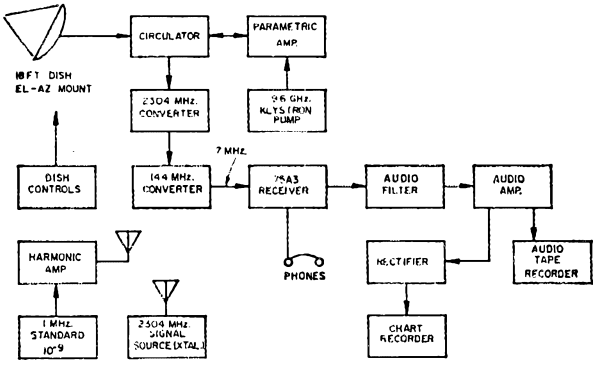


Fig. 2—Block diagram of the receiving system used by W4HHK in receiving the moon-reflected signals of W3GKP on 2304 MHz.

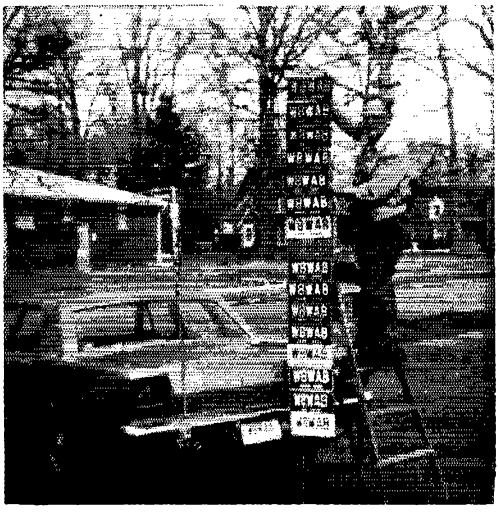
noise on 432 MHz. W3GKP has a surplus 28-footer, which had brush growing up through it at one time, and it required extensive work to put it back in shape. Particularly critical was surface roughness, and this has been solved in part by covering critical areas with aluminum foil. It is on a transit mount, with the elevation adjusted manually.

Tests will continue, with the object of improving the circuit, and eventually to establish two-way communication. W4HHK has a klystron-final transmitter in construction, but has concentrated thus far on improving the receiving end of the system, while W3GKP worked mainly on the transmitter problems. Both participants express their appreciation to their respective MARS organizations, and to the many amateurs who have provided valuable assistance on many phases of the endeavor. Participation by other amateurs having suitable equipment is invited. — *W1HDQ*

Strays

Who says QRP rigs can't bring results? In a letter from Bill Hennigan, W3CZ, we learn that he has worked all call areas except W7, plus 186 counties, with the two-transistor 80- and 40-meter c.w. rig which appeared in *QST*, June 1967. Power output from the rig is approximately 2 watts, and all operation has been done from portable locations such as parks and similar sites. He worked two W6 stations from this side of the U.S.A. while running only 2 watts input! He plans to build the D.C. 80-10 receiver in May 1969 *QST* to serve as a mate to his QRP transmitting gear. Here, at least, is testimony that low power — plus proper operating habits — can be made to work effectively.

Incidentally, a new 2-watt QRP transmitter appeared in June *QST*. It is designed for 12-volt operation and will work off dry batteries. — *W1CER*



Recently, W8WAB requested and was awarded a pin to signify his 25 years of continuous League membership. John also has a "token" to signify maturity in another aspect of his ham career—17 Ohio license plates bearing his amateur call!

MOEDRAS . . .

A "Scientific" Breakthrough in Antenna Switching

BY GENE PRESSLER,*
W3ZXV

"When a windfall lands upon you, make use of it to help yourself to a unique station!" This very human attitude of life dates back to the earliest days of amateur radio. Here is a practical modern application of the adage.

It seems to me that many of the truly great discoveries in science have come about as the result of what almost might be called accidents, except for the fact that common to each is a person with the rare gift of keen perception who saw a basic scientific truth in some simple everyday occurrence. It was in this way that Archimedes invented the word "Eureka" while taking a bath and the illustrious Newton discovered bruised apples while sitting in contemplation beneath an apple tree.

Other scientific landmarks were achieved as by-products of scientific investigations, the directions of which were changed unpredictably by the hand of fate. Bakelite, for example, was invented by a scientist, probably searching for a better embalming fluid, who discarded phenol and formaldehyde together in the same container and then couldn't pry the lid off his garbage can when the stuff solidified. (Wonder if that's where the word "stiff" originated?)

My own area of scientific interest is the little known field of cybernetic argumentation, or, as I prefer to call it, "cybernetation," a contraction of the two words. It means arguing with computers.

You may have heard of my famous argument with a computer at one of the country's most powerful insurance companies earlier this year regarding the alleged non-payment of my life insurance premium? No? Perhaps, then, you are familiar with a more recent work of mine involving a nationwide mail order retail firm whose electronic accounting equipment obstinately refused to correct the annoying misspelling of my name. The case, which is already established as a classic in the field of cybernetation, was won only after I made the Ultimate Threat — to bend, staple, fold and mutilate the punch card on which my account records are kept. Surely, you recall reading about the great debate which ensued.

No? Well, no matter — I fear we are digressing and I mentioned the subject only for background. On with the story . . .

Several months ago, I became involved with an unexpectedly complex project to construct a digital readout clock. Having fallen heir to a number of Burroughs' "Nixie" numerical counter tubes, a digital clock seemed a natural application for these rare and fascinating electronic objects.

Nixies are small neon-filled vacuum tubes containing multiple cathodes mounted cleverly inside in the shape of the numerals, 1 through 0. By applying a d.c. potential to the proper pairs of terminals, the numerals can be made to glow one at a time in whatever order you might wish. Nixies have many applications in the computer field and, of course, I happened to be quite familiar with their use through my work in cybernetation.

To return to our story, however, the digital clock project quickly turned out to be a dud. Sketching a circuit on ever larger pieces of paper soon indicated how hopeless the task as schematics of the endless flip-flop circuits spread ever outward to eventually cover the walls of the shack. Cost proved to be a deciding factor, too, for I discovered that several hundred transistors would be required to sequence the Nixie

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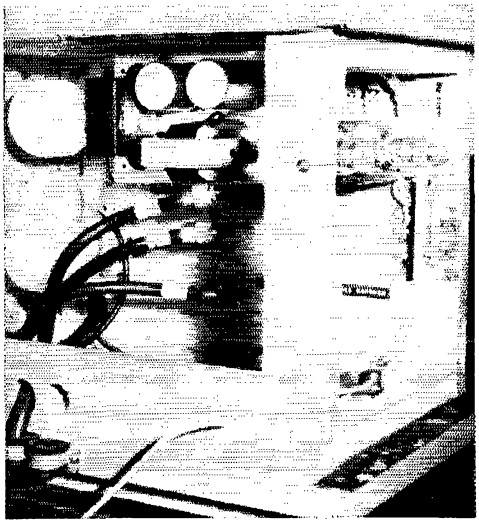
digits to synchronize with the 1440 minutes in a 24-hour day.

Well, telling time by that method wasn't deemed all that important and the project was laid aside regretfully amid mounting frustration over the fact that, hard as it had been to come by a half-dozen of the fascinating Nixies, I had no economically feasible use for them.

I consoled myself by deciding to work out my disappointment in rebuilding the antenna selector switch I had installed at the station operating position. The heart of this project was the Waters coaxial antenna switch, a fancy sealed unit with an input connector and six outputs to which I could connect my several antennas to provide quick changeover when hopping from band to band.

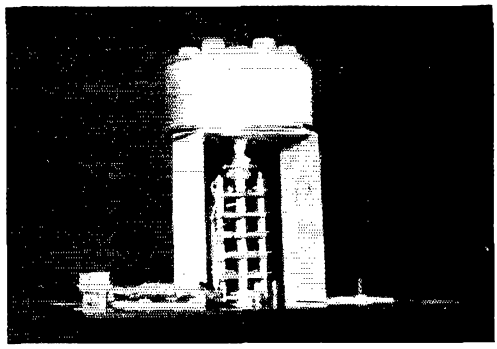
As I began work, a thought broke o'er me in waves, like the rising tide lapping higher and higher up the sandy shore. (Isn't that a pretty sentence?) "Eureka," I cried, half aloud! Why not a digital-readout antenna changeover switch? Why not indeed, I thought as I closed my eyes and curled my toes to better soak up the thrill of discovery breaking over me (me!) as it had hundreds of other seekers of knowledge before me. Surely this was the perfect solution to both problems — a needed antenna switch and a use for my intriguing Nixies.



The panel has been removed (at the right of the photograph) to show the power supply, Nixies, antenna leads and dummy-load lamps.

A few pencilled calculations and the simple circuit resulted. A solid-state d.c. supply provided the 170 volts required to fire the Nixie tubes.

An afternoon spent with soldering gun burrowing about among the various circuit components resulted in the electromechanical marvel shown on the previous page. Hidden behind a neatly dressed panel, the finished switch makes a very attractive addition to the shack.



The four-gang logic selector is mounted nearest the panel. The coax switch is at the rear.

The final wires connected to the appropriate points, I sat back with a feeling of immense satisfaction for, as a by-product of my research into the digital clock, I had invented the world's first MOEDRAS — a *M*anually *O*perated *E*lectromechanical *D*igital *R*eadout *A*ntenna *S*witch.

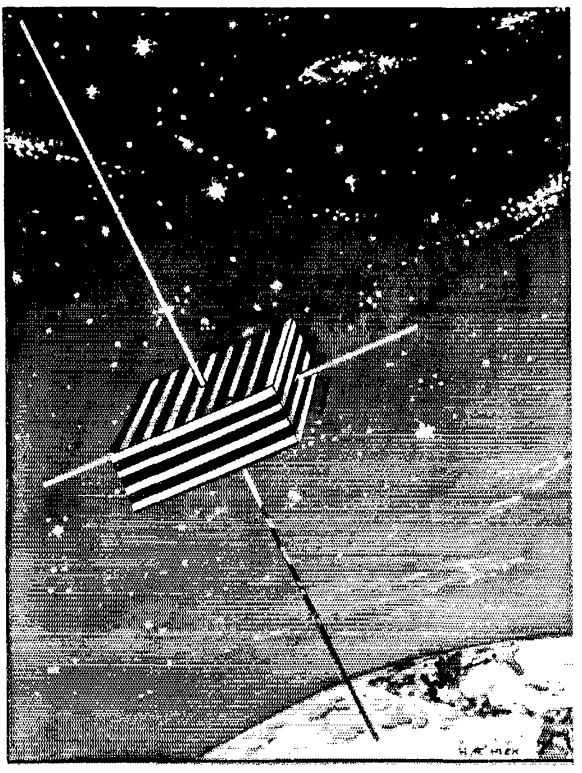
The MOEDRAS is not only capable of choosing any of six antennas (or is it antennae?) but, with a twist of a knob, the band on which it is set literally glows its identifying digits back at me. Want to tune up on 75 meters? The numerals 7 and 5 wink back at me. 10 meters? The 1 and Ø shimmer back in radiant orange.

The only problem was presented in accommodating the tri-band beam, which operates on 10, 15 and 20 meters. Having space for only four digits, this problem was solved by a kind of digital shorthand, *i.e.*, by ignoring 15 meters. When the switch picks up that particular antenna, the numerals 10 and 20 blink on behind the readout window.

Even a "no antenna" condition is indicated by wiring up zeros straight across the board when the switch is in an antenna-less situation. The final position is an off condition in which all power for the unit is turned off and the transmitter is connected to a dummy load.

Now, on the chance this might give you some ideas, you will find that, in addition to Nixie tubes, a number of other types of digital readout devices are beginning to make their appearance on the surplus shelves, including several using a number of sneaky methods to project an optical image on a piece of frosted glass. These relatively simple devices use miniature pilot lamps as light sources, although there is nothing really complicated about either type. If you can latch onto a source of supply, construction of your own version of the MOEDRAS may be one of the simplest practical uses you can find for these devices. Digital readouts do more than just dress up the shack: they can be fascinating things with which to experiment. End of story.

Now, where did I put that letter I was working on to my computer at the bank? Oh, yes, there it is. "Dear Machine: It seems you made an error . . ." QST



Australis-Oscar

Its Design, Construction and Operation

BY DAVID T. BELLAIR, VK3ZFB* and STEPHEN E. HOWARD*

ONE of the initial efforts of the newly formed Radio Amateur Satellite Corporation (Amsat)[1] will be the securing of a launch for Australis-Oscar, the satellite constructed by a group of VKs and sent to Project Oscar in 1967. It was expected that launch would occur sometime in 1968 and that following its launch the satellite would go by the name of Australis-Oscar 5. Unfortunately, the mission on which it was to have gone is now indefinitely postponed and it was suggested, therefore, that Amsat might have some luck in getting the satellite sent aloft. With the blessing of Project Oscar, Amsat has agreed to try.

Construction of Australis-Oscar was begun in 1966 by Project Australis with the cooperation of Project Oscar and the Wireless Institute of Australia. The Australis group is an outgrowth of the Melbourne University Astronautical Society and was set up for the purpose of building satellites which can be used by amateurs for long distance communication on the v.h.f. and higher bands. In contrast to its American counterpart, Australis had no local background in satellite technology. This situation contributed to the difficulty in initiating the project. Financial limitations also restricted progress. As a result, the first satellite is a relatively simple test vehicle carrying two telemetry transmitters, a command system and a magnetic attitude control system. All electrical power is supplied from batteries which are expected to have an operating lifetime of about two months.

The satellite does not contain a transponder. It will not be possible to communicate through it as was the case with Oscars 3 and 4. Its two beacons, one in the h.f. range and the other in the v.h.f. range, are expected to yield some worthwhile scientific data concerning the ionosphere during this period of relatively high solar activity. A second mission will be to experiment with a relatively simple, but possibly effective, stabilization system. In addition, the orbiting of Australis-Oscar will provide valuable experience for amateurs and other radio enthusiasts throughout the world in tracking satellites and reducing telemetry data obtained from them. The existence of the h.f. (ten-meter) beacon on the satellite will certainly bring about much greater participation in reception and tracking activities than was the case with Oscars 1 through 4 which transmitted only on two, or ¾ meters.

* Project Australis, Union House, University of Melbourne, Parkville, Victoria, Australia 3052.

[1] Klein and Tynan, "AMSAT, The Radio Amateur Satellite Corporation" *QST*, June 1969.

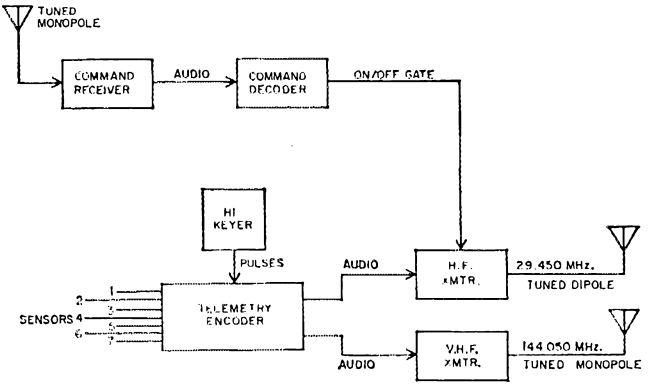


Fig. 1

The title drawing shows what Australis-Oscar 5 will look like in orbit. The satellite is housed in an aluminum case measuring 17 × 12 × 6 inches. Its weight is about 35 lbs. including 21 pounds of batteries. See fig. 2.

The electronics of the satellite is represented by the block diagram of Fig. 1. The physical internal layout is shown in Fig. 3. The principal subsystem essentials consist of two transmitters (10 meters and 2 meters), a command system to allow specially equipped ground stations to turn the 10-meter transmitter on and off (2-meter transmitter operates continuously), a stabilization subsystem, the *HI* keyer, the telemetry subsystem and the battery.

A brief description of the major subsystems of the satellites follows: The *HI* keyer, shown in block diagram form in Fig. 4 consists of a 4-Hz. multivibrator. Its output is fed to four frequency dividers. Each of these divides the frequency by two so the output of the final divider is 0.25 Hz. or one cycle every four seconds. The outputs of the 4-Hz. multivibrator and the various dividers are connected to a series of NOR gates to produce the letters *HI* in Morse code.

Temperature, spin rate and battery performance are relayed to earth by the seven-channel telemetry subsystem. Two temperature measurements are made using thermistors. One of these is on the inside surface of the aluminum case, and the other in the insulated electronics compartment. Three phototransistors sensitive to reflected radiation from the earth are mounted on orthogonal axes. The output from each will indicate how the satellite is spinning, and hence can be used to gauge how the magnetic attitude stabilization system (described below) is working. The rate of variation of all three constitutes a measure of the satellite's spin rate.

The telemetry channel sequence is as follows:

0 *HI* identification
1 Battery current drain
2 X-axis horizon sensor
3 Battery voltage
4 Y-axis horizon sensor
5 Internal temperature
6 Z-axis horizon sensor
7 Skin temperature

In each case, the outputs of the various sensors determine the frequency of an audio oscillator. Unlike Oscar 1 and Oscar 2, the *HI* signal carries no telemetry data. A continuously operating switch (encoder) samples each sensor for about 6½ seconds in each 52-second cycle, connecting each sensor in turn to the frequency determining circuitry of the audio oscillator. The output of this oscillator is used to amplitude-modulate the two transmitters. The audio frequency may vary from 400 Hz. up to about 2000 Hz. depending on the value of the function being telemetered at the moment. A block diagram of the telemetry subsystem is shown in Fig. 5.

The solid state two-meter transmitter is shown in block diagram form in Fig. 6. It consists of a crystal-controlled oscillator operating on 36.0125 MHz. and two frequency doubler stages, the second of which serves as the output stage delivering a nominal 50 milliwatts at 144.050 MHz. Amplitude modulation is introduced from the telemetry subsystem by applying a switching signal to the first frequency doubler stage.

Fig. 7 shows a block diagram of the 10-meter transmitter. In it a crystal oscillator operating on the output frequency of 29.450 MHz. drives an amplitude-modulated Class-C p.a. providing a nominal 250 milliwatts of output power. The modulation of this transmitter is identical to that of the 2-meter transmitter except that it is shifted

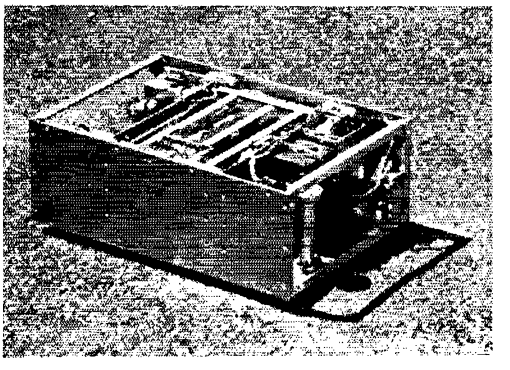


Fig. 2

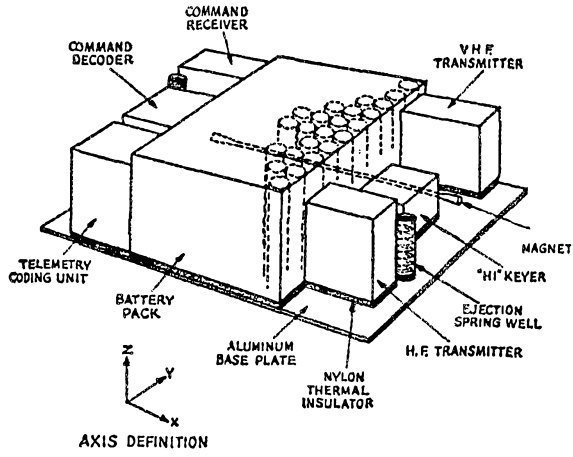


Fig. 3

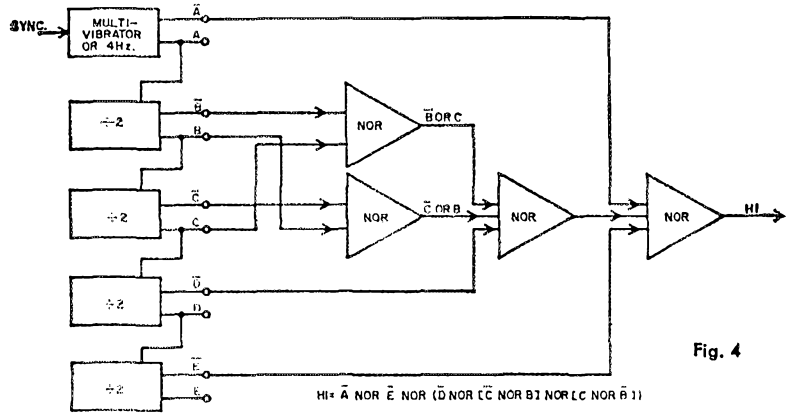


Fig. 4

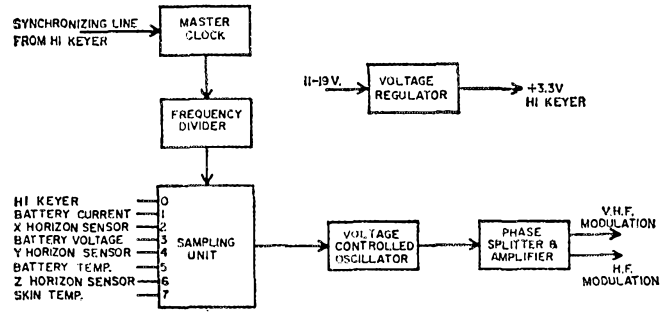


Fig. 5

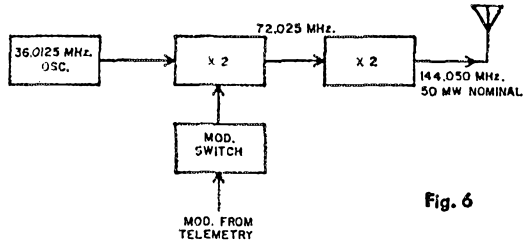


Fig. 6

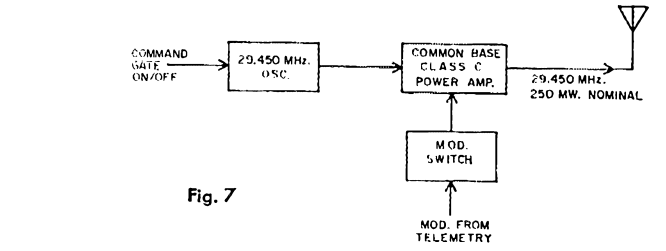
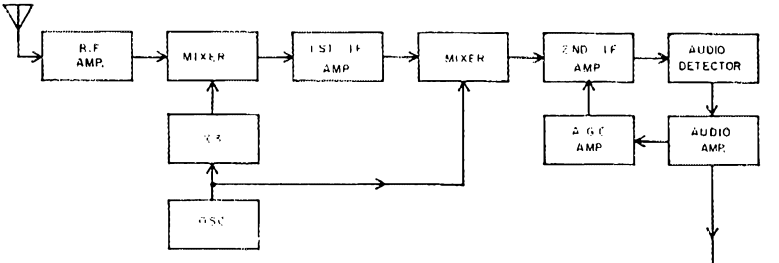
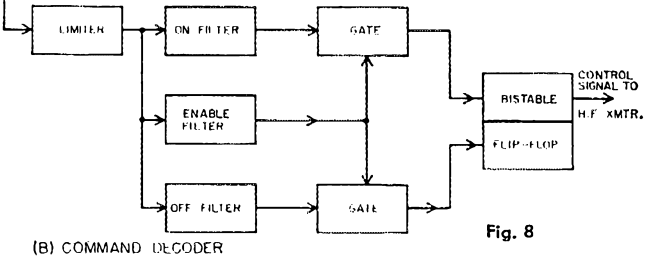


Fig. 7



(A) COMMAND RECEIVER



(B) COMMAND DECODER

Fig. 8

in phase by 180°. In each case the modulation index is 0.90.

Commands from earth are detected by a double-conversion superhet command receiver. The audio output of this receiver is fed to the decoder which determines the validity of the command. If a correct signal is received, the decoder produces a control voltage to switch the h.f. transmitter on or off. A timetable for 10-meter beacon operation will be published prior to launch. Fig. 8 shows a block diagram of the command receiver and decoder.

Power for the satellite is supplied by 28 size "G" manganese alkaline cells wired in two identical 20-volt series "strings." Each string supplies one transmitter, and the rest of the electronics is run from both strings through an arrangement of protective diodes. If one string fails by short circuit or open circuit, one transmitter ceases operation, but the rest of the system continues to function.

When Australis is placed into orbit, it will be spinning at some 4 revolutions per minute. This spinning will cause fading in the signal. In order to remove the spin energy, a set of permalloy rods with a very large hysteresis loop at the low flux density has been included. Hysteresis loss, along with eddy current loss in the case, will tend to remove the spin, allowing orientation along the local magnetic field vector by a small bar magnet (see fig. 3) which is also included. Since the v.h.f. antenna lies along the same axis as the bar magnet (the X axis), fading of the v.h.f. signals should be reduced. All antennas are made of flexible steel tape.

The electronics modules are mounted on an aluminum frame which is built around the battery compartment. A layer of thermal insulation separates all of this from the outer case. A paint pattern is applied to the satellite's outside surface to maintain a fairly stable internal temperature by regulating heat radiation and absorption.

A succeeding article will deal with the tracking of Australis-Oscar 5 and with interpreting and recording its telemetry signals. Further information on the satellite is available from Project Australis, or from the Radio Amateur Satellite Corporation (Amsat), P.O. Box 27, Washington, D.C. 20044. QST

AMATEUR RADIO PUBLIC SERVICE

NTS RACES AREC

In the Public Interest, Convenience, Necessity NRH

CONDUCTED BY GEORGE HART,* WINJM

IMPACT

You will note, elsewhere in this issue[1], that we have a job to do in conducting a study and preparing a report on the impact of certain non-amateur groups in areas of emergency preparedness activities which have traditionally been carried out by amateur radio. The "we" in this case is not the editorial pronoun referring to the undersigned, but the collective pronoun referring to the Communications Department. And what is the CD? Well, structurally speaking it is a department of the headquarters, but in actuality it also embraces all the elements of the field organization — all the appointees, all participants in AREC and NTS and all ARRL members anywhere who are participating in emergency preparedness activities, whether under the aegis of the League-sponsored program or not. Additionally, we (and this time it *is* editorial) would like to extend the invitation to contribute input for this study to *all* amateurs interested in the subject.

Note that the study is of the "impact" the activities of these other groups and services are having or have had on what we do or should be doing, not of the nature of or organization of such groups or services themselves. How can we do else but say "more power" to any group of communicators performing a public service? What we are studying is *ourselves* more than them, but the study will inevitably involve consideration of to what extent we are losing some of our traditional functions in this field, *why*, and *what* we can do about it. A corollary question that should not come up but regretfully has in some cases has been: do we *want* to do anything about it?

The Board Meeting minutes cannot discuss in detail the background for each motion made, but each of them does have a definite background and this one is no exception. Here, in essence, are the salient points in the background for this one:

1) The Citizens Radio Service, through its REACT and other groups, is in some places providing local area services which were once the exclusive province of amateur radio, presumably because of their (the CRS) numerical superiority.

2) There is a lack of delineation of RACES and AREC areas of responsibility in some areas that requires consideration of methods to employ in resolving differences at the local levels. Amateurs are known to shun involvement because of the rivalry, overlapping and poorly-defined missions. In particular, the practicality of attempting to depict RACES as part of the League's ARPSC continues to be questioned and criticized, detracting from the unanimity of the overall preparedness effort.

3) Section leaders are finding it increasingly more difficult to maintain an active and productive corps of emergency coordinators. The fault appears to lie less with the organizer than with a declining attractiveness to involvement for the volunteer participant.

These developments suggest the need for revising our philosophy and/or exploring ways to restructure our emergency preparedness involvements — first, to accommodate and cooperate with services being provided by others (both amateurs working outside ARRL-sponsored programs and non-amateurs) and, second, to bring our own efforts to a new focus which will provide more attractions and rewards for the participants.

The above may sound a little "heavy." What it means, in a nutshell, is that we have to decide what, if anything, can be done about inroads being made into our traditional functions, and how we can best modify our present philosophy, approach and existing programs to give amateurs a better purchase on them.

A number of west coast traffic handlers got together at the SCN meeting on April 26. Pictured, right to left, are W6VNQ, PAN Manager; W6MN, SCN Manager; WA6BRG, Chairman of the Pacific Area Staff; and WA6ROF, manager of RN6.

*Communications Manager, ARRL.

[1] ARRL Board Meeting minutes, Minute 75, p. 76.

Since we have been studying just this, on a continuing basis, for the past 20 years or more, without coming to a definite conclusion, it is obvious that we need more help, more input, the benefit of more concrete and concise thinking. There is only one place to get this — from the field, from "you guys out there." So, HW, OMs??!! — *W1NJM*.

Traffic Talk

Another Board Meeting motion that will bring to a head years of study on a project is Minute 65, which calls for a monthly traffic award similar to BPL, giving points for such traffic-handling functions as checking into a net, performing as a net control or an assigned liaison function, handling phone patches and possibly Emergency Corps participation.

Appointees will remember that a poll conducted a year ago in a CD Bulletin established the desirability, at least among *that* group, of eliminating the BPL in favor of setting up such a column including the above items *along with* traffic totals as one of the factors involved. The prospect, however, was greeted by such loud howls of anguish from so many of the "residents" of the BPL column that the project was temporarily shelved in favor of more crucial matters. Now it is settled. The BPL column will continue as is, but a new Honor Roll column will be added which will occupy a place in these pages as a regular monthly feature, similar to BPL in *Operating News*. But first, a lot of "setting up" must be accomplished, SCMs must be briefed on how to report activities and traffic operators will need to know how many points they should claim for each of the above functions, how and to whom to report them, etc. Before we can give anybody information on these things, we must first decide on them ourselves.

How to achieve equity among the various functions of traffic handling is a real problem. How many points is each function worth? If a net check-in is basic (one point for each check-in?), how much is a NCS job worth? Five points? Ten? How about an assigned liaison function from one net to another? Is this worth more or less than a net control job? Is handling a phone patch worth the same number of points as checking into a net? All in all, the comparison is something like trying to compare the value of an apple with that of an orange or a pear or a peach. No doubt it will have to be arbitrary at the beginning and let experience dictate changes as we go along.

Remember "Up the Flagpole" in June '65 *QST*? One of the flags run up the pole was a detailed proposal for a point system to replace BPL. It didn't fare too well as far as getting salutes was concerned at the time, but now that there is a definite commitment to an honor roll based on some of these concepts, perhaps it is worth reconsidering. Omitting number of messages handled from any of the criteria (since these will continue to be credited under BPL), here is what is left:

(a) For every complete NCS job reported to the net manager, 1 point.

(b) For every duly authorized (by net manager) liaison performed with other net or nets (including NTS-TCC functions), 1 point.

(c) For every *three* QNIs in directed public service nets, 1 point.

(d) For each *reported* operation in which emergency communications were handled in a bona fide communications emergency, 5 points.

On April 12, a drill to simulate the effects of an earthquake was held in San Gabriel, Calif. EC W6MLZ enlisted the aid of local school pupils and boy scouts to act as victims of the quake. Above is scene at one of the hospitals as the casualties begin to arrive.

(e) For each *reported* alert operation in which station was on alert for not less than 3 hours, 2 points.

(f) To the above, we should now also add: For handling a successful and complete phone patch, one point.

Now, if we accept the above as the proper point proportion and all the criteria as those deserving such points, then all that has to be decided is how many points in a month's time should be required to "make" the honor roll. For the sake of round numbers, how about 10.

Okay, how much of a performance would be required to make the ARPSC Honor Roll? In a month during which there is no emergency or alert, a once-weekly performance of the NCS chore would give an operator four points. If he also performs as liaison once a week, that's four more, for a total of eight. In doing the above he already has 8 QNIs, so he has ten points already — 10-⅔rds, to be exact. By handling phone patches, reporting into the net or nets to handle traffic when he is not an assigned NCS or liaison station, and by taking an active part in every emergency operation or alert that comes along, he can enhance his standing in the Honor Roll.

The original proposal also credited points for traffic handled — specifically, 1 point for every 100 message handlings and 1 point for "making" BPL. It seems such points could still be credited as a part of the ARPSC Honor Roll, and while it might be argued that acting as a liaison station, for example, is hardly the equivalent of handling 100 messages, the message-handler has *two* places in which to be recognized.

No matter how it starts off, there are bound to be many inequities -- but let a start be made. Send in your comments by Aug. 1, please. October '69 *QST* will announce the final criteria for the ARPSC Honor Roll (or whatever name is decided upon) and in the November issue the first such listing will appear. After six months, the criteria will be re-evaluated, points readjusted, perhaps some eliminated, others added. In any case, continued input from the field will be desirable.

All comments will be considered; however, it is hoped you will appreciate that not all can be acknowledged. Make your comments on the following:

1) Your agreement or disagreement with the basic concept.

2) How you would change the counting system — that is, what categories would you eliminate, which would you add, how many points would you assign to each?

3) Would you count traffic handled as one of the categories or would you leave this strictly in the BPL?

Use your own judgment as to what else to comment on, but please let us have comment *at least* on the above three points. —*W1NJM.*

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National Traffic System. A few words seem appropriate concerning net reports and how they are used to give some idea of just what is going on out in the vast hinterland of NTS.

As anyone familiar with the system will know, NTS operates basically at four levels: Section and Local, Region, Area and TCC. Each month, dozens of reports from all four of these levels are received and must be sorted through to extract the necessary information. There are special forms for each level or reporting to make the job a little easier, but some net managers apparently don't understand the forms and what information we need to make the reports meaningful.

Actually, there are very few problems with reports on the TCC, Area and Region levels. Most of the managers have been around awhile and are very familiar with NTS procedures. It is rare indeed for one of these reports to be among the missing when the manuscript is being prepared each month. If one is missing, it is nearly a sure bet that the pony express dropped the ball.

The TCC directors report on form CD-133 while Area and Region managers use form CD-89. New supplies of these forms were recently printed and CD-89 was revised somewhat in accord with suggestions from the field. These upper level reports are normally checked for arithmetic accuracy and surprisingly few errors are found. About the only negative comment to be made for these reports is the recent lack of comment from the managers for use in this column.

Section and Local nets are our biggest problem. The reporting form, a postcard-sized piece of light cardboard, for these nets is ungloriously called CD-125. It was designed with simplicity in mind, yet some managers seem to have difficulty executing it. The problem is compounded by the fact that some of these cards are used by non-NTS nets, so several such reports must be weeded out each month before serious NTS compilations can begin.

Provided on the card are clearly marked spaces for the two bits of information normally used in the monthly summaries: "Sessions" and "Traffic". However, these spaces may be filled with anything ranging from QNI to a cryptic group resembling 494-104-83-15. We haven't been able to determine whether this is a telephone number, a safe combination, or actually expresses, in some code, a net report.

Some of the other spaces on the card are "Manager", "Freq.", "Days", and "Time." This information can help keep our file of net registrations up to date, since it can advise of a change we normally wouldn't get until the net is reregistered. The spaces for "NCS" and "Liaison stations" are some help in determining whether a net is adhering to the NTS system concept.

One other point on NTS reporting: If we don't get the reports in time, they don't do anyone much good. The nominal deadline for reports is the 15th of the following month, so reports should be in the mail at the very latest by about the 10th.

Okay, now that everybody understands NTS reporting, we can expect twice as many reports next month. — *WA9HHH.*

April Reports:

Net	Sessions	Traffic	Rate	Average	Representation (%)
1RN	60	730	.397	12.2	94.3
2RN	61	584	.671	9.6	98.0
3RN	60	707	.501	11.8	97.9
4RN	53	552	.365	10.4	84.8
RN5	60	592	.366	9.9	88.3
RN6	60	1154	.719	18.9	100.0
RN7	60	323	.290	5.4	43.3
8RN	61	750	.411	12.3	97.3
9RN	60	724	.629	12.1	91.7
TEN	60	478	.499	7.9	77.9
ECN	57	276	.282	4.8	72.2
TWN	50	201	.233	4.1	61.0
EAN	30	2239	1.421	74.6	97.2
CAN	30	1175	.913	39.2	98.8
PAN	30	1327	1.036	44.2	100.0
Sections[1]	1907	12775			
TCC Eastern	120[2]	940			
TCC Central	90[2]	606			
TCC Pacific	120[2]	1016			
Summary	2699	27,149	EAN	14.9	—
Record	2613	28,426	1.391	19.1	—

[1] Sections and Local nets reporting (62): BUN (Utah); PVTEN (N.J.); QIN (Ind.); KTN, KYN (Ky.); WSBN, WIN, WSSN (Wisc.); M6MTN, WSSB, QMN (Mich.); VSBN, VN (Va.); OZK (Ark.); GN, WFPN, FMTN, VEN, TPTN, FPTN, FAST (Fla.); CCN, HNN (Colo.); EPA, PTTN, EPAEPTN (Pa.); OSSB, OSN, BN (Ohio); CN, CPN (Conn.); NCNL, NCNE (N.C.); WVN (W. Va.); SSZ, OLZ (Okla.); ILN (Ill.) NLI Phone, NYS (N.Y.); SMN, MNN (Mo.); AENB, AEND, AENH, AENR, AENM (Ala.); TN, TSN (Tenn.) LAN (La.); MDCTN (Md.-D.C.); TTN, TEX (Tex.); NMRTN (N.M.); QKS (Kans.); WSN (Wash.); RISPN (R.I.); MSN, MJN (Minn.); NCN (Cal.); WMN (W. Mass.); GBN (Ont.)

[2] TCC functions, not counted as net sessions.

Transcontinental Corps. W3EML reports a fair month with traffic up slightly, all functions assigned and working well, and the transition to daylight time accomplished with no problems. WØLCX says the change to daylight time is making it rough going in the west. W7DZX says it's always good to see traffic up.

April reports:

Area	Functions	% Successful	Traffic	Out-of-Net Traffic
Eastern	120	94.1	2592	940
Central	90	94.4	1284	606
Pacific	120	93.2	2032	1016
Summary	330	94.2	5908	2562

The TCC Roster: Eastern Area (W3EML, Dir.) — *W1s* BJG NJM YKQ, K1ESG, *W2s* FR GKZ PU, K2RYH, *W4s* BHN BLV UWA, WB2RKK, W3EML, K3MVO, *W4s* NLC UQ ZM, K4KNP, K6CAG/1. Central Area (WØLCX, Dir.) — W4OGG, K4AT, WB4AIN, *W5s* MI RHF, *W9s* CXY DND VAY, *WA9s* BWY RAK VZM, K9STN, *WØs* HI INH LCX, KØAEM, *WA1Øs* DOU IAW. Pacific Area (W7DZX, Dir.) — *W6s* BGF BNX EOT IPC IPW VNQ VZT DYX, *WA6s* BRG LFA ROF, WB6HVA, *W7s* KZ ZIW, K7HLR, WA7CLF.

Public Service Diary

On March 22, a twin engined plane took off from Denver on a flight to Durango in western Colorado. A sudden change in the weather forced the pilot to use instruments. His last radio contact was at 1440 MST. The plane was due in Durango slightly after 1600 but it never arrived.

Early on the morning of March 23, the Civil Air

Patrol began a search for the missing aircraft. It was soon discovered that CAP communications would not be sufficient for the operations so the Pueblo Ham Club was asked to assist.

Conditions ruled out the use of 75 and 40 meters, so 2-meter FM, utilizing a repeater, was pressed into service. A base station was established at the Pueblo Airport which was the base for the air search. Additional units were installed at the city hall in La Veta and at the Center, Colo., Airport. A number of mobile units were used to supply relays, and a spare FM unit was quickly installed in a CAP plane.

Late on the afternoon of March 28 the wreckage of the plane was sighted at the 13,000 foot level on Spanish Peaks, a very rough and dangerous location. A big jet helicopter was used to land a number of mountain rescue team members within a quarter mile of the crashed plane. Contact with the helicopters and rescue parties was maintained using hand-carried units. All six people abroad the plane perished.

WAØUZO was control operator at the La Veta station for all seven days of the operation while WAØVTO did the same at the Pueblo Airport station. Another twelve amateurs took part at one time or another in addition to the repeater station, WAØSNO. — *KØSPR, EC Pueblo County, Colo.*

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The Los Alamos (N. M.) AREC assisted with the search for a boy who had failed to return from a hike on March 29. Civil Defense headquarters was manned by K5QIN and WA5RCP while the Los Alamos ARC station, W5PDO, was operated by W5NDW and WA5ROU. W5OJM and W5PNY set up portable stations at the field search site. K5CXN, WA5ROW and WA5ROT soon joined the search, which quickly located the boy, who was safe. — *K5QIN.*

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On April 22, 14 Regina (Sask.) amateurs, under the direction of EC VE5DO, assisted the Emergency Measures Organization with communications at Lumsden. The Qu'Appelle Valley was severely flooded and it appeared that the water would spread to the town. The efforts of thousands of volunteers managed to save the town. — *VE5DO, EC Regina, Sask.*

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At 2150 GMT on May 8, a tornado struck the town of Kettering, Ohio, doing estimated damage in the several millions of dollars. K8SNJ and W8KKF activated the local two-meter civil defense frequency until it was decided, at 2347, to activate the RACES plan of the Miami Valley CD Authority. By 0100 nineteen stations had reported their availability. The Red Cross also requested communications aid between the disaster control point, the emergency shelter and outlying assembly points. At 0619 communications were secured, although some of the local amateurs stayed on duty for several hours more. Thirty-one amateur stations were active, on the two meter band. The operation also utilized a repeater. — *W8KKF*

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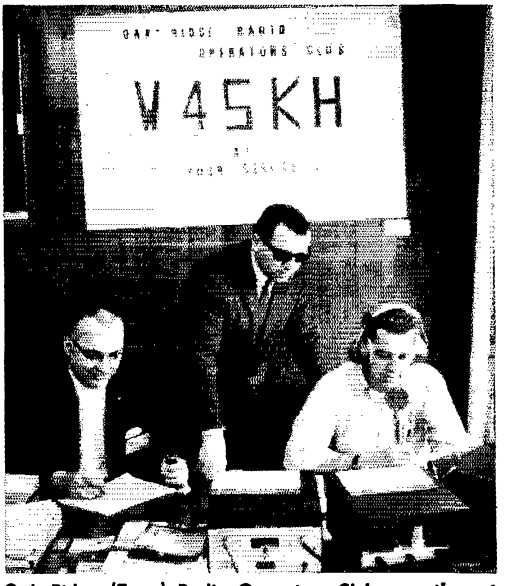
On April 19, a Novice Dune Buggy Race covering a course of 50 miles was held near Ocotillo Wells, Calif. Amateur radio was used to provide communications for five check points along the course, with an additional station at the start/finish line. One emergency call was placed when a motorcyclist turned over and received a cut on the head.

On April 20, the experienced drivers' race was held. For this race, in which 150 drivers were entered, ten checkpoints were utilized. Again an emergency occurred when one of the drivers attempted a short cut but got stuck in a dry wash. An ambulance responded to the call but only minor bruises were sustained in the mishap. — *WA6KHN, SEC San Diego.*



Oak Ridge (Tenn.) Radio Operators Club recently put on an exhibit on amateur radio and handled traffic for the ladies participating in the Tennessee Womens Bowling Tournament. Left to right are K4OUK, K4LTA and WA4NZF.

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EC K2AYQ contacted the communications chairman of the Adirondack Chapter of the American Red Cross when it was learned that the Patrician Paper factory in South Glens Falls, N. Y., was ablaze. WA2AQD took a portable unit to the scene to await arrival of the Red Cross disaster unit in case communications were needed to headquarters. WB2FRV and WB2BZJ also assisted at the fire scene until the portable unit malfunctioned. WB2VWD came to the rescue with his mobile. It was soon determined that communications were not needed, so the operation was secured. — *K2AYQ, EC Glens Falls Area, N. Y.*

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Thirty-seven SEC reports were received for the month of March, 1969, indicating 14,494 active AREC members. That is a loss of eight reports and about 1700 members compared to the same time last year. Sections reporting were: Ala, Alta, Ariz, Ark, Colo, EFla, EMass, EPa, Ind, Iowa, Kans, Ky, Mar, Mich, Mo, Mont, Nebr, Nev, NMex, NLI, NTex, Ohio, Que, SF, SCV, Sask, SDak, SNJ, Stex, Tenn, Utah, Va, Wash, WVa, WFla, WNY and WPa.

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Independent net reports:

Net	*Sessions*	*Checkins*	*Traffic*
Hit & Bounce	30	366	433
7290 Traffic	44	1574	1255
QTC	22	224	91
Northeast Traffic	30	380	675
Clearing House	26	331	241
Mike Farad E & T	26	317	345
Eastern US Traffic	28	67	141
All Service	4	64	20
20 Meter ISSB	23	501	6978
North American SSB	26	548	429
75 Meter ISSB	30	1036	392

QST

The 22nd Simulated Emergency Test

or, We Did Fine in '69!

REPORTED BY BILL REICHERT,* WA9HHH

IN the write-up for the 1968 Simulated Emergency Test[1], reporter W1ARR commented "You just *know* things went pretty well when 'Best SET we've ever had' was almost a commonplace remark. . . ." Needless to say *this* reporter looked upon the prospects of the 1969 SET with some trepidation. Could ARPSC improve on "the best ever?"

You bet we could! Even after the reports were thoroughly red-penciled, the AREC/RACES and NTS divisions both bettered last year's efforts in nearly all categories by wide margins. No doubt the 1969 marks were uplifted somewhat by the trend toward increased reporting, but we like to think that when the myriad of pretended catastrophes struck on January 25 and 26, ARPSCers near and far just decided to better a good showing.

When the decision to move the SET from October to January was reached in 1967, it was questioned whether the new date would help or hinder the all-important test of emergency preparedness. If the first two to be held in the winter month are any indication, there certainly is no deterrent attached. AREC/RACES total points have increased nearly 25% over the 1966 figures while NTS total points nearly doubled.

This is not to say SET '69 went perfectly. The major purpose of a drill like SET is to discover weaknesses in the system, and certainly some faults were uncovered in both divisions. Now that we more thoroughly recognize our problems, can they be conquered? Can we continue to do better next year and the year after and on into the future?

We think ARPSC can do it. The job may be tougher, we may all have to work a little harder each time, but we can't relax a second until we do so well the term "amateur" applies only in its licensing sense. Amateur radio's efforts in the public interest, convenience and necessity must not go unrecognized, and when the day of reckoning arrives, amateur radio public service will be a major "plus" in our favor.

Our hats off, guys 'n' gals, for a job well done!

National Traffic System

What can be said about NTS that hasn't been said before? Traffic net performance in this year's SET completely overshadowed all previous performances in similar tests. As was true last year, we had perfect reporting from all NTS Region and Area Nets, and the three TCC Areas. At the section level, 105 nets reported, compared to 97 in 1968. All 120 nets reporting amassed a grand total of 102,158 points compared with 79,161 in 1968.

VE2BVG, VE2CH, VE2BZF and VE2BVO, in the customary sequence, were all active from this substation, located at Chicoutimi, of the Arvida Communications Control Center.

Only a very few adverse remarks were heard concerning NTS. One concerned the overflow of SET traffic into regular net sessions as much as a week after the disaster test weekend. Considering the fifty percent increase in traffic handled, the overflow may simply signify the achievement of a long standing goal: that of overloading the system. This is one of the purposes of the SET — to find the limits of our capabilities. Now we can concentrate on improving efficiency so the point of overload is more remote.

Other comments concerned the apparent come back of the NTS pin-up girl. (What? You've never heard of Betty Garble?) While we are striving to improve our efficiency we should also strive to improve our accuracy. In a marathon operation like SET, as operators become tired, the likelihood of errors increases. Don't QSL that message until you're sure you have it right!

On the Newington scene, ARRL received 432 radiograms from ECs, ROs, and other SET participants. W1AW (operated by W1WPR and W1QIS) and League staffers W1ARR, W1ETU, WA1GFW and WA9HHH/1 (operating from home stations) handled 294 of these while the

* Communications Assistant

[1] Hill, "The 1968 Simulated Emergency Test," *QST*, August, 1968, p. 50.

following local ops took care of the rest: WA1HOL, 72; W1BDI, 36; W1BOI, 7; WA1FHN, 6; K1ZYF, 6; K1SXF, 4; W1PRT, 3; WA1IEG, 3; and K1ILQ, 1.

Below are listed the complete statistics for the reporting nets. Column A is traffic handled; B is minutes in session; C is the number of different stations participating; D is the number of different NCS; and E is the number of different stations performing a liaison to a higher level net. Included in the list are some nets that are not usually considered part of NTS; however, if proper liaison was carried out, the net did become part of the system, if only for SET purposes.

Name of Net	*A*	*B*	*C*	*D*	*E*	*Total points*
1RN	498	825	48	6	12	1509
2RN	349	595	35	9	10	1109
3RN	295	679	48	9	16	1195
4RN	443	714	61	9	21	1429
RN5	770	960	71	12	18	2022
RN6	427	819	64	8	13	1415
RN7	282	900	33	6	12	1338
8RN	346	858	56	9	11	1360
9RN	147	545	32	10	5	831
TEN	288	490	17	3	16	907
ECN	160	633	26	11	7	935
TWN	264	548	28	6	9	943
EAN	1294	820	102	8	17	2443
CAN	1014	914	77	8	30	2272
PAN	757	710	55	6	0	1607
TCC Eastern	1548					
TCC Central	896					
TCC Pacific	569					
KPN (Kans.)	1371	1560	36	5	5	3053
NLI Phone (N.Y.)	882	1701	51	14	9	2700
GSBN (Ga.)	483	1020	321	10	0	2195
Lake Erie/Tri-State (Pa.)	560	1440	28	6	2	2096
Area Four-AREC (Va.)	377	1230	50	11	12	1822
PVTEN (N.J.)	253	1445	33	8	2	1814
Minnesota 6-Meter Traffic	158	1500	39	5	2	1771
QFN (Fla.)	459	898	52	12	45	1746
NJAN (N.J.)	115	1440	18	6	3	1636
KYN (Ky.)	249	1203	28	12	7	1603
CN (Conn.)	388	940	37	14	22	1582
NCN (Calif.)	465	960	38	6	9	1576
NJEPTN (N.J.)	321	1075	56	6	5	1563
AENR (Ala.)	23	1440	23	1	2	1524
VSBN (Va.)	178	1052	80	8	14	1500
Area 4 6-Meter AREC (Va.)	187	1200	27	5	6	1496
Washington AREC	289	1080	33	3	4	1470
LAN (La.)	190	775	167	12	13	1424
WSN (Wash.)	244	960	27	7	13	1358
VN (Va.)	340	796	45	11	11	1336
NYS (N.Y.)	290	798	58	11	13	1324
KTN (Ky.)	330	648	94	6	3	1211
TSSB (Tenn.)	341	714	39	7	7	1203
TN (Tenn.)	194	617	120	14	15	1196
WFPN (Fla.)	310	650	67	6	3	1139
PFN (Pa.)	47	960	42	4	4	1126
WPA (Pa.)	146	808	27	8	15	1123
BN (Ohio)	167	779	36	11	9	1118
EPA (Pa.)	189	725	43	14	8	1110
Arundel Emergency (Md.)	175	750	31	7	5	1045
GSN (Ga.)	198	697	12	9	11	1019
Central Kentucky 6M Emer.	60	900	32	2	1	1007
TPTN (Fla.)	160	471	147	6	9	1000
San Fernando Civil Defense	184	720	7	5	4	963
EPAEPTN (Pa.)	129	603	126	60	35	953
ECTN (N.J.)	162	630	27	8	6	916
APSN (Alta.)	166	620	49	5	1	914
Noon Time Net (Wash.)	52	660	84	4	2	910
AENM (Ala.)	212	483	78	5	3	891
Alexandria 2 Meter (Va.)	102	705	19	3	2	870
TTN (Tenn.)	118	540	61	9	6	855
QIN (Ind.)	91	630	20	8	7	838
AENB (Ala.)	86	623	20	8	6	819
Stark County Emergency (Ohio)	76	660	20	2	5	811
ILN (Ill.)	130	523	18	12	10	802
QMN (Mich.)	98	570	29	8	4	786
Augusta AREC/RACES (Ga.)	259	360	35	9	5	759
Area 4 2-Meter AREC (Va.)	93	600	17	3	3	757
Pierce County AREC (Wash.)	143	360	98	5	2	736
Orange County Six Meter (Tex.)	52	600	19	2	3	715
North East Texas Emergency	26	620	9	6	3	709
FMTN (Fla.)	155	359	52	3	6	663
NCN (N.C.)	85	470	17	9	5	659
Copper State Net (Ariz.)	40	515	20	4	4	635
NLIVHF (N.Y.)	202	330	22	5	1	606
Navesink Emergency (N.J.)	57	324	78	5	8	602
Tidewater Emergency (Va.)	52	360	30	7	5	532
MON (Mo.)	55	345	13	9	7	506
Schenectady Emergency (N.Y.)	47	346	31	4	3	490
OZK (Ark.)	31	351	17	6	5	471
QKS (Kans.)	87	293	15	4	8	470
FCATN (Ky.)	75	300	17	3	5	449
AREC-CD Amateur Radio (Ohio)	62	300	25	2	4	442
Newport County Emergency (R.I.)	100	240	17	3	2	399
Spokane-Lincoln County AREC	271	30	17	2	10	395
MoSSB (Mo.)	43	210	45	3	2	368
Anderson Radio Club (S.C.)	36	260	26	30	10	362
Alamogordo VHF (N.M.)	67	240	8	3	1	343
PTN (Me.)	80	206	6	4	5	343
CIRCE (Ohio)	18	240	11	3	3	310
SET NET	21	240	8	2	2	297
BUN (Utah)	37	152	38	4	2	295
Kansas Zone 15 AREC	47	189	21	2	1	293
Clark County Emer. (Ky.)	46	170	22	3	2	285

As usual, the American Red Cross added a great deal of purpose to the Simulated Emergency Test. The Kalamazoo, Mich., Chapter was no exception. Here W8EMT is operating on ten meters from the ARC chapter house.

Left to right are W6MN, K6MUV, WB6NST and WB6UZS operating at the W6IN Society. Although this photo was taken after the SET, the club was active during the Test supplying AREC-NTS-RACES liaison for the San Fernando Valley ARPSC. The club has full capability on the 1.8 through 450 mHz. bands.

Queens County 10 Meter	20	210	8	2	2	266
Brazos County Emer. (Tex.)	33	200	6	2	2	265
AENT (Ala.)	40	134	28	3	3	260
Tri-County Radio Assn.	26	180	12	2	4	260
Bay County CD (Fla.)	62	120	13	5	5	258
NDN (N. Dak.)	19	196	8	4	3	256
Palm Beach County (Fla.)	21	194	8	2	2	251
Washoe County CD Medical (Nev.)	14	180	15	4	1	249
Weber County CD (Utah)	39	150	12	1	2	228
Sussex County (Del.)	28	114	19	2	7	225
PHDARA (Mo.)	31	120	21	3	3	223
Gibson County Emergency (Tenn.)	11	170	5	3	2	216
VEN (Fla.)	59	121	12	2	2	212
Buncombe County ARPSC (N.C.)	5	150	13	4	3	206
NHN (Fla.)	17	135	10	1	1	182
Northern Virginia Emer.	5	120	17	1	3	179
Arkansas Valley Emer.	17	120	9	1	2	170
Nebraska 160 Meter Weather	2	92	27	1	2	163
South Metro 2 Meter FM (Colo.)	24	90	8	1	5	160
Kokomo ARC Emer. (Ind.)	9	60	2	11	2	138
AEND (Ala.)	8	94	7	2	2	136
Kansas Zone 13 AREC	28	60	9	3	3	136
Dundy County AREC (Minn.)	8	88	7	2	1	125
Benton County RACES (Iowa)	29	60	9	2	1	122
East and West Pasco Emer. (Fla.)	2	90	3	2	1	113
Okaloosa County Emer. (Fla.)	10	60	9	2	3	113
AENH (Ala.)	13	50	11	2	2	105
Fairbury/Jefferson County AREC (Nebr.)	12	60	8	1	4	105
SCN (S.C.)	7	49	7	3	2	95
Belmont County Emer. (Ohio)	3	60	1	1	1	74
Middle Tennessee Emer.	1	30	8	1	1	57
Totals (1969)	24,982	64,476	4297	727	770	102,158
(1968)	17,045	52,962	3797	569	720	79,161

Below are listed several nets who reported but no evidence of liaison to NTS could be found. We appreciate the participation, and thank each operator who took the time to check in. Figures following the net names are the total points each net garnered.

Bartholomew County AREC (Ind.)	2017
Billings Emergency (Mont.)	97
Camden County (N.J.)	53
Fremont County CD (Ida.)	239
Lake County Emergency (Fla.)	260
Madison County AREC (Ind.)	181
Platte County (Wyo.)	35
Portland Area AREC (Ore.)	574
Quebec Section AREC	430
Saguenay VHF 2 Meter (Que.)	454
Southern Wisconsin 2 Meter Relay	84

AREC/RACES

Although the gains made by the AREC/RACES division of ARPSC weren't quite so pronounced as those of NTS, the 1968 marks were surpassed in all but three catagories. Unfortunately, two of the catagories losing ground were the self-powered portables and mobiles, and the emergency powered home stations. Portables and mobiles were down to 1282 units after a record 1513 in 1968, and home stations on emergency power fell from 350 to 343.

Ohio and Eastern Florida continued as the leaders in a 1–2 punch, holding places they have occupied for several years. Alabama regained a high place by moving from twenty-second to third. Washington gained another notch, moving from fifth to fourth, making that section's improvement over the past two SETs nothing short of fantastic. Other sections gaining ground were: Tennessee (15 to 5); Kentucky (14 to 6); Indiana (12 to 8); Orange (20 to 13); Eastern Massachusetts (21 to 14); Eastern New York (44 to 15); and Los Angeles (53 to 16).

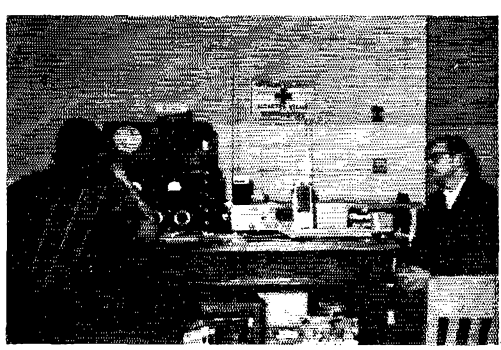
SET is a competition only insofar as a given group is competing with its own previous efforts. Therefore, some scoring system is a necessity. The scoring system used ranks each section in four catagories: (1) Total number of reports; (2) Number of mail reports; (3) Number of radio reports; and (4) Overall score. Since there were 62 sections reporting, there were 62 positions available in each of the four catagories. The sum of the places is taken, giving ranking points. The lower the number of ranking points, the higher the section will place.

Below the summary which follows, the sections are listed according to overall ranking points accumulated. The parenthetical number following the place number is last year's position. (M)

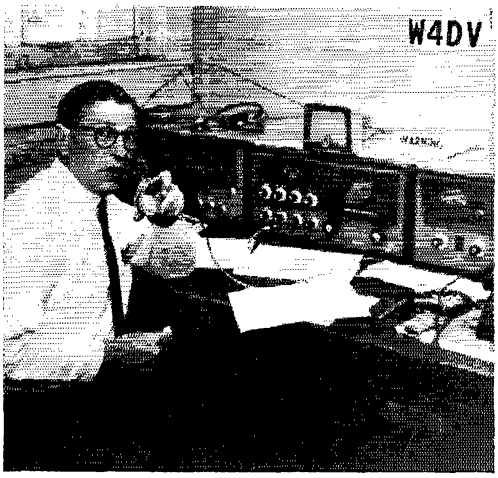
or (R) following an entry indicates only a mail or only a radio report was received, otherwise both were received.

Total reports: 279 (263)
Mail reports: 259 (236)
Radio reports: 121 (137)
Total reported AREC/RACES membership: 9693 (8282)
Total reported participation: 4484 (4122)
AREC/RACES messages to SEC or State RO: 2800 (2240)
EC/RO message to ARRL Headquarters: 189 (162)
Self-powered portable and mobile units: 1282 (1513)
Fixed stations on emergency power: 343 (350)
Total SET points: 37,985 (33,970)

Area of Jurisdiction	*Reported by*	*Points*
1 (1). OHIO (11 ranking points, 12 reports)		**2842**[1]
Belmont Co. (M)	W8BQ	28
Clark Co.	W8VZE	135[1]
Franklin Co. (M)	W8ERD	328[1]
Hamilton Co. (M)[2]	K8THT	440
Highland Co.	K8CKY	35
Jefferson Co. (M)	W8ERR	91
Lucas Co.	K8LFI	561[1]
Mahoning Co. (M)	W8OE	231[1]
Montgomery, Green, Preble Cos.	W8ILC and W8IPT	543[1]
Richland Co. (M)	WA8MHO	88
Ross Co.	K8SUB	137
Stark Co.	K8DHJ	225[1]
2 (2). EASTERN FLORIDA (12 ranking points, 16 reports)		**2023**
Alachua Co. (M)	WA4UFO	134
Broward Co. (M)[2]	WB4CKY	184
Clay Co. (M)	W4WHK	9[1]
Dade Co.	WB4HKP	137
Duval Co. (M)	W4GUJ	217
Ft. Pierce (M)[2]	W4NTE	13
Hillsboro Co.	W4KRC	167
Indian River Co. (M)	WA4SCK	78
Lake Co.	K4UYN	114[1]
Lee Co. (M)	W4SMK	42
Palm Beach Co. (M)[2]	WA4RQZ	110
Pasco Co. (M)[2]	WA4YRU	68
Pinellas Co. (M)[2]	WB4BGW	100
Polk Co.	W4FP	468[1]
Sarasota and Charlotte Cos.[2]	W4PBK	135
Seminole Co. (M)	WB4FSF	47
3 (22). ALABAMA (17 ranking points, 16 reports)		**901**[1]
Calhoun Co. (M)[2]	K4HJM	30
Chambers Co.[2]	WA4VEK	4
Dale Co.[2]	W4HRU	19
De Kalb Co.[2]	W4DGH	3
Jackson Co. (M)[2]	WA4NPL	7
Jefferson Co. (M)[2]	W4GET	117
Lauderdale and Colbert Cos. (M)[2]	WA4OCM	178
Lee Co.[2]	WA4DYD	67
Limestone Co.	K4KJD	86[1]
Madison Co.	W4YFN	212[2]
Monroe Co.[2]	K4KMG	20
Morgan Co. (M)	K4WHN	115
Perry Co. (M)[2]	WB4KSM	6
Talledega Co.[2]	WA4BXU	28
Tallapoosa Co. (M)[2]	WA4FOI	4
Wilcox Co.[2]	K4KMG	5
4 (5). WASHINGTON (18 ranking points, 13 reports)		**1698**[1]
Adams Co. (M)	W7CTS	19
Benton Co. (M)[2]	W7OEB	20
Chelan Co (R)[2]	K7UDG	—
Clallam Co. (M)[2]	K7PXA	43
Columbia Co. (M)[2]	W7RXH	39
King Co.	K7WTG	106[1]
King Co. (BEARS) (M)	W7RJW	272[1]
Kitsap Co.	W7AXT	85
Kittitas Co. (R)[2]	W7JHR	—
Pierce Co.	K7NKZ	721[1]
Snohomish Co.	WA7CYY	123[1]
Spokane and Lincoln Cos. (M)[2]	K7LRD	122
Walla Walla Co.[2]	W7GVC	148
5 (15). TENNESSEE (20 ranking points, 12 reports)		**1366**[1]
Bradley Co. (M)[2]	WA4GQL	54
Bristol, City of (M)	WA4NEC	138[1]
Coffee and Franklin Cos.	K4EGC	243[1]
Davidson Co.	W4SQE	39[1]
Gibson Co. (M)	WA4YFG	46
Green Co.[2]	K4MOS	48
Knox County (M)[2]	K4VZI	82
Rutherford Co. (M)	W4SZE	68
Shelby Co. (M)[2]	W4OQG	199
Sullivan Co.[2]	WB4ANX	278
Washington Co.	WB4EHK	124[1]
Weakley Co. (M)[2]	W4FLW	47
6 (14). KENTUCKY (29 ranking points, 18 reports)		**1560**[1]
District 1 (M)	WA4GMA	88
District 2 (M)	W4CSN	187[1]
District 3 (M)[2]	W4MPT	44
District 4	WA4FMY	409[1]
District 6 (M)	WA4AEH	39
District 7 (M)[2]	WB4HTN	21
District 8 (M)[2]	K4YZU	336
District 10 (M)	K4HOE	51[1]
District 11 (M)	WA4BZS	86[1]
District 12 (M)[2]	W4SZB	8
District 13 (M)[2]	WA4GHQ	120
District 14 (M)[2]	WA4AVV	40
District 16 (M)[2]	WA4WWA	12
District 17 (M)[2]	WA4WQZ	2
District 18[2]	K4AVX	41
District 19 (M)[2]	WB4IBO	3
District 20 (M)[2]	W4CID	42
District 21 (M)[2]	WB4EOR	31
6 (4). NEW YORK CITY-LONG ISLAND (29 ranking points, 8 reports)		**2739**[1]
Brookhaven Area (M)	W2OQI	272
Brooklyn (M)	WB2FXW	154
Huntington Township[2]	W2HAE	285
Kings Co.	WA2UCP	148[1]
Nassau Co.	W2FI[3]	983[1]
Queens Co. (M)	WB2RXB	201[1]
Richmond (M)[2]	W2VKF	117
Suffolk Co. (M)	K2HTX	579[1]
8 (12). INDIANA (32 ranking points, 8 reports)		**1009**[1]
Bartholomew Co.[2]	WA9OLM	99
Clark Co.[2]	W9HRY	47
Howard Co. (M)[2]	WA9QEQ	156
Jay Co. (M)	W9SNQ	66
Kosciusko Co.[2]	W9ENU	83
La Porte Co.	K9HYV	260[1]
Madison Co. (M)	K9ATV	93
Randolph Co. (M)	W9QUH	205
9 (3). NORTHERN NEW JERSEY (41 ranking points, 6 reports)		**1303**
Englewood	WA2CCF	119[1]
Monmouth Co. (M)	WB2BCS	446
Passaic	K2KDQ	206
Plainfield (M)	WA2ASM	88
South Bergen Co.[2]	W2DMJ	304
Stanhope (M)	WA2KZF	140[1]
9 (8). IOWA (41 ranking points, 11 reports)		**620**
Benton Co. (M)[2]	WØFFM and WØEEG	58
Buena Vista Co. (M)	KØEVC	37



Over the past several SETs, the Washington section has shown a tremendous increase in ARPSC activity in moving from "way down the list" to fourth position, just behind perennial SET leaders, Ohio and Eastern Florida. K7BFL is keeping an eye on the local situation while Spokane Red Cross Disaster Chairman Herb Ayers looks on.



SET activity was much increased in Georgia this year. Here Section Emergency Coordinator WA4WQU operates W4DV, the station of the Amateur Radio Club of Augusta, during the Test.

Clay Co. (M)[2]	KØEXU	23
Clinton Co. (M)	WAØEFN	308[1]
Humboldt Co. (R)[2]	WØFDM	...
Jefferson Co.	KØIQV	28
Jones Co. (M)	WØCQC	42
Linn Co. (R)	WØLIJ	...
Muscatine Co. (R)	WØBX	...
Story Co. (M)	WØJIG	124
Washington Co. (R)[2]	KØUXW	...
11 (10). SOUTH TEXAS (42 ranking points, 7 reports)		**2440**
Bexar Co. (M)[2]	K5HZR	223
Brazos Co. (M)[2]	WA5RXO	94
Harris Co. (M)	K5HXR	1746
Jefferson Co. (M)	W5TFW	75
Nueces Co. (M)	W5AQK	143
Orange Co.[2]	W5ICL	142
Webb Co.[2]	WN7JYG/5	17
12 (7). MICHIGAN (46 ranking points, 5 reports)		**890**
Calhoun Co.[2]	WA8VXE	150
Cass Co.	K8HPO	1201
Kalamazoo Co. (M)[2]	W8NWW	177
Monroe Co.	W8NDM	2241
Wayne Co.	W8BEZ	219
13 (20). ORANGE (53 ranking points, 4 reports)		**1285[1]**
Desert Area (M)	WA6TAG	150[1]
Orange Co.	WB6RVM	3051
Riverside	K6CID	5801
San Bernardino	K6GGS	2501
14 (21). EASTERN MASSACHUSETTS (54 ranking points, 8 reports)		**4784**
Acton	W1QMN	41[1]
Haverhill[2]	W1EEF	124
Hudson (M)[2]	W1UJF	36
Maynard (R)[2]	W1TRD	...
Medford (R)[2]	WA1DXI	...
Somerville (M)[2]	K1DZG	82
Wayland (M)[2]	W1EHT	74
Winthrop (M)	W1BB	121
15 (44). EASTERN NEW YORK (58 ranking points, 5 reports)		**1143[1]**
Albany Co. (M)	WA2BAH	4631
Bethlehem (M)[2]	W2GTI	144
Dutchess Co.	W2HZZ	921
Schenectady (M)[2]	W2TV	355
Westchester Co.[2]	WA2JWL	89
16 (53). LOS ANGELES (63 ranking points, 4 reports)		**649[1]**
East San Gabriel Valley	WA6JXG	250[1]
Los Angeles CD Area A[2]	W6TXJ	218
San Fernando[2]	K6MIV	87
Whittier (M)[2]	W6LVQ	64
17 (16). SANTA CLARA VALLEY (64 ranking points, 4 reports)		**624**
Half Moon Bay	W6VK	69
Palo Alto, Mt. View, Los Altos	W6ASH	113[4]
Redwood City-Menlo Park	W6DEF	409[1]
South Monterey Co. (M)	WB6IZF	33
18 (12). MONTANA (69 ranking points, 5 reports)		**307**
Billings	K7UPH	61
Bozeman	WAØATY/7	108
Laurel	W7LBK	80
Livingston	K7SVR	38
Phillips Co. (M)	K7OZU	20[1]
19 (11). VIRGINIA (70 ranking points, 6 reports)		**993[1]**
Alexandria (M)	W4JXD	112
Arlington Co. (M)	W4FF	73
Fairfax Co.[2]	WB4CVY	355
Norfolk (M)[2]	WA4BUE	229
Virginia Beach (M)	WA4EUL	121[1]
Winchester, Frederick and Clark Cos. (M)	W4ACC	103
20 (28). WISCONSIN (73 ranking points, 4 reports)		**422[1]**
Manitowoc Co.[2]	W9BZU	63
Marathon Co.	W9IVA	159[1]
Racine (M)	W9SZL	151[1]
Rock Co.	WA9IZK	49
21 (17). NEBRASKA (75 ranking points, 5 reports)		**475**
Adams, Webster Cos.[2]	KØFJT	102
Jefferson Co. (M)[2]	WØAGK	27
Lancaster Co. (M)	WAØEUM	162[1]
Richardson Co. (M)	WAØDFS	101[1]
Sioux, Dawes and Sheridan Cos.	WAØJKN	83
22 (24). COLORADO (80 ranking points, 4 reports)		**713[1]**
Arapahoe Co.[2]	WØFA	220
Denver Metro Area (M)	KØLPI and WØGVT	313
El Paso and Teller Cos. (R)	WØGCH	...
Pueblo Co.	KØSPR	180[1]
23 (23). GEORGIA (82 ranking points, 6 reports)		**539[1]**
Atlanta Metro Area (M)[2]	WB4EZX	133
Augusta (M)[2]	W4DDY	261
Bibb Co. (M)	WA4HYW	123[1]
Coweta, Fayette (M)	K4IKV	22
Fulton Co.[5]		...
Merriweather[5]		...
24 (6). WESTERN NEW YORK (84 ranking points, 5 reports)		**492**
Chemung Co.	K2DNN	105
Delaware Co. (M)	W2TFL	61
Glens Falls Area	K2AYQ	222
Onondaga Co. (M)	WA2AWK	104[1]
Wansau Co.[5]		...
25 (33). OREGON (91 ranking points, 4 reports)		**774[1]**
Josephine Co.	W7DEM	200
Marion Co. (M)[2]	W7TMF	239
Multnomah Co.[2]	K7PHP	335
26 (30). MISSOURI (98 ranking points, 5 reports)		**320**
Buchanan Co. (M)[2]	WØOGC	89
Clay Co.[2]	WAØKUH	138
Jackson, Jasper and Mercer Cos. (M)[2]	KØRPH	93
St. Charles Co. (R)	WØRTO	...
St. Louis Co. (R)[6, 7]	KØAEM	...

Minnesota also showed an increase in SET activity this year. Here WØHWY, on the left, is receiving traffic on a local six-meter net while WAØIAW is providing NTS liaison through MSN and TEN.

27 (10). KANSAS (99 ranking points, 4 reports) **543**
Zone 1 (M)[2] ..... WAØOZP 102
Zone 9 (M) ..... WØGU 129
Zone 13 (M) ..... KØLPE 76[1]
Zone 15 ..... KØUVH 236[1]

28 (24). SOUTHERN NEW JERSEY (100 ranking points, 4 reports) ..... **251[1]**
Burlington (M)[2] WA2HJF 81
Camden Co. (M) ..... W2ORS 40[1]
Gloucester Co. ..... K2SOL 101[1]
Mercer Co. ..... W2YPZ 29[1]

29 (31). WESTERN NEW YORK (107 ranking points, 3 reports) ..... **834[1]**
Allegheny and Westmoreland Cos. (M) ..... K3SMB and K3CHD 420
Erie Co.[2] K3IOX 307
McKean Co. (M) ..... W3OCR 107[1]

30 (41). WESTERN FLORIDA (108 ranking points, 5 reports) ..... **368[1]**
Bay Co. (M) ..... WA4JIM 120[1]
Jackson Co. (M)[2] W4KCA 26
Madison Co. (R)[2] ..... WA4GHE ...
Okaloosa Co. (M)[2] WB4EER 141
Washington and Homes Cos. (M)[2] WA4SRR 81

31 (35). ILLINOIS (110 ranking points, 2 reports) ..... **529[1]**
Cook Co. ..... W9HPG 416[1]
Sangamon Co. ..... W9BUN 113[1]

32 (18). OKLAHOMA (114 ranking points, 2 reports) **451**
Comanche Co. K5BYF 302
Garfield Co. ..... WA5FVJ 149[1]

33 (42). LOUISIANA (122 ranking points, 2 reports) ..... **736[1]**
Algiers and Westbank ..... W5LHS 119[1]
Southwest Louisiana (M)[2] W5SKW 617

34 (28). WEST VIRGINIA (123 ranking points, 4 reports) ..... **198[1]**
Fayette Co. (M)[2] K8CFT 27
Kanawha Co. (M)[2] W8CHY 43
Randolph Co. (M) ..... K8MSP 71[1]
Upshur Co. WA8NDY 57

35 (55). MINNESOTA (128 ranking points, 4 reports) ..... **299[1]**
Freeborn Co. (M)[2] ..... WØFIT 84
Minneapolis-St. Paul (M)[2] ..... WAØDWM 105
Mower, Dodge, Fillmore and Steel Cos. (M)[2] ..... WØAZR 76
Wabasha Co. (M)[2] ..... KØZRD 34

36 (nil) WYOMING[2] (132 ranking points, 2 reports) **336**
Natrona Co. K7TAQ 284
Platt Co. (M) W7TZK 52

36 (nil). SAN FRANCISCO[2] (132 ranking points, 2 reports) **184**
Humboldt Co. W6BWV 104
Petaluma W6PZE 80

38 (44). DELAWARE (137 ranking points, 2 reports) ..... **305[1]**
New Castle Co. (M) WA3DYG 181
Sussex Co. ..... WA3GSM 124[1]

39 (32). SASKATCHEWAN (140 ranking points, 3 reports) ..... **386[1]**
Moose Jaw (M) ..... VE5IL 108[1]
Prince Albert (M) VE5BO 135
Saskatoon (M) ..... VE5RJ 143[1]

40 (51). RHODE ISLAND (142 ranking points, 2 reports) **105**
Block Island[2] K1JSG 15
Newport[2] W1JFF 90

41 (37). QUEBEC (144 ranking points, 3 reports) ..... **327[1]**
Beauharnois, Huntington and Chateau Cos. (M) ..... VE2ADE 81[1]
Saguenay-Lake St. John (M)[2] VE2BAI 212
St. Hyacinthe (M) ..... VE2BVY 34[1]

42 (19). MARYLAND-DISTRICT OF COLUMBIA (151 ranking points, 3 reports) **322**
Anne Arundel Co. (M) ..... K3LFD 208[1]
Baltimore (M)[2] K3RGB 60
Calvert Co. (M) ..... W3ZNW 54[1]

43 (49). SAN JOAQUIN VALLEY (158 ranking points, 2 reports) ..... **138[1]**
San Joaquin Co. ..... K6RBB 71[1]
Tuolumne Co. (M)[2] WB6RZI 67

44 (34). CONNECTICUT (162 ranking points, 2 reports) **41**
Danbury W1ADW 41
Southington (R) ..... W1WHR ...

45 (nil). IDAHO[2] (163 ranking points, 3 reports) **77**
Boise Co. (R) ..... W7IWU ...
Fremont Co. (M) W7AXL 28
Nez Perce Co. (M) WA7EWW 49

46 (26). ARKANSAS (165 ranking points, 3 reports) **42**
Drew Co. Area (M)[2, 6] WA5TLS 2
Pope Co. (M)[2] WA5LKB 40
White Co. (R)[2] ..... WA5KQU ...

47 (48). ALBERTA (175 ranking points, 1 report) ..... **246[1]**
Calgary ..... VE6AWM 246[1]

48 (39). EASTERN PENNSYLVANIA (176 ranking points, 2 reports) ..... **276[1]**
Bucks Co. (M)[2] WA3KTK 245
York Co. (M)[2] K3FOB 31

49 (nil). ARIZONA[2] (177 ranking points, 1 report) **243**
Pima Co. K7CET 243

50 (43). NEVADA (179 ranking points, 2 reports) **244**
Sparks-Reno (M)[2] W7SRM 98
State of WA7BEU 146

51 (58). MARITIME (180 ranking points, 1 report) ..... **190[1]**
Halifax ..... VE1AI 190[1]

51 (50). NORTH TEXAS (180 ranking points, 3 reports) ..... **162[1]**
Angelina Co. (R)[2] ..... WA5TMN ...
Deaf Smith Co. (M)[6] ..... W5JSM ...
North East Texas (M)[2] K5QKM 162

53 (nil). SOUTH CAROLINA[2] (183 ranking points, 1 report) **176**
Anderson Co. W4FVV 176

53 (27). ONTARIO (183 ranking points, 2 reports) **131**
Leeds Co. (M)[2] VE3GMQ 21
Toronto Metro Area ..... VE3CO 110[1]

55 (40). SAN DIEGO (184 ranking points, 1 report) **152**
San Diego Co. ..... WB6SQZ 152[1]

56 (57). UTAH (188 ranking points, 1 report) **128**
Weber Co. W7GPN 128

57 (59). NORTH DAKOTA (190 ranking points, 1 report) ..... **368[1]**
State of ..... KØSPH 368

58 (46). ALASKA (195 ranking points, 2 reports) **62**
Anchorage (M) KL7FON 46
Eagle River (M)[2] KL7FLS 16

59 (nil). NEW MEXICO[2] (204 ranking points, 1 report) **237**
Alamogordo (M) WA5FLG 237

60 (36). SACRAMENTO VALLEY (208 ranking points, 1 report) **179**
Yolo Co. WA6TQJ 179

61 (37). NORTH CAROLINA (216 ranking points, 1 report) **84**
Buncombe Co. (M)[2] WA4KWC 84

62 (55). WESTERN MASSACHUSETTS (221 ranking points, 1 report) ..... **30[1]**
Southwick (M) ..... W1ALL 30[1]

[1] Bettered last year's score. [2] Jurisdictional area not reported in 1968 SET. [3] The reports of W2ZAI, W2UAL, W2ELK and K2DHC are included in the totals of W2FI's report. [4] Score is the same as last year! [5] Hearsay reports indicate there was activity in this area. [6] No test held. [7] Liaison was maintained with Midwest Headquarters, American Red Cross. QST

Feedback

Not even members of the Contest Advisory Committee are immune from the ravages of Murph. The c.w. score of W8DB, Ohio Section, was omitted from the Sweepstakes results appearing in April *QST*. Credit Vince with 56,703-308-74-A-15 — and credit the Miami Valley Amateur Radio Contest Society with an adjusted aggregate score of 603,282. This agonizing reappraisal lifts the MVARS crew from 12th place to 9th in the SS club competition. Apologies to all, fellas.

Add to SS phone scores: W8IPA (Ohio) 41,580-252-66-A-24. Somehow this one was dropped from the individual scores but included in the West Park Radiops total. Sri!

The c.w. score of WA6IVN should have been included among the "Champs" on page 61. Steve's total of 129,315 points was good for seventh-high score.

The c.w. score of WN8BPD (Mich.) wound up in the Ohio tabulation. Excuse it, OM, please.

ARRL QSL Bureau

The function of the ARRL QSL Bureau System 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 4¼ by 9½ 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:

W1, K1, WA1, WN1[1] — Hampden County Radio Association, Box 216 Forest Park Station, Springfield, Massachusetts 01108.

W2, K2, WA2, WB2, WN2 — North Jersey DX Assn., P.O. Box 505 Ridgewood, New Jersey 07451.

W3, K3, WA3, WN3 — Jesse Bieberman, W3KT, RD 1, Valley Hill Rd., Malvern, Pennsylvania 19355.

W4, K4 — H. L. Parrish, K4HXF, RFD 5, Box 804, Hickory, North Carolina 28601.

WA4, WB4, WN4[1] — J. R. Baker, W4LR, 1402 Orange St., Melbourne Beach, Florida 32951.

W5, K5, WA5, WN5 — Hurley O. Saxon, K5QVH, P.O. Box 9915, El Pasco, Texas 79989.

W6, K6, WA6, WB6, WN6 — San Diego DX Club, Box 6029, San Diego, California 92106.

W7, K7, WA7, WN7 — Willamette Valley DX Club, Inc., P.O. Box 555, Portland, Oregon 97207.

W8, K8, WA8, WN8 — Paul R. Hubbard, WA8CXY, 921 Market St., Zanesville, Ohio 43701.

W9, K9, WA9, WN9 — Ray P. Birren, W9MSG, Box 519, Elmhurst, Illinois 60126.

WØ, KØ, WAØ, WNØ — Alva Smith, WØDMA, 238 East Main St., Caledonia, Minnesota 55921.

KP4 — Alicia Rodriquez, KP4CL, P.O. Box 1061, San Juan, P.R. 00902.

KZ5 — Gloria M. Spears, KZ5GS, Box 407, Balboa, Canal Zone.

KH6, WH6 — John H. Oka, KH6DQ, P.O. Box 101, Alea, Oahu, Hawaii 96701.

KL7, WL7 — Alaska QSL Bureau, Star Route C, Wasilla, Alaska 99687.

VE1 — L. J. Fader, VE1FQ, P.O. Box 663, Halifax, N.S.

VE2 — John Ravenscroft, VE2NV, 353 Thorncrest Ave., Montreal 780, Quebec.

VE3 — R. H. Buckley, VE3UW, 20 Almont Road, Downview, Ontario.

VE4 — D. E. McVittie, VE4OX, 647 Academy Road, Winnipeg 9, Manitoba.

VE5[1] — A. Lloyd Jones, VE5JI, 2328 Grant Rd., Regina, Saskatchewan.

VE6 — Karel Tettelaar, VE6AAV, Sub. P.O. 55, N. Edmonton, Alberta.

VE7 — H. R. Hough, VE7HR, 1291 Simon Road, Victoria, British Columbia.

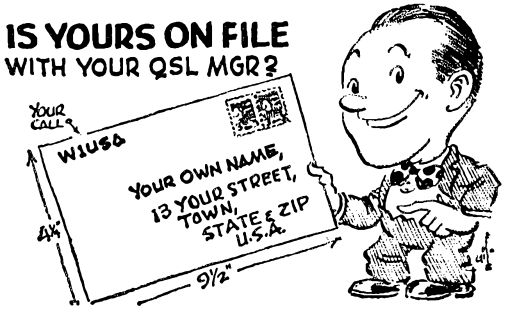
VE8 — George T. Kondo, VE8, ARRL QSL Bureau of Department of Transport, Norman Wells, N.W.T.

VO1 — Ernest Ash, VO1AA, P.O. Box 6, St. John's, Newf.

VO2 — Goose Bay Amateur Radio Club, P.O. Box 232 Goose Bay, Labrador.

SWL — Leroy Waite, 39 Hannum St., Ballston Spa, New York 12020.

[1] **These bureaus prefer 5 × 8 inch or #50 manila envelopes.**



COMING ARRL CONVENTIONS

July 4–6 — Rocky Mountain Division, Salt Lake City, Utah.
July 5–6 — West Virginia State, Jackson's Mill.
August 16–17 — West Gulf Division, Amarillo, Texas.
August 29–30 — Great Lakes Division, Louisville, Kentucky.
September 13–14 — Georgia State Convention, Augusta.
October 11–12 — Roanoke Division, Huntington, West Virginia.
October 17–19 — Southwestern Division, San Diego, California.

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 for up to two years in advance.

Strays

Stolen Equipment

The following equipment was stolen from my shack: McGraw-Edison Megacycle Meter, Serial No. 9324 and a McGraw-Edison Grid Current Meter, Serial No. 9463. Anyone with information please contact Earl Crews, W4DBH, 2522 Shafer St., Norfolk, Va. 23513, Tel.: 703-853-4903.

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The items listed here were stolen from my car in early May in Jackson, Miss.: Heathkit Model HW-12 transceiver, Serial No. 452-6457A GH-12; New-Tronics Hustler antenna with 75-meter coil and spring mount; Regency Model ATC-1 shortwave converter (80-10 meters); Lear Jet A209 8-track tape machine, Serial No. 1000172 and 17 tapes; Poloroid Land Camera (Big Swinger) and two boxes of film; green army blanket; knapsack; and a rotary amber-warning light with cigar-lighter plug and suction-cup mount. Please contact Robert M. May, II, WA4DBG, P.O. Box 270, Jonesboro, Tenn. 37659, Tel.: 615-753-3421.

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The following equipment, property of Collins Radio Co., was stolen in Dallas, Texas, May 11. Anyone having information that might assist in locating these items is asked to contact H. T. Blaker, Collins Radio Co., Building 445, Dallas, Texas, Tel.: 214-235-9511: Collins 51S-1 receiver, Serial No. 6312; 51S-1 receiver, Serial No. 6363; KWM-2 transceiver, Serial No. 15138; two 312B-3 speakers; 312B-4 speaker console, Serial No. 59533; 516F-2 power supply, Serial No. 58398 (Note: interconnecting cables, power cables and instruction books were included with above item); MM-1 mobile microphone, SM-1 desk top microphone; Vibroplex "Deluxe Original" semi-automatic bug key; footswitch with connector cable; Telex Headsets type HFR-91, HUP-01 and HMV-2; and a Kollsman Aircraft Altimeter type C-12, No. 671BKO10.

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On May 15, my car was broken into and a Galaxy V Mk 3, Serial No. 8004AX1098, was stolen. Surprisingly, the power supply mounted under the car's rear seat, was left behind. Please notify William N. Tavolga, WB2HBD, 60 Durie Ave., Closter, N. J. 07624.

Hamfest Calendar

Alberta — Hamfest '69 will be held at the Edmonton Inn, Edmonton, Alberta, Canada on August 1, 2, and 3. Registrations must be in by June 30 to be eligible for the early registration benefits. Write Hamfest '69, P.O. Box 2692, Postal Station A, Edmonton 15, Alberta, Canada.

Arizona — The Amateur Radio Council of Arizona is holding its 18th Annual Fort Tuthill Hamfest on July 11, 12, and 13. Hookups are available this year for campers. Swap table, transmitter hunt, entertainment, and a pot-luck lunch on Sunday are but a few of the plans. Fort Tuthill is located 5 miles South of Flagstaff in the Coconino County Fairgrounds. Talk-in on 3878 kHz. and 146.94 MHz. For further information contact Bob Dreste, K7VOR, 5040 N. 13th Ave., Phoenix, Arizona 85013.

Colorado — The Totah ARC will hold its annual July 4th Family Picnic at Lake Vallecito, Colorado on July 4, 5, and 6. All are welcome. Please bring your own camping equipment. General location is east of the lake. Watch for the road marker.

Idaho — The 37th Annual WIMU Hamfest will be held at Mack's Inn, Idaho, 23 miles South of West Yellowstone, Montana on August 1, 2, and 3.

Illinois — The Hamfesters RC of Chicago announces its 35th Annual Midwestern Hamfest, Sunday, August 10 at Santa Fe Park, 91st and Wolf Road S.W. of Chicago. The Hamfest features manufacturer and distributor exhibits, swappers row, awards, clowns and games for children, and activities for the XYL. For more information and tickets, write Tom Ondriska, WN9YZW, 6609 South Kedvale, Chicago, Ill. 60629.

Illinois — The Quad-Co. ARC will sponsor the 12th Annual Hamfest of the Breakfast Club on July 19 and 20 at Terry Park, ¾ mile east of Palmyra, Ill. All other groups are invited to meet at the Hamfest, giving prior notice to the Hamfest committee. There will be dancing and movies Saturday night. Bring your own basket lunch. Sandwiches and soft drinks will be available on the grounds. Mobile talk-in on 3873 kHz. from noon Saturday to 11:00 A.M. Sunday. Bring your swap gear. Camping facilities open from Friday afternoon until Monday morning. Pre-registration until July 7 is $1.00, $1.50 at the gate. Write Hamfest. % Quad-Co. ARC, Box 323, Chatham, Illinois 62629.

Illinois — The Six Meter Club of Chicago, Inc. will hold its 12th Annual Hamfest in Frankfort, Ill. on Rt. 45, 1 mile north of Route 30, on August 3.

Indiana — The Wabash Valley ARA will hold its 21st Annual V.H.F. Picnic Sunday, July 27, all day, at Turkey Run State Park which is located about 40 miles north of Terre Haute, on I.S. 41 and 47. One dollar registration at the gate only. Full day of events. Contact E. Clehouse, K9EJU, 925 Barton Ave., Terre Haute, Ind. 47803.

Indiana — The IRCC Hamfest/Picnic will be held at the Browcounty State Park on Sunday July 13.

Indiana — The Tri-State ARS 22nd Hamfest will be Sunday, July 20 at the Four H Center on Highway 41 north of Evansville, Indiana. Large air conditioned auditorium. Ladies bingo, swappers row, overnight camping, fun and games for all the family. Advance registration $1.50, at the door, $2.00. Contact Jack Young K9LAU, P.O. box 492, Evansville, Ind. 47711, for more details.

Kentucky — The Paducah ARC will hold their annual Ham Picnic at the Noble Park Community Center, Paducah, Ky. on July 13. Lunch will be served on the grounds. Bring along your swap material and equipment. Further information from Frank Henson, WB4GTQ, 3753 Ramona Dr., Paducah, Ky. 42001.

Louisiana — The CLARC Hamfest will be held at Alexandria on July 12 and 13.

Louisiana — Don't forget the Alexandria Banquet and Hamfest August 2 and 3.

Manitoba — The Peace Garden Hamfest will be held on July 12 and 13. See North Dakota.

Maryland/D.C. — The MDD/MDCTN/MDDS Picnic will be held at Patapsco State Park on August 2 and 3.

Michigan — The Annual Southwestern Michigan V.H.F. Picnic will be held at Allegan County Park, August 3. The Picnic is sponsored by the Van Buren County ARC, W8JUU, Bangor, Michigan.

Minnesota — KØZRD can tell you about the Lake City affair on July 20.

Missouri — The Zero Beaters ARC are once again planning their annual Hamfest. This year it is to be held on August 3 at the City Park in Washington, Mo. There will be a swap shop and many other activities. A lunch will be served.

Montana — The dates for the Glacier Hamfest are July 19 and 20. Check with K7DCH for more information.

Montana — See Idaho.

Nebraska — The Central Nebraska ARC will hold its Annual Steak Fry and Hamfest at the Victoria Springs State Park near Anselmo, Nebr., Sunday July 27. For those that come before Sunday there will be a wiener roast and get-together Saturday evening, July 26. Camping facilities are available. For further information write Paul Hartman, WAØIXD, Box 145, Arnold, Nebr. 69120.

Nebraska — The Concordia affair will be held August 3. Check with WAØCCW for the details.

New Jersey — The Knight Raiders V.H.F. Club will hold their third Annual Outdoor Hamfest and Picnic on Saturday, July 19 at Weasel Drift Picnic Grove, Garet Mt. Reservation, West Paterson, N. J. Activities start at 10:00 A.M. and include swap shop, auction, contests, manufacturer's displays, etc. K2DEL/2 talk-in on 6 and 2 meters. More information from K2DEL or any club member.

New Mexico — See Colorado.

North Dakota — The Sixth Annual International Hamfest will be held on July 12 and 13 in the International Peace Garden, at Boissevain, Manitoba/Dunseith, North Dakota.

Ohio — The Van Wert ARC, W8FY, will hold their Annual Picnic at Jubilee Park on Sunday, July 27, in Van Wert, Ohio.

Ohio — The Second Annual Ohio Traffic Nets Picnic will be held beginning at 10:00 A.M. Saturday, August 2, at WRFD Picnic Park in Worthington.

Ontario — The Annual Picnic of the Amateur Radio Sideband Association will be held July 13 at Hav-Sum-Fun Park, Fergus, Ontario.

Pennsylvania — The Two Rivers ARC will conduct its Fifth Annual Hamfest on Sunday, July 27 at the Balkan Hotel Grounds, on Coulter Road, off Lincoln Way, McKeesport.

Pennsylvania — The South Hills Brass Pounders and Modulators, Inc. will hold their 32nd Annual Hamfest in Pittsburgh on August 3, in the pavilion at St. Clair Beach.

Saskatchewan — The week end of July 5 and 6 is the date for the Saskatchewan Hamfest in Moose Jaw. VE5CG has the "gen."

Tennessee — The Oak Ridge Radio Operator's Club will sponsor the 20th Annual Crossville Hamfest at the Cumberland Mountain State Park July 26 and 27. The Saturday night banquet is to be held at the Holiday Inn in Cookville. Sunday features a picnic and many other activities of interest. Contact the Club, P.O. Box 291, Oak Ridge, Tenn. 37830, for further information.

Texas — Ham and CB Swapfest, Sunday, July 27, at the City Park in Levelland, Texas. Sponsored by the Northwest Texas Emergency Net and Levelland Communications Club. This is an event for the entire family. Bring your own picnic basket. Registration begins at 9:00 A.M. lunch at 1300. Mobile talk-in is the net frequency, 3950 kc., and channel 11 for CBers.

Utah — See Idaho.

Virginia — The Shenandoah Valley ARC will hold its Annual Hamfest on August 2 and 3. Banquet and Dance on Saturday night at the Holiday Inn East. Hamfest on Sunday at the National Guard Armory. For further information write SVARC, P.O. Box 139, Winchester, Va. 22601.

Washington — The 1969 Washington State Hamfest will be held July 12 and 13 at the Sportmen's Chateau, 16409 Canyon Road East in Tacoma. There will be two days of activities for hams and their families. Camping and trailer space available on the grounds. Pre-registration is $5.00, $5.50 at the gate. For motel reservations, camping reservations, registration applications, or information, contact Hamfest Chairman Merl Chavis, W7IKG, 5640 S. Yakima St., Tacoma, Washington 98408.

Wisconsin — The Annual WNA Picnic will be held in Madison, Wis. on July 13.

Wyoming — See Idaho.

QST

Happenings of the Month

Board Meeting Minutes
Space Conference in 1971
Goldwater Bill for Immigrants

GOLDWATER BILL FOR IMMIGRANTS

"Happenings" reported earlier this year on the Goldwater bill, SJ 27, which would allow FCC to issue licenses to immigrants who had taken out first papers toward citizenship. One interpretation of SJ 27 found that it would permit all kinds of FCC station and operator licenses — not the Senator's intention at this time. Accordingly, K7UGA had introduced a new bill, S-1466, which makes it clear that only amateur licenses are involved.

The ARRL Board of Directors unanimously endorsed the bills at their meeting in May.

The Senator has requested those interested in the bill to write the Honorable Warren Magnuson of Washington State, chairman of the Senate Commerce Committee and their own Senators asking for action this session. A moving plea by ex-YO4AAC appeared in "Correspondence From Members" page 80, June *QST*, and earlier, we ran a letter from George Pataki, ex-YO2RO who started it all (February 1968 *QST*, page 76).

ITU CONFERENCE ON SPACE SET FOR 1971

A World Administrative Radio Conference on space and radio astronomy has been scheduled for June, 1971, by the Administrative Council of the International Telecommunication Union (ITU), following up on the extraordinary conference held in 1963. FCC has already begun U.S. preparation for the conference through publication of four Notices of Inquiry; the ARRL, on behalf of amateurs, is among organizations responding to the Notices.

Incidentally, the Administrative Council chose William James Wilson, VE3NR, as chairman of the current session. "Bill," an active amateur on both h.f. and v.h.f., is chief, Radio Regulations Branch in the new Canadian Department of Communications (the branch earlier was part of the Department of Transport).

TIME CREDIT FOR FOREIGN LICENSES

The Federal Communications Commission has published a Notice of Proposed Rulemaking which would recognize time under an overseas amateur license toward Extra Class privileges. In part, the proceedings in Docket 18540 result from a request of Desmond Roy Hearsum, W8LUZ, that U.S. amateurs who were first licensed more than 25 years ago by another country be considered eligible for a two-letter Extra Class callsign under Section 97.51 (a) (5).

Governor Daniel J. Evans signs Senate Bill 35 which reduces cost of call letter license plates in Washington State from $30 to $5 for permanent reflectorized plates. At the signing: Senator Nat Washington; Gerald Seligman, W7BUN; William R. Watson, W7BQ; Jack Nelson, Deputy Director of the Motor Vehicle Department; Don Ashley, W7HMJ; and Representative Stu Bledsoe. The plates will be available August 1.

To that idea the FCC added amendment of Section 97.9 (a) (1), so that an applicant could count time under a foreign license toward the two-year service requirement of the Extra Class.

The proposed new rules will read:

Section 97.9 Eligibility for new operator license. . . . (a) *Amateur extra class* . . . (1) At any time prior to receipt of his application by the Commission has held for at least two years an amateur operator license of other than the Novice or Technician Class, issued by any agency of the United States Government or submits proof that he held for a period of two years an amateur operator license at least equivalent to a General Class license issued by a foreign government . . .

Section 97.51 Assignment of call signs. (a) . . . (5) One unassigned two-letter call sign (a call sign having two letters following the numeral) may be assigned to a previous holder of a two-letter call sign, the prefix of which consisted of not more than a single letter. Additionally, a two-letter call sign may be assigned to an Amateur Extra Class licensee who submits evidence that he held any amateur radio operator or station license, issued by any agency of the United States government or by any foreign government, 25 years or more prior to the receipt date of an application for such assignment. Applicants for two-letter call signs are not permitted to select a specific assignment except in accordance with subparagraphs (1) and (2) of this paragraph. . .

Any interested person may file comments on this proposal on or before July 25, 1969 and reply

comments on or before August 11, 1969. Formal participation requires an original and 14 copies; however, FCC usually accepts "informal comments" of individuals who do not have facilities for producing 15 copies.

F. Cheney Beekley, Ex-W1GS

F. Cheney Beekley, formerly W1GS and advertising manager of *QST* from 1932 to 1951, died May 24 at his home in West Hartford, Conn. "Beek" was an innovator, and it was he who in 1936 sold the idea of a larger handbook to the rest of the gang at Hq. (472 pages compared with an earlier 260) Helping to pay for the larger book was another idea of Beek's, the "Catalog Section" whereby small advertisers (and some not so small) printed their whole catalog as advertising in the *Handbook* rather than going to the expense of an independent booklet. During Word War II, Beek pursuaded the equipment manufacturers that they should pay the same money for half the amount of *QST* advertising space, thus enabling the League to build a "Reserve for Rehabilitation" and saving paper at the same time. He also had great ideas in other fields, perhaps the most notable being invention of the noise-cancelling microphone, which made radio operation in tanks possible for the first time. A former General Manager of the Maxim Silencer Company, in recent years he's been chairman of the Boards of Beekley Corporation and Newmatic Corporation of West Hartford, and active in design and printing of business systems and forms.

FCC DENIES THREE CB PETITIONS

The Federal Communications Commission has formally buried two petitions, RM 661 and RM 703, on file since 1964, and a newer one, RM-1212 which asked for more frequencies. Petitioners were the American Citizens Band Assn., Trico 11 Meter C.B. Radio Club, and Midwest CBers C-19 Horizontal Club. The frequencies were to be hacked out of the amateur ten-meter band and the Remote Pickup Broadcast band

Cleveland, Ohio, proclaimed amateur radio week April 20–26, 1969. Gathered for that purpose: W8UDG, K8ONA, W8SUS, W8BAH, WA8QFK, Mayor Carl Stokes, WA8PCJ, WA8PPK and K8ZBL.

26.10-26.48 Mc., and by sharing with the Business Radio Service 27.21–28.0 Mc.

The League does not usually involve itself in affairs of the Citizens Radio Service; however, since these proposals would have affected the amateur service, we filed comment, five years ago, pointing out that assignment of the ten-meter band to the Citizens Radio Service would be in derogation of the International Radio Regulations, Geneva, 1959. In its denial, FCC cited this as a reason for turning down the requests. FCC pointed out that the other services involved rated a higher priority than the Citizens Radio Service, and until the needs of these services were fully met it could not transfer any of their frequencies to the CRS. Sharing with the Business Radio Service is unnecessary, the agency said, since type accepted equipment meeting the needs of both services is already available, and persons with bona fide business needs are already eligible for licenses in both services.

The Commission also denied requests by the CBers for lower fees and for formation of an Advisory Committee.

WHO THE DEVIL IS WHO?

15th in a Series of Call Conversion Charts

Here are additional calls of amateurs taking advantage of new rules which allow Extra Class licensees licensed 25 years ago or longer to acquire two-letter calls. If you should be listed here, let us know by post card right away.

Now	*Was*	*Now*	*Was*	*Now*	*Was*	*Now*	*Was*
W1GO	W1CFW	W3TL	W3RUG	W5OM	W5GRT	W8JE	W8DDV
W1LO	W1IRF	W3WD	W4LBK	K6BI	W6BHI	W8JH	W8WDU
W1LX	W1GSB	W3YF	W3EMQ	K6FK	W6PQQ	W9GT	W9GZB
W1NC	W1HYJ	K4IN	W4AJC	K6OP	WA6MCE	WØHW	WØASO
W1ND	W1FDB	K4KC	W3RBC	K6UV	W2FJE	WØIG	WAØMYS
K2KT	W2BXK	K4KZ	W4UXZ	W6VQ	K6UOZ	WØIL	WØFGY
W2UZ	W2MVR	W5JF	W4ZJQ	W8CH	K8INA	WØIS	W9IRN
W2WF	WB2TBU	W5OE	W5BLU	W8HL	W8EZT	WØKC	WØGHW
W3CI	W3DXB	W5OI	W5KYI	W8IT	W8BDD		

Behind the Diamond *Number 16 in a Series*

When you're writing "Behind the Diamond" at *QST*, you like joiners, activists, people who collect titles like a Navy jumper collects lint — it's easy to roll off the proper number of words and write the story. Sooner or later, though, you run up against a character like this month's subject — sweet and friendly, but no memberships in things, no hobbies to speak of, never an officer of the ARRL Girls Club, not even a ham. Nonetheless, she's a model of quiet efficiency: **Cecilia Christensen Hatch,** supervisor of the Membership Records Section at ARRL Hq.

Sis came to the League on February 17, 1928 (yes, friends, that's '28!), typing letters for the circulation manager and issuing certificates to new members — some two million have been sent out under her supervision! Today she keeps ten girls working on the various phases of certificate issuing, record-keeping, stencil typing, filing and printing of address labels for each month's issue of *QST*. Yet there's always work being done at Sis's desk, too. She's a working boss, well dedicated to duty and intensely loyal.

We said she has no hobbies — well, yes, she has one. Grandchild watching. Sis's daughter Valerie has three offspring: Robert, going on 14; David, nearly 11; and Lisa, 2. Sis spends as much time as she can with the grandchildren — and she's always ready to whip out photographs in self-defense if some other proud parent or grandparent makes the first move!

MINUTES OF THE 1969 ANNUAL MEETING OF THE BOARD OF DIRECTORS

The American Radio Relay League, Inc.
May 2–3, 1969

1) Pursuant to due notice, the Board of Directors of The American Radio Relay League, Inc., met in annual session at the Governor House Motor Hotel, New Orleans, La., on May 2, 1969. The meeting was called to order at 9:35 A.M., c.d.t., with President Robert W. Denniston, WØDX, in the Chair, and the following directors present:

Roy L. Albright, W5EYB, West Gulf Division
Charles J. Bolvin, K4KQ, Southeastern Division
Robert York Chapman, W1QV, New England Division
Victor C. Clark, W4KFC, Roanoke Division
Charles G. Compton, WØBUO, Dakota Division
Harry J. Dannals, W2TUK, Hudson Division
Noel B. Eaton, VE3CJ, Canadian Division
Sumner H. Foster, WØGQ, Midwest Division
J. A. Gmelin, W6ZRJ, Pacific Division
John R. Griggs, W6KW, Southwestern Division
Philip E. Haller, W9IIPG, Central Division
Harry A. McConaghy, W3EPC, Atlantic Division (Vice Director, Acting)
Alban A. Michel, W8WC, Great Lakes Division
Carl L. Smith, WØBWJ, Rocky Mountain Division
Philip P. Spencer, W5LDH, Delta Division
Robert B. Thurston, W7PGY, Northwestern Division

Also in attendance, as members of the Board without vote, were Wayland M. Groves, W5NW, First Vice President; R. O. Best, W5QKF, Vice President; and John Huntoon, W1LVQ, General Manager. Also in attendance, at the invitation of the Board as non-participating observers, were Central Division Vice Director Edmond A. Metzger, W9PRN; Roanoke Division Vice Director L. Phil Wicker, W4ACY; Southwestern Division Vice Director Arnold Dahlman, W6UEI; Rocky Mountain Division Vice Director Thomas G. Banks, W5HJ; and Canadian Division Vice Director Colin C. Dumbrille, VE2BK. There were also present Treasurer David H. Houghton; General Counsel Robert M. Booth, Jr., W3PS; Assistant General Manager Richard L. Baldwin, W1IKE; Communications Manager George Hart, W1NJM; and Senior Assistant Secretary Perry F. Williams, W1UED.

2) The president, joined by the Board, expressed regret that Gilbert L. Crossley, W3YA, director from the Atlantic Division, was unable to be present because of illness; the entire assembly expressed its wishes for a prompt and complete recovery.

3) After discussion and minor amendments, on motion of Mr. Chapman, unanimously VOTED that the Board adopts the agenda for the meeting as distributed.

4) On motion of Mr. Thurston, unanimously VOTED that the minutes of the 1968 Annual Meeting of the Board of Directors are approved in the form in which they were issued by the Secretary.

5) On motion of Mr. Griggs, unanimously VOTED that the Annual Reports of the Officers to the Board of Directors are accepted and the same placed on file.

6) Mr. Eaton, as Chairman, presented the report of the Finance Committee; Mr. Thurston, for Chairman Crossley, presented the report of the Planning

Committee; Mr. Spencer, as Chairman, presented the report of the Membership and Publications Committee; Mr. Haller, as Chairman, presented the report of the Public Relations Committee; Mr. Groves, as Chairman, presented the report of the Merit and Awards Committee; Mr. Denniston reported for the Frequency Allocations Study Committee; Mr. Eaton, as Chairman, presented the report of the Special Committee on the Field Organization and Affiliated Nets; Mr. Griggs, as liaison director, presented a report of the Advisory Committee on VHF Repeaters; Mr. Clark, as liaison director, reported for the Advisory Committee on Contests.

7) On motion of Mr. Spencer, unanimously VOTED that the Annual Reports of the Directors to the Board of Directors are accepted and the same placed on file.

8) The Board was in recess from 10:40 A.M. until 2:40 P.M., from 4:25 to 6:00 P.M., and from 6:22 to 8:15 P.M., for the purposes of informally discussing the contents of the committee reports and other matters not requiring formal action by the Board, for luncheon, and for dinner. During the formal sessions, supplementary oral reports were offered by the Officers of the League and the General Counsel, and by Directors Gmelin and Clark for Project Oscar and Amsat, respectively.

9) On motion of Mr. Bolvin, the Board unanimously expressed its deepest gratitude and appreciation for the fine work done by Delta Division Director and Mrs. Philip P. Spencer as host and hostess for the 1969 Board Meeting.

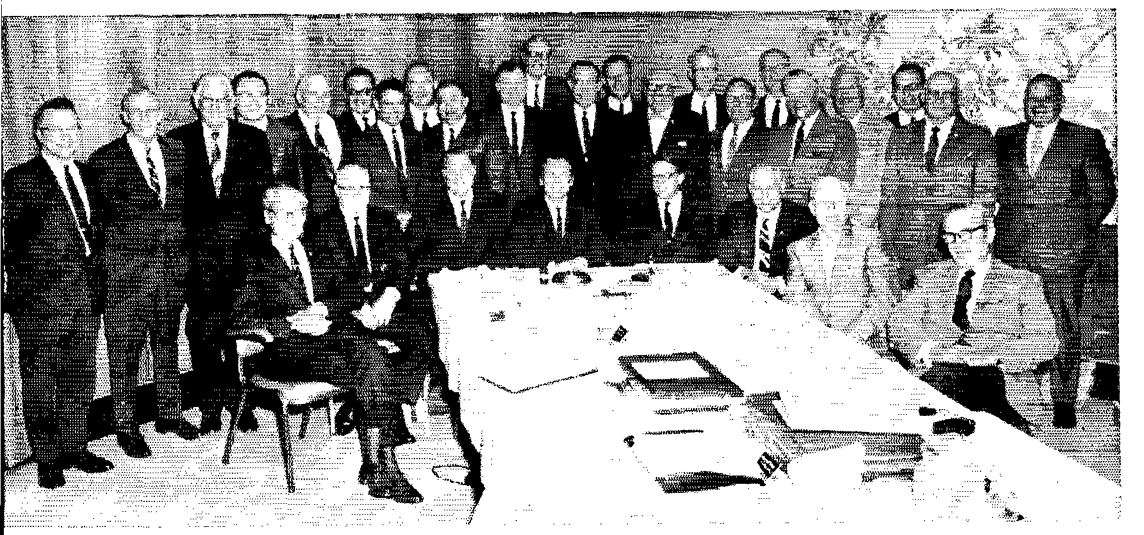
10) Moved, by Mr. Smith, that the election of directors and vice directors, when there are two or more eligibile nominees for any such office, be conducted as follows:

1. Not later than the first day of October, each eligible nominee shall submit, in addition to the information previously submitted in response to questions as to his eligibility, a list of amateur organizations and activities in which he has participated and a statement of not more than 200 words setting forth affirmatively the reasons why he believes he should be elected. Such statement shall not directly or indirectly, by inuendo or otherwise, attack or question the qualifications or character of an opponent. One photograph of the nominee may be included.
2. The statement of the eligible nominee so prepared shall be printed at League expense and included in the envelope by which the ballots are mailed to the members. Separate sheets of equal size and composition shall be used for each nominee. Near the bottom of each sheet shall be a brief explanation to the effect that the foregoing statement was prepared by the nominee and was not edited or otherwise modified by any officer or employee of the League.
3. That lists of members eligible to vote in the election shall not be provided or otherwise made available to an eligible nominee or anyone else for the purpose of mailing or otherwise distributing information bearing directly or indirectly upon the forthcoming election. This prohibition shall apply as well to addresses, addressed envelopes, and similar items.

After discussion, moved, by Mr. Chapman, that the motion be referred to an appropriate committee for further study: but there was no second, so the motion was LOST. After further discussion, on motion of Mr. Clark, unanimously VOTED that the matter is laid on the table.

11) On motion of Mr. Smith, after discussion, unanimously VOTED that the General Counsel prepare and present for consideration at the next regular or special meeting of the Board of Directors a procedure for removing from office any holder elected thereto pursuant to the Articles of Association, By-Laws, or Rules and Regulations of the Communications Department, who has failed to fulfill the duties and responsibilities of his office or who has become unable or otherwise not qualified to fulfill the duties and responsibilities of his office.

12) On motion of Mr. Bolvin, after extended discussion, VOTED, 11 in favor to 4 opposed, that



A quick break for a happy portrait: (seated) W5NW, W7PGY, W3PS, WØDX, W1LVQ, WØBUO, Treasurer Houghton, W3EPC. (standing) W1IKE, WØGQ, W5QKF, W5LDH, W6KW, W1UED, K4KQ, VE2BK, W6ZRJ, W2TUK, W4KFC, WØBWJ, W6UEI, W1QV, VE3CJ, W5HJ, W9HPG, W9PRN, W8WC, W1NJM, W4ACY and W5EYB.

the President appoint a committee or assign to a standing committee the task of studying and recommending to the Board a form of League field organization which will provide contact between the Headquarters and those members whose interests do not presently coincide with the interests of the Communications Department.

A "solid-state linear" for the chairman's gavel is presented to WØDX by VE3CJ. Actually a gong from the old Eaton Knitting Mill in Ontario, it did raise the audibility of Bob Denniston's hammering by tenfold or so!

13) Moved, by Mr. Bolvin, that the League petition the FCC to permit licensees of Conditional Class or higher located in Alaska, Hawaii, Puerto Rico, and the insular possessions of the United States to operate phone on the frequencies 21200–21250 kHz. Further, it is moved that the League staff be directed to consult with the other IARU societies as to the wisdom of, at a later date, possibly petitioning FCC to permit phone operation on these same frequencies by Extra Class licensees. After discussion, on motion of Mr. Clark, unanimously VOTED to amend the motion by striking all of the text after the words "21200–21250 kHz." After extended discussion, the motion as amended was REJECTED (Mr. Eaton abstaining).

14) Moved, by Mr. Bolvin, that the League petition the FCC to permit Technician Class licensees to operate in the frequency band 29000–29700 kHz. On motion of Mr. Thurston, after discussion, it was VOTED, 9 in favor to 6 opposed, to amend the motion so that the frequencies would read 29500–29700 kHz. After further discussion, the question then being on the motion as amended, the same was ADOPTED, 14 in favor to 1 opposed (Mr. Eaton abstaining).

15) On motion of Mr. Bolvin, after discussion, it was unanimously VOTED that at the earliest practicable date beacon stations on one or more of the v.h.f. bands be established as part of the W1AW v.h.f. operation already authorized and funded; this beacon, or beacons, should operate at regular hours and on a published schedule.

16) Moved, by Mr. Bolvin, that an affiliated club, upon request, be given a gratis subscription to *QST* and its library, provided that the club can show that it has at least 10 ARRL members, all of whom must sign the request. But there was no second, so the motion was lost.

17) On motion of Mr. Griggs, after discussion, unanimously VOTED (Mr. Eaton abstaining) that the Board of Directors does hereby instruct the General Counsel to support the petition of W8SDZ, now listed as RM-1392 before the FCC, to permit amateur RTTY to operate at 60, 75, and 100 w.p.m. speeds.

18) Upon motion of Mr. Griggs, after discussion, unanimously VOTED that the General Manager is instructed to supply to each SCM upon request, and at no cost to the SCM, a set of training and operating manuals to aid in his field organization efforts.

19) Moved, by Mr. Griggs, to instruct the Planning Committee to consider the feasibility of a petition to the Federal Communications Commission for a change in the radiotelephone suballocations now existing from 3800 to 4000 kc. to a new suballocation from 3750 kc. to 4000 kc. and to revise the present suballocation of 3700 to 3750 kc. for Novice A-1 operation to 3650 to 3700 kc.; a change in the present suballocation from 7200 to 7300 kc. to a new suballocation from 7150 kc. to 7300 kc. and to revise the present suballocation of 7150 to 7200 kc. for Novice A-1 operation to 7100 to 7150 kc.; a change in the radiotelephone suballocation now existing from 14,200 to 14,350 kc. to a new suballocation from 14,175 to 14,350 kc.; a change in the present radiotelephone suballocation from 21,250 to 21,450 kc. to a new suballocation from 21,200 to 21,450 kc. and to revise the present suballocation of 21,100 kc. to 21,250 kc. for Novice A-1 operation to 21,100 kc. to 21,200 kc.; the Committee to report by the next annual Board meeting. On motion of Mr. Cmelin VOTED to amend the motion by inserting, after "Novice A-1 operation to 21,100 kc. to 21,200 kc.," the words: "That liaison be established with IARU to evaluate international aspects of these possible changes, and report by the next annual Board meeting." The question then being on the motion as amended, the same was unanimously ADOPTED.

W5EYB

20) Moved, by Mr. Albright, that news and activities of v.h.f. repeater operations be reported each month in *QST* as a principal subsection of "The World Above 50 Mc." Material for this subsection to be compiled and submitted by the VHF Repeater Advisory Committee, whose responsibilities are hereby amended to include this additional function; assistance, where necessary, being furnished by League headquarters personnel. The prime purposes of this subsection shall be to publish information and establish leadership in the field of amateur

v.h.f. using repeaters, including techniques, operations, research, legislation and organizations. It is further moved that this subsection shall, in its operations, endeavor to act as a coordinating clearing house for all interested individuals and organizations engaged in amateur v.h.f. using repeaters, for the exchange of information, through the columns of *QST* magazine. That initially, this subsection shall place emphasis on 144 MHz. f.m. operations but will be alert to expand to other frequencies and techniques once the initial objective has been attained. In addition, a section of the Radio Amateur's Handbook, rather than a separate publication, shall be devoted to this subject until such time as available material indicates the need for a separate publication. After discussion, on motion of Mr. Dannals, unanimously VOTED that the matter is laid on the table.

21) Moved, by Mr. Albright, that ARRL code practice broadcasts and bulletin broadcasts be moved out of the Extra Class portions of the amateur bands. After extended discussion, moved, by Mr. Ginelin, to amend the motion by striking the text and substituting the following: "The Communications Department is directed to institute a campaign via the Official Observer program to inform stations working close to W1AW frequencies of the importance of these transmissions," but the motion to amend was rejected, 2 votes in favor to 12 opposed. The question then being on the original motion, the same was REJECTED, 3 in favor to 13 opposed. Messrs. Albright and Clark requested to be recorded as voting in favor.

22) Moved, by Mr. McConaghy, that the League petition the FCC to change its rules concerning the "grandfather" clause by updating the 35 year amateur license experience effective 1969 for automatic waiver of Extra Class examination under Section 97.25(c) of the rules, "Automatic waiver of Extra Class examination requirements." Provisions of Section 97.51 for two letter 1 x 2 call signs would not apply. But after extended discussion, the motion was REJECTED, with Messrs. Michel, McConaghy and Chapman requesting to be recorded as voting in favor, Mr. Foster as voting against, and Mr. Eaton abstaining.

23) On motion of Mr. McConaghy, VOTED, 8 in favor to 7 opposed (Mr. Eaton abstaining) that the League petition FCC to change its rule concerning the "grandfather clause" to include holders of the former Amateur Extra First Class licenses under Section 97.25(c) of the rules, "Automatic waiver of Extra Class examination Requirements."

24) The Board recessed at 11:50 P.M., reconvening at 8:55 A.M. on May 3 with all directors and other persons hereinbefore mentioned in attendance.

25) On motion of Mr. Compton, unanimously VOTED that the Board reaffirms the present investment policy of the League to invest approximately $100,000 in government securities.

26) Moved, by Mr. Eaton, that the General Manager be directed to keep only a reserve for Life Membership in an amount, at minimum, to provide equivalent dues income for the life expectancy of such members plus an amount for contingencies as directed from time to time by the Finance Committee. After extended discussion, upon further motion of Mr. Eaton, unanimously VOTED that the matter is laid on the table.

27) On motion of Mr. Eaton, unanimously VOTED to continue paying off, faster than required, the liability for past service benefits of our revised employee's pension plan.

28) On motion of Mr. Chapman, after discussion, unanimously VOTED that the General Manager and counsel promulgate the establishment of The American Radio Relay League Foundation, as a separate non-profit corporation under Connecticut State Laws. The objectives and purposes of such a said corporation will be to provide ways and means for permanently establishing authority to utilize special funds and property of the said corporation, and the income therefrom under such restrictions as might be imposed. The Foundation should have power to lease, purchase or construct suitable buildings for housing amateur stations, and provide for the proper management and operations of the same. It would also be the authority of the Foundation to establish special funds as it may consider necessary and proper. The charter of such a Foundation will provide for a Board of Managers, of whom the President, Treasurer and Secretary of the League, plus other director-elected members, will constitute the governing Board.

29) On motion of Mr. Compton, unanimously VOTED that the General Manager be authorized to increase the League automobile travel expense reimbursement rate from nine to ten cents per mile.

"Gavel's Eye" view of the meeting, from where the president sits.

30) On motion of Mr. Chapman, unanimously VOTED (Messrs. Spencer and Thurston abstaining) that, in view of an announcement of a forthcoming conference of the International Telecommunications Union, the Board replenishes the $100,000 fund for the defense of amateur frequencies.

31) On motion of Mr. Eaton, VOTED that his earlier motion concerning the reserve for Life Membership be lifted from the table. After further discussion, with the consent of his second, Mr. Eaton withdrew the motion.

32) On motion of Mr. Haller, unanimously VOTED that the League continue its program of assistance to amateur radio groups overseas so as to strengthen the growth of amateur radio throughout the world.

33) On motion of Mr. Haller, after discussion, unanimously VOTED that the Communications Manager arrange for one Communications Department party a year in which the members are invited to work the League's official family of officers and appointees.

34) On motion of Mr. Haller, unanimously VOTED that the General Manager provide vice directors with advance copies of *QST* each month on the same basis as directors copies.

35) The Board was in recess from 10:20 to 10:46 A.M.

36) On motion of Mr. Compton, after extended discussion, unanimously VOTED that pursuant to Article 4 of the Articles of Association and By-Law 21, a special meeting of the Board of Directors be held in the Newington-Hartford area commencing at 10:00 A.M., Eastern Standard Time, on Saturday, November 1, 1969, to consider or act upon the following matters:

1. Actions pending before the FCC
2. Reports and studies of Hq. staff
3. Amateur band occupancy
4. Committee recommendations
5. Establishment of an ARRL Foundation
6. Recommendations of the General Counsel for amendments to the Articles of Association and By-Laws which would provide for two meetings of the Board each year.

Further, that any other matters to be considered or acted upon may be added at any time up to and including October 22, 1969, upon the written or telegraphic concurrence of at least nine directors. All directors are urged to arrive as far in advance of said meeting as possible and reasonable for committee meetings and informal conferences.

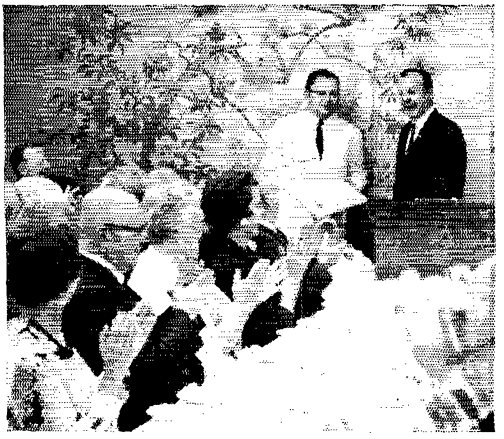
37) On motion of Mr. Compton, unanimously VOTED (Mr. Eaton abstaining) that the General Counsel initiate discussion with the FCC leading to increasing the transmitter power permitted in scatter, satellite and moonbounce experimentation on the very high frequencies and above.

38) Moved, by Mr. Spencer, that the General Manager be instructed to prepare a new separate handbook on VHF Repeaters to be written and published by the League. Moved, by Mr. Dannals, to lay the matter on the table; a tie having been found to exist, with 7 in favor and 7 opposed, the president cast the deciding vote in favor of laying the matter on the table.

39) Moved, by Mr. Spencer, that a suitable publication be written by the League after consultation with reading specialists, directed at the 12-16 year old age group. After extended discussion, moved by Mr. McConaghy that the matter be laid on the table, but the motion to table was rejected. On a rollcall vote, the question was decided in the affirmative, all directors so voting except Messrs. Albright, Chapman and McConaghy, who voted in the negative.

40) The Board was in recess from 12:23 to 12:46 P.M. for luncheon.

W3EPC and WØDX



Now it's Colonel Bob Denniston, as WØDX accepts a "commission" from the Governor of Louisiana through host director Philip P. Spencer, W5LDH.

41) On motion of Mr. Spencer, unanimously VOTED that the General Manager be instructed to take steps leading to addition of an "Introduction to Amateur Radio" course to high school and adult education classes.

42) On motion of Mr. Spencer, after discussion, unanimously VOTED that a postpaid insert inviting membership to be filled out for both new and renewal membership be included in selected League publications, and in *QST* once a year. During the course of the above discussion, First Vice President Groves was in the Chair from 12:50 to 1:06 P.M.

43) Moved, by Mr. Spencer, that the General Manager be instructed to employ the services of a reading expert who would help make *QST* and other League publications more readable; but, after discussion, with the consent of the second the motion was WITHDRAWN.

44) On motion of Mr. Spencer, after discussion, unanimously VOTED that the General Manager be instructed to periodically publish in *QST* information on the structure of the League, including diagrams, an explanation of duties and functions of various League officials, including directors and SCMs, and a glossary of ham terminology.

45) Moved, by Mr. Spencer, that the Executive Committee be authorized to not renew ARRL membership of persons who have had their licenses, issued by FCC or the Canadian licensing authority, revoked. After discussion, on motion of Mr. Bolvin, VOTED that the matter be laid on the table; Mr. Spencer requested to be recorded as voting opposed.

46) Moved, by Mr. Spencer, that any substantial written complaint by an eligible nominee for director or vice director of unfair, unethical, or otherwise undesirable action by or on behalf of an opposing candidate received by the Secretary prior to the counting of ballots shall be referred to the committee of tellers for investigation and preparation of a written report of findings of fact and recommendations. The report of the results of the vote shall be withheld until the report of the committee of tellers has been completed. Should the committee of tellers conclude that the complaint is well founded and that substantial injury or hardship has been done to the complainant, certification of the results of the vote shall be withheld pending submission of the report to and action by the Executive Com-

mittee. Moved, by Mr. Gmelin, that the matter be laid on the table; but there was no second, so the motion to table was lost. After extended discussion, on motion of Mr. Albright, VOTED that the matter be laid on the table. Messrs. Griggs, Haller, Spencer and Thurston requested to be recorded as voting opposed.

47) On motion of Mr. Spencer, after discussion, unanimously VOTED that DXCC members may submit QSL cards in increments of 10 after 250 countries have been credited.

48) On motion of Mr. Michel, after extended discussion, unanimously VOTED to make membership for college radio clubs affiliation with ARRL uniform with the rules now in effect for secondary school clubs.

49) Moved, by Mr. Michel, that W1AW repeat the 0230 GMT schedule code practice at 1300 or so on 80, 40 and 20 so the shift workers would have an opportunity to benefit. After discussion, on motion of Mr. Eaton, VOTED to amend the motion by striking the text and substituting therefore the following: "That, for a trial period of six months, W1AW repeat the 0230 GMT schedule code practice at 1300 or so five days per week." Messrs. Albright and Griggs requested to be recorded as voting opposed. The question then being on the motion as amended, the same was ADOPTED; Messrs. Albright and Griggs again requested to be recorded as voting opposed.

50) Moved, by Mr. Michel, that the ARRL reimburse amateur radio clubs the sum of $10 (50¢ x 20 yrs.) when one of their respective club members receives ARRL Life Membership; but there was no second, so the motion was LOST.

51) On motion of Mr. Albright, unanimously VOTED to lift from the table his motion concerning regular reports on VHF Repeater operation in *QST*. On further motion of Mr. Albright, unanimously VOTED to amend the motion by striking the text and substituting therefor the following: "That news and activities of VHF Repeater operations be reported each month in *QST* as a principal subsection of 'The World Above 50 Mc.' The prime purposes of this subsection shall be to publish information and establish direction in the field of amateur v.h.f. using repeaters, in the areas of techniques, operations, research, legislation and organizations. The VHF Repeater Advisory Committee will be requested to assist in developing this program." The question then being on the motion as amended, it was unanimously ADOPTED.

52) On motion of Mr. Dannals, the Board commended the members of the Intruder Watch for their fine efforts, and the Assistant General Manager for his management control of this valuable program; it is recommended that the activities and results of actions initiated by this dedicated group of amateurs continue to be reported periodically in our official journal *QST*.

53) On motion of Mr. Dannals, after discussion, unanimously VOTED (Mr. Eaton abstaining) that the General Counsel request the Federal Communications Commission to make the entire 144-148 MHz. band available for use by Technician Class licensees in lieu of the present 145-147 MHz. subband.

54) On motion of Mr. Dannals, unanimously VOTED (Mr. Eaton abstaining) that the General Counsel request the Federal Communications Commission to reduce the waiting period for eligibility to take the Extra Class exam from two to one year (FCC regulations Section 97.9(a)).

55) On motion of Mr. Dannals, unanimously VOTED (Mr. Eaton abstaining) that the General Counsel request the Federal Communications Commission to reconsider its position on simultaneous holding of the Novice and Technician licenses to permit presently-licensed Technicians to obtain a Novice license without surrendering their present license and waiting one year.

56) Moved, by Mr. Foster, that the General Manager implement preparation of a countries list jointly prepared by IARU amateur societies which would be recognized and accepted by all organizations which issue DX awards. After discussion, moved, by Mr. Clark, to amend the motion so that it would begin, "That the President and General Manager study the feasibility of implementing . . ." etc. Moved, by Mr. Albright, to further amend the motion by striking the text and substituting therefor the following: "That the ARRL recommend that the IARU establish a countries list for DX award purposes," but there was no second so the second motion to amend was lost. Thereupon, the question being on the first amendment, the same was unanimously ADOPTED. On motion of Mr. Bolvin, it was unanimously VOTED to further amend the motion by striking the word "which" and those following it. The question then being on the motion as amended, which reads: "That the President and General Manager study the feasibility of implementing preparation of a countries list jointly prepared by IARU amateur societies," the same was unanimously ADOPTED.

57) The Board was in recess from 2:52 to 3:01 P.M.

58) On motion of Mr. Chapman, unanimously VOTED that division directors are authorized to attend ARRL National Conventions with expenses incurred chargeable to authorized division allotments.

59) On motion of Mr. Chapman, unanimously VOTED that the League sponsor achievement awards for Five-Band Worked All States confirmed contacts, identified as 5B-WAS; any authorized mode of communications would be recognized, and rules and regulations set forth for this achievement would be promulgated by the Communications Manager; only contacts made after date of promulgation will be considered.

60) On motion of Mr. Chapman, unanimously VOTED that the General Manager is directed to have the Public Relations Counsel prepare material

BOARD THANKS VOLUNTEER A.R.R.L. OFFICIALS

In reviewing the work of the League for the past year the ARRL Board of Directors again found that much of our progress is due to the volunteer efforts of elected and appointed officials in the administrative and field organization of our association. By unanimous action the Board has again expressed its sincere thanks to the Vice-Directors, assistant directors, SCMs, SECs and QSL Managers — an action which we know all amateurs will heartily endorse. The Board also commended members of the two trial Advisory Committees — on V.H.F. Repeaters and on Contests — for accomplishing much in a very short time.

or distribution to prospective members that will convey the tangible value of ARRL affiliation to the individual.

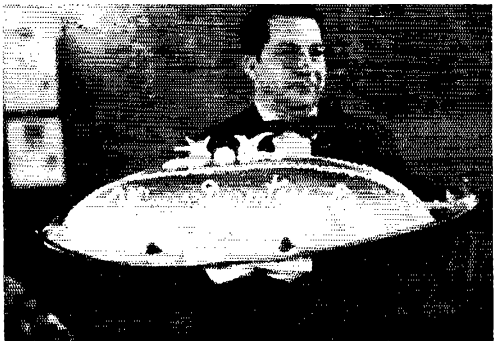
61) On motion of Mr. Chapman, unanimously VOTED (Mr. Eaton abstaining) that the General Counsel is authorized to file comments and petitions to implement the report of the VHF Repeater Advisory Committee, with due consideration being given to the status of various related rule making proceedings now pending before the Federal Communications Commission.

62) On motion of Mr. Chapman, unanimously VOTED that the ARRL Board of Directors goes on record as commending the VHF Repeater Advisory Committee for its accomplishments, particularly for the recommendation concerning VHF Repeaters and its proposed regulations.

63) On motion of Mr. Gmelin, unanimously VOTED that the Communications Manager is instructed to establish the I.C.A.O. phonetics code as the approved phonetics of the American Radio Relay League.

64) On motion of Mr. Gmelin, unanimously VOTED that Article 20 of the Rules and Regulations of the Communications Department is amended to add the words "Upon the approval of the Executive Committee or by the Board of Directors" so that the paragraph will read as follows: "20. These rules and regulations shall have the force and effect of by-laws of the League. They may be amended as necessary from time to time by the Communications Manager upon the approval of the Executive Committee or by the Board of Directors, who shall cause more detailed provisions to be published as needed in the current edition of the League publication, 'Operating an Amateur Radio Station.' Amendments to the current edition shall be effective upon publication in *QST*."

65) On motion of Mr. Gmelin, unanimously VOTED that the Communications Department will establish a second monthly traffic award similar to the Brass Pounders League (BPL) and of equal stature to give credit through a point system for such items as: (a) net check-in. (b) net control duties. (c) net liaison duties. (d) Emergency Corps participation. (e) phone patch operation. A minimum point level for this award shall be established and reporting will be via the SCM's report as is done with the present BPL.



After the Board Meeting, directors, officers and their wives were guests of Roy Alciatore, W5RU, at his famous Antoine's Restaurant. The dessert was this spectacular baked Alaska, appropriately decorated, here being held by the headwaiter.

66) Moved, by Mr. Gmelin, that the Editor of *QST* be instructed to establish a propagation column in *QST*. This column will include predictions of radio propagation on the amateur bands for the month of issue of *QST* and predicted general trends in the sunspot cycle and in long range possibilities in propagation conditions for amateurs. After discussion, on motion of Mr. Chapman, VOTED, 12 in favor to 4 opposed, that the matter be laid on the table. Mr. Gmelin requested to be recorded as being opposed to tabling.

67) On motion of Mr. Gmelin, after discussion, unanimously VOTED that the Board of Directors of the ARRL authorizes a special one-year study committee to work with members of the Oscar Association and the Board and Administration of Foothills College in Los Altos, California, to investigate the possibilities of establishing a joint Oscar/ARRL amateur station at the Foothills College headquarters of the Oscar Association.

68) On motion of Mr. Gmelin, after extended discussion, unanimously VOTED that the General Manager study ways of speeding the delivery of *QST* to all parts of the United States and Canada, particularly to the west coast, Hawaii and Alaska, and report back to the Board the results of this study not later than the next Board of Directors meeting.

69) On motion of Mr. Spencer, unanimously VOTED to lift from the table his motion on a repeater handbook. Moved, by Mr. Dannals, that the motion be amended by striking the text and substituting the following: "Moved that the Membership and Publications Committee study the feasibility of preparing a 'Special Techniques Handbook' featuring sections on RTTY, repeaters, amateur TV, space communications, facsimile and other special communications techniques." But the motion to amend was rejected. Moved, by Mr. Chapman, that the matter be laid on the table, but there was no second, so the motion to table was lost. The question then being on the original motion to produce a handbook on VHF Repeaters, a rollcall vote was taken and the motion was ADOPTED by a vote of 10 in favor to 3 opposed. Voting in the affirmative were Messrs. Albright, Clark, Eaton, Foster, Gmelin, Griggs, Michel, Smith, Spencer, and Thurston. Voting in the negative were Messrs. Bolvin, Dannals, and Haller. Abstaining were Messrs. Chapman, Compton and McConaghy.

70) On motion of Mr. Smith, unanimously VOTED to lift from the table his motion on election procedures. On motion of Mr. Smith, after discussion, unanimously VOTED to amend the motion by striking the text and substituting therefor the following: "That the election of the directors and vice directors, when there are two or more eligible nominees for any such office, be conducted as follows:

1. In addition to the information submitted in response to questions as to eligibility, each nominee may file with the Secretary, or may have filed in his behalf, not later than the first day of October, a list of amateur organizations and activities in which he has participated and a statement setting forth affirmatively arguments in behalf of his election. Such statements shall be limited in length to a single sheet (8½ x 11) and shall not directly or indirectly, by inuendo or otherwise, attack or question the qualifications or character of an opponent. One photograph of the nominee may be included.
2. The statement of the nominee so prepared shall be printed at League expense and included in

the envelope by which the ballots are mailed to the members. Separate sheets of equal size and composition shall be used for each nominee. Near the bottom of each sheet shall be a brief explanation to the effect that the foregoing statement was prepared by or in behalf of the nominee and was not edited or otherwise modified by any officer or employee of the League.

3. Lists of members eligible to vote in the election shall not be provided for or otherwise made available to an eligible nominee or anyone else for the purpose of mailing or otherwise distributing information bearing directly or indirectly on the forthcoming election. This provision shall apply as well to addresses, addressed envelopes and similar items.

Moved, by Mr. Chapman, that the motion be further amended so as to assign it to the Planning Committee for study. On a rollcall vote, the further amendment was ADOPTED, 10 votes in favor to 5 opposed. Those in favor were Messrs. Albright, Bolvin, Chapman, Clark, Dannals, Eaton, Foster, Haller, McConaghy and Michel. Those opposed were Messrs. Compton, Gmelin, Griggs, Spencer, and Thurston. Mr. Smith abstained. The question then being on a study of election procedures by the Planning Committee, the same was unanimously ADOPTED.

W1QV, WØBWJ and W8WC

71) On motion of Mr. Griggs, unanimously VOTED that the matter of establishing a DXCC Advisory Committee at the earliest possible date is to be undertaken by the Planning Committee.

72) On motion of Mr. Clark, unanimously VOTED that funding not to exceed $200 per committee is authorized as administrative expenses for the two advisory committees now in operation.

73) On motion of Mr. Clark, unanimously VOTED (Mr. Eaton abstaining) that the General Counsel is instructed to request the Federal Communications Commission to permit the use of a typewriter (provided by the applicant) for the code copying portion of an amateur radio operator examination.

74) On motion of Mr. Clark, unanimously VOTED (Mr. Eaton abstaining) that the General Counsel is instructed to petition the Federal Communications Commission to enable the assignment of 1 x 3 (preferred) call signs to those holders of the Extra Class license who request it and who pay the appropriate fee therefor; such calls to be assigned on a random basis.

75) On motion of Mr. Clark, unanimously VOTED that the Communications Department is instructed to conduct a study into, and at the next meeting of the Board report upon, the impact of citizens band groups, MARS and other operations in areas in which emergency preparedness activities have traditionally been carried on by amateur radio, and to recommend possible adaptive changes in the structure of our emergency preparedness service.

76) On motion of Mr. Gmelin, unanimously VOTED that the General Manager is hereby authorized to reimburse the division directors for actual expenses incurred by them during the year 1969, in the proper administration of ARRL affairs in their respective divisions, up to amounts as follows:

Canadian Division Director	$1500
Atlantic Division Director	2400
Central Division Director	2400
Dakota Division Director	1000
Delta Division Director	2800
Great Lakes Division Director	2400
Hudson Division Director	2500
Midwest Division Director	1500
New England Division Director	2500
Northwestern Division Director	2400
Pacific Division Director	3200
Roanoke Division Director	1800
Rocky Mountain Division Director	1600
Southeastern Division Director	2200
Southwestern Division Director	3200
West Gulf Division Director	2500

77) On motion of Mr. Griggs, after discussion, unanimously VOTED that to continue the Board's policy of reimbursing Section Communications Managers and QSL Managers of the League for certain travel in furthering ARRL organizational activities, the General Manager is hereby authorized to pay during the year 1969 a total amount not to exceed $12,500 under terms prescribed by the Communications Manager for SCMs, and the General Manager for QSL Managers, following the general pattern established by the Board.

78) On motion of Mr. Thurston, after discussion, unanimously VOTED that, to continue the Board's policy of reimbursing Section Emergency Coordinators for certain travel in furthering ARRL organizational activities, the General Manager is hereby authorized to pay during the year 1969 a total amount not to exceed $7,000 under terms prescribed by the Communications Manager following the general pattern established by the Board.

79) On motion of Mr. Gmelin, unanimously VOTED that, to continue the Board's policy of reimbursing National Traffic System officials above the section level for certain approved travel in furthering ARRL organizational activities, the General Manager is hereby authorized to pay during the year 1969 a total amount not to exceed $6,000 under terms prescribed by the Communications Manager following the general pattern established by the Board.

80) On motion of Mr. Chapman, unanimously VOTED that the General Manager is hereby authorized to pay during the period between January 1, 1970 and the 1970 annual meeting of the Board, expenses against usual authorizations for administrative and committee operations in no greater amount than 1969 authorized amounts.

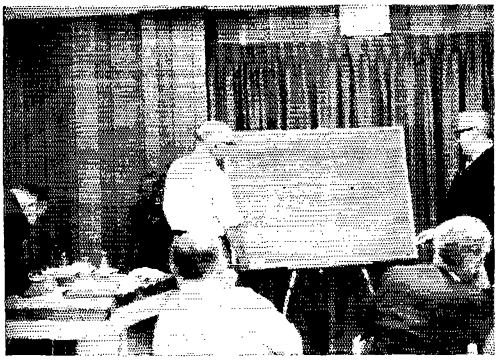
81) On motion of Mr. Bolvin, unanimously VOTED that in recognition of his outstanding work on the analysis of typical amateur antennas using modern computer techniques and at a level which will provide source material for the communications industry for many years to come, the League presents the 1968 Technical Merit Award to Dale Covington, K4GSX of Marietta, Georgia. During

the course of the above discussion, First Vice President Groves was in the Chair from 5:00 to 5:03 P.M.

82) On motion of Mr. Eaton, unanimously VOTED that the rules and regulations of the Communications Department are changed to require candidates for SCM to have been a Full Member of the League for two years and to have held a General or Conditional Class license or a Canadian Advanced Amateur Certificate for two years.

83) On motion of Mr. Eaton, unanimously VOTED that the qualifications for Official Observer should logically include standards such as the holding of a certain class of license, exact details of implementation to be in the hands of the Communications Manager.

84) Moved, by Mr. Gmelin, that the procedures for the election of the Executive Committee require re-balloting when the plurality of an apparent winning candidate is less than a majority of the total votes cast, the re-balloting to be accomplished by removing the name of the candidate with the fewest votes on the previous ballot. After discussion, on a rollcall vote, the measure was ADOPTED, 10 votes in favor to 6 opposed. Those voting in the affirmative were Messrs. Bolvin, Clark, Compton, Dannals, Eaton, Foster, Gmelin, Haller, McConaghy, and Smith. Those voting in the negative were Messrs. Albright, Chapman, Griggs, Michel, Spencer and Thurston.



Tellers W4ACY and W9PRN record the vote for membership on the Executive Committee, while the third teller, VE2BK, rechecks the ballots (far left).

85) The Chair announced the opening of nominations for director members of the Executive Committee, and named Vice Directors Wicker, Metzger and Dumbrille as tellers. Mr. Dannals nominated Mr. Smith; but the latter declined because of the pressure of business. Mr. Smith nominated Mr. Clark. Mr. Thurston nominated Mr. Spencer. Mr. Clark nominated Mr. Dannals, Mr. Michel nominated Mr. Eaton. Mr. Haller nominated Mr. Compton. Mr. Chapman nominated Mr. Griggs. Mr. Chapman nominated Mr. Gmelin. On motion of Mr. Haller, unanimously VOTED that the nominations are closed. The tellers announced the results of the balloting as follows:

Mr. Clark	13
Mr. Spencer	6
Mr. Dannals	11
Mr. Eaton	9
Mr. Compton	14
Mr. Griggs	8
Mr. Gmelin	3

Whereupon, Victor C. Clark, W4KFC; Charles G. Compton, WØBUO; Harry J. Dannals, W2TUK; and Noel B. Eaton, VE3CJ, were declared elected as members of the Executive Committee for the ensuing term.

86) On motion of Mr. Gmelin, unanimously VOTED that the Board of Directors commends the Contest Advisory Committee for its excellent organizational work during the past year.

87) On motion of Mr. Gmelin, unanimously VOTED that the General Manager continue an advertising campaign in magazines which might be read by individuals who are likely to have an interest in becoming radio amateurs, in an attempt to attract more individuals into the amateur service.

88) On motion of Mr. Spencer, unanimously VOTED that SCMs and SECs be permitted to use five trips a year, out of the ten presently allowed, to visit non-amateur groups, with the prior approval of the Communications Manager.

89) On motion of Mr. Albright, unanimously VOTED that a section of the 1970 Radio Amateur's Handbook be devoted to the subject of VHF Repeaters.

90) On motion of Mr. Albright, unanimously VOTED that the Board expresses its sincere thanks and appreciation for the untiring work and devotion to the League and to amateur radio by the vice directors, assistant directors, SCMs, SECs, QSL Managers and all the members of the League, and it is the sense of the Board that their contribution to amateur radio has done much to enhance amateur radio in the field of public service, convenience and necessity.

91) On motion of Mr. Haller, unanimously VOTED that the Board extends its appreciation to the Field Engineering Bureau and the Amateur and Citizens Radio Division of the Federal Communications Commission and to the Canadian Telecommunications Bureau for their continued assistance and cooperation in administering affairs of the amateur body during the past year.

92) Moved, by Mr. Smith, that Vice Directors be authorized to attend one Board meeting at League expense during a two-year term of office. After extended discussion, the ayes and nays being ordered, the motion was REJECTED, 7 votes in favor to 9 opposed.

93) On motion of Mr. Chapman, unanimously VOTED that the Board express its deepest appreciation to the several vice directors present for their demonstration of interest in League affairs by their attendance at this meeting, since vice directors incur the expense of attendance out of their own pockets and are to be commended for their interest in the American Radio Relay League, in actions of the Board, their attendance and interest as well as their devotion to the League going beyond the call of duty (Applause).

94) On motion of Mr. Chapman, a rising vote of appreciation for the service of Carl L. Smith, WØBWJ, as a member of the Executive Committee, was unanimously ADOPTED (Applause).

95) On motion of Mr. Bolvin, unanimously VOTED (Mr. Eaton abstaining) that the General Counsel file comment in support of maritime mobile operation on 7.0–7.1 MHz., FCC Docket 18506.

96) On motion of Mr. Dannals, unanimously VOTED (Mr. Eaton abstaining) that the General Counsel file ARRL support for RTTY in 28.0–28.5 MHz. and c.w. operation in 144.0–144.1 MHz. (in lieu of the respective present assignments, RTTY at 29.0–29.7 MHz. and c.w. at 147.9–148.0 MHz.), FCC Docket 18508.

OFFICERS' REPORTS AVAILABLE TO MEMBERS

Each year the offices of the League make comprehensive written reports to the directors. The Board has made these reports available to interested members, in a volume which also includes reports of the directors. The cost price is $1.00 per copy, postpaid. A copy of the financial statement only is available without charge. Address the General Manager, ARRL, Newington, Conn. 06111.

97) On motion of Mr. Griggs, unanimously VOTED (Mr. Eaton abstaining) that the League go on record as supporting the Goldwater bills, S-1466 and S. J. Res 27, which would permit immigrants who have filed first papers to become amateurs.

98) On motion of Mr. Chapman, the following resolution was unanimously ADOPTED: WHEREAS, Don Mix, W1TS has served the American Radio Relay League faithfully and well as a technical writer and Assistant Technical Editor for 36 years, and WHEREAS, he has been throughout that time an example of utmost devotion to duty and thereby contributed to the growth and stature of the League and amateur radio and WHEREAS, he retired from the League's active staff on January 1, 1969, NOW THEREFORE BE IT RESOLVED that the Board of Directors of the American Radio Relay League in annual meeting assembled do hereby express to Don Mix, W1TS, their deep appreciation for his long and diligent service to the League and amateur radio.

99) On motion of Mr. Smith, unanimously VOTED that J. A. Gmelin, W6ZRJ, is appointed liaison director to Project Oscar, Inc. and Victor C. Clark, W4KFC, is appointed as liaison director to the Radio Amateur Satellite Corporation.

100) At this point, announcement was made of committee appointments by the president as follows:

Membership & Publications Committee.....	Mr. Spencer, Chairman Mr. Clark Mr. Albright
Public Relations Committee.....	Mr. Haller, Chairman Mr. Griggs Mr. Bolvin
Merit and Awards Committee.....	Mr. Groves, Chairman Mr. Foster Mr. Dannals
Finance Committee....	Mr. Eaton, Chairman Mr. Chapman Mr. Compton
Planning Committee...	Mr. Thurston, Chairman Mr. Michel Mr. Gmelin

101) On motion of Mr. Compton, unanimously VOTED that the General Manager is hereby authorized to pay expenses for the operation of ARRL committees during the year 1969, but not to exceed amounts as follows:

Finance Committee	$2000
Planning Committee	1500
Membership Publications Committee	1000
Public Relations Committee	1500
Merit Awards Committee	400

102) Whereupon, on motion of Mr. Groves, the Board adjourned, *sine die* at 6:30 P.M.

103) (Time in session as a Board, 15 hours, 33 minutes; total direct authorizations, $105,786.48)

JOHN HUNTOON
Secretary

MINUTES OF EXECUTIVE COMMITTEE MEETING

No. 326
May 1, 1969

Pursuant to due notice, the Executive Committee of The American Radio Relay League, Inc., met at the Governor House Motor Hotel, New Orleans, La., at 9:40 A.M May 1, 1969. Present: President Robert W. Denniston, WØDX, in the Chair; First Vice President Wayland M. Groves, W5NW; Directors Charles G. Compton, WØBUO, Harry J. Dannals, W2TUK, Noel B. Eaton, VE3CJ, and Carl L. Smith, WØBWJ; General Manager John Huntoon, W1LVQ. Also present were several directors, in attendance preliminary to the annual meeting of the Board.

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

Allen County Amateur Radio Technical Society	Fort Wayne, Ind.
Ascientia Amateur Radio Committee of the Seaholm High School Science Club	Birmingham, Mich.
Bergenfield Amateur Radio Klub	Bergenfield, N. J.
Bonner County Amateur Radio Club	Sandpoint, Idaho
Brainerd Area Amateur Radio Club	Brainerd, Minn.
Brightleaf Amateur Radio Club	Greenville, N. C.
Cathedral High School Amateur Radio Club	Indianapolis, Ind.
Chaminade High School Radio Club	Mineola, N. Y.
Chatham High School Amateur Radio Club	Chatham, N. J.
Chenango Valley Amateur Radio Association	Norwich, N. Y.
Coastside Amateur Radio Club	Pacifica, Calif.
Dade County Amateur Radio Public Service Corps.	Opa-Locka, Fla.
Fayetteville-Manlius High School Amateur Radio Club	Manlius, N. Y.
Greater Atlanta VHF Society	Tucker, Ga.
Gulfstream Society of Amateur Radio Operators	Lake Worth, Fla.
IBM Owego Amateur Radio Club	Owego, N. Y.
Indianapolis Ham Association	Indianapolis, Ind.
Key Klickers Amateur Radio Club	Stirling, N. J.
Klick & Chatter Club	Spencer, Iowa
McDowell High School Radio Club	Erie, Pa.
Miami County Amateur Radio Club	Troy, Ohio
Michigan State University Amateur Radio Club	East Lansing, Mich.
Middle Tennessee Amateur Radio Society	Manchester, Tenn.

W4KFC and K4KQ

WØBUO and W2TUK

National Institutes of Health Radio Amateur Club	Bethesda, Md.
North Shore Amateur Radio Club	Woodbury, L.I., N. Y.
Penn Hills Amateur Radio Club	Pittsburgh, Pa.
Plantation District Radio Club	Hahnville, La.
Radio Amateur Satellite Corporation	Washington, D. C.
Radio Amateurs of Corry	Corry, Pa.
Radio Club of Explorer Post 285	Worthing, Ohio
Raleigh Amateur Radio Society, Inc.	Raleigh, N. C.
Ridgewood DX and Contest Club	Ridgewood, N. J.
Rogue Valley Amateur Radio Club	Medford, Ore.
Saint Bernard Boys' High School Amateur Radio Club	Uncasville, Conn.
Springbrook High School Amateur Radio Club	Silver Spring, Md.
Springfield Amateur Radio Club (SPARC)	Oreland, Pa.
Storm Lake Amateur Radio Club	Storm Lake, Iowa
Submarine Base Amateur Radio Club	Groton, Conn.
Sudlow Junior High School Amateur Radio Club	Davenport, Iowa
Thomas A. Edison Amateur Radio Club (H.S.)	Alexandria, Va.
University of Washington Amateur Radio Club	Seattle, Wash.
Valley of the Moon Amateur Radio Club	Sonoma, Calif.
Wabash County Amateur Radio Club	Wabash, Ind.
Wagner College Amateur Radio Club	Staten Island, N. Y.
Western Quebec VHF/UHF Radio Club	Pincourt, Que.
West Nebraska Tech Amateur Radio Club	Sidney, Neb.

On motion of Mr. Compton, unanimously VOTED to grant approval to the holding of a Central Division Convention in Indianapolis, Ind., May 24, 1969; a Great Lakes Division Convention in Louisville, Ky., August 29–30, 1969; a Southeastern Division Convention in Miami, Fla., January 17–18, 1970; a Pacific Division Convention in Fresno, Calif., May 15–17, 1970; a Georgia State Convention in Augusta, September 13–14, 1969; and a Pacific Division Convention in San Jose, Calif., July 3–5, 1971.

On motion of Mr. Smith, unanimously VOTED to grant Life Membership to the following applicants:

G. Timothy Anderson, WA2DUE, Robert L. Anger, W1GNR, J. H. Baldwin, VE3BS, John Davis Bassett, W3CN, Emile L. Cahn, WA5ATM, W. Gregory Clark, WN3JUK, Robert E. Cole, K8IZK, Rodney C. Conley, K8KFY, William I. Dunkerley, Jr., WA2INB/KL7ELA, Henry W. Eckhard, W6ON, John Thomas Evans, Jr., WA1JLX, Robert J. Evans, WB6IXN, Edward F. Everett, W1ALE/W1TNO, Larry Fistolera, WB6OCD, Roderick M. Fitz-Randolph, W5HVV, Edward H. Foster, W1TTL, Randle D. Frazer, Jr., K4YYX, Benjamin J. Friedland, K2PBP, Jean A. Gmelin, W6ZRJ, Harold Gross, K6UQC, Barrie C. Hiern, K5SGP, Tom H. Higgins, VE3GEQ, George W. Hippisley, Jr., K2KIR, William H. Holabird, W6APF, Zenon Janowski, W2JRI, John B. Johnston, K3BNS, Henry Kampe, W9OKM, Malcolm P. Keown, K4RIN, Kenneth B. King, WA2HZI, Richard G. Kirkpatrick, W8HWU, E. Charline Larson, WA7DXI, James L. Lawson, W2PV, Frank Louis Lepinski, KØMLO, Harry W. Lewis, W7JWJ, Richard Lieber, K9GEL, Lester V. Lohrman, WA3ENE, Gordon S. Marshall, W6RR, Robert O. Martel, WA4YWK, Ernest D. Marten, W2GNB, J. Raymond McGrath, K7CUY, James J. Minikel, WB6MQE, William Nighman, W4ZSH, C. L. Pennington, W4UIN, Raymond Walford Perrin, VE3FVN, Clifford J. Peterson, WA9SUE, Albert W. Pollock, WB6NRB, Michael Pozzani, K3WBD, Earl P. Price, Jr., W5ILY, Larry E. Price, W5TIA/W4DQD, Lawrence F. Rains, WA6HIL, Norman G. Ray, W7LFA, Charles J. Reno, WA8WKQ, Robert Stanley Rolfness, W7VZX, Phillip Meyer Sager, WB4FDT, Burnett H. Sams, WA3BJF, Russell C. Scott, KL7SHM/W7SHM, Leo F. Servary, W4FRL, Joseph H. Seung, KH6GAU/KR6KQ, Lawrence Owen Shaw, W9OKI, John W. Sherman, W6KAS, Edward P. Smith, W8JYY, Ivan D. Smith, Jr., K8VEX, Maxwell G. Smith, W7CAL, Aaron Spiro, W2SUC, Spero Spiro, W5PCZ/W9EEP, Selwyn J. Stansfield, WA8GDR, David B. Stewart, WA6FYP, Larry W. Strain, WAØEMS, J. F. Teed, W7UIU, David L. Thompson, W3DEV, Edgar A. Vacca, WA7FXD, Chauncey Van Alstine, W2IWI, Albert W. Vitt, WAØCVS, Geoffrey S. Vore, W9QBJ/WA9MZII, Simon Merrill Weiss, WA2HJD, Averill M. Williams, WN2GQT, Frederick E. Wirth, Jr., WA8DOM, Donald J. Woods, WB2EKR, Charles N. Wright, W4PED, Charles E. Ziegler, W8FTQ.

The Committee next reviewed the proposed program for the 1969 National Convention.

On motion of Mr. Compton, unanimously VOTED to authorize Chief Accountant Jane G. Mastronarde to sign documents in connection with the League's several savings accounts.

There being no further business, the Committee adjourned, at 10:57 A.M.

Respectfully submitted:
JOHN HUNTOON
W1LVQ
Secretary

Barry Goldwater, K7UGA/K3UIG, recently dropped in on MARS headquarters in the Pentagon. With the Senator: Ed Liscombe, K4KNV, Chief MARS Army; Joe Ziglinski, W4DIN, Assistant Chief MARS Army; SFC J. R. Smalley, WB4LNY, Chief Operator K4USA, and SP4 Patricia Merren, receptionist.

July 1944

. . . The death of C. Stuart Ballantine is noted by K. B. Warner in his editorial. A mathematical genius, he nevertheless had the ability to write for the ordinary amateur and published the famous textbook, *Radio Telephony for Amateurs*, in 1922. This was a god-send to those hams who were floundering around with tubes and didn't really know, for the most part, what they were all about. His discussions on antennas and what made them radiate were most illuminating to me, who, at that time, was a very firm believer in tuning for maximum amperes — thermo-couple amperes, of course. Experiments with F8AB in 1924–25 convinced me that a Marconi antenna working below its fundamental really got out much better than when working at or just above, even though the antenna current was substantially less.

. . . Clinton B. DeSoto, W1CBD, *QST*'s Editor, along with Cy Read, W9AA, take a relatively short training cruise on a Liberty ship, to observe the goings-on. This particular ship is part of the Maritime Administration's program for training wireless operators for seagoing service and the boys get their final training before being assigned to a regular berth on a cargo ship. Of course, there are a lot of photos, but the article is mainly concerned with life aboard a Liberty Ship. This is a good story.

. . . WERS and the War are still with us. Frank Heubner describes a WERS control station superhet which goes a long way to solving the problems of interference from nearby nets. Since he is talking about New York City and the congested frequencies there cause lots of interference, this is a good step in the right direction. There are only seven tubes and it looks easy enough to build.

. . . We are in the beginnings of commercial television. The Iconoscope has made its appearance and B. W. Southwell, W6OJW/2, gives a good resume of the principles involved. He tells just how it works.

. . . Interested in an inexpensive impedance bridge for measuring *R*, *L* and *C* values? Athan Cosman tells all about it. It is natural to start off with the classic Wheatstone bridge, familiar to all physics students. Certain modifications, and you come up with the other types of bridges developed by others, such as the Maxwell and Hay inductance bridges.

. . . "Sourdough" philosophies on "Them wuz the Good Old Days," as of 1944. This is hilarious reading. Wonder who "Sourdough" was? Some of his expressions are reminiscent of "The Old Man" and some of Dixie Jones' Owl Juice.

. . . Ed Tilton, W1HDQ, gets into the subject of Aerology. Weather and cloud formations have a direct bearing on u.h.f. communications. — *W1ANA*

"NEW" BOOKS

Ham Radio Incentive Licensing Guide, by Bert Simon, W2UUN, published by Tab Books, Blue Ridge Summit, Pa., 160 pages, 5½ × 8½, $6.95 hardbound, $3.95 paper.

How many different covers can bring substantially the same information — or misinformation — to the struggling amateur aspirant?

In 1956 W2PIK "borrowed" heavily from the ARRL *License Manual* for his *Getting Started in Amateur Radio;* but at least the publisher eventually had the decency to admit the transgression and apologise. About 1958, in preparing copy for the *CQ License Guide*, K2IEG did a clumsy job of attempting to change the ARRL text to seem his own, and the diagrams were practically identical — but with different lettering, naturally; one was actually a photocopy of ARRL's. Then a couple of years ago, K2ZSQ and K2AES "authored" the *Amateur Radio Incentive Licensing Guide* (p. 83, April 1968 *QST*), largely a warmed-over version of the old *CQ* effort, including most of the original errors but topping them with a few of their own.

This "new" book by W2UUN makes the others look like saints. Little or no attempt is made to camouflage the source of material: much of it is direct copy of the ZSQ/AES misguided effort, and if permission was given it is not indicated. The sample test questions are crude paraphrases; the diagrams are direct photocopies; even some of the straight text is photocopy, possibly to save typesetting costs.

In its favor, however, we note that little of the erroneous material in the source book was purloined. The poor prospective purchaser thus faces the dilemma of whether to pay $6.95 (hard cover) for this job, or $2.75 (paper) for the source book — and then edit the errors himself! Meanwhile, we wonder if the ARRL *License Manual* (still $1) realizes how many illegitimate offspring it has sired? — *W1LVQ.*

Strays

HEADQUARTERS VISITS

The League Headquarters building is open to visitors Monday through Friday, 8:30 to 4:30, on a "drop-in" basis, and at other times by appointment. The headquarters is on Main Street (Conn. Route 176 and 176-A) about a mile north of the center of town, and about 3 miles west of Conn. 15-U. S. 5, the Wilbur Cross Highway. (For W1AW visiting hours, see the schedule on page 106).

RADAR TRAP TRAPPED

Jan Jubon, WA2REM, was radared at 41 m.p.h. in a 25 m.p.h. zone in Madison, N. J. recently. At one dollar for each mile over the limit, plus five dollars court costs, the town figured that Jubon owed $21. On a hunch, he checked with the FCC and found that the town's radar license had expired over a year and a half ago! Jubon says he probably will not pursue the matter but expects to get a fair deal in court now that he is holding such an ace in the hole.

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.

I.A.R.U. News

INTERNATIONAL AMATEUR RADIO UNION, THE GLOBAL FEDERATION OF NATIONAL NON-COMMERCIAL AMATEUR RADIO SOCIETIES FOR THE PROMOTION AND CO-ORDINATION OF TWO-WAY AMATEUR RADIO COMMUNICATION

BRUSSELS CONFERENCE

Some 27 national amateur societies were represented (7 by proxy) at the triennial conference of IARU Region 1 (Europe and Africa) in Brussels, Belgium, the week of May 4–10. Reciprocal licensing, encouraging amateur radio interest in developing countries, the Intruder Watches, and representation at the forthcoming space radiocommunications conference, were among many subjects discussed by delegates.

A concerted effort will be made by all societies to convince their telecommunications administrations that amateur space communications activity (satellites, moonbounce, etc.) should be permitted in all bands above 28 MHz., instead of the current provision for 144–146 MHz.

Each year one of the European contests (e.g., WAE) will be used as the nucleus of a larger DX contest sponsored in the name of Region I. It is hoped 1970 will be the first year for the new system. The *Radio Sports Federation* of the USSR offered to provide the major trophy.

A worldwide setup of 10- and 15-meter beacons, for propagation studies, was initiated by DJ7AA, was proposed by *DARC*, the German society, and endorsed by the conference. G2BVN is to be coordinator.

ARRL/IARU president WØDX addresses the Regional IARU Conference in Brussels. On the left is ON4AK, president of the Conference's host society, *Union Belge des Amateurs Emitteurs*.

Some of the delegates felt that earlier efforts to encourage the growth of amateur radio among citizens of developing countries moved too quickly into the training and equipment stages without first undertaking a promotional program of creating widespread interest. Thus efforts will now be concentrated on newspaper articles, radio programs, films, etc.

In addition to organizing the work schedule of the conference, host society *UBA* (Belgium) arranged several receptions and an excursion for the visiting delegates and observers (the latter including IARU President WØDX, Secretary W1LVQ, Region II Secretary OA4AV, Region II Treasurer VE3CJ, and IARC representatives F8RU and HB9AJU). One highlight was the statement by P. Bouchier, of the Belgian licensing authority, that his view toward amateur radio was much more favorable since he had learned in detail of some of the scientific programs undertaken by amateurs.

These are some of the delegates from Region I IARU societies at the Brussels Conference. Seated at the table from left are, YU1AF, UA3AF, RAEM, G3BVG, G6NZ, HB9RG, HB9DX, SM4GL, and SMØBDS.

CONVENTION NOTES:

The *Union de Radioaficionados Espanoles* will hold its third annual international amateur radio convention in Santa Cruz de Tenerife, Canary Islands, September 12 through 17. Convention activities will include a tour to the local radio and television station, visits of many points of interest on the Island, and leisure time sports.

A complete convention program and further details may be obtained by writing: International Convention of Radio Amateurs, P. O. Box 215, Santa Cruz de Tenerife, Canary Islands.

The *Radio Society of Great Britain* takes great pleasure in inviting you to the International Radio Engineering and Communications Exhibition, to be held in London from 1st to 4th October 1969. This Annual Exhibition, sponsored by the *RSGB* and organized by P. A. Thorogood, G4KD, has now come to be known as an international event. In recognition of this, the Society holds a special reception for overseas visitors on the Friday evening of the Exhibition. This year our reception will be held on October 3rd, and we should very much like to have you with us on that evening.

The Exhibition covers all aspects of our hobby from home constructed to the newest and most sophisticated commercial equipment. In addition the many activities of the *RSGB* will be featured in special displays. Headquarters stations GB2VHF and GB3RS will be in operation on 80–2 meters, a.m., s.s.b. and RTTY.

The International Amateur Radio Club announces plans to hold its annual convention on September 12 and 13 in Geneva, Switzerland. A technical program will include talks by delegates to a CCIR (technical committee) meeting of the International Telecommunications Union. For further convention information, write the International Amateur Radio Club, Box 6, 1211 Geneva 20, Switzerland.

STRATFORD UPON AVON, 1969

A special station will operate from Stratford-upon-Avon in England, July 11–13, to celebrate the 700th anniversary of the beginning of local government in the town, a date which preceded the birth of William Shakespeare at Stratford by 300 years!

Call sign will be GB3SUA. Operation will be 80 through 10 meters, s.s.b., a.m. and c.w. A special QSL will be issued.

The station will be located on the banks of the River Avon, close to the Shakespeare Memorial Theater. Local celebrations will include a river carnival, boat rally and public dancing in the streets.

Further information from M. Webb, G3OOQ, 14 Townsend Road, Tiddington, Stratford-upon-Avon, Warwickshire, England, or *RSGB* Public Relations Officer, Sylvia Margolis. Touring amateurs who expect to be in the district at that time are particularly asked to contact *RSGB*.

AMATEUR RADIO: AN ASSET TO LIBERIA

At the recent Field Day sponsored by the *Liberian Radio Amateur Association*, U.S. Ambassador Ben H. Brown, Jr. praised the society on its work. The following is a portion of Ambassador Brown's address: "Amateur radio has been an important factor in many advances in communications. And one notes with satisfaction as well that one of the goals of the *Liberian Radio Amateur Association* is that of furthering good relations among people across national boundaries."

"Quite apart from this, the very practical effects of amateur radio activities in Liberia are clearly demonstrated. One of its more important activities, I happen to know, is the training program of the *LRRA*. Classes have been conducted in both electronics and the Morse code; technical journals have been made available to members and potential members of the *Association;* and there are even club stations in the country, one of the more important of which is the one at Booker Washington Institute, where the radio equipment provided is felt to be a real addition to the technical curriculum of that institution. . . . In this country, as in the rest of Africa, there is a great need for radio-communication technicians in the fields of radio and television broadcasting. Amateur radio provides a training ground. Repair of home receiver sets, aeronautical radio navigation and communication, operation and maintenance of telephone facilities are all services which Liberians themselves can, should, and *must* perform in time. My hope is that the *Liberian Radio Amateur Association* will continue and expand its efforts, especially its training programs, so that the day when this will come to pass will be advanced."

"The *Association* is to be congratulated for all that it has done and for being able here today to celebrate — with hams throughout the world — yet another field day. I wish to congratulate Mr. Sam Watkins, EL2P, who founded the Association in 1962, and his able and enthusiastic assistants in that founding, Mr. Samuel Butler, EL2L and Mr. Sewell Brewer, EL2S."

NEW NAMES

With the recent reversion to Japanese sovereignty of the Bonin & Volcano Islands and Marcus Island, the KG6I and KA1 prefixes were changed to JD. The islands will now be shown on the ARRL Countries List with the Japanese names of Ogasawara Islands and Minami Torishima. Thus, for DXCC purposes, contacts with the former Bonin & Volcano Islands and Marcus Island have the same country status as contacts with Ogasawara Islands and Minami Torishima. QST

Changes of Address

Please advise us *direct* of any change of address. As our address labels are prepared in advance, please allow six weeks notice. When notifying, please give old as well as new address and Zip codes. Your promptness will help you, the postal service and us. Thanks.

Correspondence From Members-

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

NEW PREFIX — MOØ

¶ I propose that the ARRL suggest, to the proper regulatory body, the prefix MOØ be used for all radio-communications call signs originating from the moon, and that all calls from moon orbit have the prefix MO7.

With the landing of men on the moon expected soon, and the colonization of the planetoid by radio users probable, it seems proper to suggest a prefix for lunar-based communications. At any rate, I hope to see some type of prefix assigned to the moon. — *Bruce Frahm, WNØTAS, Colby, Ks.*

[EDITOR'S NOTE: Sorry, MAA-MZZ is assigned to Great Britain.]

QST COMMENTS

¶ Re "New Law," May *QST* Correspondence: Is WA3LVV admitting to zero code speed or does he copy backwards? — *Phil Ellis, W2RPV, Westbury, N. Y.*

¶ Many years ago you appointed me as your (or *QST*'s) "chief looker for bum statements and haywire specifications" when I found 11 in one bad month.

Now let's take the April '69, p. 96 pictures and caption. If that weren't in the April issue I would ask for an endorsement to update my previous assignment with the magazine.

The shadows of the horns are between the same rivets. Therefore the pictures were taken within 10 minutes of each other. Our hero changed from coat to shirt-sleeves, but has the same light spot in his hair. The table, gear, patch cables, boxes, and hubcaps are the same in both exposures. While A was underexposed, B was overexposed. If they were facing each other, the sun has found a new way of orbiting the earth around it to reach impossible angles. 40 GHz. is mighty high frequency, even for 10 mw. No key and neither a pair of headphones nor a loudspeaker is obvious. Power sources are unmentioned, but had to be of 120 v.a.c. Those tables do not fit in a car very well. Even the camera was rotated 90° to throw me off. Neither call was in my (too) old *Callbook*. Changing from light to dark-rimmed glasses is obvious.

Now then, own up or I will resign my appointment — retroactively, if need be. — *George Bonadio, W2WLR, Watertown, N. Y.*

¶ The "get off my frequency" syndrome has shown too many signs of becoming epidemic. The discussion of this subject on page 94 of May *QST* is actually long overdue, albeit it will surely bring you much abuse from those who singly, or by systematic practice, seek certain frequencies as proprietary franchises.

I seriously recommend that the article be reprinted, on the cover, and repeated every 5 pages, of an early issue of *QST*. — *J. H. Ferguson, W1IIM, Wayland, Mass.*

¶ Re May *QST* correspondence — "Strange Hobby" by WN2IEM: What an inspiring and profound letter. If only we could see more and more of this type of feeling and writing, there might be a chance for amateur radio.

I'd like to see that letter published once a month just to show that there are some persons within the amateur fraternity that aren't bellowing about "free speech," incentive licensing — pro and con, about this and that and every stupid thing under the sun, but just a nice sincere letter from a nice sincere person.

Imagine? — a letter in *QST* that isn't ripping up something — downing someone — praising ARRL for I.L. — damning ARRL for I.L. but just a few simple words that capture an intangible feeling that most of us have lost in the asinine hectic world of demonstrations, rebellion against authority, against the status quo, against moving forward. . . .

By golly one little letter that, if read, makes a ham feel like he wants to be a ham . . . a masterpiece! — *Robert A. Manning, K1YSD, West Rye, N. H.*

¶ I was appalled at the number of entries in a recent "Silent Keys" column. I'm rapidly becoming convinced after looking at my ashtray after a couple of hours of traffic handling, one of the reasons for the large number of Silent Keys must be due to lung cancer, indirectly caused by hamming. Caution: Field Days may be hazardous to your health! — *Joe Hoener, KØFYL, Fort Collins, Colo.*

¶ If you think things are *now* bad on the ham bands (*QST* editorials for Feb. and April 1969), just wait until amateur slow-scan television becomes generalized and the boys start illustrating their "heated discussions on sex" with those postcards they brought back from Paris! — *Rupert A. Lloyd, Jr., F5SF/W3LR, Argeles-sur-Mer, France.*

¶ The "Hidden Mobile Antenna," April *QST*, being the answer to my problems, I tried to go one better; by feeding the other roof post and switching the feed points I figured I could have a switchable directional single-element beam. The signal reports were very promising till I hit a large bump, a sway-backed Chevy has a lousy radiation pattern. The warped frame was cured by welding a large pipe to the roof posts; it shorts out the antenna but is ideal for holding the mast of the 80-meter field day quad. — *William Heinzinger, WA9VOL, Harwood Hgts. Ill.*

¶ I want to compliment you on your stand against use of obscenity on the ham bands, and to urge you to even greater effort in that direction.

I am, and have been for many years a newspaper reporter. I take a back seat to no one in the defense of free speech and a free press. But freedom of speech, and of the press, stops where common decency stops. . . . —*Wayne S. Scott, W5WEJ, Santa Fe, N. M.*

CONFUSED NOVICES

¶ As with most Novices, I was stuck with an "under one hundred class" general-coverage receiver; so the QRM's always a problem. What makes it worse though, are a few amateurs who purposely add to the chaos. Just about every night at 7:30 you hear a barrage of "QST QST QST" very near W1AW's frequency. They're obviously trying to confuse us poor Novices; why? Your guess is as good as mine. — *William Kornfeld, WN2HOS, Commack, N. Y.*

MORE ON THE 2-YEAR WAIT

¶ On behalf of myself and many others in the same boat, I would like you to petition the FCC or whatever you see fit to get the job done. Please get rid of the 2-year wait before you can get the Extra Class license. I have been a General and then Advanced now for over a year I am majoring in electronics at a vocational technical school and have a Commercial Radiotelephone ticket also. Please get rid of that two year wait. Many hams are very well qualified to get the Extra so please get going. — *Gerald J. Warzcha, WAØTNQ, Minneapolis, Minn.*

¶ It is possible to examine a person to see if he knows code and theory which he has learned off a record and out of textbooks. But experience cannot be learned out of textbooks or from phonograph albums. It must be experienced! There are techniques and operating methods only learned from on the air experience. If the Extra Class license is really going to be the top of the line then the licensee must know these methods and techniques. Enthusiasm is no substitute! — *David George Johnson, WB4JTT, Norfolk, Va.*

¶ When the c.w. subbands are doubled to 50 kHz. this fall, new General and Advanced Class operators will lose the best DX portion of the c.w. bands. We should at least have a chance to regain these frequencies now instead of having to wait out the present two year requirement. Experience doesn't make the best operators; but rather the effort one is willing to put forth. Let's make incentive licensing what the name implies by removing this unfair restriction. — *Paul Husby, WAØUCU, St. Paul, Minn.*

[EDITOR'S NOTE: See page 81 for affirmative action by the Board.]

BOUQUET

¶ I think your report of Sweepstakes in the current issue of *QST* shows journalistic brilliance and creativity unprecedented in radio contest reporting. . . . — *Wayne Overbeck, K6YNB, Fullerton, Ca.*

¶ Where are the April Fool's articles? Besides Bob Hill's SS writeup I couldn't find any. I looked, but I'll be danged if I can sort through those technical-like pieces. — *Steve Sacks, WA2EUX, Mendham, New Jersey.*

INCENTIVE LICENSING

¶ You can kindly take my name off your mailing list; I have been a faithful ARRL member for many years, but I chose to cut this relationship because of your very apparent lack of interest in the members of the amateur radio spectrum who are not holders of doctors of electronics degrees. The idea of telling the FCC that it would really aid the art to cut the bands all apart and give the select few their own private part. I'm not against giving the Extra Class something extra for their effort, they deserve it; but why not suggest to the FCC that they allow them to use s.s.b. on part of the c.w. band. Now that would have been great, but the way you handled it, dumb brother dumb, you have set the art back 50 years. I hope you enjoy yourself in your private part of the bands. I will point out to you now, in my meek way by subscribing to another ham magazine which chose to stick up for the average ham, instead of stepping on him. I am not alone in my opinion, it is shared by other members of my club, and many on the air.

Anyway brother amateur, let me wish you good luck and I hope that someday you will start trying to help us instead of hurt us; then I'll gladly support you even if you raise your rates to $50 a year.

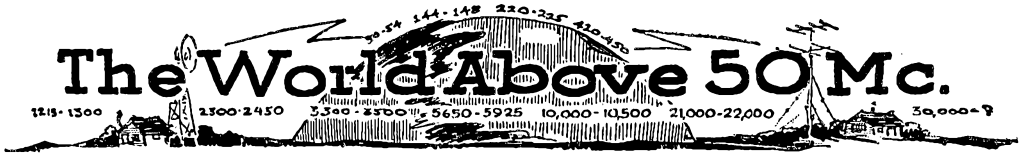
To make this letter sound not all bad, I will thank you for the good that you have done in the past. But this one stand in regards to forcing me to obtain the Extra Class license I find very hard to forgive. — *Gerald Dimmitt, WA6FCY, Coos Bay, Oregon.*

¶ A person who will not improve himself, and who stands still and gripes because there are means for those who study and work to improve themselves and earn special privileges (which he could also have by study and work) deserves no sympathy, nor soap box, nor magazine pages from which to expound his negativism. Some insist on total benefits for all without rewards for those who work over those who do not. This philosophy is often found in those yet too young to realize the value of working and earning an advanced status in life. I am proud to say I am of a different breed. I believe in taking the positive approach, always striving to excell. With its special privileges my Extra Class license also brings added responsibilities, of being equipped with fine gear and knowing how to use it, and of furthering the art's advancement in any way I can. I could never be interested only in my own operating pleasure and do nothing to help others improve. Some may answer this by saying, "To each his own — you tend to your technical advances and leave us simple souls to operate and enjoy ourselves. If we don't want to progress, that is our business." To such I say, "No, it is not your business alone. It is up to all of us to pull together to upgrade our amateur service. There are always those who have ability and ambition, and there should be provision for the earning of special privileges." — *Paul H. Lee, W3JM, Kensington, Md.*

¶ During the recent ARRL DX Contest as in all other DX contests, VK3APN went on 80 meters. One thing quickly became apparent: although conditions were "average," the number of W/Ks being worked was many times that of any previous DX contest. Two things alone were responsible for this: the outstanding skill of the W/K operators; and few low power stations calling excessively and creating untold QRM on 80 in the States.

Now both of these factors can be traced directly to the incentive licensing system: the upgrading of required standards, and the fact that the bands have been subdivided into segments for exclusive use by the various grades of license.

Since the overseas prestige of American amateurs is governed solely by the way they operate, it is plain that the ARRL has done a great service to all U.S. amateurs. Any who are not proud of it deserve to be relegated to the lower grades of license. ARRL, keep up the good work. — *Peter Nesbit, VK3APN, East Malvern, Vic., Australia.*



CONDUCTED BY BILL SMITH,* K4AYO

The ARRL Board and V.H.F.

At the annual May meeting of the ARRL Board of Directors several actions were taken that are of major interest to v.h.f. men.

West Gulf Division Director Roy Albright, W5EYB, introduced a motion calling for a subsection of this column to be devoted to v.h.f. repeaters. We hope that this will be instrumental in our receiving more f.m. and repeater news, for much more will be needed, if the special subsection is to serve its purposes. The channel has been here all along, since any v.h.f. news is meat for these pages. The main problem has been that of getting news from workers in this fast-developing field. The form that the new subsection will take is mainly up to you. We'll run short "how-to-do-it" items, operating news, information on new repeaters, interesting changes in existing ones, or anything that will advance the cause. Contributions too involved for presentation in the column will be considered for regular *QST* material. Director Albright also moved to have expanded repeater coverage in future editions of the ARRL *Handbook*.

Hudson Division Director Harry Dannals, W2TUK, who has always been interested in v.h.f. problems, introduced a motion to petition FCC to make the entire 2-meter band available to Technician Class Licensees, instead of the present 145 to 147 MHz. Mr. Dannals also moved that the FCC Notice of Proposed Rule-making, Docket 18508, which would move the 100-kHz. c.w. subband down to 144.0 to 144.1 MHz., be approved. Full text of this docket is given in June *QST*, page 76.

Other actions of the Board in the v.h.f. field call for establishment of beacons on one or more v.h.f. bands at W1AW; initiation of talks with FCC regarding use of power in excess of 1 kw. for scatter, satellite and moonbounce experiments; a study of the possibility of a joint ARRL-Oscar communications station at Foothills State College, Los Altos, California, headquarters of Project Oscar; and petitioning FCC for Technician Class operation between 29.5 and 29.7 MHz.

A more detailed report on the Board meeting appears elsewhere in this issue of *QST*. I hope that you will study the minutes carefully. I am encouraged by this active interest of the Board in v.h.f. matters, and suggest that we reciprocate by maintaining close contact with our Directors. You'll find them listed on page 8 of every issue of *QST*.

*Send reports and correspondence to Bill Smith, K4AYO, ARRL, 225 Main St., Newington, Conn. 06111.

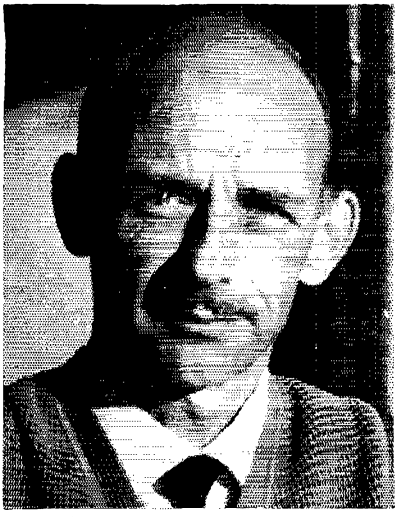
1296 E.M.E. Record

On Nov. 9 of last year, WB6IOM and G3LTF had their first success in lunar 1296-MHz. communication. The strip-chart of this work, published in the January issue (top, page 79), though a highly significant bit of evidence, could not be accepted as proof of communication for a new world DX record for the 1215-MHz. band, since it contained no positive call-sign identification, or exchange of information. Work has continued on the improvement of the stations at both ends, and on April 27, beginning at 2300 GMT, the two achieved an audible exchange of call signs and signal reports.

The signal of G3LTF peaked 5 to 6 db. above the audible threshold, and WB6IOM was up to 12 db. over the noise at G3LTF. This establishes a new record for the 1215-MHz. band, 5492 miles, exceeding the distance between W1BU and KH6UK by some 400 miles. Assisting WB6IOM and WB6AKZ, Owen Bennett and Mike Mikalides.

WB6IOM's transmitter has a ring amplifier of eight 2C39s, delivering 500 watts. The receiving system has a parametric amplifier, a solid-state converter and a pair of receivers, one for audible reception and the other for the paper stripchart recorder. Pete's antenna is a 16-foot homebuilt dish, replacing a 10-footer used last fall. Feedline losses in a nearly 40-foot run are measured at less than 1 db.

WB6IOM says the April 27 test gave signals at least 6 db. better on paper than the November 9 test. The integrator-recorder system is 6 to 10 db. better than audible reception, or a signal may be copied on paper 6 to 10 db. before it becomes audible to the ear. Pete is working on a language system



This is John Morgan, ZL1AZR, holder of one end of the 144-MHz. moonbounce DX record. On March 4, 1969 John worked SM7BAE for a 11,055-mile contact.

involving dashes of different frequency for different messages. It includes letters and numerals. He says his coding system is better than Morse code for weak-signal work, and may allow more e.m.e. participation by those not having space for large fixed-beam arrays. If his system works, and undoubtedly it will, we may again have to reconsider what constitutes a "contact." Pete is confident that the e.m.e. path is a practical medium for communications between any two points on earth which can simultaneously see the moon.

At this writing, WB6IOM was putting his coding system into practical use during a series of e.m.e. tests scheduled for late May. We hope to have more to report next month. Meanwhile, we congratulate Pete, his co-workers and G3LTF for their achievement.

Dick Hart, KØMQS, became the first U.S. operator to work New Zealand on 2 meters. Dick turned the trick on moonbounce by working ZL1AZR.

Some Thoughts on Six Meter DXing

W4GDS and this writer spent one week in May signing ZF1DT on Grand Cayman Island in the Caribbean. We managed more than 100 contacts, but this number could have been greatly increased by improved operating practice.

When a rare station is coming through is a poor time to discuss your station equipment, how high your antenna is, and the weather. The name-of-the-game is to work as many stations as possible. To do this, follow the lead of the DX operator. If he is giving only calls and a signal report, that is all he wants in return. Don't give his call repeatedly. We worked many stations who would give our call a dozen times, and their own two or three times. The DX operator *knows* his call, it is yours he wants, plainly and without the cute phonetics which lead only to confusion. If you don't know who the DX station is, but hear the pileup, don't jump right in and call. Listen first and determine who the DX is and how he is working the pileup — and don't call while the DX is calling or working a specific station. When you have made your contact, move off frequency for your next contact to avoid interfering with others attempting to also work the DX.

Transmitter power and a good antenna system certainly help, but it is surprising how well an S6 signal will stand out in a pile of S9 signals if the operator is skilled. A short call on c.w. may help, assuming the DX station is operating s.s.b. A c.w. signal is quickly noted.

A station in a rare state like Wyoming, or a foreign country, will receive hundreds of QSLs. Multiplied, this can be a considerable postage expense. A self-addressed stamped envelope enclosed with your QSL is a courtesy which will almost always insure your receiving the DX QSL. This works only in U.S. postal areas, of course.

These skills are learned only through experience. A few hours listening to DXers on 20 and 15 meters will help develop them, though h.f. operating techniques may not be optimum. Once learned, they may be applied to working that rare state or some foreign station, and are guaranteed to increase your DXing successes.

OVS and Operating News

50-MHz. *sporadic E* started slowly this season. Even in the lower U.S. latitudes it wasn't until late May that things got rolling. May 24 was an interesting day. ZF1DT, Grand Cayman Island, operated by W4GDS and K4AYO, began working stations in Alabama, Texas, Tennessee and Florida at 1207 GMT, or not long after sun up. The opening lasted the better part of the day, fading completely at times only to later reopen. At 1400 GMT, while working K5AGI in Louisiana, John was also working W9s on backscatter with his beam pointed towards the Caribbean. W5RCT, Texas, reported hearing a Spanish speaking station about the same time.

Conditions on May 25 were also excellent. W6s were heard in Florida, and a Wyoming station livened up the band, over single-hop paths in the midwest. WB4KUN, Miami, worked numerous 9s, and found a rare Vermont contact, K1GYT.

Looking back to early May and late April we note that on April 19, ZF1AA, Grand Cayman, operated by K2OLS worked ZK1AA, Cook Island. During a two-week stay on Grand Cayman, ZF1AA also worked 10 South American countries and W4GDS, Florida. On April 20, WB6KAP and two other W6s worked ZK1AA. The grapevine has it that ZK1AA also worked into Texas. Also on the 20th, KX6HK,

RECORDS

Two-Way Work
50 MHz.: LU3EX — JA6FR
12,000 Miles — March 24, 1956
144 MHz.: W6NLZ-KH6UK
2540 Miles — July 8, 1957
220 MHz.: W6NLZ — KH6UK
2540 Miles — June 22, 1959
420 MHz.: W5LUU — WA4KFW
1150 Miles — April 13, 1965
1215 MHz.: W6DQJ/6 — K6AXN/6
100 Miles — June 14, 1959
2300 MHz.: W2BVU/1 — K1DRB/1
225 Miles — Aug. 30, 1968
3300 MHz.: W6IFE/6 — W6VIX/6
190 Miles — June 9, 1956
5650 MHz.: WA6KKK/6 — WB6JZY/6
179 Miles — October 15, 1966
10,000 MHz.: W7JIP/7 — W7LHL/7
265 Miles — July 31, 1960
21,000 MHz.: W2UKL/2 — WA2VWI/2
27 Miles — Oct. 21, 1964
Above 30,000 MHz.: W6FUV/6—W6ICJ/6
2.3 Miles — Feb. 9, 1969

James Swan, HI8XDS, better known as Swany, is providing many 50-MHz. contacts with the Dominican Republic. Look for him on 50.103 a.m.

in the Marshall Islands, worked several Japanese stations. Thanks to K4GGI/1 for his reports this spring on KX6HK.

There were several auroras in the northern states during April. WA1DPX, Massachusetts, reports one on the 29th. He worked W2, 3 and 8 and VE2AIO.

WA5TTH agrees that E_s was off in May. Mary says she observed a good opening on the 10th when she worked into Minnesota, Kansas, Colorado, New Mexico and Arizona. WA5TTH also worked XE1PY on May 7, as did W4GDS and K5AGI. The latter also worked XE1GE. And also on the 7th, K5MDV, New Orleans, and W4GDS, Pompano Beach, Florida heard ZK1AA around 2200 GMT. The Cook Island station was also heard at XE1PY on May 6, and at WA5TTH on May 8.

In addition to some 100 E_s contacts from Grand Cayman Island in late May, ZF1DT made four scatter contacts with WA4MHS, New Port Richie, Florida, and one contact with WB4KUN, Miami. WA4MHS runs a SB-110 and 6-element Yagi and had a consistently readable signal over the 600 mile all-water path. ZF1DT ran a TR-6 and 3-element Yagi. QSLs for contacts with ZF1DT are available from K4AYO, 850 N.E. 141 St., N. Miami, Florida 33161. Please include a stamped, self-addressed envelope.

Finally, we note that YL HK5AKA is active on s.s.b. from Columbia; W2BOC is interested in receiving detailed reports of unusual E_s conditions, especially multi-hop openings. WB6LYD thinks there should be a column listing for stations wanting to make c.w. contacts to help increase their code proficiency. Six-meter reporting and activity were off during late April and early May as a result of the late E_s season.

Congratulations are in order for K7BAG, Bothell, Wash., who joined the select circle of 50-MHz. WAS holders May 29. His certificate is No. 89.

E.M.E. Two-Way Records

144 MHz.: SM7BAE — ZL1AZR
11,055 Miles — March 4, 1969
420 MHz.: WA6LET — G3LTF
5,730 Miles — Sept. 25, 1965
1215 MHz.: WB6IOM — G3LTF
5492 Miles — April 27, 1969

2-METER STANDINGS

W1JSM	35	8	1400	W5HFV	27	10	1285
K1ABR	34	8	1478	W5MCC	25	8	1430
W1AZK	34	8	1412	K5PTK	17	5	1330
K1WHT	31	8	1300				
K1HTV	30	8	1310	W6GDO	17	4	1326
K1WHS	29	8	1300	W6WSQ	16	4	1390
K1UGQ	29	8	1280	K6HAA	13	4	1380
K1BKK	28	7	1275	W6NLZ	12	5	2540
W1HDQ	24	7	1040	K6HMS	11	4	1258
W1VTU	22	8	1296	K6JYO	11	4	1240
K1MTJ	20	7	1225				
K1JIX	18	6	800	W7RG	27	6	1320
K1RJH	17	7	1450	K7NII	24	5	1290
				K7ICW	16	4	1246
W2NLY	37	8	1390				
W2CXY	37	8	1360	W8PT	41	9	1260
W2ORI	37	8	1320	W8IDT	31	8	1150
K2HLA	36	8	1305	W8IDU	27	8	1150
W2BLV	36	8	1150	W8NOH	26	8	1165
W2AZL	36	8	1380	W8THT	24	8	1000
WA2FGK	33	8	1340	K8ZES	22	8	675
K2RTH	31	8	1215	WA8VHG	13	6	465
W2CRS	26	8	1270				
W2DWJ	23	6	860	K9SGD	42	9	1300
WA2EMB	22	8	1335	WA9DOT	41	9	1303
K2DNR	22	7	1200	K9AAJ	11	9	1200
WB2FXB	21	6	915	K9UIF	11	9	1150
K2YCO	20	7	750	W9AAG	37	9	1200
WA2PMW	19	6	1000	W9IFA	33	8	1060
				W9YYF	33	8	1050
W3RUE	36	8	1100	W9PBP	32	8	820
W3KWH	35	8	1335				
W3GKP	32	8	1108	W0BFB	15	10	1380
K3CFA	25	8	1200	K0MQS	43	10	1590
W3BDP	25	8	1100	W0NXF	42	10	1326
W3BHG	22	8	1140	W0DQY	41	9	1300
K3OBU	21	7	930	W0LFE	38	9	1040
W3HB	20	8	1310	W0LER	36	9	1250
W3LHF	19	6	700	W0EYE	35	9	1380
WA3GPL	19	6	625	W0ENC	33	9	1334
W3TFA	18	8	1342	W0DRL	25	9	1295
				W0LCN	27	8	1000
W4HJQ	39	9	1150				
W4WNH	38	9	1350	F8DO	1	1	5100
W4HHK	38	9	1280	KH6UK	2	2	2540
K4EJQ	37	8	1125	OH1NL	1	1	5850
K4IXC	36	8	1403				
K4QIF	35	8	1225	VE1AUC	7	2	500
W4CKB	34	8	1325	VE2BGJ	16	6	750
W4FJ	34	8	1150	VE2HW	11	5	800
K4GL	33	8	1275	VE2DFO	12	4	600
W4VHH	33	8	1100	VE3EZC	33	8	1283
W4AWS	29	8	1350	VE3AIB	29	8	1340
				VE3ASO	28	8	1285
W5UGO	42	10	1398	VE3EVW	25	8	1100
W5RCI	42	9	1289	VE3BQN	25	7	1250
K5WXZ	36	10	1450	VE7BQH	6	2	1248
W5AJG	33	9	1360				
W5UKQ	29	8	1150				
W5LO	28	7	1254	VK3ATN	3	3	10417

The figures after each call refer to states, call areas and mileage of best DX. Revised May, 1968.

144-MHz. activity centered around meteor scatter and aurora during the same period. The April Lyrids shower was called "generally poor" by K1HTV. One of the few contacts reported was that between KØMQS and VE1PL on April 21. The burst lasted about one minute, allowing what is probably the first VE1/KØ 2-meter contact. W6GHV, San Jose, heard calls from WA5MFZ, K7VTM, WØENC and VE7BQH, but completed no contacts.

The May Aquarids shower was better. W6GHV worked VE7BQH, British Columbia, but K7NII, Phoenix, but got only pings from K7ICW. VE7BQH clicked with K6HAA and worked W6GHV on s.s.b., and nearly worked K6JYO. VE2DFO listened to five days of schedules between VE2BCJ and KØMQS. Those two finally worked on the fifth schedule. VE2DFO suggests potential m.s. operators listen to known schedules to help become familiar with m.s. techniques *before* trying a schedule. Good suggestion, Don. WØLER was disappointed in the Aquarids. John got only calls from WSAEC, West Virginia, and pings from W4LSQ, Alabama.

VE2DFO noted aurora in Quebec on May 13, 14, 15 and 16. He worked some 40 stations on those dates and heard stations as far as Virginia and Indiana. He managed one new one, W3BHG in Delaware, for an even dozen. WA2BCY caught the May 13 opening. He worked or heard Ohio, Michigan, Vermont, Rhode Island, Massachusetts, Illinois, South Carolina plus VE2 and VE3.

220- and 420-MHz. STANDINGS

220 MHz.

W1HDQ	13	5	450
K1JIX	12	4	600
K1BFA	8	3	225
K2CBA	17	5	1090
W2DWJ	15	5	740
K2DNR	13	5	600
W2SEU	12	5	325
K2RTH	11	3	300
W2CRS	10	4	440
W3UJG	14	5	460
W3RUE	10	5	480
K3IUV	10	4	310
K4IXC	3	2	1090
K4GL	2	2	—
W5RCI	10	5	910
W5AJG	3	2	1050
W5LO	2	2	660
W6WSQ	4	4	945
K7ICW	4	2	250
W7JRG	2	2	959
W8PT	11	6	660
WØEYE	8	4	910
VE3AIB	7	4	450

420 MHz.

K1BFA	10	4	470
W1QVF	10	5	400
K1JIX	10	4	460
W1HDQ	10	3	250
K2UYH	15	6	718
K2ACQ	13	8	880
W2BLV	13	5	500
K2CBA	12	6	2670
WA2EMB	12	6	720
W2CLL	12	6	693
W2DWJ	11	4	330
K2YCO	9	6	525
WA2EUS	9	4	260
K2YCO	8	6	550
W2SEU	6	4	220
W3RUE	14	7	585
W3UJG	9	4	400
K3IUV	9	4	310
W4FJ	17	7	940
K4QIF	15	6	1065
K4EJQ	12	5	550
K4NTD	8	2	835
K4GL	5	2	—
W4VHH	5	1	450
W5RCI	19	6	880
W5ORH	12	4	700
W5AJG	7	3	1010
W5UKQ	6	2	590
W5AWK	3	2	222
W6DQJ	4	2	360
K7ICW	4	2	225
W7JRG	2	2	420
W8PT	13	7	715
W8MNZ	13	7	600
K8REG	13	6	625
K8DEO	13	6	450
W8HVX	12	6	495
W8RQI	10	6	425
WA8VHG	7	5	415
W8FWF	7	4	450
W9WCD	17	7	825
WA9HUV	16	7	780
W9AAG	12	4	600
K9AAJ	12	5	425
WA9NKT	9	3	400
W9JIY	8	4	500
WØDRL	17	5	1065
WØLCN	6	3	688
WØEYE	6	2	425
VE2HW	3	3	750
VE3EZC	7	5	510
VE3AIB	5	4	450

K1HTV, Connecticut, says the May 15 aurora was "pretty fair." Rich worked K4QIF, Virginia, and heard K4GL, South Carolina. K4GL's signal was audible only from the west. Also on the 15th, W3BDP, Delaware, worked K1BKK, Vermont, for state number 25. Sam also worked W1AZK, New Hampshire and W1FJH, Massachusetts.

And on tropo, WA8YYW, Detroit, worked a 330-mile path into West Virginia May 19 using a Twoer.

On May 2, KH6EEM and WB6KAP began a series of tropo schedules on 144.09 at 0600 GMT, daily.

WØLER says K9IMX/4 at Ozark, Alabama, wants schedules. Address Dan Smith, 100 Deerpath Road. K6RIL, WB6PDN and W6GHV are active most evenings on s.s.b., in northern California, looking for southern California contacts. W6GHV says K6JYO, K6IBY, WB6CXF, K6TSK, W6NLZ, W6DQJ and K6HAA are southern California regulars. W6GHV offers a limited number of schedules from his portable Oregon location during the August Perseids. He will run a kw. and 15-element Yagi. From British Columbia, VE7BQH writes that the following stations are active in the Pacific Northwest; W7EKI and K7TBL, both Oregon, with a kw. apiece, W7FS and W7FP, both Washington, each running 150 watts, and K7UMC, also Washington, with 1 kw. In British Columbia, VE7s ASV, BBG and BQH offer schedules. W7FN is reported readying for Washington 2-meter work.

WA5RIB says the Caprock Amateur Radio Society, Box 1092, Lubbock, Texas 79408 wants schedules for club members.

Dick Wolberg, ex K2HLA, is now W1FJH, near Boston. And K1HTV wants Perseid meteor shower schedules.

420-MHz. reporting has been off, but should be picking up again as tropo conditions improve. WØDRL, Kansas, has completed a four-wire rhombic and has heard his moonbounce (e.m.e.) echoes. Al is running tropo schedules with K2UYH, New York. That is a long path, but those two are persistent and just may make the contact.

K8DEO says tropo was good on May 8. He worked W4NUS, N. C., for state number 13.

VE7BQH says news that W1FZJ/KP4 is now active on 432 e.m.e. has stirred much interest. Lionel says K7UMC, Wash., has 300 watts on 432, VE7BBG has 100 watts, and that he is running 40 watts.

WØLER, Minneapolis, has some comments on 432 lightning scatter. John says he can pinpoint the location of the thundercells. He recently amazed a weather bureau forecaster with observations of a severe storm over western Iowa. John has received bursts of up to 2½ minutes duration from WØDRL during some storms.

W4HHK and WA4HGN are continuing their 105-mile path tropo schedules. Results are good except during rainfall. WA4HGN runs 80 watts input, output is estimated at 10 to 20 watts, and a 4-foot dish 35 feet high. W4HHK has an 18-foot dish on a 35-foot platform mount. QST

RULES FOR LIFE MEMBERSHIP

1. The Board of Directors has established a provision for Life Membership in The American Radio Relay League, Inc., effective August 1, 1967.
2. Life Membership is granted only by the Executive Committee, upon proper application from a Full (U. S. or Canadian licensed) Member.
3. The Life Membership fee is twenty times the annual dues rate, or currently $130.
4. An applicant may choose an alternative time-payment plan of 8 quarterly instalments, $16.25 each. In such instance he will be provided an interim two-year Full Membership certificate. Upon completion of the payments, Life Membership will be granted.
5. Life Memberships are non-transferable, and dues payments are non-refundable. In the event an applicant is unable to complete payments on the instalment plan, he will be given a term of membership, at the annual dues rate, commensurate with payments received.
6. 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 $1, 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.
7. Applications forms are available upon request from the Secretary, ARRL, Newington, Conn. 06111.

CONDUCTED BY LOUISE RAMSEY MOREAU,* WB6BBO

YL - OM 1969

EVERY February and March it's the girl watcher's, and boy watcher's delight when the wraps are off, the calls no longer disguise the person behind the key or mike, and the hunt is on to log YL operators. For the amateur in search of certificates here is the opportunity to locate necessary contacts for the many certificates sponsored by YL clubs, or YLRL, as well as others that are available through ARRL.

Ebba Krisjansson, VE5DZ, vice president of YLRL, and contest chairman, sends her congratulations to the winners, and her thanks for such neat logs.

Top score for the YL-c.w. contest was W1YYM, with a thundering 45,885 points. VE3EZI, followed with 32,602, and WA3HUP, was third with 25,232 points. In YL-phone the east again took the honors. W1RLQ was first place scoring 42,872; K2AGJ second, 40,272; and K8ONV came in third with 34,836 as her score.

The OM-c.w. contest resulted in W5WZQ top spot, with a score of 4641, K2EIU/5, 3937 was second, and W9LNQ in third place with 3461 points. The OM phone scores were K2EIU/5, 5,160; K9UCR. 3,780, and WA1CJR, third place with 2,558.

YL News and Views congratulates the winners, and to all the others it was a wonderful contest, we all had a real good time. See you all in February and March next year.

Soapbox

"Enjoyed it very much and am looking forward to doing it again next year." — W3IRY. . . . "Enjoyed limited participation, hope to work a few more the next time." — WA3ICF. . . . "More YLs from east coast would be greatly appreciated. How about extending the contest period, didn't hear any 80 meter activity." — WA6JDI. . . . "Many thanks for f.b. contest. Too bad I missed VE5 multiplier in both contests." — WAØUIS. . . . "Beam down so didn't make too many contacts. Need 12 states for WAS-YL." — KØETA. . . . "I1PRK is a newcomer, and hope to be more active in years to come." — I1PRK. . . . "Hope I'm around to participate in contests to come and meet all the YLs." — W1PEG. . . . "Didn't realize 88 was so difficult to send on a keyer." — K2GIQ/1 . . . "Am a senior high school student so didn't get too much time to be on." — WA2CWX. . . . "YLs scarce but was a nice party." — W3ADE. . . . "Lots of fun even with all the QRM, see everyone next year." — W3MGP. . . . "Where was VE5DZ? Could have sure used VE5." — W4JUJ. . . . "Some method should be set up to distinguish YL calls from OMs, maybe a different check number." — W4GRG. . . . "Thanks for a very nice party." — W4FRL. . . . "Enjoyed my 13th YL-OM test. Prefer longer time to hunt those elusive YLs. Missed some of the regulars. Where were ZL2JO, JA1YL, PY2SO, VE5DZ?" — K2EIU/5. . . . "It was a pleasure to make even a few contacts when most of them say 'thanks for first Arkansas.' Also enjoyed the pace of the party." — W5JVU. . . . "Contest is too short for people who work on Saturdays." — W6QFU. . . . "Tnx for nice party. Be looking for all you gals next year." — W6CLM. . . . "Not enough YLs for this OM, No W7, W6 or DX." W9WR. . . ." QRM from new color TV." — WØKCG. . . . "Why not add an extra award category for club scoring and increase the interest from the clubs?" — K3JYZ.

*YL Editor, *QST*, Please send all news notes to WB6BBO's home address; 1036 East Boston St., Altadena, Calif. 91001.

Kay Anderson, W8DUV representing the Tri-State ARC of Huntington, W. Va., Kay is co-chairman of the Roanoke Division Convention to be held in Huntington, October 11, 12, 1969. (Photo courtesy of W8JM.)

1969 — YL — OM Contest Results

High Scores

YL C.W.

W1YYM.....45,885
VE3EZI.....32,602*
WA3HUP.....25,232

YL Phone

W1RLQ.....42,872
K2AGJ.....40,572
K8ONV.....39,836

OM C.W.

W5WZQ.....4,641
K2EIU/5.....3,937
W9LNQ.....3,461

OM Phone

K2EIU/5.....5,160*
K9UCR.....3,780*
WA1CJR.....2,558*

Scores

YL C.W.

W1YYM.....45,885
W1RLQ.....21,406
K1NEI.....17,304
K1LCI.....9,537*
K1BUF.....4,346
WA2WHE.....22,135
WA2CUZ.....15,876
W2EBW.....7,645
WB2PYI.....7,154
W2EWO.....3,276
WA3HUP.....25,232
W3SLS.....6,662
WA4BVD.....10,841*
K4VDO.....7,536*
K4BWQ.....7,302*
K4RHU.....6,991*
WA5SKI.....10,867*
W5QWI.....3,885*
WB6QMD.....23,240
WA6MIW.....825*
WN6KJD.....572
WA8USU.....21,225*
WA8FSX.....17,112
WA8GFW.....13,688
K8ONV.....12,852
WA8KMT.....1,605*
WA9MWU.....15,370*
W9USR.....8,320
KØZSQ.....16,254
KØEVG.....6,321
WAØMNL.....4,416
VE3EZI.....32,602*
VE3ART.....5,688*
VE3GTI.....5,499*
VE6ABV.....15,552
DJ9SB.....13,120
G2YL.....61*
OH3RZ.....675
SP8CPS.....375
UA9PF.....3,666
UA3QB.....220
VK3KS.....22,842*

YL PHONE

W1RLQ.....42,872
K1LCI.....10,175*
K2AGJ.....40,572
WB2YBA.....23,868
WB2OQU.....14,987*
W2OWL.....4,978
WA3BLZ.....27,145*
WA3HUP.....19,684
W3MDJ.....15,456
W3LQY.....4,301*
WB4BOJ.....33,540*
K4RHU.....12,545*
WB4COP.....7,104
WA4UWK.....5,040*
WA5QQR.....10,012*
WA5TYH.....7,000
WA6AOE.....1,872
K8ONV.....39,836
WA8FSX.....22,612*
WA8OFW.....12,096
WA8ENW.....8,976
WA91YG.....29,550
K9LUI.....26,065*
WA9NEJ.....25,460*
W9GHO.....20,140
W9VNG.....6,424
KØEVG.....20,930
WØJUV.....13,250*
KØEPE.....5,240
KH6AFN.....5,088*
KL7FPM.....567
WA3UYJ/KP4.....8,848
VE4ST.....20,388*
VE3EZI.....39,489
VE3BBO.....24,076
VK3KS.....19,440
ZS5OB.....1,855
7P8YL.....13,150

OM C.W.

W1HOZ.....2,138
W1PEG.....1,064
K2CLQ/1.....736*
K7JRE/1.....574*
K1ZFQ.....384
W1MRW.....135*
K2DDK.....3,117*
WB2ZOW.....1,762*
WA2BXK.....1,333*
K2LFG.....1,260*
WA2CWX.....1,010*
W2RUK.....787*
WB2KSK.....113*
W3MNE.....1,938
WA3EXX.....1,725*
W3JET.....1,595*
W3QMX.....1,558*
W3BQN.....1,486*
W3ADE.....1,300*
WA3KDI.....1,181*
W3QLW.....900*
W3MGP.....625*
K3YBW.....540*
K3YHR.....357*
W4ZOK.....1,417*
W4JUJ.....1,395
K4GSX.....1,268*
WA4JRW.....1,125*
W4GRG.....1,053
W4FRL.....891*
WB4KZG.....787*
W4KMS.....540
W4FVY.....437
K4FU.....220*
W4GHW.....210*
K4OHK.....165*
W4LEP.....143
W5WZG.....4,641*
K2EIU/5.....3,937*
W5BUK.....1,488
WA5SRR.....1,218
W5QNY.....999
W5QZG.....833*
K5YAA.....715*
W5JVU.....150*
W6QFU.....1,551
W6CLM.....988
W6WLV.....682*
W6JLK.....570
WA6JDT.....467*
W6JOW.....225
W6GBY.....80
WA7EDB.....1,062*

Carolyn, WA6ITN, and John Hollar, W3JJU, were married on December 21, 1968.

W7CPX.....570
K7KHA.....546
WA8VLM.....2,021*
W8AQ.....1,276
WA8RDW.....1,046*
K8NQP.....1,026*
W9LNQ.....3,412*
W9NLF.....2,295*
W9DU.....1,762*
WA9DEF.....1,330*
W9YDQ.....990*
W9TCU.....787*
W9WR.....704
W9CHD.....420*
W9GDF.....240*
WAØUIS.....1,860*
KØWPK.....1,105*
WAØFMD.....825*
WAØELO.....736
WAOBMV.....690
KØVSH.....688*
WAØCTX.....675*
WØQLG.....132
KØKKG.....80*
VE1AE.....1,342*
VO2GD.....594
VE2AQO.....920*
VE3FDP.....735*
VE6UP.....1,232
EA2HR.....31*
G3IDG.....101*
HL9KG.....16*
HP1BR.....560
OA4DX.....45*
OH5VT.....36
OK2QX.....49
SM5BDY.....15*
SP8HR.....101*
SP8GH.....72
SP8MJ.....56
SP8CCC.....10
SP1KCX.....4
UA1ZX.....110
YU1BCD.....9
YU1SF.....125*

OM PHONE

WA1CJR.....2,558*
W1BAB.....2,240*
W1HOZ.....1,035
K1SGU.....510
K2DDK.....1,438*
W2QKJ.....792
WA2EMW.....770
W2CVW.....726
K2JTU.....247*
WA2CIS.....187*
WA2BXK.....130
W2JB.....70
W3BQN.....1,100*
WA3EXX.....977*
W3IRY.....825*
WA3IXF.....468*
W3EAD.....412*
W3QLW.....320
W4AVY.....1,134
W4GZD.....1,080
WB4KZQ.....892*
WA3APO/4.....782
WB4GGA.....641*
WA4UFW.....607*
W4KMS.....520*
W4JUJ.....500*
W4LEP.....221
K2EIU/5.....5,160*
W5QNY.....907*
W5QGZ.....206*
W5QNQ.....31*
W6RQZ.....703
WA6JDT.....195*
W6QFU.....120
W7CPK.....594*
K6DLY/7.....280*
W8MXO.....1,631*
W8WUO.....1,575*
WA8YXE.....1,397*
WA8VLM.....1,230*
K9UCR.....3,780*
W9NLF.....2,120*
W9TLU.....1,140*
W9LKI.....960*
K9KKX.....520
KØETA.....1,125*
WAØVJN.....770
WAØUIS.....356*
WØPAN.....195
WAØTGD.....165
VO1AW.....110
DL1RA.....140
I1PRK.....101
YU1BCD.....31
YU1BPG.....180

YL c.w. confirmation logs: K1QFD, WB2JE, W3CDQ, WØQXF, WWA8ENW, G8-LY. YL fone confirmation logs: W3RXJ, W4TVT, G8BTS, UA3KBO. OM confirmation logs: c.w. W2-CUE, W2CVW, W6BIL, W6RQZ, WA6ZRA, OH3-UQ/6, K7BSR, W8DSE, KL7IR, K7PVY. SM7BXT. UA9OS. OM fone confirmation logs: W7EOI, W8JJA. Note: *after a call means low power multiplier was claimed.

YLRC/LA 1969–70 officers. Seated: W6CEE, President; WB6DFN, Vice president. Standing WA6ZTW, Recording Secretary; and W6QOO Treasurer.

YLRC/LA 1969–1970 Officers

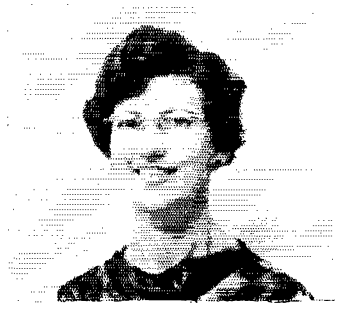
The YLRC of Los Angeles elected officers for the year 1969–1970 at the club's May meeting. The new officers are:

President, Vada Letcher, W6CEE
Vice president, Roberta Baldwin, WB6DFN
Recording Secretary, Evelyn Brightman, WA6ZTW
Corresponding Secretary, Sharon Leighty, WA6TIY
Treasurer, Jean Newswanger, W6QOO

Installation of the officers will be made at the June meeting. The club year begins in September.

VE5YY, Martha Pankratz

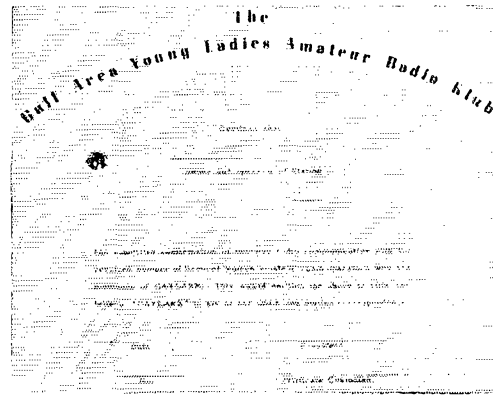
Visit a friend who has an amateur radio station and you end up either disinterested, or "hooked on the stuff." Martha found she simply couldn't exist without radio and was licensed VE5YY in 1962, and a year later she had her Advanced Certificate. At first she worked mainly 15-meter c.w. but later became active on s.s.b. both mobile and at her home. Recently she has added 2-meter equipment. She participates in local communications in connection with parades, walkathons, and other events requiring the use of amateur radio as a link.



VE5YY, Martha Pankratz.

VE5YY has been secretary of the Saskatoon Amateur Radio Club for the past six years. In addition to the usual duties of a club secretary, she has been responsible for much of the work in *From Spark to Space*, the history of Canadian Amateur Radio which was a project of the club. According to Martha her work on the book "just sort of happened that way." The material, pictures, and information began to arrive and somebody had to do something if the history were going to be written. So she started it, took off for vacation, and returned to find that the club wanted her to continue. The final job of editing was done by four members of the Executive group of the club, but the initial writing and the many revisions were the responsibility of VE5YY.

In addition to radio, Martha enjoys dancing and dressmaking.



GAYLARC Certificate.

Meet the Club — GAYLARC

A dozen is a comfortable way to designate twelve of anything and the past dozen years have been packed with activity for the Galveston Area YLs.

The GAYLARCS held their first meeting in October 1957 to determine the interest of the women of that area in a YL club. It was enough that their first official meeting came the following month with Harriett, K5BJU, as the first President. By January there were 14 members.

The name LARC is a natural for many women's amateur radio clubs and here GAYLARC was the suggestion of Lillian Beebe, WA5WZF. The little bird that is their insignia is the design of the OM of Phyllis, W5CXM.

Happiness, to the GAYLARCS, is service to others. They have provided communications for a girl who was a heart patient at the medical center with her family in Hawaii; kept Latin American students in touch with their homes; handled Easter messages to personnel in the armed services from their families; set up a club station for the annual Girl Scout Cadet event for the San Jacinto Council, Girl Scouts; and, as guests of the Governor of Texas, for "Operation Home Town," in El Campo, handled communications between El Campo and the capitol in Austin. In 1959, they were the YL hostesses for the National ARRL convention in Galveston. They have participated in Field Day every year except 1968. In this event the OMs act as chief cooks and bottle washers so that the gals can do the operating!

Requirements for the GAYLARC certificate are log information of contacts with six members of the club, plus a dime to cover postage. W5ERII is custodian.

The club call is K5SKF. Meetings are held the last Friday of each month at 8:00 P.M. at different members' homes. Visiting YLs are welcome and may attend by writing, or calling, K5BJU, K5PFF or WA5KRJ. Any licensed YL is eligible for membership in the club. The membership at present is made up of one Novice, one Conditional, six General, and 11 Advanced Class operators. QST

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How:

This period could go down in history as the Great QSL Hunt of '69—Five-Band DX Century Club status just around the corner!

"Here's a note to let you know of my interest in and progress toward 5B-DXCC," writes W4QCW of Richmond, well up in the running. "I worked my 100th country on 80 meters March 11th, having already passed that mark on the other four bands. I then started on the QSLing job. As of May 2nd my worked scores stood at (eighty through ten) 110/125/155/144/140. It has really been a lot of fun, especially the 80- and 40-meter DXing. I'm planning to make my major efforts in the future on those bands with beams and phased verticals instead of the inverted vees used so far."

5B-DXCC need not be *everybody's* cup of DX tea. K4OCE currently prefers another evergreen approach to long-haul sport. Guest editorial from Bob:

QRP—Quit Running Power

Would you like to get congratulations every time you score a QSO? Like more than the usual stereotyped reports? Like to receive QSLs in a hurry, often with picture postcards and special touches included? These are just a few of the extraordinary DXperiences I'm having lately. QRP has opened a new facet of amateur radio to me, and the sport has become so enjoyable I feel bound to pass the word along to others.

Many of my associates have long enthused over the idea of QRP DX but felt that such things as DXCC could hardly be accomplished with really low power. This motivated me to try my luck on 14-MHz. c.w. with a 7-watt transistor transmitter. In February, March and April of this year I succeeded in contacting 100 countries with a three-stage 2N706-2N697-2N3553s rig and a borrowed signal generator for v.f.o.

*7862-B West Lawrence Ave., Chicago, Ill. 60656

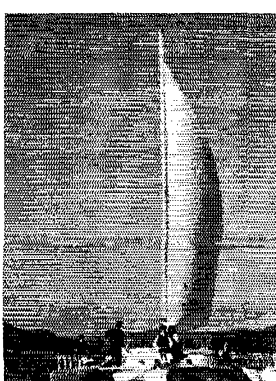
The difference in signal strength between 10 and 1000 watts is only 20 db. I've noticed little difficulty working countries in the West Indies and South America. It's quite easy to work Europe, although reports will generally run S5-6-7 instead of the usual kw.-style S8-9. Not only is QRP a great challenge; it seems to attract international DX friendship at a far faster rate than routine RST-73-CUL kilowatt results. My seven watts amazed me. Care to join the fun?

K4OCE didn't dwell on his antennas but we surmise the customary beam. Self-addressed stamped envelopes to Bob will get descriptions of that little rig. Any other giant-killers going strong out there in the DX jungle?

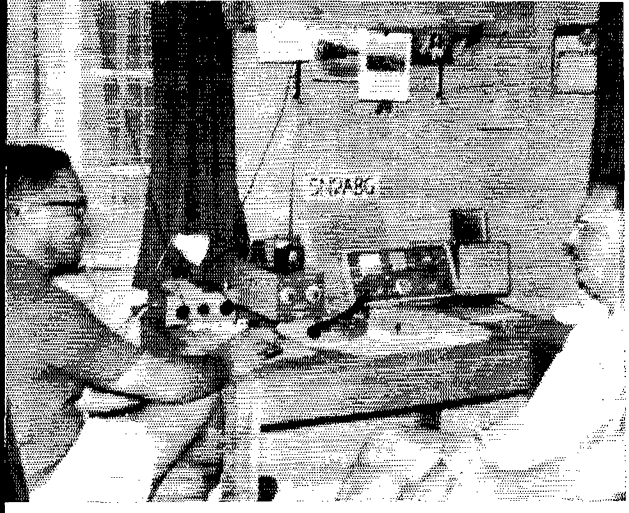
What:

This year's spring equinox rolled in like the usual DX lion, produced a record quantity of easy countries on 10 through 80 meters, and then—*blahh*. Summerlike doldrums moved in by May, normally a decent DX month, and WWV began muttering steadily dismal U-4, W-5 and other discouragements. Have the past few wonderful years of DX prosperity spoiled us? How much time do we have left before *really* crummy h.f. conditions take over? . . . The 5B-DXCC stampede cost us some coverage of recent DX doings among our Novice and 160-meter DX diggers, a shortcoming we'll amend right now. . . .

15 Novice hearties, though buffeted by springtime solar instabilities in their 21-MHz. range, keep pushing up their code speeds in fun fashion. **WNs** 2DRS 2FEL 2GMC 4LAL 7JOV 9WLF 9ZRV and ØWEP await colorful QSLs from **CO2s** 4DL RM, **CR6LK** (21, *121* kHz.) *1900* GMT, **DJs** 3SA (105) 13, 5OD, **DK1HP** (135) 16, **DLs** 1AA (143) 15, 1ZV (125) 16, 2JO (137) 19, 2MK (105) 13, 4QP (139) 17, 4ZS 0TJ (160) 0, **EA8GR** (120) 1, **Fs** 2GV 3HA (123) 18, 3KT 9LT, **Gs** 2WQ 3DMJ (140) 15, 3ILS (129) 14, 3MHB 3MKH 3MWP 3NSY 3PJW (160) 16, 3PUM, **GW3HXD**, **HA3MJ** (129) 13, **HB9RX** (180) 18, **HP1EE**, **Is** AMR SF ZJV (144) 13, **JAs** 1DIO (120) 16, 1CXQ 1CZP 1HBN 1HIS 1HRK 1IFS 1IVV 1OSN 1OYH 1QXX 1VIO 1WOE 1WPX 2YFE 3YEN 6GH 6GNI 7ARM 7UZ 8BAX 8BPY 8EJB 9CAF, **JH1BCS**, **KG6AQY**, **KH6HN**, **KP4DJ** (140), **KZ5NC** (125) 0, **LA1KM**, **OA4BD**, **OE6GC**, **OHs** 2BEG (141) 16, 6AA 6NH (135) 13, 6WY (137) 14, **OKs** 1AQO (129) 15, 1ASJ 2BAI 2BMF (129) 13, 3CFY, **ONs** 4RN (140) 15-16, 5DO (140) 15, **PAØs** GHI (153) 2, JOD (137) 16-17, PHK NQ, **PY5ASN**, **SMs** 2COL 2COR 4CJY (135) 16, 4JS 6AFH (120) 23, 7BGC, **SP3DG** (123) 20, **VKs** 3BM 3UJ 9BG (132) 16, **UB5DV** (132) 15, **VR6-TC** (162) 18 **WL7GLW**, **WP4s** CAE DEP (123) 14,



KA7CS (W7TNZ) and XYL K7BGS are sailing this floating hamshack from Japan toward New Zealand via Guam. Watch for their FT DX-100, SBE-34 and FL-1000. (Photos via W1CUT)



5N2s AAF and ABG, still active from troubled Nigeria, talk things over in the 5N2ABG hamshack. New 5N2 authorizations are hard to obtain for the present. Current licensees include 5N2s AAJ AAK AAX ABF ABH ABI, school station, AAU, and 5N2NAS of the military. *(Photo via W9SCD)*

XE1EM (160) 23, **YV5**BKA (138) 17, **ZL**s 2DN 3JC, **ZS3**XQ (145) 19, **5H3**JJ (135) 18 and **9E3**USA (137) 19.

160

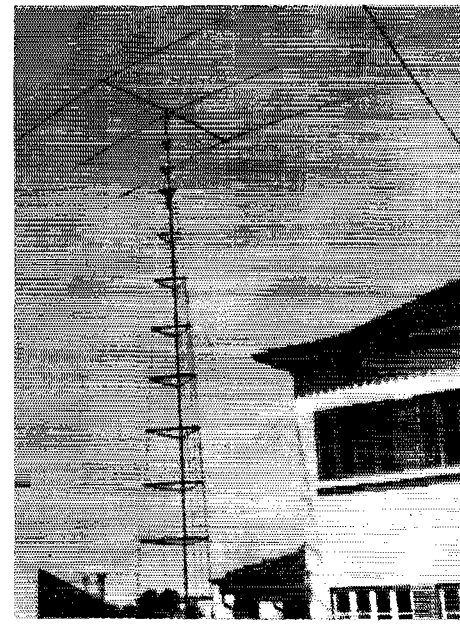
C.W.'s 1968-'69 season started out with promise but bogged down shortly in a swamp of QRN and QSB. Nevertheless **W**s 1BB 2RAA, **K8**DHT and **WA1**FHU report plenty of determined activity by **CE3**-CZ, **DL**s 1HS 9KRA, **EI**s 6AS 9BG, lots of **G**s, **GC3**-IEW, **GD3**s EGF VNZ, **GM3**FXM, **GW**s 2RV 3ESP 3LDH 3UUZ, **HA5**KFZ, **HB9**CM, **HK**s 5EV ØTU, **JA**s 1BHG 1HXE 1PVK 1RQA 2CLI 2NQG 3AA 3BDQ 3UI, **KH6**GLU, **KP4**s AST LC, **KV4**FZ, **OE**s 1KU 5XXL, oodles of OK-OLs, **ON4**WC, **PAØ**s CD CFM, **PJØ**s CC MM, **PY2**s BJII BKO PA PE, **TA2**E, **VK**s 3APN 3ATN 5KO, **VO1**FB, **VP**s 2GBR 2KK 2VI 5AA 7NY 8KF 9BO 9BP, **VQ8**CBR, W1FZJ/**KP4**, **XEØ**GEN, **YV1**OB, **ZB2**s AY BO, **ZD3**A, **ZP9**AY, **6W**/W4BPD and **6YO**A . _ . _ . Concerned 160-meter DX hounds are campaigning to help keep 1825-1830-kHz. available for DX reception when long skip is in, this notch a traditional transmitting range for the European top-band gang. Sounds reasonable—diplomatic requests for QSY should do the trick.

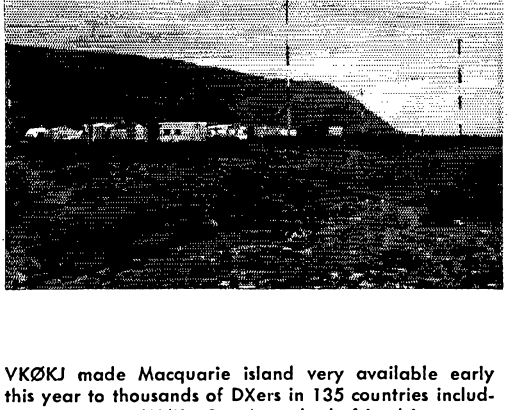
Later we'll get around to in-depth analyses of other bands courtesy (15 c.w.) **W**s 1BGD/2 1EGM 2LJF 3BBO 3HMR 3HNK 3KNG 4YOK 7BE 8BQV 8YGR, **K**s 5MHG/6 5YUR 6TWT 9EUZ, **WA**s 1FHU 1JKZ 1KEX 2APG 2DQE 2FOR 3GVP 3JRY 5SOX 7BOA 8VBY 8YXE 9SQY, **WB**s 2DZZ 2RNJ 2UOO 4GTI 4IGL, **VE7**BST, 1IER; (15 phone) **W**s 1BGD/2 2DY 2LJF 2VOZ 3HNK 4UF 4YOK 5BZK 8BQV 8YGR 9LNQ, **K**s 1UHY 5YUR 6TWT, **WA**s 1FHU 1IDP 1JKZ 2BHJ 9MQI 9SQY 9TFM 9URY, **WB2**DZZ, P. Kilroy, B. Tindall; (10 c.w.) **W**s 3HNK 4YOK 7BE 8BQV 8YGR, **K**s 1HDO 3CUI 3UXY 5YUR ØGVA, **WA**s 1FHU 1JKZ 3ATX 5PPZ, **WB**s 2RNL 2UOO 4GTI, 1IER; (10 phone) **W**s 1EGM 2VOZ 3HNK 4UF 4YOK 5OJZ 8BQV 8YGR 9LNQ, **K**s 1HDO 5YUR, **WA**s 1FHU 2YWR 8MCQ 8YXE 9TFM, **WB2**DZZ; (40 c.w.) K8DHT, **WA**s 1FHU 1JKZ 2YWR; (80 c.w.) **W1**SWX, **WA1**s **FHU** FNJ; (20 c.w.) **W**s 1ARR 1FK 1TAT 3HNK 3KNG 4YOK 6EAY 7BE 8IBX/2, **K**s 1LWJ 4UHY 4OCE 6TWT 8DHT 9SRR, **WA**s 1FHU 1JKZ 1KEX 2YWR 5PPZ 6JVD 9SQY, **WB4**GTI, **VE7**BST, 1IER; (20 phone) **W**s 1BGD/2 2VOZ 3HNK 3ICQ 4YOK 8YGR 9LNQ, **K**s 1UHY 6TWT, **WA**s 1FHU 1JMR 2YWR 5PPZ 8YXE, **VE7**BST, 1ICTL and Mr. Kilroy. See you on the "How's" Bandwagon!

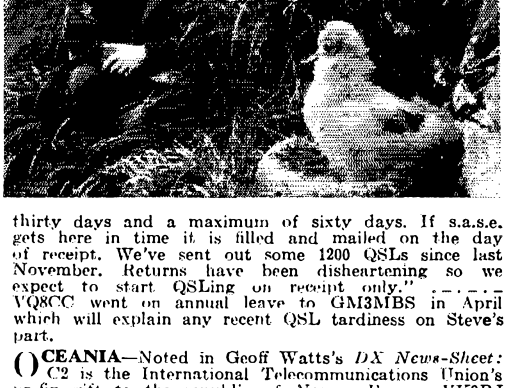
Where:

SOUTH AMERICA—"Venezuela's 4M prefix will henceforth be issued for use by club stations only," notes YV5BPG. "Club station YV5AJ holds the 4M5A permit and can also sign the equivalent 4M1A, etc., for other call areas." Pedro got a kick from PJØCC's listing as both a "QSLer of the Month" and as a QSL-yearned-for item in March *QST*. That's why DX is so intriguing, we suppose—some guys score and some guys don't, some guys will and some guys won't . _ . _ . WA5MYR updates our May listing for 9Y4RP. "Ron's current address is P.O. Box 1290, Port of Spain, Trinidad, but anyone who wants a faster QSL should send a card to me, his QSL manager. QSLs arriving without s.a.s.e. (self-addressed stamped enveloped), or s.a.e. plus IRCs (International Reply Coupons), are forwarded to 9Y4RP for later answer via bureaus."

CR6LF's outstanding signal takes off Statesward from this launching pad at Sa da Bandeira. Vic prefers phone action on 21 and 28 MHz. (Photos via W3HNK)







VKØKJ made Macquarie island very available early this year to thousands of DXers in 135 countries including some 1500 W/Ks. Greg's motherly friend is a sooty albatross. VKØKJ is VK7KJ again now, busily catching up on QSL accumulations. (Photos via W1BPY)

ASIA—I'm no longer QSL manager for KA2KS," notifies K1SCQ. "I held the job while I was in Japan but this was terminated when I was captured with the USS *Pueblo*." . _ . _ . _ VE3ABG writes, "I'd interested to hear from someone desiring to act as QSL manager for Turkish stations. I'm already quite busy with TA2E's QSLing." . _ . _ . _ "I still handle cards for VU2DIA," reminds K6OZL. "Those who have had self-addressed stamped envelopes on file with me for a long time should send me follow-up QSLs which I will forward to Hegde with notes. He's very busy with police work in Goa." . _ . _ . _ "I've assumed K2IXP's QSL responsibilities for 4X4s AS and FV," confirms K2MME . _ . _ . _ "VE3DLC is my QSL manager for all contacts after March 1, 1969," announces HS3DR . _ . _ . _ "I am now world-wide QSL manager for EP3-AM," affirms W3GJY. "Complete logs are on hand for QSOs dating back to 1965. QSLs not accompanied by self-addressed stamped envelopes will be answered via bureaus."

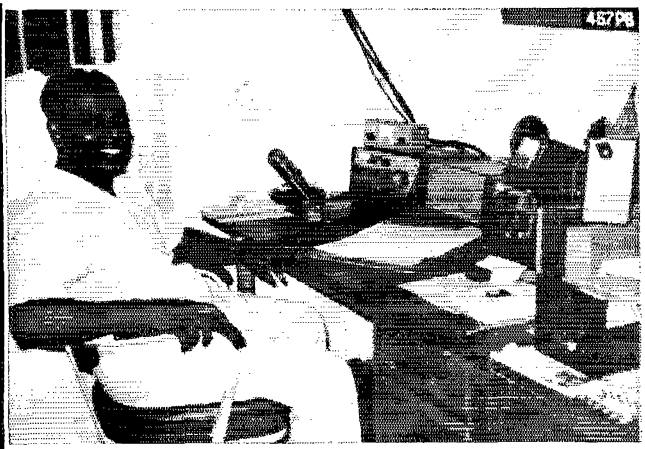
AFRICA—"One of the toughest decisions I have ever made was to stop being QSL manager for 7P8AR," regrets W4BRE, pressured by increasing business responsibilities. "Working with Ulli all these years has been a wonderful experience but the arrangement is now terminated as of April 1, 1969. 7P8AR has been very prompt with logs. Until otherwise noted he should be QSLd direct to his Maseru address." . _ . _ . _ WB2WOU claims QSL responsibility for EL2J-5L2J QSOs from June 9, 1968, through February 14 of this year, s.a.s.e., or s.a.e. plus two IRCs, requisite . _ . _ . _ W6JZU disclaims 5X5 QSL connections . _ . _ . _ F2MO instructs, "QSL FB8XX through FR7ZD for QSOs before January 6, 1969. Contacts after that date may be confirmed through me. FR7ZD has replied to all QSLs received direct or via bureaus. Be patient, please, because logs arrive very irregularly from Kerguelen, usually no more often than once each year." Michel has fresh FB8XX logs for contacts from January 23, 1969, to April 1, 1969, but is as yet unable to confirm QSOs made between January 10 and 23, 1969 . _ . _ . _ WA9-PRE/2 explains, "9J2XZ QSLs are held a minimum of thirty days and a maximum of sixty days. If s.a.s.e. gets here in time it is filled and mailed on the day of receipt. We've sent out some 1200 QSLs since last November. Returns have been disheartening so we expect to start QSLing on receipt only." . _ . _ . _ VQ8CC went on annual leave to GM3MBS in April which will explain any recent QSL tardiness on Steve's part.

OCEANIA—Noted in Geoff Watts's *DX News-Sheet:* C2 is the International Telecommunications Union's prefix gift to the republic of Nauru. Former VK9RJ surprises friends as C2JW. . . . W6JFW, vacationing again as FO8BW, will clear up his Tahitian QSLing after he returns Stateside in September. . . . In future the prefix DX will be used on special occasions by Philippine nationals and no longer will appear in reciprocity callsigns . _ . _ . _ "WAØKDI assumes managerial duties for my QSLs as of April 17, 1969," affirms KG6AQI. "Prior QSOs may be QSLd via WAØPQF."

EUROPE—UZ3s TA and TB display an additional new Russian prefix, according to ISWL's *Monitor*. Goes with the UA3-UV3-UW3 block . _ . _ . _ 3A2EE-FØDH apprises, "DL7FT is my QSL manager as of April 1, 1969." . _ . _ . _ HFO knows nothing about ZA QSL routings; save your stamps . _ . _ . _ "I can confirm Stateside-only QSOs for SM6s CTC and CTQ after April 1, 1969," declares WB2FWW . _ . _ . _ It seems to me that QSLing by s.a.b. stations is several per cent less than returns from c.w. stations," opines DL1BO, reporting only a 42-per-cent response over his past three or four years of sidewinding.

WHEREABOUTS—ARRL Director VE3CJ hears from JA1KIS of JARL that recent Canadian postage increases apparently caught some VEs napping. Gets more difficult to keep track of all the time, but DXers are obliged to carefully monitor zooming postal rates . _ . _ . _ Lack of s.a.s.e. or s.a.e.-IRCs from petitioning W/VEs, enclosure of U.S. postage instead of Canadian, use of local instead of GM time, omission of mode-of-QSO indication, and failure to send a separate envelope for each expected QSL are among difficulties encountered by VE3EUU and other QSL tenders north of the

DL3EA steps off a plane on Easter Island which, not so long ago, was a rarely worked entity on your ARRL DXCC Countries List. How times change—looks like the week end tourist influx into KH6-land. (Photo via W1CW)



4S7PB performs as net control station for the Southeast Asia Net when not busy adding to his own DX total. HS3WT (W1UUQ) snapped this picture of Paddy on a recent visit to Colombo. (Photo via HS3DR)

border . . . . . WA5PPZ credits W2SAW's foreign mint postage facility for boosting his QSL returns . . . . . CR8AI, F2GD, HKØTU, JA1CQR, KC6s BW JC, KGs 4DT 6AQI, SU1IM, UAs 3HR 6BV, VS6AI and 9J2MX, plus QSL aides Ws 2CTN 2GHK 2RDD 4DQS, K9KLR, WAs 3HUP and 9KDI, are "QSLers of the Month" applauded roundly by Ws 1SWX 3ICQ 4UF 4YOK, Ks 4RON 9SRR, WAs 2YWR 5PPZ and WB4JXN for unusually prompt pasteboard production. Any creditable quickies in your postbox lately? . . . . . *Alp!* K6IDV needs a nudge toward confirming his 1964 HC8JU contact; WA6JVD would appreciate suggestions re holdouts KC6BK '63, VPs 5GT '64, 8IY '67, 8JF '67, 4W1JA '67, 5W1AA '63; and WN2DRS yearns for the tardy wallpaper of HK7GM, PY5ASN and YV5BKA . . . . . IIMZM and VE3GHL offer to act as QSL managers for deserving DX ops . . . . . Some discrete postal possibilities now, but bear in mind that each is necessarily neither "official", complete nor accurate. . . .

C2JW, R. Wirth, c/o OTC, Nauru
CE4BM, Aptdo. 582, Santiago, Chile
CO6JH, J. Hernandez, Aptdo. 180, Cienfuegos, Cuba
CP1GD, Aptdo. 470, La Paz, Bolivia
CR3KD (s.s.b. via WA4PXP, c.w. via W2CTN)
CT1s MZ TZ UE (via W3HNK)
EA1KA, Pontevedra nr. 6, Vigo, Spain
EL2BJ, Box 98, Monrovia, Liberia
FL8AO, Box 59, Djibouti, Fr. Somaliland
G5AKO-GC5AKO-GD5AKO-GW5AKO (to W1EGT)
GM5AMX, A. Keddie (WB2IDU), Opns. USS *Simon Lake* (AS-33), Holy Loch, Scotland, c/o FPO, New York, N.Y., 09501
JA1XIQ, 18-24 Suwa-cho, Hiratsuka city, Kanagawa, Japan
JT3KAA, P.O. Box 639, Ulan Bator, M.P.R.
OK1AQW, V. Zdenek, Stod. J. Fucika 596/23, Czechoslovakia
PJ9VL, Box 692, Curacao, N.A.
PK1CK, Box 29, Djakarta, Indonesia
SM6s CTC CTQ (see text)
SVØWJJ, APO, New York, N.Y., 09223
TF2WLQ, J. Lambertson, 57th FIS, Box 713, FPO, New York, N.Y., 09571
TN8BU, P.O. Box 2239, Brazzaville, R.C.
UA6KOD, P.O. Box 22, Taganrog, U.S.S.R.
ex-VK4EV, C. Brain, Federal St., Rainbow, Vic., Australia
VP2s KG KM (via VE3EUU)
VP5TH, T. Holcomb, US NavFac, Grand Turk, NPO 558, via Patrick AFB, Fla., 32925
VQ9B, R. Barry, Box 191, Port Victoria, Mahe, Seychelles
VQ9C, c/o PAA/Mahe, Box 4187, Patrick AFB, Fla., 32925
VS6AI, G. Flenner, 34 Mt. Kellett Rd., Hong Kong
WA6QGW/PX (via K6VVA)
WA9HYS/LX (to WA9HYS)
XE2RB, Aptdo. 1353, Juarez, Mexico
XW8CN, P.O. Box 25, Vientiane, Laos
YBØAC, P.O. Box 1056, Djakarta, Indonesia
YO7s ARY ARZ (via YO7NA)
YV5CUZ, Aptdo. 3636, Caracas, Venezuela
YV7s BI DF EU (via WB2CGE)
ZD7GO, G. Owen, Plot 4C, Pff., Bradden Dr., Greens Norton, Towcester, Northants., England
2B3DC, P.O. Box 113, Zurich 47, Switzerland
4X4s AS FV (via K2MME)
4X4s CW CY QL SK SO UL WP (via WB2WOU)
4Z4s AQ HF HG (via WB2WOU)
5A3TK, P.O. Box 3184, Tripoli, Libya
5L2AS, Box 1529, Monrovia, Liberia
5L9VAT, P.O. Box 1477, Monrovia, Liberia
5LØX/mm (via DJ7LQ)
9L1EA, Box 15, Freetown, Sierra Leone
9M6HM, C/O Police Hq., Kota Kinabalu, Sabah, E. Malaysia
CT3AW (to DJ2IB)
DL4ER (to WA9HYS)
DL4QQ/PX (via K6VVA)
EL2J-5L2J (see text)
EP3AM (via W3GJY)
FØDH (via DL7FT)
FB8XX (see text)
FO8AU (via W3GJY)
FP8AU (via FP8AP)
G5AGN (to WA9HYS)
GB2HRH (via RSGB)
GB3LFI (via GW3VBP)
HI8XRM (via WA2RSX)
HKØAE (via LCRA)
HS3DR (via VE3DLC)
K3JJG/YBØ (via W3GRS)
KA2KS (see text)
KC6BY (via WB9ALM)
KC6CT (via W9VW)
KG6AOI (see text)
OK5KWA (via OK3UL)
OY2A (via DL7FT)
PA9HS (to G3MZK)
PJ6AA (to KV4AM)
PU7APS (to PY7APS)
PU9HL (to PY9HL)
SK5BB (via SM5DXU)
SK9WL (via SM7CRW)
SU1JW (via SU1IM)
ex-VK9RJ (to C2JW)
VP2SU (via WB2WOU)
VP5JJ (to K4FTN)
VQ9/A/D (via W4ECI)
VU2BX (via WAØLGR)
YBØAAE (via DJ1OJ)
YV5CEY (via W3HNK)
ZB2BS (via GW3PSM)
ZE1DC (via WA9UES)
ZF1AA (via K2OLS)
ZF1AR (to W8ROF)
ZF1CB (to 6Y5UC)
ZF1CW (via WB8ABN)
ZF1DT (to K4AYO)
ZF1KV (to WAØQOI)
ZF1QW (to W4IQW)
3A2EE (via DL7FT)
5L2VAT (via ET2E)
5R8AN (via K4IE)
7P8AR (see text)
9L1AT (via G3LMT)
9Q5HT (to DL9WB)
9V1PD (via MARTS)
9Y4RP (see text)

FW8DY was the Wallis island work of KH6GLU and VE6AJT in early February. In this sequence we see Don checking the putt-putt, Don milking a phone pile-up, Ed giving the c.w. hounds a tumble, and Ed packed

F2YS/W2 (left) and F3VN/W2 are friendly rivals on the international reciprocal-operating front. Jacques and Pierre are nip and tuck in a race toward Stateside single-sideband DXCC status.

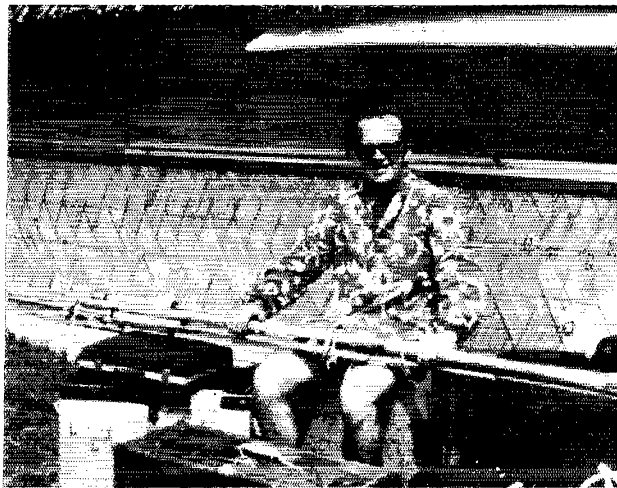
HB9P, first licensed in 1930 as Switzerland's twelfth radio amateur, gets his DX kicks these days with a Model L converter and Lorenz 15B printer.

Your QTH committee this trip: **Ws** 1CW 1SWX 1TAT 3ICQ 4UF 4YOK 6FL 8KFY 9FUP 9LNQ, **Ks** 3CUI 4UCQ 9SRR, **WAs** 1FHU 1JKZ 2YWR 5PPZ 6JVD 9SQY, Columbus Amateur Radio Association *CARAscope* (W8ZCQ), DARC's *DX-MB* (DL3RK), *DX News-Sheet* (G. Watts, 62 Bellmore Rd., Norwich, Nor, 72 T., England), Far East Auxiliary Radio League (M) *News* (KA2LL), Florida DX Club *DX Report* (K4GRD), International Short Wave League *Monitor* (A. Miller, 62 Warward Ln., Selly Oak, Birmingham 20, England), Long Island DX Association *DX Bulletin* (W2GKZ), Newark News Radio Club *Bulletin* (L. Waite, 39 Hannum St., Ballston Spa, N.Y., 12020), North Eastern DX Association *DX Bulletin* (K1IMP), Northern California DX Club *DXer* (Box 608, Menlo Park, Calif., 94025), Southern California DX Club *Bulletin* (WA6GLD), Utah DX Association *Bulletin* (K7DEQ), VERON's *DXpress* (PAQs EX LOU TO VDV WWP) and West Coast *DX Bulletin* (WA6AUD). There's a spot for *your* shoulder at this wheel, OM.

Whence:

Some DX contest single-op results to pass along before we shelve this mill and head for a shaded hammock to rest up from—oo-ooh!—Field Day. W2LWI gives us advanced data on last year's VK/ZL-Oceania affair. C.w. toppers by call area are Ws 1EVT 2LWI 3NU 4OMW 5BUK, K6HN, Ws 7IR 9VNE ØDYA, VE3EWY, VO1AW and KH6GNE; in order of score we see W7IR, K6HN, W1EVT, K6AN, Ws 3NU 2LWI 6RGG 3VKD, KH6GNE, Ws 1DTY 9VNE and 5BUK. As for voice, it's Ws 1DTY 2FCR 3JNN 4HOS 6GHM/5, WA6EPQ, K7RLS, Ws 8KIT ØPAN, VE3GVO and KH6GNE by call area; WA6EPQ, KH6GNE, W6GHM/5, K5JEF, Ws 3JNN 8KIT, KH6s GMP GKI, W2FCR, WA5EFN and WØPAN in scoring order. Continental kingpins are (c.w.) DM2ATD, JA2CXF, KH6GNE, PY2SO, W7IR; (phone) DJ2YL, JA6YCU, OA4JR, VR1L, WA6EPQ and ZS5OB. U.S.S.R. entries outnumbered W/K/VE/VOs 64 to 38 on code, 29 to 22 on voice. The next VK/ZL-Oceania DX Contest is scheduled for the first two October week ends, specs soon upcoming . . . . . JA1-KIS of JARL fills us in on 1968 All-Asian DX Contest results. Call area leaders on our side are Ws 1AW (K1ZND), K2DJD, Ws 3MSK 4KXV 5BUK, WA6IVN, K7INE, W9AQW, VEs 2DCX 6VO 7SV, KH6GNE and KL7MF. In order of score we find WA6IVN, K6-AHV, Ws 3MSK 1AW 9AQW 1EVT, WB6QJD, W4KXV, K2DJD, W6GEN, Ks 7INE 3HTZ and W1TW. On the sponsor's scene JAs 1CWZ 2HLX 3GZN 4DWG 5BJC 6YCU 7BVH 8GR 9BEX and ØBBB posted call-area highs; ranking scorers are JAs 1CWZ 6YCU 2HLX, JH1AYT, JAs 3GZN 5BJC ØBBB 2WB 7BVH and 9BEX. Continental highs: CR7IZ, CX3BH, JA1CWZ, KH6GNE, UA1KBA and WA6IVN. There were 46 W/K/VE entries, 62 from Russia. This year's All-Asian shebang occurs the last week end of next month, participation particulars due in August's "How's" . . . . . In the '68 SP DX Contest, Poland's PZK sponsoring, WA1DJG, W4ZXI, WA1FHU, Ws 2NCG 3GN, VEs 1AE and 2IL finished in that sequence for our team. The home-front pecking order goes SPs 5ZA 9DH 2PAH 8CP 9PT 9AI 8BAJ 9ZD 6AJL and 9ABU. Wheels per continent: EL2Y, PY1PK, UA9WS, UB5LS, WA1DJG and ZL1ARY . . . . . Reminder: RSB's 10th Anniversary Bermuda Contest concludes with a c.w. binge on the 20th-21st of this month, and LCRA's '69 Independence of Colombia affair goes parallel on the same dates. Details were brieted here last *QST*. Now where's that hammock—maybe we can hear Gus and the Navassa Hilton gang on our trusty transistor.

up for departure some 2000 contacts later. The boys will be cooking up additional Pacific delicacies for future serving. *(Photos via KH6GLU)*



Operating News

GEORGE HART, W1NJM,
Communications Manager

ELLEN WHITE, W1YYM,
Deputy Comms. Mgr.

Administration: LILLIAN M. SALTER, W1ZJE

DXCC: ROBERT L. WHITE, W1CW
Contests: ROBERT HILL, W1ARR

Training Aids: GERALD PINARD
Public Service: WILLIAM O. REICHERT, WA0HHH

That Phonetic Alphabet. Speaking of tempests in teapots and mountains made out of molehills, a favorite topic of conversation (not to mention debate) among voice operators has always been which phonetic alphabet is the best and which one we should all be required to use. When voice operation started becoming popular in the thirties, the League recommended use of the Western Union alphabet (Adams, Boston, Chicago, Denver, etc.). During World War II the JAN (Joint Army-Navy — Able, Baker, Charlie, Dog, etc.) alphabet came into widespread use and the Western Union alphabet was all but forgotten. After the war there was widespread feeling among hams that they had had enough military stuff, and so the League adopted its "very own" phonetic alphabet (Adam, Baker, Charlie, David, etc.), a hybrid list adopting words from several other alphabets. Nevertheless, the JAN list continued to be heard most often in the amateur bands, purely as a matter of habit.

Not until the late fifties did the present ICAO (International Civil Aviation Organization) list start being used officially by the military, its principal advantage said to be that it contained words that could be understood in any language. Amateurs, for the most part, ridiculed it, and some groups actually objected to inclusion of the word "Whiskey." The post-war-adopted ARRL list never really did take hold, however, and most amateurs continued using the old JAN list, or lists of their own devising. In fact, facetious phonetics appeared frequently among amateur voice operators, and even today most of us have some "phunny phonetic" equivalent for our calls. (However, this writer's call is No Joking Matter.)

Popularizing the tri-lingual ICAO phonetic list has been a long, hard battle, but through enforced use among governments of Spanish, French and English-speaking countries it has gained inexorably and today is more widespread than any other. Recognizing this fact, the League's Board of Directors first ordered it to appear in ARRL literature and operating aids alongside the ARRL alphabet, and at the recent Board meeting adopted it as *the* ARRL standard. Consequently, in future reprints of current publications the old ARRL-recommended alphabet will be "phased out" and Adam-Baker-Charlie-David will be replaced by Alpha-Bravo-Charlie-Delta.

But remember this, you voice operators: the

OPERATING EVENTS (Dates in GMT)
ARRL-IARU-Affiliated Club-Operating Events

July	August	September
June 28 to July 7 WARC Centennial (p. 114, June *QST*).	2-3 Illinois QSO Party (p. 111, this issue). Md.-D. C. QSO Party (p. 110, this issue).	4 **Qualifying Run, W6OWP**
3 **Qualifying Run, W6OWP**	2-4 Missouri QSO Party (p. 122, this issue).	6-8 Washington State QSO Party
12-13 **CD Party** (c.w.)*	5 **Qualifying Run, W6OWP**	11 **Qualifying Run, W1AW**
15 **Qualifying Run, W1AW**	13 **Qualifying Run, W1AW**	13 **Frequency Measuring Test**
19-20 **CD Party** (phone)* Ontario QSO Party (p. 154, this issue). Independence of Colombia Contest (p. 103, this issue).	16-17 New Jersey QSO Party Indiana QSO Party	13-14 **VHF QSO Party**
20 Minnesota QSO Party (p. 112, this issue).	30-31 All Asian DX Contest	Oct. 11-12 CD, phone 18-19 CD, c.w.
26-27 New Hampshire QSO Party (p. 128, this issue).		Nov. 8-9 SS, phone 15-16 SS, c.w.
* League Officials and Communications Dept. appointees, only.		

NOTE: Possible W6OWP Qualifying Run "alternate" (same times and frequencies) is W6ZRJ.

Early December saw the "Changing of the SCMs in Maryland-D. C. Section" at a meeting held at the QTH of outgoing SCM K3JYZ. All LOs of MDC were in attendance except the SEC, W3LDD. (L-R) seated are **K3JYZ** retiring SCM and **K3LFD**, new SCM of MDC; standing **K3GZK**, PAM of MDCTN; **W3CBG**, RM of MDDS and **WA3HTQ**, RM of MDD.

ultimate purpose of any phonetic equivalent is to make yourself understood. If you succeed in doing this, it really doesn't matter *what* phonetics you use. On the other hand, *no* phonetic equivalent is going to accomplish it if you speak with a mouthful of mush.

Beacons, Parties and Morning Code Practice. By the time you read this, many will have been asking when the several motions passed by the Board concerning the above subjects will be put into effect. The answer: all in good time. Actions passed by the Board require a great deal of implementation at headquarters, some of which itself requires announcement in *QST* in the first available issue — *this* issue. But even before the announcement can be made, the practical problems concerned have to be considered, discussed, and perhaps further ideas solicited from the field. It just doesn't do to rush headlong into things.

Tentatively, then, here is the schedule.

(1) The matter of the W1AW v.h.f. beacons requires some study. What kind of transmission is required, how is identification going to be accomplished, what frequencies shall be used? We hope for an announcement in August *QST*.

(2) The QSO Party in which all ARRL members in addition to SCM-appointees will be eligible to participate is being referred to the Contest Advisory Committee for their recommendations. Hopefully, there will be further information available on this next month also. If you have ideas, write to W6CUF. Some things to discuss include what the exchange shall consist of; whether or not scoring bonuses should be available for holding an appointment, being a life member, having a code proficiency certificate; when the party should be held, in place of or separate from a quarterly CD Party; and any other similar related questions.

(3) The W1AW morning code practice can start 'most any time, but probably will start (or will have started) on July 1 for the six-months trial. Whether or not enough details will have been worked out to get an announcement to this effect into the W1AW schedule in this issue of *QST* is a good question at the frantic moment of writing. However, look for a repeat of the previous night's code practice on the usual frequencies at 1300 GMT Monday thru Friday.

Your Code Practice Skeds, Please. The fact is inescapable that W1AW is located 'way up here and you are trying to copy its code practice way out there and despite the best

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for March Traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
K6BPI	5744	1853	1668	185	9450
K5TEY	2	1437	1429	1	2869
K3N8N	775	1208	408	47	2438
K5BNH	7	1074	980	50	2111
W7BA	14	904	854	46	1818
KØSPH	76	414	350	850	1690
W9JYO	897	379	352	27	1655
KØONK	117	732	713	22	1584
WAØVAS	9	666	640	41	1356
W1OJM	6	605	603	2	1216
K7UDG	7	585	576	9	1177
KH6GHZ	119	438	402	36	995
WAØGRX	124	154	154	515	947
W3CUL/4	197	376	351	12	936
WA2BHN	25	416	403	12	856
W3EML	25	457	370	0	852
W8UPH	3	425	374	47	849
WA8ETX	351	256	199	13	819
W6RSY	30	402	285	94	811
WA7HKR	7	405	353	8	773
W5OBD	5	355	353	0	713
WB2RKK	21	303	288	16	628
WA1IGF	28	305	268	24	625
WA4DYL	14	313	294	4	625
WA9AKR	2	308	299	11	620
WA3INC	43	271	235	68	617
W4SQQ	22	293	257	42	614
W9EWH	13	300	286	14	613
W9CXY	5	302	296	3	606
K8LNE	9	309	256	18	592
WA5TYH	1	292	270	17	580
WA8WZF	11	275	266	7	559
WA7BZY	2	289	242	25	558
W9EQO	207	175	174	1	557
WA4SCK	15	268	266	2	551
WØLCX	16	297	228	3	544
KØZSQ	0	272	0	271	543
K7KBX	1	263	262	1	527
WA5FJN	5	260	253	7	525
W7GEP	0	258	242	13	513
Late Reports:					
K6BPI (Dec.)	7481	1608	1440	168	10697
K6BPI (Mar.)	7324	1318	1146	172	9960
WA8WZF (Mar.)	7	398	422	5	832
W6VNQ (Dec.)	17	374	337	0	728
W6VNQ (Jan.)	13	296	290	1	600
W6EOT (Jan.)	0	273	275	4	552

More-Than-One-Operator Stations

WØAA/Ø	9	880	0	880	1769
K4KDJ	428	53	224	19	524
Late Reports:					
WØAA/Ø (Mar.)	5	476	0	476	957

BPL for 100 or more *originations-plus deliveries*

WAØJXT/Ø 301	WA2EUO 115	W3TN 105	
K1BCS 277	WB2YQO 114	WA6DIL 105	
W9ESJ 181	WA6BYZ 113	W1TXL 104	
W9ICU 158	WA3IUV 112	W9JBQ 104	
	WA5KIV 112		
WØKYG 143	WAØRVR 110	WB2CXR 100	
WA3IHV 132	W3MPX 109	Late Reports:	
WAØOEJ 130	WAØJRA 108	WB6ZDJ/6(Dec.) 156	
WB6ZDJ 125	K8MYV 107	WB6ZDJ (Jan.) 151	
WA9QOQ 122	WB4FDT 106	WA3BSV (Dec.) 100	

More-Than-One-Operator Stations

W3ABT 305 W4DFU 297

BPL Medallions (see July, 1968 *QST*, p. 99) have been awarded to the following amateurs since last month's listings: WB2GAL, WA3BSV, WA6BYZ, W8OUU, VE3ERU

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 origination 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.

antenna orientation in the world there are times when you just cannot copy it. There are also some who cannot copy at the times of the W1AW transmissions, and although the morning transmissions may take care of some of these, there is still need for supplementary code practice transmissions from volunteer amateurs. Headquarters puts out a list of such stations, with their schedules, along with information on commercial stations that send text usable for code practice (getting scarcer and scarcer) but it is difficult to keep it up to date. It has been suggested that an up-to-date list be published occasionally in *QST*. Therefore, please send us *your* up-to-date schedule so we can use it for two purposes: first, to update our present printed list, and second to put a list of code practice stations on these pages from time to time. The information we need is call, days and times (GMT), frequencies and speeds transmitted.— *W1NJM*

ARRL CODE PROFICIENCY PROGRAM

Qualifying Runs

Any person can apply for an ARRL code proficiency award. Neither League membership nor an amateur license is required. Send copies of all qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the six speeds transmitted (10–35 w.p.m.) you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m., you may try later for endorsement stickers. Each month the ARRL Activities Calendar notes the qualifying run dates for W1AW and W6OWP (W6ZRJ, alternate) for the coming 3-month period.

W1AW will transmit a qualifying run on all listed c.w. frequencies at 0130 GMT July 15. (In converting, 0130 GMT June 14 becomes 2130 EDST July 14.)

W6OWP (W6ZRJ, alternate) will transmit a qualifying run on 3590 and 7129 kHz. 0400 GMT July 2.) (In converting, 0400 GMT June 4 becomes 2100 PDST July 2.)

Code Practice

W1AW transmits daily code practice according to the following schedule. For practice purposes, the order of words in each line may be reversed during the 5–13 w.p.m. transmissions. (Each tape carries a checking reference.)

Speeds	Local times/days	GMT times/days
10, 13, 15	7:30 P.M. EDST daily 4:30 P.M. PDST	2330 daily
5, 7½, 10, 13, 20, 25	9:30 P.M. EDST \ SaTTh 6:30 P.M. PDST / Sat	0130 MWFSn
"	9:00 A.M. EDST MWF 6:00 A.M. PDST	1300 MWF
35, 30, 25 20, 15	9:30 P.M. EDST MWF 6:30 P.M. PDST	0130 TThSat
"	9:00 A.M. EDST TTh 6:00 A.M. PDST	1300 TTh

The 0130 GMT practice is omitted four times a year on designated nights when Frequency Measuring Tests are made in this period. To permit improving 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 texts to be sent in the 0130 GMT practice on the following dates:

Date	Subject of practice text from May *QST*
July 16:	*It Seems to Us*, p. 9
July 22:	*The Mainline TT/L-2 F.S.K. Demodulator*, p. 28
July 25:	*Long-Delayed Echoes*, p. 38
Date	Subject of practice text from *Understanding Amateur Radio*, First Edition
Aug. 1:	*Losses*, p. 108
Aug. 6:	*Resistance Only!*, p. 109

W1AW SCHEDULE, JULY 1969

The ARRL Maxim Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 1 P.M.–1 A.M. EDST, Saturday 7 P.M.–2:30 A.M. EDST and Sunday 3 P.M.–10:30 P.M. EDST. The station address is 225 Main Street, Newington, Conn., about 7 miles south of Hartford. A map showing local street detail will be sent upon request. The station will be closed July 4, in observance of Independence Day.

	Sunday	*Monday*	*Tuesday*	*Wednesday*	*Thursday*	*Friday*	*Saturday*
0000	.....	← C.W.-OBS[1] →					
0020–0030[4]	.....	.....	3.700[6]	14.020	14.020	7.150[6]	14.020
0030	.....	.....	3.700[6]	14.100	14.100	7.150[6]	14.100
0100	.....	← Phone-OBS[2] →					
0105–0130[4]	.....	.....	3.820	50.120	145.600	1.820	21.270
0130	← CODE PRACTICE DAILY[1] (35-15 w.p.m. TTh Sat), (5-25 w.p.m. MWFSn) →						
0230–0300[4]	.....	.....	3.555	.....	1.805	.....	3.555
0300	RTTY-OBS[3]	.....	← RTTY-OBS[3] →				
0310–0330[4]	.....	.....	3.625	14.095	7.095	14.095	3.625
0330	Phone-OBS[2]	.....	← Phone-OBS[2] →				
0335–0400[4]	.....	.....	7.220	3.820	7.220	3.820	7.220
0400	C.W.-OBS[1]	.....	← C.W.-OBS[1] →				
0420–0430	.....	.....	3.700[6]	7.020	3.945	7.150[6]	3.520
0430–0500	.....	.....	3.700[6]	7.080	3.945	7.150[6]	3.555
1300	.....	← CODE PRACTICE[1] (5-25 w.p.m. MWF), (35-15 w.p.m. TTh) →					.....
1700–1800	.....	21/28[5]	21/28[5]	21/28[5]	21/28[5]	21/28[5]	.....
1900–2000	.....	14.280	7.255	14.280	7.255	14.280	.....
2000–2100	.....	14.100	14.280	14.095	21/28[5]	7.080	.....
2200–2300	.....	21/28[5]	21.100[6]	21/28[5]	7.255	14.280	.....
2300–2330	.....	.....	.....	RTTY OBS[3,7]	.....	.....	.....
2330	← CODE PRACTICE DAILY[1] 10-13-15 w.p.m. →						

[1] C.W. OBS (bulletins, 18 w.p.m.) and the code practice on 1.805, 3.52, 7.02, 14.02, 21.02, 28.02, 50.02, and 145.6 MHz.
[2] Phone OBS (bulletins) 1.82, 3.82, 7.22, 14.22, 21.27, 28.52, 50.12, and 145.6 MHz.
[3] RTTY OBS (bulletins) 3.625, 7.095, 14.095, 21.095 and 29.015 MHz.
[4] Starting time approximate. Operating period follows conclusion of bulletin or code practice.
[5] Operation will be on one of the following frequencies: 21.02, 21.08, 21.27, 21.41, 28.02 or 28.52 MHz.
[6] W1AW will listen in the Novice segments for Novices, on the band indicated, transmitting on the frequency shown.
[7] Bulletins sent with 170-Hertz shift, repeated with 850-Hertz shift.
Maintenance Staff; W1s QIS WPR, K6OSO. *Times-days in GMT. Operating frequencies are approximate.

DXCC Notes

As a result of actions taken at the May 1969 meeting of the ARRL Board of Directors, the following announcement is made regarding DXCC endorsement submissions.

Effective July 1, 1969, for those DXCC participants having accredited totals of 300 or more, submissions for further endorsements may be made on the basis of 5 or more cards, or a number of cards which will bring the participant's new total to a number exactly divisible by 5 (e.g., if the present total were 302, then a submission of 3, or more, cards would be permitted).

For participants having accredited totals of 240 through 290, submissions may be made on the basis of 10 or more cards, or a number of cards which will bring the participant's new total to a number exactly divisible by 10 (e.g., if the present total were 263, then a submission of 7, or more cards would be permitted).

Accredited totals of from 100 through 220, endorsement submissions will continue to be on the basis of 20 or more cards, or a number of cards which will bring the participant's new total to a number exactly divisible by 20 (e.g., if the present total were 159, 1 or more cards would be permitted).

Honor Roll credit submissions will continue to be accepted during March and September *only*, for the June and December *QST* Honor Roll listings. If you are not currently on the Honor Roll, but have enough cards to bring your new total up to (or past) that of the last-place position shown on the previous Honor Roll listing, you may submit the new cards during March and September.

DX CENTURY CLUB AWARDS

From April 1, through April 30, 1969, DXCC Certificates based on contacts with 100-or-more countries have been issued by ARRL Headquarters to the amateurs listed below.

New Members

K1NIE....232	W4AX....141	W1EQV....109	W3CRE....103	DJ8WD....101	K8MPF....100
W6LVF....188	UW6LC....137	LA5SH....108	WA4EWX..103	K9UFK....101	K9ABQ....100
W2CAZ....170	JA1OCA....133	OK1NL....108	DJ9SO....102	UA1KCU...101	KH6SP....100
ET3USA....162	W5CWQ/6..133	DK1BY....107	K9IDQ....102	UP2CV....101	TJ1AJ....100
PY2GE....155	I1BRM....129	I1LAV....107	VE8SG....102	W4NG....101	V88FX....100
DL7LV....153	UA9KTE...120	WA9FWY...106	W2DNZ....102	WB6OIE...101	W7NP....100
K2GDP....153	VE1AIH....119	WA9VBX...106	WA2MYB...102	WB8ANV...101	WA7ABO...100
4X4JS....148	K4ZLE....114	SM6EOC...104	WA3EFI....102	WA9LMA...101	WA7GQA...100
WA3EIZ....144	W2HWS....112	W7FCD....104	W5EGY....102	DJ8RF....100	W8IHD....100
K4KI....143	UA3DM....110	WA8FJA....104	W8YMB....102	K4JUQ....100	

Radiotelephone

9M2NF....254	VR1L....132	DJ9BW....113	W9CWK....106	W4JNY/-		WA2CFA...100
VK2WD....223	DJ9IA....131	WA6TKQ...112	WA9FWY...104	KP4....102		W4PWB...100
W9MQK....198	EA2CW....124	K9WSR....111	DK2JW....103	EA1IY....101		WA1TMP...100
DL1UR....174	K1NIE....121	W9MNR....110	WA9CAB...103	K9VBX....101		W9KRU....100
PY2GE....155	WA8YBB...121	WA8YFW...109	WØPAN....103	WB6WIT...101		K9LUX....100
W2CCS....151	JA1OCA....120	DL7LV....107	K4ZLE....102	K4BBF....100		VE3ECI/-
4X4JS....144	DJ3DJ....118	K2GDP....107	K5UKN....102	K9ERP....100		WØ....100
I1WRP....138	K4KI....117	K4TSJ....106	K9IDQ....102	K9UFK....100		9G1KM....100
ET3USA....132	ON5DJ....114	OA6BW....106		W2HSM....100		

Endorsements

Endorsements issued for confirmations credited from April 1, 1969 through April 30, 1969 are listed below. Endorsement listings through the 300 level are given in increments of 20, above the 300 level they are given 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.

340	W8LY	WA4WIP	W1MDO	W4OEL	K3BNS	K6PUR	VQ8CC	WØBA
W5ABY			W6KNH	W6DOD	K3EUR	K9PQG	W2GHK/4	
	315	**300**		W8VLK	K9KDU	WB2RBG	K4PHY/-	**120**
335	WA2RLQ	HB9DX	**260**		OE1KW	WA4FFW	YV5	K2QMF
W8PHZ	W5NMA	K9PPX	G2FYT	**220**	VE3EU	W8GOC		K4RTA
	WØBN	SMØKY	K5QHS	K8UDJ	WA2LOR	WØDAK	**140**	KA9MF
330		VE7CE	VE3CTX	PY1MB	W4HHN		DK1HP	WA1DRC
W1JNV	**310**	W2QKJ	WB2YQH	SM5FC	W4UF	**160**	JA6CNL	WA3EFH
W6DZZ	YV5BPJ	W4AXE	W4GTS	SM7TV	W5NLP	HK7UL	K2YEK	W4PLM
	W1QJR	W4ZXI	WA8LSO	VE3FKL	W6BJI	K3ICA	K3OLG	WØYVA/4
325		W6SIA		W4JVU	W6HPG	K3OTY	LA8SJ	W6INM
W9MQK	**305**	W8YGR	**240**	W7JWE	W8OG	K9KBW/4	LA9TG	W6KHS
W9TKD	KØUKN	W9WKU	I1FO	W8DWP	W9NVJ	OE8RT	OH6NH	W8TJQ
	PY1HX		K5AEU		WAØDUB	PY5QE	W2DF	W8YLJ
320	SMØCCE	**280**	K9WEH	**200**		SP5AFL	W5HCJ	W9JVF
VE2YU	W1YYM	SM5WJ	WA1CJR	HK3AVK	**180**	UD6BW	W9BF	W9MCR
W21RV	W4UWC	K4CAH	W1PYM	JA1FDU	K4OCE	VE3GHL		

Radiotelephone

335	W6BSY	W3YZI	WA2VOH	**220**	PY1MB	JA2APA	K9WEH	VP9CP
ZL1HY	W7QPK		W6DZZ	VE3FKL	SM5FC	K3BNS	VE3GHL	W3KVS
	YV5BPJ	**280**		W4JVU	W4PGZ	KØYIP	VE4BJ	WØBA
325		JA1BK		W8GKM	W6HPG	VE4XN	W2GHK/4	
W8MPW	**305**	W2FXA	**240**	W8VHY	W6SIA	W2YYL	W8PQD	**120**
ZL1KG	W5NMA	WA2WVL	F5JA	W8YGR	W8HXR	W4UF	W9DRL	K2QIL
	W9JT		K5QHS		WØYDB	W6AOI	W9PWQ	K4RTA
320		**260**	WA1CJR	**200**	YN1RTS	WA6RTA		KH6BZF
	300	K2JMY	WB2HZG	AP2MR	YV4UA	WA7DRP	**140**	KR6TAB
K5JEA	K5AWR	K4YYL	W6PTS	DL6NX		ZF1GC	DJ4ZD	WA2RSX
	KØUKN	SM5WJ	W9ABM	K1LHT	**180**		PY1HX	WB2BDH
310	SM5CZY	VE2YU	W9WKU	OE1KW	CT1FL	**160**	K9PQG	W3HNK
LU9DAH	WA2EOQ	VE3CTX	YV4QG	ON4PL	DJ3CN	K3OTY	KH6FQB	WA8NDE

APRIL CD PARTIES

Tame, tame, tame — heck, nobody even broke any scoring records this time. K2EIU operated from Tinker AFB, Okla., and shook up the multitude ("OKLA?") with his 75-foot piece of TV lead-in tossed over a 10-foot-high bush. W7TVF doled out Nevada QSOs with vigor and promises continued CD activity in future affairs. WB2FIT, keying W8UM, sports calloused fingers after 95 band-changes. Phone fanatics were pleasantly surprised by the appearance of EC KZ5IK. Nearly everybody made the transition to 15-minute off-times and the 0500Z ending time with a minimum of pain.

In the following tabulation of high *claimed* scores, read (from left to right): total score, number of QSOs, number of sections, hours of operation. Final adjusted scores will appear in the July *CD Bulletin*. — *W1ARR*

C.W. SCORES

K2EIU/5	277,200-785-70-19
W8UM (WB2FIT, opr.)	272,995-769-71-20
W4GEQ	255,300-737-69-19
K3HKK (K3AHT, opr.)	239,020-696-68-20
W4UQ	234,150-662-70-18
K2KIR	227,200-633-71-12
K2LWR	220,455-639-69-16
K9ZMS/6	214,065-596-71-17
KØAZJ	207,310-594-69-19
K6QPH/4	205,700-600-68-18
WB2RKK	201,670-595-67-18
WØINH	192,960-569-67-16
W6WX	178,500-503-70-15
K4FU	178,365-510-69-14
W6DGH	177,140-514-68-11
W7CFJ	167,670-479-69-10
WA3HTQ	166,075-511-65-14
W8QXQ	161,160-467-68-12
WA7ISP	158,790-469-67-15
W1ETU	157,500-500-63-13
WA5KQN	156,090-467-66-19
W8AHZ (WA8POS, opr.)	154,450-460-66-17
WA5VDH	152,460-481-63-16
K1TKS	150,480-450-66-16
K6LBV	149,440-462-64-18
K3HNP	146,900-447-65-16
W6IPC	143,480-415-68-18
W9PJT	140,075-427-65-15
K7CTI	136,740-423-64- 9
KØCNC	136,640-421-64-10
WØIYP	135,850-418-65-14
WA5RYM	131,520-408-64-16
W3VA	130,510-415-62-15
WØUCE/3	130,240-400-64-14
K5OCX	128,205-400-63-11
W9LNQ	127,260-397-63-11
K3OAE	125,400-380-66-14
VE3ERU	124,210-387-63-15
WB4HUS	124,000-394-62-16
W2ZVW	120,900-365-65-10
W5QGZ	120,280-382-62-14
W6BVB	117,920-345-67-14
W1DAL	117,800-373-62-14
W4LK	117,300-384-60-18
W8CKX	117,250-350-67-11
WA5PUQ	116,550-370-63-13
W5EKF	116,160-363-64-20
W7IUO	115,605-364-63-19
W3MPX	114,345-357-63-18
K1QFD	113,850-341-66-18
WA2CAL	113,155-364-61-11
K3EXE	112,140-356-63-20
W3CRE	110,565-351-63-10
K9LBQ/7	110,100-360-60- 6
WA1HLP	109,560-328-66-14
K6OT	108,255-346-67-14
W5FCX	107,100-335-63- 9
K4B8S/4	106,640-338-62-13
K4CIA	105,860-310-67-10
K6CAG/1	104,725-350-59-13
K1DIK/2	104,000-320-64-20
W4SQF	103,950-325-63-11
K4RIN/5	103,320-324-63- 6
W7GHT	103,230-327-62-16
WA9QBM (WA9s OTD QBM)	201,825-616-65-10
W1AW (K6OSO, WA9HHH)	155,840-483-64-20
WB4FDT (4 oprs.)	119,180-398-59-18

PHONE SCORES

K9LBQ/7	155,520-479-64-17
K3HKK (K3AHT, opr.)	122,760-389-62-13
KØYVU	107,880-345-62-18
W9EWC (W9AQW, opr.)	107,400-358-60-10
WAØOTE	92,400-303-60-16
W6DGH	90,915-312-57- 9
K2EIU/5	87,210-299-57- 9
W6NJU (K9ZMS, opr.)	80,655-276-57- 9
W7TVF	69,325-229-59-17
WA9BWY/9	66,820-253-52-12
K1THQ	66,555-256-51- 7
K4FU	66,300-248-52-11
W4TYE	64,395-243-53-12
WØIYP	62,370-231-54- 9
W6UZX (W6IPC, opr.)	60,760-210-56-14
W9YT (WA9AIB, opr.)	51,250-200-50- 5
W5EKF	51,150-186-55-12
WB4DOY	49,440-202-48-10
W7EJU	48,880-184-52-16
W2ZVW	45,675-196-45- 9
WB4JDD	45,450-200-45-10
K6QPH/4	42,000-170-48- 8
WA8MCR	41,405-164-49- 6
WA9TUM	40,750-157-50- 6
K4BSS/4	40,560-150-52- 8
W6BIP	36,500-139-50- 5
WB2RKK	35,200-153-44- 9
W1NJL	34,230-156-42- 6
K7CTI	33,350-141-46- 5
W5MQ	31,240-138-44-10

DX Test — High Claimed Scores

(*Continue from page 53*)

EA1FD	819,060-170-1611
OZ1RH	816,141-163-1670
DJ5GI	809,096-152-1775
OE2EGL	746-976-124-2008
PY7ASQ	735,540-130-1890
ZL1HW	719,168-148-1622
KL7WAH	684,930-158- 237
ON5GQ	677,820-158-1430
ON5MG	664,242-149-1486
EP3AM	656,466-142-1541
PY4KL	641,691-141-1517
CR7DS	640,563-141-1515
VE3BS/VP9	623,720-155-1342
KX6GS	619,084-148-1398
G3WTV	576,232-136-1413
JA1CG	560,945-155-1207

Multioperator

6YØA	4,719,114-281-5598
SK6AB	2,824,038-217-4339
I1TAE	2,773,890-210-4389
G3JOC	2,680,509-221-4055
F5OJ	1,408,850-190-2478
DL4USN	1,384,944-172-2684
I1CZW	1,307,766-178-2449
KA9MF	1,000,890-165-2022
DL4FS	675,567-131-1779
SK3BP	510,825-147-1160

Silent Keys

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

K1EQI, Irving H. Reynolds, Rutland, Vermont.
W1FAV, William K. Hawthorn, Jr., Somerville, Mass.
W1HD, Donald L. Spender, Cheshire, Conn.
W1KPD, Harry E. Gilbert, Berlin, N. H.
W1QO, Waldo S. Heath, Winsted, Conn.
W1QT, John M. Wade, Brewester, Mass.
W1UDD, Myron Prescott, Portland, Maine.
K1WPQ, Wayne Smith, Norwich, Conn.
W1WPV, Robert M. Hall, Montpelier, Vermont.
W1WZP, Normand M. Bernard, Thompson, Conn.
W2GJL, William E. Nagley, Basking Ridge, N. J.
W2OCP, George W. Maustellar, Vestal, New York.
K2USQ, Roland J. Brown, West Trenton, N. J.
W2WHX, Edwin J. Stone, Cohoes, New York.
WA3ERB, Ralph Kroger, Matamoras, Pa.
K3HYO, Walter V. Levanas, McKees Rocks, Pa.
W3VZY, Leonard A. Wish, Coraopolis, Pa.
WA4AFY, Joseph C. McBee, Flintstone, Georgia.
W4BUC, Wright Hoss, Jonesboro, Tenn.
K4CMM, Norris F. Dobbins, Roanoke, Virginia.
W4GCC, William C. Landolina, Sr., Clemmons, N. C.
K4HF/W9ZB, Robert F. Wilson, Clearwater, Florida.
WA4MGA, Arthur H. Holcombe, Lithonia, Ga.
K4QMS, Kenneth F. Stanfield, East Point, Ga.
W4SXW, Clifford M. Carr, Mableton, Ga.
W4ZSQ, Daniel F. Brock, Birmingham, Ala.
W5HRQ, Lee Ligon, Odessa, Texas.
W5IEI, Bennie E. Willenborg, Fort Worth, Texas.
K6ABD, Charles Bancroft, Hemet, Calif.
W6AXI, Bernard L. Leiter, Modesto, Calif.
W6BEE, Christian A. Christensen, San Bruno, Calif.
W6BZB, Fred M. McCauley, Los Angeles, Calif.
W6CF, William Bates, Modesto, Calif.
W6CHO, Marion F. Dunkel, South El Monte, Calif.
W6CWD, Joseph I. Beach, Yermo, Calif.
K6IJO, Morley La Salle, Alhambra, Calif.
WN6JXD, Micheal B. Kelly, Anaheim, Calif.
W6KSW, Harold Hicks, Clovis, Calif.
W6LEG, Mortimer M. Rich, Soledad, Calif.
W6PIB, Frank Smith, N. Hollywood, Calif.
W6PLP, Albert S. Chironi, San Francisco, Calif.
K7GIE, Dr. Charles H. Dockhorn, Seattle, Wash.
W7GZB, Aubrey E. LaPlante, Seattle, Wash.
W7HIO, Russell D. Haner, Portland, Or.
W7EVN, Jay B. Reasoner, Casper, Wyoming.
K7YPC, Robert Willard, Gardiner, Montana.
WB8BWC, Ralph G. Folz, Cincinnati, Ohio.
WA8DBN, Fred H. Bashore, Southgate, Mich.
W8DUY, Donald C. Holzapfel, Ashland, Ohio
WA8HLG, Donna J. Kovac, Port Clinton, Ohio.
W8HXQ, Richard P. Boals, Gahanna, Ohio.
WA8KNP, Floyd E. Stultz, Mt. Vernon, Ohio.
W8LDC, Dr. William J. Donaldy, E. Cleveland, Ohio.
W8LPD, John W. Klotter, Cincinnati, Ohio.
K8MIG, Melvin Kessie, Highlands Heights, Ohio.
W8UGO, John L. Miller, Lansing, Michigan.
W8ZX, Harry S. Weber, Dover, Ohio.
W9AIK, Harry Baird, Stanford, Illinois.
WA9AMX, Raymond Watkins, Hammond, Indiana.
W9ARN, John Roelfs, Jr., Peoria, Illinois.
W9CUH, Carl L. Hansen, West Lima, Wisconsin.
W9HAI, Myron S. Eavery, Brazil, Ind.
WØFKM, Herman S. Hoffman, Joplin, Montana.
WØFYJ, Martinus P. Bollesen, Blair, Nebraska.
KØLGU, David M. Epperson, Independence, Missouri.
KØLIT, Dominic A. Miraglia, Aurora, Colorado.
WAØTBB, Wallace R. Whetham, N. St. Paul, Minn.
VE2AMB, Eric S. Gould, Dollard-Des-Ormeaux, Quebec.
VE3GY, Ailwyn Aveling, Hamilton, Ontario.

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

DELAWARE—SCM, John L. Penrod, K3NYG—SEC/PAM: W3DKX. RM: W3EEB. Renewals: WA3GSM as Sussex EC and OPS; W3DKX as SEC. W3BHG and WA3BAO are doing meteor scatter work. W3EEB visited PAØ and EA1-Land for a vacation. W3TRC got a big bang out of the last CD Contest. He reports that they are better than the SS Contest. WA3KFF squeezed a new tower and beam out of his pop. W3CZS. WA3FRC and WA3IID are preparing for their 1st-class commercial tests. Are you interested in joining a radio club or any other radio organization? Just drop me a card and I'll direct you to the right person. Mark your calendars now for the Delaware Hamfest in Harrington to be held Aug. 17. Net reports: DEPN, QNI 59, QTC 6, DSMN, QNI 44, QTC 5, DTMN, QNI 27, KCEPN, QNI 33. Traffic: W3EEB 57, W3TRC 31, W3DKX 20, WA3HWC 4, K3NYG 2.

EASTERN PENNSYLVANIA—SCM, George S. Van Dyke, Jr., W3HK—SEC: W3ICC. RMs: W3EML, K3MVO, W3MPX, K3SLG. PAMs: K3WAJ, K3MYS. V.H.F. PAM: W3FGQ. OBS reports were received from WA3AFI, W3CBH, K3WEU, WA3INC, WA3EEC, W3ID, K3RDM; OVS reports from K3WEU, WA3KTP, W3ZRR, W3FGQ, WA3EEC, WA3BJQ; OO reports from K3WEU, W3NNC, WA3IUV, W3KEK, K3RDT, K3HNP, W3FGQ.

Net	*Freq.*	*Operates*	*QNI*	*QTC*	*RM/PAM*
EPA	3610	Daily	324	369	W3MPX
PTTN	3610	Daily	244	166	W3MPX
EPAEP&TN	3917	Daily	541	348	K3WAJ
PFN	3960	Mon.-Fri.*	522	400	K3SLG
VHF (6)	50.25	Mon.-Fri.	97	48	W3FGQ
VHF (2)	145.35	Mon.-Fri.	41	3	W3FGQ
ENTN	3740	Mon.-Wed.-Fri.	29	61	WA3IUV
QTC	7240	Mon.-Fri.	224	91	WA3AOJ

*Operates Sat. and Sun. only on heavy traffic seasons. New officers of the Lehigh College ARC are K3MNT, pres.; WA3EEC, vice-pres.; K3KBO, secy.-treas. U. of Penn.: K3WJQ, pres.; K7YNO, vice-pres.; WB2WXA, secy.-treas.; WA3ILV, pub. rel. Springfield ARC: WA3JDF, pres.; WA3EPA, vice-pres.; WA3JRO, secy.; WA3KDU, treas. The recent FMT produced some new experts: K3DYU 0.8 p.p.m., W3ADE 5.3, W3INV 0.7, WA3HMU 834.2; WA3FBP 6.1; W3ESQ 19.6; W3PT 27.6 W3MFY 1.7, K3LPP 0.3, WA3JKB 17.0, W3JET 7.6, WA3IUV 10.9, K3HNP 4.4, W3BFF 0.3, K3EMA 30.5. K3YEO received the JJEbers Memorial Award of the Lehigh Valley Section of IEEE. WA3CTW is secy. of M.I.T. Radio Society. If you are looking for that Extra Class license and code speed is your problem, try 7030 kc., 0200Z Mon.-Fri., 22 w.p.m., WB2LZJ. W3EML reports TCC is holding up with extra traffic from Easter greetings. WA3INC is doing yeoman work on 3RN. The newest Novice from K3WEU's class is WN3MEW. K3WEU may be portable in Canada this summer. K3MVO puts in his usual report. WA3IUV visited hams while on vacation in Florida. For their work in the Eve Bank Net WA3ATQ and OM were guests at the annual meeting and luncheon of the Eve Foudation of Delaware Valley. W3FGQ is keeping the v.h.f. nets going. WA3AOJ says guests are interfering with her traffic work. W3ICC, our hard-working SEC, needs help. W3CID is on his way to 5-Land. WA3AFI and W3CBH are old faithfuls. WA3CKA has his home-brew s.s.b. gear working and now can be liaison between phone and c.w. nets. WA3GAP reports all his time is now ECARS. WN3LCB passed the General Class exam. W3VA says his new call is like magic on DX. K3RDM got his big "E" ticket. The Panther Valley Wireless Assn. is trying to swing the local C. of C. into printing QSLs. WA3EWV reports the PVWA had a fine Annual Dinner. Traffic: (Apr.) K3NSN 2438, W3EML 852, WA3INC 617, W3MPX 448, W3ABT 305, WA3KKB 301, K3WEU 239, K3MVO 232, WA3IUV 227, WA3IHV 177, WA3ATQ 147, K3BHU 140, W3FGQ 136, WA3AOJ 111, WA3JWF 103, K3HNP 92, K3PSO 91, W3HK 86, WA3AFI 85, W3CID 76, K3WAJ 66, K3OIO 61, WA3EEC 57, W3NNL 54, WA3LAK 52, WA3JWL 35, WA3JKB 34, K3MDG 33, W3HNK 28, W3CBH 21, WA3GLI 21, W3FPC 20, WA3CKA 18, WN3LEI 18, WA3GUK 17, WA3GAP 15, W3VAP 15, W3BNR 14, K3KTH 14, W3NNT 14, W3ADE 10, W3OY 9, W3BUR 8, WA3KEY 8, WA3FPB 7, K3HKW 7, W3RV7, WA3FPM 6, WA3KKM 6, WN3LCB 6, WA3IYC 3, W3VA 3, WA3CMD 2, WA3IAZ 2, W3ID 2, W3AIZ 1, WA3BJQ 1, W3EU 1, WA3EWV 1, W3KEK 1, WA3KTP 1, K3RDM 1, W3YPF 1. (Mar.) W3AIZ 5.

MARYLAND-DISTRICT OF COLUMBIA—SCM, John A. Munholland K3LFD SEC: W3LDD.

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QTC*	*QNI Ave.*	*Mgr.*
MDD	3643	2300Z	Daily	30	355	13.3	WA3HTQ/RM
MDDS	3643	0030Z	Daily	29	53	4.7	W3CBG/RM
MDCTN	3920	2200Z	STTS	17	83	17.1	W3ATQ
MEPN	3920	2200Z	MWF	23	47	21.2	K3IAG
		1700Z	SS				
MSTN	50.400	0000Z	M	4	23	11.2	WA3EOP
MTMTN	145.206	0100Z	T-S	24	39	7.9	W3IFW
CVTN	145.620	0200Z	M-Th-Sa				WA3JPI

New appointments: WA3LFL, K2DEB/3 as OOs; K3JOM as OVS. Endorsements: W3EOV as OPS; WA3CEK, W3ECP, K3OAE, K3QDC, K3QDD, W3PRC, W3PZW, W3WV, WA3HTQ as ORSs; W3PYW as OO; WA3CFK, WA3IHR, W3DFW, WA3BMM as ECs; W3CDQ as OBS; W3LDD as SEC. Dates to remember: July 27, MDD/MDCTN/MDDS Picnic at Patapsco State Park; Aug. 2-3, MDC QSO Party. W3GKP bounced a 2.3 GHz. signal off the Moon to W4HHK in western Tenn. The MSTN Communicator reports 29 net members forming a v.h.f. trunkline from the District to Hagerstown. With the CVTN adding Cumberland Valley, and the MTMTN handling the D.C.-Baltimore-Bel Air route, all we need for solid v.h.f. coverage of MDC is an Eastern Shore-Southern Maryland network. New officers of the Capitol Tech Ham Club are K3SGB, pres.; WA3JAK, vice-pres.; WA3EOP, secy.; WN3JBS, treas.; K3FQF, stn. mgr. WA3CCN/AM, portable Vietnam, hopes to be QNI MEPN as you read this report. WA3LCC worked 60 countries on a vertical and got his Advanced Class ticket, too. A sock-it-to-him motorist slammed W3EOV/mobile in the rear and dislocated his antenna. K3GJD plans to hit the comeback trail for net operations when school is out. W3TN made the BPL again. K3RGB/EC and 17 other Baltimore City AREC stations provided a 24-mile trunk line for a high school charity "walk on hunger" during April. W3EOK is busy preparing for retirement. W3ECP says K3QQN and K3KWX are portable USAF. K3LRJ is overseas and WA3GSS is now WB6NBH. WA3KNJ will operate 80 meters from Maine this summer. WN3KAA passed the General Class exam. WA3IJR made WAS with the aid of the Apr. CD Party. W3CZ operates mobile with low-powered transistorized gear to help the county hunters get the hard-to-get counties in Maryland. SEC W3LDD needs ECs in Caroline, Carroll, Charles, Dorchester, Howard, Kent, Prince Georges, Queen Anne, Somerset, Talbot, Wicomico and Worcester Counties and D.C. Traffic: (Apr.) W3TN 279, WØUCE/3 174, W3ATQ 172, W3DYA 125, WA3IYS 102, WA3GUI 99, WN3KAA 89, K3LFD 77, W3CBG 65, WA3HEN 60, W3LQY 54, WA3IJR 51, WA3IRQ 45, K3OAE 45, W3EOV 32, WA3ERL 32, WA3HSU 31, W3FA 28, W3GEB 28, WA3KEW 22, WA3IAQ 21, WA3CEK 19, WA3EOP 17, WA3IHW 17, W3ZNW 17, W3ECP 13, WA3GXN 13, K3QDC 12, WA3BYN 9, WA3GGO 6, K3TBD 6, WA3KNJ 3, WA3LCC 1. (Mar.) WØUCE/3 106, W3DYA 95.

MARYLAND-D.C. QSO PARTY

August 2-3, 1969

All amateurs are invited to participate in the fourth MD-DC QSO Party, sponsored by the Maydale ARC (MARC), in order to promote friendship and operating ability among the radio amateurs of the world.

Rules: 1) The party begins at 2200 GMT August 2 and ends at 2200 GMT August 3. 2) A station may be contacted only once on each band and mode (i.e. c.w.-phone-RTTY). Separate logs must be submitted for each mode., cross-check sheets should be kept to eliminate duplicate contacts. 3) Exchange: MD-D.C. stations send QSO number, RS(T), and county. (Independent cities, Baltimore and Washington, D.C. count as separate counties). All others send QSO number, RS(T) and ARRL section or country as applicable. 4) Scoring: MD-D.C. stations score one point for each number sent and one for each received, multiplied by each different ARRL section of country. All others score one point for each number sent and one point for each number received, multiplied by each different Maryland county, (25 total). 5) Certificates will be awarded the highest scoring station in each ARRL section and country. Separate awards for phone and c.w. When more than six stations submit logs from one section, second place will be awarded. More than ten, third place will be awarded. 6) A readable copy of the log showing contest station call and location. QSO numbers sent and received, county and/or ARRL section or country should be mailed to C. E. Andersen K3JYZ, 14601 Claude Lane, Silver Spring, Maryland, 20904 (postmarked before Sept. 1, 1969). Each entry must include the name and address of the operator in block letters along with a signed statement that the operator has observed all the regulations of his country and that the decisions of the contest committee will be accepted as final. No logs will be returned. Enclose an s.a.s.e. if the contest summary is desired. 7) Suggested frequencies: 3575 3850 7075 7275 14,075 14,275 21,075 21,325. Novices 3735 7175 and 21,110.

SOUTHERN NEW JERSEY—SCM, Edward G. Raser W2ZI—Asst. SCM: Charles E. Travers, W2YPZ. SEC: W2LVW. RMs: WA2KIP, WA2BLV. PAMs: WA2UVB, W2ZI. NJN reports: 7 P.M. Session, 36 sessions, 410 check-ins; 303 traffic; 10 P.M. Session, 30 sessions, 115 check-ins, 43 traffic. W2ZI and his XYL are homeward bound from a very enjoyable cruise to Australia and other ports. The Sunday Morning N.J.E.F. and Traffic Net is staffed by the DVRA station with W2SNK, W2ISZ and K3CPF. An antenna-raising was held recently at the W2DNF QTH in Princeton. During the operations, W2DNF was assisted by W1PFS and W2YPZ. WB2FJE is looking around for a 40- to 50-ft. tower for his beam. There is considerable interest in radioteletype among New Jersey hams. Equipment at various stages of installation may be seen at the QTH of W2IGL, WA2KVU, W2ZZ, WA2TAF, W2PEV, W2YPZ and WA2BAU. It is possible that an RTTY net is in the offing at an early date. The membership is reminded of the Annual QSO Party on Aug. 16 and 17. Details will be forthcoming. Plan to keep this date open. Traffic: (Apr.) WA2ABY 126, W2PU 122, WB2VEJ 92, W2ORS 62, W2YPZ 54, WA2ANL 33, W2DNF 22, W2IU 20, K2SHE 14, WA9PRE/2 14, WB2FJE 13, WB2QMA/2 11, W2JI 10, K2MBW 7, WB2DRG 5, W2ZQ 2. (Mar.) WB2VEJ 136, WA2ABY 97, W2PU 42, WA2KAP 15.

WESTERN NEW YORK—SCM, Richard M. Pitzeruse, K2KTK—Asst. SCM: Rudy W. Ehrhardt. W2PVI, SEC: W2RUF. PAM: WB2VSL. RMs: K2KIR, W2FR, W2MTA, W2RUF. New appointees are W2CXM and WA3HRV/2 as OBSs, K2YAH as OO, W2MPM as OVS. NYSPTEN reports 1681 check-ins and 414 messages cleared for Mar. I am very sorry to have to report the passing of K2LPT of Delaven. The Cornell University Radio Club has big things planned in the form of full-size four-element monobanders for 20 and 15 meters for club station W2CXM. K2VCZ speaks loudly with an 1800-watt p.e.p. linear. WB2VSL continues to do an outstanding job as PAM. WB2WGF NCSed his first session of the NYPON. That knocking you heard was his knees. W2CFP invites comments and suggestions for his amateur radio program on WHCU in Ithaca. Dave also reports that the Ithaca repeater for 2-meter f.m. is progressing smoothly and will be on the air soon. The EC of one of the finest AREC groups in WNY, K2AYQ, and AECs K2MUG, W2BOR and WB2ZTP, visited ARRL Hq. WA2PZD/WB2NNA is now with IBM. Sorry to report the passing of the XYL of W2AFB. WN2ICU tells of a Novice net struggling for survival on 7170 kc. daily at 2030Z. WB2ZDP reports an upswing in 2-meter activity but bemoans slow going on 6. WB2VVZ should have his v.h.f. beams back up by now. NYS certificates were issued to W2ANV, W2FEB, W2HYM, W2MTA, W2RUF, K2JBX, K2OFV, WA2BEX, WA2CAL, WB2SMD and WB2YVP. The NYS Net Picnic will be held Aug. 9 at the QTH OF W2MTA. The RARA elected WB2MCP, pres.; WB2MAC, vice-pres.; WB2UDV/W2EMX, treas.; K2OIU, secy. New RAGS officers are K2PTH, pres.; WB2VBK, 1st vice-pres.; WA2DAD, 2nd vice-pres.; WB2VHT, secy.; WB2QKQ, treas. W2WS is undertaking an ambitious project of preparing a listing of all amateurs in Western New York. He is in need of volunteers to help him with this enormous task. W2JIT has held his ticket for 57 years. The NYS traffic total for Mar. was 481. K2IMI and WA2FOR had perfect attendance in ESS for Apr. W2FR, K2KQC and WB2YQO made the BPL. The section is in need of more qualified OOs and OBS! If interested, let me know. Please be sure to get your reports to me by the fifth. Traffic: (Apr.) WA2CAL 435, W2OE 341, W2RUF 237, WA2BEX 167, WB2SMD 149, K2RYH 132, WB2YQO 125, WB2VND 119, W2MTA 109, WB2HLI 108, K2UIR 61 W2FER 55, W2RQF 40, WB2ZDK 29, K2VCZ 26, WB2VSL 26, WB2WGF 25, W2PRY 24, WA2HSB 23, W2PVI 19, K2KIR 18, WB2RWR 18, WB2YEE 16, WB2NZA 14, K2IMI 13, WB2OYE 12, WA2GLA 10, K2DNN 8, K2OFV 8, W2CFP 7, WA2HSU 6, WA2IQH 4, WN2ICU 3, W2EMW 2. (Mar.) K2RYH 67, W2AFB 28, WA2ILE 24, WA2HSB 22, WA2ANE 8, K2AYQ 8.

WESTERN PENNSYLVANIA—SCM, John F. Wojtkiewicz, W3GJY—SEC: W3KPJ. PAM: W3WFR. RMs: WA3AKH, W3KUN, W3MFB, W3NEM. Traffic nets: WPA, 0000 GMT 3585 kc. daily. K3AHT enjoys contesting from K3HKK, club station of the Nittany ARC. Congratulations are in order for W3TZM, who acquired his Amateur Extra Class License W3ZJZ shows 100 percent check-in into the Washington County AREC Net. WA3JDT will study electrical engineering at Youngstown State U. K3SIW accepted employment with the Westinghouse Corp. at Baltimore. W3YA and W3KZF suffered heart attacks. Radio takes a back seat but not on the new Honda WA3DBN is sporting. W3KSI is recuperating after a brief stay in the hospital. W1HDQ, from ARRL Hq., was the guest speaker at the Steel City ARC. WA3HPP purchased a new Galaxy V. To all those stations who checked in, net controls and visitors to the Keystone Slow Speed Traffic Net (KSSN) during the past traffic season, many thanks—WA3AKH, net manager. Plan to operate in Canada this summer? If so, write to the Post Office Dept., Century Bldg., Lisgar St., Ottawa, Canada, for permission. Apply well in advance. The Two Rivers Fest will be held at the Balkan Hotel grounds, McKeesport July 27. WA3FFS has a TV transmitter operating on 440 Mc. WN3LLX has become a member of the Rag Chewers Club. K3OLG and WN3JXA were joined in holy matrimony. Nittany ARC members are providing communications again for the annual Firemens Parade at State College. This provides for good public relations for amateurs in that area. Amateurs interested in civil defense communications should write to Otto L. Schuler, K3SMB, Radio Officer, Office of Civil Defense, 417 Allegheny Bldg., 429 Forbes Ave., Pittsburgh, Pa. 15219. He also is EC for Allegheny County. WA3AKH is mobiling for the summer. New appointments: WA3JBN as OO. Endorsements: K3GEO as OO; K3SJS, W3SMV, W3UHN as ORSs; WA3GQJ, K3OTY as OPSs. Check the expiration date on your license. Traffic: (Apr.) WA3IPU 208, K3ZNP 160, W3LOS 136, WA3AKH 99, K3EXE 89, W3GJY 75, W3MFB 71, W3KUN 42, K3SMB 42, K3HKK 37, WA3DBV 14, WA3GTE 12, WA3HSI 9, K3HCT 8, K3SJN 8, K3SJS 4. (Mar.) K3HCT 19.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—SEC: W9RYU. PAMs: WA9CCP and WA9PDI (v.h.f.) Cook County EC: W9HPG. Net reports:

Net	*Freq.*	*Times*	*Days*	*Tfc.*
IEN	3940 kc.	1400Z	Sun.	no report
ILN	3760 kc.	0100Z	Daily	153
NCPN	3915 kc.	1300Z	Mon.-Sat.	323
NCPN	3915 kc.	1800Z	Mon.-Sat.	
III PON	3915 kc.	2245Z	Mon.-Fri.	626
III PON	3915 kc.	1430Z	Mon.-Fri.	

111 PON	145.5 Mc.	0200Z	M.W.F.	147
TNT Net	145.35 Mc.	0300Z	Sun.-Fri.	284

K9IFE, W9HSD, W9DY/GFF, W9WYB, K9RAS, W9JU/K9OSO, W9MKL, W9VOX, WA9TLT, W9RWD, W9-REC, WA9NHB, W9CAA, W9DGV, K9KEP and K9KRW in the League's latest Frequency Measuring Test. K9NBH has been appointed an Official Relay Station and an Official V.H.F. Station. W9CWH is experimenting with RTTY. The 9RN time has changed to 0045Z for the early session and 0230Z for the late session. WA9IVL has taken a YL, with K9GHR and K9DTB as witnesses. W9MEP reports that the Whiteside County ARC has monthly emergency tests. WA9YQT's new QTH is Chester, Ill. W9VBV received his Extra Class license. WB9ALS has moved to Alabama. WN9BCS is a new Novice call. WA9ZRV is now a General Class licensee. WA9ABK is now back on the air with an SB-101 and an Advanced Class ticket. W9LNQ has been enjoying his TR-4, especially FB in the contests. WA9TCW has his 2-meter antenna back in operation. A new Novice heard from Barrington is WN9BCS. WA9YFH and K9RAS have a new harmonic, born Apr. 8. K9IDQ, K9HDZ and K9QFR are directors/officers of the newly-chartered Sangamon Valley DX Association, Inc. WA9QBM received his DXCC certificate. WA9WZW and WA9SLT received their General and W9OKI his Advanced Class licenses. WN9BCX and WN9BCY are new Novices. Our sympathy to the family and friends of K9VGT, of Lombard, who recently passed away. FB meetings and eyeball QSOS were held at the Central Division Convention in Indianapolis, Indiana. The Bank of Rantoul, (Rantoul, Illinois) had an amateur radio display in the bank for Amateur Radio Week proclamation. W9IWI and K9VBK were elected pres. and vice president of the Amateur Radio News Service. The Breakfast Club Hamfest will be held Sat. and Sun., July 19 and 20th, at Terry Park in Palmyra, Ill. WA9AKR is the only BPL certificate recipient this month. Traffic: (Apr.) WA9AKR 620, W9HOT 212, W9NXG 166, K9AVQ 162, WA9TUM 159, WA9OTD 111, W9JXV 103, W9DOQ 82, WA9ZUE 60, WA9WNH 48, WA9BRQ 40, WA9LDC 34, WA9NZF 33, W9LNQ 20, W9PRN 20, W9YH 19, K9RAS 14, WA9KQD 12, WA9UXF 11, WA9QXT 4, K9HSK 3, K9IDQ 1. (Mar.) W9JXV 94, WA9QBM 93, K9RAS 34, K9WMP 14.

ILLINOIS QSO PARTY

August 2-3, 1969

The Radio Amateur Megacycle Society, Inc. (K9CJU) announces that the seventh annual Illinois QSO Party will be held from 1600 GMT August 2 to 2200 GMT August 3, 1969. *Rules:* 1) Use all bands, c.w. and phone; all voice modes classified as phone. The same station can be worked and counted for a QSO point on each band and each mode. i.e., a c.w. and a phone contact on the same band with the same station will count for two points. 2) Illinois stations score 1 point for each contact with stations either in or out of Illinois. All others score 1 point for each contact with an Illinois station. 3) Ill. stations multiply total QSO points by the total number of states, Canadian provinces and ARRL countries worked. All others multiply total QSO points by the total number of different Illinois counties worked. NOTE: U.S.A., Canada, Hawaii and Alaska count as separate countries and Hawaii and Alaska also count as states. 4) Illinois stations give QSO number, RS(T) and county. Others give QSO number, RS(T), state, province or country. 5) Suggested frequencies: 1815 3560 3735 3900 7060 7115 7260 14,060 14,275 21,060 21,110 21,360 28,060 28,700 kHz. and 145.2 MHz. 6) In Illinois, single and multiple-operator stations compete in separate categories with certificates issued for first, second and third place winners in each category. Outside Illinois, a certificate will go to the high scoring station in each U. S. state, Canadian call area and each country provided that at least two valid entries are received from said region. Other certificates may be issued at the discretion of the contest committee. Decisions of the contest committee are final. 7) Logs are to show: dates in GMT, stations worked, exchanges, bands, modes and claimed score. Operator's name must be clearly printed and log must show whether single or multiple operator. 8) Logs must be postmarked no later than Sept. 1, 1969 and mailed with adequate postage to the Radio Amateur Megacycle Society, K9CJU, 3620 N. Oleander Avenue, Chicago, Ill. 60634. If a summary of contest scores is desired, please enclose a business-size s.a.s.e.

INDIANA—SCM, William C. Johnson, W9BUQ—Asst. SCM: Mrs. M. Roberta Kroulik, K9IVG. SEC: W9BUQ.

Nets	*Freq.*	*Time*	*Apr. Tfc.*	*Mgr.*
IFN	3910 1330Z	Daily 2300 M-F	269	K9IVG
ISN	3910 0000Z	Daily 2300Z S-S	455	K9CRS
	2130Z	M-Sat.		
QIN	3656 0100Z	Daily	188	WA9FDQ
Ind. PON	3910 1245Z	Sun	3	K9EFY
Ind. PON V.H.F.	50.7 0200Z	Mon.-Thurs.	271	WA9NLE

With deep regret I report W9CSH, of Kokomo and K9LXY, of Kokomo, as Silent Keys W9KMY, Kokomo Radio Club *secy.*, reports that there is a lot of 6-meter activity going on now. W9HWR is visiting in Washington, D.C. W9GUK is on the air with an HW-100. K9ULU and family left for Belgium via Iceland in May. The IRCC Hamfest/Picnic will be held at the Brow-county State Park Sun., July 13, 1969. W9NTP gave a talk on amateur TV at the Purdue ARC. K9FZU always sends in his bulletin sked. W9GZB is sporting a *new two-letter call*, W9GT; also he has his Extra Class license. Because of the time change there is some confusion about the net time. All evening nets are on GMT. The morning nets are on GMT but start one hour early as some net members have to leave for church and would not be able to check in. W9BUQ will be on amateur TV soon and is going to work more v.h.f. K9CRS is home from the hospital and doing all right. I attended the Dayton Hamvention but did not get to see all of you who were there. W9SST has a new Cadillac Eldorado with his mobile. W9UEM is back from Florida. W9SVL is back in the States. W9DZC, NC IPN on Sun. morning, runs the net from almost any place as he does a lot of traveling in his Camper. QIN Honor Roll: K9VHY 26, W9JBQ 22, WA9HAG 18, K9HYV 16, WA9MTY 15, W9QLW 15. *Amateur radio exists because of the service it renders.* BPL certificates went to W9JYO, W9FWH, W9EQO, W91CU, W9JBQ and WA9QOQ. W9PMT, mgr. of the Hoosier V.H.F. Nets, reports Apr. traffic as 105. Traffic: (Apr.) W9JYO 1625, W9FWH 613, W9EQO 557, W91CU 383, W9HRY 279, K9IVG 261, W9JBQ 237, WA9QOQ 161, K9FZX 125, K9STN 98, WA9PQM 86, K9HYV 75, W9QLW 71, W9BUQ 65, K9VHY 51, WA9TJS 47, K9KTB 41, WA9VBG 41, WA9VZM 39, K9EFY 36, WA9KOH 36, WA9WME 28, W9CMT 25, K9RWQ 25, K9WGN 24, K9ILK 23, WA9GJZ 21, W9YYX 21, WA9AXF 20, W9DZC 17, W9SNQ 16, W9HWR 15, WA9BHG 13, K9CBY 12, K9FUJ 12, W9LG 11, WA9JIX 10, WA9OAD 9, K9JQY 7, W9FC 6, W9RTH 6, W9PMT 5, WA9QEQ 5, W9ENU 2. (Mar.) W9JBQ 180, WA9VZM 158, W9QLW 145, W9HYV 132, WA9PQM 86, WA9MXG/9 41, WA9GJZ 22, WA9KOH 22, W9CMT 20, WA9WME 18, W9BDP 3.

WISCONSIN—SCM, Kenneth A. Ebneter, K9GSC—SEC: W9NGT. PAMs: K9DBR, WA9IZK, W9LVC, W9NRP, WA9QNI and W9AYK. RMs: K9KSA and W9DND.

Nets	*Freq.*	*Time*	*Days*	*QNI*	*QTC*	*Mgr.*
BWN	3985 kc.	1245Z	Mon.-Sat.	465	165	W9AYK
BEN	3985 kc.	1700Z	Daily			W9LVC
WSBN	3985 kc.	2200Z	Daily	1562	363	WA9QNI
WIN	3662 kc.	0300	Daily			W9DND
WSSN	3780 kc.	2330Z	Daily	178	40	K9KSA
WRN	3620 kc.	0030	Sun.	25	2	K9GSC
SW2RN	145.35 Mc.	0130Z	Daily	255	27	WA9IZK
SWRN	50.4 Mc.	0200Z	Mon.-Sat.			K9DBR

A net certificate went to W9EMC for WSSN. New appointments: W9ZBD as EC for Dane county; W9AYK as PAM for BWN. Renewed appointments: W9ESJ as OPS, W9YT as ORS, WA9SAB as OBS, K9OSC and W9VSO as OOs, W9NRP and WA9IZK as PAMs, W9BZU, K9UTN, W9CFS, W9ONI, W9UFY and WA9IZK as ECs. *BPL certificates for Apr. traffic* went to W9-CXY and W9ESJ. FMT results: WA9WTM 9.9, W9EQ 1.2, W9BCY .3 p.p.m. error. K9KSA has a new SB-301 and an SB-401. W9RQM has his Extra Class license and operated in the DX Contest as /KH6. WA9RTH has a new General Class license, a Swan 500C and a new baby daughter. K9OSC has added a 75S-3 to his station. WN9AJL passed the General Class exam. WA9THF reports a new FL200B and an R390. Traffic: (Apr.) W9CXY 606, W9ESJ 372, K9CPM 276, W9DND 243, WA9QKP 180, WA9RAK 83, K9FHI 74 WA9TXN 71, WA9QNI 70, W9DXV 67, W9AYK 62, K9TBY 62, W9KRO 60, K9WRQ 57, W9IRZ 50, K9JPS 50, WA9PKM 47, W9RTP 44, K9KSA 41, K9GSC 37,

K9PKQ 29, WA9UMT 27, W9BCH 21, WA9UNN 20, WA9THF 19 K9LGU 18, W9NRP 16, W9RQM 14, WA9HFB 4, K9GDF 3, WA9SAB 3, K9ZMS 3. (Mar.) K9JPS 33, W9RTP 26, WA9WOC 20, K9DHN/9 8.

DAKOTA DIVISION

MINNESOTA—SCM, Larry J. Shima, WØPAN—SEC: WAØMZW. PAMs: WAØMMV, WAØHRM, WAØOEJ, KØGYO. V.H.F. PAM: WAØDWM. RMs: WAØIAW, WAØRRA. WØ QSL Bureau: WØDMA. New appointments: KØGYO as MISTN PAM, WØBE, WAØJPR as ORSs. Volunteers are needed to fill Official Observer appointments. Four years amateur experience is required. The many stations that assisted with the recent flood traffic are to be commended for their fine work. More than 200 stations participated. The Twin City Repeater Association, with WAØPVF as chairman, is setting up a 2-meter t.m. repeater. Scout groups are invited to check into the Scout Ham Radio Net, 21,360 kc. Sat. at 1800Z. WØPAN visited ARRL Hq. while on a recent trip East. Clubs: Please send the SCM news on meetings and activities. Traffic: (Apr.) WØAA/Ø 1769, WAØVAS 1356, WAØOEJ 363, WAØTHI 358, WØKYG 284, KØMVF 159, KØZRD 157, WØBUC 149, WAØIAW 136, WAØJRA 135, WØHEN 93, WAØMMY 87, WAØOEF 87, WAØRRA 84, KØIJL 66, WAØEPX 57, WAØTQT 49, WØPAN 42, WAØLAC 31, WAØONS 31, WØAAU 28, WAØEPG 26, WAØODB 24, KØFLT 21, WØEQO 16, WAØJPR 16, WAØRKF 15, WAØRKV 13, WAØTLN 12, KØCSE 11, WØKLG 11, WAØLIS 10, WAØEWK 7, WAØPMM 7, WAØDFT 6, WØKNR 6, KØWXH 6, WAØRXM 5, WØTCK 5, WØUMX 5, WAØCJU 4, WAØGMX 2, WØSZJ 2, KØZWG 2, WAØPSI 1, WNØYAH 1. (Mar.) WØAA/Ø 957, WØAZR 83, WØHEN 49, WØATO 31.

MINNESOTA QSO PARTY

July 20, 1969

All radio amateurs are cordially invited to participate in the fourth annual Minnesota QSO Party, sponsored by the Viking Amateur Radio Society.

Rules: 1) Contact will be between a Minnesota station and a station outside of Minnesota, or between two Minnesota stations. Valid contacts may be made once on c.w. and once on phone, on each band, unless one station changes his location such that he would provide a new multiplier. 2) Time periods are as follows, in GMT: Phone operation 0000 to 0400, and 1600 to 2000. C.w. is from 1200 to 1600, and 2000 to 2400. 3) Suggested frequencies: C.w.—3580 7080 14,080. Phone—3880 7280 14,280 21,380 and 29,600 (channel 60). Contacts on any other bands or frequencies are valid and are encouraged. On all bands, but especially on 75 and 80, please listen carefully for nets and avoid them. 4) Scoring for Minnesota stations: Multiply total QSOs times your multiplier which is the total number of different ARRL sections and countries worked on c.w. PLUS the total number of different ARRL sections and countries worked on phone. Minnesota may be counted as a section, if worked. Countries must be listed on the ARRL countries list and may not include or be a part of any ARRL section. 5) Scoring for stations outside of Minnesota: Multiply total Minnesota QSOs times your multiplier, which is the total number of different Minnesota counties worked on c.w. PLUS the total number of different Minnesota counties worked on phone (possible 87 on each mode). 6) Exchange: Minnesota stations send QSO number, RS(T), and county. Others send QSO number, RS(T), and section or country. 7) First place award certificates will go to the highest scoring station in each section or country, provided that station makes at least 5 QSOs, and to the highest scoring station in each Minnesota county, provided that station makes at least 20 QSOs. Certificates will also be sent to the highest scoring Minnesota station and the highest scoring station outside of Minnesota. 8) Logs must contain all of the contact exchange information, plus date, time, band, mode, multiplier lists, score computations and section or county. Logs must be postmarked on or before Aug. 11, and a self-addressed stamped envelope should be enclosed with U.S. entries if certificates or the published results are desired. 9) Send logs to: Viking Amateur Radio Society, Box 3, Waseca, Minnesota 56093.

NORTH DAKOTA—SCM, Harold L. Sheets, WØDM—SEC: WAØAYL. OBS: KØSPH. PAM: WØCAQ. RM: WAØRSR. KØTYY had a bout with pneumonia and was in the hospital. WAØOVW took his trip to Ft. Worth with the Science Fair representatives. WØTNQ is back on the air with a Swan 500C. WAØMND wound up the bowling season by being on a division championship team at the state tournament. The Bismarck Radio Club, WØZRT elected WAØOVT, pres.; WAØTOF, vice-pres.; WØBF, secy.-treas.; WAØRSR and WAØMSJ, co-activity chairmen. Meetings are held the 4th Thurs. at a member's home. WAØLZD spent the time during the flood manning the pumps in his home. KØRSA and XYL made a trip to the Peace Gardens to make arrangements for facilities on the Canadian side for the International Hamfest to be held July 12-13. The Forx Radio Club manned WAØJXT/Ø at the CAP Communication Trailer at the north side reporting the Red River level each hour when needed. Much credit for work during the flood must go to KØSPH, WAØAYL and WAØGRX, who spent long hours at their rigs. WØBF monitored the Minot, Grand Forks and Fargo nets. WØDM stood by the kw. and helped when needed. WAØELO, Ward Co. EC, organized the Minot fellows and with the able assistance of the Minot Air Force group, held down the fort during the emergency. WAØHUD still is doing his stuff on TEN but says traffic is slowing down some.

Net	*Sess.*	*Check-ins*	*Tfc.*			
YL WX	19	373	33	0730 M-F	3990 kc.	WAØGRX, WAØMND
ND CW	19	68	*QNI* 3	2100 M-F	3650 kc.	WAØRSR
160m Goose River	4	60		0900 Sun.		WØCDO
NDPON	12	184	10	1730 CDT Sat. 0900-1730 Sun.	3915 kc.	WAØHUD
NDAKRACES	33	790	155	1830 CDT M-F 1730	3996.5	KØSPH

Traffic: KØSPH 1690, WAØGRX 947, WAØJXT/Ø 338, WAØAYL 217, WAØRWM 163, WAØHUD 139, KØATK 54, KØPVG 53, WØNMV 51, WØDM 46, WØWWL 33, WØBF 23, WAØTBR 23, WØKTZ 13, WØHBR 12, WAØJPT 4, WØCDO 3.

SOUTH DAKOTA—SCM, Seward P. Holt, KØTXW—SEC: WAØCPX. PAM: WAØCWW. RM: WØIPF. Net Mgrs.: WØHOJ, WAØLLG, WAØPNB, WØIPF, WØZWL and WAØOYT. New calls heard on the nets: WAØYFR, WAØTRS, WNØYAK, WAØYSR, WAØSHA and WNØYIN. The Sioux Falls ARC held its Annual Picnic June 2. WØDIY reports progress. His address is Will Rogers Memorial Hospital, Saranac, N.Y. Doc, Ed and Stan are sporting a new Swan Cygnet. WØIT and his XYL are making a three-week trip to Italy. Traffic nets: Morning Net, ½ month, QNI 198, QTC 20, informals 7. NJQ Net, QNI 354, QTC 33, informals 46. Late Net, QNI 1264, QTC 32, informals 146. There is a definite lack of reports. Your SCM would appreciate any news and reports. Traffic: WAØPNB 138, WØIG 38, KØAIE 26, WØHOJ 15, WØDJO 9.

DELTA DIVISION

ARKANSAS—SCM, Robert D. Schaefer, WA5IIS—SEC: W5PBZ. RM: W5NND. PAM: WA5PPD. K5AKS is conducting a code class for the Northeast Arkansas Amateur Radio Society. WA5SGW, WA5VBE and WA5WMJ participated in the Feb. FMT. W5EC is a Silent Key. WA5NFY passed the Advanced Class test. W5PBZ passed the Extra and made CP-25.

Net	*Time*	*Freq.*	*Tfc.*	*QNI*	*Mins.*	*Mgr.*
RN	2330Z	3995	46	529	463	WA5PPD
OZK	0000Z	3790	31	248	613	W5NND
Teenage	2230Z	3995	19	258	632	WA5QMQ
APN	1100Z	3937	8	476	1348	W5VFW

Top stations on OZK were W5NND 28, W5QOO 24, WA5NOC 18, WA5TLS 18, WA5QCI 17, K5EDH 16, W5MYZ 16. WA5TLS is now putting out an OZK Bulletin. W5MYZ is moving to Louisiana. Bob has been one of our hardest working traffic men. Traffic: W5ORD 713, W5NND 198, WA5QMQ 33, WA5KEF 29, WA5TJB 25, WA5RCK 22, W5PBZ 18, W5RIT 4, WA5TLS 2.

LOUISIANA—SCM, J. Allen Swanson, Jr., W5PM SEC: W5OB. RM: K5ANS/5. V.H.F. PAMs: WA5DXA, W5UQR. Don't forget the Alexandria Banquet and Hamfest Aug. 2 and 3. The Southwest La. ARC has cancelled its Fish Fry because of conflicting dates. The 5th Annual BRARC Banquet and Hamfest is now history but many pleasant memories will linger on.

Beneath this calm exterior lurks... Supertetrode!

Eimac's sensational new water cooled 50 and 100 kW tetrodes are the world's finest for high power applications. They're ideal for transmitters in HF, FM and broadcast bands, for over-the-horizon radar, distributed amplifiers, high energy physics and high power voltage regulation.

Both tetrodes feature transconductance double anything even we've been able to offer. They have greatly reduced cathode lead inductance and a unique re-entrant anode, permitting a shorter stem and lower input capacitance. Feedback capacitance also is much lower, simplifying tube neutralization and eliminating any need for a neutralization circuit. In both tubes the screen base is designed to serve as an electrostatic shield.

These tubes have 4 to 5 dB higher gain than comparable tetrodes, yet are very compact. The 4CW50,000E (50 kW model) weighs only 35 pounds. It has 310 pF input capacitance, 52 pF C_{out} and 0.6 pF feedback capacitance. The 4CW100,000E weighs 50 pounds, has 349 pF C_{in}, 60 pF C_{out} and 0.8 pF C_f. For data and application assistance contact your nearest Varian/Eimac distributor or ask Information Operator for Varian Electron Tube and Device Group.

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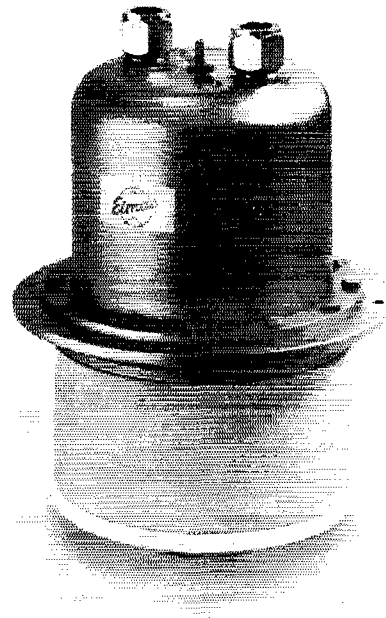

Ted Henry needed a rugged linear triode. So he came to us.

Two rugged Eimac 3-500Z high-mu triodes are featured in Henry Radio's new 2K-3 linear amplifier. Henry designed the amplifier around versatile Eimac power tubes because these popular triodes are ideal for grounded-grid operation at the 2 kW PEP SSB input level, and at the 1 kW DC input level for CW, AM and RTTY. Users of this new Henry rig will enjoy a conservative plate dissipation rating of 1000 watts for year-in, year-out reliability under key-down service. Henry's choice should be your choice. For more information on the 3-500Z and on Eimac's line of power tubes for advanced transmitters, write Eimac Amateur Services Department or contact your nearest Varian/Eimac distributor.

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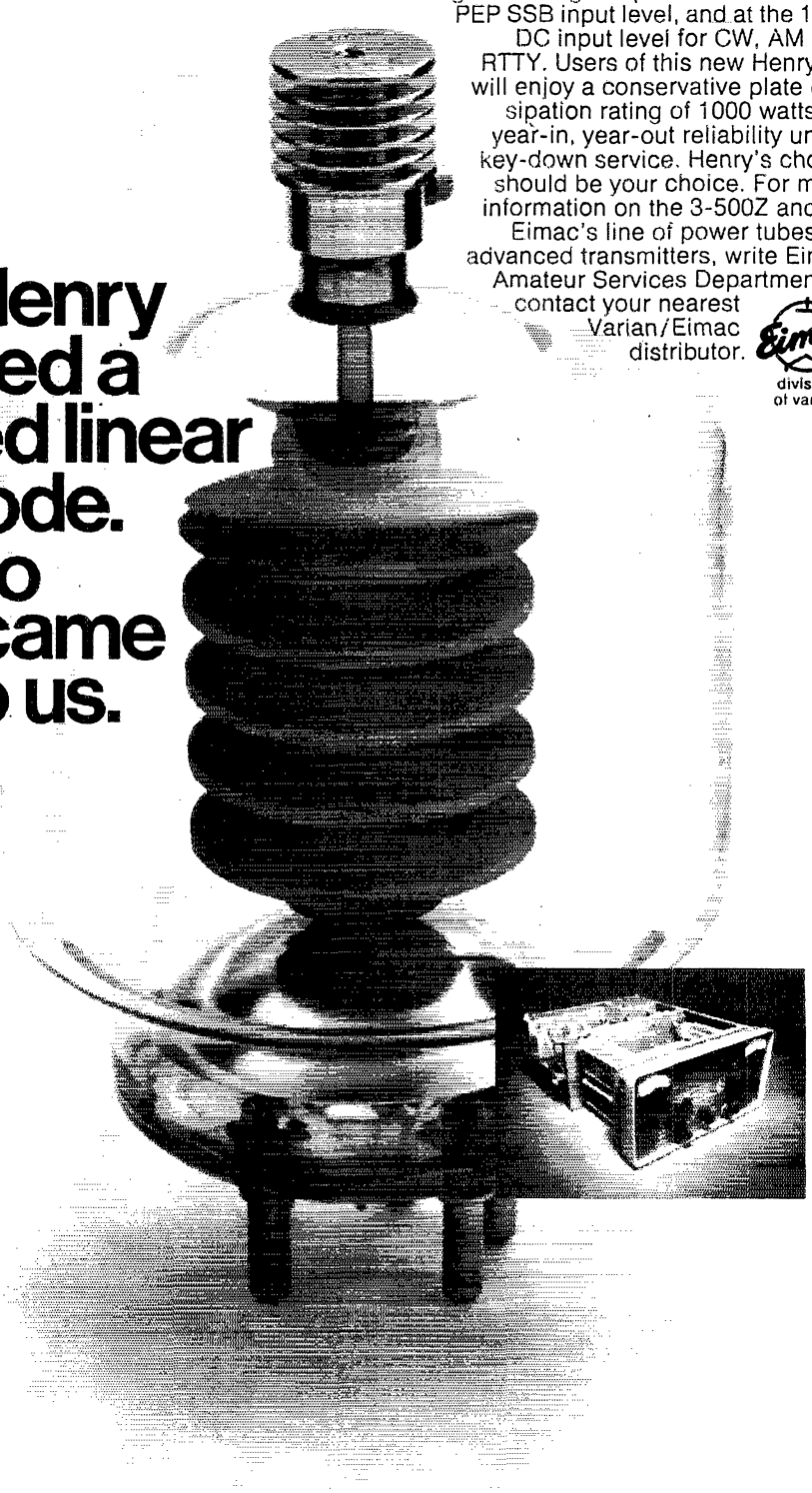

W4YEW soon will take over duties as the new Navy MARS District Director. K5ARH, newly-elected LARC prexy, is hard at work on plans to increase club interest during the months ahead. The GNOARC recently heard a Ma Bell Engineer discuss "Foreign Attachments" tariffs and regulations, including phone patches. The Lafayette gang, it is rumored, did an outstanding job in the recent cancer drive up that way. W5WMU was a repeat winner in the La. QSO Party. Lindsey Torbett, call not known here, gets a bow tor going from Novice through Advanced Class in one sweep! The CLARC reports a repeater is under test on 2 and soon will be in operation. WA5OVX and her OM, W5FMO, are copying PX and ARRL skeds preparing for the Extra. W5GHP spends many hours with RTTY on Navy MARS. Incidentally your SEC is now W5OB, ex-W5BUK. W5MI has been selected as TCC Operator of the year (1968) (Central Division) and his plaque says "Transcontinental Corps Central Area Operator of the year 1968." WA5WBZ says his matching network works FB 80 through 10. Army MARS had a fine meeting in Opelousas recently, according to W5CEZ, State Director. The Bastrop gang will work again this year in the Cerebral Palsy Telethon. WA5QVN, in Monroe, reports that the recent classes for Novice produced 28 new hams! W5GZR has earned his coveted net certificate. K5ANS/5 is setting up an incentive system for LAN with the winner to be presented a trophy. Incidentally, W5GHP and K5ANS/5 have started an autostart RTTY Net. Interested RTTYers should contact either for details. Traffic: W5GHP 173, W5MXQ 166, W5MI 131, W5CEZ 128, K5ANS/5 92, WA5WBZ 52, W5EA 28, WA5QVN 24, WA5OJG 1.

MISSISSIPPI—SCM, Clifton C. Comfort, WA5KEY—SEC: WA5JWD. This is the third month in a row that tornadoes visited our state. On the 13th there were 8 known, on the 17th overhead sightings with hail and flooding, on the 23rd 3 more sightings with one touching down. Plans are being worked out for an AREC weather net covering several states leaving RACES frequencies for use by the respective states between affected emergency areas and their state Hq. Contact SEC WA5JWD for or with information. WA5SIM is now Advanced class. Congrats to W5LL on his new two-letter call. WA5IXC and W5HTV have established solid 2-meter contact between McAdams and Jackson and are looking for others to join them. KL7EGM visited WA5UDQ. K5VQA is a proud papa and K5UAK is a proud grandpapa. New Novices are WN5WOJ, WN5YGW, WN5YIR. New Generals WA5-WUX, WA5UYW and WA5YJA. Thanks for the concern and phone patches while my XYL was in the hospital. Check into our nets when ever possible. GCSBN, 3925, 2230Z daily. W5JHS net mgr.; MSBN 3990, 0015Z daily. WA5SIM, net mgr.; RACES, 3987.5 Sun. 0745 CDT. K5IZS State RO. Traffic: WA5FII 39, WA5JWD 33, WA5SIM 15, WA5SEG 11, WA5WJP 11, WA5IXC 6, WA5SKI 3.

TENNESSEE—SCM, Harry A. Phillips, K4RCT—SEC: W4WJH. PAMs: W4PFP, WA4YBT, WA4EWW, WA4CRU. RM: WB4GSS.

Net	*Freq.*	*Days*	*Time*	*Sess.*	*QNI*	*QTC*	*Mgr.*
TSSB	3980	Mon.-Sat.	2230Z	26	1207	118	WA4YBT
TPN	3980	M-Sat.	1145	30	1322	71	W4PFP
		Sun.	1300				
ETPN	3980	M-F	1040	22	568	23	WA4EWW
TCN	3980	Thurs.	0100	5	53		W4TYV
TPON	3980	Sun.	2330	4	125	29	K4RTA
TTN	7290	Daily	2100	30	487	153	WA4CRU
TN	3635	Daily	0000	30	246	117	WB4GSS
TSN	3635	M-W-F	2300				WB4GSS
ETVHF	50.4	M-W-F	2300	13	168		WA4TJJ
ETVHF	145.2	Tu.-Th.	2300	9	54		WA4TJJ

I was very pleased with the interest shown by the Oak Ridge Club during my April visit. During my trip to New Orleans I enjoyed visiting the GNOA Club on Apr. 25 and the Jefferson Parish Club on Apr. 27. Congratulations to WB4EAB, Delta ARC "Ham of the year". W4VJW NCS TPN, had low net participation one morning when he called the net without an antenna. W4KQL has added a linear ad a 90-ft. tower. WN4LHO is after Africa for WAC. WB4GTI has been chasing DX on 20. WB4JDD got WAS. Congratulations to W4HHK and W3GKP on their successful moonbounce test on 2304 Mc. How's that for DX? Remember the Crossville Hamfest July 19 and 20. Bring your appointment certificate for endorsement. Traffic: W4OGG 247, K4AT 184, WB4GSS 116, W4WBK 84, W4KQL 76, WA4CRU 64, W4SQE 59, WA4UAZ 53, WB4DGI 49, WB4DJP 33, WA4GLS 29, W4PFP 26, WB4HYY 24, W4CYL 19, WB4GTI 16, WB4JDD 16, WB4DYJ 14, WB4HLH 12, K4LTA 12, WA4WVW 12, WB4ANX 10, WA4CQK 10, W4LHE 10, WA4YON 10, WA4YEM 9, WA4NEC 8, K4AMC 7, WB4EHK 6, WA4ZXZ 6, W4WJH 3, WA4EWW 2, WB4IMS 2, W4VJ 2.

GREAT LAKES DIVISION

KENTUCKY—SCM, George S. Wilson, III, W4OYI—SEC: W4VYS. Appointments: WB4FDK, WB4KPE as ORSs; WB4FLA, WA4GHQ, WA4MXD, W4OTP, K4TRT as OPSs. BPL: WA4DYL.

Net	*QNI*	*QTC*	*Net*	*QNI*	*QTC*
KRN	400	34	KYN	425	690
MKPN	384	97	FCATN	174	156
KTN	824	334			

Don't forget the Louisville (Great Lakes Division) Kenvention Aug. 29, 30 or the Henderson gala Sept. 14. Our nets are all something to be proud of. Join one. One Kentuckian recently heard an out-of-stater, who should know, holding up one of our nets as a model. A Louisville 6-meter RTTY link is expediting traffic between nets. We're all glad to hear W4ISF's big signal again. W4CID made WAS after 12 years. WB4FDK has a new beam, 85-ft. tower and lots of DX cards. WB4FLA is justly proud of his CP 30. Owensboro airport needed that new control tower, what with W4-EWM, W4OYI, WA4VIR and WA4EBP flitting about. If you get a KSP air-spotter speeding ticket, you may have been clocked by WA4GSB, "The Flying Fuzz" to his friends (*only* to his friends). This was another plus month for traffic, appointments and AREC membership. Traffic: (Apr.) WA4DYL 625, WA4VUE 451, W4-BAZ 236, WB4HUS 234, WB4KPE 166, W4OTP 165, W4GVU 152, WA4AGH 151, WB4HQW 140, W4OYI 92, K4MAN 82, WB4EOR 77, WA4VZZ 66, WA4WWT 61, W4UK 49, WB4FDK 46, WB4FLA 45, WB4LIV 43, W4NBZ 40, W4KJP 36, WB4AIN 35, K4AVX 31, WA4-MXD 30, WB4HFY 29, K4VDO 26, K4UMN 20, K4-FPW 17, W4VYS 16, WA4MEX 13, WA4GMA 12, W4SZB 12, WB4GCV 11, K4TRT 11, K4HOE 10, WB4HTN 10, K4YCB 10, W4MWX 5. (Mar.) K4CSH 85, W4NLO 54, W4CID 36, WB4FDK 34, W4MWX 7, WA4MEX 5, W4ISF 2. (Feb.) WB4HUS 31.

MICHIGAN—SCM, Joseph L. Pontek, K8HKM—SEC: W8MPD. RMs: W8FWQ, W8RTN, WA8OGR, K8KMQ, W8IXJ, W8GAI. PAMs: K8GOU, K8JED. V.H.F. PAMs: W8CVQ, W8YAN. Appointments: WA8-NLC as ORS; W8QPO as OPS; WA8PHL and W8AGQ as ECs. Silent Key: WA8KRH and K8CYD's son passed away.

Net	*Freq.*	*Time*	*Days*	*QNI*	*QTC*	*Sess.*	*Mgr.*
QMN	3663	2300	Dy	933	521	83	W8FWQ
WSSB	3935	0000	Dy	868	174	30	K8WRJ
PON-DAY	3935	1600	M-Sat.	487	428	26	K8LNE
PON-CW	3645	0000	M-Sat.	126	32	26	VE3DPO
BR/MEN	3930	2230	M-F	587	166	26	K8LJS
GLETN	3932	0230	Dy	909	103	30	WA8ONZ
M6MTN	50.7	0000	M-Sat.	154	41	26	WA8LRC

The section owes W8FX our best for ten years of outstanding service as SCM. If I get the same cooperation, Michigan can't help but remain the No. 1 section. You can catch me on most nets at one time or another. New officers: The Amateur V.H.F. Assn.—W8UAO, pres.; W8MBH, vice-pres.; WA8VTK, secy.; W8VRU, treas.; W8DDO, W8JXU, dir. SVARA—W8IZ, pres.; K8IIB, vice-pres.; WA8ILU, secy.; K8LNR, treas.; W8CTY, W8KNB, WA8GRI, dir. WB8DEG, from Wayne, holds the call DL5DJ while stationed in Germany with the Army. WA8QCW is now a home-owner. WA8LYF's contest crew is planning a summer crop of big antennas. The Soo Club would like to hear from old members who have left the area. The WB8CQM, Lansing, repeater is in operation. Congratulations to K8BZV on receipt of the Ziengenbien Award. The Blossomland ARA received excellent publicity. Send me a copy of your club's coverage. WB8DNI now is General Class and WA8FOC and WB8AAX now Advanced Class. Keep those Form 1s and letters coming. Traffic: (Apr.) K8LNE 592, WA8WZF 559, K8KMQ 272, W8JTQ 230, W8NOH 189, W8GAI 158, K8ZJU 143, WA8SQC 131, W8IZ 122, WA8QGI 122; WA8VGQ 116, W8EU 103, W8ACW 82, W8TDA 77, W8MO 71, K8HLR/8 69, W8RTN 65, K8JED 58, K8GOU 57, K8MXC 53, W8BEZ 47, WA8LNC 42, W8FX 33, WA8ONZ 29, K8CKD 27, W8YAN 27, WA8LRC 26, W8IUC 25, W8WVL 20, W8-FWQ 19, W8MPD 18, WA8WGM 15, W8ZBT 13, K8QLL 12, W8UFS 11. K8VDA 11, WA8MCQ 10, W8TBP 10, WA8LXY 8, WB8DKZ 6, WA8ZJM 6, WA8MCQ 5, W8AAM 4, WB8ANR 4, W8HKT 4, WA8LRC 4, W8SH 1. (Mar.) WA8WZF 832, K8HLR/8 36, WA8ZPH 36.

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621 VFO 39
R-S Receiver 39

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Zeus VHF Xmtr 289
Interceptor Rec. 299
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Allbander tuner 69
Venus 6m Xmtr 225
416 AC Supply 75
SS Booster 39
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COLLINS
75A-2 Receiver $219
75A-4 (ser.#601) 325
75A-4 (ser.#3159) 399
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75A-4 (ser.#5162) 449
Speaker (A1, A2, A3) 9
KWM-2 Xcvr 689
351D-2 Mount 75
516F-2 AC Supply 115
516E-2 28v Supply 95
MP-1 DC Supply 119

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2A Receiver $159
2B Receiver 189
2CQ Combo 34
2NT Xmtr 99
MS-4 Speaker 12
TR-3 Xcvr 369
AC-3 AC Supply 65
DC-3 DC Supply 89
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TR-4 Xcvr 439
AC-4 AC Supply 75

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EICO
730 Modulator $ 49
753 SSB Xcvr 129
751 AC Supply 49

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King 500A Xmtr $225
SB-175 SSB Xmtr 59
755A VFO 29
Galaxy 300 Xcvr 129
PSA-300 AC Sup 39
G-300 DC Supply 69
Galaxy III Xcvr 169
Galaxy V Xcvr 239
Galaxy V Mk II 259
Galaxy V Mk III 279
AC-35 AC Supply 65
AC-400 AC Supply 75
RX-2 Special VFO 59
SC-35 Speaker 12
UM-1 Modulator 25
F-3 300 cy. filter 24
Rejector 9
Rejector AC Supply 4

GONSET
Comm I 6m $ 69
GC-105 2m Xcvr 169
2, 6m VFO III 39
6m Linear II 59
6m Linear III 75
G-50 Xcvr 169
911A AC Supply 39
912A DC Supply 39
Thin Pak 19
G-77 Xmtr 39
G-77A Xmtr 49
6m 12v Converter 19

HALLICRAFTERS
SX-62A Receiver $199
SX-100 Receiver 139
SX-101 Mk III 139
SX-101A Rec 189
SX-110 Receiver 99
SX-115 Receiver 269
SX-117 Receiver 199
SX-146 Receiver 189
R-46B Speaker 9
HT-32A Xmtr 249
HT-37 Xmtr 199
HT-41 Linear 175
HT-46 Xmtr 225
SR-150 Xcvr 289
SR-160 Xcvr 169
SR-42 2m Xcvr 119
SR-42A 2m Xcvr 139
SR-46 6m Xcvr 69
HA-26 2-6m VFO 29

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HQ-145C Rec. $149
HQ-150 Rec 139
HQ-170 Rec 169
HQ-170AC (rack) 199
HQ-170AC Rec 239
HQ-170A/VHF 279
HQ-170AC/VHF 289
HQ-180 Rec 239
HQ-180C Rec 249
HQ-180A Rec 339
S-200 Speaker 15
HX-50 Xmtr 175
HXL-1 Linear 225

HEATHKIT
GR-64 Receiver $ 39
SB-300 Receiver 225
SB-301 Receiver 249
XC-2 2m Conv. 15
SBA-300-3 Conv. 15
MT-1 Xmtr 29
TX-1 Xmtr 115
SB-10 SSB Adaptor 75
HX-10 Xmtr 189
HX-20 Xmtr 129
HX-30 6m Xmtr 175
HA-20 6m Linear 95
HW-10 6m Xcvr 139
HW-12 75m Xcvr 89
SB-110 6m Xcvr 249
SB-110A Xcvr 295
SB-401 Xmtr 249
SB-620 Scanalyzer 119
VF-1 VFO 19
HW-16 Novice Transceiver 99
HW-30 (Two'er) 39
GP-11 DC Supply 5
VHF-1 Seneca 139
HP-23 AC Supply 39
SB-600/HP-23 54
UT-1 AC Supply 25
HD-15 Patch 19
IO-12 5" scope 39

JOHNSON
Adventurer $ 25
Valiant II 189
Audio Amplifier 49
Invader 200 225
Invader 2000 475
6N2 VHF Xmtr 85
6N2 VFO 34
6N2 Conv. (28-30) 39
Phone Patch 15
KW Amp w/desk (store pick-up) 575

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V-44 VFO $ 17
TR-106 6m Xcvr 89
V-107 VHF VFO 19
T-175 6/10m Lin 75

LAKESHORE
P-400GG Linear $ 89

LINEAR SYSTEMS
LSA-3 Linear $ 39
500-12 DC Sup 89
250 AC Supply 39
350-12 DC Sup 69
400 Century DC 75

NATIONAL
NC-300 Receiver $149
NC-303 Receiver 239
NC-300-C6 conv. 29
VFO-62 34
NTS-2 Speaker 12
XCU-303 Calib. 19
NCX-3 Xcvr 169
NCX-5 Xcvr 339
NCX-5 Mk II 389
NCXA AC Supply 75
VX-501 Rem. VFO 125
200 Xcvr 239
AC-200 AC Sup 59

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500C Xcvr 389
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XC-50N (30-34) $ 25

TEKTRONIX
545 Scope $1250

TRANSCOM
SBT-3 Xcvr $189
SBA-3 AC/Spkr. 39

UTICA
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650A Xcvr/VFO 99

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City _____

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The items listed below are brand-new and carry the full manufacturers New Equipment Warranty. Some items have been on display, but most are Factory Sealed. NOTE: No trade-ins can be accepted on the close-out items shown below.

BTI	Reg.	NOW
LK-2000 Linear (ND)	$795	$635

EICO	Reg.	NOW
753 Transceiver - kit	$190	$139
751 AC Supply - kit	80	54
752 DC Supply - kit	80	54
752 DC Supply - wired	110	79
720 Transmitter - kit	90	59
722 VFO - kit	45	34
HFT-90 FM Tuner - kit		29
E-3A Metal cover for above		2
ST-97 FM Stereo Tuner - w - wired	139	89
1050 Battery Eliminator & Charger - kit	42	29
526 VOM - kit	16	12
526 VOM - wired	20	16

GALAXY	Reg.	NOW
DAC-35 Deluxe Console	$100	$ 79
SC-35 Speaker	20	18
2000 Linear with Supply - (Factory Sealed)	495	375

MOSLEY	Reg.	NOW
V-5 80-10m Vertical	$143	$ 89
V-3 20-10m Vertical	28	19
RV-4RK Roof Mtg. kit	35	17

MOSLEY		Reg.	NOW
TA-32 2 el., Tri-Band	C R	$ 84	$ 59
TA-32 Jr. (300 watt)	C R	60	45
TA-40K 40m Conv. kit			25
TW-3X 20,40,80m Ant.	C R	23	18
TD-2 40&80m Dipole	C R	50	35

NATIONAL		Reg.	NOW
NCX-200 80-10m Xcvr	N D	$359	$259
AC-200 AC Supply	N D	75	60
NCXA AC Supply	N D	110	90
NCX-500 80-10m Xcvr	N D	399	299
AC-500 AC Supply	N D	95	75
HRO-500 Receiver	N D	1675	1275

SWAN		Reg.	NOW
45 Swantenna	C R	$ 65	$ 45
TV-2 Transverter (14Mc)		295	245
TV-2 Transverter (50Mc)		295	245

TELREX BEAMS	Reg.	NOW
10M-309 3 el.,10m Beam	$ 49	$ 25
6M-624 6 el. 6m (24' boom)	69	49
2M-3846 38 el. 2m (43' boom)		95
2M-1528 15 el. 2m (28' boom)	65	50

N D = New Display
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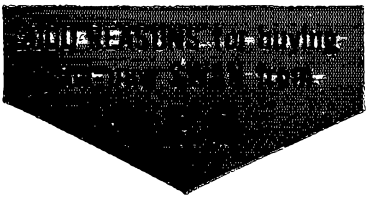

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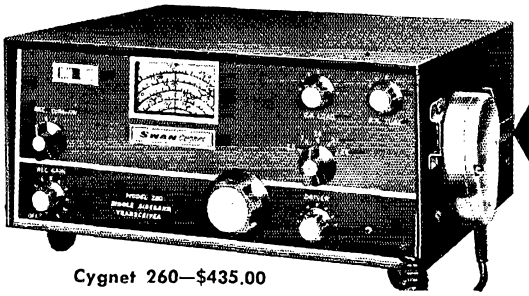

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Purchase any new Swan transceiver or linear at the regular price with no trade-in and you may take a $50.00 Credit toward the purchase of any other merchandise.

LOOK at your low Monthly Payment AFTER JUST $5.00 DOWN

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Balance	Monthly Payment
Up to $300.	$10
$300.01 to 340.	11
340.01 to 370.	12
370.01 to 400.	13
400.01 to 430.	14
430.01 to 460.	15
460.01 to 490.	16
490.01 to 520.	17
520.01 to 550.	18
550.01 to 580.	19
580.01 to 610.	20
610.01 to 640.	21
640.01 to 670.	22
670.01 to 700.	23
700.01 to 730.	24
730.01 to 760.	25
760.01 to 790.	26
790.01 to 850.	28
850.01 to 910.	30
910.01 to 970.	32

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I have the following to trade: (what's your deal?)

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☐ C O D (20% deposit) ☐ Revolving Charge Plan

Name _____

Address _____

City _____

State _____ Zip _____

☐ **Send Reconditioned Equipment Bulletin**

OHIO—*SCM*, Richard A. Egbert, W8ETU—Asst. SCM: Roger Barnett, K8DDG. SEC: W8OUU. RM: W8IMI. PAM: K8UBK. V.H.F. PAM: WA8ADU. Apr. net reports:

Net	*QNI*	*QTC*	*Sess.*	*Freq.*	*Time*	*Mgr.*
OSSBN	1685	917	60	3972.5	1430 & 2245Z	K8UBK
BN	598	383	59	3580	2300 & 0200Z	W8IMI
O6MtrN	433	43	52	50.61	2300Z	WA8ADU
				50.16	0100Z	
OSN	160	60	28	3580	2225Z	WA8VNU
Apricot	240	425	30	51.0	0100Z	K8ONA

BPL certificates for Apr. traffic go to W8UPH and WA8ETX. The *Buckeye Net Bulletin* now carries news of OSSBN and 06MtrN. Subscriptions are available from W8GOE. The Second Annual Ohio Traffic Nets Picnic will be held beginning at 10 A.M. Sat. Aug 2 at WRFD Picnic Park in Worthington. Details available on any of the nets. Congratulations to the Buckeye Net for the peachy Ohio QSO Party. Local nets sending representatives to section nets should have the representatives identify themselves as liaisons upon checking in. Appointments made in Apr.: WB8AKU, WB8AKW and WB8CHW as ORSs; WN8CEH as OVS; WA8ZBU as OBS. Many more station appointment vacancies exist. W8UX advises that the new Awards Chairman for the Ohio Council of Amateur Radio Clubs is K8ITF. New Officers of the Buckeye Belles are K8MZT, pres.; K8CKI, vice-pres.; W8ETT, secy.; WA8QHG, treas. Columbus ARA's ARRL Night with W1IKE, W8WC, W8JSU, W8ETU, K8DDG, W8OUU and W8ERD all on the program was a big success. The Lima Area ARC recently purchased a vehicle for emergency communications. The Dayton Hamvention attracted an estimated 3300 this year with about 600 attending the banquet. The Dayton ARA will hold its Family Picnic Aug. 24 at Variety Park. Springfield ARC had W1HDQ as its speaker at the SARC Annual Banquet Apr. 25. Fairfield County Civil Defense has named K8YRR communications officer and WA8IBT radio officer. Hamilton Co. AREC, with the help of QCEN, furnished communications for the United Clothing Drive in that area. W8AL reports that K8AQU got both a pilot's license and a second son in Apr. New officers of the Genoa RC are K8IDA, pres.; WB8CFZ, vice-pres.; K8VVH, secy.; W8SUD, treas. OBS K8WGJ has been appointed National Director of the USAF MARS Youth Training Program. Congratulations to new Extras K8HBN and WA8VNU, and to new Advanced WA8EKQ. Westpark Radiops claims a score of over 2 million in the 1969 DX Contest. Franklin Co. AREC/RACES has worked out a plan for sharing communications responsibilities with the local CB group. The plan is agreeable to both and eliminates unhealthy competition. WB2LZJ advises that code practice transmissions, using articles from ARRL publications for text material, will be transmitted at 22 w.p.m. 0200 to 0300Z Mon. through Fri. on 7030 kc. This practice is directed toward Extra-aspirants and should be a big help in getting up the code speed. Identification and information will be sent at 11 w.p.m. Note the Novice call among the traffic reports below. Traffic: (Apr.) W8UPH 849, WA8ETX 819, W8IMI 248, W8QCU 184, W8PMJ 161, WA8DWL 156, WB8CHW 154, W8GVX 148, WA8LAM 148, WA8ETW 134, WA8ZTV 131, WB8BZX 121, W8SUS 116, WA8ETK 95, WA8VNU 91, W8GRT 88, W8QZK 87, WA8DUL 71, K8UBK 71, K8QYR 66, W8OE 62, K8ONA 62, K8PBE 59, WB8AKW 57, WA8QFK 57, W8CHT 55, K8LXA 54, W9LRE 51, WA8SED 50, W8QXQ 49, W8VND 49, WA8UPI 48, WA8ADU 47, W8FGD 47, W8GNL 40, WA8OCG 39, W8GOE 37, WA8ZGC 33, WA8YIB 32, K8DDG 29, W8DAE 28, WA8FSX 27, W8OUU 27, WB8BLH 24, W8NAL 22, K8EHE 21, W8ETU 21, W8LAG 21, W8UX 21, WA8SHP 19, K8BYR 17, W8JH 17, WA8NOQ 17, WA8MHO 16, WA8KTN 15, WA8YHN 12, WA8AJZ 11, WN8AKU 11, WA8COA 11, W8HII 11, WA8PZK 11, WA8JEH 10, WN8BCU 9, WA8VVN 8, W8WEG 7, W8AJW 5, WA8MCR 5, K8DHJ 4, K8CKY 3, W8IO 3, W8TV 3, WA8ZBU 2, W8EEQ 1, K8ONQ 1, (Mar.) W8LT 52, K8LXA 23, W8WDU 20, WA8RQQ 15, WA8ZYT 2.

HUDSON DIVISION

EASTERN NEW YORK—SCM, Graham G. Berry, K2SJN—Asst. SCM/RM: Ruth E. Rice, WA2VYS. SEC: W2KGC. PAM: WB2VJB. V.H.F. PAM: WB2YQU. Section nets: NYS on 3675 kc. nightly at 2300Z; ESS on 3590 kc. at 2300Z each night; NYSPT&EN on 3925 kc. nightly. Note net times are one hour earlier until fall. *Appointments and renewals*: ORS to WA2BHN; OBS to WA2BRA; OVS to WA2BAH and WB2ICZ. All appointees: The E.N.Y. CD team has been in action one year this month. Renewal time! *With the clubs*: The Apr. Hudson Council meeting saw representatives from Albany and Schenectady on deck, plus 25 other clubs in the division. The night before, Director W2TUK and Vice-Director K2SJO attended the Albany Club meeting. The HARC soon will have a newsletter for all clubs. Secretaries of member and non-member clubs, please send news items to K2IES for inclusion. The RPI Club (W2SZ) reports its first 1215-Mc. contacts and VHF DXpedition (!) to Mt. Greylock for a total of 65 contacts. The New Rochelle Club class of 30 now is halfway through its 1969 theory course. *On the bands*: WB2AAL's Sat. net (14,255 Mc. at 1900Z) is being heard in the section. WB2LXJ is running ARRL-approved c.w. practice on 7030 kc. Mon.-Fri. at 0200Z; IDs and information at 11 w.p.m., text at 22 w.p.m. aimed at would-be extras. The NYSPT&EN '69 Picnic is scheduled for Chenango State Park Aug. 16. Details available from WB2VJB, Asst. Net Mgr., or on the net (see above). Congrats to W2QFR, WA2PBX and WA2FOR on their Frequency Measuring Test results, and to Bob Ireland on his .2 p.p.m. results! WB2BXL reports FB results from the new 40-meter dipole. Congrats to new Extra WA2FOR. WB2RBG reports 6 and 2 both poor in Apr. except for two aurora openings on the 2nd and 28th with W1, 2, 3 and 8 all available. The ECARS Net is growing. Ask W2CFP for details or tune 7255. K2BQW now holds a DXCC certificate. WA2CRW is the new Asst. EC for Albany County 75-meter activity and reports the 40-meter antenna is back in business. All traffic-handlers, please keep MARS off reports unless it crosses over to amateur bands through your station. K2SJO, K2IES and others are setting up a station at BSA Dorland Center in Rye. W2PYN, with a new TR4 feeding a TA33 Jr. and a new 6-meter f.m. repeater is all operational as summer begins from Albany HS. WB2VJB is chasing DX with a new quad and kw. linear. Traffic: WA2BHN 856, WA2VYS 97, WA2VYT 74, WA2CRW 59, WA2SPL 54, K2SJN 32, WB2VJB 24, W2ANV 17, W2ODC 17, K2TXP 14, WA2FOR 13, WB2RBG 12, WB2FOA 9, WN2HSF 9, WB2DXM/2 8, WA2EAH 2.

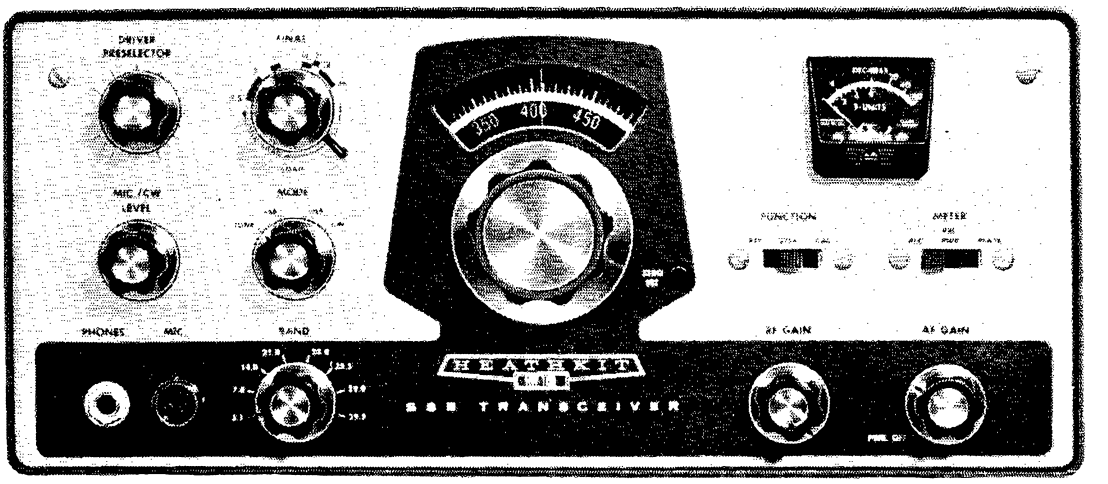
NEW YORK CITY AND LONG ISLAND—SCM, Blaine S. Johnson, K2IDB—Asst. SCM: Fred J. Brunjes, K2DGI. SEC: K2OVN. PAM: W2EW.

NLI*	3630 kc.	1915/2200 Nightly	K2UAT	RM
NLIVHF*	145.8 Mc.	1930 MTWTF	WB2RQF	PAM
NLIPhone*	3932 kc.	1600 Daily	WA2UWA	PAM
Clear Hse	3932 kc.	1100 Daily	WA2GPT	Mgr.
Mic Farad	3925 kc.	1300 Ex. Sun.	K2UBG	Mgr.
East US	3683 kc.	0001 Nightly	K2UBG	Mgr.
All Svc	3925 kc.	1300 Sun.	K2AAS	Mgr.
NYSPTEN	3925 kc.	*1800* Daily	K2SPO	Mgr.

**Section nets. All times above are local.*

WB2WFJ fell off the air smack dab in the middle of the month when the rig's function switch failed to function. K2UBG stopped off at the MARS installation on the Dover Air Force Base while mobiling over Delaware and Maryland during the Easter vacation. WB2RQF still is negotiating with the old QTH before shooting off to Suffolk County and the new one. Congratulations to WA2HBP, who passed the good old Advanced Class license exam during his Easter vacation. The Fun City atmosphere has gone and polluted the splendid plumage of W2PF's beloved 20-meter Telrex yagi so he had to send up another. WA2BRF has gone active again with a brand-new SR-42A. WB2DRW has acquired the call WB2IQY for his location up at R.P.I. and loads his EICO 753 up on a square metal window frame as his version of a Krazy Squalo. WA2QJU goes to work in the Overseas and Microwave Lab of Bell Tel. after graduation this spring. WA2PMW reports that the Tu-Boro RTTY Net is on 145.62 Mc. every night at 2000 EDST looking for all you RTTY-type contacts. W2HDM presented a talk on A.M. Repeaters at the Apr. meeting of the Suffolk County RC. W2TUK, Hudson's beloved old DD, spoke at the Apr. meeting of the New York RC. At the Apr. meeting of the New York City QRP #1 WB2RQF was presented with a birthday cake generously adorned with an interesting assortment of 417 tubes and candles. The Apr. meeting of the Flatbush RC is reputed to have been a fishing trip, but the winner (fish or FRC) has yet to be announced. The RC of Brooklyn hid a couple of mini-transmitters about the Apr. meeting room and members made a game of searching them out with transistor broadcast receivers. By the way, the RCB publication *Bandspread* has gone to offset printing complete with pictures and it really looks keen. The Five Towns RC Apr. meeting continued to shape up the club's plan for a station and training program being established at the Martin Luther King Recreation Center in Long Beach to instruct the community in the wonders of amateur radio. Among other things, the Larkfield ARC discussed the all-important aspects of public service in

AN EMBARRASSING SUCCESS . . .



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Kit SB-600, 8 ohm speaker, 6 lbs. **$18.95***

HW-100 SPECIFICATIONS — RECEIVER. Sensitivity: Less than .5 microvolt for 10 dB signal-plus-noise to noise ratio for SSB operation. **Selectivity:** 2.1 kHz minimum at 6 dB down 7 kHz maximum at 60 dB down (3.395 MHz filter). **Input:** Low impedance for unbalanced coaxial input. **Output impedance:** 8 Ω speaker, and high impedance headphone. **Power output:** 2 watts with less than 10% distortion. **Spurious response:** Image and IF rejection better than 50 dB. **TRANSMITTER. DC Power input:** SSB: (A3j emission) 180 watt P.E.P. (normal voice: continuous duty cycle). CW: (A1 emission) 170 watts (50% duty cycle). **RF Power output:** 100 watts on 80 through 15 meters; 80 watts on 10 meters (50 Ω non-reactive load). **Output impedance:** 50 Ω to 75 Ω with less than 2:1 SWR. **Oscillator feed-through or mixer products:** 55 dB below rated output. **Harmonic radiation:** 45 dB below rated output. **Transmit-receive operation:** SSB: PTT or VOX. CW: Provided by operating VOX from a keyed tone, using grid-block keying. **CW Side-tone:** Internally switched to speaker or headphone, in CW mode. Approximately 1000 Hz tone.

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amateur radio at its Apr. meeting. WB2LZJ is sending code practice for the Extra Class aspirant on 7030 kc. from 0200-0300 GMT, Mon.-Fri. at a speed of 22 w.p.m. with ID and information sent at 11 w.p.m. WB2UGP has reported that WB2AYD, the Stony Brook University station, is quite active with a Collins S/Line on 40-10 meters. Congratulations are in order to WN2GMD of the Larkfield ARC for passing the General Class exam. Listen, have a wonderful time on your vacation now that the time is nigh, but be careful and c'mon back, ya hear!

NORTHERN NEW JERSEY—SCM, Louis J. Amoroso, W2ZZ—SEC: WA2ASM. RM: WB2RKK. PAMs: W2PEV, K2KDQ, WA2KZF, WA2TBS.

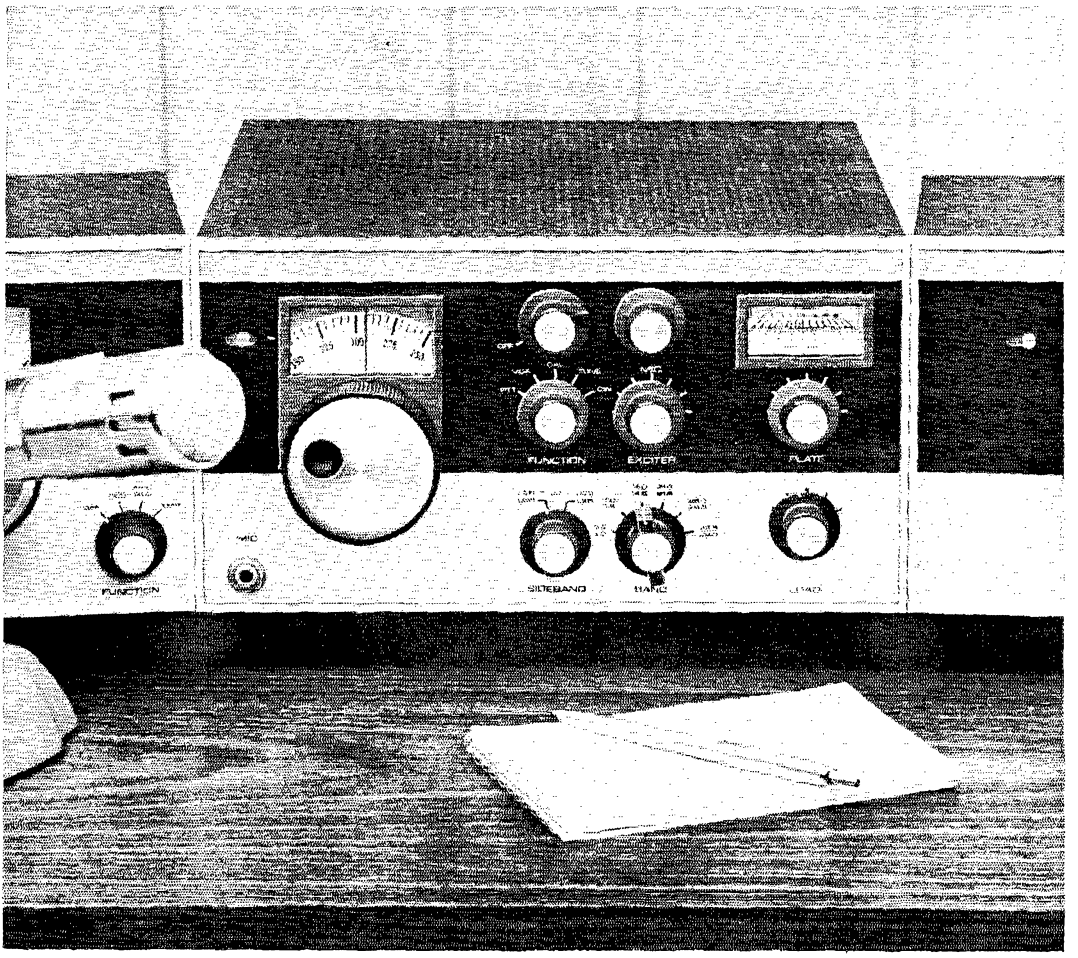
ARPSC Section Net Schedules

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*Tfc.*	*Mgr.*
NJN	3695 kc.	7:00 P.M.	Dy	30	410	303	WA2BLV
NJN	3695 kc.	10:00 P.M.	Dy	30	115	43	WA2BLV
NJSN	3740 kc.	8:00 P.M.	Dy	16	54	29	WB2RKK
NJEPTN	3950 kc.	6:00 P.M.	M-Sat.	30	625	260	W2PEV
NJPON	3930 kc.	6:00 P.M.	Sun.	4	81	26	WA2TEK
NJAN	50,425 kc.	8:00 P.M.	M-F	23	249	41	WA2KZF
PVETN	145,710 kc.	7:30 P.M.	Dy	30	248	128	K2KDQ
ECTN	146,700 kc.	9:00 P.M.	Dy	27	181	90	WA2TBS

New appointments: W2CVY as OO; WA2BAN and WA2BAU as OPSs; WA2ATO as OBS. Endorsements: 39 ORSs and OPSs. Please note the change in frequency for both the NJEPTN and the NJAN. W2LA and W2FZY are home from the hospital. WN2JEZ is a new ham in Maplewood. WN2JAO is a new ham in Somerville and credits K2DLJ with the assist. WA2HSJ passed the Advanced Class exam. K2IEF passed the Extra. WA2DZE passed the General Class exam and WN2GHM is now WB2GHM. Congratulations to all. WB2FEH is now using an Inverted Vee. WB2HSJ is on RTTY. WB2ZGE and WB2UVX both received WAS and WAC certificates. Their station includes a Galaxy GT-550 and a TA-33. W2DU, W2OV, W2BQK, K2QZH and WA2CCF all submitted measurements for the Feb. FMT. W2DU's reading was *perfect*. WB2FNG applied for WAC and WAS. W2COT visited his son in PAØ-Land. WA2BHJ received his WAC and is planning a rotary dipole for 40 and 80. Have fun. New club officers of the St. Peters Prep RC are WA2BAN, chairman; WB2DJL, secy-treas.; WA2GVW, Novice instructor. WA2BCT reports 98 worked with 51 QSLs for DXCC. WA2ATO reports 210 worked and credits 15 meters. WA2CRF has a new TX62 and an eleven-element beam on 2. WA2BAN added a remote v.f.o. to his Galaxy 5. W2CVW claims a good score in the DX Test using a dipole. WN2IZS is a new Novice in Fairlawn and is using a 2-C and 2NT as his station. WA2DIG and W2TP attended the Dayton Convention. W2ISK installed the HW-32 in his car. WB2EZI put up a big wheel for 2. Aug. 16 and 17 are the dates for the annual N.J. QSO Party. Have a safe summer. Traffic (Apr.) WB2RKK 628, WB2WID 241, WA2EUO 238, WA2BAN 228, WB2CXR 222, WB2DDQ 214, WB2FEH 188, K2KDQ 118, WA2TBS 103, WB2WNZ 94, WA2BCT 73, K2DEL 64, WA2GHE 62, WA2ACP 50, WA2CRF 44, WB2YXY 42, W2PEV 36, WB2ZSH 35, WA2BAU 33, WA2CCF 33, WA2CWU 33, WA2HSJ 32, WA2CAI 31, W2ZZ 29, WB2BXK 24, WB2YPQ 23, WA2GLI 19, K2ZFI 17, WA2FRZ 15, WB2NSV 15, WA2NJB 13, WN2FVH 11, K2MFX 8, W2EWZ 7, K2PBP 6, W2TFM 6, WA2EUX 5, WA2DQE 4, W2JDH 4. (Mar.) W2CVW 34, WN2FVH 22, WB2YPQ 20, WA2CRF 14.

MIDWEST DIVISION

IOWA—SCM, Wayne L. Johnson, KØMHX—SEC: KØLVB. PAM: WØPZO. RM: WØLGG. OBSs: WØLCX, WØJAQ, WØCXN, WØSEF, WAØMIT. New appointees are KØJGI as OPS; WØKB, WØMOQ, WAØOTQ as ORSs. WØPZO was reelected manager of the Noon Net. Incumbent KØLVB is now senior ANCS. New ANCSs are WØDDW, WAØKZL, WAØ-MIT. The Plymouth County AREC was activated with KØTFT as EC. KØVDY expects to spend a year in Hawaii for Uncle Sam after graduating from U. of Iowa Medical School. WØMOQ, formerly K1AII, is a welcome addition to Tall Corn. Membership in the Contest Committee of ARRL has kept WAØSDC busy. WØEEC is active again after hospitalization. WAØKWH expects to work at Collins during his vacation from Iowa State. WAØOTE has a new TR4-RV4. WØJAQ worked in Rapid City during May; he should be back on his OBS schedule now. Clubs please note: The list of Iowa clubs on file with the SCM is very out-dated. Please advise current officers and regular meeting dates. Is there any interest in a periodic consolidated club bulletin? The National Convention is now history. It was



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Sit down to one of the new GT-550s...switch on that tremendous power...and pick up one of your favorite DX contacts. You'll swear you're talking to the guy next door!

This is *the* rig. The one they all want. And now you understand why. Makes you want to go home and throw rocks at your own outfit.

The price kinda surprises a guy, too. Doesn't cost as much as you figured to own the best. You can add those great matched accessories one at a time until you have everything a ham could want.

Wonder what you can get on a trade-in? Ask your dealer.

See the Galaxy line at your Dealer's. If he doesn't have it, write us for one near you who does.

GALAXY ELECTRONICS

"Pacesetter in Amateur/Commercial Equipment Design"

10 South 34th Street • Dept. QST-CC43 • Council Bluffs, Iowa 51501

nice to meet old friends and match faces to familiar calls. Many Flying Farmers Fly High.

Net	*Freq.*	*Day*	*GMT*	*QNI*	*QTC*	*Mgr.*
Iowa 75	3970	M-Sat.	1730	1509	182	WØPZO
Iowa SSB	3970	M-Sat.	2300			WØYLS
Iowa 160	1815	Daily	0000	710	5	KØTDO
PON	3915	Tu-Th	2330	22	7	WAØDYV
PON	3697	M-F	2330	27	2	WAØDYV
TLCN	3560	Daily	2330	190	122	KØAZJ

Traffic: (Apr.) WØLCX 544, WØKB 317, KØAZJ 180, WØPZO 130, WØUPX 115, KØJGI 109, WØMOQ 95, WAØKZL 54, WØLGG 39, WAØBSF 36, WØJPJ 24, WAØDYV 22, KØKAQ 15, KØTDO 14, KØVDY 14, KØEVC 11, WAØPPW 11, WAØOTQ 9, WAØJUT 7, WAØLPK 7, WØRW 6, WAØGMZ 6, KØJMA 6, KØTFT 6, WAØMIT 5, WAØRUF 4, WAØAIW 3, WAØOTE 2. (Feb.) WAØSDC 30.

KANSAS—SCM, Robert M. Summers, KØBXF—SEC: KØEMB. PAM: KØJMF. RMs: KØMRI, WAØJFV. V.H.F. PAMs: WAØCCW, WAØLSH. Apr. net reports:

		Freq.	*CDT*	*Mgr.*	*QNI*	*QTC*	*Sess.*
QKS	Daily	3610	1900 2200	KØMRI	335	179	60
KSBN	M-Sat.	3920	1830	KØJMF	698	117	25
KPN	M-W-F	3920	0645	KØJMF	199	20	14
	Sun.	3920	0800				
KWN	M-Sat.	3920	1800	WAØLLC	620	73	30
Ks EC	Sun.	3920	1300	WAØCCW			
Ks PON	M-Sat.	7255	1230	WØLXA			

New appointments: WAØTHQ as ORS/OBS. Kansas also has two more operators now holders of A-1 Operator certificates—WØAYL, and KØBXF. WAØNFP informs us he has moved to Enid, Okla. Likewise a move is in store for W9ECV/Ø, one of our more active OOs, who is moving to N. Mex. WØHI found time to operate 2 hours in the recent CD Party. Zones 7, 13 and 15 report low-band AREC net activity with combined totals of 13 sessions, QNI 152. A report from "CCW" shows the v.h.f. AREC nets doing a real bang-up job. For Mar. Zones 1, 7, 9 and 15 had QNI 220, QTC 90, in 30 sessions. Zone 1 appears to be the aggressor with Zone 7 following closely, each with QNI in the 70s. Apr. report shows Zone 1 with top QNI of 88, with Zone 7 report missing but a grand total QNI of 222, QTC 11 in 33 sessions. Zones 1, 9, 11 and 15 report. Traffic: WØHI 293, WAØTHQ 290, WAØCTL 204, WØINH 177, KØJMF 135, KØMRI 103, KØBXF 100, WAØLLC 91, WØPSN 77, WØCGZ 54, WAØLBB 54, WØBGX 49, WAØOWH 47, KØGZP 44, WAØJOG 32, KØEMB 26, WAØNFP 24, KØJID 21, KØLPE 21, KØGII 18, KØPSD 15, WAØSHG 14, WØGCJ 13, WAØOZP 12, WAØSEV 11, WAØCCW 10, WAØUTT 6, KØUVH 6, WØFDJ 2.

1969 MISSOURI QSO PARTY

Starts 2200 GMT Saturday August 2
Ends 0200 GMT Monday August 4

This is the 6th Missouri QSO Party sponsored by the Northwest St. Louis Amateur Radio Club. There is no time limit or power restriction, and the same station may be worked on more than one band, phone or c.w. for additional credits.

Exchange: QSO number, RS(T) and QTH. Missouri stations send county; stations outside Missouri send state, province or country.

Scoring: For Missouri stations; count one point per contact, total contacts multiplied by the number of states, provinces and countries. Out-of-state stations; 2 points for each Missouri contact multiplied by the number of different Missouri Counties worked (possible 115).

Awards: A certificate to the highest scorer in each State, Canadian province and foreign country (minimum of 5 contacts). The top 5 single operator stations in Mo. and the 3 top clubs (no aggregate scores) in the world will receive awards.

Frequencies: c.w. 3540 7040 14040 21040 khz., phone 3940 7240 14240 21340 khz. Check 3940 at 0300 GMT, 7240 khz at 1600 GMT and 14240 khz at 2000 GMT on August 3 for Missouri stations.

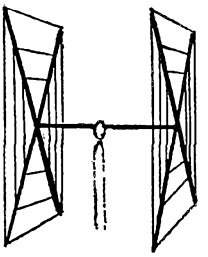
Mailing deadline: Logs must be in by August 30, 1969. They should be sent to Paul Hafner, KØ JPL, 1269 Forest Home Drive, St. Louis, Missouri 63137. Be sure to include an s.a.s.e. for a copy of the results.

AHA! YOU THOUGHT GOTHAM

was a tremendous corporation, with hundreds of workers. Well, we're not. Gotham is just two brothers, working hard to make the best antennas we can, at prices that reflect our low overhead. All orders shipped instantly. In QST since 1953 without missing a single issue.

QUADS

Worked 42 countries in two weeks with my Gotham Quad and only 75 watts . . . W3—



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.

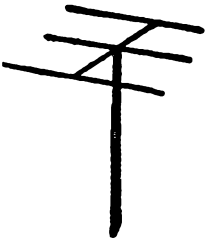
Now check these startling prices—note that they are much lower than even the bamboo-type:

10-15-20 CUBICAL QUAD	$35.00
10-15 CUBICAL QUAD	30.00
15-20 CUBICAL QUAD	32.00
TWENTY METER CUBICAL QUAD.	25.00
FIFTEEN METER CUBICAL QUAD.	24.00
TEN METER CUBICAL QUAD	23.00

(all use single coax feedline)

BEAMS

The first morning I put up my 3 element Gotham beam (20 ft) I worked YO4CT, ON5LW, SP9ADQ, and 4U1ITU. THAT ANTENNA WORKS!WN4DYN



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 E1 20	$19	4 E1 10	$18
3 E1 20	25*	7 E1 10	32*
4 E1 20	32*	4 E1 6	18
2 E1 15	15	8 E1 6	28*
3 E1 15	19	12 E1 2	25*
4 E1 15	25*		
5 E1 15	28*		

*20′ boom

ALL-BAND VERTICALS

"All band vertical!" asked one skeptic. "Twenty meters is murder these days. Let's see you make a contact on twenty meter phone with low power!" So K4KXR switched to twenty, using a V80 antenna and 35 watts AM. Here is a small portion of the stations he worked: VE3FAZ, TI2FGS, W5KYJ, W1WOZ, W2ODH, WA3DJT, 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 check or money order. We ship immediately upon receipt of order by railway express, shipping charges collect. *DEALERS WRITE!*

GOTHAM, 1805 Purdy Ave, Miami Beach, Fla. 33139

MISSOURI—SCM, Robert J. Peavler, WØBV—As your new SCM, I wish to thank the ARRL members of Missouri for the confidence they have shown in me. I hope they will give me the cooperation they gave my predecessor, WØGS, and that I will be able to do as good a job for them. Appointments renewed: WØBUL as PAM, WØBV as ORS and OVS. Net reports:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNS*	*Tfc.*	*Mgr.*
MEN	3885	2330Z	M-W-F	13	162	33	WØBUL
MoSSB (Mar.)	3963	2400Z	M-Sat.	26	901	291	WØRTO
MoSSB (Apr.)	3963	2400Z	M-Sat.	24	745	193	WØRTO
MON	3885	0100Z	Daily				KØAEM
MNN	7063	1900Z	M-Sat.	26	100	45	WØOUD
SMN	3585	2200Z	Sun.	4	14	7	WØOUD
MoPON	3930	2100Z	M-F				WØHVJ
PHD	50.45	0130Z	Tue. (GMT)				WAØKUH

WNØUOX passed the Technician Class exam and the General Class exam a few weeks later. WNØTYE passed the General Class exam. WAØFMD received his Extra Class license. WAØRVR and WAØRPV are two new, very active, stations on MON. WNØTSB operated from the Scout-O-Rama in Kirksville. Traffic: (Apr.) KØONK 1584, WAØRVR 402, WAØHTN 203, WØOUD 95, KØRPH 65, WØJKF 29, WØBUL 25, WAØFMD 20, WØBV 12, WØRTO 6. (Mar.) WØBV 22, WØRTO 20.

NEBRASKA—SCM, V. A. Cashon, KØOAL—SEC: KØODF. Monthly net reports for Apr.: Nebr. Storm Net, WAØLOY, 2330Z sessions, QNI 1004, QTC 35; 0030Z session, QNI 910, QTC 55. Nebr. Cornhusker Net, WAØGHZ, QNI 1020, QTC 151. Nebr. Morning Phone Net, WAØJUF, QNI 1107, QTC 37. West Nebr. Phone Net, WØNIK, QNI 533, QTC 34. AREC Phone Net, WØIRZ, QNI 148. Nebr. C.W. Net (NEB I), WAØFGV, QNI 58, QTC 1. Nebr. C.W. Net (NEB II), WAØHWR, QNI 58, QTC 16. 160-Meter Wx Net, WAØCBJ, QNI 202, QTC 12. Note Storm Net time changes. PAMs and RMs are requested to forward net meeting times if listing of nets is preferred in the format last month's *QST*. The Nebraska Emergency Phone Net has changed its name to Cornhusker Net. The 160-Meter Wx Net has suspended operations until fall. We are saddened by the loss of KØKKV; he will linger in the memory of all who knew him. Traffic: WØLOD 242, KØJTW 50, WAØFGV/Ø 36, WØHTA 34, WAØCBJ 33, KØFJT 33, WAØTMG 30, WAØJIH 26, WAØLVM 26, KØYRL 24, WØAGK 23, WØGEQ 23, WAØHWR 21, KØFRU 18, WAØIXD 18, KØODF 18, WØBFV 15, WØFQB 12, WAØGVJ 9, WØNIK 8, WAØPCC 8, WØVEA 8, KØDGW 7, WAØOQX 7, WØRJA 7, WAØEEI 6, WAØPIF 6, KØOAL 4, WØHOP 3, WAØJUF 3, WAØLOY 3, WAØNYM 3, WAØQLE 2, WAØRPB 2, WØWZR 2, WØYFR 2, WØPHA 1, WØSWG 1.

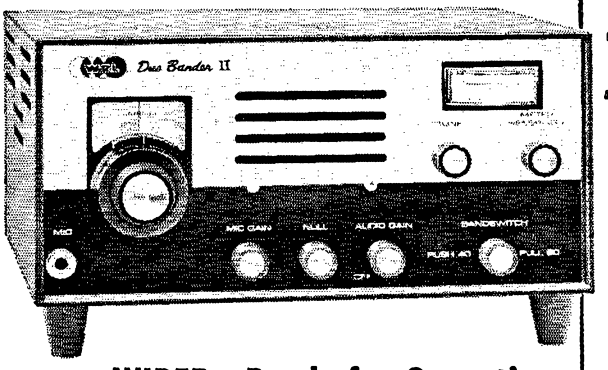
NEW ENGLAND DIVISION

CONNECTICUT—SCM, John McNassor, W1GVT—SEC: W1PRT. RM: WA1HSN. PAM: W1YBH. V.H.F. PAM: K1SXF. Activity report for Apr.:

Net	*Freq.*	*Days*	*Time*	*Sess.*	*QNI*	*QTC*
CN	3640	Daily	1845	30	318	408
CPN	3880	M-S 1800 Sun.	1000	29	522	192
VHF 2	145.98	M-S	2200	22	98	30
VHF 6	50.6	M-S	2100	22	202	52

High QNI: CN: WA1HEW, WA1HOL and WA1HSN. CPN: W1GVT and K1SXF 27, WA1HEW 25, WA1FXS, W1LUH and W1YBH 24, W1NBP 23, WA1IGF 19, WA1HLP 18, K1BSB, WA1JKR, K1MBA and WA2HMX 16. SEC W1PRT has resigned because of the pressure of business. His outstanding work is greatly appreciated and I owe him a personal debt of gratitude. Most sincere thanks, Jack, and sorry you can't continue. Director W1QV attended a busy ARRL Board Meeting. See Highlights in this issue of *QST*. WA1HEW made arrangements for the 16th Annual Net Dinner Apr. 19 which was well attended. This was a fine chance for net members to meet and exchange ideas. WA1HSN, our RM, kindly offered to share space in his *Nutmeg Net News* with CPN and V.H.F. Nets. V.h.f. repeater activity is increasing rapidly. Comments are appreciated. Extra Class c.w. practice is available at 22 w.p.m. Sun.-Thurs. 9 P.M. on 7030 kc. via WB2LZJ. ID and Information at 11 w.p.m. Congratulations to: WA1IGF on Apr. BPL; K1GUD, WA1KMR and WA1HHB on Advanced Class licenses; WA1JZC and WA1KNG on General Class licenses; WA1HOL on WAS; K1CSB on 600 DX contacts since his return from Viet Nam; Murphy's Marauders on the high SS Contest rating! U.h.f. operators can benefit from membership in the

Great NEW Values from World Radio!



WIRED—Ready for Operation

Designed for the Amateur whose interest is 80 and 40 meter SSB. Here's power and performance at a very reasonable cost! Power to make good contacts...a selective Receiver, Stability and compactness! (5"x11¼"x10"). Weight 11 pounds. Smaller by far than anything in its power class. Beautifully finished...a Fantastic performer! Available in both Fixed Station and Mobile Packages (not shown).

THE BEAUTIFUL NEW

Duo Bander "II" TRANSCEIVER

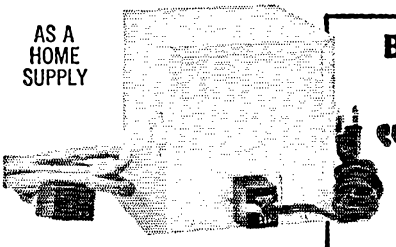
ORDER #66MA059 **$169.95**

Only $8 Monthly on payments

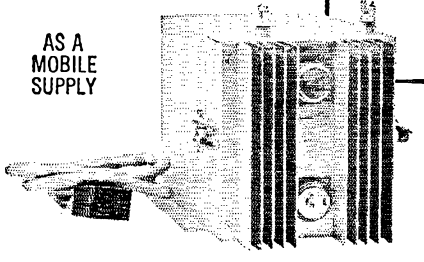
LOOK AT THESE FEATURES: Up to 400 watts * PEP/SSB • 2 Kc Calibration • Solid State VFO • Covers LSB on 3.8-4 and 7.1-7.3 mHz • Sharp 2.7 kHz Crystal Filter • New, husky 6LB6 tubes in the final to a Pi-network • "S" and RFO Metering • E-Z one knob tuning.

**With individual Deluxe WRL Supplies.*

AS A HOME SUPPLY



AS A MOBILE SUPPLY



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"Duo Power 300" DUAL POWER SUPPLY

Change in an instant from Mobile to Home!

Rated for operation at 300 Watts PEP with all Duo-Bander models—fixed or mobile.

ORDER #66MA003

$149.95

Only $8 monthly

The all-new "Duo-Power 300" Supply is ideal for the man using the rig as Fixed-Mobile-Portable at the least cost. Use as a complete 12VDC mobile supply or unsnap the transistor module end and use it for a 115VAC home supply. Approx. 5⅝" x 6⅛" x 9⅛" (HWD). Weight 18.5 lbs.

Buy 'em together—SAVE $20!* (Order Package ZZM189)
You get the DUO-BANDER II and DUO-POWER 300 Both for $299.90! **Cash order only*

Write for Catalog on other Packages Available
QST DD43

WORLD RADIO

3415 West Broadway ● Council Bluffs, Iowa 51501

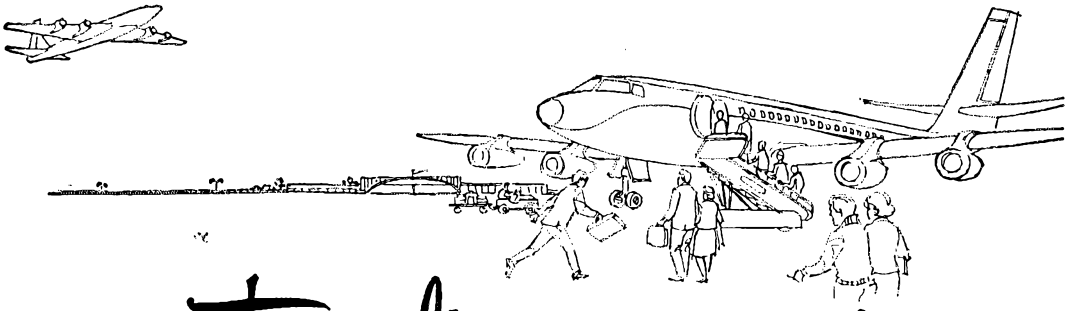
"SERVING THE AMATEUR FOR OVER 33 YEARS"

Talcott Mt. U.H.F. Society. Contact W1HDQ for further information. Traffic: (Apr.) WA1IGF 625, WA1HSN 254, WA1HEW 249, W1EFW 197, WA1HOL 160, W1EJ 148, W1WCG 147, K1SXF 128, WA1FNJ 113, WA1JGA 101, WA1INP 84, W1AW 81, WA1GGN 69, W2GVT 65, WA1HLP 53, WA1FXS 26, W1BDI 23, W1LUH 22, K1MBA 18, WA1GWS 17, W1BNB 16, W8CWE/1 16, W1QV 16 W1CTI 15, W1YBH 13. WA1KMR 12, W1OBR 12, W1NBP 10, W1CUH 6, K1YGS 4, WA1KNG 1. (Mar.) W1EFW 242.

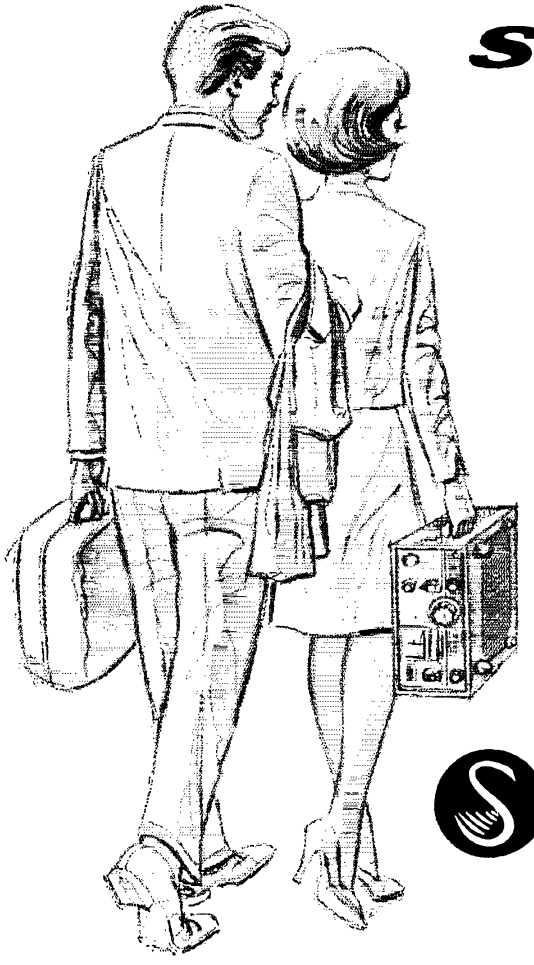
EASTERN MASSACHUSETTS—SCM, Frank L. Baker, Jr., W1ALP—W1AOG, our SEC, received reports from W1UJF, WA1DXI, K1s, ZUP, and DZG. Silent Keys: W1FST, K1ZJK. The following took part in the Feb. FMT: W1s PLJ, BGW, HJP, DRH, IU, DDO QX, K1QDR, WA1HQB, W1OJM made the BPL. W1FCG, ex-K7MEY is in Melrose. W1QV and W1ALF attended the Annual Banquet of the Nortolk County RA. New officers of the club are W1PNH, pres.: K1EPL, vice-pres.; W1HTR, treas.; K1HRV, secy. WA1ETC is in the Coast Guard. W6YK was here to get a 25-year pin from Raytheon. W1EAE spoke at the Quannapowitt RA on "Traffic Handling." EM2MN had 22 sessions, 188 QNIs, 166 traffic. The 6-Meter Cross Band Net had 21 sessions, 79 QNIs. W1DFS and his XYL went to England. WN1KTZ has his Advanced Class license. The Yankee S.S.B. Net meets on 50.1 Mc. Sun. at 0900. W1BCH has a TA-33 beam. WA3ITR/1 has a four-element wire beam for 15. WA1BVN, 70 years young, passed the Advanced Class exam. W1NF is working some DX on 80. W1AAC, now in Sunapee N.H., has the call WB4LZD in Florida. W1DAL moved to Westford. W1AEC had a booth at the New Bedford Hobby Show. WA1FNM made a code monitor. WA1HHK, in East Coast Amateur Radio Service, is on 7255 kc. WA1DED-DEC is in the Bahamas for a stay. W1AOG reports NEEPN had 4 sessions, 70 QNIs, 3 traffic. K1DZG went to VE2-3 Land on a trip. K7JRE/1 is working DX. W1LE has a gas-driven emergency power supply. K1AJQ is RO and EC for Medfield. K9AQP/1 built a new preamplifier using a 2N3478 transistor for 432 Mc. K1SMT is a new OO. Appointments endorsed: W1s JNV, HXK as OOs; W1s ZMO KWD, RM, MME as ECs; W1s UIR, MME as OBSs; W1s AOG, MME. UIR as OPSs; W1DAL, WA1FHU as ORSs; W1AOG, WA1DFL as OVSs. W1AKY was auctioneer at the South Shore ARC. New RTTY on 6: W1ZQM, W1LQU, W1MU/1. WA1DPX won first place in the First Giant RTTY Contest as SWL. WA1HHK is putting his Twoer in his Buick. W1MX is taking part in the MIT Open House. W1MX worked W4JFU on 2. The Capeway RC met at W1UOH's; W1ANE showed movies that he has taken as a radio operator for 30 years. WA1s CRA and ESI are MARS members. The T9 RC held Ladies Night at Country Squire Inn. New officers are W1KGH, pres.; WA1IZF, vice-pres.; W1ISX, treas.; W1MNK, secy. W1s KON and MJE had a winter vacation in Antigua. W1CSS is now Advanced Class. New officers of the N.E. Chapter of QCWA are W1VN, chmn.; K1AAQ, secy.-treas. W1HXK is teaching at Mass. Radio School. W1DA is moving to New Mexico. WB2QOQ/1, at Ft. Devens, gets on 6 from Mt. Wachusett into N.J. K1CCW has a New Eng. Div. NETMAP for 20¢ a copy. W1CQN and WA1FKQ have a Drake R4-B-T4-XB combination. W1IU is getting the FMT bug. WA1EMN had a minor heart ailment. W8PEY/1 and WA1EJM operated out in the So. Pacific and Bill showed movies at the Chelmsford ARA. K1VGM, a new OBS, has a HW-100. WA8KAM/1 sends in W1KBN's ORS/OBS for endorsement. W1ZSJ sends in reports for the Central NE Net: (Feb.) 1240 QNIs, 63 traffic. (Mar.) QNIs 1227, traffic 70. The net is on 3945 kc. at 6:30 A.M. Net activity: Elkins, N.H., Sept. 5, 6, 7. Traffic: (Apr.) W1OJM 1216, WA1EYY 397, K1ESG 249, WA1IBL 231, WA1FAD 229, W1PEX 207, W1EMG 142, W1BUF 113, WA1ESI 105, K1PRB 85, W1CTR 57, WA1GXC 53, W1AEC 42, WA1HHK 35, WA1IJL 32, WA1DEC 27, WA1DPX 26, W1NUP 23, WA1IFE 21, WA1DED 20, K1LCQ 20, W1DOM 18, W1AOG 17, WA1CRA 12, K1YUB 8, K1DZG 6, W1MX 5, W1DAL 4, K1CLM 4, K1OKE 3, K7JRE/1 1, W1LE 1. (Mar.) WA1IBL 321, K1UYB 4.

MAINE—SCM, Herbert A. Davis, K1DYG—SEC: K1CLF. RM: W1BJG. Traffic nets: Sea Gull Net meets Mon. through Sat. at 1700 on 3940 kc.; Pine Tree Net meets daily on 3596 kc. c.w. at 1900. WA1FLG has resigned as PAM because of other commitments. He did a good job and it sure was appreciated. We note with regret that W1BOK is a Silent Key. He had the Dexter Hamfest for many years and was well known. He was active in many parts of the radio world. He will be sadly missed by all who knew him along the way. Traffic: K6CAG/1 253, WA1FLG 99.

NEW HAMPSHIRE—SCM, Donald W. Morgan, K1-



traveling companion



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NEW HAMPSHIRE QSO PARTY

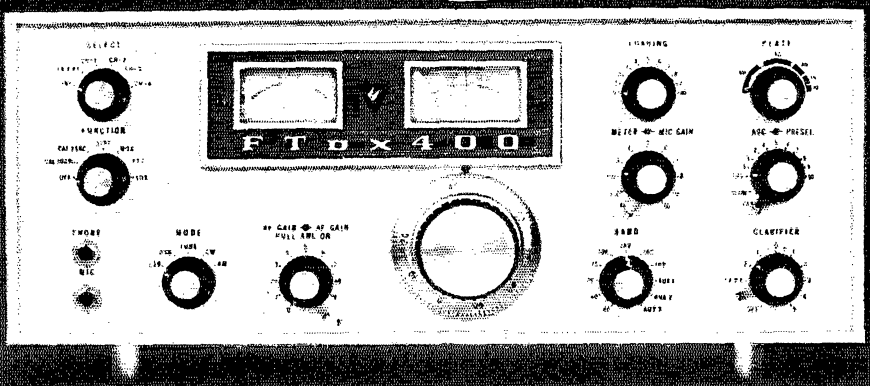
July 26-27, 1969

The Bow Radio Association announces its sponsorship of the eighteenth New Hampshire QSO Party and invites all interested radio amateurs to participate. *Rules:* 1) The contest period will be from 1700 GMT Saturday July 26 to 2300 GMT Sunday July 27. All bands and modes may be used. New Hampshire stations work as many stations as possible, stations outside of N. H. work N. H. stations only. Stations may be worked once on each band/mode. There are no power or time restrictions. 2) The contest call is "CQ NH." N. H. c.w. and RTTY stations should identify themselves by sending "de . . . NH K." Phone stations give call and say "New Hampshire calling." 3) N. H. stations send QSO number, RS(T) and county. Others send QSO number, RS(T) and state, province or country. 4) In scoring, N. H. stations multiply the number of non-N.H. QSOs by the total number of states, provinces and countries *plus* one point per N. H. QSO. All others multiply the number of QSOs by the number of N. H. counties worked (10 maximum). 5) A certificate will be awarded to the two highest scoring stations in each N. H. county and to the highest scoring station in each state, province and country. A cup will be awarded to the highest overall high-scoring station. 6) Neat and accurate logs including the participant's name, address, call and county/state/province/country should be postmarked no later than August 6 and mailed to WA1CBP, RFD #3, South Bow Road, Concord, N. H. 03301. Include an s.a.s.e. for published contest results which will be final. 7) Suggested frequencies are (c.w.) 3680 7080 14,080 21,080 28,080; (s.s.b.) 3950 7250 14,250 21,350 28,550; (RTTY) 3610 7040 14,090 21,090; (v.h.f.) 50.4 145.4. Novice activity is anticipated.

QES—SEC: K1RSC. PAM: K1APQ. RM: K1BCS. T GSPN reports 896 check-ins and 142 pieces of traf The NHAREC shows 121 check-ins, 46 traffic. We w come WN1LDS, of Contoocook, a Bow Radio As member, and WA1KXN, of N. Hampton. K1YSD ORS and OPS. W1ET, the Dartmouth College Club, active again on all bands. W1RCC has a second car mobile work and will be on 80 through 6 s.s.b. and a. K1BCS, one of our traffic men, spends some of his ti as a guest speaker at Kiwanis meetings. WA1CBP minds us that six-letter call plates are available in N. W3JWZ/1, an OVS from West Pa., has joined us in state as W1FKF and is on 160, 40 and 6 meters. K1T should be operating from W1BYS by now. W1SWX ports 155 countries confirmed on 3.5 Mc. and he ne only three more zones for "worked all zones." Eighteenth New Hampshire QSO Party will be spo scored by the Bow Radio Assn. on July 26 and 27. RSC reports all NCs for NHAREC are from our sta He also is helping out as NCS on the N.E. Emerge Phone Net. Traffic: (Apr.) K1BCS 366, WA1IIH 3 K1PQV 92, K1QES 8, K1TXC 6, W1RCC 5, W1SWX (Mar.) WA1IIH 307, K1TXC 6.

RHODE ISLAND—SCM, John E. Johnson, K1A —SEC: K1LII. RM: W1BTV. PAM: W1TXL. V.H. PAM: K1TPK. Endorsements: W1BTV as RM, and OO; WA1EEJ as OPS. The Newport County Em gency Net meets on 29.53 Mc. every Sun. at local time. Checking into the net are the follow members of the Newport County RC: W1JFF, W1WL W1TXL, K1YGY, WB2HWP/1, W1EXG, W1JHF WB4KRV/1. The club also has a net operating at same hour on 50.9 Mc. for 6-meter hams. WN1KR net mgr. of the Aquidneck Novice Net, reports t the net meets every Sun. at 0900 local on 21. Mc. Stations checking in at the first meeting on Apr. were W1EXG, WN1KRP, WA1AUL and WN1KC WN1JXD recently passed the General Class ex and plans to operate on 40- and 20-meter c.w. a 75- *and* 10-meter a.m. *WA1EEJ, who is at colle* reports that he worked with the Fidelity ARC recen when they operated at the Midland Mall. The WL Club of Rumford recently landscaped the backy of the clubhouse with an assist from WA1IYF, WA1II W1FNH, K1HMO, K1AGA and K1AMG. Traf W1TXL 484, W1YKQ 150, K1TPK 85, W1BTV K1QFD 52, K1VYC 41, WB2HPW/1 24.

TOP OF THE YAESU F LINE



THE FT DX 400 TRANSCEIVER

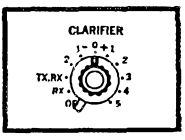
Conservatively rated at 500 watts PEP on all bands 80 through 10 the FT dx 400 combines high power with the hottest receiving section of any transceiver available today. In a few short months the Yaesu FT dx 400 has become the pace setter in the amateur field.

FEATURES: Built-in power supply • Built-in VOX • Built-in dual calibrators (25 and 100 KHz) • Built-in Clarifier (off-set tuning) • All crystals furnished 80 through the complete 10 meter band • Provision for 4 crystal-controlled channels within the amateur bands • Provision for 3 additional receive bands • Break-in CW with sidetone • Automatic dual acting noise limiter • and a sharp 2.3 KHz Crystal lattice filter with an optimum SSB shape factor of 1.66 to 1.

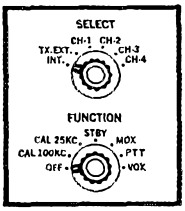
Design features include double conversion system for both transmit and receive functions resulting in, drift free operation, high sensitivity and image rejection • Switch selected metering • The FT dx 400 utilizes 18 tubes and 42 silicon semi-conductors in hybrid circuits designed to optimize the natural advantages of both tubes and transistors • Planetary gear tuning dial cover 500 KHz in 1 KHz increments • Glass-epoxy circuit boards • Final amplifier uses the popular 6KD6 tubes.

This imported desk top transceiver is beautifully styled with non-specular chrome front panel, back lighted dials, and heavy steel cabinet finished in functional blue-gray. The low cost, matching SP-400 Speaker is all that is needed to complete that professional station look.

SPECIFICATIONS: **Maximum input:** 500 W PEP SSB, 440 W CW, 125 W AM. **Sensitivity:** 0.5 uv, S/N 20 db. **Selectivity:** 2.3 KHz (6 db down), 3.7 KHz (55 db down). **Carrier suppression:** more than 40 db down. **Sideband suppression:** more than 50 db down at 1 KHz. **Frequency range:** 3.5 to 4, 7 to 7.5, 14 to 14.5, 21 to 21.5, 28 to 30 (megahertz). **Frequency stability:** Less than 100 Hz drift in any 30 minute period after warm up.

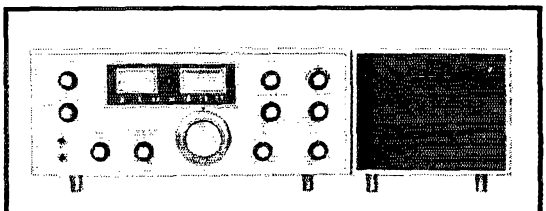


CLARIFIER CONTROL — Does the work of an external VFO — allows operator to vary receive frequency 10KHZ from transmit frequency, or may be used as an extra VFO combining transmit and receive functions.



SELECT CONTROL — Offers option of internal or outboard VFO and crystal positions for convenient preset channel operation.

FUNCTION CONTROL—Selects crystal calibration marker frequency and desired transmit mode of operation.



FT DX 400 $599.95 — SP-400 $14.95

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— PROFESSIONAL EQUIPMENT FOR THE AMATEUR —

VERMONT—SCM, E. Reginald Murray, K1MPN—This column is being written in the hospital; therefore we've *been unable* to assemble the usual net and traffic reports. We do thank all those who sent us their regards, especially the Burlington Amateur Radio Club, Inc., gang, who supplied 2-meter f.m. gear which certainly makes our stay most interesting. The BARC will again sponsor the popular International Field Day on Aug. 16-17 at Green Lantern Inn, Charlotte, Vt. Chairman is W1HRG. For early bird registration write K1URQ, Fred Fields, 7 Park Terrace, Essex Jct. 05452. With regret we report Sister Jean, K1YDS, as Silent Key. Flood threats brought many stations to the fore and efforts of individuals who took over net control and kept nets going were appreciated, especially by Vt. Civil Defense. C.d. frequency 3990.5 kc. and 2-meter repeater W1KOO proved to be valuable links of reliable communication with most parts of state. Welcome Novices: WA1KYV (Sharon), WA1KXM (Chester Depot).

WESTERN MASSACHUSETTS—SCM, Norman P. Forest, W1STR—RM W1DVW reports attendance during Apr. slightly off from Mar. but up from February with a total of 142 messages handled. The Fitchburg-Leominister area still needs coverage. The order of attendance out of a possible 30 sessions were W1BVR-29, W1ZPB-23, W1DVW-21, W1IHI-18, K1WZY-18, K1IJV-17, W1STR-15, W1ZEL-10 with the rest less than ten. Stan Thompson gave an excellent account of early radio gear during the HCRAI Apr. meeting. It will be Middlefield for HCRAI Field Day and Brother Bernard's home cooking again this year. *The FARC Oscillator* continues to be an excellent publication under the guidance of W1NPL, WA1IZS and K1ZQB. K1ZKH is looking for recruits for the Navy MARS program. We hear K1ZOC is known as Zanzibar, Ocean, Charlies! K1YQQ's crystal set worked well without a capacitor during homebrew night? WA1CXD was the winner with his crystal set which outperformed all others. The Montachusett ARC also had a homebrew night with first prize going to W1GUI for his auto keyer. Tied for second were K1DPP, K1YLU and WA1GBB. HCRAI reports 142 paid-up members as of Apr. CMARAI reports K1YRV has about 12 pupils taking advanced code and theory on Wed. from 7 to 9 P.M. Traffic: W1ZPB 129, WA1IHI 109, W1STR 72, W1BVR 66, W1DVW 63, W1IC 25, WA1IZS 13, WA1IAU 12.

NORTHWESTERN DIVISION

IDAHO—SCM, Donald A. Crisp, W7ZNN—SEC: K7THX. The FARM Net convenes week days on 3935 kc. at 0200 GMT. The Idaho RACES Net convenes week days on 3991 kc. at 1414 GMT. The Lewiston Club provided communications for a sports car race up Winchester Hill. The race was sponsored by the University of Moscow Sports Car Assn. K7THX, W7ZNN, WA7FFZ and KL7FOZ stationed their mobiles at strategic points on the course and WA7JHY operated a portable station at the start. WN7MCX is a new ham in Lewiston. WA7EWV passed the Advanced Class test. WA7DNK underwent a leg operation. W7GIT received an ORS endorsement. Newly-elected FARM Net officers are K7ORA net mgr.; W7ZNN, Chief net control. The Bonner County Club is now affiliated with the League. W7IDA is secy.-treas. K7UAE and the Idaho Falls amateurs are making plans for the WIMU Hamfest which should prove to be bigger and better than ever. K7KBX qualified for a BPL award for the second month in a row. FARM Net report: 22 sessions, 439 check-ins, 250 traffic handled. Traffic: K7KBX 527, WA7BDD 116, W7GHT 63, W7ZNN 25, K7CSL 4.

MONTANA—SCM, Joseph A. D'Arcy, W7TYN—SEC: W7RZY. PAM: W7ROE. RM: WA7DMA.

Section Nets	*Freq.*	*Time*	*Days*	*QNI*	*QTC*	*Mgr.*
Montana Traffic Net	3910 kc.	0100	M-F	553	69	W7ROE
Montana Post Office Net	3950 kc.	0300	D	531	220	K7PWY
Montana Section Net	3950 kc.	1700	Sun.			

Appointments: WA7JWF and WA7DBA. It is with deep regret that we report the Silent Key of K7UPH of Billings. Bob was active in League affairs in Montana and also was an advocate of 2-meter f.m. in the section. A few months ago the call of K7PWY was used in the place of K7YPC as a Silent Key. We apologize for this error. WA7DMA was in Spokane to take an FCC exam. K7NDV, K7OEK and W7TYN attended the Spokane's Northwest Weather Net Dinner. K7DCH and K7DCI have done a great job in setting up the Glacier Park Hamfest. Hope to see every one in the Park. Traffic: (Apr.) W7LBK 56. (Mar.) WA7IZR 78. W7LBK 63.

RF-505

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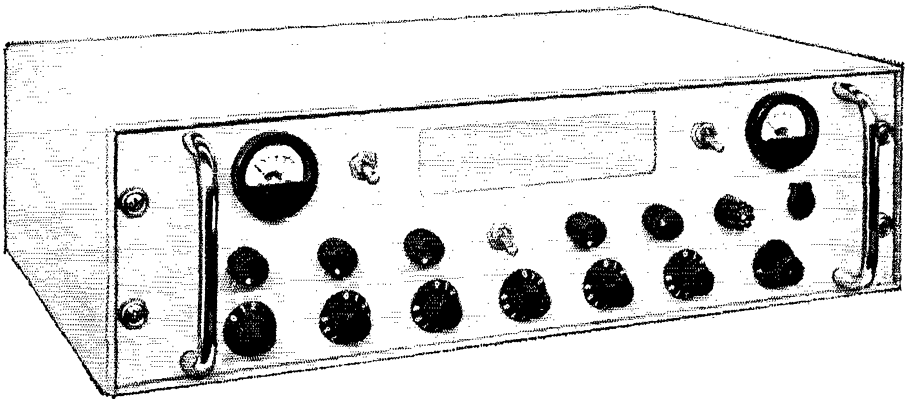

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- **Sensitivity:** 0.5 μv for 10 db S + N/N.
- **Dynamic range:** 125 db.
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- **All solid state.**

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OREGON—SCM, Dale T. Justice, K7WWR/WA7KTV—RM: W7ZFH. PAM: K7RQZ. Section net reports: W7ZFH reports for the OSN for Apr., sessions 24, check-ins 105, traffic 41. K7YQM reports for the AREC Net, sessions 30, check-ins 811, traffic 39, contacts 113, maximum number of counties 19. W7QWE writes that the Oregon Memorial to Silent Keys is at the engraver's waiting for funds to allow some 40 names to be added. Donations can be sent to Don Misner, W7QWE, 2634 S.W. Huber St., Portland, Ore. 97219. WA7JMY is on s.s.b. from Grants Pass. W7PKN is fixing TV sets in his spare time. WA5FTN made 560 phone patches to S.E. Asia during Apr. W7CPK sends in a nice report and says he has been working lots of counties for awards; also he has WAS on 75 s.s.b. WA7JMD has finished his desk and moved into the house with his gear. W7VIF reports for the OEN: For Mar., sessions 61, check-ins 4184, traffic 59, contacts 458; for Apr., sessions 59, check-ins 4186, traffic 44, contacts 447. WA7DCC reports for the Portland 2-Meter AREC Net, 432 check-ins and 2 traffic. K7AXF is reactivating the AREC in Coos County. Traffic: K7RQZ 435, WA7IFS 143, W7ZFH 89, K7IFG 83, K7OUF 51, WA7KIU 44, K7YQM 31, WA7JAU 24, W7HLF 20, K7WWR 20, W7ZB 20, WA7GMP 19, W7BNS 16, W7MLJ 14, K7ADR 11, W7CPK 4, WA7JMD 4, K7KPT 4.

WASHINGTON—SCM, William R. Watson, W7BQ—SEC: W7UWT. Asst. SEC: K7WTG. RM: K7CTP.

AREC	1700Z Sun.	3930 kc.	QNI 46	QTC 7	Sessions 4
WSN	0145Z Daily	3590 kc.	QNI 269	QTC 146	Sessions 30
WARTS	0100Z Daily	3970 kc.	QNI 1219	QTC 121	Sessions 26
NTN	1830Z Daily	3970 kc.	QNI 856	QTC 571	Sessions 30
NSN	0300Z Daily	3700 kc.	QNI 323	QTC 90	Sessions 30

It's now official—Amateur plates will be $5 instead of $30. The plates will be "reflectorized" and issued as "lifetime" plates. Aug. 1 will be the effective date under the statutory law. Applications must be sent directly to the Department of Motor Vehicles, Olympia, Wash. Concurrently, Governor Daniel J. Evans proclaimed the week of Sept. 1-7 as Amateur Radio Week in Washington State, pointing out the valuable public service rendered by amateur radio. Special certificates signed by the Governor again will be issued and sponsored by the Puget Sound Council ARC. The annual QSO Party will take place the week end of Sept. 6-7, sponsored by the Boeing Club (BEARS). Other certificates will be available by the BEARS, Tacoma Club (Logger's Certificate) and the Apple City Radio Club of Wenatchee. The Second Annual State Hamfest sponsored this year by the Radio Club of Tacoma will be held the week end of July 12-13 at the Sportsman's Chateau. The Walla Walla Club will hold its Annual Hamfest in Sept. The Clallam County Club held an FB meeting to revitalize the AREC. SCM W7BQ and SEC W7UWT were on hand for an assist. WA7FVD reports for the U. of W. Club, now back on the air at the club station and looking for a new club site on campus. The SRA of Spokane reports 100% results of members taking FCC exams. W7SAB reports more DX on s.s.t.v. along with W7FEN who added ZL and KC4 contacts. WA7KWY reports the Novice Traffic Net moved to 7151 at 2330Z. K7QOM will be heard from K4NAA at the Pentagon. W7ETR now is operating XP1AA on 20 meters. W7ZIW is filling a spot on TCC. W7DZX is continuing his many years as Pacific Area TCC manager. I wish to take this opportunity to thank all those who assisted in advancing the Washington section for the past two years during my administration as SCM. Traffic: (Apr.) W7BA 1818, K7UDG 1177, WA7HKR 773, WA7BZY 558, W7DZX 469, W7PI 300, K7CTP 196, W7ZIW 162, WA7DZL 123, W7AXT 120, W7JEY 106, K7KPA 104, W7BQ 95, K7JXO 75, W7MCW 73, W7BTB 67, WA7ACQ 58, W7KZ 58, W7GVC 57, W7GYF 43, W7JWJ 41, W7BUN 38, WA7-EDQ 35, W7APS 29, W7UU 23, W7IEU 22, WA7JEB 20, W7ZHZ 20, W7USO 19, WA7BDB 18, K7OXL 15, WA7BBJ 14, W7UWT 14, W7SAB 11, WA7HSJ 9, WA7EYN 7, W7OEB 6, W7QGP 6, K7YFJ 6, K7SUX 4, K7GZI 3, WA7KWY 3, W7FQE 2, K7MGA 1. (Mar.) WA7HSJ 42.

PACIFIC DIVISION

EAST BAY—Asst. SCM: Paul Parker, WB6DHH—I, WB6DHH, am glad to see an increase in the number of station activity report forms. It makes the job of writing this column much more exciting. I attended a meeting of the Oakland Radio Club on May 2, and heard a very impressive talk and series of slides given by WA6PKN. I recommend this talk to all interested clubs and would advise you to get in touch with Jerry if you are interested. W6LNZ and W6IPW had a dinner party on Apr. 24. WA6DIL

A NEW TRANSCEIVER WITH

1000 WATTS PEP ON SSB, 1000 WATTS ON CW, 500 WATTS ON AM

More info? It's five-band (80 through 10 meters), completely self-contained (with power supply, monitor speaker and RF speech clipper built-in), and is all solid-state (except for drive and ceramic tetrode final amplifier).

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reports that he finally made the BPL listings. WB6YCA finally got his MARS call and has been attending fire alarm school in Fresno. I wish to hear from other clubs in the section. I would like to attend one of your meetings. There have been some thoughts kicking around in regard to starting a section net to handle traffic. All those interested in forming such a net should get in touch with WA6DIL. There has also been some talk of a Novice class in the Diablo Valley area. WB6DHH is finding out how rough 20 meters can be at times and is looking for a beam and reasonable support. Apr. *QST* had an interesting article in the technical correspondence column written by W6TTS, of Albany. I am in full sympathy with Gene and I hope we have more real parts stores open to everyone in our area, too. That is about all the news there is for this month, gang, and I wish that more of you would let me know what you are doing in ham radio these days. Traffic: W6IPW 456, WA6DIL 242, WB6YCA 37.

HAWAII—SCM, Lee R. Wical, KH6BZF—SEC: KH6GHZ. PAM: W4UAF/KH6. RM: KH6AD. V.H.F. PAM: KH6EEM. QSL Mgr.: KH6DQ. RACES nets: (40, 10, 6 and 2 meters). Coordinate with KH6AIN.

Nets	*Freq. (Mc.)*	*Time*	*Days*
Friendly Net	7.290	2030Z	M-F
Pacific Interisland Net	14.320	0830Z	M-W-F
Boy Scout Ham Radio Net	21.360	1800Z	Sat.
S.E. Asia Net	14.320	1200Z	All
Marianas Islands Net	3.850	0830Z	2, 3, 4 Tue.
Gecko Net (Marianas Is.)	14.240	0930Z	Tue. & Thurs.
Pacific DX Net	14.240	0700Z	Tue. & Fri.
Marine Corps Net	21.380	1900Z	All
Confusion Net (phone patches)	21.400	0200Z	All

Looks like the Honolulu ARC will be relocating KH6WO at its FD site at the north end of Waimanalo Beach Park June 28-29. All meals and drinks for all participants will be six dollars payable in advance. After June 16 all FD tickets will be seven dollars. WH6GRG recently won a Junior Achievements Award of a trip to Disneyland. KH6GQW reports visitors at his QTH recently were XW8AX, KR6NR, KW6EJ and 9J2NW. Pat also obtained his Advanced Class ticket. The Honolulu DX Club now reports that its 2-meter DX Tip Off Net is now ready and participation has been excellent. KH6ART and KH6GBX are voices heard frequently over Radio KUMU. KH600 has been off vacationing on the East Coast. Circle your calendars for the Southwestern Division Convention Oct. 17-19, '69, to be held at the Hilton Inn in San Diego. Obtain your tickets by writing to the Registration Desk, '69 ARRL SW Div. Convention, c/o P.O. Box 1469, San Diego, Ca. 92112. WB6SQZ is the publicity chairman. Traffic: (Apr.) KH6GHZ 995, KH6GQW 16, KH6BZF 14, W4UAF/KH6 2, KH6GQB 2, KH6GLU 1, WH6GRG 1. (Mar.) KH6GQW 1.

NEVADA—SCM, Leonard M. Norman, W7PBV—SEC: WA7BEU. The W7DDB 6-meter repeater is still plagued with troubles; however, the 2-meter repeater has considerable activity. W7YRY received a very nice write-up in the *Los Angeles Herald Examiner* on his amateur radio activities. WA6KZI/7 was active in the CD Party on c.w. K7RKH worked KØMQS on 6-meter meteor-scatter after many long hours and months of scheduling. WA7BEU has a Model 28 teletypewriter. W7TVF and K7ZOK displayed a very fine collection of rare DX QSL cards at the SNARC meeting. W7TVF worked 65 of the 75 sections in the CD Party in 302 hours of operation and made nearly 100,000 points on c.w. The Sierra Hamfest Bowers Mansion, between Reno and Carson City Aug. 23, 1969, will provide a picnic for the children with a fenced playground and swimming area. QSP QSL for details to NARA, Box 2534, Reno, Nevada. Graduation exercises were held for the SARS code and theory class. Many new licensed operators are expected to be on the air soon.

SACRAMENTO VALLEY—SCM, John F. Minke, III, WA6JDT—ECs: K6RHW, W6SMU, WA6TQJ. RM: W6LNZ.

Net	*Freq.*	*Time*	*Days*	*Mgr.*
NCN	3630 kc.	0200Z	Daily	WA6LFA
NCN/2 (Slow speed)	3630 kc.	0330Z	Daily	WB6WGR
Yolo Co. CD	146.9 Mc.	0200Z	Tue.	WA6TQJ

The Sacramento Valley section can use additional ECs, an SEC and a PAM. If interested, please contact your SCM. The North Hills Radio Club will again sponsor the California QSO Party to be held the first

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week end in Oct. February FMT participants included W6KDJ, K6PAC, W6TFH, WB6WPH, K6GG and WA6CXB. W6TFH had an average error of 0.5 p.m. WA6TAY is busy building QRP rigs; the first one was so QRP it didn't get a signal out to the front yard. WB6WJO has been elected secy. of the San Joaquin Net, which meets at 0100Z on 3915 kc. WB6AUH spent about three weeks in New Guinea (VK9) doing a documentary. WA6JDT is trying to work counties now after battling DX. Traffic: (Apr.) W8VDA/6 149, W6LNZ 40, WB6WJO 40, WB6MAE 26, WA6RBD 17, WB6ZJV 16, WB6VSC 7, WB6YTX 6, W6NKR 5, WB6EAG 4. (Mar.) W8VDA/6 207, WA6RBD 30.

SAN FRANCISCO—SCM, Hugh Cassidy, WA6AUD—SEC: W6WLV. There was a good turnout from the San Francisco section at the Pacific Division Convention with every county in the section represented. W6HSA passed away suddenly in Apr. just as he was preparing to return to work after a siege in the hospital. New active DXers in Marin are K6MHO and K6UFT, both in the Novato area. WA6BYZ made the BPL again in Apr. making the list close to twenty for Joe. K6TZN was elected EC for the Mission Trail Net in its recent elections. K6JFY has returned to the air after a long lay-off, testing 7- and 21-Mc. with an end-fed Hertz antenna. WB6QPG received his WAS from ARRL Headquarters and is now the EC in the Arcata area. The Valley of the Moon Radio Club heard WA6AUD discuss various ARRL matters on the visit of the SCM to the May club meeting in Sonoma. VS6DR, well-known on the higher frequencies, was a guest of WB6UJO in June, the Hongkong Big Signal going on to attend the Pacific Division Convention in Sacramento. W6UDL and WA6ALK were mobile on a visit to Missouri in May. W6WLV ran up a score of 68K in the April CD Party. OH2SX visited W6RQ recently, the result of an invitation made over the air. WB6JQP returned from one of his ocean voyages and jumped right back into action with the traffic-handlers on the NCN. Another addition to the NCN is WB6KMI in Sonoma, who takes a turn at N/C on the slow-speed session. Traffic: WA6BYZ 283, W6KYQ 192, WB6JQP 138, W6WLV 137, W6BWV 31, WA6AUD 23, WB6LFT 19, K6TWJ 10, WB6QPG 8, W6RQ 3.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—In Apr., the Springville Rodeo Parade was held, and the following helped in communications and were very successful: WB6RYA, WA6EYO, W6PIX, WB6CMP and WA6FCR. WA6EDQ is mobile on all bands. The Tulare County repeater is going strong again after the winter snows. WB6EYO is mobile on 75. K6RPH is mobile with an SBE-34. W6UBK is putting up a beam for 10-15-20. WB6VFU is running a kw. on 75 s.s.b. W6KTW is chasing DX on 15-20 meters with a three-element quad. The Delta Amateur Radio Club has an emergency trailer going strong. WB6WWV got his General Class ticket. W6JMP got his Advanced Class ticket. W6JUK is building a kw for 2 meters. WB6OWI is on 2 meters mobile and is in Air Force MARS. The Fresno Amateur Radio Club held its 26th Hamfest in Fresno, with 350 in attendance. The Pacific Division Convention will be held here in Fresno in 1970, and you better start making plans to attend. WB6ZBX has a three-element beam for 10-15-20 meters and is building a kw. amplifier. Traffic: (Apr.) WA6SCE 234, W6IPC 217, K6KOL 144, WB6ZBX 100, WB6HVA 80. (Mar.) WB6HVA 90.

SANTA CLARA VALLEY—SCM, Albert F. Gaetano, W6VZT—SEC: W6VZE. RM: WA6LFA. W6DEF returned from his trip to Japan and still had a traffic count of over 100 for the month. While in Japan he visited the Red Cross station (JA3YAQ) at Kyoto. W6RSY, again with top traffic count in the section, has been handling a great deal of MARS traffic that he has been putting into the NTS. Keep up the good work, Ed. WB6BPT has a new electronic keyer that he appears to have mastered. W6ASH still is inactive except for CD work. K6HGV has been monitoring the 2- and 6-meter bands. Norcal Chapter of the QCWA had a display of old ham gear at the ARRL Convention in Sacramento. WB6ZSE received her 30-w.p.m. CP sticker copying with a pen. She also is working with the Monterey Peninsula College Electronics Dept. to get its club station on the air. Members of the West Valley Club have formed a Novice net that meets at 2000 Mon. and Wed. on 21.114 every week. WB6DWX has worked ten countries with his new mobile rig. WB6IYK is trying to tune his quad to perfection. W6VMH gave a talk at the Foothill Radio Club meeting on the building of the Oscar package. Some of the main workers on the package were W6VKP, WA6RDZ, K6GSJ, W6UF and W6VMH. Director Gmelin took his XYL with him to the Board Meeting in New Orleans. Traffic:

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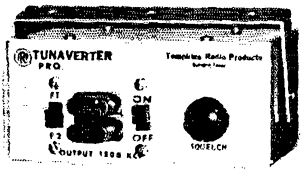

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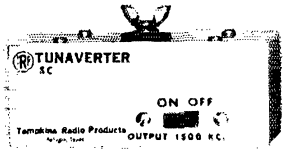

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For noise-free monitoring. No wires to BC radio! Easy installation! Just plug in! 9 or 12 volts. 1 X 3".

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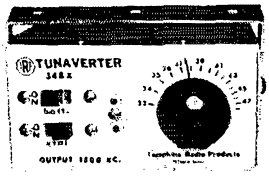

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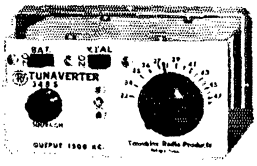

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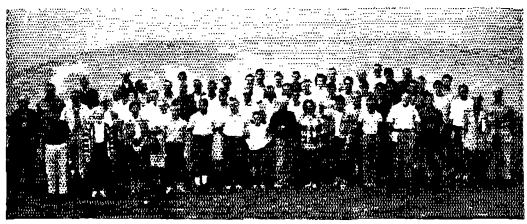


W6RSY 811, W6YBV 314, WA6LFA 212, W6DEF 112, W6VZT 52, WB6ZSE 42, W6AUC 23, K6HGV 20, W6BPT 18, W6ASH 6.

ROANOKE DIVISION

NORTH CAROLINA—SCM, Calvin M. Dempsey, WA4UQC—Asst. SCM: James O. Pullman, W4VTR. SEC: WA4LWE. RM: W4IRE. PAM: W4HJZ. Congratulations to W4EFY on his appointment as OBS. WB4GHK and K4EEY are new ECs. W4EVN made the BPL again. Keep up the good work, Hank. We appreciate all the reports; keep them coming in. We welcome K5TGA/4 from Viet Nam. WA4ZPC has his new 3-400Z linear on the air and it sounds good.

Net	*Freq.*	*Time*	*Days*	*QTC*	*Mgr.*
THEN	3923 kc.	0030Z	Daily	124	WA4VNV
NCN (E)	3573 kc.	2330Z	Daily	82	W4IRE

Traffic: W4EVN 299, K4VBG 76, WA4VNV 71, WA4GMC 58, K4EO 38, K4YCL 18, WA4UQC 14, WA4AKX 12, W4VTR 9, WA4KWC 4, K4ZKQ 2.

SOUTH CAROLINA—SCM, Charles N. Wright, W4PED—SEC: WA4ECJ. PAM: W4VFO. RM: Vacant.

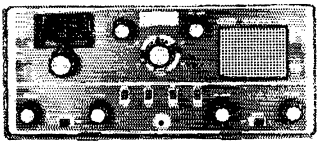
SCPN	3930 kc. 0830 and 1530 EDST	Sun., 12 Noon Daily
SCN	3795 kc. 2245Z and 0200Z	Daily
SCSSBN	3915 kc. 2300Z	Daily Apr. traffic: 124

W4UFV was named Sidebander of the year at the Annual S.S.B. Dinner in Greenville. W4VFO will serve as S.S.B. Net Mgr. and PAM for the 1969-1970 term. Thanks to WB4BZA for his FB performance as retiring PAM. The new arrangement of liaison from the C.W. Net to the S.S.B. Net to 4RN works well and qualifies our S.S.B. Net as a fully participating member of NTS. In Spartanburg, WB4LMS got his 2.5-kw. generator going after its first flywheel ran away and chased him all over his carport. K4LNO's rockhounding keeps him from the rig. K4HDX is putting the finishing touches on his home-brew flying machine. WA4LPX and K4NZE are in Viet Nam. In Anderson, W4PST has a new s.s.b. rig on the air. On Apr. 19 W4FVV/M reported a trailer accident on 126 to the Highway Patrol in Greenville via K4VVT. Traffic: (Apr.) K6QPH/4 60, W4PED 56, W4NTO 44, WB4BZA 23, W4FVV 13, W4BJE 4, W4JA 4. (Mar.) WA4HFA 9.

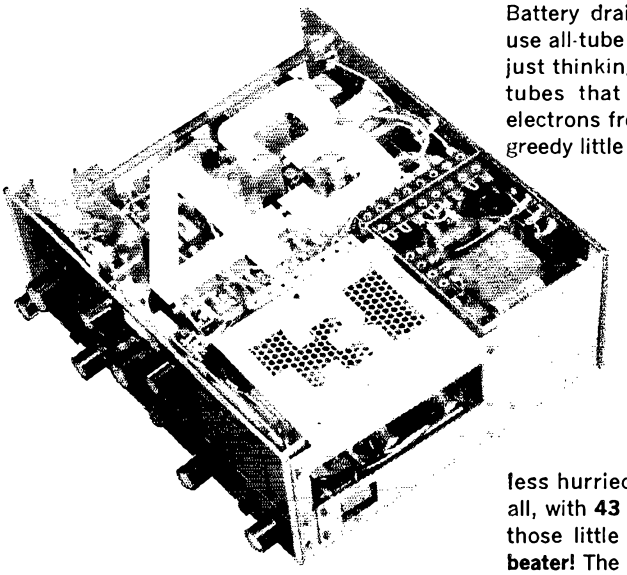
VIRGINIA—SCM, H. J. Hopkins, W4SHJ—SEC: K4LMB. PAM: W4OKN. RMs: WA4EUL, K4MLC. WB4HRA reminds beginning netters that a good place to gain experience is EASN at 2300Z on 3740. WB2LZJ announces 22 w.p.m. code practice on 7030 at 0200-0300 GMT. W4ZYT is a new ORS. K4MLC has awarded VSN certificates to WB4JEZ, WB4GDO and WB4HRA. WB4FDT has CP-30 and WAS. WA4OGZ has been appointed RO for the City of Portsmouth. Mobileers wishing to render or receive assistance would do well to monitor 7255. It is occupied by ECARS, in the East, virtually all day long. W4JXD applauds the fine showing of Virginia hams in both the Phone and C.W. Jan. CD Parties. Please be reminded that nominating petitions for Virginia SCM are due at Hq. prior to Aug. 11, 1969. See June *QST* for details. Another very successful Division LO meeting was held in Apr., thanks to W4ACY, the Greensboro Club and Chairman W8JM. During the summer most NTS nets are meeting an hour earlier GMT but some, like 4RN, may have shifted early sessions to 40 meters. Traffic: (Apr.) W4SQQ 614, K4KDJ 524, WB4CVY 301, W4UQ 226, WB4FDT 200, K4KNP 155, WA4EUL 149, WB4DRB 101, W4ZM 77, WB4DOY 67, K4MLC 64, W4RHA 58, K4FSS 50, K4JM 50, WA4OGZ 50, K4PQL 47, WB4FUJ 42, W4OKN 42, WA4JJF 39, W4THV 38, WA4PBG 27, WB4GTS 24, K4VCY 23, W4ZYT 23, W4YZC 16, W4KX 14, WA4WQG 13, K6ZQB/4 13, WB4FLT 12, W4TE 11, K4GR 9, WA4NJG 8, WA4YTH 8, W4MK 7, W4SHJ 7, K4TSJ 7, WB4GDO 5, W4JUJ 2, W4IA 1. (Mar.) WB4FLT 19.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM—SEC: W8EV. RMs: K8TPF, K8MYU. PAMs: K8CHW, W8IYD. Net Managers: C.W.—W8SQO. Phone—WA8YOF. New QCWA officers are W8CLX, pres.; W8BOK, vice-pres.; W8HZA, secy. The fall meeting will be held at Hotel Frederick, Huntington, during the Roanoke Division Convention, Oct. 11-12. W8HZA was code instructor for the KRC ten-week training course. WA8NDY and WA8WCK report Buckhannon ARC toured the Etam Earth station. WA8TWR is headed for W.V.U. K8MYV made the BPL. W8DUV, K8MYU and WA8YSB have received their WACWV certificates. W8BDD now is W8IT and K8INA is W8CH. W8HVB/8 operated from

SBE



heater beater



Battery drain worries many mobile operators who use all-tube transceivers---dampens their enjoyment just thinking about those dozens or more vacuum tubes that are sitting there siphoning globs of electrons from the car battery merely to keep their greedy little heaters glowing.

Sadly also, this wasteful, heat producing current demand keeps right on even when just listening. Thoughts about the cost of a new set of tubes at replacement time can also be very disturbing indeed.

SB-34 owners who operate mobile are apt to be more relaxed. They need not be unduly concerned about battery drain so their transmissions are a little less hurried---conversations more enjoyable. After all, with **43 heaterless semiconductors** and only **3** of those little glass bottles, every SB-34 is a **heater beater!** The odds of **43 to 3** can be even more in your favor when you use only the receiver to check out "who's where". Flip your standby switch---**heaters off** and the drain from the car battery drops to a mere half-amp trickle.

SB-34 is a passenger-pleaser also. **Only 5" high,** fits under dash and leaves leg room. **It weighs only 19 pounds**---handles like a briefcase. This is meaningful at vacation time when you may want to shift it to your plane or boat---or to a motel. Built-in power supply is dual---12V DC **and** 117V AC for just such contingencies. Add, a "hot" receiver, Collins mech filter, selectable SB's, solid-state switching (no relays), dual-speed RX and TX tuning and much, much more. SB-34 just has to be far out in front as the top choice for mobile.

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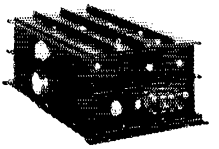

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Raleigh County Home Show with 16 amateurs assisting. New amateurs are WA8WDK, WB8BSN, WB8AST, WN8CJF, WN8CJG and WB8AKR. Serving on the "Amateur of the Year" committee were WA8RQB, WA8HSZ, W8MSP, W8GWR, W8HCY, K8MYU and WA8UUY. W8DUV has been appointed chairman for the Powder Puff Derby, Huntington area. The Mountain State ARC of Elkins operated from 4000-ft.-high Bickle's Knob in Field Day. Traffic: W8SQO 152, K8MYV 122, WA8BBG 113, WA8YSB 90, WA8POS 86, WA8YHH 74, WA8NDY 69, WA8RQB 67, W8HZA 50, W8HVB/8 47, W8CKX 37, WA8YOF 36, WA8WCK 28, WA8WIX 28, W8JM 24, W8DUV 23, WA8TWR 16, K8QEW 6, WA8LFW 5, K8RLC 5, WA8FZP 4, WA8CKN 3, W8WEJ 3, W8ETE 2, K8QYG 2, WA8YCC 2, K8ZNH 2, W8AEN 1, W8AFX 1, WA8AGC 1, WA8ALI 1, W8EKC 1, W8FUU 1, W8KNG 1, WA8MRI 1, W8QEC 1, W8QZO 1, WA8THX 1, WA8TAL 1, WA8WPR 1.

ROCKY MOUNTAIN DIVISION

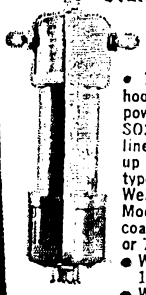
COLORADO—SCM, Charles M. Cotterell, WØSIN—Asst. SCM: Neal S. Morris, KØTIV. SEC: WAØHLQ. RM: WØLRN. PAM: WØCXW. V.H.F. PAM (Denver Metro): WAØLIK. We are looking for interest in V.H.F. PAMs in other areas of Colorado such as the Colorado Springs-Pueblo, Grand Junction and/or the Longmont, Loveland, Ft. Collins, Boulder areas. With 4 v.h.f. nets on in the Denver area, perhaps more, activity is on the upswing. Stations in other parts of Colorado are regularly heard here. A V.H.F. PON is on at 8 P.M., Thurs. 50.4; Six-meter S.S.B. 8 P.M. Sat. 50.115. WØWYX reports the 2-meter t.m. repeater is going good. KØZSQ made the BPL for Apr. and is off for a California vacation with OM DCW. WAØKOQ and WØUAT report CD Party activity. WAØQFY is the new EC for District 10. WØLCE reports wind damage to the antenna. EC reports were received from KØSPR, WAØJEV and WAØKAQ. KØSPR is newly endorsed. OO KØHWB reports 54 cooperative reports mailed. WØLRW is a newly appointed OO. From WØLRN we hear work is progressing on the traffic guide. New OPSs are WØANA, WAØQFY and WAØQZW. A new ORS is WØKAU, CCN net mgr. Traffic: KØZSQ 543, KØMNQ 369, KØJSP 182, WØWYX 128, WØLRN 94, WØKAU 87, WAØMNL 51, KØTIV 32, WAØPGM 24, WØUAT 19, WØANA 16, WAØQFY 16, WAØSIZ 16, KØECR 13, WØSIN 12, WAØLIK 5, WØCBI 4, WØLRW 3, WAØQZW 3, WAØKOQ 2, WØLCE 1.

NEW MEXICO—Acting SCM, James R. Prine, W5NUI—The "Bean Feed" Hamfest at La Mesa, sponsored by the Mesilla Valley Radio Club with K5ECQ as "green chili chef" and host was very well attended and enjoyed by all. An auction of various items was held. The New Mexico Net (NMN), meets on 3760 kc. at 0100Z Tue.-Sat. during Daylight Saving Time. K5MAT, manager, had a fairly good month with QNI 95 and QTC 40. WA7FBV has a new HW-100 on the air. Field Day equipment should be serviced and kept in readiness for emergency work. Contact your local EC or State EC. W5PNY. Traffic: K5MAT 117, WA5UJY 105, W5DMG 37, WA5MIY 19, WA5OHI 18, W5MYM 16, W5NUI 16, W5PNY 9, W5BWV 8, W5NON 6, WA5BLI 4.

UTAH—SCM, Thomas H. Miller, W7QWH—SEC: W7WKF. RM: W7OCX. W7EAI and W7VTJ are teaching simultaneously General and Novice classes for the blind at the Blind Center in Salt Lake City. W7JSS also is helping out. WN7LFS and WN7KHC, who just recently received their tickets, have been very active on the bands. WN7KHC has worked 39 states with 30 confirmed and WN7LFS has worked 20 states. VE, CE, JA, JH, and ZL. Both fellows are blind and doing exceptionally well in their new hobby. BUN and TWN have changed to Daylight Saving Time and TWN has moved to 7070 kc. W7LQC has installed a new beam on top of a 90-ft. pole. K7ZJS sent 59 OO reports during the month of Apr. He also has qualified for Class 1 Official Observer. Please send your reports in at the end of each month. Station activity report forms are available from me on request. Remember the ARRL Rocky Mountain Division Convention, July 4, 5, 6, in Salt Lake City. Traffic: W7EAI 78, W7OCX 58.

WYOMING—SCM, Wayne M. Moore, W7CQL—SEC: K7NQX. RM: K7KSA. PAMs: W7TZK, K7SLM. OBSs: K7SLM, K7NQX, W7SDA. K7TAO WA7FHA. Nets: Pony Express, Sun at 0800 on 3920; YO, daily at 0130 GMT on 3610; Jackalope, Mon. through Sat. at 1215 on 7260; Wx Net, Mon. through Sat. at 0630 on 3920. New officers of the Shy-Wy Club: W7COK, pres.; WA7KUE, vice-pres.; WN7JYO, secy-treas. K7IMA

$12.95 W2AU FOUR PURPOSE BALUN $12.95



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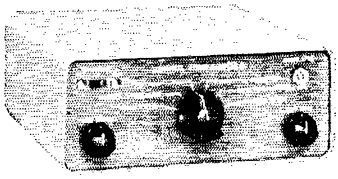

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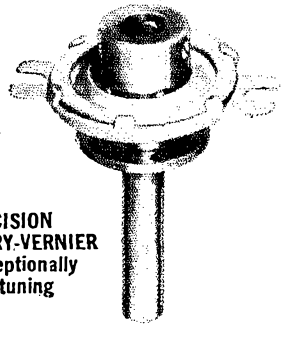

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has moved to Samoa. WA7KKH has moved to Midland Tex. W7WCL is moving to Vermont July 1. K7SAR ha moved to a home in the country. W7VJI has bee visiting in Massachusetts. W7HDS has compiled a lis of all the Cheyenne hams. The SCM's Field Da trophy will be presented at the hamfest, so send m your Field Day report as soon as you can. WA7KK won the Laramie Science Fair with his satellite weathe data collector. K7YUG is giving his new beam a goo workout. K7NQX has a new communications van an is getting it outfitted. Traffic: K7NQX 356, W7SDA 59 W7TZK 59, K7AHO 22, W7NKR 21, K7VWA 19 WA7BDI 16, K7WRS 8, K7OVD 5, WA7AUV 2.

SOUTHEASTERN DIVISION

ALABAMA—SCM, Donald W. Bonner, W4WLG—SEC K4KJD. RM: K4BSK. PAM: WA4EEC. The BARC certainly put on an FB hamfest this year in Birmingham. WA4MTG got the TR-4 with power supply K4BSK got the Swan Signet. K4KJD was awarded the annual Citizenship Award by the Birminghan Club. Congrats, Billy. It was good to have K4KQ our Director, with us. Other awards presented were PAM Sweepstakes to W4CBG (phone), RM Sweepstake Award to W4MKU (c.w.), SEC Field Day Award t HARC and the NADXA DX Trophy to W4ZNI WB4IEY is the new NM for AENR and the new schedule is Tues., Thurs., Sun. at 1915 CDST. W4USM and K4AED are new OPSs, W4USM is a new ORS K4AED is a new OO. How about more activity o 160 meters. W4AUP is on and can give all the details With all the a.m. transmitters and simple converter around it should be easy to get on and conditions are good at night. Traffic: W4HFU 145, K4BSK 109 WB4EKJ 105, WA4FYO 95, K4AOZ 68, WA4VEK 58 WN4KSL 43, WA4GGD 34, W4FVY 25, WN4MIN 24 WB4GMH 22, WN4KDI 19, W4WLG 16, WA4ROP 14 K4WHW 10, WN4LAL 9, K4ADK 5, W4DGH 5 WB4LAO 5, K4KJD 4, WN4KSJ 4, WB4KSM 4.

CANAL ZONE—SCM, Russell E. Oberholtzer, KZ5OE —The CARC is firming plans for Field Day. The CZARA held a farewell party for KZ5WI and KZ5WC KZ5WC is retiring stateside and KZ5WI is retiring in ZL-Land. Congrats to all who passed the Advanced Class test. Ex-KZ5AJ is coming back to KZ5-Land after a tour of duty in Vietnam. KZ5SA and KZ5CT are on cloud 9. Their son recently returned from Vietnam and is stationed in the Zone. KZ5MPN and KZ5CON are off on stateside vacations. KZ5OB is off to school in 9-Land for a few weeks. Recent visitors to the Canal Zone included HC1RR and W9OIG and his XYL. Traffic: KZ5SF 184.

EASTERN FLORIDA—Acting SCM, Ronald J. Locke, W4YPX—SEC: W4IYT. Asst. SEC: W4FP. RMs: W4ILE, K4EHY, W4RWM. PAM 75M: W4OGX. PAM 40M: W4SDR. V.H.F. PAM: WA4BMC. Official Bulletin reports were received from K4DAX, K4LPS, W4OGX and WA4EYU. Traffic reports are now starting to dwindle some because of summer activities. Sure would be nice to have an even amount the year round. Those of you who missed the Orlando Hamfest really missed a good time. It was especially nice to see W4IYT and all his family there. WB4AIW has been in the hospital for a while, but is doing OK now. W4DFU participated in the University of Florida Engineering Fair. Everyone seemed to be impressed with the radio exhibit. W4LEP had surgery and went QRT for a short while. He is back in the grind again, though. George has received his WAS, W-Del, and Ford Tin Lizzie awards. WB4FLW has resigned as NHN manager because of the pressure of school work. Ted reports he finally got some QSLs from the Bureau. W4YNM reports the Columbia ARS recently held a work day and has its 2-meter rigs installed in the cars. We also understand that W4CYG checks into the West Florida Net, so you can get rid of your Lake City traffic that way. W4ILE has curtailed his activities because he is teaching his XYL and harmonics. When they all get tickets, I wonder how they will schedule operating time Traffic: W3CUL/4 936, WA4SCK 551, W4DFU 314 WB4AIW 308, WB4HJW 305, WA4IJH 239, W4FPC 214 WA4FGH 176, W8BZY/4 143, K4LAN 128, WB4IER 112 K4DAX 104, W4SDR 101, W4EHW 80, K4LEC 73 W4SMK 65, W4NGR 60, WB4ADL 59, WB4EPD 51 W4AKB 50, WA4HED 50, W4FP 49, W4TJM 48, K4SJF 42, K4IEX 38, W4YPX 28, W4OGX 36, WA4CIQ 33 W4IYT 33, WA4HDH 32, W4IAD 27, W4LK 24, W7OX/ 22, K4EBE 20, K4LPS 18, WA4EYU 16, WB4KWJ 13 W4SOM 11, W4VPQ 9, W4LEP 8, W4SCY 6.

GEORGIA—SCM, Howard L. Schonher, W4RZL— SEC: WA4WQU. RM: W4FDN. PAMs: K4HQI, W4YDI W4HYW finds time to handle OBS schedules and operated some new nets. WB4HLX has his Advance

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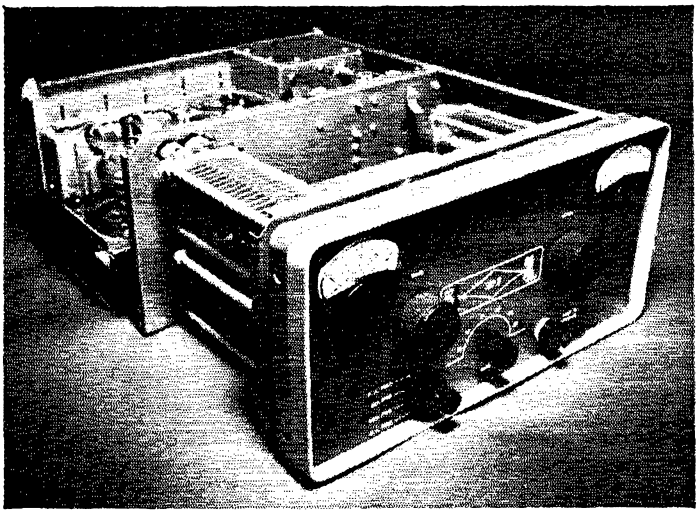

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Class license and a new Thunderbird Tri-Bander with an HW-100 in the works. W4LRR is Extra Class. W4DQD reports a new club in the Statesboro area—the Georgia Southern Area ARC. It will operate W5TIA/4 in the QSO Party. W4FEW has a new SP-600, WB4GTB an R4-TX4, WA4NJP a Swan 250 and kw. linear on 6 s.s.b. W4BGH modified his HW-17. WB-6UTC/4 has a Swan 500. K4TXK soloed in a T-38. WA-4GXZ enjoys traffic, ragchewing and home-brewing. Which kind, Art? WA4UQQ has an SR-400 back in top shape. GSN completed 60 sessions with 330 check-ins accounting for 145 messages. The Georgia S.S.B. Net with 30 sessions checked in 903 stations for a traffic total of 84. We hope soon to be able to report the many patches handled by the Georgia S.S.B. Net along with the formal traffic. W4DDY is snowed under at work. Sure tears up the traffic total, doesn't it, Homer? W4TYE reports the Cornelia Radio Club is sponsoring a new Novice program with 18 students. Habersham County should soon have a fine ham population. Traffic: (Apr.) WB6UTC/4 121, K4TXK 83, WA4RAV 62, W4TIF 56, WA4GXZ 55, W4NSO 53, W4FDN 52, W4PIM 49, W4CZN 42, WA4UQQ 34, W4DDY 17, WA4BVD 14, W4RZL 11, W4REI 9, W4TYE 8. (Mar.) W4YDN 39, W4DDY 37, W4TYE 20, WB4GOJ 2.

WESTERN FLORIDA—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4IKB. PAM: V.H.F.: K4NMZ. RM: K4UBR. RM-RTTY: W4WEB. Nets:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*
WFPN	3957 kc.	2200Z	Daily	30	720	96
QFN	3651 kc.	2230/0200Z	"	60	—	—

Many W. Fla. hams attended the Orlando Hamfest. Three section f.m. repeater groups were represented and joined the station association. New hams are WN4MPM, Tallahassee; WN4MPI, Panama City, WN-4MNM, Milton; WN4MUS, Pensacola, Perry: W4RTN is on 75-meter s.s.b., and promises to be on 2-meter f.m. shortly. Jasper: W4WCU has been QRL building a house, but hopes to put rare Hamilton County on the air soon. Tallahassee: W4MQQ is preparing a list of hams in the Capital City. State c. d. bought a new 80-watt 2-meter f.m. rig and gain antenna for the area hq. here; WB4AWU is the chief op. Chipley: WA4ZIM has 50 watts on 2 meters. Panama City: K4AHV is conducting another code class. The PCARC set up a booth for traffic at a shopping center on Armed Forces Day. Fort Walton: The N.W. Fla. F.M. Assn. finally received its own call, WB4KLT, and repeater authorization from the FCC. K4UBR completed his 12' x 24' panelled ham shack. Pensacola: The FFARA received the memorial call W4UC. W4ETE was appointed OBS for the FFARA. QFN is down to six members in West Fla., five of them in Pensacola! Traffic: (Apr.) K4LAN 128, WB4HKM 74, WZ4EOQ 28, W4WEB 25, W4IKB 23, WB4DVM 20, WA4JIM 20, WB4JGY 16, W4RKH 14, WB4EQU 7. (Mar.) W8RIY/4 58, K4UBR 8.

SOUTHWESTERN DIVISION

ARIZONA—SCM, Gary M. Hamman, W7CAF—SEC: K7GPZ. RM: K7NHL. PAM: W7UXZ. EC Pima County: K7CET. EC Maricopa County: K7WUG. The Ft. Tuthill Hamfest has been moved up to July 11, 12, 13 at the Coconino County Fairgrounds located five miles south of Flagstaff. Camping and trailer facilities are available in addition to many motels in Flagstaff. Swapfest, entertainment Sat. evening, transmitter hunts and pot-luck lunch on Sun. are some of the activities planned. K7CRO now has a repeater on Mt. Lemmon operating 2-meter f.m. An automatic phone patch has been installed by the Arizona Repeater Assn. at its repeater in Phoenix. W7SBM has been elected mayor of Youngtown. K7UXG now has a camp trailer. W7DLF and W7UXZ now have Advanced Class licenses. Several stations continue to run overseas phone patches, including K7HQF, W7KYM, WA7CYB, K7NOS, K7UGA and K7GPZ. Last month K7UGA completed 2935 patches. Local telephone company officials indicate their Voice Coupler is now available at a charge of $.50 per month plus the usual installation charge of $7.50. Contact your local telephone office or your SCM for more details. Copperstate Net handled 220 and Arizona Post Office Net 37 messages in Apr. Traffic: W7GEP 513, K7NHL 230, WA7IIF 66, W7CAF 45, WA7FNN 36, W7SBZ 31, K7NOS 27, W7DLF 25, W7OUE 15, WA7FEG 14, W7UXZ 14, W7OIF 12, WA7EQC 11, W7LLO 11, W7JMQ 10, W7WGW 10, W7KYM 8, W7YXA 8, WA7HLU 7, W7CEN 6, K7RLT 5, K7JFY 2.

ORANGE—SCM, Roy R. Maxson, W6DEY—K6OT, hobbling around with an injured knee, now sends with his left foot. OO WA6JZZ has added a scanalyzer to the 75A-4 for furnishing better reports. My thanks to the Fullerton Junior College Amateur Radio Club for its offer of assistance; particularly WA6GYR, pres., and WA6FSK, advisor. SEC WB6RVM and the following AREC members participated in the CIF Tennis Matches, furnishing communications between the different, widely-separated courts in the Santa Ana area. WB6QAK, W6JTZ, WA6YWN, W6WRJ, K6MJU, WA6TSU and W6DEY. WB6JQX, pres. of the Anaheim Amateur Radio Association, Inc., was recently the featured speaker at the Massachusetts Institute of Technology. W6KFF, of the Anaheim Heath Center, recently passed the Extra Class exam and got the new call. Traffic: WB6ANT 90, W8ELW/6 63, W6WRJ 38, K6OT 10, WA6TAG 8, W6BUK 6.

SAN DIEGO—Acting SCM, Richard E. Leffler, WA6COE—SEC: WA6KHN. Our section has need of OO, OPS, OBS and OVS appointees. Does anyone care to fill these vacancies? Apply now to the SCM. Club news: Elections have taken place all over the section. Results show that the ARC-EI Cajon ARC elected W6IJO, pres. Palomar's club is headed by K6HAV. WA6DOT is the call of the new UCSD Club. SOBARS elected W6SRS as pres. Our newest club is W6ISA, the Southern Pacific Amateur Radio Contest Society. Further information may be had through K6VZA. North Shores elected WB6SOK as pres. Other election results: County Council has K6YRF as chm. The V.H.F. Club elected WA6ZXJ as leader. Section news: Sun., Apr. 27 saw the 31-mile march communications handled by both CB and amateurs jointly! WA6DOT (club) handled the 23rd Annual Torrey Pines Soaring Meet on 6 for two days. K6EQN and K6ROR are now at 432-Mc. WB6UMT is now station custodian of KR6KI, Camp Kinser, Okinawa. Code practice is held T-W-TH nights on 21.180 at 2030. WB6SEZ and WB6KSA work together on this. WB6KSA is now OPS. Active hams and clubs in Imperial County should contact the SCM. Traffic: (Apr.) K6BPI 9450, W6VNQ 462, W6EOT 400, W6BGF 317, W6LRU 173, WB6ZDJ 151, (Mar.) K6BPI 9960, W6BGF 464, W6EOT 344, W6LRU 196. (Feb.) W6BGF 467, W6EOT 409. (Jan.) W6VNQ 600, W6EOT 552, WB6ZDJ 180. (Dec.) K6BPI 10697, W6VNQ 728, WB6ZDJ/6 207. (Nov.) WB6ZDJ 167.

SANTA BARBARA—SCM, Cecil D. Hinson, WA6OKN —SEC: K6GV. RM: W6UJ. The Cal Poly ARC, W6BHZ, had a fine exhibit during Poly Royal with several operating positions and much traffic being handled. WA6COE has received his General Class license. W6NLJ is suffering from TVI. W6UJ got his DXCC. W6EKO spends his time active with civil defense. W6OUL is out after the rare ones. WB6NGU can handle traffic in and out of Buellton, as demonstrated during the recent floods. W6UJ reports a decrease in his activities because of work and personal obligations. K6GOS will again lead the Simi Valley ARC to great things during Field Day. K6AAK has acquired a new Hallicrafters SR-400. W6HW is building a Heath HW-100. W6KZO will be moving to the San Luis Obisbo area. WN6ZWM has a new Drake R4 and T4 waiting for his General Class ticket. Traffic: (Apr.) WA6DEI 322, W6UJ 6. (Mar.) WA6DEI 186.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. E. Harrison, W5LR —Asst. SCM: E. C. Pool, W5NFO. SEC: W5JSM. PAM: W5BOO. RM: W5QGZ. Top excitement in Apr. included the Navy MARS East Texas gathering in Tyler State Park, attended by some 75 people including Com8 Chief Radioman and OO W5PBN. W5MSG is looking for intruder near 3770 1300-1400Z Sun. The Abilene Swapfest had a nice crowd. Several Northern Texas League appointees participated in the CD Contest. The San Angelo Radio Club reports its new call is W5QX, requested in memory of Carl Brinegar, long-time West Texas amateur. The CapRock Radio Society publication, *Ignition Notes*, advises club meetings are held the 1st and 3rd Tue. of the month at the Red Cross Bldg. WA5VES is Field Day chairman. Also WA5CPK assisted with the printing of the club paper. W5EYB, Director Albright, will address the CARS Thurs., Aug. 14, preceding the West Gulf Division Convention in Amarillo. WA5KHE, EC Nacogdoches County, reports extreme amateur activity in Stephen F. Austin College together with the establishment of a Message Center for use by students. The Garland Club reports two new General Class licensees, Carl and Barbara. Your SCM has on hand a new list of ARRL clubs in Northern Texas. Drop me a line and I'll send same. The new *RACES SOP*

and Traffic Manual is out for perusal. W5RHF is rapidly becoming eligible for the "Big Hat." WA5PPF applied for OPS appointment. W5NC sent a QCWA Luncheon announcement for the Houston gathering. Irving ARC is doing great job with v.h.f., u.h.f. and 10-4 CB people. The Director's Houston SCM/SEC meeting was very informative. See results of the Board meeting in *QST*. W5VEZ, Forth Worth OO, resigned because of urgent business. RM W5QGZ assisted W5IL, former SCM (1920 era), in working his rig over. We have 12 Asst. Directors in the West Gulf Division, namely W5BGE, W5CCV, W5CNO, W5DZ, W5DRZ, W5EJT, W5FW, W5GR, W5CL, W5MFX, W5SG and W5UZX. W5QPX certified 145 observations in Apr. for a record thus far. W5FCX reports new officers of the Pampa ARC. Traffic: K5BNH 2111, WA5TYH 580, W5RHF 216, W5QGZ 155, W5HVF 146, WA5KIV 127, WA5PPF 121, W5JSM 65, K1ZAT/5 55, W5FCX 54, W5LR 14, WA5QWA 10, WA5CTJ/5 8, WA5VES 8, WA5QQR 4.

OKLAHOMA—SCM, Cecil C. Cash, W5PML—Asst. SCM: Willie L. Stover, K5OOV. SEC: WA5FSN. RM: W5QMJ. PAMs: W5MFX, K5TEY, WA5JGU, K5ZCJ. The amateurs in this section are becoming more and more emergency and public-service minded. This is evident by the fact that during adverse weather conditions you can once again find a weather watch net on 3855 kc. with v.h.f. links on 50.25 and 144.1 Mc. direct to the Weather Bureau through the state c.d. communications center, which has direct communications with police dept., highway patrol, sheriff's dept., fire dept., CAP, and Red Cross. This watch is not only for reporting weather. At least twice in the past month mobile stations on 50.25 Mc. were the first means of communications at the scene of auto accidents with

injuries. In both cases an ambulance and the highway patrol were notified. Credit goes to WA5TVY, WA5JGU, K5ZYU and WA5HUN. W5JKK is the proud owner of a new SW-500C. W5UZX is now running an SW-240 mobile. W5TKC is operating an invisible antenna (in the attic). The Miami Club has been revived with WA5FLU pres., and K5JOA vice-pres. Congratulations to Extra Class licensees W5LTJ and W5NL; Advanced Class W5JRK, WA5OUO, K5VWQ, and WA5WMK; General Class WA5WHO; Technician WN5WAH, WN5WHV and WN5WIC are waiting for a notice to change the "N" to "A". Net reports.

Net	*Sess.*	*QNI*	*QTC*	*Net*	*Sess.*	*QNI*	*QTC*
OLZ	15	39	112	SSZ	17	31	9
OPEN	4	149	10	STN	25	680	45
OPON	22	306	190				

Traffic: K5TEY 2869, W5QBF 293, W5QMJ 96, WA5IMC 65, WA5LWD 57, WA5QIQ 54, W5MFX 43, W5FKL 37, WA5FSN 28, WA5KFT 28, W5PML 25, K5SWL 22, WA5AOB 21, K5OOV 14, WA5NZM 11, WA5DZP 7, K5CBA 4, W5IQ 4, WA5RYM 2.

SOUTHERN TEXAS—SCM, G. D. Jerry Sears, W5AIR—SEC: K5QQG. PAM: W5KLV. RM: W5EZY. New EC appointment: WA5TXI for Grimes County (home QTH is Navasota) and WA5FJN for Montgomery County (QTH near Magnolia). Your SCM and SEC presented certificates at the home of WA5FJN. Congratulations to WA5FJN on making the BPL with 527 pieces of traffic in Apr. He reports his traffic was "with the help of some FB operators." Nice to have you fellows aboard. Both operate v.h.f. and u.h.f. PAM W5KLV got the bugs out of his mobile rig and is working on an Extra Class ticket. K5WYN, NCS for West Gulf Emerg. Net, has been busy making *some patches for marine mobile.* The Golden Triangle meetings have been going great. The Port Arthur Beaumont and Orange ARCs meet several times each year together which keeps up interest. ORS/OPS K2EIU/5 was on duty at Tinker AFB in Okla. in Mar. and Apr. and now is back with the So. Texas gang. At a recent meeting of SCMs, SECs and our Director W5EYB, we learned that Nacogdoches County was listed as in Northern Texas so Southern Texas lost an EC, WA5KHE, and ORS WA5KIV and Northern Texas has gained some action. Several of the So. Texas clubs are making serious plans for Field Day. Best of operating to all and good luck. If you haven't heard it on the air here it is again: Be sure your emergency power is in good operating condition. The hurricane season is approaching; the twister season has already begun. Traffic: (Apr.) WA5FJN 525, WA5TXI 156, WA5KIV 127, WA5GNP 88, W5BGE 87, WA5AUZ 61, WA5QKE 56, W5CWE 37, W5TFW 30, W5ABQ 27, K2EIU/5 15, K5HMF 12, W5AIR 5, K5WYN 4, W5KLV 2. (Mar.) K2EIU/5 87.

CANADIAN DIVISION

ALBERTA—SCM/SEC, Don Sutherland, VE6FK—PAM: VE6ADS. ECs: VE6SS, VE6AFQ, VE6XC, VE6AWM. The Alberta Public Service Net is averaging 1500 QNI per month but formal traffic is light. Let's all originate more traffic. The new officers of the Hat Ham Club are VE6AAI, pres.; VE6UH, vice-pres.; Jack Sears, secy.; VE6ALA, treas.; VE6TR, exec. officer. VE6AWF, CARA, pres., enjoyed his recent visit to the Hat Club. The CARA classes turned out eleven new hams, a passing percentage of 85. Congratulations to VE6ALS and his able assistants. The proud winners at the NARC Awards Night were: Sacker Tech Award, VE6ARA; Home Br., VE6AJX and VE6AOW; Merit Awards, Ex-VE6, N. Burtch and VE6EA; Bunny Hunt, VE6FB; Broughton V.H.F. Award, VE6HR; the VE6LF Memorial P R Award, VE6ALJ. The CAREC recently helped out in a mountain rescue operation. A full report will be submitted by EC VE6AWM. VE6TG, our former SCM, has started his nomadic retirment life. Best of luck, Harry, we will all be looking forward to many visits from you.

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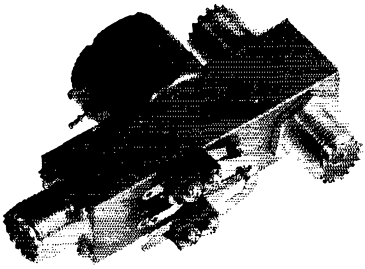

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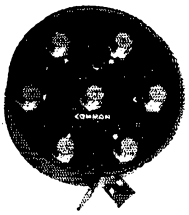
REMOTE 115V ac
60-262842



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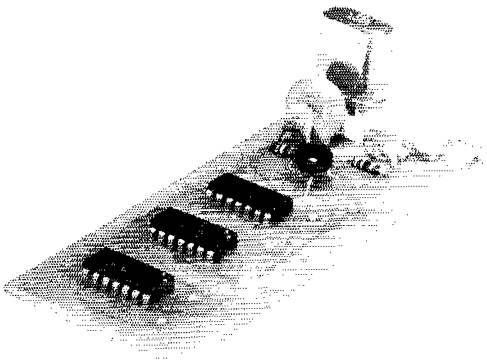

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BRITISH COLUMBIA—SCM, H. E. Savage, VE7FB —VE7XN (ex-VE3LR and VE3XR) was visited by the holder of his old call, VE3XR. VE7Vancouver, Sea, Festival will be sponsored by VE7BVG. Many people have taken to gardening and fishing so that news is nil. The Royal City ARA's officers are VE7ABS, pres.; VE7AGL, vice-pres.; VE7NW, secy. The Vancouver Island Microwave Society held its first meeting. VE7GG has been AWOL nets while building a super-duper ham shack. VE7KY will be confined to the hospital for some time. A nice report was received from VE7ASX and we hope he soon will be active. VE7CAK is active with an FT-DX400. VE7BVB is leaving the Fraser Valley for the Interior. Sure hope we can still copy our new net mgr. Traffic: (Apr.) VE7LL 22, VE7SE 5, VE7AC 4, VE7GG 4. (Mar.) VE7AC 27, VE7FQ 12.

MANITOBA—SCM, John Thomas Stacey, VE4JT—The Peace Garden Hamfest comes up on July 12 and 13 and from the advance information on plans it will be a very worthwhile endeavor. VE4RE and VE4QG supplied equipment and gave a demonstration on 2-meter operation. VE4WJ is new in Alexander and is the father of VE8DL. VE4EG lost his beam and quad during a recent storm. VE4FO reports successful contacts outside the Dauphin area on his slow-scan TV system. VE4EI is Off to Flin Flon for the summer and has been checking on the activities of the RTTY Autostart Net on 14.075 and 3.6275 Mc. Net reports for the month: MTN, sessions 30, QNI 125, QTC 48. Phone Net, sessions 29, QNI 523, QTC 13. Traffic: (Apr.) VE4EI 35, VE4RO 35, VE4FQ 33, VE4YC 16, VE4JA 14, VE4XN 10, VE4QJ 9, VE4NE 6, VE4RL 6, VE4OC 3, VE4FO 2, VE4JK 1. (Mar.) VE4FQ 13.

MARITIME—SCM, William J. Gillis, VE1NR—SEC: VE1HJ. VE1AMR recently was appointed net mgr. of APN. Walt advises that APN is in need of additional operators and stresses that APN is a training net and welcomes all newcomers regardless of speed capability. VE1AKO recently attended the Midwest YLRL Convention accompanied by OM VE1AGM. VE1AJR is off to Tanzania and plans to operate under 5H3. The Halifax-Dartmouth Clubs are offering an FD trophy for local participants. Congrats to the Moncton Club on graduating 9 trainees; all passed the DOT exams. VE1PI, despite confinement to a wheel chair, keeps active and does a fine job of assembling kits for the local gang. VE1XG is back from a cruise to South America. VE1CX is off to G-Land. Don't forget the convention in Dartmouth on Labor Day week end. Net report: APN, QNI 326, QTC 105, sessions 60. Traffic: VE1AMR 113, VE1RO 91, VE1AUD 78.

ONTARIO—SCM, Roy A. White, VE3BUX—One of the real old-timers in many phases of radio, VE3MJ, passed away in April. Jack was an Inspector with the D.O.T. at one time and started station CFCO in Chatham. The CJ Banquet in Toronto in Apr. drew about 200 amateurs including many from VE2-Land. VE3FW, who is 88 years young and still "active," was there. Also present were 23 blind amateurs. A collection to aid the worthy efforts on behalf of these boys netted close to $200.00. Somebody took your SCM gently to task because a certain Silent Key had not been announced or published in *QST*. The answer is simple. If you don't tell me, how am I supposed to know? The OPN has been streamlined and is producing good results. No more alphabetical roll-call. It's first come, first served. VE3CXB has given up running the Muskeg Swap Net after three years but is making arrangements for it to carry on. The Ottawa ARC publishes valuable Propagation Prediction Charts, courtesy of VE3DAM. VE3BND is active again after an absence of too many years. Your call-letter decal on the rear window of your car is a good way to publicize ham radio, whether you are "mobile" or not. The Oxfam Walk was bigger than ever this year. It is perhaps significant that the GRS boys are taking an increasing participation in this sort of thing. Belleville and Kingston Clubs teamed up in Apr. to hold a joint auction with the proceeds going to the C.N.I.B ARC. The same two clubs held a banquet together in May and the Kingston Club is looking for a 2-meter repeater base location. I hear that RSO is about to publish an RTTY handbook. It will be available around Sept. The RTTY group is trying to get the Bureau of Standards and the DOT to provide a series of audio standard frequencies as an extension of the WWV and CHU services. Traffic: (Apr.) VE3GI 334, VE3DV 164, VE3ERU 158, VE3DPO 107, VE3BUX 105, VE3AWE 100. (Mar.) VE3GI 210, VE3DV 157, VE3ERU 143, VE3CYR 121, VE3BUX 103, VE3DPO 103.

ONTARIO QSO PARTY

July 19-20, 1969

All amateurs are invited to participate in the Ontario QSO Party, sponsored by the Radio Society of Ontario, Inc.

Rules: 1) The time period is from 1700 GMT July 19 to 2400 GMT July 20. 2) There are no power restrictions and all bands can be used. Contact credit with the same station on different bands and/or modes will be given. 3) Ontario stations score 1 point per contact and multiply by the number of ARRL sections and foreign countries worked. Outside stations score 3 points per Ontario station and multiply by the number of Ontario counties worked on each band. 4) Certificates will be awarded to the highest scoring station in each ARRL section. Certificates will be awarded to the highest scoring station in each Ontario county provided a minimum of 25 contacts had been made. A trophy will be awarded the highest scoring Ontario station. 5) Suggested frequencies: 3560 3685 3855 3909 7030 7240 7290 14,040 14,140 14,225 14,290 21,050 21,300 28,100 28,600 50,250 50,360 144,000-144,500 and 145,800 kHz. 6) Ontario stations send QSO number, report and county. Others send QSO number, report and section or country. 7) The general call to be used is "CQ Ont" on c.w. and "Calling any Ontario station" on phone. 8) Logs should be postmarked no later than Aug. 31, 1969 and sent to the "Contest Chairman," Radio Society of Ontario, Inc., P. O. Box 334, Toronto 18, Ontario. Stations sending an s.a.s.e. will receive a copy of the results.

QUEBEC—SCM, J. W. Ibey, VE2OJ—SEC: VE2ALE. RM: VE2DR. The Ontario-Quebec Net has been asked to consider 0200 GMT instead of 2300 GMT because of the erratic conditions propagation-wise. VE2BVY, inactive for a few weeks, has slowed operation of Reseau de Telegraphie du Quebec (RTQ). VE2APT is kept busy as NCS of the AREC nets. VE2AXT has been endorsed as Official Observer. This reminds us of the need for more OO appointees. We also are in great need of PAM for both h.f. and v.h.f./u.h.f. The VE2TA 2-meter repeater on Mt. Bruno is greatly missed since the heavy snows last winter damaged the antenna. VE2BGJ ran a meteor shower contact with KØMQS on 144.200 Mc. This is believed to be the first VE2/KØ (Iowa). VE2DJJ, secy., says the Wagar High School Amateur Radio Club will accept any given amount of radio gear. La première expérience du concours VE2 s'est avérée un franc succès; d'autres améliorations seront apportées au concours de l'an prochain; félicitations à VE2WM pour son excellent travail dans l'organisation de ce "contest." Le comité de traduction de VE2DBF est très actif. Tous les amateurs du Québecen connaîtront bientôt les résultats. VE2NR est actif sur 20 mètres. VE2AAH opère maintenant avec un kilowatt. Quelques nouvelles voix sur le 75-mètres s.s.b.: VE2JH, VE2TO, VE2DJT, VE2ADF, VE2DGT, VE2AOF. Traffic: VE2BVY 86, VE2AJD 45, VE2DR 37, VE2CP 30, VE2OJ 29, VE2ADE 22, VE2ALE 17, VE2DKJ 5.

SASKATCHEWAN—SCM, Gordon C. Pearce, VE5HP —Hamfest in Saskatchewan 1969 will be held in Moose Jaw the week end of July 5-6. One of the most serious floods in Saskatchewan's history occurred during the spring thaw and runoff in the Qu'Appelle Valley this year. At Lumsden and Fort Qu'Appelle, amateurs provided emergency communications for the Saskatchewan Emergency Measures Organization. The turnout of Regina and District hams was outstanding, and appreciation was expressed by the EMO for the job well done. Under the very able direction of VE5DO, assisted especially by his XYL, VE5HO, the effort was participated in by the following: VE5s DO, HO, DA, OF, VD, KE, KK, KM, PO, RQ, TO, JU, EJ, UU, KF, GG and VE2UQ/5. Besides the base station manned by VE5HO, base stations were set up at Fort Qu'Appelle and Lumsden and were assisted by mobiles in those districts which relayed messages into a portable station established in the Legislative Buildings in Regina. The 2-meter repeater station is fully operative in Regina. Running 30 watts at present, mobile relay between Moose Jaw and Regina has been made. Saskatoon and Prince Albert amateurs provided communications between check points throughout the walkathons held in the province during Apr. and May. Traffic: VE5KZ 10, VE5EO 2, VE5PX 2, VE5RE 2, VE2XG 2, VE5YR 2.

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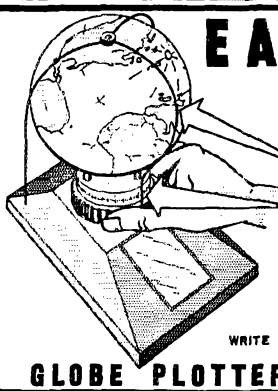

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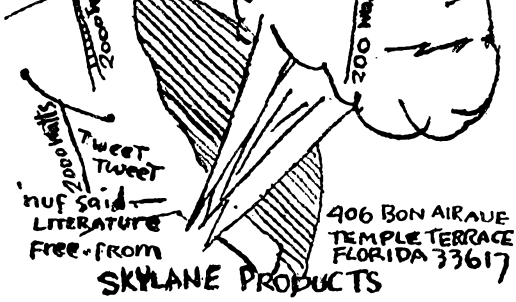

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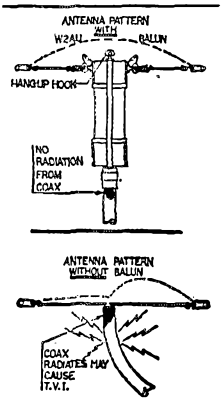

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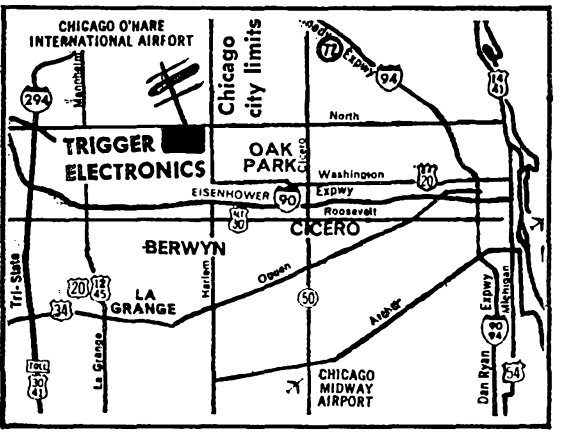

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516F-2 AC	119	HT44 &AC	299	CLEGG 22ER NEW.	249
516E-2 28VDC	99	SX73	399	NCX5 &AC	399
30L-1 MINT	349	SX105	49	NC155	129
DRAKE 2A	169	SX111	149	HRO500 MINT	1150
DRAKE 2B	209	SX130	159	LF10 MINT	249
DRAKE 2AQ	29	WR2000	79	HEATH SB101	379
DRAKE R4A	299	S240	99	HEATH HP23	47
DRAKE TR3	359	SR42A	149	HEATH SB301	269
SBE34	279	SR46A	139	JOHNSON RANGER.	99
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SPECIAL — LIMITED QUANTITY 722 VFO W/AC 751 AC SUPPLY $60
SPECIAL — NEW EICO SUPPLY $35
KITS — prices subject to change without notice

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RUSH THE FOLLOWING: Enclosed

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TRIGGER Electronics
7361 NORTH AVE. • RIVER FOREST, ILLINOIS 60305
(WEST SUBURBAN CHICAGO)

Where the HAM IS KING!

HAM-ADS

(1) Advertising shall pertain to products and services which are related to amateur radio.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters. Ham-ads signed only with a post office box or telephone number without identifying signature cannot be accepted.

(3) The Ham-Ad rate is 35¢ per word, except as noted in paragraph (6) below.

(4) **Remittance in full must accompany copy, since Ham-Ads are not carried on our books. No cash or contract discount or agency commission will be allowed.**

(5) Closing date for Ham-Ads is the 20th of the second month preceding publication date.

(6) **A special rate of 10¢ per word will apply to advertising which, in our judgment, is obviously non-commercial in nature.** Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 10¢ rate. Address and signatures are charged for, except there is no charge for zipcode, which is essential you furnish. **An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 35¢ rate.** Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.

(7) **Because error is more easily avoided, it is requested copy, signature and address be printed plainly on one side of paper only. Typewritten copy preferred but handwritten signature must accompany all authorized invertions. No checking-copies can be supplied.**

(8) **No advertiser may use more than 100 words in any one advertisement, nor more than one ad in one issue.**

(9) Due to the tightness of production schedules, cancellation of a Ham-Ad already accepted cannot be guaranteed beyond the deadline noted in paragraph (5) above.

Having made no investigation of the advertisers in the classified columns except those obviously commercial in character, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

A.W.A. National Amateur Radio Historical Conference, Oct. 3, 4, and 5th, East Greenwich, Rhode Island. A weekend of nostalgic memories: Spark transmitters, Crystal sets, Hartley oscillators, and Regenerative Receivers. Everyone welcome! Write W2QY.

"SEE your picture and a thumbnail sketch of your life in wireless along with many of your old buddies in Spark Gap Times magazine published by the Old Old Timers Club. Charter membership is offered to all pre-World War I operators, regular membership to any operator licensed 40 years or more ago. Be a recognized pioneer, join the Old Old Timers by writing the Secretary W5ZC, Bert E. Gamble, 402 Beck Building, Shreveport, Louisiana 71101."

INVITATION: New York Radio Club invites New York Area hams and SWLS to its regular monthly meetings, the second Monday of each month at the Hotel George Washington, Lexington Ave. and 23rd St. at 8 PM. W2ATT, New York Radio Club.

WELCOME To Maritime Mobile service net. 14313 KHz, daily 2130Z. Amateur Radio's service to the Fleet. Vic Barry RDC USS Corry, DD817 FPO, N.Y., N.Y. 0950.

SIX Meter Club of Chicago, Inc. 12th Annual Hamfest, Sunday, August 3, 1969. "Picnic Grove" on U.S. #45, in Frankfort, Illinois. $1.50 in advance; $2.00 at gate. Val Hellwig, K9ZWV, 3420 S. 60th Ct., Cicero, Illinois 60650.

HAMFESTERS Radio Club, Chicago, Illinois, proudly announces its 35th Annual Midwestern Hamfest, Sunday, August 10th at Santa Fe Park, 91st & Wolf Road, SW of Chicago. The Hamfest features manufacturer and distributor exhibits, swappers row, awards, clowns and games for the children, and activities for the XYL. Featuring the Swan 500C with AC, PS, the Hamfest climaxes "Illinois Amateur Radio Week August 3rd thru 10th". For info and tickets, write Tom Ondriska, WN9YZWZ, 6609 South Kedvale, Chicago, Illinois 60629.

NOMINATIONS are due for the 1969 Illinois Amateur of the Year Award to be presented at the 35th Anniversary Hamfest. Hamfesters, 6000 South Tripp, Chicago, Illinois 60629.

QCWA—Quarter Century Wireless Association is a non-profit organization founded 1947. Any amateur radio operator licensed 25 or more years is eligible for membership. Write for information, A. J. Gironda, W2JE, 1417 Stonybrook Ave., Mamaroneck, N.Y. 10453.

MICHIGAN Hams! Amateur supplies, standard brands. Store hours 0803 to 1730 Monday through Saturday. Roy J. Purchase, W8RP, Purchase Radio Supply, 327 E. Hoover St., Ann Arbor, Michigan 48104. Tel. NOrmandy 8-8262.

PROP Pitch rotor, WW2, small, excellent, $45.00. Link, 1081 Aron St., Cocoa, Fla. 32922.

WANTED: Military and commercial laboratory test equipment. Electronicraft, Box 13, Binghamton, N.Y. 13902.

COLLINS gear. Retiring to apartment living: KWM-2, PM-2, CC-2, $750; 312B5 station console control, $250; 351D2 mobile mount and 516E-1 12V p.s. $150; MM-2 mic and hdfones $25; TA-33 and 40 ft. Rohn self-supporting tower, $100; Complete parts for code-typer, $50. Laboratory and test equipment. Send SASE for complete list or you come and see. WB4MUB*9, 17 Ohio Dr., Decatur, Ill. 62525. Tel: 877-1133.

QSLS??? America's Finest! ! ! Personalized made-to-order. Samples 25¢. DeLuxe 35¢, refunded. Sakkers, W8DED, Holland, Michigan 49423.

C. FRITZ-QSLS that you're proud to send, bring greater returns! Samples 25¢ deductible. Box 1684, Scottsdale, Arizona 85252.

QSLS, Second to none. Same day service. Samples airmailed 25¢. Ray, K7HLR, 25 South Terrace Drive, Clearfield, Utah 84015.

QSLS "Brownie" W3CJI, 3111 Lehigh, Allentown, Penna. 18103. Samples 10¢. Catalog 25¢.

QSLS. With all this competition, you've gotta have something different. Try us. Samples 10¢. Alkanprint, Box 5494, Minneapolis, Minn. 55408.

QSLS stamp and call brings samples. Eddie Scott, W3CSX, Fairplay, Md. 21733

QSLS Free samples, attractive designs. Fast return, W7IIZ Press, Box 2387, Eugene, Oregon 98402.

QSLS—SMS. Samples 25¢. Malgo Press, Box 375, M. O. Toledo, Ohio 43601.

DELUXE QSLs Petty, W2HAZ, P.O. Box 5237, Trenton, N.J. 08638. Samples, 10¢.

10¢ Brings free samples, Harry R. Sims, 3227 Missouri Ave., St. Louis, Mo. 63118.

QSLs, Free samples, rubber stamps, address labels, stationery, Quality with service. R. A. Larsen Press, Box 45, Fairport, N.Y. 14450.

QSL, SWL, cards that are different. Quality Card stock. Samples, 10¢. Home Print, 2416 Elmo Ave., Hamilton, Ohio 45015.

QSLS, Radio Press, 15008 Orchid Ave., Poway, Calif. 92064.

CREATIVE QSL Cards. Personal attention. Imaginative new designs. Send 25¢. Receive catalog, samples, and 50¢ refund coupon. Wilkins Printing, Box 787-1, Atascadero, Calif. 93422.

QSLS SWLs Hundred $2.00, samples dime. Garra, 414 Mahoning St., Lehighton, Penna. 18235.

QSLS 300 for $4.35, samples 10¢ W9SKR, George Vesely, Rte #1, 100 Wilson Road, Ingleside, Ill. 60041.

QSLS-100 3-color glossy $3.50; silver globe on front; report form on back. Free samples. Rusprint, Box 7575, Kansas City, Mo. 64116.

QSLS SWLS, WPE. Samples 15¢ in adv. Nicholas & Son Printery, P.O. Box 11184, Phoenix, Ariz. 85017.

QSLS: 100, $1.25 and up, postpaid. Samples, dime. Holland R3, Box 649, Duluth, Minn. 55803.

MINI QSLS. Eye-Ball cards. Free information. A. A. 2833 Irving Ave., South Minneapolis, Minn. 55403.

RUBBER Stamps, 3-line address $1.50. J. P. Maguire Company, 448 Proctor Avenue, Revere, Massachusetts 02151.

QSLS, samples 10¢. Fred Leyden, W1NZJ, 454 Proctor Ave., Revere, Massachusetts 02151.

RUBBER Stamps. Return mail delivery, postpaid. Basic price, $1.00 first line, 60¢ each additional line. Request type style chart. Fulton Rubber Stamps, Route 216-A, Fulton, Maryland 20759.

QSLS. Neat, quick, 10¢. Filmcrafters, Box 304, Martin's Ferry, Ohio 43935.

3-LINE engraved badge, any color, $1.25. Special rates to clubs. Fallert's Engraving, 121 N.C. St., Hamilton, Ohio 45013.

QSLS Kromkote glossy 2 & 3 colors, attractive, distinctive. Choice of colors, one hundred—$3.00 up. Sample 15¢. Agent for Call-D-Cals. K2VOB Press, 457 Chancellor Ave., Newark, N.J. 07112.

3-D QSDS—The modern concept that makes all others old-fashioned. Samples 25¢ (refundable). 3-D QSL, Co., Monson 2, Mass. 01057.

EMBOSSED QSL's. Free Samples, with cut catalog 25 cents. Ace Printing Service, 6901 Clark Ave., Cleveland, Ohio 44102.

QSLS, finest YLRL's, OMSs samples 10¢ W2DJH Press, Warrensburg, N.Y. 12885.

RUBBER Stamps $1.15 includes tax and postage. Clint's Radio. W2UDO, 32 Cumberland Ave., Verona, N.J. 07044.

ORIGINAL EZ-IN double holders display. 20 cards each in plastic, 3 for $1.00 or 10 for $3.00 prepaid and guaranteed. Free samples to Dealers or Clubs. Tepabco, John. K4NMT, Box 198T, Gallatin, Tenn. 37066.

QSL cards Finest quality. Economical prices. Fast service. Free samples. Little Print Shop. Drawer 9848, Austin, Texas 78757.

LOW PRICED QSLs! Free samples!! K.L.L. Press, Box 258, Martinsville, N.J. 08836.

QSLS, SWLS, XYL-OMS. Sample assortment, 25¢. All the fabulous designs of the late Warren Rogers. KØAAB. Patterson Printing Co., 961 Arcade St., St. Paul, Minnesota 55106.

QSLS 3-color glossy 100, $4.50. Rutgers Vari-Typing Service. Free samples. Thomas St., Riegel Ridge, Milford, N.J. 08848.

QSLS by K1FF: $200 for 100. Others at reasonable prices. Samples 25¢ (deductible). K1FF QSLS, Box 33, Melrose, Mass. 02177.

RUBBER Stamps, badges, nameplates. Fast, accurate delivery. Request price info and style charts from Fulton Rubber Stamps. Route 216-A, Fulton, Maryland 20759.

PICTURE QSL cards of your shack, etc. from your photograph. 500, $12.00, 1000 $15.25. Also unusual non-picture designs. Generous sample pack. 20¢. Half pound of samples 50¢. Raum's, 4154 Fifth St., Philadelphia, 19140.

FREE to Novices, Generals, all hams! Immediate information, including photo, showing most exquisite way yet to display, and protect your QSL collection. Contains free offer. You'll be impressed. Practical Products, Box 1365, Pittsfield, Mass. 01201.

PHOTOSTAMPS. Free information. Willar Specialties, 7 Raymond Ave., South Yarmouth, Mass. 02664.

ATTENTION Canadian and New England Hams! The annual convention sponsored by Radio Amateur of Quebec Inc. will be held in Granby, Que. on the 27, 28, and 29th of June. Information and advanced registration from VE2BLP, Box 523, Granby, Que.

CANADIANS! The best selection of new and used gear in stock at all times. Drake, Swan, Yaesu, Hy-Gain and others. It will pay you to check our deals. The Ham Shack, 1566A Avenue Road, Toronto 12, Ontario (Tel: 416-789-1239).

CANADIANS! NCX5 and NCX4 power supply "as is" (Just returned from National factory overhaul and looks like new!). Still sitting in cartons and waiting to go on the air. Price is seven hundred bucks. George Burnside, RR No. 1, Angus, Ont. P., Canada.

NOVICE Crystals: 40-15M $1.33, 80M $1.83. Free list. Nat Stinnette, Umatilla, Fla. 32784.

QCWA—Quarter Century Wireless Associates is a non-profit organization founded 1947. Any Amateur Radio Operator licensed 25 or more years is eligible for membership. Write for information A.J. Gironda, W2JE, Box 394, Mamaroneck, N.Y. 10543.

WANT Early issues RDO News, Science & Invention, Electrical Experimenter, Radiocraft, Modern Electrics, Popular Radio, Radio Broadcast, Wireless Age, 1923-1925 Callbooks. For historical library. Wayne Nelson, W4AA, Box 127, Concord, N.C. 28025.

NORTHERN California hams:best deals, new and reconditioned equipment. Write, call or stop for free estimate. The Wireless Shop, 1305 Tennessee, Vallejo, Calif. 94590. Tel: 707-643-2797.

HAM Transformers rewound, Jess, W4CLJ, 411 Gunby Ave., Orlando, Florida 32801.

SELL swap and buy ancient radio set and parts magazines. Laverty, 118 N. Wycomb, Landsdowne, Penna.

DUMMY Loads, 1 KW, all-band, $7.95; wired, $12.95. Ham Kits, P.O. Box 175, Cranford, N.J. 07016.

POLICE Fire Radio Dispatcher directories! Eclusive official directories: *Call signs, frequencies of local, county, state* agencies. National. For all VHF fans, CD, AREC, RACES, MARS, VFD's. Catalog for stamp. Communications, Box 56-T, Commack, N.Y. 11725.

WANTED: Military, commercial, surplus, airborne, ground, transmitters, receivers, test-sets, especially Collins Airborne. We pay cash, and freight. Ritco Electronics, Box 156-Q567, Annandale, Va. Phone: 703-560-5480 collect.

WANTED: 2 to 12 304TL tubes. Callanan. W9AU, 625 West Jackson Blvd., Chicago, Ill. 60606. (Note new address, fellas!)

MANUALS for surplus electronics. List 15¢. S. Consalvo, 4905 Roanne Drive, Washington, D.C. 20021.

HAM'S Spanish-English manual $3.00 Ppd., Gabriel, K4BZY, 1329 N.E. 4th Ave., Fort Lauderdale, Florida 33304.

WANTED: For personal collections; How to Become a Radio Amateur, Edition 9; The Radio Amateurs License Manual, Editions, 11, 12, W1CUT, 18 Mohawk Dr., Unionville, Conn. 05085.

TUBES, test equipment, transmitters or receivers. Any and all types bought for cash or trade on new or used ham gear. Air Ground Electronics, 64 Grand Place, Kearny, New Jersey 08032.

1916 QST's needed for personal collection. Price secondary. Ted Dames. W2KUW, 308 Hickory Street, Arlington, New Jersey.

FOR Sale: SB-101 and SB-200. Wanted, kits to wire. Heath preferred, 12% of cost, some in stock. Professionally wired. Lan Richter, K3SUN, 131 Florence Drive, Harrisburg, Penna. 17112.

WE buy all types of tubes for cash, especially Eimac, subject to our test. Maritime International Co., Box 516, Hempstead, N.Y. 11551.

CASH Paid for your unused Tubes and good Ham and Commercial equipment. Send list to Barry, W2LNI, Barry Electronics, 512 Broadway, N.Y., N.Y. 10012. Tel: (212) 925-7000.

TOROIDS, 88 mh uncased, 5/$2.50. Postpaid. Humphrey, WA6FKN, Box 34, Dixon, Calif.

WANTED: Tubes and all aircraft and ground radios. Units like 17L, 51X, 618T or S. R388, R390, GRC. Any 51 series Collins unit. Test equipment, everything. URM, ARM, GRM, etc. Best offer paid, 22 years of fair dealing. Ted Dames Co., 308 Hickory St., Arlington, New Jersey 07032.

INTERESTING Sample copy free. Write: "The Ham Trader," Sycamore, Illinois 60178.

RTTY gear for sale. List issued monthly. 88 or 44 Mny toroids, five for $2.50 postpaid. Elliott Buchanan & Assoc., Inc. Buck, W6VPC, 1067 Mandana Blvd., Oakland, Calif. 94610.

WANTED: Model *#28* Teletype equipment, *R-388, R-390A.* Cash or trade for new amateur equipment. Alltronics-Howard Co., Box 19, Boston, Mass. 02101.

1000 PIV @ 1.5 amp, epoxy diodes includes disc bypass, caps and bridging resistors. 10 for $3.75. Postpaid USA. With diode purchase, 125 Mf. at 350 volt electrolytic capacitors. 50¢ each. Postpaid USA, no limit. East Coast Electronics, 123 St. Boniface Rd., Cheektowaga, N.Y. 14225.

WE'RE Trying to complete our collection for Callbooks at Headquarters. Anyone have extra copies of Government Callbooks 1922-1925 and Radio Amateur Callbooks 1928-1934? ARRL, 225 Main St., Newington, Conn. 06111.

QST's for sale from W2AYU estate. Forty years—1925 to date, complete except for 1938 through 1941. Unbound, but in good to excellent condition. Will consider sale of all or by the year. Best offer plus shipping costs. Henry J. Metzner, 206 Glen Street, Glens Falls, New York 12801.

TUBES, test equipment, transmitters or receivers. Any and all types bought for cash or trade on new or used ham gear. Air Ground Electronics, 64 Grand Place, Kearny, New Jersey 07032.

HAM—Counselor over 18, to instruct at children's camp in the Pocono Mas. of Penna. Own equipment required. Explain type of equipment and further qualifications to Pocono Highland Camps, 6528 Castor Ave., Phila., Penna. 19149.

HEATHKIT HR-10B receiver with crystal calibrator, instruction book, ussed 1 hour: $74. Knight P-2 SWR meter, $15; Knight compressor amplifier $15; Jerrold Channel Three antenna and amplifr, $69; Cush Craft 2 and 6 antenna, $15. Local deal. Herb Holzberg, W2FCI, 115 Sandra Dr., Totowa, N.J. 07512. Tel: 201-256-0826.

CHRISTIAN Ham Fellowship: For details write Christian Ham Fellowship, 5827 Lakeshore Drive, Holland, Michigan 49423.

40 YEAR run of QST's for sale, 1926-1966. Only 3 issues missing. Good condition. Best offer takes. F.O.B. Walla Walla Valley Radio Club, P.O. Box 321, Walla Walla, Wash. 99362.

WRL's used gear has trial-terms-guarantee! Galaxy V $229.95; TR3-$339.95; Swan 250-$249.50; SR150-$299.95; KWM1-$299.95; 516F1, ACPS-$69.95; HX10-$199.95; 14X-$319.95; AF68-$49.95; SX146-$189.95; HQ17OAC-$129.95; HQ18OAC-$349.95; R4A-$319.95; Hundreds more. Free "blue-book" list. Write WRL, Box 919, Council Bluffs Iowa, 51501.

THE 5th Annual Wood County Amateur Radio Club Ham-a-rama will be held on July 6th at the Fairgrounds in Bowling Green, Ohio. Write WE8AYY, Gale Lawrence, Bradner, Ohio for more details.

MANUALS-TS-323/UR, TS-173/UR, LM-18, BC-638A, SSB-100, $5.00 each. Many others. SASE brings reply. S. Consalvo, W3IHD, 4905 Roanne Drive, Washington, DC 20021

WANTED: Hallicrafters SX-28 or a recvr-state condition-N.Y. metropolitan area only. N. Verna, 184 Harding Dr. New Rochelle, N.Y. 10801.

SELL: six meter receiver, Hallicrafters S-106, best offer takes it. Elwick, 230 Woods Lane, Somerdale, New Jersey 08083.

HAMMARLUND HQ-200, matching speaker, xtal calib; new. $210.00. A.S. Frank, 15 Hawkins Drive, Northport, *New York 11768* (516-261-9253).

HW-32 Transceiver; good condition $60.00 F.O.B. Hazleton. Blair Cates. WA3BSV, 532 Locust, Hazleton, Pa. 18201.

SELL: Collins KWM-2, AC power supply $750.00; 30L1 $325.00; HA-1 Keyer $45.00; mint condition. Jack Kaplan, 56 Carver Terrace, Yonkers, N.Y. 10710.

COLLINS R-390A, $650. KWS-1 $500. Plus wattmeter, mike and assorted accessories. clean equipment. $1100 takes all. W6YJG, H. C. O'Brien, 12054 Hammack St., Culver City, Calif. 90230. 213-398-5380.

HAMMARLUND HQ-17OC excellent condition $125.00. Gonset Communicator III, mint condition $125.00. Tecraft 2 meter transmitter, model TR-20/144, new in factory sealed carton less power supply. $40.00. Complete 10 meter AM Mobile, link transmitter, Gonset Converter, auto receiver, and control box at pickup price $25.00. Frank Lester, WA2AMJ, 280 W. Main St., Bergenfield, N.J. 07621

PAWNEE 2 meter transceiver-$149.00. Eico-730 Modulator 50 watts-$45.00. Eico 720 transmitter 90 watts-$55.00. Relay box above $7.00. Call-write WB2LXJ-FA5-4970, 4379 Furman Ave., N.Y. 10466.

SELL: Lampkin 105B, 205A and PPM package. All excellent condx $350.00. WØDRL, 1432 Belle Ave., Topeka, Kansas 66604.

FOR Sale: 25 watt, plate modulated, Lafayette model HA-1200 2 meter transceiver with built-in VFO. Self contained portable model HA-144. Both in immaculate condition with mikes included. Original cost $379.90, make offer to W4TSD, John Bowman, 8420 Rubimont Rd., Richmond, Va. 23235.

SELL: CB transceiver sonar G. 110VAC, 12VDC 9 xtals, mike $85.00. Want: Manual for Globe Champion 350. Want: SB200 linear, must be reasonable. Joe, WA2CKM, 1816 Parkview Bronx, N.Y. 10461.

BC-348 speaker original heavy case, and matching output transformer $12.50. WØFGZ.

VHF, Heathkit HX30, SSB, CW, AM, $140.00. Also T175 linear $75.00 or both for $200.00. WB4BZS, 5200 Dolphin Lane, Charlotte, N.C. 28205.

SALE: Heath HW22 and HP13-DC$120.00. Vibroplex blue racer $12.00. Cush Craft 6 meter halo and mast $10.00. K1EUS, Tel: AC: (203) 582-0236.

SELL, trade or buy Call Books, handbooks, magazines, and old radio sets and parts. Erv Rasmussen, 164 Lowell, Redwood City, California 94062.

SELL: Hallicrafters 18AVQ, in superb shape. Looks like new, $170.00. Will pay postage. WAØDXL, 514 North Washington, St. Peter, Minn. 65082.

SAVE. On all makes of new and used equipment. Write or call *Bob Grimes, 89 Aspen Road, Swampscott, Massachusetts.* 617-598-2530 for the gear u want at the prices u want to pay.

R. L. DRAKE Co. Notice: come say hello to the fellows from the R. L. Drake Company at the following conventions: Des Moines, Iowa, National ARRL, June 20-22; Jackson's Mill, W. Va., West Virginia State, July 5-6; Amarillo, Texas, West Gulf Div. ARRL, August 16-17; San Diego, California, Southwestern Div. ARRL, October 17-19. The R. L. Drake Company will be closed for summer vacation on Thursday, July 3, and will re-open on Monday, July 21.

TEST Equipment wanted: Any equipment made by Jewlett-Packard, Tektronix, General Radio, Stoddart, Measurements, Boonton. Also Military types with WRM-( ), USM-( ), TS-( ) SG-( ) and similar nomenclatures. Waveguide and coaxial components also needed. Please send accurate description to Tucker Electronics Company, Box 1050, Garland, Texas 75040.

R389, R390, R390A, 51J4, 75A4, 75S3A, NC101X, HR050-T1, HR060T1, SP600, KWM-1, KWM-2, 62S1, 312B5, HA-2, and others. List for SASE. W2ADD.

VHF-UHF Digest, Sample 30 Cents. M. Goldman, Box Milwaukee, Wisconsin 53024.

INVITATION To form a Town Hall group for open discussion, debate and dissent on amateur radio matters. Write WA5TSN, 4023 Mackland Ave., Albuquerque, N.M. 87110.
INVITATION. Voudrais 'vous un group les francais aider dans l'etudies pour reseau des emetteurs francais' Ecrit WA5TSN, 4023 Jackland Ave., Albuquerque, N.M. 87110.

39th-ARRL West Gulf Division Convention August 15, 16 & 17, Amarillo, Texas. For an ideal summertime weekend of ideas, fellowship, entertainment, fun (and maybe good luck), you can't miss at $10.50 for registration. W5WX Panhandle Amateur Radio Club. Box 5453, Amarillo, Texas 79107.

AMATEUR Paradise Vacation: Livingstone Lodge, Mascoma Lake, Enfield, N.H., Cosy cabin for two weekly, $55.00. Swimming, Fishing, boats, sports, Ham Radio, Dartmouth Golf, Tennis, Hot showers, fireplaces, light housekeeping. Children half. Lake Shore Camp sites. Literature. Al O. Livingstone, W2QPN.

FIVE Band DXCC-WAS. Summary tabulation log. Instant check band/country/state contacts. Record both Fone/CW; 80 thru 10. Date. Also 160/6. All staes/current DXCC countries. Separate listing deleted countries for all-time DXCC record. Total 22 pages heavy paper. $1.50. Kinetic *Publications, Room 411, 261 Hamilton Ave.*, Palo Alto, California 94301.

REPAIR and calibration service. Write before shipping. Panronics, Inc., 6608 Edsall Road, Alexandria, Virginia, 22312.

SELL: Portable, gas driven D.C. Generator, 16 volt/150 amp. Boonton mod 202-D FM sig. gen. H-P mod 202-B audio osc. all excellent with manuals. $125 each, shipping paid. WB2PLY, Box 207, Princeton Jct., N.J. 08550.

WANTED: An opportunity to quote your ham needs. 30 years a ham gear dealer. Collins, Signal/One, Drake, Swan and all others. Also $25,000.00 inventory used gear! Request list. Chuck, W8UCG, Electronic Distributors, 1960 Peck, Muskegon, Mich. 49441.

COILS: Want old plug in type coils, 150W, 500w, 1000 w. fixed center link: all bands: Cash: K6OB, 2007 17th, Bakersfield, California 93301.

10 Meter amateur band linear R.F. amplifiers for base or mobile use. Base units: "Hornet"-200 watts PEP output-$104.95; "Raider" 400 watts PEP output-$149.95; "Maverick" 800 watts PEP input $244.95. Mobile: "Scorpion" 200 watts PEP output-$99.95; "Bandit II"-up to 500 watts PEP output-$169.95. Electronic relay switching. All units designed for transceiver operation. State drive power when ordering. Dealer inquiries invited. D & A Manufacturing Co., 1217 Avenue C, Scottsbluff, Nebraska 69361.

SELL: Brand new YAESU Ft-DX-400 transceiver and FL-DX-2000 linear. W8AO, 2912 Riverview Boulevard, Silver Lake, Ohio 44224.

3000 V @ 3mf brand new GE Pyrano oil capacitors, $3.00 each. Can mail, 3-lbs. each shipping weight. FOB P. Wandelt, RD #1, Unadilla, New York 113849.

SELL: HT-44 and 120 AC supply. Factory recondition $265.00 HT-41 linear, mint condition $170.00. Will ship. WAGKHT, Manfred Siegert, 2224 W. Fletcher, Chicago, Ill. 60618.

DX Awards Log. 150-page book gives number and type contact for over 100 major ham and SWL awards. Individual log for each award. $3.95 postage paid ($4.95 foreign). McMahon Company, 1055 So. Oak Knoll, Pasadena, Calif. 91106.

OLD QSTs for sale: 103 QSTs 1929-1949; "CQ", 1947-1957; 16 "Radio" 1938-1941. All good to excellent condition. 25¢ each you pay postage, or make bulk offer. W6SN.

SELL: Hallicrafters HT-44, SX-117, a.c. pwr. supply, Heath Ham-Scan. Will sell separately or as a unit for $450. Also Heath SB-110A w*pwr supp. $250: TX-1 Apache, $50; Ameco TX-62 w/VFO, Johnson 6N2 xmtr, Nuvistor conv. 50, 144 & 432 MHz. Hy-Gain beams, 3-el. 20M, 6 el. 6M and 8 el. 2M. Offers wanted. R. Petrushun, WA2IRN, 138 Coe Ave., Hillside, N.J. 07205. Tel. (201)-352-4708.

UNIVERSAL Power Transformers: 115 volts a.c. and 12 VDC primaries. Perfect power for Field Day and/or vacation rig. Transformer only $3.95 each. Available with complete parts kit. Your QSL will bring details on this excellent item, as well as a list of other available bargains in electronic components and hardware. Bonanza Electronics Div., P.O. Box 62, Florham Park, N.J. 07932.

FOR Sale: UTC LS-185 power xfrmr 3.5 KV-1 KV at 1.2 amps, CCS, $350; UTC LS-691 modulation xfrmr 1 KW audio CCS, $300; UTC, LS-103 modulation reactor, companion LS-691, $50; UTC, LS-49 audio driver xfrmr, $30; UTC LS-6, audio driver xfrmr, $25; UTC LS-10 line to grid, $17.50; UTC CG-512 line to grid, $15; Units perfect, boxed and shipped with freight and insurance paid by buyer. George W. Smith, Jr., W5HIP/W5DPS, Rte 1, Box 137, Pottsboro, Texas 75076.

SBE-34 Xcvr. in excint condx. $265.00. "Adventurer", $20.00; Clegg 99'er, $65.00. KØOST, Labor. 6017 Penn Ave., South Minneapolis, Minn. 55419.

SWAN 500, 117XC, 484X, TH3A-mk3, accessories, excellent condition, $600 complete; student, will sell separately. WA3-EYM, 347 East 37th. Erie, Pennsylvania 16504.

COLLECTORS Item: IRE Proceedings, run 1950 thru 1954, broken 1945 thru 1948. SASE list. Consider Kennedy 110 trade; interested in SR-2000. 1314 Holly Glen, Dallas, Texas 75232. W5LR.

DISCOUNTS! Big discounts: Antenna tower packages, savings to 20% Foam/RG8/U .08/ft. w/purchase, Ham-Ms $99; T-44, $59; AR-22, $29; AR-33, $39. Save! New displays: Swan 250-C, $459.00; 500C (used), $389; Galaxy GTV-550, $399; TR-4, $489; T4XB, $389; R4B, $369; L4B, $650; BTI, $695; Gonset GSB-201-MK III, $339; Swan MK II, $589. Prices F.o.b. Send SASE for listing of used equipment and quotes. We undersell those who won't be undersold! A.R.I. West (L.A. Amateur Radio Inc.) 2302 Artesia Redundo Beach, California 90278. A.R.I. Midwest (Evansville Amateur Radio, Inc.) 1311 N. Fulton, Evansville, Indiana 47710.

FILTER-Condensers: Aerovox oil-filled 100 mfd. @ 3000vdc condensers, $30.00 each. Basil J. Weaver, 1821-C Ave. M, Lubbock, Texas 79401.

WANTED: Early wireless receivers and transmitters prior to 1926 for private collection. Jack Swanson, W5PM, RFD #1, Box 399, Covington, Louisiana 70433.

INTEGRATED Circuits: new medium power RTL IC's in epoxy TO-5 packages; 900 buffers, 914 gates, 60¢ each; 93 J-K flipflop, 90¢ each. Add 15¢ handling and postage. HAL, Box 365, Urbana, Illinois 61801.

STEREO. Harman Kardon Citation I preamp; Heath AA-121 80w amplifier, AJ-13 tuner AA-32 amplifier. Package only, $210 shipped. R. Wanat, 443 Atlas Dr., Madison, Alabama 35758.

FOR SALE: Complete station. Hallicrafters HT-44, PS-150, SX-117, and HA-10 LF/MF tuner. Like new. Manuals and original cartons. $529 or best offer. WAØLMK, LeRoy Ulrich, 1731 South Shore Dr., Worthington, Minnesota 56187.

DRAKE: 2NT, 8 crystals Novice 15, 40 meters. $120. You pay postage. Fred Peachman, 56 LaBarge Hudson Falls, N.Y. 12839.

WANTED: Parks 2 meter converter, (I.F-28-32mc). J. Gysan, WIVYB, 53 Lothrop St., Beverly, Mass. 01915.

WANTED: Please—schematics McMurdo-Silver 802 803 receivers. G. Publow, Pieton, Ontario.

COMPLETE 80-2 meter station: TX-62, Ameco Nuvistor 2 Meter Converter, Lafayette HE-80, Heath DX-40, Big Wheel, Coax, Relay, Mike, Speaker. All for $260 or will sell separately. Stephen Slavsky, WB2TJE, 77 West 181 Street, Bronx, N.Y. 10453.

SELL: 30S1 linear amp. like new with 2 spare 4CX1000 tubes, $675.00. Gonset Comm 4, $150.00. Matching VFO $30.00. Prefer local sale, but will ship. All FOB, no personal checks, Bill, W6DIR, Tel 805-485-1643. 900 Elder St., Oxnard, Cal. 93030.

TRANSFORMERS rewound, Jess, W4CLJ., 411 Gunby, Orlando, Fla. 32801.

DRAKE TR4 with AC and DC supplies, and cables Turner 1454X desk mic and Mobilers CM boom mic $500.00. Prepaid USA W1TJW, P.O. Box K, Falmouth, Mass. 02541.

DRAKE: Excellent T-4X, R-4A, AC-4 $650. No trades! WB6-RQK, Box 433, Sausalito, California 94965.

WANTED: Lens with shutter for 5 x 7 view camera. Need normal lens, approx. 200-mm, 7-inch focal length, f 4.5 or better. Also looking for clean 400-mm tele for Exakta VX-IIB or Minolta SRT-101. Will pay reasonable price, or swap A-1 solid-state 432-MHz, converter. Also have commercial quality Nuvistor strip-line 432-MHz, converter with P/S, plus other trade items. Write: W1CER, ARRL Hq.

SWAM 240 and AC supply late model, high serial number, excellent condition—complete with spare brand new final tube and p.t.t. mike. Three bands-s.s.b.-c.w. $225.00 complete. Will ship anywhere collect upon receipt of certified check or m.o. R. Myers, W1FBY, 225 Main St., Newington, Conn. 06111.

COLLINS 30L-1, $325; KWM-2 (late) with Waters Rejection Tuning and 516F-2, $725; Jim Catlin; 813 W. Fern; Fullerton, Calif. 92632.

SX-117 mint condx. $225 F.O.B. Has WWV xtal. Going to college and need xcvr. John, WA5URC, 2764 Ramsey, New Orleans 70114.

FOR Sale: Hy-Gain TH-4 beam. Very good condition. $70.00. WA8DVX, 619 N. Sugar St. Celina, Ohio 45822.

FOR Sale: Collins 51J4 with 1, 3, 6, Kc. mechanical filters, excellent condition with cabinet. $625 FOB, W7QCN/Ø, 1610 Shasta Drive, Colorado Spring, Colo. 80910.

SELL: Hallicrafters SX-101, Elmac AF-67, PMR 8, homebrew linear, Hornet beam, and rotator, other miscellaneous equipment. Best Offers. Al Nelson, 176 Dover Street, New Haven, Conn. 06513 Phone: 776-9024.

VIDICON-RCA 7735A—$12.00, Toshiba 7038—$20.00, test Vidicon $9.00. Vidicon Yoke & Focus Coil $20.00. Wanted: 2 meter SSB transceiver. WB2GKF, Stan Nazimek, 506 Mount Prospect Avenue: Clifton, New Jersey 07012.

PL-172 tube or equivalent in good used condition wanted at reasonable price. Write F. G. Ruhl, K2BLL, 57 Drum Hill Drive, Summit, N.J. 06901.

WANTED for cash—Singlesideband Engineers SB3-DCP Inverter and W-72 interconnecting cable—WØDVZ, Box 475, Ottumwa, Iowa.

HALLICRAFTERS HT-40 xmtr. 75 watts, 80-6, AM-CW. Excellent. $40. WA5TSL, Montie Fisher, 2520 S.W. 64th St., Oklahoma City, Oklahoma 73159.

WANT: 32S3, PS, 75S3. Write or phone WØAIH, Rev. Paul Bittner, 814 4th St., S. Virginia, Minn. 55792.

COLLINS 75S-3 and 32S-3 with 516F-2. WA4JAJY—6251 S.W. 44th Street, Miami, Florida 33155.

WANTED: Unused D.I. Line I.C.'s and "Nixie" tubes. Si Marians, W2ETM, 6261 Collins Ave., Miami Beach, Fla. Tel: 305-866-8881.

HALLICRAFTER-HT37, good cond., $175.00; SR-150 with A/C D/C and mount, mint, $500. K3UEJ, T. Appler, 2981 Normandy Dr., Ellicott City, Md., 21043.

SELL: Model 19 Teletype tape set with communications type keyboard. Also, professional TTY converter with "Decision threshold computer." Best offer Buyer pick up. W2AH, 151 Rock Creek Lane, Scarsdale, N.Y. 10583. Tel: 914-723-5493.

DRAKE RV-4 remote VFO. Excellent condition. $55.00. Pete Stachiw, WB2FFZ, 516-423-2613.

HALLICRAFTERS Receiver SX101A MK 111 excellent condition $150.00. W2UI, 427 Oakland Ave., Maple Shade, N.J. 08052.

SELL: HT-37 Hallicrafter with Push-to-talk and break-in keying. Manual. Make offer. W2EC, 8 Nathan Hale Dr., Setauket, L.I., N.Y. 11785. Tel: (516) 751-0473.

FOR Sale: Eight month old Swan 350c with matching AC supply model 117-xc $450. Also 14avQ vertical ant. $20. Frederick Kraiger, 5 Reese Parkway, Fredonia, N.Y. 14063. Tel: 679-1370. Must sell.

FOR Sale: Linear components pair 4CX250B's, Rotron Fan, Rectifiers, all for $25.00 plus shipping. Will trade Laboratory standards for Drake receiver. Samkofsky, 201 Eastern Parkway, Brooklyn, New York 11238.

WANTED: Manual for Johnson Pacemaker, Will copy or else. Lew K8VCS, 518 Liberty St., Lawton, Mich. 49065.

RARE back issues of QST: June, July and August 1917 for sale, good condx, intact ($25.00 each or best offer over $20.) Also June, 1919 and June 1921 (cover torn). Make offer for complete run. April 1922 up to current year. Transportation extra. W1VW, R. W. Woodward, 41 Middlefield, West Hartford, Conn. 06107.

HEATHKIT HW100 with HP23 power supply, excellent condition factory aligned, used only about 20 hours $300. going to college. Also AR22R rotator, never used $25. Gotham Tri-Band quad never used $25. Whole deal together $325. Yellin, WB3VIN, 315 Rogers Avenue, Bklyn, N.Y. 11225.

HALLICRAFTERS—SX-140 rcvr—HT-40 xmtr—HA-5 VFO —AM-2 SWR like new. $145.00. A. E. Wilson, East Brewster, Mass. 02640.

SWAP only: Have basement full of stuff and variety of interests. SASE for list. Swap only for mutual benefit, commercial rascals need not reply. Joe Dickens, WA9UGE, 601 S. Dodson, Urbana, Illinois 61801.

PLATE Transformer: 3600-0-3600 VAC at 1500 MA CCS with dual 120/240 VAC primary. This rugged commercial transformer, manufactured by Moloney Electric, measures 13"H, 11"W, and 10"D. Net wt. 85 lbs. $54.95 FOB Peter W. Dahl, 5325 Annette Ave., El Paso, Texas 79924. Also: Custom transformer design and manufacture! Write today for a free quotation on any transformer or inductor.

SELL Heathkit HX-30 6 meter SSB transmitter $125.00, Heathkit HA-20 6 meter Linear Amplifier $75.00, National NC-303 receiver $200.00. Ameco 6 and 2 meter converters $20.00 each. 833-A tubes $20.00. 803 tubes and sockets $7.50, printed circuit boards with 10 or more transistors and 30 or more diodes and resistors and capacitors 75¢, K8VEK, Box 385, Wayland, Mich. 49348.

PREPARE for FCC exams! You need Posi-Check, now with addenda to cover latest FCC questions. Multiple choice questions, diagrmas, explained answers, IBM sheets for self-testing. Same form as FCC exams. New price—General Class $3.50, Advanced Class $3.75. Extra Class $4.00. Each complete for a specific exam. Basic questions duplicated if they apply. Third class postage, prepaid. Add 32 cents per copy for first class mail, 64 cents for air mail. Send check, or money order, to Posi-Check P.O. Box 3564, Urbandale Station, Des Moines, Iowa 50322. Addenda available separately for each class to previous purchasers covering new questions. Send 50 cents per copy in coins or stamps.

GSB-201 in mint condition, wired to opr, transceive, without external power, manuals & cables. Finals BHA's perfect. $200. Tom Thornton, Rt. 2, High Ridge, Mo. 63049. WAØKZS.

CLEGG Zeus $250, Interceptor $225, Venus, AX $225, Thor, AC, DE $225, 99'er $70. National NC173 $70. NC183D $135. HRO Junior $40. Hallicrafters SX-71 $100. Heath SB-300 $220.Olson RA570 $55. George Misic, WA8LEM, 37370 Windy Hill Drive, Solon, Ohio 44139.

SWAN 500c & 117xC power supply used only a few hours—perfect; best offer, over $395. F. Pulver, 94-10 60th Ave., Rego Park, N.Y. 11373 (212) 592-6668.

FOR Sale: QSTs 1958 through 1964. K4BGS, 3603 Sayward Drive, Durham, N.C. 27707.

HEATHKIT HR-20 receiver with pwr supply, mint condition $95.00. You pay shipping. A. Gagliardi, WB2FWL, 2 York Pl., Williston Park, N.Y. 11596.

SB-34 with book and microphone, excellent condition, $250.00 or best offer. Gerald E. Crawford, K7UPJ, 342 Spear Drive, Ft. Bragg, N.C. 28307.

SELL: Heath Marauder HX-10 in excellent condition with instruction manual $200.00. You pay shipping. C.E. Johnson, W4RGL, 161 Diane Circle, Melbourne, Florida 32901. Telephone 305-773-3244.

FOR Sale: Heath HO-10 monitor scope, mint. $45.00. M. Heiman, Box 744, Showlow, Arizona 85901.

TELEPHONE Dialers (2)—Presto-dial Automatically stores 36 telephone numbers and at push of button dials any one. Works on rotary or touchtone. Never used, at $119. Gonset 6 meter linear (826's) $79. Topaz C10WDG mobile power supply $50. FOB Richard M. Jacobs, WAØAIY; 4941 Tracy, KCMO 64110.

SELL: Galaxy V Mark 3 with xtal calibrator, AC400 power supply, and SC-1 speaker. Used very little. In mint condition. $400 complete in original boxes. No trades. Marvin Fein, 151 Rock Creek Lane, Scarsdale, N.Y. 10583.

NATIONAL Zip Code Directories 50,000 listings (No zip codes listed for streets in larger cities!) $1.25, Quantity discounts to clubs. Ottawa Amateur Radio Club, 216 East Main, Ottawa, Ohio 45875.

NATIONAL NC-200, 5 band transceiver, AC 200 power supply, manuals and original cartons. Excellent condition. $290. Gloria McDaniel, W9GHO, 6362 Breamore Road, Indianapolis, Ind. 46220.

SELL: Lafayette HA-350 plus speaker, $95; Heathkit DX-100, $80.00. Sell together or separate: plus extras. Contact Berman, 627 Buxton Ave., W. Hempstead, N.Y. 11552.

SALE: HRO-50-T1. Very good condition, original manual, speaker and 7 coils: A,B,C,D,E,F, and AC. Giving general coverage 480kc to 30MC, and 80,40,20,15, and 10-meter Ham-band coverage. Sorry, no shipping. $130. R.D. Venn M.D., 20 Overlook Rd., Mountain Lakes, N.J. 07046 Tel: (201) 335-6479.

SX-101A ssb receiver, excellent, $155. Pick up or NYC friend handle shipping. Drake 2NB, $12. Howie, WB2PUI, LU4-0316.

KWM-2, Waters Q-Multiplier, 516F-2 supply, built-in speaker. WA2UHV, Roslyn, L.I., N.Y. Tel: Days (516) 1V1-9844, Evenings (516) MA1-2629.

SALE: Set of 4-volume directory of military, commercial, test equipment, 1500 pages, full data on hundreds of surplus units, $5.50. G. White, 5716 N. King's Highway, Alexandria, Va. 22303.

SELL: Heath Pawnee 2 meter AM transceiver $125, Johnson Pacemaker $125. SBE 34 $250. Bob Fogle, W2ZOC, 191 Washington St., Lockport, N.Y. 14094.

HALLICRAFTERS HA-6 w/P-26 used 5 hours, $125; HT-30, Fine on 80M, other bands require work, $75. Dan Hubecky, Losee Road, Wappingers Falls, N.Y. 12590.

NCX5, Mark II, with calibrator and NCXA supply $375.00. Swan 500 Transceiver, $300.00. All in perfect condition. BC221 Frequency Meter $50.00. Swan 140, good, $75.00. Philip Schwebler, W9GCG, 4536N50 St., Milwaukee, Wisconsin 53218.

SWAN: 250C less power, $250; Drake 2C receiver with 2CS speaker, $175. Drake SC2 and SC6 converters, $25 each. PSI converter power supply, $7; Heathkit DX60B novice transmitter $60; HG10B VFO, $25. All in excellent condition, no trades. John O'Rourke, WA5WRC, Route 1, Box 152, Welling, Okla. 74471.

SELL: Collins 75S-1 Receiver. Just realigned, excellent condition. $245 firm. Earl Eggers, 2105 West 29th, Eugene, Oregon 97405.

SELLING Out: Drake 2-B $150/HT 37 xmtr $210/HT 41 Linear $190/Lafayette HA-460 6 meter xcvr w/Halo $90. You ship, prices firm. N.S. Layman, R.D. 2, Ellis Woods Road, Phoenixville, Pa. 19460.

FOR Sale: Swan 500C transceiver with VOX and 117XC power supply, and speaker, latest model No. 1295720 excellent condition new November 1968. $450.00. H. Mc Cune, K6LVI, 6775 Miners Ravine Rd., Roseville, Calif. 95678. Tel. 916-791-1362.

CLEGG 66'er, nearly new, $140 postpaid. KØALL, Box 721, Fargo, North Dakota 58103.

WANTED: Swan 350, 500 or comparable Drake. Greater Boston only. K1YUB, 19 Cambria Street, Somerville, Ma. 02143 Tel: 666-2421.

COLLINS 75A4 with 3.1 KC and .5 CY. filters recently updated at Collins factory, excellent. Also matching speaker. $400. Ranger $100. K4YVL. 813-527-1941.

SELL: SX-117 rcvr $229; Heath 2er w/mod $29; Heath MT-1 xmtr and power supply $29; Heath QF-1 Q-Mult $9; four each, 7034/4X150A, 8245/4CX250K & 8167/4CX300A; Gardiner code practice machine with ten tapes $15; JT-30 mike $6; Heath HW-20 "Pawnee" 2 meter scvr, vfo, 117AC/12DC (9/68 WRL Blue Book $189) rcvr not working, make offer. All USA postpaid. Bill Bode, 13241 Eton Pl., Santa Ana, Calif. 92705.

SELL: Hallicrafters SR-150, A.C. and D.C. supplies with mobile mount, $335.00. 75A4, mint, 2 filters, $375. M. H. Klapp, W2EQV, 25 Gladwish Road, Delmar, N.Y. 12054. Tel a.c.(518)-439-9531.

SAN DIEGO Area: sell 75S1, 32S1, 516F2, 312B4, SB-200, $1080. Bill Deane, 8831 Sovereign Rd., San Diego, Calif. 92123. Tel: 278-0345.

WANTED: QST copies in good condition 1920, 1921, 1922 and August of 1958 to complete personal 50-year collection. Rex Bassett, W4QS, Box 4163, Fort Lauderdale, Florida.

SALE: Heath SB-101, 3 months old, wired by electrical engineer in military, $400. Lt. Dale S. Manwiller, WA5VZT, 126 Fair Valley, San Antonio, Texas 78227.

LINEAR 80-10, 1200 watts PEP, expert workmanship. Photo on request. Write Mort Caldwell, W8IFN, 128 Parkview Drive, Westover, West Virginia 26505.

HEATH HW-16 CW transceiver in good condition: must sell. $85. Jim Nelson, Box 10, Rexford, Kans. 57753.

FOR Sale: Lafayette HE-45A, six-meter transceiver in very good condx. $55.00. James A. Edwards, WB4DQJ, 7517 Dr., Columbia, S.C. 29209.

COLLINS 75A4, KWS-1, like new, $1050; 75A4 filter (3.1), $20; 455FA21 filter, $20; 100 kc xtal HC13/U, (new), $3.75; Criterion 144 Mc converter, $40; Eico 753 transceiver (no power), $90; 516F2 transformer (new), $20; HE-50 6-meter converter, Lafayette, $12.75. F.o.b. KØARV, 2925 Wildwood Ct., N.E., Cedar Rapids, Iowa 52402.

SELL: Hallicrafters SR-160 Tri-Band transceiver with a.c. and d.c. power supplies and car-mount, complete with xtal calibrator, Shure mike, SWR meter, cables and manual. $300. Gonset G-63 80-6 meter receiver with xtal calibrator. $75. Jim Smith, WA9MRX, 822 E. Evergreen, Wheaton, Ill. 60187. Tel: 312-668-7965.

HRO-7, with PS, and coils 14-30, 7.0-14.4, 3.5-7.3, 1.7-4.0, 9-2.0, .48-.96. $76. J. Laggis, 75 Saltonstall Parkway, East Haven, Conn. 06512.

FOR Sale: Johnson Viking Valiant, good condition, with low pass and relay $150. WAØPKE, 687-42nd, Des Moines, Iowa 50312.

SB-101 Trade for TR-4 even or add cash for KWM2; Galaxy V-mk 11 w/ag for 2KW linear—sell either. SB-640 R-vfo $75 or trade for Sony 105 recorder. WØBNF, Box 105, Kearney, Nebraska 68847.

WANTED: Operational Manual for an RME-4300. Art Lynch, WN2IPD, Box 39A, RD no. 1, Ovid, N.Y. 14521.

WANTED: Manual TM 11-2627 for Tube Tester I-177B. George Knipe, W7IGE, Route 6, Nampa, Idaho 83651.

HT-37 Excellent condition, with spare 6146's, antenna relay and manual, $195.00. K2EHR, 50 E. Clinton Avenue, Bergenfield, N.J. 07621, 201-384-2022.

INSTRUCTOGRAPH: Learn the code easy Instructograph and 14 tapes, 5wpm to 20wpm, will ship $45. Michael Poston, Box 549, Cornelia, Ga. 30531.

WANTED: R-4(A) (B) crystals, T-4(X) (B), Superex headphones, bug. Jerry Malone, WØLMII/1, 27 Maple, Cambridge, Mass. 02139.

WANTED: Home-brew 3-1000Z linear in good shape and from ARRL Handbook. J. Potts, Cal Poly Power Station, San Luis, Obispo, Cal. 93401.

GALAXY V MK3: AC supply; matching speaker. Mint. Used very little. All for $425.00. B-24 Mini-beam. Newest model. $45.00. K8HIX, Terrance Williams, 210 Selma, Cadillac, Michigan 49601.

SELL: Hammerlund SP600JX receiver in two-tone matching gray EMCOR cabinet. Excellent sensitivity, calibration and stability on all bands. With operating manual. Price $250. M. J. Boho, Edinboro, Penna. 16412.

DRAKE R-4, MS-4 speaker, perfect $235.00, HT-37, mint $215.00. Send for picture. Want both? Will add patch, mike, relay. Write for details. WA4UQQ, Box 272, Savannah, Ga. 31402.

70 QSTs 1934-1941 (4 duplicates, one 1931) plus 10 "Radios" 1936-1940. Best offer. Swift, 1414 34th St., Washington, D.C. 20007.

TOROIDS 88 or 44 mhy center-tapped, not potted, 5/$2.00 ppd. Model 32KSR latest page printer, excellent, little used condition, $200; FRXD 14 typing reperf-TD combination, $25; Deskfax #6500 facsimile transceiver, $20; Brand new Clegg 66'er, original box, $160; NCX5 and NCXA, like new, $400. Drake 2B and 2BQ, $175.00. 11/16" reperforator tape $3/box/10. B&W 51SB sideband adapter, $50. Wanted: Ham-M rotator. Stamp for list. Van, W2DLT, 302Z Passaic Ave., Stirling, N.J. 07980.

OPENING Discount Sale on all makes of amateur gear. Call or write for that special deal to Syncom Electronics, 726 Cypress Drive, Franklin Square, L.I., N.Y. 11010. Tel: a.c. (516)-489-7662.

HALLICRAFTERS SR-400 Cyclone transceiver and P-500 pwr. supply, spkr, mint, 10 months old. Cost $950. Sells for $650. Pick-up deal, or you pay shipping. Alan Ast, 8558 So. Kostner, Chicago, Ill. 60652. Tel: a.c. (312)-582-1470.

DRAKE 2C receiver and 2CQ speaker, 100 Kc calibrator, less than two months old. Absolutely new condition. Best offer over $175 takes all. Bernard N. Levin, 45 Mayflower Drive, Tenafly, N.J. 07670.

COLLEGE: Must sell DX-60B, $70; KT-340, RX, $45.00 (with speaker), external B FO, GD-125, $12.00. Lentz, WA2CWW, 26 Walnut St., Pleasantville, N.Y. 10570.

FOR Sale: Apache Xmtr (late) $125.00; SX-101A rcvr, $185.00. Both in a package deal: $250 will include xtal mike and desk stand, antenna change-over relay. Will ship F.o.b. express or truck. E. W. Madole, W5LEA, Box 264, Greenwood, Miss. 38930.

LIKE new, Collins MP-1 and 351D-2, $215; CC-2 and PM-2, $170; SB-34, xtal-cal. mike and 2 mobile mounts (1-new) $335; Swan 117-XC, $80. Guaranteed, everything perfect; no trades, can ship. Louis J. Kocurek, Jr., 108 Thelma Dr., San Antonio, Texas 78212.

SHACK Clearance: RAK-7, $50; RDO w/30-90 and 300-1000 Mhz, t.u., $100; S-76 w/R-46, $60; SX-28, $75; Kuhn 357C HF/VHF rcvr, $50; AMR-100 (Aussie version of HRO), $40; Knight VFO, $15; TBW-5 xmtr, $35; misc. 800 series xmtg. tubes. W9FQE, 4726 W. Linden Ave., Glenview, Ill. 60025. Tel: a.c. (312)-827-1503.

CRYSTALS Airmailed: MARS, Marine, SSB, Nets, Etc., Novice .05% Crystals $1.50. Custom finished etch stabilized FT-243 .01%—any kilocycle or fraction 3500 to 8600 $1.90, (five or more this range only $1.75 each), (nets, ten or more same frequency $1.45). 1700 to 3499 and 8601 to 20,000 $2.95, overtones supplied above 10,000 10.001 to 13.500 fundamentals $2.95. Add 50¢ each for .005%. Add 75¢ each for HC-6/u metal miniatures above 2000. 450—460 Kilocycles, FT-243 $2.95. Crystal singles and groups for ARRL-QST Handbook, SSB Manual. Be specific. Write for order-bulletin. Crystals since 1933. Airmailing 10¢/crystal, surface 6¢. C-W Crystals, Marshfield, Missouri 65706.

CQ, all issues from March 1948 through 1966. Best offer, plus shipping. Charles L. Davis. 2692 Kelly Ave., McKinleyville, Calif. 95521.

SELL: Collins 32S3—75S3, 30L1, 312B4, 516F2. Heath SB610 'scope, all in exclnt condx: $1375.00. Call Henry Blakeley, Deer Haven Rd., Mahwah, N.J. 07430. (a.c.) 201-327-9090 after 5PM or week-ends.

MAINLINE TT/L-2 filters in vector C-12 cans. J-J Electronics, Canterbury, Conn. 06331.

SALE: LA-400C linear 800 PEP, $100; Johnson 250-23 Matchbox, $45.00; Heaht HW-30. $35.00; Ameco CB2—PV preamp, PS-1, $30, plus shipping. Herb Adler WB2VZW, 10 Scott St., Massapequa Park, L.I., N.Y. 11762.

FROM the Estate of the late W1JAH: Make reasonable offer on the following: Unused: Sonar low-pass filter LP-7 52 ohm 1 k.w.; RK 4D22 tubes with sockets; UTC S-39 transformer; Johnson 10Q antenna, 4 mfd. 1500 DC capacitor; 4 mfd. 2000 DC capacitor; two 811-A tubes; 813. Used: Heath VTVM, Millen Grid Dip meter 90651; 866-A: Taylor T-40; Hytron HY-25; National 1" 'scope; misc. Triplett, Hoyt, Readrite meters. Percy C. Noble, W1BVR, P.O. Box 5, Lanesboro, Mass. 01237.

BEST Reasonable offer; SBE-34 SSB transceiver, SBE mike, mobile mount, Hallicrafters S-38D receivers; Deluxe Joystick antenna; Eico FM-AM tuner; Knight 12-watt mono. Amplifier, Garrard Model 50 changer. All are in excellent condition. Spicer, K8HJM, 334 N. Miami St., Trenton, Ohio 45067.

COLLINS 75S-3 and matching speaker in A-1 condition. $350.00. Frank Chiorello, Sr., 366 Commonwealth Ave., Trenton, N.J. 08629.

VIKING Valiant, in gud physci physical condx, exclnt electrically. Sacrifice: $110. Going sideband. John, WA2GMP, 1212-91st St., North Bergen, N.J. 07047. Tel: a.c. (201-869-0517.

SBE-34 with SB-2 mike. In exclnt condx. First offer for at least $240 takes. WB4HOI, Osterhoudt, 2405 Apple Hill Road, Alexandria, Virginia 22308.

HEATH SB-300 receiver, w/manual. Just aligned by Heath on 6-24-68. No first reasonable offer refused. You state price in first letter. Dan Mittler, 65-36 Wetherole, Rego Park, N.Y. 11374.

COLLEGE Expenses. Sell Galaxy V, power supply, speaker, calibrator, VOX and remote VFO, $400. WAØELM, 1709 South Lewis, Kirksville, Missouri 63501.

HALLICRAFTERS SR-150, AC and DC supplies; custom mobile mount, Hustler with loads, phone patch, microphone, SWR bridge, Vibroplex, cables extras. Works perfectly. Detailed description on request w/SASE pls. Best offer. You pay shipping. Michael Treister, MD, K8GJM/9, 6007 North Sheridan, Chicago, 60626.

FOR Sale: Knight T-150, $50; SX-28 rcvr, $25; 4-125's variac, HRO coils and more. Send SASE for full info and list. Kenneth Johnson, WA5NQE, 701 Carolyn, Austin, Texas 78705.

TRADE/SELL Collins 51J3/R388 w/SSB product detector, $395; RME VHF-126 50/144/220 converter, $55; Mosley TA-33, $75.00; Hy-Gain pocket tape antenna, $45.00; Parks and Critereon VHF/UHF converters, Panadaptor, misc, list SESE. W4API, Box 4095, Arlington, Va. 22204.

I.C.'s factory-fresh Fairchild UL914, 70/, 3 for $2.00. Motorola MC790P dual flip-flop $1.75, 3 for $5.00. Add 15¢ for postage. Logic Components, Box 224, New Canaan, Conn. 06840.

WANTED: B&W HDVL coils, also mounts and swinging links. W1BB.

MODEL 19 Teletype with extra paper and ribbons. Local pick-up deal only, sry, $160.00. Brand new SR-160, unused, $200; P-150-DC, $90; MR-160, $12.50. Swan 240 with matching AC supply, speaker built-in and E-V 727 mike, $225. W1ERX, 117 Highland Ave., Rowayton, Conn. 06853.

QSTS 1930-1968. Some years complete. Write your needs or SASE for list. 25¢ each, plus postage. Also list of CQ, "Radio" "Audio Engineering" ARRL and West Coast Handbooks. E. Halton, W1QWU, Providence College, Providence, R.I. 02918.

SELL: Galaxy V, Mark II; Galaxy VFO, Galaxy power supply, VOX, xtal calibrator, all perfect condx, used only 5 hours! Guaranteed perfect! In original cartons, only $499. F.o.b. Pittsburgh, Penna. 15237. Contact W3NV, 8258 Brittany Place.

COLLINS 75A2 RX w/xtal calibr. $175; Heath SB-400 TX, $200; both in exc. condx, Hank Perras, K1ZDI, 174 Andover Road, Billerica, Mass. 01821. Tel: (a.c.) 617-667-1639.

SWAN 500, VX-1, 410 remote VFO, 117-XC spkr/AC supply, 12 VDC 14-117 supply Hustler ant. 15/20 coils. M+2U mobile mike, $450.00. First certified check gets. You pay shipping. All manuals and original boxes. K2RDM, P.O. Box 445, Pleasantville, N.Y. 10570.

COLLINS 30-L-1, in mint condx, $325.00. K1HNQ, Stewart S. Mitchell, 104 Tea Ticket Path, Tea Ticket, Mass. 02536.

NCX-5 with NCX-A power supply and VX5 VFO with calibrator: $500. Central Electronics, 200V, $375. Dr. M. F. Hash, W7YHS, 319 N. 26th St., Billings, Montana 59101.

FOR Sale: Drake R4 and T4X with AC power supply and speaker, $600; Gonset GSB-201, $200; Waters codax keyer, $50: Ham-M, never used, with 100 feet of cable: $90. Wanted: c.w. filters for 75S-3B. WB2QKG, Saul Slonim, 2727 Ocean Parkway, Brooklyn, N.Y. 11235. Tel: a.c. (212)-891-0222.

SR42A—Hallicrafters 2-meter transceiver with 12-volt mobile supply. HA26 VFO, both in exclnt condx: $165.00. W8DSW, R. Hudson, 6646 Crane Ave., Detroit, Michigan 48213.

COLLEGE Bound: Heathkit HR-10B receiver, DX-60B transmitter; HG-10B vfo, Eico 730 plate modulator brand-new Turner 454X microphone, relay, more. $200. Eric Sky, WB2DFE, 76-34 269th St., New Hyde Park, L.I., N.Y. 11040. Tel: a.c. (212)-347-5712.

SELL: Heath DX-100, $80.00; HR-10, $55.00. National NC-125, $50.00 w/Q-mult., Vibroplex bug, 1-year, $12.00. Dave Dix, WA2CGM, 676 Shadowlawn Dr., Westfield, N.J. 07090.

WANTED: Hallicrafters SX-62A will buy or swap for SX-117. Sam Whitworth, WA4OTC, 402 Concord Ave., Anderson, S.C. 29621. Tel: a.c. 803-225-9664.

HEATH HW-22, in exclnt condx, $75; Heath Cheyenne 100-watt AM-CW. Michael W. Reeves, W7GPI, 18302 9th Ave., N.E., Seattle, Washington 98155.

SWAN 350, has everything, selectable sideband, xtal calibrator c.w. sidetone. 117 supply, late model, mint condx: $395 or your best offer. DX-60A, $45.00. WB6UVH, Rte 1, Box 1746, Meadow Vista, Calif. 95722.

"DON and Bob" new specials. Midland 23-136 2KW in-line power and SWR meter (Reg. $24.95). $15.95; Hy-Gain TH6DXX (reg. $165), $138.00; Tri-Ex W-67 ft. freestanding crank-up (reg. $851.50) $725.00; Mosley Classic 36 $144.95; Motorola HEP-170 diode 2.5A, 1000V, 39¢; GE-81LA, $6.95; GE 6146B, $4.95; Raytheon 6JE6C, $3.95; GE 829B, $14.95. Guaranteed surplus. ANB-1 military headset with band, cord, plu $8.95; Teled HMY-2K stethoscope headset, $3.95. Used Collins 75A-4, KWS-1 $1000 cash; 75A-3, $250; Drake 2B, $150. Write for export quotes. Bankamericard. GECC. Prices F.o.b. Houston. Don, K5AAD, Bob, WA5UUK, Madison Electronics, 1508 McKinney, Houston, Texas 77002. Tel a.c. (713)-CA4-2668.

VE-R-R-Y in-ter-est-ing sample sent free. WØ Bargains Galore. 1949 Van Reek Lane, St. Louis, Mo. 63131.

SIX Meters: complete, except for antenna. Lafayette HE-45B (12 watts); VFO; Rotator, 100 ft. coax. $65.00. Pick-up deal only. Sry, no shipping. Steve Falk, WB2UFN/WA3IVN. 178-01 69th Ave., Flushing, L.I., N.Y. 11365. Tel: 212-AX7-8435.

40 M 2-el. shortbeam, $50. Tri-band vertical, $18; new 4-band trap horizontal, $18. Hy-Gain roto-brake, New West Coast indicator, $100. Other antennas, parts. W7DI, 6633 E. Palo Verde Lane, Scottsdale, Ariz. 85251.

TOROIDS. Uncased 88 or 44 mhy. 5 for $1.50 ppd. M. Weinschenker, K3DPJ, Box 353, Irwin, Penna. 15642.

SELL RAK-8 low-freq. receiver (15 to 600 kc.). $60 f.o.b. Hartford. R. L. Baldwin, W1IKE, 26 Ridge Road, Simsbury, Conn. 203-658-7307.

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SB-301 receiver, C.W. filter, 6-meter converter. Mint condx. Make offer! Aerotron 2-meter AM transceiver, $50. Sydney Horn, WA5TEO, 343 Broad St., Lake Charles, La. 70601.

JOHNSON KW Matchbox $75.00: Heathkit Q-Meter $40.00: Heathkit distortion analyzer, $40.00: LM freq. meter, 115 VAC military supply and cables, original cal. book, $75.00: Heath HP-23 power supply, $35.00: Elco 377-K audio generator, $25.00; Drake 2-B receiver, mint condx, 2AQ, xtal cal., WWV, etc. $170. All with manuals, and guaranteed excellent. Lindsey, 1919 Ramada, Houston, Texas 77058. Tel: 488-0517.

AUTRONIC Keyer w/paddle $45 Webcor regent three-speed two-track tape recorder $45.00: SR160 HBAC c.w. filtr. $175.00. Matchbox w/meter, new condx, $50. RME 4350 $80, CE-100V, $295: Swan 175 w/HP13, $125; CDR TR2, new w/cable, $30. F.O.B. Art Ford, W2HAF, 6 Stoothoff Rd., East Northport, N.Y. 11731. Tel: (516)-FO8-6136.

ECO 753 Transceiver, $95.00. FET-VFO. Drift negligible. You pay shipping! W2WHK, 210 Utica St., Tonawanda, N.Y. 14150. Tel: a.c. (716)-692-5451.

APACHE in gud condx, manual, $75.00. Plimpton, W2IXH, Box 334C RD#4, Newton,N.J. 07860.

GONSET GC-105, 2-meter transceiver, good, $150.00. Sterzenbach, 1883 Estrella, Monrovia, Calif. 91016.

SELL: 66 inch black enclosed relay-rack on heavy-duty casters and 1500 volt, 600 Ma. Ham power supply. Pick-up deal only. $60.00. K4JH, 1521 Beverly Road, Rocky Mount, N.C. 27801.

TOWER, Tristao CZ-37 with 10 ft. mast; Mosley Classic 33 beam and Ham-M rotator. $200. K6GMP, 1720 Ambassador Ave., Beverly Hills, Calif. 90210. Tel: a.c. (213)-273-0664.

FOR Sale: Drake 2NT xmtr, brand new condx. $100 firm! R.S. Crowell, 640 Stonehenge Dr., Mary Esther, Florida 32569.

WRL 300 W. Globe Champion transmitter Elmac AF67 transmitter, PMR7 rcvr with 12 V. DC/110 VAC power supply. W8DJZ, 235 Fredrick St., Medina, Ohio 44256.

NEW Hammarlund HQ-215 receiver and separate speaker, $350. WA2IZU, 15 Family Lane, Levittown, L.I.,N.Y. 11756.

SELL: Ham-M rotor, in exclnt condx: $75.00. Dwight Kalita, K8VYY, 312 Carpenter Rd. Defiance, Ohio 43512.

NOVICE - Tech-General: T150 80 to 6 meter transmitter, 150 watts crystal or VFO, $45.00. T.R. Troike, WA8VOE, 909 Fifth St., Sandusky, Ohio 44870.

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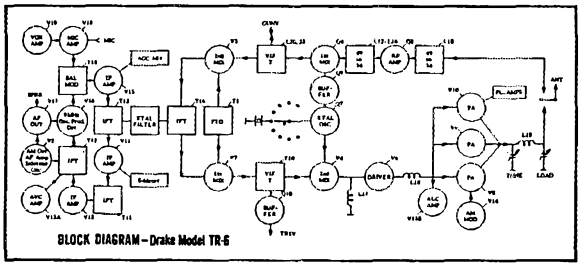

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VFO DIAL CALIBRATION: 1 kHz divisions; dial accuracy is within ±1 kHz.
CALIBRATOR: 100 kHz calibrator built in.
FREQUENCY STABILITY: Less than 100 Hz overall drift per hour after 15 minutes warm-up; less than 100 Hz for 10% supply voltage change.
SPLIT FREQUENCY OPERATION: Xmt and Rcv frequencies may be separated by up to 600 kHz by use of the RV-6 or FF-1 accessories.
MODES: SSB, AM, and CW.
POWER SUPPLIES: Drake AC-3, AC-4, DC-3, DC-4 or DC-24.
TUBES AND SEMICONDUCTORS: 19 tubes, 7 bipolar and 3 field effect transistors, 12 diodes.

RECEIVER SPECIFICATIONS

SENSITIVITY: Less than 1/10 microvolt for 10 db S+N/N ratio at 2.4 kHz band width.
SELECTIVITY: 6 dB bandwidth 2.4 kHz with USB filter provided. Accessory filters available for LSB, AM (6 kHz) and CW (.3 kHz).
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INPUT: 50 ohms unbalanced.
OUTPUT: 4 ohms to speaker or headphones.
AUDIO OUTPUT POWER: 2 watts at 10% HD.
AVC: Output variation less than 3 dB for 60 dB input change. Fast attack. Release time selectable.
MANUAL GAIN CONTROLS: RF gain control sets threshold for AVC, AF gain control.
DETECTORS: Switch on front panel. Product detector for SSB and CW Envelope detector for AM.
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CARRIER INSERTION AND SHIFT: Automatic on AM and CW, shifted carrier CW system.
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AUDIO RESPONSE: 400 to 2800 Hz at 6 dB.
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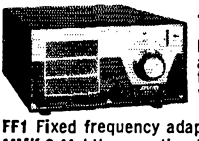

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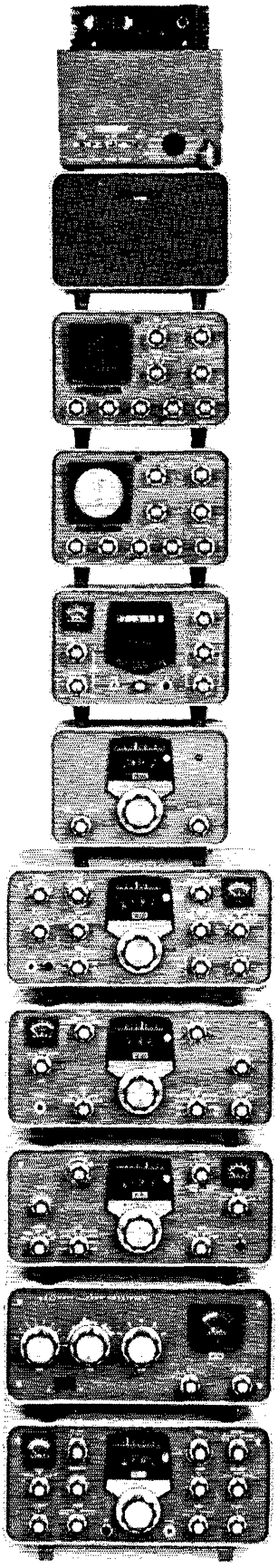

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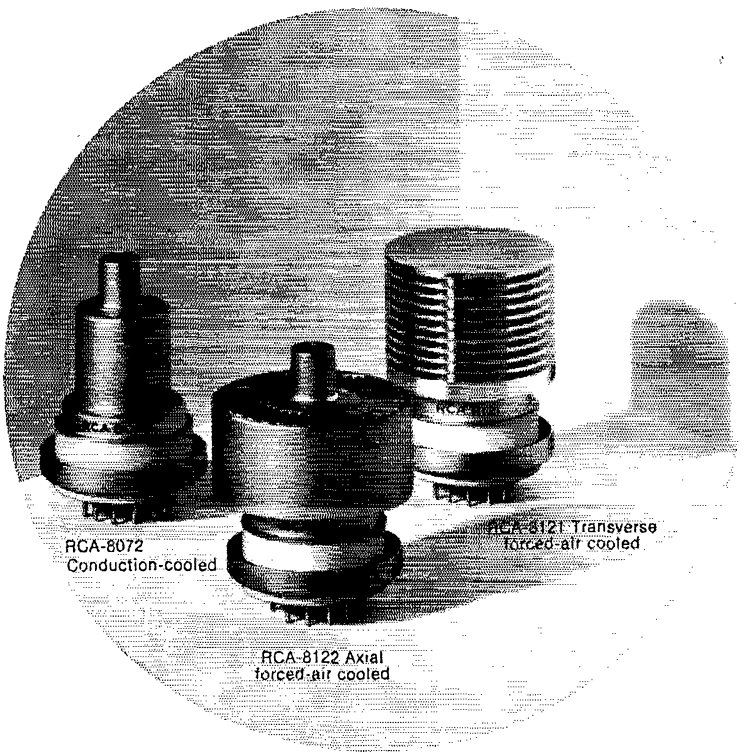

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